devoted entirely to amateur radio

In this Issue—
Building a Simple Crystal-Controlled Transmitter
If all the copies of QST were put end to end—

but why put 'em that way? Why don't you put yours side by side in a nice QST binder. Then your QST file looks like what it really is—a library of the best radio amateur dope in the world. Twelve copies, and the yearly index go in each binder. Then your copies of QST are where you want them—when you want them. A sturdy binder finished in rich, wine colored, Du Pont Fabrikoid. Waterproof, oilproof, wearproof, troubleproof, 100 proof.

$1.50 each, postpaid

American Radio Relay League

West Hartford, Connecticut
Would you operate Blindfold?

Lack of adequate meter equipment blindfolds you when making the critical adjustments that are necessary to get the utmost from your transmitter.

Adequate Weston or Jewell Indicating Instruments in your transmitter allow you to “see” when adjustments have been properly made — assuring maximum output, yet warning of dangerous overloads that may destroy expensive equipment.

The cost of complete Weston or Jewell Instrument equipment is less than the cost of replacements that may be necessitated by a single overload. Protect your transmitter before it is too late!

Universal A.C.—D.C. Meters

— with this instrument you can measure every

- A. C. and D. C. Voltage with ranges from 0-5 volts to 0-1,000 volts
- A. C. and D. C. Current with ranges from 0-1 ma. to 0-100 ma. and higher

A wide range of needs in laboratory and test work may be filled with this versatile universal A. C. and D. C. instrument.

Weston Shunts and Resistors may be added to either the Jewell Pattern 88 or the Weston Model 301 Rectifier Type Instruments to secure any ranges desired within the limits listed above. Write for literature completely describing these instruments and their many possibilities.

Weston-Jewell Instruments for every transmitting need

The new combined Weston-Jewell line offers radio amateurs a wide range of instruments that meet every possible transmitter need. Below is a chart listing several sizes of panel mounting instruments especially adapted to amateur uses. For complete list of ranges and prices, use the coupon at the bottom of the page.

<table>
<thead>
<tr>
<th>Instrument Size</th>
<th>A.C.</th>
<th>D.C.</th>
<th>R.F.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weston 4 3/4&quot; case diameter</td>
<td>Model 429</td>
<td>Model 431</td>
<td>Model 401</td>
</tr>
<tr>
<td>Jewell 3 1/4&quot; flange diameter</td>
<td>Pattern 78</td>
<td>Pattern 88</td>
<td>Pattern 68</td>
</tr>
<tr>
<td>Weston 3 1/4&quot; flange diameter</td>
<td>Model 476</td>
<td>Model 301</td>
<td>Model 425</td>
</tr>
<tr>
<td>Weston 2&quot; case diameter</td>
<td>Model 517</td>
<td>Model 506</td>
<td>Model 507</td>
</tr>
</tbody>
</table>

Instruments for many special applications are included in the complete line, including percentage modulation meters, universal A.C.—D.C. instruments, and many others.

Weston Electrical Instrument Corp.,
Jewell Electrical Instrument Co.,
602 Frelinghuysen Ave., Newark, N. J.

Please send me your complete catalog WJ on Radio Panel and Radio Service Instruments.

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

Say You Saw It in QST — It Identifies You and Helps QST
NEW GENERAL RADIO PARTS

Crystal Holder

- Dustproof moulded bakelite case. Pressure type holder — adjustable tension. Chromium plated top and bottom plates, prevent tarnish — lapped flat. Crystal held in bakelite retention rings. Plug mounting, 3/4-inch spacing. Holder takes round or square crystal up to 1 1/2 inches square and to 4 mm. thick. General Radio quality throughout.

TYPE 560-A — Price $2.25

Relay Rack

- Stands on bench top. Steel frame, black enamel finish tapped and drilled whole length for standard panel notching. Takes standard 19-inch panels, 1/8-inch or 1/4-inch thick. Ideal for neat arrangement of transmitter and receiver assemblies. Total panel space: 43 3/4 x 19 inches. General Radio quality throughout.

TYPE 480-B — Price $15.00

PRECISION DIALS


<table>
<thead>
<tr>
<th>Type</th>
<th>DIAL Diam.</th>
<th>Scale Divisions</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>704-A</td>
<td>4 in.</td>
<td>180°</td>
<td>200</td>
</tr>
<tr>
<td>704-B</td>
<td>4 in.</td>
<td>270°</td>
<td>300</td>
</tr>
<tr>
<td>706-A</td>
<td>6 in.</td>
<td>180°</td>
<td>300</td>
</tr>
<tr>
<td>706-B</td>
<td>6 in.</td>
<td>270°</td>
<td>450</td>
</tr>
</tbody>
</table>

LARGE PLUGS AND JACKS


<table>
<thead>
<tr>
<th>Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>674-P</td>
<td>$0.25</td>
</tr>
<tr>
<td>674-J</td>
<td>0.35</td>
</tr>
<tr>
<td>674-D</td>
<td>0.50</td>
</tr>
</tbody>
</table>

ORDER DIRECT AT ABOVE NET PRICES
Shipping Charges Prepaid in U. S. A. or Canada if Cash Accompanies Order

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

AMATEUR RADIO

Editorials
WMAQ Broadcasts Again
Armistice Day Message
U.S.A.-Ireland 'Phone Reception
Building a Crystal-Controlled Transmitter
An All-Wave Midget Receiver
Efficiency in the Output Amplifier
Audio Selectivity — Alias Tone Control
Keeping the Feeders Taut
A Sure-Fire Condenser Microphone
A Lesson from the Commercials
Running Down Local QRMs
Standard Frequency Transmissions
The Single-Signal Receiver at Work
A Transparent Transmitter With Unusual Features — Cutting Out Tunable Hums — Electronic 'Phone Break-In — Another 'Phone Break-In System — Curing Interference With Telephone Lines — An Adapter for the SE-143
W8XK in New Location
Amateur Radio Stations
Simple Time-Lag Device
Calls Heard
A. R. U. News
Silent Keys
Communications Department
Correspondence Department
Summer Activities
The Hudson Division Convention (Report)
The Midwest Division Convention (Report)
Hamads and QRAs
QST’s Index of Advertisers

For the Experimenter

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

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

Subscription rate in United States and Possessions and Canada, $2.50 per year, postpaid; all other countries, $2.50 per year, postpaid, single copies, 25 cents. Foreign remittances should be by International postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.


Copyright 1932 by the American Radio Relay League, Inc.
Title registered at United States Patent Office.
Use these NATIONAL Parts
When you Build SHORT WAVE

When you build a short-wave receiver or transmitter — get the maximum efficiency and performance with these NATIONAL parts, designed for short-wave use. NATIONAL Company, pioneer in the radio field and in the manufacture of electrical apparatus since 1914, has developed a full line of parts for ultra short-wave use in its Research Laboratories. Some of these are shown below. The full NATIONAL Company line of the famous Velvet Vernier Dials, Variable Condensers for Receiving and Transmitting Use, Transformers — RF, Audio and Power, Tube Shields, SW-58 and SW-3 Short-Wave Receivers, NC-5 Short-Wave Converter, Ultra High Frequency Receiver HFR (5 meters), Ultra High Frequency Converter HFC, Communications Type Receivers AGS and SBG, MB-32 Deluxe Broadcast Tuner, Speaker Amplifier and Power Supplies, are all shown in the new NATIONAL 18-page Bulletin No. 200, sent free on receipt of coupon below.

SEU S-W CONDENSER
For short-wave work only. Heavy double-spaced, rounded edge 270° plates, insulated front bearing, constant low impedance pigtail, Isolantite insulation, single hole panel or base mounting. Any capacity up to 25 mmf. For ultra short-wave tuning or neutralizing in low power transmitters.

NATIONAL SOCKETS
Isolantite tube and coil sockets, glazed upper surface, give maximum efficiency in ultra high frequency circuits, suitable for sub-panel or baseboard mounting; available in standard 4, 5 and 6-pronged types.

TYPE TMP
Transmitting Condensers
Split-stator type, for medium power push-pull transmitters. Fine for 5-meter work — give extremely accurate balance between both sides of tank coil. Heavy polished plates, rounded edges, self-aligning conical bearings, rigid frame construction, 3000 and 6000 volts.

COIL & TUBE SOCKETS
MIDGET R-39 COIL FORMS
Made of improved R-39, low-loss ultra HF material. Have best form factor for ultra S-W work and lowest power-factor, insure stability, maintain calibration. Also available in larger size with either 4, 5 or 6-prong for regular short-wave use.

"N" VERNIER DIAL
A 4" solid German-silver precision dial with the original and matchless Velvet Vernier mechanism and a real vernier permitting accurate reading to 1/10 division. Has 3-point attachment for easy and accurate mounting.

COUPON
National Co., Inc.,
61 Sherman Street,
Malden, Mass.

Please send me your new Bulletin No. 200, giving full particulars and prices of NATIONAL Short-Wave and other parts and apparatus. (Write your name and address in margin below and mail today.)

Q-11-32

Say You Saw It in QST — It Identifies You and Helps QST
Section Communications Managers of
THE COMMUNICATIONS DEPARTMENT, A. R. R. L.

Atlantic Division

Atlantic Division

Eastern Pennsylvania
W3GS
Jack Wagenaus
210 Main St.
Pennburg
Maryland-Delaware-District of Columbia
W2NY
Harry Ginsberg
2305 N. Pulaski St.
Baltimore, Md.
Southern New Jersey
W3BL
Gedney Rigor
412 2nd Ave.
Haddon Heights
Western New York
W8DSP
Don Vaccaro
213 Hickock Ave.
Syracuse
Western Pennsylvania
W8CUG
C. H. Grossarth
R. F. D. 3, Elcher Rd.
Emerson, Belfaete, Pa.

Central Division

Central Division

Illinois
W9WR
Fred J. Hinda
6618 West 34th St.
Bersway
Indiana
W9FE
Arthur L. Pfumm
1511 Spruce St.
Indianapolis
Kentucky
W9QX
Kenneth H. Conroy
P. O. Box 2332
Louisville
Michigan
W8KH
Harry A. Timmons
1553 E. Rohnwood Ave.
Detroit
Minnesota
W8SS
Harold H. Kurth
3550 N. 8th St.
Cedar Rapids
Wisconsin

Dakota Division

Dakota Division

North Dakota
W9DGS-IPW
Wm. Langer
313 First Ave., S.
Jamestown
South Dakota
W9FNS
Howard Cashman
121 N. Spring Ave.
St. Pauls Falls
Northern Minnesota
W9LQ
Palmer Anderson
Route I, Box 270
Duluth
Southern Minnesota
W9AIR
Herman Radiodoff
R. 2, Box 15
Sleepy Eye

Delta Division

Delta Division

Arkansas
W5ABJ
H. E. Veile
4917 West 10th St.
Little Rock
Louisiana
W5W
F. M. Wurls, Jr.
1716 Park Ave.
Shreveport
Mississippi
W5AV
William G. Boldler
708 W. Elm St.
Jackson
Tennessee
W4SP
James B. Wilt
732 N. Fifth Ave.
Knoxville

Hudson Division

Hudson Division

Eastern New York
W2LU
Robert E. Haight
1080 Helderberg Ave.
Schenectady
New York
W2WO
M. J. Gajger
113-17 17th Pl.
St. Albans, L. I.
New Jersey
W2FX
Walter A. Cobb
28 Ampere Parkway
East Orange

Midwest Division

Midwest Division

Iowa
W9PFD
George D. Hansen
Box 27
Salix
Kanas
W9FLG
J. J. Spertel
305 Western Ave.
Topeka
Missouri
W9EYG-HCP
C. R. Cannady
300 Sixth St.
Moosett
Nebraska
W9EAM
Smedz C. Wallace
Green St.
Clarke

New England Division

New England Division

Connecticut
W1CTI
Frederick Ella, Jr.
19 Merrill Rd.
Newark
Maine
W1CDX
John W. Singleton
16 Merier St.
Wilton
Massachusetts, Eastern
W1ASI
Joseph A. Mulden
33 Cortland St.
Ashmont
Western Massachusetts
W1ASY-W1RB
Earl G. Huladow
25 Phillips St.
Springfield
New Hampshire
W1AT
W. H. Miller
41 Beacon St.
Concord
New Jersey
W1AE
Roy Yale
341 Hamilton St.
Providence
Rhode Island
W1RD

Northwestern Division

North Western Division

Alaska
W7PQ
Richard J. Fox
Box 301
Ketchikan
Idaho
W7AYH
Charles A. Thompson
1001 East Bridge St.
Boise
Montana
W7ATQ-7QG
C. W. Wiers
1001 East Bridge St.
Red Lodge
Oregon
W7BZ
Raymond L. Cuminnes
4835 N. Ashberst Ave.
Portland
Washington
W7RE
John D. Grube
1921 Atlanta St.
Seattle

Pacific Division

Pacific Division

Hawaii
W6COG
C. D. Stamen
Pearl City
Nevada
W6ZAD
Keokat L. Ramsay
1511 Buena Vista Ave.
Nevada
Los Angeles
W6HT
H. E. Nahmsen
Box 903
Ontario
Santa Clara Valley
W6AMM
Robt. Stone
R. 1, Box 11
San Francisco
East Bay
W6ZM
S. C. Houston
2523 23rd Ave.
Oakland
San Ramon Valley
W6WB
C. F. Banks
262 Castro St.
San Francisco
San Francisco
W6AXM
Paul S. Frearle
1350 F St.
San Francisco
Arizona
W6BFJ
Ernest Mendoza
1434 East Madison St.
San Francisco
Philippines
K1AXA
Newton E. Thompson
714 10th Ave.
San Francisco
San Diego
W6GQOP
Harry A. Ambler
4101 Hamilton St.
San Diego
San Joaquin Valley
W6BYY
E. J. Beall
Box 418

Rocky Mountain Division

Rocky Mountain Division

North Carolina
W4DW
H. L. Caveness
2303 Clark Ave.
Raleigh
Virginia
W4A
R. N. Eubank
2817 Montrose Ave.
Richmond
West Virginia
W4ND
C. D. Hoffmann, Jr.
126 Washington Ave.
Wheeling

Southwestern Division

Southwestern Division

Colorado
W9BN
Artie Davis
2499 South Sherman St.
Denver
Utah-Wyoming
W9DJ
C. R. Miller
114 E. 2nd North St.
Provo, Utah

Southern Division

Southern Division

Alabama
W4KP
L. B. Elwell
1056 Waverly St.
Tallahassee
Eastern Florida
W4K
Ray Atkinson
284 East First St.
Jacksonville
Florida
W4MS
Edward J. Collins
1129 East Brailnd St.
Pensacola
Georgia
W4PM
Chas. W. Davis
668 Cooledge Ave., N.E.
Atlanta
Georgia-Southern-Carolina-Cuba
W5S
Roy L. Taylor
1614 St. Louis Ave.
West Palm Beach
Jaloe-de-Fins-Porto Rico-Virgin Islands
Northern Texas
W5ABJ
Emil Glisz
1st Balloon Co.
St. Petersburg
Oklahoma
W5WQ
David H. Calk
8324 Ave. Q
Houston
Southern Texas
W5BG
Jerry O'lian
324 West Coat Ave.
Albuquerque
New Mexico
W5AUW

Maritime

Maritime

Ontario
W3IDQ
A. M. Crowell
69 Dublin St.
Halifax, N. S.
Quebec
W3RH
H. W. Bishop
49 Eastman Ave.
London
Queen's
W5AP
J. C. Stadler
4344 Westmount Ave.
Westmount, P.

Western Division

Western Division

Alaska
W4KN
Roy L. Taylor
1614 St. Louis Ave.
St. Petersburg
Arizona
W4K
Emil Glisz
1st Balloon Co.
Bermuda
California
W4MS
David H. Calk
8324 Ave. Q
Vancouver
Georgia
W4PM
Chas. W. Davis
668 Cooledge Ave., N.E.
Atlanta
Hawaii
W5S
Roy L. Taylor
1614 St. Louis Ave.
St. Petersburg
Idaho
W5WQ
David H. Calk
8324 Ave. Q
Bermuda
Montana
W3BQ
John L. Green
115 Farby St.
Winnipeg
Nebraska
W4E
Wilfred Staufe
2040 McFarnst Ave.
Regina
North Dakota
W9DGS-IPW
Jim Langer
313 First Ave., S.
Jamestown
South Dakota
W9FNS
Howard Cashman
121 N. Spring Ave.
St. Pauls Falls

* Officers appointed to act until the membership of the Section choose permanent SCM's by nomination and election.
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 fraternalism and a high standard of conduct.

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

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

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

A directory of the amateur societies affiliated with the League, showing their times and places of meetings, is available upon request.

OFFICERS

President ............... HIRAM PERCY MAXIM, W1AW
 Hartford, Connecticut

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

Secretary ............... KENNETH B. WARNER, W1EH
 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.
Warring in late September we find that the Madrid international radio conference has made considerable progress in the three weeks it had then been in session. As was expected, the first week was occupied principally in the lining up of the various committees, with additional delay in the settlement of diplomatic questions of voting and official language. Gradually, however, the decks seem to have been cleared for action and while much of the time up to the last of September was occupied in a big fight on long-wave broadcasting — the principal problem of the conference, apparently — there was progress on amateur matters.

Summarized, it would appear that the general amateur regulations have been adopted almost identically as they exist at present in the Washington convention of 1927. Our amateur representatives were successful in defeating an attempt to foist the so-called Hague regional agreement on us. Those who are interested in knowing just what it would have meant to have such a set of conditions under which to operate are referred to page 24 of QST for December, 1929, where the Hague agreement is set forth in detail. So far, then, each nation will continue to be free to specify its own amateur power limits, operator qualifications, etc., which is, of course, just what we in America want.

Another much-desired step in the right direction was the acceptance by the conference committee of our view that amateur stations and experimental stations are two different kinds of animal and should not be classed together. However, a special definitions committee will have another whack at this later, so more battle may materialize on the point before the conference is over. On the message-traffic question only the conference fight tune in on the official A.R.R.L. broadcasts which are made up each week from data cabled by Secretary Warner on the happenings of the previous week.

Wrn the exception of the temporary amateur ticket, which continues to have a one-year term, all classes of radio operator licenses will now be issued for a three-year term as the result of instructions sent out to supervisors by the Federal Radio Commission recently. We hasten to point out that this applies to operator licenses only; our station licenses continue on a one-year basis. However, there is some hope that our desire for an extension of the station-license period may soon come about, too. On September 30th, Commissioner Lafount introduced a resolution — as yet not acted upon — looking to the extension of the term of amateur station licenses to three years, commercial to two years, and broadcast to one year.

At the same time it issued the three-year operator license order, the commission washed out the old license form. Gone, apparently, are the days of the impression certificates which have been so familiar to us through all these years. The new operator licenses are prosaic printed documents similar to the present station license. Progress, we suppose, and undoubtedly a saving to the government — but those old tickets were grand decoration for the wall of our operating room!

November, 1932
Again, as November rolls up on the calendar, members of the League in seven of our divisions will be given their constitutional Elections opportunity to select the man of their choice to represent them for the next two years on the League's board of directors. As has been customary now for some years, we take time out for a moment to call attention to the elections and to urge every member to exercise his voting right.

Our League, as has often been pointed out on this page, is a democratic organization. The thing that is at once the strength and the weakness of such a form of government is that the voting power resides in the individual. An intelligent voting membership can make a democracy the nearest approach to ideal government man has been able to devise; conversely, a democracy becomes a sorry spectacle when members either fail to vote or vote carelessly. An inactive director, who doesn't answer correspondence, doesn't maintain contact with his constituents or exhibits a lack of the ability we must have on our board, is principally a reflection on the poor judgment of those who elected him.

ELECTING YOUR DIRECTOR IS 100% UP TO YOU, THE INDIVIDUAL MEMBER. The board, the officers, headquarters — none of these can lift a finger to do it for you. It's your job. When you receive your ballot, vote — and don't forget to mix in headwork while you're about it.

A. L. B.

WMAQ Broadcasts for Hams Again

THE popular "Ninth District Radio Amateur" program conducted by Forrest P. Wallace over WMAQ last spring is being resumed October 15th, a piece of good news to the amateurs all through the Middle West who followed this program avidly during the weeks it was put on last season. Every Saturday afternoon, from 5:15 to 5:30 p.m., C.S.T., the WMAQ broadcast will come over on its 670 kc. frequency.

Wallace, W9CRT, N.B.C. announcer, reminds us that correspondence from fellow amateurs is welcomed, as well as club papers from both the eighth and ninth districts. This material is very valuable in making up the weekly broadcasts, and serves as a medium of giving all clubs and amateurs a "break."

Armistice Day Message

ZLVA v WLM, W3CXM and W3CXL on November 7th

THE annual Armistice Day message from the Chief Signal Officer to Army Amateurs will be broadcast from WLM on 6990 kc., W3CXM on 3548 kc. and W3CXL on 3005 kc. on Monday night, November 7th. The message will be broadcast every hour, on the hour, from WLMA and on the half hour from WLM and W3CXL (keyed simultaneously). This will continue from 6:00 p.m. until 2:00 a.m. Thursday (E.S.T.). It also will be broadcast from all Net Control Stations. All Army Amateur stations should copy the message from either: (a) one of the two Army Net Control Stations or (b) from their own Corps Area Net Control Station.

All stations copying the message should mail their copy direct to the Chief Signal Officer, Munitions Building, Washington, D. C. The message should show the operator's name and station call, the hour received and from what station received.

All Amateurs, whether members of the Army Amateur Radio System or not, will have their calls listed on the Army honor roll, and also in QST, if they copy and mail in the received message.

U.S.A.-Ireland 'Phone Reception

LOCAL high-powered W1DTJ after receiving reports on 3000-ke. W 'phones in Matthew Sheridan, Wilkinshtown, Navan County, Meath, Ireland, decided that a test would be interesting. Accordingly, a letter was dispatched to Sheridan and in the meantime W1DTJ passed the word along the Atlantic Seaboard of the forthcoming test and interest was intense among the 'phone brethren. The night of the test came and the W stations sent their calls broadcast on scheduled time, nothing else to do but sit and hope reception was good in Ireland. Two weeks later the report was received by W1DTJ and the successful stations getting across were: W1AVG, W1AVK, W1BNR, W1DTJ, W2CE, W2CMH, W2DOK, W2GO, W2LI, W3ALZ, W3AQR, W3SM and VE1AX.

Many stations were received besides these but because they came through three and four deep it was impossible for Sheridan to distinguish the calls. Mr. Sheridan's log shows in addition these calls heard at previous dates: VE1AJ, VE1DA, W1A1HM, W1BES, W1BIC, W1CZS, W2AMB, W2AMH, W2CGY, W2DKA, W2II, W3AMB, W3BLZ and W8AHP. Looks as though the time was ripe for some transatlantic 'phone schedules.

Strays

W8EXI says that W9FBC is right about moonlight nights being better for YL's than DX, because he visited seventeen hams in the Bronx one summer night and found only one at home -- and that one was just getting ready to do some stepping out!

The town of Ocean Grove, N. J., is one of those blue-law communities in which automobiles are prohibited on Sundays. On those days there is perfect high-frequency reception, especially on 14 me. and higher, says W2BYK!
BEGINNERS — and a large number of amateurs who are not beginners — frequently fight shy of crystal control because it looks complicated and expensive. Yet transmitters of this type need not be costly or hard to build. A crystal oscillator is, in fact, simpler than a self-controlled oscillator in mechanical construction, largely because the attention to small details that is such an important factor in the design of a good self-controlled oscillator becomes a relatively minor consideration. For example, a self-controlled oscillator must have a high-C circuit with its attendant demand for a high-capacity tuning condenser and an inductance of low resistance to reduce losses; it must be protected against vibration and mechanical shocks if the good effects of proper electrical design are not to be nullified; coupling the antenna and tuning to the oscillator are arts in themselves if the built-in stability of the oscillator is to be preserved under working conditions; circuit adjustments must be carefully made; precautions must be taken to make certain that the transmitter is not radiating off frequency.

THE SIMPLEST CRYSTAL TRANSMITTER

No doubt one of the things that discourages beginners from using crystal control right at the outset of their amateur careers is the fact that even the simplest low-power sets seem to be two or three-tube affairs. They have at least one amplifier in addition to an oscillator, and amplifiers must be neutralized — a difficult-looking proposition — to say nothing of the extra tuning adjustments required by amplifiers. But it is not necessary to have an amplifier with a crystal oscillator. The oscillator can be coupled right to the antenna just as can any self-controlled oscillator, and it can be keyed at ordinary rates of speed just as well as can the self-controlled oscillator, provided one has a reasonably active crystal. The power output will be just about the same as that from a high-C self-controlled oscillator at the same plate voltage.

An oscillator of this sort can be made quite simply, requiring only a coil and condenser which together will tune to the frequency of the crystal, a crystal and holder, a by-pass condenser and r.f. choke, and a few small resistors. Since the chief requirement is to get as much power as possible from the oscillator without danger to the crystal, the oscillator tube should be a Type '47 pentode, which is one of the best performers in this respect. Nothing complicated about the wiring diagram, which is the right-hand half of Fig. 1, nor about the sample layout shown in the photograph. In this photo the oscillator occupies the right-hand half of the board, the left-hand

November, 1932
half being reserved for a doubler which makes two-hand operation possible. This outfit, in conjunction with another unit which will be described in a coming issue of QST, forms a complete crystal transmitter for low-power three-band operation. To start out, however, only the oscillator need be built. The doubler can be added later, but room might as well be left on the board for it.

The socket for the '47 is placed at the rear edge of the baseboard, which measures 6 X 16 inches, near the right-hand edge, and just to its right is a socket mounting for the plug-in crystal holder. The filament center-tap resistor, $R_4$, is just behind the tube socket. The oscillator tuning condenser, $C_1$, is mounted at the front edge of the board, the plate blocking condenser, $C_6$, being fastened to the board between $C_1$ and the tube socket. The oscillator inductance, $L_1$, is at the left. These are the only oscillator parts mounted on top. Underneath are the r.f. choke, the grid leak, $R_3$, the dropping resistor for the '47 screen voltage, $R_4$, and the screen by-pass condenser, $C_5$. These are placed where it is most convenient to meet the connections coming through from the upper side of the baseboard, and their relation to each other has no particular significance. The filament and plate connections from the power supply are brought in through Fahnestock clips fastened to the rear edge of the board. The $L_1C_1$ circuit is designed to cover the 3500-ke. band, and therefore will work with a crystal cut for any frequency in that band.

**THE 7000-KE. DOUBLER**

Although the doubler part of the set may be omitted if operation on only the 3500-ke. band is wanted at first, it is just as well to describe its construction at this point. The doubler is nothing more than an amplifier which has its plate circuit tuned to the second harmonic of the oscillator frequency; in other words, the output of the doubler is on a frequency just twice that of the crystal oscillator. Output on this frequency is possible because the doubler is a *distorting amplifier*; the greater the distortion it introduces the greater is the harmonic output. This, it will be observed, is just the opposite of what is intended with audio amplifiers.

Since the output circuit of the doubler is tuned to twice the frequency supplied to its input circuit, the doubler cannot itself oscillate and consequently does not need to be neutralized. It is therefore no more difficult to hook up than an audio amplifier would be. Maximum harmonic output will be obtained when the doubling tube has a high amplification factor and is operated with large negative bias and a strong input signal. The Type 46 tube has a high amplification factor and is therefore a good tube to use as a doubler. The bias in this case is obtained just as it is in a self-controlled oscillator—by the use of a grid leak through which the d.c. grid current flows. The parts required are a grid leak, $R_3$ in Fig. 1, a grid condenser, $C_6$, tuning condenser and inductance, $C_5$ and $L_3$, which will tune over the 7000-ke. band, blocking condenser, $C_4$ and an r.f. choke, as well as a 5-prong tube socket and a center-tap resistor. The grid condenser and leak are mounted under the board at the center. All other parts except the r.f. choke are mounted on the upper side of the baseboard, at the left-hand side.

Between $L_3$ and $L_4$ is a single-pole double-throw porcelain-base switch, connected as shown in Fig. 1, for the purpose of connecting the oscillator to the doubler. The blade is connected to the stator plates of $C_1$ and one of the jaws to the buffer grid condenser. The other jaw is left unused for the moment, but will be used with the amplifier unit to be described later. This switch disconnects the doubler when the set is to be used on the 3500-ke. band. A piece of bus-wire run along the top of the baseboard at the rear connects the center-taps of the two filament resistors together. The plate-voltage for the doubler is fed in by means of a Fahnestock clip on the rear edge of the board.

A quite simple scheme is used for coupling the antenna coil to the tank coil of either stage. This coil, like the other two, is wound on a piece of bakelite tubing, and this in turn is fastened to a piece of brass strip, the other end of which is
held to the rear edge of the baseboard by a
wood-screw midway between the two coils. By
making the brass supporting strip the proper
length and carefully centering the wood-screw,
the antenna coil can be swung from one tank coil
to the other, and any degree of looseness of
coupling can be obtained simply by positioning
the antenna coil correctly with respect to the tank
coil being used. A pair of flexible wires from the
ends of the coil make connection to two Fahnestock
clips on the rear edge of the board, these
serving as terminals for the antenna or feeder
connections.

POWER SUPPLY

Any of the power supply units made from
broadcast receiver parts described previously in
QST, How To Become a Radio Amateur, and The
Radio Amateur's Handbook will work satisfac-
torily with the transmitter. We show one here,
however, which is somewhat more suitable for
this particular job because the voltage regulation 1
is much better than with those heretofore de-
scribed. This is because the filter has been ar-
 ranged with the output of the rectifier feeding
into a choke instead of a condenser. A choke-
input filter with a bleeder of the right size is
capable of much better output voltage regulation
than a condenser-input filter, especially when
a mercury-vapor rectifier is used as in the present
case. The disadvantage of choke input is, how-
ever, that the output voltage is somewhat lower
than the secondary voltage of the transformer
used, and is considerably lower than the output
voltage obtained with condenser input with the
same transformer at all except the heaviest loads.
On the other hand, with choke input much more
current can be taken from the rectifier-filter
system without endangering the life of the rectifier
tube than is possible with condenser input. With ordinary broadcast power-pack
transformers, which have a secondary voltage of
350 to 400 volts each side of the center-tap, the
output voltage drops to around 300 volts with
choke input, whereas for a reasonable amount of
power output it is desirable to have about 400
volts for the plates of the r.f. tubes.

Now that the 82 mercury-vapor rectifier tubes
have made their appearance, however, trans-
formers designed to give about 400 volts output
with a choke-input filter have become available,
and such a transformer is used in the power sup-
ply shown in the photograph. This one is made
by Silver-Marshall, and has a high-voltage
winding which delivers 520 volts each side of the
center-tap. In addition there are two 2.5-volt
windings for lighting the rectifier and other tubes
in the set. Since the transformer is designed for
horizontal mounting in a broadcast receiver
chassis, the same type of mounting has been em-
ployed here, a rectangular hole being cut out of
the power-supply baseboard so that the side of
the transformer on which the terminals are
brought out will drop through to the under side of
the board. The transformer is held to the base-

1 See following issues of QST: July, 1932, pages 11 and 12; November, 1930, page 11.

2 Voltage regulation is defined as the ratio of the difference
between full-load voltage and no-load voltage to the full-
load voltage. A power supply whose output voltage changes
very little from no load to maximum load is said to have
good regulation. See the "Power Supply" chapter of The
Radio Amateur's Handbook for more complete discussion.
braided lead from the electrostatic shield between primary and secondaries of the power transformer is connected to the center-tap of the high-voltage secondary, as shown.

ANTENNAS

Every amateur who has been on the air for any length of time has his own preferences as to antennas and tuning systems. However, for the sake of those who may be putting in their first transmitters we have a few suggestions to make.

Generally the chief factor in determining the kind of antenna to put up is the amount of space available. If there is room enough, the Zepp antenna shown at A in Fig. 3 is a good one to use. The radiator, or antenna proper, is approximately 130 feet long, and the two feeders are 30 to 35 feet each. These should be spaced about 6 to 8 inches apart with spacers such as those described in the chapter on "Antennas" in The Radio Amateur's Handbook. With feeders of this length it is necessary to use series tuning on 7000 kc. and parallel tuning on 3500 kc. as shown at A and B respectively.

Series tuning requires two condensers, which should have a maximum capacity of about 250 µfd. each. Any type of variable condenser will do for this purpose. For changing the feeder tuning system rapidly when shifting from one band to another, a switching arrangement such as the one described a few months ago in the Experimenters' Section will be convenient.³

If space does not permit putting up a Zepp, a single-wire antenna with a total length of about 65 feet from the transmitter to the far end may be used. This also will call for different tuning methods on each band, but only one antenna condenser will be required in either case. Fig. 3C shows the method used for 3500-kc. operation, and Fig. 3D the 7000-kc. tuning system.

The specifications for the coupling coil, L₁, in Fig. 1, will be correct with either of the antenna systems recommended above. With other types of antenna or Zepp feeders of different lengths, it may be necessary to use a larger or smaller number of turns. If this should be the case, the right number of turns must be determined by experiment.

TUNING

A milliammeter of some sort is almost a necessity for tuning and for making sure that the tubes are not overloaded. Even a cheap meter is better than none at all. A neon lamp also is a handy thing to have for indicating r.f. A low-range r.f. ammeter (0–1 ampere is about right) is helpful but not really necessary; a two-volt flashlight lamp can be substituted for it in making tuning adjustments.

After the power supply connections have been made to the set, the crystal should be plugged in and the oscillator tested. To do this open the switch S, if the doubler part of the set has been built, and move the antenna coil as far away from the oscillator coil as possible. A switch or telegraph key should be placed in the negative lead from the power supply so the plate current can be cut off without turning off the filament. Close the switch or key and turn C₁ until there is a pronounced dip in oscillator plate current, indicating oscillation. Generally the plate current will be about 50 milliamperes non-oscillating, and will drop to 20, approximately, when oscillating. The more active the crystal the lower will be the plate current with the tube oscillating.

³ QST, December, 1931, page 39.
any frequency within the band will be satisfactory. If the set is to be used on 7000 kc. as well, the frequency must be between 3500 and 3560 kc. to keep within the 7000-7300-kc. limits when doubling. Similarly, if 14-mc. operation is to be tried at some future date, the crystal frequency must be between 3500 and 3600 kc.

Once the oscillator is functioning, the antenna coil may be coupled to it and the antenna or feeders tuned to resonance. If the antenna condenser or condensers are in series with the feeders, as at A and C, Fig. 3, the two coils will probably be coupled closely together. If parallel tuning, as at B and D, is used, however, the coupling generally will be fairly loose; that is, the axes of the two coils will not be on the same line. Adjust the antenna tuning until the ammeter or other resonance indicator shows maximum current. Almost certainly a readjustment of \( C_1 \) will have to be made when the antenna coil is coupled to \( L_1 \). Manipulate \( C_1 \) and the antenna condenser until the antenna current is greatest. If too much coupling is used the oscillator may stop working, in which case the coupling must be backed off.

There is one other factor which must be considered when working on 3500 kc. It is necessary to have the oscillator key properly, and to make certain that this is accomplished the signal should be monitored. If dots are missing or if the keying sounds chirpy, the tuning must be readjusted until the keying is clean and the oscillator starts every time. This may necessitate a slight reduction in antenna current.

**Operating the Doubler**

Tuning the doubler is much the same as the procedure used with the oscillator. The antenna should be disconnected from the coupling coil or the latter placed midway between \( L_1 \) and \( L_2 \) and the switch \( S \) closed. In this case the milliammeter should be in the plate circuit of the doubler. Start the crystal oscillating — the neon lamp will be useful at this point to indicate oscillation if no milliammeter is available for the oscillator plate circuit — and note the rise in the doubler plate current. Then tune \( C_2 \) for minimum plate current, the minimum point indicating resonance. The plate current with \( C_2 \) set off resonance will be determined by the oscillator strength; with the oscillator condenser, \( C_1 \), set for maximum output the off-resonance plate current will be from 100 to 150 milliamperes, and at resonance should drop to 30 or 40 ma. Always keep \( C_2 \) set at resonance because under other conditions the plate power is all dissipated in the doubler tube itself and the tube will get hot. This may be the cause of grid blocking, a condition in which the grid emits electrons and causes still higher plate current, with the result that the tube may be ruined.

The antenna coil should be coupled to the doubler tank coil and tuned in just the same way as has been described previously. The plate current with the antenna coupled should be 50 to 60 milliamperes; do not try to load the doubler too much or blocking may take place with the result described above.

With the Zepp antenna shown in Fig. 3, the feeder current will be in the neighborhood of .3 to .4 amp. on both bands at the recommended plate voltages and with a normally active crystal.

**Keying**

The simplest method of keying the oscillator, putting the key in the — B lead from the power supply, has already been suggested. Center-tap keying may be used — with less danger of key thumps in neighboring broadcast receivers — if filament by-pass condensers are substituted for the center-tap resistors shown in Fig. 1 and a center-tap resistor connected across the filament winding on the transformer in the power supply unit. The key might also be placed in series with the oscillator grid leak, \( R_5 \), at the filament side, or in series with the screen dropping resistor, \( R_4 \). Either of the last two methods is likely to result in a back-wave when the key is open because the tube may not be completely stopped from oscillating.

If the set is to be used on 7000 kc. only, there are two other keying methods available in addition to those mentioned above. The key can be placed in the positive plate voltage lead to the doubler tube, leaving the oscillator running continuously, or it can be used in place of the switch \( S \), in which case it breaks the excitation to the doubler. The oscillator works continuously in

*Continued on page 90*
An All-Wave Midget Receiver
A Semi-Portable Covering from 12 to 4500 Meters

By R. B. Parmenter*

There is consistent demand for a compact and semi-portable receiver that is battery operated and that covers both high and low frequencies. It’s handy to have around the shack for occasional listening in on what the long-wave commercials are doing or, even, for taking in an occasional broadcast program. And it’s just a midget that covers practically the entire frequency range of long-distance radio communication.

A MIDGET THAT COVERS PRACTICALLY THE ENTIRE FREQUENCY RANGE OF LONG-DISTANCE RADIO COMMUNICATION
Antenna condenser, regeneration and filament controls are at the left. The tip-jacks below the tuning dial are for the headphones.

The antenna condenser, regeneration and filament controls are at the left. The tip-jacks below the tuning dial are for the headphones.

The thing to take on a vacation trip to copy traffic from the OW as it is broadcast on schedule by home-town hams. The receiver described here was built with these ideas in mind. It has just returned from a 2000-mile auto trip during which it did itself proud — and is still hitting them off in fine shape. Both short and long waves are covered by means of interchangeable plug-in coils, all of which are on moulded bakelite formers of 1 1/2 inches outside diameter. A total of 9 coils gives practically continuous coverage of all frequencies between 60 kc. (5000 meters) and 25,000 kc. (12 meters), with three more giving bandspread tuning of the “80-”, “40-” and “20-meter” amateur bands. A double-section tuning condenser takes care of the L/C ratio requirements of the different ranges.

With so many different types of tubes on the market it is rather difficult to decide just which ones are the best for portable use. The choice depends on how much output one wants and how much battery weight can be lugged around. However, a ’32 screen-grid detector and a ’33 pentode audio make a nice combination and give all the output that two sets of headphones need. Considerable current is used by the filament of the ’33, but if strong signals are desired it is the tube to use.

Construction
The entire receiver was built from whatever was available and in casting around for a metal cabinet an old defunct “2-mike” filter condenser case was picked out to house the receiver. It is of sheet iron and measures 5 1/2 by 7 1/2 by 6 1/2 inches. Several layouts were tried but, like a Chinese puzzle, only the one shown would permit getting everything inside with the lid closed and all controls on the front panel.

The top of the iron case was cut out to take a hinged top so that coils could be changed without too much trouble. The lid is of 1/16-inch aluminum, 6 1/4 by 6 inches. A strip of 3/4-inch of the original iron was left so as not to weaken the case.

The top and two sides of the cabinet, into which the front panel is fastened, are strengthened by 1/4-inch square brass which is tapped and fastened both to the cabinet and the front panel. The panel and sub-panel are of 1/16-inch aluminum, the panel being 7 1/2 by 5 1/2 inches and the sub-panel 5 by 6 1/2 inches. The shelf is fastened to the panel with another length of square brass with 1 1/2-inch room to mount condensers and run some of the wiring underneath. All of the parts are mounted so that by removing six screws in the panel and one in the back, the entire receiver may be taken out of the cabinet. The one screw in the rear is fastened into a small length of square brass which is fastened to the shelf. This prevents sagging or vibrating.

The upper post on the front panel is for the antenna and the lower post for the ground. The three knobs are (beginning at the top) antenna series condenser, filament rheostat and regeneration control. The main tuning dial is the only other control. The antenna series condenser may seem an unnecessary luxury but it is a life saver in avoiding dead spots due to antenna resonance and is almost indispensable in a set that has no r.f. ahead of the detector. It is also useful when using the low-frequency coils. One of the rotor

* Chief Operator, A.R.R.L. Headquarters Station W1MK.
plates of this condenser is bent so that when maximum capacity is reached the condenser is shorted out. This position is useful for the low-frequency ranges and also when working without a ground on the receiver.

The tuning condenser is a National ET-27 which was formerly used in an all-wave super-het. It has two sections with a small switch to cut out the larger section and allow the use of three plates in the rear for the high-frequency ranges. The switch is to the left of the condenser. It was necessary to put this switch on as it does not come with the condenser. A clip may be used instead but is not as permanent or convenient. The coil socket is mounted off the sub-panel 34-inch to keep the coil clear of the metal. The '32 detector has a sub-panel type of socket while the '33 has a socket which is mounted above the panel. The plug-in mounting to take the extra plate by-pass condensers is mounted above the screen-grid coupling unit. Between this and the panel is the .25-µfd. by-pass condenser which is across the regeneration control. The permanent plate by-pass condenser of 500 µfd. capacity is mounted behind the coil socket. The r.f. choke is mounted to the right of the tuning condenser, as is the grid leak mounting. The screen-grid by-pass capacity of .01 µfd. is mounted under sheath, right at the screen-grid terminal on the socket. The grid condenser is mounted to the rear of the tuning condenser with its grid lead and clip next to the tube. This is the clip that is connected to the grid of the detector for all coils except the band-spread coils, which have their individual leaks, condensers and grid clips. The r.f. choke is a cross between a low-frequency and a high-frequency choke and is of the open type that is used as a "replacement" in broadcast receivers.

A PLACE FOR EVERYTHING AND EVERYTHING IN ITS PLACE

The coils plug in between the screen-grid detector (right) and pentode output tube (left). The extra plate by-pass plugs into jacks on the bakelite strip above the audio coupler. The midget switch between the coupler and tuning condenser cuts the larger section of the tuning condenser in circuit for the lower frequencies. The extra detector grid lead is used with the non-band-spread coils.

No serious dead spots were encountered in the range 15 to 4500 meters.

The plate by-pass condenser of 500 µfd., which is plenty for the high-frequency ranges, is a little small for the long-wave coils as with it they will not oscillate over the entire range. Additional plate by-pass capacity is therefore plugged in the mounting for that purpose. Three plug-in condensers should take care of this, 500-µfd., .001-µfd. and .002-µfd., which are fitted with G.R. plugs to fit in the mounting.

It is hard to get perfect control of regeneration in a receiver of this type without using a variable plate by-pass condenser. However, with the plug-in capacities the low-frequency coils can be made to oscillate over their respective ranges and by dropping the screen-grid voltage to 22\(\frac{1}{2}\) volts, and leaving off any extra by-pass capacity, it is possible to get perfect control in the useful range 550 to 900 meters. With different combinations, such as the antenna series condenser shorted out, etc., it is possible to cover the entire range and here on the East Coast the signals in this range have a nice punch. It is interesting to listen to

---

**FIG. 1—**

C1 — National ET-27, total maximum capacity 490 µfd. Three-plate separate section of ET-27 is 50-µfd. maximum.
C2 — 100-µfd. midget.
C3 — 250-µfd. mica.
C4 — .01-µfd. mica.
C5 — 500-µfd. mica.
C6 — .25-µfd. paper.
R1 — 2 megohm (Individual leaks and condensers on band-spread coils).
R2 — 50,000-ohm rheostat.
RFC — Broadcast-band r.f. choke, inductance approximately 80 millihenries.
L1, C, R — National S-101 screen-grid coupler. All parts enclosed in one case.
Lx, Ly, Lz — See coil table.
X — Plug-in position for extra plate by-pass capacity.
the 600-meter gang and hear some really good operating procedure. It affords good code practice, besides. Also, a receiver which covers these frequencies is very useful in getting the weather forecasts and storm warnings.

THE COILS

The coil forms are all five-prong Silver-Marshall and specifications are given in the accompanying coil tables, including the spacing between the windings. Fig. 2 shows the wiring for the band-spread coils and should make this clear.

The low-frequency coils require forms somewhat longer than the standard type and the additional length was obtained by bolting on an extension consisting of a standard form with its pin end cut off. The top of the form used for the extension was butted against the top of a regular form, as shown in Fig. 3, and brass 4-36 machine screws were run through holes drilled through the form, into small pieces of brass strip tapped for these screws. Two of these fastening strips were used for each form. This makes a long form which is very rigid.

Just a few words about the low-frequency coils. Because of the small space available in the receiver it was of course impossible to make use of the usual size honey-comb coils. An attempt was first made to bank wind them using No. 30 wire. It was a messy job at best; the small size wire made it impossible to get them to hold their shape, so this was given up and the coils used were wound up to our specifications, using Litz wire on the two largest coils and No. 22 wire on the broadcast coils. They are all made to slip on over the 1½-inch diameter five-prong coil form and all are “universal” wound. The inductances of the various coils are given in the table.

The coupling between the plate and grid coils is rather critical and the antenna coil influences the range somewhat so the best procedure in getting the proper spacing of these coils is as follows:

After sawing off the end with the prongs of the form extension, five flexible wires were soldered in the pins of the end cut off and this was inserted in the detector coil socket as a sort of adapter. The antenna, grid and plate coils were then slipped on one of the completed coil forms, with the antenna coil at the bottom, the grid coil in the center and the plate coil at the top. This differs from the line-up for the high-frequency coils and was necessary in order to get sufficient coupling to the antenna coil. The form with its three windings was then connected “haywire” style to the five wires from the coil socket, being sure to get them connected to the correct points as it is possible to burn out the tube filaments if one is careless. The plate coil is then backed off or slid back to where it oscillates properly. The antenna coil will, of course, influence this also, so adjustment must be made on it as well. The closer the antenna coil is to the grid coil, the closer the plate coil must be in order to get it to oscillate. It does not pay to use too close coupling between the antenna and grid coils as this throws off the calculated frequency range and just enough coupling should be used to bring in the signals with good volume. The spacings given were found to be the best in our particular case. In case the receiver howls badly the trouble may be due to too loose plate coupling so that the circuit is just on the edge of oscillation. Try tightening the plate coil coupling. Too close antenna coupling can cause the same thing. Some audio coupling between the headphones and the ’33 pentode was bothersome in our case, and whenever the ’phone cords were accidentally near the back of the receiver bowing resulted. This was noticed on the high-frequency coils. As soon as the coils were completed and the receiver fastened in the cabinet no more trouble was experienced, although by opening the lid and bringing the ‘phones or ‘phone cords near the top a terrific howl resulted — so do not be fooled by this.

Since the entire filament current is .32 ampere, the smaller types of dry cells are not suitable and No. 6 dry cells were decided upon as filament supply. The battery box presents somewhat of a weight but makes up for this by having enough batteries to operate the receiver for several

(Continued on page 86)
Efficiency in the Output Amplifier

Some Suggested Methods of Increasing Antenna Power

By Fred H. Schnell, W9UZ*

QST and the A.R.R.L. Handbook contain more information on amateur transmitters than any other publications. Yet, now and then it may happen that a suggestion or two would be helpful as additional information, especially for those who are interested in transmitters of the type that use two tubes in the output amplifier, push-pull. However, it is generally conceded that every amateur, no matter what power he uses, desires to get the most from what he has. To increase his signal strength reports from R. and R. to R. or from QSA3 to QSA5, he would gladly spend any reasonable amount of time trying one thing or another. This sort of work brings practical results; these results pass from one of us to another — and the whole fraternity of amateur radio profits by them. This is one of the very reasons why we amateurs are in existence today — we have gone ahead; we have tried new ideas; we have experimented with difficult radio problems; we have solved many of them; and we have passed the dope along through QST. We have not stagnated. If we had, we still would be using apparatus of the vintage of 1920 and perhaps older. True, our fundamentals are the same; but just think how they have been broadened in the adaptation of the modern apparatus in the modern amateur station.

The present transmitter in use at W9UZ has been in operation for more than a year. Just because it uses two 250-watt tubes in the output amplifier doesn’t mean, necessarily, that it is a 500-watt transmitter. It may be more, but is as likely to be less, as we shall see. Generally, with two 250-watt tubes (output or plate dissipation) in push-pull, and with an input of about 1000 watts, efficiency of 50 percent might be expected, in which instance the output should be 500 watts. Now, power amplifier plate efficiency of 50 percent, and higher, is attainable. But everything in the transmitter must be just right if it is to be realized. Grid excitation to the output amplifier, plate tank circuit design, proper tuning and neutralization, antenna system and antenna coupling, all are just as much a part of the transmitter as the transformers, radio-frequency chokes, tubes and power supply. Very often we amateurs take these things too much as we imagine them to be and not as they really are.

This transmitter, for instance, started with a plate input of 1000 watts to the output amplifier and the antenna power was about 250 watts. With but a few minor apparatus changes, a little figuring and thinking, and a couple of days’ time, the antenna power was increased to more than 500 watts with no increase in input. The measuring gear which usually can be found around most ham shacks was used for making calculations and measurements, due allowances being made for such errors as are bound to crop up with gear of this type. Of course, precaution was taken in checking the measurements; otherwise they would have been of no value for comparison purposes. The information is approximate, yet it has been useful for such comparisons.

THE OPERATING POSITION AT W9UZ

and the antenna power was brought from low to high efficiency by the methods described poses. The information is approximate, yet it has been useful for such comparisons.

THE TRANSMITTER LINE-UP

In this, the first push-pull amplifier of this power in use at W9UZ, the output amplifier and the antenna system are of principal interest because something new was learned about each one. The front end of the transmitter is much the same as several that already have been described in QST and can be covered briefly.

The supporting frame measures 16 inches from front to back, 20 inches across the front, and the front panel is 40 inches high. The supporting uprights are duralumin, 3/4" by 3/4" by 3/8-inch. Each aluminum shelf and compartment shield is 3/8-inch thick. The front panel, also aluminum, is

* 4915 No. Sawyer Ave., Chicago, Ill.
\$\frac{3}{4}\text{-inch}
\text{thick and the two sides, back and top} \\
\text{(all aluminum), are \$\frac{3}{4}\text{-inch thick. The uprights} \\
\text{and cross members are rigidly fastened with angle} \\
\text{pieces, machine screws and lock washers. Each} \\
\text{side, the top and the back are drilled with \$\frac{1}{4}\text{-inch} \\
\text{holes for heat ventilation.} \\
\text{Each radio-frequency choke is the Navy Type,} \\
\text{three-section. Each section consists of one hun-} \\
\text{dred turns of No. 30 B. & S. silk-enamel wire,} \\
\text{universal type of winding, each coil being \$\frac{3}{4}\text{-inch} \\
\text{in width and 1 1/4 inches in diameter, 1 inch spac-} \\
\text{ing between each. The winding form is a \$\frac{1}{2}\text{-inch} \\
\text{round bakelite rod, 5 inches long. These chokes} \\
\text{cannot be wound by hand.} 1 \\
\text{The inductor of the screen-grid (75-watt) am-} \\
\text{plifier is 3 1/2 inches in diameter, ten turns of} \\
\text{quarter-inch copper tubing. The plate voltage is} \\
fed to the center of this inductor. The excitation 
to each of the 250-watt tubes is taken from this 
inductor, one from either end. A 0-100 d.c. 
milliammeter is connected in each grid lead. 
When the proper value of capacitance is used in 
circuit, since this meter does nothing more than 
indicate resonance. The amount of current can 
be made most anything desired, depending upon 
the capacitance and the inductance in the cir- 
cuit; the higher the capacitance, the higher the 
current. Every amateur must be familiar with 
this. 
Each amplifier tube is biased with batteries 
and a resistor as well; a sort of semi-automatic 
grid bias control. This type of grid bias, unless 
there is some good reason against it, can be recom- 
pended as preferable to either only batteries or 
only the resistor. 
PUSH-PULL OUTPUT AMPLIFIER 
Of course, this is the most important and the 
most interesting part of this transmitter. All the 
shuddering, fear and visions of sleepless nights 
that would have to be spent in getting this stage 
to work properly turned out to be nothing but 
wild imaginings. There has been nothing so sim- 
ples as neutralizing this push-pull output stage. 
As a matter of fact, considerable care was used in 
shielding each unit of the transmitter. It still 
seems to be the same old story about shielding — 
"Partial shielding is a partial cure for something 
that should not exist in the first place and com- 
plete or proper shielding simply avoids those 
aliments." Stray high-frequency voltages are 
trouble makers and they should be restricted by 
the use of proper shielding. Perhaps that accounts 
for the fact that the amplifier was neutralized 
and tuned within a few minutes from the time the 
transmitter was first put into operation. The 
method of performing this operation is as follows: 
Refer to Fig. 1. The filaments of the two 250- 
watt tubes are heated. The plate supply is dis- 
connected. Grid bias of -180 volts is connected 
through the 10,000-ohm resistor. The feed leads 
to the 75-watt stage have been connected and 
that stage has been tuned to resonance, as indi- 
cated by the two grid meters which show a deflec- 
tion of 22 to 26 ma. The two neutralizing con- 
densers, C \text{a} \text{and } C \text{b} \text{are at maximum capacity.} 
A single turn of wire connected to a flashlight 
bulb serves as an indicator. The single turn of 
wire is insulated with tape so it can be mounted 
(temporarily) right in the tank circuit. The two 
neutralizing condensers, C \text{a} \text{and } C \text{b} \text{are simulta-} 
neously turned slowly until the flashlight goes 
out, which it does when the amplifier is neu- 
tralized. Then a few very small adjustments are 
made down through the transmitter, carefully 
bringing everything into resonance. The flash- 
light bulb and loop are removed. Then plate 
voltage (reduced) is applied. If everything has 
been done carefully, the tank r.f. ammeter ( \text{M} \text{a}) 
will show current. It remains then only to in- 
crease plate power until the transmitter is oper- 
at ing at normal input. Antenna tuning should be
checked from time to time as power is increased to be sure it is taking the load properly. Note: The grid chokes (GC) are not necessary in this transmitter, since it works just as well without them. They were put in and taken out several times—and left in the last time as a matter of convenience because they had been soldered in place.

GOING AFTER EFFICIENCY

The output amplifier has provided no end of interesting experimental work from which materially better results have been obtained. The normal operating characteristics, at present, may be of interest. The d.c. voltage is 1950 with a load of 500 ma. The plate tank current is 4.4 amperes with the antenna drawing full load. The 7000-kc. plate tank inductor, \( L_p \), is 3½ inches in diameter, 12 turns of \( \frac{1}{4} \) inch round copper tubing with \( \frac{1}{4} \) inch between turns. The inductance is 8.8 microhenrys. The tank circuit tuning capacitors \( (C_t) \) are National Type TM-450 condensers, double-spaced and connected in series with the r.f. ammeter (Mal connected between them. The capacity at 7173 kilocycles is about 45 \( \mu \)fd., plus tube and associated capacitances. The plate current is 40 ma. with the antenna disconnected, a power input of about 78 watts.

W. H. Hoffman, W2BEP, suggested that the plate load impedance for Class B amplifiers (three-element tubes) should be at least twice the impedance of the plate of the tube for high efficiency. Several calculations were made and these were checked by measurement during the experimental work. Starting with a tank inductor of 2.3 microhenrys and a tank capacitor of 210 \( \mu \)fd., the plate current (antenna disconnected) was 210 ma. or more than 400 watts in the tube-plate and associated circuits, as compared to the low-C dissipation of 78 watts. The measured r.f. tank current was 28.0 amperes at 7173 kilocycles. The r.f. tank current was calculated as 29.9 amperes using the inductive-reactance formula, and for capacitive-reactance was 29.3 amperes, the radio-frequency voltage per tube being taken as 70 percent to 80 percent of the applied d.c., the value being doubled for the push-pull amplifier, in this case approximately 3100 volts.

Changes were made in the tank inductor and capacitor by a four-to-one ratio. The inductance was increased from 2.3 microhenrys to 8.8 microhenrys and the capacitance was reduced from 210 \( \mu \)fd. to about 45 \( \mu \)fd. The tank current was again calculated: inductive-reactance, 7.9 amperes; capacitive-reactance, 7.8 amperes. The measured current was 7.3 amperes, with the antenna load disconnected; the plate input, as mentioned, about 78 watts — and tubes cooler, much cooler.

These approximations serve their purpose in pre-determining what may be expected at normal tube operation. There is no sense in buying an r.f. ammeter with a 0-10 scale (if one still insists on having it) if the maximum current is going to be between two and three amperes. The two experiments bear out Hoffman's suggestion quite reasonably and efficiency increases can be expected if heat losses in the plate circuit are to be considered. Why use a lot of power to heat the plate of a tube! A red-hot plate may make a nice ornamental room heater but it isn't heating the antenna, and that's where we'd like to see it "get hot."

This brings up the matter of high-C versus low-C. It is well known in the amateur field that an oscillator circuit using a large amount of capacitance and small amount of inductance is more "frequency stable" than a circuit in which the capacitance is small and the inductance is large. In some measure this is true because when a tube heats (and what amateur runs his tubes cool?) there is a change of internal capacitance, but when the parallel or tuning capacity is large, (high \( C \)) the percentage of total capacity change is very small, hence less frequency "creeping." Also, the low load impedance tends to swamp the effects of changes in tube impedance and thereby stabilizes the frequency in the dynamic sense. In circuits of this type, the tank current may be extremely high because the circuit has low impedance. Too, the plate load may be approximately the same with the antenna load or without it, although this depends upon the "awfulness" of the circuit, the transformer coupling action and the amount of antenna resistance reflected back into the tank circuit. In practically any type of straight oscillator, the low-impedance plate load (high \( C \)) circuit is desirable.

However, in the r.f. power

THE TRANSMITTER FROM ITS LEFT SIDE, SHOWING THE INTERSTAGE SHIELDING

The push-pull power amplifier occupies the top deck.
amplifier, where, for normal tube operation, high efficiency is desired, the high impedance (low C) plate circuit is more desirable.

ANTENNA SYSTEM

What do you suggest be done when you want a radiator about 67 feet long and the roof is only 52 feet long? There is only one thing to be done — bend it. That accounts for the bent feeder system and the bent radiator in the Zepp-feed antenna system at W9UZ. Actually, it looks like the letter "Z." This antenna problem is far from being as simple as it sounds. All amateur antennas work after some fashion or another, but usually they are strung up without much thought and the final hitch is taken with a prayer that it will "do its stuff." Unfortunately, the antenna puts out only a part of the power that goes into it. Therefore, it is a good plan to put as much power into the antenna as can be put there. Too much of it goes down the gutter spout or drain pipe as it is, and antenna power is too precious to waste. It is just as precious as the power in the output amplifier, and the two must work together at all times for high efficiency.

As a beginning, the radiator for 7173 kilocycles was cut to a length of 66 feet 4 inches in accordance with antenna design data for a one-half wave radiator. The feeders were cut to 34 feet in length and they were spaced 6 inches apart with nice hard maple spreaders boiled in paraffin. The feeder and radiator wire is No. 12 enameled. The antenna system is located between two three-flat buildings, and it was necessary to mount two 32-foot masts on top of the two-flat house in which W9UZ is located. When everything was all tuned up and in operation for a month or two, signal strength reports seemed to average considerably below what was expected. Something was wrong — very wrong. W1EH accounted for not more than a pair of '10's in the output amplifier, judging by signals he received. So — a receiver and a galvanometer and a pair of 'phones were taken three miles away from the transmitter and some readings taken.

After getting everything all set so it would stay put, the galvanometer showed a deflection of 10 — that is, this was taken as the reference setting for further tests that were to come. The radiator was hauled down and cut in half, exactly, and a 0-3 ampere r.f. meter was connected at the center (Fig. 2). Then it was hauled up again and the transmitter was tuned for maximum power into the antenna. Hold the key down; climb up on the roof; with a pair of binoculars read the current at the center of the radiator. It is 1.94 amperes. Receiver galvanometer deflection is 10. Haul down the radiator; cut off a few inches; make it 66 feet; climb down and retune for resonance; hold the key down; climb up on the roof; read the meter — it is now 2.1 amperes. Again the same motions for 65 feet 8 inches and the current is up to 2.4 amperes; next time, 65 feet with 2.6 amperes; and at 64 feet the current drops to 2.58 amperes — the critical length has been passed. And here is a case of stretching the antenna 3½ inches on each half, a total of 7 inches in all. It isn't a hard job — copper will stretch, you know. At 64 feet 7 inches the current is 2.72 amperes. The three-mile away receiver reports a deflection of 17 divisions on the galvanometer. Surely, some improvement has been made.

Somebody said that antennas of this approximate frequency can be taken to have a resistance of 60 to 80 ohms, approximately. To measure the antenna resistance at this operating frequency and expect anything like accurate results is just a fond hope. However, after deciding that the resistance method was as good as could be had, a non-inductive resistor was made up as shown in Fig. 3. It measured 83 ohms at 1000 cycles — a 7-inch piece of "lead" from a pencil. This was connected in the radiator along with a 0-2 amper e r.f. meter, in the exact center. The transmitter was adjusted until the current in the meter was 2.0 amperes — enough power to make the resistor warm up. Then the radiator was hauled down and up (how many times!), and the resistance varied until the current dropped to 1.0 amperes, one-half the no-resistor value. The resistor was then removed and without making any change was measured at 1000 cycles — slightly more than 68 ohms. While this may be far from the actual resistance of the radiator as it would be measured with precision instruments, it serves as a guide — on which basis the power is taken to be more than 500 watts in the antenna (Z^R). No attempt was made to measure the antenna.
resistance at different lengths, in which there is bound to be some difference. In addition to what was obtained in current measurements, a nice case of a stiff neck was acquired. It isn't easy! As a basis for computing approximate power at the previously mentioned lengths, only as a matter of comparison for a given frequency, the antenna power at 1.94 amperes would be 255 watts; 0.6 feet and 2.1 amperes, 300 watts; 65 feet 8 inches and 2.4 amperes, 392 watts; 65 feet and 2.6 amperes, 499 watts; 64 feet and 2.58 amperes, 455 watts; and 64 feet 7 inches and 2.72 amperes, 500 watts, plus. All of it amounts to arriving at an increase of antenna power from something like 255 watts to 500 watts, brought about by trimming about 2 feet from the radiator length. Yes, signal reports have changed for the better by some decibels.

At W9BCL, operating in the 7000-kilocycle band, and using the same type of antenna system with a crystal-controlled oscillator and a 50-watt output amplifier having an input of 260 watts, the prescribed methods were followed in adjusting the antenna system. Before cutting, the current was 0.7 ampere and, assuming 70 ohms (bad practice, assuming), the power was 35 watts. When the gang finished trimming 4 feet from his radiator, the current was 1.2 amperes and reports had jumped from $R_1$ and $R_2$ to $R_2$ and $R_3$ and even $R_a$, according to W9AHQ, from whom this information was obtained by radio.

Audio Selectivity—Alias Tone Control
By Alton H. Goud, W1CFO

Most of us have heard of the indolent gentleman living under a leaky roof who remarked that when the sun was shining there was no need of worrying about the leak, and when it was raining it was too sloppy to go up and fix it.

So it is with audio selectivity. We can manage to get along without it when there are not too many stations on the air. But when the QRM snails in without warning, it is time to wish for something that we could twist and still follow that station who is rattling away in the bedlam, confident that we are copying everything.

There is something that we can do, and it is so overwhelmingly simple that the wonder of it is that all our receivers are not so equipped at the present time. It is nothing but a tone control, such as our BCL friends have been using for the past two years.

A glance at the sketch will convince anyone of the simplicity, and a trial on your own receiver will show the effectiveness. It can be attached to any receiver, regardless of the audio system used. There are no traps to build or inductances to calculate. The values of the two units, 0.1 µfd. for the condenser and 100,000 ohms for the volume control, are average and will work well with all transformer coupled systems. With resistance coupling it may be necessary to use a higher value of resistance in the volume control. This refers to the last audio tube only; it does not matter what kind of coupling is used in the first audio.

The writer uses and recommends the type of audio system which gives good bass response. Use good quality transformers whether you intend to apply this tone control or not. A low or medium ratio is best. A medium or low-pitched tone works through noise and QRM better, even without a tone control, and with one the effect is very gratifying. With the growing use of crystals and d.c. signals trying to pick out one station from three or four on the same frequency with the same kind of whistling note is very confusing, and it is almost uncanny as you turn the tone control down toward the bass to hear the interfering stations on both sides gradually fade away, leaving the signal you want with nearly as much volume as before. Hardly less gratifying is the ability to soften the sharp discharges of static, and to minimize the roar of a power leak.

Try a tone control on your receiver, and give the other fellow's signals a chance.

Keeping the Feeders Taut

When Zepp feeders are pulled off at an angle from the antenna one wire usually is tight as a drum and the other hangs slack unless the separators are put on at just the right angle which is not a right angle. A Memphisham suggests the arrangement shown in the drawing to overcome this. All the pull is concentrated on one point, and the actual connection of the live feeder to the antenna is made by a short piece of flexible wire.

November, 1932
A Sure-Fire Condenser Microphone

Full Design Details for the Amateur Builder

By Howard F. Anderson, W1BVS*

WHY, when you talk condenser microphone to most amateurs, do they throw up their hands and say "N.D."? Well, probably because many condenser mikes are so insensitive that they require too much audio gain, are too complicated to make and too tricky to adjust. The one here at W1BVS has good sensitivity, is easily built and has a dual adjustment feature that eliminates the trickiness. It has given perfectly satisfactory results and most always causes comment on the part of the fellows worked because of the very good quality and lack of background noise.

The two most important features in a condenser mike are the adjustment of the tension on the diaphragm and the adjustment of the gap between the diaphragm and back plate. The two adjustments should be entirely independent of each other. Otherwise when the gap is right the diaphragm tension is likely to be wrong, and vice versa. If the adjustment to give the proper diaphragm tension for good frequency response makes the gap too great, then the sensitivity is poor. If the adjustment to give the proper gap for good sensitivity makes the diaphragm tension other than what it should be for good frequency response, then the "quality" is punk. Unlike the usual condenser mike intended for amateur construction, this one provides for independence of these two all-important adjustments and does it simply.

The materials used for this job require a minimum of machine work and are of a type that is generally available, the whole thing being built around an obsolete magnetic loud-speaker unit of a type widely distributed in years past and still to be found kicking around radio shop "grave-yards" in goodly numbers. As an alternative to this unit, the whole head can be machined to the specifications given in the drawings.

First procure from the junk pile, or some of your friends, an old Atwater-Kent goose-neck speaker of the vintage of about 1925; the model number of this one is 636722. Any amateur will recognize this speaker. It has an adjustable unit in the base. Throw away the horn and unscrew the unit from the base and throw the base away too. Now dissect the unit and take out the pole pieces, magnets, diaphragm and tension ring. Save the tension ring and diaphragm and heave out the pole pieces and magnets.

The first construction is the back-plate mounting. Salvage a 4-prong bakelite tube base, break out the pins and cut off the top so that the shell is \( \frac{1}{16} \) -inch long, being sure that it is cut true. Drill out two of the pin holes and also drill two \( \frac{1}{8} \)-inch holes to match in the back of the speaker unit so that the sawed-off base can be fastened on the little ears in the center. Also drill a \( \frac{1}{8} \)-inch hole centered in the tube-base bottom, and countersink from the outside for the flat-head screw which goes up through the socket to hold the back plate, as shown in the drawings. The back plate is made from a piece of brass \( \frac{1}{4} \) inches in diameter and about .020 inch thick, perforated with \( \frac{1}{16} \) -inch holes. This can be obtained in any hardware store. A piece of the same material \( 2 \frac{3}{4} \) inches in diameter is used on the front of the mike to keep poking fingers and other things away from the diaphragm. The back plate must be flat, and is soldered to the screw coming up through the center of the tube base. This plate forms one connection of the mike, the shell being

*28 Maple St., Torrington, Conn.
the other. This completes the rear section.

Now for the diaphragm and front end. First take the front shell and make a hole 1 1/2 inches in diameter in the center of it. This can be turned out in a lathe or made by drilling a row of holes and using a hammer and chisel, with a file for finishing. Also drill the four 1/8-inch holes for mounting as shown in the drawing and photographs.

Now make up the three rings as per the drawings. These are of brass and can be turned out very easily in a lathe. In case one is not handy, the two diaphragm rings can be cut out of flat stock, the circle-of-holes method being used to make the openings. These rings must be flat, and can be made so by putting a piece of No. 00 emery cloth on a flat piece of board and grinding them with a circular motion until a really flat surface is obtained. On the tension ring (the one with the projecting lip) a little ingenuity on the part of the amateur will be called for. If a lathe is available, the whole thing can be turned out of one piece of brass. If hand tools are the only recourse, the logical procedure is to make the two pieces separately and sweat them together with solder. One thing to remember is that the projection of the tension ring that goes against the diaphragm must be smooth and have no burrs or rough spots. Otherwise when the ring is drawn up it may punch a hole in the diaphragm.

The diaphragm is made either of duraluminum .001-inch or less thick, or of the foil from a cigarette package. That from "Old Gold" is about the right thickness and tensile strength. If you use the foil take it off very carefully from a new package, so as not to make any creases or pinholes in it, and cut it out the same size as the old diaphragm, using the latter as a templet. Before cutting, however, put the tinfoil on a smooth piece of paper such as a page from QST, making sure there is no dirt under it, and smooth with a soft piece of cloth. After cutting out the diaphragm, put it in between its two rings and

---

**FIG. 1 — DETAIL OF THE CONDENSER-HEAD COMPONENTS**

---

**THE ESSENTIALS OF THE CONDENSER UNIT**

They go together in the order shown, from left to right, and are identified as the front cover screen, head casing, diaphragm tension ring, diaphragm and diaphragm ring assembly, back-plate tension spring and, finally, the back-plate assembly. Further details are shown in the drawing.
tighten the four small screws which hold it in place.

Now for the assembly. The diaphragm tension ring goes into the front of the unit first, with its flat surface toward the front. Be sure the four holes in the front of the unit line up with those in the tension ring. Next put on the front plate or screen and insert the four screws. Then put in the diaphragm assembly with the thin ring toward the tension ring. Line up the screws and take up tension. Now slip in the spring (the wavy ring) that keeps tension on the back part of the unit, and screw in the back section.

Before going further, connect a dry cell and a pair of phones, or high-resistance voltmeter, in series across the mike terminals. If you screw in the back part of the unit carefully you will hear a click and a grating noise, when the diaphragm and back plate just touch. Do this very carefully — you might ruin the diaphragm. When you hear the click (which means that the back plate is against the diaphragm), back off just a hair and blow on the diaphragm, not too hard, and adjust until there is no noise.

This completes the head unit. The mounting and amplifier can be made to suit the individual, but one thing must be remembered. Keep the lead from the back plate to the grid condenser and grid as short as possible. As shown by the photos, the tube is hung upside down in the head amplifier to make these connections meet this requirement. The head-amplifier shield can be cylindrical like the one shown, which is 4 inches in diameter and 8¾ inches high, or can be square. A dry-cell "A" battery for a Type '30 tube may be placed right in the shield, as is done in this case. With a tube drawing more filament current it would be necessary to use an external "A" supply and an additional pair of leads in the cable. The circuit of the head amplifier is shown in Fig. 2.

As to the number of stages necessary for good output, here at W1BVS I use either of two amplifiers. One is a Western Electric 7-A which has one '12-A in the first stage and two '71-A's push-pull in the second stage. The other amplifier is single stage using a '33 pentode. Either of these works into a pair of '45's push-pull; and these excite two Type '10's as Class B modulators. And the '10's will put out 50 watts of audio nicely, as I can prove.

So there is nothing terribly complicated about a condenser mike, and any amateur who knows how to use a few tools can build one. The drawings show an alternative design in case one has the facilities of lathe to turn one up. When using the mike, do not put it inside a copper or tin box that may be subject to mechanical vibration and which will set up an unpleasant ringing sound.

If a little care and patience are observed, I am sure that any amateur can build a mike as good as this one and I know it will improve the quality of the output from his station. It is well worth the time and small amount of money spent.

W9GXI has an 82 that has been giving service for a month at 950 volts and 150 mils, and has been used intermittently at 1125 volts and 200 mils — and this with a condenser-input filter. Some tube!
A Lesson from the Commercials
Describing Some Simple Methods of Protection for the Amateur Station

By Don H. Mix, WITS*

WE AMATEURS have taught the commercials and broadcasters many a lesson—no doubt about it—they admit it. However, we ourselves must also admit that occasionally these engineers do contribute technical ideas and policies which we may use to advantage, and we usually do so. But there is one idea which commercial and broadcast engineers have been dangling in front of our noses for years, an idea which would save us thousands of dollars yearly, and yet we have taken no cognizance of it. Perhaps it has been held too closely to our noses to be readily distinguishable. The idea to which I refer is that of proper protection of our valuable transmitting equipment, to say nothing of our lives, limbs and pursuit of happiness.

Newspapers and "hot stuff" radio magazines say radio is still in its infancy. I don't share this opinion, at least as it applies to the amateur. I believe the amateur is at least in the kindergarten stage. With this maturity upon our shoulders, it is time we gave some thought to making the operation of our transmitters safer, less destructive and more fool-proof.

I have read QST since its birth and never miss the section devoted to the description of individual stations. This section has covered some of the best ham stations in the world and yet I cannot recall a single instance in which mention was made of more protection than primary fuses—and I'll bet if some of these were removed, we'd find a portrait of a very badly pock-marked Mr. Lincoln underneath. A modernized version of an historical theme-song might fit this situation, "Millions for fireworks but not one cent for protection."

On the other hand, the commercial radio and broadcasting engineers consider protection of apparatus and personnel a prime necessity, and a visit to any one of their stations will demonstrate how thoroughly convinced of this they are by the rows of circuit-breakers, relays, fuse blocks, etc. Although the cost of these devices may run into many hundreds of dollars, engineers know that their use will save their initial cost many times over in a short period.

Most amateurs doubtless have gone, or will go, through experiences similar to mine. While in the process of tuning up an oscillator or amplifier, the plate current may suddenly jump to many times its normal value; or an amplifier, apparently perfectly neutralized, will, in the middle of a QSO, suddenly go into oscillation and heat the elements to the melting point. It may be bias failure or a dozen other things. Or it may easily be as simple a mistake as connecting to the 2500-volt transformer tap instead of the 1500-volt tap, I've done that, too. In all cases, it is pure luck if the plate switch can be pulled in time to save the tube; and I've seen tube after tube relegated to the junk pile because the overload came too quickly. Not only tubes are in danger, but meters, rectifiers, transformers, etc. These accidents happen more often in an amateur transmitter than in a commercial installation because the amateur always strives to work his tubes at the highest efficiency possible, thereby obtaining the greatest output for his money. Often we run the input up to double and triple the rated value because we are obtaining more than normal efficiency and holding the plate dissipation to a safe value.

In September QST a process was described whereby an output of 850 watts is secured from a pair of '52's with 4500 volts on the plates and the remarkable efficiency of 85%. Many amateurs would like to duplicate these results and hundreds will make the attempt. But, as the article points out, tuning must be done with extraordinary precautions. As is always the case in highly efficient circuits, a slight maladjustment results in enormous overload on the tubes and associated equipment and many hams who attempt this are going to sacrifice some good equipment. I am not attempting to discourage this kind of work. I am going to try it myself—but not without sufficient protection. Not all of us have the background of experience necessary; and proper protection, obtained at a small cost, will permit us to go ahead with but little apprehension for the safety of our equipment.

High efficiency in amplifiers usually means high biasing voltages and this brings us to another decision in favor of proper protection which will save us money. There is only one way of obtaining high biasing voltages cheaply and that is by the use of grid-circuit resistances or leaks. Unless we have some sort of protection, however, we have an extremely hazardous set-up, so hazardous that very few of us relish the risk. In this system the entire biasing voltage is obtained by the voltage drop through the leak, energy for

* 107 Stearns St., Bristol, Conn.
which is supplied by the excitation provided by the preceding stages. This means that we are staking the safety of our final amplifiers on the 100% performance of the oscillator or other preceding stages. A failure of any one of these means no bias and fireworks. Primary keying may reduce the period of overload in case of failure, but at high efficiencies, things happen fast—and how! Of course, primary keying does not fit in case of 'phone anyway. So, most of us are content to pay the necessary price for a more reliable source of biasing voltage.

I do not believe that I have covered all the arguments in favor of proper protection. I have confined my arguments to those in favor of less destruction, of a saving in transmitter operating expense, and have not mentioned the fact that suitable protection means more hours on the air and less time wasted in waiting for new equipment and reconstruction. However, I think that these will suffice.

Compared with the size of the problem the cure is simple. Most protective devices operate on one of two principles. One is thermal and the other magnetic. Those operating on the thermal principle depend upon the heating effect of the current and are usually intended for circuits in which a prolonged overload of several seconds at least is permissible. While light-circuit fuses have sometimes been used to some advantage, they are invariably slow and none too uniform in operation. They also possess the disadvantage that they must be replaced from time to time at added inconvenience and cost. Such fuses are, however, quite useful in filament circuits and often save the price of a new tube.

This brings us to the magnetic circuit breaker which is the device used universally in all commercial installations. This type uses a magnetic winding placed usually in the plate circuit of the tube between negative high voltage and filament. The winding is of sufficiently low resistance to have a negligible drop in voltage across it. Associated with the magnetic winding is an armature, similar to that of a relay, and some sort of a spring operated switch. The action of the armature serves to trip the switch, the idea being shown in Fig. 1. The magnetic breaker is usually calibrated by providing means for setting the armature at various distances from the magnetic coil. In actual practice, the breaker is set to trip at a plate current value slightly above the safe value at which the tube may be operated continuously. The coil terminals are connected in series with the plate circuit between negative high voltage and filament, as mentioned before. The terminals provided for the “switch” portion of the breaker are connected in the primary of the plate transformer. Now, as long as the plate current remains at a safe value, the primary circuit is closed and we operate as normally. But the instant an irregularity occurs, whether we are aware of it or not, the plate current flowing through the magnetic coil becomes sufficient to draw the armature and this trips the spring-operated switch and opens the primary of the plate transformer in a fraction of a second — before much, if any, damage can be done. As soon as the trouble has been cleared, the breaker may be reset by simply pushing a button or pulling a handle provided for the purpose, which again closes the primary circuit.

![Magnetic Circuit Breaker Diagram](image)

The action of the magnetic breaker is many times faster than any thermal operated device. Thus, it is obvious that we have a kind of electrical watch-dog which constantly keeps an eye on the color of the plate for us and relieves us of all worries for the safety of our equipment. We can try new circuits, 100% modulation, use automatic or leak bias, and even forget to use a proper plate voltage, and still be able to save most of the equipment from disaster.

As an example of the saving which proper protection will involve, I will mention an experience on record at station W9EK-XII at Madison, Wis. This station was in regular operation over a period of five years. Among the various transmitters designed, constructed and operated, there were three crystal-controlled transmitters, each running a Type '04-A in the output stage. During the first few months of testing and experimenting, in spite of our utmost precautions, numerous casualties occurred which included one of the prized '04-A’s. In view of this last loss, it was decided to purchase a couple magnetic circuit-breakers. The type purchased was of the variety which breaks the high voltage d.c. directly and their

(Continued on page 88)
Running Down Local QRM

By Robert B. Witschen, W9SV*

Occasionally we read of some ham who has a chronic case of power leak in his vicinity. Having been in the interference business for quite a number of years, I would like to give some light on the subject that never seems to have come out in print.

A lot is said about how to stop interference, but very little is mentioned about finding it without the use of fancy gadgets with high falutin' intensity meters. Or, maybe most of us think that a loop set is needed. Well, let's say here that intensity meters are OK but not at all necessary, and that the farther one keeps from a portable loop the better. There is only one place for the loop set and that is for locating high-line QRM. So if you have no nearby high tension lines, then just forget about the loop set.

Here's the dope. Get out the portable ham receiver. A two-tube ham receiver with earphones and very little sock is just right. This is to be used for finishing the work when within fifty feet or so of the source of interference. But it is not used until the area has been definitely located. The reason that the little portable set is stressed at the start is to enable you to finish where you would otherwise give up the chase.

Now for the main and important part. It's a regular automobile radio. Some ham or friend perhaps has one, and usually has noise too, so is willing to help. Try to get a car radio that reproduces the high notes well, because the noise is much more pronounced on such a set. The next thing, a point generally overlooked, is to fix in mind that the source the QRM is of "universal" wavelength. In other words, the b.c. set shows little or none of the QRM that is heard on short waves, it indicates that the source is some distance away.

Now get the car radio going, and if you cannot hear the same noise that you hear on short waves (very unlikely) go to some suspected power lines until the noise is definitely heard and identified. Then don't do this: End up where it is loudest. You might drive for miles and find it loudest at the end of a line, perhaps a mile from the source, and miss the source entirely. This can happen even with an intensity meter. (HL) Remember the universal wavelength effect and, instead of keeping the dial at the loudest point of reception of noise, just detune from this point until the noise is barely audible. Try the other side of the peak, too, and check the width of dial tuning range blanketed by the noise. As you drive there will be noticed quite a number of dead spots where the noise will suddenly disappear and then rise to normal. After these are passed, check again — and if the dial blanketing is narrower for the same intensity, then change your course until the noise is effective over a wider area of tuning. Keep the noise intensity as low as possible, using the volume control, until in driving

* 1419 St. Germain, St. Cloud, Minn.

November, 1932
If you are out in the open near a pole having a transformer, try hitting the pole with a big rock or heavy wooden mallet. If the radio emits squawks in tune with the thumps, get a power man to climb the pole for loose wires and fuses or corroded lightning arresters. Shaking the guy wires will do the same thing, but it is hard to pick out the exact pole, since the whole system will be in vibration. But even this is enlightening.

In the event the noise comes from some appliance, get out the portable, attach about two feet of stiff wire to the grid end of the coil for aerial (20-meter coil OK) and you will be able to finish the job on the intensity principal. (Here we have the universal wavelength effect again.) In residences it may be better to get permission to check fuses, screwing them in and out to switch circuits on and off, and have a partner in the car blow the horn for the “off” signal when the noise quits.

For high-tension work use a good loop set. Keep the loop at right angles to the spans and every pole showing noise will give off a “buzz” without you hearing the noise of the whole line. Defective insulators are rare. Loose hardware is noisy (induction) and can be detected or temporarily stopped by tapping the pole with a wooden mallet.

The writer is using an aerial for the car radio that looks like a loop, but is only such when the receiver is tuned to the natural period of the loop. It is mounted permanently at right angles to the line of travel, being built around the rear window of the coupe. In order to get loop action in this way, one end of the winding is left free and the other goes to the aerial post of the radio (Fig. 1). The conventional ground is retained on the receiver, and this aerial gives good volume for all purposes. What the designers of short-wave converters have been trying to avoid in the resonance effects of unused inductances is used to advantage in this case.

To those seriously minded in this work, it may be stated that the loop contains 15 turns of No. 15 s.c. enameled wire in a groove 1 1/4 inch wide, size of the frame being 20 x 13 inches. The b.c. receiver chosen was a Silver-Marshall auto set because of its ability to bring out the highs extremely well. Resonance with this combination appears at about 1200 kc. A commercial portable was discarded for the final “touch-up” work in favor of the portable described in August, 1931 QST — thanks to W9CH.

---

**Standard Frequency Transmissions**

<table>
<thead>
<tr>
<th>Date</th>
<th>Schedule</th>
<th>Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov. 2, W.</td>
<td>B</td>
<td>W1XP</td>
</tr>
<tr>
<td>Nov. 4, F.</td>
<td>BB</td>
<td>W9XAN</td>
</tr>
<tr>
<td>Nov. 5, S.</td>
<td>RX</td>
<td>W9XAN</td>
</tr>
<tr>
<td>Nov. 6, S.</td>
<td>C</td>
<td>W6XK</td>
</tr>
<tr>
<td>Nov. 11, F.</td>
<td>A</td>
<td>W1XP</td>
</tr>
<tr>
<td>Nov. 13, S.</td>
<td>C</td>
<td>W1XP</td>
</tr>
<tr>
<td>Nov. 16, W.</td>
<td>A</td>
<td>W9XAN</td>
</tr>
<tr>
<td>Nov. 18, F.</td>
<td>B</td>
<td>W6XK</td>
</tr>
<tr>
<td>Nov. 23, W.</td>
<td>BB</td>
<td>W1XP</td>
</tr>
<tr>
<td>Nov. 25, F.</td>
<td>B</td>
<td>W9XAN</td>
</tr>
<tr>
<td>Nov. 30, W.</td>
<td>BB</td>
<td>W9XAN</td>
</tr>
<tr>
<td>Dec. 2, F.</td>
<td>BB</td>
<td>W9XAN</td>
</tr>
<tr>
<td>Dec. 3, S.</td>
<td>RX</td>
<td>W6XK</td>
</tr>
<tr>
<td>Dec. 4, S.</td>
<td>C</td>
<td>W6XK</td>
</tr>
<tr>
<td>Dec. 9, F.</td>
<td>A</td>
<td>W6XK</td>
</tr>
<tr>
<td>Dec. 11, S.</td>
<td>C</td>
<td>W1XP</td>
</tr>
<tr>
<td>Dec. 14, W.</td>
<td>A</td>
<td>W1XP</td>
</tr>
<tr>
<td>Dec. 16, F.</td>
<td>B</td>
<td>W9XAN</td>
</tr>
<tr>
<td>Dec. 21, W.</td>
<td>BB</td>
<td>W1XP</td>
</tr>
<tr>
<td>Dec. 22, F.</td>
<td>C</td>
<td>W9XAN</td>
</tr>
<tr>
<td>Dec. 28, W.</td>
<td>BB</td>
<td>W9XAN</td>
</tr>
<tr>
<td>Dec. 30, F.</td>
<td>BB</td>
<td>W6XK</td>
</tr>
<tr>
<td>Dec. 31, S.</td>
<td>BB</td>
<td>W6XK</td>
</tr>
</tbody>
</table>

**STANDARD FREQUENCY SCHEDULES**

<table>
<thead>
<tr>
<th>Time (a.m.)</th>
<th>Duration</th>
<th>Sched. &amp; Freq. (a.m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00</td>
<td>9000</td>
<td>BB</td>
</tr>
<tr>
<td>6:08</td>
<td>7100</td>
<td>W9XAN</td>
</tr>
<tr>
<td>6:16</td>
<td>7200</td>
<td>W6XK</td>
</tr>
<tr>
<td>6:24</td>
<td>7300</td>
<td>W9XAN</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.

(Continued on page 84)
The Single-Signal Receiver at Work

C.W. Reception 97% QRM-Free at W1MK—Low-Power Signals Brought to High-Power Level—More Ideas for Construction

TIME and experience try the real worth of anything new. This applies particularly to the realm of technical development, especially to that of radio. Some months have elapsed now since the single-signal receiver graduated from the QST laboratory and was given its baptism of fire under practical amateur traffic conditions in the League headquarters' station W1MK. Previous months of development and testing under laboratory conditions had given a pretty fair idea of what might be expected in the way of performance. But here was something that represented a revolution in high-frequency receivers, not only in basic theory but also in circuit detail and construction. Practically every previously accepted standard feature of high-frequency receiver design had been thrown overboard and a brand-new start from scratch had been made.

True enough, exhaustive laboratory tests had failed to show up anything in the nature of a basic fault. But what might develop in rigorous day-to-day service of scheduled traffic handling? How would it react to operation right alongside a pair of 500-watt transmitters? How would it cope with those QRM and QRN situations that never show up in casual reception but inevitably occur when important traffic is at stake? How would it "wear" after the usual first enthusiasm for something new had passed? Although confident that the single-signal receiver would work a large degree of improvement over the best-of-their-kind receivers that had previously held sway, we had to try it to find out just what the measure of the improvement might be. Headquarters' station W1MK offered an ideal tough spot for the test. And here is Chief Operator Parmenter's report covering the first month's service.

Traffic Handling With the S. S. Receiver

By R. B. Parmenter, W1MK

The original model of the single-signal receiver, described in QST for July and August, has been used for all work at W1MK since August 23 and it certainly has proved to be a knock-out. After a few nights of tuning around and making comparisons of the three i.f. filter connections, it was decided that the straight superhet connection (crystal shorted) would be useful for 'phone reception when QRM was not too bad and that the more selective parallel connection was most satisfactory for 'phone reception in bad QRM. But for c.w. use with all types of signals and under all conditions, the series filter connection proved to be by far the best. The "broad" setting of the selectivity control makes a fine stand-by position, while slight readjustment of this control makes available any degree of greater selectivity up to the maximum peak of the "sharp" position, as QRM and back-
damage to the tubes or ear drums, of course. Best of all, break-in operation has been made possible to within beat-note of the fundamental of the 3500-kc. self-excited transmitter and right up to the output frequency of the 7.0- and 14-mc. crystal-controlled transmitter with its oscillator and three stages running continuously. Nothing like this had ever been possible with the receivers previously used — and no wonder, with the receiver position but inches away from both transmitters and the receiving antenna lead-in of necessity running parallel to and 6 inches from the transmitting feeders. All that is needed for perfect break-in on any band is better separation between the receiver and transmitters, and shielded antenna leads to the receiver.

The all-around stability that is characteristic of this receiver, its ability to hang onto a steady signal without continuous retuning, together with its high selectivity, have made the use of a "mill" for copying traffic the rule rather than the exception. Needless to say it is a great convenience to take strings of five messages and more directly on the typewriter instead of scribbling them long-hand and then recopying on a "mill" for delivery. Any signal having a semblance of stability will stay put as far as the receiver is concerned.

**QRM AND QRN**

In hundreds of QSO's very little QRM has been experienced, not over three or four cases in which it has been impossible to copy our man. Needless to say these exceptions have occurred where the interference was of identically the same frequency as that of the station being worked. What a contrast to the interference previously experienced. The log shows that with this receiver QRM-free reception has been boosted to some 97%. When the receiver is used with the series filter connection natural QRM is decreased remarkably and local QRM of all kinds becomes practically non-existent, as does a.c. induction from any source. (Anyone building the receiver without the crystal i.f. filter is making a big mistake.)

**EASE OF CONTROL**

As an example of the effective sensitivity, in routine operation it is not unusual for us to receive from schedule stations "QSA3 R4" reports on our 500-watt signals on nights when skip effects are bad — and to have the other fellow a thousand miles off with his pair of '45's come rolling in "QSA4 R8." This has happened on so many occasions that we have become reconciled to the seeming superiority of the low-power outfits. It is accounted for, of course, by the high sensitivity and low background noise level of the receiver which, combined with its exceptional stability and selectivity, make all signals stand out. There have been any number of cases in which we have copied message after message without a miss from a lower-powered station while he, using an ordinary receiver, has been unable to get a thing from us but "OK." The receiver makes all the difference.

**THE CONTROL PANEL OF W1ZF'S MODEL OF THE SS. RECEIVER**

The large dials are for r.f.-detector tuning (left) and h.f. oscillator (right). The knobs are for antenna trimmer (left), filter switch (upper right) and selectivity control (lower right).

**THE CONTROL PANEL OF W1ZF'S MODEL OF THE SS. RECEIVER**

The large dials are for r.f.-detector tuning (left) and h.f. oscillator (right). The knobs are for antenna trimmer (left), filter switch (upper right) and selectivity control (lower right).

**OTHER DEVELOPMENTS**

So much for the report of "RP" of W1MK. Now let's take a look farther afield and see what others are doing with the single-signal receiver. One noticeable consequence of its introduction is the stimulation of new designs in the commercial field. Several commercial organizations...
are preparing to manufacture the complete receiver, we have been informed, while others prominent in the field have adopted one or more of its features, particularly the electron-coupled high-frequency and audio-beat oscillators, developments first supplied to superhets in the QST laboratory and first described in QST. Several amateurs have modernized their commercially built short-wave supers by converting them to s.s. rigs and a number have built and are using models based on the original. Among the latter is W3ZF-W3CGI, who passes on the dope on his version of the high-frequency and i.f. filter unit that he is using with a b.c. chassis for the i.f. and second detector unit.

The Single-Signal Super in Another Dress

By Don L. Lusk, W3ZF-W3CGI

In the August, 1932, issue of QST James J. Lamb described the essentials of a single-signal superheterodyne, which has created a multitude of requests for more information on how to build it. This article is not intended to be a theoretical discussion of this circuit or apparatus, but merely a description of another method of construction, incorporating the desirable features pointed out in the above articles. In this version of the high radio-frequency and i.f. filter unit some of the trimmings have been left over till after the depression, or until such time as further experiments are made. Getting right down to business we start at the front end.

Radio-Frequency Pre-selector Stage

This is essentially as described by Lamb with the exception that the grid-bias circuit decoupling feature has been omitted, eliminating \( R_1 \) and \( C_5 \) of Fig. 3 in the August QST article. This stage is extremely well shielded. There are two reasons why this should be most complete. First, if oscillation occurred here it would defeat the purpose of our oscillator stage, in addition to allowing all sorts of squeals and what-not to be passed on to the i.f. stages. Also, shielding is particularly desirable because we want the signals to come into the set only one way, from the antenna through the pre-selector circuits. This stage uses a Type 58 tube, operating with 200 volts on its plate and approximately 90 volts screen. The output of this stage is run through a special shielded wire, having a large diameter and low capacity to ground, into the first detector.

This stage is wired as shown in the August article, with the exception that here again we left off the grid-bias circuit decoupling feature, eliminating condenser \( C_s \) and resistor \( R_4 \) of the original circuit. This stage uses another Type 58 tube, the output of which is fed through the special shielded wire to the i.f. filter.

The filter stage contains a standard Litz-wound 465 to 525-kc. i.f. transformer whose two padding condensers are disconnected from shunting the coils and are used as the balancing condenser in the crystal circuit \( (C_{1s}) \). This stage is peaked to a frequency of 500 kc., as is the frequency of the special crystal. The crystal is not of the usual power type variety, but is made especially to use a low-capacity air-gap crystal holder. The crystal itself is not much larger than about the size of a dime. It can be either round or square. There seems to be no particular advantage in having a power type crystal here, since it serves only as a filter.\(^1\) This particular holder was made by the Chase Instrument Co., of Philadelphia. The dual 140-µfd. tuning condenser is connected between the compartment housing the trimmer, coil and tube of the r.f. stage (extreme left), and that of the first detector coil and tube. To the right of the detector is the i.f. oscillator, with the i.f. filter (including the first i.f. amplifier tube) at the extreme right.

Tests with the original model showed that the larger crystals (approximately 1 inch square) were more responsive and hence gave greater receiver sensitivity than the miniature "chip" type. The smaller crystal might account for the necessity of using additional amplification. — Editor.

November, 1932
nected across the secondary of the i.f. transformer, and a three-position inductance switch selects "Series," "Parallel" or "Off" connection of the i.f. filter, permitting variations in selectivity to suit requirements. When the switch is thrown in the "Off" position, the receiver can be considered as a straight modern superheterodyne. One change was made in this circuit. A Type 58 tube was incorporated here as the first i.f. amplifier to provide greater r.f. gain and to prevent signal loss which might be likely if we ran the output from the i.f. filter to the grid of the i.f. tube in a separate intermediate-frequency amplifier unit. This I believe to be an improvement over the original design, if a b.c. receiver chassis is to furnish the i.f. amplifier.

THE HIGH-FREQUENCY OSCILLATOR

This is designed to permit "logged" tuning, using plug-in coils. As mentioned before the cost of the unit had to be kept down, and since "midget" four-prong coil forms were on hand and the coil-switching rig required considerable labor for its installation, it was decided to use plug-in coils. Since we were interested only in the amateur frequencies, we decided that another method of band spreading would be more desirable. A General Radio Type 556 band-spread condenser was pulled out of the old dynatron frequency meter and was made to do double duty in the new receiver. We reasoned thus: If the electron-coupled oscillator is the latest in frequency meters, why couldn't we use this arrangement as both the calibrated high-frequency oscillator for the super and as a frequency meter, and thereby do away with the old dynatron idea? It works out FB except that there must be a difference between the oscillator frequency and the incoming one. That is, suppose we were receiving W1XP on 4000 kc. Our oscillator is actually 500 kilocycles higher in frequency or on 4500 kc., the difference equivalent to the resonance frequency of the i.f. unit. But we were not interested in measuring the frequency of our oscillator, we were interested in measuring the incoming signal frequency, which is still 4000 kc. Simple, if you do it right.

A word about the stability of the electron-coupled oscillator may not be amiss. The receiver, after it was completed, was tuned for two hours to the frequency of WWV on 5000 kc. (the Bureau states that their accuracy is better than one part in five million) with no noticeable variation frequency over the entire period. Of course, the set was warmed up for about a half-hour before the transmission. Also, we might just as well put up our argument here against too much band spread. Because of the extreme selectivity of this receiver it is not advisable to spread the bands too much, since it would take too long to tune from one end of the band to the other in fishing for answers to CQ's. Of course if you never send out this little "demon," why then spread the tuning as much as you like. No doubt there are a lot of arguments "pro" and "con" on this subject, so we are content to let you decide yourself. You will note from the picture that the oscillator tuning condenser is screwed to the base and that an insulated flexible coupling is used between this and the tuning dial, thereby eliminating frequency fluctuations due to vibrations in the front panel, etc., and making the assembly more rigid. Extreme care should also be exercised in the shielding of this stage. If r.f. leaks out, it might cause undesirable couplings to other parts of the receiver. A little extra "doping" here and there will result in improved stability and a receiver that you can truthfully be proud to own.

Adjusting and tuning up the receiver after construction has been completed is exactly as has been already fully explained and the reader is referred to the original article for the data. A good high-frequency signal generator (commonly known as an aligning oscillator) is an asset, however, as is also an output meter which will enable you to peak every circuit to exact resonance without guessing.

THE RESULTS OBTAINED

The performance of this receiver is really astonishing. It truly is a revelation. Signals that cannot be touched with an ordinary super can be picked up and read with perfect ease with this instrument. And because of its single-signal selectivity the old band doesn't sound half so crowded.

"What is single-signal reception?" a number of fellows ask. The answer is that instead of hearing each c.w. signal twice as is customary with the ordinary receiver, you hear it only once. In other words, as you tune into a c.w. signal it is of high pitch and, with gradual tuning in the
Third All-Section Sweepstakes Contest


By F. E. Handy, Communications Manager

Nine full days of operating enjoyment, including two whole week-ends! Any ham with an amateur station who lives in the U. S. A. or Canada can take part.

The whole idea of the contest is this. Each station gets on the air as much as possible during the contest period. As many stations as "worked" as possible. A message must be exchanged as necessary proof of "solid" QSO. In working stations the idea of working as many different A.R.R.L. Sections as possible is also kept in mind.

Keeping Score

Each message received, counts one; each message sent, likewise, counts one. Each station you work can contribute a possible addition of two points to your score. At least one message must be handled between the two stations before any entry may be added or score claimed. A message in each direction must be exchanged to get the maximum possible count of "two" in the course of a QSO. (Additional messages may be handled during each QSO of course, but add no more to the score.)

As contacts are made and a score built up, you keep a list of stations, their location or A.R.R.L. Section, and the number of points for each QSO. At the end of the contest all these points are added up. Then count the number of different A.R.R.L. Sections worked with which at least one message has been handled, and multiply the sum of your points with individual stations by this number. Since the A.R.R.L.'s field organization has 69 Sections, that number is the greatest possible multiplier. After the first bunch of QSO's the score mounts with amazing rapidity and makes it extremely interesting to keep score and compare scores. Keep the summary of your score in the form given with this announcement, listing the names of all operators at your station whose work is responsible for any part of the score indicated in your "summary."

The General Call

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

The Messages

Messages are to be transmitted in complete A.R.R.L. form with city of origin, number, date, address, text and signature, the text being of ten or more words by plain language count where messages are made up for the purposes of this activity. Many messages in our contest may be "originated and delivered," addressed to the station being contacted. However, when regular routine traffic happens to be in need of routing in a particular direction for delivery or further relaying it should be handled and held with the rest of the message file, to be submitted if called for, following the report of work in the contest. Routine traffic may be counted regardless of the length of the text. There is no excuse for routing messages in the wrong direction unless it is learned that a station can forward them by

There is no point in working the same station more than once in the contest period if 5 points have been earned by exchanging messages. If but one point is made the first time a station is worked you can add a point by working this station again and handling a message in the opposite direction.

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

November, 1932

33
schedules or traffic routes though. Message files must be kept, and in the cases of the winners in each Section or any special question that the committee on awards could answer by reference to your file, operators will be called upon to send Hdq. their contest traffic for examination and return. Failure to provide traffic files if called upon to do so will constitute disqualification. However, participants are not requested to send in message files with their reports, but merely to hold them for possible call. It is believed that this arrangement will make possible a saving of work and expense as well as simplify the arrangements for those who take part.

Message form is explained in detail in the Seventeenth Edition of the "Rules and Regulations of the Communications Department." (This booklet also contains the Federal Radio Commission regulations for amateur stations, Q Code, International Prefixes, a large photograph of W1MK and other information. On receipt of a postal to A.R.R.L. requesting this publication it will be sent free of charge if you state that you want the information in connection with the Sweepstakes contest.) In all cases in which Sections are smaller units than states, the name of the Section should be included after the signature in originated messages to assist participants in properly crediting messages.

An example of amateur message in A.R.R.L. form follows:

He msg fm San Jose Calif W6PBW NR 388 NOV 14
To Bill Harrison W1YS
85 Mystic St
West Medford Mass
Can you schedule W6FO Chicago to complete coast to coast long hop trunk line Santa Clara Valley Section to terminal in Eastern Massachusetts Section
E J Amaranites
(Santa Clara Valley Section)

The contest will call for individual originality in making up the messages to be sent to each station worked. Identical-text (so-called rubber stamp) messages must be ruled out of the count of both individual points and Sections worked. As many messages can be sent to a given Section as you can work stations there. All messages for which points are claimed must be handled sometime between the official beginning time and end of our message-handling All-Section Contest. In checking reports points will be deducted for traffic with incomplete preambles, rubber-stamp texts, etc., and this may apply to one or both the stations responsible for haphazard work.

THE CONTEST PERIOD

The exact starting and ending time for our 1932 Sweepstakes is given in the following table for each variety of time in order that there be no misunderstanding. The contest runs from Saturday, November 12th, through Sunday, November 20th (until early Monday, November 21st).

<table>
<thead>
<tr>
<th>Time</th>
<th>Starts</th>
<th>Ends</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.S.T.</td>
<td>Nov. 12 5:00 a.m.</td>
<td>Nov. 21 5:00 a.m.</td>
</tr>
<tr>
<td>E.S.T.</td>
<td>Nov. 19 4:00 a.m.</td>
<td>Nov. 21 4:00 a.m.</td>
</tr>
<tr>
<td>C.S.T.</td>
<td>Nov. 19 5:00 a.m.</td>
<td>Nov. 21 5:00 a.m.</td>
</tr>
<tr>
<td>M.S.T.</td>
<td>Nov. 19 6:00 a.m.</td>
<td>Nov. 21 6:00 a.m.</td>
</tr>
<tr>
<td>P.S.T.</td>
<td>Nov. 19 7:00 a.m.</td>
<td>Nov. 21 7:00 a.m.</td>
</tr>
</tbody>
</table>

IN GENERAL

The word "Sweepstakes" used in connection with our contest signifies "a clean sweep." This is appropriate since our highest scoring stations have literally "swept the air," piling up a great number of points by skilful operating work. The "Sweepstakes" has become one of our most interesting and popular A.R.R.L. activities.

The scope of the contest as has been outlined will indicate its extreme simplicity. For any hams who have ever taken part it is unnecessary to explain the opportunities for making new contacts and friendships between amateurs in each and every League Section, as well as in each and every frequency band. It is of interest to see how many Sections can be worked in the contest period; to determine how many stations can be worked! If you have never tried to work "all Sections," take this as an opportunity to try it. You will add new Sections, and new stations. Any frequency bands can be used.

REPORTING RESULTS TO HQ.

Report to A.R.R.L.,® West Hartford, Conn., giving your log or tabulated list of QSO's, showing the Sections, stations, points, and your "grand total" as soon as the contest is over, for credit in the full report of results in QST. Include a signed statement that the score and points as enumerated are correct and true to the best of your knowledge and belief. Hold message files for checking but do not send them unless and until called for by Hdq. Use the form suggested herewith in making your report:

New A.R.R.L. Award for Sweepstakes Winners

A newly designed charm bearing a finely worked design symbolic of amateur radio communication and inscribed with the call signal of each winner will be awarded to the victors in this most popular and typical of our A.R.R.L. contests. The design of this emblem is shown herewith (actual size). It gives some idea of the beauty and character of the award, although a black and white reproduction can scarcely do it justice. Awards, where practicable will be made publicly by A.R.R.L. officials and League representatives attending conventions, hamfests and club meetings, and they will be made as soon as practical after the contest is over.

Bronze charms will be given the winner in each Section, except the highest scoring winner in the Canadian portion.

® All competitors are requested to submit their lists, even if they only show a small score, because by doing this they are helping to support the claims made in logs from other stations, and also so they may receive full credit for their work in QST.

34 QST
of the field organization, as well as the “high mark” for all U. S. A. territories, who will receive the same design done in gold. On the reverse of the charm will be a neatly worded inscription, THE AMERICAN RADIO RELAY LEAGUE AWARD—THIRD ALL-SECTION SWEETSTAKES CONTEST NOV., 1932. Additional lettering will identify the Section in which the winner is resident also. Shall we reserve one of these awards to put with your trophies, or hang on your watch chain?

COMPETITION

The main competition each operator must consider comes from operators in his immediate Section. Section scores will be tabulated too, to see which S.C.M. has the hardest working “team” in proportion to the number of stations in his territory. Work to be high station in your Section, and you may also be “national” high. The awards are primarily for the operator running up the best record for each Section.

OPPORTUNITY EQUAL FOR ALL

In a previous Sweepstakes one of the winners used a ‘01A transmitter with 180 volts B supply! Power may help but it isn’t everything, and this shows the possibilities in every case where there is “real operating” behind the key. In that same contest a 3.5 mc. phone ran up a score of over 2500 points. The possibilities of competition between sta-

tion will report the biggest bunch of Sections worked on c.w.? ... On ‘phone?

It is not absolutely necessary that every station you swap messages with be actually taking part in the contest to make your points count. However, logs will be checked and compared with each other by the award committee in as thorough a manner as possible. The message files of leading stations will be examined to insure complete fairness and accuracy of the results and awards. Any neatly kept tabulation in the form given with this announcement will be an acceptable and welcome report. Any operator you work that doesn’t know “what it’s all about” can be referred to these pages of QST. First of all ask the station to come through with a message and take yours.

SUMMARY OF FINAL SCORE

<table>
<thead>
<tr>
<th>Date and Time (local)</th>
<th>Station Worked</th>
<th>Freq. Bands</th>
<th>City or Town</th>
<th>A.R.R.L. Section</th>
<th>Check if New Section</th>
<th>Traffic</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov. 12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:08 a.m.</td>
<td>VERBE</td>
<td>7</td>
<td>St. Lambert, P. Q.</td>
<td>Quebec</td>
<td>x</td>
<td>1-S</td>
<td>3</td>
</tr>
<tr>
<td>12:19 a.m.</td>
<td>W6ZM</td>
<td>3.5</td>
<td>Oakland, Calif.</td>
<td>East Bay</td>
<td>x</td>
<td>1-S</td>
<td>1</td>
</tr>
<tr>
<td>Nov. 18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>W6AUW</td>
<td>3.5</td>
<td>Albuquerque, N. M.</td>
<td>New Mexico</td>
<td>x</td>
<td>3-2</td>
<td>2</td>
</tr>
<tr>
<td>12:25 p.m.</td>
<td>W6GAC</td>
<td>3.5</td>
<td>Auburn, Calif.</td>
<td>Sac. Valley</td>
<td>x</td>
<td>1-S</td>
<td>2</td>
</tr>
<tr>
<td>13:25 p.m.</td>
<td>W6AIM</td>
<td>3.5</td>
<td>McFarland, Calif.</td>
<td>Sac. Valley</td>
<td>x</td>
<td>1-R</td>
<td>2</td>
</tr>
<tr>
<td>13:48 p.m.</td>
<td>W6SO</td>
<td>14</td>
<td>Washington, D. C.</td>
<td>Md.-Del-D.C.</td>
<td>x</td>
<td>1-R</td>
<td>2</td>
</tr>
<tr>
<td>1:00 a.m.</td>
<td>VERAC</td>
<td>14</td>
<td>Theford Mines, P. Q.</td>
<td>Quebec</td>
<td>x</td>
<td>1-R</td>
<td>2</td>
</tr>
<tr>
<td>1:29 a.m.</td>
<td>W6ZM*</td>
<td>7</td>
<td>Oakland, Calif.</td>
<td>East Bay</td>
<td>x</td>
<td>1-R</td>
<td>1</td>
</tr>
</tbody>
</table>

5 Sections

Score: 14 points x 6 Sections = 70.

* Marked second QSO’s (W6ZM worked twice).

I hereby state that in this contest I have not operated my transmitter outside any of the frequency bands specified on my station license, and also that the score and points set forth in the above summary of my work are correct and true.

(Signed) (Call) (Address)

QUESTIONS AND ANSWERS ON CONTEST MATTERS

Is it necessary when sending a message which you originate for delivery at a station which you contact, to put in the name, street address, etc., or will the call signals, city and state suffice?

As a general rule, the more complete the address the better. Far too many messages on A.R.R.L. message blanks are returned.

(Continued on page 88)

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

November, 1932
A BOthersome necessity which confronts the new amateur who is building his first receiver is that of "band-spreading," which simply means adjusting the tuning circuit of the receiver so that each of the several amateur bands occupies nearly all of the tuning condenser dial. A single tuning condenser with several plug-in coils will not spread each of the bands over the dial properly, because a condenser with a fixed capacity range will tune over a great many more kilocycles at the very high frequencies than it will at the low frequencies. Since the amateur bands vary in width and do not become proportionately larger at the higher frequencies, something must be done to the tuned circuit in the receiver to compensate for the differing number of kilocycles in each band.

Many methods of band-spreading have been devised, but one very simple scheme has not had as much attention from amateurs as it deserves, although used in several manufactured receivers. It is the arrangement in which a variable condenser of fairly large maximum capacity is used in parallel with a very small variable condenser, the large condenser being used as a "band-setting" adjustment and the smaller for the actual tuning. See Fig. 1. This method almost eliminates the "cut-and-try" in making coils, and it has the further advantage that frequencies outside the amateur bands can be picked up, with good tuning spread around practically any frequency to which the large "tank" condenser may be set.

The principle upon which this method operates is not hard to understand, and can be explained quite easily by the example in Fig. 2. Suppose we have a variable condenser whose minimum capacity is 10 µfd., and maximum capacity 100 µfd. With a coil of suitable size this condenser will tune over the range given in Fig. 2, which shows the frequency in kilocycles of the coil-condenser combination for different condenser settings. To cover the frequencies between 3500 and 4000 kc., for instance, requires a capacity change of 10 µfd., since the condenser capacity for 3500 kc. is 40 µfd. and for 4000 kc., 30 µfd. Thus, in Fig. 1 if C₁ is set at minimum capacity (plates all out) and C₂ is set at 30 µfd., then a 10 µfd. change in C₁ will tune the circuit over the entire 3500-kc. amateur band. If the construction of C₂ is such that the difference between its maximum and minimum capacities is just 10 µfd., then the band will be spread over the entire dial on C₂.

Here is where the curvature of the graph comes into play. If C₁ had been set at 20 µfd. instead of 30, the same 10 µfd. change in C₁ would give a tuning range from 4000 kc. to 4850 kc., or a total coverage of 850 kilocycles as compared with 500 in the first example. On the other hand, if C₂ had been set at 70 µfd., the tuning range would be 2450 to 2650 kc., or a total of only 200 kc. The greater the capacity used at C₁, the smaller the tuning range in kilocycles for a given size of condenser at C₂, and vice versa. Therefore if the tuning coil is of such size that a high-capacity setting of C₁ must be used to tune the circuit to the highest frequency desired, the band-spread will be great; while if a low-capacity setting must be used to tune the circuit to the highest frequency desired, the degree of band-spread will be small — that is, a comparatively small number of dial divisions on C₂ will cover the entire band. By using the right size of coil the desired degree of spread can be obtained on any of the amateur bands despite the fact that the size of C₂ remains constant, which overcomes the difficulty usually experienced in using the same tuning condenser on all bands, as mentioned in our first paragraph.

In using the system, C₁ and C₂ may be two separate variable condensers, C₁ having a maximum capacity of about 100 µfd., and C₂ about 15 µfd., allowing 5 µfd. minimum capacity for the latter condenser so the change in capacity from maximum to minimum will be about 10 µfd. These specifications need not be followed exactly, however, because the system is more or less flexible and slight differences can be compensated for by alterations of the coil constants. The larger the capacity range covered by C₂, however, the larger is the "tank" capacity needed at C₁, so...
that if $C_4$ has a larger capacity range than 10 \(\mu\text{fd.}\), it may be necessary to use a condenser at $C_1$ with a maximum capacity greater than 100 \(\mu\text{fd.}\). To get the right range for $C_2$ it is generally necessary to cut down a midget condenser until there is only one stator and one rotor plate. Special double-section tuning condensers for this method of band-spread also are available from some manufacturers.

We can give a few specifications on the basis of the condenser capacities mentioned above. Most of the plug-in coil forms are either 1\(\frac{1}{4}\) or 1\(\frac{1}{2}\) inches in diameter and about 2 inches long. Allowing room for tickler or antenna windings, the winding space available for the tuning coil will be about 1\(\frac{1}{2}\) inches. On this basis, the coils should be as follows:

<table>
<thead>
<tr>
<th>Frequency Band</th>
<th>No. of turns</th>
<th>Length of Winding</th>
<th>Wire Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1715-2000 kc.</td>
<td>90</td>
<td>1(\frac{1}{4}) inches</td>
<td>28 d.c.</td>
</tr>
<tr>
<td>3500-4000 kc.</td>
<td>45</td>
<td>1(\frac{1}{4}) &quot;</td>
<td>21 d.c.</td>
</tr>
<tr>
<td>7000-7300 kc.</td>
<td>13</td>
<td>1 &quot;</td>
<td></td>
</tr>
<tr>
<td>14,000-14,400 kc.</td>
<td>6</td>
<td>1 &quot;</td>
<td></td>
</tr>
</tbody>
</table>

In the first two cases the wire size is the largest that can be used to get the required number of turns into the permissible space. Smaller sizes can be used, of course. In all cases space the turns evenly so the length of the coil is that shown in the fourth column; if this is not done the resulting inductance will be widely different from the required value.

To adjust the system, first try the 14,000-ke. coil. Set $C_1$ at minimum and tune to the high-frequency end of the band with $C_1$ identifying the frequency by commercial marked stations, amateur stations or a frequency meter. $C_1$ will be very nearly at maximum capacity. Then tune over the band with $C_3$, identifying the low-frequency end in the same way, and note the spread. If it is not great enough, reduce the maximum capacity of $C_2$ by cutting down the number of plates in the condenser or increasing the spacing between plates (double-spacing), and try again until the desired spread is obtained. If the spread is too great, add a turn or two to the coil and adjust as before. The other bands can be handled in just the same way, except that if the spread is not satisfactory it should be adjusted only by changes in the coil, not in $C_4$, remembering that removal of turns from the coil will increase the spread and adding turns will decrease it. The 14,000-ke. tuning should be adjusted first, because it is on this band that the greatest shunt capacity at $C_1$ is required. If the adjusting is started with the low-frequency coils it may be found that $C_1$ is not large enough to give the right spread on 14,000 kc. after all the work has been done on the other bands, which would mean that it would all have to be done over again.

From an eliminator, because the effect of wavering plate voltage is reduced and the signals have less tendency to "wander." If the builder is satisfied with anything less than full dial-scale bandspread this system is by far the easiest to get into operation, because some degree of spread can be obtained with almost any coil that will tune to the high-frequency end of the band in conjunction with $C_1$. Also, the means is at hand to compensate for changes in circuit capacity caused by changing tubes, the effect of the tickler coil, and so on, without its being necessary to rewind the tuning coil. As is so often the case when those systems are used which require a very small tuning capacity.

**Strays**

From a recent copy of Collier's: "Oftentimes when a ship's wireless operator makes a mistake or has an argument with another operator, many others who happen to be listening in give vent to their amusement by jamming the air with the famous radio laugh — two dashes, two dots, two dashes." 'Tis a different world on 600!

**About 56-Mc. Work**

Circumstances conspired to prevent the publication, this month, of a story on recent five-meter equipment and results. The postponement, however, gives us an opportunity to ask for further data from 56-mc. workers. Brief descriptions of transmitters together with short outlines of results obtained would be of great value in permitting a bumper review of the latest 56-mc. gear and its performance. Drag out the old mill, you birds.
A Transmitter With Unusual Features

HERE is a brief description of a transmitter that has given exceptional satisfaction for a low-power job, and in which there are two or three details that differ enough from ordinary practice to be of possible help to others.

The set is an m.o.p.a., using a '47 pentode Hartley oscillator, a '47 buffer, and a Type '10 final amplifier. It is used for c.w. work on the 3.5-, 7- and 14-mc., bands, and for 'phone on 3.5 and 14 mc. The oscillator is set permanently on 3500 kc., regardless of the band on which the final amplifier works—a stunt which helps greatly in maintaining a very clean and stable signal from the oscillator. The buffer stage works as a straight-through neutralized amplifier on 3.5 mc., as a doubler on 7 mc. and as a quadrupler on 14 mc. Plug-in inductances are used in both this stage and the final amplifier. The input to the '10 in the last stage generally runs between 35 and 40 watts.

The wiring is shown in the diagram, Fig. 1. No constants are given, since the sizes of coils, condensers, etc., do not differ from those used with other sets of similar nature. The oscillator tank circuit should be High-C, of course, but it is best to use a fairly high ratio of L to C in the other two stages.

One of the unique points about the transmitter is the keying system. A .001-µfd. fixed condenser is connected across the tank tuning condenser of the buffer stage, in series with the keying relay, the contacts of which are normally closed (back-contact relay). When the key is pressed the relay contacts open, thereby taking the fixed condenser out of the circuit. When the key is open and the relay contacts closed, the condenser adds so much capacity to the system that the buffer tank circuit is detuned, with the result that the r.f. is effectively “killed,” cutting off the excitation to the last stage. Since the '10 is biased to cut-off or beyond, no plate current flows when the excitation is cut off. The advantages of this scheme are that it permits full break-in operation on 14 and 7 mc., and break-in within a few kilocycles of the operating frequency on 3.5 mc.; the keying is absolutely clickless; and there are no chirps or back-wave. 1

The modulating scheme for 'phone work is also simple and effective, a form of grid-bias modulation being used in which the modulator tube acts as a variable grid leak for the modulated amplifier. This arrangement is also used by several other 14-mc. 'phones, including W5AEJ, W5BRD, W5GA, WS5PC, WS5KC and others.

A letter from Roy F. Bennett, W5AEJ, also a user of this system of modulation, describes his method of adjusting it as follows: The modulated 1 This method of keying is subject to one disadvantage—the plate current on the tube being keyed will rise to values which may be abnormal when the tank circuit is detuned if the excitation from the preceding amplifier is large. So long as this “detuned” plate current is not much greater than the rated plate current for the tube no damage will be done to receiving types such as the '47 and '45, at normal plate voltages. With thoriated-filament tubes such as the Type '10, however, the filament is likely to be deactivated rapidly, even though the “detuned” plate current does not exceed the 60-mil oscillator rating. Oxide-coated filament '10’s will be less subject to loss of emission under the same conditions. —Editor
amplifier is tuned up just as for c.w. work, and the excitation is then reduced until the maximum increase in antenna current is obtained when the microphone is spoken into. Note that this is not the same thing as adjusting for maximum antenna current. W5AEJ uses a Type '01-A to modulate a 211.

It should be pointed out that this modulation scheme is practically the same thing as the method described by Reuben A. Isberg in "Making Practical Use of Grid-Bias Modulation," page 37 August, 1932, QST, and is subject to the same limitations as the transformer-coupled system shown in that article. If the modulation percentage is to be high, the power output will be low, considering the power capabilities of the modulated amplifier for straight c.w. It is impossible to obtain both high power output and high modulation percentages simultaneously without introducing a great deal of distortion and probably, also, over-modulation, with resulting spurious side-bands and broadness. These effects, unfortunately, cannot be detected by listening to the quality in an ordinary monitor, nor are distant listeners' reports of much value, since reports of "broadcast quality" are passed out for almost anything that is readily understandable. A vacuum-tube voltmeter such as the "modulometer" described in the Handbook should be used to check for overmodulation and to measure percentage of modulation.

Cutting Out Tunable Hums

One annoyance sometimes encountered with home-built "B" supply units for receivers is the so-called "tunable" hum, or hum which appears only when the detector tube is oscillating, and then often at only certain groups of frequencies.

These hums seem to be unaffected by the amount of filter used, and a "B" supply which shows no trace of hum when used with a non-oscillating receiver frequently is a bad offender in this respect. Again, the hum may be completely absent if the antenna is disconnected from the receiver, only to appear with full strength just as soon as the antenna is hooked on.

A simple scheme which has worked to perfect

tion in several cases of this kind is shown in Fig. 2. It consists simply in by-passing the elements of the rectifier tube; that is, connecting a condenser of .001-µfd. capacity or thereabouts between each plate and the filament center-tap of the rectifier tube. The capacity used is not critical. Ordinary mica receiving condensers will stand up if the inverse peak voltage across the tube elements is not more than 500 volts.

This scheme has done a good job of eliminating hum when ordinary r.f. filters between the rectifier tube and the input section of the filter failed utterly.

Electronic 'Phone Break-In

Taking a lesson from the Rube Goldberg schemes used on some of the current B.C.L. receivers for intra-channel noise elimination we emerge with a system for automatic 'phone break-in having no relays and no moving parts. The system is broadly as follows: A tube $T_1$, Fig. 3, is biased beyond plate cut-off until a signal from the speech amplifier releases it. When this occurs its plate current, flowing through $R_2$, biases a second tube, $T_2$, beyond cut-off. This, in turn, removes the voltage across its plate resistor, $R_3$, thereby reducing the paralyzing voltage on the grid of the oscillator to nominal operating bias. It sounds complicated but works neatly. The rest of the story is a condenser, $C_1$, which provides the "quick advance and slow return" necessary to hold the works in during the interval between words and sentences.

Some details are: The coupling condenser $C_1$ is connected to the grid of a tube in the speech amplifier which has a normal swing of a few volts. The grid battery, $B_1$, is adjusted to a sufficiently large voltage so that the grid of $T_1$ never goes positive and yet sufficiently small that the audio signal swings it distinctly below the minus four-volt mark.

The condenser $C_2$ must have low leakage. A good one will show less than .5 microamps when

FIG. 2.—FIXED CONDENSERS CONNECTED ACROSS RECTIFIER TUBE ELEMENTS ARE EFFECTIVE IN ELIMINATING TUNABLE HUMS WITH "B" SUBSTITUTES

FIG. 3.—CONTROL CIRCUIT FOR 'PHONE BREAK-IN — NO RELAYS REQUIRED

C1 = 1 µfd. Rs, Rs = 1.0 megohm.
C2 = 4 µfd. Ts, Ts = Type 36 tubes.
R1 = 1.5 megohm. Bi = Not less than 4 volts.
used as indicated. If, however, it has enough leakage to cause an appreciable voltage across \( R_n \), it is possible to add a reversed grid battery to tube \( T_1 \) so that the net grid voltage is zero when \( T_1 \) is removed. The hang-fire device works like this: When the grid bias of \( T_1 \) is reduced by the signal, condenser \( C_2 \) discharges at a comparatively rapid rate through the tube, but when the tube is again biased high the condenser must recharge through \( R_2 \). This takes a certain length of time which depends on the product of the capacity of \( C_2 \) and the resistance of \( R_2 \). For the values shown it takes about four seconds for \( T_1 \) to lose 60% of its grid voltage.

The methods of turning off the receiver while the transmitter is on are numerous so this “is left as a problem for the student.”

— J. O. Mesa, Waltham, Mass.

Another 'Phone Break-in System

Another break-in system requiring no relays and operating on a similar principle to the one described above is outlined in the following letter from H. D. Ashlock, W9TD:

“The July issue of QST contained descriptions of two interesting break-in ‘phone systems. In this connection some of the ‘phone gang may be interested in the method used by the General Electric Company for several years to obtain single-frequency duplex operation of their powerline carrier telephones.

"Fig. 4A shows the basic circuit. It will be recognized as the familiar blocking-tube keying circuit arranged for voice control. Fig. 4B is a later development and consists of a rectifier and filter between the control amplifier and the control tube. This circuit gives very smooth operation, and since there are no mechanical relays to introduce lag the operation can be made as rapid as desired by the proper choice of circuit constants.

"Since the plate voltage on the oscillator may vary considerably during modulation because of the drop in the control tube, it would be well to use a master oscillator circuit designed to minimize frequency variation due to plate voltage changes.”

The constants in the rectifier circuit of Fig. 4B may be approximately those of \( C_2 - R_2 \) in Fig. 3. Their sizes will determine the lag during which the carrier remains on after the voice has ceased.

Curing Interference with Telephone Lines

Probably a good many hams, especially operators of ‘phones, have had trouble with the land ‘phone lines picking up their transmissions and causing interference. Here is an interesting letter from W. H. Carter, Jr., W5ANW, which brings to light a little-suspected cause of such interference:

“The neighbors in the vicinity of W5ANW have been bothered at times with the telephones picking up the transmissions from this station. The telephone company has had several men out here working on the problem and have not been able to correct it. Telephone lines are run by the back of the shack about 7 feet from the transmitter and about 100 feet from the flat-top antenna. Tests were run on this cable, a 51-pair line, and the signal from W5ANW was heard on all of them regardless of how well the cable sheath was grounded. The drops were removed in the tests so that they could not have contributed to the difficulty.

“After the telephone company had given it up as a bad job and were to wait for a man to get back to town to work on the problem, I decided to try a remedy myself. I discovered the cause and corrected it. The mike on the telephone instrument was acting as a detector and the cable pair was picking up sufficient energy through the lead cover to give a loud signal in the headphone. The trouble can be corrected in three ways: first, by winding a copper cable around the telephone cable and grounding it off at both ends; second, by isolating the telephone disturbed through a repeated coil and furnishing a local mike battery; third (and the easiest method), by simply inserting an aperiodic r.f. choke coil in the 'tup' side of the line at the instrument. This choke can be screwed to the terminal strip in the bell box.
and is easy to install. It is not at all critical as to value but if properly designed will completely eliminate all interference. The choke must be placed in the tip side of the telephone line or it will not be effective.

"I have heard of several cases like this one which were not corrected because the solution could not be discovered."

An Adapter for the SE-143

Many of us in amateur radio have been told that our operating is not as it should be; often it has been suggested that we should listen more on 600 meters where commercial operating is reputed to be at its best. The average amateur has encountered difficulty in building a receiver for this wavelength that is selective enough to exclude the powerful signals of broadcast stations in the adjacent band, or else he doesn't care to spend the money to build such a set.

This station, because of its activity in the Navy Volunteer Communication Reserve, was loaned an SE-143 receiver. This receiver is equipped with a crystal detector, with provision made for a vacuum-tube detector to be added externally. After fussing around with batteries and building detectors, mostly of the 201-A variety, and having no real success with any of them, the set was stowed away.

One day the op had the happy thought of taking four leads off the SE-143, the filament, grid, and two plate leads, placing them in an adapter plug and plugging into the detector coil socket of the short-wave receiver used in this station. This receiver has an untuned r.f. stage using a 35 tube, a 35 regenerative detector, and two stages of audio. The short-wave receiver was connected normally to its antenna-ground system. The SE-143 was connected to an antenna independent of the short-wave receiving antenna, but to the same ground. The antenna and grid circuits of the SE-143 were coupled loosely, about 40 on the inductive coupler scale, and the antenna series condenser turned to nearly maximum capacity. The grid tuning condenser was next tuned to 600 meters and then the tickler coupling tightened until the detector slide into oscillation. What a surprise! Six hundred came to life and ship stations came in R9 plus. The '35 oscilates smoothly, with no backlash, grunting or fringe howl over the whole wavelength range of the receiver. No interference is experienced from nearby broadcast stations.

With the necessity of building a detector and audio system eliminated, and no batteries to fool with — just four leads and an adapter plug to suit your short-wave receiver coil socket — the SE-143 is made practical for the amateur.

— J. E. Ploucher, W3BRB

The same idea can be applied to other similar receivers, no doubt with equal success. A great many amateurs own government surplus Signal Corps and Navy sets covering the range between 250 and 2500 meters, a large number of which are not being used just because of the bother of building detector and amplifier equipment to go with them. This simple scheme is certainly worth a trial.

— Editor

**Strays**

The liquid sold by the Kresge stores under the name of “Krome Plate” makes copper tubing inductances look very pretty and also is FB for the brass plates in the crystal holder.

— W3BRY

**PHOTO-STAMPS FOR QSL's**

Hams who like to have photographs of themselves on their QSL cards will be interested to know that it is possible to obtain miniature photographs in postage-stamp form which can be stuck on the card or other correspondence without the expense attendant upon the making of a regular half-tone and the necessary printing. The pictures are printed photographically and are therefore extremely clear and sharp, even though the size is small, and can be made from any type of photograph. The stamps can be procured from the Photo-Stamp Company, Girard Trust Building, Philadelphia, Pa.

**W8XK in New Location**

With license for power up to 40 kw., W8XK is now occupying four high-frequency channels and operating at Saxonburg, Pa., right alongside its "low-frequency" big brother KDKA. In addition to the former frequencies of 6140 kc. (48 meters) and 11,870 kc. (24 meters), frequencies of 15,210 kc. (19 meters) and 21,540 kc. (13 meters) are now being used by new short-wave transmitting equipment installed at the Saxonburg plant. Placing the whole works under one roof has made possible the common use of much equipment by both the standard broadcast transmitter and the high-frequency outfits. The official daily schedule of W8XK is now as follows:

<table>
<thead>
<tr>
<th>Frequency (kc.)</th>
<th>Time</th>
<th>E.S.T.</th>
<th>G.M.T.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,140</td>
<td>4:30 p.m.—Sign-off</td>
<td>2100—Sign-off</td>
<td></td>
</tr>
<tr>
<td>11,870</td>
<td>3:00 p.m.—4:30 p.m.</td>
<td>2000—0200</td>
<td></td>
</tr>
<tr>
<td>15,210</td>
<td>6:30 a.m.—4:00 p.m.</td>
<td>1130—2100</td>
<td></td>
</tr>
<tr>
<td>21,540</td>
<td>6:30 a.m.—11:00 a.m.</td>
<td>1130—1600</td>
<td></td>
</tr>
</tbody>
</table>

November, 1932
FRANK L. BRITTIN, 1409 Rosemont Ave., Chicago, is the owner of the fine-looking outfit shown on this page. W9DCX is a combined c.w.-phone station, working on 3625 kc. for c.w. and 8945 kc. "phone. The large vertical panel on the table at the right contains the 210 crystal oscillator, temperature controlled (the temperature-control box projects from the right about halfway up), an 865 buffer amplifier, a 203-A modulated amplifier, and two 545's in parallel as modulators. The power supply for the oscillator is housed in the base. The output of the 203-A is fed to the linear amplifier, a DeForest 571, a 750-watt three-element tube, which is mounted on the front of the unit which appears at the left of the table. In the upper portion of this unit is the tuning equipment for the 571 stage, while the lower part is occupied by the rectifier and filter for the high-voltage supply. Four 572 mercury-vapor tubes in a bridge circuit comprise the rectifier. The filter has two 750-mil chokes and three 3000-volt oil-filled condensers.

Between the two transmitter panels is the receiver, an a.c. job using a 235 tuned r.f. stage, 235 detector, 227 first audio and 245 second audio. Just above the receiver is the output amplifier used for c.w. An 860 is used in this stage. The speech amplifier is housed in a separate cabinet about ten feet from the transmitter, and is not shown in the photograph. It has two stages of 227 amplifiers and a third stage with two '47's in push-pull. The output is matched to a transmission line connecting the speech amplifier and modulator, and a line-to-grid transformer and speech choke are mounted in the upper rack of the first transmitter unit. Two microphones are used: a Universal BB and a KK of the same make.

On the shelf under the table is a 1500-volt power supply which handles the 203-A, 545's and 865. The plate transformer for the linear amplifier and its primary reactor are also placed on this shelf. In addition to the receiver described above, W9DCX also has a Hammarlund Comet Pro and a National SW-8, although these are not shown in the photograph.

During the past few months reports on the 'phone have been received from 42 states, and it has also been heard in Germany and New Zealand.

W5FB, Hazen, Ark.

W5FB is a good example of a neat and effective low-power station. It is owned by Harold Clarke, Hazen, Ark., and is installed in its own 10 by 12-foot shack in the yard. The transmitter is a push-pull TNT using a pair of 210's, and works on all three bands. It is
mounted on top of the rack which holds the power supply, and is at the left on the operating table in the photograph. The power supply is the usual 550-volt transformer, pair of '51's, and brute-force filter. The key-thump filter is built into the power supply unit. Just in front of the regular transmitter is an R.E.L. 271 outfit which is used as a spare and in emergencies.

To the right of the transmitter is an R.E.L. 231 receiver, with a home-built receiver beside it. At the extreme right is the monitor.

W5FB's antenna is a 132-foot Zepp with 45-foot feeders. The station has been on the air only since February, 1932, during which time all districts have been worked on 3500 kc. The station has also been heard in New Zealand on this band. Best DX so far is Japan, on 14 me.

K7ANQ

WAY up in Alaska, near the Alaskan Peninsula on the south side lies a group of islands called "The Shumagins," and of this group is Wossnessenski Island, the home of Miss Lily Osterback and K7ANQ.

Lily has the distinction of being Alaska's only YL, or at least we believe so; and with her kind permission we are giving the "low-down" on her station, which is known to most of the fellows on this continent, but which few have seen.

The transmitter is a self-excited outfit using a pair of 50-watters in a tuned grid tuned plate circuit. Plate voltage is obtained from a 1500-volt 900-cycle motor generator, driven by a 32-volt bank of storage batteries. Quite recently a chemical rectifier was tried and the results were beautiful. The note is high pitched (about 1800 cycles) and is often mistaken for crystal control.

The transmitter is built on a hardwood frame and three well-seasoned wood panels. The top panel holds two antenna ammeters and an antenna feeder tuning condenser. The central panel contains the controls for the oscillatory circuit, and the controls for the power supply are at the bottom.

The receiver is the "old standby" regenerative detector and 2-step, the last stage being arranged to peak at approximately 1000 cycles. There is also an auxiliary receiver which is used exclusively for long-wave press. This may be seen at the extreme right of the photo, and uses the old familiar honeycombs. Although not shown in the picture, there is a 6-tube broadcast receiver which furnishes entertainment during the long winter months.

The antenna is a fundamental 7 mc. Zepp, using the second harmonic for 14 mc., although the latter band is very erratic in these latitudes.

In order to charge the numerous storage batteries used at K7ANQ a gas engine is employed since no other source of power is available.

Although DX is not slighted, Lily's main interest is traffic and keeping schedules — the one with W7TX going steadily for the past three years. Traffic can be handled with the best of them, so never be afraid of sending too fast for Lily, because it just isn't done.

Four continents have been worked, and owing to the station's geographical position, regular communication is had with the Orient.

K7ANQ—WELL-KNOWN ALASKAN YL STATION

For a good rag-chew give K7ANQ a call, fellows, and see for yourself.

— Lyle Geary, VE5AW

Simple Time-Lag Device

THE accompanying diagram shows a time-lag arrangement used by N. Holman, of Singapore, which is simplicity itself. The delay action is contributed by the carbon-filament lamp in series with the relay, and the time can be varied by adjusting the tension of the relay armature spring and by the setting of the 50-ohm variable resistor. The delay is obtained by virtue of the fact that carbon has a negative temperature coefficient of resistance, so that the relay current is small when the circuit is closed and increases to a value which will operate the armature when the lamp filament gets hot.

Naturally the size lamp required will depend on the current needed to operate the relay. Holman's juice is 110 volts d.c., which of course means that a d.c. relay will work OK. An a.c. relay can be used with a.c. supply. The device is sensitive to external temperature, which makes it necessary to re-adjust the variable resistor occasionally.
LONG-AWAITED opportunity has come to amateur radio in the British Isles. On July 25th came first official announcement of the formation of a Royal Naval Wireless Auxiliary Reserve, with an organization somewhat similar to the U.S. Naval Reserve and the Army-Amateur Radio System. The Reserve will be drawn from those who are interested in the art of radio communication, and naturally it is expected that the vast majority of those enlisting will be members of the R.S.G.B.

The organization plans have been proceeding ever since the first of the year, having been arranged by an Admiralty Committee of which three R.S.G.B. officers were members. The organization plans were based largely upon information supplied by the A.R.R.L. in connection with the U.S. Reserves. The Reserve will be divided into Areas, Districts, Sections and Units. The Units will consist of 10 members of the Reserve, five of whom shall possess some transmitting facilities.

The response to date has been even more enthusiastic than was anticipated, and there is every indication that the Reserve will be in full operation within the London districts before the end of October.

At the R.S.G.B.'s Seventh Convention Capt. Murray, Director of Signals Department, Admiralty, addressed the members and gave a clear explanation of its objects, which, briefly, are intended to provide a reserve of trained operators for naval service in time of war. It is hoped eventually to extend the scope of the Reserve into other parts of the British Empire.

We have been requested to publish the following notice to American and other amateurs regarding traffic conditions in Australia and New Zealand:

"It is a breach of the regulations for VK and ZL hams to accept messages of a personal character from overseas stations. Only recently the acceptance of such messages has come under the notice of the Radio Inspectors of Australia and New Zealand, and the amateurs concerned have rendered themselves liable to being dealt with by their respective authorities. Please don't call VK and ZL if you have messages of a personal character for delivery or relay."

A protest against our practice of listing the Island of Formosa's unofficial prefix as "YK" comes from Osamu Tsukiji, a Japanese amateur. By his statement, the correct prefix for Formosa (or Taiwan, which Japanese assert is the correct name for the island) is not YK, but is JU, being in the Taihoku or 9th Japanese district. Taiwan is a dominion of Japan, says Tsukiji, and when an amateur living there desires to build an amateur station, he must secure permission from Teishinsho, the Department of Communications. Use of the prefix YK is illegal, and denotes an undercover or "bootleg" station.

The map of Japan's inspection districts reproduced elsewhere in these columns will give a clearer idea of the situation.

The maximum power input permitted in the French QRP tests held during the week of September 11th-18th was five watts, the use of either phone or C.W. being permitted. The tests were organized by M. Bouchard, FSZB, and while we have as yet no information as to their outcome, the probability is that some highly interesting long distance work was done by the low-powered French stations.

November, 1932
The R.E.F. requests that reports be sent on the reception of all French stations during this period, if this has not already been done. Just take a glance through your log for that week, and send QSL cards as you find the entries. Make doubly certain that this has been done in the event you have worked any F stations.

The Seventh R.S.G.B. Convention proved even more successful than its competitors. The proceedings opened on Friday, August 26th, reports J. Claricoats, R.S.G.B.'s Hon. Secretary, and the first event was a lecture delivered by Mr. C. F. Booth of the G. P. O. Radio Section on the subject, "Measurement of Frequency."

On the following day a delegates' meeting was held in which all English districts were represented. Many important decisions were reached, including the arrangements for future Society tests. The business meeting followed, during which the Society awards for the year were presented.

The convention concluded with a dinner at which nearly 150 members were present.

An interesting bit of ultra high frequency work is reported by Pierre Godfrin, F8BJ, in which the reception of 7.6 meter signals was accomplished across practically the whole of France. F8GQ, located in Granville (Mancho) was able to identify and obtain verification of the radio-telephone transmissions of a station at Corse de Calenzana, working duplex with Nice. The receiver consisted of a regenerative detector with two stages of a.f. The power used at the Calenzana station was in the neighborhood of 200 watts, feeding into a directional antenna. Reports on reception of this station in other parts of Europe would be welcomed by the R.E.F.

H. A. Maxwell-Whyte, "Ham" member of the WAC Club, reports an excellent contact with ZL3AQ on 7 mc. 'phone. Both voice and a phonograph record went through QSA5 for nearly an hour. G6WY suggests that this may be a possible world's record for consistent telephony, the distance being about 13,000 miles. The input used was 170 watts to the last stage. The previous day 'phone was put through to ZL3AQ, who received the music on the loudspeaker. G6WY promises to claim a 'phone WAC in the near future.

Which leads us to comment that the 'phone WAC business has been decidedly lagging of late. There hasn't been one issued since October 11, 1930, and the original four 'phone WACmen, ON4UU, VK2HC, G6BY, and G15NJ, are still the only holders of this special certificate. We've had threats of applications from several international 'phonists, but none have as yet materialized. Has the depression hit intercontinental voice for some reason?

8000 miles per watt is the latest achievement standing to the credit of Jim Watson, VK3NQ, QRP addict. As reported by Eric W. Trebilcock, the "Overtone King," VK3NQ QSO'ed F8ET when using a type '01A tube with a plate potential of some 100 volts. VK3NQ made WAC, using under ten watts, you know.

A great deal of FB 28 mc. work is being done throughout Europe at the present time, distances up to 3500 miles being reported. Unfortunately, only commercial harmonics have been heard from the U. S. It seems that the best distances for working over there are up to 800-1000 miles, according to G5FV.

Stung by such instances as this, renewed activity on 28 mc. is being broached by a few W's, notably W9GFZ and W1SZ.

Amateur Radio in New Zealand
By D. Wilkinson, President N.Z.A.R.T.

The year 1921, when a number of experimenters were granted provisional licenses for reception, marks the official beginning of amateur radio activity in New Zealand.

In 1922, Mr. Ralph Slade of Timaru startled the amateur world by consistently logging the signals from American amateur stations on 1000 meters.

In 1923 the provisional amateur licenses were replaced by regular ones, and the first amateur transmitting stations came into operation. Communication with all parts of New Zealand and later Australia soon became commonplace on.

JAPANESE DISTRICTS
wavelengths around 160 meters, Mr. Frank Bell, 4AA, leading the way.

In 1924 the first success in the realm of long distance work was achieved by Mr. Ivan O'Meara, 2AC, who succeeded in working with the Argentine station CBS in the neighborhood of 110 meters. A few weeks later the first contact with America took place when 4AA worked the Californian station 6BCP. On Sept. 17th, 1924, Mr. Slade's signals from 4AG were heard in England on 90 meters, and the following day Mr. Bell, 4AA, worked 2SZ, London. Soon afterwards Mr. Shiel, 4AK, of Dunedin, worked a station in France situated only a few miles from his antennas. These great achievements were sufficient to identify New Zealand amateurs as among the most successful in the world, and to mark 1924 as the outstanding year in all the history of international radio communication.

In 1925 New Zealand amateurs were granted the use of wavelengths around 32 meters in the higher frequency regions, and on these waves excellent long distance work was consistently performed and communication with every part of the globe took place. However, it was not until 1927 that contact with South Africa was accomplished, the honor going to Miss Brenda Bell, of 4AA.

In 1926, due chiefly to the efforts of amateurs in the Auckland district, an association was constituted to be known as the New Zealand Association of Radio Transmitters, representing the amateur fraternity throughout New Zealand. The Association was soon firmly established and a monthly bulletin of its activities was published — "Break-In."

The one outstanding accomplishment of 1928 was the first successful two-way work with an overseas station on a wavelength near ten meters, when Mr. Arthur, 1AN, communicated with an Australian amateur.

During the past three years the association has made wonderful progress, and the membership now stands at seven hundred, consisting of 400 transmitting members and 300 receiving members. The annual subscription is five shillings (approximately one dollar) and the monthly bulletin "Break-In," which is distributed gratis to all members, has grown into a 32-page publication and ranks as the best amateur effort in the Southern Hemisphere.

An annual convention is held each year between Christmas and the New Year. Headquarters is situated in Christ-church, postal address Box 617, and the QSL Bureau in Ashburton, Box 25.

Officers of the Association are as follows:

President D. Wilkinson, ZL2AB
Vice-Pres. H. B. Arthur, ZL1AN
I. O'Meara, ZL2AC
N. W. Laugesen, ZL3AS
N. Shrimpton, ZL4AO
Gen. Secretary R. T. Stanton, ZL3AZ
Ass't Sec'y R. K. Venables, ZL3BZ
Treasurer N. W. Laugesen, ZL3AS
Editors H. P. V. Brown, ZL3CG
N. W. Laugesen, ZL3AS
Distribution Manager C. W. Parton, ZL3CP
QSL Bureau G. Clarkson, ZL3CD

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

Thomas W. Baird, W7VL, Spokane, Wash.
Warren C. Elmore, W7BRB, Great Falls, Mont.
Glen K. Groom, W6BPN, Los Angeles, Calif.
William Carter Hamilton, W9GCF, Sedalia, Mo.
Frederick A. Hill, ex-4GL, ex-9BHX, Savannah, Ga.
Claude E. Judd, W7BKR, Bremerton, Wash.
Philip E. Lowell, Portland, Me.
Donnell O'Conner, ex-8VR, Rochester, N. Y.
Henry F. Pribbenow, W8BUN, Wichita, Kans.
Z. Smith Reynolds, W4ZZH, Winston-Salem, N. C.
G. W. Salt, V6ZAF, Selangor, Malaya.
I. A. Sowder, W4OR, Chattanooga, Tenn.
J. R. Walker, W9BXJ, Mason City, Ill.

November, 1932
Ham Splutterings: Alaska

THE Communications Department

The communications -- when a W6 with an R7-a.c. note smothers your first ZL. Vice versa. The very YL at, K7BND (twelve years to you, "each foot jumped backwards = 100 volts" should be "50 volts," or perhaps it's the altitude here. Handam's Purgatory -- a one-building camp, with three BCL's on the one power line with the transmitter.

The two A-1 YL ops at K7ANQ. To the OM's "GE Lily" the answer is invariably, "GE, OM, this is Eleanor," or vice versa. The very YL at K7BND (twelve years to you). Curious! with the nice keying and the sweet nothings -- Ah, there, Virginia!

Do BCL's go to heaven? Such language! K7ATD's comments on all the broken-hearted YL's he left in "Sunny California" and the wailings for his station cat, which was, but is no more. Ambitions: (1) To put out a sig with a note like K7FF's. (2) To follow in the footsteps of W7BB in his wanderings and visits to foreign hams (July QST). Are BCL's necessary in making up a complete world?

BCL's on the one power line with the transmitter. Is a BCL anyway? "The rum-dum BCL in the room below is a BCL after all." No more. Ambitions: (1) To put out a sig with a note like K7FF's. (2) To follow in the footsteps of W7BB in his wanderings and visits to foreign hams (July QST). Are BCL's necessary in making up a complete world?

To Improve Relaying—Do More Listening

By F. C. Everett*

When a commercial operator has traffic for a given direction a short call will always give him the correct station, for he knows what station is in the right direction. That station will be listening for him. Amateur operation is not that easy because of the scattered frequencies of amateurs and the peculiar paths upon which their ether transmits.

Traffic Briefs

The July issue of Shell Progress (sent us by courtesy of W6CAW) contains an interesting description of the work of amateur operators will exert a great amount of care and energy in arranging and organizing schedules, opening wonderfully reliable traffic routes. Yet it is sometimes virtually impossible for any station not scheduled to get a message into or out of a "scheduled" route without a pure accident. Too often the same stations will, in general, confine their operation to their own little clique.

A station operating, say on the 3000-kc. band and handling large quantities of traffic, or at least on the air pretty consistently gets to be quite well known. If another station has traffic for the point this station is located, or for a city in the direction of this station, the operator is quite apt to wish that he could pass along his messages; provided he can raise you, who operate in such a reliable net. His only opportunity to do so is to answer one of your CQs or else raise you after you finish working some one on schedule or otherwise.

The regulations and A.R.R.L. procedure are arranged to automatically take care of this possibility. After you send SK and your call you are expected to immediately turn your dial and listen for other stations that may be calling you. Unfortunately, comparatively few stations follow this simple idea. Properly speaking, SK means the end of a communication, and when used in this sense it may mean that you will immediately break out into new CQ flames. You may turn in for the night (you should send UL if you so intend, though), or you may walk to the window for a moment to light a cigarette.

Several stations have formed the habit of using QRZ? after SK and their call to indicate that they readily send over the band before proceeding further. Others call CQ just once to make known their intentions. Thus -- "SK WSCMY QRZ? or SK WSCMY CQ de WSCMY. Personally I prefer the former method.

I heard another very fine use of the single CQ the other night. The operator in question was calling a station and had, of course, repeated that station's call and his own several times. He obviously didn't raise him for just a moment he said CQ de W9XXX -- just the once, but I called and raised him. The advantage is obvious.

Those little sure-footed movements on your part will brand you as a good operator among the fraternity and make them anxious to hand you traffic and it is surprising how you can make messages appear apparently out of thin air if you use good procedure.

Listen around the band a bit and find out who works the band before proceeding further. Others call CQ just once to make known their intentions. Thus -- "SK WSCMY QRZ? or SK WSCMY CQ de WSCMY. Personally I prefer the former method.

I heard another very fine use of the single CQ the other night. The operator in question was calling a station and had, of course, repeated that station's call and his own several times. He obviously didn't raise him for just a moment he said CQ de W9XXX -- just the once, but I called and raised him. The advantage is obvious.

Those little sure-footed movements on your part will brand you as a good operator among the fraternity and make them anxious to hand you traffic and it is surprising how you can make messages appear apparently out of thin air if you use good procedure.

Listen around the band a bit and find out who works the band before proceeding further. Others call CQ just once to make known their intentions. Thus -- "SK WSCMY QRZ? or SK WSCMY CQ de WSCMY. Personally I prefer the former method.

I heard another very fine use of the single CQ the other night. The operator in question was calling a station and had, of course, repeated that station's call and his own several times. He obviously didn't raise him for just a moment he said CQ de W9XXX -- just the once, but I called and raised him. The advantage is obvious.

Those little sure-footed movements on your part will brand you as a good operator among the fraternity and make them anxious to hand you traffic and it is surprising how you can make messages appear apparently out of thin air if you use good procedure.

Listen around the band a bit and find out who works the band before proceeding further. Others call CQ just once to make known their intentions. Thus -- "SK WSCMY QRZ? or SK WSCMY CQ de WSCMY. Personally I prefer the former method.

I heard another very fine use of the single CQ the other night. The operator in question was calling a station and had, of course, repeated that station's call and his own several times. He obviously didn't raise him for just a moment he said CQ de W9XXX -- just the once, but I called and raised him. The advantage is obvious.

Those little sure-footed movements on your part will brand you as a good operator among the fraternity and make them anxious to hand you traffic and it is surprising how you can make messages appear apparently out of thin air if you use good procedure.

Listen around the band a bit and find out who works the band before proceeding further. Others call CQ just once to make known their intentions. Thus -- "SK WSCMY QRZ? or SK WSCMY CQ de WSCMY. Personally I prefer the former method.

I heard another very fine use of the single CQ the other night. The operator in question was calling a station and had, of course, repeated that station's call and his own several times. He obviously didn't raise him for just a moment he said CQ de W9XXX -- just the once, but I called and raised him. The advantage is obvious.

Those little sure-footed movements on your part will brand you as a good operator among the fraternity and make them anxious to hand you traffic and it is surprising how you can make messages appear apparently out of thin air if you use good procedure.

Listen around the band a bit and find out who works the band before proceeding further. Others call CQ just once to make known their intentions. Thus -- "SK WSCMY QRZ? or SK WSCMY CQ de WSCMY. Personally I prefer the former method.

I heard another very fine use of the single CQ the other night. The operator in question was calling a station and had, of course, repeated that station's call and his own several times. He obviously didn't raise him for just a moment he said CQ de W9XXX -- just the once, but I called and raised him. The advantage is obvious.

Those little sure-footed movements on your part will brand you as a good operator among the fraternity and make them anxious to hand you traffic and it is surprising how you can make messages appear apparently out of thin air if you use good procedure.

Listen around the band a bit and find out who works the band before proceeding further. Others call CQ just once to make known their intentions. Thus -- "SK WSCMY QRZ? or SK WSCMY CQ de WSCMY. Personally I prefer the former method.

I heard another very fine use of the single CQ the other night. The operator in question was calling a station and had, of course, repeated that station's call and his own several times. He obviously didn't raise him for just a moment he said CQ de W9XXX -- just the once, but I called and raised him. The advantage is obvious.

Those little sure-footed movements on your part will brand you as a good operator among the fraternity and make them anxious to hand you traffic and it is surprising how you can make messages appear apparently out of thin air if you use good procedure.

Listen around the band a bit and find out who works the band before proceeding further. Others call CQ just once to make known their intentions. Thus -- "SK WSCMY QRZ? or SK WSCMY CQ de WSCMY. Personally I prefer the former method.

I heard another very fine use of the single CQ the other night. The operator in question was calling a station and had, of course, repeated that station's call and his own several times. He obviously didn't raise him for just a moment he said CQ de W9XXX -- just the once, but I called and raised him. The advantage is obvious.
W6CNO, the late Llateur station of Mr. John Stenson, Santa Barbara, Calif.

W6CNO not only originates a good number of messages from travelers, but schedules are maintained with many points up and down the Pacific Coast to distribute them. "Between times" Mr. Stenson's brass pounding helps to deliver messages and roll up a nice total — and he is often able to find out information regarding touring conditions — or surprises the next automobilist to stop at his filling station by giving him positive information that it may be "raining points up and down the Pacific Coast to distribute them.

Delivering messages and roll up a nice total — and he is often able to find out information regarding touring conditions — or surprises the next automobilist to stop at his filling station by giving him positive information that it may be "raining points up and down the Pacific Coast to distribute them.

Walter A. Cobb, newly elected SCM of Northern New Jersey, is also a charter member of "W.A.C." (His name alone would entitle him to that distinction.) Lots of pep in his community says Walt in a recent letter. His address is "83-Ampere Parkway, East Orange, N. J.," and he originally hailed from Ampere, N. J., so why not?

W7BB sends an interesting bit of news as follows: "We work Ed Mahoney of OMlTB, Sumay, Guam, nearLy every day. The average report at both ends is H8-9. One day when we were putting a very husky signal into OMlTB he fed our signals into a home-made class B amplifier. He then proceeded to break the plate circuit and key the OMlTB transmitter with our transmission. Every dot carried perfectly.

Ed Mahoney of OMlTB, Sumay, Guam, nearLy every day. The average report at both ends is H8-9. One day when we were putting a very husky signal into OMlTB he fed our signals into a home-made class B amplifier. He then proceeded to break the plate circuit and key the OMlTB transmitter with our transmission. Every dot carried perfectly.

The following contribution by Mr. Jack Wagen­seller, W3GS*, wins the C.D. article contest prize for this month.

Your articles on any phase of amateur communica­tion activity are solicited. Each month the prize winner has his choice of three selections of prizes. See page 55, September, 1932, QST, for more complete details of the article contest. Send yours today. — F. E. H.

Why Handle Traffic?

By Jack Wagenseller, W3GS*

A GREAT number of the amateurs to-day when approached on the subject, say: "Why Handle Traffic?" Well, OM, there must be a reason because for several years traffic handling has increased remarkably. Every day more amateurs are realizing that this is the most important and most interesting branch of amateur radio. Traffic handling is the backbone of amateur radio, OM, and every one must do his share to strengthen that backbone.

More fun may be derived from handling traffic than from any other amateur activity. If any amateur does not get this great pleasure, it is because he does not handle traffic in the right way. It is necessary to make schedules. Don't make a schedule with the first station which you hear, but pick out a good reliable station with an operator who also likes to handle traffic. Pick out an operator who can copy all your messages with ease. Then you will begin to get fun out of handling traffic.

A deep interest in traffic handling is the most essential factor in becoming an ORS. Make traffic your most impor­tant station activity. Make at least one schedule in each direction and handle as much traffic as possible. Keep a copy of every message handled, and on the 16th of each month report your traffic total to your Section Communic­ations Manager. (It is welcome whether you hold ORS or not.) Include in this report any special activities, experiments, or accomplishments which have taken place at your station.

After reporting to your SCM for three consecutive months, make application to him for ORS appointment. Your SCM will then send you the regular ORS forms to be completed and returned to him as soon as possible. If these are in order, the SCM will send you a form sheet by means of which a "test" schedule will be arranged between the applicant and the SCM (or some station appointed by him). The purpose of this "sked" is to give the applicant a test on actual traffic handling over the air, in use of proper procedure, and to verify that the applicant can copy fifteen words per minute.

If the above requirements are fulfilled and you quality as an ultra-reliable the SCM will forward your ORS certificate of appointment. Once an ORS you will receive report cards, the ORS bulletin, and other valuable advance information from Headquarters. You may also then participate in the big quarterly ORS parties. Become an ORS, OM. All the best stations are ORS — ORS are the best stations.

* A.R.R.L. Section Communications Manager Eastern Pennsylvania, 210 Main St., Pennsburg, Pa.

Three S.C.M.s Honored

Herman Radloff, W9AIR, received the commendation and best wishes of "the gang" when he was presented with a ten-dollar gold piece at the Southern Minnesota Ham Convention banquet at Mankato, Minn., September 10th. "A new amateur experience in Rad's eight years of pleasant associations in our amateur radio fraternity," he says.

O. J. Spetter, W9FLG, and the Kansas Wouff-Hong Trophy, presented at the Kansas Midwest Division Conven­tion in recognition of his leadership and the quality of his station and operation. This initial presentation of the Kaw Valley Radio Club is a replica of the original wouff-long at Headquarters. It is made entirely of wood from a spar of the frigate Constitution, the "Old Ironsides" of naval song.
and story. This trophy will become the permanent possession of the Kansas amateur who winning it three years in succession. Spetter, active in amateur radio for twenty years, received an overwhelming vote for the first award of this new honor to "the Kansas amateur who has done most for amateur radio in the past year."

I. S. Liner, KA1SL, A.R.R.L. Section Communications Manager for the Philippines, is now in this country visiting at Beverly Hills, Calif. The Thursday preceding his departure the KA-gang presented him with a silver cup inscribed suitably in appreciation of his services as S.C.M. Liner expects to return to his position in Manila in about four months. In the meantime Thompson, KA1XA, is appointed Acting S.C.M. for P. 1.

Traffic Briefs

C. D. Sisten, K6COG, SCM Hawaii, was married on August 27. Best wishes and much happiness, OM.

Operator Magner of RX1AA spent a two weeks' vacation at W2ADQ, where he maintained contact with his wife via a schedule, W2ADQ-RX1AA. The VF is an op also. Magner kept the W2ADQ-NY1AB schedules while W2ADQ was on vacation.

Another about fast relaying: Here's how it's done at W7BB. On August 25th W1MK gave W7BB three messages for the Philippine Islands, one for Hawaii, and one for Alaska. W7BB passed the P. I. traffic to KA1LY within five hours, the Hawaiian traffic to K6EBR in about three hours and the Alaskan message to W7TX-K7PQ within thirty minutes. Traffic doesn't linger long at W7BB's shack!

Use Standard Message Form

IN THE course of eight evening communications I found seventeen different operators all using a different message form. Some sent no date. Some sent the number of the message last and no town or station of origin. Some sent incomplete addresses. Oh, me! The results were unlike radiograms in the poor form these operators used. Why not adopt the standard A.R.R.L. message form for amateur work?

The advantages of standard forms are numerous; in fact, could be listed for hours at a time. In the first place, better form speeds up traffic handling, requires less fill in and QRS, prevents garbled messages, makes for more reliable traffic schedules and has many other advantages. Traffic handling is as important to hams as putting power into their antennas! More attention to proper traffic form should better traffic handling as a whole.

Proper form makes a neat appearing message when written out, easy to file, and easy to trace every movement. It makes traffic increasingly worthwhile, and much more a pleasure to handle in business-like fashion. San Francisco can boast of good traffic procedure, though it doesn't have as many reporting stations as some of the other sections. Use of standard procedure and proper system is certainly A-1 here. A message in the regular A.R.R.L. form recommended for amateur work is as follows:

SAN FRANCISCO CALIF W6ZF NR 101.

ALL RADIO AMATEURS CARE ARL WESTHARTFORD CONN HOW DO YOU LIKE IT DOES IT NOT APPEAL TO YOUR GOOD SENSE OF JUDGMENT RAM RADIO NEEDS A STANDARD FORM OF MESSAGES WILL YOU DO YOUR BIT TOWARD THE MOVEMENT W6ZF W6AYC

— R. O. Martin, W6ZF-W6AYC, Manager KUP, San Francisco

Relative Traffic Standings (AUGUST—SEPTEMBER)

<table>
<thead>
<tr>
<th>Messages Per Station (25%)</th>
<th>Stations Reporting Traffic (25%)</th>
<th>Gain or Loss (Traffic Reports) (25%)</th>
<th>Traffic Total (25%)</th>
<th>Standing Based on Average of All Four Ratings (%)</th>
<th>Leading Section in Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kansas</td>
<td>213.9</td>
<td>Los Ang. 163</td>
<td>E. Fla. +21</td>
<td>Kansas 8558</td>
<td>Los Angeles 72.5</td>
</tr>
<tr>
<td>E. Bay</td>
<td>169.5</td>
<td>Mich. 96</td>
<td>Los Ang. +18</td>
<td>Los Angeles 6514</td>
<td>Illinois 85.6</td>
</tr>
<tr>
<td>P. I.</td>
<td>155.8</td>
<td>Ill. 76</td>
<td>Wash. +17</td>
<td>Michigan 4102</td>
<td>Connecticut 70.6</td>
</tr>
<tr>
<td>N. E.</td>
<td>135.6</td>
<td>Wash. 73</td>
<td>San Jon. +17</td>
<td>Illinois 4187</td>
<td>Washington 85.8</td>
</tr>
<tr>
<td>R. C.</td>
<td>134.8</td>
<td>Ohio 64</td>
<td>Mich. +11</td>
<td>Michigan 3905</td>
<td>New England 87.2</td>
</tr>
<tr>
<td>M.D.-D.C.</td>
<td>103.8</td>
<td>Md. 44</td>
<td>Ohio +10</td>
<td>Washington 3506</td>
<td>Northwestern 83.7</td>
</tr>
<tr>
<td>W. Va.</td>
<td>103.5</td>
<td>Conn. 43</td>
<td>Mich. +35</td>
<td>Washington 3006</td>
<td>West Virginia 83.7</td>
</tr>
<tr>
<td>Alaska</td>
<td>100.8</td>
<td>W. Va. 42</td>
<td>W. Va. +9</td>
<td>Washington 2906</td>
<td>New York City-L. I. 83.9</td>
</tr>
<tr>
<td>Ga.-S. C. - etc.</td>
<td>100.1</td>
<td>Kansas 40</td>
<td>W. Pa. +9</td>
<td>Maryland 2806</td>
<td>Eastern Florida 83.9</td>
</tr>
<tr>
<td>So. Tex.</td>
<td>98.8</td>
<td>Ky. 39</td>
<td>Ill. +9</td>
<td>Maryland 2700</td>
<td>Canadian 83.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>S. P. +9</td>
<td>Maryland 2100</td>
<td>West Virginia 82.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Delta +9</td>
<td>Maryland 1700</td>
<td>Kentucky 82.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Arkansas 81.1</td>
</tr>
</tbody>
</table>

THE TEN HIGHEST SECTIONS

S. C. M.

The Traffic Banner returns to LOS ANGELES after one month's stay in Kansas. W6FLG and his team made a good attempt to retain the honors, however, and are close on L. A.'s heels. For the third consecutive month Los Angeles is again in first place in number of stations reporting traffic with 1,641 stations reporting traffic reports. Ties for the June-August reporting month, that being the last month a report was received from every Section of this Division. Actual "gain or loss" figures from July-August are given parenthetically and are used in computing the "gain or loss" for the whole field organization.
A.R.R.L. Official Broadcasting Stations

Call     ORTz  Det.  Rel.  Total
W3QDL 643 117 826 1096
W3CXL 243 117 836 1196
W3CX 125 105 127 357
W3SQA 105 105 127 337
W3NR 125 117 836 1296
W3M 130 105 140 375
W3GMX 47 117 826 1096
W3E 130 105 127 362
W3CG 130 105 127 362
W3H 130 105 127 362
W3GG 130 105 127 362
W3HF 130 105 127 362
W3I 130 105 127 362
W3J 130 105 127 362
W3K 130 105 127 362
W3L 130 105 127 362
W3M 130 105 127 362
W3N 130 105 127 362
W3O 130 105 127 362
W3P 130 105 127 362
W3Q 130 105 127 362
W3R 130 105 127 362
W3S 130 105 127 362
W3T 130 105 127 362
W3W 130 105 127 362
W3X 130 105 127 362
W3Y 130 105 127 362
W3Z 130 105 127 362

Month of August—September 15th. Note the stations responsible for above one hundred deliveries. Deliveries count!

A total of 500 or more bona fide messages handled and counted in accordance with A.R.R.L. practice, or just 100 or more deliveries will put you in line for a place in the next BRASS POUNDERS’ LEAGUE. Why not make more schedules with the reliable stations you hear and take steps to handle the traffic that will qualify you for B.P.L. membership also? * Correct listing for this station for July-August.

Atlantic Division

Western Pennsylvania — SCM, C. H. Grossarth, WSCUG — WSDLG is high man this time. W8AJE is working on the Pittsburgh Net. W8KD was at the Cleveland Convention. A new station is W8FPU is working in the W. Pa. Net. W8AXI reports new hams W8HMQ and W8ENK in Erie. W8HGG took his test for license. W8BLM has a nice total. W8JUW was commissioned in the Naval Reserve. W8EDQ reports W8PTC, W8HTG and W8BHP new hams in his vicinity. W8ELZ got his ORS. W8DLK wants to hook the gang on Sunday mornings. W8JKR is active at the Natural Radio Arroyo, W8YA says, “Back on the air and ready go do.” W8CQA tells us that W8RS has four daily schedules. W8JWU says the Alonna Radio Club started up three new hams. W8CMP kept a schedule with W8CPY. W8AVY cancelled his OBS. W8EUG is after an ORS. W8AAQ was married Sept. 4th. W8WPD is a new ham in Pittsburgh. W8AQW is now attending college. W8CQP is looking for traffic. W8CRF is having transmitter trouble. W8RDO is on 7 me. W8FJY promises more traffic. W8AQLF has been working DX on 7 me. W8AFN is a ham in the Weather Bureau and W8AFN says the Amateur Transmitters Association of W. Pa. elects new officers in October. W8CUG has been repairing his big stick. W8JON reports from State College. W8DVZ reports for W8VI and W8NCN, W8CQG is studying for his amateur exam. W8GRA is busy getting his rig working. Reports were received from W8ESE, W8FSD, W8CGB, W8EBC and W8SFH.


*W8CQG 38.

Maryland-Delaware Area—SCM, Harry Gineberg, W2AN — W3ABK, RM (Edgar Hudson), W3BWT, Chief RM (Bpwa W. Darne). W3A00 has resigned as ORS and RM. The Westminster Amateur Radio Club has call W3BAP, District of Columbia. W3CXL handled WX reports from the Weather Bureau. W2BWT is installing crystal. Ed Day is returning to W3ASO. W3IL is getting his share of DX. W3NR will find cooler weather more inducive to good traffic work. W8CQG has been QRL 50-me. experi-
ments. Maryland: W3JA leads Md. W3CV now has p.d.c. W3DCG is putting in o.e. W3ZT has a dandy 3.5 mc. W3BGT has trouble with his "sky-wire." W3AFF is operating a 15-mc. "W3AK 15" for experimental purposes. W3J-K has gone off to school. W3WN gets out FD. W3BRS is pulling traffic. W3BEH has "10s in p.p. T.N.T." W3CJS has a new power transformer. W3OJZ reports for first time. W3CGF has put W3BDG on the air. W3AYD is getting ready back to 3.5 mc. W3DGQ is getting excellent results in his 56-mc. experiment. W3NY found a few hours to go on 7 mc. Delaware: W3EC has a 56-mc. rig. W3BAK will be back in the traffic lineup soon. W3WV has good antennas.


EASTERN PENNSYLVANIA — SCM, Jack Wagener.

W3GSS-W3BF — W3FLA and W3OFF joined the ranks of ORS. W3BFF will soon be an ORS. W3AKB is back on full-time schedules. W3CVS handled traffic from the American Legion Convention. W3AQN is QRL work. W3OR is heard in Germany on 3.5 mc. W3MC has revamped his whole station. W3AHD tried 1.75-mc. 'phone. W3BDD has a new power transformer. W3FTK reports for first time. W3BSC brings us to the Industrial School, Washington, D. C. The SCM is awaiting station license renewal. The following reports were sent in via W3DJ:

Traffic: W3ZDG, W3BEU, W3BWP, W3JN, W3AQQI and W3CQFD. Having a new antenna stack will make a telescope. W3EU put new guys on his pole. W3CHU is old W3SS. W3CJA has a 7-mc. crystal peaking. W3MG is QRL WEP. W3AQW reports for first time. W3BBL reports a new amateur to go to the Industrial School. W3SGWZ is doing nice traffic work. W8FLA and W8FJF joined the ranks of ORS. W8FJF will soon be an ORS. W3AKB is back on full-time schedules. W3WSF has cancelled all "WSNQ"s. W3AQF has cancelled all "WSQW"s. W9BOZ is on with 50-watter at new QRA. "DX on 14 mc. is doing nice traffic work. W9LH and W9AMQ in form again. W9FQQ buys new "W9NW"s. W9DLU attends the Convention in Syracuse. W8GWZ reports traffic from the New York State Fair, Sept. 5th to Sept. 11th. The operators were W8QF, W8QFY, W8AOW and W8AED. W8BJB is back from Texas. W8DSV is lining up new ORS. W8GYV, the station formerly reported as W8JX, is now W8JX. W8VXQ is on 14 mc. W8AFB has cancelled all his schedules. W8DX is finally located in a permanent new QRA. W8DHEU is doing nice traffic work. W8QL is on 1.75-mc. band. W8BBF got laid off again. W8DEQ reports the new Tri-Cities Wireless Association has 45 charter members. W8FLB reports W8DEQ has no yearbook. "W8FDY is QRL Soccer. W8EUF attended the Convention in Syracuse. W8GWZ reports W8HNV a new station in Rome. W8AUU reports hearing W8CVO working WICA 235 using "W8AIM modulator. W8HNN reports BCLs. W8GSD reports two new hams in Rochester, W8CNW and W8GSD. W8BRB received his first QSL from Germany. W8BIF has QSO 254 foreign stations during the fiscal year. W8DEQ is on 3.5 mc. band in early morning. W8BBF reports the 2.1-T. c.w. "W8BFB") will be on with the call W8QY. W8AFM will soon have all his new transmitters going. W8EKM is now ORS. W8HCD (YL) is second op. W8LH is checking off-frequency stations. W8DEN took unto himself a wife. W3EQX wants ORS. W8AUU and W8FJF are using breakin. W8AQF built the two complete 56-mc. transmitters and receivers used at the National Gridl Meet in Elmina. W8ACQ and W8CJU operated from early morning until dark each day of the Meet. W8AWH and W8BIF should both be ORS. W8EMW is all set for another big traffic season. W8DMD should have more traffic after he installs his new "Class B" transformers. HI. W8CTG is district N.C.S. for A.A. A.R.S. A '10 rig is giving W9BAN good results. W9DNL has returned from Calif. Missouri loses and Ky. gains a good station in W8BA. W9HCO is putting in 50-watt Class B modulator. W9BEN took unto himself a wife. W8BEN and W8BEN are all new calls. W8CJU has been busy building a new crystal-controlled job. W8CDQ, Miss Elizabeth Zandonini and her sister, Miss Marie Zandonini, were guests of Mr. and Mrs. W8DST during the Convention in Syracuse. W8GWZ has portable call W8PAI. W8QWH and W8AXW is QSL. W3CQG is on 56 mc. band. W3GQS is doing nice traffic work. W8QL is on 1.75- mc. band. W8FDY is QRL Soccer. W8EUF attended the Convention in Syracuse. W8GWZ reports W8HNV a new station in Rome. W8AUU reports hearing W8CVO working WICA 235 using "W8AIM modulator. W8HNN reports BCLs. W8GSD reports two new hams in Rochester, W8CNW and W8GSD. W8BRB received his first QSL from Germany. W8BIF has QSO 254 foreign stations during the fiscal year. W8DEQ is on 3.5 mc. band in early morning. W8BBF reports the 2.1-T. c.w. "W8BFB") will be on with the call W8QY. W8AFM will soon have all his new transmitters going. W8EKM is now ORS. W8HCD (YL) is second op. W8LH is checking off-frequency stations. W8DEN took unto himself a wife. W3EQX wants ORS. W8AUU and W8FJF are using breakin. W8AQF built the two complete 56-mc. transmitters and receivers used at the National Gridl Meet in Elmina. W8ACQ and W8CJU operated from early morning until dark each day of the Meet. W8AWH and W8BIF should both be ORS. W8EMW is all set for another big traffic season. W8DMD should have more traffic after he installs his new "Class B" transformers. HI. W8CTG is district N.C.S. for A.A. A.R.S. A '10 rig is giving W9BAN good results. W9DNL has returned from Calif. Missouri loses and Ky. gains a good station in W8BA. W9HCO is putting in 50-watt Class B modulator. W9BEN took unto himself a wife. W8BEN and W8BEN are all new calls. W8CJU has been busy building a new crystal-controlled job. W8CDQ, Miss Elizabeth Zandonini and her sister, Miss Marie Zandonini, were guests of Mr. and Mrs. W8DST during the Convention in Syracuse. W8GWZ has portable call W8PAI. W8QWH and W8AXW is QSL. W3CQG is on 56 mc. band. W3GQS is doing nice traffic work. W8QL is on 1.75- mc. band. W8FDY is QRL Soccer. W8EUF attended the Convention in Syracuse. W8GWZ reports W8HNV a new station in Rome. W8AUU reports hearing W8CVO working WICA 235 using "W8AIM modulator. W8HNN reports BCLs. W8GSD reports two new hams in Rochester, W8CNW and W8GSD. W8BRB received his first QSL from Germany. W8BIF has QSO 254 foreign stations during the fiscal year. W8DEQ is on 3.5 mc. band in early morning. W8BBF reports the 2.1-T. c.w. "W8BFB") will be on with the call W8QY. W8AFM will soon have all his new transmitters going. W8EKM is now ORS. W8HCD (YL) is second op. W8LH is checking off-frequency stations. W8DEN took unto himself a wife. W3EQX wants ORS. W8AUU and W8FJF are using breakin. W8AQF built the two complete 56-mc. transmitters and receivers used at the National Gridl Meet in Elmina. W8ACQ and W8CJU operated from early morning until dark each day of the Meet. W8AWH and W8BIF should both be ORS. W8EMW is all set for another big traffic season. W8DMD should have more traffic after he installs his new "Class B" transformers. HI. W8CTG is district N.C.S. for A.A. A.R.S. A '10 rig is giving W9BAN good results. W9DNL has returned from Calif. Missouri loses and Ky. gains a good station in W8BA.
home. W9JVA is on nightly. W9CEE is working 7-, 3.5- and 14-mc bands. W9DFN has moved to Richmond. School clubs W9ABV, W9AP, W9AS has been appointed RM for northern Ky. district. Lighting Calculus keeps W9BNF busy. W9CMO is on 80, W9ARF 17, W9CBQ 17, W9CHQ 12, W9AIU 10, W9BAZ 9, W9CWOQ 9, W9YJO 6, W9CGB 6, W9EYW 5, W9BOZ 5, W9GJZ 4, W9GQO 3, W9FVZ 3, W9HALX 2, W9CIS 2, W9L1 1, W9M8RI.

Ohio — SCM, Harry A. Tummonds, W8BAI — District No. 1: RM W8WSY. W8DAT is putting in a "10. W8CJO has a schedule with W7AHF, Schedules being lined up reports W8XH, W8DIJ schedules W8SYD, W8GP is new ORS. W8HHP is attending Convention, W8BYD is a regular ORS. W8BYD is organizing a high school and college network, W8DSM may have charge of the A.A.R.S. Net in this District. W8CQF is about set for regular schedules, W8QQQ is a new reporter. May fever predominate over radio at W8GUL. W8AWC is back on the job. W8BKL is puddling around Lake Erie. W8FFS is on 3390 kc. W8RDR will have new MCPA. W8DQJ is member ROWL. W8EFP was busy on cellular phone at the A.A.R.S. Domestic meeting. W8WKL, W8WUL. W8GKM is back at Case School. W8CIY got engaged to YL, mashed his leads. W8WUI are building a receiver. W8GJW is on the beach at Cedarburg. W8EAR got a new meter. W8BCV is a new ham at Beaver Dam. W8APO is in p.e. W8DHT is a high-power ham. W8HJS is waiting for B-Eliminators. W8FVJ is on the air. W8GJS is ready for A.A.R.S. W8HCS is on 3390 kc. W8GJS has been visiting hams. W8GGJ is ready for the Comm. Exam. W8ABM promises to be on air more this winter. W8AQU has an 8-5, junior opr. W8EDH tells of his marriage to W9GT. W9HFL won the Lucky Strike Audition by playing his banjo. W8GO is awaiting station license renewal. W8KCP will be on with spark coils for power. W8GVI is getting under way as Route Manager. The Milwaukee Radio Amateurs Club held its first meeting, Sept. 16th. The Burlington Club is preparing for the busy winter season. A new club is the Mequon Area Radio Amateur Club. W8DFP is on 7 mc. W8HNX, W8AUX and W9JXU are on 3.5 mc.

Traffic: W8FSS 119, W9AUX 110, W9DEA 52, W9DXY 42, W9FAY 30, W9AQZ-ZN 27, W9HMS 21, W9FAP 14, W9EYX 13, W9DPJ 14, W9IQW 11, W9DI 11, W9DY 9, W9EQE 8, W9GH 7, W9HKL 7, W9BD 6, W9W 6, W9ZB 11, W9GVI 16. W9AGS, W9ABH, W9AKO, W9BQD, W9BQH, W9CXX, W9CZK, W9GEM and W9GGO are the operators. The Geneva High School Radio Club, W9GJ, has started to hold meetings. W9GEM has been busy on A.A.R.S. District No. 3: W8BTB blew a power transformer. W8BZD reports for the Maumee Valley Radio Assn. and traffic on 70 mc. W9JOZ is new RM. W9ABW has been QRL. W9ABW has '966s. W9AEB resigned as ORS. W9ARX is FBOO. W9AEO is going to build a c.e. rig. W9AX is working 3850 kc. W9AXU, W9BMR, W9BMD and W9BYD are new ORS. W9BYJ is still vacationing. W9DXY is QRL sickness. W9AXK has W9CVH as call at Purdue. W9BYD is a new ham at Clinton. W9BYD is waiting for B-Eliminators. W9BYD is on the air. W9DXY is QRL. W9BYD is building a receiver. W9BYJ is a sailor on a windjammer.

Traffic: W9BFM is on 14 mc. W9EYC and W9BKL are building a receiver. W9BYJ is waiting for B-Eliminators. W9BYD is a new ham at Clinton. W9BYD is a new ham at Clinton. W9BYD is a new ham at Clinton. W9BYD is a new ham at Clinton. W9BYD is a new ham at Clinton. W9BYD is a new ham at Clinton.
NW Section, W8ERU, E. A. Hubbell; RM NE Section, W8DDE, Ed Wilcox. Congratulations to our high traffic man W8AIL. Schedules with W8JDN at the Whiteside County Fair Grounds helped W8LV. W8YI took his homemade W9AGI to New York State. W9KQ and W9CBG live all within two blocks of one another. W9DXZ is arranging schedule with the Dallas State Fair. W9KIC and W9KHD are newcomers in Xenithworth. W9AAK has a new monitor. W9LQG and W9LQF are trying to pull traffic. W9KIC decided to run a.c. to the house. A new P.P. at W9KCT.

MOP.A. W9GJJ is back from operating on the boats. W9AAR W9CUH 20, W9CKM 18, W9AMO 16, W9ABA 15, W9KA W9FOV at Morton High School started. W9CJN wants 11, W9AZI 10, W9AVB 9, W9BYZ-W9DZG-W9ILG- are picking up, W9BPU says the club is growing. W9BVP first VK. W9DZG is installing crystal. W9BPN has gone to W9HSG copied a QST from W4PF giving storm warnings for the recent Florida hurricane. W9LX and W9AV are out to push traffic. W9KX's dad has decided to renew! W9FTX and W9DBO are working together. W9GAI will use 3.5 me. W9HD is getting out fine on 1.75 me. W9CSB is experimenting with a.c. receivers. W9FGD says schedules are getting easier to grow ducks in the parlor than to get W8AF and W8FGW to report! W8KJ is going to knock W8BO out of the Salford Field 'high-tracker' throne. W8BLF forgot to renew! W8BLF is doubling for W8FX while the latter is up North. Nice work, W8IXH! W8GBM is out to give W8PP some hot competition. W8EVJ will start popping soon. Out of nowhere comes W8GCW in a club (daily) doing splendid work in spite of total blindness. W8ACU cooking for himself, W8GJX is married, isn't it? W8CFZ has 70' mast with a red beacon. W8DZ is all hot-cha. C'mon out of your shell, W8DL'E. W8EBQ tells us that W8DOV is going to knock W8HOT of! W8BIU is doubling for W8FX while the latter is growing. W8TG is blackmailing Tate, thanks us! W8DSM isn't a "dead rat"...yet! W8CFZ continues to mimeo the "Bull". W8DLX is on a roll. W8GW is putting his hams on schedule. W8GMB is out to give W8GNI some hot competition. W8EVJ will start popping soon. W8BO wants to get in net One of DAR. W8HL handles his with Army Amateurs. W8DHA's new call is W8HJ! W8ST is still winning. W8PP tells us that Monroe now has a club. W8COUP reports his first. W8FTV wants to get in net One of DARA. W8CAW is all hot-cha. C'mon out of your shell, W8DHE. W8EQE reports W8GYN as new in Nonica. W8BEP (ex-W8LL) you get Fur Honan organized to club, eh! Ludington Radio Club: Who're your officers? W8CSOW- W8BSM claims that with W8FX as campaign manager for "W8HY for SCM" we are handicapped! While bunking around U.P. (Mish.) W8AVD, W8EXT, W8FBC and W8CWR bumped into one another in a box car! W8FX, W8VZ and W8AF are new Junior Operators. W8ABH and W8GQS sent us some stamps this time for the "newcomers": W8GUC-W8IN-W8JEW-W8CGR-W8SCY - W8FTP - W8BTR - W8AYO - W8BEP W8HBR - W8GBM - W8XHJ - W8BIU - W8RL - W8CPS-W8JIC-W8FBR-W8FBS-W8EVI-W8FPL-W8QYN-W8SCN-W8CRS. W8QG is new Jackson A. R. traffic manager. W8EUC relayed 58 messages in Army "eagle carrier pigeon-radio" maneuver. W8CST is our newest ORS. W8BND and W8CUX are working together. W8COUP thinks it's time to get back to W8FX and W8FGW to report! W8KJY is going to knock W8BO out of the Salford Field 'high-tracker' throne. W8BLF forgot to renew! W8BLF is doubling for W8FX while the latter is up North. Nice work, W8IXH! W8GBM is out to give W8PP some hot competition. W8EVJ will start popping soon. Out of nowhere comes W8GCW in a club (daily) doing splendid work in spite of total blindness. W8ACU cooking for himself, W8GJX is married, isn't it? W8CFZ has 70' mast with a red beacon. W8DZ is all hot-cha. C'mon out of your shell, W8DL'E. W8EBQ tells us that W8DOV is going to knock W8HOT of! W8BIU is doubling for W8FX while the latter is growing. W8TG is blackmailing Tate, thanks us! W8DSM isn't a "dead rat"...yet! W8CFZ continues to mimeo the "Bull". W8DLX is on a roll. W8GW is putting his hams on schedule. W8GMB is out to give W8GNI some hot competition. W8EVJ will start popping soon. W8BO wants to get in net One of DAR. W8HL handles his with Army Amateurs. W8DHA's new call is W8HJ! W8ST is still winning. W8PP tells us that Monroe now has a club. W8COUP reports his first. W8FTV wants to get in net One of DARA. W8CAW is all hot-cha. C'mon out of your shell, W8DHE. W8EQE reports W8GYN as new in Nonica. W8BEP (ex-W8LL) you get Fur Honan organized to club, eh! Ludington Radio Club: Who're your officers? W8CSOW- W8BSM claims that with W8FX as campaign manager for "W8HY for SCM" we are handicapped! While bunking around U.P. (Mish.) W8AVD, W8EXT, W8FBC and W8CWR bumped into one another in a box car! W8FX, W8VZ and W8AF are new Junior Operators. W8ABH and W8GQS sent us some stamps this time for the "newcomers": W8GUC-W8IN-W8JEW-W8CGR-W8SCY - W8FTP - W8BTR - W8AYO - W8BEP W8HBR - W8GBM - W8XHJ - W8BIU - W8RL - W8CPS-W8JIC-W8FBR-W8FBS-W8EVI-W8FPL-W8QYN-W8SCN-W8CRS. W8QG is new Jackson A. R. traffic manager. W8EUC relayed 58 messages in Army "eagle carrier pigeon-radio" maneuver. W8CST is our newest ORS. W8BND and W8CUX are working together. W8COUP thinks it's time to get back to W8FX and

DAKOTA DIVISION
SOUTH DAKOTA — Acting SCM, Stanway Gough. W9DNS — W9LZS sends the best traffic report received in four months. W9DJN is looking for local schedules. W9GQR and W9DJN received a visit from W9BAM, W9EES is installing c.c. W9BJV has a new 40-foot Zeppelin. W9IJS is in the air, but not operating with the rest of the gang due to the weather. W9GQR is in need of an update on his schedule.


NORTHERN MINNESOTA — SCM, Palmer Andersen, W9DOQ — W9BLT took traffic at the State Fair. W9BRB has new rig. W9HCY has portable W9BCI. W9AVZ reports a club being organized on the Cuyuna Range. W9HEE spends 70% of his time on the radio. W9QWU calls for DX reports again. W9IRB operated at the Minnesota State Fair, along with W9BBL, W9DQW and W9VBM. W9JIE uses all 47a. W9GW (Mr.) has moved to 7 mc. W9IPN wants an ORS. W9DPF is publishing Duluth 'phones. W9ALB has an ORS.


DELTA DIVISION
MISSISSIPPI — SCM, William G. Bodker, W5AZY — WSBU is correspondant for the new fifth district publication "Sparks." W5BAA reports W5KAN's new transmitter, W5CXM worked a VE4 with a low power. Our RM W5ANX had some trouble with a two-frequency crystal. W5JV reports having calmed the ruffled feelings of several nearby BCLs. W5UM says college QRM will put him on the air. W5ABU has a 500-watt c.c. job ready to take on the air. W5AFW is busy repairing BCL sets. W5AZV completed two new single wire Hertz antennas. W5BOT and W5BNW are attending college.


ARKANSAS — SCM, Henry E. Veite, W5ADI — W5BMI and W5BSE are for high "trafficers." W5BXY reported for the Pine Bluff gang. W5GN did some for El Dorado. W5BZE has moved. W5SI has new 100-watt c.c. job, W5BUX was heard by a ZL on 3.5 mc. W5CNK was QSO J1HK W5BR and W5KQ on 85 mc. W5BKL, W5BUX, W5SI, W5PX, W5KV are all c.c. W5BDW has moved to new QRA. W5CYC is using type 10s.


TENNESSEE — SCM, James B. Witt, W4SP — W4AMD attended the Hamfest at Bluefield. W4AEP motored to Atlanta, plans to go to Mobile for the month. W4BZ is working a CME. W4EFD reports the gang stopped at WCAL to trade for 50-watters! W4HZU has one of them, too. W4BZTZ is President, W4EOG Vice-President, and W4BDN Secretary-Treasurer of the reorganized S.M.R.A. W4IDF is organizing the So. Minn. SCM. W4KQ has a new ORS.


LOUISIANA — SCM, F. M. Watts, Jr., W8YW — Hello, everybody! We're still hanging around. W8BEP is a newcomer. W8AQG took unto himself a wife. W8BBW is on 7 mc. W8APA is on regularly. New fellows in Minden: W8CMQ, W8COR, W8COG and W8CRI. W8BZB Q5ed his first VK. W8QJ and W8HP pooled their equipment and W8WV will be back with you soon.


HUDSON DIVISION
EASTERN NEW YORK — SCM, Robert E. Haight, W2LU — W2BZA continues leading the gang. W2UL reports PB DX. WE2LU dried out his new receiver. We2LKU returned from Maine, W2AVN visited WAQW and
W1ANS, W2BJF is heard on all bands. W2CJP is on 3.5 mc. for winter. W2AEW is on 7 and 14 mc. W2ATM moved to new QRA. W2ACY worked 27 Europeans in 13 days in July. W2BLK built a new o.a. rig. W2CSJ reports nice visits at HQs. W2DDD delivered a message received from D4AAB with W2BBO aid. W2DRU is priming up. W2DSH and W2DVY made application for ORS. What a shock W2BYF is putting out with that new crystal. W2QJ is our only YL. W2BCT is dragging in foreign DX. W2BZT is spotted in the packed house. W2CIZ fitted out with a new receiver. Scheduled for afternoon and Friday and Saturday nights. W2BZZ will be back on shortly. W2CIFU reports QSO with EAR185. W2ZZDZ is also W2ZZBE. W2DIK is back on air. W2AUX is using a crystal. The Radio Club held a Clambake Barbecue on Aug. 26th. W2CSC only casually. W2BCH is undecided what band to operate on. W2DQN is pounding through on 1.75-mc. 'phone. W2CTE and W2DFU are in love with 56 mc. W2BCG was heard in Germany on 3.5 mc. W2DWA and W2DIN tried 7 mc. W2BUI resigned his ORS. W2DMH is new ham in Sconsetady. W2CQH-W2ZZBF is back on air. W2BMX is back from college. Ex-W2SSG promises activity soon. W2EMF, old-time W2CYO, is pounding out with 'phone on 1.75 mc. W2CYV and W2DCX also use 1.75-mc. 'phone. W2BLL is QRL school. W2CQG on 3350 kc. contacted F8JJ. W2BHH is busy making a second op out of his brother-in-law. W2DEL and W2BBK are preparing to attend VQR drills. W2CTC is heard once again. The ORS station will be on the air shortly with crystal control.

Traffic: W2BBA 172, W2UL 107, W2LI 92, W2BV 19, W2AV 17, W2JJP 12, W2ATM 8, W2ACY 3, W2DJS 2, W2ALO 2. NEW YORK CITY AND LONG ISLAND — SCM, M. J. Grainger, W2AUS — W2COl has been appointed ORS and ORS. Route Manager W2QM has been promoted, and his duties now include that of RM for Manhattan. The Hamfest at Hempstead Lake State Park, on Sept. 11th, was enjoyed by over a hundred hams of this Section. Free eats were supplied by the Nassau Radio Club. W2CXY, W2CJY puts in 2000-volt QST. W2DLJ is new ham in Nassau County. Manhattan: W2SC is the one and only high station. W2AWT reports from Canada, Staten Island: W2WP reports a new AC receiver. W2AHO leaves for school soon. Brooklyn: W2CBS continues his experiments. W2Azy continues his duties as RM in Brooklyn. W2PF has a new crystal. W2CWP's YL is W2TU. W2DQU pounds away at the LI trunk. W2ASG is rebuilding. Two new reportes are W2DUE, W2CJU and W2CGL. W2AIF, W2AUS are back on the air. W2DTS reports his first report. W2DRG handles traffic. W2DAL sends in first report. W2DQK reports large total. Queens: W2ADQ wins first place for the Section with a BPL total. W2DMH sends in his report. W2COI is goinggood. W2CZK is back on air. W2DNM now has '52s in PP TNT. W2DWA is heard on all bands. W2DWE reports that will make him WAC. School has claimed W2BIW. W2BIF and W2BFN are still looking for ORS. W2CIZ 82, W2AMT 21, W2CSC 20, W2BJT 24, W2BMX 13, W2BGJ 24, W2DJ 50, W2DDG 60.

MIDWEST DIVISION

NEBRASKA — SCM, S. C. Wallace, W9FAM — W9DI, RM, is starting off for the season. W9DHA, Grand Island, is Assistant RM, taking care of the western half of the state. W9DMY sends in a good report. W9IFE is a new reporting station. W9AZT is going to locate at Boul- der, Colo. W9AVJ is reporting ORS. W9AFM is QRM rebuilding. W9DGL has been working a lot of DX. W9EWO was down to see W9FAM a short time ago. W9ERH is getting ready for the season.

KANSAS — SCM, O. J. Spetzer, W9FLG — The Midwest Division Convention in Topeka was a huge success with a turnout of 170 hams. W9FLG was presented with the Kansas trophy, an exact scale size of the original Wouff-Hong hanging at HQs. CX7 takes all honors with an all-time record. Our hats off to the gang operating W9AY during camp period. W9HNS handled two death messages with 15-minute service. The SCM was glad to hear from the Parsons gang. The Kansas YL hails from there. W9AWP reports that the weather at Topeka was perfect. W9QG was working 3500 kc. now. W9WWW won a Port Arthur College scholarship offered at Convention. W9DEB is getting set for big U.S.N.R. season. Which reminds us, watch the Kansas A.R.S. gang this month. We are using optics with good results. What happened to the Arkansas City gang this month? W9EFE took a trip to Texas to visit his son. W9PF reports exams at Topeka netted Hitawas four hams.


Traffic: W9CRM is a new station in Aurora. W9JYC is a new station in Alabama. W9HBI's '52 gets out better on 7 mc. with TNT. W9HNM says "Let's show Iowa up!" W9ABU is playing football. W9CRM slowed up a little. Hannibal Amateur Radio Club: W9GBC stepped out on traffic. W9HWW was in Minnesota on vacation. W9BEJ is a 3.5-mc. receiver "specialist." W9EFZ is QRL. YL and work. W9FT in an old-time ham. R. L. Cook, W9EVA is rolling. W9CNS still holds to 'phone. W9IRR spends most of his time in club activities. W9JZG and W9CLX are active. W9WIX operates 'phone. W9GTO is working. W9GJL reports for the first time. W9ABH reports little DX. W9BGS is getting started.

Traffic: W9CRM is a new station in Aurora. W9JYC is a new station in Alabama. W9HBI's '52 gets out better on 7 mc. with TNT. W9HNM says "Let's show Iowa up!" W9ABU is playing football. W9CRM slowed up a little. Hannibal Amateur Radio Club: W9GBC stepped out on traffic. W9HWW was in Minnesota on vacation. W9BEJ is a 3.5-mc. receiver "specialist." W9EFZ is QRL. YL and work. W9FT in an old-time ham. R. L. Cook, W9EVA is rolling. W9CNS still holds to 'phone. W9IRR spends most of his time in club activities. W9JZG and W9CLX are active. W9WIX operates 'phone. W9GTO is working. W9GJL reports for the first time. W9ABH reports little DX. W9BGS is getting started.

Traffic: W9CRM is a new station in Aurora. W9JYC is a new station in Alabama. W9HBI's '52 gets out better on 7 mc. with TNT. W9HNM says "Let's show Iowa up!" W9ABU is playing football. W9CRM slowed up a little. Hannibal Amateur Radio Club: W9GBC stepped out on traffic. W9HWW was in Minnesota on vacation. W9BEJ is a 3.5-mc. receiver "specialist." W9EFZ is QRL. YL and work. W9FT in an old-time ham. R. L. Cook, W9EVA is rolling. W9CNS still holds to 'phone. W9IRR spends most of his time in club activities. W9JZG and W9CLX are active. W9WIX operates 'phone. W9GTO is working. W9GJL reports for the first time. W9ABH reports little DX. W9BGS is getting started.

Traffic: W9CRM is a new station in Aurora. W9JYC is a new station in Alabama. W9HBI's '52 gets out better on 7 mc. with TNT. W9HNM says "Let's show Iowa up!" W9ABU is playing football. W9CRM slowed up a little. Hannibal Amateur Radio Club: W9GBC stepped out on traffic. W9HWW was in Minnesota on vacation. W9BEJ is a 3.5-mc. receiver "specialist." W9EFZ is QRL. YL and work. W9FT in an old-time ham. R. L. Cook, W9EVA is rolling. W9CNS still holds to 'phone. W9IRR spends most of his time in club activities. W9JZG and W9CLX are active. W9WIX operates 'phone. W9GTO is working. W9GJL reports for the first time. W9ABH reports little DX. W9BGS is getting started.

Traffic: W9CRM is a new station in Aurora. W9JYC is a new station in Alabama. W9HBI's '52 gets out better on 7 mc. with TNT. W9HNM says "Let's show Iowa up!" W9ABU is playing football. W9CRM slowed up a little. Hannibal Amateur Radio Club: W9GBC stepped out on traffic. W9HWW was in Minnesota on vacation. W9BEJ is a 3.5-mc. receiver "specialist." W9EFZ is QRL. YL and work. W9FT in an old-time ham. R. L. Cook, W9EVA is rolling. W9CNS still holds to 'phone. W9IRR spends most of his time in club activities. W9JZG and W9CLX are active. W9WIX operates 'phone. W9GTO is working. W9GJL reports for the first time. W9ABH reports little DX. W9BGS is getting started.

Traffic: W9CRM is a new station in Aurora. W9JYC is a new station in Alabama. W9HBI's '52 gets out better on 7 mc. with TNT. W9HNM says "Let's show Iowa up!" W9ABU is playing football. W9CRM slowed up a little. Hannibal Amateur Radio Club: W9GBC stepped out on traffic. W9HWW was in Minnesota on vacation. W9BEJ is a 3.5-mc. receiver "specialist." W9EFZ is QRL. YL and work. W9FT in an old-time ham. R. L. Cook, W9EVA is rolling. W9CNS still holds to 'phone. W9IRR spends most of his time in club activities. W9JZG and W9CLX are active. W9WIX operates 'phone. W9GTO is working. W9GJL reports for the first time. W9ABH reports little DX. W9BGS is getting started.
RHODE ISLAND — SCM, R. H. Miller, W14AE—W1AJ joined the A.A.R.S. WIELU has five schedules. WICGO is building new transmitter. WIEQF is perk out fine. W1AQ will be on soon with new outfit. W1AOP is going well. W1BTP is starting up for the season. W1BSZ reports W1AMG has some good meetings arranged for the winter season. Get in touch with Horace Young, 73 Clarence St., Providence, R. I., for dope. W1BZI-W1ZS-W1WI is still going strong.

Traffic: W1BOY 73, W1ASZ 22, W1BGA 17, W1AOP 14, W1BTP 12, W1UE 12, W1ALI 11, W1AAM 6, W1W 56, W1NI 43, W1QV 16, W1HFM 16, W1W 15, W1DOT 2, W1CJH 2.

WICA is the air this month and is back in the BU gang. W1AQW is working the world. W1CBA is in good shape and is working the world. W1CAF, W1VID and W1AQ are going well. W1BTP is still working the world. W1CAB is on with a N.H. station. W1AEW will be on soon with a new outfit. W1AMU is back in the BU gang.

Traffic: W1BOY 90, W1CB 90, W1AMG 68, W1W 56, W1NI 43, W1QV 16, W1HFM 16, W1W 15, W1DOT 2, W1CJH 2.

Traffic: W1AEW 22, W1IBG 10, W1CAB 5, W1MC 2, W1BDI, Stamford (W1AMG), Gilder- man. W1CDW has some nice schedules. W1BIH is on the job in Bridgeport. W1AMG is back in the BU gang.

Traffic: W1BOY 22, W1BGA 17, W1AOP 14, W1BTP 12, W1UE 12, W1ALI 11, W1AAM 6, W1W 56, W1NI 43, W1QV 16, W1HFM 16, W1W 15, W1DOT 2, W1CJH 2.

Traffic: W1BOY 22, W1BGA 17, W1AOP 14, W1BTP 12, W1UE 12, W1ALI 11, W1AAM 6, W1W 56, W1NI 43, W1QV 16, W1HFM 16, W1W 15, W1DOT 2, W1CJH 2.

Traffic: W1BOY 22, W1BGA 17, W1AOP 14, W1BTP 12, W1UE 12, W1ALI 11, W1AAM 6, W1W 56, W1NI 43, W1QV 16, W1HFM 16, W1W 15, W1DOT 2, W1CJH 2.

Traffic: W1BOY 22, W1BGA 17, W1AOP 14, W1BTP 12, W1UE 12, W1ALI 11, W1AAM 6, W1W 56, W1NI 43, W1QV 16, W1HFM 16, W1W 15, W1DOT 2, W1CJH 2.

Traffic: W1BOY 22, W1BGA 17, W1AOP 14, W1BTP 12, W1UE 12, W1ALI 11, W1AAM 6, W1W 56, W1NI 43, W1QV 16, W1HFM 16, W1W 15, W1DOT 2, W1CJH 2.

Traffic: W1BOY 22, W1BGA 17, W1AOP 14, W1BTP 12, W1UE 12, W1ALI 11, W1AAM 6, W1W 56, W1NI 43, W1QV 16, W1HFM 16, W1W 15, W1DOT 2, W1CJH 2.

Traffic: W1BOY 22, W1BGA 17, W1AOP 14, W1BTP 12, W1UE 12, W1ALI 11, W1AAM 6, W1W 56, W1NI 43, W1QV 16, W1HFM 16, W1W 15, W1DOT 2, W1CJH 2.

Traffic: W1BOY 22, W1BGA 17, W1AOP 14, W1BTP 12, W1UE 12, W1ALI 11, W1AAM 6, W1W 56, W1NI 43, W1QV 16, W1HFM 16, W1W 15, W1DOT 2, W1CJH 2.
of four one now. Who is guilty of the theft of W7ACO's rectifier tube? W7A4Q said 75-watt, conditions are very poor. His statement is confirmed by W7ALW and W7QD. W7BYX blew his rectifier. This report is the "swan song" as SCM for W7A4K. W7AVH has been elected to the job for the next two years. To those hams who have helped me so much during the last two years I extend sincere thanks for the next two years. To those hams who have helped me 40.

W7SL is our star traffic station this time. W7BSS, W7BST, W7CBS and W9CXY were visitors at Missoula. W7CHW handled a few, W7CE took a trip to Chicago. W7BZA is doing some nice work. W7BDJ keeps schedules with W7BB, W7BZA and W7BNX. W7AHF turned in a total. W7CEG is on with "40's". W7BCE pops up with a surprising total. W7FL has moved to Bozeman for school. W7BNL is working in Bozeman. W7AFY plans to be on again soon. W7BNU has a new o.c. layout. W7BKT has a fire and got burned out. W7BOP is trying to make 211Es next year. W7AVG has been on a three-week vacation in De-

ner, visiting home folks and W6CAK, his father. W7U will probably move to California soon. W7BGC has raised his first VK. W7BBH has been busy golfing. W7HI and W7BII have been busy. W7I2QF has some nice reports. K7BOG has changed QRA in Great Falls. W7BYE reports the key click filter designed by the SCM and shown in the Experimenters' Section of July 1931 is very PR. W7I2QF and W7I2EF are new ORS in the past 10's in P. T. T. W7AYG has ordered parts for a new P. O. MOPA. W7BDJ did some operating at W7CCE, the Great Falls Electric City Radio Club station, during the Fair and hammerstead there recently. W7AJT has about given up hope on W7WV.

Traffic: W7AOD 113, W7AAT 24, W7FL 21, W7AHF 61, W7BCG 3, W7BDJ 12, W7BII 46, W7BBB 3, W7BCE 63, W7CBS 8, W7BCU 15, W7BFL 8, W7BGA 11.

OREGON — SCM, Ray Cummins, W7ABZ — W7AHW is high man for the month. W7CCU, American Legion Convention station in Portland, was manned by W7ALJ, W7BFC, W7WU, W7BU, W7PF, W7HI, W7AEM, W7QY, W7BGW, and W7ABZ. W7AEM is on the air. W7WL is going deer hunting, W7AZJ reports for the Coos Bay Club, W7AXJ and W7A4H attended the Yakima Convention, W7QY reports two new Portland stations in operation, and W7AEM, W7QY, W7BYQ, W7BQF is Coos Bay Club's new Vice-President. W7ZZZ joined Army Net. W7BQX says VE4's big DX for him. W7AO visited SCM. W7ACH remains RM for Oregon. W7WU sends in a nice total. W7WUK says 5.5 mc. traffic is all on line. W7AHW reports he has been on American Legion traffic. W7APE sends in OBS schedules. W7AEM possesses a new pair of "96's". W7AHF is attending OSC this year. W7QF is QRL farm work. W7FOR works his first VK and ZL. W7PL reports via radio. W7ABZ is on c.c. on 3596 and 3550. W7AJT has some fine schedules. W7SY is the only Eugene reporting station this month. W7ALO renews activity on Army Net. W7CBF will be back in Astoria this year. W7AXY has four crystals. W7BOO and W7BZS send in traffic reports. W7ABZ had to fight fire. W7BZL goes back on school. W7AQM applies for ORS, and W7EN for OBS. Your new SCM wishes to thank all his friends for the best wishes received. I am looking forward to a very active year, and desire the cooperation of all the amateur operators in Oregon.

Traffic: W7AOD 410, W7AZB 222, W7WR 135, W7AYY 172, W7AVH 57, W7BAM 47, W7AEM 46, W7BZQ 84, W7QY 16, W7CA 8, W7BOO 6, W7BZB 20, W7HI 19, W7ACH 18, W7SY 14, W7AHJ 13, W7ALA 11, W7BOI 11, W7MAQ 9, W7WL 4, W7QY 2, W7BZS 2, W7AJZ 1, W7ED 60.

K7CA — SCM, Richard J. Fox, K7PQ — This report received via radio from K7FF by W7AXJ and mailed to HQs. K7TP reports reception cards from England and Germany for 14 mc., and from England on 7 mc. K7ONY and K7CI are cut off. K7BH and K7DN are on the air. K7BBN is doing a p.p. transmitter, K7A1P is building a couple amateur poles. K7FF rebuilt his 75-watt outfit. K7ABQ and K7AYN are having great results on ultra high frequency. K7CNF has an 8F 30-watt c.o. job. K7AZ has been working K7FF on 3.5 mc. K7BLI was only communication the town of Kennebec had while W7QF was there. K7BYV and K7QO have gone to the States for the winter. K7BNS has left for his trapping cabin. A wedding helped put K7PQ into the HPL.

Traffic: W7CRT 41, K7ARL 11, K7CEE 17, K7BEH 12, K7BMY 12, K7QO 250, K7FF 234, K7BLI 111, K7CKK 60.

WASHINGTON — SCM, John P. Gruble, W7RT — W7BB is leader in traffic work. W7BOF secured special permission from Washington, D. C., to operate at the Puyal-

up Fair. W7WY has some prospecting. W7AXJ and W7BKT ran neck and neck. W7BPH passed license requirements. W7KK has new QRA. W7AJ is making schedules with W7I2G. W7NE had trouble with burnt-out equipment. W7CGK is getting tired of working Sixth District. W7UJ is building a transmitter, W7ATW may use pair '55's. DX on 14 mc. interests W7BWK. Most of W7BW's traffic is relayed. W7AQB has five Weston meters. W7BYS uses five watts. W7UX is eager to contact Africa. W7BRW sends a fine report. W7TU has been maintaining Kennebec's reputation. W7A1B has been moving. W7BYA got well ahead of his rivals at W7CCF. Mrs. Anne Bell, popular Tacoma XYL, passed her amateur exam with a grade of 88! Fleet Week traffic is very poor.

Traffic: K7ARL 11, K7CEE 17, K7BEH 12, K7BMY 12, K7QO 250, K7FF 234, K7BLI 111, K7CKK 60.

W7MM — SCM, John P. Gruble, W7RT — W7BB is leader in traffic work. W7BOF secured special permission from Washington, D. C., to operate at the Puyal-

up Fair. W7WY has some prospecting. W7AXJ and W7BKT ran neck and neck. W7BPH passed license requirements. W7KK has new QRA. W7AJ is making schedules with W7I2G. W7NE had trouble with burnt-out equipment. W7CGK is getting tired of working Sixth District. W7UJ is building a transmitter, W7ATW may use pair '55's. DX on 14 mc. interests W7BWK. Most of W7BW's traffic is relayed. W7AQB has five Weston meters. W7BYS uses five watts. W7UX is eager to contact Africa. W7BRW sends a fine report. W7TU has been maintaining Kennebec's reputation. W7A1B has been moving. W7BYA got well ahead of his rivals at W7CCF. Mrs. Anne Bell, popular Tacoma XYL, passed her amateur exam with a grade of 88! Fleet Week traffic is very poor.

Traffic: K7ARL 11, K7CEE 17, K7BEH 12, K7BMY 12, K7QO 250, K7FF 234, K7BLI 111, K7CKK 60.
by J. H. MacLafferty, Jr., W6RJ. With the next report, the first six months' traffic contest will be brought to a close and as Chief Route Manager for the Section. He will be succeeded and W6AMJ also report. Contra Costa County: W6EJA is the winner will be presented with the Hammond Memorial W. A. Hammond, W6ALX.


SANTA CLARA VALLEY — SCM, Bruce Stone, W6AMM — The 14th Annual Pacific Division Convention is to be held in San Jose at the Saint Clare Hotel. The S.C.C.A.A.R. would surely appreciate hearing your suggestions. W6AMM's total grew out of only two weeks and three days of operation; all trans-pacific. W6HMM again found in c.c. rig. W6MOE is active again. W6GFW is semi-active.


ARIZONA — SCM, Ernest Mendoza, W6BFJ — W6CDU resumed KAIHR-14. W6BRE handled messages from the N.G. station W6CLE. W6BLP worked hams at KHFH. W6CCEC is on every day. W6DHR is new ham in Douglas. W6CVW reports South Americans coming in on 7 mo. W6DHF has one of the nicest radio stations. W6FAL, W6JL, W6LW, W6LB, W6GGS, W6CVR and W6FQ attended the Pacific Division Convention. W6FQ and W6BFJ did some 'phone work. W6DUB is chief of WQ. W6DRE is going to put in 50-watters. W6DKJ is helping W6DSK with his work. W6ATK handled one message resulting from vacation. W6CLL is working on 7 me. W6WU returned from the coast. W6UG is working on 7 me.


Fast Education: W6CDU resumed KAIHR-14. W6BRE handled messages from the N.G. station W6CLE. W6BLP worked hams at KHFH. W6CCEC is on every day. W6DHR is new ham in Douglas. W6CVW reports South Americans coming in on 7 mo. W6DHF has one of the nicest radio stations. W6FAL, W6JL, W6LW, W6LB, W6GGS, W6CVR and W6FQ attended the Pacific Division Convention. W6FQ and W6BFJ did some 'phone work. W6DUB is chief of WQ. W6DRE is going to put in 50-watters. W6DKJ is helping W6DSK with his work. W6ATK handled one message resulting from vacation. W6CLL is working on 7 me. W6WU returned from the coast. W6UG is working on 7 me.

Time: KAIHR 940, KAIINA 212, KAIIG 188, KAIICO 112, KAIT 75, KAIJB 21, KAIKA 39, KAIICM 97, KAIJ 23, KAIK 18, KAIK 8, KAMA 8.

SAN DIEGO — SCM, H. A. Ambler, W6EOP — W6A returned to college; will use W6EF, W6FWF and W6MVX are getting ready for traffic. W6BHR reports W6AXN and W6BIV, W6CK, W6DAK are going to 1.75 mo. W6DPB is experimenting with tele­vision. W6BHR installed new dome tubes in receiver. W6BIV is getting ready for the contest. W6BAM and W6BVX are busy harvesting walnuts. W6WQ is now station in Santa Ana. W6A1CJ has a new P.P. transmitter. W6BGF is on delivery net, schedules on 7 me.


Convention. W6A1C, W6EUV, W6RK, W6ETL is back in the lead. W6A1CD is doing excellent work for unemployment relief warehouse in Compton. W6AOR is knocking 'em cold. The traffic contest sponsored by W6DPB is very active. W6FVM has fine total. W6BPP is the control station for the unemployment relief. The call of the control has since been changed to W6QF. W6BPP is on 14-me. 'phone. W6QF returns to USC. W6EII has new Hammerlund Comet "pro." W6CZV worked Z32A. W6GFTays school holds him down. W6DWP won private contest between himself and W6DGZ. W6CZZ is unemployed, reports for the contest. W6A1CD has been operating a new home from the Convention. W6DNW has a new transmitter under construction. W6QG reports a nice vacation. W6Z6W is on for the contest. W6Z6W is on 1.75 mo. 'phone. W6DHJ is signing W6EUF now. W6BUC has received a fine report on the A.A.R.S. at Convention.


Club operated W8FJS at the W. Va. State Fair. W8GB

virginia — scm, c. s. hoffmann, jr.


formed of the condition of Dr. Madfarlane of Cedar, who was seriously ill in a Salt Lake City hospital. W6EY has a monitor. W6FEB changed to 50-watt at Vancouver, B.C. W6BAE-ZZAF was in daily contact and gang won grand prize. W6BTX is commanding officer of W6EY has a good Colorado schedule. Nothing new at W6DPO. W6AFN is a past master at building Grammer's 3-tube portable receiver, says A.A.R.S. work keeps W6DP busy. W6AFN is a past director, W9AAB, is going to run for the same job again. W9AQN put a '52 in final. W9GUW is back in Denver. W9FPR is on 3.9-mc. 'phone. W9ESX is out of mining, has a portable, W9KFJ. W9EPC is working 3.5 mc. and 7 me. W9BYC is selling part of outfit. W9BXQ is testing antennas. W9BYC is selling part of outfit. W9QXW is kicking out fine. W9HOO is on with 250-watt. W9CYM does some Navy work. W9DSB-ex:9AJQ-W9HQT-Bill Groves-Melvin Lodge. W9HFZ is rebuilding to c.c. W9FUH is back to c.c. W9LCI has a crystal rig hot. We would like to hear from W 4, AI, N. W4AZB, Official Observer for W4ANR, W4CJ, W4KM, W4BAM and W4AFV. W4CJ is located at 518 East Idlewild Ave., Tampa. W4GS kept 24-hour line-up: W4DU, W4MF, W4WM, W4WS, W4UH, W4ASV-W4ZZW has been having MG trouble. W4BEQ is studying for the exams. W4AOM still clings to crystal rig hot. W4ASV-W4ZZW is putting in c.c. W4KBQ is studying for the exams. W4AOO still clings to some Navy Net work. W4DST-ex:9AJQ-W9HQT — Bill Groves-Melvin— are keeping K1Z perking. W9BSJ is on some from W8AIR. W9FQK builds a real short wave tuner. W9QW is working KOQ. W9QZ is QSL KFXF. W9B5 started up a radio store. W9AV is kicking out fine. W9H0O is sure making some good buns. W9GQ is QSL Grand Lodge. W9E2 is rebuilding to c.c. W9F9U is back to school. W4CHT is using c.c. radio service. W9H1 is W9HJ. W9IVO is busy with music. W9BOJ sold out. W9B9K-W9ASD is on some. W9DGD of Kansas City, Mo., and W9EFC of St. Louis visited Denver. W9KG, ex:9DKM, has been second op at W9BN. W9FYK visited the Denver gang. W9GJF has portable W9ZAJL. The North Denver High School set is being rebuilt by W9HGL, W9EBR, W9FPH and W9FPY. W9GJF is after DX. W9NE is busy with music. W9H1Q has a c.c. rig. W9QXW is building antennas. W9XWY and W9Q6 are building 1.75-mc. 'phones. W9QWY reported OK. W9QZAJ and W9DPN assisted KVO in the broadcast of the Pike's Peak Races on Labor Day.


SOUTHEASTERN DIVISION

GEORGIA-SOUTH CAROLINA-CUBA-ISA of PINE-SOFTO RICO-VIRGIN ISLANDS - SCM. Chas. W. Davis, W4PM in August knowledge, has put with the biggest total since W4PM has been SCM. CM2MW is now 0.0. He and CM2SH were elected to membership in Atlanta Radio Club at Sept. meeting. W4WO visited Washington recently. W4AXU is now attending G.M.A. in College Park. W4A1N (15) is youngest member of the Atlanta gang. W4BEY is the star performer on 'phone, CM2JM's shack was searched by the police for revolutionary prop! W4BG rates ORS, W4AM and W4BW report. W4AZT is now operating KB4 and W4BVZ sends a later report. Any good stations who want to join the Trunk Lines please contact our RMs — W4BO and W4AY.


WESTERN FLORIDA - SCM. Eddie Collins, W4MS-W4ZZP - Route Manager, S. M. Douglas, Jr., W4ABW-W4PCN. Everyone had a very FB time at the Hamfest in Tallahassee. W4ASV-W4ZZW won the liars contest. W4AUP has a brand-new three-year operator's license. W4BDK has P-P TPTG. W4BOW won a TNT transmitter at the Hamfest. W4BQP has moved to Georgia. W4BPI wants to get in the West Fla. traffic route. W4APT has been rounding them out. W4CQX-MIKE has the list of W4AXU. W4PCC. W4AUA comes across with a nice traffic total. W4C was visited by most of the West Fla. hams this month. W4Q2R-W4PFL is on a trip to Indiana. W4ASG has a new crystal. W4AVU made trip to Atlanta and returned with a new operator's license, says W4Q2R for his. W4BMY gets 500 volts out of spark coils. W4BRW is attempting the same and W4VY wants the dope. W4DJF keeps a schedule with W4BNE. W4AXP keeps four daily schedules. W4AIR wants a good Colorado schedule. W4BTY is putting in c.c. W4AYQ-W4PDS is active on 4.3 mc. and 7 mc. W4AGS-W4PCX operates on three bands. W4KB is still the king of 'phones. Mrs. W4KB keeps the 7000-ke. crystal rig hot. W4CQX-MIKE has the list of W4AXU. W4AUN-W4ZZR in Md. wants schedules with the West Fla. gang. W4CS is now an Ensign in the U.S.N.R. W4BEW is heard with a rapid fire buzz. W4BFD is our newest ORS. W4BNE has been having receiver trouble. The recent hurricane removed the old lower at W4ATN. W4BGQ has worked all districts. W4A1L is active on 3500 kc. W4UW-W5NO has been busy at WCOA. W4DX has applied for station license renewal. W4Q2R-W4PFL promises crystal control. W4BRW visited W4Q2R. W4VY was caught building a new transmitter. W4AYQ-W4ZGW has been having MG trouble. W4BRO is studying for the exams. W4AOM still clings to crystal rig hot. W4ASV-W4ZZW has been having MG trouble. W4BEQ is studying for the exams. W4AOO still clings to crystal rig hot. W4ASV-W4ZZW has been having MG trouble. W4BEQ is studying for the exams. W4AOM still clings to crystal rig hot. W4ASV-W4ZZW has been having MG trouble. W4BEQ is studying for the exams. W4AOO still clings to crystal rig hot. W4ASV-W4ZZW has been having MG trouble. W4BEQ is studying for the exams. W4AOO still clings to crystal rig hot. W4ASV-W4ZZW has been having MG trouble.
the "berries." W4PBM, the Seminole Club station, are up a stump as to how to keep out elevator noise in their receiver. W4U5X is hanging away at DX. W4HY asks "Why is an AC receiver not an AC dozens the same." W4AIH is bound to work with his PDC signal. W4DE, W4BXX and W4BHW report traffic. W4OR is one of our newest traffic men. W4A2S says life is just one QSL after another. W4HIC has deposited us for school. W4BGA has a new portable MOPA. The Naval Reserve group at NDV are having 100% drills at Jax and invite all hams to meet with them any Thursday evening. W4BNR is keeping schedules with CM2CF. W4AJX received his WAC certificate. W4ALP is building a 1W rig.


ALABAMA -- Clark, L. D. Elwell, W4KEP-W4PAI and W4ZDN handled traffic from Alabama National Guard meet at Camp McClellan. W4AQ0 is having trouble with receiver. W4OG has been visiting, W4U5N has not been heard since the hurricane. W4OA thanks W4BGE, W4MF, W4ADJ and others who helped after hurricane. W4AQQ has been visiting Mobile. W4AJC is on the go. W4ABU has a new 160-watt crystal phone. W4ADJ is working on new rig. W4THA has a 1.75-m phone. W4ALA is a new VHF man. W4AJC and W4DKC are now o.e. W4AP, W4AEZ and W4R are in the A.A.R.S. 'phone net. W4APU is being examined for ORS. W4DHD is new Obs in Birmingham. W4BPB is a nice schedule. W4DI is in the A.A.R.S. CW nets. W4DXC has lost his 96s. W4AUF, W4BGO and W4ANW are report schedules. W4GOQ works six districts easily. W4HO is at St. Mary's University. Beaumont: W5CDM is a new 'phone receiver. W4APU 2.

WEST GULF DIVISION

SOUTHERN TEXAS -- Clark, L. D. Elwell, W4KEP-W4PAI and W4ZDN handled traffic from Alabama National Guard meet at Camp McClellan. W4AQ0 is having trouble with receiver. W4OG has been visiting, W4U5N has not been heard since the hurricane. W4OA thanks W4BGE, W4MF, W4ADJ and others who helped after hurricane. W4AQQ has been visiting Mobile. W4AJC is on the go. W4ABU has a new 160-watt crystal phone. W4ADJ is working on new rig. W4THA has a 1.75-m phone. W4ALA is a new VHF man. W4AJC and W4DKC are now o.e. W4AP, W4AEZ and W4R are in the A.A.R.S. 'phone net. W4APU is being examined for ORS. W4DHD is new Obs in Birmingham. W4BPB is a nice schedule. W4DI is in the A.A.R.S. CW nets. W4DXC has lost his 96s. W4AUF, W4BGO and W4ANW are report schedules. W4GOQ works six districts easily. W4HO is at St. Mary's University. Beaumont: W5CDM is a new 'phone receiver. W4APU 2.


WISTOR FUTURE

SOUTHERN TEXAS -- San Antonio: W5OW-WLJ has nice outlet for traffic to Panama, Philippines, Hawaii and China. W5VQV is doing OK. W5WDC is mostly on 3.5 me. W5AOD handles most of the BCL sets. W5MN, W5UX and W5BWM are busy with ORS going OK. W5AND says W5YE will be on soon, W5AKX has a new ORS. W5BPM reports W5YF at SMU. W5BXY has a new rig. W5SPV is out a few. W5BFI plans on a new rig. W5ATB says life is just one QSL after another. W5AEK handles 495s in p.p. W5CPO is a new ham at Bristow, W5AR. W5ATB "...try to get on the air," W5TG and W5CBV are working on ORS. W5AMO has been transferred to Grisoom. The Cen-Tex Amateur Radio Club has been organized at Temple. Get in touch with W5BXX for details. W5AQG is on 14-me. phone. W5ARK and W5AIW are getting back on the air.
W5RJ has been snowed under with Convention plans. QST reports, "Sparks," and trying to run a ham store.

CANADA

MARITIME DIVISION

NOVA SCOTIA — SCM, A. M. Crowell, VE1DQ — High-traffic man. VE1DJ, VE1DH and DI have combined outfits. VE1EK is a new man. VE1EA burns his winter. VE1DQ has applied for OBS.

QRM baseball. VE3NA lost an '81. VE3BV had a visit from QRM. VE3DN has power supply difficulty. VE3AU was QRM'd by flu. VE3PN has a score of DX. VE3CL and VE3DG are QRL work. VE3NL reports from like to hear from VE2JA, VE2JC, VE2EL, VE2ES, VE2EH, etc. VE2CU and VE2CM are QRM. VE2AC and VE2AH are popping their heads up for the contest. VE2AJ is stepping out well. VE2AC is running up a score for the contest. VE2AM is planning big things. VE2AF and VE2AG are heard occasionally. VE2AH is getting good reports.

Traffic: VE2DQ 12, VE2JK 5, VE4EO 5, VE4HM 4, VE4DP 5, VE3EA 2, VE4EC 1.

BRITISH COLUMBIA — SCM, J. K. Cavalsky, VE5AL — VE5FG and VE5DZ assisted mounted police, in which VE5DZ had to walk several miles to make delivery of the message. VE5EC handled emergency traffic for VE5GZ when the telephone lines went down. VE5HP remains one of the connecting links with Cocos Island. VE5IR is on daily. VE3GH is on 1.75-mc. 'phone. VE3CT is trying new antenna. VE3FO is sporting three ops. VE5DB is top traffic man followed by VE5ED and VE5EF. VE5EF handled traffic for a local radio show. VE5FF is talking 'phone. An electrical storm just about put VE5AC out of commission. VE3AL is trying to keep schedules. VE5GT made a nice total. VE5AM is working out of town.

Traffic: VE5DH 500, VE5DB 320, VE5HP 193, VE5FE 180, VE5EW 147, VE5CH 138, VE5EC 137, VE5AC 106, VE3AL 99, VE3GC 90, VE3CT 73, VE5FF 53, VE5DZ 11, VE3IR 10, VE5CT 5.

PRAIRIE DIVISION

MANITOBA — SCM, J. L. Green, VE4BQ — VE4DJ hooked five Vks and a ZL. A new station appears signing VE4ZS. VE4DK dicked TGI3A. VE4BO popped his Belgian 200 bottle. VE4NA is making "whoopie" on 14 mc. VE4HP is on 75 mc. VE4GR had visits from VE4FS, VE4ED, VE4KM and VE4JH. VE4GA had visits from 27 hams. VE4FF and VE4CB visited him. VE4EH is installing crystal. Look out for new hams at North Battleford, VE4KV, VE4KB, VE4KR. Frank Vincent has an FB DX 2-tube receiver. "VE4IG is signing VE4DJ handle traffic on 1.75-mc. 'phone. VE3HJ has increased power. VE3RI visited his brother. VE3AJ is back home. Traffic: VE3AU 352, VE3IR 109, VE3DW 18, VE3IR 15, VE3GL 14, VE3IC 10, VE3HV 11, VE3LL 9, VE3AD 8, VE3DJ 5, VE3EB 2, VE3DQ 9, VE3AD 15.

Traffic Briefs

Traffic: VE4DF 10.

SASKATCHEWAN — SCM, Wilfred Shaw, VE4B, VE4CA had visits from 27 hams. VE4FB and VE4CB visited him. VE4EH is crystal. Look out for new hams at North Battleford, VE4KV, VE4KB, VE4KR. Frank Vincent has an FB DX 2-tube receiver. VE4IG is going back to Moose Jaw. VE4HJ has a score of new hams in the making. VE4CM nearly finished MOPA. VE4TV has been transferred to Moose Jaw. VE4GR had visits from VE4KV, VE4F and VE4FB. VE4FB says Yks and ZLs appear now about 7:30 a.m. D.S. T. The Saskatoon gang wish to add their vote of thanks to the retired SCM, Bill Pickering. VE4EL was heard occasionally. VE4AL 99, VE4GC 90, VE4CT 73, VE4FF 53, VE4DZ 11, VE3IR 10, VE5CT 5.

LATE AND ADDITIONAL REPORTS

W3AF is a new station in Bluefield. W3BE2 is a new station in Norfolk. NY1AB continues his BPL totals.


Traffic Briefs

W3BF was almost arrested when he attempted to erect an antenna at 10 o'clock one night. The neighbors thought there was a burglar on the roof trying to get in a third-floor window. As a result the police received six telephone calls within a half hour and responded with bandit chasers and motorcycles. HI.

Speaking of sky wires a new one was recently being put up at W9AYY with the assistance of W9GGZ and an aerial photographer. The wire got caught in the pulley and the a.p. proceeded to climb the thin pipe. He arrived at the top all right—but not to W9AYY's No. 2 mast. He came down very gaily, still holding the end of the pipe in the form of a microphone boom. W9AYY is now considering entering the mike-boom manufacturing business!
Good Idea

Wharton, Texas

Editor, QST:

An idea occurred to a group of hams in this locality regarding the solution to the new license problem, and our plan might be of interest to other hams over the country.

Being in a slightly isolated section, and finding the why's and wherefore's of radio rather confusing, the services of Mr. J. W. Hunt, W5TG, of Houston, Texas, were secured and night school begun in the home of the writer. This short course continued for a month, during which time intensive code work was carried on, together with the fundamentals of radio and a question and answer course. Every fellow brought up such mysteries as confronted him, and with the able assistance of Mr. Hunt and a blackboard we feel that something was accomplished. This class was drawn from four small towns in this vicinity and the individual students were both licensed and unlicensed aspirants, and ranging from twelve-year-old boys to professional men forty-five years old, fourteen students in all.

Fellows, there is always some one near you who has finished in the game and who is willing to help. For real amateur cooperation knows no bounds, and this might prove a solution to your troubles. I might add that Mr. Hunt managed very well for food and lodging while with us, and each amateur put up $5.00. Times are thin, but the old ticket is certainly worth a fin. What say?

Millard M. Walker, W5AHK

Two-Band 'Phone QSO's

San Marcos, Texas

Editor, QST:

An experiment attempted recently, proving very successful and presenting the 'phone man an opportunity for additional enjoyment, prompts me to submit the dope in the hope that interest can be created in the working of two-band, two-way break-in QSO's, eliminating the "'phone monologue" without the necessity for additional equipment.

Having a schedule for 1:15 p.m. with W5CEI of Austin, Texas, and arriving at the shack a little early, I tuned to 1900 kc., the frequency he operated on. Determining to find out the possibility of working break-in I switched on my transmitter, which is crystal controlled on 3992 kc. Severe feed-back resulted when the loudspeaker was used but by using headphones W5CEI could be heard very distinctly without any interference from my transmitter whatsoever. After contacting, W5CEI was asked to try reception in the same manner but due to local interference at his end he was unable to receive my signals very well. After a short time, however, W5CEI tried his receiver again and reported reception of my signals 100% on the loudspeaker. Both transmitters and receivers were on constantly and reception was perfect.

Had the transmitters and receivers been hidden out of sight one would have believed the conversation was being carried over the telephone system by land line. Another QSO late yesterday evening during a lightning and thunder storm with terrific QRN proved the dependability of operating in that manner, and I feel confident 'phone operators learning of the success of this system will be eager to try it out. Furthermore, it affords 'phone operators on both the 100 and 75 meter bands an opportunity to chew the rag without the necessity for taking turns listening and talking.

W5CEI is using a pair of 211-A tubes in push-pull with 1000 volts on the modulated amplifier and my transmitter uses one 210 in the final stage with 500 volts. Provided crystal control and selective receivers are used no difficulty should be encountered in working with any amount of power. In our case it was not even necessary to move our receivers from their normal positions on the operating table. However, we both plan to use shielded lead-ins to our receivers to minimize pick-up from our transmitters.

Here's hoping this will get the fellows started with two-band two-way QSO's! It's quite a thrill and it beats the old way by a lot. Let's hear what success you have, fellows.

Tom Serur, W5APM

On R.A.C. vs. D.C.

Tully, N. Y.

Editor, QST:

The writer notes with much interest the letter from W8BDK appearing in the August issue of QST.
Three New Generals
Midget Series

DESIGNED by a Ham for Hams. Made in the most modern and progressive Battery Plant. Ideal for Monitors, Portables and general experimental work. The smallest and lightest Batteries on the market. Any one of them will go in your coat pocket easily. Two sizes for full voltage "A" circuits, and the Midget "B" will pack a punch of smooth, pure, quiet, sure-fire DC that will put "steam" into your Monitor or Portable. Every Battery moisture-proof. Buy direct. Use the coupon. Prices include postage anywhere in the United States.

ALSO:

General V-30-DX regular size square cell 45-volt "B" Battery
General V-30-X super heavy duty police type 45-volt "B" Battery

General Dry Batteries, Inc.
13000 Athens Avenue
CLEVELAND, OHIO

General Dry Batteries of Canada, Ltd., Toronto, Canada

W8GYR, Ham Dep't, General Dry Batteries, Inc., 13000 Athens Ave., Cleveland, O.
Gentlemen: Enclosed find $......for which please send me at once, postpaid in the U. S.,
......Type V-30-AA Midget "B" Batteries at $1.50 each.
......Type P-2-X Midget "A" Batteries at 35c each.
......Type P-2-KX Midget "A" Batteries at 60c each.
(Print name and address in the margin)

Say You Saw It in QST — It Identifies You and Helps QST
Over 600 questions and answers covering all radio operator license examinations

This new edition of Nilson and Hornung's well-known book will help you pass examinations and to know your stuff better in any field of practical radio. Brought completely up-to-date. Enlarged to cover more amateur work; also police, aeronautical and other radio.

Just Published

Nilson and Hornung's

RADIO OPERATING QUESTIONS AND ANSWERS

350 pages, 5½ x 8, 96 illustrations, $2.50

New 4th Edition

including

— information on broadcasting, marine, aeronautical, police and amateur operating
— many new questions and answers on latest types of transmitters and other equipment
— more information on amateur operation, including unlimited amateur telephone operator's license
— new radio laws
— new questions and answers on important technical, general and theoretical topics
— regulations governing issuance of all classes of radio operator's license examinations

Every question is typical of those you meet on examinations; answers are complete, illustrated, and give the information essential to meet every situation. For amateurs, short wave fans, men who are preparing for operator examinations or technical positions. Radio companies give preference to licensed operators for all positions. This book gives quick, direct preparation for all examinations. Examine it free.

See this book 10 days free

Send this coupon

McGRAW HILL BOOK CO.,
330 West 42nd Street, New York City

Send me Nilson and Hornung's Radio Operating Questions and Answers, new 4th edition, postpaid, for 10 days free examination. I will send $2.50 or return the book within 10 days of receipt.

Name....................................... 
Address...................................... 
City and State............................. 
Position..................................... 

Name of Company....................... QST-11-32
(Book sent on approval in U. S. and Canada only)

Somewhat similar records have been kept at W8CSE over a period of nearly a year. Observation has covered both the 80 and 40 meter bands. The transmitter used consisted of a 245 TNT oscillator complete with its own power supply and a 210 output amplifier with 600 volts of half-wave rectified a.c. on the plate. The difference between the d.c. and r.a.c. was obtained by substituting a 200-ohm resistor for the 30-henry choke in the amplifier power supply.

Only approximately 23% of the calls were answered when using a p.d.c. note while about 81% produced results when r.a.c. was used. Reports received invariably favored the pure d.c. signal both in readability and strength.

Undoubtedly the difference in results obtained lies in the fact that W8BDK is using higher power and the p.d.c. signal from the m.o.p.a. is a little sharper than the self-excited rig. W8BDK's r.a.c. note is a smooth 120-cycle note which is not unpleasant to copy while the signal from W8CSE is heavily modulated by the half-wave power supply. This seems to indicate that the rottener the note the better the results.

In this day of constantly increasing activity on the already crowded amateur bands there is no place for a signal that takes up four or five dial divisions and it shows the lowest and meanest form of selfishness for anyone to put out such a signal.

So let us get together in the spirit of fair play and good sportsmanship and clean up those rotten notes and broad signals and hereby raise ourselves to a place of higher respect in the estimation of our fellow amateurs.

— H. E. Preston, W8CSE

"The Truth and Nothing But—"

Editor, QST:

To begin with, I'm not an amateur, but so great has my interest become in amateur radio that I am a prospective one. In anticipation for examination for my license, I studied code, so to-day for a little while I donned the 'phones for practice in copying. Then — "CQ de W3 — " after listening for a moment I tuned around and found W1 — calling W3 — back. So, W3 — being an obliging young ham, comes back to the "12" and says "ur sigs QSA5-R7A p.d.c. note" — more information then "K". Back comes W1 — "ur p.d.c. sigs QSA4-R6 hr in 'Podunk'". This was fine; both boys satisfied and everything rosy, but — and what a but — both notes were of rawest a.c.!

This little tale is meant to be "con" — not "de" — structive, but how can a fellow know whether his junk heap is perking if such insincerity as this exists? Please keep in mind, I am not yet a ham, and my point is — what would this look like to any other fellow — not a ham? Would it increase or lower his opinion of amateurs? That's up to hams to decide.

— John M. Lennon
Now, a NEW and BETTER COMET "PRO"

CUSTOM BUILT, SHORT-WAVE SUPERHETERODYNE

YES—it is IMPROVED. It didn’t need it, but we DID it!

Enthusiastic amateurs, professional operators—on ships, at airports, in police work and rebroadcasting of foreign programs—without exception—pronounced the "PRO" YEARS AHEAD of all short-wave receivers.

It was. It still IS. But now, it is even better than that!

Its army of users didn’t think the "PRO" could be improved. Neither did WE until we began experimenting with the new types of tubes.

The improved "PRO" uses four "58" tubes, two "57's", one "247", and an "80" rectifier.

It is even more selective, but easy to tune with its simple band-spread system. It delivers FULL LOUDSPEAKER VOLUME. The oscillator is more stable, due to electron coupling. Intermediate amplification is increased, with greater stability. It gives smoother operation on the 10 to 20 megacycle band. The shielding is more effective, and the new metal cabinet removes all stray influences. Wood cabinet is optional. A battery model is also available.

A really GREAT receiver for the most exacting short-wave work—anywhere, anytime!

Mail Coupon for Descriptive Folder

Pacific Coast Representatives
HENGER-SELTZER CO.
711 E. 14th Street, Los Angeles
1264 Folsom St., San Francisco

HAMMARLUND MFG. CO.
424 W. 33rd St., New York, N. Y.
Please send me illustrated folder describing the improved COMET "PRO" Short-Wave Superheterodyne.

Name ........................................
Address ......................................

Say You Saw It in QST — It Identifies You and Helps QST
TRYMO OFFERS
Exceptional Bargains

TO HAMS AND SERVICE MEN

Our Chief Engineer, Mr. Frank Grimes, will gladly answer any radio problems pertaining to receiving, transmitting, or public address system.

<table>
<thead>
<tr>
<th>Input and Output Transformers, pair</th>
<th>$2.79</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hammarlund .00001 Var. Cond., Very Special</td>
<td>$1.69</td>
</tr>
<tr>
<td>Flechtheim Portable Meters</td>
<td></td>
</tr>
<tr>
<td>0-500 Volts D.C.</td>
<td>$1.49</td>
</tr>
<tr>
<td>0-500 Volts A.C.</td>
<td>$1.95</td>
</tr>
<tr>
<td>ISOLANTITE</td>
<td></td>
</tr>
<tr>
<td>Coil forms</td>
<td>$1.00</td>
</tr>
<tr>
<td>CARDWELL CONDENSERS</td>
<td></td>
</tr>
<tr>
<td>T 199 .00033 3000 volt</td>
<td>$6.75</td>
</tr>
<tr>
<td>147 B .00045 3000 volt</td>
<td>$6.75</td>
</tr>
<tr>
<td>Aluminum Cans</td>
<td></td>
</tr>
<tr>
<td>6 x 5 x 9</td>
<td>$1.75</td>
</tr>
<tr>
<td>6 x 10 x 7</td>
<td>$2.75</td>
</tr>
<tr>
<td>5 x 2 x 0</td>
<td>$2.00</td>
</tr>
<tr>
<td>5 x 3 x 3</td>
<td>$2.00</td>
</tr>
<tr>
<td>10 x 6 x 6</td>
<td>$4.25</td>
</tr>
<tr>
<td>Also aluminum sheets cut to order</td>
<td></td>
</tr>
<tr>
<td>JACKSON IRONS</td>
<td>$59c</td>
</tr>
<tr>
<td>2 TUBE SHORT WAVE SET</td>
<td>$9.95</td>
</tr>
<tr>
<td>Uses 232 and 233 tubes</td>
<td></td>
</tr>
<tr>
<td>80 METERS IN SPECIAL SHIELD CASE</td>
<td></td>
</tr>
<tr>
<td>STAND-OFF INSULATORS</td>
<td>50c</td>
</tr>
</tbody>
</table>

Our Chief Engineer, Mr. Frank Grimes, will gladly answer any radio problems pertaining to receiving, transmitting, or public address system.

Flechtheim 2 mfd 1000 volt cond | $1.46 |
Flechtheim 4 mfd 1000 volt cond | $2.86 |

FLECHTHEIM

Harmonics

979 Grace Terrace, Teaneck, N. J.

Editor, QST:

It is, of course, nothing extremely unusual for stations to hear and work each other on their second harmonics; however, a short time ago I worked W2DZA whose receiver and transmitter were both tuned for the 40-meter band while my receiver and transmitter were both tuned for the 20-meter band. Since this QSO was totally unarranged — we had not met previous to it — it caused us both a great deal of surprised amusement. Perhaps we would never have realized the nature of the contact were it not for the remark made by A. H. Knight, the operator of W2DZA, to the effect that he had not yet done any work on 20 meters. His remark — and the subsequent revelations — explained why it was that my signals were very weak at his station, there being but a quarter of a mile between the two stations. His signals were coming in like cannon shots.

— Charles H. Luhrs, W2CSV

Sigh With Me

Los Angeles, Calif.

Editor, QST:

Not knowing just how many years it takes to be classed as one of the fraternity of "Old Timers," I won't make any claims, but at least I have been through several periods of wild forecasting and dark forebodings.

I was just perusing some of my old radio magazines and noting some of the sets and new (?) hook-ups of that time. What memories they recall! I can still picture myself poring over the latest hook-up, critically appraising it, noting a new way to connect a coil or a new place to squeeze in a resistor. It mattered not whether the results were anywhere near what was claimed for the set. So long as the hook-up presented a different way to connect the parts, it made little difference how rotten the set worked.

I used to build crystal sets until I had exhausted about every possible combination of parts. When the magazines offered nothing new, I invented my own connections. Such experimenting was comparatively harmless and inexpensive. A good crystal set could be built in those days for around $15. But the tube sets were different! A stage of r.f., detector, and two stages of audio delivered into the pocket-book to the tune of about $150. I'll always remember that sinking feeling when I blew nine WD-11's at a cost of $6.50 each and dropped the tenth one.

A service kit, in those days, consisted of a pair of 'phones and a B battery. A loud click on a transformer meant the primary was O.K. A soft click was ditto for the secondary. And so it went. Everything had to click. 'Phones were tested by noting the loudness of the click when the tips were touched to the tongue (incidentally, a good way to test 'phones).

Now, what do we find? Complicated, semi-automatic receivers that only the makers know how the wheels go around. With new types of...
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 or let us tell you where you may buy.

Pioneers in their class, CARDWELL Midway “Featherweight” condensers have established a new standard of quality for small, light and compact transmitting and receiving condensers, moderately priced.

Like all CARDWELL condensers the Midway “Featherweight” type is carefully assembled like fine machinery, by skilled artisans. There is no compromise with quality and fine workmanship, as by the use of rivet press assembly methods and other expedients making for cheapness of manufacture.

Truss-like construction, with the steady tension of strong machine threads held everlasting tight in the bulldog grip of lock-washers, insures permanent rigidity which no shock or vibration will ever cause to slacken, as may be proved by the large quantities of CARDWELL condensers constantly being purchased for use in aircraft radio equipment throughout the country.

Such construction is expensive—for us—but costs you no more.

Send For Literature

THE ALLEN D. CARDWELL MFG. CORP.
83 PROSPECT STREET • BROOKLYN, NEW YORK

“The Standard of Comparison”
BARGAINS

NEW WESTON METERS (In Original Cartons)

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.C.</td>
<td>Volt, 60 Min.</td>
<td>$5.00</td>
</tr>
<tr>
<td>Millivolt</td>
<td>25-525; 0.25; 0.50; 0.10; 0.05</td>
<td></td>
</tr>
<tr>
<td>D.C. Voltmeter</td>
<td>0-150; 0.25</td>
<td></td>
</tr>
<tr>
<td>D.C. Ammeters</td>
<td>0-2; 0-10; 0-20; 0-50; 0-1 A</td>
<td></td>
</tr>
<tr>
<td>D.C. Voltmeters</td>
<td>0-150; 0.25</td>
<td></td>
</tr>
<tr>
<td>301 F.</td>
<td>300-500 V. per Volt</td>
<td>$4.50</td>
</tr>
<tr>
<td>302 F.</td>
<td>500-1000 V. per Volt</td>
<td>$4.00</td>
</tr>
<tr>
<td>303 F.</td>
<td>1000-2000 V. per Volt</td>
<td>$3.00</td>
</tr>
</tbody>
</table>

JEVEL METERS — F.F. & M. Mountings; Steel Cases.

- 54 Milliamperes; 0-300 F.P.; 0-250 F.P.; 0-500 F.P. $3.75
- 425 Thermal Ammeters; 0-2.50; 0-5.00; 0-20.00 $3.75
- 385 V. Meter Port. A.C. with Multi. for 300 V. 15-150 V. $2.25
- 301 V. Meter, 500-1000 V. 1000 Ohms per Vt. Push-Full $11.25

FIVE DOLLARS OR A MILLION?

Editor, QST:

A million dollar service is rapidly becoming worth about five dollars. I refer to the service rendered by the Standard Frequency stations. It has become practically impossible to calibrate monitors, frequency meters, and receivers from these transmissions because of selfish and unnecessary transmissions of other stations of relatively less importance.

Those of us who have constructed our new dynamos cannot possibly calibrate them because of the unnecessary QRM that invariably spoils our work in the reception of these signals. In the southwest portion of the United States we are not very near to the Standard Frequency stations and it is very hard for us to hear the transmissions. We can only hope that those stations on frequencies near those we desire to hear for calibration purposes will suspend operation for the half hour that they are sent.

Let us cooperate and help one another to maintain the service at the million dollar value. — W6EBJ

Summer Activities

Fairs, show stations, conventions, and every-day vacation set-ups have found amateurs willing and successful in sending messages to and from friends and relatives. We are briefly mentioning several which have come to our attention. Some are bare results but all show the same spirit — pleasure derived in being of service whenever possible and for as long as necessary.

State Fair, Wheeling, West Va.

W8FJS came into being on September 4th and lasted throughout the fair, September 8th. A self-excited '52 on 3800 kc. was used for the transmitter. The booth was attractively decorated with ham embellishments including tubes for trimmings. The American Legion sponsored the fair and were very cooperative and appreciative of W8FJS. A total of 347 messages were handled
Collins Transformers

A complete line of audio and power transformers of highest quality has been developed for use in COLLINS Transmitters and COLLINS Speech Equipment. Because of the remarkable results obtained, these standardized items are now offered to the general transmitting and sound engineering field.

Collins Audio Transformers

MULTICOIL CONSTRUCTION — Skillful use of both interspaced and pi type windings results in increased flux linkage, lower distributed capacity and greater efficiency.

BALANCED WINDINGS — Great care has been taken to preserve perfect electrical balance on all push-pull and Class B transformers in order to assure good wave form.

ASTONISHINGLY WIDER FREQUENCY RANGE — Is accomplished by high inductance and extremely high secondary resonance frequency, permitting full bass response and complete transmission of the very high frequencies which play such an important part in achieving naturalness.

SPECIAL SILICON ALLOY CORE — Having the highest permeability consistent with permanence of characteristics is used in preference to other high permeability alloys which are subject to damage by temporary overloads.

VACUUM IMPREGNATION — And a new technique of winding coils to extremely close mechanical and electrical tolerances assures absolute uniformity and dependability.

COLLINS Transformers are built to exact specifications in the plant of the Chicago Transformer Corporation. Unequaled engineering and production facilities make it possible to offer a superior product at a fair price.

SPECIFICATIONS

<table>
<thead>
<tr>
<th>Type No.</th>
<th>LINE-TO-GRID TRANSFORMERS (Fig. 3)</th>
<th>Price, $4.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>610</td>
<td>500 ohms to single or push-pull grids.</td>
<td></td>
</tr>
<tr>
<td>665</td>
<td>200 ohms to single or push-pull grids for condenser single or double button microphones.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>INTERSTAGE TRANSFORMERS (Fig. 3)</th>
<th>Price, $4.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>307</td>
<td>Plate to single or push-null grids.</td>
</tr>
<tr>
<td>309A</td>
<td>Push-pull plates to push-pull grids.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TUBE-TO-LINE TRANSFORMERS — Low Level (Fig. 2).</th>
<th>Price, $4.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>516</td>
<td>Tube to 200 or 50 ohm line (20,000 ohm primary) for condenser microphone output.</td>
</tr>
<tr>
<td>517A</td>
<td>Tube to 500 ohm line (20,000 ohm primary).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASS A AMPLIFIER OUTPUT TRANSFORMERS (Fig. 3)</th>
<th>Price, $4.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>450</td>
<td>2-45's or '50's to 500 ohm line.</td>
</tr>
<tr>
<td>450A</td>
<td>2-45's or '50's to 15 ohm voice coil.</td>
</tr>
<tr>
<td>470</td>
<td>2-247's to 500 ohms.</td>
</tr>
<tr>
<td>470A</td>
<td>2-247's to 15 ohms.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MIXING TRANSFORMERS (Fig. 3)</th>
<th>Price, $4.50</th>
</tr>
</thead>
<tbody>
<tr>
<td>220</td>
<td>50-200 ohms to 50-200 ohms.</td>
</tr>
<tr>
<td>221</td>
<td>50-200 ohms to 500 ohms.</td>
</tr>
<tr>
<td>225</td>
<td>500 ohms to 500 ohms.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASS B INPUT TRANSFORMERS (Fig. 3)</th>
<th>Price, $4.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>715</td>
<td>'45's or 50's to grids of 46's or '6A's (Secondary is low impedance and can be led to Class B tubes through three wire line).</td>
</tr>
<tr>
<td>761</td>
<td>46's Class B to 5,000 to 6,000 ohms, for modulating 510's.</td>
</tr>
<tr>
<td>762</td>
<td>46's Class B to 4,000 ohm speaker.</td>
</tr>
<tr>
<td>765</td>
<td>46's Class B to 500 ohm line.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASS B OUTPUT TRANSFORMERS, for Type '0A tubes (Fig. 3)</th>
<th>Price, $5.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>790</td>
<td>'03A's Class B to 5,000 to 6,000 ohm load, for modulating one '03A.</td>
</tr>
<tr>
<td>791</td>
<td>'03A's Class B to 2,500 ohm load, for modulating two '03A's.</td>
</tr>
<tr>
<td>792</td>
<td>'03A's Class B to 10,000 ohm load, for modulating two '52's.</td>
</tr>
<tr>
<td>785</td>
<td>'03A's Class B to 500 ohm line.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CLASS B OUTPUT TRANSFORMERS, for Type '0JA tubes (Fig. 1)</th>
<th>Price, $19.50</th>
</tr>
</thead>
<tbody>
<tr>
<td>790</td>
<td>'03A's Class B to 5,000 to 6,000 ohm load, for modulating one '03A.</td>
</tr>
<tr>
<td>791</td>
<td>'03A's Class B to 2,500 ohm load, for modulating two '03A's.</td>
</tr>
<tr>
<td>792</td>
<td>'03A's Class B to 10,000 ohm load, for modulating two '52's.</td>
</tr>
<tr>
<td>785</td>
<td>'03A's Class B to 500 ohm line.</td>
</tr>
</tbody>
</table>

IMPORTANT: Preserve this advertisement for your guidance in ordering, or send 25c in coin for a complete manual on COLLINS Transformers and Transmitting Equipment, with circuit diagrams and design data.

Complete information on COLLINS Power Transformers will appear next month.

Collins Radio Company
Collins Transmitters is now known as Collins Radio Co. in order to include its widened field of activity
CEDAR RAPIDS, IOWA • W9CXX •
Proud of it?

Are you proud that you are an amateur — proud of your A.R.R.L. membership? Then proclaim it! Let the hams who meet you on the street, in the radio store, or traveling, know it. Wear your A.R.R.L. emblem!

The distinctive League emblem comes in four different forms. Its use by members is endorsed and encouraged by the League. Every member should endeavor to display the insignia of his organization in every possible way.

THE PERSONAL EMBLEM, in extra-heavy rolled gold and black enamel, just ½" high, supplied in lapel button or pin-back style, is recognized as the sign of a good amateur. Wear your emblem, and feel proud of having taken your rightful place in the radio fraternity. Either style, $1.00, postpaid.

THE AUTOMOBILE EMBLEM, heavily enameled in yellow and black on sheet metal, will gain you friends. On the road, traveling, it identifies you as a real amateur. 5 x 2½", holes top and bottom. 50c each, postpaid.

THE EMBLEM CUT, a mounted printing electrotype, the same size as the personal emblem, is for use by members on amateur printed matter, letterheads, cards, etc. $1.00 each, postpaid.

THE "JUMBO" EMBLEM, an attention-getter for the shack wall or that 100-footer, is a big yellow-and-black affair 19 x 8½", same style as the Automobile Emblem. $1.25 each, postpaid.

The American Radio Relay League
West Hartford, Conn.
**BARGAINS**

Transmitting key, army air corps. Silver 1/24 contacts, with thinner light. Reduced to $1.50

Lightning Switch, High Grade W.E. Heavy Copper Blade and Contacts. Size 7 x 8 x 6 high. While they last............ $3.50

Western Electric Relay with Adjustable Platinum Contacts. Capable of controlling a heavy circuit of comparatively high voltage, with a very low primary consumption, 0 watt minimum $1.50

Lightning switch, ceiling type, heavy brass. Can handle 10 A.M. Carbons............ $4.50

NEW LOW PRICE

Dynamotor 3/250 volt, bulb input, 50 watts. Normal $9.00. Per pair............ $15.00

Western Electric Switchhouse C.W. 93. Control board for Dynamotor System C.W. 977. Consists of starting switches, open 0-60 milliamp, self voltmeter with switch contacts. Very special............. $8.00

for testing main lines and outputs. Also contains complete filter Marx.
Look this service over—let I.R.C. supply ALL your Resistor needs

Come to resistor headquarters no matter what your problem. Test for yourself these money-saving devices provided for servicemen:—

Metallized Resistors for Replacement.
Wire Wound Resistors for Meter Conversion.
Handy Certified Kits of Resistors for every service problem.
I.R.C. Meter Conversion Charts—and complete instructions for making Sprayberry Set Analyzer. Free.

Get on our service list. Have the I.R.C. service help as soon as issued. Write today.

INTERNATIONAL RESISTANCE CO.
Toronto, Ont.

and

PRECISION WIRE WOUND RESISTORS

AT LAST!
A Real
CONDENSER
MICROPHONE
at a price you
can afford

Model S-2
$65.00

Dealers: Write for details

Comes complete with
2 stage amplifier and
25 ft. cord

OUTPERFORMS
ALL CARBON TYPES

Send for Catalog on
Sound Equipment,
Microphones and Acceso-
ries

SOUND ENGINEERING CORP.
20 N. Wacker Drive
Chicago

Woolworth Bldg.
New York

Lawn Bazaar Amateur Station
W1BFS was installed at a Lawn Bazaar in Mystic, Conn., recently and originated over 250 messages not to mention local interest. It was highly successful and another is to be held before this is in print.

Amateur Radio at CNG Encampment
Amateurs of the Regimental Hq. Co., 169th Infantry, Conn. Natl. Guard, manned W1EFI at Niantic, Conn., during the summer encampment and a daily schedule was kept with W1PO at Hartford, the home city of the company. Many messages were handled between the two stations.

Amateurs at Boy Scout Camp
Boy Scouts at W8ZZAF, located at Mill Creek, West Va., kept in touch with home via W8GEG. The equipment at W8ZZAF was built up after receiving word there was a.c. power available at the camp. Upon arrival it was found that this “juice” was three miles away. Accordingly, incidentally, being prepared, hasty changes were made and 135 volts supplied the 201-A, which was put in the transmitter and was sufficient to cover the 500-mile link. About 500 messages were handled, as well as press despatches.

W9ZZBL at Minnesota State Fair
The largest fair of its type in the world closed September 10th after a week of publicity and interest shown the amateur booth to some half million in attendance. KSTP loaned a transmitter for the occasion and as this transmitter had formerly been used to keep in contact with Byrd, there was considerable interest in the amateur booth. Originally it had been planned to handle traffic for those at the fair but FRC regs put this out of the question at the last minute.

Amateur Radio at Elks National Convention
Birmingham, Ala., was the center of Elk interest during July 11th-15th at their national convention. A steel building hampered the amateurs from handling as much traffic as possible, but over 400 messages were handled during the session. Apparatus was furnished by W4AJP and W4ASW and was set up in the registration lobby. A booth decorated in appropriate colors housed the amateur gear. Operators and clerks included W4ADL, W4AJP, W4ARR, W4DD, W4BMU and W4BBA while relaying was done by W4PAI, W4DD, W4AJW, W4ARR, W4VV, W4AGI and W4KP.

Hamfest at Granite, Oklahoma
Mr. and Mrs. W5ATO were hosts to many hams in surrounding towns during a Sunday in August. A dinner was prepared for all present and trips were taken to local spots of interest after the subject of radio had been discussed at great length and the guests left during the evening after spending a day devoted entirely to hamming.

Lions’ Club Sends Greetings
Early in May the Passaic (N.J.) Lions’ Club through the facilities of the Passaic Amateurs’ Radio Club sent a message of good will to all
REL equipment is the finest that money can buy. In comparing it with competitive offerings look at these points: quality, design, performance, reputation and, last but not least, price. Get REL apparatus at your dealers or direct. Descriptive bulletins on request.

The REL "300" has been designed for use at the elevated positions necessary for 5-meter DX transmission. Uses two tubes in a push pull circuit, either -01A, -45 or type -10 tubes. Eight foot tubular antenna extends above oscillator unit. All parts completely housed in one-piece metal casting. Thoroughly protected from moisture and atmospheric effects by hinged front cover and rubber gasket.

Provisions are made for hoisting or permanent fastening and for locking all controls. Only four connections required from "300" outdoor oscillator to station modulator.

Price, net to the amateur, $31.75

Here is the REL "301" modulator unit. Specially engineered to operate with the REL "300" or other outdoor oscillators. Employs two type -33 or -47 pentodes as modulators depending on oscillators used. Plate current of both the modulator and outdoor oscillator is read on the Weston meter supplied. This unit can also be used to modulate your present low powered C. W. transmitter. Price, net to the amateur, $25.50

And now we have the REL "297". A radio telephone transmitter for 5 meters. The "297" can be operated with either of the following tube arrangements: two -01A and two -33 pentodes or two -45 and two -47 pentodes. Either of these combinations will provide unexpected results. Equipped with Weston plate current meter, single frequency control, high quality modulation — adaptable to any antenna. No further experiments required. Hook up power supply, insert tubes and it works. Price, net to the amateur, $27.75

The Radio Engineering Laboratories, Inc. also manufacture a complete line of ultra high frequency equipment for other than amateur purposes. Submit your problems to our engineering department. Catalogs and bulletins upon request.

Radio Engineering Laboratories, Inc.
100 Wilbur Avenue
Long Island City, New York
Other Lions' Clubs throughout the world. This message was transmitted from W2CXH. Among those assisting were W2BBG, W2DGY, W2CFY, W2CXH, W2AYL, W2DTO, W2AVO, W2CVY. The message was picked up from W2CXH by W5MS, Corpus Christi, Texas, and was delivered to the Lions' Club of that city, W4ACB, Tallahassee, Fla., tried to get the message but did not succeed due to bad QRM. The message is believed to have been received in many other cities.

The Hudson Division Convention

With nearly 500 "Hams," YL's and OW's sitting down at the banquet, this year's convention, held at the Athletic Club, Newark, N. J., on May 21st, under the auspices of the Bloomfield Radio Club assisted by the North Jersey Clubs, proved beyond a doubt that amateur radio is far from being inactive. What the convention committee was able to do in one day should be a guide to other conventions.

Dr. A. L. Walsh, director of the division greeted the delegates and gave a complete account of the Board of Directors' meeting. Informative addresses were made by Hugo Romander, W2DLJM, on antennas and our good friend J. C. Warner, of RCA Radiotron, on the new tubes which have recently been released. Jim Lamb from QST who was about the big city hunting for articles gave a surprise visit and talk to the gang on "Electron Coupled Frequency Meters." Frank Gunther, W2ALS, of Radio Engineering Labs., on "New 5-Meter Equipment." The exhibits on the mezzanine floor brought back the days of some of the early conventions and formed a very instructive display. Unfortunately space does not permit us to mention their names, but due credit has been given to all on the programs. Lieut. David Talley had busy with the Army-Amateur group and Lieut. O. G. Cope, U.S.N., representing the Third Naval District carried on the good work of the Volunteer Communication Reserve. Inter-spersed between meetings, H. J. Kelly, W2BTZ, had his hands full with the numerous contests and stunts which won worthwhile prizes.

The best attended event of the convention was an initiation into the Royal Order of the Wouff Hong, recently revived, being staged for the first time since its revival by the Brooklyn Radio Club. Great credit goes to Ed. Glaser, Riccobono, Wormald, Seid, Joffe, Baunach and Abrahamson for this performance.

A. G. Wester, W2WR, S.C.M., North Jersey took charge of the O.R.S. meeting and plans outlined for more and better activities.

And then the big event of all Hudson Division Conventions — the banquet. There is no doubt that the chef of the Athletic Club knew what he was about with the ten course dinner because it enabled that past-master of Toastmasters, Henry Shore, to fulfill his duties to the satisfaction of all.

Lieu. A. A. Hebert, U.S.N.R., Treasurer, A.R.R.L., brought greetings from President Maxim and Secretary Warner. Director Walsh expressed his appreciation to the committee for its work at this...
Big Scoop! 25-watt tube. Just what the amateurs have been waiting for! 7½ volts filament, 850 plate volts, grid volts 75-100 only $4.75

**MICROPHONES:** Extra sound American Double microphone cases (chromium plate).................. $2.85
Stand-off insulators. per dozen.......................... $0.59

866 new type, spiral filament, circular plate, extra heavy $1.59
866 Heavy duty, mercury rectifier tubes.................. $2.95

**TRANSFORMERS — THIS MONTH’S SPECIAL!**
Thordarson — 2-7½ volt C1 windings, 1-9 volt C7 windings, high voltage 1500 volts C7. Tapped primary; weight 11½ lbs; height length 9½", each.......................... $3.50

**CONDENSERS**
Arsco 4 mfd 1500-2500 v. each side of center.............. $1.75
Arsco 3 mfd 1000-2000 v. each side of center............. $1.25
Arsco 2 mfd 1000-2000 v. each side of center............. $1.25
Arsco 1 mfd 750-1500 v. each side of center............. $1.25

**CRYSTALS**
Checked single-button mike formers, fully shielded and fully mounted—$1.95; Double button........ $2.25

**BEEHIVE INSULATORS:**
20,000 or 25,000 ohm 100 watt, each.................. $1.20
Prime Universal watch case model. single button mikes........ $1.39

**SUPER WASE**
Pilot Universal Super Wasp. tunes from 15 to 050 meters, all A.C., new assembled........................ $7.50

**RELAYS**
Western model 301 0-50 volts, each........................ $0.79

**BEEHIVE INSULATORS:**
20,000 or 25,000 ohm 100 watt, each.................. $1.20
Prime Universal watch case model. single button mikes........ $1.39

**READRITE SET ANALYZERs No. 710, tests 4, 5, 6, 7 prong**

**WIRE**
Arsco power transformers, all fully md., encased in aluminum-bakelite cases — a real heavy job and a pride to any ammateur: 750 volts each side center; 2-7½ volt C7 windings, each........................... $6.00
1000-1500 v. each side center 375 watts, each........ $8.00
1500-2000 v. each side center 850 watts, each........ $11.00
2000-2500 v. each side center 1500 watts, each........ $14.50

**PHONES:** Brand Superior.................................. $5.95

**STAND-OFF INSULATORS**
per dozen.......................................................... $0.59

**PLUGS:**
Universal type CD double button mike................... $1.15
Universal type EL................................................ $1.95

**C.T.**
No. 463: 7.5 volt 1.5 mfd................................. $3.50
No. 464: 7.5 volt 1.5 mfd................................. $3.50
No. 465: 7.5 volt 1.5 mfd................................. $3.50

**GREAT CRYSTAL GRINDING COMPOUND:**
per pkg.......................................................... $0.15

**METERS**
A.C. Voltmeters 0-6, 0-10, or 0-15........................ $5.50

**PRECISION PLUG-IN CRYSTAL HOLDER:**
for any of above $2.69; FinishedIn black, with rubber cord for A.C., beautiful job. $7.50

**ANY OF ABOVE $2.69, Finished in black, with rubber cords for A.C., beautiful job.**

**TELEPLEXES with three tapes, special 10.00**

**OPEN EVENINGS**

**WE CARRY EVERYTHING FOR THEHAM IN STOCK MORE FOREIGN TRADE SOLICITED**

We also carry a tremendous stock of used parts, etc. Write in on special requirements and we shall be pleased to take care of you.

UNCLE DAVE’S RADIO SHACK
356 Broadway
Long Distance Phone 4-5746
ALBANY, NEW YORK
and in 74 other countries throughout the world—

ARCTURUS
BLUE Tubes
The world over, where quality is essential, Arcturus Blue Tubes are used.

Many American set manufacturers, through experience, equip all their export sets exclusively with Arcturus Tubes. They, like their foreign accounts, cannot take chances with tubes that are put in service thousands of miles away.

No other radio tube has been paid as great a tribute.

In the United States, Arcturus Tubes are used by more set manufacturers as initial equipment than any other tube—a signal tribute to the quality tube.

When engineers include Arcturus Blue Tubes in their specifications, when radio jobbers and dealers offer them to the public, they have the ample justification of world-wide approval.

Arcturus Radio Tube Co., Newark, N. J.

ANY Set is Better with Arcturus Blue

RADIO SCHOOL
YOUNG MEN wanted to train as radio operators, we prepare for U. S. Govt. license; send for 40-page catalog; established 1899. Oldest, largest and best equipped school in N. E. 170 Lic. graduates in 2 yrs. Investigate.

MASS. RADIO SCHOOL, 18 Boylston St., BOSTON

ABCD HANDBOOK!

(A) You know you need Handbook.
(B) Question is simply to overcome that inertia.
(C) Handy coupon, plus dollar bill, does the trick.

(D) A. R. R. L., 38 LaSalle Rd., West Hartford, Conn. ENCLOSED $1 SEND HANDBOOK.

(Your Name)
(Street or Box)
(City and State)

convention and Walter A. Cobb, W2CO, Chairman of the convention, replied in appropriate words, sharing the credit with Akers, W2FL; Mears, W2VQ; Stricker, W2CSZ; Mustermann, W2TP; Kimmell, W2ACN; Kelly, Kaltman. McCann, Spangenberg and Shepard. Twenty-one affiliated radio clubs were represented and while we should like to mention their names space is lacking. After the distribution of prizes, the floor was cleared and dancing enjoyed by a large number, with hamfesting continuing into the small hours. Thanks, Bloomfield.

—A. A. H.

The Midwest Division Convention

REPORTING conventions is somewhat like writing a book; with a good plot it becomes a simple matter, and so it is in the case of the Iowa-Midwest Division held at Ames, Iowa, May 20th and 21st, at Engineering Hall, Iowa State College, under the auspices of the Campus Radio Club. A good program well carried out and a successful convention.

The Radio Supervisor was on the job early the first day, and well he did, because 100 amateurs took the examination and only 7 flunked; fine record, fellows. George D. Hansen, none other than W9FFD, gave a fine demonstration on five-meter transmission. Director Kerr made a complete report on the annual Board of Directors' meeting, supplementing advanced information on Madrid Conference.

A sad incident took place during the convention, but it demonstrated the strong fellowship existing in the amateur ranks. That active "ham" W9EQJ, R. P. Griffith, of Goldfield, was reported in the hospital at Fort Dodge with heart trouble; greetings and flowers were being sent him, but too late, and a wreath was substituted to show our sincere respect.

For many years Mr. D. C. Faber, Director Engineering Extension Service, has seen to it that the technical sessions would have the best of speakers, and this year's convention left nothing to be desired after listening to such speakers as Mr. E. B. Fowler, of the N. W. Bell Telephone Co., on "Fundamentals of Speech Transmission"; Mr. George K. Rollins, of the Grand Island Monitoring Station, on "Methods of Interception and Measurements of Radio Signals"; Prof. G. W. Fox, of Iowa State College, on "Recent Developments in Crystal Control." Mr. J. C. Jensen, WCAJ, had some fine slides illustrating his lecture on "Plate Supply and Filters"; Carl Menzer, WSUI, gave a fine talk on "Class B Modulation." After all these interesting speakers, the other best event was the banquet with Director Kerr as the toastmaster.

The dinner was served at the Hotel Sheldon-Munn and was enjoyed by all. The convention closed with the distribution of prizes sending everybody home happy. Our thanks to the manufacturers who contributed so generously, to the Campus Radio Club and its very efficient committee.

—H. W. K. and A. A. H.
SPEcialS—THIS MONTH ONLY
Read 'Em and Weep

888's and 871's—The little 866—5000v. 300 Mill Mercury Vapor Rectifier ..........$1.00
888 or 871 Filament Transformer—2½v, 12 amps—Special .......... $1.25
50 WATERTONS 203A, 211, 845, Very Special ................. $5.95
Full Nickel stretched gold plated diaphragm—100 ohms per button .......... $5.45
Fully cased double button mike transformers .......... $1.95
Desk model nickel plated mike stand and case .......... $3.00
Complete parts for making a condenser mike head, with instructions .......... $4.50
Quartz Crystal blanks .......... $1.00

Radiobuilder's Special UX210 15 Watt Transmitting Tube.......... $1.50

Made especially for us and in use by our customers. Ask any ham that's using them. Double your present output. Use up to 1500 volts on the plate. Use 15-18 grid. "B" amplifiers. Oscillators, RF amplifiers. Duty cycle as low as 4 minutes with ease.

Double Duty UX250's 100% modulators—281's 110 volt 750 volt rectifiers Special Heavy Duty, ea. .......... $1.50
281M-300 Mill 15 volt, drop .......... $1.75
874 Power 2.5 amp, 10,000 v Mercury Rectifier .......... $1.95

NEW
46 Dual Grid Class "B" Amplifier ea. 75c
40 Dual Diode Triflde
250 Det-Amplifier .......... $1.25 Can be used on AC or DC
235A .......... $1.25 235 Plates Screen Grid
232 RF Splitter .......... $1.25 232 Det-Amplifier
235A .......... $1.25 235 Plates Screen Grid
50 RF Fence .......... $1.25

Mercury Full Wave Rectifiers, 300 Mill. 280M........... $95 282 & 283........... $75

MORRILL TRANSMITTING CONDENSERS
Test voltage—2000v, 3000v, 4000v, 6000v, 10,000v.
Working voltage—2000v, 3000v, 4000v, 6000v, 10,000v.
1 mfd .......... $1.65 $2.10 $2.75 $3.75 $6.75
2 mfd .......... $3.00 $4.00 $4.95 $7.45 $10.50
4 mfd .......... $4.80 $6.00 $7.75 $11.00 $15.00
6 mfd .......... $6.80 $8.50 $10.75 $16.50 $22.50
8 mfd .......... $8.75 $11.00 $13.75 $20.50 $28.50
10 mfd .......... $11.00 $14.50 $17.75 $28.00 $37.00
15 mfd .......... $15.00 $20.00 $25.00 $40.00 $53.00
20 mfd .......... $20.00 $28.00 $35.00 $56.00 $75.00

Beehyve Standoff Insulators, best quality. Brown Glaze finish. Each. $1.00 Per Dozen
25 mfd 100 V. Bias bypass condensers, each $1.00
50 mfd 150 V. Bias bypass condensers, each $1.00
85 mfd 250 V. Bias bypass condensers, each $1.00
100 mfd 350 V. Bias bypass condensers, each $1.00
200 mfd 500 V. Bias bypass condensers, each $1.00
500 mfd 1000 V. Bias bypass condensers, each $1.00

Pilot Midget Var. Condensers, 100 mfd, 0.001

A.R.R.L. Hand Books
25 mfd 5,500 volts, 2.5 amp., center tapped .......... $4.00

Uncased—Unmounted 866 transformers. Each. $2.75
210 Filament Transformers 7.5 volts, center tapped, each .......... $1.95
In stock and on demonstration.

Pro chassis, test tubes .......... $74.00
Comet Pro in Cabinet .......... $88.80
National "SW" Hand Books .......... $24.00
No. 12 Enamelled antenna wire, 100' pack .......... $1.00

NATIONAL "11-1-7-5" POWER TRANSFORMERS
1000 watts—2000-1000, 2000-2000, 2500-2500........... $17.45
5500 watts—2000-1000, 2000-2500, 3000-3000........... $22.50

All p-s undiscounrantly guaranteed ninety days against mechanical and electrical defects.

PLATE POWER TRANSFORMERS
250 watts—700-0.750 and 7& $1.50
500 watts—1000-1.000 and 1000-1.000 .......... $2.50
900 watts—2000-2.000, 2000-2.000, 2500-2500 .......... $2.50

Fully mounted in aluminum case. Terminals on bakelite panel.

866 Transformer, In Beauty of a case with Stand-Insulators. Tested at 15,000 volts, 2½ volts, per plate, each $5.00

Uncased—Unmounted 866 transformers. Each. $2.75

210 Filament Transformers 7.5 volts, center tapped, each ........... $1.95
In stock and on demonstration.

20-22 24-26 28-30 32-34

9½ long 130000 ohms with six taps .......... $2.00
A.C. Voltmeters 0-3, 0-5, 0-7½, 0-10, 0-15, each .......... $2.50

AC bias, plates and tubes

A.C. Voltmeters 0-3, 0-5, 0-7½, 0-10, 0-15, each .......... $2.50

A.C. Voltmeters 0-10, 0-5, 0-10, 0-15, 0-20, 0-250, 0-300, 0-10000 ......... $1.00

200 watts—1000-1000, 1000-1000, 1500-1500, 1500-1500........... $1.00

C.R. Transformers—Contact transformers. Special for use with tubes........... $1.00

500 mfd 9,000 volts, 50 amp., center tapped .......... $1.00

Midget Power Transformers, 35-0-35, 5 amp., center tapped, each .......... $1.00

Amateur Hand Book and Crystals, 30 or 100 mfd, each .......... $2.50

Radiobuilders plug-in crystal holders with GR plugs .......... $1.50

Do it yourself! One of each is 15 lbs. They are fully cased in a black crystalline finish can. Porcelain standoff insulator terminals. We invite comparison.

ALL SIZES MAGNET WIRE IN STOCK

G.I. New Lamps—Excellent for locating stray RF and in wavemeters ¼-1-K watt sizes. Each. .......... $0.55
Midget Power Transformers, 350-0-350, 5 amp., center tapped .......... $2.50

The above transformers are wound with No. 18 primary and 20 amp. secondary.

RADIOBUILDERS 200-WATT FILAMENT POWER TRANSFORMERS
11 volts, 15 amps for 4500 watt, center tapped, cased .......... $5.50
12½ volts 18 amps CT for 2 to 3—250 watters, cased .......... $7.50
5 volts, 20 amp. CT, 2000 volt insulated, 10,000 volt .......... $6.00

The above transformers are wound with No. 18 primary and 20 amp. secondary.

All prices guaranteed. Terms Cash or C. O. D. All prices F. O. B. Newark, N. J. No discount required on orders under $5.00. 20% required on all orders over $5.00. Please Include postage. New catalog will be out shortly. Get your name on our mailing list.

Open Evenings. Phone ESsex 2-1539

VISIT OUR STORE WHEN IN TOWN
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

3 Times World Champion Operator Candler Trained

"By applying Candler System methods I won the Radio Telegraphic Championship of the World consecutive years at 50, 55-10 and 56¾ wpm. I say to you Commercial and amateur operators, by all means take Candler High Speed Telegraphing and "Mill" Courses."


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

Candler System Co., Dept. 58
6343 South Kedzie Ave. Chicago, Illinois

If you want to copy press — send perfectly at 35 wpm or more with a bug in key — copy 3 to 5 words behind — 0, K, instantly — write Candler for free advice. The CANDLER SYSTEM of High Speed Telegraphing trains your Brain, Muscles and Nerves to Co-Ordinate in doing fast, accurate work. It gives you Confidence, natural Concentration and banishes Nerve Strain. Original CANDLER METHODS have developed over 45,000 of world's fastest Morse and Radio operators including the champion.

TELEGRAPH-TOUCH-TYPE-WRITING — only method for operators. Shows how to use "mill" in receiving.

Free advice. If you are a beginner and want to learn code the scientific way, or if you want to become a real Expert, and receive the benefit of his 20 years' experience in developing Experts. Your questions will be answered promptly and personally. No obligation.

CANDLER SYSTEM SINCE 1925

COMMERCIAL AND BROADCAST STATIONS

We are at your service to supply you with HIGH GRADE CRYSTALS for POWER USE, sold crystals ground to an ACCURACY of BETTER than 0.03%. Fully mounted in our Standard Holder. TWO DAY DELIVERIES. Prices as follows:

FREQUENCY RANGE

100 to 1500 Kilo-cycles $4.00
1501 to 3000 Kilo-cycles $4.50
2001 to 4000 Kilo-cycles $5.00
4001 to 6000 Kilo-cycles $6.00

Special Prices Quoted for Quantities of Ten (10) or More Crystals

AMATEUR BAND CRYSTALS

Prices for grinding crystals in the Amateur Bands below are for a crystal ground to within 10 Kilo-cycles of your specified frequency unmounted. Mounted in our Standard Holder $5.00 additional. Frequency calibration of the crystal, wrote Candler and is easy. In several instances he has cut one-inch

LOW FREQUENCY CRYSTALS

Low frequency crystals are available to us as low as 1,000 CYCLES. Prices upon receipt of specifications.

SCIENTIFIC RADIO SERVICE

"The Crystal Specialists"

124 Jackson Ave., University Park, Hyattsville, Md.

QST Oscillating Crystals

"SUPERIOR BY COMPARISON"

SINCE 1925

COMMERCIAL AND BROADCAST STATIONS

We are at your service to supply you with HIGH GRADE CRYSTALS for POWER USE, sold crystals ground to an ACCURACY of BETTER than 0.03%. Fully mounted in our Standard Holder. TWO DAY DELIVERIES. Prices as follows:

FREQUENCY RANGE

100 to 1500 Kilo-cycles $4.00
1501 to 3000 Kilo-cycles $4.50
2001 to 4000 Kilo-cycles $5.00
4001 to 6000 Kilo-cycles $6.00

Special Prices Quoted for Quantities of Ten (10) or More Crystals

AMATEUR BAND CRYSTALS

Prices for grinding crystals in the Amateur Bands below are for a crystal ground to within 10 Kilo-cycles of your specified frequency unmounted. Mounted in our Standard Holder $5.00 additional. Frequency calibration of the crystal, wrote Candler and is easy. In several instances he has cut one-inch

LOW FREQUENCY CRYSTALS

Low frequency crystals are available to us as low as 1,000 CYCLES. Prices upon receipt of specifications.

SCIENTIFIC RADIO SERVICE

"The Crystal Specialists"

124 Jackson Ave., University Park, Hyattsville, Md.

W4AKJ has a suggestion that should help some hams in tuning an m.o.p.a. transmitter to a single-wire feed antenna. With the amplifier disconnected, clip the feeder on the oscillator tank and tune to resonance with the antenna, at the same time noting the monitor or frequency-meter setting at which the signal appears. Then disconnect the feeder, hook on the amplifier, re-tune the oscillator to the same frequency, and adjust the amplifier. The feeder can then be clipped on the amplifier tank with the assurance that the antenna is being fed at the right frequency.

Dr. Cyriax's record of holding one call at one location for twenty years has inspired Warren M. Andrew, of Denver, to claim quite a different sort of record — the most calls at the most different addresses. We quote from his letter: "Started in 1909 in Greeley, Colo., with the single letter "A" as a call when a city block was DX. Graduated to "MA" in 1912 in Boulder with 90 miles exceptionally good DX. Went to Cleveland when it was headquarters for the 9th district and took an exam to bring back 91A: to Colorado as the first examined licensed call in the state. The war and then 9DRC at Boulder, followed by 7HN at Great Falls, Mont., 9CPK Denver, 5ARL Lubbock, Texas, 6DRL Los Angeles, W5AIE-W5ZZA Albuquerque, N. M., and now W0IVT-W9ZZAE back in Denver, to say nothing of a hitch at a broadcast station and two ship stations, together with two other portable calls. That makes 12 amateur calls in four districts, three commercial calls on land and sea, and in the game some 22 years plus — and still going strong!"
**Big Tubes at Little Prices**

Regular, brand new high power tubes at prices that will make you put your 210's in moth-balls. Made by nationally known manufacturer, tested and guaranteed.

<table>
<thead>
<tr>
<th>Tube</th>
<th>Price</th>
<th>Off Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>872</td>
<td>$7.75</td>
<td>$6.25</td>
</tr>
<tr>
<td>873, 811</td>
<td>$8.75</td>
<td>$7.50</td>
</tr>
<tr>
<td>860</td>
<td>$8.95</td>
<td>$7.95</td>
</tr>
</tbody>
</table>

(Pricing subject to change without notice. Order now!)

**Genuine RCA VX-210-B, high voltage half-wave rectifiers, use in place of 210-A. Price 87c.**

**RCA Licensed TUBES**

Unconditionally guaranteed for three months

- 112A: $3.35
- 112B: $3.45
- 112C: $3.95
- 210: $4.19
- 211A: $4.45
- 211B: $5.00
- 245: $8.75
- 227: $10.00

**Put a set of National Uoron tubes in the circuit.**

<table>
<thead>
<tr>
<th>Tube</th>
<th>Price</th>
<th>Off Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>210</td>
<td>$1.40</td>
<td>$1.20</td>
</tr>
<tr>
<td>224</td>
<td>$2.75</td>
<td>$2.30</td>
</tr>
<tr>
<td>236</td>
<td>$3.60</td>
<td>$3.00</td>
</tr>
<tr>
<td>247</td>
<td>$4.50</td>
<td>$3.50</td>
</tr>
</tbody>
</table>

**Note:**

- 210’s, 220’s, and 230’s are 866’s.
- 245’s are 230’s.
- 227’s are 201’s.

**Put a set of National Union 1 meg. condensers connected in delta.**

**Large titanium mfd. 210’s.**

<table>
<thead>
<tr>
<th>Condenser</th>
<th>Price</th>
<th>Off Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>210</td>
<td>$1.40</td>
<td>$1.20</td>
</tr>
<tr>
<td>224</td>
<td>$2.75</td>
<td>$2.30</td>
</tr>
<tr>
<td>236</td>
<td>$3.60</td>
<td>$3.00</td>
</tr>
<tr>
<td>247</td>
<td>$4.50</td>
<td>$3.50</td>
</tr>
</tbody>
</table>

**Faradon To be Faradon TUBE FILTERS**

- 1 Mfd. 1000 Volt: $1.25
- 1 Mfd. 1500 Volt: $1.25
- 2 Mfd. 1500 Volt: $1.40
- 1 Mfd. 3000 Volt: $1.55
- 2 Mfd. 3000 Volt: $2.00
- 8 Mfd. 1000 Volt: $2.50
- 8 Mfd. 2000 Volt: $2.75
- 8 Mfd. 3000 Volt: $3.25
- 8 Mfd. 5000 Volt: $6.75

**Transformer Specials**

- Midget 1500 watt transformers. 100 MA. 30 c. t. 12 c. t. Complete. Havens sell them for $12.00. Harrison sells them for $5.00.
- Special Transformer. Havens sell it for $12.00. Harrison sells it $5.00.
- Special Transformer. Havens sell it for $12.00. Harrison sells it $5.00.
- Special Transformer. Havens sell it for $12.00. Harrison sells it $5.00.

**ROYAL SHORT WAVE RECEIVERS**

- A complete line of receivers for the amateur and the short wave fan that combines high standby with the highest sensitivity and the lowest possible price. In neat metal cases. Large titanium oil insulators, terminals protected by cover, and with zero adjustment. A real bargain at only 99c.

**The A C Chief**

- The A C Chief with additional type 58 used as screen grid. 1000 volt filament and grid. $26.46

**The Royal Chief**

- The Royal Chief with additional type 303 used as screen grid. 1000 volt filament and grid. $34.46

**The A C Star**

- Uses one of the new type 58 super-control screen grid pentodes, a 247 pentode audio amplifier, and a 280 rectifier. Especially designed for hams, quiet operation on Short Waves. Ready to plug into your AC line. Complete, including many high priced accessories. Order now before the next shipment is consigned! Simultaneously with four coils covering from 14 to 200 meters or with band spread coils for the 20, 40 and 80 meter bands.

**Filter Choke Specials**

- Every item on a outstanding bargain! You set more for your money at Harrison’s. The A C Chief. 5 volts. 2100 MA. 250 ohms. $26.46
- The Royal Chief. 5 volts. 2100 MA. 250 ohms. $34.46
- The A C Star. 5 volts. 2100 MA. 250 ohms. $32.86

**Microphones**

- Universal double button microphones. Gold spot diaphragm. 200 ohms per button. $5.40
- Wholesale tap diaphragm, 200 ohms. Wholesale price. $1.00
- Western Electric M4C 100 ft. three conductor microphone cables. Shielded. Heavy rubber covered. $1.00, 12 ft., $1.50, 24 ft., $2.25, 50 ft., $3.50, 100 ft., $5.75
- New bakelite tube bases — UX or UX, $e. Carbon resistors. All sizes. Each, each, each.

**Get your low price on any set or part!**

VISIT OUR NEW SALES ROOMS

One block south of Cortlandt Street

HARRISON RADIO CO.

145 Liberty St., Dept. T-11

New York City

Say You Saw It in QST — It Identifies You and Helps QST
Order a Set of
Centralab
Motor Radio
Noise Suppressors
Get 50% to 500% more efficiency with these sturdy suppressors. Priced Right.
Set of 5 for 4-cyl. car, Retail Price $2.00,
Your Price.............................. $1.10
Set of 7 for 6-cyl. car, Retail Price $2.75,
Your Price.............................. $1.50
Set of 9 for 8-cyl. car, Retail Price $3.50,
Your Price.............................. $1.90

Centralab
Central Radio Laboratories
Milwaukee

square crystals into four parts and by edge-grinding has succeeded in developing four crystals where there was only one before. By finishing one side of each of the crystals slightly they can all be put on different frequencies. Cutting through the crystal takes about a half hour using the method described above. All of the crystals were “Y” cut.

W1ANC’s eagle eye spotted an ad for an auto “B” eliminator which is supposed to deliver 80 watts with only a 10-amp. intermittent drain from a 6-volt storage battery. Combine this with what you could save using Listerine toothpaste and a G. E. refrigerator and the depression is all over, says Harry!

Standard Frequency Transmissions
(Continued from page 28)

TRANSMITTING PROCEDURE
The time allotted to each transmission is 8 minutes, divided as follows:
2 minutes — QST QST QST de (station call letters).
3 minutes — Characteristic letter of station followed by all letters and statement of frequency. The characteristic letter of W1XP is “G”; that of W9XAN is “O”; and that of W6XXK is “M.”
1 minute — Statement of frequency in kilocycles and announcement of next frequency.
2 minutes — Time allowed to change to next frequency.

ACCURACY
Although the accuracy of the transmissions is not guaranteed, those of W1XP are usually dependable to 0.001 per cent and those of W9XAN and W6XXK to 0.01 per cent.

THE TRANSMITTING STATIONS
W1XP: Massachusetts Institute of Technology, Round Hill Research, South Dartmouth, Mass., Howard A. Chinn in charge.
W6XXK: Don Lee Broadcasting System, Los Angeles, Calif., Harold Peery in charge.

REPORT BLANKS
Blanks for reporting on the S.F. transmissions will be sent postpaid upon request. Just send a card or message to Standard Frequency System, QST, West Hartford, Conn., asking for s.f. blanks.

WWV 5000-KC. TRANSMISSION
The 5000-kc. transmissions of the Bureau of Standards station, WWV, are given every Tuesday from 10:00 a.m. to 12 noon and from 8:00 to 10:00 p.m., E.S.T. The accuracy of these transmissions is to better than 1 cycle (one in five million). Information on how to receive and utilize the signals is given in Letter Circular LC-335, obtainable on request from the Bureau. Communications concerning these transmissions and reports on their reception should be addressed to Bureau of Standards, Washington, D. C.

--- J. J. L.
FIRST-AID RESISTOR KIT
Pocket size. Furnished in 1-watt and 2-watt types. Protect-O-Packed to keep wire-leads straight. Each unit stamped with value. Includes free supply of service labels.

Since radio receivers have become so popularly equipped with resistors, a new service has been created — for resistors, like other parts, cannot go on forever. “Look to your resistors” has become an important byword when sets are not performing satisfactorily. This is but one of the opportunities OHIOHMS offer the service man.

OHIOHM RESISTORS
THE OHIO CARBON COMPANY
12508 Berea Rd. Cleveland, Ohio

SPARK SUPPRESSOR SETS
for eliminating ignition interference on 4, 6, or 8 cylinder cars. Contain condenser and necessary suppressors.

RADIO INSULATORS

Get Started in RADIO
Write for free booklet telling about this growing and most promising industry. The radio operator is an officer aboard ship. His work is light, pleasant and interesting. He has many opportunities to travel to all parts of the world. You can qualify in a short time in our well-equipped school under expert instructors.

Educational Department
WEST SIDE Y M C A 4 West 63d St.
New York

“EMP-LAB” FOR LESS THAN $20!
Here is the famous EMP-LAB PXO-1 crystal controlled transmitter & power supply. All tubes, x-tal ground 1/10 of 1%, your spec. freq., milliammeter, metal cabinet, vernier dial, power supply chassis cadmium plated, assembled, wired and tested. Additional stages may be purchased with power supplies to obtain frequency doubling advantages or increase power. Amplifiers may be modulated for fone. Power supplies sold separately. Write for further information and our complete parts catalog.

EMPIRE STATE RADIO LABORATORIES
LYON BLOCK, ALBANY, N. Y.

Say You Saw It in QST — It Identifies You and Helps QST
ELECTRAD Volume Controls

ELECTRAD Standard REPLACEMENT VOLUME CONTROLS now have removable end covers. Just snap out the standard cover and instantly replace it with a built-in power switch, if desired.

Another popular feature of the new ELECTRAD Volume Controls is the long ALUMINUM shafts, which may easily be cut to any required length.

ELECTRAD makes the most complete line of replacement resistors and volume controls now available. They are IDEAL for service and experimental work. Ask your dealer.

AERO INTERNATIONAL
ALL WAVE II-TUBE
SUPER-HETERODYNE DELUXE
$39.75

Completely assembled with two matched full dynamic speakers from 15 to 350 meters. Besides the regular broadcast band it brings on loud speaker reception, foreign programs, amateurs, police calls, ships at sea, and aeroplanes. One-dial control. No plug-in coils. Latest superphonic tubes.

Attention Ham! This set can be furnished for operation on the ham band only, for $2.00 extra.

AERO WORLDWIDE
1-TUBE SHORT WAVE SET
For Headphone Operation
Price $5.95

Listen in direct to London, Paris, Berlin, Buenos Aires and other broadcasting stations throughout the world via short waves. WORLDWIDE RECEIVER sets 14 to 350 meters. Aero 1-Tube Short Wave Set, $8.75. The same as above set but it has one stage of audio frequency added to it. Aero 4-Tube Short Wave Radio,...$10.90 Aero 6-Tube Short Wave Radio,...$11.90 Aero 6-Tube Super-Heterodyne 10.50

CHAS. HOODWIN CO., 4240 Lincoln Ave., Chicago
PASSING the EXAM is more important than merely taking it

MAKE sure you do not flunk out; be prepared for any question you may be asked. Typical questions, and their answers, are given in the new reprint of QST’s popular articles on “Passing the Government Examination for Amateur Operator’s License.” Originally these articles appeared in the January and February, 1930 issues; so popular were they that the entire back copy supply of these issues was exhausted within a year. Rewritten, they were again published in October and November, 1931 and reprints prepared for distribution. This supply has again been exhausted, and now —

Revised in terms of latest amateur practice, with complete information on the new amateur regulations, a new reprint of the “Passing” articles is ready for distribution. In convenient, economical pamphlet form, you can find the answer to every exam question in it. 20c per copy postpaid.

THE AMERICAN RADIO RELAY LEAGUE
WEST HARTFORD, CONNECTICUT

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)

ALUMINUM BOX SHIELDS
Genuine “ALCOA” stock, silverdip finish.

\[
\begin{align*}
5 \times 9 \times 0 & : \quad $1.75 \\
10 \times 6 \times 7 & : \quad 2.95
\end{align*}
\]

ANY SIZE TO ORDER
National Velvet-Varnish type F dial, Reg. Price $4.50, Special $1.50.

BLAN, the Radio Man, Inc.
177 Greenwich Street, New York, N. Y.

Willie had a superhet.
He couldn’t make it work;
So he got himself a Handbook
Now you ought to hear it perk.

Moral —
Send a dollar today for your copy of the Radio Amateur’s Handbook 242 pages of invaluable ham dope.

American Radio Relay League, Inc.
West Hartford, Conn.

PORT ARTHUR COLLEGE
PORT ARTHUR, TEXAS

Say You Saw It in QST — It Identifies You and Helps QST
THE BEST 50 WATT SOCKET
Now way down in price!

Note exclusive Double Contacts. No more tubes wrecked due to contact resistance. Excellent porcelain insulation, cadmium plated soldering terminals, slotted knurled nuts, etc.

No. 211 Socket, new list price ...................  $2.40
Another new socket, very similar, but for UX base tubes. The best socket for '66 rectifiers, '52 and other transmitting tubes.

No. 210 Socket, list price ....................... $1.50

Why use bulky stand-offs? Those handy insulators you see everywhere are our No. 20, 2½" high, but only 1¼" by 1¼" base. No. 20 Stand-off Insulator, list price $.15

Your jobber can supply these and other JOHNSON items at generous discounts, or order direct.

E. F. Johnson Co., Waseca, Minn.

All of the above coils are close-wound with No. 30 d.c.c. wire.

LOW FREQUENCY COILS

<table>
<thead>
<tr>
<th>Freq. Range</th>
<th>Plate</th>
<th>Space</th>
<th>Grid</th>
<th>Space</th>
<th>Ant.</th>
</tr>
</thead>
<tbody>
<tr>
<td>60-176 kc</td>
<td>3.8 mh.</td>
<td>24½&quot;</td>
<td>15.8 mh.</td>
<td>24½&quot;</td>
<td>30 mh.</td>
</tr>
<tr>
<td>100-545</td>
<td>340 mh.</td>
<td>1¼&quot;</td>
<td>1.7 mh.</td>
<td>1¼&quot;</td>
<td>4 mh.</td>
</tr>
<tr>
<td>500-1620</td>
<td>40 mh.</td>
<td>3½&quot;</td>
<td>200 mh.</td>
<td>1½&quot;</td>
<td>450 mh.</td>
</tr>
</tbody>
</table>

Low frequency coils are compact Diamond-weave type wound to specifications by F. W. Sickles Co., Springfield, Mass. All coils are for forms of 1½-inch outside diameter.

Third All-Section Sweepstakes Contest

(Continued from page 56)

turned here by the post office department daily because they lacked a sufficient address to insure delivery. Every message to be relayed through even one station should have the name as well as street and number and all other possible information. However, in the case of messages going direct from originator to addressee the call signal, city and state will be deemed adequate. Participants may guide themselves accordingly.

How should messages complete in other respects but bearing no signature be sent? With the words "no sig" after a double dash at the end of the text.

What type of message texts should be exchanged in verification of a QSO? Would these be considered "rubber stamp" texts? (1) Do you think we could keep a regular schedule (2) How many points has your station in these national tests query.

The texts are O.K. as they differ materially from each other. Many other questions or facts pertinent to the apparatus in stations, localities, opinions regarding conditions, DX, traffic or radio-phone operation, comments on the characteristics of different amateur frequencies, off-frequency operation, regulations, the interference question, high quality signals, beginners, broadcast or ship operating, organization work, Army or Navy Net operation, station descriptions, QST articles, message procedure, laws, etc., would make excellent texts for messages to be originated in the contest, not to mention the variety of non-radio subjects that could be called upon when operators in remote districts may find themselves short of regular traffic.

What about participation by the A.R.R.L. Hdq. staff members? While stations owned and operated by members of the staff at A.R.R.L. Headquarters may participate and while the scores will count for Connecticut, the station owners and operators will be ineligible to receive any awards. The Headquarters station will transmit its regular official and special broadcasts at the usual times but whenever possible in the remaining time will participate in the contest work to add to the enjoyment and scores of those looking for QSO's.

Reports or summaries from participating stations must be received at A.R.R.L. Hdq. from all stations except those in Alaska, Hawaii and P. I. on or before noon December 24, 1932, to be counted in the results or to be considered in the awards. From those outlying points reports must be received on or before January 28, 1933. Play safe ... mail your report immediately at the end of the contest period to avoid delay and insure that your results are credited.

A Lesson from the Commercials

(Continued from page 68)
cost was comparatively high, running about thirty dollars each as I remember it. But the records show that, after the installation of the breakers, not a single tube was lost. All of the dozen or more tubes in these three transmitters as well as
"HOW CAN I BECOME A RADIO AMATEUR?"

Does your answer come easily, freely, briefly? No blame to you if it doesn’t—amateur radio is a complex and diversified pursuit, and it cannot be considered in a word.

The easiest way to answer that question is to suggest that your inquirer secure a copy of the League’s special beginner’s booklet. It is by far the best answer you could possibly give him, too, for the 32 pages of the new second edition of “How to become a Radio Amateur” outline the entire field of amateur radio, make learning the code easy, and tell how to build a simple station, with clear illustrations and easily followed building instructions—and there’s concise dope on getting licenses and operating properly, too. In short, it answers the question—thoroughly, yet simply. An inexpensive introduction to amateur radio and preliminary to the Handbook. The price is 25c, postpaid.

AMERICAN RADIO RELAY LEAGUE, West Hartford, Connecticut

FREE Amateur and Servicemen’s Wholesale Guide

Hot off the press! Chock full of latest of everything for the Radio Serviceman, Amateur, Experimenter. Detailed illustrations; vital and interesting facts. Hundreds of “Hot Shot” bargains! Astonishing wholesale prices that challenge all America. WRITE TODAY for your free copy!

BURSTEIN-APPLEBEE COMPANY

FREE Amateur and Servicemen’s Wholesale Guide

MODERNIZE YOUR RADIO EQUIPMENT

Standard relay racks and panels will give your apparatus that desired commercial appearance. Our prices are right. Details upon request.

FRAZER-GLASSFORD LABORATORIES

LOW RANGE FUSES

- Littlefuses for Instruments: Amps.: 1/100, 1/32, 1/16 — 20c ea.
- 1/8, 1/4, 3/8, 1/2 — 15c ea. 1 — 10c ea. For milliammeters, ham rectifiers, etc. Use 1/8 for radio B circuits. High Voltage
- Littlefuses: 1000, 5000, 10,000 volt ranges in 1/16, 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1⅛, 2 amps. Reasonable. Price 35c to $1.25 ea.
- Write for instructive bulletin 4-A.

LOW RANGE FUSES

- Littlefuses for Instruments: Amps.: 1/100, 1/32, 1/16 — 20c ea.
- 1/8, 1/4, 3/8, 1/2 — 15c ea. 1 — 10c ea. For milliammeters, ham rectifiers, etc. Use 1/8 for radio B circuits. High Voltage
- Littlefuses: 1000, 5000, 10,000 volt ranges in 1/16, 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1⅛, 2 amps. Reasonable. Price 35c to $1.25 ea.
- Littlefuses for Instruments: Amps.: 1/100, 1/32, 1/16 — 20c ea.
- 1/8, 1/4, 3/8, 1/2 — 15c ea. 1 — 10c ea. For milliammeters, ham rectifiers, etc. Use 1/8 for radio B circuits. High Voltage
- Littlefuses: 1000, 5000, 10,000 volt ranges in 1/16, 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1⅛, 2 amps. Reasonable. Price 35c to $1.25 ea.
- Write for instructive bulletin 4-A.

Transmission Condensers

Dubbilier brand means all types—mica, paper, oil-filled, oil-impregnated, ultra-short-wave, and now, compact electrolytics here shown. Infinitely superior workmanship and materials. Two-year service guarantee. Lowest prices.

DUBBILIER CONDENSER CORP.

DUBBILIER CONDENSER CORP.

4377 Bronx Blvd. New York City

Say You Saw It in QST — It Identifies You and Helps QST
YOU CAN’T AFFORD TO BE WITHOUT THE NEW
Easy-Working Genuine Martin

No. 6 VIBROPLEX
Reg. Trade Marks: Vibroplex, Bug, Lightning Bug

In Colors
Blue
Green
Red

Makes sending easy, Easy to learn, Easy to operate.
Black or Colored, $17. Nickel Plated, $19

Improved MARTIN Vibroplex
Black or Colored, $17
Nickel Plated, $19

Special MARTIN RADIO Bug—Extra large Specially Constructed Contact Points for direct use without relay, Black or Colored, $25

Liberal allowance on old Vibroplex Remit by Money Order or Registered Mail
THE VIBROPLEX CO., Inc. 825 BROADWAY
New York
Cable Address: “VIBROPLEX,” New York

BLILEY PIEZO-ELECTRIC COMPANY
Masonic Temple Bldg., Erie, Pa.

BLILEY CRYSTALS
Quartz and Tourmaline
Powerful — Accurate — Uniform
Quartz Crystals supplied at your dealer close to specified frequency, 0.05% calibration: 1750, 3500Kc bands, $5.50. 7000Kc, $9. Quartz mounting, $2.50. Tourmaline Disks: 7Mc band, $12. 14Mc band, $14. Tourmaline mounting, $2.50. 525Kc Lamb-super mounted crystal, $9.50. 100Kc Std. Freq. mounted bar, $12.00.

Laboratory and Kit Equipment for Service Men

Shallcross Resistors have many uses in Multi-Range Meter circuits and modern set analyzers. Our Bulletin 150-C contains many valuable charts and wire diagrams completely describing their use. Send now 4¢ in stamps for your copy of this valuable booklet.

90 Sig at De ans det i QST — Det identificerer Dem og hjælper QST
A Dynamic Microphone, moving coil type, is now ready. See our October QST Ad. Write for our ham Catalog. Southern Photo QSL’s. Have you seen these new clever 5x3x6” receiver or monitor cans? Very special. $1.00. Theodore Stern (W2CZR), 215 West 91 Street, N. Y. C.

SPECIAL Tubes for 6 meter Transmitters and Receivers. Condenser Mike Kits, W.E. type units $3.50. Ass’d L, $5.00. Condenser Microphone and 2-stage ampl. unit, complete, $20.00. Phone Break In Equipment. Guaranteed complete automatic units that can be attached to any transmitter. Write.

New Superior Var. Trans. Cond. 33 1/4% off to Hams. Frequency Meters, Monitors calibrated. Per point. $.50.

Low Prices on Cans! Size—#6—5x5x6 $1.28 1.28
5x4x6 1.28 1.28
5x6x6 1.28 1.28
6x6x6 1.28 1.28
6x4x6 1.28 1.28
10x6x6 2.57 2.57
10x8x8 2.57 2.57
14x10x10 2.57 2.57
14x12x12 2.57 2.57
18x12x12 2.57 2.57
24x12x12 2.57 2.57

The above cans are supplied "knocked down" with drilled and tapped aluminum corner posts. Write for our LOW prices on aluminum and complete cans. Our prices come the best. 20% deposit with all orders—postage extra. We ship any size order anywhere. We represent all nationally known radio manufacturers. Low prices on all tubes. Write for discounts.

SOUTHERN PRODUCTS
Dept. 105 
UNIVERSITY, ALABAMA

DUPLICRYSTAL OVEN

Southern Products Announces
A GREAT TUBE SALE AND OTHER UNUSUAL VALUES

Jewell Radio Company
110 Chambers St., N. Y. City

Say You Saw It in QST — It Identifies You and Helps QST
HAM-ADS

(1) Advertising shall pertain to radio and shall be of the nature of offers of goods or services or experiments in their behalf.

(2) No use of any character will be accepted, nor any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement appear to be a part of another, nor shall any such advertisement be used by the others.

(3) The HAM-Ad rate is 15c per word, except as noted in paragraph (4) below.

(4) Reimbursement in full must accompany copy. No cash or contra account on more than 6 issues will be allowed.

(5) Closing date for HAM-Ads is the 25th of the second month preceding the month of publication. The rate is not refundable.

(6) A special rate of 7c per word will be applying to advertising which, in our judgment, is obviously non-commercial in nature, and is placed and signed by a member of the American Radio Relay League. Such advertising of bona fide charitable, religious, educational or other similar non-commercial or charitable nature will be examined by the ARRL, and may be refused if the League determines that it does not qualify for exchange or advertising interchange for purposes of the League. The American Radio Relay League takes the 7c rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and takes the 15c rate. Prohibitions of paragraph (5) above apply.

(1), (2), (4) and (5) apply to all advertising in this column regardless of which rate may apply.

PLATE power for your set, the very heart of its performance, for quietness, DX ability, lifelong permanence, absolute dependability, lowest ultimate cost, no other plate source even approaches the simplicity of a small ducted select alkaline storage B battery. Built painstakingly; every joint pure nickel, upset electrically welded. Genuine Edison Electrolyte. Our list describes condition, parts, enamelled and wire, silicon steel. Available immediately, filament and plate transformers for the new 872-866 rectifiers, complete plate power supply, 23c; power transformer, 60c; iron core, 25c. Our fourth year in the crystal business. Prompt shipments. Precision Piezo Service, 427 Asia St., Brooklyn, N. Y.

BARGAINS: Brand new filter condenser block, 4 sections, one inch square, scientifically ground for maximum power at very high frequency, 25c. SELL or trade: Jynatron frequency meter parts; thermocouples; 1 to 5 amperes, $2.25. Ham crystals with holder, $5.50; 250 microamperes, $4.50. Transformer windings, core, aluminum chassis parts, monitor cases, braze corrosion resistance, W9ELA, 1014 E. Ave. 38, Los Angeles.

QSLs, 85¢. W9EKO. SELL — new Weston 459, 525 ammeters, $5. Robert Bate, 4105 Alto Rd., Baltimore, Md.

QSLs — that speak for themselves. SWLO samples for stamp, 50¢ postpaid. Beyond Rocklin, 73c. Kinding, Kent, Ohio.

GOOD crystals — fair prices. Hollister Crystal Labs., Merriam, SELLING out, two 212Ds with pockets for only 611. each. Tube, for quietness, DX ability, lifelong permanence, absolute dependability. QSLs — ...att. that speak for themselves. SWLO samples for stamp, 50¢ postpaid. Beyond Rocklin, 73c. Kinding, Kent, Ohio.

BARGAINS: Brand new filter condenser block, 4 sections, one inch square, scientifically ground for maximum power at very high frequency, 25c. SELL or trade: Jynatron frequency meter parts; thermocouples; 1 to 5 amperes, $2.25. Ham crystals with holder, $5.50; 250 microamperes, $4.50. Transformer windings, core, aluminum chassis parts, monitor cases, braze corrosion resistance, W9ELA, 1014 E. Ave. 38, Los Angeles.

QSLs, 85¢. W9EKO. SELL — new Weston 459, 525 ammeters, $5. Robert Bate, 4105 Alto Rd., Baltimore, Md.

QSLs — that speak for themselves. SWLO samples for stamp, 50¢ postpaid. Beyond Rocklin, 73c. Kinding, Kent, Ohio.

CLEAR edge power crystals, 1000-4000 Icos. Ye. 8¢, Xs. $3.50 W9ADA.


QSLs, two color 100, 75¢; 150, $1; postpaid. Samples. W9GOF, Muskm, Mishawaka, Ind.

CODE machine, $12. Stanley Dan, Stillwater, Minn.

WESTON meters (used) — 100 to 500 milliamperes, $3.75; thermocouples, 1 to 5 amperes, $6.25. Ham crystals with holder, $5.50; 250 microamperes, $4.50. Transformer windings, core, aluminum chassis parts, monitor cases, braze corrosion resistance, W9ELA, 1014 E. Ave. 38, Los Angeles.

QSLs, 85¢. W9EKO.

TRANSFORMERS, reactors made to your order. Real quality, quick service, lowest prices. Baker Engineering Labs., Fort Wayne, Indiana.

SELL — two 504As, new factory sealed $35. each, both $60. D. C. Akron, W2FL, East Orange, N. J.

CODE machines, tapes and complete instruction for beginners or advanced students — both codes — for sale or rent very convenient, $12, staff, L. C. Whitaker, Durham, N. C.

WIEFL — Lester E. Balcom, 294 Summer St., Malden, Mass.

W2BHT — John R. Reardon, Lake Ave., Breilee, N. J. U. S. Naval Radio Sta., Manasquan, N. J.

W2ELN — Norwood V. Bradshaw, 2588 Flatbush Ave., Brooklyn, N. Y.

W2JVA — R. S. Beazan, 334 Lafayette Ave., Bellevue, Ky.

WIMK, A.R.R.L. Headquarters


The following calls and personal data belong to members of the A.R.R.L. Headquarters gang:

W1AK — W1KIP Clyde J. Housdson "ch."

W1BWA — R. T. Beaudin "rb."

W1BDI — F. E. Handy "fh."

W1CDB — W2ZBB Clinton B. DeSoto "de."

W1AL — J. L. Lamb "jill."

W1DF Geo. Grammer "hg."

WIEK K. B. Warner "ken."

W1SS A. E. Hebert "eh."

W1SS-W1H2Z C. C. Rodinson "rod."

W1UE E. L. Battey "ey."

W1TRUE SECTION

CRISTALS, Brazilian quartz, c.o.d. calibrated crystals, one inch, X or Y $3.50, 50-750 to 4000 K.; oscillating crystals, one inch X or Y, $1.50. Unfinished blanks, odds and ends less than one inch, guaranteed to make good oscillators. 90c. Grinding carbide wheel 25¢ per box. William Threem, W8PN, 88 E. McMillen Ave., Cincinnati, Ohio.

QSL cards, message blanks, stationery, snappy service. Samples free. Write today. W1BEF, 16 Stockbridge Avenue, Lowell, Mass.

SPECIAL transmitting and receiving equipment custombuilt to your requirements. Careful engineering; adequate shop facilities; good workmanship, reasonable prices. Let me quote or Advanced students — both codes — for sale or rent very convenient. Fort Wayne, Indiana.

ZEBRA — 46th class B. $4.50 pair. Tube to line and line to grid $4.50 pair. Plate, filament, and audio transformers and chokes. Write for circular, W8UD, Douglas, Mich.

Q R A SECTION

50c. straight with copy in following address form only:

WIEFL — Lester E. Balcom, 294 Summer St., Malden, Mass.

W2BHT — John R. Reardon, Lake Ave., Breilee, N. J. U. S. Naval Radio Sta., Manasquan, N. J.

W2ELN — Norwood V. Bradshaw, 2588 Flatbush Ave., Brooklyn, N. Y.

W2JVA — R. S. Beazan, 334 Lafayette Ave., Bellevue, Ky.

WIMK, A.R.R.L. Headquarters


The following calls and personal data belong to members of the A.R.R.L. Headquarters gang:

W1AKW-W1KIP Clyde J. Housdson "ch."

W1BWA — R. T. Beaudin "rb."

W1BDI — F. E. Handy "fh."

W1CDB — W2ZBB Clinton B. DeSoto "de."

W1AL — J. L. Lamb "jill."

W1DF Geo. Grammer "hg."

WIEK K. B. Warner "ken."

W1SS A. E. Hebert "eh."

W1SS-W1H2Z C. C. Rodinson "rod."

W1UE E. L. Battey "ey."

W1TRUE SECTION

CRISTALS, Brazilian quartz, c.o.d. calibrated crystals, one inch, X or Y $3.50, 50-750 to 4000 K.; oscillating crystals, one inch X or Y, $1.50. Unfinished blanks, odds and ends less than one inch, guaranteed to make good oscillators. 90c. Grinding carbide wheel 25¢ per box. William Threem, W8PN, 88 E. McMillen Ave., Cincinnati, Ohio.

QSL cards, message blanks, stationery, snappy service. Samples free. Write today. W1BEF, 16 Stockbridge Avenue, Lowell, Mass.

SPECIAL transmitting and receiving equipment custombuilt to your requirements. Careful engineering; adequate shop facilities; good workmanship, reasonable prices. Let me quote or Advanced students — both codes — for sale or rent very convenient. Fort Wayne, Indiana.

ZEBRA — 46th class B. $4.50 pair. Tube to line and line to grid $4.50 pair. Plate, filament, and audio transformers and chokes. Write for circular, W8UD, Douglas, Mich.

Q R A SECTION

50c. straight with copy in following address form only:

WIEFL — Lester E. Balcom, 294 Summer St., Malden, Mass.

W2BHT — John R. Reardon, Lake Ave., Breilee, N. J. U. S. Naval Radio Sta., Manasquan, N. J.

W2ELN — Norwood V. Bradshaw, 2588 Flatbush Ave., Brooklyn, N. Y.

W2JVA — R. S. Beazan, 334 Lafayette Ave., Bellevue, Ky.
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

For Your Convenience
QST's
INDEX OF ADVERTISERS
IN THIS ISSUE

Americal Red Cross .................................................. 78
Arcturus Radio Tube Co. ........................................... 80
A.R.R.L. Application Blank ....................................... 84
A.R.R.L. Booklet ........................................................ 80
A.R.R.L. Emblem ....................................................... 84
A.R.R.L. Handbook .................................................... 80, 87, Cov. II
A.R.R.L. Supplies ...................................................... Cov. III
Bian, The Radio Man, Inc. ........................................... 87
Billey Piezo Electric Co. ............................................. 90
Burriss Applebee Company .......................................... 87

Candler System Company ............................................ 82
Capitol Radio Engineering Institute ............................. 84
Cardwell Mfg. Corp., Allen D. .................................... 71
Central Radio Labs .................................................... 84
Collins Radio Company .............................................. 83
Cornell Radio Mfg. Co. .............................................. 88
Chicago Radio Products ............................................. 83

Dobbs Condenser Corp. ............................................... 89
Electrad, Inc. ............................................................ 85
Empire State Radio Labs ............................................ 85
Everett & Son, Inc. M. M. .......................................... 85
Fraser-Glasford Labs ................................................ 89

General Dry Batteries, Inc. ....................................... 67
General Radio Co. ..................................................... 2

Hammarlund Mfg. Co. ................................................ 69
Harrison Radio Co. .................................................... 83
Hoodwin Co., Chas .................................................... 88

International Resistance Co. ...................................... 76

Jewell Electrical Instrument Co. ................................ 1
Jewell Radio Co. ....................................................... 91
Johnson Co., E. F. ..................................................... 88

Leeds ................................................................. 95
Littlefuse Labs ......................................................... 89

McGraw Hill Book Co. ............................................... 68
M & H Sporting Goods Co. ........................................... 98
Manhattan Elec. Bargain House .................................. 73
Massachusetts Radio School ........................................ 80
Merit Radio Company ................................................ 88

National Company ..................................................... 4
Ohio Carbon Co. ........................................................ 85

Passing the Exams ..................................................... 57
Pax Arthur College ................................................... 87
Premier Crystal Labs ................................................. 93

QST Binder .................................................................. Cov. II

Radio Engineering Labs ............................................. 77
Radio Supply Co. ......................................................... 87

Schwartz & Son, Maurice ............................................. 91
Scientific Radio Service .............................................. 82
Shaller Tube Co. ........................................................ 90
Southern Products ...................................................... 91
Sound Engineering Corp .............................................. 76
Stearns, Theodore ...................................................... 91

Teleplex Co. ............................................................... 78
Try-So Radio Co. ........................................................ 70

Uncle Dave's Radio Shack .......................................... 79
United Radiobuilders ................................................ 81
United Radio Mfg. Co. ............................................... 89
Universal Wireless Sales Co. ....................................... 72

Vibraplex Co. ............................................................. 90

West Side YMCA ........................................................ 90
Western Wireless, Ltd. ............................................... 91
Weston Elen, Instrument Corp. ..................................... 1

Mentionnez que vous l’avez lu dans le QST — Cela vous identifie et aide le QST
**LEEDS Rectifier Tube Specials**

280M Rectifier .................................. $1.25

Improved 888 rectifiers, now only............... $1.35

Regular 866, formerly $2.25 now ................ $1.95

Heavy duty 210, now ............................ 1.50

Special low loss 210 as described in Sept. 1931........ 2.05

Newly developed super 866 with spiral filament, self-aligning plate; chokes are practically impossible in this tube due to its unique construction .......................... 2.95

**Genuine Baldwin Phones**

Type G $12.60 List — Mica diaphragm. Limited quantity — only 2 pair to a customer. Special! .................. $3.95

Erie imported 4000 ohm featherweight phones, Special! .... $1.35

Para imported featherweight phones .................. 1.35

$5 Eisman Head phones: 2500 ohms; brand new; complete with head band and cords .......................... 1.00

**FLECHTHEIM**

**HIGH VOLTAGE FILTER CONDENSERS** at the lowest prices ever sold. Listed in our Oct. adv., page 7. All 200v. — 400v. — 650v. sizes of bypass and filter condensers proportionately reduced.

**KELLOGG SINGLE-BUTTON HAND MIKE.** Ideal for portable transmitter. Extra Special! .................. $1.95

**NAVY TYPE TELEGRAPH KEY** List $3.50. Navy knob — 3/16" Tungsten contacts.

While they last .................................. $1.25

**LEEDS SUPREME TRANSMITTING KEY.** Ideal for beginner’s practice set.

List $1.25. Special Now ............................ 55c

**No. 398 Gold Bug Automatic Transmitting Key** $12.50 List. Simple in construction, correct mechanically, and electrically rugged and durable 3/16" contacts, complete with cord and plug. Brand new in original cartons.

While they last .................................. $4.45

No. T020 Extra heavy 3/16" contact .................. $5.45
## Price List Single-Signal Superhet as described in QST for August 1932

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminum cabinet (knocked down) including brass rod, screws, drill,</td>
<td>$6.71</td>
</tr>
<tr>
<td>tap and hinges. All parts cut to fit but not drilled or tapped.</td>
<td></td>
</tr>
<tr>
<td>1 IRC 1-watt 250,000-ohm resistors</td>
<td>$0.36</td>
</tr>
<tr>
<td>1 IRC 1-watt 5000-ohm resistors</td>
<td>$0.36</td>
</tr>
<tr>
<td>1 IRC 1-watt 100,000-ohm resistor</td>
<td>$0.36</td>
</tr>
<tr>
<td>1 IRC 200,000-ohm resistor</td>
<td>$0.36</td>
</tr>
<tr>
<td>1 IRC 1-watt 1,000,000-ohm resistor</td>
<td>$0.36</td>
</tr>
<tr>
<td>1 Electroline RI 323, 2000-ohm potentiometer</td>
<td>$0.55</td>
</tr>
<tr>
<td>1 Set of (2 coils) 20-meter band spread coils</td>
<td>$1.83</td>
</tr>
<tr>
<td>1 Set of (2 coils) 40-meter band spread coils</td>
<td>$1.83</td>
</tr>
<tr>
<td>1 Set of (2 coils) 80-meter band spread coils</td>
<td>$1.83</td>
</tr>
<tr>
<td>1 3/4&quot; National Isolantite 5-prong tube socket</td>
<td>$1.08</td>
</tr>
<tr>
<td>1 National Type 24 tube shields</td>
<td>$0.46</td>
</tr>
<tr>
<td>2 National flexible insulated couplings</td>
<td>$0.66</td>
</tr>
<tr>
<td>2 National RF chokes, type 100</td>
<td>$0.90</td>
</tr>
<tr>
<td>1 Hammarlund shielded polarized choke 2PCH</td>
<td>$0.38</td>
</tr>
<tr>
<td>15 ft. heavy filament hook-up wire, flexible</td>
<td>$0.15</td>
</tr>
<tr>
<td>20 ft. regular push back hook-up wire</td>
<td>$0.45</td>
</tr>
<tr>
<td>1 Aerovox 3/8&quot; bakelite extension shaft</td>
<td>$0.39</td>
</tr>
<tr>
<td>2 dozen 6/32 round head brass machine screws</td>
<td>$0.16</td>
</tr>
<tr>
<td>2 National 6-prong Isolantite tube sockets</td>
<td>$0.72</td>
</tr>
<tr>
<td>2 National Isolantite 6-prong tube sockets</td>
<td>$0.36</td>
</tr>
<tr>
<td>2 National flexible insulated couplings</td>
<td>$0.66</td>
</tr>
<tr>
<td>2 National RF chokes, type 100</td>
<td>$0.90</td>
</tr>
<tr>
<td>1 Hammarlund shielded polarized choke 2PCH</td>
<td>$0.38</td>
</tr>
<tr>
<td>15 ft. heavy filament hook-up wire, flexible</td>
<td>$0.15</td>
</tr>
<tr>
<td>20 ft. regular push back hook-up wire</td>
<td>$0.45</td>
</tr>
<tr>
<td>1 Aerovox 3/8&quot; bakelite extension shaft</td>
<td>$0.39</td>
</tr>
<tr>
<td>2 dozen 6/32 round head brass machine screws</td>
<td>$0.16</td>
</tr>
<tr>
<td>2 National 6-prong Isolantite tube sockets</td>
<td>$0.72</td>
</tr>
<tr>
<td>2 National Isolantite 6-prong tube sockets</td>
<td>$0.36</td>
</tr>
<tr>
<td>2 National flexible insulated couplings</td>
<td>$0.66</td>
</tr>
<tr>
<td>2 National RF chokes, type 100</td>
<td>$0.90</td>
</tr>
<tr>
<td>1 Hammarlund shielded polarized choke 2PCH</td>
<td>$0.38</td>
</tr>
<tr>
<td>Total Cost of Complete Kit $65.00</td>
<td></td>
</tr>
</tbody>
</table>

## Price List I. F. and Audio Amplifier Single Signal Super described in September 1932 QST

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Alum. base panel 16&quot; x 10&quot; x 3&quot; (bent)</td>
<td>$2.70</td>
</tr>
<tr>
<td>1 IRC Box 3/8&quot; x 3/4&quot; x 1/16&quot; (bent)</td>
<td>$2.00</td>
</tr>
<tr>
<td>1 IRC 100,000 Ohm 1-watt resistor</td>
<td>$0.18</td>
</tr>
<tr>
<td>1 Electroline RI 250, 2000-ohm potentiometer</td>
<td>$0.55</td>
</tr>
<tr>
<td>1 IRC 200,000-ohm 1-watt resistor</td>
<td>$0.36</td>
</tr>
<tr>
<td>1 IRC 500,000-ohm 1-watt resistor</td>
<td>$0.36</td>
</tr>
<tr>
<td>1 IRC 50,000-ohm 1-watt resistor</td>
<td>$0.18</td>
</tr>
<tr>
<td>1 IRC 100,000-ohm 1-watt resistor</td>
<td>$0.18</td>
</tr>
<tr>
<td>1 IRC 500,000-ohm 1-watt resistor</td>
<td>$0.18</td>
</tr>
<tr>
<td>1 Electroline RI 120, 250,000-ohm potentiometer</td>
<td>$0.55</td>
</tr>
<tr>
<td>1 Electroline RI 120, 500,000-ohm potentiometer</td>
<td>$0.55</td>
</tr>
<tr>
<td>1 IRC 1500 Ohm 1-watt resistor</td>
<td>$0.18</td>
</tr>
<tr>
<td>1 Yaxley 200-ohm center tapped resistor</td>
<td>$0.15</td>
</tr>
<tr>
<td>2 5/8&quot; KC IF transformers and shields</td>
<td>$2.94</td>
</tr>
<tr>
<td>1 Thordarson R 400 Audio transformer</td>
<td>$2.94</td>
</tr>
<tr>
<td>1 Thordarson Output transformer</td>
<td>$2.94</td>
</tr>
<tr>
<td>2 Hammarlund SPC RF chokes</td>
<td>$1.96</td>
</tr>
<tr>
<td>1 Hammarlund RFC 85 RF chokes</td>
<td>$1.16</td>
</tr>
<tr>
<td>1 Toggleswitch SPST</td>
<td>$0.21</td>
</tr>
<tr>
<td>1 Yaxley 702 Jack</td>
<td>$0.43</td>
</tr>
<tr>
<td>2 National type TS8 tube shields</td>
<td>$0.46</td>
</tr>
<tr>
<td>2 National type 24 tube shields</td>
<td>$0.46</td>
</tr>
<tr>
<td>1 Beat frequency osc. coil and shield</td>
<td>$1.77</td>
</tr>
<tr>
<td>2 National Isolantite 5-prong tube sockets</td>
<td>$0.08</td>
</tr>
<tr>
<td>2 National Isolantite 6-prong tube sockets</td>
<td>$0.72</td>
</tr>
<tr>
<td>10 feet shield wire</td>
<td>$0.12</td>
</tr>
<tr>
<td>50 feet push back hook-up wire</td>
<td>$0.45</td>
</tr>
<tr>
<td>1 Aerovox .01 mica condensers</td>
<td>$4.95</td>
</tr>
<tr>
<td>3 Fleischheim 1 mfd 250-volt paper cond.</td>
<td>$1.47</td>
</tr>
<tr>
<td>1 SM 276 RF choke</td>
<td>$0.45</td>
</tr>
<tr>
<td>2 Aerovox .0025 mfd mica condensers</td>
<td>$0.54</td>
</tr>
<tr>
<td>1 Aerovox .01 mfd tone control condenser</td>
<td>$0.45</td>
</tr>
<tr>
<td>1 Hammarlund MICS 1000 padding condenser</td>
<td>$0.89</td>
</tr>
<tr>
<td>1 small 250 MFP mica condenser</td>
<td>$0.09</td>
</tr>
<tr>
<td>1 Hammarlund MICSOS condenser</td>
<td>$1.06</td>
</tr>
<tr>
<td>1 Weston type 506 0 to 1 MA</td>
<td>$5.74</td>
</tr>
<tr>
<td>1 L.F. transformer, Sickles type</td>
<td>$1.18</td>
</tr>
<tr>
<td>1 L. F. Filter transformer, Sickles type</td>
<td>$1.00</td>
</tr>
<tr>
<td>1 Second detector, I. F. transformer</td>
<td>$1.75</td>
</tr>
<tr>
<td>1 Heterodyne filter with condensers</td>
<td>$1.50</td>
</tr>
<tr>
<td>Total Cost of Complete Kit $45.00</td>
<td></td>
</tr>
</tbody>
</table>

Any Individual Part Sold Separately

New, 1933 Catalog Just off the Press. Write for Your Copy. Contains All that’s New in High Frequency and Laboratory Apparatus

36 Years of Service

M. & H. SPORTING GOODS CO.
512 MARKET STREET  PHILADELPHIA

Specialists in Radio Equipment

96 Wir bitten darum, sich auf QST zu berufen — Sie weisen sich dadurch aus und unterstützen dadurch gleichzeitig QST

RUMPFORD PRESS
CONCORD, N. H.
THEY WON'T GIVE YOU MORE ANTENNA CURRENT—

BUT

they'll improve your station efficiency just the same.

OFFICIAL A.R.R.L. LOG BOOK
A well-kept log is an essential part of a well-run station. This book, with 39 pages for operating records and 39 blank pages for miscellaneous notes, forms a complete history of your station—your most valuable radio record. Contains list of Q signals, message number sheet, bound-in page of cross section paper for receiver or frequency meter calibration, etc. Size 8½ x 10¾, bond paper, bound in heavy paper covers. One book 40c or three books for $1.00. Postpaid.

MESSAGE DELIVERY CARDS
Neatest, simplest way to deliver a message by mail. Good looking and easy to use. Saves writing an explanation of method in which message was handled. On U. S. stamped postals, 2c each; on plain cards (for Canada, etc.) 1c each. Postpaid.

MEMBER'S CORRESPONDENCE STATIONERY
Write your radio letters on this A.R.R.L. stationery. It identifies you. Used by most old-timers and prominent amateurs. Excellently lithographed on 8½ x 11 bond paper. Now using heavier 20-lb. stock instead of 16-lb. as heretofore. 100 sheets—50c; 250 sheets—$1.00; 500 sheets—$1.75. Postpaid.

OFFICIAL A.R.R.L. MESSAGE BLANKS
The proper and most convenient form. Designed by the A.R.R.L. Communications Department to make speedy and accurate handling easy. A great aid to good operating practices which reflect credit on your station. Bond paper, size 8½ x 7¼. Put up in pads of 100 sheets. One pad 35c or three pads for $1.00. Postpaid.

THE AMERICAN RADIO RELAY LEAGUE
West Hartford, Connecticut
The Radio Amateur's Handbook

The World's Standard Guide
A Manual of Amateur Short-Wave Radiotelegraphic Communication

To

Amateur Radio

Chapter Titles:
I. Amateur Radio
II. Getting Started
III. Fundamentals
IV. How Signals Are Sent and Received
V. Receivers
VI. Frequency Meters and Monitors
VII. Transmitters
VIII. Radiotelephony
IX. Power Supply
X. Keying and Interference Elimination
XI. Antennas
XII. The A.R.R.L. Communication Dept.
XIII. Operating a Station
Appendix of Tables, Formulae, etc.

242 Pages - 231 Illustrations - 187,654 Words
Price: One Dollar

Published by The American Radio Relay League, Inc.
West Hartford, Connecticut