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<th>COMPONENTS FOR EVERY APPLICATION</th>
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<tr>
<td><strong>LINEAR STANDARD</strong>&lt;br&gt;High Fidelity Ideal</td>
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<td><strong>HIPERM ALLOY</strong>&lt;br&gt;High Fidelity ... Compact</td>
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<td><strong>ULTRA COMPACT</strong>&lt;br&gt;Portable ... High Fidelity</td>
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<td><strong>OUNCER</strong>&lt;br&gt;Wide Range ... 1 ounce</td>
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<td><strong>SUB OUNCER</strong>&lt;br&gt;Weight 1/2 ounce</td>
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<tr>
<td><strong>COMMERCIAL GRADE</strong>&lt;br&gt;Industrial Dependability</td>
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<td><strong>SPECIAL SERIES</strong>&lt;br&gt;Quality for the &quot;Ham&quot;</td>
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<td><strong>POWER COMPONENTS</strong>&lt;br&gt;Rugged ... Dependable</td>
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<tr>
<td><strong>VARITRAN</strong>&lt;br&gt;Voltage Adjusters</td>
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<tr>
<td><strong>MODULATION UNITS</strong>&lt;br&gt;One watt to 100KW</td>
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<td><strong>VARIABLE INDUCTOR</strong>&lt;br&gt;Adjust like a Trimmer</td>
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<td><strong>TOROID HIGH Q COILS</strong>&lt;br&gt;Accuracy ... Stability</td>
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<td><strong>TOROID FILTERS</strong>&lt;br&gt;Any type to 300KC</td>
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<td><strong>MU-CORE FILTERS</strong>&lt;br&gt;Any type 1/2 - 10,000 cyc</td>
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<td><strong>EQUALIZERS</strong>&lt;br&gt;Broadcast &amp; Sound</td>
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<td><strong>PULSE TRANSFORMERS</strong>&lt;br&gt;For all Services</td>
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<td><strong>SATURABLE REACTORS</strong>&lt;br&gt;Power or Phase Control</td>
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<td><strong>PLUG IN ADAPTER</strong>&lt;br&gt;Impedance Matching</td>
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<td><strong>FOSTERITE</strong>&lt;br&gt;Grade 3 JAN Components</td>
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<td><strong>CABLE TYPE</strong>&lt;br&gt;For mike cable line</td>
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<td><strong>VERTICAL SHELLS</strong>&lt;br&gt;Husky ... Inexpensive</td>
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<td><strong>REPLACEMENT</strong>&lt;br&gt;Universal Mounting</td>
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<td><strong>STEP-DOWN</strong>&lt;br&gt;Up to 2500W ... Stock</td>
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<td><strong>LINE ADJUSTORS</strong>&lt;br&gt;Match any line voltage</td>
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<td><strong>CHANNEL FRAME</strong>&lt;br&gt;Simple ... Low cost</td>
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To you triode men, looking for value in the medium-to-high-power class, Types GL-810 and GL-8000 are money in the bank... whether you mean to work phone or CW. The cost of either G-E tube is less than half that of most other types of equal input. Here's saving!

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Macon, Ga.: Specialty Distributing Co.
Miami, Fla.: Herman Radio Supply Co.; Thurow Radio Distributors, Inc.
Orlando, Fla.: Radio Accessories; Thurow Radio Distributors, Inc.
Pensacola, Fla.: Thurow Radio Distributors, Inc.
St. Petersburg, Fla.: Welch Radio Supply Co.
Tallahassee, Fla.: Thurow Radio Distributors, Inc.
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(List as of June 25, 1949)
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PETERSEN RADIO COMPANY, INC.
2800 W. BROADWAY • COUNCIL BLUFFS, IOWA
### Southern Division

**Centro de Comunicaciones**

<table>
<thead>
<tr>
<th>State</th>
<th>Call Sign</th>
<th>Name</th>
<th>Address</th>
</tr>
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<tbody>
<tr>
<td>Delaware</td>
<td>W7HCM</td>
<td>Robert L. Kostick</td>
<td>1817 W. State St., Wilmington</td>
</tr>
<tr>
<td>Delaware</td>
<td>W7KU</td>
<td>Thomas L. Wilson</td>
<td>109 W. 1st St., Dover</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>W3AKM</td>
<td>Richard A. Rogers</td>
<td>506 E. 10th St., Philadelphia</td>
</tr>
<tr>
<td>Delaware</td>
<td>W7BMN</td>
<td>John H. Brown</td>
<td>2007 W. Main St., Harrisburg</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>W3AKX</td>
<td>James A. Ross</td>
<td>405 N. 3rd St., Scranton</td>
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### Atlantic Division

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<tr>
<th>State</th>
<th>Call Sign</th>
<th>Name</th>
<th>Address</th>
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<tbody>
<tr>
<td>New Jersey</td>
<td>W3AKC</td>
<td>Charles M. Gray</td>
<td>102 W. 4th St., Camden</td>
</tr>
<tr>
<td>New Jersey</td>
<td>W3AVC</td>
<td>John E. Roden</td>
<td>123 N. 6th St., Newark</td>
</tr>
<tr>
<td>New Jersey</td>
<td>W3AVG</td>
<td>Alix N. Otis</td>
<td>104 W. 5th St., Jersey City</td>
</tr>
<tr>
<td>New Jersey</td>
<td>W3AVH</td>
<td>Edward E. Rittenhouse</td>
<td>402 N. 1st St., Trenton</td>
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### Midwest Division

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<th>State</th>
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<th>Name</th>
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<tbody>
<tr>
<td>North Dakota</td>
<td>W7AKA</td>
<td>Gustav H. Boosbott</td>
<td>500 E. 1st St., Minot</td>
</tr>
<tr>
<td>South Dakota</td>
<td>W7AKM</td>
<td>William J. Ritter</td>
<td>102 W. 3rd St., Pierre</td>
</tr>
<tr>
<td>Minnesota</td>
<td>W3AKP</td>
<td>John H. Brown</td>
<td>200 E. 1st St., Mankato</td>
</tr>
<tr>
<td>Missouri</td>
<td>W3AKQ</td>
<td>James A. Ross</td>
<td>405 N. 2nd St., Kansas City</td>
</tr>
<tr>
<td>Nebraska</td>
<td>W3AKR</td>
<td>Albert O. Ross</td>
<td>123 N. 3rd St., Lincoln</td>
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### Southeastern Division

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<th>State</th>
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<th>Name</th>
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<tbody>
<tr>
<td>Alabama</td>
<td>W4AKX</td>
<td>Paul B. Martin</td>
<td>123 W. 1st St., Birmingham</td>
</tr>
<tr>
<td>Georgia</td>
<td>W4AKY</td>
<td>James A. Ross</td>
<td>405 N. 4th St., Atlanta</td>
</tr>
<tr>
<td>South Carolina</td>
<td>W4AKZ</td>
<td>Albert O. Ross</td>
<td>123 N. 5th St., Columbia</td>
</tr>
<tr>
<td>North Carolina</td>
<td>W4AKA</td>
<td>William J. Ritter</td>
<td>102 W. 2nd St., Raleigh</td>
</tr>
<tr>
<td>Georgia</td>
<td>W4AKB</td>
<td>Albert O. Ross</td>
<td>123 N. 6th St., Atlanta</td>
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### Western Division

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<th>State</th>
<th>Call Sign</th>
<th>Name</th>
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<tbody>
<tr>
<td>Colorado</td>
<td>W9DQZ</td>
<td>W. M. Mitchell</td>
<td>1959 A. St., Denver</td>
</tr>
<tr>
<td>Utah</td>
<td>W7DNP</td>
<td>Alvin M. Phillips</td>
<td>RFD 2, Ogden, Utah</td>
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<tr>
<td>California</td>
<td>W6DQ</td>
<td></td>
<td>1959 A. St., Denver</td>
</tr>
<tr>
<td>Nevada</td>
<td>W8DQ</td>
<td></td>
<td>RFD 2, Ogden, Utah</td>
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<tr>
<td>Arizona</td>
<td>W9DQ</td>
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### Operations Division

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<tr>
<td>Radiogram</td>
<td>W1DQ</td>
<td>W. M. Mitchell</td>
<td>1959 A. St., Denver</td>
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<tr>
<td>Operations</td>
<td>W2DQ</td>
<td>Alvin M. Phillips</td>
<td>RFD 2, Ogden, Utah</td>
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<td>Communications</td>
<td>W3DQ</td>
<td></td>
<td>1959 A. St., Denver</td>
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<td>Operations</td>
<td>W4DQ</td>
<td></td>
<td>RFD 2, Ogden, Utah</td>
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<tr>
<td>Communications</td>
<td>W5DQ</td>
<td></td>
<td>1959 A. St., Denver</td>
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Manufacturers of Precision Radio and Television Equipment
THE AMERICAN RADIO RELAY LEAGUE, INC.,
is a noncommercial 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 noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

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

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the Secretary at the administrative headquarters at West Hartford, Connecticut.
When FCC announced its proposed changes in the amateur rules (Docket 9295) it invited all interested parties to file comment. Pursuant to the decision of the League's Board of Directors to register opposition to the Commission's proposal for "a new overall plan or blueprint to provide scope and direction for the immediate and long range development of the service" the League, on July 19th, filed the following written statement and brief.

FEDERAL COMMUNICATIONS COMMISSION

Proposed amendment
of Part 12 of the
Rules and Regulations
(Amateur Radio Service)  Docket 9295

WRITTEN STATEMENT OF COMMENT
On behalf of the American Radio Relay League, Inc.

1. Appearance
The American Radio Relay League, Inc., a non-profit national organization of amateur radio station licensees and operators, enters its appearance in this matter pursuant to the provisions of paragraph 11 of the Notice of Proposed Rule Making and submits this, its written statement and brief, as setting forth its comments.

2. Request for oral argument
The importance of the proposed rules, the strength of the opposition to them, the novelty of the theories upon which they are based are all such that full oral argument is a prerequisite to a complete and proper resolution of the problems presented. An opportunity for such oral argument is requested.

3. Preliminary Statement
We wish to record, first, the appreciation of the League for the interest the Commission has shown in the amateur service as evidenced by the effort obviously expended in preparation of the Notice. This is characteristic of the co-operative and sympathetic attitude which the Commission and its predecessor bodies have exhibited toward the amateur service since our beginning. The Commission and the League have had common objectives as to amateur radio — to provide for and encourage current amateur communication and research activities and the sound growth and maximum strength of amateur radio in the future. The League knows that these motives have actuated the Commission staff in proposing "a new overall plan or blueprint to provide scope and direction for the immediate and long range development of the service." It is the more difficult, therefore, for us to find ourselves obliged to disagree with the basic concept of the interrelated proposals in Docket 9295 and to oppose this concept.

4. The Opposition of the Board of Directors of the League to the proposed rules
At its annual meeting in Hartford, Connecticut, May 27-28, 1949, the Board of Directors of the American Radio Relay League gave careful study and consideration to the Commission's proposed rules. It is appropriate here to record that during these deliberations each of the fifteen directors from as many United States divisions (into which the country is divided for our internal administrative purposes), representing the net opinion of its 35,067 U. S. licensed amateur members (figure as of December 31, 1948) — spoke at length on the results of his extensive membership and non-member contacts by mail, by attendance at club meetings and conventions, and over the air. Each had endeavored to obtain the opinion of American amateurs on the Commission's proposals during the approximately thirty days available between the time of the proposals and the time of the Board's meeting. Considering the results, it was the unanimous decision of these elected representatives of the membership (1) to withdraw the proposals of the League then on file with the FCC and (2) to oppose in principle "the overall plan or blueprint to provide scope and direction for the immediate and long range development of the amateur radio service" which the Commission has stated is the basis of its proposals.

5. Withdrawal of pending requests for regulations
By a separate communication to the Commission, the League has already withdrawn its proposals originally submitted in May, 1948. It is our purpose now to discuss the second of our Board's actions — the decision to oppose the principle of Government direction and blueprinting of the
future development and scope of the amateur service.

6. No need for overhaul of regulations

In its Notice, the Commission states that in its judgment amateur radio needs such an overall plan or blueprint as a result of the general situation in which the amateur service finds itself today. It does not, however, elaborate on this reference nor does it state any other or specific reasons for any overall planning or blueprinting. The League, which has actively represented the amateur service for more than thirty-five years, is unaware of any unusual situation indicating any such need. It is not able to perceive any reasons for the Commission's decision that an unusual situation or need exists. The League, therefore, is unable to comment on these points in the absence of supporting data.

The League, however, is obliged to register its opposition to the new philosophy of providing for Government overall planning, direction and blueprinting of the amateur service, and perforce, its opposition to regulations stemming from such a philosophy.

7. Opposition to the basic philosophy of the new regulations

The key to our opposition to this new philosophy of regulation is to be found in the principles of the regulatory system under which amateur radio has heretofore operated. It is our firm belief that the present vigorous state of amateur radio in great measure is a direct result of these principles. It is our conviction that the proposed new philosophy would stifle amateur initiative, circumscribe amateur development, and eventually result in the debilitation of amateur radio as we know it today.

8. The growth and status of amateur radio

Amateur radio is one of the oldest of the communications services. From the start it has been associated with comparative freedom from restrictive regulation and freedom from Governmental direction or interference with purely internal activities or with developments within the assigned amateur frequency bands. What we believe to be wise Government policy over the years has permitted amateurs virtually unlimited scope in their experimental activities, and, more importantly, in setting their own objectives. Under this philosophy of regulation, the American amateur has become known as a tireless experimenter, an ingenious and resourceful worker in the radio field. His contributions to the radio art over the course of the years have been noteworthy. Under this philosophy amateur radio in the United States has grown and progressed to its present position in the communication field. From this philosophy there has grown that priceless in-liquid which we call the amateur spirit, the urge to devote one's time, one's money and one's energies to the problem for the sheer love of it, one of the most valuable assets this or any other nation could possess. Of this, in our Presentation for the Amateur Service before the Commission in September, 1944, we said in part:

This basic spirit in amateur radio — this heart interest in the art — has been carried by radio amateurs from their own avocation to all the other fields of radio. . . . There is, we believe, a general appreciation of the amateur spirit in research, in other lines of endeavor as well as radio. In radio it is particularly significant. It derives, we believe, from the very freedom of spirit with which the amateur meets his problems . . .

And again, in our Presentation for the Amateur Service before the Commission in June, 1936, we said:

. . . in no other field of endeavor has there been such free and untrammeled experimentation, unhampered by traditional prejudices, as has resulted from the amateur tradition in the radio art.

It was not Government direction or planning in accordance with current scientific theories which resulted in this Nation's amateurs being the first to span the Atlantic Ocean on short waves — going even so far as to finance a trip to Europe by one of their number to listen to American amateur signals which Government and commercial radio engineers of the day were sure could not be heard at that distance. As stated by Cornell University's Prof. Ernest Merritt, writing in the January 1932 issue of the Proceedings of the Institute of Radio Engineers several years later:

Presumably most [of the amateurs] were not familiar with the theoretical reasons for believing that work with short waves was not likely to prove successful; at any rate, such knowledge of theory as they had did not deter them from trying experiments which the experienced radio engineer would have regarded as foredoomed to failure.

It was not planning or directed programming of their future which, over a period of two years ending in 1936, drove a few amateur enthusiasts to doubt the conclusions then generally concurred in by Government and commercial radio engineers that the present television wavelengths were endowed with strictly "line-of-sight" properties. Patiently developing their own receiving and transmitting apparatus, antennas and automatic photographic recording equipment, they began receiving signals consistently over 100-mile paths, and eventually succeeded in establishing a relationship between the observed results and temperature conditions of the lower atmosphere. . . . They gave the whole radio world an entirely new concept of the way in which such signals are propagated.

It is the League's fear that a program of directed development or a blueprinted future, however well-intentioned, would stifle the enthusiasm, the insatiable curiosity and the tireless energy which resulted in these and a score of other developments.

9. The danger to further amateur development

It is with alarm and deep concern, therefore, that we learn that the Commission now proposes to blueprint and direct the future course of amateur radio and to inaugurate a series of new regulations as part of an overall plan "to provide scope and direction for the immediate and long range development of the service," to establish "an integrated and continuously reviewed and revitalized plan for improving operations and techniques." This curtailing of the freedom under which amateurs have progressed throughout their history, this announced intention to replace it with Government direction, would inevitably discourage the very things which have made American amateur radio great. The ardent interest of amateurs in their pursuit of radio could not flourish under Government blueprinting or direction, or in fact under any blueprinting or direc-
tion. Because the amateur spirit derives largely from an intense, personal interest in radio, because the activities of amateurs are purely voluntary, the Nation would, under such a system as is now proposed, most certainly lose the brilliant public-service capabilities and performances of the amateur service. What has made the amateur the invaluable asset he is to this Nation is the precious freedom he enjoys to seek his own objectives by experimenting in any type of communications or experimentation he chooses, with only a minimum of internal regulation once he meets those fundamental regulatory requirements which are designed (1) to prevent his interfering with other established services and (2) to insure his compliance with the provisions for amateurs in international regulations to which the United States is a party.

10. The Commission's authority

In case it is not already apparent, we wish to make it clear here that it is not our intention to dispute the right of the Commission to make appropriate regulations for the amateur service. We fully recognize that right, as we have over the years during which the body of amateur rules has slowly been created, expanded and modified, as occasion required. Any regulations in addition to those required to meet the two fundamentals enumerated in the previous paragraph, and particularly regulations dealing with the purely internal arrangement of amateur operating activities and experimentation, should be formulated with extreme care. Such regulations should be arrived at only as their need evolves from the experience of the amateur body itself. This has been the basis on which the structure of amateur rules has slowly been brought into being over the years — by recommendations from the majority of the active amateurs of the country, through its representatives. New rules should be enacted only as the desirability of modification of existing rules becomes apparent, or by informal engineering discussions with amateur representatives when the Commission itself perceives a need for modification. We believe that this philosophy of regulation for the amateur service — that of permitting the amateur body to seek its own objectives and to request of the Commission such minimum regulation as will accomplish those objectives — is the only system which offers the public-service capabilities and performances of the amateur service. What has made the amateur service will be as brilliant in the future as it has been in the past.

11. The position of the League in amateur affairs

Since 1914 the amateur body has possessed a mechanism to permit the interchange of ideas on regulatory matters and to establish a position on any particular matter which receives majority support. Thus it is adequately equipped to participate with the Commission in informal engineering discussions. That mechanism is the amateur national association, the American Radio Relay League, and we believe it appropriate to discuss the functioning of that mechanism.

12. The organization of the League

The American Radio Relay League is an incorporated non-profit membership society of American amateur radio operators, over 35,000 strong as of December 31, 1948. The League also has on its membership roster some thousands of persons planning to become amateurs and some additional thousands of Canadian and other foreign amateurs — to a total of nearly 60,000 (as of the same date). The control of the League rests in the hands of its American (and Canadian) licensed-amateur membership, classified as Full Members; other members, classified as associate members, have no vote.

For administrative purposes the United States is divided into 15 regions, or termed divisions. Elections are held by the licensed amateur members in the various divisions every two years to choose a director and an alternate director from each division. In Canada, the amateur membership similarly selects a Canadian General Manager and an Alternate Canadian General Manager. Any ten licensed-amateur members of the League in a division may join in nominating candidates for the positions of director and alternate director for that division. The By-laws of the League provide very stringent requirements for eligibility as a candidate. A candidate must have held an amateur license for a continuous period of at least four years immediately preceding his nomination; he must also have been a member of the League for the same period. Further, the By-laws provide that he is ineligible to be elected if he is engaged in the commercial radio field, or who might otherwise benefit from any selfish influence in the affairs of the League, is ineligible as a candidate. From the various candidates nominated, a director and an alternate director are then elected in each division by secret mail ballot of the licensed-amateur membership in that division. Thus licensed amateur members exercise complete control in the selection of their representatives.

The 15 directors so elected from the United States divisions, plus the Canadian General Manager elected to represent Canadian amateurs, plus the President and Vice-President, constitute the Board of Directors. The members of the Board receive no compensation. They give freely of their own time to fulfill their duties.

13. The democratic character of League representation

The By-laws of the League charge the directors with the duty, among others, to "keep themselves informed on conditions and activities in their respective divisions, and on the needs and desires of the League members therein, that they may faithfully and intelligently represent them in the Board of Directors." A director speaks for his members because by their selection of him they have indicated confidence in his leadership and judgment; he speaks for them, moreover, because he is in continuing contact with them — by correspondence, by bulletins, by amateur radio, or by visits to club meetings, conventions, and other gatherings of amateurs. In several of our divisions the directors have set up informal organizations of club councils and representatives from each of the active operating amateur radio networks in their respective divisions, as additional means of gathering amateur sentiment concerning the particular problems of the day.

The Board of Directors of the American Radio Relay League thereby is a common meeting ground where the elected representatives of amateurs all over the country may gather to discuss such problems, to express the opinions of the amateurs and to come to mutual agreement on the best course to follow.
This is the democratic way, in which the majority rules. But in any democratic system there are also, inevitably, minorities — sometimes small, sometimes sizeable.

14. “Dissident” groups within the League

There are minority opinions within the membership of the American Radio Relay League. They have always existed. In general, the minority on any question has in the past been willing to abide by the decisions of the majority. At present, however, a few of those amateurs making up the minority are split into two factions and have formed two separate groups. The Commission’s Notice of Proposed Rule Making mentions the names of these two amateur groups and terms them “national societies.” We fully subscribe to the fundamental of democracy that everyone has a right to be heard, but, we think it will be of interest to the Commission to learn the status of these two groups, in so far as the limited release of data concerning them will permit, for comparisons with similar data which we have furnished earlier in this discussion concerning the League.

The National Amateur Radio Council is a non-profit group formed in May of 1948 and subsequently incorporated under the laws of the State of Indiana. It is understood to be governed by a Board of Directors elected by its membership. In a paid advertisement in May of 1949 the Council claimed it had “nearly 2,000 members.” An earlier membership list showed that approximately three-fourths of the total membership were licensed amateurs, so a current amateur membership of about 1,500 is indicated. A comparison of this earlier list with ARRL membership records showed that over one-half of the NARC members were also members of the League. The Council was born of dissatisfaction by a minority group with the results of the 1948 meeting of the ARRL Board of Directors as concerns amateur telephony privileges. As is evident from the proposals which the Council separately placed before the Commission in September of 1948, one of its aims is to prevent increased privileges for the use of radiotelephony within the amateur bands. It is also understood to lend support to FCC’s newly-expressed principle of Government direction and blueprinting of amateur radio. In connection with this we note that the policies of this group are established and controlled by a Steering Committee which, at least in January of this year, was composed of six employees of the United States Government in Washington, D.C.

It is important to point out that the combined amateur membership in these two groups — on the order of 2,000 — is less than 5 percent of the U.S. amateur membership of the League. It is also pertinent to note that major objectives of the two groups — as they relate to telephony privileges in the amateur bands — are diametrically opposed. The presentations of these two groups, separately or combined, are on behalf of an absurdly small minority of amateurs. An appreciable portion, and probably more than half, of these few amateurs are also members of the League who, unwilling to accede to the common desires of the majority of the amateurs as determined by the democratic processes of the ARRL Board mechanism, have attempted to circumvent this mechanism by participating in separate pressure groups to achieve ends which are not considered by the majority of amateurs.

15. Specific proposed regulatory provisions in the Notice

The League does not feel that it is now able to comment on the specific items proposed by the Commission for various regulatory changes. By the present statement the League registers disagreement with, and vigorous opposition to, “a new overall plan or blueprint . . .” proposed by the Commission. The Commission’s statement in its Public Notice is that “the proposals herein made, while numerous, are interrelated and constitute an overall plan.” Therefore, the League does not feel that it can comment individually on specific items when its position is to oppose the basic concept of such an overall plan of which the specific items are indicated as an integral part.

16. Suggested Commission action

It is our request, therefore, that the Commission set aside (or at least defer action on) the proposed regulations set up in the Notice; that it direct the Amateur Section to convene an informal conference of all interested parties; that the purpose of such conference be:

1. To determine in what respects if any, the present provisions of Part 12 of the Rules and Regulations are inadequate or unsatisfactory; and

2. If any defects be found, to recommend appropriate corrections.

American Radio Relay League, Inc.
38 La Salle Road
West Hartford, Connecticut

By Arthur L. Budlong
Secretary

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Its Attorneys

July 19, 1949
A Simplified Circuit for Audio Image Rejection

Applying Audio Phasing Principles to C.W. Beat-Note Reception

BY GEORGE GRAMMER,* W1DF

If your receiver lacks the doodads that give the single-signal reception so necessary in crowded c.w. bands, you'll be interested in this "poor man's crystal filter." Audio selectivity — now obtainable simply and at low cost from surplus units or bridge-type circuits — plus audio phasing — a bonus from single-sideband receiving techniques — forms a system that has selectivity characteristics very similar to those of the modern crystal-filter communications receiver.

THE process by which a c.w. signal is made audible or "detected" in the b.f.o. method of reception is equivalent to the action that takes place in the mixer or "first detector" of a superhet receiver. That is, the frequency of the incoming signal is simply converted to a new frequency. In the case of b.f.o. reception the new frequency is in the audio range; in the case of the superhet mixer, it is an "intermediate" frequency. In the superhet we depend on the intermediate-frequency amplifier to supply the necessary selectivity. If the analogy between the superhet mixer and the b.f.o. detector is carried to its logical conclusion, we can equally well depend on the audio amplifier to supply all the selectivity needed in c.w. beat-note reception.

The conclusion is true, up to a certain point. In the frequency-conversion process harmonics may be generated; also, two or more signals present in the converter circuit may mix together to produce undesired beat frequencies. In the superhet mixer these unwanted frequencies are easily filtered out by the i.f. selectivity. In the b.f.o. mixer many of the unwanted frequencies fall in the audio range and thus increase the interference problem. However, they can be reduced to negligible proportions by using a linear detector. This may be a properly-operated frequency-converter tube, or may be the ordinary diode detector having a b.f.o. voltage much stronger than the strongest signal likely to be applied to it.

A more serious problem arises from the fact that signals equally spaced either side of the b.f.o. frequency produce the same beat tone. The standard method of reducing this "audio image" response is the use of sufficient i.f. selectivity preceding the mixer. In the modern communications receiver a crystal filter is the customary means by which the necessary selectivity is secured. Thus "single-signal" reception.

The drawings at A, B and C, Fig. 1, review the situation as it exists in the ordinary receiver. If the r.f. selectivity is low, the desired signal and its audio image produce equal audio outputs with the tuning set off the b.f.o. frequency so that the desired signal produces, say, a 1000-cycle beat note. Fig. 1B shows the effect of increased r.f. selectivity in reducing the amplitude of the image response. If the r.f. selectivity is low but a high filtered out by the i.f. selectivity. In the b.f.o. mixer many of the unwanted frequencies fall in the audio range and thus increase the interference problem. However, they can be reduced to negligible proportions by using a linear detector. This may be a properly-operated frequency-converter tube, or may be the ordinary diode detector having a b.f.o. voltage much stronger than the strongest signal likely to be applied to it.

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The "Phaser" — a device for phasing out a signal on the other side of zero beat in c.w. reception. In combination with audio selectivity it simulates crystal-filter performance, and is an inexpensive aid to selectivity in non-crystal receivers.

The three tubes in the unit are: front left, audio phasing amplifier; front right, b.f.o. amplifier; rear right, detector. The screwdriver control on the left wall is the audio phasing adjustment. The operating controls, on the front wall, are the rejection control and a switch for changing from one side of zero beat to the other.

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* Technical Director, ARRL.

degree of audio selectivity is used the desired signal and its image again produce equal outputs, even though the selectivity may be very great against other audio tones.

An alternative method of reducing the audio-image response is the use of a special detector with audio phasing networks. 3 This method, combined with audio selectivity, can produce results fully equal to those obtainable with r.f. or i.f. selectivity. The circuits so far described are capable of a high order of performance, but it must be admitted that they are also technically intricate. However, the practical aspects of c.w. reception permit a method of approach that leads to very simple circuits, requires no precision parts or test equipment, and offers no technical difficulties that cannot be surmounted by anyone capable of reading instructions and turning a couple of controls.

The heart of the audio phasing system is the phasing network. The problem is to devise a circuit that will have a constant phase shift of 90 degrees and at the same time have constant attenuation over the audio range. Such a network is a necessity if all frequencies on the other side of zero beat are to be eliminated simultaneously, as should be done in single-sideband "phone" reception.

However, the simultaneous elimination of all frequencies on the other side of zero beat is not necessary in c.w. reception. One reason is that there are usually only a few, at the most, signals present on the "other side," so there are only a few definite frequencies present at any given time. A second reason is that all of the unwanted beat notes except the exact audio image of the desired signal can be eliminated or greatly reduced by audio selectivity. Consequently, for c.w. it is possible to use a simple 90-degree phaser circuit in which the attenuation varies, and then independently control the amplitude to eliminate a chosen single frequency. Although only one frequency is completely eliminated, other frequencies in the immediate vicinity are considerably attenuated.

Fig. 1D shows the response curve that is obtainable from a simple audio phasing system, using the detection principle outlined in earlier articles. The other side of zero beat is reduced somewhat overall, compared with the desired side. The important point, however, is that there is a complete null at one beat frequency (1000 cycles in the case indicated), so that the response to the audio image is zero. In practice, it is possible to move this null to any desired frequency in the important part of the audio range. The operation is similar to that of the phasing control of a crystal filter but, unlike the filter, the depth of the null does not depend on the selectivity. When the system is properly adjusted the response is zero at the undesired beat note, even if there is no r.f. selectivity at all.

When the phasing system is combined with audio selectivity, the over-all response shown at Fig. 1E is typical. Signals on the other side of zero beat build up somewhat on either side of the null, the extent of this "other side" response depending on the amount of audio selectivity. The general operating characteristics resemble the selectivity obtainable with a crystal filter. However, the method is of interest not particularly as an arrangement for superseding the crystal filter, but as a scheme for approximating filter performance in existing receivers that do not have filters. For that reason simplicity and low cost are paramount considerations in practical circuit design.

Audio selectivity, as such, needs no further discussion here because any of the well-known

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**Principles**

Fig. 1 — Comparison of r.f. and audio selectivity.
methods can be used. Neither is it necessary to go into a detailed description of the detection principles utilized, since they have already been covered. The requirements, in brief, are these: (1) Two separate detectors or mixers, the signal being applied to both but each having its own b.f.o. voltage. These b.f.o. signals must differ in phase by 90 degrees. (2) A circuit that will shift the phase of the audio output of one detector by 90 degrees. (3) A means for combining the outputs of the two channels so that the desired signal is heard while the audio image is suppressed.

The Detector Circuit

There are probably innumerable detector arrangements that will work satisfactorily. However, not all of them will meet the requirements of this special case, which are (1) simplicity and economy, (2) no adjustments requiring test equipment, (3) ability to operate with the b.f.o. shut off so that ordinary 'phone signals can be received. While this last may seem rather incomprehensible to users of ordinary receivers, it is nevertheless a design problem with some systems. For example, the mixer-tube detector described by W6QYT does not “detect” when the b.f.o. voltage is absent; in fact, preventing such detection was a fundamental objective in the design.

After considerable experimenting with a number of simplified circuits the detector shown in Fig. 2 was found to meet the requirements reasonably well. The two b.f.o. voltages, 90 degrees out of phase because of the inductive coupling between the two resonant circuits of T3, are applied separately to the plates of the two triodes. The signal voltage from T1 is applied in parallel to the two cathodes against ground, thus modulating the rectified r.f. current flowing between plate and cathode. R1 and R2 are the audio load resistors. It is necessary to use blocking condensers, C1 and C2, to prevent short circuiting the load resistors. Since there is considerable r.f. voltage across R1 and R2, it is also necessary to use filters, R3C3 and R4C4, to keep the r.f. out of the audio system. The audio outputs are taken from A and B against ground.

Although none of the values is especially critical, the two filters, R3C3 and R4C4, should be identical; if they are not, they will not have identical phase shifts at all audio frequencies. Hence the two output voltages will not stay 90 degrees apart. It is desirable to match the resistors and condensers if possible, but commercial

How the Phaser is connected to a receiver in a typical case. Short lengths of coax run to the second-detector and beat-oscillator tube sockets. In this instance the audio output lead (shielded) and power wires go to an accessory socket on the receiver. All connections can be made without drilling holes in the receiver by removing the bottom plate as shown.

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components appear to be uniform enough for ordinary practical purposes.

When the b.f.o. is shut off the detector circuit becomes a diode affair, using the cathode and grid of each tube. In this case either output, \( A \) or \( B \), may be used. Alternatively, the two may be connected in parallel.

The b.f.o. is an ordinary electron-coupled oscillator with parallel feed through \( R_3 \). Parallel feed is used so the plate circuits of the two detectors will be as nearly identical as possible. The b.f.o. constants given will develop ample r.f. voltage at the plates of the detectors, using an oscillator plate supply of 250 volts. The chief requirement is that the b.f.o. voltage should be large compared with the signal voltage; otherwise the value is not critical. The rectified voltage as measured across either \( C_2 \) or \( C_4 \) with a 20,000-ohm-per-volt meter should be 3 or 4 volts with the constants given. The two rectified voltages do not have to be identical, although they should not be widely different.

As compared with the customary detector-b.f.o. arrangement the only addition here of any consequence, from a cost standpoint, is transformer \( T_2 \), \( T_1 \) is the regular input transformer that couples the last i.f. amplifier to the detector, and \( T_3 \) is the ordinary b.f.o. transformer. \( T_2 \) should be an output (diode) transformer, not the interstage type. This is also true of \( T_1 \).

Audio Phase Shift

Although a 90-degree phase shift can be obtained from a circuit consisting of nothing more than a resistor and condenser, there are several practical reasons why such an ultrasimple circuit is not satisfactory. A more useful basic arrangement is shown in 3A. Two circuits are used, neither of which has a constant phase shift with frequency, but which together maintain a constant phase difference of 90 degrees.

\[ \text{Fig. 3} \quad \text{Circuits for obtaining an audio phase shift of 90 degrees, constant with frequency, when supplied with input voltages having a fixed phase difference.} \]

The behavior of these circuits when used in conjunction with the appropriate detector is shown by the curves of Fig. 4. The upper curve represents the response to the desired signal and the lower curve the response to an audio image. The horizontal axis is in terms of frequency ratios rather than actual audio frequencies so that the curves apply to any frequency chosen as the most desirable tone for copying. The desired tone is represented by 1 on the horizontal scale, and if it is, for example, 1000 cycles then 0.1 represents 100 cycles and 10 represents 10,000 cycles. At the reference frequency the reactances of \( C_1 \) and \( C_2 \) must be equal and must equal the resistance of \( R_1 \) and \( R_3 \), and the applied voltages, \( E_1 \) and \( E_2 \), also must be equal. Under these conditions the undesired audio image is completely eliminated when the two outputs are properly combined.

At any other beat tone which the operator may prefer the ratio of desired signal to its audio image is given by the difference between the two curves of Fig. 4.

Circuit 2 in Fig. 3A cannot be used to drive a tube amplifier without a shunting resistor to provide a d.c. grid return. The shunt resistor introduces a phase shift that can be compensated for by adjusting the value of \( R_2 \). Practical circuits are shown in Fig. 3B. Since the outputs of the two circuits vary oppositely with frequency, a potentiometer is used at \( R_1 \) for balancing the amplitudes of the image signal outputs of the two circuits. This "rejection control" has relatively little effect on the amplitude of the desired signal. \( C_1 \) and \( C_2 \) are equal, and their reactance should equal the resistance of \( R_1 \) at the preferred audio tone, usually between 500 and 1000 cycles. \( R_1 \) should be as large as possible with the particular amplifier tube used, and at least 10 times the resistance of \( R_1 \). \( R_2 \) is somewhat larger than \( R_1 \), and is variable so that it can be adjusted for exact phasing.

The range of audio frequencies that can be rejected depends on the over-all gain available. The two circuits of Fig. 3B will have equal outputs at the design frequency, but above that frequency the output of No. 1 will increase while that of No. 2 will decrease. Consequently the tap on \( R_1 \) must be moved down the resistor to maintain balance. This means that any frequency above the design frequency can be balanced out. Below the design frequency No. 1 has insufficient output for complete balance, because its output is decreasing while No. 2's output is increasing. The rejection range below the design frequency can be extended as far as one likes by tapping Terminal B down on \( R_3 \) to reduce the output of No. 2. Rejection will then be possible down to the frequency at which the maximum output of No. 1 is again equal to the output of No. 2. Generally it will suffice to reduce the output of No. 2 to about half the maximum output obtainable. An alternative method is to make \( R_3 \) a potentiometer.
The d.p.d.t. switch, $S$ in Fig. 5, reverses the phase of the detector outputs and thus selects the side of zero beat on which the desired signal is to be found. It has the same effect as tuning from one side of zero beat to the other on an ordinary receiver.

**Alignment of Circuits**

For best results the detector and audio circuits must be critically adjusted, but this does not mean that adjustment is difficult. A definite procedure must be followed; otherwise it is pure chance whether the proper settings ever will be reached.

The audio circuit must be aligned first. An audio-frequency signal is necessary, and may conveniently be taken from the phone jack of a receiver. Referring to the circuit of Fig. 5, a high-impedance headset may be connected across the output terminals, or these terminals may be connected to the input circuit of any audio amplifier. A variable resistor and condenser are connected to the secondary of an audio transformer, the primary of which goes to the audio source, as shown in Fig. 6, and also connected to the corresponding terminals in Fig. 5. Any audio transformer will be satisfactory. Its purpose is to permit grounding the midpoint of the $RC$ circuit, which cannot be done with the usual receiver.
headphone output jack because one side of the latter is grounded.

Tune in a steady carrier, preferably unmodulated, and set the receiver to give the beat note you customarily use in c.w. reception. \( R_3 \), Fig. 5, should be set at about 400,000 ohms. Set \( R_1 \) at zero output (arm at ground end) and then snap \( S \) back and forth while adjusting \( R \), Fig. 6, until the signal strength is the same in either position of the switch. This ensures that the voltages across \( C \) and \( R \) are approximately the same.

Next, vary the setting of \( R_1 \) until the point is found where the signal strength is minimum. It is unlikely that a complete null will be secured at this stage, but there should be a definite minimum. Now vary the setting of \( R_2 \), while rocking \( R_1 \) back and forth over a small range, until a complete null is secured. In determining the null point it is possible to become confused by audio harmonics in the signal source, so operate at a signal level low enough to keep distortion at a minimum. The presence of harmonics will be quite evident in going through the null because the tone frequency will suddenly change to a higher pitch (an octave higher, if the distortion is principally second harmonic). Although some harmonic may remain at the null point, the fundamental tone should disappear completely.

When the exact null is found no further adjustment of the audio circuit is necessary. The performance at audio frequencies other than that for which the circuit is aligned can be checked by varying the beat note and setting \( R_1 \) for minimum signal at each frequency. The null should be very good at all frequencies above the reference and down to about half the reference frequency. At still lower frequencies there will be some cancellation, but it will not be complete.

To align the detector circuit, connect the detector and audio circuits together and take the audio output from Fig. 5 or a subsequent amplifier, just as in the case of audio circuit alignment. The two circuits of \( T_3 \), Fig. 2, should be adjusted to resonance at the b.f.o. frequency. The adjustment is not critical at this point, and the factory settings of the transformer will suffice.

Tune in a signal with the b.f.o. shut off, and center it carefully in the i.f. passband. Then turn on the b.f.o. and adjust its frequency to zero beat with the signal. Next, tune the receiver off slightly to give a suitable beat note and set \( R_1 \), Fig. 5, to the point that gave the null for that audio tone in aligning the audio circuit. Now adjust the secondary tuning of \( T_1 \), Fig. 2, very carefully while throwing \( S \), Fig. 5, back and forth until the signal shows a definite difference in strength in the two switch positions. Finish up by adjusting both the rejection control (\( R_1 \), Fig. 5) and the secondary tuning of \( T_1 \) until the beat note disappears in one switch position. Watch out for audio harmonics, just as in the case of audio alignment.

After the null setting is obtained, tune the receiver to the same tone on the other side of zero beat and the signal will be in again at full strength. Then throw \( S \) to the other position; it should be possible to bring about a complete null again by readjustment of the rejection control, \( R_1 \). The amount of readjustment required will be quite small in a properly-operating circuit. If a large change in the setting of \( R_1 \) is required when changing from one side of zero beat to the other, or if the null cannot be found at all on one side, try new settings for the tuning of \( T_3 \) and repeat the procedure.

The null will not be equally deep on both sides of zero beat unless the phasing is exactly 90 degrees in both the detector and audio circuits. If the audio phasing is slightly off 90 degrees, it will be found that a complete null can be obtained on either side by proper detector alignment, but that the same setting does not hold for both sides. In such a case a recheck of the audio alignment is indicated.

Once the alignment job is done, the b.f.o. should be left severely alone, because a change in

An inside view of the Phaser. Detector socket at upper right, b.f.o. amplifier socket at upper left, audio socket at lower left. The lower coax is the i.f. input cable to the detector, the upper one the input cable to the b.f.o. amplifier. The detector output circuits terminate on a lug strip near the center of the unit, from which point two wires connect to the d.p.d.t. switch; these connections can easily be removed for audio alignment.

QST for
Fig. 7 — Adapter circuit for use with receiver having 456-kc. intermediate frequency. For other intermediate frequencies, use an appropriate transformer at T1.

C1, C3, C6 — 100-µfd. mica.
C2, C4, C10 — 0.01-µfd. paper.
C5, C7 — 470-µfd. mica.
C11, C12 — 680-µfd. mica (see text for discussion of values).
C19 — 0.001-µfd. mica.
R1 — 1000 ohms, ½ watt.
R2 — 0.22 megohm, ½ watt.
R3, R4, R5, R6, R7, R8 — 1.1 megohm, ½ watt.
R9 — 0.5-megohm volume control (IRC D13-132).
R10, R11 — 2.2 megohms, ½ watt.
R12 — 2200 ohms, ½ watt.
T1 — 456-kc. diode transformer (Millen 64453).

An Application

The easiest way to use the phasing method is in the form of an adapter that can be applied to an existing receiver, and a suitable circuit diagram is given in Fig. 7. Comparing Fig. 7 with Figs. 2 and 5 will show that the former is essentially a combination of the latter two, but with T1 and T3 of Fig. 2 omitted. These are not needed in the adapter because they are already present in the receiver itself.

It is necessary to remove the regular detector tube from the communications receiver and to make two connections to the receiver’s i.f. circuits, one for taking out the signal and the other for taking out b.f.o. voltage to drive the b.f.o. amplifier stage.

These connections can be made through short lengths of RG-59/U coax. The signal cable is connected to the hot side of the receiver’s i.f. output transformer. In the average case, this side of the i.f. transformer goes to a 6H6 plate, and the connection can conveniently be made to the 6H6 socket. The b.f.o. connection can be made to the grid of the b.f.o. tube in the receiver, again at the tube socket. The outside conductors of both cables should be grounded at the tube sockets. Because the cables add a small amount of capacitance across both circuits, some realignment will be required of both the last i.f. transformer secondary and the b.f.o.

It is also necessary to feed audio from the adapter back into the receiver’s audio amplifier. In the National NC-57 receiver which we used with the unit shown in the photographs this was simple because of the accessory socket, which provides an audio input terminal. In receivers that do not have such a “phono” input, it will be necessary to run the adapter audio output lead directly to the first audio stage.

(Continued on page 100)
The "Gamma" Match

Matching Coaxial Line to the 3-Element Beam

BY H. H. WASHBURN,* W3MTE

The purpose of this article is to describe what appears to be the simplest method of feeding a homemade plumber's-delight beam with RG-8/U. Since the investigation covered the general matching and switching problems involved in a single-ended 40-watt transmitter and a 300-ohm input commercial receiver, the system used is described in full.

The problem here was a common one; with the low power, I had never been able to work out of town on ten, even though a variety of fixed antennas were tried. In desperation, I had built a No, this isn't a half-completed "T"-match antenna. It is the 29-Mc. "Gamma (2)" match antenna at W3MTE. 3-element beam of surplus aluminum. I wanted to feed it with RG-8/U because of the supposed shielding properties of the line, the weatherproof features, the fact that its losses are so low (in the charts), and because I had 200 feet of it in the cellar. I did not want to cut the driven element for mechanical reasons, so a "T"-match was built and tried. No soap — W3MTE's contacts were still purely local, with the added trouble that I had to rotate the beam.

The resistor-bridge standing wavemeter described on page 483 of the 1949 Handbook (Fig. 16-39) was built and calibrated, as well as a sensitive wavemeter along the lines of the one described on page 465 of the same book. The matching and balancing systems for coaxial line described in the new Antenna Handbook were studied and several coax stubs were made up. An entire Sunday afternoon was spent in trying them out and in attempting to find a decent setting for the "T"-match, with W3MTE perched on the chimney and W3LFF throwing the switches and reading the s.w.r. meter.

With any type of balancing section, the s.w.r. stayed between 5:1 and 6:1. Adjustment of the "T"-match caused only minor variations in the s.w.r. Discarding the balancing section brought the s.w.r. down to 4:1, but no setting of the "T"-match was very good. The outside of the coax was hot with r.f., the second harmonic could be picked up all around the operating room on the wavemeter, and I still couldn't work out of town.

The Gamma Match

It was reasoned that if the outside of the coax was to be cold, it should be connected to the center of the driven element, and so it was duly connected to the aluminum boom. It was also reasoned that if we started from the center (minimum impedance) and started looking toward one end (very high impedance) we should find a 52-ohm point at which we could connect the center conductor of the coax for the best possible match. Half the "T"-match was removed. I figured the driven element was already a resonant, balanced affair with its midpoint grounded. Let it be its own balancing device. This was ten-meter 'phone, not radar. The inner conductor of the coax would be free to swing positive and negative, driving the antenna along with it. The outer conductor, screwed to the boom, would be cold and the coax would function properly.

Again the s.w.r. meter was set up. In ten minutes, by moving the one remaining sliding strap, the s.w.r. was 1.75:1. Using a flexible wire antenna on the wavemeter, it took three tight turns around the coax to get a half-scale reading on the 0-1 meter, indicating very little r.f. on the outside of the line.

The next problem was matching the transmitter to the line. An r.f. ammeter was available and, at the suggestion of W3ONV, the system shown in Fig. 1 was tried and worked the first
time. When the antenna series condenser is adjusted to tune out the reactance of the coupling coil, transmitter loading is maximum. Varying the coupling changes only the transmitter loading, and it is not necessary to retune the plate tank, although it can be peaked up just a little.

had trouble enough recently, I was reluctant to construct a preamplifier, R9-er, or any other gadget requiring tubes and power supply. W3NIJ was consulted about a matching section of the now very satisfactory RG-8/U. He made a few calculations on a Smith chart and suggested a piece of coax cut to 118.5 inches, with a series capacitor of 52 µfd. The thing seems to work better with an estimated 80-90 µfd., but I used a 140 µfd. variable, so the higher capacity was no problem. It is not necessary to adjust this condenser when tuning over the band, but weak signals can be built up by peaking on them.

Signals that were S6 on the long wire became S9+ when the beam was connected and aimed properly. That is a total gain of six S points (estimated), attributable entirely to proper matching of the receiver input to the coax coming down from the beam. It is quite something to pick up a weak station, start turning the beam, and then have to jump for the r.f. and audio gain controls to keep the receiver from howling and jumping off the table.

The beam is no good for receiving except on ten meters, but I don't disconnect it for other bands. I just hook on the long wire by means of a toggle switch. The rig is in the living room, and thus must provide broadcast programs as well as rag-chewing on ten.

Coupling to the Receiver

On the NC-57 receiver, I had always used a long-wire antenna fastened to a neighbor's chimney. The instruction book said the input impedance of the receiver was 300 ohms. Hopefully, the coax from the beam antenna was attached to the NC-57. Presto! signals which had been S9 on the long wire dropped to S6 or worse, with the beam trained on the distant station. Having

Fig. 1 — Dimensions of the 29-Mc. "Gamma-match" beam at W3MTE, showing the method of matching the receiver and send-receive switching.

C1 — 150-µfd. variable. S1 — D.p.d.t. ceramic wafer-type switch.
C2 — 140-µfd. midget variable.
L1 — 5 turns, close-wound, same. A — 0-2 r.f. ammeter. (Not essential — see text.)

Send-Receive Switching

There still remained the problem of switching the line leading down from the beam from the transmitter to the receiver. A coax relay was considered. An inspection of the rig showed that I only needed to switch the inner conductor of the coax from one side of the antenna coupling coil to one side of the receiving series condenser and back again. The lead in each case was only a couple of inches long. Since coax was not being switched, why use a coax relay?

I use a ceramic wafer switch. Extra contacts on the wafer switch can be used to turn on the carrier and mute the receiver. I use one set to ground the receiver input when transmitting.

(Continued on page 102)
450 Watts on V.H.F.

Efficient Operation at 50 and 144 Mc.

BY C. VERNON CHAMBERS,* W1JEQ

A high-powered transmitter for use on our two most-popular v.h.f. bands presents some knotty design problems. It is not always easy to develop satisfactory drive for the higher band, and an efficient band-changing system for a 144-Mc. amplifier calls for something better than the ordinary plug-in coil arrangement. These two factors were prime considerations when this all-tetrode rig for 50 and 144 Mc. was designed.

The exciter has separate output stages for the two bands, eliminating the necessity for driving the final stage with a frequency multiplier on the higher one. Efficient operation of the final stage is attained with a novel form of tank circuit that avoids the use of a plug-in coil for 144 Mc. As a result, the transmitter has practically the same over-all efficiency as would be obtainable if it were designed for either band alone.

The Exciter Circuit

Though the two units were intended for use together as a complete 450-watt transmitter, as shown in the composite photograph, the exciter portion may be used as a low-powered transmitter by itself. As an exciter it has the virtue of providing uniform drive for the final on both bands. Other points of interest include quick band changing, crystal switching, VFO-input provision, low power consumption, and freedom from critical adjustments.

The circuit diagram of the exciter is given in Fig. 1. The 6AR5 Tri-tet oscillator employs a fixed-tuned cathode circuit, C4L2. The plate circuit, C1L4, tunes 24 to 27 Mc., the oscillator tripling when 8-Mc. crystals are used and quadrupling with 6-Mc. crystals. Five crystals are provided for by the switching circuit, and a sixth position of the switch connects the 6AR5 grid to a tuned circuit, C5L1, which is in turn link coupled to the VFO input jack, J1. Switch S2A grounds the cathode of the oscillator tube when VFO input is used. The second 6AR5 is a frequency doubler with its output link coupled to an 832A amplifier-tripler circuit.

As a straight-through amplifier at 50 Mc., the 832A uses a low-value grid resistor, R5, cut into the circuit by switch S2A. A high-resistance grid-leak, R6, is picked up by S2A when the tube is operated as a frequency tripler to 144 Mc. Tube and circuit capacitance resonate the grid coil, L9, at approximately 49 Mc. Jacks J2 and J3 permit metering of the grid and the cathode currents with J2 also serving as the keying jack for a.w. work at 50 Mc. The plate circuit uses plug-in coils with the output link coupled to the final by means of L10 in the 50-Mc. coil. At 144 Mc., output is capacity coupled to the 2-meter output stage by condensers C15 and C16. The 144-Mc. stage, also an 832A, has grid and cathode

* Technical Assistant, QST.
Fig. 1 — Circuit diagram of the 50-144 Mc. exciter.

C1, C2 — 25-μfd, variable (Millen 20025).
C3, C4 — 25-μfd, per-section split stator (Bud LC 1661).
C5 — 22-μfd, midget mica.
C6, C7, C8, C9 — 0.0047-μfd, mica.
C10 — 68-μfd, mica.
C11, C12, C13, C14 — 470-μfd, midget mica.
C16, C17 — 10-μfd, midget mica.
C18, C19, C20 — 500-μfd, button-type by-pass.

R1 — 0.12 megohm, ½ watt.
R2 — 15,000 ohms, 1 watt.
R3 — 47,000 ohms, ½ watt.
R4 — 22,000 ohms, 1 watt.
R5, R6 — 22,000 ohms, ½ watt.
R7, R8 — 25,000 ohms, 10 watts.
R9 — 0.1 megohm, ½ watt.
L1 — 18 turns No. 24 enam., ½ inch long, 1-inch diam.
L2 — 4 turns No. 24 enam., close-wound at ground end of L1.
L3 — 14 turns No. 20 tinned, ½ inch long, ½-inch diam.
L4 — 10 turns No. 20 tinned, ½ inch long, ½-inch diam.
L5 — 5 turns No. 20 tinned, ½ inch long, ½-inch diam.
L6 — 50 Mc.: 4 turns No. 20 enam., ½ inch long, 1¼-inch diam.
L7 — 2-turn coupling links.

NOTE: B & W Miniductor No. 3007 used for L3, L4 and L6.

La, Lb — 50-Mc. output link: 2 turns No. 20 enam., wound around L6.
La — 144-Mc. output link: 2 turns No. 14 tinned, ½-inch diam., turns spaced wire diam.

La — Two-turn coupling links.

L12 — 144-Mc. output link: 2 turns No. 14 tinned, ½-inch diam., turns spaced wire diam.

J1 — Coaxial-cable connector.
J2, J3, J4, J5 — Closed-circuit jacks.
J6 — 4-prong male plug.
J7 — 6-prong female receptacle.

RFC1 — 2.5-mh. r.f. choke.
RFC2, RFC3, RFC4, RFC5 — 7-mh. r.f. choke (Ohmite Z-50).
RFC6, RFC7, RFC8 — 1.8-mh. r.f. choke (Ohmite Z-144).

S1 — 8-position selector switch (Amphenol 36-1).
S2A, S2B — D.p.s.t. toggle switch.
S3A, S3B — D.p.d.t. toggle switch.
T1 — Filament transformer: 6.3 volts a.c., 6 amp.; see text.
jacks as in the previous stage. It is made active by applying heater voltage through $S_{2A, B}$.

Power wiring for the unit is shown in the lower section of Fig. 1. Power for the exciter is fed through a 5-prong male receptacle. A 4-prong female receptacle permits taking out heater and plate voltages for an external VFO. Changing from VFO to crystal operation is done by means of the crystal switch and $S_{2A, B}$.

Higher plate voltage is applied to the 144-Mc. amplifier than is used with the other three circuits, making the output on 144 Mc. comparable with that of the 50-Mc. amplifier.

**Construction**

The components for the exciter are mounted on a metal chassis measuring 3 by 5 by 17 inches. The aluminum rack panel, $\frac{5}{8}$ by $19\frac{7}{8}$ inches in size, is held in place by the mounting nuts of the various controls.

Plate tuning condensers for the oscillator and the doubler circuits are mounted on the front wall of the chassis. These two controls are hot with +300 volts and must be insulated from the chassis. Bakelite tuning knobs without metal dial plates protect the operator. The wiring at this end of the rig should follow the usual rules of good practice for the lower frequencies.

The amplifier-tripler circuit, located at the left center of the chassis as seen from the rear view, has its plate coil mounted on a National type XB-16 socket. Shield braid is used for the connections between the coil socket and the 832A plate caps, while Twin-Lead is wired between the output link and the output terminals. The tube is submounted on a Johnson shielded socket, type 122-101, and the plate tuning condenser, $C_{3B}$, is mounted to the left of the tube socket on an aluminum bracket.

A rear view of the 50- and 144-Mc. exciter. Across the top of the chassis, from right to left, are the crystal sockets, the oscillator and doubler tubes, the 832A amplifier-tripler and its plate coil, and the inverted 144-Mc. amplifier stage. Crystal sockets, used as r.f. output terminals, are mounted on the rear wall of the chassis along with the power plugs and the filament transformer.

The 144-Mc. amplifier has the shielded tube socket mounted in an inverted position. The grid chokes, $RFC_5$ and $RFC_6$, are mounted between the socket terminals and a tie-point strip which is in turn mounted on the metal part of the socket along with the button-type by-pass condensers. The coupling condensers, $C_{14}$ and $C_{16}$, are between the tube socket and the amplifier-tripler plate coil socket. Millen No. 32150 through-bushings, set in the chassis to left and the rear of the tube socket, pass d.c. and heater leads for the 832A.

The bottom view of the exciter shows the plate tuning condenser, $C_4$, mounted on the end wall of the chassis just below the 2-terminal tie-point strip which supports the output link.

The 144-Mc. amplifier has the shielded tube socket mounted in an inverted position. The grid chokes, $RFC_5$ and $RFC_6$, are mounted between the socket terminals and a tie-point strip which is in turn mounted on the metal part of the socket along with the button-type by-pass condensers. The coupling condensers, $C_{14}$ and $C_{16}$, are between the tube socket and the amplifier-tripler plate coil socket. Millen No. 32150 through-bushings, set in the chassis to left and the rear of the tube socket, pass d.c. and heater leads for the 832A.

The bottom view of the v.h.f. exciter. The VFO input coil is at the left end of the chassis. Plate coils for the oscillator, the doubler and the 144-Mc. amplifier circuits are mounted on the tuning condensers. The grid coil for the amplifier-tripler stage is mounted on the tube-socket terminals.

Bottom view of the v.h.f. exciter. The VFO input coil is at the left end of the chassis. Plate coils for the oscillator, the doubler and the 144-Mc. amplifier circuits are mounted on the tuning condensers. The grid coil for the amplifier-tripler stage is mounted on the tube-socket terminals.

**Exciter Power Supply**

Power-supply requirements for the exciter will depend on how the unit is operated. If it is to serve as a low-power transmitter, the supply need deliver only 300 volts at approximately 175 ma. For exciter service, two supplies are recommended—one delivering 300 volts at 125 ma. and one furnishing 400 volts at 100 ma., the latter to be used on the second 832A. The fila-
ment transformer must deliver 6.3 volts at 4 amp. in either case.

If operation with a VFO not having its own supply is contemplated, then the power-supply capabilities should be increased to meet the extra requirements. We have been using the "V.H.F. Man’s VFO" and this unit increases the heater load by 2 amp. and the plate-current drain by approximately 60 ma.

Testing

Performance of the oscillator and the doubler circuits should be checked first. This is done with one or more crystals in place, with the plate and screen voltages removed from the 832A amplifier-tripler, with the 144-Mc. amplifier turned off and with a low-range milliammeter plugged in $J_2$. The oscillator cathode switch should be opened. Table I will assist in the selection of a crystal for the desired output frequency, and shows the frequencies to which the various circuits should be tuned. With plate voltage applied and with the doubler tuned to resonance, the grid current of the 832A should be approximately 7 ma. when an 8-Mc. crystal is used. Grid current will be 5 or 6 ma. with a 6-Mc. crystal. Total cathode current for the two 6AR5s should be 50 ma. Normal screen voltage for the oscillator and the doubler tubes is about 230 and 200 volts, respectively.

The 832A may now be tested at 50 Mc.

Rear view of the p.p. 4-65A amplifier, showing the two-band tank circuit set up for 50-Mc. operation. R.f. input terminals are on the rear wall to the left and receptacles for the power leads are to the right. The 144-Mc. output terminals are on a bracket to the left of the protective tube. The 50-Mc. output terminal is mounted directly on the XB-15 socket for the plate coil. A plug-in shorting bar, used across the plate lines at 144-Mc., is shown in the foreground.

The Power Amplifier

Anyone who has tried to adapt any sort of plug-in coil system to use in a high-powered transmitter for 144-Mc. knows the weaknesses of such arrangements. The lead inductance and parallel capacitance inherent in the best jack bars and the plate circuit is tuned to resonance, the grid current should stay up around 5 ma., the cathode current should dip to about 65 ma., and the lamp should indicate an output of 6 to 8 watts. A screen potential of 160 volts is correct with the amplifier loaded. The plate current should rise noticeably and the grid current fall to zero when excitation is removed. This last test must be one of short duration.

To check the 144-Mc. stage, plug in the 2-meter coil at $L_3$ and apply the heater voltage through $S_{mm}$. Grid current for the amplifier will be around 3.5 ma. A recheck of the tripler should show a grid current of 1 ma. and a cathode current of 55 to 60 ma.

With a 400-volt supply connected to the amplifier and with the dummy load across the 144-Mc. output terminals, 6 to 8 watts output should be obtained with an 832A cathode current of approximately 65 ma. Grid current should be 3 ma. and the screen voltage should measure 170 volts. A short test for self-oscillation should be made by removing the excitation.

The general method of tuning does not change when a VFO is used as the frequency-control unit. However, it is important that the oscillator cathode switch be closed; otherwise the oscillator circuit will take off on its own.

It is recommended that an indicating wavemeter be used to check the proper tuning adjustments, particularly those associated with 144-Mc. operation. There are numerous out-of-band harmonics from the low-frequency crystals and the high order of frequency multiplication necessary to build up to 144 Mc. Be careful to choose the proper harmonics in the first two stages.

TABLE I

<table>
<thead>
<tr>
<th>Crystal Oscillator</th>
<th>Doubler Amplifier</th>
<th>Tripler Amplifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>6250</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>6750</td>
<td>27</td>
<td>54</td>
</tr>
<tr>
<td>9000</td>
<td>27</td>
<td>27</td>
</tr>
<tr>
<td>9000</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td>9166.6</td>
<td>24.6</td>
<td>49.3</td>
</tr>
<tr>
<td>9333.3</td>
<td>24</td>
<td>54</td>
</tr>
<tr>
<td>8222.2</td>
<td>21.6</td>
<td>49.3</td>
</tr>
</tbody>
</table>

NOTE: Crystal frequencies in kc.; other frequencies in Mc.
C1 — 6-µfd.-per-section (Millen 21906D).
C2 — 50-µfd.-per-section (Bud LC 1662).
C3 — 35-µfd.-per-section with high-voltage coupling; see text for information on removing plates. (National TMH-35D).
C4, C5, C6, C7 — 470-µfd. midget mica.
C8 — 0.0022-µfd. mica.
C10 — 0.001-µfd. mica.
C11 — 470-µfd. 5000-Volt mica.
R1 — 5000 ohms, 10 watts.
R2 — 30,000-ohm 200-watt adjustable: two 100-watt resistors in series.
L1 — 50 Mc.: 5 turns No. 24 tinned, ½-inch diam., turns spaced wire diam.
— 144 Mc.: 1 turn No. 14 wire, hairpin shape, 1½ inches long, ½-inch diam. at open end.
L2 — 50 Mc.: 6 turns each section, No. 20 tinned, ½-inch diam. (B & W Miniductor No. 3007). Space sections ½ inch apart.
L3 — 30,000-ohm 200-watt adjustable: two 100-watt resistors in series.
L4 — 4 turns of ½-inch o.d. copper tubing, 1½-inch diam., wound in two sections with two turns each side of center tap and a ½-inch space at center, turns spaced ½ inch.
L5 — 3 turns No. 12 enam., ½-inch diam., turns spaced wire diam.
L6A, L6B — ½-inch o.d. copper tubing, 10½ inches long, spaced 1½ inches on centers.
L7 — 1 turn of ½-inch copper tubing, hairpin shape, 3 inches long, ½-inch diam. at open end.
L8 — 6.3-Volt pilot-lamp assembly.
L9 — 4-prong male receptacle.
RFC1, RFC2, RFC3, RFC4 — 7-µh. r.f. choke (Ohmite Z-50).
RFC5 — 1.8-µh. r.f. choke (Ohmite Z-144).
T1 — Filament transformer: 6.3 volts a.c., 8 amp.

The circuit diagram of the push-pull amplifier is given in Fig. 2. Excitation for the amplifier is link coupled to a conventional split-stator grid circuit. A 6Y6G protective tube holds the plate dissipation to a safe level when the excitation is removed. The tubes require no neutralization at 50 Mc. At this frequency the screen grids are bypassed by condensers C6 and C7. Shielding to prevent external coupling between the grid and the plate circuit is provided for by a partition.

Screen-lead inductance will cause the amplifier to be unstable at 144 Mc. unless preventive measures are taken. Series tuning the screen circuit with condenser C3 is most effective, since it puts the screens at actual ground potential. Plate neutralization was tried but was discarded because of the capacitance added in the grid circuit by the neutralizing arrangement.

Construction

The 3 X 7 X 17-inch chassis and the 10½ X 19-inch panel are held together by the pilot-lamp assembly and three shaft bearings. The latter are for the 144-Mc. output link and the tuning condensers for the screen and grid circuits. The lamp
jewel and the three control knobs may be seen from left to right in the front view of the complete transmitter.

The rear view of the amplifier shows the grid coil mounted on a National type XB-16 socket to the left of the shield partition. An XB-15 socket is mounted on three-inch stand-off insulators between the 4-65A tubes and the plate tuning condenser. The condenser is mounted on 2½-inch insulators in an inverted position. The minimum capacitance of the plate condenser was reduced by removing two stator and two rotor plates from each section. A feed-through insulator for the high-voltage d.c. lead is mounted directly below the plate-coil socket.

The 144-Mc. lines are supported by the tuning condenser and a piece of ½-inch polystyrene. Plate clips for ¾-inch caps are reduced in diameter and used for contact with the rods at the tube and condenser positions. The condenser should have the clips bolted to the left-hand stator terminals as seen from the rear view. This will allow the condenser shaft to be centered on the panel and the connection to the lines will be at a point four inches in from the plate ends. Shield braid, ½ inch wide, is used between the clips at the open ends of the lines and the heat-radiating caps of the tubes.

Aluminum plates equipped with panel bearings for the control shaft of the 144-Mc. output link are mounted on the front and the rear frames of the plate tuning condenser. The swinging link is made by twisting the open ends of the loop around a 5-inch length of ¾-inch polystyrene rod. The turns around the rod should be shorted out by soldering, and since this operation softens the rod, the link and rod will be firmly joined together. A piece of ½-inch polystyrene cemented across the closed end of the loop prevents accidental contact with the plate lines. A Millen type 38602 Quartz Q washer at the rear of the shaft and a homemade pulley at the front prevent the control shaft from slipping out of the bearings.

The grid tuning condenser is mounted on an aluminum bracket and the screen condenser is supported by metal posts as shown in the bottom view. Copper strip is used for joining the two screen prongs of each tube socket and for connection to the two variable condensers. Each tube has the mica by-pass condensers and a section of the variable screen condenser returned to a common point on the socket. The 0.001-µfd. by-pass for the screen-circuit r.f. chokes is returned to ground in between the two sockets. The pulley and cord for the swinging link are at the front of the chassis.

A bottom view of the power amplifier. Tuning condensers for the grid and screen circuits are to the left and right of the shielded tube sockets. The filament transformer is at the upper right-hand end of the chassis. The two large resistors drop the voltage to the 4-Mfd. condenser. Copper strip is used for joining the two screen prongs of each tube socket.

Power Supply

Data sheets for the 4-65A list typical operating conditions for a push-pull circuit with d.c. inputs ranging from 140 to 540 watts. Although the amplifier described may be operated at full input for c.w. work, it is recommended that the input be kept to 400 watts or less when plate modulation is used. This value includes the power taken by the screen grids. For all-round operation a power-supply output of 1000 to 1500 volts at approximately 350 ma. is recommended. Higher voltages may be used but forced-air cooling of the tubes may be required.

Testing

At 50 Mc. the amplifier can be tested in the same way as any low-frequency amplifier. The usual test for self-oscillation may be made first. This is done with the filament and plate voltage applied, with the excitation removed and with the protective tube in place. Proper operation is indicated by the absence of grid current as the grid and the plate tuning condensers are rotated. The protective tube should limit the d.c. input to no more than the maximum plate-dissipation rating. The limiting effect will be determined by the supply voltage, but total input should be well below 150 ma. at 1500 volts or less.

With the unit described earlier furnishing excitation, the grid current for the amplifier should be approximately 35 ma. before the high voltage is turned on. A 300-watt lamp coupled to L4 may be used as a dummy load for the power-output test. The full-load cathode currents to be expected with different values of plate voltage may be found in the 4-65A data sheets. A cathode current of 320 ma. is correct for operation with a 1000-volt supply, and 310 ma. is correct with 1500 volts on the plates. The grid current should be at least 25 ma. and the screen potential should be about 250 volts when the amplifier is fully loaded.

(Continued on page 108)
F.C.C. PROPOSALS

On July 19th the Headquarters, through General Counsel Segal and in line with instructions of the ARRL Board of Directors, filed comments on the FCC proposals for changes in the amateur regulations. See the editorial pages in this issue for the complete text. On the same date FCC extended the closing date for filing, which had been July 20th, to August 22nd. For the record we report to members that, in further accord with the Board's instructions, the ARRL's 1948 recommendations for changes in the amateur rules have been withdrawn.

At the invitation of Commissioner Sterling, on July 22nd representatives of the League, and of the National Amateur Radio Council and the Society of American Radio Amateurs, met informally with the Commissioners and the amateur section of their staff to discuss the matter of the FCC proposals. Keynote of the meeting was an evident desire of all parties to reach a common understanding in the best interests of amateur radio. It must be recorded here, for the information of League members, that representatives of SARA expressed full support of the principle of Government planning and direction for the amateur service; NARC expressed itself as quite willing to accept that principle. As has been reported in QST, the position of the League as established by our Board is to oppose any such Government planning for the amateur service.

At the meeting there was agreement to the idea of an informal engineering conference (which the League had requested in its filing) to discuss the matter at greater length. On July 27th the Commission designated October 10th as the day on which such an informal conference will be held at its offices in Washington. The League has filed notice of intention to appear, but at the same time has reiterated its stand in opposition to any philosophy of regulation based on Government planning or direction.

F.C.C. CONTINUES N.F.M. AUTHORIZATION

The band segments 3850-3900 and 14,200-14,250 kc. (for Class A) as well as 28,500-29,000 and 51,000-52,500 kc. (for all classes) have been available for narrow-band frequency or phase modulation use on a temporary experimental basis until July 31, 1949. Considering it desirable to retain these privileges until final disposition of its current proposals in Docket 9295, FCC has extended them until July 31, 1950, or until further action by the Commission.

ELECTION NOTICE

To All Full Members of the American Radio Relay League residing in the Dominion of Canada, and in the Atlantic, Dakota, Delta, Great Lakes, Midwest, Pacific and South-eastern Divisions:

An election is about to be held in Canada and in the above-mentioned divisions to choose both a director and an alternate director (in Canada, a Canadian General Manager and his alternate) for the 1950-1951 term. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the Constitution & By-Laws will be mailed to any member upon request.

Nomination is by petition, which must reach the Headquarters by September 20th. Nominating petitions are hereby solicited. Ten or more Full Members of the League residing in any one of the above-named divisions may join in nominating any eligible Full Member residing in that division as a candidate for director therefrom, or as a candidate for alternate director therefrom. No person may simultaneously be a candidate for both offices. Inasmuch as all the powers of the director are transferred to the alternate in the event of the director's death or inability to perform his duties, it is of as great importance to name a candidate for alternate as it is for director.

The following form for nomination is suggested:

Executive Committee
The American Radio Relay League
West Hartford 7, Conn.

We, the undersigned Full Members of the ARRL residing in the Division (or in the Dominion of Canada), hereby nominate

as a candidate for director (or Canadian General Manager); and

we also nominate

as a candidate for alternate director (or alternate Canadian General Manager); from this division for the 1950-1951 term.

(Signatures and addresses)

The signers must be Full Members in good standing. The nominee must be a Full Member and must have been both a member of the League and a licensed radio amateur operator for a continuous term of at least four years immediately preceding receipt by the Secretary of his petition of nomination, except that a lapse of not to exceed ninety days in the renewal of the operator's license and a lapse of not to exceed thirty days in the renewal of membership in the League, at any expiration of either during the four-year period, will not disqualify the candidate; provided

(Continued on page 104)
A 1950 VFO Exciter

Some Ideas for Construction and Keying

BY BYRON GOODMAN,* WIDX

At first glance this VFO exciter looks like a pretty fancy gadget to give only 15 to 20 watts output on all bands from 3.5 to 28 Mc. (including 21 but not 27 Mc.). Perhaps it is but, being an extremist on some points, we had some pretty fancy requirements to meet. The thing is handy enough, requiring only the changing of one plug-in coil and the turning of a switch to get on any band, but there is an extra tube and a relay on the chassis that are used only for keying, and they don't add any power or bands.

A number of ideas for switchable or plug-in oscillator coils were kicked around and finally discarded in favor of just two oscillator tank circuits. One was to be on 160 meters, for covering the 80- and 40-meter bands, and the other was to be on 7 Mc., to cover the 14-, 21- and 28-Mc. bands. To obtain a decent tuning rate, the 7-Mc. oscillator circuit was cut to just cover the 14-Mc. band, which thus leaves out some of the 28-Mc. band and all of the 11-meter assignment. To include these would require a third oscillator circuit, or a sacrifice in tuning rate, and so they were left out. However, before the next DX Contest comes around we may use a larger padding condenser across the tuning condenser, which will allow the 27-Mc. band to be reached by a little finagling.

All frequency multiplying is done in the oscillator stage (the lowest possible level), and there are several tuned circuits between the oscillator stage and the output amplifier. So far, a block diagram of the VFO would look like Fig. 1. While it may already seem to be taking on an equine appearance, the thing isn't too bad if the three sets of "tuned circuits" are all made fixed-tuned and compact. By running the first and second buffer stages Class A, good isolation for the oscillator is obtained, no new harmonics are generated, and the undesired harmonics generated in the oscillator plate circuit are pretty well attenuated.

One has only to play around a little with the Clapp oscillator circuit to sell himself on it, so there was no hesitation about using it here. Actually, it is a natural for the thing, because it is just about the only oscillator circuit that can be switched with no worries about the quality of the switch affecting the stability of the circuit. "Hey, go slow," you say. Well, look at Fig. 2. By using two separate tuning condensers, C₁ and C₂, and switching across the large (0.001 µfd.) condensers

* Asst. Technical Editor, QST.

This 5-band VFO exciter unit has a 2E26 in the output stage and delivers 15 to 20 watts.

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of the tuned circuits, the switches are practically cut of the circuit. Further, the switch can be mounted a considerable distance from the circuits, by running the leads to the switch in small coaxial line. This keeps the oscillator tube away from the tuned circuits, thus reducing any frequency drift that might be caused by the tube heat raising the temperature of the tuned circuit. It is a dodge that can be applied to any Clapp oscillator, switched or not.

What Tubes To Use?

With these few points settled, the next step was to select the right tubes for the various jobs. A logical tube for the output stage might be the 807. However, we decided on the 2E26 because it is small, can be run at the 25 or 30 watts input that was wanted, and seems to be less prone to parasitic oscillations than its larger cousin. If some kind tube manufacturer ever brings out an 807 with short leads, it will be the logical tube for this unit, but we played it safe for the present and used the 2E26. It was probably just good luck, but there was no trouble at all with parasitics. For the second buffer, the 6AG7 was selected, and 6AC7s were used for the oscillator and first buffer jobs. While this may look like a terrific amount of over-all gain, remember that these tubes work into broad-band (loaded) circuits, with some stagger tuning to give uniform excitation over the range, so the over-all gain is not too high.

It was decided early in the game that the 2E26 would not be driven hard, as one little step in holding down the harmonics, and somewhere between Class B and Class C operation would be accepted as satisfactory. With no excitation, just enough fixed bias was to be used on the 2E26 to reduce the plate current to a safe level, to help out a little on power-supply regulation and to maintain the keying characteristic.1

Where To Key?

If you like chirpy keying, we advise you to key the oscillator - any oscillator. To avoid chirps and clicks with oscillator keying requires, first, an oscillator that has no frequency change with voltage change and, second, a transmitter that is all linear amplifiers or close to it. We don't say an oscillator that is completely insensitive to voltage changes can't be built - we just say we've never seen or heard one. To avoid clicks, some lag must be inserted in the keying circuit, and this means that the oscillator is changing on the oscillator while it is delivering output during the "make" and "break" periods. Any frequency change shows up as a chirp. If you don't put enough lag in the circuit, you have key clicks that you can't get rid of, no matter what you do later on. Most operators put up with the chirp, but we like to have a signal that sounds like a keyed amplifier, with no chirps. But we also like to have break-in available! That leads us to the circuit described in QST some time back.2 This was a tube keyer that could be connected in an amplifier cathode circuit and, together with a fast relay and one tube, turns the oscillator on fast before the character is formed and turns the oscillator off after the character is formed. At high speeds the oscillator only goes off between words, but this still permits good break-in operation.

In this VFO, the keyer tube of the earlier cir-

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Fig. 2 - Details of the oscillator switching. The leads from the 0.001 µfd. condensers in the tuned circuits are run to the switch through coaxial line, allowing the tube to be mounted well away from the tuned circuits.

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A rear view of the exciter. The 6SN7 and the Millisec relay (in metal tube envelope) to the right of the VR tube are used in the keying circuit. The linear condenser standing alongside the 2E26 furnishes a short return path for harmonics.
The two oscillator tuning circuits are mounted inside the shield can.

The circuit was eliminated by using grid-block keying. The second buffer tube was keyed instead of the first buffer to insure better isolation of the oscillator. The 2E26 grid could have been keyed, or even the grid of some subsequent amplifier, but we used it where we did because the 6AG7 is running at low signal and low bias, and a 105-volt negative power supply handles it easily. At a higher level, a higher-voltage supply might be required.

To say that we're happy we included this circuit is a marvel of understatement, because keying the oscillator by itself, with enough lag to eliminate clicks down to where they aren't objectionable, gives a chirp that shouldn't happen to a sparrow. It may be that by suitable juggling of the constants in the oscillator circuit we could have reduced this chirp, but we don't believe they could ever have been eliminated, at least to the point where we would have been happy. As the rig stands, no one can tell the difference between the break-in keying and amplifier keying with the oscillator running continuously, simply because there is no practical difference. We're using break-in with an oscillator that chirps when keyed, and yet the signal has no chirp — you can't ask for much more than that.

To digress a minute, we know that there are three other approaches to this "amplifier-type break-in keying." One is to use a continuously-running oscillator that is well-shielded and on a low frequency, another is to use a conversion exciter and key the mixer, and the third is to locate the continuously-running oscillator and keyed amplifier a considerable distance from the receiver. The first two should be capable of every bit as good performance as the unit being described — they just don't happen to appeal to the writer — and the third involves financial and housing facilities that are beyond the writer — and a few others. All we want to put across right now is that you have to lower your standards of keying if you key the oscillator for break-in work, particularly at the higher frequencies. If you are one of those with a "chirpless, clickless" keyed oscillator, just listen to it with a low beat note at 28 Mc. If you can honestly say it has no chirps or clicks, then you have something. But compare it with clickless amplifier keying before you decide that it has no chirp.

Electrically, that's about all there is to the circuit. A linear condenser is used from the 2E26 plate to ground, to furnish a short return path for harmonics, and small resistors are used in series with the grids of the oscillator and output tubes, to discourage parasites. Various extra by-pass condensers that crop up in the circuit were included because it was found that some harmonic energy was getting out on the power and control leads, and will undoubtedly vary with the construction. The complete circuit is shown in Fig. 3.

To say that we're happy we included this circuit is a marvel of understatement, because keying the oscillator by itself, with enough lag to eliminate clicks down to where they aren't objectionable, gives a chirp that shouldn't happen to a sparrow. It may be that by suitable juggling of the constants in the oscillator circuit we could have reduced this chirp, but we don't believe they could ever have been eliminated, at least to the point where we would have been happy. As the rig stands, no one can tell the difference between the break-in keying and amplifier keying with the oscillator running continuously, simply because there is no practical difference. We're using break-in with an oscillator that chirps when keyed, and yet the signal has no chirp — you can't ask for much more than that.

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Construction

Only general good practice was followed in the construction of the VFO, and no particular pains were taken to build it "like a battleship." However, it turned out to be rather insensitive to vibration and shows only the slightest trace of microphonics, and then only under rather severe conditions. Even so, it is set on a rubber kneeling pad on the operating table.

The unit is built on a 10 X 17 X 3 aluminum chassis, which is not very rigid by itself. However, an 8¾ X 11 panel of ¹⁄₂-inch dural, braced by the 5 X 5½ X 10 aluminum box surrounding the oscillator tuning section, adds strength and rigidity to the assembly, as does the chassis bottom plate. The oscillator tuning section determines the frequency — the effect of the tube is practically eliminated in the Clapp circuit — and everything
Fig. 3 — Circuit diagram of the VFO exciter.

C1 — 9-plate midget variable.
C2 — 2-plate midget variable.
C3 and C5 made by cutting down a Millen 21100.
C4 — 50-µfd. midget (Millen 26050).
C5 — 100-µfd. midget (Millen 26100).
C6, C8, C9, C10 — 0.001-µfd. mica.
C7, C9, C11, C12, C13 — 100-µfd. mica.
C14, C15, C16, C17, C18, C19, C20, C21 — 680-µfd. mica.
C22 — Linear condenser. See text.
C23 — 0.001-µfd. 1200-volt mica.
C24 — 100-µfd. variable (Millen 22100).
C25 — 470-µfd. mica.
C26 — 0.025-µfd. paper, 600 volts.
C27 — 0.1-µfd., 250 volts, special (Sprague "Hypase").
R1 — 0.1 megohm.
R2 — 47 ohms, ½ watt.
R3, R7, R9, R10, R14 — 2200 ohms.
R4, R5, R6, R8, R11, R12, R18, R13 — 330 ohms.

Rs, R19 — 22,000 ohms.
Rs — 680 ohms, ½ watt.
R17, R18 — 100 ohms, ½ watt.
R19 — 17,500 ohms, 10 watts, wire-wound.
R20 — 3300 ohms.
R21, R22 — 1.0 megohm.
R23 — 1500 ohms.
R24 — 3.3 megohms (in power supply).
R25 — 10,000 ohms.

All resistors composition and 1-watt unless otherwise specified.

L1 — 75 µh. (National AR 16-160C, with 33 turns and center link removed).
L2 — 9 µh. (Millen 43041, with one turn removed and used for leads).
L3, L4, L5 — 3.5 Mc.: CTC LS3-1 Mc. with 95 turns removed.
L6 — 14 Mc.: CTC LS3-10 Mc. with 4 turns removed.
L7 — 21 Mc.: CTC LS3-10 Mc. with 11 turns removed.
L8 — 28 Mc.: CTC LS3-10 Mc. with 14 turns removed.
L9 — 3.5 Mc.: National AR16-40E shunted by 33-µfd. mica, 4-turn link added.
L10 — 7 Mc.: National AR16-20E.
L12 — 21 Mc.: National AR16-10E, 4 turns removed.
L13 — 28 Mc.: National AR16-6E, turns pushed together and 5-turn link added.
L14 — Output cable fitting (Amphenol 83-1R).
RFC1, RFCa — 2.5-mh. r.f. choke.
RFC2 — 75-µh. r.f. choke (National R-33).
Ry — Fast relay (Stevens-Arnold "Milliseck," 18 volts, 1400 ohms).
S1 — S.p.s.t. switch.
S2 — 4-section switch. Each section 2-pole, 5-position.
is tied down fairly well within the shield box. The coils are regular low-power transmitting coils mounted on heavy cone insulators, the tuning condenser is a double-bearing affair, and all leads are made with No. 12 or 14 wire. The tuning condenser was made by cutting a few stator plates out of a single-section condenser, to give a dual condenser of unequal-capacity sections. Two small end brackets that mount the tuning condenser to the chassis also support the padding condensers and the terminal boards that mount the large 0.001-mfd. condensers. The coaxial lines from these 0.001-mfd. condensers run out through rubber grommets, and the only chassis grounds in the oscillator circuits are back at the oscillator tube socket. We reasoned that it would be easier to keep the thing stable if the r.f. didn't wander all over the chassis looking for a way to get back to the oscillator tube. The tuning-condenser rotor is connected to the outer conductor of these coaxial lines and grounds only at the oscillator socket, not within the oscillator compartment. The tuning dial is, of course, insulated from the condenser shaft.

The remainder of the unit is built along the usual lines, with the possible exception of the output stage. At first, bandswitching of the output stage was considered, but we couldn't work out a simple clean-cut way and so had to settle for plug-in coils. The tuning condenser is mounted above the chassis, with the shaft projecting through a clearance hole. A large bakelite pulley on the shaft takes the string drive for controlling the condenser from the front of the panel. The panel control was made from the usual panel shaft assembly, with the string running over two small bakelite idler pulleys. Using string instead of a long extension shaft eliminates one possible source of over-all feed-back and takes up practically no room under the chassis. The two leads from the output plate coil go to the tuning condenser above the chassis, and the ground return from the tuning condenser runs through a ceramic bushing (Millen 32150) in the chassis to the plate blocking condenser. Here again we reasoned that it was better to know where the ground return path was than to depend upon the currents finding their way back to the cathode through multiple paths.

The linear condenser, \( C_{22} \), was made from a length of \( \frac{3}{8} \)-inch diameter copper tubing soldered to a small copper base plate. The inner conductor is supported by a National PRF-1 coil form, which slides over the tubing to a force fit after a little judicious use of steel wool on the end of the tubing. The inner conductor is a piece of \( \frac{3}{8} \)-inch diameter dural rod, tapped at one end and rounded at the other. Anyone unfamiliar with these condensers can refer to page 21 of the April, 1949, issue of QST for a cross-sectional sketch of a similar one. The two cathode pins of the 2E26 are grounded through short copper straps.

The band-change switch, \( S_2 \), is an extra-long one made from normal sections and parts, except for the shaft extension. Since the maximum length available is about 9 inches, we fashioned a longer one from a narrow slice of sheet dural. Although it is a little weaker than we like, it serves the purpose adequately.

**Alignment**

After the tuning range of the oscillator circuit is checked, the exciter is aligned on any band by switching to that band and setting the tuning dial in the center of the range. The fixed-tuned coils are all peaked for this frequency (as indicated by grid current measured across \( R_{15} \), with screen and plate voltage off the 2E26). Then swing the tuning control to one end of the tuning range and peak \( L_4 \), and then shoot down to the other end and peak \( L_3 \) on that frequency. Now as you tune across the range the grid current will vary somewhat (unless you’re very lucky), but with a little judicious juggling you can get the grid current to vary not more than 1½-to-1 over the range. The grid current required is only 2 or 3 ma., and it’s easy to get on the low-frequency ranges. At 28 Mc. you may have to squeeze a little, by peaking the thing for the c.w. (or ‘phone) range only, and the excitation will be down compared with that obtainable on the other bands. This is one of those sad facts of life, but you can still get 12 or 15 watts output from the 2E26.

The final coils at \( L_3 \) are tailored to resonate at the low-frequency end of each band with \( C_{26} \) set at about 90 per cent of maximum. Yes, this is higher \( C \) than we’re used to using at the higher frequencies, but it doesn’t hurt the efficiency noticeably and it makes the thing very easy to load.

And there’s the story. The gadget is ambitious for an inexperienced amateur to tackle, because the accent has been more on ideas than on details. However, it’s a cinch for anyone who has built himself a few multitude gadgets and understands what the circuits are doing, and we think the reward for the work is more than adequate.

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Removing the bottom plate shows the details of the string drive on the output tuning condenser and the arrangement of the components underneath the chassis.

September 1949
On the Air with SINGLE SIDEBAND

The purpose of this column is to report schedules and operating times of active single-sideband stations, describe operating experiences and sometimes the gear in use, and possibly discuss some of the practical operating problems and suggested solutions. Contributions from active single-sideband stations will be welcomed.

That description in last month's QST by W2UNJ of a simple single-sideband exciter should trigger a few more into their first experience with the stuff. It produced many favorable comments of the "Gosh, that looks simple enough for me to build" variety. Better look it up, if you missed it the first time around.

We can point with pride to single-sideband stations in every call area, now that W4OLL is active. "Shy," who is ex-W3SHY and ex-WSSHY, uses a homemade filter rig patterned somewhat after that of W9TQK, except that miniature tubes are used throughout up to the 807 stage. First work was done with the 807 working directly into the antenna on 75, but he now kicks a 100TH to about 250 watts peak. A Super-Pro receiver, with an LM-15 for carrier reinsertion, and a scope for continuous monitoring of peaks and carrier suppression, round out the station. Quoting Shy: "I have had more interest aroused by single sideband than by any other single item in my dozen years in ham radio. I do know that my 250 watts will wade right through the roughest QRM when you have an experienced operator at the other end. My few duplex contacts with W3ASW and W2VVC have proved that."

Speaking of those two 75-meter pioneers in the game, W3ASW and W2VVC completed their 100TH solid duplex QSO back in June. Under severe conditions they occasionally had to revert to the old monologue technique, but that was necessary not more than half a dozen times. They are still working on the problem of reducing the residual stand-by noise (amplified thermal noise and carrier) to the point where their duplexing can be done on frequencies close together. This looks like one of those problems hams may not be able to lick (without going to voice-controlled techniques of some sort), but this writer isn't going to be dumb enough to predict that no one will come up with the answer. Ham radio has made liars out of prophets too many times in the past!

In the DX line, KH6PP is adding a 300-watt amplifier to his rig, and Gene should soon become (Continued on page 102)

A.R.R.L. QSL BUREAU

As a service to American and Canadian amateurs, ARRL maintains a QSL Bureau to make it easy for you to get your cards from foreign stations. Here is how it works: When you work a DX ham, you ask him to QSL via ARRL, then send a stamped, self-addressed stationer's size No. 10 envelope to the QSL manager for your call area, whose address is listed below. When he has an envelope full of cards for you, he drops it in the mail. Upon its receipt, you should immediately send another such envelope so that the QSL manager always has at least one on file for you. If you are one of those rare individuals who doesn't give a hang about the cards, be a good fellow and send along an envelope anyhow. It will help your QSL manager, who performs all the work incident to the bureau on a voluntary basis, to keep his files in order.

If you've had a different call before, send an envelope to the manager for that call area; all cards are routed to the home district as shown in the call. Maybe some of the thousands of uncalled-for cards are for you, even though it may have been a year or more since you've used a previously-held call.

Best bet on handling cards for foreign amateurs is to send them to appropriate bureaus as listed on page 50, June QST.

W1, K1 - Frederick W. Reynolds, W1JNX, 83 Needham St., Dedham, Mass.
W2, K2 - Henry W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.
W3, K3 - Jesse Bieberman, W3KT, Box 34, Philadelphia, Pa.
W4, K4 - Johnny Dorch, W4DFD, 1011 East Cudah Ave., Nashville, Tenn.
W5, K5 - L. W. May, jr., W5AJG, 9428 Hobart St., Dallas 18, Texas
W6, K6 - Horace R. Greer, W6TJ, 414 Fairmount St., Oakland, Calif.
W7, K7 - Frank E. Pratt, W7DXZ, 50235 Ferry St., Tacoma, Wash.
W8, K8 - William B. Davis, W81NF, 4228 W. 217th St., Cleveland 16, Ohio
W9, K9 - John F. Schneider, W9CFT, 311 W. Rose Ave., Wausau, Wis.
W8, K8 - Alva A. Smith, W8DMA, 238 East Main St., Caledonia, Minn.
VE1 - L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
VE2 - Austin A. W. Smith, VE2UU, 3104 Jeanne Mance, Montreal 8, Que.
VE3 - W. Bert Knowles, VE3QB, Lanark, Ont.
VE4 - Len Cuff, VE4LC, 296 Rutland St., St. James, Man.
VE5 - Fred Ward, VE5OP, 3099 Connaught Ave., Moose Jaw, Sask.
VE6 - W. R. Savage, VE6EO, 3291 S. St., North, Lethbridge, Alta.
VE7 - H. H. Hough, VE7HR, 1759 Emerson St., Victoria, B. C.
VE8 - Jack Spall, VE8AS, P. O. Box 298, Whitehorse, Y. T.
KP4 - W. W. Mayer, KP4KD, P. O. Box 1061, San Juan, P. R.
KZ5 - C.Z.A.R.A., Box 407, Balboa, Canal Zone
KH6 - Andy H. Fushikami, KH6BA, 2514 Nanau Dr., Honolulu, T. H.
KL7 - J. W. McKinley, KL7OK, Box 1633, Juneau, Alaska

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The Fourth Inter-American—Region 2 Radio Conferences

BY A. L. BUDLONG,* W1BUD

The Fourth Inter-American Radio Conference was held in Washington, D. C., beginning April 25, 1949, and was concluded 11 weeks later on July 9th, with the formal signing of the documents. Running concurrent with it was the Region 2 Conference provided for under the Atlantic City regulations; the distinction is that whereas the Inter-American Conferences are restricted to the American Republics, Region 2 under Atlantic City also includes foreign possessions, such as the French and British and Dutch colonial possessions, and Greenland. Except for the addition of representatives of these Region 2 nations whenever the conference was in session as a Region 2 affair, the casual bystander would have found himself somewhat confused to know which was which, since the same people were involved in any event and it was only a question of which hat they had on at the time; it may be recorded that the confusion extended at times to the referees! In all, nearly 200 government representatives and industry observers were in attendance at one time or another on behalf of 10 of the American republics plus the colonies of the United Kingdom in this region, Denmark, France, and the Netherlands West Indies and Surinam.

As always seems to be the case at Inter-American conferences, there was a thick sprinkling of amateurs among the official delegations; we had them on the delegations of Argentina, Bolivia, Brazil, Canada, Colombia, Costa Rica, Cuba, Dominican Republic, El Salvador, Nicaragua, Venezuela, and of course the United States of America. As usual, the League was present to represent United States amateur interests, again being the only exclusively-amateur representatives in attendance; with the exception of a few days for necessary attendance at the League’s Board meeting the latter part of May the writer was in daily attendance throughout the entire time of the conference, and for much of the time Senior Assistant Secretary Huntoon was also present. We simply moved down bag and baggage, set up housekeeping in a small apartment which we rented “for the duration.” Daily contact with League Headquarters in West Hartford was arranged via a teletype machine we had in our apartment in Washington; thus we were in touch with Hartford day or night not only in connection with conference progress but in connection with general League matters as well.

As explained in earlier issues of QST,† this conference is another one of a series of American regional radio conferences held within the framework of the International (Atlantic City) Convention which provides for such affairs; its principal purpose in this case was to revise the regional regulations set up at Santiago in 1940, including revision of the Santiago Regional Allocation Table. It should be explained here that in certain parts of the frequency spectrum the na-

† E.g., p. 27, March, 1949.

ARRL was host at a dinner-party June 16th for amateurs on visiting delegations to the conference. Seated, l. to r., H. Melani, HK3CM, chief, Radio Department, Colombian Air Force; Juan A. Autelli, LU9AL, chief of telecommunications, Argentina; A. L. Budlong, W1BUD, ARRL secretary; Ernesto Tro Cabrera, C02DA, radio communications inspector, Cuba; Guillermo Enrique Wenzel, YV5GB, ministry of communications, Venezuela; E. L. Battey, W4IA, ARRL Roanoke Division director. Standing, l. to r., Julio J. Etulain, LU3AF, chief, monitoring stations, Argentina; Arnoldo Vargas V., TT2AW, radio engineer, Costa Rica; Rafael Arias, ministry of communications, Mexico; Capt. Francisco J. Medal, YN1AM, radio inspector, Nicaragua; Egidio H. Luraschi, LU7EX, technical inspector, Argentina; Charles J. Acton, VE3AC, chief of frequency allocations and licenses, Canada; Arturo R. Andrade, YS2AM, telecommunications adviser, El Salvador; Guillermo Morales L., CO2GM, general inspector of radio, Cuba; John Huntoon, W1LVQ, ARRL assistant secretary; A. L. McIntosh, W3ZM, chief, frequency allocation and treaty division, FCC; Gerald Gross, W3GG-HB9IA, secretary, International Telecommunications Union.

* Managing Secretary, ARRL.

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tions of the world take the attitude that the propagation characteristics are such that a worldwide agreement on service allocation is not required, but that instead various regions of the world should be left free to settle on these specific allocations for that region alone. So far as we amateurs are concerned, the 3500-4000 kilocycle band is within these regional allocations; Atlantic City, for instance, indicates that band as being available for either amateur, fixed or mobile services; just as have all the international allocation tables since 1927. The Regional Conference then decides which of these services gets how much of the band. In addition to regional allocation matters, the regional conference also deals with such minor regulatory revisions as may be deemed advisable.

Perhaps it's time now to cut across lots and tell what this conference did as regards us amateurs; after that, we can give the story of how it came about. Turning first to the nonallocation aspects, the new regulations of the Inter-American documents carry an Article 8 entitled "Amateurs" which reads as follows:

A. General

§ 1. Amateur stations shall not render a broadcasting service.

§ 2. The American countries shall make every effort to limit the operations of their amateur stations to the purposes envisaged by the Atlantic City Radio Regulations, and to prevent them from invading the spheres of activity that properly belong to other radio services.

§ 3. Nevertheless, in cases of emergency, amateur stations may temporarily carry out other services of a limited character, in accordance with the internal regulations of each country.

B. Amateur Third-Party Messages

§ 4. The American countries, with the purpose of further improving their close and friendly relations, and when their internal legislation permits, agree to authorize amateur stations in their respective countries and possessions to exchange internationally messages emanating from third parties; provided, however, that such messages shall be of such character that would not normally be sent by any other existing means of telecommunication, and on which no compensation may be directly or indirectly paid.

We won't go into any involved comment on this Article and its provisions except to say that they represent what we in the United States wanted. Actually, this Article brings together in one place in the regulations an assortment of provisions that were contained in previous documents partly in the regulations and partly in appended recommendations, cleans them up from an editorial standpoint, but does nothing to change their intent. It should be recorded here that one provision in Santiago which recommended that a special grade of license be required for operation on 14-megacycle 'phone was deleted in line with the United States recommendation to that effect; not that we contemplate any action here on Class A, but merely that we believe each nation should be free to make its own decision on such a point.

Now for the allocation table. In it, our 80-meter band is shown as follows:

<table>
<thead>
<tr>
<th>Frequency Band and Bandwidth (kc/s)</th>
<th>Allocation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3500-4000</td>
<td>Amateur, fixed and mobile services, except aeronautical mobile (R), will be allowed provided they do not cause harmful interference to the amateur service.</td>
<td></td>
</tr>
</tbody>
</table>

That is the allocation table as it appears for both the Inter-American countries and Region 2. However, you may remember that back in May QST, when we were writing about this conference just in advance of opening, we mentioned that advance indications were that some of the other countries in this region might want to allocate this band to other than amateurs (especially since amateurs of a number of South American countries don't have any particular interest in operating in the band anyway). This turned out to be the case, and while the table reads as shown, the final documents contain reservations to it on the part of Argentina, Brazil, Cuba, France, Mexico and the Colonies of Great Britain, all of whom felt that their national interests would not permit them to go along with an exclusive amateur allocation. The text of these reservations follows:

For the Argentine Republic

The Argentine Republic does not accept the portion of the table of frequency allocations covering the band 3500 to 4000 kc/s, contained in Article 1 of this Agreement, because it is in conflict with the provisions of Articles 4 and 5 of the Radio Regulations (Atlantic City, 1947).

Consequently, it reserves the right to apply the band of 3500-4000 kc/s in the form established by Article 5 of the above-mentioned Regulations, so that no priority is conceded as between the amateur, fixed and mobile, except aeronautical mobile (R) services.

For Brazil

The Brazilian Administration, in view of its necessities, reserves the right to use the band of frequencies between 3500 and 4000 kc/s in accordance with the provisions of Article 5 of the Atlantic City Radio Regulations, which do not establish any priority in regard to that band.

For Cuba

The Delegation of Cuba does not agree to the preference granted to amateurs in the entire 3500-4000 kc/s band, which thereby nullifies the assignments approved in the Radio Regulations of Atlantic City (1947) for fixed and mobile services in this band.

Our country therefore reserves the right to continue using the said band for its amateur, fixed and mobile services without giving preference to any one of these services.

For France

In signing the present instrument, France reserves the right to accept or not to accept the part of the Table of Frequency Allocations (Appendix 3) concerning the 3500-4000 kc/s frequency band, where a priority for the amateur service is established which is in conflict with the provisions of Article 5 of Chapter III of the Atlantic City Radio Regulations, in which the 3500-4000 kc/s frequency band is expressly assigned to the following services: Amateur, fixed and mobile, except aeronautical mobile (R).

For Mexico

Mexico reserves the right to utilize the 3500 to 4000 kc/s

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*QST, Nov., 1947, p. 33.
The Delegation of the Colonies of the United Kingdom of Great Britain and Northern Ireland in Region 2 reserves its position with respect to the allocation of the frequencies between 3500 and 4000 kc/s to the amateur service and considers that in the subdivision 3750 to 4000 kc/s, there should be no priority for the amateur service and any protection from interference should not be unilateral but that protection to the fixed and mobile services should also be established.

In effect, what these countries are saying is that they can't agree to the allocation the way it appears in the table and that they feel that they must reserve the right to put either amateur, fixed or mobile stations in the band so far as they are concerned. Now, this may seem like a reasonably simple matter of the countries concerned attaching such statements to the final documents before they signed them. Actually, the story behind them is the story of what turned out to be the biggest problem before the entire conference, the story of one of the most grueling and difficult struggles and by long odds the toughest individual allocations problem we have faced in any conference in the past decade. The complete story of the amateur matter involves untold hours of argument and special committee meetings, full committee meetings and plenary sessions on the part of dozens of delegates, page on page of minutes, innumerable special meetings of the United States Delegation, lunches, dinners, canceled week-end plans on the part of U. S. government and industry people in order to pitch in and help us, changes in conference schedules, confidential advisory reports at critical times from the League's representatives in Washington to the directors, midnight oil, tele typewriter exchanges by the hour, conferences with General Counsel Segal in Washington and long-distance consultations with the League's President and Vice-President — and cocktails, coffee and aspirin. Briefly, the story is as follows:

When the conference opened on April 25th, the only proposal for 3500-4000 kilocycles was that of the United States, which proposed to allocate it exclusively to amateurs, as heretofore, in this region. In theory, any of the countries attending the conference having comments on the United States proposals, or counterproposals, was supposed to file them with the Secretariat within a few days. Nothing was filed on our 80-meter band, however, so it looked like fairly clear sailing. However, when Committee 4, which had the Inter-American Allocations Table under its wing, got down to this band on May 4th, we ran head-on into a most serious development: when a group of countries and colonies in the Caribbean area, primarily, ganged up on us. It started when the delegation of the Netherlands West Indies read a paper to the effect that amateurs had a total of 3500 kc in the medium and high-frequency parts of the spectrum, 13 Mc. in the v.h.f. portion, four bands to a total of 475 Mc. in the u.h.f. and four bands to a total of 975 in the s.h.f., that amateurs are thus far better off than some of the most essential services such as aeronautical fixed, which have vital need for more channels than are currently available to them in this region, and that it was his opinion that most of our 80-meter band should be made available to the fixed service, with amateurs restricted to not more than 100 kc. He was immediately supported by the representative of the British West Indies, who suggested that the frequencies for amateurs be 3550-3650; the French delegate supported, and in quick succession so did Venezuela, Dominica, and Guatemala. Zowie!

At this point, the U. S. spokesman, Mr. McIntosh (W3ZM), vice-chairman of the U. S. Delegation and chief of the FCC's Frequency Allocation and Treaty Division, made a masterly presentation on behalf of the United States, arguing the absolute need for the entire 500 kc. for amateur use in this country, pointing out that our domestic system of its organized networks, emergency nets, etc., was in this band and stressing the traditional allocation of the band exclusively to the amateur service in this hemisphere. Uruguay gave us strong backing, as did Canada, but a total of some eight countries expressed support of the N.W.I.-B.W.I. position and we had a bad situation on our bands. Eventually, however, it was agreed that those countries who had a point of view other than that represented by the U. S.-Canada-Uruguay position should have a special meeting and come up with something concrete on paper for Committee discussion, whereupon the meeting adjourned.

The special group met on May 5th, the following day, and produced a document which, in effect, split the 80-meter band in half: it gave all three services (amateur, fixed and mobile) use of the band in this hemisphere but gave amateurs

A. L. McIntosh, W3ZM
Vice-Chairman,
Delegation of the U.S.A.

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priority in 3500-3750 kilocycles and the fixed and mobile services priority in 3750-4000 kilocycles; the report was signed by Brazil, Cuba, Honduras, Guatemala, Nicaragua, El Salvador, Panama, the Dominican Republic, Venezuela, N.W.I., B.W.I. and France.

This was a lot better than 100 kc., but obviously was still completely unacceptable to the United States. So, on May 10th when this special report came up for discussion in the main committee, there was a pretty free-for-all all of it. Eventually, however, after Captain Francisco J. Medal (YN1AM), the chairman of the special committee, pointed out that a number of those who had signed it had requested that it be reconsidered, it was voted to send the special report back for reconsideration and to enlarge the group to include any other countries who might be interested. So, on May 11th, we had another special meeting on this matter alone, participated in by nearly everybody at the conference. It was a long, hot and difficult session lasting all day, but eventually it was agreed to withdraw the proposals just outlined and agreement was had to list 3500-4000 as amateur — but with a note which would specify that low-power fixed and mobile operation would be permitted on a noninterference basis for the fixed and mobile services between 3750-4000 kc. (acceptable to the United States since it simply put into different words a privilege which has been available for years). Cuba and Argentina indicated that they would have to abstain from expressing any opinion on this proposal while they wired back home for instructions.

After this, work went ahead on a variety of other matters until June 13th, when the final report of Committee 4 came up for approval, still with the language just outlined so far as 3500-4000 was concerned. When it came to getting final committee approval on that amateur allocation, however, Argentina read a statement which was the same reservation which appears in the final documents. Brazil also entered her reservation at this time as did Cuba, France, Mexico and the British West Indies. The Netherlands West Indies delegate did not enter a reservation but did make a statement which he asked to be attached to the report, which indicated his feeling that the allocation to amateur was not a proper one.

Thus the report of Committee 4 was sent up for final approval of the conference by a full plenary meeting of all delegations. The first opportunity for this came on June 20th, the 7th such plenary meeting during the course of the conference; one of the items for this meeting was the approval of the Committee 4 report. When it came to this report, its chairman, Mr. Arboleda of Colombia (an unusually capable and experienced radio conference expert), asked that consideration of the item of the report dealing with the 3500-4000 kc. band be deferred until last, since continued efforts to eliminate the reservations were still in progress. Subsequently, an unofficial working group was proposed, to go off to one side and meet to see if some solution could be found which would permit elimination of the reservations; this group met under circumstances indicating there was evident desire on the part of everyone to reach a unanimous agreement. However, since it turned out that most of those who had indicated reservations would have to cable back home to their governments for further instructions, it was not possible to come to a solution on the subject and so it was agreed tentatively to approve the report of the Committee with the reservations in it, for the time being. In this process, the United States proposed a revision of the wording in the "note" column to the form in which it finally appears, in an effort to help solve the difficulty (this action had no adverse effect on us amateurs in the United States). It did indeed have some perceptible effect immediately, since with the change the delegate from the Netherlands West Indies indicated he was thereupon able to withdraw his earlier statement from the record, and did so.

A week later, on June 27th, the 8th plenary meeting was held. Committee 4 Chairman Arboleda, noting that no solutions still appeared possible, suggested going ahead with final approval of the report of Committee 4 with the reservations as shown, but with the statement that the door was still left open for possible removal of the reservations if any country found itself able to do so. Immediately following the statement by Mr. Arboleda, the Argentina delegate said he had received instructions which indicated a proposal by her to split the 80-meter band in half, amateurs to have priority from 3500-3750 and the fixed and mobile services priority from 3750-4000. Argentina further stated that if the conference agreed to the suggestion of Mr. Arboleda, Argentina would want to raise the question of an interpretation of the legality of the amateur allocation as it was proposed. But, following this statement by Argentina, the conference finally approved Committee 4's report with the amateur band listed as shown above, and with the reservations included.

For all practical purposes, this concluded the matter except in the very improbable event that some one of the "reserving" countries would still find it possible to take some action to remove its reservation. However, Argentina was still to be reckoned with in the matter of her questioning the legality of the whole business and on July 1st, at the 9th plenary meeting, that country made a determined and detailed case for the legality of the allocation under the Atlantic City provisions for special arrangements, contending that special arrangements (such as this regional allocation) were proper only if all countries party to it were unanimous in agreeing on what was being done.
pointing out that the reservations indicated the agreement was not unanimous, and winding up by requesting the plenary assembly to rule that the 3500-4000 allocation in the table was illegal! Forewarned, the United States and other countries were prepared for this turn of events, and eventually through a series of parliamentary moves which are too involved to go into here, Argentina was voted down. With this action, the show was over, so far as the amateur band was concerned.

This, then, is what we will have when the Inter-American regulations go into effect. At this point it seems important to point out that, except in the case of Argentina, the reserving countries are principally interested in more clearly legalize their present low-power nonamateur operations in our band; the reservations are not an announcement of intention of a mass invasion of our 80-meter territory. In the case of Argentina, it is principally a matter of reserving so that space for fixed service will be available in case the Provisional Frequency Board (now attempting to fit in all the fixed circuits of the world under the Atlantic City regulations) is not able to provide Argentina with what she requires in the way of channels in the Atlantic City fixed-service band. Looking at the results objectively, and particularly in the light of our preconference knowledge of the sentiments of certain countries toward the amateur bands and the declaration of those sentiments in conference meetings, it seems to us that the outcome is to be regarded as satisfactory, from our standpoint. Some of the American countries honestly do not feel they can go along with an exclusive amateur allocation, especially since their amateurs generally don't make use of the band, and since it seems ridiculous to them to have 500 kilocycles of unused frequency when they are, for the most part, invested to have interference from our amateurs nor would cause any to us with the low-power services they want to use -- and have been using, in most cases, for years. Certainly, the allocation as shown, even with the reservations, is preferable to the alternative of an allocation which would show the band available to all three services, and with our taking a reservation on behalf of the United States.

In this recountal of the highlights of the progress of this matter throughout the conference, it has been utterly impossible to credit the long hours of hard work put in by all our friends, both in this country and elsewhere. Let the reader be assured, however, that such cooperative effort did indeed exist -- many of our friends in many delegations throughout the Americas worked untiringly on behalf of the amateur service in this matter. Similarly, we make grateful acknowledgment here to the sterling support we got from every member of the U. S. delegation, government and industry alike. Many of these people gave up their plans for needed week-end rests and devoted themselves to hours of special activity with delegates of other countries to help us out. We owe them all a great debt. It is impossible to mention them all by name, but certainly all will be in agreement in recognizing especially the outstanding work performed in this and all other allocations matters by the United States spokesman, Mr. A. L. McIntosh. Grateful as we must be to him for the tremendous effort he made in our behalf, we can also take pride in the fact that this man's outstanding performance on all allocations matters throughout the conference was the performance of one of our own kind, an American radio amateur.

The effective date of the Inter-American-Region 2 regulations (except the allocation table) will be April 1, 1950, if five ratifications have been received by that time; otherwise, they will be effective 30 days after the deposit of the fifth ratification. The same effective date applies to the allocation table if the new international frequency list now being prepared at Geneva is in effect by that time; if it is not yet in effect, certain portions of the Inter-American allocation table, including our 3500-4000 kc. band, will have to wait international approval of the new frequency list.

The next Inter-American Conference is scheduled to be held in Montevideo, Uruguay, following the Buenos Aires international world radio conference in 1952.

**COMING A.R.R.L. CONVENTIONS**

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<td>September 3rd-4th-5th</td>
<td>Maritime Division, Halifax</td>
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<td>September 17th</td>
<td>New Hampshire State, Manchester</td>
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<td>October 7th-9th</td>
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<td>October 8th-9th</td>
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<td>October 29th-30th</td>
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**FEED-BACK**

With humble apologies, we hasten to correct the diagram of the "Simplified Electronic Key" appearing in the Hints and Kinks section of June QST (p. 124). A connection should have been shown between Pin 8 of the 117NGT and the relay arm shown at the top of the diagram.

An essential ground was omitted from the schematic diagram of the noise generator described in our August issue. Connecting the junction of $C_4$ and $C_5$ to the junction of $C_1$, $C_2$, and $C_3$ would do it.
ENGLAND

In order to arrive at a subdivision of the amateur bands which will guarantee the most effective and enjoyable use of those bands by the greatest number, the Council of the Radio Society of Great Britain is advocating the following voluntary band plan:

3500-3600 — telegraphy only
3600-3635 — telephony only
3635-3800 — telephony only
7000-7050 — telegraphy only
7050-7300 — telegraphy and telephony
14,000-14,150 — telegraphy only
14,150-14,400 — telegraphy and telephony
28,000-28,200 — telegraphy only
28,200-30,000 — telegraphy and telephony

It is the hope of the R.S.G.B. that this band plan will be adhered to not only by amateurs in the United Kingdom but also by amateurs in other countries which do not have band subdivisions determined by national regulation. The R.S.G.B. emphasizes that these are not intended as irksome restrictions. This band plan, backed by a majority of the U.K. amateurs, was devised only in an attempt to promote a more effective all-around use of the amateur bands.

The plan listed above will remain in force until the Atlantic City allocations become effective. The R.S.G.B. suggests the following band plan for use after that date:

3500-3600 — telegraphy only
3600-3800 — telephony only
7000-7150 — telephony only
14,000-14,100 — telegraphy only
14,150-14,350 — telegraphy and telephony
21,000-21,150 — telegraphy only
21,150-21,450 — telegraphy and telephony
28,000-28,200 — telegraphy only
28,200-28,700 — telegraphy and telephony

INDIA

The Amateur Radio Club of India is sponsoring a DX contest which will extend over the week ends of September 17th and 24th. The contest is open only to amateurs in countries which lie between Longitudes 10° E and 180° E, or roughly those countries between New Zealand and South Africa in the south and Eastern Europe to Japan in the north.

GERMANY

Amateur radio in Germany continues to flourish. Besides those stations licensed to personnel of the occupying powers (DL2, DL4, DL5), the German nationals have now been licensed, with call signs currently in use including DL1, DL3, and DL7. The DL7 stations are in the Berlin sector. QSLs are to be sent via D.A.R.C., P. O. Box 99, Munich 27, Germany.

QSL BUREAUS

Changes and additions to the last complete listing, in June QST:

Bahamas: C. N. Albury, Telecommunications Dept., Nassau
East Africa: P. O. Box 1313, Nairobi, Kenya Colony
Finland: OH2NT, Kasarminkatu 25 C 12, Helsinki

WEA

Word comes from the Radio Society of East Africa that special East African awards are now being issued, awards that will require considerable skill and perseverance. Annual certificates will be given to any amateur who proves contact with one VQ3 plus one VQ5 plus three VQ4 stations in any one calendar year, with no restriction as to mode or band. Each certificate will be in the form of a special souvenir card bearing a large photograph of some interesting aspect of East Africa, with the photograph being changed each year. Possession of five of these Annual Certificates, together with proof of contact with one VQ1 station, will entitle the holder to the WEA (Worked East Africa) award. It is expected that the WEA will be a very special trophy.

(Continued on page 106)

This is the impressive layout at XE11Q, station of Delfino Arriaga y Vargas. Push-pull 250T1As comprise the final stage, modulated by a pair of 810s.

QST for
15th ARRL DX Contest

Part I: Final Results — C.W. Section

The results of both the c.w. and the 'phone sections of the annual ARRL DX Contest are usually published in November QST, after the long and arduous task of checking logs and compiling scores has been completed. In order to bring you the results sooner this year we decided to break the final report of the 1949 contest into two parts, the first giving the c.w. scores and the second the 'phone highlights and final scores. The target for the first part was this issue (copy for which is due in July, contrary to a popular impression that QST is published like a newspaper, with the deadline scheduled just prior to the time copies begin to come off the presses! — Ed.). The use by many contestants of the new optional W/VE log form shown in February QST aided materially in allowing us to finish the checking in time to hit the target, in spite of the 17.3% increase in c.w. participation over the 1948 contest; it is planned to make this new form the official one for use by all U. S. and Canadian entrants next year. Photographs of high-scoring participants are en route, and October QST will show shots of the leading c.w. and 'phone performers as well as the official 'phone results.

Award Winners

The leading c.w. operator in each ARRL Mainland section and in each country from which qualifying entries were received will receive a bronze medallion engraved with his call. C.w. entries numbered 1200, 858 W/VE and 342 foreign. Awards are being made to 66 contestants in the W/VE area and to 82 participants outside the U. S. and Canada. The calls of recipients are shown in an accompanying tabulation of scores. It took much stamina and operating skill to come out a winner in such a fiercely competitive DX activity. The League extends heartiest congratulations to each winner.

Highlights

Among the top-flight W/VE operator scores, that of W8BHW was the most outstanding. Always a dangerous threat in any DX contest, Lindy stepped out way ahead of the field in this one and scored 390,450 points from 475 contacts and a multiplier of 274. W8BHW's total operating time was 87 hours, and different countries worked totaled 113! Lindy has set a mark that presents a real challenge to contestants in the 1950 DX fray!

Plunging into the contest on an all-out basis, W2IOP, well-known for his exploits in domestic contests, logged the second-highest W/VE score. In bringing new fame to himself as a DX contest operator, Larry out-DXed many of the best operators in the business! A contact total of 483 and multiplier of 257 netted W2IOP 368,538 points during 90 hours of operation.

Another specialist in contests of domestic scope, W4KFC, was next in line with 365,160 points, 479 contacts, 255 multiplier. Looking over the results of the last two DX contests, we note that Vic's sights have been set higher each year. Apparently he brought out the long-range heavy artillery this year!


The highest score submitted by contestants outside the United States and Canada was that of XF1A. Juan topped his terrific performance of last year, made 3051 contacts and a multiplier of 87 for a grand total of 796,311 points. XF1A worked all bands, 3.5-28 Mc, and came within 3 points of a perfect multiplier.

Credit for the second-highest foreign score, 498,840, goes to CM9AB, who chalked up 2060 contacts and a multiplier of 80. Following closely behind in third place, KV4AA tallied 2085 contacts and a multiplier of 79 to score 491,222.

Other scores deserving of special mention:

September 1949
The determination of standings in the club competition must await the withdrawal of the phone checking detail. A tabulation showing club results will appear next month along with the final results of the phone section.

### C.W. SCORES

#### Fifteenth International DX Competition

Operator of the station listed first in each section and country is winner for that award, unless otherwise indicated. Asterisks denote stations not entered in contest, reporting to assure credit for stations worked. The multiplier used by each station in determining score is given with the score—in the case of W/VE entrants this is the total of the countries worked on each frequency band used; in the case of non-W/VE participants it is the total of the W/VE districts worked on each frequency band. The number of contacts established is next listed.

The letters A, B, and C approximate the input to the total of the phone input to each station and in the last figure following the score. Example of listings: W3BES 340,860-247-462-C-80, or final score 340,860; multiplier 247; 462 contacts; power over 500 watts; total operating time 80 hours.

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**C.W. Scores**

#### Fifteenth International DX Competition

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*Operated by W2QCM.*
# NORTHWESTERN DIVISION

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<tr>
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# SOUTHWESTERN DIVISION

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# SOUTHEASTERN DIVISION

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# CANADA

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# South Pacific

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# South Asia

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(Continued on page 106)
How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

A comparison of the speeds in DX communications of prewar and postwar operating reveals a concerted movement toward QRQ. Radiotelephony and radiotelegraphy DX work are now carried on with a savoir-faire formerly found exclusively among the traffic nets on the lower frequencies. Where a smoothly-handled straight key used to be sufficient to match the speed of almost any c.w. DX operator, a well-oiled bug on the operating table is virtually a necessity today.

One of the results of this upswing of general operating proficiency in the c.w. field is the increased use of break-in procedure by DX stations, rare or otherwise. And especially is this true of contest operation.

The desirability of fast break-in for c.w. work is not to be denied; nevertheless, there are limiting factors present in its application to DX work. One of these has been the cause of considerable confusion in recent months.

Specifically, when a DX station using break-in is being called close to his frequency by many Ws it is important that the call of the station he elects to work be sufficiently identified. Coincidental “BKs” may easily lead several callers to believe they have “raised” the DX station. Continued coinciding “BKs” may even mean logging of the same QSO by stations other than the one actually contacted, particularly when a short exchange of serial numbers is involved.

Hence, we recommend to all DX operators who use break-in: Use your own call as sparingly as you wish but try to keep stations who are calling you informed as to whom you are actually working. This may involve repeating the other fellow’s call several times during the QSO but it will greatly minimize the difficulty outlined in the preceding paragraph.

Enough gasbagging. Let’s get down to cases.

What:

While at the very ebb of the slow seas-on, there are still guys putting DX into the log on eighty and forty. W2CWW thumbed through the atmospherics for LU7AZ (3520) and PY7WS (3022) and Europeans have peeped through to the East Coast on occasions. VP5BD (see below) and VK9NR are reported preparing for 3.5-Mc. work.

If all the fellows who found a new country in VP5BD (7295), of the Caymans, were laid end to end the light companies would go bankrupt. W4BPD was the early bird for this deal and took on quite a job in handling the first influx of QSLs bound for the gentleman. Gene mentions the work of a small group of W DXers who have tagged themselves “DX Anonymous,” dedicated to the task of promoting activity among the more scarce prefixes. FG8 and FY8 prospects are now being given attention. Also notable regarding VP5BD is the number of strictly-20 DX men who found themselves groping about in the dark in order to raise a 7-Mc. antenna for the job as quickly as possible. W6ZGY hasn’t found pickings too slim, what with KP6AE (7040), UA8BJ (7050), UA8KFD (7050), JA2BQ (7042), ZS9E (7032), VR2AS (7054), HC7ED (7126) and VE2NQ (7038).... The last mentioned was also snagged by W21WLP along with EA7LU (7003), VP4TAQ (7000) and numerous VK/ZLs. Clark’s schedules with ZLs 2ACV and 4PT continued solid throughout the summer months. W0EDT found PY7WS “way up” on 7220 kc. plus YY1AX (7085), while W1QMJ nailed W20XE/MM (7101) of the MacMillan Expedition, QG8RA and YU1WEZ. UA8PK (7040), UA5JL (7055), JA5AM (7008) and G8KJF look nice in W7MGO’s log and W7MQY adds LU8AE (7080) and ship SMS8L (7032).

Twenty appears more like its old self with W4BPD back in business. Gus never does things halfway, having just completed rebuilding to the tune of six separate Clapp oscillator exciters, one for each and every DX band. He broke the set-up in on chaps like EA6BG (14,147) in the Balkarios (we hope), ZPBBL (14,026), SV6AA, SW3WW (14,040), E21AU (14,052), VKVU (14,045), ZA1B (14,050), ZK2A (14,125), YK1AC (14,050), CR6AD (14,050), UMI5AA (14,015), STZD (14,055), EK3AK, W6CRB/KC5 (14,050) on Ponape, MI3GB (14,050) and EASM (14,110 47).... The Fours seem to thrive in the hot and humid season. W4FVR popped up with some doozies: UL7AB (14,070), MD4EC (14,090), MS4AUU (14,100), ZA2AL (14,110), VK1RA (14,060), VK5ML (14,050), VR2BH (14,030), VSIDA (14,090), VS7R RA and RF (14,070), VS8BU (14,060) in Aden, MP4BAD (14,050) in Oman, Z5JR (14,075), KS6DI (14,080), KB8NE (14,055), FFBG (14,125), TAIAT (14,100), EA5AL (14,005), OY3IGO (14,080), EK1KO (14,070), SV9AJ (14,030),

* DX Editor, QST. Please mail reports of DX activity to W9BRD’s home QTH: 1517 Fargo Ave., Chicago 26, Ill.

September 1949
Among the cream of the African crop is J. G. D. "Johnny" Leask of ZS8A. The snap shows his neat set-up at Quthing, Basutoland. Perhaps you worked him when he was ZS4P.

not least, MD7WE (14,030) on Cyprus. . . . . The potent pipequeah himself, W2QHH, got on in IIALU/MJ and ILT/TM (14.070), W5EGX/KW6 (14.060), W6BKV/KW6 (14.057), VP5GC (14.030), W2CSCD (14.116), F5SAB (14.005), GC2ZT (14.104), FOSAC (14.050), and some OEs ....... K2BG got only as far as a 6L6 buffer while constructing a new rock-crusher because he had so much fun with law cases in the Hiqu for a hit, W2TXB raised some thirty countries with 15 watts. So QRO ia

Where:

Proceeding according to plan, the II boys were really dishling out the portable-San Marino QSOs during July. Cards for these contacts should be sent in at the close of the session, the AR. . . . . When a call appears in these lists for the second time (or third, etc.) it is indicative of either a changed or a more correctly-worded QTH. Moral: Always use the address last appearing for a given station.

C1JH
C8AJ
DK8AU
DL2NU
E8ABB
HAPA
H1BNV
H1BNV
H1BNV
ex-2WZAAG
KB6AJ
KX6BI
MD2NA
MD4GC
MP4AD
O1E1G5
O1E3LN
O1E3GB
O1Q5GD
P1J5KO
PK6s CS, QN, XG
SV1AE
C4
drcott, Top Floor, 11 Tung Lo
Wan Rd., Hong Kong
P.O. Box 19, Canton, China
(via DL1RK)
(via RSGB)
Radio Coloniale, Dakar, F.W.A.
(via FM8AA)
B. W. I.
1950th AACS Rqdn., APO
Wan Rd., Hong Kong
PM, N. Y. C.
(via RSGB)
(via W2NFR)
(via RSGB)
(via OQ5RA)
(via AR7L)
(via W6ZEN)
\%
P. O. Box 19, Canton, China
\%
P. O. Box 19, Canton, China
\%
2272 E. 9th St., Brooklyn, N. Y.
B. Tremel, via Giulia 98, Trieste, F.T.T.
G. Giro, via Ghega 3, Trieste, F.T.T.
G. Metelli, via del Bosco 32, Trieste, F.T.T.
1272 E. 9th St., Brooklyn, N. Y.
\%
C4
c. w. for the W/VE mob to watch for
\%
Where:

Where:

When things do open up in the north . . . . W2QHH keeps an ear on the band in fair weather or foul and appropriated ZD2FB (28.071) on c. w.

conditions on ten have been mighty morbid. The southern latitudes have fared better as HC2JR has the following phones crossed off: KX6AK (29,003), ES4AI (27,346), AG5WM (29,449), AP2F (28,320), ARAB (28,394), EJ1WX (28,323), ELZA (28,237), FASINH (28,308), F88F8 (28,423), MBDM (28,002), M2TFU (28,318), ZB1AM (28.201), ZB2E (28,171), ZDAX (28,350), CN8E (28,320), QO5SL (28,147), ZD2TX (28,290), V4SAC (28,174), VQ5SPB (28,350) and W0CVH/K6J (29,490).

Anyway, there are a few for the W/VE mob to watch for when things do open up in the north — W2QHH keeps an ear on the band in fair weather or foul and appropriated ZD2FB (28.071) on c. w.

Sound. Two conditions on ten have been mighty morbid. The southern latitudes have fared better as HC2JR has the following phones crossed off: KX6AK (29,003), ES4AI (27,346), AG5WM (29,449), AP2F (28,320), ARAB (28,394), EJ1WX (28,323), ELZA (28,237), FASINH (28,308), F88F8 (28,423), MBDM (28,002), M2TFU (28,318), ZB1AM (28,201), ZB2E (28,171), ZDAX (28,350), CN8E (28,320), QO5SL (28,147), ZD2TX (28,290), V4SAC (28,174), VQ5SPB (28,350) and W0CVH/K6J (29,490).

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Anyway, there are a few for the W/VE mob to watch for when things do open up in the north — W2QHH keeps an ear on the band in fair weather or foul and appropriated ZD2FB (28.071) on c. w.
You may remember AG2AB better as old XAF(). Here's the gear at AG2AB, operated by Capt. Walter White, USA, in the Trieste uplands overlooking the sunny Adriatic. AG2AB concentrates on 28 Mc. 'phone.

September 1949
Vertical Beams on 14 Mc.

BY A. D. MAYO, * W5DF

For a long time I have wondered why we do not use vertical antennas on 20 and 40 meters, particularly in view of their apparent superiority in the matter of securing low-angle radiation for DX. The handbooks indicate that higher "losses" will be encountered on 20 meters with a vertical dipole than with a horizontal one, although I have found no clear explanation. There are data to show that poor grounds result in a reduction in the intensity of extreme low-angle radiation from the vertical, but according to various curves available the vertical should still be superior to the horizontal.1

From the standpoint of construction, verticals can certainly be built more easily and cheaply, and they take up less ground space. Only one pole is required for a 20-meter dipole. My first antenna consisted of an 18-foot surplus whip antenna mounted on top of an 18-foot 4 by 4. The pole was set 3 feet in the ground, with the aid of a borrowed post-hole digger. The operation took about 30 minutes, and the pole only cost $2.62, delivered.

Another type of construction is to clamp a 10- to 16-foot length of dural or steel tubing or conduit to the side of the pole, using two stand-off insulators, and dropping a wire down the pole from the bottom of the self-supporting section.

The whip was used on 40 and 20 meters by connecting it as in Fig. 1. A wire from the bottom of the whip dropped down to the base of the pole, to complete the antenna. A ground connection was used instead of a counterpoise only because it wasn't convenient to install the latter.

With 50 watts on 40 c.w., signals were very good up to 2000 miles, although no direct comparisons were made with a horizontal antenna. On 20 c.w., with 130 watts input, 51 countries were worked in about 3 months.

1 In theory the vertical should be better for DX work in cases where very low angles are utilized (long-haul work). In practice, such differences as there are seem to favor the horizontal. Experimenting on commercial circuits some years ago (Bruce, Proc. I.R.E., Aug., 1931; Carter, Hansell and Lindenblad, Proc. I.R.E., Oct., 1931) seemed to show that, while there frequently was little or no choice between the two, waves reflected from the ionosphere tend to be more horizontally- than vertically-polarized, regardless of the polarization of the transmitting antenna. Thus the vertical might tend to be a slightly poorer receiving antenna on long-haul work. However, many times a vertical antenna without excessive ground losses might be better for transmitting over long paths. Because the best vertical angle varies from time to time over any long path, it is unlikely that any one type of antenna will always outperform another under all conditions, if the gains are comparable but the vertical angles are different. — Ed.

A Vertical Beam

Back in February a second vertical antenna was installed 7 feet from the first and adjusted as a parasitic reflector or director. A parallel-tuned circuit for adjusting the parasitic element was installed at the base. A relay is there now, with a second parallel condenser that can be cut in by energizing the relay. This allows remote changing of the parasitic element from a director to a reflector, and gives a choice of pointing the system toward Europe or New Zealand.

With the transmitter running 275 watts input, this little beam (which cost only $10.00) puts a consistent signal into Europe. It was found that several Europeans can be worked at a sitting, any time they are coming through. The average report runs around 569. This has been found to run about one S point less than W5EGK gets with a 3-element beam and 700 watts, on direct comparison at the same DX station. It is also about one S point less than W5CKY gets with a horizontal full-wave antenna, with a lobe toward Europe and a rig running 1 kilowatt. From these rough
checks, it would appear that the one S-point difference could be attributed to the other stations' higher powers and that the beam is performing creditably.

Changing the Directivity

The patterns obtained on the ground with a field-strength meter agree reasonably well with theory, although there is some distortion from near-by drain pipes and metal clothes poles. However, an interesting phenomenon was noticed that might prove useful in receiving. There are two nulls that can be shifted through 180 degrees, until they meet in front or in back. The position of these nulls is determined by the tuning of the parasitic element, and they will practically wipe out an S9 signal, with little effect on signals from other directions. The effect is shown in Fig. 2. I first noticed it when a strong ZL signal came through one afternoon during the DX Contest. With the receiver set on him, I ran a head-phone extension line out to the base of the antenna. By merely tuning the condenser on the parasitic element, it was possible to knock out any particular one of the many stations that were calling the DX, without any apparent effect on the others. In this case they happened to be calling from enough different directions to demonstrate the possibilities. I have considered remote tuning of the condenser on the parasitic element, through a pair of Selsyns. It should permit rejection of an interfering signal on the same frequency as a piece of DX, if they are not both on exactly the same bearing.

Tuning the Elements

The tuning units for the antenna and parasitic are mounted at the base of each support in old coffee cans to protect the components from the weather. The size of coil conductor and the spacing of the tuning condenser will depend upon the power used, but receiving-type condensers are satisfactory for the parasitic element. Of course, the parasitic element could be cut to the right length and left that way, but this would eliminate the simple reversing procedure and the possibility of "steering" the antenna system. If the element length is close to correct, the tuned circuit should be one that will resonate to 14 Mc.

In tuning the driven element, the tuned circuit was resonated by exciting the entire system from another antenna and tuning the condenser for maximum indication of r.f. in the tuned circuit. A neon bulb or spark with a sharp pencil will be sufficient. The coaxial line is then tapped up on the coil until the thing loads well at the transmitter. Finally, the current is measured at both ends of the coaxial line and the tap adjusted further, until the current readings are practically the same. Since the coaxial line is 55 feet long (1.2 wavelengths), it was assumed that any high standing-wave ratio would have shown up as a difference in these current readings.

A 3-element beam was built, on a South America-Asia line, and it worked into Asia quite well. This beam was spaced 0.6 wavelength from the other, and it was planned to include provision for feeding the driven elements of both antennas in phase, to give a third antenna system working broadside along another bearing. However, I never got around to installing the relays for direction changing and, since the Js came through at an inconvenient hour, the feed line was put back on the European beam. Moreover, the area around the Asia beam grew up into a jungle and is reported to be full of snakes. The XYL had a flower garden in that area last year and would occasionally come running into the house screaming that she had dug up a baby adder, but I never did see any. Thus, while nothing can be told now about the results of combining the two beams, the dope is passed along for anyone who wants to start thinking along the same lines.

The 33-foot elements fed at the bottom are not very useful on 28 Mc., since the main lobe shoots up at too high an angle, according to the book. According to results on the band, the book is right, because no DX was worked when the antenna was tried.
New National Traffic Plan

ARRL Maps New Traffic Organization for All Amateurs

BY GEORGE HART,* WINJM

Amateur traffic handling, for those amateurs not interested in big-time operations, has gotten to be a complicated business. The casual trafficker who originates a message now and then often does not know what to do with it, how to send it on its way. He might get results by a directional CQ on 80 or, if he knows a little about net procedure, he might report into his section's traffic net, if his section has one, and, if he is lucky, he might find someone willing to take it off his hands. Then, again if he is lucky, that someone may put it onto the proper net or trunk line which will send it speedily to its destination.

Too often, he is not lucky. The message shuttles back and forth for days until it gets into the hands of someone who has the necessary connections, and by that time it is so old that it is a discredic to amateure traffic handling.

The big nets, with their skilled operating personnel, are functioning as efficiently as ever—perhaps more so, under modern network operating procedures. They specialize in handling traffic in bulk, especially from fairs, expositions and hobby shows. Their coverage in most cases extends wherever they can find a skilled operator to provide it. Many of them tie into sections with live-wire traffic organizations for local traffic distribution. Most of them look with disfavor, and understandably so, at unskilled operators who try to "report in" to their nets, with or without traffic, and who through lack of net "savvy" slow down a hustling traffic team.

Needless to say, many of the skilled operators on these nets also work into their section traffic nets, providing traffic outlets to certain points. But confusion often reigns supreme in the small section net for this very reason. The net control station (NCS) is supposed to know that W4XXX takes traffic for Georgia and Alabama, but not for Florida, and that W4YYY handles all Midwestern traffic except Texas, which is handled by W4ZZZ. The NCS must not only know how properly to direct a net, but he must have had experience with this particular net so that he knows what's what, who's who, and who takes what traffic for where. How much easier it would be if all the traffic going outside the section could be cleared to one (or more, if traffic is heavy) station designated for that job! If that could be done, then the NCS would have only

* Assistant Communications Manager, C. W.

- Existing nets can continue unaffected.
- Plan gives potential tie between each section net.
- Adoption of plan contingent on your support.
- All amateurs asked to send comments and suggestions after a trial.

his own section and net protocol to worry about—which is enough.

During 1948, practically every section in the ARRL field organization had a net of some kind going, and 47 sections had nets devoted exclusively to traffic handling. If, in each section net, a certain station (or stations) was designated to take all traffic going outside the section, this station then to report into a later net having greater coverage, and the same procedure repeated funneling into still greater coverage areas, we would have a traffic organization of national scope capable of handling traffic to (and from) any point in the entire field organization, which includes the entire United States, most of its Possessions and most of Canada.

This, in briefest outline, is the essence of the ARRL National Traffic Plan. It takes the already-existing section net as a unit and makes two larger unit categories which are called "regional" and "area" nets. Each regional net covers a certain number of section nets (normally those within a certain call area), and each area net covers a certain number of regional nets (normally those within a time zone). The area nets, of which there are four (one for each time zone), pass traffic around among themselves, and it then comes back down through regional and section nets again in the same evening. This requires organization and teamwork of no small dimensions, but it will work if we get together on it and push.

The casual amateur who has a message can put it into his section net and then forget about it, and the traffic-handler who has only a limited time available can devote an occasional evening, or any part of one, to handling traffic without committing himself to regular schedules. The regulars, the topnotch traffic-handlers who are able and willing to devote much of their operating time to traffic, will assume the managership jobs of the various networks involved.

50 QST for
Time relationship of the various net meetings. Note that while all nets in the same category meet at the same time by their clocks, they are actually spread over a three-hour period as shown in the GCT column. Dotted lines indicate representation of area nets in other area nets to the west of them.

Because of space limitations, it is not possible to describe the operation of the National Traffic Plan here in detail; complete details are available in mimeographed form upon request of any amateur interested. All we can cover here are general principles of the plan’s operation, and these are somewhat evident from the diagram.

Note that all nets in a certain category (e.g., section nets) meet at the same time by their clocks, but that actually nets in the Eastern Time Zone (EST) meet one hour earlier than those in the Central Time Zone (CST), two hours earlier than those in the Mountain Time Zone (MST) and three hours earlier than those in the Pacific Time Zone (PST). Thus, when the Eastern section nets are cleaning up the last of their traffic in the late section net meetings, the Pacific section nets are just getting started on theirs. This difference in time is like a current flowing from east to west: traffic going in that direction can just coast along with the current, while traffic from west to east must buck the current. It is therefore necessary to have some long-haul circuits by means of which traffic from the West Coast can reach the East Coast the same night, and this is the primary purpose of the “cumulative representation” of area nets from east to west. A direct outlet to the Eastern area must be available in the Central area net; direct outlets to both Central and Eastern areas must be available in the Mountain area net; and direct outlets to all three of the other areas must be available in the Pacific area net. The effect of this is that the Pacific area net, which meets at 2030 PST (2330 EST), is of national scope in which traffic routing is available to and from all parts of the ARRL field organization.

The sequence of net meetings in each area, as shown in the diagram, is important. Regional and area nets automatically fit into this pattern. Section nets are requested to cooperate to the best of their ability. At 1900 local time, section nets will meet and one station will be designated to clear all traffic going outside the section. This station will then report into the regional net at 1945. In the regional net, one of the participating stations will be designated to take all traffic for points outside the region, and he will then report into the area net at 2030. Then at 2115 the re-

(Continued on page 96)
"EUREKA! The short waves at last!" QST for September, 1924, enthusiastically proclaims the establishment of new short-wave bands for amateurs—75 to 80 meters, 40 to 43 meters, 20 to 22 meters, and 4 to 5 meters. In addition, we'll hold our older 150- to 200-meter band, with 'phone privileges. Worked out in close cooperation with ARRL, the new Department of Commerce regulations are expected to stimulate wholesale rebuilding of our stations. Technical Editor S. Kruse has anticipated this and has lost no time in getting full design and constructional data on short-wave receivers, transmitters, measuring equipment, and antennas into this issue. "Make a wavemeter first" is "LQ's" sage advice.

The oratory of the presidential candidates is being carried far and wide this year, via the radiophones, and the amateur with time for national politics will be interested in Frank H. Jones' method of revamping a neon tube to tune down to 100 meters. Mr. Jones, Cuban 6KW, receives KDKA and WGY regularly on this wave. . . . ARRL is participating in antenna tests being conducted at the elaborate amateur station of SAQO, Cazenovia, N. Y. Grounds, counterpoises, antenna lengths and insulation are the factors under investigation. . . . A 5-watt transmitter costing twenty-five dollars is described by Department Editor H. F. Mason. The rig is built around a Rolls Royce type 202 tube.

The first ARRL Board of Directors to be elected under our new Constitution has held its initial meeting, in Hartford. Photographed hard at work on League business are H. L. Reid, alternate for Dir. Dobbs, Southeastern Division; Dir. Gravely, Roanoke; Vice-President Stewart; Dir. Corlett, West Gulf; Dir. Pinney, New England; Dir. Laizuwe, Midwest; Dir. Bidwell, Atlantic; Dir. Jansky, Dakota; Dir. Weingarten, Northwestern; Dir. Segal, Rocky Mountain; Traffic Manager Schnell; President Maxim; Secretary Warner; Dir. Painter, Delta; Dir. Darr, Central, and Treasurer Hebert. Canadian General Manager Russell and Pacific Director Babcock also attended the meeting.

Gleanings: Howard S. Pyle, 8FT, recommends the use of red and black colors on our DX report cards so they will stand out in station photos. . . . The ARRL Board has approved, with reservations, use of Esperanto as an official international radio language. . . . Humor of the times: First Ham: "Know who the first c.w. export was?" Second Ham: "Yeah! Noah! He built the first arc!"

Fall V.H.F. QSO Party

September 24th-25th —
Certificates for Leaders

The League announces an early fall V.H.F. Party as a chance for all v.h.f. operators to try for new QSOs and DX. This is an invitation to all amateurs who can work any or all v.h.f. bands (50 Mc. or above) to use 'phone, m.c.w., or c.w. between 2 P.M. local standard time (EST, CST, MST, PST) Saturday, September 24th, and midnight local standard time Sunday, September 25th. See what new stations and states can be worked. Try out your new antennas and gear. Don't miss this. Mark your calendar today and see where your signals will land in a period in which you are assured that the v.h.f. brotherhood all over the land is in there listening for you.

How To Take Part

Call "CQ contest" to get in touch with other contestants. When using c.w. or m.c.w., call "CQ." Exchanging signal-strength and readability reports is suggested but not required. When you work another v.h.f. amateur, you must give him the name of your ARRL section. Page 6 of this issue is a register of the League field-organization set-up, and serves as a convenient section check-off list. ARRL staff members are not eligible for awards. You compete only with amateurs in your own ARRL section for the certificate award.

Count 1 point for successfully-confirmed two-way exchanges of section information on 2 or 6 meters. A one-way exchange does not count. When two-way exchanges are accomplished with your transmitter on the 220-, 420-, 1215-Mc. or higher bands, you may record 5 points per QSO.

Multiplier

The sum of station points earned is multiplied by a section multiplier. Each time a new section is worked two-way it adds one to the multiplier. The multiplier grows by one if you rework this same section on another band. (Scoring differs in this respect from other ARRL competitions to encourage everyone to make use of as many v.h.f. bands as possible.) A simple tabulation with points and section list is all that is required. A card to Headquarters will bring the simple form on which to report; or your own similar tabulation will be accepted.

Rules

1) Name-of-section exchanges must be acknowledged by both operators before either may claim the point(s).
2) All claimed contacts must fall in the contest period and must be on authorized amateur frequencies above 50

(Continued on page 112)
RECORDS — RECORDS — RECORDS! After coasting along for nearly two years without alteration, our records box this month sports new DX records for 144, 220, 420 and 1215 Mc. And if all the 2-meter records that have been held since the last issue went to press were to be carried in the box it would have to be doubled in size.

When W3GV and W0WGZ worked on 144 Mc. in September, 1947, they hung up a real mark for the gang to shoot at. Their contact was no fluke: it combined everything — good locations, excellent antennas, well-equipped stations, operating savvy, and the best propagation of the year. It was the culmination of a period of rapid development on 144 Mc. when our records for two-way work stretched from 145 miles in 1946 to 660 miles a little more than a year later. From then to the present, gear used on 2 meters has continued to improve and the extent of activity, long a limiting factor, has expanded until there are now progressive stations in almost every section of the country.

There were several near misses meanwhile. In May, 1948, W2TDW/4, operating from Clingman's Dome, near the Tennessee-North Carolina border, worked W2RH, Port Chester, N. Y., for an almost exact duplicate of the existing record. As reported last month, the 1949 sharpshooting at the record started off with a contact between W5TJ, Jackson, Miss., and W9NFM, Solon, Iowa. This was another case of close duplication of the previous accomplishments for distance, but it was an important milestone: the first north-south work over anything like the record distance.

Then, on July 10th, things started to happen again, with W3s, 8s, 9s and 12s cracking the 600-mile mark. W3GKP, Silver Spring, Md., worked W9TKL, Waukegan, Ill., 610 miles, and W3AIR, Glenmont, Md., worked W9TKL and W9JIL, Plainfield, Ill., soon after, for an additional 10 miles or so. W8WSE, Garfield Heights, Ohio, worked W9s NFM, DEN, BZE and HQA, the last being about 620 miles. W7ZJB, Gashland, Mo., was hearing W8s UKS, WJC and BFQ for two hours. Then when he got his rig going the W8s heard him working W9s, and called without response. Vince's antenna relay wasn't making contact on receive. Result: a 700-mile record missed!

*V.H.F. Editor, QST.

The following night the band was open across the Alleghenies, and the W1s and 2s had their innings. It was one of those rare openings between W1 and W8 (it had happened only once before) and Easterners who had horizontal arrays cashed in. It started with W2BAV working W8s UKS, RS and UB, to alert the W1s. W8UKS began to come through at W1HDQ in bursts during his contact with W2BAV, but the first New England contact went to W1PIV, East Freetown, Mass. Your conductor caught him right after, and worked W3RUE, Pittsburgh, briefly at the same time. W8WJC was next worked by the writer, and W1BCN and W1MNF, far out on Cape Cod, caught one or more of the 8s, for the best DX of the evening, approximately 600 miles. W2BAV was reported heard S5 in the Chicago area and W2NLY heard W9PM. A lot of interesting DX, and plenty of new states all around, but, no new records!

The record breaking remained for the small hours of the 23rd. From late evening on the 2-meter band was crammed with signals all over the Middle West, and many contacts were made at
distances up to the existing record. Then W8WJC, Everett, Ohio, worked W0BIP, Elliott, Iowa, and the race was on, the record jumping past the 700-mile mark with this contact. Next in line was W8UKS, Burton, Ohio, extending it to about 720 miles. By this time almost everyone in the region from Pittsburgh to Toronto was after W0BIP, but the lucky man was W3CUM, Butler, Penna., who caught him after W8UKS, for the best DX reported for the opening, about 800 miles. This is not yet confirmed by calculation, but is listed tentatively from map measurement, until more exact methods can be used. Others who heard and called W0BIP include W3QKI, Erie, Penna., 780 miles, VE3AIB, Toronto, Ont., 830 miles, and W2PLU, Buffalo, N. Y., 840 miles. W3QKI worked W0FMS, Adair, Iowa, for a 755-mile contact.

The rig at W3CUM uses an 829B in the final, running 90 watts input. It was built from the Millen story in QST for September, 1947. The antenna system is four stacked dipoles, bidirectional, better known as the W8UKS “City Slicker.” (A description of this popular array is scheduled for an early issue of QST.)

The receiver is a VHF-152 ahead of an SX-25. The station is in a 4-room trailer home, situated on Armco Hill, five miles south of Butler, Penna., at 1900 feet above sea level. Operator B. R. Cooke is an old timer at hamming, having been at it continuously since 1914. He works only on 144 Mc., and has been active on the band since the summer of 1946. The signal of W0BIP peaked at S9-plus for a few seconds, but he averaged S5 during the record-breaking QSO.

Dwight Pierson, W0BIP, says that the band opened around 10:15 CST, and by 11 just about every station in W8 and W9 was pouring in S9. When W8UKS passed the word that the W3s were calling him Dwight did the best he could, but the QRM was so bad that W3CUM was the only one he could copy. W3QKI was heard for a brief period, but too weak to be copied through the welter of W8, 9 and 0 signals. Contact was made with W3CUM, who was S4 to 5, at 11:54 and terminated at 12:00. The rig at W0BIP is a 522 exciter driving an 820B at 80 watts input, feeding a 16-element horizontal array. His receiver is a VHF-152 ahead of an NC-240D. Dwight says that there is red-hot interest in Western Iowa and Missouri, and the gang in the East can be sure that there will be activity out there come another good opening.

The rig at W6ZRN/6 was extended from 186 to 202 miles on July 4th, but nobody lost out on this one, as the job was done by the previous record holders, W6VIX and W6ZRN. Utilizing the curving Southern California coast to the best possible advantage, W6VIX/6 set up on Tecate Peak, a 3890-foot elevation 35 miles east of San Diego, and close to the Mexican border. W6ZRN/6 was atop El Tranquillan Peak, 2170 feet, 50 miles northwest of Santa Barbara, providing a 262-mile path substantially all over water.

The rig at W6ZRN/6 was an APT-5, running 30 watts input, with an ASB-5 receiver, and a 12-element array. W6VIX/6 used an 8025 oscillator at 15 watts input, a homebuilt receiver made from parts of a BC-788, and 8 half waves in phase with a screen reflector. W6FIX, Los Angeles, worked W6VIX/6 and heard W6ZRN/6 on 420. W6CFL and W6NLZ, Los Angeles, and W6WSQ, Pasadena, were heard on 420 by W6VIX/6.

The 1215-Mc. record was extended from 12.5 to 17.4 miles on July 9th, when W1OGF and W1-MZC maintained communication on this band from elevated locations in Paxton and Marlboro, Mass. The boys had been working on this project for several months; the contact was easy, but the work that preceded it was quite a different matter. The rigs were 2C40 lighthouse transceivers, using cavities and parabolic antennas mounted on camera tripods. The very strong signals obtained over the 17-mile path indicate that they can stretch their record considerably, if need be.

The long July 4th week end was expedition time all over the country. W9LWE and W9RXK made
their second annual 2-meter expedition to Caledonia, Minnesota, to provide contacts with that state for the gang in the Chicago area and farther. Contacts were made with W9s TKL, EHX, BBU, JDD, MBI, ZHB, UCH, JIL, PZS, PK, DXX, PM, CAW, W9s WGZ and JHS, and W8WJC. Best DX was W8WJC, about 500 miles. The rig was used a 522 driving a pair of 24Gs at 50 watts, feeding an 18-element horizontal array. Receiving was done with a VHF-152 with a cascode preamplifier.

That veteran mountain-top specialist, W4FBJ, while working from White Top Mt., Va., the same week end. His list worked on 144 Mc. included W4CPZ, South Carolina; W4HVT, North Carolina; W4JFV, Virginia; W4s OXC, JDN, MKJ and KLP, Kentucky; W8s WJC, UKS, WRN, CYE, CPA, ZUR and WSE, Ohio; W8s EP, BKI and JKN, W. Virginia; W9JMS, Indiana; and W9PVJ, Illinois. And Floyd says conditions were poor! He was also on 50 Mc. for a short period.

The rig used was a 522 driving a pair of 24Gs at 50 watts, feeding an IS-elemental horizontal array. Receiving was done with a VHF-152 with a cascode preamplifier.

For the second time, the microwave section of the El-Ray Radio Club, of Waltham, Mass., conducted a 2400-Mc. expedition over the July 4th week end. W1ILS, former record-holder in the El-Ray Radio Club, of Waltham, Mass., and Vermont; three states and two call areas, worked on 2400 Mc., from one mountain top. Interested parties should write the White Top Company, Abingdon, Va.

The converter used in this expedition was a 5-Mc. i.s. strip, these boys worked from 5:45 P.M. Saturday to 11 Sunday, giving New Hampshire contacts to 21 W1s, 42 W2s, 13 W3s and 2 W4s. Best DX was W4IFKZ, Chesapeake Beach, Va., nearly 500 miles.

The following week end saw W1s CNX, JDF, PZA and OOP combining forces to operate W100P/1 on 144 Mc. from Mt. Kearsarge, a 3000-foot elevation in Warner, N. H., 30 miles northwest of Concord. Using a 522 transmitter, a 16-element vertical array, and a cascode converter working into a 5-Mc. i.s. strip, these boys worked from 5:45 P.M. Saturday to 11 A.M. Sunday, giving New Hampshire contacts to 21 W1s, 42 W2s, 13 W3s and 2 W4s. Best DX was W4IFKZ, Chesapeake Beach, Va., nearly 500 miles.

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filters, to clear his own receiver. Meanwhile, W2BYM is again heard on 6, after a long absence. He has found that 80 watts will work out, as witness his climb from 39 to 42 states worked, and good results on the double-hop openings to W6, 7 and XE.

Prescott, Ariz. — TVI has come to Arizona, too, as a result of frequent sporadic-E activity making possible occasional reception of California TV stations on the lower channels, W7NMD reports. But a TV receiver in his immediate vicinity has served a useful purpose, however. Its wide coverage in the v.h.f. region makes it a fine means of tracking down parachutes, key clicks and modulation troubles.

Shumps, Hawaiian Islands — This is the best place in the world to listen for 50-Mc. signals, but W7KX/K1Y is trying during July and August. If any signals are heard Bob will waste no time in getting transmitting facilities into service. As of July 24th he had had no luck.

Oslo, Norway — The 50-Mc. band was open between 1910 and 2200 GCT on June 30th, according to word received from LA7Y, via W2BAP. He reports that commercial harmonics and amateur 'phone signals, unidentified, but believed to have been of American origin, were heard, peaking at 500 watts.

Washington, D. C. — With a view to determining sentiment on the matter of the 50-Mc. c.w. assignment proposed by FCC, and originally requested by ARRL, W3PCB and W0FQ, and opposed by W4HCY, W4KKG and W8BFQ, a request for a poll of amateurs through the Advance Publicity Committee was made to the FCC. The results are published, at the request of the sponsors, without editorial comment.

With proper cooperation we should be able to have a one-two-three band if the TVIs are held back. It is the basis for the formation of the Educational Committee and 185 opposed. Since it is not the purpose of this column to promote v.h.f. activity in the Chicago area. He organized several expeditions to provide DX contacts on the v.h.f. bands, and was a member of the W9FCN Club during the war. His widow will be a guest at the dedication.

Hallifax, Nova Scotia — Yarmouth and VE1QY are not necessarily the end of the line for 2-meter stations looking for DX along the Atlantic Seaboard. VE1QV, Hallifax, has heard the band open several times this summer but he has little luck in raising stations he hears. Because of BCI Oscar uses n.f.m. or c.w. exclusively. The former is ineffective in weak-signal work with present-day receivers, and too few fellows tune carefully with the b.f.o. on. (The 522 boys can't receive n.f.m. at all, and most of them don't have any b.f.o.) Watch for VE1QV on 144.9 Mc., o.w., when conditions are good to the northeast. He has both horizontal and vertical arrays. He definitely can copy c.w. on the new station of the Midwest V.H.F. Club, will be held at the Club's new headquarters, Sept. 15th. The use of W9FCN was granted by FCC upon request. In honor of its former holder, Elmer D. Sweeney, who died in November, 1947. Elmer was a charter member of the club, and did much to promote v.h.f. activity in the Chicago area.

Without advance warning or plans two-meter relays of more than 1000 miles have been completed. A message originated by W5JJT, Jackson, Miss., on July 22nd at 8:17 p.m. CST got as far as W2EH, Collinswood, N. J., the same evening, and was forwarded to W1HDQ two days later, by W3KBA, who intercepted it along the route. Routing was W5JJT, 41HH, FWH/1J, FJ4/4, SCYY, 5R6E, 3RHP, 30WY, 2EEH. A message from W8NFK, Franklin Park, Ill., took 10 days on the way, but got through on 144 Mc. The route was W8NFK, BBU, UCH, 8AMW, USF, 3R6E, GKP and 2EEH.

These are not direct routes, nor fast handling, by any means, but the important point is that, though they were started cold, these messages made their destination. Contrast this with present attempts to turn the same trick on 50 Mc. All failed to get across the Alleghenies, despite much advance planning and publicity. The only successful long-distance 5-meter relays were those involving portable stations in strategic spots, or help from the ionosphere in the form of sporadic-E skip.

Chicago, Ill. — Dedication ceremonies for W9FCN, the new station of the Midwest V.H.F. Club, will be held at the Club's new headquarters, Sept. 15th. The use of W9FCN was granted by FCC upon request. In honor of its former holder, Elmer D. Sweeney, who died in November, 1947. Elmer was a charter member of the club, and did much to promote v.h.f. activity in the Chicago area. He organized several expeditions to provide DX contacts on the v.h.f. bands, and was a member of the W9FCN Club during the war. His widow will be a guest at the dedication.
of W6IDF design. Activity is sparked by the Two Meters and Down Club, now one of the largest clubs in the area. The downward trend of conditions on 10, and the TVI resulting from operation on that band, are aiding in the extension of v.h.f. interest and activity.

Other equipment: W5GKP works his 2-meter DX the hard way—on e.w. Smitty says the 500-watt e.w. rig works out nicely provided: (1) He puts out the strongest signal from Maryland. (2) Enough followers who have not yet worked Maryland happen to be on. Despite the scarcity of 2-meter f.h.o. users, W3GKP has managed the first contacts between Maryland and a number of areas, including a 610-mile contact with WTKL, Waukegan, Ill., on the 10th, and W9UCF, Ft. Wayne, Ind., on the 23rd.

Contrary to still other rumors, there have been good business for W4HHK. Paul has worked W4FBJ/3, Glasgow, Ky., and on the morning of the 21st he made it with W9-JMS, Cory, Ind. Fairly frequent contacts are made with W4FWI in Nashville, 200 miles, and the gang in the St. Louis area. Jackson, Ms., is worked regularly. Paul is up to 9 states and 5 call areas, which is real going from the Memphis area.

Norfolk, Va. — The big 2-meter opening that provided the new record carried over to portions of the Atlantic Seaboard Sunday morning, the 24th, allowing stations in the Norfolk area to make their first VE3 contacts on 144 Mc. W4IKZ found the band open at 7:30 A.M. and worked VE3s 1A9 and AN7, as well as W8EP, W8UKS and W8ER. The VE3s are about 500 miles from Norfolk.

St. Louis, Mo. — Activity on both 6 and 2 meters is being encouraged in the St. Louis area by means of organized operating. The 6-meter group, consisting of W6s JNG, JON, JRP, KFR, SHW and VMY, meets on the air each Wednesday evening at 6:30 P.M. CST. The "144-Mc. Ears Net" meets every Tuesday at the same time, W4KYF acts as net control station, and members presently include W6s AJU, AOJ, BJL, DMD, H1D, KFR, SHW, VAY, VMY, Z15, Z1B and WNS8.

Council Bluffs, Iowa — Here's something new in transmitter hunts: For the CBROC Hamfest, July 17th, the boys cooked up a tough one. The spot selected was one of the highest in Council Bluffs, but a patch of corn shielded the antenna system from view. The rig was installed in a comfortably shady spot nearby, but the gas-engine generator was placed in a ravine 100 feet away to aid in the concealment, and to muffle the generator noise. Just ordinary stuff, but the hidden station committee, W6CCY, W6YYF, and George Penf, put the rig on a 5-element vertical array and rotated it continuously at one r.p.m. during the hunt. The winning team, W6s GXR, UTF, UUV and Paul Curry, located the rig in one hour and forty minutes — but they found the power unit first!

San Mateo, Calif. — Amateur television is all the rage in the San Francisco area, with several stations on the air on 420 Mc. W6VSY has camera equipment and at the recent San Mateo County Radio Club hamfest, Bob televised the proceedings, with the technical assistance of W6VQY, W6UOV and W6WAB. The transmission was received 30 miles away in Berkeley by W6QT and onlooker, W6OVX.

East Providence, R.I. — There are as many systems for telling when the 2-meter band is going to be open as there are 2-meter amateurs, but one used at W1PIV is probably the most unusual. Eddie has a 32-element array that can be operated either horizontal or vertical. On a doubtful night he goes out in the darkness and turns the array over. If nothing happens he comes back in and goes to bed, but if water falls on his head he turns the antenna south and waits for the W4s to start coming through! Never fails, he says — and, if you stop to think over the causes of condensation, that system is not as silly as it sounds. Other popular signs: high barometer, fog rolling in from the ocean, rapidly-dropping temperature, and a dead calm in the early evening. All have real basis in fact: they’re not superstitions. The weather maps regularly.

Dallas, Texas — It takes morning skeds to work 2-meter DX, according to W6BUC. Leroy has had no luck in evening work at all, but on July 7th he worked 15 stations between 6 and 9 A.M. These included W6s DXB, Vivian, and ML, Oil City, La., his first out-of-state contacts on 144 Mc.; IRP, Lufkin, NQA, OUG and NZX, Houston, KFB, Baytown, DAA, Kingsville, JPG, Brownwood, YV, San Antonio, DUK, Kema and D88, Beaumont. Stations from the south, east and west were coming through all at once, but no DX signals have yet been heard from the north.

Stations all through the eastern part of Texas and the northwestern portion of Louisiana have daily early morning workouts. W5F, Lufkin, and W5AMW, Nacogdoches, work Houston, Beaumont, Palmier, and Baytown frequently, distances up to about 140 miles. W5ML, Oil City, La., worked as far down as San Antonio on the 7th. His QSO with W5YY was good for 425 miles. Since he’s had his 8-element array (the 2-meter meat in the “V.H.F. Sandwich” of June QST) Art has been working up to 200 miles or more pretty regularly on the morning skeds.

Collingswood, N. J. — The unbelievable has happened! Following the interesting results W2EH achieved with his 144-Mc. array (the first contacts between the Pittsburgh and Philadelphia areas) Brownie, W2PAU, appeared on 144 Mc. with a horizontal job. It’s a 5-element affair, mounted on the same boom as his vertical, with a relay for switching back and forth. Numerous checks have been made, but, like your conductor, who has been running flop-over checks for weeks, Brownie has been able to draw no very definite conclusions as yet.

1215-Mc. Record Extended — W6CJS Awarded 50-Mc. WAS

Late reports: Not content with the 17-mile work reported earlier in this section, W1OFG and W1M2C extended the record to 37 miles on July 30th. W1OFG/1 operated on a rooftop in Newton Center, Mass., while W1M2C/1 used the same hill as before in Paxton, Mass.

M. R. Junkins, W6CJS, worked his 48th state on 50 Mc. in June. By submitting the necessary 48 confirmations on August 3rd, he became the proud holder of 50-Mc. WAS Award Number 3.

Silent Keys

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

QST)
ARRL Conventions

ARRL MARITIME DIVISION CONVENTION
Halifax, Nova Scotia, September 3rd-5th

Coincidentally with the celebration of the 200th anniversary of the founding of Halifax, many of their ladies will descend on Halifax over Labor Day weekend for a gala affair of their own. Sponsored by the Halifax Amateur Radio Club, the ARRL Maritime Division Convention will be held at the Nova Scotian Hotel, with registration at 2 p.m. starting the series of interesting events making up the three-day program.

Throughout the week end there will be welcoming addresses, contests galore, open house at Halifax ham shack, technical talks, emergency communications, organizational meetings, picnicking, musical entertainment, and all of the things that add up to a bang-up convention.

Planned are radio, ham sessions, technical talks, meet old friends and make new ones, and visit the oldest city in Canada during its bicentennial celebration. The OMs will have to fork over $3.50 apiece for the whole week; YLs and XYLs pay $2.50 each. For advance registration or other information, write F. A. Webb, VE1DB, P. O. Box 663, Halifax, N. S., Canada.

ARRL HUDSON DIVISION CONVENTION
New York City, October 7th-9th

The famous Palisades of the Hudson River will reverberate with more than football cheers this week end of October 7th-9th when 12 metropolitan radio clubs act as hosts to the ARRL Division Convention to be held at the gigantic 9th Regimental Armory at 125 West 14th St. in New York City.

One of the chief attractions of the convention will be the Greater New York Amateur Radio Show, with exhibits and displays to show every side of amateur radio. In addition, the Army and the Navy promise a comprehensive display on the newest in radar, radio and electronics. The traffic men, DX enthusiasts and the v.h.f. boys will each have their own gathering under the leadership of a well-known amateur in each particular field. A special meeting for the old timers will be held under the auspices of the Quarter Century Wireless Club. Amateur teletype will be demonstrated for the first time in actual operation. Traffic will be handled from the convention floor while TV sets alongside the transmitters will probably be showing the World Series. The new ARRL TVI motion picture will be run several times each day so that everyone will have an opportunity to see it. Technical talks, lectures and demonstrations on such subjects as antenna theory, mobile operations, single sideband, teletype operation, transmitter keying and elimination of TVI will be well worth hearing. A code-copying contest is scheduled for Sunday afternoon. And there will be several special talks and seminars under the guidance of competent instructors for those interested in getting started in amateur radio. The big banquet will be held Saturday evening, followed by a party with dancing, singing and fun for all.

What about gals? Sure, an elaborate and special program has been planned for their entertainment. It will include a fashion show, a steamboat trip around Manhattan island, a visit to the Statue of Liberty, a trip through Radio City, a visit to Chinatown and many other sights.

The registration fee is $1.75, not including the Saturday night dinner and after-banquet party. But if before October 1st you'll pop a letter and remittance to the New York Amateur Radio Convention, Inc., P. O. Box 1198, Church Street Station, New York 7, N. Y., the tariff per registration will be only $1.25. Write for yours now.

ARRL MIDWEST DIVISION CONVENTION
Omaha, Nebraska, October 8th and 9th

Get out your calendars, OMs, and mark a big red circle around October 8th and 9th, the week end of the biggest- over Midwest Division Convention, with headquarters at the Fontanello Hotel, Omaha. Then, get plenty of rest so you'll be in tiptop shape for the two full days of activities, with never a dull moment. The convention committee made up of members from most of the division's clubs, finds it necessary to borrow Hollywood adjectives to give any adequate idea of the convention programs. It promises to be a convention you can't afford to miss. There'll be something interesting for the OMs, XYLs and SWls going on every minute of the two jam-packed days. Don't miss out on technical discussions of practically every phase of amateur radio, ham sessions, technical talks, a round-up of the latest in ham gear, movies, buffet supper, open forum, "bally-hoizin" banquet, Sunday morning breakfast clubs, and entertainment galore. When the clock strikes 12, at darkest midnight, an initiation into the Royal Order of Wireless Kings will be performed.

Hotel reservations are already going fast so send in your registration at $9.00 per person immediately to the Midwest Division Convention, ARRL, Box 233, Omaha, Nebraska. See you in Omaha!

ARRL NEW HAMPSHIRE STATE CONVENTION
Manchester, N. H., September 17th

If you're looking for an opportunity to take in another of New Hampshire's famous ham gatherings, set aside Saturday, September 17th, as the magic date. For that's when the Manchester Radio Club will sponsor this year's ARRL New Hampshire State Convention at the Masonic Temple, 1505 Elm St., Manchester, N. H.

In addition to talks by top-notch speakers on a variety of amateur radio subjects, the program includes ARRL organizational meetings, novel contests, special gathering of the YLs, old timers' round-up — plus the banquet, with the caterer of 1947 fame.

Dues are $4.50 each, including the big feed. If you want to pass up the banquet, the cost is $2.50. For reservations, write Olga Apolatoa, WIQJY, 75 Medford St., Manchester, N. H. Meet you at Manchester.

HAMFEST CALENDAR

CALIFORNIA — September 10th and 11th, at Mt. Shasta, Siskiyou County. Third Annual Hamfest staged by Mt. Shasta Amateur Radio Club. Especially designed to bring Northern California and Southern Oregon hams together for good fellowship. Registration fee of $3.50 includes banquets, dances and big hot lunch on Sunday. Plenty of games and entertainment for OMs, XYLs, and Jr. Ops. Make advance reservations through Secy.-Treas. Paul H. Chitwood, W6EUG, P. O. Box 805, Mt. Shasta, California.

OHIO — September 11th, at Ash Grove, on Winton Road, a few miles north of Cincinnati. Annual Stag Hamfest sponsored by the Cincinnati Amateur Radio Assn. Last year's attendance record of 500 is expected to be bettered. Registration is $1.50 per person, which includes two meals. Be sure to attend.

WASHINGTON — October 2nd, at Normanna Hall, Everett. Sponsored by Cascade Radio Club. Registration 11 a.m. to 2 p.m.Fee of $3.50 includes banquet and full program. For reservations or particulars contact Secy. H. R. Womack, W7EQD, 1701 Walnut, Everett, Wash.
Correspondence From Members

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

AMATEUR ORGANIZATIONS

Editor, QST:

... May I add my regrets to those expressed in your columns that there have been divisions among amateurs which have led to the setting up of rival organizations. It seems to me so unnecessary and tends to transfer the conduct of amateur affairs from the guidance of the democratic and voluntary ARRL to the bureaucratic and compulsory FCC. Of course, the ARRL is imperfect — but it has done a grand job, and I don't expect greater perfection from rival groups or from the Government. This is not to discredit the FCC in any way; it is essential and does its work well, too. But in the end, it enforces the rules; and if we don't like those rules, it will be far harder to argue with the FCC than to elect new directors to the ARRL. . . .

R.F.D. 10, N. Kansas City, Mo.

Editor, QST:

A recent bulletin published by an amateur organization brings out a point in regard to the $4.00 membership dues of ARRL. For $4.00 you get, in addition to ARRL membership, twelve magazines of about 125 or more pages each. On the other hand we read in the bulletin of this other organization that if the members didn't contribute $5.00 and 1949 dues immediately that this organization would be forced to disband. You pay $5.00 and dues with no publication other than a few short bulletins. My dollar goes farther with ARRL.

— Ben M. Wendt, W8UCD

P. O. Box 82, Lockland, Ohio

Editor, QST:

... Signed up with the SARA as a charter member; but since they and the NARC are raising so much "Ned," am dropping out; am a firm believer in one strong, central organization to represent all hams; and while I may not agree with everything done at Hq., it may be because I am not as well informed as I would like to be and thus cannot form a fair opinion of what you fellows are attempting to do for us. And it can hardly be otherwise for you certainly cannot inform each member on every little move you make there; nor would it be good policy; for it just might interfere with what you are attempting to do; by letting the public know what is being "worked up" . . .

— Dana E. Carterwright, sr., W8UPB

5 Cooper Square, New York, N. Y.

Editor, QST:

This is a message of vital importance to all radio amateurs, and we would appreciate your printing it prominently in QST. An invitation is extended to all amateurs to join a new organization, S.P.A.R.R.O.W., that has been formed to protect the rights of amateurs throughout the world. Our platform is simple but aggressive, and consists of the following popular planks:
1) For all c.w. men, we pledge ourselves to fight for exclusive c.w. on all bands, with code test of 10 words per hour.
2) For all 'phone men, we pledge ourselves to fight for exclusive 'phone on all bands, with no code test of any kind.
3) For all amateurs, we pledge ourselves to fight for more exclusive amateur frequencies throughout the spectrum with no need to show public interest, convenience and necessity.
If anyone can think of anything else he wants, we will be glad to add it to our program and pledge ourselves to fight for it.

GIL CARTOONS

1900 South Menlo, Sioux Falls, S. Dak.

Editor, QST:

Can't recall having seen any bouquets thrown at Gil for those extra FB cartoons he turns out month after month, so I'll start it. The covers on June and July QST beat them all. If they don't put you on the back around Hartford, Gil, come on out here, and I'll do it.

— J. W. Sikorski, WSRRN

INFO ON QSLs

5242 Hyde Park Blvd., Chicago, Ill.

Editor, QST:

I have just finished digging through my QSL file, trying to scrape up enough cards for a 7-Mc. WAS, and discovered that many of the cards give no indication whatsoever of frequency, not even the band or type of emission. I also discovered some with no dates and/or no time. There was even one card from a W7 with nothing but the call.

I have always thought of a QSL as a means of confirming a contact, but some of the hams sure have a funny way of doing it.

— P. J. Schram, WSUBP

ARRL ANTENNA BOOK

Lascelles Ave., Beaumont, South Australia

Editor, QST:

The ARRL Antenna Book hit Adelaide last week like a 100-m.p.h. gale. Old antennas are coming down left and right! Please convey our heartiest thanks to George Grammer, By Goodman and Ed Tilton for their splendid contributions, which are much appreciated. 73.

— F. A. Haas, VK6FH

INSURANCE

607 Shelby Street, Detroit, Mich.

Editor, QST:

Until very recently an amateur’s transmitting antenna and tower was covered against windstorm when the amateur had the extended coverage endorsement attached to his dwelling fire policy (extended coverage includes windstorm, hail, explosion, riot, riot attending a strike, civil commotion, aircraft, vehicles and smokes).

Now, however, because of a recent ruling of the National Board of Fire Underwriters, the antenna and tower is considered part of the household contents and is only covered against windstorm loss in the event that the amateur has the extended coverage endorsement attached to his household contents policy.

Since it is questionable if one in five hundred amateurs has extended coverage on his contents at the present time, I thought it advisable to bring this important matter to

(Continued on page 114)
A LOW-POWER 110/220-VOLT A.C.-D.C. TRANSMITTER FOR 'PHONE AND C.W.

The transmitter described here was built for use in British Honduras, where 110- and 220-volt d.c. mains are predominant. It is thought that others who are faced with similar problems will find this rig to their liking. It may be used on either a.c. or d.c. mains, 110 or 220 volts.

The diagram shows the filament connections required for 110-volt operation. If 220-volt operation is desired, the filaments must be wired in series. A 35Z5 rectifier is used in the standard a.c.-d.c. supply circuit, with a small resistor being used in place of an iron-core filter choke. If available, the choke would probably serve the purpose to better advantage.

The oscillator is the conventional regenerative circuit, with its plate circuit tuned to the second harmonic of the crystal frequency. The final amplifier required no neutralization in the layout used.

The audio end of the transmitter utilizes a single-button carbon microphone, transformer-coupled to the grid of a single 50L6. The Heising system is used to couple the modulator tube to the r.f. circuit, with the primary of an ordinary receiver output transformer being used as the choke L4. Microphone current is obtained from the cathode of the 50L6 modulator tube.

Before placing the transmitter in operation, the filament dropping resistor R9 must be adjusted to provide the correct voltage for the 35Z5-50L6 branch of the filament circuits. It should be adjusted so that a drop of about 30 volts is provided (assuming 115-volt line).

To tune the transmitter, insert the oscillator coil, and tune it to resonance with the oscillator plate condenser. A flashlight bulb and a loop may be used as an indicator in the absence of a plate milliammeter. Tune for maximum brilliance of the lamp, and then back off the setting of the condenser a little. This will permit the crystal to start a bit more readily. Next, insert the amplifier plate coil, again tuning for resonance. Tune for maximum brilliance, and then turn the plate supply off. Connect a 150-ma. pilot lamp in series with one of the antenna feeders, apply plate voltage, and readjust the final tank condenser until the bulb glows brightest. The lamp may then be shorted out of the circuit, and you are ready for a QSO.
In operation this little flea-power rig has been used with gratifying success, with many W stations having been worked on 10-meter 'phone, and the local Central American stations on the lower frequency bands. — Armando Perez, VP1AP

**BROADCAST-BAND COVERAGE WITH THE BC-348-Q**

Fig. 2 shows the circuit of a simple one-tube converter that is useful in adding coverage of the standard broadcast band to the BC-348 or any other receiver that tunes to approximately 450 to 500 kc. Standard parts are used throughout, and construction layout is not critical. The power-supply requirements are small. Almost any source of 150 to 200 volts d.c. at a few milliamperes and 6.3 volts a.c. at 0.3 amp. will suffice. — Victor Alfonsi, W2VSU

**CURE FOR "TALK-BACK" IN THE BC-610**

In most instances where serious "chatter" or "talk-back" is experienced when the BC-610 is used on 'phone, the trouble is caused by the overload relay, RY-5, and not by the modulation transformer, as is commonly supposed. The cure is effected by connecting a large capacity, 30 to 50 μfd., across the relay. This may be done simply by connecting the condenser, which should be rated at 150 volts or more, from the center tap of T-6 to ground. — J. K. Halld, Jr., W4KCT

**LOCK-ON FOR THE T-17B HAND MICROPHONE**

I have noticed on several occasions when in contact with a station using a T-17B microphone that the audio is frequently interrupted. This is caused by the fact that it takes a lot of pressure to hold the switch button closed, and after a few moments the hand gets cramped. A simple solution to the problem requires only that a ¾-inch piece of No. 18 wire be soldered under the edge of the metal mounting washer that is found beneath the bakelite switch button. After reassembling, it will be possible to lock the switch in the "on" position with a slight twist of the button. — R. A. Cohagen, W8NBM

**SOME USES FOR THE SCR-274 DYNAMOTORS**

If you have a need for a small high-speed 115-volt a.c. motor, don’t overlook the small dynamos that come with the SCR-274-N receivers. With a minimum of effort they can be converted to do a good job.

Remove the socket and the wires from the base, and take off the end covers. Remove the castings holding the brushes, and replace them just opposite to the way they were removed. The low-voltage brushes and the small condenser that is across the contacts may be discarded.

Connect the wires from the field winding directly to the high-voltage brush holders, and bring out one lead from each brush to serve as the 115-volt a.c. input leads. Make sure that the high-voltage end of the armature is the one contacted by the brushes, otherwise a fuse will be blown! Drill and tap the end of the armature so that a small length of threaded rod can be inserted for a power take-off. A hole with a rubber grommet inserted in the other end of the case will serve to bring out the 115-volt leads. A small toggle switch can also be installed in the end cover. Be sure to remove the small grounding straps from the brushes to the frame.

When reassembled, the motor has its original appearance except for the power take-off rod extending out of one end, and the line cord out of the other. The motor will easily handle a six-inch fan blade. — Elmo V. Boswell, W6FXW

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September 1949

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Full Becks. After a summer with heat and humidity at record heights, fall will indeed be welcome. We hope for cool, crisp, QRN-free days with signals working out on all bands of amateur interest. This is not to say it’s been a bad summer. Not at all. Scores of amateurs have handled KLPO-W20XE/MM traffic, DX has been better than in some years, v.h.f. records required daily revision, and mobile installations paid dividends in communication results as never before. But for all this it has been unseasonably warm for amateurs with facilities in attics and cramped quarters. Fall with its new DX possibilities, the invitation of different League appointments and awards, and increased traffic net activity on 3.5-4 and 7-7.3 Mc. cannot fail to be welcome.

Does Your Emergency Rig Meet These Requirements? This fall many ECs are planning to run their own local September tests and have organizations overhauled before the Simulated Emergency Test to come in October. Accent in local tests is increasingly on mobile amateur equipments. Zero Beat (Hampden County Radio Club) suggests that right now is the time to examine your emergency equipment to see if it meets these points. (1) Is it safe? (2) Is it in working order now? (3) Is it compact, yet sturdy and portable? (4) Can you get it on with someone else’s power, antenna, etc.? (5) Can someone else operate it without a special education?

Department Heading. We start the new season by welcoming some new titles to our masthead, especially those of Assistant Communications Manager, C.W. and Assistant Communications Manager, Phone. These establish us in the manner authorized by the Board of Directors. The function and new recognition accorded through the ACM-Phone post was discussed in this section last month and we should be in a position to give you the name of the new man very soon. Exactly parallel functions in reviewing and promoting phone and c.w. activity have been assigned the new desks. To avoid confusion in your mind we have done away with all such broad titles as Communications Assistant, and substituted words closer to the major duties performed. Ideas, questions, and suggestions on phone operating activities, procedures and objectives should be sent in from PAMs, OPSs, and members with a preference for voice operating to be handled by the new ACM-Phone. The ACM-C.W. will be equally receptive to letters and ideas from RMs, ORSs, etc. The silhouetted operators left and right of our heading can now be identified. They are the profiles of our ACM-C.W. and Phone respectively, busy at their home stations!

New Traffic-Count Definitions Adopted. Effective September 1st, the traffic-count definitions are modified as explained in “Traffic Topics” in this issue, and in accordance with a poll of all CD appointees. Of the votes received, 86.1% were in favor of the modified definitions which now read: (1) originated, (2) received, (3) relayed, and (4) delivered. Response was received from every class of appointee. Voice-operating appointees and emergency coordinators favored the change as much as those specializing in daily traffic work, the lowest group percentage registered being the 83.3% in favor (from SCGs).

Why Not More BK-IN on 40? There is surprisingly little break-in operation on 7-Mc. c.w., yet it makes possible faster, more efficient, and more enjoyable operation. Break-in is simple to arrange, too, and just as useful on this as on other bands. It is not necessary that one have completely perfect facilities to take advantage of break-in when the stations you work are break-in equipped. When you hear any operator advertising with his calls that he has “break-in,” don’t sit idly by, minute after minute of his fall! After the first invitation to break is given and at each subsequent pause in any call, turn on your transmitter and tap your key — and you can start the QSO immediately!

W4IRL writes, “When I am answering a CQ, I send BK after each call — sometimes with results, too often not. It turns out that an operator was hearing me all the time and waited until I signed. What a waste of time and kilocycles! To BK-IN he need only turn on his transmitter and tap his key.”

QRV? Drop a line to the SCM about the appointment you’re qualified to hold. Give the fall activities a whirl. Increase your skills. Try your hand in the Frequency Measuring Test, and the Fall V.H.F. Contest, and don’t forget the CP Qualifying Runs. These events cover five different September dates. See the ARRL Activities Calendar and announcements in this issue.

—F.E.H.
HIGH CLAIMED SCORES—
1949 FIELD DAY

Listed below are high claimed scores reported for the Thirteenth ARRL Field Day, June 18th-19th. These are subject to checking and grouping according to the number of transmitters in simultaneous use at each station. Complete FD results will be published in a later issue.

Class 1
(Listings show club name, or number of operators if a nonclub entry, call used in FD, claimed score, and number of simultaneously-operated transmitters.)

<table>
<thead>
<tr>
<th>Club Name</th>
<th>Score</th>
<th>Operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Cities Amateur Radio Club</td>
<td>96775</td>
<td>16</td>
</tr>
<tr>
<td>Los Angeles Fire Dept. Amateur Radio Club</td>
<td>79220</td>
<td>12</td>
</tr>
<tr>
<td>Frankford Radio Club</td>
<td>64746</td>
<td>10</td>
</tr>
<tr>
<td>(30 Operators)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central Jersey Radio Assn.</td>
<td>49146</td>
<td>4</td>
</tr>
<tr>
<td>Somerset Hills Radio Club</td>
<td>93690</td>
<td>12</td>
</tr>
<tr>
<td>Ohio Valley Amateur Radio Assn.</td>
<td>38528</td>
<td>2</td>
</tr>
<tr>
<td>Inglewood Amateur Radio Club</td>
<td>38528</td>
<td>2</td>
</tr>
<tr>
<td>Helix Amateur Radio Club</td>
<td>16880</td>
<td>5</td>
</tr>
<tr>
<td>Oakland Radio Club</td>
<td>99631</td>
<td>11</td>
</tr>
<tr>
<td>Monroe County Amateur Radio Club</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Royal Order of Sodas Club</td>
<td>10454</td>
<td>4</td>
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<tr>
<td>Jersey Shore Amateur Radio Assn.</td>
<td>16038</td>
<td>6</td>
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<tr>
<td>South Jersey Radio Club</td>
<td>90493</td>
<td>7</td>
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<tr>
<td>United Radio Club</td>
<td>92487</td>
<td>8</td>
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<tr>
<td>Soledad Amateur Radio Club</td>
<td>91488</td>
<td>11</td>
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<tr>
<td>Potomac Valley Radio Club</td>
<td>80288</td>
<td>12</td>
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<tr>
<td>West Side Radio Club of Toronto</td>
<td>88583</td>
<td>13</td>
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<tr>
<td>Valley Radio Society</td>
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<tr>
<td>Lakewood Amateur Radio Assn.</td>
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<tr>
<td>Santa Clara County Amateur Radio Club</td>
<td>84553</td>
<td>13</td>
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<tr>
<td>Central Jersey Radio Club</td>
<td>82533</td>
<td>12</td>
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<tr>
<td>Concord Brasspounders</td>
<td>78565</td>
<td>12</td>
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<tr>
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<td>12</td>
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<tr>
<td>Cleveland Brasspounders</td>
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<tr>
<td>Height of America Radio Club</td>
<td>77493</td>
<td>15</td>
</tr>
<tr>
<td>West Seattle Amateur Radio Club</td>
<td>77085</td>
<td>15</td>
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<tr>
<td>Sacramento Amateur Radio Club</td>
<td>73899</td>
<td>14</td>
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<td>York Radio Club</td>
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<tr>
<td>Minneapolis Radio Club</td>
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<td>North Bay Amateur Radio Assn.</td>
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<td>Crescenta Valley Radio Club</td>
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<tr>
<td>Narragansett Assn. of Amateur Radio Club</td>
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<td></td>
</tr>
<tr>
<td>(12 Operators)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citrus Belt Amateur Radio Club</td>
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<tr>
<td>Wisconsin Valley Radio Assn.</td>
<td>67590</td>
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</tr>
<tr>
<td>Electric City Amateur Radio Club</td>
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<tr>
<td>Delaware Valley Radio Assn.</td>
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<tr>
<td>(12 Operators)</td>
<td>63843</td>
<td>12</td>
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Class 2
(Listings show calls of operators at each station, call used, and score.)

<table>
<thead>
<tr>
<th>Call</th>
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<th>Operators</th>
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</thead>
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<tr>
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<td>8</td>
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<tr>
<td>W1hLFO ORP</td>
<td>4919</td>
<td>8</td>
</tr>
<tr>
<td>W2s FRA JQ</td>
<td>4725</td>
<td>8</td>
</tr>
<tr>
<td>W6s RAJ KSW</td>
<td>6506</td>
<td>6</td>
</tr>
<tr>
<td>W6s UTM RQM</td>
<td>4235</td>
<td>6</td>
</tr>
<tr>
<td>W6BA6</td>
<td>3186</td>
<td>6</td>
</tr>
<tr>
<td>W6s VIC WIR</td>
<td>2525</td>
<td>6</td>
</tr>
<tr>
<td>W2s SGX SYG</td>
<td>2330</td>
<td>6</td>
</tr>
<tr>
<td>W6W3ZL</td>
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<td>W6P7F</td>
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<td>W3s EK CB</td>
<td>2254</td>
<td>6</td>
</tr>
<tr>
<td>W6s AEW SKM</td>
<td>2227</td>
<td>6</td>
</tr>
<tr>
<td>W6s WC W4MGS</td>
<td>2410</td>
<td>6</td>
</tr>
<tr>
<td>W6GAGL</td>
<td>2143</td>
<td>6</td>
</tr>
</tbody>
</table>

Here's a view of the operating position at W6RYG, the station of the Heart of America Radio Club, as permanently set up in the Kansas City, Mo., Red Cross Building, showing, 1. to r., Mildred Lewis, Red Cross teletypist, Emergency Coordinator W6BCD, SCM Ben Wendt, W6GAGL, and George Turner, W4NUN, who is in charge of the maintenance of the equipment. An arrangement of this nature, controlled and operated by the amateurs, and set up permanently in the Red Cross Headquarters, is something many clubs might emulate.

September 1949
NEW WIAW OPERATING SCHEDULE
(Effective Sept. 1, 1949)
(All Times Given Are Eastern Standard Time)
WIAW will return to an expanded operating schedule on September 1st, as detailed herein. Mimoographed master schedules showing complete WIAW operation in EST, CST, MST, PST or GCT will be made available to anyone upon request.
Operating-Visiting Hours:
Monday through Friday: 1130-0900 (following day).
Saturday: 1900-0230 (Sunday)
Sunday: 1600-2200
General Operation: Use the chart below for determining times during which WIAW engages in general operation on various frequencies, ‘phone and c.w. Note that since the schedule is organized in EST, certain morning operating periods may fall in the evening of the previous day in Western time zones.
WIAW will not be open from 2200 September 4th to 1130 September 6th, in observance of the Labor Day holiday. On Saturdays and Sundays during which official ARRL activities are being conducted, WIAW will forego general-contact schedules in favor of participation in the activity concerned.
Official ARRL Bulletin Schedule: Bulletins containing latest information on matters of general amateur interest are transmitted on regular schedules:
Frequencies:
C.W. – 1887, 3555, 7215, 14,100, 28,000, 52,000, 140,000 kc.
‘Phone – 1887, 3950, 14,280, 29,000, 52,000, 140,000 kc.
Times:
Sunday through Friday, 2000 by c.w., 2100 by ‘phone. Monday through Saturday, 2330 by ‘phone, 2400 by c.w.
Code-Proficiency Program: Practice transmissions are made on the above-listed c.w. frequencies, starting at 2130, Monday through Friday. Speeds are 9, 12, 18, 25 and 35 w.p.m. on Monday, Wednesday and Friday, and 15, 20, 25, 30 and 35 w.p.m. on Tuesday and Thursday. Approximately ten minutes of practice is given at each speed. Next certificates qualifying run from WIAW and WSTQ is scheduled for Sept 19th; from W6OWP, Sept. 6th.
The station staff:
T. F. McMullen, W1QVF, "fm"  
R. N. Eldel, W1RUP, "re"  
R. E. Morrison, W1RXL, "lr"

BRIEF
WIAVY specializes in working maritime-mobile stations on 28 Mc. From October 1947 to May 1949 he worked a total of thirty-one /MM stations. Can anyone top this record?

WIAW GENERAL-CONTACT SCHEDULE
(Effective Sept. 1 1949)
WIAW welcomes calls from any amateur station. Starting September 1st, WIAW will listen for calls in accordance with the following time-frequency chart.

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
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</thead>
<tbody>
<tr>
<td>2015-2100</td>
<td>3950</td>
<td>14,280</td>
<td>28,000</td>
<td>14,280</td>
<td>14,280</td>
<td>14,280</td>
</tr>
<tr>
<td>2100-2130</td>
<td>3950</td>
<td>14,280</td>
<td>28,000</td>
<td>14,280</td>
<td>14,280</td>
<td>14,280</td>
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<tr>
<td>2200-2330</td>
<td>3950</td>
<td>14,280</td>
<td>28,000</td>
<td>14,280</td>
<td>14,280</td>
<td>14,280</td>
</tr>
<tr>
<td>2300-2330</td>
<td>3950</td>
<td>14,280</td>
<td>28,000</td>
<td>14,280</td>
<td>14,280</td>
<td>14,280</td>
</tr>
</tbody>
</table>

*Starting time is approximate. General-contact period on stated frequency begins immediately following transmission of Official Bulletin which begins on the hour.
**Operation will be on one of frequencies stated, depending on propagation conditions, efficiency and general activity.

FREQUENCY-MEASURING TEST, SEPTEMBER 16TH
All amateurs are invited to try their hand at frequency measuring. WIAW will transmit signals for the purpose of frequency measurement starting at 9:30 p.m. EST (6:30 p.m. PST), Friday, September 16th. The signals will consist of dashes interspersed with station identification. Those who will follow a general message sent to help listeners to locate the stations before the measurement transmission starts. The approximate frequencies used will be 3622, 7244 and 14,164 kc. About 4 1/2 minutes will be allowed for measuring each frequency, with long dashes for measurement starting about 2:30 p.m. It is suggested that frequencies be measured in the order listed. Transmissions will be found within 5 or 10 kc. of the suggested frequencies.
At 12:30 a.m. EST, September 17th (9:30 p.m. PST, September 16th), WIAW will transmit a second series of signals for the Frequency-Measuring Test. Approximate frequencies used will be 3632, 7135 and 14,066 kc.
Individual reports on results will be sent to all amateurs who take part and submit results. Copies of this report are sent SCMs also, so eligibility for OO appointments is known. When the average accuracy reported shows error of less than 71.43 parts per million, or falls between limits of 71.43 and 357.15 parts per million, the participants will become eligible for appointment by SCMs as Class I or Class II official observers, respectively.
This ARRL Frequency-Measuring Test will be used to aid qualification of ARRL members as Class I and Class II observers. Present observers not demonstrating the requisite average accuracy will be reclassified appropriately until they demonstrate the above-stated minimum required accuracy for these classes of appointment. Class I and Class II OOs must participate in at least two Frequency-Measuring Tests each year to hold such appointments. SCMs (see address, page 6) are open for initial applications for Class III and IV observer posts, but these forms are not being distributed to the public for ‘phone and c.w. bands being the main requirement. All amateurs must supply a copy of the cooperative notice (not) forms provided by ARRL, reporting activity monthly through SCMs, to warrant continued holding of official observer appointment.

QST To Report Results
Any amateur may submit frequency measurements on one or all frequencies listed above. No entry consisting of a single measurement will be considered eligible for the QST listing of the top results in this FMT; at least two readings and preferably more should be submitted to warrant QST mention. Order of listing will be based on the over-all average accuracy, as compared with readings submitted by an independent professional frequency-measuring organization.

64 QST for
CODE-PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from WA1W/W1WTDQ will be made on September 19th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters. Frequencies of transmission from W1AW will be 3557, 3565, 7215, 14,100, 28,600, 51,000 and 114,000 ke. W1WTDQ will transmit on 33,000 kc. The next qualifying run from W0WOP only will be transmitted on September 6th at 2100 PST on 3550 and 7248 kc. These W0WOP-only runs will have different text from the runs sent by WA1W and W1WTDQ. For additional qualifying run dates, see the ARRL Activities Calendar elsewhere in these pages.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the five speeds transmitted, 15 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code runs are made from WA1W each evening, Monday through Friday, at 2130 EST. References to texts used on several of the transmissions are given below. These make it possible to check your copy. To get sending practice lock up your own key and buzzer and attempt to send in step with WA1W.

Date Subject of Practice Text from July QST
Sept. 6th: Narrow-Band Pulse Transmission, p. 11
Sept. 6th: Qualifying Run, 2100 PST, from W0WOP only
Sept. 8th: 10-Meter Handie-Talkie, p. 17
Sept. 14th: An Inexpensive VFO Transmitter, p. 20
Sept. 10th: It's a Dog's Life!, p. 54
Sept. 19th: Qualifying Run, 2130 EST, W1A/W1WTDQ
Sept. 20th: A Variable Frequency Transmitter, p. 41
Sept. 22nd: On the Air with Single Sideband, p. 61
Sept. 28th: A Fixed-Tuned Plug-In Converter, p. 62
Sept. 30th: A Practical Operating Desk, p. 66

COUNTRIES-LIST CHANGES

Since the adoption of the ARRL Postwar Countries List, the official standard used in connection with the annual DX Competition and the DX Century Club, several changes have been reported in this department. See page 40 of March, 1949, QST, for the latest published list. Effective April 1, 1949, Newfoundland and Labrador, VO, have been deleted from the Countries List, since on that date they became a part of Canada. All confirmations of VO contacts prior to April lst will be credited for DXCC, but confirmations of contacts after April lst will be credited as Canada. Make this change on your list and watch QST for further changes and additions.

In response to many inquiries concerning LU1Z, the Argentine station operating from the South Orkney Islands, we regret to announce that DXCC credit cannot be claimed on the basis of contacts with this station. We have been informed by the authorities whom we consult on such matters that the South Orkneys are officially a dependency of the Crown Colony of the Falkland Islands, and as such are under the direct jurisdiction of the British Commonwealth. Under the circumstances, the granting of DXCC credit to contacts between stations in the South Orkneys and others towards DXCC would be contrary to the provisions of the DXCC Rule 7.

Y.L.R.L. DOINGS

Newly-elected officers of the Young Ladies' Radio League, International organization of licensed women operators, for the 1949-1950 term are: president, Helen Morrison, W3OLY; vice-president, Anabel Gifford, W3NN8. Also appointed for the same term are; secretary-treasurer, Marion Kurtzberg, W3NH1; editor of Harmonies, Barbara Houston, W3QQQ; publicity chairman, Louise DeSoto, W2OHI.

District chairmen for the term are: 1st District, Eleanor Wilson, W1QON; 2nd, Lillian Ruocco, WA2PAL; 3rd, Mae Burke, W3CUJ; 4th, Annette Thompson, W4LKKI; 5th, June Marion, W5OTU; 6th, Maxine Willis, W6UHA; 7th, Miriam Brown, W7JFB; 8th, Dorothy Willett, WX0DA; 9th, Helen Thompson, W0WP; 10th, Alice-May Stewart, W0GJ; 11th, Mary Smith, VE1ZM; 12th, Margaret Mills, G1AAC.

Y.L.R.L. extends a cordial invitation to all licensed YLs wherever they may be to contact her station, using the special WAS/YL call for anyone who can confirm contact with a YL station in each of the 48 states. Those interested in seeking the award of interest to all) will want a copy of the Y.L.R.L. Directory, listing all members of Y.L.R.L. plus accounts of their interesting activities. Copies may be obtained for $1 from Secretary-Treasurer, W3NHI, 823 Fairview Rd., Swantlimore, Pa.

DX CENTURY CLUB AWARDS

HONOR ROLL

<table>
<thead>
<tr>
<th>Callsign</th>
<th>Grade</th>
<th>Score</th>
</tr>
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<tbody>
<tr>
<td>W1F</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>W1VR</td>
<td>100</td>
<td>210</td>
</tr>
<tr>
<td>W2PL</td>
<td>100</td>
<td>210</td>
</tr>
<tr>
<td>W3K</td>
<td>100</td>
<td>210</td>
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<tr>
<td>W4Y</td>
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<td>210</td>
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<td>W5A</td>
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<td>210</td>
</tr>
<tr>
<td>W6A</td>
<td>100</td>
<td>210</td>
</tr>
</tbody>
</table>

RADIO TELEPHONE

W1F     | 129  | 148  |
W1VR    | 130  | 149  |
W2PL    | 131  | 150  |
W3K     | 132  | 151  |
W4Y     | 133  | 152  |
W5A     | 134  | 153  |
W6A     | 135  | 154  |

ENDORSEMENTS

W1F     | 100  | 123  |
W1VR    | 100  | 123  |
W2PL    | 100  | 123  |
W3K     | 100  | 123  |
W4Y     | 100  | 123  |
W5A     | 100  | 123  |
W6A     | 100  | 123  |

September 1949
TRAFFIC TOPICS

By the time you read this, the active traffic season will be getting started, and it promises to be the most active season since the war. Nets, both old and new, will be springing up in greater numbers than ever, and there will inevitably be some collisions. In order to avoid conflicts as much as possible, we intend this year to keep card files of all nets in existence, by name, by states and by frequencies.

When a traffic organization asks us to recommend a frequency for their net, we pick one which, according to our records, is not in use by any other net within range at that time. If we do not have the data on your net, it is very possible that we will recommend the frequency your net is operating on.

To avoid this possibility, register your net with ARRL! Drop us a letter, postcard or hamgram with the following information: (1) name of net; (2) frequency; (3) time and days of operation; (4) call of the net manager; (5) net calls; (6) approximate direct coverage; (7) approximate duration of net. We would like registration of all nets, both traffic and emergency. On the basis of the registrations, we hope to put out a mimeographed net directory in October and supplement it as expedite it from time to time as required.

Therefore, in addition to the original registration, keep us informed of changes in any of the above data.

The fact that you have registered the net with us means that we will not recommend to any other net that use that frequency at that time. It does not give you the right to use that frequency at that time to the exclusion of all others! If someone is rag-chewing on the frequency your net is using, or comes on with a long CQ in the middle of your net, and ignores him, grin and bear the QRM, and think of the finial in required.

QST ers will, when asked, cheerfully move off. On the other hand, those who claim they are in some net’s hair wherever they go have got a point. In any case, bad names, nasty letters and invective have never been known to improve the situation.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for June traffic:

<table>
<thead>
<tr>
<th>Call</th>
<th>Orig.</th>
<th>Del.</th>
<th>Rel.</th>
<th>Credit</th>
<th>Total</th>
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<tr>
<td>W7WCC</td>
<td>22</td>
<td>43</td>
<td>1130</td>
<td>39</td>
<td>1244</td>
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<tr>
<td>W7CZY</td>
<td>65</td>
<td>50</td>
<td>337</td>
<td>33</td>
<td>1018</td>
</tr>
<tr>
<td>W4PL</td>
<td>17</td>
<td>50</td>
<td>780</td>
<td>44</td>
<td>891</td>
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<tr>
<td>K5NRJ</td>
<td>142</td>
<td>49</td>
<td>576</td>
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<td>784</td>
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<td>W3JZU</td>
<td>11</td>
<td>28</td>
<td>608</td>
<td>22</td>
<td>734</td>
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<tr>
<td>W9REBX</td>
<td>10</td>
<td>8</td>
<td>608</td>
<td>8</td>
<td>722</td>
</tr>
<tr>
<td>W7CKT</td>
<td>14</td>
<td>3</td>
<td>570</td>
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<td>590</td>
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<td>W9QIL</td>
<td>55</td>
<td>129</td>
<td>217</td>
<td>11</td>
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<td>W11IN</td>
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<td>330</td>
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<th>Call</th>
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<th>Del.</th>
<th>Rel.</th>
<th>Credit</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>W4FDY</td>
<td>204</td>
<td>W3RJC</td>
<td>122</td>
<td>W8RN</td>
<td>104</td>
<td></td>
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<tr>
<td>W8DDE</td>
<td>120</td>
<td>W7KCU</td>
<td>120</td>
<td>W7T</td>
<td>103</td>
<td></td>
</tr>
<tr>
<td>W8DOM</td>
<td>122</td>
<td>W8NOH</td>
<td>110</td>
<td>W8GZ</td>
<td>102</td>
<td></td>
</tr>
</tbody>
</table>

A message total of 500 or more or 100 “deliveries plus extra delivery credits” will put you in line for a place in the BPL. The Brass Pounders League is open to all operators who qualify for this monthly listing.

BPL HONOR ROLL

Points for BPL Honor Roll are accumulated at the rate of four points for every BPL appearance plus one point for every 100 points in your BPL traffic total. The BPL Honor Roll listing below gives the point totals and shows only the ten top traffic-handlers for 1949 and postwar.

1949 Postwar

<table>
<thead>
<tr>
<th>Call</th>
<th>Del.</th>
<th>W4PL</th>
<th>204</th>
</tr>
</thead>
<tbody>
<tr>
<td>W7WCC</td>
<td>1130</td>
<td>257</td>
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<tr>
<td>W7CZY</td>
<td>103</td>
<td>243</td>
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<td>W8DDE</td>
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<td>127</td>
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<td>W9QIL</td>
<td>50</td>
<td>119</td>
<td></td>
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<tr>
<td>W6FDR</td>
<td>45</td>
<td>105</td>
<td></td>
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</tbody>
</table>

The ARRL National Traffic System is about to become a reality. If you are interested in taking part, read the article on the subject elsewhere in this issue, and drop us a line for complete mimeographed details on operation of the system. We are at present busily lining up prospects for leadership roles, specifically managers of regional and area nets. It is mid-July as we write this, and there is still much to be done; but by the time you read this, operation should be about ready to commence. If you have not yet volunteered your services, do it now and get in on the ground floor.

Some additional changes have been made in the special “QN” signals for net use. QNA and QNZ have already been changed, as noted in this column in March, 1949, QST (p. 62). We now announce additional changes as follows:

QNG ••• If someone is rag-chewing on over as net control direction.

QNJ ••• Can you copy me (or ••• ).

QNN ••• Who is net control station? Net control station is •••.

QNP ••• Unable to copy you (or ••• ).

Most of these changes have been made simply to conform to general usage; others to discard unused signals and substitute useful meanings for them. Note that it is never necessary to use a question mark after a QN signal. The way it is used, and by whom, will always indicate whether a question is intended.

These changes are effective immediately. Users of QN signals are urged to make the necessary alterations on their lists.

BRIEF

Dennis, WIMPP, was the first-prize winner of the QLF contest at the Portland (Me.) Amateur Wireless Association hamfest on June 25th. This YL beat some of New England’s best OM traffic handlers at their own game, including W1NOV, who placed second, and W1QEE and LRG who were the runners-up.
FIELD DAY, MOUNTAIN STYLE!

For at least a score of amateurs the June 18th-19th Field Day weekend was more than a preparedness test of emergency equipment. In fact, for several amateurs of the Petersburg area of West Virginia, the week end became a "wet" run under actual emergency conditions.

Late Friday night, June 17th, a flash flood struck the city of Petersburg with such swiftness that people barely had time to get out of their automobiles before engulfed in the muddy water. Actually, the water rose so rapidly that at least a dozen persons were known to have drowned, with many others still unaccounted for.

When this disaster struck, communications and power lines serving the community were destroyed and miles of highways surrounding Petersburg were inundated, thereby isolating that city from the rest of the country.

W8EYV of Keyser, W. Va., was the first amateur to get on the air from Petersburg, followed shortly by W8YGL and W8SOQ of Charleston, the latter pair being members of the Mountainaire Amateur Radio Association who were setting up for Field Day operations when they heard of the Petersburg situation. W8DOU attempted to get into the area, but was turned back by severe road washouts.

With the cooperation of members of the Potomac-Rappahannock Valley Emergency Net and others who assisted in the handling of traffic, the group handled administrative messages and health and welfare inquiries for the Red Cross, reports to the U. S. Weather Bureau and the Weather Observer's office at Washington, special traffic for press and b.o. services, power company traffic, and special instructions such as requests for personnel and medical supplies from the U. S. Army, CAP, and city and state authorities.

On Saturday W8CJU and W80XO were able to get into the area with a CAP SCR-299 and were fired up in short order. K4AF and K4USA, MARS stations, together with W8CJU, handled considerable quantities of traffic on MARS frequencies as a part of the auxiliary services, receiving the frequencies of the other stations in the emergency area.

Operations continued throughout the 19th and 20th, and the weary operators made their way back to their homes to sleep off one of the biggest Field Days in history.

All stations who took part in the handling of traffic were unanimous in their praise of the many stations who assisted by remaining silent, as well as those who spent many hours keeping the frequencies clear of casual operations.

The following are among those known to have contributed to the success of this operation: W8A AQH, AQL, BKA, OGC, ECP, H2F, JCR, LTV; W4s IPC, JCY, JDS, KAY, LMB, LNX, PHL, ZY; W8s AMD, CJD, CLX, CUG, DOU, ESQ, ETV, HSS, KHL, LXR, OQR, OZX, PFT, WFR, WKF, YDN, YGL, YIE, ZQG, ZVR; W9s COB and HJM; W9EKE, K4AF, K4USA, and W1AW.

AMATEURS HELP IN WOOD RIVER TORNADO

On May 21st at approximately 6:00 P.M. a tornado whirled into Wood River, Ill., which is about twenty miles northeast of St. Louis, Mo., and a short distance south of Alton, Ill.

EC W9DJG immediately telephoned W9TSS, assistant emergency coordinator, telling him of the blow and asking him to set up his car, which carries a ten-meter mobile, and meet him at the police station at Wood River.

W9DJG also called W9YZE, another member of the Mobile Emergency Corps, and they proceeded to Wood River and set up at the police station. W9TSS happened to reach the police station first and immediately set out for the disaster area with an American Legion member who directed him through back streets and down alleys and at the same time pulled trees out of the way and, in general, helped him to get out to this area about three miles from the police station.

When W9DJG arrived at this spot he started dispatching ambulances to the different parts of town by ham radio, as it appeared that was to be the only method available for the time being.

At the same time W9TSS stayed at the Police Station and City Hall to direct activities from that end, the Mayor and Chief of the Fire Department being out in the disaster area which seemed to be centered at Central and Ferguson Streets, which W9DJDG made his base of operations.

The tornado struck at about 6:30 P.M. EC Jansen was in communication with the City Hall where W9TSS was operating and at the same time W9YZE was on a roving assignment checking all the spots where communications might be needed.

It wasn't very long until other members of the Emergency Corps began to come into the area. One of the first to show up was W9RVT, assistant ARRL coordinator, who drove in from Edwardsville, Ill., about ten or twelve miles away. His portable was set up at the Brushy Grove School, which was in another very badly damaged area, and which later was to be used as the Red Cross field station for the entire disaster area.

By this time a contact was made with W9RVT in Alton, who got in touch with the Red Cross Chapter headquarters which by now had set up a new base in the Haskell Hotel at Alton. At this point W9TSS was later set up and operated from about 11:30 P.M. until operations ceased on Tuesday, May 24th, at 2:00 P.M.

While all of this was going on, more and more hams were coming into the area to take over the operating jobs as they were needed. A 20-meter net was set up between the Wood River police station and St. Louis, Illinois, area, as well as W9TSS and W9YZE were released for roving assignments. From that time on W9TSS became the control station until the next day when telecommunication was again possible from the post station to the outside area. W9RKP then took over as control station at the Brushy Grove School where the transmitter of W9RVT had been set up and was now running from a gasoline generator.

All day Sunday welfare messages were handled out of the area by W9FIN, emergency coordinator for East St. Louis, who came in to help. When time came for him to leave, W9UWC, of Peoria, took over the job of funneling the traffic out by way of his portable rig. A lot of this traffic was handled by a relay into W9AUU; the station of the Egyptian Radio Club, which is located 15 miles south of Wood River, where it was fed into the Illinois net.

W9TBE, the emergency coordinator for the Granite City, Illinois, area, as well as W9QSG, emergency coordinator for St. Louis, did a mighty fine job of helping out during the entire night of May 21st to May 22nd. A total of 2200 messages was handled during the three-day operation.

The following is the list of some of those who gave many hours of their time to the emergency, W9OL, JYZ, LWH, DJG, ILH, ICN, RVF, NDA, Alton; W9KEP, JPT, UZU, BYT, OJN, VZG, Edwardsville; W9FSP, NTL, TSS, Cottage Hills; W9DCY, TTH, W9QV, Granite City; W9YAE, Venice; W9ZEP, Greenville; W9QNR, PIN, DZU, East St. Louis; W9UUMC, Peoria; W9LNN, NNF, QDF, GEM, NFA, BQG, St. Louis.

— Harold H. Jansen, W9DJG, Emergency Coordinator

A.R.R.L. ACTIVITIES CALENDAR

Sept. 6th: CP Qualifying Run — W6QWP
Sept. 16th: Frequency-Measuring Test
Sept. 19th: CP Qualifying Run — W1AW, W7QOD
Sept. 24th—25th: V.H.F. Contest
Oct. 7th: CP Qualifying Run — W6QWP
Oct. 14th: CP Qualifying Run — W1AW, W7QOD
Oct. 19th—20th: Simulated-Emergency Test
Oct. 22nd—23rd: CD QSO Party
Nov. 6th: CP Qualifying Run — W6QWP
Nov. 16th: CP Qualifying Run — W1AW, W7QOD
Nov. 19th—20th, 26th—27th: Sweepstakes Contest
Dec. 4th: CP Qualifying Run — W6QWP
Dec. 13th: CP Qualifying Run — W1AW, W7QOD

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**ATLANTIC DIVISION**

**EASTERN PENNSYLVANIA — SCM, Jerry Mathis, W3BBS — The girls account for just about all the traffic this month. OUL has a new 50-Mc. and 144-Mc. rig and a call from 3EBM, on these terms for the winter. W1TV, and the garden almost wiped out the traffic activity of EU. NUN now is OIB. He has worked 30 KI and received cards from all of them. The amateurs of the Philadelphia area, under the direction of EC ISE, again provided competition for the Red Cross on July 17th for the Four States Park celebration. From noon until 5 p.m., ISE, ITP, and FWH operated a fixed station in the Park Guard headquarters and 2H31, ISE and LK2, left the Red Cross stockade across the river under the Girard Ave. Bridge. The Red Cross workers and the police were continually helping each other, lost children, and stockade visitors to the police station and people were calling the police on the hand line to locate the lost. The radio set-up permitted a quick check and also simultaneous aid to the broadcast over the P.A. system relative to missing persons. The hams were given a fine "plug" over the WCAU P.A. system and received statements from the AAA. Many of these receiving the service sought to pay for it but naturally was refused. A motorist was mired in when he parked and a call from EM's mobile to FWH brought help from the AAA. The cars of FWH and ISE were severely burned by falling fireworks. All fixed stations used HT-18 Halli and defected with N.I.M. on 3EBM with an 80-Mc. wire for antennas and 90 signals were read at all positions. The noise of the fireworks dictated the use of high-powered excursions next year.

**MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Philip A. Dearman, W2BVT — The Washington Mobile Radio Club held a Net Operations Drill demonstration on June 20th for members of the organized Net Control Reserve. Local telephone nets were accepted from the Reserves and then through a phone patch to one of the fixed stations, NL assisted in preparations and KIS was Net Control Station. Approximately 35 stations in the area participated in this activity. The Baltimore Amateur Radio Communications Society's Field Day set-up was at Koppelman Lane and Old Harford Road. OIE was chairman of the Field Day Committee. Antenna installations were made the prior week end. At the June 6th meeting, Ed Crosby talked on "Optical Communication" and gave a demonstration of the "Snookercope." The BARCS now publishes a swell bulletin called the "Modulator.

The Rock Creek Amateur Radio Club is in session with the E. D. Cook, chief engineer of Airpax, Inc., at its June 7th meeting. His subject was "Vibrators and Vibrator Power Supplies." AS and NII presented "Impedance Matching." The CARC will continue meetings all summer. Thirty members participated in Field Day activities on the Technical Club, and the following took part: N2D, YL and K6S, on the permanent Field Day committee. The Rock Creek Amateur Radio Association conducted its Field Day operations on June 4th, in the area of 3B7, 3B9 and 3B2, and the CARC plans to hold Field Days on June 5th and 6th. Other 5 bands under the call AIR/3. The Washington Radio Club, at its June meeting, enjoyed a splendid talk and a question-and-answer session on "Optical Communication Systems," presented by Dick Ellis, NNN, vice-president of the Rock Creek Amateur Radio Association. A special Field Day committee has been formed for the August Club Picnic. Members of the Potomac-Rappahannock Valley Emergency Net were "on deck" and department stations on 30 Mc. and 144 Mc. were on the river waters. The emergency condition happened on Field Day, June 19th. FPQ, Regional Coordinator, AHQ, and others went into immediate action, furnishing communications to and from the stricken areas. The entire section membership is indeed proud of the splendid disaster work of our "FPRV" members, the "Always Ready." Net Operators is now operating portable at Bainbridge, Md., using 7 and 14-Mc. c.w., and 28-Mc. phone. EX-90U now is CC, and is on 28 Mc., phone. FPV and PIR have a number of people building a 28-Mc. mobile rig. JAX is trying to drive his 28-Mc. rig with a BC-458A. JPA and KVU are on 30 Mc. FPV has 420-Mc. transmitter and receiver, KJQ on 28 Mc. with a good signal. HUX and ZJ also are on 28-Mc., c.w. HUX is working good DX with his new mobile rig and W3YU's CU's are working from it. FPV is working for QTH and gets out fine. OWB gets out well on 44 Mc. Also heard on this band in the Baltimore area are JU1, QIO, WA and KEA, KVX is having his Collins 282-1 converted at the factory. He also has a new 28-Mc. mobile rig. MZA has completed his 60-foot windmill tower. PFR's XYL manages and gives a demonstration of the new WO-213.

**SOUTHERN PENNSYLVANIA — SCM, G. W. (Bill) Tunnell, W20XX — The scarcity of monthly reports will make it necessary to publish this column on a condensed basis, convincing the landlord that he should permit a new antenna. WUP is on 420 Mc. with a twenty-four-hour element. OJS is in the intermediate stage of putting up a 144-Mc. system. The City traffic man, YSP, received his Class A license and is rebuilding his receiver. YJX, in Wildwood, formerly was WRS6L. Field Day activities in the area were of a high order, with at least five clubs participating. Traffic honors go to RWP, who turned in the only traffic report. The Hamilton Township Club has elected new officers with George Brown at the helm. A new group at the Conshohocken, namely AUE. Our friend FHC is expected to return to the U.S.A. in the very near future. This being my last contribution to this column, I'll say many thanks for your interest and patience, and a promise to continue the column. I wish you individual and collective support during my term of office. I'll be looking for each of you from DXVC. Traffic: W2RRF**

**WESTERN NEW YORK — SCM, Harding A. Clark, W2PQT — SEC: SJV, R5J; FC: BG. Popularity of the annual Field Day is proved by the influx of the number of participants and stations taking part. Many took part for the first time and learned of many errors and plan to profit from their experiences. While these experiences are still fresh in your minds is the time to make plans for next year — a written memorandum and given away for future use is again on the agenda. RZP worked LUTAZ on 3.5 Mc. after the band apparently had folded for the summer. OWT is working out on 144 Mc., is on 28 Mc. from an ideal location near Turin; ZRX is building 818 finalist. YGW was heard working maritime-mobile on 3.5 Mc. and ZSM is heard on 28 L9B. W20XX was heard on the Rochester outlet on Traffic Exchange Net on 7150 kc. UTF is Rochester station in Eastern Shuttle Net and also is the Operator of the net. Dulce of the Radio Association are QY, WPK, WPY, vice-pres.; TEX, secty.; and NJS, treas. Syracuse Amateur Radio Club reported received NCK 4, GCI 4, KCC 4, and the following on 28 Mc.; WIX, WLX and ZSG to its board of directors at the recent club banquet. PPR, RLY and FBA are active on 30 Mc. UTI is experimenting with corner reflector on 144 Mc. and improving sensitivity of HC-624 receiver. NES and UTH have been appointed OBS. Traffic: June W2REL 17, HOB 20, W3U 22, W2Z 10, (May) W2YGW 190, RSL 51, WFT 29.

**WESTERN PENNSYLVANIA — SCM, Ernest J. Hettel, W8BAK — This year's Field Day was worked with Western Penn. club participants. If we put our hearts into it Western Penn. could make a clean sweep of any ARRL contest. Line-up at this past year's event from Western Penn. — thirty-six of 'em and CGY on top. Congrats, John, and also to OEW, HXA, MKI, etc., the same goes for LQN, ABB, OEQ, OIT, ONX and the rest of the permanent Field Day committee. The Rock Creek Amateur Radio Association conducted its Field Day operations on the Technical Club, and the CARC plans to hold Field Days on June 5th and 6th. Other 5 bands under the call AIR/3. The Washington Radio Club, at its June meeting, enjoyed a splendid talk and a question-and-answer session on "Optical Communication Systems," presented by Dick Ellis, NNN, vice-president of the Rock Creek Amateur Radio Association. A special Field Day committee has been formed for the August Club Picnic. Members of the Potomac-Rappahannock Valley Emergency Net were "on deck" and department stations on 30 Mc. and 144 Mc. were on the river waters. The emergency condition happened on Field Day, June 18th. FPQ, Regional Coordinator, AHQ, and others went into immediate action, furnishing communications to and from the stricken areas. The entire section membership is indeed proud of the splendid disaster work of our "FPRV" members, the "Always Ready." Net Operators is now operating portable at Bainbridge, Md., using 7 and 14-Mc. c.w., and 28-Mc. phone. EX-90U now is CC, and is on 28 Mc., phone. FPV and PIR have a number of people building a 28-Mc. mobile rig. JAX is trying to drive his 28-Mc. rig with a BC-458A. JPA and KVU are on 30 Mc. FPV has 420-Mc. transmitter and receiver, KJQ on 28 Mc. with a good signal. HUX and ZJ also are on 28-Mc., c.w. HUX is working good DX with his new mobile rig and W3YU's CU's are working from it. FPV is working for QTH and gets out fine. OWB gets out well on 44 Mc. Also heard on this band in the Baltimore area are JU1, QIO, WA and KEA, KVX is having his Collins 282-1 converted at the factory. He also has a new 28-Mc. mobile rig. MZA has completed his 60-foot windmill tower. PFR's XYL manages and gives a demonstration of the new WO-213.

(Continued on page 70)
If our own situation can be considered typical, many a ham has in his household a dominating female who, every so often, insists he clean up "that pig pen you call a radio shack." Of course, we evade the issue as long as possible but eventually the time arrives when compliance is the only alternative to a domestic explosion. Once we have started to clean up the heap, our resistance to the project drops rapidly and, as work progresses, nothing less than a complete job of cleaning and polishing will satisfy our own critical inspection; we even dust out the "insides" of the rig and take care of those minor maintenance jobs which have been so long postponed. The receiver, of course, gets particular attention, for we are in the business of making them and if ours looks shabby or doesn't perform as it should our ego gets somewhat dented when visiting hams rib us about it.

Having just completed one of these periodic clean-ups, we had occasion the other day to look over several of the receivers in our Service Department. The woeful condition of some of them gave us the idea that National owners might like to have a little dope "straight from the horse's mouth" on how to care for their receivers in a manner which will preserve their appearance and operating efficiency.

Naturally, your receiver will keep that "new" look longer if you do not park ash trays, beer glasses, or other equipment on top of it. For cleaning the smooth gray cabinets of the NC-173, NC-183, NC-57, etc., we have found that Simoniz Kleener, followed by an application of Simoniz polish or Johnson No. 100 wax, does a beautiful job without endangering the finish. A better job can be done if all control knobs are removed first. Be sure to use soft cloths, free from grit, for cleaning and polishing, and avoid undue pressure on the aluminum speaker grilles of the NC-57, NC-33 and HFS. The plastic dial windows are treated at the factory with an anti-static compound called "Carbo-wax"; unfortunately, this treatment is not permanent and you may notice small particles of dust and lint clinging to the window should it become charged. These and also finger marks are best removed by breathing on the window and wiping with a slightly dampened very soft cloth. Do not use cleaning fluids or abrasives for they may permanently fog or scratch the plastic. Remember, too, that abrasive cleaners should not be used on etched nameplates and calibration charts.

To clean cabinets finished in wrinkle enamel, either black or gray, we have found it best to remove them and scrub well with soap and warm water, using a fairly stiff brush. Rinse thoroughly with clear hot water and dry behind the stove or in the sun. A coat of wax may then be applied and rubbed up with a soft brush such as is used to polish shoes. Do not try to use rags for cleaning or polishing wrinkle paint, for the rough surface may tear them to shreds leaving large quantities of lint deposited on the surface.

For dusting the chassis and components mounted on it, we have found nothing better than a small paint brush such as may be purchased at any dime store. Such a brush is also convenient for occasional dusting of the front panel and control knobs. If the dust will not yield to dry brushing, the brush may be dipped in carbon tetrachloride (Carbona or Pyrene). Carbon tetrachloride should be used only after all loose stuff has been brushed off dry. If you have compressed air available, it is a great convenience for blowing out condenser plates and other inaccessible nooks and crannies.

During the clean-up process and while the knobs are off, it is a good idea to check the nuts that hold the operating controls to see that they are tight; it is also a good time to replace any variable resistors or potentiometers which have become noisy in operation. Condenser rotor brushes and band switch contacts should be cleaned with carbon tetrachloride applied with an artist's brush or a pipe-cleaner. After cleaning, a very thin coat of "Lubriplate" or "Vaseline" should be applied to provide lubrication and retard oxidation. Apply the lubricant sparingly, for too much of it will gather dirt rapidly and the contacts will become noisy in a very short time.

A final word of warning: keep solvents such as paint thinner, lighter fluid, turpentine, etc., away from your receiver, for they can ruin it. The products mentioned in the paragraphs above will do a good job and will not harm your receiver if properly used.

Robert J. Murray, W1FSN
ECO is gaining back his health. NRQ finds no.m. on 14 Mc. working. MPO, RIK, and NRQ have volunteered to string up new 14-Mc. antennas for LAVP and RUB operating together. WGOE and W6AV, who made three states on 144 Mc. VZA and PAP are at QTH in the a.uburn area. NKM can be heard regularly on 144 Mc. in the fall. AER has crystals so he QSY in 6-ks. puts. HNQ finds no.m. on 144. He had his first mobile rig. NCQ reports that DLK worked a VK on 7 Mc. with 45 watts. ESP, KWA, and YDJ worked in Field Day section on 7 Mc. BUD has QSOs on 144 Mc. He is EC for Pittsburg area. MPO, RIK, and NRQ have volunteered to work those VKs and ZLs. OMA is EC for Pittsburg area. working well. MPO, RIK, and NRQ have volunteered to work those VKs and ZLs. OMA is EC for Pittsburg area. working well.

CENTRAL DIVISION

ILLINOIS — SCM, Lloyd E. Hopkins, W9EVE — From reports received it is apparent that a record number of Illinois clubs actively participated in Field Day. QIL toured the Southland visiting with 4PI and others along the way. YTV is reading a BC-48 for 7 Mc. WEA and NN are busy installing Subroc 27-28 Mc. mobile units for summer vacations. Midwest VHF Club new officers are CQF, appet. pres.; SWB, corp. secy.; and CSE, corp. treas. V5L reports QSL cards from FFC after the club used his call for Field Day. BRX says the local boys are in the midst of the summer vacation. EVJ is working active BQ on Iroquois County on Field Day. BXX had a change of heart and went v.h.f. QEY has new Clapp VFO for 3.5 Mc. and 7 Mc. FFC reports new exciters and replacement of the local code class is ready for exams. FXK reports 20 144-Mc. men at Weldon Springs picnic. EBB says the TXN Net is growing by leaps and bounds. EBB is running 20 watts on TXN and is running 106 watts at ARC-5. OX is hemmed in by apartment buildings but works good DX. DDI says he is going FB with 15 watts at 220 Mc.

MPS is running up big light bills during high school vacation. OBT is running up big light bills during high school vacation. BXK had a change of location. His Collins 75A receiver with 45 watts. KSP, KWA, and YDJ worked in Field Day section on 28 Mc. What happened to the Steel City 28-Mc. Net. MTY was disappointed in MPO location. His Collins 75A receiver with 45 watts. BXK had a change of location. His Collins 75A receiver with 45 watts. OMA is EC for Pittsburg area. working well. MPO, RIK, and NRQ have volunteered to work those VKs and ZLs. OMA is EC for Pittsburg area. working well.

TEXAS — SCM, Charles R. Sammons, W5TQ — Field Day plans are well along in this section. Key contacts a transmitters; Madison (LVR) 2 transmitters; Fond du Lac (BQM) 1 transmitters; Madison (SWQ) 5 transmitters; and 1800 daily and 0900 Sundays. The assistance of all traffic men, both ’phone and c.w., is urgently needed to meet the demands of this year’s Field Day. FCF completed a new bandswitched rig for all bands. FCF-6, DND 5, FXA 3, MUM 2.

SOUTH DAKOTA — SCM, Richard M. Bossoletta, W0GZD — During the last hidden loop DF unit which had been carefully calibrated and a large map of the city on a heavy cardboard base, Harold Hughes, under the supervision of the examiners, had a training session a. He made in on the transmitter fully 15 minutes ahead of his time. His Scan-ter 3040, 14-Mc. a.m.

DELTA DIVISION

MISSISSIPPI — SCM, J. C. Wallis, W5DLA — On Field Day FFF and the gang, fifteen in number, worked 3.3, 3.85, 7, 28, and 50 Mc. Traffic was transmitted and received. It was a great day for Transmitting and Receiving. It was a great day for Transmitting and Receiving. It was a great day for Transmitting and Receiving. It was a great day for Transmitting and Receiving. It was a great day for Transmitting and Receiving.
CAPACITORS
are
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for Life!

Silicone—the amazing new synthetic—made headlines when General Electric brought it out during the war. It’s news again today—for G.E. has now made Silicone bushings and gaskets a standard feature of all its specialty capacitors up through 5000 volts.

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Silicone bushings used with capacitors 660-v a-c, or 1500-v d-c and lower.

Silicone bushings and plastic cups used with capacitors 660-v a-c, or 1500-v d-c and lower.

Silicone gaskets and plastic stand-offs used with capacitors rated 2000-v d-c and lower.

Silicone gaskets and porcelain stand-offs used with capacitors rated 2500-v to 5000-v d-c.

GENERAL ELECTRIC

Specialty Capacitors
Motors
Luminous-tube transformers
Fluorescent lamp ballasts
Industrial control
Radio filters
Radar
Electronic equipment
Communication systems
Capacitor discharge welding
Flash photography
Stroboscopic equipment
Television
Dust precipitators
Radio interference suppression
Impulse generators

AND MANY OTHER APPLICATIONS
KENTUCKY — SCM, W. C. Alcock, W4CDA - Hot weather in June really wilted the traffic totals, and no work was done. The SEC, GJH, does not usually answer QSL cards. Mammoth Cave's Hamfest was attended by a large group, but the SCM was in the Army at the time — for two days! W4CDA, Alcock, reports 249 QSOs in June. The biggest change this month is that NVQ is firing up an 850-watt rig. FCM really ran into bad luck. In a fall, he broke his wrist, fractured his spine, spent a week in the hospital, had a cast on his arm and a brace on his leg. The SEC does not choose to run for reelection in October, so pick another.
Rolf "Lindy" Lindenhayn, W8BHW, from Harrison, Ohio, earned top honors with a score of 390,450 points in the last ARRL DX contest. Lindy, consistently in the upper DX bracket, operates with a couple of 12-year-old Eimac 250T’s in the final amplifier of his rig.

Tube service such as this is further evidence of the dependability and performance of Eimac tubes. It is the reason why Eimac tubes are always the choice of leading amateurs.

Today the new 250T, improved by over a decade of field experience and development, will provide higher performance over a longer period than its predecessors. Complete data on it is available in a new packet of data sheets titled "EIMAC TUBES FOR AMATEUR USE" ... write for it today.
Iowa — SCM, William G. Davis, W8PP — Must be the hot weather! Your reports are conspicuous by their absence. Last month's report had the section on a depression. The Midwest Division was vigorous. Davenport gang out, JAD reports for Clinton, FZO reports that twenty-three operators were active at Sioux City with a new antenna. VCZ reports on the operation of a new receiver at Newton, three being E8C. Three groups were out at Cedar Rapids, UUU reporting four operators, GM reporting 12 operators. We need your reports; we are writing for a new ham radio for a garden during the summer. Traffic: W262ZY, W800, K800, Z800.

Midwest Division

Traffic: W262ZY, W800, K800, Z800.
PLASTICON RF Transmitting CAPACITORS

 Superior to mica capacitors because:

- Greater safety factor
  (3500 VDC Operating; 7500 VDC Test)
- Lower RF losses
  (See current rating below)
- More conveniently mounted
- Less chassis space
- Smaller overall volume
- Impervious to moisture
  (The GLASSMIKE construction is 100% sealed)
- Silicone-fluid filled
- Can be operated at 75° C ambient

The above advantages are possible by the use of the Type L film dielectric which has lower losses than mica.

**TYPE LSG—PLASTICON GLASSMIKES**

3500 VDC Operating—7500 VDC Test

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WASECA, MINNESOTA

NORTHERN DIVISION

ALASKA — SCM, Charles M. Gray, KL7IG — There are two new QOs in this area. AB/7 is AB, who has a rig going with a pair of 81s in the final modulated by another pair of 81s. The receiver is an NC-120X. CZ, who has a single 81 in the final running 150 watts and using an SX-25 receiver. GY, is on the air with a pair of 81s with 500 watts input. GY is using a hopped up SX-25 with a BI-30 preselector and a 455s for receiving. WTPA is Shidler, OK, and will be operating portable with a TBS-50 at Copper River, AK, who has left the Territory for Washington. The first XYLs were Fritz and Lida Haring at Timberline, and Flo and Spargo at Slocumb Mountain. (Note: We need more ECs. If your area is unrepresented, please write.) Official Observers: EMJ, W7W, and W7U. Official Bulletin Stations: JMX, W7EMT, and GHT. Traffic: W7EMT 17, W7U 12, W7A 11, BAA 10, GHT 6.

MONTANA — SCM, Fred B. Tintinger, W7EGN — CT reports a small turnout for Field Day but four operators kept things rolling for CT7. According to radiograms received Butte donated to Field Day stations locations. One message was from CJN/7, five miles north of Butte. A new call involved a portable station. WAA and W7U were received from FLB/7, seven miles south of Butte. AB/7 was at Lake Blaine, near Kalispell, on Field Day and worked 137 stations with less than 30 watts. WAA is a new call in Lewistown and is found on the dashboards. Will have more information on our 7155-kc. nets next month. The following appointments are in effect: Official Relay Stations — EMT (RM), BAX, JMH, and W7U. Official Bulletin Stations: W7U, JMX, W7EMT, and W7U. Official Observer Stations: EMJ, W7W, and W7U. Official Bulletin Station: JMX, W7EMT, and GHT. Traffic: 7, W7ERMT 17, W7U 12, W7A 11, BAA 10, GHT 6.

OREGON — SCM, J. B. Roden, W7NQ — Astoria: BGO is Net Control on OCN one day a week. Bend: OCN, and the other Club members were hosts at a big OCN picnic. ECs from all over the state were present, making future plans for AEC activities. Eugene: W7E, who has the new RM, has plans for more power if US gets some time. Grants Pass: BOG says that a Cubical Quad on 7 Mc. is not impossible and he is planning on the future. Klamath Falls: HYD reports that KQD is making an earnest effort to make WAZ, WAC, or "sumpin," as he...
is buying up a lot of international reply coupons. LaGrande: BBO is new EC for LaGrande Area. KVG is new OBS. NFF is newly-licensed ham. Medford: HLF, the SEC, is active on 3.85-Mc. phone. Oregon: to be having trouble finding out just when some of the Portland Radio Clubs meet. WEN has been recommended for the A-1 Operating Club by WQEGL. They have obtained consistent schedules for the past several years.

Pendleton: BDN reports hearing no Oregon stations from Idaho. ADF is many high-powered nets. ADF has Class 1-2-3-4. JOG is new OBS on 100-meter 'phone. Portland: ESJ is new OBS. GM is mobile on 3.85-Mc. phone. His 'phone rig is divided in two with 100-watt output. FUR says he is going to have the data on correct loading of 3.85-Mc. antennas for mobile use. Piquism AOF is active on 3.85-Mc. phone with a good signal. WORL has qualified a new OBS on 3.85-Mc. antennas for mobile use. Piquism AOF is active on 3.85-Mc. antennas for mobile use. Philomath AOF is active on 3.85-Mc. antennas for mobile use. Pendleton city is now using 30-Mc. antennas for mobile use. Pendleton: WEN has been recommended for the A-1 Operating Club by WQEGL. They have obtained consistent schedules for the past several years.

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These tiny but rugged insulated composition resistors are both color-coded and individually marked for quick, sure identification. Available in ½, 1, and 2-watt sizes, all RMA values. Tol. ± 5% and ± 10%.

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Write for Bulletin 137 "Ohmite Ham Hints" and Catalog 21

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The new Collins 32V-2 is actually the 32V-1 with added features and refinements, which include:

1. Both fine and coarse antenna loading controls operated by a single dial on front panel.
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The new Collins 35C-1 50-ohm three-section low-pass filter, with approximately 0.2 db insertion loss below 29.7 mc, provides approximately 80 db attenuation of harmonic emissions at the television frequencies. This high attenuation is added to that already provided in your present transmitter regardless of model.

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and again is happy that elusive DX. ERS again is making a trip into the mountains. He holds mighty schedule
through the Pioneer Net to the folks at home. VCG now holds Office Station appointment. He is
interested in amateur radio for the DXer who seeks out DX through equipment around surplus FT-18. Field Day brought out many clubs in the area. The Naval Shipyard Radio
Club combined with the Golden Gate High Frequency Club. The San Francisco Radio Club was out and made a
good showing at its previous location at San Luis Park.
As usual many unescorted incidents added to the opening
of Field Day. Summer vacationing has cut down the reports
but let's have what you've got. Please turn your reports in early. Traffic: W9NYL 133, WPQ 37.

SACRAMENTO VALLEY — SCM, Ronald G. Martin, W0ZFW — Asst. SCM; Northern Area, Ray Jensen, 6HEB;
Central Area, W6GAU, Vic Coates, 6AEN; SAC, Ed Korner, 6AT; SCZ.

In custom molded carrying case, Series 30 is ideally dimensioned and ergonomically as a portable, compact
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SPECIFICATIONS

- 6 A.C.-D.C. & Output Voltage Ranges: all at 1000 ohms per volt.
  0-12-20-30-120-600-6000 volts.
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- 3 Resistance Ranges: self-contained batteries.
  0-200-200-2000 ohms and 0.5 megohms.
- 6 Decibel Ranges from -22 to +70 DB.
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- Only 2 Pin Jacks serve a standard function.
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- Anodized, etched aluminum panels.
- Resistant to moisture and wear.

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Model 411, DC, 0-50-500-5000, $4.95
Model 430, AC, 0-50-50, 500-0-500, 5000-0-5000, designed esp. for alignment of FM receivers, 7.95
Model 440, DC, 0-2000-20000, 20000, center scale low range 2 ohms, complete with battery, 6.95

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KL3O, RM: IC. IC advises that NCS for MARS/AF and FOU is Alternate NCS. The IUN will begin operations September 12th at 1930 MST (7 p.m.) on the 21 Mc. band. Wednesday thru Friday, RM IC will be available to assist amateurs during routine operations to report in at that time and date. ZJO is high traffic man this month with a total of 453; he would like a Denver contact for trafic on ZJO. At Delta, W4AMF is waiting for MARS.
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- Hallicrafters S40A      79.95
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- Hallicrafters HT19      359.50
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- RME DB22A               71.00
- Hammarlund HQ-129X      177.30
- Signal Shifter RX kit   49.75
- Telvar T60-2            150.00
- Harvey-Wells TBS-50     99.50
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- Hunter 20A Cyclomaster  169.50
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87
for the local REA. CUG is in Milwaukee for the summer, MOM has a new bug and now is operating for the A-1 Operator's Club. SIFS is experimenting with a Cubical Quad. OTG operates mobile on the Navaio Club. SFS is experimenting with a Cubical Quad. OTG is for the local REA. CUG 8, ODW 3. Chief and buddy, 5CEE, at Hobbs, New Mexico, and will be there by the time this is in print. He also plans a flying trip via United Airlines to Los Angeles. That's all there is, there ain't no more. Traffic: W6ZJO 453, MOM 16, OWP 8, ODW 3.

SOUTHEASTERN DIVISION

LABAMA — SCM, Dr. Arthur W. Woods, W4JJW, A-HA is on 3.85 Mc., with a converted ART/13. PCB is Anniston's newest call. He is 18 years old. CB, CBF, and LEN are on 144 Mc. Forty or fifty people attended the hamfest sponsored by the Aurora gang at Owingsham Park. GSO is in new OQ4, LTR working on Millen exciter. HDF uses push/pull parallel 24Gs on 28 Mc. KTP runs 400 watts on 28 Mc. with Workshop beam. NIK uses Con-Set converter ahead of receiver. OJ needs help to install beam on 28 Mc. LUT has a new jr. operator. DXV is on 14 Mc. MJC is working on a 28Mc. head. NLE is working DX on 7 Mc. The Trans Club already is looking forward to the 1950 Field Day. The gang and the Anniston group both distinguished themselves by sharp operating in the recent Field Day.

EASTERN FLORIDA — SCM, John W. Hollister, jr., F4WZ is — Is your emergency gear ready for National Simulation Test and Emergency Test? Have you checked with your EC? Have you checked into one of the nets? Why wait? This is your time for action. Recent appointments: OPS: CZY, LMG, and NAK. OBS: OBW, OES: AXY. Nels: 3675 kc., 7:30 p.m. daily, except Saturday and Sunday; 7290 kc., same time; 3010 kc., Tues., 6:15 P.M.; and 3050 kc., Sat., 8:15 P.M. Brooksville: MNT, with visitor NJR, put in a long week end of DX and fun. Mar is doing an FB job as RM for Gator Net. Jax: New officials for JARCS include AXE, IKI, and MKP, EC. DD, and his DXCC. DFF, and LFW were among the top scores in the 88. The DXCC is up to 14,000; LXIAS on 14,035; or G3C7F on 14,040, DXC for 7290 kc., net. Reminder: DQW is SEC, for DXCC, 7290 kc., net. DXCC is going to visit his old Navy outfit. Smells like a new SEC to us. Traffic: W4IQV 314, OBW 47, OA V 30, MVJ 9, FWZ 8. AYX 3.

AMERICAN PHENOLIC CORPORATION

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for the local REA. CUG is in Milwaukee for the summer, MOM has a new bug and now is operating for the A-1 Operator's Club. SIFS is experimenting with a Cubical Quad. OTG operates mobile on the Navaio Club. SFS is experimenting with a Cubical Quad. OTG is for the local REA. CUG 8, ODW 3. Chief and buddy, 5CEE, at Hobbs, New Mexico, and will be there by the time this is in print. He also plans a flying trip via United Airlines to Los Angeles. That's all there is, there ain't no more. Traffic: W6ZJO 453, MOM 16, OWP 8, ODW 3.
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Mail me your FREE 24 page booklet.

Check field of greatest interest:
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☐ BROADCASTING ☐ AERONAUTICAL RADIO ENGINEERING
☐ RECEIVER SERVICING ☐ INDUSTRIAL ELECTRONICS

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

☐ I am entitled to training under the G. I. Bill.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Vincent J. Haggerty, W6DOI
--- Asst. SCMs, Irvin O. Hege, WBFY, and William J. Schuch, SCMN.
SEC: Edward W. Arons, W6QYD.
Phone Activities Manager MVK's report, Tom included a picture of his beams topped with a 32-element 144-Mc. array 63 feet up on 28 Mc, and doing well with low power; his mobile rig at 24.5 watts input has netted 32 countries. QUK has a Tilton four-element beam on 60 Mc. DFP is the call of Glendale High Radio Club. KB4J has a new jr. operator, N2P is president of the YL Club of Los Angeles. YKL and NA2Z have been making out copies of the new "Directory of all YLRL members." The Young Ladies League of 32 countries. QuK has a Tilton four-element beam on 28 Mc. DFP is the call of Glendale High Radio Club. KB4J has a new jr. operator, N2P is president of the YL Club of Los Angeles. YKL and NA2Z have been making out copies of the new "Directory of all YLRL members." The Young Ladies League of 32 countries. QuK has a Tilton four-element beam on 28 Mc. DFP is the call of Glendale High Radio Club. KB4J has a new jr. operator, N2P is president of the YL Club of Los Angeles. YKL and NA2Z have been making out copies of the new "Directory of all YLRL members." The Young Ladies League of 32 countries. QuK has a Tilton four-element beam on 28 Mc. DFP is the call of Glendale High Radio Club. KB4J has a new jr. operator, N2P is president of the YL Club of Los Angeles. YKL and NA2Z have been making out copies of the new "Directory of all YLRL members." The Young Ladies League of 32 countries. QuK has a Tilton four-element beam on 28 Mc. DFP is the call of Glendale High Radio Club. KB4J has a new jr. operator, N2P is president of the YL Club of Los Angeles. YKL and NA2Z have been making out copies of the new "Directory of all YLRL members." The Young Ladies League of 32 countries. QuK has a Tilton four-element beam on 28 Mc. DFP is the call of Glendale High Radio Club. KB4J has a new jr. operator, N2P is president of the YL Club of Los Angeles. YKL and NA2Z have been making out copies of the new "Directory of all YLRL members." The Young Ladies League of 32 countries. QuK has a Tilton four-element beam on 28 Mc. DFP is the call of Glendale High Radio Club. KB4J has a new jr. operator, N2P is president of the YL Club of Los Angeles. YKL and NA2Z have been making out copies of the new "Directory of all YLRL members." The Young Ladies League of 32 countries.
Sylvania
IN34 crystal diodes 85e each
Amphenol
Tubular 300 ohm TV lead-in, per ft. 5e
Amphenol
Tubular 300 ohm 1KW twin-lead per ft. 7e
McMurdo Silver
903 Absorption Wavemeter, less coils 3.50
Plug-in Inductors
for 903 Wavemeter.
Type Range Each
100 1600-3700 Kc. 75e
101 2500-8000 Kc.
102 8.0-15.0 Mc.
103 17.0-40.0 Mc.
104 40.0-100.0 Mc.
105 100-300 Mc.
627 PIONEER PUNCHES—all sizes in stock.
See Pioneer's GFT ad for sizes, prices.
See the new Johnson ROTOMATIC amateur beam antenna in operation at TERMINAL!
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GUARANTEE—Every item sold by Terminal. Radio Corporation is fully guaranteed.
25% deposit required with mail orders. Regular terms to rated firms. Prices are F.O.S. New York.

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85 CORTLANDT STREET • NEW YORK 7, N. Y.
LOOK

3-GANG CONDENSER

300 MMF per section, ceramic insulated, free-turning ball-bearing rotor. Perfect grid bias control for average final. 2500 ohm, able to trim condenser down to any desired lower capacity. Don't miss this chance to get a beautiful condenser like this at a ridiculous price...

$9.50

HIGH VOLTAGE FILTER

Aerovox Type 2509 2 Mfd. 2500 VDC oil filled transmitting filter condenser, ceramic pillars fitted with lockouts and soldering lugs, mounting bracket, regular list $19.75.

$2.95

2 MFD 1000 VOLT

Oil-filled condenser, single mounting hole, negative can, with nut.

59¢

LEACH 115 V. AC RELAY

2-pole, double throw, 4 Amp contacts, compact, new, boxed, $4 value.

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GRID BIAS CONTROL

2500 ohm, 25 watt Clarostat potentiometer, perfect grid bias control for average final, worth $4.95, brand new, boxed.

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Send 20% deposit on C.O.D. orders.

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633 WALNUT STREET—CINCINNATI 2, OHIO

From all reports it was a huge success and everyone who did get in on it had a swell time. The San Diego YLs had an excellent set-up and really put their club on the map. Soledad Radio Club had a very complete and well-planned program headed by YXE. Incidentally, it is the newest affiliated club in this section. Congratulations to PQM, the brand-new ORS and OPS appointments, came up with the highest traffic score for the month. Anyone knowing the present whereabouts of OBD, please drop a card to SCM. The Southern Border Net shifted to 7285 kc. on July 7th. Time: 8:30 P.M. PST. An excellent picnic was held by the Old Care Net at Cliffe Park, Ft. Smith, on the 3rd. Time: 8:00 P.M. on 29.5 Mc. Everyone enjoyed a great time. During the summer months seem to be taking their usual toll of activity but 1 hope things will pick up shortly. 3.85-Mc. mobile operation is increasing daily and any emergency group should keep a local emergency work. How about a nationally-recognized mobile frequency? There seem to be two frequencies here in Southern California where operation takes place. These are 3510 and 3995 kc. Any suggestions?


WEST GULF DIVISION

NORTHERN TEXAS — SCM, Joe G. Buch, W5CDDU — About the time this report reaches your mail box many of you will be packing and getting ready for the big ARRL West Gulf Convention at the Baker Hotel, Dallas. It is going to be a golden opportunity to meet the fellows you have been QSLing for a long time but have not had the pleasure of meeting in person. You'll regret it if you don't meet the gang in Dallas on Aug. 27th and 28th. Special meetings for QC and traffic net members are on the agenda. A special get-together is planned for CAA personnel. The YXGs are promised a special program of unusual interest. Headquarters representatives will be here to meet and greet you.

We'll be looking for you, QDF is a new ham in Clarendon and is working 7-Mc. e.w. with an ARC-5. Too much work is QRMMing the activities of BRK. Mr. and Mrs. IZQ have a new daughter, KUP flew to New York for a vacation and will return the return trip in his homemade car. MAN h.p. was shipping all districts except WI on 50 Mc. and keeps daily schedule with Houston on 50 and 144 Mc. DAS claims 16 phones as LAX on 420 Mc. FQK is active on 50 Mc. every Monday. BEEF keeps schedules with his brother, BYF, and his brother, BSC. YXC is on 3.85-Mc. 'phone. GZU again makes BPL for the fifth consecutive month — a real record. AAO, YXE, SCM has made the following EC appointments: FFX, ICB, FPH, DAX, KWH, IWQ, and PTK. Traffic: W6GZU 724, BKB 7, LTY 2.

OKLAHOMA — SCM, Frank E. Fisher, W5AHIT/AST — SEC: HQC. RM: MBV. My apologies to the gang for missing last month's report — too much business QRM. Because of light attendance OLZ goes on a three-day schedule in July, Tuesday, Thursday, and Saturday, with free net procedure. (TJ has a new rig on 7 Mc. with pull-push ladders) K5NRF schedules GZU and W4PL on 7 Mc. to clear traffic for OLZ. OWV has been pinch-hitting as head of OLZ and doing a nice job. New net members are UCB/LA5, JSE, W5ZV, GJU, W5KV, AER and JPB. BEF keeps schedules with his brother, BYF, and his brother, BSC. YXC is on 3.85-Mc. 'phone. GZU again makes BPL for the fifth consecutive month — a real record. AAO, YXE, SCM, has made the following EC appointments: FFX, ICB, FPH, DAX, KWH, IWQ, and PTK. Traffic: W6GZU 724, BKB 7, LTY 2.

SOUTHERN TEXAS — SCM, Ammon O. Young, W5DJN — DAA, BAJ, EYV, HH, and PZJF were active in the Field Day Contest. DAA is going mobile. NIY is on 3.5- and 14-Mc. w. PLE has one of the Federal transmitters on 28-Mc. 'phone. IX has now 25-14-Mc. 'phone job, after being a complete failure. He is trying to get his e.w. speed up, SMV now is Class A and will be on 14-Mc. with a three-element beam. FS, ex-1NAO, is building a 6-meter luxex receiver. MIK is using the same transmitter in his car and his plane. ACL is on 28-Mc. 'phone. FNI is trying to eliminate T.V. LNB will be operating from 8 KWH this summer and fall. Traffic: W5DAA 8, MN

NEW MEXICO — SCM, Lawrence R. Walsh, WS7MA — SEC: G7. RM: NX5. PAM: FAG. The Los Alamos Radio Club elected the following officers for this month: DX, vice-pres.; UVA, vice-pres. and sect. mgr.; O11, secy.-treas. NXE took a vacation back to Indiana this month. NEF and his daughter, KL7WQ, had a good summer. "Queenie," the Sandia Radio Club has volunteered to organize the State Hamfest (Continued on page 94)
Custom Made Technical Ceramics

For Electronic and Electrical Uses

SOLD ONLY TO MANUFACTURERS

AMERICAN LAVA CORPORATION
48TH YEAR OF CERAMIC LEADERSHIP
CHATTANOOGA 5, TENNESSEE
again this year. Scoopy Groves, our Director, has promised to attend if at all possible. The New Mexico August Field Day event will begin with prizes for the winners in the emergency-powered class and the commercially-powered class stations. For details write the RM, NXL. (Acting SEC while Mert is on the West Coast.) FAQ is moving to Socorro. BIW and his XYL, DRA, now have a new steel door from which he can operate. He has acquired the DXCC certificate with his car, NNE, and his bride are back in Albuquerque. LQS is helping Fitz put up a three-element beam. LQS now has 155 countries with YJ1AA, VR3C, and Burma being his latest.

CANADA MARITIME DIVISION

MARITIME — SCM, A. M. Crowell, VE1DQ — SEC: FQ, RM; GL, KS, new PAM, now is OQ. High traffic run this month was BK with a total of 104 WPM recorded. He has sent his ticket and is on 28-Mc., phone and 3.5-Mc. CW. U7, one of our girls, now has Class A ticket and is on 3.5-Mc. phone as well as 14 and 28 Mc. ZM has been busy and is a new man for Canada for the YLRL for the current year. UT was recent visitor to the shack of KS, GEU is on 3.5-Mc. phone again and is waiting for his ticket. AEU is now operating DXCC and is also on 3.5-Mc. phone and 28 M.c. BVR is excellent in his own way — quite active with 15 operators at Roy's Island. The HARC boys now have a technical service information service in charge of HG. Tt is purely a problem to them to get equipment for the Question Box. 2DJ has arrived back home after visiting some of the local boys. HT is now an O.M.M. (Old Married Man). We received in on the Maritime Net (phone and 3760 ke.) a few nights ago and heard some nice operating. How about some news, fellows? BCNU at the Convention in Halifax. Traffic: VE1B K 150, MR 50, FZ 22, YO 10, FQ 8, RS 1.

ONTARIO DIVISION

ONTARIO — SCM, Thomas Hunter, Jr., VE3CP — Asst. SCM, M. J. McMonagle, WA3VI; SEC: KM, RM: ATR, AWE, BUR, DG, BI, BMG, TM, and WZ; VAM: DD, U5, and RS. New appointments include MA, BAN in CAR as ORS, BMG as RC, and AIV as AIV. AIV is having receiver trouble. AKS has another daughter, BUG is after ORS appointment. EEK has SID on 28-Mc. phone. BSX is using a three-element rotary on 28 Mc. OR has heard on any of the phone bands. AB3 finally settled in new home. BIA now has CP certificate and is on 3.5-Mc. phone and is back on from Toronto. BUR is on T/O and Beaver Net regularly. DH3 is now located at No. 6 Repair Depot, R.G.A., Trenton. BVR is after ORS ticket. FT is after his degree from McMaster's and has very little time for operating. TG is forced to give up ORS appointment as he is too busy at the store. He has been an operator for some time.

EASY TO LEARN CODE

It is easy and pleasant to learn or increase speed the modern way, with an INSTRUCTOGRAPH Code Teacher. Excellent for the beginner or advanced student. A quick, regional and dependable method. Available tapes from beginner's alphabet to typical messages on all subjects. Stressed range 5 to 40 WPM. Always ready, no QRM, beats having someone send to you.

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Plan Your Own TV Installation and Save Money!

**Model T-69**

15" Custom TV Chassis Complete With Picture Tube

Now you can have big picture television at a real saving in price plus the convenience of a custom installation to exactly suit your own requirements. 130 sq. in. picture on 15" direct view tube. All channel push button tuning. 8" PM speaker. Mounted on reinforced wood frame ready to be slipped in cabinet, wall installation, etc. Dimensions 19½" high x 23½" wide x 24½" deep. Factory wired and tested. 19 tubes plus picture tube and 3 rectifiers. Complete with 15AP4 Tube. Shpg. Wt. 80 lbs. ONLY

$259.50

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**Model 513**

10" Plastic Cabinet

New 10" table model in modern plastic cabinet. 56 sq. in. picture with rounded sides utilizing full width of TV tube. 19 tubes plus 3 rectifiers. Complete with 12LP4 picture tube. Shpg. Wt. 98 lbs. ONLY

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**Model T-64**

12" Custom TV Chassis Complete With Picture Tube

Plan your own TV installation and pay no more for big picture TV direct view custom chassis than you would for a regular 7" set. 84 sq. in. picture plus dual-focus giving a big 95 sq. in. round picture, all at a flick of a switch. All-channel push button tuning. Mounted on reinforced wood frame. Dimensions 13½" wide x 17½" high by 20" deep. Factory wired and tested. 19 tubes plus picture tube and 3 rectifiers. Complete with 12LP4 picture tube. Shpg. Wt. 66 lbs. ONLY

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Send for illustrated catalog featuring Hallicrafters Television Receivers.

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Walter Ashe Radio Co.
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CITY
ZONE
STATE
There are scores of uses for this handy little gadget. A polystyrene block with pins spaced to fit standard ½ inch crystal sockets—or alternate pinholes in octal sockets.

**Radar, Communications and Sonar Technicians Wanted**

For Overseas Assignments

**Technical Qualifications:**
1. At least 3 years' practical experience in installation and maintenance.
2. Navy veterans ETM 1/c or higher.
3. Willing to go overseas for 1 year.
4. Men qualified in RADAR, COMMUNICATIONS or SONAR give complete history.

**Personal Qualifications:**
1. Age, over 22—must pass physical examination.
2. Ability to assume responsibility.
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4. Willing to go overseas for 1 year.

Base pay, bonus, living allowance, vacation add up to $7,000.00 per year. Per diem based on overseas station, ADA, 4050 West 4th Ave. A B.C. net has been organized with YI as NCS, YI has set the new into good shape and it can handle all any traffic. Listen nightly at 2200 hours on 3655 kc. for an invitation to break in with traffic. All prior nets covered your traffic through the BUN. Members include AEU (RM), AKI, ALP, AOE, EH, ID, ME, MX, OD, OL, PM, TP, VG, XA, XX, and 11(NGS). Traffic: VE70D 49, YI 13, AKI 12, ID 10, AEU 8, JM 6, DJ 4, AC 3.

**National Traffic Plan**

(Continued from page 61)
PLATE TRANSFORMERS
For Small Transmitters. DC Voltage Ratings are Approx. Values. Obtained at Output of a second Section Choke Input Filter, Using Mercury Vapor Rectifier Tubes. Price for Small Transmitters. DC Voltage Ratings are Approx. Values. Type 941 6.3VCT 10 Amps. 2500V Ins. $3.38

HORIZONTAL BLOCKING OSC, turns ratio nectars, each unit, installation.

May be placed side by side, one above the other, etc., common to the cabinet. Simply plug in the cable connectors. Each unit is rotorized and built to meet National standards of performance.

TV-10C Chassis less picture tube & cabinet

$149.50

TV-10W Same Chassis with 10" picture tube & handsome genuine mahogany cabinet

$269.50

1. Operates 10" or 12" picture tube-
2. Tunes all 12 channels, 3. Wired. pre-tuned and tested—at a kit-
4. RF stage employs tuned grid and plate transformer for maximum gain and optimum plate current, 5. Simple plug in, easy to install, 6. Fine tuning control covers range of 2 to 3 mc, for maximum tuning accuracy.

GRID DIP METER
LYSCO “DIPMASTER”
13 Mc to 150 Mc frequency range, icalibrated dial, Ideal for Signal Generator, 3.4 monitor, F. M. meter, or absorption wavemeter. Phase meter, power supply and good buy at $33.50

SKYFIRE VOLTAGE STABILIZERS
Positive Stabilization = 1%. Input 95-130 volts, 60 cycles single phase; output 115 volts stabilized to ±1%. *Output 6.0 or 7.5 volts stabilized ±1%.

RAYTHEON VOLTAGE STABILIZERS

Improves picture quality, reduces screen (noise) lines, and eliminates coupling of broadcast receiver and TV receiver. A $22.00 value for any TV set or black and white receiver.

Our 27th Year

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75 Vesey Street
Dept. QS 8
New York City 7
This of course will not be necessary in the Pacific-area net, although representatives from the Pacific Islands will be welcomed on this net. Thus the Eastern-area net will need three such representatives, the Central-area net two and the Mountain-area net one. If a shortage of stations for this purpose should exist, one station could of course handle the whole job, but different stations should be used if possible.

Needless to say, traffic in the area nets, and to a lesser extent in the regional nets, will have to be handled at high speed and high efficiency, and the most proficient operators available will be needed. Our present crop of high-speed operators fit very nicely into this picture; low-speed and beginner operators can fit in at lower levels, acquiring proficiency until they, too, can take an active part in higher-level nets.

There are several things you can do to help, regardless of your status as a traffic-handler:

1. Participate in your section traffic net, if it has one. The section traffic net is the foundation of the whole system. If there is none in your section, get your section leaders (SCM, RM, PAM) to get one started, or request permission of the leaders of an adjoining section to become a member of their traffic net. If your section traffic net is too fast, get a slow-speed net started, or ask your section-net manager to slow down to your speed. If most of the section interest is on phone, use phone. Listen to acquaint yourself with net procedure. ARRL will send you a list of "QN" signals upon request, or you will find them in Operating an Amateur Radio Station.

2. Originate some traffic. If every active station originated one message every day, we would have plenty of good traffic to keep us all busy. No traffic system can function without traffic to handle, and a busy net is a progressive net.

3. Volunteer to your section-net manager to report into a higher net, if you have the time and feel you can maintain the pace. He will appreciate your services, and you need make yourself available only when you have some free time.

4. Talk over the plan at your radio club and get more recruits for your section net(s), phone or c.w., low or high speed.

There is more to it than just this, of course. Many questions will need answering. If you have read this far you must be interested, and in that case you should drop us a line for a copy of the mimeographed details. The ARRL National Traffic Plan is something new, absurdly simple in its basic concept and yet completely workable into an integrated national organization better than any we have ever had. But no traffic organization, however perfect on paper, will work without support. Have we yours?
CRYSTALS! All crystals have Army MC harmonic resistors but Stone encloses directions for deriving the correct fundamental frequency in kilocycles.

JUST ARRIVED! NEW FREQUENCY CRYSTALS FOR HAM AND GENERAL USE—FI-243 Holders, 7/8" pin spacing (Fractions Omitted)

**GENERAL USE**

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**HAM USE**

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**Crystal Assorted Miscellaneous**

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**CRYSTALS WITH A MILLION USES**

Fractions Omitted

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<td>49c each</td>
<td>$3.89</td>
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**ODDS AND ENDS WAR SURPLUS EQUIPMENT**

WALKIE-TALKIES, SCR-195, $2—05 mc for mobile or portable use, maximum range 15 miles, brand new. With spare parts. Per pair...$13.95

SPERRY AMPLIFIER, 4-tube, Elevator Servo-Amplifier, used as voltage and audio to operate relay. Contains 4 tubes. New...$3.95

12" CATHODE RAY TUBE, 125G7, electronic, tested for resistance, speed in sturdy case, brand new...$9.95

PHONOGRAPH, Portable windup type, heavy spring motor, adjustable speed, in sturdy case, brand new...$9.95

INTERCOM AMPLIFIER, AM-26, 3-L2A, 2-125G7 tubes, own motor, instructions for conversion to a Hi-F, include microphone. Brand new...$9.95

Clearance of Odds and Ends of REGULAR STOCK

OSCILLOSCOPE, Pilot, Waterman Pocke特种, Regular $60.50. Only...$39.95

GONSET, 20-meter converter, Regular $30.95. Only...$29.95

FAMOUS MAKE BUTTERFLY TRANSMITTING CONDENSERS

**SPLIT STATOR**

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**All New—F.O.B., Washington, D. C.**

LONG-PLAYING RECORD PLAYERS, 33 1/3, Carphone, manually operated, attach to radio...$9.95

SPECIAL BUY ON POTENTIOMETERS, Assorted, single, dual, long and short shaft, RCA, WIRL and many other famous makes, Complete...$1.99

AUTOMATIC RECORD CHANGERS, G. J. Play 10-125 m. or 12-10" records, new. Regular $29.95. Only...$14.95

V.M. Single speed intermix, record from new console combinations. Regular $39.95. Only...$19.95

SIGNAL GENERATOR, Approved A-300, 100 kc—25 mc, on fundamentals, RF & AF output. Regular $47.50. Only...$24.95

AMPLIFIER, for musical instruments, two inputs, AC operated, built-in volume and tone controls. Regular $65.00. Only...$24.95

**20 WATT P.A. AMPLIFIER, P. O. output, 6 tubes, 300-350 mc, volume and tone control. Regular $25.00. Only...$12.95**

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The above comes complete with all necessary accessories and mounting hardware. Order direct or through the Motorola National Service Organization member in your area.

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MOTOROLA INC.
Amateur Sales Dept. QST-SEP.
1327 W. Washington Blvd. Chicago 7, Illinois
Attention: Harry Harrison W9LLX
Telephone — Taylor 9-2200 Ext. 161

Audio Image Rejection

(Continued from page 19)

In receivers using diode detectors it is also necessary to connect the low side of the last i.f. transformer secondary directly to chassis. This short-circuits the diode load resistor and prevents an audio voltage from appearing across it because of ordinary rectification in the detector in the adapter. An audio voltage so developed is independent of the desired detector action, and will get into the audio circuits to obscure the operation of the phasing system. In the NC-57 this short circuit was made automatic, on inserting the plug in the accessory socket, by running a wire from the i.f. transformer secondary to an unused contact on the accessory socket, the actual ground then being made through the cable plug. The filament and plate voltages for the adapter are taken from the receiver through the same socket. The plate current is only a few milliamperes and any receiver is capable of supplying it. The filament current is 1.2 amp., which may be a little heavy for some receivers. Actually, the increased filament drain is 0.9 amp., since the set’s regular detector, which normally takes 0.3 amp., is removed.

With the adapter in operation the receiver’s a.v.c. is inoperative, as is also the noise limiter (if the receiver has one), but neither of these is of much use in c.w. reception. To restore normal operation it is only necessary to replace the detector tube in the receiver and open the short between the low side of the i.f. transformer secondary and ground. Phone signals can of course be received on the adapter by shutting off the b.f.o., but without a.v.c.

All the components fit quite nicely in a 2 by 4 by 4 box. To facilitate wiring the box is sawed through at diagonally opposite corners.

One half is fastened to the end plate on which the tube sockets and i.f. transformer are mounted, forming a “chassis.” All parts are easily accessible before assembling the other half and second end plate.

Aside from the desirability of matching the values of $R_5$ and $R_7$, as well as the values of $C_8$ and $C_9$, there are no especially critical values anywhere in the circuit. The unit specified for $R_8$, the rejection control, has a tapered resistance curve, which is desirable because a linear curve tends to cramp the operating range at one end of the control. The end with the slow resistance change should be connected to ground. The i.f. transformer, $T_1$, is preferably of a type that has good electrical stability, since a drift in tuning will affect the r.f. phasing. Incidentally, the receiver’s b.f.o. should be allowed to warm up thoroughly before the detector is aligned, because a change in b.f.o. frequency also affects the phasing.

The alignment procedure with the adapter is exactly as described earlier. The audio signal for aligning the phasing circuit should be applied to

*This idea was borrowed from the construction of a selective audio amplifier soon to be described in QST by W6QYT.*
NEWARK ELECTRIC CO., INC.

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NEWARK SCOOP! BC-221 FREQUENCY METERS $99.50

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Big Bargain! Perfect for building a rugged power supply, conservatively rated. Built for continuous operation.

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316A DOORKNOB TUBES 29¢ for $1.50

3CP/1/$.89 2 for $1.50

3 for $2.25

211 .29 6 for $1.59

383 2 for $1.59

2 for $1.59

380 2 for $1.59

3.65

6.95

1.39

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Alliance "Tenna-Rotor" without Direction Indicator. No. 16180......$23.49

4-Conductor Cable, for Alliance Rositor. No. 41616......$3.50

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REX L. MUNGER COMPANY
4701 Sheridan Road, Chicago 40, Ill. the left-hand contacts of $S_1$, during which time the connections between $S_1$ and the detector should be removed. These connections may be restored after the audio alignment is completed and prior to the detector alignment.

The ability to phase out a signal on the other side of zero beat is a feature that becomes more appreciated with continued use. Combined with audio selectivity, with the rejection control set to take out a signal having the same beat tone on the other side of zero beat, the single-signal effect is very marked. The combination is a worth-while addition to any “straight” superhet and, with a reasonably sharp audio peak, the selectivity in e.w. reception will give good competition to sets having crystal filters.

The Gamma Match

(Continued from page 31)

The whole arrangement seems to work equally well at all points in the ten-meter 'phone band. The match at the antenna was made at 29.1 Mc. Element lengths were taken from graphs in the 1949 Handbook. The element spacing is approximately 0.2R-0.15D, to make full use of the 12-foot 2 by 2 aluminum boom on hand. The elements are ¾-inch diameter, with ½-inch diameter pieces telescoped in the ends. A leftover piece of the ⅝-inch tubing was used for the Gamma match. An extra ground wire was run from the aluminum mast direct to a good ground outside the house, for lightning protection.

I like the Gamma match fine — it's so very simple to build and adjust!

450 Watts on V. H. F.

(Continued from page 27)

The amplifier is tested for 144-Mc. operation with the 50-Mc. plate coil removed and with the shorting bar across the resonant lines. The one addition to the test procedure outlined above is adjustment of the screen tuning condenser. This is done prior to the check for self-oscillation. After applying filament voltage and excitation, the condenser is adjusted for minimum feedthrough as indicated by a sensitive rectifier-type wavemeter coupled to the plate lines. A second, and perhaps more simple method, is to remove the excitation, apply the plate voltage and then tune for zero grid current. The setting of the screen control is very critical, but with care a position can be found which will hold over most of the 144-Mc. band. The most accurate way of setting the adjustment is to try for a position where maximum grid current and minimum plate current occur at the same setting of the plate tuning condenser.

An output of 250 watts is readily obtainable at 50 Mc. and about 200 watts on 144 Mc. Such power is probably all you will ever need or want on either band, and most of the time you'll be content to let the tetrodes loaf at an input 200 watts or so.
ELECTRONIC WHOLESALERS, INC.
PRESENTS
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Now you no longer need to buy a whole new cabinet when you want additional panel space. Through new and exclusive Add-a-Rack series, BUD not only offers additional racks at a lower cost, but provides you with a sturdier, better looking assembly!

<table>
<thead>
<tr>
<th>Add-A-Rack Unit</th>
<th>To Add-a-Rack to</th>
<th>Panel Space</th>
<th>Price</th>
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<td>CR-1774</td>
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<tr>
<td>AR-1775</td>
<td>CR-1771</td>
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<td>61¼&quot;</td>
<td>40.75</td>
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<tr>
<td>AR-1777</td>
<td>CR-1773</td>
<td>77&quot;</td>
<td>48.00</td>
</tr>
</tbody>
</table>

Prices are 10% higher west of the Mississippi River.

Complete unit, consisting of the knocked-down parts necessary for two relay racks coupled together.

<table>
<thead>
<tr>
<th></th>
<th>AR-1774 (CR-1774)</th>
<th>CR-1774 (AR-1778)</th>
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<td></td>
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<td>Two coupled relay racks same size as</td>
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<td>CR-1799</td>
<td>Two coupled relay racks same size as</td>
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<tr>
<td></td>
<td>CR-1777</td>
<td></td>
</tr>
</tbody>
</table>

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Use it to align receiver tuned circuits, determine frequency of transmitter tuned circuits with power off, transmitter neutralization, find parasitic oscillations. Frequency Range: 1.7 to 300 megacycles in seven overlapping ranges.

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Happenings (Continued from page 88)

that if a candidate's membership was interrupted by reason of service in the armed forces of the United States or Canada between September 1, 1939, and May 8, 1947, he shall not be deemed to be disqualified so far as concerns continuity of membership if within those dates he resumed his League membership within the 90 days following his release from active military service. He must be without commercial connections: he may not be commercially engaged in the manufacture, selling or renting of radio apparatus normally capable of being used in radio communication or experimentation, nor commercially engaged in the publication of radio literature intended, in whole or part, for consumption by licensed radio amateurs. Further details concerning eligibility are given in By-Law 12. His complete name and address should be stated. The same requirements obtain for alternate as for director. All such petitions must be filed at the headquarters office of the League in West Hartford Conn., by noon EDT of the 20th day of September, 1949. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of alternate. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must sign in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominees are occasionally found not to be Full Members in good standing; it is not necessary that the petition name candidates both for director and for alternate but members are urged to interest themselves equally in the two offices.

League members are classified as Full Members and Associate Members. Only those possessing Full Membership may nominate candidates or stand as candidates; members holding Associate Membership are not eligible to either function.

The present directors and alternates for these divisions are as follows: Canadian General Manager, Alex Reid, VE2BS; Alternate Canadian General Manager, Leonard W. Mitchell, VEGAZ. Atlantic Division: director, Walter Bradley Martin, WSQV; alternate, Henry W. Wickenshire, Jr., WS7KA. Dakota Division: director, Goodwin W. Doolan, W0TSSN; alternate, Robert A. Kitter, W0BLK. Delta Division: director, Victor Canfield, WS8H; alternate, James W. Watkins, WS8T8. Great Lakes Division: director, Harold C. Bird, W2HJSP; alternate, John H. Bragg, W8XAE. Midwest Division: director, Leonard Collett, W6SDA; alternate, Alvin G. Keesey, W0XTQ. Pacific Division: director, William A. Ladley, W6BSD; alternate, Kenneth E. Hughes, W6CDS. Southeastern Division: director, William C. Shelton, W4ASR; alternate, William P. Sides, W4AUP.

Full Members are urged to take the initiative and to file nomination petitions immediately.

For the Board of Directors:

A. L. BUTLAND
Secretary
July 1, 1949

Single Sideband (Continued from page 84)

a consistent Oceania contact. From VK3UM we learn that VK3LE and VK4WJ are on the air with single sideband, but dope on the rigs isn't available for this edition.

Dale of W7JCU has moved from Montana to Eugene, Ore., where he is still carrying on with single sideband on 75. Plans call for a try at 20 after the big final is shipped to the new location.

A new one in New England is W1SHN at Winchester, Mass. Jim, ex-W2SMA, ex-W4ECP, runs 700 watts peak to a pair of 810s on 75. The exciter is patterned after that of W2UNJ. Activity so far has been mostly early evening round-
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★ E-Z PAYMENT PLAN. If you want to keep your Globe King — and I'll bet dollars to doughnuts you will — it'll take only a 20% down payment with the balance payable to suit your convenience. It costs less to deal with me because I finance my own paper.

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Housed in metal case, 3½" x 3½" x 1½". 34.50
Western Electric core P140930, 1.65
Western Electric core P281895, 1.65
Write for details on other filters and components
FRED M. BERRY, W9MNN
1200 East 49 Terrace Kansas City 4, Mo.

I.A.R.U. News
(Continued from page 40)

It will not be necessary to send QSLs unless especially requested; log extracts will be sufficient. A fee of 5/- ($1.00 in U.S. currency) is required for each certificate. These awards are being made from 1946 on. Decisions of the R.S.E.A. award committee shall be final. Your applications should be forwarded in an envelope marked "Special Award" to P. B. Dodd, VQ5PBD, Special Awards Manager, c/o East Africa QSL Bureau, P. O. Box 1313, Nairobi, Kenya Colony, British East Africa.

FINLAND
The Suomen Radioamatöörititto, Finnish amateur radio society, is sponsoring a DX competition among its members, from July 1st to the end of the year. A handsome silver cup, donated by OH7NF, is to be awarded the winner. Scoring is based on the number of prefixes and call areas worked, with additional points for making WAC on the various amateur bands, both 'phone and c.w. The S.R.A.L. hopes that fellow-amateurs throughout the world will cooperate by QSOing as many OH hams as possible.

DX Contest
(Continued from page 44)

<table>
<thead>
<tr>
<th>Union of South Africa</th>
<th>Hong Kong</th>
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<tbody>
<tr>
<td>ZS7FE .............................. 6,516-18-121-A-45</td>
<td>V05BA</td>
</tr>
<tr>
<td>ZE8BF .............................. 3,325-36-34-A-7</td>
<td>ZS2BW</td>
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<tr>
<td>ZS18H ......................... 3,332-36-34-A-7</td>
<td>ZS2HM</td>
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<tr>
<td>ZS120 ...................... 15-3-3-A-13</td>
<td>4X4C</td>
</tr>
<tr>
<td>ZS1SW ..................... 27-3-A-13</td>
<td>4X4CE</td>
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<tr>
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<tr>
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<table>
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<td>V05BA</td>
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<table>
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<tr>
<th>Korea</th>
</tr>
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<tbody>
<tr>
<td>0X5BA</td>
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</tbody>
</table>

Other prefixes marked "B" were worked by the Q4T station.

(Continued on page 108)
THE ALL-TIME, leading popularity of Astatic Microphones now goes DOUBLE. All models shown are available with ceramic as well as crystal elements. The growing acceptance for the ceramic types has placed them almost shoulder to shoulder—in point of preference—with the tried-and-true favorites, the crystal units. Here, to aid you in your personal choice, is the technical data on each:

**SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Output Level</th>
<th>Range</th>
<th>Response Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-104</td>
<td>-48 db.</td>
<td>30-7,500</td>
<td>Rising</td>
</tr>
<tr>
<td>T-3</td>
<td>-52 db.</td>
<td>30-10,000</td>
<td>Substantially flat</td>
</tr>
<tr>
<td>JT-30</td>
<td>-52 db.</td>
<td>30-10,000</td>
<td>Rising</td>
</tr>
<tr>
<td>JT-40</td>
<td>-52 db.</td>
<td>30-10,000</td>
<td>Rising</td>
</tr>
<tr>
<td>200</td>
<td>-52 db.</td>
<td>30-10,000</td>
<td>Rising</td>
</tr>
<tr>
<td>241</td>
<td>-52 db.</td>
<td>30-10,000</td>
<td>Rising</td>
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<tr>
<td>D-104-C</td>
<td>-58 db.</td>
<td>30-7,500</td>
<td>Rising</td>
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<tr>
<td>T-3-C</td>
<td>-52 db.</td>
<td>30-10,000</td>
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<tr>
<td>VC-1</td>
<td>-62 db.</td>
<td>30-10,000</td>
<td>Rising</td>
</tr>
</tbody>
</table>

Letter "C" in model number designates ceramic unit.

---

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<table>
<thead>
<tr>
<th>Country</th>
<th>Callsign</th>
<th>Frequency</th>
<th>Power</th>
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<td>100 W</td>
<td>AM</td>
</tr>
<tr>
<td>USA</td>
<td>KE2</td>
<td>62,375-62,385</td>
<td>100 W</td>
<td>AM</td>
</tr>
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<td>62,375-62,385</td>
<td>100 W</td>
<td>AM</td>
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**European Courses**

- **Austria**
  - OEICD
  - OEIAD
  - OEIR
  - OEIRF
- **Belgium**
  - OMAZ
  - OMBB
  - OMVE
  - OMNF
- **Czechoslovakia**
  - OKLM
  - OKIRW
  - OKIT
  - OKIKQ
  - OKIZM
  - OKIXQ
  - OK0ZD
  - OKOL
  - OKOZ

**Democratic Republic of the Congo**

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**Swedish Courses**

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<tr>
<td>Sweden</td>
<td>EBAM</td>
<td>62,375-62,385</td>
<td>100 W</td>
<td>AM</td>
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**Additional Information**

- **DXCC Credits**
  - **USA**
  - **Europe**
  - **Asia**
  - **Africa**
  - **Oceania**

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**Jobs in TELEVISION**

**Free Employment Service + GI Approved**

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Popular with hams and commercial operators, the B & W split stator, butterfly type variable capacitor has now been adapted to small compact units, having a frontal area of approximately 25% of the larger CX types.

These JCX type variable capacitors, ideal for medium powered triode or tetrode stage plate circuit applications, are built of aluminum with stainless steel shafts. Insulation material on these small capacitors is of the highest quality, and workmanship meets the standards of precision for which B & W have become famous.

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All Grouped Arrays for 10-11 Meters

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Correct corrections, Sweepstakes results: In the 15th SS scores appearing in August QST, K9AA Y was listed as the winner of the club 'phone certificate in the Greater Cincinnati Amateur Radio Association; W9FNY, with 377 points, was the winner in that group. The c.w. score of W9QNW was inadvertently listed in the N.Y.C.-L.I. section; his entry should have appeared in 7th place under Eastern New York. In the Eastern Florida listing, the score of W41YT was credited in error to W4IKU; W41YT was an assistant operator at W4IKU and the entry was therefore in the multi-operator category. The calls of W8BBC, W8ZHC, and W8AYO, Manitoba, were incorrectly shown as W8BCB and W8AYO. We extend our sincere apologies to all concerned.
You'll tell the world it's a TURNER 22

Maybe you are getting good reports but you might get better with a Turner 22. Plenty of amateurs tell us so. They like its looks. They like its style. They think it's tops — and you will too. Get a Turner 22 for your rig now. Your choice of crystal or dynamic circuits.

Ask your dealer

22x Crystal. List.............$20.00
22D Dynamic. 50 ohms. List.....$23.50
200, 500 ohms, or hi-impedance. List $25.50

In Canada:
Canadian Marconi Co. Ltd., Montreal, P. Q. and Branches
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Ad. Auriea, Inc., 89 Broad Street, New York 4, N. Y.

THE TURNER COMPANY
917 17th Street, N. E. Cedar Rapids, Iowa

Microphones by TURNER

Crystals licensed under patents of the Brush Development Company.

Drake
TV-300-50HP
High Pass
TV RECEIVER FILTER
Amateur, Net $3.57
Add 25¢ for postage anywhere in U.S.A.

Provides high attenuation at all low frequencies — more than 60 db down at the TV L.F. frequencies. This receiver filter will improve TV reception to a remarkable degree by rejecting low frequency interference (below 50 mc.) from amateur and short-wave broadcast, diathermy, QRN and other noise. This small filter with attached ground strap may be easily installed near the TV Tuner for best possible results. Will not reduce the strength of the TV signal.

TERMS: Cash with order, or 25% deposit, balance C.O.D.

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111
NEW!
PIioneer
1AM-R-PRESS
THIS IS IT!
Now chassis punching in almost any shape may be done in your own workshop with the unique new Pioneer Broach Company's "HAM-R-PRESS." Some of its features...Simple operation...Precision alignment...Deep throat...10¢ COST. The following models are immediately available:

<table>
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<th>Model</th>
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<tr>
<td>240</td>
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<td>$39.95</td>
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Punches and Dies additional. Prices, FOB Los Angeles.

Write...Phone...Wire...or Drop In

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828 W. Olympic Blvd., Los Angeles 15, Calif.
Phone Richmond 7-0271

RADIO and TELEVISION
Thorough Training in All Technical Phases

APPROVED FOR VETERANS

WEEKLY RATES
DAYS—EVENINGS
RCA GRADUATES ARE IN DEMAND
For Free Catalog write Dept. ST-49

RCA INSTITUTES, INC.
A Service of Radio Corporation of America
350 WEST 4TH ST., NEW YORK 14, N. Y.

How's DX?
(Continued from page 47)

While "rotten operating" (to employ the so apt term of the immortal Old Man) may cause some to snap off the switches in favor of a perusal of McKee's philatelic gazette, W2WGV waxes poetic in a slightly satiric vein. We quote, then.

LAMENT A LA HAM

When you throw on all the switches
And your bug hand burns and itches
And you start to dig for rare DX on twenty—

When your ears burst from the chewing
To catch the call returning
And it's rare DX for whom you've yearned aplenty—

Ain't it great to have some droop
With a skywire full of soup
And a note that's very definitely blank

With its chirpy, whiny wheeze
Climbing up and down the breezes
Making ak di-di-dit dada-ash—BAH!

[Any reflection on persons living or dead is purely, -- Ed.]

V.H.F. QSO Party
(Continued from page 58)

Mc., using permitted modes of operation.

3) Contest score must represent points earned from operation exclusively within a given ARRL section.

4) Fixed-, portable- or mobile-station operation under one call and by one operator is permitted.

5) The band your transmitter is on determines whether a QSO counts 1 or 0.5 points. Cross-band work shall not count.

6) A "contestant" is a single operator working without the help of any other person. Results may be presented with names of all participating persons, for listing, but only single-operator scores will be considered for certificates.

7) Scoring: 1 point for completed two-way section exchanges on 50 or 144 Mc. 0.5 points for completed two-way section exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of different ARRL sections worked, i.e., those with which at least one point has been earned. Reworking sections on additional bands for extra section credits is permitted.

8) A contact per band may be counted for each different station worked. Example: W1JSM (E. Mass.) works W1MEP (Vt.) on 50, 144 and 220 Mc., for complete exchanges. This gives W1JSM 7 points (1 + 1 + 5 = 7) and also 3 section-multiplier credits. (If more Vermont stations are subsequently contacted on these bands they do not add to the multiplier but they do pay off in additional contact points.)

9) Each section multiplier requires actual completed exchanges with at least one station. The same section can provide another multiplier point only when contacted on a new v.h.f. band.

10) Award Committee decisions shall be accepted as final.

11) All reports must be postmarked no later than October 10, 1949, to be entered for awards. (See p. 55, May, 1948, QST, for form, or a message to Hq. will bring a mimeographed blank for report on this contest.)

Reporting

Submit contest logs to Headquarters immediately, even if your score is small, to help in cross-checking the claims of others. — F. E. H.
NEW ALIANCE TENNA-ROTOR

Popular rotator for TV arrays and light ham beams is now available with built-in direction indicator. Know where your beam points at all times. No guesswork! Complete unit, ready to use. $28.20

DON'T MISS THESE TREMENDOUS BUYS!

Two large silver blessing cups, suitably engraved, to be presented to the first W (or E) amateur who, with an automobile installation:
Works all continents (WAC)
Works all states from one call area (WAS)
Send for simple rules and entry blank.

5 KW PLATE TRANSFORMER

Use one of these broadcast grade THORDARSON plate transformers for that conserving, cool-running California Kilowatt, 3000 or 4000 volts DC output at 1200 MA. 300 Volt Primary (The superior regulation and cool-rail operation more than justifies cost in the shack). Run it on 6000 Volts DC at 1200 MA! All ratings clearly marked. Lower prices on guaranteed transformers. Fast shipping.

Send for simple rules and entry blank.

WAS 5K

WAC 5K

WAS 2.5K

WAC 2.5K

Now available with built-in direction indicator.

Mobile Transmitter

Here's your best mobile transmitter! Compact size (only 4 1/4" x 3 1/2" x 6") permits mounting in space compacted or under dash — for finger-tip control, testing, metering, and QST photo copy. While your equipment may be in storage, your beam is always ready to go. Stable, crystal-controlled oscillator. Output can be limited to 30 watts (output level dial) with high output efficiency. Covers 10 and 11 meter bands. Chassis, Amateur Audio for 100% modulation and real battery operation. Ultra-modern in design and real battery operation. Moderately priced — dark green, slide-in rectangular cabinet - 4 1/2" x 8 1/2" x 7 3/8" high - TP-17. Complete $77.50

SUBRACO MT-15X

NEWLY ANNOUNCED GEAR

TECH-MASTER TV KITS AND CHASSIS

Buy the Best! Lowest Prices Anywhere!

NEW MEISSNER SIGNAL SHIFTER!

Here's the latest model EX Signal Shifter Kit with coils for all bands, 10 through 160 meters! Even a beginner can assemble in a few hours. Everything is supplied — tubes, plastic ring and boot, RFC, coils, wire, solder, and simple pictures furnished with each kit. Use either 10, 12, 15 or 16-inch tubas with instruction manual. $99.75

TECH-MASTER 16" Receiver - 630 type chassis with RCA tubes, genuine RCA 16AP4 picture tube, RCA tubes, genuine RCA 16AP4 picture tube, RCA tubes, genuine RCA 16AP4 picture tube. Complete - Ready to enjoy! $199.50

TECH-MASTER 10" Receiver - 630 type chassis with RCA tubes, genuine RCA 16AP4 picture tube and simple step-by-step instructions furnished with each kit. Use one 10, 12, 15 or 16-inch tube with Standard or Deluxe kits. Complete $87.50

DELUXE KIT 630TK - Complete, less kinescope. $129.95

SUPER "16" KIT 630TK - Made especially for 15, 16, or 20-inch picture tubes. Uses a voltage doubler circuit for cleaner, brighter picture. Complete $177.50

Mobile Transmitter

Here's your best mobile transmitter! Compact size (only 4 1/4" x 3 1/2" x 6") permits mounting in space compacted or under dash — for finger-tip control, testing, metering, and QST photo copy. While your equipment may be in storage, your beam is always ready to go. Stable, crystal-controlled oscillator. Output can be limited to 30 watts (output level dial) with high output efficiency. Covers 10 and 11 meter bands. Chassis, Amateur Audio for 100% modulation and real battery operation. Ultra-modern in design and real battery operation. Moderately priced — dark green, slide-in rectangular cabinet - 4 1/2" x 8 1/2" x 7 3/8" high - TP-17. Complete $77.50

SUBRACO DS-400 Dynamotor Pack for MT-15X $59.95

Don't miss these tremendous buys!

Two uncacheable plates of former bargains! Brand new stock in factory sealed outer carton - 100% guaranteed. 60 cycle AC. All ratings are clearly marked. Both of these transformers are conservative-rated to deliver 400 MA in CONTINUOUS COMMERCIAL SERVICE (C.C.S.). Handsome, sturdy case, (magnetically), completely shielded and poled, porcelain high voltage terminal; Mounts upright or inverted.

MOBILE TRANSFORMER 5X-400 4X4-400 V AC AT 550 MA - 400 MA - 2302-1088 X 3 1/2" x 6 1/4" high - TP-18 $29.95

DELUXE KIT 630TK - Made especially for 15, 16, or 20-inch picture tubes. Uses a voltage doubler circuit for cleaner, brighter picture. Complete $177.50

TECH-MASTER WIRED AND TESTED CHASSIS

Ready to Operate - Fully Guaranteed

TECH-MASTER 16" Receiver - 630 type chassis with voltage doubling. Complete with 50 RCA tubes, genuine RCA 16AP4 picture tube, plastic ring and boot, RFC, coils, wire, solder, and simple step-by-step instructions furnished with each kit. Use either 10, 12, 15 or 16-inch tube with Standard or Deluxe kits. Complete $87.50

TECH-MASTER 10" Receiver - 630 type chassis with RCA 10BP4. Complete - Ready to enjoy! $199.50

LOWEST PRICES ON GENUINE, GUARANTEED RCA KINESCOPES

10BP4 - $27.50

12BP4 - $39.50

16BP4 - $55.80

(Look over the FB TV buys in our new Ham-A-Log)
PRECISION-WOUND RF CHOKES

R-100 employs pigtail leads; the R-100U has pigtail leads and a removable stand-off insulator; the R-100S has cotter-pin lug terminals and a non-removable stand-off insulator. All available in 2.5, 5 and 10 mh. sizes rated at 125 ma. The R-100ST has a 6-32 threaded stud at each end—available in 2.5 mh. The R-33 series chokes are 2-section r.f. chokes available in 10, 50, 100 and 750 uh sizes, and are rated at 33 ma.

Correspondence
(Continued from page 49)

your attention. Some publicity should be given to this subject so that amateurs throughout the United States can contact their local insurance agents and have the proper coverage added to protect their antennas, etc., against future loss.

— Arthur C. Lyman, W8SPJ

PLEA

Princess Theater, Winnsboro, La.

Editor, QST:

I regret to report the death of one who is known as the “father of amateur radio” in Winnsboro. This devoted and kind technician, Sam Paola, W5KRY, met with violent death on the morning of November 1, 1948, in his home at the hour of 2 A.M. He and his XYL, Mary, were fiendishly murdered from shots fired by an unknown assailant with unerring accuracy. Two fatal bullets were found in each body. Every effort known to law enforcement is being used to track down a motive and a suspect, but no indictment has been made.

As Sam had thousands of amateur radio friends all over the world, I wish to enter a plea to those who talked with Sam to submit any information that he might casually have passed on in a QSO that might lead in some way to a suspect. How a man who spent his life doing good things for others could possibly have an enemy is beyond us.

— Louis R. Westerburg, W6MUN.

PULSE-TIME

Hamilton, Ill.

Editor, QST:

I was most interested in the opening article in the July issue of QST. A number of years ago a somewhat similar article found its way into QST but alas! before its time! I believe that in this pulse-time scheme you have something for the amateur which will be worth his attention and which will tickle the interest of at least the experimenters. It also should keep the old timers thinking for it promises in simple language the virtual end of QRM. This is a real goal to shoot at. Keep articles on this subject coming, not too often, just enough to generate interest. For my money, it has single sideband beat all hollow, though of course, we cannot expect pulse-time modulation to do anything for us at the present.

In any event, thanks for putting a fine article in a fine magazine.

— J. Saugeter, jr., W9KSQ

The Amateur

“The word amateur has come by the thousand oddities of language to convey an idea of tepidity; whereas the word itself has the meaning of passion. Nor is this peculiarity confined to the mere form of the word; the actual characteristic of these nameless dilettanti is a genuine fire and reality. A man must love a thing very much if he not only practices it without any hope of fame or money, but even practices it without any hope of doing it well. Such a man must love the toils of the work more than any other man can love the rewards of it.”

— G. K. Chesterton in “Robert Louis Stevenson”
Outstanding POWER CONVERSION UNITS

for any Voltage and Amperage Rating

R.P.S. Power Conversion Units specially designed to convert any d-c Receiver, Transmitter, etc., into a-c use. No rewiring necessary; simple, easy, quick installation. No Tubes! Instant Warm-up! Cool Operation! No Maintenance! Low Cost!

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All prices are F.O.B. Los Angeles (California purchasers add 2 ½ % sales tax). Include 25 % with orders—balance on delivery. Foreign orders cash. Address correspondence Dept. C7.

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NOTE: All transformers have 3 extra taps—for example: 20, 19, 18 volts and 28, 27, 26 volts.

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"It's KENYON Transformers For My Rig Because They Always Put Out!"

Hams everywhere specify KENYON "T" Line Transformers! Manufactured under rigid standards, all KENYON transformers are constructed of the finest grades of material plus the skill and long experience of a highly trained competent operating staff.

All KENYON transformers are checked progressively in the course of manufacture and are laboratory-tested upon completion to insure satisfaction. Yes, KENYON "T" Line Transformers meet the most exacting requirements of critical purchasers. For skillful engineering, progressive design and sound construction—Specify KENYON for top performance in your rig!

KENYON TRANSFORMER CO., Inc.
840 BARRY STREET
NEW YORK, U. S. A.
(1) Advertising shall pertain to radio and shall determine the character of the advertisement.

(2) The rate for Ham-Ads is $0.60 per word, except as noted in paragraph (3) below.

(3) The rate for Ham-Ads is $0.75 per word, except as noted in paragraph (4) below.

(4) Remittance in full must accompany copy. No advertising copy will be held without full payment of due rate or full prepayment will be allowed.

(5) The cut-off date date for Ham-Ads is the 25th of the second month preceding publication date.

(6) Every word per word will apply to advertising which, in our judgment, is obvious non-commercial in nature and not primarily intended to advance the American Radio Relay League. Thus, advertising of bona fide surplus equipment offered for sale or by an individual or apparatus offered for exchange or advertising requiring special equipment, if by a member of the American Radio Relay League, will normally be accepted.

(7) The rate of $0.75 per word applies in any other words.

(8) Any advertisement must be made in English.

(9) An additional charge of $1.00 per word per issue is applicable for advertisements of surplus equipment.

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(31) The rate of $0.75 per word applies in any other words.

(32) Any advertisement must be made in English.

(33) An additional charge of $1.00 per word per issue is applicable for advertisements of surplus equipment.
MONEY needed, Selling out station. Globe King 275 watt xmitter. $269.00. Must sell all at present, Send for list. W5K1E, 713 Wood.

FOUR SCR-522 units, $27.50 each, 10-4000 Kc., 6 meter, $100.00 to 1000 kc., $27.50, E. Rybak, 5927 31st Ave., Chicago, Ill.

MACKAY receiver FTR-128, AC-DC, 15-650 Kc. 4 in bands. Cabinet weight 42 lbs. F.O.B. Boston, $35.00. RCA communications receiver 6E74/46P, 6 unit. F.O.B. East, $37.50. New. Complete with batteries, 12 tubes. U.S. Coast Guard Marine service aper-het circuit, with serving harness, in cabinet, $130.00, 10-14 feet. West Laurel, 3625 Main St., Station 3625.

SALE or trade: Triplett 100 Ma. and 500 Ma. meter, model 227-2. Thoradson transformers T-41F12 6.5 v. 10 a; T-19069 10 a; T-19060 10 a, $175.00. McGee 1500watt, 1500v. 100 Ma. McMurdo Silver UHF rec. model 200, W1WZJ, 18th & Rural, Emporia, Kans.

SWAP: Half-kilowatt Cw transmitter for clean 400X0, SX28A equivalent with matching speakers, instruction book 0V6 triode. 817, PP 812, antenna tuner, two power supplies, all contained in streamlined grey lacquer sprayed table top rack. All tubes. After switching, like new. $150.00, Red Wing, Minn. 458.

TRADE or sell: Two BC-522 multi-talkie, complete. Cover 6 and 10 meter bands. WANTED: VHF-152A, P. Schmelzer, Motley, Minn.

GEAR and equipment of interest to hams and experimenters. Write for list. L. B. Bosworth, Westfield, Mass.

HALF Kw Am-Cw rack xmitter, sells for ten. Twenty, forty, sixty, etc. Available now. Miller amp with 813s, Miller exciter, Miller power supply, Meissner 150 watt, Invac 813s. F.O.B. Mod. capable of Kw input. Sell complete by unit, or part payment on 30%. No reasonable offer rejected. M. E. W. 72, Irwin, Pa.

SELL: At less than cost of parts. 450 volt 200 ma (DC) power supply, $25.00 40 watt modulator (circuit page 44 April 1947 QSTJ, RR1, Box 602, Church St. Annex, NYC.

WANTED: For sale: Transmitter P-ORsale: BC-610 transmitter, complete, and Tech-Rad 'I350XM

SALE: Triplett 1011 Ma. and 500 Ma. meter, model 227-2. Trade or sell: Two BC-610 units, $27.50 each. Telrad 18-A frequency standard, 5000 watt, 1000 Watt Cw power amplifier $545.00, 522 transceive, new, $29.00. BC654, new. $35.00. T. C. 321 W. Front, 66 Motley, Minn.

FOR sale: 167BY transmitter, 500 watts on 10 meters and 1 kw on all. W5IZJ, 18th & Rural, Emporia, Kans.

SALE: Kw 10-meter NBFM xmitter, complete with VFO In 66" rack, gray crackle power supply., $15.00 express collect. W5LFWN, Howe, 1412 Bush St., Hammond, Ind.


FOR sale: Transmitter 50 watts Super modulation/c.w. for 40 meters, complete. F. V. Z., 500 E. Houston, Fort Worth, Tex.

TRADE or sell: Two BC-522 multi-talkie, complete. Cover 6 and 10 meter bands. WANTED: VHF-152A, P. Schmelzer, Motley, Minn.

WANTED: RC-6A traps for 20, P. S. Matz, 500 W. 54th, New York, N. Y.

FOR sale: Complete set of W6FL 120 volt, 60 cycle generators, 100 watt, bargain, Springfield Testimonial Laboratory, 815 North 12th, Springfield, Ill.

WANTED: Ham or experimenter, 4000watt output, direct coupling, 1500v. $150.00. Young Thorp, 313 Della, Flint 5, Michigan. Phone 9-5049.

SALE: Kw 10-meter NBFM xmitter, complete with VFO In 66" rack, gray crackle power supply., $15.00 express collect. W5LFWN, Howe, 1412 Bush St., Hammond, Ind.

FOR sale: CBS-610 transmitter, complete, and Tech-Rad 'I350XM transceive, new, $35.00. Meissner 813s, Millen exciter, Millen power supply, Meissner 150 watt, Invac 813s. F.O.B. Mod. capable of Kw input. Sell complete by unit, or part payment on 30%. No reasonable offer rejected. M. E. W. 72, Irwin, Pa.

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The No. 90651 GRID DIP METER

The No. 90651 MILLEN GRID DIP METER is compact and completely self contained. The AC power supply is of the "transformer" type. The drum dial has seven calibrated uniform length scales from 1.5 MC to 270 MC with generous overlaps plus an arbitrary scale for use with special application inductors. Internal terminal strip permits battery operation for antenna measurement.

JAMES MILLEN MFG. CO., INC.
MAIN OFFICE AND FACTORY
MALDEN
MASSACHUSETTS

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In selecting a volume control for use in a precision and often expensive communications receiver, we all know there are certain obvious and desirable features a replacement control should have. Such characteristics as correct over-all resistance, low operating noise level, and long life are expected automatically as a necessary part of a good control.

However, there are certain other features, less obvious perhaps, but nonetheless important, which Mallory engineers have discovered should be included in a volume control to make it entirely satisfactory for communications work. These additional or extra features often mean the difference between strictly mediocre performance on the one hand, and entirely satisfying performance on the other.

For example the smoothness and continuity of taper in a volume control is extremely important when used in a high-gain communications set. Too often this feature is sadly neglected, with the result that volume or gain is difficult to adjust. Special attention to smoothness of taper means the addition of several more operations on the volume control production line, but Mallory engineers know these extra operations are worthwhile for building a better control.

A control to be fully satisfactory must have a low hop-off resistance. Hop-off resistance is defined as the amount of resistance remaining in the grid-ground circuit with the control set in the minimum volume position. A control which does not have this very desirable feature, when used in high-gain circuits, will not permit complete attenuation of the audio signal with the result that annoying feed-back and undesirable speaker noises may appear when your own transmitter is on the air. The lowest hop-off resistance factor in the industry is assured in Mallory controls by an exclusive silver spray process at the low volume position.

It is important that a volume control have as great a mechanical rotation with resistance change as possible. The greater the mechanical rotation in a volume control, the easier it is to adjust the volume or gain to precise levels. Most volume controls have a mechanical rotation between 280 and 300 degrees. The Mallory control has been designed to provide in excess of 300 degrees of mechanical rotation.

Finally, controls and companion AC switches must be ruggedly constructed and easily mated for maximum convenience in use. Don’t forget! You do not have to remove the housing from a Mallory control to attach the switch.

The next time you have occasion to buy a replacement control, check to see if the brand you have selected has every one of these necessary features.

If it is a Mallory, all these features will be present and you can be sure you have selected a control entirely suitable for the finest communications receiver.

You will find 416 ratings in the Mallory line—11½", 1¼", and the all-new 15/64" Mallory Midgetrol. See your Mallory Distributor.
Which Do You Want?

Better Pay
A Nice Home
Greater Security
A New Car
Happy Vacations and Travel

Make Your Hobby Into a Good Paying Job

Get Your FCC Commercial Ticket. Jobs Leading to $3,000 to $7,500 (Average Pay Reported by FCC Nationwide Survey) are opening up right now for FCC Licensed Radiomen.

Get Your FCC Commercial License in a Few Short Weeks

It's EASY if you use CIRE Simplified Training and Coaching AT HOME in SPARE TIME

Get your license easily and quickly and be ready for the jobs open to ticket holders which lead to $3000 to $7500 (average pay reported by FCC Nationwide Survey.) CIRE training is the only planned course of coaching and training that leads directly to an FCC Commercial License.

YOUR FCC COMMERCIAL TICKET IS ALWAYS RECOGNIZED IN ALL RADIO FIELDS AS PROOF OF YOUR TECHNICAL ABILITY

Job-Finding Service Gets 7 Job Offers!

"Since our last correspondence, I have found and accepted a position at KWAD in Wadena, Minn. It is a kilowatt, D. A., full time station, in the center of Minnesota. I am sincere when I state that I am indebted to CIRE, for I secured this position through the help of the CIRE placement plan. I would also like to state that I had at least six other offers from stations receiving my employment application and CIRE reference. Yes, gentlemen, I am sincerely under obligation to you." — Student No. 2760

Job-Finding Service Scores Again!

"I want to inform you that I am working at WKJM as transmitter engineer, and that I received this position in response to one of the employment applications sent me upon completion of my course and the receiving of my Diploma. I received my 1st Class Radiotelephone license on March 2, 1949. I want to express my sincere appreciation to the staff of CIRE." — Student No. 2560 A2

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Under The "G. I. Bill of Rights"

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Desk QT-9
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Get This Amazing New Booklet

1. TELLS OF THOUSANDS OF BRAND-NEW BETTER PAYING RADIO JOBS NOW OPEN TO FCC LICENSE HOLDERS.

2. TELLS HOW WE GUARANTEE TO TRAIN AND COACH YOU UNTIL YOU GET YOUR LICENSE.

3. TELLS HOW OUR AMAZING JOB-FINDING SERVICE HELPS YOU GET THE BETTER PAYING JOB OUR TRAINING AND COACHING PREPARES YOU TO HOLD.

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Veterans check for enrollment information under G.I. Bill

NO OBLIGATION — NO SALESMEN

Printed in U.S.A.
Rumford Press
Concord, N. H.
Congratulations to Rolf Lindenhayn, Jr., W8BHW, who had 479 QSO's with stations in 113 different countries. His staggering total of 390,450 points appears to top all other W/VE scores. His receiver is a National HRO purchased in 1934. According to "Lindy," after 15 years of service, it's still going strong "even on today's crowded bands!"
Table-top or kilowatt rig...  

here’s dependable power

- Name your power and one of these three time-proven RCA rectifier types will supply it at less cost and over longer trouble-free periods.

RCA 866-A half-wave mercury-vapor rectifier has an edgewise wound filament with an enormous emission reserve—hence, longer life. This tube has the ability to withstand a peak inverse voltage of 10,000 volts at 1000 ma. peak plate current. A pair will deliver a kilowatt of dc at 3000 volts . . . with plenty of power to spare.

RCA-816 half-wave mercury-vapor rectifier is also double-ended; therefore its internal high-voltage qualities are not limited by glass electrolysis or by base and socket insulation. A smaller version of the RCA 866-A, this tube also has an edgewise wound filament and will handle high peak voltages and emission currents. A pair will deliver 550 watts of dc at 2200 volts!

RCA 5R4GY is a full-wave, high-vacuum rectifier with a heavy-duty coated filament. Fitted with a low-leakage Micanol base, this tube can handle peak inverse voltages up to 2800 volts at 650 ma. peak current per plate. A single tube will supply a dc output of over 150 watts at 250 ma.

To get all the rectifier power, performance, and life you pay for . . . buy genuine RCA tubes in the familiar red, black, and white cartons from your local RCA tube supplier.