HIGH FIDELITY TRANSFORMERS

FROM STOCK... ITEMS BELOW AND 650 OTHERS IN OUR CATALOGUE B.

TYPICAL UNITS

HIPERMALLOY series
This series provides virtually all the characteristics of the Linear Standard group in a more compact and lighter structure. The frequency response is within 1 db. from 30 to 20,000 cycles. Hipermalloy nickel iron cores and hum balanced core structures provide minimum distortion and low hum pickup. Input transformers, maximum level +10db. Circular terminal layout and top and bottom mounting.

ULTRA COMPACT series
UTC Ultra Compact audio units are small and light in weight, ideally suited to remote amplifier and similar compact equipment. The frequency response is within 2 db. from 30 to 20,000 cycles. Hum balanced coil structure plus high conductivity die case provides good inductive shielding. Maximum operating level is +7db. Top and bottom mounting as well as circular terminal layout are used in this series as well as the ones described above.

UNITED TRANSFORMER CORP.
150 VARICK STREET, NEW YORK 13, N.Y.
EXPORT DIVISION: 13 EAST 40th STREET, NEW YORK 16, N.Y. CABLES "ARLAB"
PACIFIC MFG. DIVISION: 4008 W. JEFFERSON BLVD., LOS ANGELES 16, CALIF.
Weigh this one against all comers!

The most important single standard of receiver performance is —your own judgment. And the one sure way to judge is to compare, not only on paper, but by an actual demonstration at your distributor's.

We'll stack the new SX-101 MARK III against any amateur band receiver—in overall performance and long-life reliability.

We're betting that you will, too.

Look for and compare these features

- Utmost mechanical and electrical stability.
- Complete coverage of 7 amateur bands: 160, 80, 40, 20, 15, 11-10 meters.
- Exclusive crystal-controlled upper/lower sideband selection.
- S-meter functions with A.V.C. off/on.
- Tee-notch filter.
- Built-in crystal calibrator.

PLUS: Band in use individually illuminated ... antenna trimmer . . . dual conversion . . . full gear drive from tuning knob to condensers . . . five steps of selectivity from 500-5,000 cycles . . . many more features. Available with convenient terms from your Radio Parts Distributor. See him today!

Export Sales: International Operations
Raytheon Manufacturing Company
Waltham, Mass.

The new ideas in communications are born at Hallicrafters
Chicago 24, Illinois

In our 25th year of service
One of the reasons why single sideband is becoming so popular on the amateur bands is the narrow bandwidth required. It was thought at one time that the generation of a single sideband signal was a difficult technical job. Even though SSB might be difficult it is worth the effort because it reduces QRM. Actually, it is easier and simpler than the generation of an amplitude modulation signal.

The SSB signal can be generated in either of two ways — the filter method or the phasing method. In the phasing method, the sideband balance is dependent upon phase and amplitude control in both the audio and r-f circuits. If this control is exact and can be maintained over the operating life of the equipment, then a clean SSB signal is available for amplification. If phase or amplitude variations exist because of temperature, humidity or aging, then the SSB signal becomes less clean and the undesired sideband begins to appear.

Now look at the balanced modulator and filter circuit used by Collins. This circuit makes a clean SSB signal and it stays that way. These are the reasons the previous statement is true. The balanced modulator generates a double sideband signal and suppresses the carrier by 30 db over a long period of time. The Mechanical Filter, being 3 kc wide, passes only the desired sideband and attenuates the undesired sideband by 50 db. Also, at the carrier frequency, 20 db added attenuation of the carrier means that the carrier is balanced to a low level at the factory and it stays there. Temperature, humidity and aging do not affect the hermetically-sealed Mechanical Filter. It is composed of highly accurate metal discs which stay on frequency and insure a constant passband.

With the Mechanical Filter in a sideband separation circuit, the operator is assured a good voice frequency circuit without audio filters. The passband of the Mechanical Filter automatically attenuates those audio components below 300 cps and above 3 kc.

The filter method of generating a single sideband signal is economical to use and it is the best method of SSB generation. Why not join the ranks of satisfied Collins-equipped hams using these advanced techniques?

E. W. Pappenfus
Director, "A" Division Engineering
Collins Radio Company

Collins
CREATIVE LEADER IN COMMUNICATION

COLLINS
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INDEXED BY
Applied Science and Technology
Library of Congress Catalog
Card No.: 21-9421
Surviving Impact
is an Eimac Ceramic Tube Extra

Modern Eimac ceramic tubes offer the equipment designer many important extras. Among them is the ability to withstand impact without impairing electrical characteristics. The photograph dramatically shows what happens to a 250 watt glass envelope tube and an Eimac 300 watt ceramic tube when both are dropped from a height of seven feet. The ceramic tube "took it".

Other advantages of Eimac ceramic tubes are: resistance to damage by vibration and temperature; smaller size without sacrificing power; ability to undergo optimum processing techniques that lead to tube reliability and longevity.

The small Eimac ceramic 4CX300A, shown above, will withstand 50G shocks of 11 millisecond duration. It will operate in mobile or fixed station service at full ratings up to 500mc.

In its new line of ceramic tubes, Eimac has the answer for the amateur who needs a tube that will deliver full output under rugged conditions.

EIMAC®
SAN BRUNO, CALIFORNIA
Eimac First with ceramic tubes that can take it

<table>
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<tr>
<th>D-C Plate Voltage</th>
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<th>D-C Grid Voltage</th>
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<th>4CX300A MAXIMUM RATINGS TO 500MC</th>
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ElTEL-McCULLOUGH, INC.
SAN BRUNO, CALIFORNIA
40, 80 and 160 Meters, PR Type Z-2
Rugged. Low drift, fundamental oscillators. High activity and power output. Stands up under maximum crystal currents. Stable, long-lasting, permanently sealed; ±500 cycles. $2.95 Net

20 Meters, PR Type Z-3
Third overtone oscillator. Low drift. High activity. Can be keyed in most circuits. Fine for doubling to 10 and 11 meters or "straight through" 20 meter operation; ±500 cycles. $3.95 Net

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Third overtone; multiplies into either 2-meter or 6-meter band; hermetically sealed; calibrated 24 to 27 mc., ±3 kc.; .050" pins. $4.95 Net

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Third overtone; for operating directly in 6-meter band; hermetically sealed; calibrated 50 to 54 mc., ±15 kc.; .050" pins. $6.95 Net

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Commercial Crystals available from 100 Kc. to 70 Mc. Prices on request.

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Type Z-6A
FREQUENCY STANDARD
To determine band-edge. To keep the VFO and receiver properly calibrated. 100 Kc. $6.95 Net

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Suitable for converters, experimental, etc. Same hold-er dimensions as Type Z-2.
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For Lear, Narco and similar equipment operating in the 121 Mc. region, requiring crystals in 30 Mc. range. $3.95 Net

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RADIO CONTROLLED OBJECTS
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Has many uses—
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• As 1000 Kc. Marker for Check Points up to 54 Mc.
• As Foundation Circuit for Low Frequency SSB Crystals

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Type Z-1
TV Marker Crystals
Channels 2 through 13 ...... $6.45 Net
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4.5 Mc. Intercarrier, .01% ...... 2.95 Net
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2800 W. BROADWAY • COUNCIL BLUFFS, IOWA

EXPORT SALES: Royal National Corporation, 250 W. 57th Street, New York 19, N. Y., U. S. A.
Section Communications Managers of the ARRL Communications Department

Reports invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in QST. ARRL Field Organization station appointments are revised in the areas shown to qualified League members. These include QRS, QES, OPS, OES and PAM where vacancies exist. All amateurs in the United States and Canada are invited to join the Amateur Radio Emergency Corps (ask for Form 7).

<table>
<thead>
<tr>
<th>State</th>
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<tr>
<td>Arkansas</td>
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<td>Bozeman, MT 59718</td>
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<tr>
<td>Louisiana</td>
<td>W5MO</td>
<td>California, CA 90264</td>
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ATLANTIC DIVISION

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MIDWEST DIVISION

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DELTA DIVISION

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GREAT LAKES DIVISION

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<tr>
<td>California</td>
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SOUTHEASTERN DIVISION

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<td>Florida</td>
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SOUTHWESTERN DIVISION

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<td>Arizona</td>
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<tr>
<td>Utah</td>
<td>W7SP</td>
<td>Salt Lake City, UT 84103</td>
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Rocky Mountain Division

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<th>State</th>
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<tbody>
<tr>
<td>Colorado</td>
<td>W7DBL</td>
<td>Pueblo, CO 81001</td>
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SOUTHERN DIVISION

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<td>Texas</td>
<td>W5TEP</td>
<td>Houston, TX 77081</td>
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<tr>
<td>Oklahoma</td>
<td>W5FE</td>
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Canadian Division

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<th>State</th>
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<tr>
<td>British Columbia</td>
<td>W5CM</td>
<td>Vancouver, BC  V6G2E</td>
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<td>W6JM</td>
<td>Edmonton, AB T6J 4R2</td>
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<td>Saskatchewan</td>
<td>W6SLU</td>
<td>Prince Albert, SK S4W 3C4</td>
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<td>Manitoba</td>
<td>W5UW</td>
<td>Winnipeg, MB R3T 5J3</td>
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<td>Ontario</td>
<td>W5TB</td>
<td>Toronto, ON  M4L 1P7</td>
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<td>Montreal, QC  H3C 2P4</td>
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<tr>
<td>New Brunswick</td>
<td>W6ML</td>
<td>Saint John, NB E2L 2B3</td>
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</table>

*Official appointed to act temporarily in the absence of a regular official.
IRE commemorates the tenth anniversary of a major breakthrough in solid state electronics by devoting the entire June issue of PROCEEDINGS OF THE IRE to an up-to-date summary of progress and advances in transistors. So small that many can be held in the palm of one hand, these tiny components have ended our 50 year dependence on vacuum tubes. Without transistors, our intricate guidance and communication systems for missiles would be incredibly big and heavy. With them, whole new technologies are being developed, not only for defense but for industry and commerce as well.

**June Issue of Proceedings of the IRE is the New Standard Reference Work on Transistors**

Only once before has PROCEEDINGS devoted an entire issue to transistors. That was in November, 1952. Despite a substantial overprinting, every copy was sold within 3 months. This classic issue, coming at a time when there were no books and few papers on the subject, is still considered one of the basic references on the subject...a suitable companion to the definitive Solid-State Electronic issue of December, 1955 and the Ferrites issue of October, 1956.

Now, to mark the tenth anniversary of the transistor, PROCEEDINGS presents the latest advances in theory and application in the June, 1958 issue. Here you will find introductory articles by its inventors—Shockley, Bardeen and Brattain—specially invited papers reviewing progress in all facets of the subject, contributed papers reporting the latest and more important advances in the field. Be sure to order your copy, today!

**Partial Contents:**

"The Status of Transistor Research in Compound Semiconductors," by D. A. Jenny, RCA.  
"Recombination in Semiconductors," by G. Bemski, Bell Labs.  
"Noise in Junction Transistors," by A. van der Ziel, University of Minnesota.  
"Germanium and Silicon Rectifiers," by H. Henkels, Westinghouse.  
"The Potential of Semiconductor Diodes in High-Frequency Communications," by A. Uhlir, Bell Labs.  
"Application of Transistors in Communication Equipment," by D. D. Holmes, RCA.  
"Characteristics Data on Silicon and Germanium," by E. Conwell, Sylvania.
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 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 administrative headquarters at West Hartford, Connecticut.

**Past Presidents**

<table>
<thead>
<tr>
<th>Name</th>
<th>Years</th>
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<tbody>
<tr>
<td>Hiram Percy Maxim</td>
<td>1914-1936</td>
</tr>
<tr>
<td>Eugene C. Woodruff</td>
<td>1936-1940</td>
</tr>
<tr>
<td>George W. Bailey</td>
<td>1940-1952</td>
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**Officers**

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<thead>
<tr>
<th>Position</th>
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<tbody>
<tr>
<td>President</td>
<td>Goodwin L. Dosland</td>
</tr>
<tr>
<td>First Vice-President</td>
<td>Wayland M. Groves</td>
</tr>
<tr>
<td>Vice-President</td>
<td>Francis E. Handy</td>
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<tr>
<td>Vice-President</td>
<td>Percy C. Noble</td>
</tr>
<tr>
<td>Secretary</td>
<td>A. L. Budlong</td>
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<tr>
<td>Treasurer</td>
<td>David H. Houghton</td>
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<tr>
<td>General Manager</td>
<td>A. L. Budlong</td>
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<tr>
<td>Communications Manager</td>
<td>Francis E. Handy</td>
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<tr>
<td>Technical Director</td>
<td>George Grammer</td>
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<tr>
<td>Assistant General Manager</td>
<td>John Huntoon</td>
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<tr>
<td>Assistant Secretary</td>
<td>Perry F. Williams</td>
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<tr>
<td>General Counsel</td>
<td>Paul M. Segal</td>
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**Directors**

**Canada**

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<thead>
<tr>
<th>Name</th>
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<tr>
<td>Alex Reid</td>
<td>1928-1929</td>
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<tr>
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<td>William H. Wooton</td>
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<td>Technical Director</td>
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<td>Assistant General Manager</td>
<td>John Huntoon</td>
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<tr>
<td>Assistant Secretary</td>
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**Atlantic Division**

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<tr>
<th>Name</th>
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<tbody>
<tr>
<td>Gilbert L. Crossley</td>
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<td>Thomas C. Vincent</td>
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<td>A. U. Budlong</td>
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**Central Division**

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<tr>
<td>John G. Doyle</td>
<td>1945-1946</td>
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**Dakota Division**

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<tr>
<td>Alfred M. Gowan</td>
<td>1936-1937</td>
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<tr>
<td>Vectar C. Handy</td>
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**Great Lakes Division**

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<tr>
<td>John H. Blans</td>
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**New England Division**

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<td>Milton E. Chaffee</td>
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**Northwestern Division**

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<tr>
<td>R. Rex Roberts</td>
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**Pacific Division**

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<tr>
<td>Harry M. Engwall</td>
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**Rocky Mountain Division**

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<tr>
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<tr>
<td>Claude M. Maier</td>
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**Southeastern Division**

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<tr>
<td>James B. Born</td>
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**Southwestern Division**

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<tr>
<td>Walter P. Joos</td>
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**Western Gulf Division**

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<td>Grady A. Payne</td>
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**Midwest Division**

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"It Seems to Us..."

WORLD ALLOCATIONS PROPOSAL

For some eighteen months past, Government-industry groups have been meeting in Washington to formulate the official views of the United States toward the international telecommunications conference to be held in Geneva, Switzerland, in 1959. This procedure is somewhat different than that followed in some other countries, where only the governments dictate official views; in the U.S., representatives of the various non-Government radio services also participate in official deliberations, and of course ARRL has been present to speak for the amateur service in such meetings.

This preparatory work has proceeded apace in the general fields of operating regulations, technical requirements, and the like, but little progress has been made in the field of frequency allocation while waiting an announcement of the views of agencies of the Government as a basis for discussion. Thus the preparatory work took a big step forward in mid-April when the Federal Communications Commission and the Interdepartment Radio Advisory Committee jointly issued their proposals for a new frequency spectrum allocations.

Especially in view of some of the rumors which have been going through amateur ranks in recent months concerning our future, it is a matter of particular pleasure to report that the FCC-IRAC proposals include provision for continuance of every present amateur frequency assignment (with certain changes in u.h.f. bands to be detailed in a moment), including availability of the Loran band and the 27-Mc. ISM band.

At the moment this proposal is not yet the official U.S. position; it must be considered and approved by the Government-industry frequency committees. However, it is expected to be at least the basis of the final U.S. position and more than likely adopted substantially—if not precisely—as proposed. Inasmuch as the proposal is to continue amateur privileges as at present (with the u.h.f. modifications), we feel it is a significant victory for the amateur service; the Commission and the Government services have been confronted with exceedingly difficult problems by the demands of the other services, and the decision to hold the line on amateur bands—rather than take the easy solution by cutting into them—has only increased those problems. We can imagine no finer testimonial to their views of our worth.

The changes in the amateur u.h.f. (actually, above 220 Mc.) bands are already in effect domestically. They result from national defense considerations—of sufficient urgency that, in compliance with a request from the Office of Defense Mobilization, FCC has put them into effect immediately. The growth of radar and associated techniques of navigation and radio-positioning, particularly with the coming of the "space age," has required the expansion of available space for those facilities. Several radio services other than amateur have had their u.h.f. assignments withdrawn or shifted to provide for such expansion—without notice or hearing. In the case of amateur bands above 220 Mc., the Government feels that radio-positioning and amateurs can share with little or no mutual interference (under Executive powers, such military use of our u.h.f. bands has been made for years with practically no difficulty). The problem, however, is that with the exclusive amateur assignments existing in the past, an amateur has had the legal right to interfere with a radio-positioning operation despite its national-defense nature. This possibility the Government can no longer face, in the national interest. The action the Commission has now taken, therefore, officially admits Government radio-positioning to amateur bands above 220 Mc. (except the 21,000 Mc. band), with positioning afforded priority in the event of interference by amateurs.

We can tell you that the expectation of all concerned is that there will be little—if any—practical effect on amateur u.h.f. operation. There may be isolated cases where an individual amateur may be found to interfere with Government radio-positioning work. In such event the amateur may be required to shift frequency within the band or take some other steps as necessary to alleviate the interference. In some areas, as in the immediate vicinity of missile installations, certain restrictions may be applied to amateur use of a u.h.f. band, such as the one we have had for many years on 220 Mc. use in the vicinity of White Sands, New Mexico. It is expected, however, that such instances will occur rarely, if ever.

The text of the new rules governing our above-220 Mc. operation is published in "Happenings" this month.

So much for details. In the broad picture we of course have the world conference hurdle still ahead of us, next year. But we do appear to be headed for that conference with the United States once again backing amateurs to the hilt,
A.R.R.L. PACIFIC DIVISION CONVENTION

Fresno, Calif. — June 7-8

The Fresno Amateur Radio Club will be host to the ARRL Pacific Division Convention in Fresno on June 7 and 8. Registration fee is $7.75, which includes the banquet. Pre-registration should be postmarked no later than midnight June 2, and mailed to Radio Amateur Convention, P. O. Box 783, Fresno, Calif.

Harry Engwicht, WGHC, Pacific Division Director, and George Hart, WINJM, National Emergency Coordinator, will be honored guests at the banquet. There will be open-forum discussions, commercial displays, entertainment, and a Wouff-Hong initiation put on by the Trowel Radio Club. Special technical sessions will be held by groups including s.s.b., RTTY, v.h.f., novice, and traffic. Some of these groups will also hold informal breakfast get-togethers. There will be a ladies’ luncheon, and possibly an organized tour to a point of interest near Fresno. Outside activities will include mobile-judging and hidden-transmitter hunts on 75, 10, 6, and 2 meters. The Hotel Californian has been chosen as the official headquarters, with 125 rooms reserved for the Convention. The hotel has a large free parking lot, which should please the mobile gang.

OUR COVER

When you receive this issue, Field Day will be just about a month away, and by this time your club must have been bitten by the Field Day fever, too. Our gang has been busy making plans for equipment, watch standers, and chow. We’ve looked over last year’s scores (October, 1957, QST, p. 60) to refresh our memory on who did what. Our gasoline generator has been checked. Stocks of wrist liniment and throat lubricant have been obtained. We’re ready!

But, we won’t have a Field Day location like the unusual one pictured on the cover of this month’s QST. Our cover this month shows the Society of Amateur Radio Operators, Inc., of Oakland, Calif. (W6AEX/6), getting set up for the 1957 go. Left to right on top of the Southern Pacific boxcars are W6PZC, W6CBD, and W6UHM, while W6ASJ and W6PBX tug at the hand brake (making sure the operation is portable, not mobile), and K6GDO stands (on one foot yet!) looking up at the mast.

COMING A.R.R.L. CONVENTIONS

June 7-8 — Pacific Division, Fresno
June 14-15 — Rocky Mountain Division, Santa Fe, New Mexico
July 18-20 — Alaska Territory Convention, Anchorage
July 26-27 — West Gulf Division, Oklahoma City, Oklahoma
August 15-17 — ARRL National Convention, Washington, D. C.
September 20-21 — Dakota Division, Sioux Falls, S. D.
October 4-5 — Midwest Division, Des Moines, Iowa
October 10-12 — Southwestern Division, San Diego, Calif.
October 18 — Ontario Province, Hamilton, Ontario

A.R.R.L. ROCKY MOUNTAIN DIVISION CONVENTION

Santa Fe, New Mexico — June 14-15, 1958

The Santa Fe Amateur Radio Club will be host for the Rocky Mountain Division Convention, June 14-15 — the first ARRL convention to be held in the state of New Mexico in many years.

At convention headquarters, the Desert Inn, you will pick up your program, tickets, information, and be directed to your room reservations. Saturday morning activities will feature a welcoming address, introduction of guests, and a technical address, followed by special interest luncheons for v.h.f., DX, Novice, ladies, s.s.b., etc. The afternoon activities will consist of an ARRL meeting, activities for the ladies, and a mobile hunt and judging contest. The banquet starts at 6:30 p.m., followed by awards, a dance, and finally the Wouff Hong ceremonies at midnight. Sunday morning there will be another mobile hunt and judging contest, followed by a general assembly featuring technical talks and more “eyeball QSOs.”

Hotel rates in the Santa Fe area range from $5.00 single to $12.00 double and up. Babysitting service will be available for children two years of age and older. Advance registration (by June 1) is $7.50; thereafter, $8.50. The pre-convention party is $2.50; special interest luncheons are $1.75. Registrations should be sent to: Ruevic D. Mason, W5FHI, 1838 Otowi Drive, Santa Fe.

K9IJJ claims that he has been having some very fine QSOs using double sideband and injected carrier.

KN3BIO and KN3BIO both live in Sharon (Massachusetts and Pennsylvania respectively).
Let's Go Microwave

Practical Details of the San Bernardino Microwave Society 3300-Mc. Gear

BY A. D. BREDON,* W6BGK

The story of the activities of the San Bernardino Microwave Society (by W6VIX in December QST) brought in a surprising number of requests for more information on the microwave equipment pictured therein. Here W6BGK, a past president of the Society, supplies full details of the beer-can polaplexer and associated equipment, described in the December QST article.

MICROWAVES — those weird and wonderful little bits of electromagnetic radiation that can be squirted through pipes, offer much to interest the experimenter. In addition, they can provide a greatly needed communication service. In working with microwaves the experimenter will also broaden his own knowledge of electronics, as basic principles are readily observed at these frequencies.

No great degree of skill or knowledge is required to make use of the frequencies involved. Furthermore, one can get on the air with a minimum of expense, if gear available on the surplus market is used. Thus the aim of this article — to attempt to interest more people in microwave communication and experimentation.

Band Limits Changed; Now 3500 to 3700 Mc.

Just before press time FCC announced a change in the band, moving it 200 Mc. higher than the range for which the polaplexer described here was designed. The following changes are required for the new band:

Use two dietetic juice cans (2 1/8 inches inside diameter) soldered together, with adjacent ends cut out, of course. Dimensions from the closed end of the can thus formed are as given in Fig. 2. To tune above 3550 Mc. the 726A must be modified. Grind off the strut weld and back off the 6-82 nuts one turn to stretch the cavity. Most tubes so treated will tune to 3600 Mc.

Raise the repeller voltage by inserting an OB2 in series with the OA2 regulator tube in the power supply, Fig. 1. The series resistor, Rs, may have to be lowered in value with this change.

To begin with, let’s set up a small microwave station. The circuits and polaplexer described below have been built and used on the air with excellent results. Since 726A klystrons are available on the surplus market at a reasonable price we will choose the 3300- to 3500-megacycle band to start with. Almost all 726A klystrons will tune the complete band, and all should tune at least a good portion of it.

We now require a power source. This can be built from scratch, or an existing supply may be used. Good regulation is desirable and important. VR tube regulation would work, but electronic regulation is preferable for the beam supply. The circuit of Fig. 1 is suggested. Note that the positive side of the 300-volt supply is grounded; therefore, the shell of the klystron will not be at a high potential with respect to ground. If an existing supply with the negative side grounded is used, proper care must be exercised to prevent electric shock. Use a protective can over the klystron and an insulated tuning tool.

Next, we will need an i.f. strip. A 30-Mc. strip of 5 or 6 stages and a band width of around 2 Mc. will be excellent for the beginner. Many surplus radar i.f. units are ideal for this use. It is not absolutely necessary that 30 Mc. be used for the intermediate frequency, but it is a good figure because of the availability of surplus units. In any case, be sure you have a friend build one with the same i.f. or locate an amateur with a microwave setup to allow testing one another’s rig.

Having obtained or built a power supply and i.f. strip we have only to build the r.f. components.

The beer-can polaplexer, mounted on its parabolic reflector.

June 1958
of the system. W6IFE of the San Bernardino Microwave Society, and others, have designed what we call the "polaplexer." ¹ The theory of this was suggested by Lawson and Pound.² The frequency-difference method was used by Merchant and Harrison ³ in the first 2-way work ever done by amateurs in the microwave region, and in most amateur microwave communication since. The polaplexer uses frequency-difference duplexing, adding cross polarization to isolate the

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¹ Lawson, Radiation Laboratory Report 277, January, 1946. (Cross polarization.)
³ Merchant and Harrison, "Duplex Phone on 5300 Mc." QST, January, 1946, Page 19.

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Fig. 1—Schematic diagram of the regulated power supply for use with the 3300-Mc. station. Value of $R_i$ should be adjusted, if necessary, to give about 15 ma. through the regulator tube. Minimum current values for the various filament transformers are given. $T_1$ and $T_2$ can be one transformer, if a suitable combination of secondaries can be found in one unit.

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Fig. 2—Details of the beer-can polaplexer. Exploded view of the by-pass capacitor built into the crystal mount is shown at the lower right.
transmit from the receiver. Figure 2 shows the dimensions and mechanical details of a polaplexer. Many variations are possible.

To make use of this system one station tunes to a given frequency, say, 3333 Mc. The other station then tunes to this frequency plus or minus the intermediate frequency. If an i.f. of 30 Mc. is used, the second station would tune to 3363 or 3303. One klystron then serves as both transmitter and local oscillator. In order to couple sufficient energy from the klystron to the crystal to allow efficient mixing, a local oscillator injection adjustment screw is used. The l.o. injection should be adjusted to provide approximately 0.5 ma. crystal current. Figure 3 shows a typical crystal current metering circuit.

**Polaplexer Details**

As described by W6VIX in December QST, the San Bernardino Microwave Society polaplexers are made out of beer cans. The probe on the 726A tube is extended by 1 1/2 inches by soldering a stiff wire to the inner conductor of the probe. If the resonator shell is hot, make sure that there is no d.c. contact between the outer conductor and the can.

Perpendicular to the klystron probe we see the mixer probe. This is tuned by means of an adjustable short at the lower right of the end-view drawing. The crystal is mounted in a coaxial fitting, modified as shown in the sketch. The center element of a u.h.f. coaxial fitting is removed, and the hole left thereby is enlarged slightly to pass the body of the crystal. Connection to the small end of the crystal is made with a contact removed from an old tube socket. This is soldered to 1/16-inch diameter rod. The movable short at the opposite end of the probe is made by drilling a 1/8-inch hole in a piece of brass that is a force fit in the 3/8-inch tube. The latter should be sawed lengthwise to within 1/4 inch of the can, to permit the brass shorting slug to slide inside the tube, but still maintain a fairly tight fit. Position the short at the point that gives maximum crystal current, and then solder both joints. Caution: hold the 1/8-inch rod in heavy pliers, between the crystal and the short, to drain off excess heat and prevent damage to the crystal.

Energy at the intermediate frequency is taken off through a modified male coaxial fitting. The tip of this fitting is cut off about 1/4 inch, so that it just bears against the foil by-pass capacitor that is built into the fitting on the polaplexer. The capacitor is designed to bypass the energy at the injection frequency, but not that at the intermediate frequency. It is made as follows: cut two disks of Scotch electrical tape, one 1/8 and one 3/8 inch in diameter. Cut a hole slightly larger than the pin of the mating plug in the center of both pieces of tape. Cut a hole very slightly larger in the 3/16-inch aluminum foil. Now place the smaller aluminum disk on the crystal and center it carefully in the receptacle. Place the smaller disk of tape on this, making certain that no foil is exposed except at the center. Next, place the larger foil, followed by the larger piece of tape, on the assembly. When this is properly done, there will be no contact between the two pieces of foil. The pin of the mating plug bears on the small piece of foil. The larger foil is the grounded side of the capacitor.

The polaplexer may be used by itself as an antenna for distances up to a few hundred feet. For longer distances a parabolic reflector should be used. The polaplexer then acts as a feed horn for the dish, as shown in the photograph. The polaplexer alone has a beam width of about 60 degrees each side of center. This is ideal for illuminating the parabolic dish. In any case, the polarization of transmission should be rotated 45 degrees to the right looking toward the other station. In this way all stations are identical. The transmitting polarization at Station A will match the receiving polarization of Station B and vice versa.

The distance record for two-way communication on 3300 Mc., 190 miles, was set by W6IFE and W6VIX of the San Bernardino Microwave Society. The equipment at each end consisted of a 48-inch parabolic reflector, polaplexer, 30-Mc. i.f. strip, and power supply similar to that described above.

**The Doppler Radar Method**

By substituting a fairly high-gain audio amplifier for the 30-Mc. i.f. strip, a low power Doppler radar can be made. With a reasonable-size antenna, 24-inch diameter or larger, moving objects may be detected for a few hundred feet. Whenever the antenna is pointed at a moving object an audio note will result. The frequency of the audio note will be proportional to the speed of the object toward or away from the antenna. Interesting effects may be observed when the antenna is beamed toward an electric fan, a clock, or a fluorescent light.

This Doppler method also provides a good way to adjust the antenna feed (to focus the system). The antenna should be pointed at an electric fan at the greatest distance a tone can be heard (a few hundred feet). Adjust the position of the polaplexer toward or away from the dish to the point of strongest signal. If considerable move-
ment of the horn is necessary to produce a noticeable change (or if the original distance to the fan is small) move the fan farther away, and repeat. This focusing is extremely important, as a great deal of power can be wasted by having too wide a beam, due to imperfect focusing.

**Checking Frequency**

Since it is important to know that the klystron is operating within the band, we must have a method of measuring frequency. Cavity wavemeters are preferred but are usually too costly. A good substitute is to use the reflection null method. With the klystron in the polaplexer operating, adjust the I0 injection to give about 0.5-ma. crystal current. Place it near a vertical metal surface and find the first point several inches away at which the crystal current is minimum, mark exactly the position of the mouth of the polaplexer. Move the polaplexer or the reflecting plane away through several null points, counting the maximums, and again mark the position of the mouth of the polaplexer at the last good null point. Carefully measure between the two marks. The frequency may then be found by the formula

\[ f (\text{Mc.}) = \frac{5005 \times n}{\text{distance (inches)}} \]

\( n \) is the number of maximums between the two marks.

This is in effect the old Locher-wire wavemeter without wires. It was shown in use on the cover of *QST* for September, 1948, the frequency in that case being 10,000 Mc.

One of the beauties of the system as described in this article is its versatility. In order to work the other microwave bands it is necessary to change only the polaplexer. The power supply, i.f. strip and parabolic reflector may be used on any band. The only limiting factor is the trueness of the parabolic reflector surface. Most surplus reflectors (if not beat up) are good on all bands up to 10,000 Mc. It is even possible — for the very ambitious only — to make one's own parabolic dish. However, this article is devoted to the simple approach, so we will not attempt to give directions at this time.

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**Strays**

K4LRO is less than 5 feet tall, and so figures that his call stands for *Little Radio Operator.*

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Because of all the interest in various kinds of certificate awards, W8TZO suggests that when we order QSLs we include our *county* as part of the information on the card.

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W3EVO isn't sure whether he wants call letter license plates — he already has license plate EE 73 88.

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A beginner who had pretty well mastered his 45 r.p.m. code records provided himself with a "new" set at higher speeds merely by playing them at 78 r.p.m. — W8KSL

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Welex, Inc., of Fort Worth, Tex., make a unit called a GEN-O-DRIVE which utilizes a stepped pulley arrangement to provide higher generator output at engine idling speeds. The GEN-O-DRIVE disengages when the engine gets above 1000 r.p.m. Their address is P. O. Box 11336.
The Versatile Standing-Wave Ratio Indicator

*BYRON GOODMAN,* W1DX

Judging by some of the letters received at Headquarters and by remarks heard over the air, not everyone who owns a standing-wave indicator knows the several different jobs it can do around the shack. If there weren't a strict taboo against it, this article would have been called “Getting the Most Out of the S.W.R. Indicator.” (There aren't any editorial objections to getting the most out of anything; the objections are to the overworked cliché.)

To make sure that we're all talking about the same thing, let's review a little. Back in the days before coaxial feed lines were available, very few hams worried about the “standing-wave ratios” on their open-wire lines. A few studious types knew that such things existed on transmission lines, and a very few (non-operator types probably) could even make primitive approximations of the s.w.r. if their hands were forced. These primitive measurements consisted of trotting up and down the transmission line with a suitable indicator and finding the values of maximum and minimum voltage (or current). The ratio of the maximum voltage to the minimum voltage was called the “standing-wave ratio,” and the hot shots called it the “v.s.w.r.,” for “voltage standing-wave ratio.” The resultant number turned out to be the same as the ratio of maximum current to minimum current. It meant very little to anybody but engineers.

When WW II came along it brought, among other things, the rapid development of microwaves and waveguide and solid-dielectric coaxial-line techniques. One thing you don't do on microwaves is to get yourself mixed up with high standing-wave ratios, because the losses mount up and components like magnetrons and such don't remain on their best behavior. First efforts at measuring the s.w.r. in waveguides and coaxial lines involved the old trotting-up-and-down-the-line technique (using probes and slotted lines) and, frankly, it was very slow and a pain in the notebook. The slotted line is useful for measuring some other things but if all you want is a number called the “s.w.r.” then something direct reading is more desirable.

The direct-reading instrument showed up after a while, in the form of a device called the “directional coupler.” The standing waves on a line are formed when all of the energy isn't absorbed at the load; some of it is reflected back and, with the later energy headed for the load, sets up the standing-wave pattern of maximum and minimum voltage (and current) points along the line. (The mechanics of all this is explained in many books, if you care to dig into it.) The directional coupler makes it possible to measure independently the energy in a line going from the generator to the load and also that reflected from the load back toward the generator. A high s.w.r. occurs when much of the energy is reflected, a lower s.w.r. is obtained when little energy is reflected, and the s.w.r. = 1:1 when no energy is reflected.

The value of the directional coupler should be obvious. If for some reason we want to know the s.w.r. in a line, we don't have to trot up and down it (which gets to be difficult in most practical antenna installations); we can make our observations at the transmitter end of the line. With more and more solid-dielectric coaxial line in use by amateurs, the directional coupler was a real boon. First one to appear was the Micromatch, followed by the Twin-Lamp and then the Monimatch with its several versions. There is an allied device called the “s.w.r. bridge” that will measure the s.w.r., but it cannot be left in the line at all times the way the other devices can. It does, however, have an excellent place in the scheme of things.

**Why Know the S.W.R.?**

But what good are these devices? Smart hams could always tell when they had power going out the feed line; they used r.f. meters (thermocouple or hot-wire type, depending on the era) when they were in the chips, and they used flashlight

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bulbs or neon lamps when the groceries came first. But, you say, these modern transmitters with low-impedance output have to work into a line that has a low s.w.r. (Not necessarily so, but it’s a popular misconception.) Phooey! Low-impedance output has been used for many years (ever hear of “link coupling”?); and we have been able to load transmitters, and properly, too. Suppose you have a Monimatch and a coax-fed dipole, and the indicated s.w.r. is 2:1; what do you do about it? (You tune up in the usual fashion, say you have “a fairly low s.w.r.” and continue to operate, that’s what you do!)

What we’re driving at here is simply this: Many of the owners of s.w.r. indicators are merely using them as expensive output indicators and conversation pieces. They aren’t beginning to make use of the capabilities of the instruments.

**What the S.W.R. Indicator Can Do**

The Micromatches and Monimatches consist of (1) an instrument that you connect in the line, (2) a two-position switch and (3) a meter. The switch points are labeled “Forward” and “Reflected,” meaning that in the Forward position the meter reading is proportional to the power going toward the load, and in the Reflected position the meter reading is proportional to the power reflected (not absorbed) by the load. Whenever any reflected power is indicated it means that some of the power present is “reactive” or “apparent”; this may foul up your thinking and confuse your arithmetic if you aren’t familiar with real vs. apparent power, or power factor, but don’t let it throw you; the reflected power isn’t dissipated in your transmitter, and all it ever does is run up your line losses some.

Sometimes the meters are calibrated in watts, but more often you merely use the relative readings. The meter can be calibrated to indicate the s.w.r., because the s.w.r. can be found from a comparison of the Forward and Reflected readings. A ham with two meters could dispense with the switch and use a dual indicator like that pictured in Fig. 1. Don’t let those fancy titles like “generator” and “load” scare you off; these are merely to show that the power source is at the left and the thing you’re delivering the power to is at the right. The “generator” is usually your transmitter but it could be a driver stage or a signal generator; the “load” is usually the antenna but it could be the input circuit of a driven amplifier or a dummy load. Any of the power-handling instruments (Micromatch, reflectometer, Monimatch) have a negligible effect on the s.w.r. in the line to the left, but this isn’t necessarily true of the resistive s.w.r. bridge referred to earlier.

In this enlightened age practically everyone knows what the meter readings will be when the load has a resistance equal to the impedance of the line. (The “impedance” of the line is determined by the physical and electrical characteristics of the line; you know RG-8/U to be 52-ohm line, RG-11/U to be 75-ohm line, and so on.) If the line is RG-8/U or some other 52-ohm line and the load is 52 ohms, when we turn on

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Fig. 1—Standing-wave indicators exist in several different forms and are identified by as many different names. The directional couplers discussed in this article all have three points in common. They are used in the line, they can handle the full transmitter power, and they measure the s.w.r. by comparing the Forward and Reflected powers.

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Fig. 2—(A) When the line is terminated in a load equal to the impedance of the line, the Reflected power is zero and the s.w.r. is 1:1. (B) Any other termination will result in some Reflected power.
the generator the Forward meter will show something but the Reflected one will show nothing, as in Fig. 2A. The directional coupler is labeled “52-ohm S.W.R.” to remind you that if it were designed for another line-impedance value we wouldn’t get the same result (the Reflected meter wouldn’t read 0).

This case with the load equal to the line impedance is of course a familiar thing to anyone who has used an s.w.r. indicator. The load doesn’t have to have an ohmic resistor as shown in Fig. 2A; it can be, and more often is, the radiation (plus ohmic) resistance of an antenna. A standing-wave ratio of 1:1 means that there is zero reflected power, and the losses in the line are a minimum when the reflected power is zero. The length of the line should have no effect on the s.w.r.; the s.w.r. is determined solely by the relationship between the line impedance and the load.

When the load is anything other than a resistance equal to the line impedance, some reflected power will be indicated, as represented in Fig. 2B.

**Using the Directional Coupler**

Getting down to cases, here are some of the ways you can use the directional coupler:

1) To indicate resonance and proper coupling in the transmitter when no antenna coupler is used.

The way many hams use the things, by tuning the output amplifier for the highest indication of Forward power without burning up the transmitter. Manufacturers of s.w.r. indicators certainly don’t object to this application, but a less-expensive indicator will serve just as well.

2) In the line between transmitter and antenna coupler.

Permits adjusting the antenna coupler to give an s.w.r. of 1:1 in the line between transmitter and coupler, desirable with pi-network output and when a low-pass filter is used. The low s.w.r. also minimizes losses in this length of line, although this is usually of minor importance in what is normally a short length. Remember that your adjustments do not affect the s.w.r. in the line between coupler and antenna. However, you can use the s.w.r. indicator in the line between coupler and transmitter to measure the s.w.r. on the line between coupler and antenna.

3) To adjust coupling at input circuit of final amplifier, when amplifier is coupled to driver through coaxial line.

When this is done with driver and amplifier running at normal power, the resultant coupling condition for a midband s.w.r. of 1:1 on the short coupling line also gives the best band width, which means you don’t have to retune as often when changing frequency within a band.

4) To adjust matching section between antenna and line.

One of the very useful applications. The adjustment of a gamma match is a cinch with an s.w.r. indicator, and sheer guesswork without. With the antenna resonant (formula length) merely vary the gamma until a 1:1 or very low s.w.r. is indicated. The gamma match with an adjustable capacitor is the most convenient to use. If you can climb the tower you can use the s.w.r. indicator up at the antenna; if you have a light mast or tilter-over job that won’t support you, rig up a string drive to adjust the capacitor with the antenna up in the air. The length of line usually isn’t very important below 30 Mc., but above 50 Mc. the s.w.r. indicator is best used no more than a few wavelengths from the antenna. When the losses in the line begin to mount up, as they will in long lines at v.h.f., you will get indications of a match at the transmitter end of the line that aren’t true at the antenna end. The extent of this effect is shown in Fig. 3. We’ve seen a coil of cable a few hundred feet long used as a dummy load for a v.h.f. transmitter; it made very little difference in the s.w.r. if the line was terminated or not.

5) To check antenna resonance.

Another of the more useful applications. If an antenna is used as the termination for a line, the frequency of minimum (not necessarily 1:1)

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Fig. 3—Indicated s.w.r. as a function of true s.w.r. This clearly demonstrates the need for measuring the s.w.r. near the load when making matching adjustments at an antenna, if a long (lossy) line is used. (From an article by John Lory, courtesy of Electronics magazine, a McGraw-Hill publication.)

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s.w.r. is the frequency at which the antenna is a pure resistance (no reactance), and this is the resonant frequency of the antenna. Thus to find the resonant frequency of an antenna fed directly by coaxial line, it is only necessary to vary the frequency of the transmitter until the frequency of minimum s.w.r. is found. (Don't just look for minimum reflected power; you have to make sure that the forward power is still there, and this will probably require a few coupling adjustments at the transmitter as you run over the band.) If the minimum s.w.r. occurs at the high-frequency end of the band and you prefer to be peaked at a lower frequency, lengthen the antenna. If the minimum s.w.r. occurs at the low-frequency end and you have your heart set on the high, make with the cutters. You might be tuning a dipole made of No. 12 wire, or one of the new XTClU specials (the one made from 14 beer cans and a piece of wet string); you can still use the technique. Just remember to make the resonance check with no matching section between the antenna and the line\(^6\), and be sure you find the minimum s.w.r. and not just the minimum reflected power with some fixed transmitter coupling.

The above is based on the fact that near resonance the radiation resistance of an antenna changes slowly. Considering it to remain constant about the resonant frequency, any reactance added to the resistance will increase the s.w.r. when this antenna is used as a load for a line.

If you have any curiosity about your antenna, you can even get a fair idea of what the antenna impedance is, just by measuring the s.w.r. at resonance and then making an educated guess.\(^6\) The line should be connected in the center of a half-wave antenna or in a current loop (point of maximum current) in a long wire.

For example, suppose the s.w.r. turns out to be 1.6 at the resonant frequency, and you are using 52-ohm line. You know that the antenna impedance must be either 83.2 ohms \((52 \times 1.6)\) or 32.5 ohms \((52 + 1.6)\), from the relation

\[
Z_0 = R_1 \frac{(s.w.r.)}{Z_0} = R_2 \frac{(s.w.r.)}{Z_0}
\]

where

\(Z_0\) = Line impedance
\(R_1\) = Resistive termination smaller than \(Z_0\)
\(R_2\) = Resistive termination larger than \(Z_0\)

Your educated guess would probably be the 32.5 ohms, in the case of a multielement beam.

If your meter reads forward and reflected power, the s.w.r. can be determined by the use of Fig. 4.

**Effect of Harmonics**

There may be occasions when the reflected reading will run higher than the forward. This doesn't necessarily mean that the unit has gone haywire; in most cases it will be an indication of a serious u.h.f. or v.h.f. parasitic oscillation in the transmitter. In the case of a c.w. transmitter, the reflected reading may jump up to a high value as the key is closed and then drop down to a more normal value; this means that there is a momentary v.h.f. or u.h.f. parasitic oscillation as the key is closed.

When you are getting down to very low readings of reflected power, you have to avoid any appreciable spurious content in the transmitter if the load you are adjusting is frequency sensitive. In other words, if you are adjusting something that tunes, like a gamma match or an antenna coupler, it will give a proper termination for the line at only one relatively narrow band of frequencies. You will tune and tune and never get the s.w.r. down to 1:1 if there are a few watts.

(Continued on page 189)

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\(^6\) The line should be connected in the center of a half-wave antenna or in a current loop (point of maximum current) in a long wire.

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Fig. 4—Graph of s.w.r. vs. ratio of forward to reflected power. Use the chart on the right for low power ratios.
As long as you remain in the Novice Class your transmitter must be crystal controlled. This, of course, means that you’re restricted to the frequency or frequencies for which you have crystals. The FCC wants it that way.

But you do have a reasonably wide range of choice: within the assigned frequency range of the Novice bands, you may pick any frequency that appeals to you. Having done so, the chances are that after a short time you will wish you had picked some other crystal frequency — or that you could change the frequency of the crystal you now have — because every other Novice seems to have chosen the same spot to operate. Or perhaps you’ve seen surplus crystals advertised at bargain prices, but unfortunately not in the Novice bands, and could give yourself quite an assortment of frequencies if only you knew how to “move” crystals to spots where you’re authorized to operate.

Whatever the reason, changing the frequency of a crystal has its useful aspects, especially for the Novice. It’s not hard to do, actually, but it has to be done the right way or you may wind up by having no crystal at all. The purpose of this article is to show how it can be done safely. First, though, a little background about crystals in general.

What Crystals Are

Crystals used for transmitter frequency control are mechanical resonators, something like a tuning fork or a bell, but with one very important difference — while the crystal is vibrating mechanically it is also generating an electrical voltage of the same frequency as the mechanical vibration. This “piezoelectric effect” is characteristic of only a few substances found in nature, the most important one for our purposes being quartz. Also, unlike the tuning fork or bell, the frequencies of vibration are far beyond audibility — running, as we know, into millions of cycles per second.

Such an oscillating crystal is actually a thin slab or plate cut from the natural quartz. In the crystals that are used for amateur-band transmitter frequency control the dimension that controls the frequency of oscillation is the thickness of the plate: the thinner it is, the higher the frequency. The plate has to be cut from the “raw” crystal in just the right way (with respect to certain “axes” of the crystal) in order to oscillate at all, and the two sides of the wafer must be flat and parallel within extremely small tolerances.

Originally, oscillating plates were cut from the raw crystal along what are known as the “X”

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Crystals Where You Want Them

Grinding Techniques for the Novice

BY LEWIS G. McCoy,* W1ICP

Do you, Mr. Novice, have all the transmitting frequencies you want? And do you find that crystals you have, or can get cheaply, are on the wrong frequencies? If so, you’ll be interested in knowing how to move a crystal where you want it. It’s not hard, and it’s an interesting pastime in itself.

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and "Y" axes, and these early crystals were known as "X-cut" or "Y-cut" depending on which axis was used. Both these cuts were somewhat temperature sensitive—that is, the frequency of oscillation was subject to change as the temperature of the crystal varied. Later, several other cuts less subject to frequency-temperature effects were discovered. The ones of most interest to us are the "AT" and "BT" cuts, since these are the ones commonly used for transmitter control in the medium- and high-frequency range. Of the two, the AT-cut is the more active piezoelectrically but is much thinner for the same frequency than the BT-cut. Above about 5 Me, an AT-cut becomes so thin that its use is rather impractical because it is easily fractured, so the BT-cut is generally used for frequencies higher than this.

A crystal plate cut from the raw crystal must be "finished" by grinding it so its sides are flat and parallel and the thickness is exactly right to produce the desired frequency. In commercial crystal manufacturing, the initial work is done by machine grinding and then the crystals are brought to the final frequency by a chemical process called "etching." However, very good results can be obtained by hand grinding, especially when the problem is simply to change the frequency of an already-finished crystal.

The crystals most commonly used in amateur stations today are those designed to fit the FT-243 type holder shown in the photograph. The crystal ordinarily measures about ½" x ½", with the thickness depending on the frequency. If you have access to a micrometer you'll find on measuring the crystal that the surfaces are very nearly parallel, although the thickness at the corners and edges may be slightly less than at the center—by as much as a few ten-thousandths of an inch. This thickness variation, called "contouring," is a factor in obtaining maximum activity in a crystal.

If we grind away some of the quartz and make the crystal thinner, it will oscillate on a higher frequency. With a little experience, it is possible to move a crystal several hundred kilocycles. In essence, crystal grinding consists of rubbing the crystal back and forth over a flat surface that has been covered with grinding compound. Before we discuss the actual process of crystal grinding let's see what is needed in the way of materials.

**Grinding Materials**

All the materials needed for the job can be purchased or ordered at your local hardware store. There are two suitable methods of home grinding, and the one you choose will determine what materials are needed.

First, with either method you'll need a perfectly flat surface for the grinding operation. A piece of plate glass about 12 inches square makes an ideal surface. One of the two methods to be discussed makes use of a grinding compound such as carborundum powder and the other utilizes waterproof abrasive paper. If you decide to use compound you'll need a few ounces of No. 400 grit and a like amount of No. 220 grit and a like amount of No. 400. Grinding compound is graded by number; the lower the number the coarser the grit.

The waterproof abrasive paper is available in several different grades of grit. One sheet each of Nos. 400 and 220 will be satisfactory for most grinding jobs. If you decide to use the paper you'll also need a small amount of rubber cement: this is used to attach the abrasive paper to the plate glass and affords a simple system for changing papers.

**Holder Adapter**

Since it is necessary to keep a continual check on the frequency of the crystal as it is being ground down to its final frequency, much time can be saved by using a "quick-change" holder adapter. This is merely a piece of metal bent in the form of a clip, as shown in the photograph. It eliminates the job of fastening the cover of the holder in place each time a crystal is checked. The only other items needed are your receiver and transmitter.

**Grinding the Crystal**

Let's take a "for instance" to demonstrate how a crystal is ground. Suppose some generous ham has made you a present of a 3720-ke. "rock." Obviously, you cannot use the crystal until you move it into the Novice band. This means that the crystal frequency must be raised more than 30 kc.

Some method of checking the crystal frequency after each grinding operation will be needed, and your receiver can be used for this purpose. Let the receiver warm up so that it is not subject to drift, and after it has settled down, plug the 3720-ke. crystal into your transmitter and turn on the oscillator. (If the transmitter is one in which the oscillator cannot operate unless the entire rig is on, use a dummy antenna. You don't want to be radiating a signal on the air when checking your crystal! Also, you have to have some method of knowing where the edges of the Novice band are, obviously—this is something you ought to have, anyway. We won't go into that subject in this article, but will assume that you do have some way of telling whether a signal you hear on your receiver is in or out of the Novice band.) Tune in the signal from the oscillator and ad-
just the receiver gain to give a moderately strong signal. Don't let the receiver be overloaded, because if you do you won't be able to tell accurately enough just where the signal is.

Set the piece of plate glass on a table or other convenient working surface. Also at the working area you'll need the No. 400 grinding compound, a container of clean water, and some facial tissues or a soft, lintless cloth.

Remove the crystal from the transmitter (be sure to turn off the oscillator plate voltage or open the key) and remove the screws holding the lid of the crystal holder. Be careful, because there is a coil spring under compression just below the lid, and the whole works is likely to pop out of your hand — with the result that you may have to hunt for holder parts on the floor. Fig. 1 shows the component parts of the crystal holder in the order in which they come apart. Remove the holder lid and spring. (In some holders there is also a fiber spacer below the spring. This, too, should be removed.) The next part of the assembly is a flat contact that connects to one of the crystal socket pins. Lift this contact and under it you'll find the two electrodes with the crystal between them. Remove these three items from the holder. Note that the electrodes have raised metal portions or "lands" on each corner on one side. When the crystal is mounted in the holder it is clamped by these lands, leaving a small air space between the crystal and the major part of the electrode surfaces.

You are now ready to start grinding. The crystal is quite brittle and won't stand rough treatment, so handle it carefully. Put a pencil mark on one surface of the crystal and do all your grinding on the other side; this makes sure that at least one surface of the crystal will stay flat and "on-axis" and will serve as a reference if anything goes wrong during the grinding. Put a few pinches of No. 400 carborundum compound on the glass surface and add enough water to make a mixture the consistency of thick cream. Spread the mixture over an area about eight inches square. Lay the unmarked side of the crystal on the glass and place the tips of the index and middle fingers on opposite corners of the crystal. Use just enough pressure to move the crystal across the grinding compound in a "figure-8" pattern. Make about five "8s," and then switch your finger tips to the other two corners and make five more. This should be enough grinding for the first pass.

Wash the crystal and wipe it dry, being careful to remove all traces of grinding compound. Check to make sure the pencil mark is still clear so you know which side is being ground. Place the crystal between the holder electrodes, making sure the raised lands are touching the corners. Put the electrodes and crystal back in the holder between the contacts and place the spring and cover in place. Use the quick-change adapter to hold the unit together. (Actually, all this can be done much more quickly than it takes to tell about it.)

Put the crystal in the rig and turn on the oscillator. You'll probably find that you have only moved the frequency enough to cause a noticeable change in the beat note from the receiver. However, take heart; you have actually changed the crystal frequency! You now know the process, and you can go through the steps again, this time making more figure "8s" to change the frequency a greater amount at one time. Keep track of the number of "8s" so you will know how many it takes to move a given number of kilocycles. This is important if you're shooting for an exact frequency, since you will want to slow down the grinding process as you approach the frequency you want. There's no replacing ground-off quartz once you've overshot the mark!

Only the fine grinding compound was used in this example. For moving a relatively small number of kilocycles — say, up to 50 or so — it is better to use the fine compound and take it in easy stages. The coarser grade should be used only when you have to take off quite a bit of quartz to get near the frequency you want. Even then, you should shift to the fine grade when you get within 20 or 30 ke. of the desired final frequency.

Either grade will lose some of its cutting power
Fig. 2 — The electrodes are made with four raised areas called "lands" at each corner. The lands are the parts of the electrodes that make contact with the crystal.

after a little use. When the number of "8s" required for grinding off a given number of kilocycles tends to become excessive, add more compound to the mixture. Water, too, should be added from time to time to keep the mixture free-flowing. Also, keep rotating your "8s" as you work; this will grind the glass plate evenly and thereby prevent wearing grooves in it that will destroy its flatness.

The Abrasive Paper Method

To use the abrasive paper method mentioned earlier, you merely cement the proper grade of paper to the glass, moisten the grinding area and grind the crystal. The paper gives you uniform distribution of the abrasive. After acquiring a little experience, you'll discover that the paper method offers some advantages over the loose-compound type of grinding. When you grind over the same portion of the paper several times that area wears down and the frequency change per “figure 8” becomes smaller. You can then move to another area of the paper if you want to grind at the same speed, but still have at hand a fine-grinding area where you are able to move in slowly on your target frequency.

Keep the paper well moistened. The water keeps the crystal cool and also acts as a lubricant to prevent sticking, which could result in cracking or chipping the edges of the crystal.

As in the case of using grinding compound, the coarser paper should be used for moving the frequency rapidly through a large number of kilocycles and the finer grade for finishing off to frequency when the crystal has been brought to within 20 or 90 kc. of the final figure.

If Activity Drops

Sometimes (and this always seems to occur during the last grinding operation?) the crystal stops oscillating. If you've followed instructions so far you needn't be alarmed; lack of activity at this stage doesn't mean the crystal is ruined. Any one of several things can cause a crystal to stop oscillating. The first thing to do is to make sure the crystal and electrodes are perfectly clean. Dirt on the crystal or electrodes can lower the activity (so the crystal only oscillates weakly) or prevent it from oscillating at all.

Check to make sure that the crystal is mounted properly between the raised lands of the electrodes. It is easy to make a mistake when putting the crystal in the "sandwich."

If the crystal is clean and properly mounted but still won't oscillate, try bevel grinding the edges. This is a simple process: hold the crystal at a 45-degree angle on the grinding area and make one or two “figure 8s” on each of the four edges. If the first attempt doesn't bring the crystal back, give it two or three more trials. If this still doesn't work, it is probable that you've ground the sides out of parallel, or perhaps have a high (or excessively low) corner. A micrometer is a necessity at this point.

Measure the crystal thickness at several points to see if there is any variation. If you find a spot on the crystal that is thicker than the rest, mark it and try to grind it to the same dimensions as the rest of crystal — grinding, of course, on the same side as in your previous operations.

As mentioned earlier, the corners should be one to three ten-thousandths of an inch thinner than the center. A corner that is thicker than the main body of the crystal almost always will prevent the crystal from oscillating, so make sure that every corner is "down" just a bit as compared with the thickness at the center of the crystal.

If you've only started out to move the crystal frequency 20 or 30 kc, you shouldn't have to worry about these finer points in "contouring." Just try to keep light and even pressure on the crystal in making your "8s." Never put pressure on the center of the crystal during grinding; you may wind up with a concave plate that won't become active until it is reground with the aid of the micrometer.

Lowering Frequency

It is obvious that grinding a crystal always raises the frequency, since material once taken off cannot be restored. Nevertheless, it is possible to make a crystal operate at a slightly lower frequency than it normally has, by loading it mechanically so that it literally slows down. Although this hasn't any direct connection with grinding crystals, it is of some interest in case the grinding process is carried just a bit too far. However, the frequency usually can't be lowered more than a few kilocycles without a substantial loss of activity.

The method of loading generally used consists of rubbing cold soft solder on each side of the crystal. Mark a circle about one-quarter inch in diameter centered on each side and use the circles as guides when applying the solder. The solder should be applied to both sides in equal amounts, and frequent checks should be made to be sure the crystal keeps oscillating.

Another material that has been used with some success for loading crystals is India ink. The same procedure should be followed in using it.

Finally —

Not every crystal you may happen to lay your hands on can be shifted in frequency by the method described above. If the crystal has plated-on electrodes, don't try to grind it. Surplus (Continued on page 169)
Simple Rotary Joint
for Beam Antenna Feedlines

BY THOMAS F. SNYDER,* K6PGB/4

Of possible interest to many constructors of beam antennas is a coaxial-type rotating joint made with Amphenol type C connectors. This coaxial feedline connection permits continuous rotation and will handle power equal to that permitted by the rating of RG-8/U cable. Connectors used are the types UG-570/U and UG-573A/U, otherwise identified by Amphenol catalog numbers 82-502 and 82-530, respectively. Each is a weatherproofed, 50-ohm, constant-impedance unit of bayonet-lock design.

A method of rigging the assembly to a rotary beam is shown in Fig. 1. Notice that the rotating portion of the beam mast must be accessible below the rotator mechanism, and that the lower end of this mast is equipped with a cap which supports the type UG-570/U bulkhead jack. Coaxial cable for the connection between the jack and the gamma-match — or what have you — is fed up through the rotatable mast.

The main feedline is terminated at the rotator end with a type UG-573A/U plug. The coaxial cable should be clamped to the fixed mast an inch or so below the plug. Allow reasonable alignment between the cable, the plug and the bulkhead jack.

Fig. 1 — Drawing of the rotary joint made with coaxial connectors.

* Cocoa Beach, Fla.

Editor's Note: W1SX, a manufacturers' representative with an intimate knowledge of coaxial cable connectors, adds the following to K6PGB's useful information:

If the coupling ring on the UG-573A/U plug should fail to turn freely, as might happen after considerable weather exposure, the connectors would separate on rotation in one direction. The builder could protect against this problem by lubricating the plug coupling ring at the rear after assembling the plug to the cable. The coupling ring plays no part in the electrical circuit. Be very careful to keep oil or other lubricant out of the inside surfaces of the connector pair.

Amateurs interested in using the system described above should appreciate that type C connectors are not designed for this particular application. There is therefore no extensive experience to draw upon to indicate whether or not the connectors will stand up indefinitely.

A completely assembled set of Amphenol type C connectors is shown at the left. Individual components of the type UG-570/U bulkhead jack and the type UG-573A/U mating plug are shown in the photograph to the right.
A Complete Multiband Filter Transmitter with 6146 Final

BY GEORGE K. BIGLER, W6TEU

Here is a complete side-band transmitter, power supply, VOX and all. Utilizing a number of surplus components, it shouldn’t be too expensive to duplicate. The means for selecting the side band is novel and ingenious.

When construction of this exciter was started, it was hoped it would have a few features that previously described units lacked. Some of the features which appeared desirable, after several smaller rigs had been built, were:

1. Bandswitching, all-band c.w.-a.m.-s.s.b. operation
2. Side-band selection without carrier shift
3. Voice control with a loudspeaker
4. Peak limiter
5. Ample driving power for a kilowatt final
6. Good frequency calibration
7. Complete self-contained unit

All of these features are included in the exciter to be described, which has been in operation for about six months with excellent results. It is felt after this period of on-the-air tests that the unit is well worth the construction time required.

Construction and alignment should not be very difficult or time consuming for a ham with a reasonable amount of construction experience.

4200 Beulah Drive, La Canada, Calif.

Circuit Description

Referring to the block diagram in Fig. 1, a crystal oscillator, V\textsubscript{1A}, is used to feed a cathode follower, V\textsubscript{1B}, which drives the diode balanced modulator for carrier suppression. The double-side-band signal is fed through the two-section crystal filter, where the lower side band is rejected. The remaining upper side band is amplified by V\textsubscript{3} and fed to the mixer, V\textsubscript{4A}. The unmodulated 450-kc. carrier signal from the cathode follower is also fed to the grid of the frequency doubler, V\textsubscript{4A}, doubled to 900 kc. and fed to V\textsubscript{4B}. V\textsubscript{4B} is used as either a doubler to 1.8 Mc. or as a tripler to 2.7 Mc., depending on the position of the sideband selector switch. Thus the output of V\textsubscript{4B} is either four or six times the crystal oscillator frequency. When the fourth harmonic from V\textsubscript{4B} is mixed with the side-band signal in V\textsubscript{3}, the frequency sum can be taken at the output of the mixer to give an upper side-band signal at five times the crystal oscillator frequency. When the sixth harmonic is mixed with the side-band signal, the frequency difference can be taken to give the same resultant output frequency with the opposite side band.

The output of the side-band generator chassis is therefore at a fixed frequency of five times the original frequency, but with side-band selection available. This same principle can be applied to a fixed oscillator, as the b.f.o. in a receiver, for a selectable-side-band system.

The side-band signal at approximately 2.25 Mc. is fed to V\textsubscript{10B}, where it is mixed with the v.f.o. running from 5.25 to 6.25 Mc., to give a frequency difference output from 3.0 to 4.0 Mc.

To deliver a clean signal to the final mixer, a double tuned circuit is used, which is gang tuned with the v.f.o. The final mixer is used to convert the 3.0- to 4.0-Mc. signal to the desired band. By choosing the crystals for final conversion so that 3.0 Mc. goes to the low even megacycle end of each band, a single dial calibration from 0 to 1.0 Mc. can be used on all bands. It is only necessary to mentally add the magn-
cycles of the band in use to the dial reading to get the frequency of operation. By putting the conversion oscillator on the low side in each case, side-band reversal is eliminated. Harmonics of the 3.0- to 4.0-Mc. signal in the higher bands will fall outside the pass band where they are easily suppressed in the tuned circuits. On 10 meters, the band is divided into two sections: 28.0 to 29.0 and 29.0 to 30.0 Mc.

After final conversion the signal is amplified by $V_{105}$ and $V_{108}$ to about 30 watts peak output. Some of the r.f. output from the final stage is fed to the peak limiter $V_{201}$. The d.c. voltage developed when a preset peak level is exceeded is fed back as a control voltage to $V_{5}$, where the remote cut-off characteristic of the tube allows the gain of the stage to be modified.

$V_{201}$ is used as a two-stage speech amplifier to feed the balanced modulator. $V_{202}$ and $V_{205}$, in conjunction with a crystal diode, furnish voice control with a loudspeaker.

**Construction and Alignment of Sideband Generator**

The side-band generator is constructed on a 5 X 9 X 1.5-inch chassis. Before construction is started the i.f. transformers can be modified as mentioned in Fig. 2. Transformer $T_4$ for the balanced modulator is altered as follows: Remove all the wire from the winding on the free end of the dowel. Double enough of this wire on itself to make a 25-turn jumble-wound bifilar winding 1/8 inch from the remaining winding. Join the finish of one 25-turn winding to the start of the other and ground this junction to the bolt at the top of the transformer which will pass through the hole in the can. The remaining ends are soldered to the unused trimmer terminals for tie-points. Apply coil dope and reassemble.

After construction of the unit is completed, the multipliers should be aligned first. This can best be done with an r.f. probe on a v.t.v.m. Tune $T_6$ to the second harmonic of the i.f. oscillator, about 900 kc., and then tune $T_7$ to 2.7 Mc. with $S_1$ open. Close $S_1$ and tune the two 10-100 μf. trimmers (mounted on the chassis) to resonate $T_7$ to 1.8 Mc. The output delivered to the mixer should measure about 12 to 15 volts in both positions of $S_1$. Next, insert carrier by advancing the 5000-ohm control and then peak the grid winding of $T_4$, indicating resonance by measuring the r.f. at a grid of $T_3$. With the r.f. probe on $J_1$, tune $T_5$ to 2.25 Mc. Several peaks will be noted, but the correct one will be obtained when switching $S_1$ results in little output change and turning down the carrier control reduces the signal to nearly zero. The output should run about 1 1/2 to 2 volts with full carrier insertion, measured across $L_{101}$ (Fig. 4).

Alignment of the crystal filter is next. Referring to Fig. 3, it is seen that the filter has a very sharp cut-off near the carrier frequency due to the shunt crystals $Y_3$ and $Y_6$. Since the carrier is always on the same side of the filter, the characteristic can be shaped for better attenuation near the carrier frequency.

In selecting crystals for the filter, an adequate supply should be obtained. At a dime apiece this shouldn't break the bank and will save time in alignment. The exact channels named in Fig. 2

---

**Fig. 1** — Block diagram of the side-band exciter. The side-band generator proper is enclosed by dashed lines; this section of the exciter is built on a separate chassis. Side-band selection is obtained by using either the 4th or 6th harmonic of the low-frequency oscillator to convert the signal to 2.25 Mc.
Top view of the side-band transmitter. The side-band generator is mounted on a separate chassis (left) for better shielding and easy testing. Crystals to the right of the tuning gang (top center) heterodyne the signal to the output frequency. Speech and VOX at lower left.
Fig. 2—Circuit diagram of the side-band generator section. Unless otherwise indicated, capacitances are in μµf., resistances are in ohms, resistors are ½ watt.

S₁—D.p.d.t. rotary switch
T₁—Modified 455-kc. t.f. transformer. See text. (Miller 112C1)
T₂, T₃, T₄—455-kc. t.f. transformer (Miller 112C1)
T₅—2.25-Mc. transformer, made by removing 8½ feet of wire from each winding of 1500 kc. transformer (Miller 112W1) Coupling coil is 4 turns over rim of secondary coil.
T₆—900-kc. t.f. transformer, made by removing 28 feet of wire from each winding of 455-kc. transformer (Miller 112C1)
T₇—2.7-Mc. transformer, made by removing 9 feet of wire from each coil of 1500-kc. transformer (Miller 112W1)
Y₁, Y₂, Y₃, Y₄, Y₅—453.7-kc. crystal. Surplus, marked "Channel 45, 24.5 Mc."
Y₆—455.6-kc. crystal. Surplus, marked "Channel 46 24.6 Mc."

Bottom view of the side-band generator section. The panel controls are side-band selection switch and carrier insertion potentiometer.

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are not required, but they should be adjacent and the lower frequency should not be below 440 kc. This will assure adequate 2nd-harmonic rejection of the selectable side-band signal output in the 3- to 4-Mc. channel when the dial is near the 4-Mc. end.

A preliminary check on the crystals can be made by trying them for oscillation in the oscillator. Those that oscillate can be further checked for frequency of the peaks by connecting them between the antenna post of a BC-221 frequency meter and an r.f. probe of a v.t.v.m. Pair the crystals according to the series peaks. Only two upper-channel crystals are required, and by choosing the highest-frequency pair the pass band will be broadest. The lower-channel crystal that oscillates at the lowest frequency will probably be best for the oscillator, the next higher pair for the shunt crystals $Y_3$ and $Y_6$, and the next higher pair for the series crystals $Y_2$ and $Y_5$.

The filter is aligned as follows: With the power off the unit, connect the BC-221 output terminal to the output winding of $T_1$ through a 5-$\mu$F capacitor. With the BC-221 set in the center of the pass band (455 kc.) peak the circuit with the r.f. probe on the transformer terminal. Move the leads and repeat for the windings of $T_3$, $T_4$ and the plate winding of $T_4$. Remove the crystal from the oscillator and connect the BC-221 output to the crystal socket.

Remove the 6X8 multiplier, $V_4$, and temporarily ground the amplifier grid resistor at (E) and the audio feed to the diode modulator at (A). With the balanced modulator unbalanced by turning the arm of the 500-ohm potentiometer to one end, apply power and connect the r.f. probe to the plate of $V_2$. Peak all trimmers in the filter.

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**Fig. 3—Pass band of crystal filter after correct adjustment.**

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**Fig. 4. (See facing page.)**

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**MIXER**

---

**XTAL OSC.**

---

**KEY (B)**

---

**V.F.O.**

---

**Mixer**

---

**28 QST for**
The pass-band and side-band rejection of the filter can be checked by moving the BC-221 across the filter frequencies. By small trimmer adjustments and rechecking, a suitable curve should be obtained. The curve of this particular unit is shown in Fig. 3. In constructing five such filters, similar curves have been obtained in each case with or without resorting to crystal grinding or overly-tedious selection.

After filter alignment is complete, replace the 6X8, the oscillator crystal, and unground point (A). With an audio oscillator fed to the balanced modulator through an ARC-5 receiver output transformer, which will be mounted later on the main chassis, retune the T3 windings with the r.f. probe connected to the output winding of T3 at J4.

The pass band can be checked, which will give an opportunity to judge the relative position of the crystal oscillator frequency. Modification of the 10-μuf. capacitor at the plate of V4A may be necessary to move the oscillator to the right frequency.

With the audio input at zero, balance the 500-ohm potentiometer for minimum carrier. The 50-300 μuf. mica trimmer should aid the balance. If not, connect it to the other side of the potentiometer. Mixer balance is obtained with the 2000-ohm potentiometer at V3, but this is not a critical adjustment.

**Main Chassis Construction**

Before laying out the main chassis it will be easier to build the bandswitch assembly. This is built in two parts: first the conversion oscillator and second the mixer/amplifier.

The oscillator section is built using three Centralab GGD switch sections assembled on a P-272 index assembly. A 1¾ by 2½-inch aluminum plate is mounted on the rear using the switch assembly bolts. This plate holds the four trimmers. The switch shaft is cut off behind the assembly so that a metal ½-inch shaft coupling can be attached for coupling to the mixer/amplifier section. This facilitates removal of the mixer/amplifier switch assembly.

Referring to Fig. 4, S1A, S1C, and S1D are the oscillator switching sections. Since the crystal oscillator is a screen feed-back type, when no output circuit is connected, fundamental output will result. This is used for conversion to 40 and 20 meters with crystal frequencies of 4.0 and 11.0 Mc respectively. Converting to the higher bands requires an output circuit tuned to the second

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**Fig. 4—Diagram of the r.f. circuit following the side-band generator of Fig. 2. Unless otherwise indicated, capacitances are in μuf., resistances are in ohms, resistors are ½ watt.**

<table>
<thead>
<tr>
<th>Coil</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C101</td>
<td>Triple 150-μuf. variable (from 3- to 6-Mc. ARC-5 receiver)</td>
</tr>
<tr>
<td>C102</td>
<td>4.7 μuf. N330 and 30 μuf. NPO in parallel</td>
</tr>
<tr>
<td>C103</td>
<td>Small capacitor made by winding several turns of insulated wire around lead to pin 1 of V10. Adjust by changing number of turns</td>
</tr>
<tr>
<td>L101</td>
<td>80 turns No. 36 enam. on 3/4-inch diam, slug-tuned form (Miller 4400). Link is 3 turns wound over bottom end</td>
</tr>
<tr>
<td>L102</td>
<td>24 turns No. 26 enam. on 1-inch diam. threaded ceramic form, with half-turn loop for adjustment. See text. (National XR-60 with slug removed)</td>
</tr>
<tr>
<td>L103</td>
<td>3.5-h. choke. (No. 5634 from ARC-5 receiver)</td>
</tr>
<tr>
<td>S1</td>
<td>See text. S1A and S1B wired to short unused mixer and amplifier coils</td>
</tr>
</tbody>
</table>

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**June 1958** 29
harmonie of the crystal. Therefore, the coil $L_{105}$ is switched in by $S_{10}$ while $S_{1C}$ connects a trimmer on each of the upper bands for resonating $L_{105}$ to 18.0, 24.0, 25.0, and 26.0 Mc. These convert the 3.0-Mc. side-band signal to 21.0, 27.0, 28.0, and 29.0 Mc. The lower 40 kc. of the 11-meter band is covered below zero on the main dial.

The mixer/amplifier switch assembly is built on a 3 × 6 inch L-shaped bracket with a 1½-inch mounting foot, as shown in one of the photographs. One GGD switch section is mounted on each side of the plate. The amplifier or rear side is shown. The coils are mounted by threading them on a 1-inch brass bolt with head removed, which passes through the plate. Before threading the coils on, a nut is placed on each side of the plate, with a soldering lug under the mixer side. The poly forms can be softened enough for easy threading by filling the hole in them with coil dope. For mechanical convenience, a 100-µuf. capacitor is connected directly from the mixer plate to the amplifier grid. Then only one lead is required from the common switch terminal to the mixer plate, making easier installation possible. The same arrangement is used between the 6AK6 and the 6146.

All tuned circuits on the amplifier side are insulated from ground and bypassed by a 300-µuf. capacitor, across which the neutralizing voltage for the 6AK6 and the 6146 is developed.

Since mixing in $V_{106A}$ is not required on 80 meters, a resistor is used for the output load on this band. On 40 meters a series trap (see Table A) is used to shunt out the second harmonic of the 4.0-Mc. oscillator. To short out all unused coils, one of the spare switch terminals is wired across to the common side of the tuned circuits.

After completion of the bandswitching units, they can be mounted on the main chassis. The piece of shaft cut from the oscillator section is slid through the mixer-amplifier section and attached to the shaft coupling at the rear of the oscillator section.

The underside of the v.f.o. section is enclosed in a 3 × 1 × 5-inch box. The main tuning capacitor and diode modulation transformer were taken from a 3- to 6-Mc. ARC-5 receiver. V.f.o. coil $L_{102}$ is made with an extra half-turn loop through the inside of the form, for fine adjustment of the inductance. The 2500-ohm dropping resistor in the power supply (Fig. 7) is mounted on top of the chassis, since it dissipates about 25 watts. New mounting brackets will protect the terminals and the plate from accidental contact. The limiter, $V_{201}$, is mounted on an L-shaped bracket between the 6146 and the power transformer, to prevent coupling the output circuit under the chassis.

**Main Chassis Alignment**

Attach the side-band generator chassis to the main chassis using sheet metal screws at the rear and the panel bushings at the front. With the band switch on 80 meters, carrier control full on, set the operation switch $X_{2}$ to v.f.o. The output winding of $T_{5}$ should be repeated after connecting it to $V_{101A}$ through the shielded lead. The output of the v.f.o. is reduced through a 1.4-2.0 volt, to prevent mixer overloading.

With the main tuning capacitor $C_{101}$ set at a half turn from minimum, adjust the trimmer on...
until the mixer output is heard on a receiver at 4.0 Mc. Peak the other trimmers on C104 by connecting an r.f. probe to the cathode of V103. It may be necessary to listen first in a receiver for the peak until enough signal is getting through the double-tuned circuit to indicate on the meter. Close capacitor C101 to three turns from maximum and tune the slugs of L103 and L104 for maximum output. Repeat until the circuits track with the v.f.o., as indicated by the r.f. probe on the cathode of V103.

The v.f.o. tuned circuit values have been chosen to give a reasonably linear dial, with 4.0 Mc. falling 1/3 turn from minimum and 3.0 Mc. occurring about three turns from maximum. If a general-coverage receiver with a calibrator is available, the 3.0-Mc. end can be checked at this point; otherwise it can be checked indirectly later.

The 6AK6 output tuning can next be checked over the 80-meter band to make sure that the 30-µf. panel control will tune the range. Next check the neutralization of the 6146 by connect-

<table>
<thead>
<tr>
<th>Table A—Mixer Coils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each coil wound on 1-1/2-inch long 3/8-inch diam. polystyrene rod.</td>
</tr>
<tr>
<td>Each coil shunted by 3-30-µf. trimmer.</td>
</tr>
<tr>
<td>Band</td>
</tr>
<tr>
<td>40 m.</td>
</tr>
<tr>
<td>20 m.</td>
</tr>
<tr>
<td>15 m.</td>
</tr>
<tr>
<td>11 m.</td>
</tr>
<tr>
<td>10 m.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table B—6AK6 Coils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each coil wound on 1-inch long 3/8-inch diam. polystyrene rod. Each coil shunted by 3-30-µf. trimmer unless otherwise noted.</td>
</tr>
<tr>
<td>Band</td>
</tr>
<tr>
<td>80 m.</td>
</tr>
<tr>
<td>40 m.</td>
</tr>
<tr>
<td>20 m.</td>
</tr>
<tr>
<td>15 m.</td>
</tr>
<tr>
<td>11 m.</td>
</tr>
<tr>
<td>10 m.</td>
</tr>
</tbody>
</table>

Fig. 6—Speech amplifier and VOX circuits. Unless otherwise indicated, resistors are in ohms, relays are 1/2 watt.

K301—5000-ohm s.p.d.t. relay (Potter-Brumfield SM5LS).
T301—8-to-1 turns ratio output transformer (ARC-5 receiver output, No. 5631).
T302—7K-to-50-ohm plate-to-line transformer, reversed (Triad A-51X).
J301—Microphone jack (Amphenol 75-PC1M),
ing the r.f. probe in the antenna output connector. (The cathode of the 6146 is open in this position of $S_3$.) With grid and plate tuning capacitors peaked for maximum output, set the 2-10-$\mu$F. neutralizing capacitor for minimum output. If this does not fall within the range of the neutralizing capacitor, change the value of the 300-$\mu$F. capacitor.

To neutralize the 6AK6, disconnect the B+ at the 10K 10-watt resistor and, with the r.f. probe on the plate, adjust $C_{103}$ for minimum feed-through. This completes 80-meter alignment and a rough neutralization which should be checked later on a higher band. Output can be checked by putting the operation switch to "test" with carrier inserted.

With the band switch on 40 meters, check the output of the crystal oscillator with the r.f. probe. With the receiver dial at 7.0 Mc., tune the v.f.o. dial until the signal from the mixer is heard about three turns from maximum capacity. (The 80-meter second harmonic will be heard with the capacitor about half open.)

If this calibration does not fall fairly close, with the bottom cover on, move the half-turn loop in $L_{102}$ until it does. Set the main dial to about the center of the band as indicated by the receiver, with the 30-$\mu$F. grid-tuning capacitor in mid-range, and peak the active trimmer capacitors at $S_{1A}$ and $S_{1B}$. Check the plate tuning of the 6146 at the same time. Repeat in the center of each band with the trimmers for the band, first peaking the oscillator trimmer on the four upper bands. Uniform output across each band should be obtained by retuning the grid and plate of the 6146 with the panel controls.

To tune the 8.0-Mc. trap used on 40 meters, set the band switch on 40 meters, $S_2$ to Test, and remove the 12AU7 balanced mixer, $V_3$. With the dual 150-$\mu$F. plate tuning capacitor near minimum capacity, output should be obtained as indicated by the r.f. probe. Adjust the slug in the series-trap inductor until the output goes through a minimum, which should be nearly zero. Recheck the tuning of the 3-30-$\mu$F. trimmer at 7150 kc. with the 12AU7 back in its socket and again recheck the trap if it is necessary to move the trimmer.

Recheck neutralization on one of the high-frequency bands and alignment is complete.

A temporary dial calibration can be placed on tape run around the edge of the main dial. Make the 5-1.0 portion at 80 meters and the 0-5 on 15 meters if a general coverage receiver is not available.

Audio and Voice Control

The audio and voice control circuits are mounted behind the side-band generator chassis on the main chassis. A small plug-in relay is used for silent control of whatever circuits are desired. The audio gain and voice control gain (VOX) potentiometer leads are brought to the front panel through two-wire shielded cables. A positive
The v.f.o. coil, L102, is housed in its own shield section (upper right of center) and the two coils L103 and L104 are mounted nearby at the left. Output jack, fuse, J101, J102 and the bias potentiometer are mounted on rear apron of chassis.

Voltage is developed across the 0.25-μF capacitor from rectified receiver audio, which prevents speaker operation of the voice relay. The shielded input lead is grounded at both L104A and the mike input jack. After the audio wiring is complete, with the VOX pot set the bias to zero, by turning the arm to the ground end. The relay should close. Back the bias pot off from the ground end until the relay opens.

With the mike gain and VOX gain pots turned to suitable values, the relay should close instantly with speech but hold over by an amount determined by the RC constant in the grid of V102A.

Main Tuning Dial

After the unit is complete, a permanent tuning dial can be made. The one shown is from an ARC-5 transmitter and gives a larger scale than a receiver dial. The old calibration was removed by slipping the dial over the shaft of a grinder and tightening a nut. The grinder was turned on and sandpaper held against the dial until the old calibration was gone. Four coats of flat black spray paint were applied, with fine sanding between coats. The plain dial was attached to the capacitor shaft so a small scratch could be placed every 25 kc. The short line decals are easily lined up by cutting them about 1/2 inch long and turning the excess over the back of the dial. After leaving the dial overnight, lacquer thinner was applied sparingly to remove the binder. This leaves shiny spots on the dial which are eliminated by spraying a coat of clear plastic over the whole dial. The result is a professional-looking dial with very little expense.
A Transistorized Grid-Dip Meter

1.3 to 35 Mc. Range; Self-Contained; Pocket-Size

BY HARRY M. NEBEN*, W9YVZ

Strictly speaking, we suppose this shouldn't be called a "grid-dip" meter since transistors don't have grids. But whatever it may be called, it's a mighty handy little instrument to have around. Because it has a built-in battery supply it can be used anywhere at any time, whether there's a nearby power line or not.

The grid-dip meter is one of the ham's most useful tools. Through its use it is possible to measure the self-resonant frequencies of coils, to tell if a circuit is "in the band," and to determine whether that second stage is doubling or tripling. With the help of a few simple auxiliaries, it is also possible to measure such quantities as inductance and capacitance. However, most grid-dip meters have one disadvantage—there is a cord connected either to the power supply or to the power line. This cord can be a nuisance. The meter described is self-contained and is small enough to fit into a pocket.

The oscillator circuit for this grid-dip meter is built around a type 2N247 transistor. This transistor has a cut-off frequency of 30 megacycles, and little difficulty was encountered in getting it to oscillate at that frequency. The output of the oscillator is coupled through a small capacitance to a 1N34A diode rectifier having a variable load resistance so the rectifier output can be adjusted to stay within the maximum range of the d.c. meter used as an indicator. A 2K72 transistor amplifier is used to increase the sensitivity of the meter, with a circuit similar to that described by W1CUT in November 1957 QST.

Construction

The oscillator and meter amplifier are built in a 3 × 2½ × 5½ inch aluminum box. As shown in the photographs, the meter and tuning capacitor are mounted on the top of the box; the coil socket is on one end, and the meter adjustment control (R4) and on-off switch (S1) are on the other end. Oscillator components are mounted on a terminal strip in the space beside the meter case; and the meter amplifier is mounted on a lucite piece fastened to the meter.

When first wired, the oscillator performed successfully up to 20 megacycles using the resistor values recommended by the manufacturer for the 2N247. Further experimentation showed that the circuit could be made to oscillate reliably to 30 megacycles by using the values shown for R1 and R2. It is recommended that these two resistor values be adjusted experimentally to give optimum performance with the individual 2N247 used. One 2N247 on hand required 1000 ohms at R1 while another required 3300 ohms for optimum operation; thus the values shown, while typical, are not absolute.

The r.f. from the oscillator is rectified by the 1N34A and the d.c. output fed into the meter amplifier. It is necessary to limit the minimum

* 11316 S. Oakley Ave., Chicago 43, Ill.
1 Campbell, "Transistorized Meter Sensitizer," QST, November, 1957.
value of the load resistor to 4700 ohms to prevent pulling the oscillator out of oscillation. The setting of the 0.5-megohm rheostat with its limiting resistor does not seriously affect the frequency calibration of the oscillator.

The meter amplifier is a familiar circuit to most transistor fans. As an exact zero setting of the meter is not required, resistor $R_5$ simply can be adjusted so that the meter reads near zero when the oscillator is not functioning. The meter used in the pictured unit was a 200-microampere surplus meter. Meters of other ranges such as 0-1 ma. may be used and is chosen to give zero reading with the oscillator not operating. In fact, if a 2.5-microampere meter is used, the CK722 amplifier may be omitted and the meter connected directly between the bottom of $R_4$ and chassis.

Calibration and Use

The grid-dip meter can be calibrated from any general coverage communications receiver. However, care must be taken to see that it is not accidentally calibrated on the receiver image instead of on the true signal frequency.

Wind the highest-frequency coil first, and get the circuit oscillating satisfactorily by adjusting $R_1$ and $R_2$, if necessary. Then wind the lowest-frequency coil and note the highest frequency to which it will tune. If desired, this band may be marked on the dial; 100-ke. steps are convenient. Then wind the second 2.5-5 Mc. coil. This order is recommended as it is easier to adjust coils by removing turns than by adding them or winding a new coil. Wind a few more turns than recommended in the coil table and then take off turns until the low-frequency end of the second coil range just meets the high-frequency end of the first coil range. Cement the turns in place and calibrate this coil on the dial. For the second range it is recommended that points each 500 ke. be marked on the dial. Repeat the procedure, making the low-frequency end of the third range just meet the high-frequency end of the second range. Mark the dial in 1-megacycle steps. Then proceed in the same manner with the fourth and fifth coils.

Methods of using the grid-dip meter have been described many times in magazine articles and in the ARRL Handbook. Once one has a good grid-dip meter it becomes indispensable. This pocket-size meter is an especially convenient one.
100-Watt Transistor Mobile Power Unit

BY ROBERT L. KARL,* W8QFH

The power transistor of the type designed for switching at low frequency is ideally suited for use in mobile power supplies. However, the general lack of suitable components and design data has kept most amateurs from taking advantage of the features that supplies of this type have to offer. It is hoped that an account of some experimental work done by the author, with assistance from W9MZN, WSZM and W8BNG, will be of interest to others who are contemplating a similar project.

The design was aimed at a transistor supply that would replace the old stand-by PE103 used to power a 50-watt mobile rig. An output of 500 volts at 225 ma. was needed. While several suitable transistor types are now on the market, the 2N278 was selected for the job. This unit is readily available. It can be obtained from United Motors dealers who service Delco receivers throughout the United States. The price, although somewhat high, is not prohibitive. The 2N278 has a maximum current rating of 12 amperes and operates from a 12-volt car-battery system.

Fig. 1 shows the circuit of the first experimental attempt. The transformer T1 was designed for a frequency of 400 cycles and was wound on a core of stacked 0.014-inch hi-nickel silicon laminations. ("Audio C" core material is also suitable.) In addition to the high-voltage secondary L3 and the 12-volt primary L2, the transformer has a split feed-back winding, L1, of 12 to 15 volts.

How the Circuit Works

When voltage is applied to this circuit, one of the transistors will start conducting more
than the other because of manufacturing differences in the two transistors. The flow of collector current through the transformer primary is in such a direction as to bias the conducting transistor into greater conduction while the other transistor is biased with the opposite polarity to cut it off. The current continues to increase until the transformer saturates. At this point a reversal of current takes place and the first transistor is cut off while the second is driven into conduction. The resistors aid in the starting of oscillation by biasing the transistors out of the nonlinear region. The output wave is essentially square as shown in Fig. 2.

**Improving Efficiency**

With the arrangement of Fig. 1, a full-load efficiency of 72 per cent was obtained. At the suggestion of W8ZM, attention was turned to the use of a high-permeability toroid feedback-transformer system and a hypersil power transformer. The circuit used is shown in Fig. 3. In this circuit, it is the small toroid transformer, rather than the power transformer, that saturates to provide chopper action. It is also the frequency-determining element. In this particular case, the frequency checked at 980 cycles. An efficiency of 85 per cent was obtained at a full-load output of 500 volts, 225 ma. With the better core material, no despiking network was found necessary. The network consisting of $C_1$, $R_1$, $C_{R_1}$ and $C_{R_2}$ is for the purpose of suppressing random transient peaks.

The circuit of Fig. 1 provides automatic protection against overload. If the supply is overloaded, the circuit simply stops oscillating. In the circuit of Fig. 3, however, feedback is more independent of the load and therefore overload protection is not automatic. Proper fusing of both input and output circuits is recommended.

In both circuits, silicon diodes are used in the bridge rectifier to conserve space and make it unnecessary to supply rectifier filament power. These rectifiers also help to keep the efficiency up, since the drop across them is much less than with tube rectifiers. To obtain the necessary voltage rating, two diode units in series are required for each leg of the bridge. Since the rectified output on each half of the cycle is very close to a square wave, the output with full-wave rectification requires very little filtering.

The supply shown in the photograph was built by WB2NG and the transformers were designed by W8ZM. The problem of heat sink (cooling) was solved by mounting the two transistors on a heatsink. (Continued on page 170)
The direction finder installed on a car, using a homemade window mount. The battery clip at the bottom of the support is the "pointer" indicating the null direction.

The 75-meter phone band offers some interesting possibilities for hidden transmitter hunts — especially if you use simple direction-finding equipment like that described in this article.

Interest in the sport of transmitter hunting seems to be confined largely to the 10-meter band. Several excellent articles on transmitter hunting have appeared in QST in recent years and these have dealt exclusively with loops designed for operation on this band.1, 2, 3, 4

Here in the Los Angeles area, transmitter hunts are regularly conducted on 75 meters as well as on 10 meters. For weekend daytime hunts, 75 meters is more suitable because of the relative absence of QRM and because there is less chance for multiple reception paths.

The author hopes to stimulate some interest in operation on 75 meters by describing two direction finders which are easy to build. One of these has unidirectional properties.

The Simple Loop

The local rules in the Los Angeles area generally recognize the first car in as the winner in the 75-meter hunts. Consequently, some of the participants start out with no special equipment except a receiver. Some of the more advanced in this class also use an 8-meter. Transmitter hunting in this fashion usually becomes quite frustrating and it is not long before some serious consideration is given to the construction of some kind of loop. Those that have them usually give their 10-meter loops a try first. These work reasonably well on 75 but the sensitivity is low. A tuned loop is to be preferred.

A simple hand-held loop is shown in the photo.

All components of the d.f. are mounted on the top and sides of a "Channel-lock" type box. In this view, R₁ is on the left wall at the upper left and C₁ is at the lower left. L₁, L₂, and the output connector are on the right wall. The loop stick and whip mount on the outside.

Transmitter Hunting on 75 Meters

How to Make a Simple Loop and Direction Finder

BY JOHN ISAACS,* W6PZV

1200 California Ave., Compton, Calif.

1 Norberg, "Transmitter Hunting with the D.F. Loop," QST, April, 1954.
4 Brasewitz, "Directional Antenna for the Transmitter Hunter," QST, April, 1956.
Fig. 1 gives the circuit. This type of loop is described in the *ARRL Antenna Book.* The loop is made up of a metal can of the type used for small plastic bandages, two copper tubing fittings, a length of copper tubing, a small tuning capacitor, some hook-up wire and a length of coax cable. The mechanical parts are soldered together and then the tubing is cut and the joint is insulated with plastic electrical tape. The tuning capacitor is mounted in the can.

The hardest part is threading the wire into the copper tubing. Enamel-covered wire will short out, so time should not be spent in using this type of wire. The one-turn link connects directly to the coax cable and this in turn plugs into the receiver. The loop is tuned for maximum output on the desired frequency. The sensitivity is good and the nulls are quite sharp.

**Simple Loop Theory**

The theory of the loop antenna is adequately covered in the previously-mentioned articles. It should be sufficient to say here that a loop has two null points 180 degrees apart.

Now, two nulls are better than no null at all, but this characteristic causes a slight problem. When the loop is turned until the signal is at minimum the loop gives the line of the hidden transmitter but not its direction. By taking a bearing at two locations it is possible to draw two lines on a map and note where they intersect. This procedure must usually be repeated during the hunt because the accuracy of such a fix is not too great with the equipment ordinarily used. Nevertheless, with a little practice, this bidirectional loop will give good results and will greatly increase the chances of being first at the location of the hidden transmitter.

**Something Better**

The obvious and ultimate solution is to use some sort of direction finder that will produce only one null as it is rotated. Fortunately, the bidirectional loop can be made to function in this manner by the addition of what is called a “sense antenna.” Marine and aircraft direction-finder receivers, which are designed to operate over a fairly wide frequency range, have a rather complex input circuit. This is necessary so that the outputs from the loop and the sense antenna are always combined in the proper phase relationship. But if a direction finder is to operate on only one frequency, or over a rather narrow range of frequencies, its input circuit can be greatly simplified.

Such a direction finder for 75 meters is shown in the photograph and its circuit is shown in Fig. 2.

**Construction Details**

The loop portion of this direction finder (d.f.) is actually a loopstick of the variety usually found in portable receivers for the broadcast band. The original winding is removed and a new winding placed over the ferrite core. The loop is tuned to
resonance by means of $C_1$. A grid-dip meter can be used to make final adjustment of the number of turns of wire. This loop stick is not quite as sensitive as the hand-held loop but it is sensitive enough, and it is easier to make up and is more compact.

A two-turn link is used to obtain an output from the loop. This is placed around the center of the core.

The sense antenna consists of a 15-inch whip, an adjustable inductance that will resonate the whip as a quarter-wave antenna, and a potentiometer to control the output of the antenna. The switch is used to disconnect the sense antenna during the tune-up procedure.

The whip was secured from a local auto supply store for 89 cents. It came attached to a large suction cup and was intended to be mounted on the roof of a car and thereby create the impression that the owner had a radio telephone in the car. Any antenna of the same length, or longer, will do as well. If a longer one is used the inductance of $L_1$ will have to be reduced proportionately.

The whip, the loop stick, the inductance $L_1$, the capacitor $C_1$, the potentiometer $R_1$, and the switch $S_1$ are all mounted on a 2 × 3 × 4-inch box chassis. The loop stick is mounted and protected by means of a piece of $\frac{1}{2}$-inch thick laminated plastic and a length of fiber tubing which fits over the entire loop stick. A section of $\frac{1}{2}$-inch electrical conduit is attached to the bottom of the chassis box and this supports the d.f. The photographs show a close-up of the d.f. as well as the complete unit mounted on a car and ready for a hunt. A large battery clip serves as a direction indicator.

**Direction-Finder Theory**

To produce an output having only one null it is necessary that the outputs of the loop and the sense antenna be combined. There must, however, be a 90-degree phase difference between the two and also the signal strength from each must be the same. The phase shift is secured by tuning the sense antenna slightly off frequency by means of the slug in $L_1$. Since the sensitivity of the whip antenna is greater than that of the loop, its output is reduced the proper amount by adjusting the potentiometer $R_1$.

Another view of the car installation. The sense antenna is more clearly visible in this photograph.
The initial tune up of the direction finder is a little critical and time consuming but after it is completed any subsequent adjustments will be very easy.

The author has never tried to tune the direction finder by using a grid-dip meter or small oscillator. Possibly the initial rough adjustment could be done in this manner. The final adjustment at least should be done under field conditions. The larger the field the better. The presence of power lines or telephone lines will introduce some error in the directional properties of the d.f. Under operating conditions they will cause a little error at times but it is just a temporary condition and subsequent readings will put you back on the beam.

The author uses a small battery-operated transmitter with a built-in vertical antenna (BC-745). A friend’s mobile rig would work fine, also, but the output should be reduced as much as possible. The car with the direction finder is parked about 300 feet from the test transmitter. Remove your transmitting antenna before trying to make any loop adjustments and remember to leave it off during transmitter hunts. With the test transmitter operating on the proper frequency, disconnect the sense antenna with switch S1 and peak the loop stick using C1 and watching the S meter on the receiver. If no S meter is available one should be installed before the direction finder project is started. Once the loop stick is peaked, no further adjustment of C1 will be necessary. Now connect the sense antenna and turn R1 to minimum resistance. Then vary the adjustable slug of L1 until a maximum reading of the S meter is again noted. It may be necessary to turn the d.f. a bit during this adjustment to obtain a larger reading than with the loop stick alone. The last turn of the slug is quite critical and some capacitance effect may be noted.

Now turn the d.f. so that one side (not an end) of the loop stick is toward the test transmitter. Turn R1 a complete revolution and if the proper side was chosen a definite null should be observed on the S meter for one particular position of R1. If not, turn the d.f. 180 degrees and try again. This time leave R1 at the setting which produces the minimum reading. Now adjust L2 very slowly until the S-meter reading is reduced still further. Repeat this several times, first R1 and then L2, until the best minimum is obtained.

Finally, as a check have the test transmitter move around the d.f. and follow it by turning the d.f. If the tuning has been done properly the null will always be broadside to the loop stick. Make a note of the proper side of the d.f. for the null and the job is finished.

Using the Direction Finder

The technique of using the d.f. is simple and it only takes one transmitter hunt to become an expert. There is no need to triangulate as with a simple loop. It is just necessary to keep the d.f. tuned for a null reading. As the hidden transmitter is approached the d.f. must be turned in order to continue to get a null.

It is a good idea to continue on in the original direction until the d.f. indicates that the transmitter is at right angles to line of travel. At this point a right-angled turn toward the transmitter should be made if possible and the procedure repeated until destination is reached. If the hidden transmitter is kept dead ahead at all times it is difficult to get an accurate impression as to how far away it is except by signal strength.

One more point: If the area in which the transmitter will be hidden is known ahead of time it is a good idea to start out from the center of this area. (Of course, local rules may preclude this possibility.) The fellow with the simple loop will generally start out near the edge of a known area and you will on the average have a head start on him.
A Weather-Resistant Quad

Fiberglas Spreaders in a Two-Band Beam

BY DAVID R. WEINSTOCK,* K9GFV

Another method of supporting a quad antenna. This one makes use of Fiberglas fishing-pole stock to replace the customary bamboo spreaders which have a tendency to deteriorate when exposed to weather.

Over the past several years there have been enough articles on cubical quads to fairly well establish various dimensions and specifications, although it will be shown later that these do not always hold true. The mechanical form has also generally followed a somewhat standard appearance. Performance and economy in building have been among the major attractions to the prospective antenna builder.

This article will deal only briefly with the electrical considerations and is primarily intended to provide information for the construction of a strong, lightweight, weather-resistant quad.

About eight months ago a commercial 10/15-meter quad was put up at the home QTH. This quad was conventional, as most, and used bamboo fishing poles for the spreaders. After several months' use, it was noticed that there was quite a bit of play in the connections between the boom and the end supports and, as a consequence, the bamboo spreaders whipped considerably in any kind of a breeze. It was at that point that the decision was reached to build a more rugged structure.

This antenna can be built for considerably less than what it cost me, if the builder has time to visit junk yards and second-hand-metal dealers and has access to some machine tools. Not being too skilled myself, nor having access to the necessary power tools, and not being able to leave my business, it was necessary for me to buy the materials new and to have the machine work done in a commercial machine shop.

The raw-material cost was $50.00, including wire, coax connectors, and other hardware. The machine-shop work was $38.00. Between the junk box, second-hand stores and do-it-yourself, it should be possible to build this quad for about $40.00 to $45.00. Naturally, quads can be built more reasonably, but some of the features of this one would then have to be sacrificed.

To meet my requirements with a minimum use of nuts and bolts, my first step was to decide on what materials to use for the two most important parts — the spreaders and supports for the spreaders.

Spreaders

While walking through a sports store one day, I noticed a still-fishing pole made of four telescoping Fiberglas sections. These sections are each approximately 52 inches long and are tapered inside and out so that the ends may be telescoped to taper lock at the joints. Two of these sections were used for each spreader, giving a total length on each leg of about 8 feet 4 inches. A thin varnish spray was applied to the end of the smaller section where it locks with

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Fig. 1—A—Aluminum-tubing "spokes" inserted in a "hub" of heavy aluminum serve as mountings for the Fiberglas spreaders. B—The "hubs" that support the quad spreaders are fitted with "axles" that slide into the ends of the boom.
the larger-diameter section. This was done to provide a tighter and stronger locking effect at the joint.

The Fiberglas sections were obtained from the factory that makes the fishing poles and which happens to be located in Chicago. Although the sections were seconds as far as fishing poles are concerned, they were first class for my purpose.

The inside diameter of the two sections joined together starts at 1 1/4 inches and then tapers down to approximately 0.75 inch at the end of the 8-foot 4-inch length. The outside diameter is approximately 1.33 inches at the butt end and 0.83 inch at the small end. These dimensions provide a strong spreader which does not sag and has very little whip. Best of all is the weather resistance of the Fiberglas. A small cork was tapped into the end of each pole, plastic tape was wrapped over and around the end, and a plastic spray was applied over the ends—all, of course, for the purpose of keeping water out of the hollow sections.

**Spreader Mounting**

The next big job was the spreader supports. Each of the two end supports required the following:

1. 61 ST aluminum solid round 5 inches in diameter, 2 1/2 inches thick
2. 61 ST aluminum tubing 1 1/4 inches diameter, 0.083-inch wall, 12 inches long.

Four holes 1 1/4 inches in diameter by 1 1/2 inches deep, spaced 90 degrees, were bored into the perimeter of the solid round aluminum piece. (See Fig. 1A). Another hole 1 3/4 inches in diameter was bored all the way through the center of the aluminum round. (See Fig. 1B). The five 12-inch lengths of 1 1/4-inch tubing were inserted into these holes and welded to the aluminum round. At this point I had a component comparable to a wheel of a car with a hub, axle, and four spokes radiating at 90-degree intervals.

The next problem was how to insert the 1 1/4-inch tubing (the spokes) into the 1 1/2-inch i.d. Fiberglas, especially since the inside diameter of the Fiberglas was tapered. This was solved by cutting slits in the ends of each spoke. These slits were cut down the length of the tubing to a point about 1 1/2 inches from the hub. This was done so that as the Fiberglas pole was slipped over the spokes, the slits would allow the spokes to compress and follow the inside taper of the Fiberglas poles.

When the butt of the Fiberglas pole reached the unslit portion of the spoke, the joint began to lock, and by turning the pole as it was pushed onto the tubing, it "froze" into place flush against the hub and actually held without any additional work. To make sure, however, a hose clamp was put around the Fiberglas pole near the point where it butted against the hub.

**Quad Loops**

The quad loops were made of No. 14 soft-drawn copper wire. To assure proper dimensions, the four sides were measured off (11 feet 3 1/2 inches for 15 meters and 8 feet 4 1/2 inches for 10 meters) and a loop of wire was soldered to each of the four corners. Hose clamps were slipped over the spreaders and the clamping bolts were passed through the loops. The clamps were then adjusted on the spreaders so that the wires between were taut, with the spreaders slightly bowed. The reflector elements are duplicates of the driven elements, except that transmission-line spacers are used to tie the ends of the elements together.

The reflector stubs were made of 1/4-inch copper rod. Originally, Copperweld wire was used but could not be straightened satisfactorily, and soft-drawn copper wire bends too easily. The weight of the copper rods is not enough to cause the element wires to sag noticeably. The shorting bars consist of two alligator clips with a short piece of No. 12 wire soldered between them to give a spread of 3 1/4 inches, which equals the length of the spacing insulator.

**The Boom**

The last step was to join the axle to the boom. For the boom an 8-foot length of 61 ST 1.5 inches o.d. x 0.083-inch wall was used. Therefore, the i.d. of the boom was 1.334 inches and, since the o.d. of the axle was 1.25 inches, there was a play between the two of 0.084 inch. Fortunately, I was able to obtain some plastic sleeveing with an i.d. of 1.25 inches and a 0.04-inch wall. By slipping this plastic sleeve over the 1.25-inch axle, it increased the o.d. to 1.33 inches, which made it just 0.004 inch less than the i.d. of the boom. The result was a very tight fit between the axle and the boom, eliminating all play between the two. Since aluminum against aluminum will eventually form a weld, the plastic sleeve enables me to remove the boom if it ever becomes necessary.

Two holes were drilled at right angles to each other through the boom and axle, and 1/4-inch bolts were used to lock the axle and boom together. The total weight, boom included, is approximately 22 pounds.

**Adjustment**

The dimensions of the elements were selected from the ARRL Antenna Book and previous articles in QST and other publications. These dimensions were also checked out with the formula 238/Mc. When the antenna was at the 25-foot height before the tower was cranked up, the grid-dip meter showed that the 15-meter antenna resonated at 21.0 Mc. However, when the transmission line was attached and the transmitter turned on, the s.w.r. at 21.450 was 1.75 to 1, and went higher as the frequency was decreased. After much cut and try, a 14-inch stub was added to the 15-meter driven element. After adjusting the shorting bar, an s.w.r. of slightly less than 1.1:1 and a f/b of 28 db. were obtained. This adjustment, however, did not give maximum gain. When adjustment was made for maximum gain it was found that the s.w.r. ran from 1.3:1 at 21.250 Mc. to 1.04:1 at 21.450 Mc. (Continued on page 158)
Cosmophone 35 Bilateral Transceiver

As if ham radio isn't complicated enough these days, Cosmos Industries has to come along and offer a "bilateral transceiver", of all things. However, if you can get over the shock of a transceiver being bilateral and dig into the thing a little, you find that a mighty interesting piece of gear hides behind the ponderous title.

Essentially the Cosmophone 35 is a single-sideband station in one package, with the necessary power supply in another case. It is apparently designed for home-station use, and its case dimensions (r.f. package) of 17 inches wide, 12 inches high and 15 inches deep would seem to eliminate its adaptation to mobile work by all but a few members of the station-wagon set. But calling it a "station" is no idle phrase; the 35 is truly a station, since it is capable of completely divorcing the receiver and transmitter tuning functions, or combining them in one control if desired.

Look at it this way. There are two tuning dials on the 35, marked A and B. Each one has its own pointer on the slide-rule dial scale. A four-position switch on the panel is marked RA-TA, RA-TB, RB-TA and RB-TB. Think "receive" for R and "transmit" for T, and you see that this switch sets you up for the four possible modes of operation. For example, on RA-TA you receive and transmit on the frequency, controlled by the setting of knob A. On RA-TB you receive on the frequency set by knob A and transmit on the frequency set by knob B. It takes longer to explain than it does to understand with the unit in front of you. The possibilities should be obvious. You can tune into a net with the A dial and the switch set on RA-TA, and you can also be set up on another net by switching to RB-TB for a few seconds. This way you can hop back and forth if desired. Or you may want to work DX outside of your own frequency assignment, in which case you would use the RA-TB or RB-TA setting. You can check on the QRM level of your transmitter frequency without detuning from the DX station's channel. It's like having two transmitters and two receivers. Those are only the very obvious tricks; there will undoubtedly be many more developed as the units get into the hands of the real "operators." The fact that the 35 also has provision for c.w. and "a.m." operation merely extends the tactics to those fields as well. (The a.m. provision is carrier plus one sideband, for reasons that will be obvious later on.)

Receiver

A block diagram of the receiver section is shown in Fig. 1. The receiver is a double-conversion deal with a crystal-controlled first oscillator and a tunable second oscillator. This second oscillator has two separate tuned circuits, the ones controlled by the panel knobs A and B. Which one is active at any instant depends, of course, upon the setting of the four-position switch mentioned earlier. The output of the second mixer is at 455 kc., and it passes through an i.f. amplifier
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Fig. 1—Block diagram of the Cosmophone 35 during réception.

Aud a o-ko. wide mochaaieal filter on its way to a balanocd demodulator (1N35s.) for c.vv. or s.s.b. réception or a diode (1N34) for a.m. Selectivity in addition to that provided by the mechanical filter is supplied by a Q multiplier that can be used in either a notch or peak condition. The b.f.o., V_b, is crystal-controlled because its frequency must be accurately placed and maintained on one side or the other of the filter passband. Following detection the audio signal is amplified by two triode stages before passing on to the 6AQ5 output stage.

Prior to detection the signal is sampled and passed through a grounded-grid stage and then to an a.v.c. rectifier (6BV8 diode). A.v.c. as well as manual gain is applied to the r.f. amplifier and two i.f. amplifier stages. The a.v.c. line is metered to provide an S-meter indication. The 6BV8 diode marked "Clamper" is a biased diode that during reception limits the a.v.c. control voltage to a maximum of about —20 volts. During transmission the a.v.c. bus is held at —150 volts, for receiver protection. The clamper tube helps to speed recovery of the receiver after transmission, by quickly pulling the a.v.c. line down to —20 volts, where it can rapidly arrive at the operating condition.

While you still have one of your little blue peepers on Fig. 1, this might be a good time to discuss panel controls directly associated with the receiver. The two main tuning controls have already been mentioned, although it wasn't brought out that these are delightful two-speed planetary controls that allow you to hurry across the band or to sneak up on a signal. The fast tuning corresponds to a rate of 00 kc./révolution, and the slow speed is 12 kc./révolution. These tuning controls handle three-gang capacitors that tune the oscillator and two tuned circuits between the two mixers. A panel control marked "Recvr Peak" tunes the front end, as indicated in Fig. 1, and a "Recvr Ant Trim" in the 6DC6 grid circuit compensates for any reactance introduced by the antenna. The Q Multiplier and manual gain controls have already been implied. The selection of the b.f.o. crystal at V_b depends upon which sideband is being transmitted, as will be mentioned again later.

Transmitter

A block diagram of the Cosmos 35 in the transmit condition is shown in Fig. 2. Tubes that are active during reception as well are marked with the manufacturer's designation; e.g., tunable oscillator V_b is used during both transmit and receive. In some cases one section of a tube is used during transmit and the other section is used during receive.

Following a 6AU6 speech amplifier, a 6J6 triode section drives the 1N35s in a balanced-demodulator circuit. This balanced modulator and the 12AU7 oscillator, V_b, were used as the demodulator and b.f.o. during reception. The double-sideband signal is fed to a grounded-grid stage and then through the mechanical filter,
where one sideband is removed. Which sideband (upper or lower) is removed depends, of course, upon which crystal is switched in at the oscillator. The s.s.b. signal from the filter is amplified by a 6B6 amplifier and is then fed to a mixer where it is heterodyned to the range 2.2 to 2.8 Mc., depending upon the setting of the tuning control. If a.m. is to be used, some carrier from the oscillator, $V_c$, is fed around the filter, to give a carrier-plus-one-sideband signal. C.w. operation also uses this carrier, with no sideband. A panel control (screwdriver slot) of the carrier insertion is provided; if for any reason you want sideband plus a slight amount of carrier you would switch to the a.m. condition and back off on the carrier insertion. When you switch to s.s.b., the transmitter always has maximum carrier balance, and the carrier-insertion control is inoperative.

Output from the first mixer is heterodyned to the operating frequency in the balanced mixer (pair of 6CL6s) using the crystal-controlled 5763 that is also operative during reception. This balanced mixer circuit has the oscillator signal fed to both cathodes in parallel; the sideband signal is fed to one control grid and the other grid is grounded for audio. Following the balanced mixer, the signal is amplified by a 6CL6 driver and fed to the neutralized 6L46 output stage. The final tank is an "all-band" (National MB-10L) that requires no switching over the range 3.5 to 30 Mc. Its panel control has calibration marks for band centers, to facilitate resetting. To adjust the loading, a series capacitor in the output line is adjusted via a panel control marked "Antenna Tuning."

The 6L46 in the output runs Class AB1 and delivers about 25 watts under the two-tone test. This puts the PEP output at close to 50 watts. The 6CL6 driver is swamped rather heavily in the plate circuit, which helps to hold down distortion if you should stray past the AB1 limits. The swamping is switched as you go from band to band, so that the gain is approximately the same on all bands. This constant gain can be appreciated by users of some other equipment.

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Fig. 2—Block diagram of the 35 when transmitting.
Rear view with a panel removed shows the receiver “front end” and the transmitter driver. The compartments, from left to right, house respectively the 6DC6 grid circuits, 6BA7 grid, 5763 and crystals, 6CL6s balanced mixer, and 6CLC-6146 coupling. The coaxial fittings are for receiver input and transmitter output; the other jacks are for key and microphone.

The VOX and anti-trip circuits are usual, and panel controls are included for setting the gains through the two channels. A total of six relays in the Cosmos 35 handles the various switching functions: three relays are associated with the transfer of d.c. and bias circuits for the send-receive cycles, and three relays are associated with the transfer of tuned circuits in the variable-oscillator and 2.2-2.8 Mc. string. These latter relays are inoperative when transceiving; they come into play if an RA-TB or RB-TA combination is used.

C.w. operation is obtained through carrier insertion and no audio; grid-block keying is used on the 6BJ6, 6BG, the 6CL6 driver and the 6146 output stage.

External connections at the rear of the unit provide terminals for a loudspeaker, auxiliary audio input and output terminals, and -150 volts during receive, to be applied to a following linear amplifier when one is used. Separate antenna connectors for receiver and transmitter are provided, and one might think at first glance that the omission of an antenna relay is an oversight. To the contrary, the omission apparently was to simplify the addition of a following linear amplifier; when using the Cosmosphone 35 “barefoot” the antenna relay can be mounted right on the back of the unit.

The power supply, a separate unit, uses a 5R4GY rectifier in a +600-volt supply, a 5U4GB for +300 volts and OB2-OB2 stabilized +210, and a 6X5 in a OA2-stabilized -108 volts.

We can’t tell you anything about the instruction book for the Cosmosphone 35 because one wasn’t available at the time of writing. However, you shouldn’t need one unless something goes wrong, because the whole unit is quite straightforward and there is nothing tricky about connecting it to an antenna, a speaker and the a.c. line. Anyone who has ever operated an s.s.b. station should be able to handle the Cosmosphone like Old Home Week, and even if you’re a stranger to the Donald Duck stuff you can practice for a while on c.w. or a.m.

— B. G.

June 1958
California — The second annual Hamfest Picnic, sponsored by the San Fernando Valley ARC, will be held June 8 at the Victory-Van Owen Park, across the wash from the Naval Armory (same location as last year). There will be lots on two, six and ten to guide you in. Free coffee, soft drinks, ice cream and candy, games and prizes for all age groups. Registration starts at 10:00. Advance tickets $1.00, at the gate $1.75. Swap shop. Bring your own lunch. For further information contact Vic Lovin, K0QRT, 4645 Ben Ave., North Hollywood, phone PO 1-9730.

Georgia — The Atlanta Radio Club will hold its annual hamfest on Sunday, June 8, at the Mickey Coeburn American Legion Post No. 216, 1250 Watts Road NW, Atlanta. This location is west of Atlanta, just off the Bankhead Highway. There will be transmitter hunts on 10 and 75 meters, a get-together of the Peach Net, a chicken dinner, and many other activities. In addition there will be a Dutch supper and dance Saturday evening. Tickets are $2.00 adults.

Illinois — Starved Rock RC Hamfest, June 8 at the La Salle County 4-H Home and Picnic area southwest of Ottawa, on Illinois State Route 71 (same place as last year). Follow Route 23 to south end of Illinois River bridge, turn west on Rte. 71. Follow big yellow hamfest signs. Plenty of parking area and adequate facilities for all. Free swap section. Advance registrations $1.00 if received prior May 30, otherwise $1.50. The hamfest site is within a short driving distance of Starved Rock State Park and recreation areas. An all-day affair for Midwest hams and their families. Contact Starved Rock Radio Club, RFD #1, Box 171, Ottawa.

Iowa — The Iowa 100-meter hamfest will be held at Morris Lake near Clarion on June 8. Everyone invited. No charge. For further information contact G. D. Wayland, KD1HZ, 1177 Walnut St., Webster City.

Kansas — The Central Kansas Radio Club will sponsor its 10th annual hamfest in Salina at Kenwood Park on June 8. Registration $1.00 per person. Each person to bring a covered dish, with free drinks supplied by the club. Entertainment for the ladies and games for the kids. Contests and prizes. Rain or shine. For further information contact Joe W. Addisson, W8PXX, 908 South 11th St., Salina.

Mississippi — The Cleveland ARC will sponsor its annual hamfest picnic on June 8. Bring your own lunch, which will be an annual picnic style. Free drinks. Program to be announced later. Cost, but we have no further information on location or whom to contact. — Ed.)

Missouri — The Missouri Net Hamfest will be held in Sedalia, June 8, at the Missouri State Fair Grounds. Admission $1.00 per person, basket lunch, free hot coffee and cold soft drinks. Swap shop, events for the kids. XYLs or YLs. Everyone welcome. For further information contact Mrs. Phyllis French, W0W1E, Rte. 4, Sedalia.

Nebraska — The Dawes County Amateur Radio Club will sponsor its annual picnic on June 1 at Chadron State Park, 10 miles south of Chadron, on Highway 19. Signs will be posted. Mobiles can check in on 3850 with a transmitter at the park. There will be a transmitter hunt and a swap table. Each person to bring food, which will be served family style. Coffee and soft drinks furnished by the club. Rain or shine. For further information contact Mrs. Bonnie Davis, K3MOG, 330 North Chadron Ave., Chadron.

New York — RAGS (the Radio Amateurs of Greater Syracuse) will hold their annual family picnic on Sunday, June 15, at Pratt's Falls (12 1/2 miles NNE of Pompey). Activities from 2 to 5 p.m., with the picnic scheduled for 5 p.m, until dark. Refreshments furnished. Area clubs are invited to attend. For information and tickets (sorry, prices unknown — Ed.) contact R. Etherington, K2EAP, 208 Bay Lane, Minoa, or phone O5-0698.

New York — The Rome Radio Club Ham-Family Day has been scheduled for May 25 at Beck's Grove, Blossvale, commencing at noon. Entertainment for the whole family. Registration at the gate is $1.50. Mobiles check in with W2OPQ on 3900 kc, and 29 Mc. For further information contact Harvey Walle, K2HWS, RD #1, Blossvale.

North Dakota — The annual North Dakota hamfest and picnic will be held at Red Willow Lake, 25 miles northwest of Cooperstown, just west of N.D. Highway 1, on June 15. Check locally for further details — none were available at this writing.

Ohio — The Northeastern Ohio V.I.F., 50-Mc. Group will hold its third annual picnic on June 22, at the Wadsworth Municipal Park, Wadsworth. Contests, prizes, gifts, and fun galore for the whole family. For further information contact Harry E. Powell, W8PXX, Route 2, Alliance.

Pennsylvania — The Ninth Annual Cabinfeast of the Uniontown ARC will be held on Saturday June 21, at the club house on the old Pittsburgh Road, just off Route 51, two miles north of Uniontown. The program will include contests, prizes, horseshoes and movies. Refreshments available. WS9PE will be on 10 meters. Registration is $2.00. This affair is stag. For further information contact the Uniontown ARC at P. O. Box 441, Uniontown.

Saskatchewan — The Saskatoon ARC is sponsoring this year's Saskatchewan hamfest, which will be held on June 20-July 1. For details contact Jon Hunter, VE5HQ, 927 Avenue N. South, Saskatoon.

Virginia — The annual Burlington Amateur Radio Club International Field Day will be held at "Clarey's Bayou," Malleita Bay, on June 15. Pre-registration hunts on 20, 10 and 2 meters. Auction, boat rides, swimming, etc. For further information and motel, cabin or hotel reservations write to John Mansfield, W10Q0, P. O. Box 6, Winooski.

Washington — The Fourth Annual Family Picnic of the "Royal Order of Hoot Owls" will be held on Sunday, June 15, at Caffey's Lake Wilderness Resort in Maple Valley, 16 miles east of Seattle. Open to ROHO membership only. Games and prizes. Stump contest for XYLs. Potluck dinner at 7:30 p.m. A station at the resort will be on 50.4 Mc.
24th ARRL Sweepstakes Results

Part II — Phone and Club Totals

If you're one of the multitude who imbibed W1ZDP's 12-page c.w. compendium (May QST), you know the 1957 Sweepstakes was the greatest! Phone-wise alone, entries leaped ahead 18.7 per cent to 623 logs. Keen interest is evident in the number of very high scores, the number of scores over 50,000, the many contestants who worked all sections and the intense club competition. It was a big year for the vocalist. See if you don't agree!

Up 47 per cent was the number of scores over the 100-K mark (shown in italics), with a whopping 60 per cent rise in those reaching 50,000: W1s BAN BFB DDD DXS EKO EOR FY FZ GHJ JLN JNX OGU PKV QIB WU ZVG T, W2s V7 VDX, K2s BHP MEB SGO TCT W3s DHM FEP MDE MSK TQT WQW YBI ZIH, W4s EDQ FGH GYX/KH6 HKJ KZF UJW, K6s BCN BZJ CIP HU KBA, W7s DQK HNU ITL KC MT7 NXF PSR WU, K8s EDM HEW IAX INN, W9s AMH BSY CBE EIG GTG HM PQW QIV ZTY ZZC, K9s BWD EVR ICS INU IUL JQK LOM 00W YQG, W7s B1L BX BSW CAF CBP CTZ FIN NPV OVA ZCA ZJW, W8s A6P SSA YOW, K9s ZEK CPM, W9s AIU FVU HIM KMN NZM OHO PQA QAX QXO YOX, K9s ALP ATZ CLO EED, W7s DCG EDX JEE PRZ YQC W8O YQ, VEs 4KX 5ZM.

Among the fellows who talked up five hundred or more throat-taxing QSOs were: W0EDX 851, K6EVR 816, W6PQW 815, W3WQW 749, W1YWU 714, K4CTU 700, W5DQK 700, W6YQ 667, W8PRZ 650, W7CAF 645, W7BSW 608, W6BSY 600, K5BDW 600, W5MYI 594, W7CBP 581, W2VCZ 570, W6CBE 560, W8AJW 560, W7BV 558, W7NPV 532, W6IM 529, W1EOR 521, W4FGH 521, W7BLX 524, W9-OHO 521, W5NXF 519, W5YU 517, W6VQC 514, W9NLM 506, K5HEW 505, K9CLO 503. Noteworthy again this year is W6PQW's third-in-the-number of very high scores, the number of ranking contact figure, reflecting what low-power, perseverance and fortitude can do in a single-band stint on 28 Me.

Multipliers are the thing, as any good contestant knows, and the following group snagged all 73 with all but three operators doing it the low-power way: W1s BAN FZ YWU, W2VCZ, W3MSK, W5DQK, W6CBE, K6LOM, W7BSW, W8AJW, K8AEK, W9s EDX PRZ. Almost in league with this select clientele with 72 to their credit were: W1EOR, W6ZZC, K6BWD, W8NLM, K9ALP.

So each of you can see how your score shapes up with the high man in your vicinity, here are the licensing area leaders:

<table>
<thead>
<tr>
<th>Club</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1YWU</td>
<td>156,366</td>
</tr>
<tr>
<td>W2YCZ</td>
<td>124,830</td>
</tr>
<tr>
<td>W3MSK</td>
<td>104,241</td>
</tr>
<tr>
<td>K4CTU</td>
<td>93,130</td>
</tr>
<tr>
<td>W5DQK</td>
<td>152,643</td>
</tr>
<tr>
<td>W6PQW</td>
<td>147,864</td>
</tr>
<tr>
<td>W7BSW</td>
<td>133,152</td>
</tr>
<tr>
<td>W8AJW</td>
<td>121,764</td>
</tr>
<tr>
<td>W9O110</td>
<td>106,812</td>
</tr>
</tbody>
</table>

W0EDX, unqualified champ of this portion of the SS, got to the summit scoring 186,880 points, picking up the Minnesota sheepskin on the way. Inside Al's modern shack is a Pacemaker driving a Viking Kilowatt Amplifier on a.m. and sideband. The receiver is a considerably rebuilt 75A1 with over 30 tube functions, all within the receiver cabinet. The knob to the left of the receiver selects individual antenna systems, permits complete band change in less than 30 seconds. The exterior "landscaping"—beams, a vertical, several horizontals, etc.—would gladden the heart of any ham. Note that pole that supports the beams. It weighs three tons!
the Frankford fellows have set a rugged pace for future SS club competitions. K6KQ raised their 1965 total by almost a half-million points, averaging out to about 85,000 points per contestant. Pretty nifty doings with 61 participants!

For the first time, the El-Ray Radio Club of Massachusetts joined the big three. After 4 years in 4th place, the

El-Ray boys may prove pretty tough to dislodge from their newly won third position. The Milwaukee Radio Amateurs' Club made a special effort to climb toward the top and rose from 8th to 4th. The Hamasters Radio Club of Chicago reported that 30 percent of the club membership took part. Results are apparent in their club from 25th to 1st! The Westside Amateur Radio Club of New Orleans rose from

### PHONE WINNERS, 24TH A.R.R.L. SWEEPSTAKES CONTEST

<table>
<thead>
<tr>
<th>Section</th>
<th>Call</th>
<th>Score</th>
<th>Transmitting Equipment</th>
<th>Receiving Equipment</th>
<th>Hands Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>R. Penna</td>
<td>W6MDE</td>
<td>84,000</td>
<td>VFO-6L-807-811</td>
<td>GPR90</td>
<td>40, 20, 15, 10, 6</td>
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<tr>
<td>Md.-Del.-D.C.</td>
<td>W6MSK</td>
<td>104,244</td>
<td>VFO-6L-807-811</td>
<td>GPR90</td>
<td>75A</td>
</tr>
<tr>
<td>S. N. J.</td>
<td>K2PMB</td>
<td>84,150</td>
<td>DX100</td>
<td>75A</td>
<td></td>
</tr>
<tr>
<td>W. N. Y.</td>
<td>K2BHP</td>
<td>102,980</td>
<td>DX100</td>
<td>75A</td>
<td></td>
</tr>
<tr>
<td>W. Penna</td>
<td>W3ABW</td>
<td>39,307</td>
<td>DX100</td>
<td>75A</td>
<td></td>
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<tr>
<td>Illinois</td>
<td>W9HIO</td>
<td>100,812</td>
<td>DX100</td>
<td>75A</td>
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<tr>
<td>Indiana</td>
<td>K8CLO</td>
<td>71,485</td>
<td>VFO-6AQu-850-4-250A</td>
<td>HR07</td>
<td>75, 40, 20, 15, 10</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>W9PQU</td>
<td>83,232</td>
<td>Viking II</td>
<td>NC5B</td>
<td>75A</td>
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<tr>
<td>No. Dakota</td>
<td>W9EZX</td>
<td>90,690</td>
<td>Viking II</td>
<td>NC5B</td>
<td>75A</td>
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<tr>
<td>So. Dakota</td>
<td>W9QCG</td>
<td>105,053</td>
<td>2VJ</td>
<td>75A</td>
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<tr>
<td>Minnesota</td>
<td>W8EDX</td>
<td>186,889</td>
<td>Viking Parcarnell KW</td>
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<td>40, 20, 15, 10</td>
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<td>Arkansas</td>
<td>K6IAK</td>
<td>57,675</td>
<td>DX100</td>
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<tr>
<td>Louisiana</td>
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<td>Tennessee</td>
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<td>Kentucky</td>
<td>W1KZP</td>
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<td>Ranger</td>
<td>NC5O</td>
<td>75A</td>
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<tr>
<td>Michigan</td>
<td>K8CPM</td>
<td>35,470</td>
<td>Valiant</td>
<td>RE5 400, DB23</td>
<td>75A</td>
</tr>
<tr>
<td>Ohio V.</td>
<td>W8DOW</td>
<td>14,764</td>
<td>DX100</td>
<td>75A</td>
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<tr>
<td>K. N. Y.</td>
<td>K2TC/D</td>
<td>95,220</td>
<td>Valiant</td>
<td>HQ10X, DB32</td>
<td>75A</td>
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<tr>
<td>L. N. C.-L.</td>
<td>K8DOS</td>
<td>58,600</td>
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<td>N. N. J.</td>
<td>K2VCZ</td>
<td>124,800</td>
<td>Ranger, Viking I</td>
<td>NC5O</td>
<td>75A</td>
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<td>Iowa</td>
<td>W6UDO</td>
<td>33,981</td>
<td>2VJ</td>
<td>75A</td>
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<tr>
<td>Kansas</td>
<td>W8QMS</td>
<td>19,980</td>
<td>Viking II</td>
<td>75A</td>
<td>40, 10</td>
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<td>Missouri</td>
<td>W6JKE</td>
<td>82,877</td>
<td>Viking II</td>
<td>75A</td>
<td>40, 20, 15, 10</td>
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<td>Nebraska</td>
<td>K9DLJ</td>
<td>48,018</td>
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<td>Connecticut</td>
<td>W1YY2U</td>
<td>195,255</td>
<td>VFO-Viking I (modified)</td>
<td>75A</td>
<td>100, 75, 40, 20, 15, 11, 10, 2</td>
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<tr>
<td>Maine</td>
<td>W1UOT</td>
<td>37,500</td>
<td>VFO-6A106-6AQu-1025s</td>
<td>HQ129X</td>
<td>75A</td>
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<td>E. Mass.</td>
<td>W10GH</td>
<td>77,880</td>
<td>VFO-6A106-6AQu-1025s</td>
<td>HR05</td>
<td>75A</td>
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<td>W. Mass.</td>
<td>W1EKO</td>
<td>90,825</td>
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<td>R. L.</td>
<td>W1HFB</td>
<td>102,711</td>
<td>Ranger, Viking I</td>
<td>75A</td>
<td>75</td>
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<td>Vermont</td>
<td>W7KON/1</td>
<td>76,557</td>
<td>Ranger</td>
<td>75A</td>
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<td>Alaska</td>
<td>K7AWR</td>
<td>27,851</td>
<td>Ranger, Viking KW</td>
<td>HQ129X; SX 88</td>
<td>75A</td>
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<td>Idaho</td>
<td>W7TCP</td>
<td>56,303</td>
<td>PP 810s</td>
<td>75A</td>
<td>40, 20, 15, 10</td>
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<td>Montana</td>
<td>W7BZV</td>
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<td>Ranger</td>
<td>75A</td>
<td>75A</td>
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<td>Oregon</td>
<td>W7OVA</td>
<td>59,400</td>
<td>Ranger</td>
<td>75A</td>
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<td>Washington</td>
<td>W7BSW</td>
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<td>Valiant</td>
<td>75A</td>
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<tr>
<td>Hawaii</td>
<td>W4GY/K736</td>
<td>64,142</td>
<td>1C508</td>
<td>75A</td>
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<tr>
<td>Nevada</td>
<td>W7QCA</td>
<td>99,000</td>
<td>DX100</td>
<td>75A</td>
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<tr>
<td>Santa Clara V.</td>
<td>W6CBE</td>
<td>81,760</td>
<td>Parallel 1-125As</td>
<td>HQ600</td>
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<tr>
<td>East Bay</td>
<td>W6JQW</td>
<td>14,167</td>
<td>VFO-6A-106-2E23-2Ga</td>
<td>75A</td>
<td>10</td>
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<tr>
<td>San Francisco</td>
<td>K6HHP</td>
<td>77,375</td>
<td>6A100-6AQu-1025s</td>
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<td>75A</td>
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<tr>
<td>San Mateo V.</td>
<td>W6CQ</td>
<td>99,004</td>
<td>VFO-121-Y-187-618-813</td>
<td>Super Pro, HF-10-20</td>
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<tr>
<td>San Juan V.</td>
<td>W6ZC</td>
<td>92,662</td>
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<tr>
<td>N. Carolina</td>
<td>K4KDA</td>
<td>88,128</td>
<td>DX100; Viking II</td>
<td>75A</td>
<td>75</td>
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<tr>
<td>So. Carolina</td>
<td>W1EQY</td>
<td>35,550</td>
<td>Valiant</td>
<td>75A</td>
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<td>K4HUN</td>
<td>56,100</td>
<td>DX100; 40X3, DB23</td>
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<td>W. Virginia</td>
<td>W8SSA</td>
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<td>Colorado</td>
<td>W8DDG</td>
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<td>6A46-69V-1625s</td>
<td>SX32</td>
<td>75A</td>
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<td>Utah</td>
<td>W2TOK</td>
<td>12,120</td>
<td>Ranger, Viking II</td>
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<td>New Mexico</td>
<td>W7MTI</td>
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<td>DX100</td>
<td>75A</td>
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<td>Alabama</td>
<td>K6LNO</td>
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<td>DX100</td>
<td>75A</td>
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<td>E. Florida</td>
<td>K3CTU</td>
<td>93,150</td>
<td>VFO-6AQu-1025s</td>
<td>SX4X</td>
<td>75</td>
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<td>W. Florida</td>
<td>W8BJS/Z4</td>
<td>18,360</td>
<td>VFO-6AQu-1025s</td>
<td>NC101</td>
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<td>Georgia</td>
<td>W4CH</td>
<td>31,263</td>
<td>VFO-6AQu-1025s</td>
<td>NC101X</td>
<td>40, 20, 15, 10</td>
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<td>West Indies</td>
<td>C3HD</td>
<td>10,227</td>
<td>6V6-A106-1200TH</td>
<td>SX9</td>
<td>75</td>
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<td>Canal Zone</td>
<td>K25IF</td>
<td>209</td>
<td>VFO-6AQu-1025s</td>
<td>SX9</td>
<td>75</td>
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<td>Los Angeles</td>
<td>K6FVR</td>
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<td>Viking II</td>
<td>75A; 75A</td>
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<td>W7CAF</td>
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<td>San Diego</td>
<td>K6XV</td>
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<td>DX100; Viking II</td>
<td>NC101</td>
<td>75</td>
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<td>Santa Barbara</td>
<td>W6NFF</td>
<td>37,041</td>
<td>DX100; 6A46-1025s; NC101X</td>
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<tr>
<td>No. Texas</td>
<td>W8AY</td>
<td>108,570</td>
<td>2VJ</td>
<td>75A</td>
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<tr>
<td>Oklahoma</td>
<td>W4WLT</td>
<td>60,600</td>
<td>VFO-6AQu-1025s</td>
<td>NC101X</td>
<td>75</td>
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<td>So. Texas</td>
<td>K5DI</td>
<td>87,045</td>
<td>DX100</td>
<td>75A</td>
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<tr>
<td>Qld</td>
<td>W2KG</td>
<td>93,038</td>
<td>VFO-6AQu-1025s</td>
<td>NC101</td>
<td>75A</td>
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<tr>
<td>Ontario</td>
<td>VE3DBY</td>
<td>34,092</td>
<td>VFO-6AQu-1025s</td>
<td>NC101X</td>
<td>75A</td>
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<tr>
<td>Manitoba</td>
<td>VE14X</td>
<td>51,072</td>
<td>2VJ</td>
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<tr>
<td>Sask.</td>
<td>VE8ZM</td>
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<td>TBS90</td>
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<tr>
<td>Alta</td>
<td>VE9XV</td>
<td>20,395</td>
<td>TBS90</td>
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<td>R. C.</td>
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<td>14,781</td>
<td>2VJ</td>
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<td>N. W. T.</td>
<td>VE8OW</td>
<td>275</td>
<td>2VJ</td>
<td>75A</td>
<td>75</td>
</tr>
</tbody>
</table>

QST for
Inside or out, North Texas W5YU's setup is a beauty. In use during the contest was the versatile 32Y3-75A3 combination while 3 and 4 element beams (over 75 feet high) handled the rest.

54th to 56th place and reported they all had fun and that the perennial cry of "wait till next year" was again heard on all sides,

**Contest Quotes**

"Thought I missed my modest goal of 25,000 points, but after the smoke cleared away I realized I had a 1.5 multiplier so I have 30,000 to beat next year." — W9MX.

"Surprised myself by just missing 4 sections." — K5GGS.

"Wouldn't it be nice if every contestant would check his clock against WWV just before the start of the SS?" — W2MQB.

"Good conditions both weekends." — W2RFW.

"Special thanks to WH6RB and W7WNI for my 73rd and 73rd multipliers!" — W1YVF.

"Didn't hear W9YKD this year, what happened?" — W5ABW (Note: He was on e.w."

"By the way, where was Utah?" — K1BEB.

"VE1E seemed like music from heaven when he answered for Maritime, my 73rd section." — W5DKQ.

"Operating this 4-world circuit at the Emergency Radio Club isn't all it's cracked up to be." — K1RIM, opr. of W9TAU.

"I was really enjoying the contest until about three a.m. of the second week end when another North Carolina station gave me a number which was 120 more than mine. This is pretty hard to take when you have been working for your 44th QSO!" — TF1DXS.

"Funniest QSO was to W9VQC." — W9VQC.

"Noted that a lot of the Univcrsity ""TTLL"" station he had ever heard, his last state was Montana for my 47th state." — W1FQS.

"Furnished QSO was with a K6 who got so excited when he found out X was in Western that he forgot my call, stumbled over his own call and failed to give me a signal report. It seemed I was the first W. Va. station he had ever heard, his last state was WIS, and his 73rd section for the contest!" — W5SSA.

"Sorry I couldn't work all who called and hoped to see everyone next year." — K5JQR, opr. of K1TAW.

"I was so anxious to make it 6 consecutive years for Oregon and then I completely forgot the first week end!" — W7QVW.

"(He did it anyway!)." — W5WBM.

"Ten meters came through as it has a habit of doing. Wonderful cooperation from the gang on this band." — W3PYQW.

"Last section was raised on a CQ Vermont, sheer operating genius! And then there are these characters who respond to a QRZ by giving your call ten times and signing theirs twice, and without benefit of phonetics." — W5AJW.

"Heard Wyoming the first week end, but thought I'd catch one the second week end when they weren't so busy. My mistake." — W5XNP.

"Got my Valiant the day before the second week end. Two minutes before SS time, the high voltage rectifier blew. At 6 o'clock, I sat down and cried. It really happens in the SS!" — K5JAU.

"It was my first SS and I could write a book about all the things that went wrong." — K2TSW.

**PHONE SCORES**

**Twenty-Fourth Sweepstakes Contest**

Scores are grouped by Divisions and Sections... The operator of the station last listed in each Section is award winner for that Section unless otherwise indicated. Likewise the "power factor" used in computing points in each score is indicated by the letter A or B.

Example of listings in each section:

**ATLANTIC DIVISION**

**Eastern Pennsylvania**

| W3YLL | 78-6-4-A-1 |
| W3WBS | 18-4-2-A-1 |

**Southern New Jersey**

| W3EQA | 15-2-3-A-2 |
| W3EQA | 7-2-4-A-3 |

**Northern New England**

| W3K8J | 15-1-3-A-1 |
| W3K8J | 15-1-3-A-1 |

**Mid-Atlantic, D.C.**

| W3M8K | 104,244-478-73-A-30 |
| W3M8K | 104,244-478-73-A-30 |

**Mid-Atlantic, D.C.**

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| W3M8K | 104,244-478-73-A-30 |

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| W3M8K | 104,244-478-73-A-30 |
| W3M8K | 104,244-478-73-A-30 |

**Mid-Atlantic, D.C.**

| W3M8K | 104,244-478-73-A-30 |
| W3M8K | 104,244-478-73-A-30 |

Before you got too far into the following tabulation, why not mark the two week end preceding Thanksgiving for your attention and participation in the 25th SS. The silver anniversary of the Sweepstakes is sure to be stupendous!

— E. W.
South Lyme Beer, Chowder # Propagation Society (Conn.)
St. Louis University Amateur Radio Club
Springfield Amateur Radio Club (Ohio)
Bad Sack Radio Club (Calif.)
South Bay Amateur Radio Society (Calif.)
Hartford County Amateur Radio Assn.
Narragansett Assn. of Amateur Radio Operators (R. I.)
San Antonio Radio Club
South Jersey Radio Assn.
Port City Amateur Radio Club (N. H.)
Mumford High School Amateur Radio Club (Mich.)
Columbus Amateur Radio Assn. (Ohio)
Denver Radio Club
Ohio Valley Amateur Radio Assn.
Order of Boiled Owls (N. Y.)
Mid-Islan Radio Club (N. Y.)
ctcrus Beet Amateur Radio Club (Calif.)
Virginia Valley Radio Assn.
Westpark Radiols (Ohio)
Chicago Suburban Radio Assn.
Ohio Valley Amateur Radio Assn.
York Radio Club (Ohio)
Society for Jersey Radio Assn.
 Garten state Amateur Radio Assn. (N. J.)
Suffolk County Radio Club (N. Y.)
Indiana City Amateur Radio Club (Iowa)
Central High School Radio Club (Iowa)
Tri-County Radio Assn.
Wisconsin Valley Radio Assn.
Howe Rural WRadio Assn. (Ohio)
Joliet Amateur Radio Society (III.)
Lake Superior Radio Club (N. Y.)
Ursas Best Amateur Radio Club (Calif.)
Richmond Amateur Radio Club (Calif.)
Lockport Amateur Radio Assn. (N. Y.)
Nassau Radio Club (N. Y.)
San Antonio Radio Assn.
Delano Amateur Radio Club (Calif.)
Connecticut Wireless Assn.
Central Michigan Amateur Radio Assn.
Nashua Radio Assn. (N. Y.)
Deaver Radio Club
Columbus Amateur Radio Assn. (Ohio)
Johnson County Radio Amateur Club (Kans.)
Detroit Amateur Radio Assn.
Westside Amateur Radio Club (La.).
Richmond Radio Club (Ohio)
U.S. Navy Radiols (Ohio)
Short Skid Radio Club
Monterose County Amateur Radio Club (Colo.)
Northern Ohio Radio Assn. of Amateur Radio Operators (Ohio)
Blue Ridge Amateur Radio Society (Va.)
Atlanta Radio Club
Brown High School of Science (Calif.)
Mid-Island Radio Club (N. Y.)
 synxen V. L. R. (Va.)
 Mohawk Radio Club (N. Y.)
 University of Connecticut Amateur Radio Club
Salv Rock Radio Club (Calif.)
National Penn Radio Assn.
Springfield Amateur Radio Club (Ohio)
Santa Fe Radio Club
Watertown Valley Radio Club (N. Y.)
Frey Amateur Radio Club (Teuf.)
Freemont Amateur Radio Club (Mass.)
South Lyme Beer, Chowder & Propagation Society (Conn.)
St. Louis University Amateur Radio Assn.
Rckauksee Area Radio Society (I.)
Contin Amateur Radio Club (Ohio)
Long Beach Wireless Operators
Dayton Amateur Radio Assn.
Society Radio Club (Ohio)
Middlesex Amateur Radio Club (Mass.)
Hartford County Amateur Radio Assn.
Tri-State Radio Club (N. Y.)
Shaker Heights Amateur Radio Club (Ohio)
South Bay Amateur Radio Society (Calif.)
Tri-State Amateur Radio Society (Ind.)
Seneca County Amateur Radio Assn.
Western Illinois Radio Club
Young Men's Christian Association (Chicago)
Rayanne Civil Defense Amateur Radio Club (N. J.)
South Carolina Amateur Radio Assn.
Iowa-Amateur Radio Assn.
Lowa Township High School Radio Club (Ill.)
Mumford High School Amateur Radio Club (Mich.)
University High School Radio Club (Mass.)
Northeast Amateur Radio Assn.
Port City Amateur Radio Club (N. Y., Ill.)
University of Massachusetts Radio Club
WSFLX, our.

CENTRAL DIVISION

W9X0H: 105.912-519-694-A-40
W9A1U: 93.986-470-97-6-40
W9KUL: 20.075-183-3-A-40
W9JYO: 10.096-102-3-A-30
W9WPO: 10.096-102-3-A-30
W9KQI: 10.096-102-3-A-30
W9KQ: 10.096-102-3-A-30
W9QCI: 10.096-102-3-A-30
W9KQJ: 10.096-102-3-A-30

QST for 52
This modest shack was the scene of VESZM's QRP conquest of Canadian ham operators. John's 35-watt rig put to good use on 20, 15, and 10 meters, scoring him 66,294 points. Dipoles for 15 and 20 and a homebrew beam for 10 (favorite band) complete the picture.

**Iowa**

**Kansas**

**Missouri**

**Minnesota**

**Mississippi**

**Tennessee**

**Louisiana**

**New York**

**New Jersey**

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**North Dakota**

**Ohio**

**Great Lakes Division**

**Hudson Division**

**Midwest Division**

Meet W2VCZ, NJI winner. A Ranger, Viking I, NC300 and 75A4 in addition to beams galore have also helped Bob acquire DXCC, WAS, WAC, and WBE. Hudson Division honors to W2VCZ by virtue of 570 QSOs with all 73.

June 1958
San Joaquin Valley Section was notably represented by W6ZGC, who scored a sizeable 92,664 points. Earl is active in the Mission Trail Net and Northern California DX Club and holds the presidency of the Delano Amateur Radio Club. In addition to public service awards, W6ZGC has earned WAS, WAC, and DXCC-phone.

Washington

WTPSW 143,182-520-73-A-35
WTHX 10,640-254-61-A-36
WTHX 12,7.55-505-56-A-17
WTVS 34,500-251-50-A-30
WTVS 19,170-142-19-A-10
WTVK 1,100-107-37-A-11
WTVK 10,121-37-59-A-6

PACIFIC DIVISION

Hawaii

KHEJ 6216-94-37-B-4

Utah

WTZOR 1312-23-18-A-6

Vermont

WZ7A 11,600-107-37-A-13

San Diego

KSUM 10,122-92-57-A-22
KDFD (KNX-SAC) 6099-78-29-A-

KLOM 166-18-14-B-1

KUDD (KWOK) 60,431-151-67-R-39

W5QI 450-2-1-A-4

KKB 26-15-14-A-6


KB6MD (KB6MD-25) 60,830-148-35-A-31


K7F 12,680-256-67-A-27

W7AF 62,488-521-59-A-22

K8F 82-8-7-1


QST for

(Continued on page 130)
The National Bureau of Standards, Central Radio Propagation Laboratory, desires applications from qualified persons interested in operating upper atmosphere scientific recording equipment at Antarctic stations during 1958. Application on Standard Form 57, obtainable at local post offices, should be submitted immediately to Section 82.10, National Bureau of Standards, Boulder, Colo. Applicants should have a degree in electrical engineering or physics, with two or more years practical experience in electronics—or—two years technical education leading to an engineering or physics degree, plus four years practical experience in electronics. The practical experience can include active amateur radio experience. Appointments will be made in grades GS-9 to GS-12, salary range from $6250 to $8645 per annum, plus 25% ice differential. Training will commence during July, 1958. Personnel will leave for Antarctica during October or November, 1958, and return to the U. S. in January or February, 1960.

The U. S. Civil Service Commission is looking for electronic technicians to fill a number of positions in this country and abroad, for installation, maintenance, research and development. Salaries range from $3175 to $7570. Applications should be made on Form 5001-ABC, which is available from any post office or civil service regional office.

If you'll check back to page 38 of QST for March, 1958, you'll find mention of high-altitude nuclear bomb tests and their possible effects on propagation. This is just a reminder, as the bomb tests are now in progress.

The Arizona Amateur Radio Club has achieved the distinction of being named a member of the United States Auto Club as expression of gratitude for the work the club has done in providing communications at the big car and stock car races in Phoenix. The club brings in its mobile stations and provides track communications so that the races may be controlled better during emergencies. The hams also report the apparent condition of the cars as they roll past—helping to cut down the accident rate.

Those who struggled through the small print in last month's C. W. Sweepstakes results may remember the statement: "Kids were plunging en masse into their first contest but were any younger than 12-year-old KN6DJC?" Michigan's KN8HLR and East Massachusetts' W1NJL advise they were tied at age 11 the first week end, although NJL's twelfth birthday fell on November 12 before the second period. Any more challenges for youngest Sser?...Reading the part about "the three ambidextrous types we know of who transmit and write simultaneously," K9ELT lays claim to being number four, "but it ain't easy," says Phil.

DX Contest High Claimed Phone Scores

Here are scores claimed by phone entrants in the 24th ARRL International DX Competition held last February and March, with score, multiplier, and QSO total shown in that order.

| Single Operator | W3KPD | 229,390 225 424 | W2KB | 74,708 119 313 |
| W1OKE | 256,780 190 454 | K9JWY | 72,968 112 212 |
| W3DHN | 239,584 182 104 | W3DRD | 70,062 117 362 |
| W4OTA | 225,077 171 129 | W4FXE | 68,145 165 217 |
| W4ON | 216,216 188 306 | WA2JB | 64,980 90 240 |
| W4WFP | 219,064 191 302 | W4WFP | 61,112 184 294 |
| W8NWO | 106,943 176 373 | W4IAX | 62,483 111 183 |
| W8WBC | 106,576 172 370 | W4GIL | 60,840 112 190 |
| W2WZ | 181,851 167 361 | W3KT | 56,388 93 280 |
| W4EC | 163,789 169 320 | W4WFP | 54,000 100 208 |
| W6OKC | 189,680 185 352 | K4JU | 54,036 114 188 |
| W3ALB | 136,541 187 333 | K2QFJ | 53,010 93 190 |

W1OKE 148,810 140 339
W4OVR 135,320 150 284
W1FZ 134,396 136 330
W1NKL 129,297 141 320
W3AE 122,715 135 305
W8EAE 109,890 120 295
W4DK 103,750 125 305
W3YE 99,144 131 213
W4NEK 97,333 131 251
W4NBY 92,136 132 251
W8OYB 81,300 130 237
W9QLO 80,961 125 237

Multiple Operator
K9HJF 545,751 96 2801
DL1AAP 385,814 51 1147
DL1NCE 332,732 58 805
DL3H0C 308,869 63 721
VP4G0H 135,040 61 701
C3USQA 131,580 68 650
W3HJ 115,092 48 791
W3DL 107,916 39 737
C3DO 100,914 38 761
W3HJL 95,828 52 619
K4CF 93,851 51 615
E44AT 90,666 46 685
W9AIQ 81,510 45 419
ZL1MQ 70,069 42 360
W3KBP 70,090 39 610
W3KXZ 67,580 37 520
W3RZ 58,302 41 746
E4K 55,440 40 462
E4DV 54,818 42 335
E4P 50,938 39 304
OH4PE 50,055 47 355
OH2IIB 50,028 44 379

A preview of high e.w., totals is slated for next month's QST.

KN9HHTI and KNSITH sit next to each other in school.

W3KVD, of the Ham Register, is also quite a statistician. He examined the May issue of QST very carefully, and came up with the information that the word "Ham" had been used 100 times in that issue.

K0ISIP says that K0JTN was his first QSO as a Novice, his last QSO as a Novice, and his first QSO as a General—none of this by prearrangement.

June 1958
I was one of the many fortunate individuals to get to Antarctica because of the increased activity during the IGY. An invitation by the Argentine Navy to join the 1957-58 Argentine Antarctic Expedition was accepted in order to conduct a bacteriological study on Antarctic birds. Unfortunately, the short time between invitation and expedition did not allow time to procure portable ham equipment or to secure permission for amateur operation. A week in Buenos Aires was completely occupied with the setting up of a laboratory on the icebreaker *Gral San Martin*. The first day at sea permission was obtained from the skipper, Capitan R. A. Capurro, to operate the ship’s gear using the call LU2DEE/AM of Petty Officer Hugo Vargas. During the trip to the Antarctic a few 20 meter c.w. contacts were made.

During the three-month trip opportunities to go ashore to collect birds took me to American, Argentine, British and Chilean bases and gave me a chance to see the rigs and talk to the operators. Among the stops made were the Palmer Peninsula bases of “Esperanza” at Hope Bay (LU6ZV) and “Almirante Brown” on the Danco Coast (LU1ZE, LU6ZS). Bases visited in the South Shetland Islands were “Toniente Camara” on Half Moon Island (LU's 1ZS, 2ZS, and 1ZT) and “Arturo Prat” on Greenwich Island (CE9's AT, AU and AV). The South Orkney base of “Orcadas” on Laurie Island has the call LU1ZA. Bases visited on the Weddell Sea shelf were “Gral Belgrano” (LU’s 4ZX, 5ZX, 8ZW), “Ellsworth” (KC4USW) and “Halley Bay” (VP8’s CI, CK, and CY). The rarest DX spots visited were the uninhabited South Sandwich Islands of Zavodovski which has a live volcano and a Russian house on it and Southern Thule which was the site of LU2ZY’s DXpedition.

The Argentine, British and Chilean bases use the regular communications equipment for amateur work between traffic skeds when the bands are open. At Halley Bay the only free time is from 18 to 48 minutes past the hour — these boys will never make RCC. The transmitting and receiving equipment was different at most bases. For example at “Toniente Camara” the transmitters were Argentine Navy 40 watt A3, 100 watt A1 jobs with U. S. war surplus receivers; BC-610s and HRO-5 TAs at “Gral Belgrano”; Collins gear at “Orcadas” and a new GPT-750 with HRO-60s at “Arturo Prat.” Despite the age or the power of the rigs they really put out, probably because of large rhombic antennas at most of the stations. The Argentine and Chilean bases, like the American bases, are military operated (mainly Navy) and certain calls are assigned to each base. In the case of the Argentine bases one call is usually used by the base, and others are assigned to the radio operators and commanders who request a separate call. Most operation at those bases is on the 20
meter hand and most stateside contacts are on c.w. due to the rudimentary English of the majority of the operators. The Chilean bases have separate calls for the c.o., exec and the enlisted men. At the British bases, which are civilian run, it is an individual matter with those who qualify getting VP8 calls. The American bases have one call only and the ham shack with separate Collins gear is operated mainly by the off-duty radio operators. Amateur activity in the Antarctic is primarily for radio contact home for morale purposes. Many of the operators have never had their own call or ever been previously interested in amateur radio and are operating with special temporary licenses. The few who are dyed-in-the-wool hams are doing a good job at hamming for hamming's sake, new states, new certificates, etc. Besides the few 20 meter c.w. contacts made from the San Martin I had two opportunities for operation ashore. At “Gral Belgrano” a few 20 meter phone contacts were made using the call LU5ZX. I was fortunate in being able to stay at “Teniente Camara” on Half Moon Island in the South Shetlands from December 25 to January 3 in order to collect specimens. The c.o. and radio operators were very kind in giving me the freedom of the radio shack between traffic schedules to operate LU1ZS. The first four nights were spent on the 20 meter c.w. band until I found out with W7HTB’s help that 40 watts A3 input to a rhombic could get a 5 by 9 signal stateside. Amateurs from Hawaii (KH6OR) to Poland (SP8CK) and as far north as the Arctic Circle (VE8NW) were worked. In all 33 c.w. and 83 phone contacts were made. This operation as well as meeting personally with the ham operators at the various bases was a big thrill for me. Hams worked from more than one location were W3ROA, W4EPA, and W5JUE. These PB amateurs as well as W2IIBV, W4UKA, W4ROK, K4CKZ, K4INN, W5VU, W8CZL and V7EJB did a wonderful job in keeping my XYL and parents supplied with messages and Christmas and birthday greetings.

K6OKF got a complaint from a neighbor who couldn’t hear him on the TV set. Seems that the neighbor liked to hear K6OKF because he thought the ham conversations were more interesting than the TV programs. — K6USI

W9ZZU, Illinois district commander of U. S. submarine veterans of WWII, announces that another reunion will be held at St. Louis, Mo., on August 14-17, and he hopes that more ham veterans of the subs will be able to attend.

QST is among the 510 periodicals that are indexed by subject and author by the U. S. Naval Research Laboratory. The original index cards are to be reproduced in book form by offset printing, 21 cards per page, 10 by 14 inches, by Micro-Photography Co., 97 Oliver St., Boston 10, Mass. The publication will be available only to those who subscribe in advance of printing which will start in the third quarter of this year.

W3AXT reports a real weird one overheard on a marine telephone channel. The marine operator was having trouble reading the boat, and so she said, “I am not reading you so good just now, sir. Will you please try to come in a little clearer.” (If this works we sure gotta try it on some of the 14 Mc stuff we’ve been having difficulty with lately!) W2BR tried to reach K2VOS on the telephone at his office, but was told that K2VOS was out of town. So W2BR turned on his rig to do a little hamming. And who do you suppose he heard and worked right away?

Kn3DHX, K8HLLR and K8CPF are all named Bob Epstein. Any other hams having this name might drop a note to Kn3DHX at 2803 Jenkintown Rd., Ardmore, Pa.

Silent Keys

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

W1KML, Steve Dumas, Bridgeport, Conn.
W1RTG, Eli Crumb, Norwich, Conn.
W2BZL, Charles Kerr, Baldwin, N. Y.
W2CTX, Fred M. Mauk, Fulton, N. Y.
W2DXT, Milo B. Atkinson, Tuckahoe, N. Y.
W2FCO, Ainsley A. Carson, New York, N. Y.
W2PAG, Joseph A. Guatte, Plunging, N. Y.
W3AKH, Henry H. Lyon, Hyattsville, Md.
W7BCD, James C. Everingham, Selinsgrove, Pa.
K4CPG, Charles W. Roberts, Birmingham, Ala.
W4DJD, Stephen J. Buckler, Jr., Birmingham, Ala.
W5AKY, Elbert A. Allen, Pass Christian, Miss.
W5HOP, Robert P. Woods, Oklahoma City, Okla.
W6AK, Loyd D. Meador, Walnut Grove, Calif.
K6DM, Clyde C. Anderson, San Mateo, Calif.
W7DYY, Albert J. Wade, Bremerton, Wash.
W7FPK, Edward P. Artlieson, Millireed, Wash.
W7JQQ, Neville E. Walker, Portland, Ore.
W7KKJ, Kenneth R. Jones, Boise, Idaho
W7KKZ, Cecil V. Thomas, Seattle, Wash.
W7QVX, Alfred J. Hobbie, Arec, Idaho
K8GLE, Milt Garrod, East Palestine, Ohio
W8VFP, Dale L. Townsend, Miamisburg, Ohio
W9JYP, Donald R. Larimer, Burlington, Wis.
W9UGI, Arthur L. Harris, Bensalem, Pa.
K8LHI, George F. Smalley, Wichiha, Kans.
W8SYM, Herbert W. Jones, Omaha, Neb.
K8EAA, D. A. Lieweine, Derry, N. H.
K83BGK, Charles Hall, Kirkland Lake, Ont.

June 1958 57
THE IDEA for the WLP award occurred to me through a series of unnatural events which began by my moving into a New York City apartment. To qualify, you must simply work WAS, WAC or DXCC, have a confirmation for each contact, then get your landlord to verify that each contact was made without his permission. This will make you eligible for the difficult WLP award.

Being a small town boy, my object in becoming a ham was for relaxation and diversion. The strain of working completely relaxed in the casual atmosphere of the big town left me something less than that at the end of the day. When a friend, W2JSL, suggested ham radio as a means of enjoying life, I readily embraced the suggestion. My wife, now the XYL, of course, concurred, lest I get that unloved look so prevalent among some whose wives won't let them become hams.

In due time I received my license and brand-new call letters and arranged my equipment, a newly acquired SX9C and an ancient crystal-controlled 40-watt transmitter, in the corner of the bedroom.

I started thinking about an antenna, and it was then that I became aware that the existence of the landlord had more significance than merely that of collecting the rent.

"Honey," came the XYL's voice from the department of documents, "did you read the small print in the lease? . . . outside antennas, herewith and specifically forbidden . . . no electrical installations without express permission of the landlord."

Thus I assumed my cloak-and-dagger personality, since it was now apparent that I would have to operate surreptitiously. With this in mind, before setting up Occupation Undercover, I dispatched the XYL and jr. ops. to do some reconnoitering in what can now only be classified as enemy territory.

The jr. ops. came back with only one bit of advice — give up and buy a larger TV set. The XYL reported that we were, indeed, surrounded. There were literally hundreds of apartments around us, a solid front of entrenched TV addicts, all of whom suffer painful withdrawal symptoms should TV be taken from them.

Recently an harassed TV repairman barely escaped with his life when he attempted to remove a set to his shop for alignment. He was beset by hysterical kids, a raving mother and a mad family dog. They would fight from the rooftops, if need be.

One neighbor, it was discovered, was continuing to watch TV through dark glasses even though his doctor had diagnosed embryonic carcinoma of the eyeballs due to excessive kinescope radiation.

I learned that one ham actually did try to operate but was readily discovered and exiled to operating mobile only. The neighbors were unmoved, though, even at the sight of his XYL trudging out on a bitterly cold winter's night carrying hot coffee through the snow to her OM while he operated mobile at the curb.

My head was bloody but unbowed, so late one night I strung about 100 feet of number 20 wire out the bedroom window and attached it to the end of a clothes line pole, with the thought in mind of removing it before dawn. I didn't even get a chance to load it up; a drunken neighbor, staggering home from an office party, caught the low end of my invisible antenna with his head and snapped it — the antenna, that is. (I found out through the grapevine that he roundly thrashed his wife for setting a booby trap for him that night.)
When the XYL saw my frustration over this antenna problem, she solved it with one of her choice statements: "If you can't put it on the roof, put it under the roof." Which, of course, was the answer. I fed the thin wire up through the ceiling and around the crawl space under the roof in somewhat the shape of a pig's tail and loaded it up on 40 meters.

I then commenced my calling marathon. I called CQ for a solid week. I called CQ so often that my right hand kept moving after I went to sleep at night. Then it happened, I got an answer. W3MHO down in Pennsylvania answered.

I broke into a cold sweat and froze. My hand would no longer move, and my impulse was to shut down the transmitter and hide in a closet; but I got control of myself and completed my first QSO.

It was lovely, a wonderful lift. I approached my job that following day with a fresh new outlook.

That evening the XYL gave me the news that poked a few holes in my fresh new outlook. Our neighbors had called in the landlord to check and attempt to find the source of what they referred to as a very peculiar click, click, click, clicking noise coming from the ceiling. Faulty wiring was ruled out, but the possibility of poltergeists was considered. If the noise continued, the landlord advised them, an expert from the National Ghost Society could be called in to investigate.

I had not considered the noise problem before, but it was quite true that the noise from the manual key was greatly amplified at night, not to mention the noise from the heavy toggle switches on the old transmitter. I had kept the power down to approximately 40 watts to prevent TVI. Even though rabbit-ear antennas were being used, there were hundreds of them grouped around. I had something of the same feeling when the ammunition ship I was on during World War II got lost in a mine field.

It was now clear that a few more rules would be required if my survival as a ham was to be insured. I could not be concerned with tropospheric and ionospheric scatter or gamma-match antenna systems or the S.W.R. or the effect of source beam width on stacking. My challenge was to outwit the landlord. I jotted down a few basic rules that I felt would be essential to this end:

1. Operate only during the hours when TV is off or at a minimum.
2. Use a bug and operate it from an insulated box.
3. Eliminate toggle switches.
4. Use c.w. and earphones only.
5. Use minimum power.
6. Keep curtains pulled at all times.
7. Buy a sunlamp.

While waiting for my bug a new development created a temporary deterrent to my project: the QSL card, W3MHO came through with my first card, and I viewed it with mixed emotions. All mail for our apartment is thrown into a common hallway where each tenant thumb through it, picking out his own. Needless to say QSL cards would attract attention. In fact this first card was picked up by a neighbor and handed to my wife with the remark that it was a "funny-looking postcard." She is probably still wondering what BCNU AGN means.

However, with the arrival of my bug I started operating again, and the XYL met the mailman at the door and quickly screened out the QSLs. Then at Christmas, with no ulterior thought in mind, we gave the mailman a carton of his favorite cigarettes. Thereafter, the QSLs were pushed under our door, a service unknown in this area.

After several months of late hours, bleary-eyed operating, I had managed to work about 20 states and one Canadian, VE3EHM. Each new contact was like picking pearls from an oyster, but it was approaching hard work. My original reason, relaxation and diversion, for becoming a ham was only half fulfilled, plenty of diversion, no relaxation.

I run across an add for the new Viking Navigator about this time, so I called up Mel and asked him to send one out. It is a compact little-transmitter/exciter with a built-in v.f.o., band-switching, time sequence keying and 40 watts input on c.w., and it should be ideal for my needs. It was. I may be criticized for not building my own equipment, but the space problem in some of these New York apartments is critical. I would be afraid to fire a soldering iron for fear that I would overheat the apartment. I could lie in bed and operate the rig with my feet if I had a mind to.

I removed my pig's-tail 40-meter antenna and replaced it with a 15-meter doublet in the same area under the roof, running it just over the cross beams and about 6 inches from the master TV antenna, which, fortunately was not connected. I used 72-ohm coax for the transmission line, and secured everything with masking tape.

The hotwater radiator was my ground. I found that by cutting the radiator on or off I could vary the loading of the antenna.

With my new antenna and 40-watt Navigator I started working out on 10 and 15 meters. I was astounded at my success. In quick order I worked

(Continued on page 108)
The publishers of QST assume no responsibility for statements made herein by correspondents.

N.S.B. COMMENTS

1110 Magnolia Avenue
Panama City, Florida

Editor, QST:
This is just a line to let you know how informative I found your article in QST on n.s.b. I experimented and found that it is actually all that the author claims and he is to be congratulated on his observations. Certainly, though, it is so complicated that you must have had to have some assistance to arrive at the facts stated here.

I have been experimenting with this mode of transmission since I received my Novice ticket and I was just waiting for someone to write about it. Thanks for a fine article.
— Bart Fun, K4CBP
2018 Lowell Road
Everett, Washington

Editor, QST:
Congratulations to Mr. Pickering, W9LRA, for a very fine article which I read with deep interest. Mr. Rapp, our look to your laurels: this guy is out for the title.
— John Hubenicht, W7QLH

Editor, QST:
Congratulations to Mr. Pickering, W9LRA, for a very fine line article which I read with deep interest. Mr. Rapp, sir, look to your laurels: this guy is out for the title.
— Robert A. Hunting, KELYZ
R.D. 2, Blanchie Avenue
Klyria, Ohio

Editor, QST:
The merits of the n.s.b. system proposed by W9LRA will be instantly recognized by all forward-looking hams.

However, I would like to point out to Mr. Pickering that his idea has already been patented. On April 13, 1918, the United States Patent Office granted patent number 2,139,601 to Donald R. Keever of Colfax, N. C. This patent states that the "object of the invention is to reduce the channel width required for the transmission of an amplitude modulated wave . . . by the substantially complete elimination of side bands leaving only a wave of varying amplitude and single constant frequency." This classic patent presents an actual schematic diagram for the production of n.s.b.

It is a sad indication of our scientific lethargy that this idea was not instantly utilized by hams, commercial stations, and the military services when it was first proposed over ten years ago.
— Robert A. Hunting, KELYZ
R.D. 2, Blanchie Avenue
Klyria, Ohio

Editor, QST:
The art of DX at one time was an extremely pleasant hobby from which much enjoyment was derived for many amateurs throughout the world. However, the picture has changed considerably of late and pleasure has turned to bitterness. The amateurs out in the remote spots are bitter because they cannot talk to whom they wish at their leisure due to the hungry DXers completely ignoring all ethics of being gentleman and good radio amateur operators. This has either driven the rare ones completely off the air or into hiding on bands at times when they cannot be constantly annoyed by the pack. It results in the DXers spending altogether too much of their time hunting the now-in hiding rare ones down — time which should be spent with their families or in business or studying for the future welfare. Those of us who have had some part in developing n.s.b. to its present state of perfection have enjoyed its advantages in relative privacy thus far. Often when it is impossible to punch through on n.m., d.s.b. and even n.s.b., we often find it possible not only to get through, but to enjoy solid 100% QSO on n.s.b.

We therefore ask you to refrain from publishing further details regarding this system. If others wish to join our group, and to enjoy its advantages, let them develop the necessary proficiency and ability in its use as we have — the hard way. In that way you can help to raise the level of the "state of the amateur art," so to speak.
— Bill Widdrington, W8YTB

We are becoming less mannerly as time goes on, and so must the newcomers as they blossom out — so the only

NSB

Feature Hour

Sponsored by Kureishiki Review Co.

Evenings from 11:45 p.m. (14:54 GMT)
This broadcast is being beamed at Hawaii, America, S.E. Asia, India, Peninsa and other countries of Europe and Africa.

3925 KC
6055 KC

— K2RZC

9 Baldwin Road
Noxon, New Jersey

Editor, QST:
I found Mr. Pickering’s article on n.s.b. very interesting and informative and I certainly hope n.s.b. will become more popular. However, in our two years of experience my colleagues and I have found "no sideband suppressed carrier" to be the ultimate in QRM elimination. Perhaps an article on this mode would be in order.

Also, three cheers for QST’s more informal presentation of material! Articles such as Mr. Pickering’s and Mr. Rapp’s provide a delightful change from the usual technical and constructional articles and a little humor between lines in all the articles would certainly add to the enjoyment of the magazine.
— Ronald Lee, K8SYB
answer seems to be eliminate some of the tension. Restrict DXCC to an award for working one hundred countries. This will not eliminate the sport for the many but will do away with the tension now created by the DXers today fighting for the last few new ones. It will give back to the fellows who happen to live in the rare spots a more even chance to enjoy our hobby as was intended.

— Aug. Nickel, W2FMJ

NUISANCE...

20 Shecks Street
New York 40, New York

Editor, QST:

With all due respect to those who conceived the idea, I think it is about time that we all came to the realization that the creation of the "do-it-yourself" class of license (Novice, Technician) is a mistake that must be corrected immediately. I believe that when it becomes possible for a 10-year-old boy to get a license to operate a radio station and then contrive all of the "Video Rangers" around his vicinity to get one too, in the space of a week, that the state of the art has sunk to its lowest depths.

The Novice is responsible for innumerable tortures suffered by all general class operators on most any of the bands. The "break-break-break-break-break" and the second and third harmonics accompanied by the chirps and clicks of a newly hatched Novice are only a few. This is in addition to that fact this horrid class of license has caused our ranks to more than double in a very short time. The time has come when the ham is no longer the exception, but our ranks to more than double in a very short time. The addition to fact that this horrid class of license has caused one of the fellows to lend a helping hand and the creation of the "do-it-yourself" class of license, (Novice, Advanced) to pay a visit and see what they could do on my band, I asked six or seven nearby hams (both Geeks and Advanved) to pay a visit and see what they could do on my rig (DX 35, or DX 20, or Adventurer) and find the fault, either with the operator or the equipment. It is said if you can’t hear them you can’t work them. I can hear sounds of DX hams, and can’t work them. Surely it can’t be the rig — it must be the antenna, but how am I to tell, since not even one of the worthy brothers has been fit to visit only for a few minutes, I wonder what a fellow has to do or pay for one of the fellows to lend a helping hand?

— M. L. Braun, KNS1QB

DAHDIDIDIDIDIT

Box 1261 C.B.S.
New Smyrna Beach, Florida

Editor, QST:

Received reprint of "Your Novice Account" in the morning mail. There certainly is a tremendous amount of truth in these four pages.

My vote for number one Lid-of-the-Month is cast for the character who tries to use a bug without lots of practice on an oscillator. I have heard five, six and seven dots used for H, and since when is the letter C dah-diddle-did? I heard CQ being sent just that way this evening.

Funny how different the code sounds on one of those things. I firmly believe it would be to the advantage of all concerned if the FCC would prohibit their use by Novices. Most of them need the practice with a straight key anyway.

— Ricker J. Bodholt, KN4TDY

THE HBR-14

Oklahoma City, Oklahoma
Post Office Box 8675

Editor, QST:

I thought you might like to know I have built and have been working for several months the HBR-14 receiver (QST, July, 1957). It was constructed using the parts as specified in Ted Crosby's article. I had no trouble getting it into operation, it tunes just as sharply as the article claims and it sounds similar to the Collins receiver on c.w.

On ten meters I do not try to cover all the band with one set of coils (neither does the Collins). Have it adjusted to cover 28,000 to 28,550 kc. It has been a lot of fun building and getting it into operation.

Let us have more on receivers in QST.

— Horace Martin, W5AYO

113 North Broadway
Silico Springs, Arkansas

Editor, QST:

I wanted to let you know how swell I think the HBR-14 receiver is that was written up by Ted Crosby, W6TC. I have been on s.s.b. and c.w. the past five years (c.w. and a.m. before that) and have been using a Collins 75A1 and Central Electronics Slicer. The signal-to-noise ratio is so much better that there isn't much comparison, the HBR being so much hotter in every way. I find I don't need a slicer and the 75 kc. i.f. makes the receiver on c.w. a dream almost come true. I might add I have never before built a receiver except a two- or three-tube job in about 1934. Thanks for publishing the article and I might add Ted was more than helpful with suggestions, getting me straightened out on some minor points.

— John Stockton, W5DRW

HOW TO QSL

225 N. Julian Street
Naperville, Illinois

Editor, QST:

You cannot stress too strongly the matter of complete addresses on QSL cards, I have received cards addressed like the following: Dave’s RF Plant, K9GSW, Naperville, Illinois, or Dave, K9GSW, A.R.S., Naperville, Illinois. As any two-year-old can see, this is entirely insufficient for the Post Office Department. As there is another amateur with the name Dave in this town, and the cards mean nothing to the Post Office, the cards often are sent to the wrong address. Please put in a plug for complete addresses!

— Dave Harr, K9GSW

June 1958
This problem, sent by Louis Tonik, W3DVB, is one that either you solve immediately or you take a long, long time to figure out.

When two lengths of RG-8/U are connected as shown below, what is the impedance between points A and B? For clarity, the connection of the inner conductors at C is shown expanded slightly.

The answer to last month's tube-short question is "You can't." Actually the heater, cathode and grid were shorted together within the tube, and the lead from the cathode to pin 5 had burned out in the process. Thus testing the tube with an ohmmeter gave the unusual answer of a heater-to-grid short that didn't involve the cathode.

**Quist Quiz Correspondence**

**THREE RESISTORS IN A BOX**

(The April Quist Quiz involved a box with three terminals; resistance measurements between any two terminals showed 20 ohms. Such a box could contain a delta of 30-ohm resistors or a Y of 10-ohm resistors, and the second half of the problem was to determine, without opening the box, which configuration was used. Best answer we had, as reported in the May issue, was to burn out one resistor. This prompted several letters pointing out how simple it was to do without burning out one resistor.)

**Texas, U. S. A.**

Quist Quiz Editor, QST:

Your Quist Quiz in the April issue of QST intrigued me and I was surprised that the answer was not given in the May issue. A very simple method exists to find out if the box contains the Delta or Y connection. Put any convenient voltage between two of the terminals on the box. Between the third terminal and one of the other two place a 5-ohm resistor. By measuring the voltage across the 5-ohm resistor the type of connection can be determined. The Delta connection will have \( \frac{1}{2} \) of the applied voltage across the 5-ohm resistor. The Y connection will have \( \frac{3}{4} \) of the applied voltage across the 5-ohm resistor.

(name withheld)

**New York, U. S. A.**

Quist Quiz Editor, QST:

... that the type of circuit can be determined by connecting a known resistance (in this case 10 ohms) between any two binding posts and measuring the resistance between these posts. The resistance, as determined by the resistance formula, for a Delta connection would be 6.66 ohms and with the Y connection would be 10.66 ohms.

(name withheld)

**Inglewood, Calif.**

Quist Quiz Editor:

Disappointed in your solution! Why not put the "black box" in an r.f. field and test for voltage between terminals? If it's Y, you get nil; if Delta you should read voltage. Why not?

—Everett McMullin, W6DSY

**Univ. of Colo.

Boulder, Colo.**

Quist Quiz Editor, QST:

If one assumes pure resistance in the delta wye Quist Quiz, it may be proven mathematically that the two networks are identical as far as the external circuit is concerned, and no amount of measurement could tell one from the other. I suggest placing the box on a photographic plate and putting a bit of radioactive material on top. It seems a fellow named Roentgen did some work along these lines and came out pretty well.

— Jon W. Osterlund, W5WVK

(But suppose we used a thick lead box? — Ed.)

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**Technique Correspondence**

**MORE QUAD DIMENSIONS**

7 Warwick Road
Chatham, N.J.

Technical Editor, QST:

To corroborate WAGGV's findings on the dimensions of the Quad antenna ("Technical Correspondence," QST, April, 1957), similar observations were made on several Quads constructed at W2GJD.

The resonant length of one side of the driven element of a one-band cube Quad was found to be about 4 per cent longer than called for by the formula

\[ L \text{ (feet)} = \frac{1}{4} \times 0.984 \times \frac{f}{J} \]

where \( f \) = frequency in Mc.

In other words, the length-correction factor of 1.04 times the formula length gave the practical resonant length.

In the two-band cubical Quad (21 Mc./28 Mc.) the resonated length was found to be about 3 per cent longer than the formula length for each Quad.

In the three-band cubical Quad (14 Mc./21 Mc./28 Mc.), however, the length-correction factor for the 14-Mc. Quad was found to be about 1.05; for the 21-Mc. Quad it was found to be 1.02; and for the 28-Mc. Quad it was also about 1.02.

— Walter Hladky, W2GJD

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QST for
**FCC-IRAC Frequency Proposals**


**FCC-IRAC PROPOSALS**

The long-awaited announcement of the views of agencies of the U. S. Government toward the frequency allocation table, in preparation for the forthcoming world radio conference, was made in mid-April jointly by the Federal Communications Commission and the Interdepartment Radio Advisory Committee of the Office of Defense Mobilization. For the amateur radio service, the proposed frequency table includes provision for continuance of every present amateur frequency assignment (with some changes in u.h.f. bands described under another heading in this column), including availability of the Loran band and the 27-Mc. ISM band.

FCC and IRAC indicate they have found the Atlantic City allocations table below 30 Mc. generally satisfactory, and propose only minor changes in that portion of the spectrum, with little or no effect on the distribution of space to the various radio services. Above 30 Mc., past experience in the use of radar and associated devices of radi-navigation and radiopositioning requires, in the FCC-IRAC view, considerable expansion of frequency provisions for those techniques, and the table above 30 Mc. is modified accordingly. However, our 6- and 2-meter bands are proposed to be continued intact: above 220 Mc. certain provisions for radiopositioning use of amateur bands, detailed hereinafter, are also proposed.

The joint proposals now go before the allocations committees of the preparatory groups in Washington looking toward the establishment of a final U. S. position.

**U.H.F. CHANGES**

In mid-April the FCC issued a Memorandum Opinion and Order dealing with its frequency allocations to various services above 200 Mc. The action flows from a request by the Office of Defense Mobilization to expand the provisions for radiopositioning requirements, "which have increased significantly in recent years due to the international political climate and the advent of the 'space age.'" FCC has therefore modified some of the u.h.f. assignments; for example, it has taken some space from non-Government users, such as the fixed and land mobile services and made it available to Government for radiopositioning. The action was taken without notice or hearing, because of the stated urgency involved in national defense considerations.

The order also affects amateur bands, although only in comparatively minor respects. Our 3300-3500 Mc. is shifted, effective immediately, to 3500-3700 Mc. Other amateur assignments above 220 Mc. are continued, but with the Government radiopositioning service also admitted to such bands (except 21,000 Mc.) on a priority basis. See the editorial page this month for additional background.

The language of the amended amateur regulations is published below; these new rules are now in effect.

In a related action, Docket 12341, FCC proposes additional changes in u.h.f. assignments to allow for expansion of radiopositioning facilities. These affect mostly services other than amateur: there is only one matter involved of interest to us — a proposal to change the 21,000-22,000 Mc. amateur band to read 22,000-23,000 Mc. The views of the League on this proposal will be determined by the ARRL Board at its meeting in May.

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<td>a.</td>
<td>Paragraph (j) is amended to read as follows:</td>
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<td>Paragraph (k) is amended to read as follows:</td>
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<td>c.</td>
<td>Paragraph (l) is amended to read as follows:</td>
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<td>d.</td>
<td>Paragraph (m) is amended to read as follows:</td>
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<td>Paragraph (p) is added to read as follows:</td>
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<td>h.</td>
<td>Paragraph (q) is added to read as follows:</td>
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June 1958
made regarding times of operation such as to preclude or satisfactorily alleviate interference. In time of actual civil defense emergency, stations in the Radio Amateur Civil Emergency Service shall have absolute priority.

b. New paragraph (d) is added to read as follows:

(d) In the band 220 to 225 Mc., stations operating in the Radio Amateur Civil Emergency Service shall not at any time cause harmful interference to the government radio-positioning service.

(Refer to White Sands restrictions, ed.)

1800–2000 KC. CHANGES

Continued expansion of the Loran navigation service, which has absolute priority in 1800–2000 kc., has required the withdrawal of a portion of the privileges available to amateurs in that portion of the spectrum under a sharing arrangement. Effective May 10, 1958, the band segments 1875–1925 kc. are withdrawn from amateur use. This action stems from national defense considerations involved in the establishment of additional Loran stations operating on 1900 kc. at locations along the seacoasts of the U. S. and its possessions, and the interference protection made necessary thereby. Henceforth, amateurs may continue to use only the 1800–1825 and 1975–2000 kc. segments under the geographical and power restrictions already in force.

NATIONAL CONVENTION

The Tenth ARRL National Convention in Washington, D. C., August 15–17, continues to shape up as a major vacation attraction this summer. By the time this is in print, the Federation of Radio Amateur Clubs, Inc., will have all details in a brochure. In the meantime, queries for information (and checks for registration and events as listed in April QST) can be sent to the Federation at P. O. Box 3726, Washington 7, D. C. All hotel reservations can be handled by addressing the ARRL Convention Housing Bureau, 1616 K St., N. W., Washington, D. C.

Although no names have yet been announced, the most prominent amateurs in Government, including the Armed Forces, are slated to participate in various sessions and at the major functions. A convention communications system has been devised which will make instantly available from a central desk anyone attending the sessions, social affairs, sightseeing or other tours. Under guidance of the SCM, Louis T. Cronenberger W3UCR, the system also includes an elaborate “talk-in” network of mobile frequencies to aid the mobileer on his way to the big show.

Daily convention news will be printed in daily issues of the “Auto-Call,” the widely-circulated journal of Washington-area hams, throughout the convention period. “Andy” Anderson, W3NL, editor and publisher, has installed brand-new equipment for speedy handling of news and photos to meet the schedule.

On the exhibits side, the plans of leading hamgear manufacturers, distributors and the various Government agencies are taking form as this report goes to press. Exhibits Chairman John M. Boland, WJCC, says all armed forces will be represented by displays.

W2OLU tells us that when his Hints & Kinks, License Manual, Antenna Book, etc., get too dog-eared, he uses Scotch electrical tape #33 to reinforce the binding and the tattered edges. (Don't forget, though, that we publish a new edition of the License Manual every six months!)

The Hilltop Transmitting Association (W3ZGD), of Red Lion, Pa., awards a box of Red Lion cigars to anyone who works five Red Lion hams. The secretary of the club is Mr. Marion E. Bollinger, RFD #1, Box 21, Freeland, Md.

During the recent DX contest W9NH worked CN8QU, KH8IJ and VP7NG on all bands 160 through 10 meters.

Not so very long ago W1FTX moved out to a nice hill-top location in the wilds of Connecticut, where he figured the noise level was low and the DX good. But now he wonders. The other morning he was awakened by a loud and persistent clanging in the yard. After a bit he discovered a woodpecker sitting up on top of his 6-meter beam and pecking away at the aluminum boom. By this time that bird must have an aluminum beak.

We thought you might like to take a look at Gil, W1CD, QST's cartoonist for many, many years. His first contribution appeared in the June, 1927, issue, and his style has been a QST trademark ever since. His keen appreciation of the flavor of ham radio comes in part from the fact that he is an active ham, mostly on the 80-meter traffic nets, where he can be heard nearly every night. By days, he is city editor of the Middletown Press.
FIELD DAY is upon us again! Just about every amateur in the 73 ARRL Sections is already aware that June is Field Day month and that more operating fun is to be had on that one June 28-29 week end than at any other time during the year.

Working under conditions which could be encountered in an actual emergency, clubs and other organized groups will set up and operate multitransmitter stations independently of normal power facilities. Amateurs not with such teams will go into action as mobiles or unit-individual portables. Emergency-powered fixed stations, such as civil defense and amateur club stations, will compete in the Class D category. But whatever your method of participation, hundreds of amateurs will be scanning the bands for your signal.

The rules and entry classifications are unchanged. Pick any consecutive 21-hour period from the Field Day timetable. Once on the air two transmitters simultaneously. Each rig runs 75 watts independently of normal power facilities. Amateurs not with such teams will go into action as mobiles or unit-individual portables. Emergency-powered fixed stations, such as civil defense and amateur club stations, will compete in the Class D category. But whatever your method of participation, hundreds of amateurs will be scanning the bands for your signal.

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Here are three examples to assist score calculations:

Example 1
Assume a 25-watt rig wholly on batteries, not originating or relaying any messages, and not having more than two operators.
40 points (40 stations worked)
$\times 2$ (power below 30 watts)
= 80
$\times 3$ (all radio equipment independent of commercial mains)
= 240
$\times 1.5$ (If Class B or C and everything on batteries)
= 360
540 claimed score

Example 2
Same as Example 1 but one Field Day Message to the SEC or SCM is originated and passed in good form.
65 points (40 QSOs + 25 points for FD message)
$\times 6$ (3 = power multiplier multiplied by independence-of-mains multiplier)
= 390
$\times 1.5$ (everything on batteries)
= 585
877.5 claimed score

Example 3
The Podunk Hollow Radio Club (or any group of three or more licensed operators), portable at its FD site, operates two transmitters simultaneously, each rig runs 75 watts input and batteries or generators furnish power. One message is started in good form (25 points), is received and relayed onward (2 points), and 230 stations are contacted.
257 points (250 QSOs + 5 = 4 - 2)
$\times 2$ (power input over 30 and under 150 watts)
= 514
$\times 3$ (all gear independent of mains)
= 1542 claimed score

(Capital of all messages originated and relayed must accompany Field Day reports.)

Clubs should get every member-owned mobile unit active and report their aggregate scores to ARRL. Our increased showing through individual mobile reports and club aggregate mobile scores is important because such units are considered indispensable in civil defense planning.

Convenient log forms and summary sheets are now available from the ARRL Communications Department. You may make up your own, but please remember to include starting and ending time of operating period, bands used, dates and contact times, calls of stations worked, signal reports sent and received, and locations of stations worked as well as power sources and inputs, location and call of station, number of transmitters in simultaneous operation, number of persons participating, club name (if any) and score computations. To assure listing in the final results in QST, mail your logs by July 26.

Read over the rules below, review the results of last year's FD in October 1957 QST, and try your luck at the So You Know Your Field Day quiz in this issue. Then you should be all set to "go portable" and help make the 1958 Field Day the greatest amateur emergency exercise ever held!

Rules

1. Eligibility: The Field Day is open to all radio amateurs in the sections listed on page 6 of this issue of QST.

2. Object: For portable and mobile stations to work as many stations as possible; for home stations to work as many portable and mobile stations as possible.

3. Conditions of Entry: Each entrant agrees to be bound by the provisions of this announcement, the regulations of his licensing authority, and the decisions of the ARRL Contest Committee.

4. Entry Classification: All entries will be classified according to number of transmitters in simultaneous operation. They will be further classified as follows: "A," club or nonclub group portable stations; "B," unit or individual portable stations; "C," mobile stations; "D," home stations operating from emergency power; "E," home stations operating from commercial power sources. Thus a club or group running three transmitters simultaneously will be in the AA classification, or a mobile station with one transmitter will be in the IC classification.

Portable stations are those installed temporarily, for FD purposes, at sites away from customary fixed-station locations. Portable equipment or units must be placed under one call and the control of one licensee, for one entry. All control locations for equipment operating under one call must lie within a 1000-foot diameter circle.

Group participation is that portable-station work accomplished by three or more licensed operators.

June 1958

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1958 ARRL Field Day Rules

Annual Test for Emergency-Powered Stations, June 28-29

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<td>AST</td>
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<td>June 29</td>
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(Operate no more than 21 consecutive hours out of the total 27-hour period)
Another amateur honored by the Navy for outstanding public service is Leo Young, W3WV, who was awarded the Navy’s highest civilian award — the Distinguished Civilian Service Award.

Mr. Young, who has over 40 years of Navy service, received the award for his outstanding contributions and pioneering scientific achievements in the fields of radio communication, radar electronics identification, and radio control. He joined Naval research activities in 1917, and has played a key role in many important projects ever since. It was he who proposed the present pulse radio system and contributed several ideas basic to its success. He was awarded a commendation from the Secretary of the Navy for his pioneering achievements in radio broadcasting in 1922; the Institute of Radio Engineers’ Fellow Award in 1943; and the Presidential Certificate of Merit for his achievements in radar in 1946.

He is now a consultant in the Radio Division of the Naval Research Laboratory.

Radio has been his avocation as well as vocation. An active amateur since 1905, he has been prominent in ARRL activities through the years. He has two sons who are also hams — W5RVI and KB6BJ.

Leo Young, W3WV, recent recipient of the Navy’s Distinguished Civilian Service Award.

QST for
ARRL QSL BUREAU

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. Its operation is made possible by volunteer managers in each W, K and VE call area. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4 ¼ by 9 ¾ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

W1, K1 — D. W. Waterman, W1FPQ, 99 Flat Rock Rd., Easton, Conn.
W2, K2 — North Jersey DX Association, Box 55, Arlington, New Jersey.
W3, K3 — Jessie Sieberman, W3KT, P.O. Box 400, Bala-Cynwyd, Pa.
W4, K4 — Thomas M. Moore, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
W5, K5 — Horace G. Greer, W5TI, 414 Fairmount St., Oakland, Calif.
W6, K6 — Joseph P. Vogt, W6ASO, P.O. Box 88, John Day, Oregon.
W8, K8 — Walter E. Musgrave, W8NGW, 1245 E. 187th St., Cleveland 10, Ohio.
W3, K9 — Alva A. Smith, W9DMIA, 238 East Main St., Caledonia, Minn.
VE1, K1 — L. F. Fader, VE1FPQ, 125 Henry St., Halifax, N. S.
VE2, K2 — George G. Goode, VE2YA, 188 Lakeview Ave., Pointe Claire, Montreal 33, Que.
VE3, K3 — Leslie A. Whetham, VE3QE, 32 Sylvan Crescent, Sarnia, Ont.
VE4, K4 — Len Cuttell, VE4LC, 256 Rutland St., James, Man.
VE5, K5 — Fred Ward VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6, K6 — W. R. Savage, VE6EO, 833 10th St. N., North Lethbridge, Alta.
VE7, K7 — H. R. Housh, VE7HR, 1684 Freeman Rd., Victoria, B. C.
VE8, K8 — W. L. Geary, VE8AW, Box 634, Whitehorse, Y. T.
VO1, K9 — Ernest Ash, VO1AA, P.O. Box 8, St. Johns, Newf.
VO2, K10 — Douglas B. Ribey, Dept. of Transport, Goose Bay, Labrador.
KP4, K1 — E. W. Mayer, KP4KD, Box 1061, San Juan, P. R.
KH8, K2 — Andy II. Fuehlini, KH6BA, 2543 Namazu Dr., Honolulu, T. H.
KL7, K3 — KL7CP, 310-10th Ave., Anchorage, Alaska.
KZ5, K4 — Catherine Howe, KZ5KA, Box 407, Balboa, C. Z.

IS YOURS ON FILE WITH YOUR QSL MGR?

Your Own Name, 13 Your St., Your Home Town, U.S.A.

V.H.F. QSO Party
June 14-15

Another ARRL V.H.F. Party, open to amateurs who can work any band or bands above 50 Mc., starts at 2:00 p.m. local standard time Saturday, June 14, and continues until 11:00 p.m. local standard time Sunday, June 15. The 33-hour period will provide a fine opportunity to work some DX states, meet new friends, and give the v.h.f. gear a pre-Field Day workout.

Just call "CQ V.H.F. QSO Party" or "CQ Contest" to get in touch with other participants, then exchange names of ARRL Sections (see page 6). Figure your score as shown in rules 4 and 5.

A certificate will be awarded to the top scorer in each ARRL Section, and special recognition will also go to Novices, Technicians, and multi-operator setups (see rule 7).

After the contest, send us a copy of your log (as shown in the sample on page 48, June 1957 QST). Log forms are now available free on request from the ARRL Communications Department.

Rules

1) The contest starts at 2:00 p.m. Local Standard Time, Saturday, June 14, and ends at 11:00 p.m. Local Standard Time, Sunday, June 15. All claimed contacts must fall within this period and must be on unauthorized amateur frequencies above 50 Mc., using permitted modes of operation.

2) Name-of-section exchanges must be acknowledged by both operators before either may claim contact point(s). A one-way exchange, confirmed, does not count; there is no fractional breakdown of the 1-, 2- or 3-point units.

3) Fixed-, portable- or mobile-station operation under one call, from one location only, is permitted. A transmitter used to contact one or more stations may not be used subsequently on more than one other call during the contest period.

4) Scoring: 1 point for completed two-way section exchanges on 50 or 144 Mc.; 2 points for such exchanges on 220 or 420 Mc.; 3 points for such exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of different ARRL sections worked per band; i.e., those with which at least one point has been earned. Re-working sections on additional bands for extra section credits is permitted. Cross-band work does not count. Contacts with aircraft mobile stations cannot be counted for section multipliers.

5) A contact per band may be counted for each station worked. Example: W2TBD (N.J.) works W1PHT (Conn.) on 50, 144 and 220 Mc., for complete exchanges. This gives W2TBD 4 points (1 + 1 + 2) and also 3 section-multiplier credits. If W2TBD contacts other Connecticut stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.

6) Each section multiplier requires 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.

7) Awards: A certificate will be awarded to the high-scoring single-operator station in each ARRL section. In addition, the high-scoring multiple-operator station will receive a certificate in each section from which three or more valid multiple-operator entries are received. Certificates will also be given to the top Novice and Technician in each section where three or more such licensees submit logs. Award Committee decisions will be final.

8) Reports must be postmarked no later than July 2, 1958, to be eligible for awards. See the sample log on page 48, last June QST for correct form, or a message to Headquarters will bring printed blanks for your convenience.

June 1958 67
So You
Know Your
Field Day
Rules

BY PHIL SIMMONS,* W1ZDP

Once upon a time there was a ham named Sam who got his ticket when he was nine. Sam loved DX and contests and had 200 confirmed and three Sweepstakes awards socked away by the time he graduated from high school, first in his class. Sam was a bright boy. Because math was his forte he started studying E.E. at M.I.T., where he continued to draw straight-A grades. As a sophomore, on crisp winter evenings when the homework was done and no contests were on, Sam always curled up with a good book. *Asst. Communications Manager, C.W., ARRL.

Entropy of Stochastic Processes was one of his favorites. So were The Stability Problem in Matrix Eigenvalue Problems and Solution of Maxwell’s Equations in Cylindrical Coordinates. Yes indeed, Sam was a very bright boy.

Came early 1957 and Sam was appointed Field Day Chairman of his club, one of those big-time outfits that take the whole business most seriously. At least 50 members participated, goofing off was not tolerated, and 1000 to 2000 contacts were always made.

Genius that he was, young Sam launched his crash program. He hurriedly lined up the loftiest mountain peak in the vicinity for the site, set up operator-operator shifts, assigned people to installation and maintenance and to cooking and k.p. delegated responsibility for equipment and antennas, cranked out lists of items needed from tents and cots down to the last pencil. Old pros marveled at Sam’s organizational prowess, unanimously agreed that never in club history had the advance planning been so shrewdly laid on.

Then fate lowered the boom. Shortly after Field Day a crumpled, tear-spattered letter fluttered out of an ARRL mail sack. It was from Sam. Everything had gone awry. Rain and wind brought tents and antennas down, as capacitors and resistors fizzled with frightful regularity. Three of eight transmitters switched to commercial mains after a generator conked out. Several rigs dropped from 150 to 25 watts input due to tube failures. The copy of the Field Day Message and two log sheets were lost. Despite all the grief, however, the club managed to make over 1000 valid QSOs. The reason for the weeping was that Sam — the DX and contest ace, the A student, the organizational and mathematical whiz — didn’t know how to figure the club’s Field Day score!

Sam wasn’t the only one. After last year’s Field Day there were some three hundred Sams who didn’t know how to calculate their claimed scores or figured them incorrectly — certainly not for lack of mathematical ability because only simple addition and multiplication are involved. Others forgot to indicate transmitter inputs or whether emergency power was employed or whether they were portable or at home. Dozens furnished everything needed but the call was used. When such essentials are omitted, letters must be written to unravel the foul-up and the ensuing tangle of correspondence slows the appearance of the results in QST. And inasmuch as Headquarters wants to process FD so as to publish the final standings as rapidly and accurately as possible, we have whomped up this little quiz.

To figure a score when beset by Sam-type complications, one must comprehend the under-
lying purposes of ARRL’s June funiest, so let’s review the why’s and wherefores. First, it is basically an emergency preparedness drill, not a contest. It’s our yearly attempt to put amateur radio’s best foot forward by showing what we can do in time of flood or blizzard or any other act of God. Quivering with expectancy and with nostrils flaring, we charge out to a hilltop to demonstrate how well we can function away from home. Visitors are welcome. We are polite to representatives of the press who have written many complimentary words about our hobby. We pose blushingly (but becomingly, we hope!) for newspaper photos and live telecasts. We do our best.

Now the picture should be obvious. Its very name explains why no one parked on his tailbone in the home shack earns multipliers to compete with field stations scorewise, and why Field Day is no Sweepstakes or DX Contest. All forms of portable work are encouraged through entry classes A, B, and C and the club mobile aggregate listing. To answer the following questions correctly, one must learn the definitions of “portable,” “mobile,” and “Field Day Message,” three more major stumbling blocks. What is a “home station?” How much traffic credit is allowed and under what circumstances may it be counted toward score? What multipliers are granted for power, independence-of-mains, and batteries?

Switch to the 1958 announcement in this issue. Examine the detailed rules and the three scoring examples. Note that we must be portable on emergency power to merit the IOM multiplier. How about input? When disaster strikes might not a half-kw. provide more reliable communications than a 10-watt peanut whistle? Perhaps, but lightweight portability and power drain can be important as well. Besides, in the matter of inputs the scoring system bows to the long-recognized value of competitive incentive, hence strives to equate high and low power efforts. Without local and national competition between stations of comparable size, without new contact and score records as targets, without that bet with the club across town (loser picks up the dinner tab) and the like, Field Day — noble purpose notwithstanding — might be less popular. And what nincompoop would tamper much with a formula that has proved itself such a bang-up success for lo these many years?

Let’s cut the shilly-shally and get down to cases. Assume that all contacts are valid (i.e., made, logged and duly reported) and that all FD Messages are handled in proper form and copies forwarded to ARRL, unless otherwise indicated.

Pencils poised? Rules down pat? Wits QRV? Okay, here’s the quiz:

1. KN4OKZ is one of 15 members present at Potomac Valley Radio Club’s installation. Any rig he operates must run 75 watts input or less, be crystal-controlled, and stay within the authorized KN/WN band segments.

2. One-man portable W6BKS/6 identifies his location as Encino, California in all contacts. As the rules require exchange of names of ARRL Sections, his final score is zero.

3. To determine input to a grounded-grid final amplifier for FD purposes, the filament power must be added to the plate power because the filament is “up in the air” for r.f.

4. No FCC regulation or FD rule would be violated should a Technician serve as logger on the 7-Mc. cw. position at a FD setup.

5. The boys have been talking it up for weeks and Orville can scarcely wait for the big day. Then along comes Saturday and he has tired blood or Asiatic Flu or something and his temperature is 100°. The XYL issues an edict. “With that fever you’re staying home, Field Day or no Field Day — and that’s final!” Bitterly disappointed, Orville acquiesces, but that evening his fever subsides and he is allowed to move into the driveway with his suitcase portable. This rat’s-nest sports a v.f.o.-driven 6V6 final at a smashing 7 watts plus a 58–58–56 autodyne, both of which Orville ties to his huge 5-element wide-spaced 20-meter rotary. Power comes from a small Onan. The QRM is awful on that antiquated inhaler but Orville manages to knock off 100 contacts. Fifty are FD portables, 20 are Stateside nonportables, 30 are home-station Europeans. Orville’s score can be no higher than 50 points all told.

6. Right after FD W8XYZ informs the League that the Sudsack Amateur Radio Club made a 4500-point tally. There was no carbon paper at the site, no copy of the log is presently handy,
and he is much too busy to prepare one. He asks that the club's results be listed in the QST tabulations anyway. SARC's score will appear in the tabulations.

7. The rules do not permit club portables to utilize batteries as a power source.

8. Home stations receive neither power nor independence-of-mains multipliers.

9. Originated by home station W9RQM, this message is sent by radio to W9GIL during the FD period:

   NR5 W9RQM CK7 WAUSAU WIS 2000 JUNE 28 GEORGE WOIDA W9KQB SCM AA 2103 SOUTH 9 ST AA MANITOWOC WIS BT ONE AREC MEMBER ENJOYING HIMSELF IMMENSELY 73 BT RENO W9RQM AR

   It can be the equivalent of 25 contacts toward W9RQM's score.

10. Club portables sometimes can qualify for a total multiplier of 13.5.

11. Portables manned by two brasspounders sometimes can qualify for a total multiplier of 13.5.

12. A PE-99 powers all rigs while receivers, keying monitors, lights, hot plate, v.t.v.m. and soldering iron are on commercial mains. Though emergency-powered at a portable site, this group is ineligible for the independence-of-mains multiplier of 3.

13. W1DX/1 can roll up 127 QSOs and end up with a score of only 127 points.

14. An amateur operating his mobile rig from a.c. mains can qualify as a Class C entry.

15. W8QAV/Mobile appears in the final standings with 69 contacts and a score of 1971. A misprint must have been involved because W9QAV/8 could not earn such a large score with just 69 QSOs.

16. There is no limit to the number of hams that can work the transmitter of a mobile entry.

17. A club with five transmitters, four receivers, eight antennas and 37 operators can participate as a Class 6A entry.

18. QST credits W1EH/1 with 433 contacts and 3897 points in the one-transmitter class. It follows that W1EH/1 could not have handled any traffic whatsoever during the FD period.

19. No FD rule is violated when a club portable uses an antenna 2500 feet away from its "control location."

20. VElOM/1 operates continuously from 6:00 p.m. AST June 28 until 8 p.m. AST June 29, 1958. Assuming that exactly ten QSOs per hour were made throughout the entire period, VE1OM/1 can be credited with 260 valid contacts.

21. This garbled message pops up at 38 La Salle Road:

   NR1 K-IA/4 FALLS CHURCH GA CK30 1430 PM JUNE 30 ARRL WEST HARTFORD 7 COLO BT W4TFX AND I HAVING TREMENDOUS TIME IN CLASS B NEAR WASHINGTON DC STOP BEST 73S TO THE HEADQUARTERS GANGS BT EV BATTERY W4IA/4 AR

   It was mailed by the last amateur receiving it after a number of relays. The above is not a Field Day Message.

22. Observing that no one has yet made 300 QSOs in the mobile category, W9BRD, W9MFY and W9VES decide to join forces and shoot for a new record. They load VES' battered Merc to the hill and motor close to Illinois' highest point, Charles Mound. Using the call W9MFY/0, 30 watts input, batteries, and a full-wave 100-watt zep, the trio grinds out 327 contacts. Excellent results notwithstanding, W9MFY/0 is not a valid Class C entry.

23. Timbuktu Civil Defense Radio Association has a regular club station situated in the basement of the Kappa Delta Rho frat house on campus, but "to get out better" gear is toted up to the bunkhouse on the third floor. The TCDRA team pushes no traffic but belts out 250 contacts with 15 watts input and a PE-75 supplying the juice. Their score can be no more than 250 points.

24. Battery-powered W3EIS and W4KFC start off as a bona fide Class B station using the call W3EIS/3. Input to two ARC-5 senders is held to 450 volts at 60 ma. Hot as firecrackers, Don and Vic are averaging 30 QSOs per hour until noon Sunday when visitor W3XYZ drops by for a single-handed operating fling. Alas, his fist is lousy and his logging worst and the W3EIS/3 contact rate plummets. After 70 minutes of this farce W3XYZ departs, whereupon Don and Vic — sighing with relief — happily resume. With 650 contacts and no traffic work, W3EIS & Co.'s score is 8775 points.

25. Laurel Amateur Radio Association members W1CTJT, W1FXK, and W1ICP take part as individual units in Class O. CUT makes 20 contacts, FXX makes 25, and ICP makes 30, with respective inputs of 10, 40, and 175 watts. All three sign "portable one in Connecticut" and are entitled to the battery multiplier. In addition, CUT originates and passes an FD Message to ICP who subsequently relays it to FXX. No other messages were handled. LARA's mobile aggregate total is 985.5 points.

(Answers on page 168)

1 Profound apologies to ace traffic man Ev Battey, W4IA, for this example. Any resemblance to a message Ev may have originated is purely coincidental.
IMPROVED CONTROL CIRCUITS FOR THE DX-35

The accompanying diagram, Fig. 1, shows how a d.p.s.t. toggle switch can be used to advantage in the send-receive circuit of a Heathkit type DX-35 transmitter. Once the simple modification involving mounting and wiring the switch is completed, it will provide one-switch control of the transmitter plate voltage and any external relays that may be used for antenna changeover, receiver muting, etc.

$S_{IA}$ of the new arrangement provides on-off switching of 115 volts a.c. that has been piped over to previously unused terminals 5 and 6 of the auxiliary power socket. This voltage may be cabled out to the aforementioned relays. $S_{IB}$ of the modified circuit is connected in series with the on-off contacts of the "Operation" switch for the transmitter. Thus, $S_1$ provides simultaneous control of the transmitter, the antenna relay, and the receiver muting circuit.

In making the modification, first remove the key jack from the front panel of the transmitter. Drill a hole in the rear apron of the chassis, in between the coaxial receptacle and the microphone jack, and remount the key jack. The hole left vacant at the front of the rig should now be enlarged slightly to accommodate the toggle switch, $S_1$.

Next, replace the lead between Terminal 6 of the operation switch and ground with a pair of leads which terminate at $S_{IB}$ as shown in Fig. 1. The second wire originally connected to Terminal 6 of the operation switch (the one that goes to the slide switch) should be disconnected at Terminal 6 and then returned directly to ground.

Pin 11 or 12 of the operation switch is connected to the a.c. line cord at the 4-terminal tie-point strip identified as part “AA” on Heathkit pictorial drawings. Using an ohmmeter, or other means, determine which switch pin is so connected, and then run a wire from this pin to one terminal of $S_{IA}$. Connect the other side of $S_{IA}$ to Pin 5 of the auxiliary power socket, and then connect Pin 6 of the socket to Terminal 1 of the slide strip “AA.” This completes the wiring except for adding by-pass capacitors, $C_1$ and $C_2$ in Fig. 1, to Pins 5 and 6 of the power socket. These capacitors should be similar to those already connected to other terminals of the auxiliary power socket.

The filaments of the transmitter are still turned on and off with the operation switch after $S_1$ has been installed. The operation switch is set at either the c.w. or the phone position depending on the mode of transmission and is not used again until the transmitter is turned off. Turning the toggle on will apply high voltage—with operation switch on either phone or c.w.— and will activate the external antenna or other relays.

— Reagin Warren, W4RVH

When using a v.f.o.-DX-35 setup it is necessary to have the carrier on the air when zeroing in on the desired frequency. This forces the operator to sweep the band with a carrier and causes receiver blocking. The number two fault is minor in comparison. It is just that in changing back and forth from send to receive, the usual combination of switches on the transmitter and receiver have to be operated quickly and in the proper direction and sequence. Both of these faults are easily corrected by a simple modification without impairing the operation or basic design of the set. In fact, with the modification in effect, a shorting loop shoved into Pins 5 and 6 of the auxiliary socket leaves the operating circuits set up as described in the instruction manual.

What do we need for the big job? One 20,000-ohm 10-watt resistor, three .001-juf. disk ceramic by-pass capacitors, fifteen inches or so of hookup wire and about 30 minutes. To accomplish the modification, refer to the pictorials in the instruction manual and perform the following steps:

1) Remove the two white wires on Terminal 6 of the operation switch, solder together and tuck out of the way. No insulation is necessary because
they are grounded about three inches away.

2) Remove the connecting wire between Terminals HH-1 and E-1.

3) Connect a piece of wire from Terminal 6 of the operation switch (S) to Terminal HH-1 (S).

4) Move the transformer high-voltage center-tap lead from FF-5 to FF-3 (S).

5) Move the lead of the 20K 10-watt resistor from FF-4 to FF-5 (NS).

6) Connect one lead of the additional 20K 10-watt resistor to FF-4 (NS) and the other lead to FF-5 (NS).

7) Connect a wire from FF-4 (S) to FF-6 (NS).

8) Connect a wire from FF-5 (S) to FF-5 (NS).

9) Connect one lead of a 0.001 disk ceramic capacitor to FF-3 (S) and the other lead to one of the nearest ground point (S).

10) Connect one lead of a 0.001 disk ceramic capacitor to FF-6 (S) and the other lead to the nearest ground point (S).

With the above connections made, Terminals 5 and 6 on the auxiliary socket connect to the remote operating switch if one is used for push-to-talk operation. If such a switch is not used, 5 and 6 must be jumpered with a short piece of wire. The addition of a s.p.d.t. switch to any v.f.o. used with the set now will allow the v.f.o. to be turned on without turning on the transmitter since B-F to operate it appears on Terminal 3 of the auxiliary socket regardless of the position of the operation switch.

— Glen R. Jackman, W3GZP

SOLDERING AND SOLDERING ACCESSORIES

One of the petty annoyances in coil winding with cotton and silk covered wire is frayed insulation. A wire having frayed insulation is difficult to poke through a hole in a coil form, and loose and rumpled insulation certainly does not enhance the appearance of the finished product. By melting solder directly over the point where the wire is to be cut, sufficient resin will be saturated into the insulation to hold it in place while the cutting, dressing, tinning and soldering operations are performed.

This trick is also very effective when it is necessary to tap a length of insulated wire. The results will not present the appearance of mice having gnawed at the covering!

— Bill Fishbach, W1IKU

The problem: Field repair of a broken receiving antenna without having access to 115 volts a.c. for a soldering iron.

Solution: After cleaning the ends of the wires and looping them together, the joint was wrapped with solder that had been flattened with a hammer. The solder was then melted with a small torch, in this case an ordinary match!

Not the most highly recommended method of making an electrical joint, but certainly one worth remembering when an emergency arises.

— Robert Carpenter

One simple method of preventing damage to a polystyrene coil form during soldering is to insert the form in an inexpensive wafer socket before applying heat from the iron. The socket does carry off some of the heat that would otherwise reach the prongs, but it makes up for this by maintaining the prongs in perfect alignment.

Here at W0SGG, we mount the socket/sockets in a sheet of material that can be clamped in the bench vise, thus taking care of the problem of holding the coil form while working on it.

— Otto Woolley, W0SGG

Here is another method of protecting polystyrene coil forms against heat.

When ready to solder, stand the form on its end with the prongs sticking up. Wrap a piece of half-inch masking tape around the form with its uppermost edge protruding up over the prong end by approximately 3/16 inch. Using a teaspoon, fill the walled-in area around the prongs with water. You can now apply heat and solder to the prongs without too much danger of the form melting and the prongs becoming misaligned.

— Alexander McGlashan, K2GIN

When removing the base from a plug-in coil, tube, or multiwire connector, it is always helpful if the prongs involved can all be unsoldered at the same time. Use of a homemade ring tip such as illustrated in Fig. 2 will allow all prongs to be heated simultaneously.

The ring tip is made with Tinned No. 12 or 14 copper wire. The loop should be just large enough in diameter to enircle the ring of prongs that require heat, and the leads to the soldering gun should be as short as possible.

This method can also be used to unsolder canned components by forming the tip properly.

— Harry Star, W1MWO

A tinned copper wire extension added to the regular tip of a gun type iron will facilitate soldering in some seemingly inaccessible places.

Clean and tin the wire extension and then bend
about proper soldering methods should also re-

A handy unsoldering accessory is a tool made
from an old hacksaw blade. The surplus scav-
ger will find it practically indispensable and, if
he has a power grinder available, it can be made
in a new minutes.

The shape of the unsoldering aid is shown in
Fig. 5. Remove the teeth from the blade while
the grinder is turning over and, of course, make
the tool long enough to permit a good grip. Adhesive tape of one type or another may be
used to cover the handle part, but do not cover up
the hole at the grip end. Just remember to use
that hole to good advantage — slip it over a nail
driven high in the wall — if you have any junior
ops that can creep into the workshop!

SAVE THAT OLD MASCARA BRUSH

Turn XYL’s old mascara brush, when dipped in
a little carbon tet, is ideal for cleaning relay
contacts, volume controls, switch contacts and
other radio parts.

— Ronald Litt, K2KMA

REMOVING GUY WIRE AND GROUND
STAKES

When you next run across a guy wire or ground
stake that won’t pull up after a few mighty
heaves, put the automobile bumper jack to work.
As long as the stake or rod has a clamp or other
surface to which force may be exerted, it is fairly
certain that it will move after a few strokes on
the jack handle.

— Harry M. Engwicht, W6HC

Fig. 3—Sketch showing how W5CYF extends the usefulness
of a soldering gun by extending the length of the tip.
it tightly around the main tip as shown in Fig. 3.
Make very sure that the tips are clean and in
good contact at point marked X, and add a little
solder at this junction to assure maximum trans-
fer of heat.

The extension may now be bent into a shape
best suited for the job. Of course, the wire will
not transfer enough heat for heavy soldering op-
erations, but it does permit doing many light jobs
located in hard-to-get-at spots.

— Edwin B. Robertson, W5CYF

The accompanying photograph, Fig. 4, is an
open-for-inspection view of a soldering aid that
has seen factory use for the past four years. The
aid has so speeded soldering operations that we
simply litter the bench with them so that whenever we reach for solder — it’s there.

The aid consists of small diameter solder wound
on the film spool of a 35 mm. film cassette. Up to
four layers of solder may be wound if a 36-expo-
sure cassette is used. When reassembling the unit,
make certain that the solder feeds through the
velvet lined slot properly by aligning the slot
with the solder lead. Otherwise, the solder will
not release easily. A small hole is drilled in the
spool to hold the starting end for ease of winding.

Cassettes may be obtained from some film
processing companies at no cost because they are
not normally reused after the film is developed.

Incidentally, Kester Company puts out an
excellent booklet on the subject of soldering. A
copy makes good reading for anyone interested
in the proper application of solder.

— James R. Gracc, W0OJS

Editor’s Note: Newcomers interested in learning

Fig. 4—An open-for-inspection view
of the soldering aid made from a
35 mm. film cassette. W0OJS gives
construction details in the text.
WILL the 2540-mile 144-Mc. record ever be broken?
When the previous record of 1400 miles was set back in 1950, it appeared highly unlikely that it would ever be extended by any great amount. The W5QN1-W6ZL QSO, like others made at the same time over slightly shorter distances, was deemed to have resulted from the very dense E-layer ionization. Going much over 1400 miles by this means seems a remote possibility, and double-hop propagation (which might mean a haul of 2500 miles or more) would involve a fantastic combination of perseverance and good luck. Tropospheric propagation? We'd had some out to 1200 miles or more, but nobody gave it a chance to go much farther.

Moonbounce techniques were then in their infancy. They've advanced some since, but we're still a long way from substantial success in that department, at least within the amateur power limit. A newer technique, ionospheric scatter, may just work at 144 mc. However, it appears to be limited to something under 1500 miles.

That tropospheric propagation, first-known of all v.h.f. DX phenomena, could provide communication over distances of record proportions was hardly suspected until July 8 of last year, when W6NLZ and KH6UK achieved their first success over the Pacific from the West Coast to Hawaii. But they did it twice, proving that it was no fluke. Can we do better? What will it take, if so?

People who should know say that the tropospheric conditions that made possible these 2540-mile QSOs can extend far beyond Hawaii — but where west of Oahu would you find another KH6UK? And as for the Mainland end, few 2-meter operators have the combination of location, equipment, operating savvy and perseverance that characterize W6NLZ. Conceivably the record could be extended a few miles at either end, but what we're talking about is something more significant than a mere stretching of the record.

There are other places in the world where favorable tropospheric conditions occasionally prevail over very considerable distances. We would look for these most often on long over-water paths in the low latitudes, but coincidence of good 2-meter stations and the right conditions seems a slim chance at best, in latitudes near the equator. CT3AE, Madeira Islands, has expressed interest in trying, but he may be low on power. A remote chance, but perhaps one most

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*V.H.F. Editor, QST.
worth bearing down on, lies over the North Atlantic. Here we at least have the stations, if not the conditions. Do we have the operators?

A transatlantic 2-meter QSO won’t just happen, because a few tries are made, now and then. If it ever comes off, it will probably be the result of intensive long-term effort like that made by KH6UK and W6NLZ. There will be schedules, kept religiously and at all hours. There will be the ultimate in equipment, within amateur limits, at both ends. And there will also be phenomenal good luck!

At least a few stations have setups that offer some hope of success. At this side of the Atlantic there are plenty of kilowatts and big antennas. Presumably there are also operators—and probably these are most important. In Europe most countries have power limits that are discouraging, but some special IGY authorizations may help out. We know that at least one British station, G83IYG, has a 1-kw. authorization on a temporary basis, an excellent location and a first-class operator, G5KW. From PA9AFN, now living in this country, we learn that PK1PL, a laboratory station operated by a group of people interested in propagation experiments, will soon have a high-powered 144-Mc. station on the air. They have a fine dunes location near The Hague, with a view out over the North Sea. And in Germany, DL4WW, well known to American 2-meter enthusiasts as W3VY, is on with the legal power limit, 500 watts.

There are undoubtedly many others who are eager to work on the possibility of pushing a 2-meter signal across the Atlantic. The International V.H.F. Society tried it some years ago, and they could very likely be talked into giving it another go. A spot on the Irish Coast might be a very favorable site from which to try, too. The main thing would seem to be to try, and right now is the time to start.

50-Mc. DX News

Being in between the F3 and E6 sessions as we write, DX news on 6 is a bit light this month. There was little world-wide activity after the middle of April, although far away, the U.S. 6-meter men were concerned this was confined to work between California and Australia and New Zealand. There were a few smallies of South American DX there elsewhere, but mostly the 6-meter band was getting set for its early summer bings of sporadic-E.

A new country-to-country first was made April 5 when ZS6UR worked H29BZ at 1206 to 1215 GMT. They were in contact again from .1.230 to 1256, and from that time to lower band.

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A new country-to-country first was made April 5 when ZS6UR worked H29BZ at 1206 to 1215 GMT. They were in contact again from 12.1230 to 1256, and from that time to 1300, ZS6UR worked H29BQ. Our thanks to KH7R, W833XM and ZS6TB for relaying this information, via a lower band.

If you haven’t worked Northern Rhodesia by now, the chances are slim that you will catch it on 60 Mc. for a long time to come. Peter Lorth, WQ2PL, the only amateur in that country known to have operated on 50 Mc., will be in Bulawayo, Southern Rhodesia, by the time this appears in print. A veteran of 50-Mc. DX through two sunspot cycles, Peter made a fine contribution to the advancement of the 6-meter cause. He was one of the few African operators to work into Europe on 50 Mc. in 1947, and when the first breakthrough to North America came in 1957, WQ2PL was in there. He worked 18 states in W2, 3, 4, 5, 6, 8, 9 and 10. We wish you luck as a ZR, Peter, but let’s hope you get back to VQ2 soon.

West Coast stations had a fine time of it with the ZLs and VKs through March and early April. The last DX report we have is from W6BRAZ, Santa Rosa, who says the band was open to South America the 15th and to New Zealand the 16th. An interesting summary of Australian work comes from W. G. Francis, East Newborough, Victoria. He says that all Australian states are active on 6, the interest building up quickly with the official permission to
use the 6-meter band again, beginning Oct. 5. JAs were heard on 50 Me, last July, and some crossband contacts were made 28-50 and even 58-50, before the 50-Mc. band was reopened for the duration of the IGY. VKs also may work 56 to 60 Me, but not many have done so, understand- 
ingly, since October. VK4NG, Rockhampton, made the first JA contacts two-way Oct. 9, and in the next 15 days worked 151 JAs in all call areas except JAS, which was worked in February.

VK0BE was the first Western Australian station to work into Japan, getting through in early March. VK3ALZ and VK3PQ made the first JA contacts from their area Feb. 10. VKs M7, M6, RQ OR ER and ZAW made the first VK-JA contacts Feb. 2. VK7AB, Toowoomba, made it in January, with JA1AXE. Throughout the whole summer (winter to us who are north of the equator) VKs in the Melbourne area could hear VKs in Queensland, to the north, working JAs, but nothing could be heard of the DX until February. Scooter-S work was done with ZAs during the Christmas season, and many interstate aurora contacts were made Feb. 11.

Via 2W1KLW we have a report from VK0KT, Macquarie Island, to the effect that he operates on 50.19 Me. at 0200, 0600, 1000 and 1100 GMT, Saturdays and Sundays. He heard W6UQ?, San Fernando Valley, Sunday, March 30, at 0149 GMT. A project scheduled for the latter part of June involves sending aloft a 50-Mc.-equipped balloon, which is expected to reach 60,000 to 70,000 feet. More information on this can be obtained from VK0KT on 2.12 Me. George is on almost daily, beginning at 0100 EST.

VK5NQ, Oakland, Calif., has made a 50-Mc. ZL WAS, and he believes that this feat, completed in March, may have been the first from this country. Bob found the band is on almost daily, beginning at 0100 EST.

The first VK-W 50-Mc. QSO, so far as is known, was made March 15 by VK4NG and W6BJI, at 1622 PST. The band opened again the same day, around 2050, and VK4NG worked K6ERG, K6PXT, K6RNQ, W6RLB, K6MMT, K8DWW, Détroit, W8VCO and W8UST, Toledo, W8HCC, Sandusky, and W8VOZ, Van Buren.

Amateurs of Southern California who are interested in microwave communication will want to take in a special meeting of the San Bernardino Microwave Society. A Symposium on microwave communication will be held, which will include a two-hour session covering past and present progress in this field. Speakers will discuss general microwave theory and constructional details of equipment currently in use, much of which has been or will be the subject of QST articles by members of the SBMSS. Talks will include slides and demonstrations. Date: June 5. Time: 7:30 p.m. Place: Chaffee College Annex (A-15), Euclid Ave., Ontario, Calif.

Coaxial Tank for 50 Me.

When W4IKK moved to Signal Mountain, Tenn., he got a fine v.h.f. location, but along with it he took on a formidable overloading problem. Mountain tops have a way of being well supplied with v.h.f. stations of various services these days. Bill has Channels 3 and 9 a mile to the north, Channels that this feat. \( \text{COAX} \) in the picture, and a gas company fm station on 49.6 Me. close by. Each of these is bad enough, but together, and in combination with strong amateur signals, they create all kinds of spurious responses in a conventional 50-Mc. converter.

Coaxial tank circuit used on 50 Me. by W4IKK

U shape was employed to permit mounting on a standard chassis.
**OES Notes**

**WLABE, Stow, Mass.** — Will be operating on 144 and possibly 220 Mc, from Linwoodville, Maine, weeks ends through summer and early fall. Forty-element beam for 144 Mc. about ready to go at that location.

**W1SUE, Cohasset, Conn.** — Detailed observation of band conditions on 50 Mc. during marked 27-day cycle effects, in P, TE, Es and auroral propagation.

**W3GKP, Spencerville, Md.** — Will TU having moved to Falls Church, Va., meteor skeds are now kept with W4MU, Oceanway, Fla., nightlies at 2200. His frequency: 144.06 Mc.

Keeping record of voltage fluctuations, in F2, TE, Es, and auroral effects, as possible indication of aurora. Would be glad to hear from others with experience in this field.

**W4HFH, Colinsville, Tenn.** — Continuing daily observation of compass readings. Magnetic change, for example, hole 2 being optimum for most users. Noise generator says converter noise figure is somewhat higher than when the cascode was used, but reception of weak signals is vastly improved.

**Clubs and Nets**

Should a v.h.f. net operate if the band to be used is open for DX during the time the net is scheduled to convene? This question often comes up, and it puts the NCS on the spot. Somebody is sure to object, whichever way he decides. As we see it, the answer depends on the nature of the net. If the operation is a RACES drill, there should be no question. It should take place on time, regardless of propagation conditions. If the net is a formal one, devoted primarily to emergency work, then it should be left with the NCS to decide whether conditions at net time warrant operation.

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If the net is informal, devoted mainly to general information exchange, we feel that it is up to the members of the net themselves to decide whether they want to stay with the net. A decision on policy should be made by vote of the participants, so that the NCS will know what to do. If the decision is to cancel net operation during DX openings, as a matter of general policy, then it should be left with the NCS to decide whether conditions at net time warrant cancellation. If so, he should make a transcript in to that effect to inform net members.

Such a net, if it is to operate regardless of propagation conditions, should have a net frequency that is above the DX portion of the band in question. There are too many nets operating at 50.4 or lower, for example. They have little chance of functioning successfully if the band is open, unless they move higher in the band. The situation is less critical on 144 Mc., but the basic idea still applies.

Something new in hidden stations was pulled on the unsuspecting members of the Milwaukee 6-Meter Net in a recent hunt. The hidden station was a Communicator, connected to one of the Milwaukee Police radio stations. 300 feet up in the air. Operators were W9FRS and W9FRS, her husband, who's call does not appear in the report we have. First hunter to brave the Police Station entrance was W9ESB, closely followed by W9ESB and K9IU.

The v.a., picnic season is coming up. Here are two such events scheduled for July: The Annual Turkey Run V.H.F., Picnic, an old-timer in the field, will be held July 27. Place, as always, is the Turkey Run State Park, near Terre Haute, Ind. This is a family affair, with fun for all. More information from W9ZHH, Bowling Green, Mo., will be the scene of a similar party July 13. Ed Porter, W9ZFE, says you're all invited.

The recently-organized Greater Cleveland 6-Meter Club is now providing code-practice sessions nightly, 1900 to 1930, on the net frequency, 50.85. Transmissions are made with tone modulation, for easy copy on all types of receivers.

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RESULTS: NINTH ANNUAL YL-OM CONTEST

Some 300 YLs and 1500 OMs participated in the YL-OM Contest sponsored by the Young Ladies Radio League the first and third week ends in March. Approximately 400 more OMs participated in this year’s contest than last year, while the number of YL contestants remained about the same as in 1957. One hundred-forty-nine phone logs and 120 c.w. logs were received from OMs (91 phone and 99 c.w. last year). Eighty-one phone logs and 51 c.w. logs were submitted by YLs (73 phone and 54 c.w. last year).

These figures represent logs received for scoring; numerous logs were submitted for checking purposes only.

YLRL Vice President and chief log-checker, Kay Anderson, W4BLR, concluded: “Scores

*YL Editor, QST. Please send all news notes to W1QON’s home address: 318 Fisher St., Walpole, Mass.

First place YL phone winner W5DRI, Dena Morgan, of Brookhaven, Mississippi, was second place phone scorer in last year’s YL-OM contest. She operated on several bands, using a B & W 5100 and a Collins 75A-3 receiver for a winning rig. Dena concluded that while she enjoyed the contest very much, she was glad when it was over because her OM, W5DQK, and her three children “fared too well without (her).” Last year Dena worked 133 countries on phone, and she has applied for DXCC.

Second place phone winner in the contest was one of our Alaskan YLs—KL7BHE, Sheila Goodhue of Anchorage. Licensed in 1954, Sheila does a lot of operating with WAC, WBE, YLCC, and has an application for DXCC to her credit. Her rig is a B & W 5100 and a 75A-4 with three element beams on 10 and 20 and a five element on 15 meters. Favored frequencies are 21,380 and 28,625 kc. Sheila and her OM, KL7PIV, drove 60 miles with their two young daughters to Portage Glacier to take this photo with “authentic Alaskan background.” Sheila’s handsome parka was made of Arctic squirrel, which she tells us the Eskimos call “sic-sic-puk.” Sheila operated in Dayton, Ohio, in 1955 as W8EBM, but she now hopes to be a permanent KL7.

Edith Viburg, W9WZL, of Milwaukee, was third place YL c.w. winner. Licensed in 1953 Edie is employed as a technician at Centralab. Excepting her NC-300 receiver, she has built all of her radio gear herself. She constructed her electronic keyer according to a Dec. ’54 QST article, and she uses a separate antenna on the receiver and keys the oscillator allowing full break-in operation. She uses a longwire for 40 and 80 meters and a vertical ground plane for 20 meters. Edie’s husband and daughter are “tolerant of ham radio, but they don’t share her enthusiasm.”

From the OMs — “My first contest was surprised to find such good YL operators on c.w.” — “The only time in the year that the ladies will talk to me” — “Couldn’t we...”
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* Denotes low power multiplier used
SPECIAL CITATIONS

Bouquets to W5KRJ, W5SYL, and W2RXJF who were recipients of Public Service Commendations issued in conjunction with the 1957 Edison Radio Amateur Award.

Pease Webb, W5KRJ, of Maplewood, La., was nominated for the award by MARS for her outstanding service during Hurricane Audrey which devastated parts of Louisiana last June. (OM K5BQT, James Harrington of Lake Charles, received the grand Edison award for his efforts in connection with the same storm.)

During 1957 Iva Haley of Grand Prairie, Texas, handled some 2800 QTCs and logged over 2500 hours of operating time. Following the Dallas tornado Iva and her OM, W5MTQ, relayed 1200 emergency messages during a thirty hour period, and following the tornadoes at Silverton and Tyler Iva served as control station for more emergency net operation.

Clara Reger, W2RUF, of Buffalo, N. Y. received a citation for her tireless efforts in the rehabilitation of a fourteen year-old boy who lost both arms when his antenna fell across a high voltage line. Clara lifted the youth from his extreme despondency by helping him prepare for a novice license, by sparking an extensive campaign which showered Lynn with QSLs, and by raising funds for a rig which he could work with his feet (see photo).

We can all be proud of these three YLs who contributed so heavily of their time and themselves to worthy causes without thought of remuneration of any kind. Unwittingly they personify the true ham spirit.

The following was originally published in the August 1917 issue of QST. Recently the extract appeared in the March 1958 issue of Hawk's Eye View, a monthly publication of the Hoosier Amateur Women's Club of Indiana. We think that time has made the piece entertaining enough to re-publish again.

YEs of the Washington Area Young Ladies Amateur Radio Club are checking every aspect of the coming ARRL National Convention to be held in August in scenic Washington. D. C. Ethel Smith, K4LMB, and Joan Thompson, KN3ABT, test conditions on two and ten meters in front of the nation's Capitol on famed Capitol Hill, and in the photo on the right Ethel and Joan and Beulah Barrick, W4DEE, and Camille Hedges, W3TSC, make further checks on operating portable on the steps of the Supreme Court Building. K4LMB is in charge of the XYL program for the convention, and KN3ABT is organizing a Fashion Show guaranteed to delight all feminine guests. W4DEE and W3TSC are assisting John DeBardeleben, W3CN, in his efforts as Chairman of all convention activities for YEs and XYLs. The big weekend is August 15th, 16th, and 17th. Convention headquarters will be the Sheraton Park Hotel. Make your reservations right away for what the committee hopes will be the biggest and best of all ARRL conventions.
although there are others who object to even this. We would not venture to make a suggestion in such a delicate matter, but just the same, we fully expect to hear it. This will sound pretty chummy, but in wireless where you cannot see the other person, and where you never expect that you will see them, and where formalities are more of a dead letter than in anything else we know of, it might be that calling an unknown lady, dear girl, might be taken all right.

Language will have to be improved a little bit because, “keep out, you big ham,” will not be exactly polite when the ladies are around. We never have had much profanity on the air, so this will go as it is, but we fully expect to see a general uplift throughout the fraternity when the ladies join us. Here’s to them, and it gives us great pleasure to extend the glad hand of fellowship when the happy day comes, and we will reopen.

PLANS MADE?

For Field Day, of course! The big week end of the year is coming up fast. June 28 and 29 are the dates. Don’t forget to send us a report of your activities — pictures, too.

1958 AWTAR

The Twelfth Annual All-Woman Transcontinental Air Race is scheduled for July 4-8 this year. Take-off will be from Montgomery Field, San Diego; contestants will cross the finish line at Charleston, South Carolina Municipal Airport. Chairman of the amateur net, set-up to aid the flyers at the start and terminus points and at each of the stop-over cities en route (Yuma, Tucson, El Paso, Midland, Abilene, Tyler, Jackson, Montgomery, and Macon) is Carolyn Current, W3GTC, of Norristown, Pa.
QSL BUREAUS OF THE WORLD

For delivery of your QSLs to foreign amateurs, simply mail cards direct to the bureau of the proper country, as listed below. Cards for territories and possessions not listed separately can be mailed to the bureau in the parent country: e.g., cards for French Cameroon (FE8) go to RE in France; cards for VDBs go to RSGB in England. W, K, VE and VO stations only may send foreign cards for which no bureau is listed to ARRL.

For service on incoming foreign cards, see list of domestic bureaus in most QSTs under "ARRL QSL Bureau."

Algeria: G. Deville, FAORW, Box 21, Maison-Carrée, Alger
Angola: L.A.R.A., P.O. Box 481, Luanda
Argentina: R.C.A., Carlos Calvo 1424, Buenos Aires
Australia: W.T.A., Box 2911 W, G.P.O., Melbourne
Australia: O.A, V.S.E, P.O. Box 15, Klosterneuburg, 2
Austria: via Fienrad
Bahamas: C. N. Albury, Telecommunications Dept., Nassau
Barbados: Arthur St. C. Former, Storch Gift, Brantons, Demers Road, St. Michael
Belgian Congo: OASIE P.O., Box 614, Jadotville
Belgium: U.B.A., Postbox 634, Brussels
Bermuda: R.B.S., P.O. Box 375, Hamilton
Bolivia: R.B.S., Casilla 2111, La Paz
Brazil: L.A.B.R.S., Caixa Postal 253, Rio de Janeiro
British Guiana: W. E. Young, YS3YG, Box 325, Georgetown
British Honduras: L. H. Alpucic, VPIHA, P.O. Box 1, El Cuyo
Bulgaria: Box 890, Sofia
Burma: Fift. Lt. Aung Myint, XZ20M, 800 Yat, Rangoon, Union of Burma, Asia
Canton Island: H. T. Johnson, KB6BA, U.S.P.O. 06-500, Canton Island, South Pacific
Cayman: P.O. Box 907, Colombo
Chile: Radio Club de Chile, Box 701, Santiago
Chita: M. T. Young, P.O. Box 10, Twichung, Formosa
Colombia: L.C.R.A., P.O. Box 581, Bogotá
Cook Islands: Ray Holloway, P.O. Box 65, Rarotonga
Costa Rica: Radio Club de Costa Rica, Box 2412, San Jose
Cuba: Radio Club de Cuba, QSL Bureau, Ayuntamiento, 2
Czechoslovakia: C.A.S., P.O. Box 69, Prague I
Cyprus: Mrs. E. Barrett, P.O. Box 219, Limassol
Czechoslovakia: C.A.S., P.O. Box 69, Limassol
Denmark: OZ2N(J, Borge Petersen, P.O. Box 335, Copenhagen
Djibouti: F.I.A.M., P.O. Box 2060, Asmara
Dominican Republic: YW1RA, Apartado Postal 555, Santo Domingo
Dominica: VP2GE, St. George
Dominican Republic: C.A.V., P.O. Box 69, Princess I
Dominica: OZ2NU, Borge Petersen, P.O. Box 335, Aalborg
Duvemien: VP2DA, Box 61 Roseau, Dominica, Windward Islands
Domenican Republic: Calle Duarte 766, C. Trujillo
East Africa: (VQ1, VQ3, VQ5, VQ3), P.O. Box 1313, Nairobi, Kenya Colony
Ecuador: Guayaquil Radio Club, Casilla 784, Guayaquil
El Salvador: R.T.S.A., QSL Bureau, 39 Booterstrasse Ave., Blackrock, Dublin, Ireland
Estonia: Telecommunications Amateur Radio Club, P.O. Box 1047, Addis Ababa
Fiji: S. J. Maine, VS, R.A. Victoria Paraed, Suva
Finland: SICL, Box 306, Helsinki
Formosa: Hong MAAG, APO 63, San Francisco, California
France: R.F.E, BP 26, Versailles (S & O)
Germany (DL2 cards only): Via Great Britain
Germany (DL4 cards only): DL4 QSL Bureau, Mars Radio, APO 12, New York
Germany (DL5 cards only): Via Great Britain
Germany (other than above): D.A.R.C., Box 99, Munich 27
Gibraltar: E. D. Willis, ZR8I, 9 Naval Hospital Road
Ghana: K. L. Lloyd, ZD4BL, Box 365, Kumasi Ashanti
Great Britain (and British Empire): A. M. Fenne, 29 Chelsea Gardens, Haye, Bromley, Kent
Greece: George Zaribas, P.O. Box 664, Athens
Greece (Unlisted SVs only): USAGC, APO 295, New York, N. Y.
Greenland: APO 958, Postmaster, New York, N. Y.
Greenland: VP2GO, St. George
Guam: G.R.A.L., Box 145, Agana, Guam, Marianas Islands
Guatemala: Guatemalan Amateur Radio Club, Box 32, NAS, Navy 115, F.P.O., New York, N. Y.
Guatemala: C.R.A.G., P.O. Box 115, Guatemala City
Haiti: Radio Club d'Haïti, Box 949, Port-au-Prince
Honduras: G. A. Troches, P.O. Box 214, Tegucigalpa, D. C.
Hong Kong: Hong Kong Amateur Radio Transmitting Society, P.O. Box 641, Hong Kong
Hungary: L.H.S.L., Postbox 185, Budapest 4
Iceland: Iselekrar Radio Amatorar, Box 1058, Reykjavik
India: P.O. Box 534, New Delhi
Indonesia: P.R.I., P.O. Box 222, Surabaja, Java
Ireland: L.A.C.M., P.O. Box 495, Tallaght
Italy: A.R.I., Viale Vittorio Veneto 12, Milano, Italy
Jamaica: Ruel Samuels, VP5RS, 31 Port Royal Street, Kingston
Japan: JARL, Box 377, Tokyo
Japan (KA): F.E.A.R.L., P.O. Box 111, APO 500, Postmaster, San Francisco, Calif.
Kenya: East Africa QSL Bureau, Box 1313, Nairobi
Kenya: Mr. Kwan Loo, Chief Engineer, Radio Supervisory Bureau, O.P.I.R.O.K. Seoul (ILZAM via ARRL)
Kuwait: William N. Burress, MHPKAC, % Kuwait Oil Co., Kuwait, Persian Gulf
Lebanon: H.R. B.P. 3245, Beyrouth
Libya: AM5TF, Box 372, Tripoli
Lichtenstein: via Switzerland
Luxembourg: G. Berger, 49 Rue Turen, Luxembourg
Macau: Via Hong Kong
Madagascar: P.O. Box 257, Antananarivo
Malaysia: QSL Manager, Box 777, Kuala Lumpur
Malta: R. F. Galea, ZB1E, "Casina Cusa," Railway Road, Birkirkara
Mauritius: V. de Robillard, Box 155, Port Louis
Mexico: L.M.E., Apartado Postal 907, Mexico, D.F.
Middle East: VP5M, Phosphate
Morocco: A.A.E.M., P.O. Box 2000, Casablanca
Morocco: (Tanger International Zone only) Box 150, Tangier
Montenegro: Ljubo J. Jurev. 10 Rue Treves, Luxembourg
Netherlands: V.E.R.O.N., Postbox 400, Rotterdam
Netherlands Antilles (Aruba) Box 539, San Nicolas, Curacao
Netherlands Antilles (Curacao) Postbox 383, Willemstad, Curacao
New Guinea: Via Papua
New Zealand: N.Z.A.R.C., P.O. Box 189, Wellington C1
Northern Rhodesia: N.R.A.R.S., P.O. Box 332, Kitwe
Norway: N.R.R.L., P.O. Box 888, Oslo
Okinawa: O.A.R.C., P.O. Box 739, APO 331, Postmaster San Francisco, Calif.
Pakistan: Box 1074, Karachi
Panama: Radio, Republic of: L.F.K.A., P.O. Box 1622, Panama
Paraguay: R.C.P., P.O. Box 512, Asuncion
Peru: P.O. Box 204, Port Moresby
Philipines: K. L. Lloyd, ZD4BL, Box 365, Kumasi Ashanti
Portugal: Rua de D. Pedro V., 7-4, Lisbon
Puerto Rico: R.A.L. B.P. 3245, Reynth
QSL for
How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

Most amateurs recognize that the purpose of radio call signs includes (1) installation and/or operator identification, (2) national designation, and (3) geographical indication. In h.f. DX work all three of these angles can be crucially important. We know this. But several overseas licensing authorities apparently do not, for in certain areas of the globe call signs are issued and reassigned in patterns of supreme ambiguity.

Regarding (3) we refer such unmindful powers-that-be to the Mauritius plan (last month's “Where” text) for an exemplary stride in the right direction. And reference (1) we reiterate our periodic appeal: Retire suffixes for at least one year, preferably longer, before reassigning them. We see no reason, for example, why newcomer Joe Doaks must inherit and fight off Slippery Smith's atrocious CJS1 réputation and operating notoriety; or why valuable CJSs for Uoaks must wind up at the forwarding address of Smith.

Further specific pleas should be obviated by one simple question which we put to licensing authorities throughout the world: Beyond mere official bookkeeping, do the amateur call signs you issue clearly fulfill their purpose?

Last month's “YL News and Views” presented interesting data concerning Les Girls vis-à-vis DX. We note that the 64 DXCC memberships won by 58 YLs includes none from Asia: also that W7QGF and W6CXC are sole in their call areas, with VE3DKY the lone Canadian Clubber.

The salient statistic, however, seems to be the actual quantity of ladies listed. Even the most conservative reference to total-YL-hams estimates appears to put this féminine DXCC representation far below par. Viz., the ratio of OMs to YLs in amateur radio certainly is not as great as 4500 (roughly the number of masculine DXCC diplomas extant) to 64! Which inevitably leads us to the disconcerting conclusion that our slick chicks are generally cool to the DX facet. Smatter, gals? What's with this nix-DX? Perhaps it's unmaidenly to burn the midnight oil or rise with the chickens to work Asia on 20. Or is it unladylike to elobber competition in the pile-ups? (No, it can't be that; we've seen you kids in action at fire sales.)

Field Day comes but once each year.
A dandy chance to show your gear!
— Al Fresco

Corny couplets to the contrary, may the sun shine bright on your own FD site this month during hambon's one annual all-encompassing operating activity which calls together DX men, traffic hounds, v.h.f. specialists, rag-chow artists, and what have you. Carpe diem — to the field!

It occurs to us that the “How's” readership might be interested in random DX-worked data filed by portables in this year's event. If convenient, rifflle through your outfit's archives and let Jeeves & Co. know how you make out in the line of continents and countries worked. Of course we know it's a sheer impossibility for ND congregations to QSO anything like, say, 100 differ- ent countries within the brief allotted operating time. Well — it is, isn't it?

What:

Anchors aweigh! Field Day time is DXpedition season, too, and our bands are rife with rumors of roaming, debulking samples would have HADW imminently off to San Marino; F8GC, ON4AU and others to Andorra as PX1FC; F7DL and others to the same place; F7WC to Trinidad Isl; W3TH to VP8RT, F5RT, F72MC and undisclosed destinations; TL2s V10P and VE3AIR to San Andreas; VE3AIR thence to St. Pierre; Y2182 to Zanzibar; W2s AQ and SRL to Seychelles; VE2VA/MM. to Aves Island, etc.; VS11HX & VB, to the Maldives; VU7BM et al., to Nepal; ZS9PI to 2287/80, H.A.0 to the HAM/3A hangout; KP1A1 to Navassa; SM8BYG to Trucial Oman; the usual W/K/VE congregates to the Caribbean circuit; and John Foster Duller, V1P, to Lord Howe Island or the Albatross. When? What bands and emissions? Where to QSL? Keep an ear on W1AW and consult your favorite crystal ball regularly. Meanwhile, to facts:

20 c.w., summer resort of lone DX tradition, is the subject of mail from WIs BIL TJO, W2s ATC IBV HALL, W3s LAX LOS (51/25 worked/confirmed), W48 CYY KFC UWA, 2, W5a CAN MY, W6s KG RLP (105/171), ZZ, W7s CSM DJU GVR VOB Y4Q, W8s HX (100/55), KEL, W9s ESB (214/106), KHC, K6s ESB ESB (253/106), K3a K1A RQC (52/51), UF, K6s HIG HPR IEX JOS MDJ MBB (560), PHY NJM, K5s AUF ESW, K6s CQF CTV QHC SJS SAA (115/57), TXA (130/100), YTC,
TF2WCC (W1ZMO) offers his Keflavik diggings as our QTH of the Month, typical of the scenery surrounding most of the TF2 gang. Bob transmits on several DX bands but derives much of his Hamming fun from monitoring activities on 150 meters where he consistently logs and tapes signals from three continents. (Photos via W1BB)
A scant 445 miles from the North Pole, this snug shack housed VE8AT on Ellesmere Island at 82°39′N–62°41′W until a few weeks ago. Earle now is back in comparable Whitehorse, relinquishing title as Canada’s Most Northerly Ham Station to VE8s ML and NS, both about 449 miles from the Pole. While on Ellesmere VE8AT tried his DX hand on 80 through 10 meters, also snooping a bit on 160 and 6, but traffic responsibilities command most of the operating time available to amateurs in the Far North.

Where:

South America — If you’ve been behind the door during 1958, I would be wise to check your PY7 QSLs prior to that date (except for the most dedicated schedule-keepers. Does it ever occur on 1.8-Mc, transpiring over the past few months. A rough season, but well done!

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CT2AI, Box 29, Ponta Delerada, Azores
DL2s AD ZX, HQ, 2TAF, Moennchen-Gladbach, Germany
ex-DL2Y (via RSGB)
ex-DL4WK, Maj. M. S. Arbogast, SFAAT Army Section, GT2AI, Box 29, Ponta Delerada, Azores
EL8D, ITSOM, State Dept. Mail Rm., Washington 25, D.C.
DL2s AD ZX, Hq. 2TAF, Moenchen-Gladbach, Germany
TIAZAM/ZA, Box 185, Budapest 4, Hungary
HA1KSA, Box 185, Budapest 4, Hungary
FF8AJ (via W2AYJ)
FD8DZ (via W4TYC)
ex-J8AAA-HL1AA-DL4LU, Lt. Col. G. M. Blencoe, Hq. IIDFD, CO, USA Missile Command, APO 221, New York, N. Y.
IIDFG, CG, USA SETAF, APO 108, New York, N. Y.
HH2DD (via W2LEJ)
IIDFE, Cmdr., 7227 Support Grp., APO 251, New York, N. Y.
IR1BL, Capt. Lady, c/o SAUSA Airlines, Tegudgalpa, Nepal
PYXGK, F. Serrano, Caixa Postal 5292, Rio de Janeiro, Brazil
KX6BY, Enyu Island Radio Club, Task Grp. 7.3, APO 187, San Francisco, Calif.
KX6BY, Enyu Island Radio Club, Task Grp. 7.3, APO 187, San Francisco, Calif.
KX6CA, M. E. Meredith, Jr., USCG Loran Sdn., EBEYE, Navy 824, FPO, San Francisco, Calif.
Q9KGF, Green Hornet, Cura Postal, Rio de Janeiro, Brasil
PY0NA (to PY1CK)
PB1AO, L. T. Zohm, P. O. Box 494, Paramaribo, Suriname
PB2RI, P. O. Box 12, Paramaribo, Suriname
ex-ST2ZD (to K4GIA)
eCS2ZK, P. O. Box 70, Paramaribo, Suriname
VE8NG, HAC's Room via Edmonton, Alta., Canada
VK3IF, Coober-Pedy Gnd. (via WIGPB)
VK9MK, P. O. Lorensen, Manus, T. N. G.
VK8NO (via WIA)
VP2GL, Box 11, St. George's, Grenada, B. W. I.
VP9OR, Capt. K. H. Hurley, 100th ABW (HEDRON), APO 856, New York, N. Y.
V03-4-5JO (to ZE3JO)

PY1CK, studying DX in this Fernando de Noronha schoolroom, passed his course summa cum laude by collecting some 800 QSOs with amateurs in 85 countries during a ten-day January stay. Kibitzer PY7SC, one of several amateurs permanently stationed on the island, appears here with Flavio's DX-100, Phillips receiver plus counter, and a handheld apparatus. PY1CK and other Brasilian DXpeditioners now work at activating Trindade Island, an even more remote volcanic speck on the Atlantic missile-testing range. (Photo via W1WPO and W0YFE/WOJU)

VR3O (to G3EMY or RSGB)
VP3P, TPGO PA7HO, Christmas, Line Islands via Honolulu, Hawaii, T. H.
VR3O (to G3DJHD)
VR3O, BPO 70, Fanning, Line Islands
VS1BB/V59 (to VS1BII)
VS5JE, BPAI Ltd., Seria, Brunei
W3PZWR/KO, R. Young, CAA, Canton, Phoenix 15, (or to W3PW)
W8OWT/K56, General Delivery, Wake Island
X61CPM (via K6KE) (to W4VX)
W9AY1 (to W4VX)
Yale, c/o BSWL, 86 Barrenger Rd., London N. 10, England
Z4A7DG, Box 19, Tirana, Albania
ZAIK7, Box 42, Tirana, Albania
ZCRS, Royal Marines, Married Quarters, St. Patrick's Bks., Malta
ZD3E (W 5a via W8EUR)
ZL1NG, T. H. Phillips, 7 Bannerman Rd., Grey Lynn, Auckland W. 2, N. Z.
ZS6FT/2Z8 (to ZS6FT)
AS7WB, W. Peetra, 7a Lewis Pl, Nazagombo, Ceylon
S4ATX, Box 496, Trippel, Liluy
S4ATK (via CR6MK)
W6A2Q (via RS9GB)

Whence:
Europe — Those new Hs with Yankee drawls are stirring a storm on DX bands this summer. Thanks to successful negotiations with the Italian government, our Southern European Task Force has licensed several installations in that country. W2a NVR ZSO, KCM1Z, W1WY, W2UX, W2TDR, K2RHY and K2NQ are among Italy-based beneficiaries. A maximum input of 300 watts is permitted on 30-40-36—3067, 7000-7410, 14,000-14,350, 21,000-21,150, 29,800-29,700 and 141,000-159,000 kc, W1EUD understands that for General and Advanced licenses, a man's first application for an Army-employed civies and tech-rep personnel for 11 operation — U.S.S.R. chams via UC2A2A, UB5DW and W1AN: There now are some 3800 Russian amateurs on short-wave bands and an additional 3500 using v.h.f. . . . Some calls signed by 'YLs are UAs IBM 1KAI 3CU 3IT 3KAM 3KKB (tK2A 9DA 0KAD MKSB, etc.) . . . Several call signs, with 9A and 9A5 are G3TFT (ex-YI3AA) writes WVDXC from Habana — G3.TFT (ex-YI3AA) writes WVDXC from Havana that a parley with service licensing authorities was successfully concluded in early 1958. Brian and another G for permits and hope to be issuing UX3AA and UX3DS, respectively, the former expecting to run 15 watts to a 5768 on most DX bands . . . W2CTO relays the...
The document appears to be a collection of various articles and updates about amateur radio activities, DXpeditions, and equipment. It includes references to specific locations, events, and radio equipment. Here is a summary of the key points:

- **Current 9K2AN operational routine**: 14,050, 14,070 or stopping in game reserves for several days at a time. It specializes in Statesiders on 28,178-kc., homing in respect to standard doublet, yagi beam, zepp, vertical and folded dipole in that order.

- **Two vociferous schools of thought on this procedure**. Collecting 10 contacts in March, many with W/Ks.

- **Amateurs abroad**: Three winners from each country and amateurs abroad, and vice versa.

- **One winner among the power levels while discriminating against over-500-foot.

- **Antennas**: As much wire as I can erect. This from the gangs directional CQs during the period.

- **October**: Visiting ZS8K's antenna farm, ZS8A/ZS8 kicked off the DXpedition season down Basutoland way by collecting 110 contacts in March.

- **Antenna**: Self-supplied, a two-h.p. generator for long DX work.

- **International**:地區 activities are nonexistent in some places and Paul tells me that on many occasions the only thing that never failed him was the gangs directional CQs.

- **Power**: Self-supplied, a two-h.p. generator for long DX work.

- **Enthusiasts**: Visiting ZS8K's antenna farm, ZS8A/ZS8 kicked off the DXpedition season down Basutoland way by collecting 110 contacts in March.

- **Antennas**: As much wire as I can erect. This from the gangs directional CQs during the period.

- **International**: 称謂活動 are nonexistent in some places and Paul tells me that on many occasions the only thing that never failed him was the gangs directional CQs.

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- **Power**: Self-supplied, a two-h.p. generator for long DX work.
The daily newspaper is often an excellent source for our file of Strays. One recent news story reported on a couple of Novices who worked daily with vacuum tube volunteers and other complex equipment, while in another paper there was offered for sale a 45 Wyatt amplifier.

On the other hand, sometimes we are the ones who are fooled by the terminology. One of last month's Strays joked about the fan that reportedly spread microwaves around in an oven. Well, by gosh, W1YLB and K8ERV have both written in to say that that is exactly what does happen. The fan is called a "stirrer" and its purpose is to reflect the microwave energy in many directions so that "hot" and "cold" spots are avoided.

W2CZX, of 109-14 139 St., Jamaica 35, N. Y., is trying to obtain some old W2EPM QSLs. Prior to 1942 this call was issued to Paul Pfeffer. Mr. Pfeffer's daughters would like the cards as souvenirs and W2CZX is helping.

ZL1MS reports a bit of phone nonsense he overheard one night. A ZL2 stood by with the remark that, "Well, OM, we'll say goodnight to you and your good wife—we are single here..."

K2GMZ successfully administered the Novice exam to the 80-year old father of W2ZS.

To celebrate British Columbia's 100th birthday this year, an expedition has been organized to climb Mount Fairweather. The call VE7BCC has been assigned to the expedition and VE7ALE is organizing communications. Besides the usual expedition communications, the station will be active on both phone and c.w. Contacts will be confirmed with a special Centennial QSL. Look for VE7BCC on the air between June 14 and July 13.

Now we have another claimant for the longest QSO of record. K2SVL says that he and K2UVM maintained contact for a solid even thirty hours on August 3-5, 1957, using two-meter phone.

Radio amateurs in Union, N. J., are helping to celebrate Union's Sesquicentennial by plenty of mention of the anniversary on the air. Special QSLs have been printed for 21 of the hams in town, and a ham station will be set up at the local high school during July as part of the general Sesquicentennial exhibit.

Hams who receive signals bounced off the moon by the U. S. Army Signal Engineering Laboratories, Fort Monmouth, N. J., and report them, get this acknowledgement card. The space-age method for tuning radios to satellite frequencies is part of the Project Vanguard program. The card was designed by W2KJR.
How Not to CQ. In one week of operating KN4TDN reports hearing a CQ sent in tortured code in four different ways... NNQ, KEQ, CMA and CGT. He writes, "It really would be most interesting if all operators could hear themselves as others hear them." Undoubtedly it would give us a more outstanding or utopian amateur radio too, at least some better fists!

All experienced amateurs have observed that such poorly spaced code is bound to draw many fewer replies. Operators with good fists as well as good stations are discriminating, value their time, and are looking for operators to work who have, through practice or experience, achieved a higher degree of operating proficiency than shown in such distortions of the intended calls or characters! May we suggest some private critiques in clubs and code groups in which we frankly tell each other which letters are incorrectly sent. Some tape recording and listening-back can help a fellow recognize some of his own defects also. We also suggest consulting those published dates of W1AW code runs when we follow designated QST text accurately. Rigging up an oscillator or buzzer to a hand key and trying to key in step with the W1AW tape as you listen can help a lot in overcoming the errors that must not become habits. Work on poor spacing and any characters not perfectly formed. Soon you will be sending clear and readable code. You will be surprised how clean sending can step up your number of contacts and results.

73. Originally published in a U. S. Naval Operations Bulletin, the following from April 1934 QST will answer many questions of current day amateurs about "73." "Many have often wondered where the telegraphers conventional signal of greeting, '73,' had its origin. It dates back to the early days of telegraphy. During the Civil War, Andrew Carnegie administered both the telegraphs and the railroads. Shortly after the war the Order of Military Telegraphers was organized. The members of this order had a fine 'esprit de corps,' During the Civil War, telegraphy was just as new as radio was during the World War and the operations of armies depended in a large measure upon the intelligent use of the telegraph. Upon Andrew Carnegie reaching the age of 73, the Order of Military Telegraphers gave him a testimonial dinner and from this the term '73' came into being as a symbol of good wishes."
reasonably good equipment, stable v.f.o.s making this desirable technique possible. Cultivating correct operator procedure to accomplish quick and accurate zero-beating is something to work for though!

The usual fault, we think, is in an operator's failure, when zero-beating, to first set his receiver to true ZERO with his antenna off the receiver. (To zero the transmitter with some audio frequency pleasing to the ear to copy but not first putting the receiver to the point where it is zeroed with the incoming signal, results in setting the transmitting frequency to that audio difference with the net frequency!). The Detroit Amateur Radio Association's QMN Bulletin humorously suggests the possible designation of a brand new Q signal (for netters that can't zero or QNZ the net frequency!) to indicate: I HAVE NOT USED A COHERER FOR SEVERAL YEARS AND YOUR SIGNALS ARE WELL OUTSIDE THE PASS BAND OF MY RECEIVER.

Got Your Worked All States Award? During 1957 ARRL issued 1452 WAS certificates. This represents an increase of 15 per cent on the year; interest was already at a high point. Working all states is a significant operating achievement. Practically all FCC licensees aspire to this award, and many amateurs in other countries additionally have their eye on it. The fact that 12 per cent of the certifications go to amateurs outside the United States and Canada is an indication of the growing interest of amateurs all over the world in working all the states for only about 28 per cent of the world's amateurs are in other countries. Some amateurs right at home take years to get the QSLs from the "more difficult" states such as Utah, Rhode Island or Delaware. On the other hand the more ardent newcomers sometimes make WAS by unremitting efforts during their first apprentice year.

Mixed-submissions of phone and c.w. cards may be presented for our award, or your work accomplished in one band or all bands may be submitted likewise for WAS. It is not necessary or desired that the work be accomplished on a single band or by a single mode. We occasionally on specific request type on the award a statement for all-phone or all 3.5 Mc. work, if such is the case and your cards indeed all show such confirming evidence. We never endorse that work was accomplished with a particular equipment, or specific power level or such things that obviously are either beyond our ability to check or in any case beyond the scope of the written evidence in any degree. Operating Aid No. 8 continues to be available as a form to assist in placing your states in alphabetical order when submitting the cards direct to ARRL for WAS.

Some pointers on submitting for WAS. There are a couple of points concerning WAS that we wanted especially to mention, to forestall numerous questions. A move of less than 25 miles comes under the definition of "one location" for WAS purposes. Cards received before and after a move within this limit may be used as confirmations. Novices whose call prefix changes on receiving their General Class tickets may submit QSLs received before and after this call change, as long as their work continues to go on from the same location.

To summarize, if you are versatile and use all bands and modes you will probably get your WAS much faster than if you insist on one kind of amateur radio only. Moving your station about is permitted within a 25-mile radius. It's best not to include any mobile work cards with your confirmations sent in for WAS; if you send such a card then you must certify where you were for that contact in proof that it comes within the 25 miles of your home station. While speaking of mobile, your capability to drive to your WAS, since it isn't the same achievement as earning one from your home location! A postmark may help identify a card not otherwise identified as to source or location by its originator. Postmarks, however, are not a requirement; much of the mail these days goes through QSL bureaus anyway. Before you send them in be sure your QSLs each have all necessary data on them to confirm a QSO. If you send us in 48 cards and some do not show your same call on each, you should, if you expect credit, explain the circumstances. Give the dates and locations when you used the calls involved, also straight-line distance between the two points, if work was not all from one residence or location. Good luck in going after your WAS, if you haven't this certificate in your shack.

W1AW Goes to 1820 kc. Because of the change in general use of the 160-meter amateur band due to its expanded use for Loran, W1AW has had to shift its operating frequency from 1885 kc. to 1820 kc. The full current W1AW schedule (page 100, May QST) could not reflect this, but for Official Bulletins, our 160-meter General Operating Period and Code Practice, look now for W1AW on 1820 kc.

Your comments on our proposal to discontinue sending Code Practice addressed to amateurs on this 1820-ke. frequency are requested. In view of a prospective increase in general amateur occupancy of this 160-band sector, and the ability of users of our tape-sent code-practice to receive W1AW on 3555 kc. and our other designated frequencies a further change is planned for June 30. W1AW will maintain the Bulletin Service to 160 users, but discontinue the hour of 1820 kc. practice normally starting at 2130 EST daily, effective June 30, unless a large number of users before then indicate the wish that it be continued.

### NATIONAL CALLING AND EMERGENCY FREQUENCIES (Kc.)

<table>
<thead>
<tr>
<th>Frequency</th>
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<tr>
<td>145,350</td>
<td>29,640</td>
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</tbody>
</table>
With the AREC

It is natural enough for civil defense officials to misunderstand the aims and purposes of RACES and to think that they have the right to use the RACES segments of the amateur bands in a manner entirely to suit their own aims and convenience. But when amateurs themselves begin to adopt the attitude that RACES is civil defense and not amateur radio, it is time that we begin to examine among ourselves just what RACES is, what it is for, why it was established and how it is supposed to work.

Perhaps the best way to conduct such an examination is to start out with a very basic question: What is amateur radio? Is it a mass of irresponsible hobbiests bent on their own enjoyment? Is it a training ground for operators and technicians, a place to get their feet wet until they can step into better things? Is it a military reserve of operators, technicians and frequencies? Is it a playground for persons commercially engaged in electronics? Is it a "no man's land" of personnel and frequencies ripe for exploitation by whoever can offer its occupants something that will attract them? Is it organized, unorganized or disorganized? Is it beneficial or inimical?

To some extent it is each of these. Who can deny that a great many amateurs are interested only in enjoying themselves? That many who start out as amateurs "graduate" to better things? That the military reserve aspect is a very important one in retention of the frequencies we use? That many commercial radio people get amateur tickets so they can "play around"? That many agencies exploit amateurs and amateur radio for their own selfish ends? That some of it is organized, some of it not organized, and some of it strictly ballad up? That in some respects it is beneficial both to amateur and the public, in some other respects inimical? That many who start out as amateurs "graduate" to better things? Is it a military reserve of operators, a place to get their feet wet until they can step into better things? Is it a playground for persons or organizations bent on using them commercially engaged in electronics? Is it a "no man's land" of personnel and frequencies ripe for exploitation by whoever can offer its occupants something that will attract them? Is it organized, unorganized or disorganized? Is it beneficial or inimical?

One thing is certain: that amateur radio is a service and must continue to be one if it is to continue to exist; that amateur radio exists at all only because it qualifies as a service; that it is governed by FCC regulations for the Amateur Service and by international documents that like-wise refer to it as such.

RACES was developed as a means for using the Amateur Service in civil defense communications. To a great extent we were already organized for emergency communications when RACES came into being; the RACES rules, in effect, permitted us to make our already-organized facilities available for civil defense purposes where they existed, or to organize and offer such facilities where they did not. RACES is amateur radio as much as it is civil defense radio. The most beneficial service is and can be performed where amateurs go to civil defense officials with the story of what they can do, rather than to have civil defense officials start rounding up amateurs in order that they might use them and their frequencies.

Two disturbing situations arisen in recent months have brought on above discussion. One is a case in which amateurs who are appointed radio officers by their civil defense directors are automatically appointed ECs. One amateur wrote to say that he had just received an EC certificate from his SCM, and what he wanted to know was: What is an EC? After all, he told us, his radio officer appointment was only a gimmick to allow his civil defense people to get RACES radio equipment under matching funds; presumably, he had no familiarity with emergency communication or any real expectancy to participate in it up to that time.

The other situation had to do with civil defense officials operating RACES mobile and fixed equipment outside of RACES drills, even though they had only third class operator permits, and with a proposal to use RACES amateur frequencies for triggering devices to sound sirens and other warning instruments. The disturbing thing about this was that although the amateur who called it to our attention deplored it, he also mentioned that some local amateurs not only condoned it but actually assisted in making it possible.

We have several observations to make. One is that since RACES is an amateur service (don't you forget it or allow anyone else to forget it) we have the same responsibility for self-policing in that part of amateur radio as we have in any other part, that is, regardless of who the offender is or what high position he may hold in local civil defense. The second is that we should resist creeping infiltration of amateur frequencies by persons or organizations bent on using them for purposes not within the intent of the amateur regulations. The third is that although amateur radio can and should become a valuable adjunct to civil defense communication, we should see that it remains amateur radio and not become entirely civil defense radio, facilities and equipment offered by the latter notwithstanding.

The fourth, somewhat unconnected with the above but nevertheless worth mentioning, is that RACES is not the only civil defense communication facility, not the only c.d. radio facility, and in a good many cases not even the principal c.d. radio facility. We have our place, and it is an important place, but many c.d. officials feel that they can get along very well without us until or unless we can convince them otherwise. So let's participate in this phase of our amateur service with patience and humility, but at the same time with pride in our own organizational status and ability.
and determination to see that this status is recognized and our regulations observed.

Hey, fellas, how about putting dates on things you send in? For this month's column we had to reject four emergency items because three of them said “recently” and the other one said “last Friday night” without any reference date. We'd like to have our writeups tell when, where, how, what and who. Phrases like “last Friday,” “yesterday” and “recently” may be all right for newspapers, but for QST we have to know the date for future reference purposes. Will you help us out? Tx.

Within minutes after a snarling tornado ripped through Coeckran, Ga., on January 24, amateurs began flashing word of the emergency to civil defense and Red Cross relief agencies. Since the winds had already knocked down telephone lines, the first word of the emergency was relayed by W4PIM and K4CZR of Atlanta. W4YWO/m was dispatched to the scene of the disaster, where he set up at the Coeckran police station and immediately began relaying requests for relief supplies and information on the damage done. The state civil defense director was advised of Coeckran’s needs via W4BKK. Other amateurs assisting included W4s TJH, YEK, CFJ, K4s KEC, K4CZR of Atlanta. W4VWO/m was dispatched to the scene at c.d. headquarters, W6AIL. was operated by W6AIL and W6LGW used emergency power at his Alamo QTH and W60HR (on 2 meters) and WGCGS were passed through to destinations despite some necessary relays, and many new operators “got their feet wet” in this first emergency experience. Thanks to W2HIX, county radio officer, whose ability made it possible to operate the whole airport, where the control station is located, on emergency power; and to W2SVV, who operated from his home despite a recent operation and was instrumental in locating operators for Ewing Township when it became impossible to make contact on the land line. Thanks to K211W for this report.

Just to keep active, AVEC and RACES units frequently participate in special activities in cooperation with or assistance to various civic agencies or police. Such activities are not only good for practice and morale, but also good publicity. We summarize, herewith, a few such exercises that have been reported to us.

Three groups participated in Hallowe'en patrols last October 31. In Rockford, Ill., the Rockford Six Meter Emergency Net assisted the Winnebago County Civil Defense authorities using six mobile units and the c.d. communications truck for a control station. Reporting direct to the sheriff from the truck’s unit on 47.5 Mc.; the amateur frequency was 50.7 Mc. In Wasco County, Ore., the Dalles Amateur Radio Club cooperated with local police authorities in “Operation Vandal,” this time expanding operations from last year to cover the whole county. A local police reserve officer rode in each amateur mobile unit to take care of any law enforcement problems, relying entirely on amateurs for radio communications. Six mobiles participated, and the amateur group also supplied equipment to a number of points that were normally without c.d. radio equipment. The Western Pennsylvania Mobiles, a ten-meter emergency group, assisted police in Oakmont Borough, Pa., in similar fashion. Nine amateurs used their own equipment and their own gasoline for the three-hour period, while two others manned the control station on 29,600 kc.
The Mobiilees’ secretary, W3JZU, received letters from the Oakmont police chief and the c.d. auxiliary police in appreciation of their services.

On January 30, for four hours in the evening the Miami Valley (Ohio) C.D. Authority RACES and AREC operators worked with the Dayton Amateur Radio Assn. to supply 34 mobile units to help speed up collection of polio contributions in a “porchlight parade” held in the area. C.D. headquarters was set up at the Miami Valley C.D. Auxiliary police in cooperation with the Oakmont police chief and the c.d. auxiliary police in the Oakmont area. A number of other amateurs also assisted.

Station W4EM was set up at the headquarters to control the operation.

The Mobiilees’ secretary, W3BUD, received letters from members representing 645 AREC members. This is an increase in AREC members as well. New sections heard from were R. I., Utah, Mmm., Mich., S. N. J., Wash., Mo., Ore., and Maritime. Sections reporting for the second time this year were San Francisco C.D. Auxiliary at San Francisco, Calif., San Anselmo Valley, Md.-Del.-D. C., Wis., Conn., E. Bay, Santa Clara Valley, Md.-Del.-D. C., Wis.

RACES News

W3BUD reports that they have talked for years about RACES in St. Mary’s County, Md., but now they’ve finally done something about it. Things came to a head when a delegation consisting of W3BCP, W3BUD and W3ZZK visited the C.D. director and asked him point blank if he intended using amateurs. When he replied in the affirmative they said, in effect, “Let’s stop fooling around and get going.” As a result, W3BUD got himself appointed C.D. Communications Officer, W3ZZK radio officer and W3BCP alternate c.d. officer, and they spent the next three weeks writing a communications plan and setting a dozen local amateurs interested. They now have a ten meter net in operation and the RACES plan is on its way to success. Civil Defense headquarters has a RACES station installed. W3ZZK is EC as well as RO.

W9PSP has sent us a map of the Illinois C.D. Amateur Radio Service, showing the locations of RACES station throughout the state, indicating target cities, control stations, and locations of stations in the Illinois Emergency Net. The receiving end just so you type it — provided a lot of things. If you punch a tape for transmitting a steady 60 w.p.m., you can be maintained, W9PSP alternates c.d. station was set up in the state into 13 RACES areas. It’s a very interesting and comprehensive study and represents the results of the first survey of RACES facilities throughout the state.

San Bruno, Calif., has entered a new phase in its c.d. planning with the election of a new civil defense director who is also City Manager. W6YVH is radio officer. A C D Radio Club has been formed and received the call letters K6PVJ. The San Bruno RACES plan was approved by the FCC on July 18, 1957.

The RACES group of Norfolk, Va., held an emergency drill on March 27, observed by officers and guests of the surrounding navy, coast guard, air force and army installations. The operation went off very smoothly, with net control on 28.7 Mc. and frequent check-ins from the state control situation in Richmond. The few bugs that popped up will quickly be ironed out.

TRAFFIC TOPICS

The mail these days brings pleas from zealots of s.s.b., RTTY and high-speed c.w. to push the use of these particular methods in handling traffic. While true that each has something to be said for it, there is a general increase in the use of voice communication. In many areas, traffic is handled on the voice net, with traffic gadgetry only used in emergency situations.

February SEC reports showed a great improvement over the January totals. Twenty-six reports were received, representing 6453 AREC members. This is an increase of 4 reports over the same month in 1957, and a small increase in AREC members as well. New sections heard from were R. I., Utah, Mmm., Mich., S. N. J., Wash., Mo., Ore., and Maritime. Sections reporting for the second time this year were San Francisco C.D. Auxiliary at San Francisco, Calif., San Anselmo Valley, Md.-Del.-D. C., Wis., Conn., E. Bay, Santa Clara Valley, Md.-Del.-D. C., Wis.

TRAFFIC TOPICS

June 14–15: V.H.F. QSO Party
June 23: CP Qualifying Run — W6OPW
June 28–29: Field Day
July 3: CP Qualifying Run — W6OPW
July 19–20: CD QSO Party (c.w.)
July 22: CP Qualifying Run — W6AW
July 26–27: CD QSO Party (phone)

Aug. 6: CP Qualifying Run — W6OPW
Aug. 20: CP Qualifying Run — W6OPW
Sept. 1: CP Qualifying Run — W6OPW
Sept. 17: Frequency Measuring Test
Sept. 18: CP Qualifying Run — W6AW
Sept. 20–21: V.H.F. QSO Party
There are levels of training, and each must be completed before one can go on to the next. This is axiomatic, and once you've in traffic college, and area nets and TCC are for graduate students. Code speeds get higher, procedure is based on the assumption that the operator already has experience with the basic fundamentals and is entering on a new, advanced phase of this work. An operator with such experience is apt to have a rough time. It is customary, when a beginner stumbles into a regional or area net, to give him prompt QNX in order that the net's business can proceed without delay. Often such a beginner is resentful of such high-handed procedure, so the NCS should drop him a card explaining that this is an advanced net and that it has a great deal of traffic to handle in a limited time, that no offense was intended. Suggest that he participate in his section traffic net, and send him (or ask us to send him) a copy of CD-24 and a net directory.

We don't recommend any codespeed minimum or maximum on NTS nets, but we do think that each NTS net should remember its mission and set its operation accordingly, both as to code speed and procedures.

| Net reports | North Texas Oklahoma Net reports 31 sessions, 1116 check-ins and a traffic total of 3130, Transcontinental Phone Net reports a traffic total of 6175, comprising 2563 for the First Call Area, 2094 for the Second Call Area and 918 for the Third Call Areas. Early results are as follows: Intercontinental Net reports 96 sessions and 2563 for the First Call Area, 2694 for the Second Call Area and 918 for the Third Call Area. Early results are as follows:

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<tr>
<th>Net</th>
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<th>Average rate (%)</th>
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</table>

Summary: 1450 20030 12.5 12.5 20050 12.1 100

1 Regional net representation based on one session per night. Others are based on two or more sessions per night.

- Section nets reporting: SCN (S.C.); SCN (Calif.): Iowa 75 Phone; BN & OSN (Ohio): S. Dak. 75 Phone & S. Dak. 40 Phone; CN & CPN (Conn.): OSN (N.J.): GSN (Ga.); STS (S. Texas): TCLCN (Iowa): NJN (N.J.): LLN (ILL): WSN (Wisconsin): ESNB, ENEP & AENT (Ala.): FN (Fla.); MSN, MJP & MSN (Minn.): KSN (Kans.): CWXN, SSSN, HNPN & COLo. Emory, Fort Worth, San Antonio, C.W.: QMN (Mich.): KNN BSN, KPN & KYN (Ky.).

- TCC functions reported, not counted as net sessions.

Another record-breaking month on NTS, despite lack of two regional net reports and one TCC report. Even for the record overall average-per-session, it is a bit back as far as 1950, the first year we recorded these statistics.

Smutty, K6DYX, puts out a neat little statistical bulletin and gap sheet for PAN each month. QRM from OM Cupid is offering W2XUX for his resignation as of Aug. 1; 2RN certificates have been issued to K2BRR, W2ZVW and K2BEA.

Teen-agers are the backbone of 3RN, with an average age of 15; W9s AFF CMN DTK GYP HIZ LXU and WIEK.

W4JHI has issued 4RN certificates to K6s 14AT JKK and KNP; watch 4RN representation increase with new crops from C.Z. and W.I. Effective May 1, 9RN sessions will be at 1700 and 2000 CST; net certificates have been awarded to K2WPC, K9GVD and K9GQI. ECN is getting new life from the VE1 boys.

Transcontinental Corps. The following stations have been issued TCC certificates for the Pacific Area as of Mar. 31:  

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage</th>
<th>Successful Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central</td>
<td>99</td>
<td>1508</td>
</tr>
<tr>
<td>Pacific</td>
<td>98</td>
<td>1525</td>
</tr>
</tbody>
</table>

- The total area traffic handle is 1538.

QST for W9PC, K9GVD and K9GQI. Nice going, guys and gals. These certificates don't come easy.
ELECTION NOTICE

(To all ARRL members residing in the Sections listed below.)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Section. The notice supersedes previous notices.

Nominations are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately preceding nomination.

Petitions must be in such form as to indicate the name of the Section, the name of the person nominated, the date of nomination, and the station call of the candidate. Petitions must be signed by five members of the Section, and must be accompanied by the signatures of five such members.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately preceding nomination.

The ballots mailed from Headquarters to full members will be in alphabetical order of the names of all eligible candidates. You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager
In the Ohio Section of the Great Lakes Division, Mr. Wilson E. Weckel, W8AL, and Mr. Charles C. Miller, W8JSU, were nominated. Mr. Weckel received 295 votes and Mr. Miller received 424 votes. Mr. Weckel’s term of office began March 5, 1958.

In the North Carolina Section of the Roanoke Division, Mr. R. W. Hiley Fowler, W4RRR, and Mr. Alfred Beauchamp Leonard, W4RXG, were nominated. Mr. Fowler received 255 votes and Mr. Leonard received 172 votes. Mr. Fowler’s term of office began March 6, 1958.

In the Tennessee Section of the Delta Division, Mr. R. W. Ingraham, WH110, and Mr. Harry C. Simpson, W4SCB, were nominated. Mr. Ingraham received 241 votes and Mr. Simpson received 216 votes. Mr. Ingraham’s term of office began April 13, 1958.

In the Washington Section of the Northwestern Division, Mr. Robert B. Thurston, W7PGY, and Mr. Howard S. Pyle, W70E, were nominated. Mr. Thurston received 248 votes and Mr. Pyle received 252 votes. Mr. Thurston’s term of office began April 30, 1958.

A.R.R.L. AFFILIATED CLUB HONOR ROLL

This month we’re proud to present the first '58 Honor Roll of those affiliated clubs whose entire membership consists of members of the League. Affiliates having 100 per cent ARRL membership are determined by consulting information incorporated in the club’s official Annual Report. An edition of QST Honor Roll will be published later this year. Clubs reporting the results of ARRL membership drives being conducted currently can then be included. Each club listed below will now receive as a special recognition a 100% ARRL Club certificate. Appropriate for display in the club rooms, this certification makes a permanent record of the high standing and membership record of the society.

Aeronautical Center Amateur Radio Club, Inc., Oklahoma City, Okla.
Amateur Radio Club of Central Missouri, Inc., Sedalia, Mo.
Central Kansas Radio Club, Inc., Salina, Kansas.
Crawford County Amateur Radio Association, Meadville, Pa.
The DX Club, Lansdale, Pa.
The Fifty Club of California, Los Angeles, Calif.
Graduate County Amateur Radio Club, Alma, Mich.
Jacksonville Amateur Radio Society, Jacksonville, Fla.
Kerrville Radio Club, Kerrville, Texas.
Marathon Amateur Radio Club, Marathon, N. Y.
Mau Mau Amateur Radio Club, Kailuaui, Maui, T. H.
Norfolk County Radio Association, Norwood, Mass.
Northwest St. Louis Amateur Radio Club, Inc., Florissant, Mo.
Orange Amateur Radio Club, Inc., Orange, Tex.
Order of Boiled Owls, Lovington, N. Y.
Pacifico Radio Club, Los Angeles, Calif.
Pickens County Amateur Radio Assn., Inc., Easley, S. C.
Kappahannock Valley Radio Club, Fredericksburg, Va.
St. Louis Amateur Radio Club, Inc., St. Louis, Mo.
South Bay Amateur Radio Society, Chula Vista, Calif.
South Lyne Beer, Chowder and Propagation Society, South Lyme, Conn.
Southwest Missouri Amateur Radio Club, Inc., Springfield, Mo.
South Line Radio Club of New York and New Jersey, Upper Saddle River, N. J.
Tehama County Radio Club, Red Bluff, Calif.
The Totoh Amateur Radio Club, Farmington, N. M.
Windblowers V.H.F. Society, Saddle Brook, N. J.

CLUB COUNCILS AND FEDERATIONS

Affiliated Council of Amateur Radio Clubs, Ron Mayer, W7NGW, Secy., P.O. Box 1335, Portland 7, Ore.


FEBRUARY FREQUENCY MEASURING TEST RESULTS

The FMT of February 14, open to ARRL Official Observers and other amateurs alike, brought entries from 238 participants who made a total of 1033 measurements: 127 entries came from OOs and 111 from non-Observers. Everyone taking part has already received an individual report comparing the accuracy of his measurements of the special W1AW transmissions with those of a professional frequency-measuring laboratory.

The standings of the leaders are given below. Decimal fractions are shown only to establish an order of listing, because the official readings can be accredited only to 0.4 parts per millions.

The following ratings are based on a single measurement: OO — W7PGY 0.1, Non-OO — K6RTD 0.1.

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 W1AW will be made on June 20 at 21:00 Eastern Daylight Saving Time. Ideal texts will be sent simultaneously by automatic transmitters on 1820, 3555, 7080, 14.100, 21.010, 28.060, 50.900 and 114.000 kc. The next qualifying run from WGOWP will only be transmitted on June 4 at 2100 PDST on 3590 and 7590 kc.

Any person can 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 six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. Your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening at 2100 EDST. Approximately 10 minutes' practice is given at each speed. Reference to texts used on several of the transmissions are given below. These make it possible to check your copy. For practice purposes, the order of words in each line of QST text sometimes is reversed. To improve your list, hook up your own key and audio oscillator and attempt to send in step with W1AW.

Date Subject of Practice Text from April QST
June 3: Checking Transistor . . . , p. 20
June 6: A Half-Site Ground-Plane . . . . , p. 28
June 9: A 90-Mr. Station for the Beginner, p. 30
June 12: Optimum Stacking Spacing . . . , p. 40

QST for
In the recent Federation of British Territories in the Caribbean, and with the desire to update the Countries List and bring it into line with the published criteria, the following changes to the ARRL Countries List are hereewith announced. These changes will be effective as of June 1, 1958.

June 1, 1958 will be credited on the basis of the ARRL Countries List in effect prior to June 1, 1958.

Contacts made with stations in what was previously Leewards and Windwards will be credited on the following basis. If credit has already been given for a station in the Leewards, further credit cannot be given for that particular island. For example, if Leewards credit was claimed with VP2MY in Montserrat, no further credit can be claimed for Montserrat. A credit given for VP2LT on St. Lucia toward Windwards will count as St. Lucia and no further credit can be claimed for St. Lucia. On the other hand, a contact with VP2KM made on June 1, 1958, or after, can be claimed as credit for St. Kitts or a contact with VP2GC made on June 1, 1958, or after, can be claimed as credit for Grenada.

Contacts made with Caymans prior to June 1, 1958 will continue to be credited as separate from Jamaica. Contacts made with Caymans June 1, 1958 and later will count the same as Jamaica.

DO NOT submit confirmations for these changes before August 1, 1958. Confirmations received for credit with respect to these changes before August 1, 1958 will be returned without credit.

**DX CENTURY CLUB AWARDS**

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<th>HONOR ROLL</th>
<th>Radiotelephone</th>
<th>ENDORSEMENTS</th>
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<tr>
<td>W6GCI, 201</td>
<td>W7GMB, 70</td>
<td>W5AE, 214</td>
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<tr>
<td>W7GNO, 139</td>
<td>W5JH, 138</td>
<td>W6CAE, 213</td>
</tr>
<tr>
<td>W5GJ, 134</td>
<td>W7GMB, 212</td>
<td>W6CAU, 213</td>
</tr>
<tr>
<td>W8GCI, 134</td>
<td>W8GCI, 212</td>
<td>W5BE, 213</td>
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*Note: The above list is a partial representation of the DX Century Club Awards and Endorsements.*
• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCM for inclusion in Local News. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—Richard B. Mestrovich, W3JNG—SEC: DVB, RM: PDI, PAM: TEJ. The PIF meets on 3280 kc. at 1800 Mon. through Fri. The E. Pa. CWY. Net meets on 3610 kc. at 1830 Mon. and 2200 Wed., Fri., and Sat., with RM: PDI as RM. (YAz retired because of impending school-teaching and/or Army.) Appointments: WXX, Secy.-treas.; ORS, Epic on Columbia County EC, BUR as Bucks County EC. I am sure the rest of the gang join the SCM in wishing YAZ the best. PAM asked if RM: BES reported that when he attempted to lower his 80-meter wire recently, the weight was so great that it lifted him off the ground. New Officers are: LKC, prez.; KTV, vice-pres.; OTY, secy.; HXX, treas.; RJL and K2BBC, directors; K2JJ, publicity. CMN received his WAS certificate, while new arrival, K2WW has a new SQV XZY but our four-tetlement 20-meter beam. IMN received W-Del. certificate No. 100, NV reports that the Delaware-Lehigh ARC had a good meeting complete with an FCC inspector, GYP on 7 Mc., only because of receiver troubles, but has worked some DX and has QST. PAM is about to start a DXCC from Florida during the snow. New officers of the Abington ARC (Clarks Summit) are CWV, pres.; QDQ, vice-pres.; HKX, secy.-treas. NNRs operating time is cut down by night work. KN3ASH and KN3BKT took the General Class exam on the same day and passed. KN3DJU gets on the air with a bang, using an NC-300 and a Ranger. PDI broke away from traffic, working DX for the first time. KN3ANS reports that his station is now completely relay operated. New officers of the West Branch ARA are KDK, prez.; RGB, vice-pres.; TJJ, secy.-treas.; K2JJ, K2IUI, K2MID, directors; W32IU, public relations. CMN, has completed his club house, has a new HQ-110 and uses the call AVK. ZKQ reports the forming of the Anthracite Wireless Transmission Society was born. On Mar. 15 the 2nd and 3rd sections of the DSMC met and enjoyed meeting with the Kent Oo., guest speaker at the Kent Oo., ARC on Mar. 11 and spoke on "Getting Publicity for Your Club." TJCR was being a guest speaker at the AAARC on Mar. 6, and Montgomery Oo., EC. I am sure the test of the gang join the SCM. An amendment after Jan. 1, 1957. The 100 confirmations are 87N, pres.; 4YW, vice-pres.; EHE, secy.; K2BDD, corr.-treas.; K2BDB, the MC, TG, and the Founding of the Foundation of Radio Amateur Clubs selected ECP, pres.; NL, 2nd vice-pres.; G2Z, senior vice-pres. and elected YVF, 1st vice-pres.; REH, 2nd vice-pres.; M2MS, pres.; CRK, sr. vice-pres.; P3Z, jr. vice-pres.; YAG, secy.; FWP, treas. The Antietam RA's new club bulletin is FWP. PAM on Johnson Is. for 2 years and is /KB5 until a call is assigned. Dick is working 20- and 15-meter cw. He schedules WZ (his dad) in Delaware. BZJ, K2AAR, has joined the club and is working 80 and 40-meter cw. and is on 28, 10 and 15 meters, building antennas for a BPL medallion with his third BPL. UE made K2TID as Secy. for the new committee, and two three-element beams on 15 meters. CCB and 4EKO/3 are taking 4 meters seriously and have built a 4-meter Yagi, and reports a 3-meter call for FYS. CCB is now a Corresponding Secretary and a member of the new three-element beam on 15 meters. CCB and 4EKO/3 are taking 4 meters seriously and have built a 4-meter Yagi, and reports a 3-meter call for FYS. CCB is now a Corresponding Secretary and a member of the new three-element beam on 15 meters. CCB and 4EKO/3 are taking 4 meters seriously and have built a 4-meter Yagi, and reports a 3-meter call for FYS. CCB is now a Corresponding Secretary and a member of the new three-element beam on 15 meters.
RESEARCH
AND AMATEUR RADIO

Many of our amateur radio friends don’t realize the wide research and development activities that the Hallicrafters Company has been engaged in for a good number of years. We are not in a position to disclose many of these developments because they have to do with government projects. However, let’s consider some of the interesting ones which we can discuss.

Obviously, a majority are somewhat removed from immediate application in amateur communications, but their corollary uses soon may be seen. For example, the disposal of heat in electronic gear is always a problem. We currently are manufacturing special liquid cooled heat exchangers which are highly efficient and lightweight. If you would like, those kilowatts that now heat up your shack can be dissipated quite easily by mechanical means.

It also is interesting to note that Hallicrafters has a specialized antenna design group, equipped with the latest laboratory gear, that devotes all its time to the design and testing of new types of antennas. It is quite conceivable that some day a number of their developments may be instrumental in obtaining better radio transmission, and reception.

One of the most intriguing laboratories at Hallicrafters is the complete and separate environmental section where testing of components over long periods of time, at maximum extremes of high acceleration, vibration, temperature changes and humidity is carried out. The information learned here, daily, assures better equipment tomorrow.

Another fact we think you’ll find interesting concerns a series of “black boxes” Hallicrafters is producing. The “outputs” of these boxes can be fed into radar systems to simulate unlimited target or interference conditions. These “simulators” are being widely used today for training radar personnel as well as for testing new and extremely complex electronic devices.

Accurate clock time, independent of vertical speed position or altitude, is mandatory under many specialized conditions. Hallicrafters has these clocks in operation, fully transistorized.

As previously stated, the direct benefits of these new products to the amateur field may not be apparent at first glance. However, consider the wide experience in engineering and production that our engineers gain in evolving these complex items. The results can be seen best in the transistor techniques of the first fully transistorized, all ham band receiver, with associated S.S.B. transmitter, which Hallicrafters has just recently demonstrated. Only two tubes are in the whole unit. And we can assure you better things are on the horizon.

Peter A. Rieke, K8HHY, of Cincinnati, Ohio was the winner of the Hallicrafters Single Sideband Contest. We are using this opportunity to tell all hams, since a number of recent letters indicates some hams never received this information.

73,
Fritz Franke

Advertisement
All of these licensed radio amateurs make important contributions to the Heath line of fine ham kits. In a sense, they are your personal representatives within the company, because their design ideas and performance preferences reflect not only their own "on-the-air" experiences, but those of the amateur fraternity with which they are in constant contact. With this kind of representation in Benton Harbor, you can continue to rely on high-performance Heathkit amateur radio equipment designed by hams, for hams!

HEATH hams work to bring you

HEATHKIT 50-WATT CW TRANSMITTER KIT

MODEL DX-20
$35.95

If high efficiency at low cost in a CW transmitter interests you, you should be using a DX-20! It employs a single 6DQ6A tube in the final Amplifier stage for plate power input of 50 watts. The oscillator stage is a 6CL6, and the rectifier is a 5U4GB. Single-knob band-switching is featured to cover 80, 40, 20, 15, 11 and 10 meters, and a pi network output circuit matches antenna impedances between 50 and 1000 ohms to reduce harmonic output. Designed for the novice as well as the advanced class CW operator, the transmitter is actually fun to build, even for a beginner, with complete step-by-step instructions and pictorial diagrams. All the parts are top-quality and well rated for their application. "Potted" transformers, copper-plated chassis, and ceramic switch insulation are typical. Mechanical and electrical construction is such that TVI problems are minimized. If you desire a good clean CW signal, this is the transmitter for you! Shpg. Wt. 19 lbs.
HEATHKIT "APACHE" HAM TRANSMITTER KIT

- Newly Designed VFO—Provision For S.S.B. Adapter
- Modern Styling—Rotating Slide Rule Dial

MODEL TX-1 $229.50

Fresh out of the Heath Company laboratories, the brand-new "Apache" model TX-1 Ham Transmitter features modern styling and is designed as a handsome companion to the also-new Heathkit "Mohawk" receiver. The "Apache" is a high quality transmitter operating with 150 watt phone input and 180 watt CW input. In addition to CW and phone operation, the "Apache" features built-in switch select circuitry providing for single-sideband transmission through the use of an SSB adapter. These Heathkit adapters will be available in the near future. A compact, stable and completely redesigned VFO provides low drift frequency control necessary for single-sideband transmission. An easy-to-read slide rule type illuminated rotating VFO dial with vernier tuning provides simple bandspread and precise frequency setting. Simple band-switching control allows flip-of-the-wrist selection of the amateur bands on 80, 40, 20, 15 and 10 meters (11 M with crystal control). The "Apache" features adjustable low level speech clipping and a low distortion modulator stage employing two of the new 6CA7/EL-34 tubes in push-pull class AB operation. Time sequence keying is provided for "chirpless" break-in CW operation.

...top quality at lowest prices!

HEATHKIT "MOHAWK" HAM RECEIVER KIT

- All Critical Circuits Prewired and Aligned
- Crystal Controlled Oscillators for Drift-Free Reception

MODEL RX-1 $274.95

Outstanding results can be expected with the new "Mohawk" receiver which is designed to combine all the necessary functions required in a high quality communications receiver. A perfect companion for the Heathkit "Apache" transmitter, the "Mohawk" features the same wide-band slide rule type vernier tuning and covers all of the amateur bands from 160 through 10 meters on seven bands with an extra band calibrated to cover 6 and 2 meters using a converter. External receiver powered, accommodations are available for these converters which will be available in Heathkit's soon. The "Mohawk" is specially designed for single-sideband reception with crystal controlled oscillators for upper and lower sideband selection. A completely preassembled, wired and aligned front end assures ease of assembly. All critical wiring is done for you to insure top performance. This 15-tube receiver features double conversion with IF's at 1682 kc and 50 kc. Five selectivity positions from 5 kc to 500 CPS. A bridged T-notch filter is employed for maximum heterodyne rejection. Complete accuracy is obtained with the use of a built-in 100 kc crystal calibrator and the set features 10 db signal-to-noise ratio at less than 1 microvolt input. S-meter and many other fine features built-in for top-notch signal reception. Shpg. Wt. 90 lbs.
HEATHKIT PHONE & CW TRANSMITTER KIT

The DX-40 incorporates the same high quality and stability as the DX-100, but is a lower powered rig for crystal operation, or for use with an external VFO. Plate power input is 75 watts on CW, permitting the novice to utilize maximum power. An efficient, control-carrier modulator for phone operation peaks up to 60-watts, so that the rig has tremendous appeal to the general class operator also. Single-knob switching covers 80, 40, 20, 15, 11 and 10 meters. PI network output coupling makes for easy antenna loading, and PI network interstage coupling between the buffer and final amplifier improves stability and attenuates harmonics. A line filter is incorporated for power line isolation. The efficient oscillator and buffer circuits provide adequate drive to the 6146 final amplifier from 80 to 10 meters, even with an 80-meter crystal. A drive control adjustment is provided, and the function switch incorporates an extra "tune" position so that the buffer stage can be pre-tuned before the final is switched on. A switch selects any of three crystals, or a jack for external VFO. High quality D’Arsonval meter for tuning. Shpg. Wt. 26 lbs.

HEATHKIT DX-100 PHONE & CW TRANSMITTER KIT

Model DX-100

You get more for your transmitter dollar when you decide on a DX-100 for your ham shack! Recognized as a leader in its power class, the DX-100 offers such features as a built-in VFO, built-in modulator, TVI suppression, PI network output coupling to match a variety of antenna impedances from 50 to 600 ohms, PI network interstage coupling, and high quality materials throughout. Copper plated 16-gauge steel chassis, ceramic switch contacts, etc., are typical of the kind of parts you get, in assembling this fine rig. The DX-100 covers 160, 80, 40, 20, 15, 11 and 10 meters with a single band-switch, and with VFO or crystal operation on all bands. RF output is in excess of 100 watts on phone and 120 watts on CW, with a pair of 6146 tubes in parallel for the final amplifier, modulated by a pair of 1625 tubes in parallel. VFO tuning dial and panel meter are both illuminated for easy reading, even under subdued lighting conditions. Attractive front panel and case styling is completely functional, for operating convenience. Designed exclusively for easy step-by-step assembly. No other transmitter in this power class combines high quality and real economy so effectively. Here is a transmitter that you will be proud to own. Time payments are available! Shpg. Wt. 107 lbs.

more fine ham gear from the pioneer

HEATHKIT GRID DIP METER KIT

A Grid Dip Meter is basically an RF Oscillator used to determine the frequency of other Oscillators, or tuned circuits. Numerous other applications such as pre-tuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, designing new coils, etc. Features continuous frequency coverage from 2 MC to 250 MC, with a complete set of prewound coils, and a 500 ua panel meter. Has sensitivity control and a phone jack for listening to the "Zero-Beat". It will also double as an absorption-type wave meter. Shpg. Wt. 4 lbs. Low frequency coil kit: two extra plug-in coils extend frequency coverage down to 350 KC. Shpg. Wt. 1 lb. No. 341-A $3.00

HEATHCOMPANY  A Subsidiary of Daystrom, Inc.

BENTON HARBOR 9, MICHIGAN

102
HEATHKIT ALL-BAND COMMUNICATIONS-
TYPE RECEIVER KIT

Ideal for the short wave listener or beginning amateur, this Receiver covers 550 KC through 30 MC in four bands. It provides good sensitivity and selectivity, combined with fine image rejection. Amateur bands are clearly marked on the illuminated dial scale. Features transformer type—power supply—electrical band spread—antenna trimmer—separate RF and AF gain controls—noise limiter—Internal 5½” speaker—head phone jack and AGC. Has built-in BFO for CW reception. An accessory power socket is also provided for connecting the Heathkit model OF-1 Q Multiplier. Will supply 250 VDC at 15 ma and 12.6 VAC at 300 ma. Shpg. Wt. 12 lbs.

Cabinet: Fabric covered cabinet with aluminum panel as shown part 91-15A. Shpg. Wt. 5 lbs.

MODEL AR-3 $29.95

HEATHKIT ELECTRONIC VOICE
CONTROL KIT

Here is a new and exciting kit that will add greatly to your enjoyment in the ham shack. Allows you to switch from Receiver to Transmitter merely by talking into your microphone. Lets you operate “break-in” with any ordinary AM transmitter. A terminal strip is provided for Receiver and speaker connections and also for a 117 volt antenna relay. Unit is adjustable to all conditions by sensitivity and gain controls provided. Easy to build with complete instructions provided. Requires no transmitter or Receiver alterations to operate. Shpg. Wt. 5 lbs.

MODEL VX-1 $23.95

HEATHKIT "Q" MULTIPLIER KIT

This fine Q Multiplier is a worthwhile addition to any communications, or Broadcast Receiver. It provides additional selectivity for separating signals, or will reject one signal and eliminate a heterodyne. Functions with any AM Receiver having an IF frequency between 450 and 460 KC that is not AC-DC type. Operates from your Receiver power supply, and requires only 6.3 VAC at 300 ma (or 12.6 VAC at 150 ma), and 150 to 250 VDC at 2 ma. Simple to connect with cable and plugs supplied. Effective Q of approximately 4000 for sharp “peak” or “null”. A tremendous help on crowded phone or CW bands. Shpg. Wt. 3 lbs.

MODEL QF-1 $9.95

NOTE: $10.65 WHEN ORDERED WITH
AR-3 BECAUSE OF EXCISE TAX.

...in do-it-yourself electronics!

HEATHKIT “AUTOMATIC” CONELRAD
ALARM KIT

Designed to give instant warning whenever a monitored station goes off the air, the CA-1 automatically cuts the AC power to your transmitter, and lights a red indicator. Works with any radio receiver; AC-DC—transformer operated—battery powered, so long as the receiver has AVC. A manual “reset” button is provided to reactivate the transmitter. Incorporates a heavy-duty 6-ampere relay, a thyratron tube, and its own built-in power supply. A neon lamp shows that the alarm is working. Simple to install and connect with complete instructions provided for assembly and operation. Shpg. Wt. 4 lbs.

MODEL CA-1 $13.95

"AUTOMATIC"
CONELRAD ALARM
HEATHKIT VARIABLE FREQUENCY OSCILLATOR KIT

Enjoy the convenience and flexibility of VFO operation by obtaining this fine variable frequency oscillator. It covers 160-80-40-20-15-11 and 10 meters with three basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Requires 250 volts DC at 15 to 20 ma, and 6.3 VAC at 0.45 a, available on most transmitters. It features voltage regulation for frequency stability, and has illuminated frequency dial. VFO operation allows you to move out from under interference and select the portion of the band you want to use without having to be tied down to only 2 or 3 frequencies through the use of crystals. "Zero in" on the other fellow's signal and return his CQ on his own frequency! Shpg. Wt. 7 lbs.

MODEL VF-1 $19.50

HEATHKIT REFLECTED POWER METER KIT

A necessity in every well equipped ham shack, the model AM-2 lets you check the match of the antenna transmission system, by measuring the forward and reflected power or standing wave ratio. Handles up to one kilowatt of energy on all bands from 160 to 2 meters, and may be left in the antenna system feed line at all times. Input and output impedances for 50 or 75 ohm lines. No external power required for operation. Meter indicates percentage forward and reflected power, and standing wave ratio from 1:1 to 6:1. Shpg. Wt. 3 lbs.

MODEL AM-2 $15.95

HEATHKIT BALUN COIL KIT

This convenient transmitter accessory has the capability of matching unbalanced coax lines, used on most modern transmitters, to balanced lines of either 75 or 300 ohms impedance. Design of the bifilar wound Balun Coils will enable transmitters with unbalanced output to operate into balanced transmission line, such as used with dipoles, folded dipoles or any balanced antenna system. Can be used with transmitters and Receivers without adjustment over the frequency range of 80 through 10 meters. Will handle power inputs up to 200 watts. Shpg. Wt. 4 lbs.

MODEL B-1 $8.95

save 1/2 or more . . . with HEATHKITS

HEATH COMPANY
BENTON HARBOR 9, MICH. a subsidiary of Daystrom, Inc.

Send for this Free informative catalog listing our entire line of kits, with complete schematics and specifications.

$1.00 enclosed. Parcel post, include postage—express orders are sent shipping charges collect. All prices quoted are Net F.O.B. Benton Harbor, Mich. and apply to Continental U.S. and Possessions only. All prices and specifications subject to change without notice.
For Shack—Hill—or High Water

MALLORY Means Dependability...

A rig's got to work right—whether it's in the shack, on your favorite field-day hilltop, or part of your emergency gear. There is no compromise for dependability.

Mallory's years of experience in the manufacturing of electronic components has given them the know-how to manufacture parts that are known for dependability.

Take vibrators, for example—Mallory research and design have produced new vibrator contacts that result in up to 100% longer life, reduced arcing and mechanical noise, and fast starting.

Mallory FP capacitors, for service up to 500 working volts—DC, are the only capacitors to feature etched cathodes and fabricated plates for longer life at rated capacity—even under the toughest conditions. The complete line of Mallory transmitting capacitors, for filter, bypass and coupling service, are standards for design and replacement wherever quality and dependability count.

A Mallory Precision Components Catalog ought to be a permanent part of your reference file. You can get a copy by asking your Mallory Distributor—or by dropping a QSL to the Mallory Hamshack, P. O. Box 1558, Indianapolis 6, Indiana.
ASK ONE OF THESE DISTRIBUTORS ABOUT...

hallicrafters "2 and 6"

SR-34
two and six meter transmitter/receiver

CALIFORNIA:
Berkeley: Electronics Supplying
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Valley Electronic Supply Co.,
Culver City:
Bill Thompson Radio Supply Division
El Monte: Kimball & Stark
Hemet: Gil Severs Amateur Dist.
Long Beach: Scott Radio Supply
Los Angeles:
Henry Radio
Radio Products Sales
Oakland: Elmar Electronics
Palo Alto: Zack Radio Supply Co.
San Diego: Radio Parts Co.
San Francisco:
North California Amateur Supply
San Francisco Radio & Supply Co.
Zack Radio Supply Company
COLORADO:
Denver: Radio Product Sales Co.
CONNECTICUT:
Hartford: Hatry of Hartford, Inc
DELAWARE:
Wilmington:
Radio Electric Co., of Del., Inc
DISTRICT OF COLUMBIA:
Washington, D.C.:
Electronic Wholesaler, Inc.
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Miami: Electronic Supply
Tampa: Kibbey Radio Supply Inc.
ILLINOIS:
Chicago:
Allied Radio Corp.
Newark Electric Co.
Genoa: Crawfords Hardware
Peoria: Selectronics Supply Inc.
INDIANA:
Fort Wayne:
Warren Radio Co.
Indianapolis:
Graham Electronic Supply, Inc.
IOWA:
Council Bluffs:
World Radio Laboratories, Inc.
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Toledo: Selectronics Supplies, Inc.
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McKeansport: Barno Radio Co.
Philadelphia: Radio Electric Service Co.
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Wilkes-Barre: Shilborne Electronics, Inc.
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Houston:
Bussecker Electronic Equipment Co., Inc.
San Antonio: Modern Electronics Company
Victoria: Lavender Radio & TV Supply
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Arlington: Key Electronics
WASHINGTON:
Tacoma: C & G Radio Supply Company
WISCONSIN:
Madison: Settefield Electronics
Milwaukee: Amateur Electronic Supply

The new ideas in communications are born at...

hallicrafters
Chicago 24, Illinois
World's first complete two and six meter radio station... features transistorized, built-in power supply

**COMPLETE SPECIFICATIONS**

**General description:** The SR-34 is designed for either AM or CW and combines, for the first time in one compact package, the complete functions of a two and six meter radio station. It operates on 115-V. A.C., 6-V. D.C., or 12 V. D.C. and features a highly efficient transistorized power supply for the 6 and 12 volt operation.

**Exclusive features:** The perfect unit for short-range portable, fixed or mobile communication, the SR-34 meets—and exceeds—F.C.D.A. matching-fund specifications. The crystal sockets and transmitter tuning controls are concealed behind a panel which may be sealed to prevent tampering. Instantaneous selection of desired voltage possible and also "crossbanding" between the two and six meter bands. The specially designed cover has mounting clips for two-band antenna, owner's microphone, and cords.

Both receiver and transmitter may be used for G.W.; key jack and adjustable B.F.O. are provided. Drip-proof case is specially designed for safe outdoor use.

The transmitter is crystal-controlled; up to four crystals may be switch-selected. A fifth position on this switch permits external V.F.O. operation. Band selection also is front-panel controlled.

The receiver is a double conversion superheterodyne, having a quartz crystal controlled second oscillator. This offers outstanding selectivity and high image rejection. Highest stability is obtained through separate oscillator and R.F. sections for each band.

All receiver functions provided—S-meter B.F.O., ANL, etc. Sensitivities average 1 microvolt on both bands. Transistorized power supply eliminates noisy, erratic operation encountered with vibrator-type power supplies.

**Front Panel Controls:** Receiver: Band Selector (49-54 mc., 143.5 to 148.2 mc.); Main Tuning; Sensitivity; Audio Volume; B.F.O. Pitch; Squelch Level; Headphone Jack. Transmitter: Function Switch (P.A., Rec., Cal., AM, CW); Power On/Off; Band Switch; Crystal Selector and V.F.O.; Oscillator Tuning; Doubler Tuning; Tripler Tuning; Final Tuning; Final Loading; Meter Switch.

Power output: 6 to 7 3/4 watts on 2 meter, and 7 to 10 watts on 6 meter AM or CW, 100% mod. negative peak clipping. Rear Apron: Speech input level control; key jack; P.A. speaker terminals; mic. selector (high Z or carbon); mic. input; A.C. and D.C. fuses; power plug.

Available with convenient terms from your Radio Parts Distributor.

Export Sales: International Operations—Raytheon Manufacturing Co.—Waltham, Massachusetts
for the final proof of operating excellence...compare on the air!

THESE GREAT SERIES OF

**hy-gain** trap tribanders

the FULL-SIZE trap tribanders

the NEW mini-tribanders

---

**The 3-element trap tribander**

The 3-Element Tribander shown above is now considered as the standard of performance in the field of amateur communications. F/B Ratio: approx. 25 db. Forward gain: 8 db. average.

**99.75**

**The 2-element trap tribander**

For use in limited space when top quality transmission is desired on 16, 15 & 20M. Single transmission line, F/B Ratio: approx. 18 db. Forward gain: 5.8 db. average.

**69.50**

**The 5-element trap tribander**

One of the best, highest gain, rotatable arrays available. Heavy duty construction, 16 x 36" x 22" rectangular aluminum boom. F/B Ratio: approx. 25 db. Forward gain: 12 db. average.

**395.00**

---

**The 3-element mini-tribander**

Extremely lightweight, only 39.8 lbs. Turning radius: 13'10". Installsite almost anywhere, yet boasting many features of the full-size line. hy-gain top quality performance guaranteed.

**69.95**

**The 2-element mini-tribander**

Practically a featherweight: only 33.8 lbs. Easily one-man installed in the shortest possible time and nearly anywhere. Turning radius: 13'11". Top features at minimum cost.

**49.95**

Here's the smallest practical size consistent with efficient operation, to which the trap tribanders may be reduced. Install in the smallest city lots. Light weight & rotatable by most TV rotors. Factory pre-tuned, with dimensions given for quick, easy assembly in a matter of minutes.

---

Perfect 1:1 SWR is made possible by the new, pre-calibrated Triaxial Gamma Match System with coaxially formed reactance cancelling capacitor built in. Exceptional band width (to 25 db. F/B over entire band. Conduit connector for 54 ohm feed line included. Gamma rod and capacitor section calibrated for exact setting over each band. No external baluns, antenna tuners or matching networks needed.

---

The automatic switch action of the Insu-Traps is employed in both series of tribanders. They act as insulators at their resonating frequencies, but allow radio energies of other frequencies to pass, isolating various sections of the antennas. Mechanically and electrically stable, the traps are hermetically sealed at the factory in polyethylene cover and can completely weatherproof. Hi-Q coils wound on styron form. Guaranteed for the life of the beam. The Mini-Tribander Traps are specially weight-designed for wind loading efficiency.

**Trade • Cash • Terms**

Write, wire, phone or visit either store today.

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Henry Radio Stores

Granite 7-6701
11240 West Olympic Blvd Los Angeles 64

"World’s Largest Distributors of Short Wave Receivers."

108
The Automatic Vertical for the 2 and 6 meter bands, with the new "sleeve decoupling" principle. Complete with ground plane. Overall height of Vertical and length of ground plane: 5 ft. Less than 2:1 SWR on all bands. Complete instructions.

DECOUPLING SLEEVE
Radically new Decoupling Sleeve automatically isolates various sections of the 26-AV, developing 1/4-wave resonance on each band. Complete ground plane is also dual resonant for both bands. Totally unaffected by weather; extremely efficient at high frequencies.

INSU-TRAP
Acting as insulator at resonant frequencies, but allowing radio energies of other frequencies to pass freely. Automatic switch action isolates various sections of the vertical to make them proper length for each band. Mechanically and electrically stable. Entire trap circuit enclosed in carbon activated polyethylene cover and cap. Completely weatherproof, air tight.

COMPLETE LINE
Model 26-AV (2-6M) ...........................................$16.95
Model 12-AV (10, 15, 20M) ......................................$19.95
Model 14-AV (10-40M) ..........................................$27.95
Model 18-AV (10-80M) ...........................................$69.50
12-AV Mount Kit ..................................................$ 8.95
14-AV Mount Kit ..................................................$ 9.95

HENRY HAS ALL THE NEW EQUIPMENT FIRST...

Complete stock of all transmitters, receivers, antennas, rotators, towers, parts, accessories, equipment. Send for our FREE Catalog!

EASY TERMS
90 days open account or 10% down—up to 20 months. Write for details.

A-1 RECONDITIONED APPARATUS
Nearly all makes and models—Big Savings—Ten-day trial—90-day warranty. 90-day full trade back on new apparatus. Write for bulletin.

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Your inquiries and orders handled same day. Write, phone or wire us.

COMPLETE STOCKS
Henry has everything in the amateur equipment field, new or used...transmitters and receivers.

PRICES SUBJECT TO CHANGE
The TMC Model SBE-1, Mode Selector, Transmitting, is a universal exciter permitting the transmission of any intelligence on Single or Double Sideband, with or without carrier. 

The exciter may be used for simultaneous or independent transmission of intelligence on either upper or lower sideband. For example: A voice channel can be transmitted on the upper sideband while tone multiplex is being transmitted on the lower sideband.

The SBE-1 provides the following commonly known types of operation:
1. Conventional Double Sideband, AM, with the additional advantage of carrier level control.
2. Conventional Single Sideband with adjustable carrier insertion.
3. Conventional Interrupted Carrier, CW, or Sideband Tone CW.
4. Independent Sideband transmission with adjustable carrier insertion.

From the above paragraphs, it should be apparent that the SBE-1 provides transmission which is compatible with any of the current "controversial" systems.

The TMC Model GPT-750, Radio Transmitter provides radio telephony, telegraph, frequency shift and facsimile operation on all frequencies within the range of 2 to 32 Mc.

The GPT-750 is a field proven equipment, service tested, nomenclatured (AN/URT-17) and approved for service use. This transmitter has been used for fixed plant, mobile and shipboard operation and provides 1000 watts output CW and FS, 750 watts output radio telephone (high level modulation) and 750 watts output, PEP, single sideband, all on a continuous commercial service basis. Band switching in all stages.

WRITE FOR BULLETIN 174C

THE TECHNICAL MATERIEL CORPORATION
PAL-350
LINEAR POWER AMPLIFIER

- 350 Watts 2 tone PEP
- Parallel 4 X 250B's
- Continuous Commercial Service
- SSB · ISB · DSB · AM · CW · MCW
- 2 to 32 Megacycles
- BANDSWITCHING
- PI-NETWORK 50 to 70 ohm unbal.
- Applicable to Mobile

WRITE FOR BULLETIN 204

THE TECHNICAL MATERIEL CORPORATION
Put America Back To Work!
10% PRICE SLASH DURING MAY AND JUNE!

"I am now using the Gotham V80 vertical antenna with only 55 watts, and I am getting fantastic reports from all over the world". VP1SD

ALL-BAND VERTICAL ANTENNAS

Gotham's sensational new vertical antennas give unsurpassed multi-band performance. Each antenna can be assembled in less than two minutes, and requires no special tools or electronic equipment. In the V160, resonance in the 160, 80, 75, and 40 meter bands is secured through use of the proper portion of the loading coil. Yet, when the coil is eliminated or bypassed, the V160 will operate on 20, 15, 10 and 6 meter! The same idea applies to our V80 and V10 multi-band verticals. No guy wires needed; rugged, occupies little space, proven and tested.

Simple design and superior materials give all-band operation, and effective, omni-directional radiation. Gotham verticals are rugged, with low initial cost and no maintenance. Guaranteed Gotham quality at low Gotham prices. Perfect for the novice with five watts or the expert with a kilowatt.

DEDUCT 10%
DURING MAY AND JUNE

QUALITY MATERIAL
Brand new mill stock aluminum alloy tubing with Aluminite finish for protection against corrosion. Loading coils made by Barker & Williamson.

ALL-BAND OPERATION
Switch from one band to another. Operate anywhere from 6 to 160 meters. Work the DX on whatever band is open.

EASY ASSEMBLY
Less than two minutes is all you need to put your vertical together. No special tools or electronic equipment required. Full instructions given.

SIMPLE INSTALLATION
Goes almost anywhere. On the ground, on the roof, or outside your window.

AMAZING PERFORMANCE
Hundreds of reports of exceptional DX operation on both low and high power. You will work wonders with a Gotham vertical.

PROVEN DESIGN
Over a thousand Gotham verticals are on the air — working the world and proving the superiority of Gotham design.

AND THE PRICE IS RIGHT!

"I worked LU2ZS on Half Moon Island in Antarctica on Dec. 26 at 21150 Ke. I was using my Gotham V80 vertical antenna and only 35 watts." KNG5LI

HOW TO ORDER. Send check or money order directly to Gotham or visit your local distributor. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

WORK THE WORLD

Gotham 1805 Purdy Avenue
Miami Beach 39, Fla.
Put America Back To Work!
10% PRICE SLASH DURING MAY AND JUNE!

**YOU COULD WORK WONDERS IF YOU HAD A GOTHAM BEAM!**

**TYPE OF BEAM.** All Gotham beams are of the full half-wave plumber's delight type; i.e., all metal and grounded at the center. No wood, tuning stubs, baluns, coils, or any other devices are used.

**MORE DX CONTACTS**

GAIN. Gotham beams give the maximum gain obtainable. Our 2-element beams give a power gain of four (equivalent to 6 db); our 3-element beams give a power gain of seven (8.1 db); and our 4-element beams give a power gain of nine (9.6 db.)

**THOUSANDS IN DAILY USE**

MATCHING. Matching of the transmission line to the beam is extremely simple and quick. No electronic equipment or measuring devices are required.

**ALCOA QUALITY ALUMINUM**

ASSEMBLY AND INSTALLATION. No special tools are required for assembly and installation. Entire job can be done by one man in less than an hour. Full instructions are included with each beam.

**CONSISTENT PERFORMANCE**

MAST. Any Gotham beam can be mounted on a simple pipe mast. Diameter of the pipe should be between 7/8" and 1 1/8".

**YOU WILL WORK THE WORLD**

STANDARD AND DELUXE BEAMS. Standard beams in the 6, 10 and 15 meter bands use 7/8" and 3/4" tubing elements; the deluxe models for these bands use 3/8" and 1". In 20 meter beams, the standard has a single boom, while the deluxe uses twin booms.

**TRIBANDER BEAMS**

<table>
<thead>
<tr>
<th>Band Combination</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-10-15</td>
<td>$39.95</td>
</tr>
<tr>
<td>10-15-20</td>
<td>$49.95</td>
</tr>
</tbody>
</table>

Do not confuse these full-size tribander beams with so-called midgets. The Tribander has individually fed (52 or 72 ohm coax) elements and is not frequency sensitive, nor does it have baluns, colls, traps, or other devices intended to take the place of aluminum tubing. The way to work multi-band and get gain is to use a Gotham Tribander Beam.

**TWO BANDER BEAMS**

<table>
<thead>
<tr>
<th>Band Combination</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-10 TWO BANDER</td>
<td>$29.95</td>
</tr>
<tr>
<td>10-15 TWO BANDER</td>
<td>$34.95</td>
</tr>
<tr>
<td>10-20 TWO BANDER</td>
<td>$36.95</td>
</tr>
<tr>
<td>15-20 TWO BANDER</td>
<td>$38.95</td>
</tr>
</tbody>
</table>

Each Two Bander has twin 12' booms, and full-size half-wave elements. 7/8" and 1" aluminum alloy tubing, all castings and fittings are supplied. Assembly is easy.

**DEDUCT 10% DURING MAY AND JUNE!**

Airmail Order Today — We Ship Tomorrow

**GOTHAM**

Dept. QST
1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

<table>
<thead>
<tr>
<th>Beam Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>TWO BANDER BEAMS</td>
<td></td>
</tr>
<tr>
<td>6-10 TWO BANDER</td>
<td>$29.95</td>
</tr>
<tr>
<td>10-15 TWO BANDER</td>
<td>$34.95</td>
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TRIBANDER

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<tbody>
<tr>
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<td>$39.95</td>
</tr>
<tr>
<td>10-15-20</td>
<td>$49.95</td>
</tr>
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</table>

2 METER BEAMS

<table>
<thead>
<tr>
<th>Beam Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deluxe 6-Element</td>
<td>$9.95</td>
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6 METER BEAMS

<table>
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<tr>
<th>Beam Type</th>
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<tbody>
<tr>
<td>Std. 3-EI Gamma match</td>
<td>$12.95</td>
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<tr>
<td>Deluxe 3-EI Gamma match</td>
<td>$21.95</td>
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<tr>
<td>Std. 4-EI Gamma match</td>
<td>$16.95</td>
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<tr>
<td>Deluxe 4-EI Gamma match</td>
<td>$25.95</td>
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10 METER BEAMS

<table>
<thead>
<tr>
<th>Beam Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Std. 2-EI Gamma match</td>
<td>$11.95</td>
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<tr>
<td>Deluxe 2-EI Gamma match</td>
<td>$18.95</td>
</tr>
<tr>
<td>Std. 3-EI Gamma match</td>
<td>$16.95</td>
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<tr>
<td>Deluxe 3-EI Gamma match</td>
<td>$25.95</td>
</tr>
<tr>
<td>Std. 4-EI Gamma match</td>
<td>$21.95</td>
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<tr>
<td>Deluxe 4-EI Gamma match</td>
<td>$27.95</td>
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15 METER BEAMS

<table>
<thead>
<tr>
<th>Beam Type</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>Std. 2-EI Gamma match</td>
<td>$19.95</td>
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<tr>
<td>Deluxe 2-EI Gamma match</td>
<td>$29.95</td>
</tr>
<tr>
<td>Std. 3-EI Gamma match</td>
<td>$26.95</td>
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<tr>
<td>Deluxe 3-EI Gamma match</td>
<td>$36.95</td>
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20 METER BEAMS

<table>
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<td>Std. 2-EI Gamma match</td>
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<tr>
<td>Deluxe 2-EI Gamma match</td>
<td>$29.95</td>
</tr>
<tr>
<td>Std. 3-EI Gamma match</td>
<td>$34.95</td>
</tr>
<tr>
<td>Deluxe 3-EI Gamma match</td>
<td>$46.95</td>
</tr>
</tbody>
</table>

NEW! RUGGEDIZED HI-GAIN 6, 10, 15 METER BEAMS

Each has a TWIN boom, extra heavy boom mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line, specify which transmission line you will use.

<table>
<thead>
<tr>
<th>Beam Type</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beam #6 (6 Meters, 4-EI)</td>
<td>$38.95</td>
</tr>
<tr>
<td>Beam #10 (10 Meters, 4-EI)</td>
<td>$40.95</td>
</tr>
<tr>
<td>Beam #15 (15 Meters, 3-EI)</td>
<td>$49.95</td>
</tr>
</tbody>
</table>

Name...
Address...
City... Zone... State...
Station Activities
(Continued from page 88)

NYA C.W. meets at 3615 kc. at 1800, ESS on 3550 kc. at 1800, NC C.W. at 3550, 20 and 15 meters on 3595.5 and 3595 kc. at 6900 Sun., TCFN 2nd Call Area on 3970 kc. at 1000, SHPN on 3980 kc. at 1000, LST C.W. on 3550 kc. at 1700, NCD C.W. at 3550 kc. at 1900 and 20 meters, N26C H.F. on 3950 kc., K2B from 1000 to 1600 and 20 meters, K2W on 3550 kc. at 1000, K2OY on 3550 kc. at 1000, K2RAK on 3550 kc. at 1000, K2KZ on 3550 kc. at 1000, K2DGU on 3550 kc. at 1000, K2W on 3550 kc. at 1000, K2KZ on 3550 kc. at 1000, K2DGU on 3550 kc. at 1000, K2W on 3550 kc. at 1000, and K2KZ on 3550 kc. at 1000.

K2DGU received the Novice award in the V.H.F. Contest. Lynn has worked ten states on 2-meter c.w. using his new Novice award. A+1 Operator Award. A1C and RUP are making test runs on their equipment for Field Day. The SWNYFHA has been donating space for 500 messages in the basement of the Machinac town hall. There is also a spot for a 6-meter antenna 30 feet up. The RAWNY Board of Directors met on June 25, 1961. The new UHF net has also been set up.

K2SIL has received an A-1 Operator Award. The Niagara Frontier DX Assn. has obtained its own distinctive QSL cards. K2DZO, K2AIBJ, PPY, GBX, and K2KZ has a new HT-32. K2UFB is building an 813 d.s.b. rig. K2RH is now transmitting good quality on 10 and 160 meters. QVV is transmitting good quality on the 150-member goal soon. BON is now celebrating its 28th year of amateur radio with the same call. "BW used 20-meter s.s.b. to work Texas. K9EGJ is now totals 102 and K9UJ isCarol 103, 200 at 1800, with 40 meters at 1800. To report on the routine of a 30-mile-long parade by mobilizing the Quad City gang helped the local police in the routine of a 30-mile-long parade by mobilizing the Quad City gang helped the local police in

K2SIL now has 60 countries on s.s.b. Appoint- ment for Field Day. The SVVNYFHA has been donating space for 500 messages in the basement of the Machinac town hall. There is also a spot for a 6-meter antenna 30 feet up. The RAWNY Board of Directors met on June 25, 1961. The new UHF net has also been set up.

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  For 2 Meters or 6 Meters
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  For Generating Spot Frequencies with Guaranteed
  Tolerance from 200 KC to 60 MC.
• FO-1L 100KC Oscillator
  For Band Edge Calibration and
  Frequency Standard Use.
• FMV-1 10 KC Multivibrator
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EXPERIMENTERS  1500 KC to 50 MC

Wire mounted, plated crystals for use by amateurs
and experimenters where tolerances of .01% are
permissible and wide range temperatures are not
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CIRCUIT: Designed to operate into a load capac-
tance of 32 mmf on the fundamental between 1500
KC and 15 MC. Designed to operate at anti-
resonance on 3rd overtone modes into grid circuit
without additional capacitance load. 5th overtone
crystals designed to operate at series resonance.
(Write for recommended circuits)

Prices
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(FA-9 Fits Same Socket as FT-243)
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Overtone Crystals—3rd Overtone Operation
15 MC-29.99 MC .01%  $ 3.00
30 MC-54 MC .01%  4.00
Overtone Crystals—5th Overtone Operation
55 MC-75 .01%  4.50
76 MC-90 MC .01%  6.50

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For commercial applications, the F-6 type
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One Day Service! Specify exact frequency and crystal
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The Rotobrake, designed for internal mounting in steel towers, is clear of inside clearance, shipped complete with brackets for mounting on side of pipe and pole towers. Brake units encased in heavily ribbed, heavy wall, cast aluminum housing. Two bronze thrust and bearing surfaces are press fit into the top and bottom of housing, designed to support more than 1000 lbs. of dead weight. Rotobrake is a complete rotating assembly, with spring actuated sole- and control box. Tests rpm rotating motors, and noid released braking unit, with spring actuated, sole- available—dual rotator weight. Rotobrake is a than 1000 lbs. of dead weight. Rotobrake is designed to support more than 1000 lbs. of dead weight. Rotobrake is a complete rotating assembly, with spring actuated, sole- and control box. Tests rpm rotating motors, and noid released braking unit, with spring actuated, sole-

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DX-100, K0DIA, net manager, wants more Novices to join MJN, which meets Mon., Wed., and Fri. at 1700 local time, with NCS VY and is now active in the Mississippi and Magnolia Emergency Net and the Texas YL Roundup. The Jonesboro Club has 6 stations on 6 meters and has an active net on 75 meters. WSM has received his Novice certificate. A new Novice in Russellville is KN9M1K. KN5LNN is now General Class. KRO has a new 10000 ASQ unit and "CTW" who have moved away. Our hats are off to the Pine Bluff Club for the interest shown in the Boys Scouts of that area. The Club in Walnut Ridge recently held its Dinner Social with a good turnout. The club reports one new Novice. KN5AIA. K5GHP has moved from Clarksville to West Plains, Mo. We are glad to see the increasing interest in the local nets. Traffic: W5EHH—105, BYJ 56, K5FIS 27, W5KWZ 24, CTUZ 23, WSM 14, K5BIO 8, W5NEP 4, K5KAC 4, W5DYL 2.

LOUISIANA—SCM. Thomas J. Morey and W5FMO—G1Z's auto license plate will be displayed at the Bassissippi International High School, KL5K, active in the Mississippi and Magnolia Emergency Net and the Texas YL Roundup, is running a Command ARC/5. K5BLC should be on 420 Mc. now with 10 watts. The Central Louisiana Amateur Radio Club, marked by K5EFS, has been reorganized. Officers are KN5LNN, pres.; K5AGJ, vice-pres.; K5EFS, secy.-treas.; K5BLC/5 as net mgr. A club station has been set up at the Menard Memorial High School. The group will hold a hamfest on Aug. 31. Prizes will include a 10-B exciter. An informal gathering was held at Natchitoches recently. Among those attending were K5JPI, at whose home the meeting was held. BNF, W5iska, K5DOR, DDR, SRM, TUZ, YNG, FMO, GNN, a visiting fireman who overheard some ham talk in the local post office, has joined the club. K5BLC, the new net manager, has been reorganized. Officers are KN5LNN, pres.; K5AGJ, vice-pres.; K5EFS, secy.-treas.; K5BLC/5 as net mgr. A club station has been set up at the Menard Memorial High School. The group will hold a hamfest on Aug. 31. Prizes will include a 10-B exciter. An informal gathering was held at Natchitoches recently. Among those attending were K5JPI, at whose home the meeting was held. BNF, W5iska, K5DOR, DDR, SRM, TUZ, YNG, FMO, GNN, a visiting fireman who overheard some ham talk in the local post office, has joined the club. K5BLC, the new net manager, has been reorganized. Officers are KN5LNN, pres.; K5AGJ, vice-pres.; K5EFS, secy.-treas.; K5BLC/5 as net mgr. A club station has been set up at the Menard Memorial High School. The group will hold a hamfest on Aug. 31. Prizes will include a 10-B exciter. An informal gathering was held at Natchitoches recently. Among those attending were K5JPI, at whose home the meeting was held. BNF, W5iska, K5DOR, DDR, SRM, TUZ, YNG, FMO, GNN, a visiting fireman who overheard some ham talk in the local post office, has joined the club. K5BLC, the new net manager, has been reorganized. Officers are KN5LNN, pres.; K5AGJ, vice-pres.; K5EFS, secy.-treas.; K5BLC/5 as net mgr. A club station has been set up at the Menard Memorial High School. The group will hold a hamfest on Aug. 31. Prizes will include a 10-B exciter. An informal gathering was held at Natchitoches recently. Among those attending were K5JPI, at whose home the meeting was held. BNF, W5iska, K5DOR, DDR, SRM, TUZ, YNG, FMO, GNN, a visiting...
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An excellent companion for either the RME 4350 or 4350A. Provides easy selection of either sideband on suppressed carrier transmissions or AM phone signals. Adds as much as 15 db of sensitivity to the receiver. Can be connected to any communications receiver using 455KC IF or plugs directly into the RME receiver in jacks provided.

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8 Meters | Exam. = 9010.6 x 6 = 54003.6
Note: 3.6% difference between the above
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750 to 54 Meg. toi. .005% ea. 4.10

This is the top one of Tennessee’s outstanding hams, and a fine MARS story by US, Asst. Dist. Two MARS Directors, ZZ, kindly notifying us of their plans. OFL of Oak Ridge has announced that K4HIN has 25 states confirmed. K4HOM has a new 32V-3. New MARS members include DFV, RXX, and OQH. K4HOM has 40 states confirmed on 6-meters. Traffic: W4PL 121, W5CRF 291, K4KICG 35, W4JICG 144, K4KIC 147, LPW 170, W40GG 100, T39 99, JPQ 59. L3W 58, L7A 83, VQ 42, SCF 38, L1B 25, UO 24, UV 18, BQH 14, PAP 12, K2X 10, LTV 9, K4J 8, HNJ 6. R5A 47, L6D 34, LTV 9, LVHP 8, FEB 5, KYS 3, HSX 2, KYO 2, TDB 2, KTK 1, RHN 1, UZZ 1, WQW 1, ZZZ 1.

GREAT LAKES DIVISION

KENTUCKY—SCM, Albert M. Horns, W4KKV—SEC: JSH, RM; K4KIS, PAMS; SUD, OGY, K4CGY and JOA. Kentucky nets will picnic at Dix Dam near Danville Sun., July 14. The Kentucky Amateur Radio Transmitter Society (ARTS) and the Kentucky Radio Club of Louisville, as well as three other clubs in the state, have been busy with college, BWS is working on a new mobile rig. The Kentucky 6-Meter Net meets on 49040.00 Mhz. K4CSH clearing through KYN/TV and K4LTV. W4XN, K4TLE, and W4AYA, W48CC, now have 205 countries. K4LOL has a new mobile rig. The Kentucky 4-Meter Net meets on 146.875 Mhz. K4CSH clearing through KYN/TV and K4LTV. W4XN, K4TLE, and W4AYA.

MICHIGAN—SCM, Thomas G. Mitchell, WR8RAE—SEC: YAN, New appointments: BWS as AO Class III and IV; IPW as OBS. WGU earned the only BPL certificate for March; W4L and W41F, Pert. Cert. will be held Aug. 3 at the Allegan County Park near the intersection of Routes M 89 and US 31. The BY/ K4NQ Pique will be held July 24 at the Allegan County Park under the auspices of the Mason County RC.

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(Continued on page 123)
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FIRST AGAIN WITH A BIG VALUE "PACKAGE"

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Now...a complete high performance 10-meter station...transmitter, receiver, power supply... "packaged" for the big result, the big value.

**Complete!** Connect antenna, mike and AC power—operate—in a big way.

**transmitter...** The husky 50 watt transmitter uses Type 6146 tube, has pi network output. Multiplier stages are ganged and tracked with highly stable, calibrated VFO. (Crystal control is optional.) VFO spotting switch facilitates "zeroing in" on desired stations. Panel meter is switchable to read amplifier grid or plate currents or modulator plate current.

**receiver...** The sensitive, selective 10-meter communications receiver utilizes double-conversion, also features adjustable "squelch" for muted standby, an effective noise limiter, "S" meter, panel-mounted loudspeaker. Coverage is 28-29.7 mcs. Dial is full-vision, has planetary vernier drive for easy tuning.

**power supply...** Heavy-duty 115 volt AC power supply is built-in.

**A single compact housing...** Everything in a single compact housing... an area less than one square foot. 13 ½" wide, 7 ½" high, 12 ½" deep.

Cabinet and panel are finished in Alpine White, complemented with Gun Metal Blue knobs. Attractive... functional.

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Net 299.50
At the Albany Club on Mar. 28. Welcome to KN2LLA in Hillsdale with a Globe Chief, and all S-85.

LCB reports WAS made in three wrecks on 40-meter SWL. Appointment: K2ZMH as Cohuna Co., KC. Endorsement: TYC as ORS. The section AREC Net reports an average of 15 stations in its weekly drills. K2QIX pieked up Explorer ii sis minutes after launch before the satellite was in orbit. A total of 29 states on 2 meters is reported by LMT. The location of the MHT was hard on antennas, including the beams at DIN. Interference—its causes, cure and public approach, featured the April meeting of the Albany Club. KH1F is now the new club president. Congratulations to K2YTD on another BPL card. Unless new members QNT, the manager is considering closing the MHT Net. How about it. Novices?

NEW YORK CITY AND LONG ISLAND—SCM.

Harry J. Daniels, W2TUK—SEC: ADO, RAI: WPL, PAM: ORW, V.H.F., PAM: WKEQH.

Section Nets:

K2KJ: 300 kc., nightly at 1350 EDST and Sat. at 1015 EDST.

NYC-LIPN, on 3000 kc., nightly at 1330 EDST: NYC-LI AREC, on 3008 kc., Mon. through Sun, at 1350.

K2BGP: 110V, Traffic Net, on 2208 kc. at 1400, Wed. at 2200 EDST. Please note the change in time for the Sunday AREC Net. BPL cards go to KBB and VDT and VDT received his BPL certificate. Again the request goes out for stations in the N.Y.C. area. Messages for the Metropolitan Area must be mailed because of a lack of stations to accept the traffic. Can you help? K2VUI needs only two states to complete his WAS. K2SSE worked all Delaware counties. K2DQC dropped the "N," the New York Drill is running for more stations on 432 Mc. PZE installed a new t.r. switch. Ex-ELT is now KP4AP in Florida. A new 4-f ita linear is now in use at 130Q. K2FEC passed class with USBKBR via radio. LCF has his 420-Mc. receiver working. John sends ARRL Official Bulletins on 6-meter m.w., followed by some DX-funneling. Ex-G is good code practice for the Tech. Class licensees on 50 Mc. DPL logged a visit from CESDT. PRB is molding his new KWM-1 over 13 and 40 meters. A new SX-101 is in use at KN21VT. WAIQ is using a new CD-HAM rotor. K2KQK needs only two more states to complete his WAS. More than 20 mobiles participated in a recent 6-meter hidden transmitter hunt. The hunts and those conducted on 2 and 10 meters have met with great success throughout the section. New stations on 50 Mc. are K2YJL, K2EJ, PERK, RBS, and TCK. K2JLO posed as a mobile user of the RACES license. K2GKP, New officers of the South Side RC are K2TPU, pres.; K2JX, vice-pres.; K2UZB, secy.-treas.; and K2KAT, club advisor. K2N21 received his WAS certificate. JEG and K2YQK dropped the "N." K2N21 is on 10 meters.

NORTHERN NEW JERSEY—SCM.


Section Nets:

K2KJ: 300 kc., nightly at 1350 EDST and Sat. at 1015 EDST.

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K2KJ: 300 kc., nightly at 1350 EDST and Sat. at 1015 EDST.

NYC-LIPN, on 3000 kc., nightly at 1330 EDST: NYC-LI AREC, on 3008 kc., Mon. through Sun, at 1350.

K2BGP: 110V, Traffic Net, on 2208 kc. at 1400, Wed. at 2200 EDST. Please note the change in time for the Sunday AREC Net. BPL cards go to KBB and VDT and VDT received his BPL certificate. Again the request goes out for stations in the N.Y.C. area. Messages for the Metropolitan Area must be mailed because of a lack of stations to accept the traffic. Can you help? K2VUI needs only two states to complete his WAS. K2SSE worked all Delaware counties. K2DQC dropped the "N," the New York Drill is running for more stations on 432 Mc. PZE installed a new t.r. switch. Ex-ELT is now KP4AP in Florida. A new 4-f ita linear is now in use at 130Q. K2FEC passed class with USBKBR via radio. LCF has his 420-Mc. receiver working. John sends ARRL Official Bulletins on 6-meter m.w., followed by some DX-funneling. Ex-G is good code practice for the Tech. Class licensees on 50 Mc. DPL logged a visit from CESDT. PRB is molding his new KWM-1 over 13 and 40 meters. A new SX-101 is in use at KN21VT. WAIQ is using a new CD-HAM rotor. K2KQK needs only two more states to complete his WAS. More than 20 mobiles participated in a recent 6-meter hidden transmitter hunt. The hunts and those conducted on 2 and 10 meters have met with great success throughout the section. New stations on 50 Mc. are K2YJL, K2EJ, PERK, RBS, and TCK. K2JLO posed as a mobile user of the RACES license. K2GKP, New officers of the South Side RC are K2TPU, pres.; K2JX, vice-pres.; K2UZB, secy.-treas.; and K2KAT, club advisor. K2N21 received his WAS certificate. JEG and K2YQK dropped the "N." K2N21 is on 10 meters.
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MASTER

EXCLUSIVE TRAP DESIGN – LIFETIME WEATHERPROOFED!
ANTI-SAG CONSTRUCTION!
LOW SWR – REMARKABLY FLAT ACROSS BANDS!

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Also: World famous “Vest Pocket” and “Super” Amateur Beams, Commercial Arrays and other fine products.

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Model TA-33
Beautifully constructed 3 element beam for operation on 10, 15 or 20 meters. Forward gain is 8 db, front-to-back is 25 db, and SWR is 1.5/1. Maximum element length is 28 ft. and weighs only 47 lbs. Boom is just 14 ft.

$99.75

Model TA-32
Similar to Model TA-33, but has 2 elements operating on 10, 15 and 20 meters. Forward gain is 5.5 db, front-to-back is 20 db and SWR is 1.5/1. Featuring a short boom of just 7 ft. and max. element length of 28 ft. Weight is 34 lbs. Converts to Model TA-33.

$69.50

Model V-4-6
This low cost, high performance vertical antenna covers all bands from 10 thru 40 meters. Requires little space and may be mounted on ground or roof-top. Low SWR and band switching is automatic. Loading coil available for 80 M.

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AF-67 TRANSMITER

Serves as exciter, speech amplifier, VFO. Driver and exciter for any station using a low-powered transmitter. 7 amateur bands — 160 through 6 meters — single-knob bandswitching. Built-in VFO. Operates from 6 to 12 volt DC source. $17.70 down... $9.64 a month for 18 months*

PMR-7 RECEIVER

G-77A, with power supply. $299.00 Net

"SUPER-SIX" — 6 band converter. Covers 75, 40, 20, 15, and 11-10 meters; 19 and 49 meter BC bands. Powered by receiver. $325.50 Net

REGENCY ATC-1 CONVERTER

Self-powered, 10 through 160 meters — single-knob bandswitching. Atari $15.90 down... $9.64 a month for 18 months.

AF-67 TRANSCITER

Just $50.85 down for these two great units!

Compactness without compromise... the G-66B and G-77A are excellent examples of Gonset's skilled engineering... and you'll make your best deal at Burghardt's! G-66B's excellent reception in amateur bands 80, 40, 20, 15, and 10 meters — as well as standard broadcast band. Built-in "S" meter — antenna trimming noise limiter. G-77A: Packs real power—50 to 60 watts output, fully modulated. Covers 80, 40, 20, 15, 11-10 meters — as well as standard broadcast band. Buîlt-in limiter. G-77A: Packs real power—50 to 60 watts operation by the flick of a switch. G-77B is building a 6-meter linear final utilizing 4-400A. IADW, net mgr. for N.J., has issued his second net bulletin. WXWX expects to work 10-meter mobile from Newfoundland during July and August. K2BG has converted his Gonset for either 6 or 12-volt operation by the flick of a switch. K2PVZ is building a 6-meter linear final utilizing 4-400A. IADW, net mgr. for N.J., has issued his second net bulletin. WXWX expects to work 10-meter mobile from Newfoundland during July and August. K2BG has converted his Gonset for either 6 or 12-volt operation by the flick of a switch.
THE REVOLUTIONARY NEW 100V EXCITER-TRANSMITTER

NO TUNING (except VFO), uses famous CE BROADBAND system. PRECISION LINEAR VFO—1KC Calibration, Single Knob Bandswitch 80 thru 10, SSB—DSB—AM—PM—CW and FSK. RF Output adjustable 10 to 100 Watts PEP. Meter reads Watts Input, Amps Output and Carrier Suppression, 2" RF Scope. Speech Level and Load Mismatch Indicators. Audio Filter — Inverse Feedback — 50 db Carrier and Sideband Suppression.

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FAMOUS MODEL 600L BROADBAND LINEAR

NO TUNING CONTROLS — CE BROADBAND Couplers in HIGH EFFICIENCY CLASS AB2 using single 813. Easily driven to 600 Watts PEP Input 160 thru 10 by a 20A or 100V. Built-in HEAVY DUTY POWER SUPPLY — 45 MFD PAPER Capacitor. Meter reads WATTS INPUT, GRID DRIVE, RF AMPS, and SWR. Completely shielded — TVI suppressed — parasitic free. REMEMBER there is LESS than ONE S UNIT difference between the 600L and a 2 KW PEP job...

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MODEL 10B — 10 watts PEP. Plug-in coils...160 thru 10 meters. Perfect voice control on SSB—DSB—AM and PM — CW breaking. Carrier and calibrate level controls. 40 DB suppression.

Wired...$179.50 Kit...$139.50

MODEL 20A — 20 watts PEP. Bandswitched 160 thru 10 meters. SSB—DSB—AM—PM and CW. Magic eye monitors carrier null and peak modulation. Ideal for driving AB1, AB2, and most Class B linears.

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MODEL MM-2. 3" RF analyzer scope for use on SSB—DSB—AM—PM and CW. MONITORS RECEIVED AND TRANSMITTED SIGNALS thru new electronic switching circuits. NO TUNING — BROADBAND response 1MC to 55MC at power levels of 5 watts to 5 KW. SIMPLE CONNECTIONS. Built-in 1KC oscillator for exciter alignment. Plug-in IF adapters available for 450-500 KC, 80 KC and 50 KC.

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Fine quality, general coverage 4-band receiver (360 kc to 49 MHz) with calibrated electrical bandspread for AM, 15, 30, 40, and 80 meter bands. 12 slide-rule dial has edge and backlighting. Each radio-frequency amplifier stage and separate, calibrated high-frequency oscilator. Receives AM and CW. Built-in 100 kc crystal oscillator. For 100-150 watts, 15-60 cps, 15-7/8 x 9-1/8 x 4-9/32", Shpg. wt. 35 lbs. National NC-168-

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ELECTRONIC DISCONNECT BY MEANS OF CONCENTRIC ELEMENTS.

Electronic disconnect, essential for instant and automatic change from band to band, is highly effective. It is accomplished without coils by special concentric elements which are part of a completely new and original Gonset antenna design. The effectiveness of properly designed quarter wave sections as electronic disconnects is well known.

WEATHERPROOF.

3-Banders now use “Boots” to seal off the open-ended concentric elements from dust and moisture. These “Boots” are of the highest grade silicone rubber, have very low losses, do not absorb moisture, will not become brittle under exposure to sun and weather. They tend also to maintain element concentricity and to lessen vibration.

SET ‘EM AND FORGET ‘EM!

All elements are factory cut to correct length. 20 meters requires no adjustments. 10 meters has fixed-length parasitic elements, requires adjustment only on the driven element. 15 has adjusting sleeves on driven and parasitic elements. Adjustments are made on the ground by short, sturdy tuning sleeves which are permanently clamped after setting to specified position. You set ‘em and forget ‘em.

2-element, #3219-B ..... 84.50
3-element, #3220-B ..... 124.50

DIELECTRIC SPARINGLY USED...

Dielectric losses are greatly minimized by a design that eliminates coil forms and other large dielectric masses. Uses only widely separated low-loss rings to maintain concentric element spacing.

GAIN...VSWR...FRONT-TO-BACK RATIO...WEIGHT...FEED.

FORWARD GAIN. (typical) 3-ELEMENT: 10 meters, 8.4 db, 15 meters, 8.1 db, 20 meters, 8.2 db. 2-ELEMENT: 10 meters, 5.3 db, 15 meters, 4.9 db, 20 meters, 5.0 db. VSWR (typical) either beam: Not more than 1.4 to 1 across phone or C.W. band segments at heights greater than 35 feet.

FRONT TO BACK RATIO. 3-element, 24-28 db, 2-element, 14-18 db.

WEIGHT. 3-element, 65 pounds, 2-element, 35 pounds.

FEED: Both beams are fed with single RG8/U cable.
6 METER, 8 ELEMENT BEAM: $24.95

The hy-gain 6-meter beams are adjustable for max.
gain over the entire band, from our instructions. No
further tuning necessary. Calibration Chart supplied
with each instruction manual. Factory preassembled,
further tuning necessamy. Calibration Chart supplied
ments of 6061T6 alloy and 1¾" diameter aluminum
these beams feature heavy wall 8½" aluminum élé-
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actor built in, makea possible for the finit time a
Bars available at $3.95 extra.

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porfect 1:1 SWR. Coax connecter for 52 ohm feed
incl. Developed exclusively by hy-Bain for use in the
The hy-gain 1½ & 2 Meter Beams are factory pre-
up and into opération, these beams may be stacked for
assembled; éléments snap into position for immédiate
extra.

11/4 METER, 5 ELEMENT BEAM: $9.95
2 METER, 10 ELEMENT BEAM: $10.95

The hy-gain 1½ & 2 Meter Beams are factory pro-
essembly with coaxially formed reactance cancelling cap-
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perfect 1:1 SWR. Coax connector for 52 ohm feed incl. Developed exclusively for use in the
hy-gain single-band beams.

The 1½ & 2 meter beams in-
porate the Folded Ratio Di-
pole with nominal impedance of 450 ohms. A 1:1
SWR with 450 ohm open wire transmission lines for
max. efficiency at VHF frequencies may be realized.
Write for Detailed Information!
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Sea Dragon Certificate No. 88, 1RX, GVK and EH
joined MARS. DHP received a TCPN certificate and
joined the Mansfield Volunteer Fire Co. to help coordinate
the radio net. MWB got K4AP on 14 Mc, with a
new 216H-15 antenna. KN1G got his ham license.
EXO in Torrington, GTG in Hamden and
KLK in Meriden are now on CPN. KIBEN has
transmitting Official Bulletins daily from noon to 3 P.M., at 1200 EST.
TCW has a new 73A-4, KN1JES is a new Novice
in Torrington, JJ1 has a new HT-32 and 8X-101. The
CG ARC and QNI of 69 during four net sessions with
traffic handled totaling 10. New officers at YU are
9BAO, NRI and K2HDL. EFW has eliminated his
transmitter trouble. The CVN handled 20 messages
during 13 sessions with an average attendance of 10.
High QNI went to FHP, KIBAL, KN1BMM, FPF, K1C,
and KN1DDY. TVC, NLC, WIR, EJH, IPX, KN1JDC
and KN1DDO. New officers of the Stratford ARC are RFJ, KZZ,
SFH and ZNA. KIDEQ is a new member. WITQ
in Bristol, RM KYQ reports 357 messages handled
during 20 sessions on CN including 62 on the evening
session. KIBAL and KN1BMAI have new Globe
Scout 860 and a 13-element-13-meter beam. IKB
and WKM made DXCC the same time on the same
night. The CVN handled 6-Meter traffic during six sessions with an average
attendance of 15. New appointments: KIBEN as OBS,
W1P, 2 & 6M

MAINE—SCM, John Fearon, WILKP—SEC; QA.
K1BML, KN1BMM, FPF, K1GAY and KN1DDY are
in Scarboro. BTR. K1AOQ and AND fiave DXlOOs.

The 1¼ METER, 10 ELEMENT BEAM: $9.95
2 METER, 10 ELEMENT BEAM: $10.95

The hy-gain 1¼ & 2 Meter Beams are factory pro-
essembly; elements snap into position for immediate
use. Features 8½" aluminum elements of 6061T6
alloy & 1¾" diameter aluminum booms. Easy to put
up and into operation, these beams may be stacked for
additional gain. Stacking Bars available at $3.95 extra.

New, precali-
ibrated (GAM- MARKAL) Gamma Match as-
semble is putting out a good signal with his Viking
II, EEP and LWO are EOCs for Calais and Waterville.
2PRW and ZRH are new ICOP and KIGVX, respectively.
and missed his first DX Contest in many years. 2PRW
is a new ham in Madawaska. KIDVN and AGP are new
mobiles in Bangor. DLC lost his 20-meter heora
 license. EXO in Torrington, CJTG in Hamden and
KIBEN as OBS; AVS, GVK and KYQ as ORSs;
LIG as OPS; FJJ, TCW and WX as ECs; Traffic:
(705) W1YBH 492, W1YSD 293, FYF 261, KIBEN 238,
WITYQ 235, EFW 235, K1K 150, CHC 154, GVK 126,
MBW 114, M1G 110, N1CH 104, DHP 47, FPF 43,
HPL 41, FCE 31, QJM 30, LV 25, GTG 18, M1DB 18,
V1Y 13, ROB 11, EJH 9, KIB 9, WIKAM 7,
KIBML, 6, KN1BMM, WIFPV 6, FPF 5, AMY 2,
AVS 2, EXO 1, HQM 1. (Feb.) WINJM 70, OBR 5.

RFJ, LVE, OIH, SIV, K1CLO, KN1GNN îs FF's son. K1DYC is KIDJX's daughter.

Congrats to EUT on winning the Mass. QSO Contest
at Crosby High Schoob Belfast. PXE lost his

MAINE—SCM. John Fearon, WILKP—SEC; QA.
K1BML, KN1BMM, FPF, K1GAY and KN1DDY are
in Scarboro. BTR. K1AOQ and AND fiave DXlOOs.

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In the pages of this latest edition will be found, in addition to accumulated knowledge since the first Handbook was issued in 1926, the latest proved findings and experiments invaluable to ham and engineer alike. Every field of ham radio is covered: transmitting, both c.w. and 'phone; receiving; propagation; antennas; construction; theory; charts; diagrams; circuits; transistors; miscellaneous data; procedures; station operation, etc.

For instance, the 1958 Edition carries

- Chapters which include How-to-make-it articles dealing with Receivers, Transmitters, Power Supplies, Radiotelephony, V.H.F., U.H.F., Antennas, Mobile Equipment, radioteletype, etc.
- A separate chapter on test and measuring equipment
- 32 pages of data on vacuum tubes and semiconductors, a great time-saver to both engineer and ham
- Many pages of valuable catalog/advertising sheets, containing manufacturers' and distributors' products and services...a useful supplement to the editorial section
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West Hartford 7, Conn. • U.S.A.
How Many Turns?

If you're trying to figure out how many turns to wind on a coil for a particular band, you'll find the answer more quickly by using the Type A Calculator, designed especially for problems involving frequency, inductance and capacity. Direct-reading answers to Ohm's Law problems involving resistance, voltage, current and power may be obtained rapidly on the Type B Calculator. Be sure — and be accurate — with one of these handy time savers.

ARRL LIGHTNING CALCULATOR

Type A or Type B

$1.25 postpaid

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West Hartford, Conn.
HERE'S YOUR CHANCE

to get a B&W transmitter that:

- Covers All Bands from 80-10 Meters
- Permits VFO or Crystal Control on All Frequencies
- Provides Versatility for AM, CW and SSB with the 51SB-B
  - Features Built-in TVI Suppression
  - Has Components Conservatively Rated for Maximum Output
  - And... All at the Lowest Cost for Comparative Value

Certified by FCDA
Item No. T-32

5100-B $525.00

There isn't a transmitter on the market that gives you more versatility than the B&W 5100-B... regardless of price. In spite of superb performance, the 5100-B is as competitive in cost and often under many comparable units.

Designed for discriminating hams, the 5100-B is engineered to the highest degree by professionals. Layout and circuitry are skillfully designed to assure a minimum of harmonics and distortion.

As a basic for novice or oldtimer the 5100-B is perfect for future addition of SSB by plugging in a B&W 51SB-B. If you're ready for maximum power you can add the B&W L-1000-A Grounded Grid Linear Amplifier. This addition will give you 1000 watts peak envelope SSB-875 watts CW and 375 watts linear AM phone.

Here's your chance to get on the air with a top-quality signal. Buy a B&W Model 5100-B transmitter today. If you want additional information, before you buy, see your favorite "ham" dealer or write the factory direct.

Complete assembly 5100-B, 51SB-B and L-1000-A

Barker & Williamson, Inc.
Canal Street and Beaver Dam Road • Bristol, Penna.
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from Collins

COLLINS 75A-4 This SSB Receiver offers all the proven Collins features — excellent image rejection through double conversion, precise dial calibration and high stability of Collins VFO and crystal controlled first injection oscillator, and the ideal selectivity of Collins Mechanical Filter in the IF strip.

Net Price $695.00

COLLINS KW-1 Companion transmitter to the 75A-4. Unmatched performance in minimum space for a kilowatt. Extremely accurate 70E VFO, Pi-L output network and Mechanical Filter.

Net price $2,095.00

COLLINS KWM-1 The first mobile SSB transceiver in the Amateur field — 175 watts PEP, 14-30 mc. Fixed station use without modification.

Net price $820.00

Buy your Collins equipment on our time payment plan. Trade in allowances will probably handle the down payment. Contact us now for complete information.

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plays at the Loomia High Science Fair. MIXT and KN1ARM had exhibits at the Concord High Science Fair. KIBCS presented a ham activities program for the Franklin Kiwanis Club in March. YHI has a new three-element 10- and 15-meter beams. The North East V.I. Net is operating nightly on 160-30 mc. Bridge appointments: VAI, VBX and MEL as OOS; MEL as OBS. Endorsements: FUA as OBS; DYE as OPS, OOS and OBS. ALPs go to KNYD, FOB and KOB.

Traffic: (Mar.) KIBCS 528, WIAA 92, KDA 63, ENN 63, GMH 92, MOI 92, KVG 57, YMJ 34. EVN 9, EZ 4, CUE 2. (Feb.) KIBCS 970, WIEOW 107, HKA 105, KIBIP 20.

RHODE ISLAND—SCM, Mrs. June R. Burckett, W1WXC—SEC: PAZ, PAMs: KCS and YRC. RM: BBN and BTV. LSP has been appointed OPS. Endorsements include KIAAB as OBS and BTV as OPS. KIAAB has been awarded a sectional certificate. PAZ, YRC, KCS, BTV, BBN and VXC speak to the group of 12 ECs, 4 OPSs, 2 OBSs, 5 ORSs, and 3 OOs in attendance at an Informal Discussion Meeting held Mar. 19 in East Providence.

Traffic will return home from Europe about the middle of July, AXJ is on the air at DLAADY and is looking for his R. L. friends on 20, 15 and 10 meters. HKN has built a 6-meter converter taken from the Handbook K1ABR has added Ohio and North Carolina on 2 meters. AFN was a guest of the BYARC on Mar. 29. The PRA had an excellent turnout at its auction Mar. 11. KOXY wants a schedule with any R. L. station. ZP in CEW and WWN which was used for the group of 12 ECs, 4 OPSs, 2 OBSs, 5 ORSs, and 3 OOs in attendance at an Informal Discussion Meeting held Mar. 19 in East Providence.

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The Ampex 6939, world's first commercially available transmitting tube with frame grid construction, is capable of 5 watts total anode dissipation and 5.5 watts useful power into load (ICAS), in a miniature envelope with standard 9-pin base. It is internally neutralized and can save entire stages in equipment design, reducing circuit complexity and cost. Net price of the 6939 to user is $14.00.

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312c-1 Speaker in cabinet......25.00
351d-1 Mobile Mounting Tray.....86.00

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HIC has 300 watts e.w. at Malad, GOX, at Moscow, has a ban on antennas. CQV spoke to the Pocatello club recently. The club has a new call, DAX, with a DX-1 and an NC-100. New officers and new officers abound, SKP's mobile went dead on his visit there. CDA is planning a new TV station. Let's clean up the sloppy operating between 75 and 2 meters and improve operating standards before the FCC hits. Anyone hear what monitors your area. More friendly Official Observers are needed. Traffic: (Mar.) W7QC 25, E0Q 29.

Montana - SCM: Vernon L. Phillips, W7NPY/ W7GZ - SEC: KUH, PAM; E01, RM/W7EIM: KUH, PAM/W7EIM, were prize-winners at the Billings Science Fair. New calls: KN7BNB at Livingston; K7BQF, W7BQF and KN7ZCW at Billings; K7ZM2Q at Great Falls; KN7DBD at Ravarjo, KA1M2X moved from Livingston to Casper, WY. K7BQF moved from Roundup to Philipsburg, GOA moved from Bismarck to Great Falls. New officers of the Old Faithful Radio Club are Pete Lunders, pres.; K7CHT, vice-pres.; H7X, sec., and Bill Zander, treas. The Picnic will be held June 8 in Wheatland County Park at Harlotton. The 24th Annual Glacier Park Hunt will be held June 16-18 at Apgar Village, Montana. The 26th Annual W.L.LU. Hunt will be held Aug. 2-3 at Big Springs, Idaho. Traffic: (Mar.) W7MIM 48, PF6 45, OOG 12, NV5 8, G7H 7, K7BQO 5, AXD 2, W7BKB 2, JFV 2, CCQ 1, EWR 1, TGM 1, (Feb.) W7HIM 48, PF6 45.

Oregon - SCM: Hubert R. McVetty W7DZX — YLV now is operating full break-in, OAIW is working hard for his 30-w.p.m. sticker. A new 6-meter net in Portland is operating on 50.55 Mc. and meets each Sun. at 5:00 PST. Anyone hearing them is welcome to check-in. The Portland ARC is working on the 6-meter RACES Net along with the conversion of ARC-les for use on 6 meters. We recorded the following passings of QSO's, of Portland, who received many write-ups on his D.M. work with model planes, lawn mowers, etc, SUN has a new Combiner III. LT reported help from friends in Alaska. QUS is Globe operating under new officers, active in the hospital. A good month in March in spite of weather, with AM, OAIO, BVH and ZEH making HLA1. L7N has a new baby daughter. The Allies ARC's new officers are NSA. pres.; JCV, vice-pres.; AIZ, sec. The Astoria ARC's new officers are PHX, pres.; HQL, vice-pres.; EUC, sec. Q7S, new members, make regular reports. The O-meter RACES Net meets every Sun. at 2000 PST. Anyone hearing them is welcome to join. The Portland ARC's new officers are NSA, pres.; JCV, vice-pres.; AIZ, sec. The Astoria ARC's new officers are PHX, pres.; HQL, vice-pres.; EUC, sec. Q7S, new members, make regular reports. The O-meter RACES Net meets every Sun. at 2000 PST. Anyone hearing them is welcome to join. The Portland ARC's new officers are NSA, pres.; JCV, vice-pres.; AIZ, sec. The Astoria ARC's new officers are PHX, pres.; HQL, vice-pres.; EUC, sec. Q7S, new members, make regular reports. The O-meter RACES Net meets every Sun. at 2000 PST. Anyone hearing them is welcome to join.

Washington - SCM: Victor S. Gish, W7FLEX - This is the last report of your present SCM. Thanks to all of you who have been so good about submitting reports regularly — it helps to make the job easier. At this writing bulletins are now out for you to vote for either OK or PGY for your new SCM. AIB is continuing with his efforts to get all of the WSN to take ORS appointments. AMC is checking in on WSN regularly. BVH is using a BC-474 and setting FB reports. LYM is thinking of putting up a vertical for 80 meters. G7J is a new WSN member from Mount Lake. FYZ is checking off on traffic and is busy trying to keep the car going. CWN still has projects in the field and reports some traffic for a change. QSL reports there is no activity until summer. JFW has about finished with school and should be back in Sullum when you read this. NWP now is using a DX-45-000-000 report in place. Any connection between the two? RGL is sending QSO's on 3700 kc. at 1800 PST Tue., Thurs, and Sun. WNTXHE passed the Tech. Class exam, AVM is trying to get into the Aberdeen gang to go in for ORS appointments. The Valley ARC reports new officers are D0E, pres.; ZMC, vice-pres.; K7APF, treas.; JCV, sec. GBR will handle the Field Day activity this year. HUT now has 75-meter antenna up. The Clark County ARC held a hamfest May 7 with attending. Traffic: W7BA 1701, PGY 554, K7WAT 270, W7DZK 141, AH 58, AJS 72; AMC 66, W7GL 41, OQ 45, W7UU 40, RNX 41, K7TO 42, WAU 41, HUT 13, E0Q 6, CWN 5, G7V 5, JEY 4, NWP 2, RGL 1. Pacific Division

Hawaii - SCM: Samuel H. Lexell, K7RBD — (Continued on page 188)
NEW MULTI-BAND ANTENNA COILS

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**THE ARISTOCRAT**
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20M - 3 ELEMENTS
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Carefully engineered, incorporating the latest design principles for top performance, the hy-gain monobanders are factory pre-tuned and pre-matched. Complete with easy-to-follow instructions for assembly, these beams sold with 1 year guarantee. Features in-clude large diameter elements and ruggedly built Boom/Mast clamps. Booms hot dipped galvanized steel for max. strength with minimum wind resistance. "Hy-gain" elements, 6061T6 alloy. Extremely simple to put up and into operation.

Average Gain: 8½ db. Average F/B Ratio: 24 db.

Don’t forget the ham convention to be held on Kauai this year. July 4, 5 and 6. The plan has been approved and will be sponsored by the newly-received Kauai Ham Club, AAJ, AWG, AYG, CKD and KS have received their KSCM licenses. The Islander representatives are looking forward to seeing you in RN6. How about some traffic man contacting your SCM and getting us into the national picture? K6QCG is the latest call assigned on Wake Island, but KB6Q has moved there and has applied for a KW6 call. Since your SCM spent a month on Wake Island, there will be no traffic reports this month. Any that were sent in will be reported next month.

NEVADA—SCM, Albert R. Chin, W7JVL—SEC: JU, Activities are still in progress in the Reno Area with good attendance at club meetings and a variety of activities. The transmitter hunts, B7Y, reports the issuance of certificate No. 58 to CRT for 25 Nevada contacts and endorsement No. 8 to AKW for 50 Nevada contacts. The visitor to the March NARA meeting was H81B, Al Williams, from Thailand, who will be looking for the group on his return home. Watch for him on 10 meters, ZHW, now s.s.b. with a new Packemaker, is hoping this is the answer to TVI. TQE handled emergency traffic over the Red Cross Net during the heavy snow storms, and Traffic was handled between Reno and Echo Summit, Calif., the site of some nice staged Greyhound busses. TQE, a man of many talents, is assisting Mrs. Chinn, one of the teachers at Northside School, in conducting code classes for potential Novices. Be prepared. Field Day is around the corner.

SANTA CLARA VALLEY—SCM, G. Donald Eberlein, W8YHM—SEC, NOV, RM: ZRJ and QMO. KEYKG is a new OIH. Endorsements: YHM and ZRJ as OIBS; JG and RBB as OSS; OZ as OOFJ; OZG, VKQ and ZWE as ESC; ZRJ as OQ. Section net certificates were issued to PLG, K6YKG and K6SRC. The SCCARA will hold meetings the 2nd Mon. of each month in the e.d. room of the new City of San Jose Police Communications Building in the Rosea Street Civic Center. K6YTV lost his beam and tower after a day of wind storms but both have been replaced, K6BMP, K6TW and K6BBC will operate portable under an X7L call from San Felip, Baja California, turning in the necessary paperwork for Top performance, the hy-gain monobanders are factory pre-tuned and pre-matched. Complete with easy-to-follow instructions for assembly, the beams are sold with 1 year guarantee. Features include large diameter elements and ruggedly built Boom/Mast clamps. Booms hot dipped galvanized steel for max. strength with minimum wind resistance. "Hy-gain" elements, 6061T6 alloy. Extremely simple to put up and into operation.

Average Gain: 8½ db. Average F/B Ratio: 24 db.

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3. Set tune selector switch to RA TB. The same tuning procedure applies as to Mode 2 except channel A and channel B are now reversed.

4. Set tune selector switch to RB TB. The same tuning procedure applies as to Mode 1, except you are now transceiving on the channel B frequency. By alternating between RA TA and RB TB you can maintain contacts with two nets without disturbing any frequency settings.

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SPECIFICATIONS

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- Transmits or receives SSB (upper or lower), single sideband with carrier (AM) or C.W.
- Peak-Null "Q" Multiplier.
- Receiver Sensitivity: 1 Micro-volt @ 6 db S/N ratio.
- Single 6146 output.
- Built-in VOX and QT.
- 40 db suppression.
- 3.1 kc mechanical filter for transmission and reception.
- Dual speed tuning knobs with ratios of 20:1 and 100:1 over a 600 kc band spread.
- Meter Indication for R.F. output, final Grid or Plate current and receiver signal strength.
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Amateur Net Price

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Power Supply #P35

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HAMMARLUND

SAN FRANCISCO—SCM, Fred H. Laubacher, W6OPL—The report this month consists of activities by numerous operators who had their respective stations in readiness for any possible civil emergency due to the heavy rains threatening the lives and properties of families throughout the State of California. Congratulations go to the northern area of this section, namely, the tri-county emergency drills which are held each Sun., at 1030 on 3720 kc., QSY, as usual, provided brass to the tune of a full radio count. A station activity report was received from SLX, in Eureka, who states that WSP/2 has moved to Eureka.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, WA7HVJ, EC: K6BO, EC: K6BO, Don’t forget the ARRL Pacific Division Convention to be held in Fresno June 7-8, 1958. The Hotel California will be the headquarters with activities at the Blackstone Auditorium. The officers of the Delta Amateur Radio Club are K6AXV, pres.; K6RR, vice-pres.; and K6QBD, sec-y-treas. ARRL reports that the 2- and 6-meter station is operating in the new ed. headquarters in Hanford. K6AXV wants it known that he is in Merced and not in Turlock, as previously reported. JUK got his W3DZZ beam up and reports fabulous results. He also got a new SX-101, QFR got his W3DZZ beam up 60 feet and is pleased. JPS has 21 states confirmed on 6 meters running 2 watts to a ground-plane antenna. NKZ pressed his General Class test. K6BYV was looking for the 2-meter gear. K6AXV moved to Kansas City, The Tulare County Amateur Radio Club holds meetings in the new Club House, in the basement the 1st Wed. of each month, ARC spent

532 for the 2-meter net. K6OSO received his 20-w.p.m. sheepskin. K6QNZ is a new Novice in Berkeley. K6CG had BPL for February and March. K6TVU moved into 2-meters, NW visited NW, K6ZBL has 50 counties for WACC and 28 states for WAS and runs RTTY on 6 and 2 meters. K6RQP is pushing ARRL on 1.5 kc. and 100 contracts. There are several appointments open within the section, including PAM and HM Status. Contact your SCM for the appointment desired. New those who were coming in. The more the better. Traffic: (Mar.) K6GN 85, WN1W 171, G6S 58, W6O1H 20, K6Z1B 16, QHC 7, UHC 2, (Feb.) K6TR 718.
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KWM-1 Net Price $820.00
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two weeks at Treasure Island with the Navy Reserve.
I report reports, fellows. See you at the Convention.

TRAFFIC: (Mar.) KG3AT 307, W6ADH 468, ERL 12,
ARE 7.  

ROANOKE DIVISION

NORTH CAROLINA—SCM, B. Riley Fowler, W4KRM—SEC; HUL, PAM: DRC, V.H.P., PAM: ACY; HUL is busy changing the procedure on the Tar Heel Emergency Net in accordance with the amendments adopted recently. The State is divided into eleven areas and a copy of the call areas has been furnished to all net members. The AREC districts have been changed to correspond with the new net areas. Some areas will have three or more Emergency Coordinators while some will have only one. The plan is to have each EC responsible for having ONE representative on the Tar Heel Emergency Net, with an area net established with the AREC on 2, 6 or 10 meters or some frequency other than 3865 kc. The dup to this new process will be the EC. If he functions properly, the program will be a success; if not, it is doomed to failure. ECs should give this top priority and get this done. If you feel that you cannot do this, please notify HUL so he can replace you as EC.  

Charlotte is planning a big hamfest May 25, Asheville is tentatively planning a big one July 4–5. I get many fine bulletins from amateur radio clubs. I wish each club would write me giving the club name and officers. I would like to keep you informed on the State Bulletin on what is going on in the State.

SOUTH CAROLINA—SCM, Dr. J. O. Dunlap, W4QV—KAPB has been appointed as SEC and PAM as PAM. ARC’s RM appointment has been endorsed. The Lancaster Club, with K4OOG at the helm, is busy to our talk and advice on EC, and has secured much help on RACES from HJXK, the director of c.d. for York Co. SOD is back on the state ready to resume activity in the ARES. Congrats to the Charleston Club on the new bulletin. EVA—W4HJO. K4POP and CPS can furnish details on this club’s hamfest to be held May 2 and 3. F4P has one of the most elaborate station set-ups for emergencies in the State. K4KPB writes of the Church Club meeting, 30 members from 5 counties, with H4MB as guest speaker. HQK is hard at work with the S.C. Novice Net on 3745 kc. ZES is awaiting confirmation for WAC as DL4X. K4TEB and K4OA are busy with their Commercial Class exams. The Barnwell, N. Augusta, Aiken, Williston Ham Picnic will be held at Barnwell State Park. June 1. Officers of the Shandyham Amateur Radio Club now K4DJW, pres.; K4QVN, vice-pres.; K4YJ, secy.; K4OKC, treas. Traffic: K4QVN 188, G4AT 166, W4PED 46, AKG 36, GQY 10, FM 5.

VIRGINIA—SCM, John Carl Morgan, W4XK—SEC PAK reports a very successful c.d. drill in Norfolk County. V.h.f. activity in the state is burgeoning; K4BIK is sparking a 6-meter net with participants in Va., Md., Pa., W. Va. and the District Sun. at noon. The Richmond Area 2-Meter Net meets Mon. Wed. and now has a link with the Norfolk Area. Drills with “club saver” portable antennas are being conducted in the Norfolk Area. K4QES says he XYL, K4YQER, ended the first Norfolk “Cradle of Democracy” certificate (a new award of the Lower Peninsula’s Hamp- ton Roads ARC), QES K4EVE is busy reporting the tracking of satellites to King’s College. The VFN Annual Picnic officially is scheduled for June 15 at SH’s farm in Fluvanna County. K4CQJ now is K4AUU at Warrenton, MO moved to Maryland and now is 3 ML. We regrettfully note the passing of BLE in March. HK headed for XE-Land for a few months. K4FIQX recently replaced a long wire “coated with my blood and the XYL’s tears!” AAD now has a 1-kw. s.s.b. linear final peaking. K4ELG made WAS on 80 meters, CYO is chasing his Master’s degree at G.W.U. while K4RYS and K4EAQ both are too busy colloguing to do any hamming. K4ORQ blames inactivity on the net, K4DWP dropped in on the SCM en route home for Easter. The Richmond Club reports QSLs continue to arrive for VA-19, 407 certificates having been issued as of Feb. 26. Traffic: K4AT 545, ELG 354, W4PPC 374, K4KPH 29, W4QK 275, K4EZL 33, QES 229, QIN 128, W4ET 73, YYG 65, K4ELG 52, DSD 42, W4KX 41, SHJ 41, K4CGW 40, W4PVA 28, K4ECD 27, W4HPG 25, LA 25, CYO 25, K4EYM 19, WAAD 18, K4UEP 15, K4US 10, K4HP 12, K4UP 11, W4LK 8, LW 8, OOL 5, CYO 3, JUJ 2. (Feb.) K4CGW 302, W4TIM 105, K4ORQ 1.

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SSB Mobile Transceiver

Get outdoors during hot summer months with the KWM-1, the first SSB Transceiver for fixed or mobile use. Easy-as-pie removal from convenient mounting tray under your car's dashboard. Look at these features: operates on ten 100 KC crystal-controlled bands anywhere in the 14-30 MC range; common components in transmitting/receiving circuit saves space, assures exact coincidence of signals in transmitting and receiving; self-adjusting automatic load control; mechanical filter sideband generation; complete TVI filtering; PI-L output network; panel meter is S-Meter during receive, multimeter on transmit. Input of 175 watts PEP on SSB. Uses VOX circuits for break-in C. W. with built-in monitor. Transmitter input designed for high impedance crystal or dynamic mike. Frequency stability is within ±100 cycles, noise 40 db below one tone carrier. Readability comparable to KWS-1/75A-4. Only 6 ¼" high x 14" wide x 10" deep. Loads of other features too.

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<td>$820.00</td>
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<tr>
<td>518E-1 12 VDC Power Supply</td>
<td>$262.00</td>
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<tr>
<td>518F-1 115 VAC Power Supply</td>
<td>$136.00</td>
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<tr>
<td>312B-2 Speaker Console with Directional Wattmeter</td>
<td>$185.00</td>
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<td>312B-1 Speaker in Cabinet</td>
<td>$25.00</td>
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<tr>
<td>351D-1 Mobile Mounting Tray</td>
<td>$86.00</td>
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in these new CP STATIONMASTER ADVANCED DESIGN ANTENNAS

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- Light weight
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- Potted In Fiberglass
- 144-175 MC Cat. No. 200-509
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- Cut to exact frequency

TP2WBD, EA8 has slowed up on his DX because of school work. VII is working good DX with his DX-100, SSA does a fine job in editing the Black Diamond Club's bulletin. K8BYJ is doing a fine job of operating. K8RO is a new OPS and OBS on the V.H.F. Net, The 50-Mc State Net has been organized to assist the Weather Bureau in obtaining data on river conditions in the Huntington Area. At other strategic locations, K8AO is doing a fine job as V.H.F. PAM, K8CRM is active on 75 meters with 18 watts and QSOed at 2187 kHz. FUM is active with the Weather Bureau Net. FNI handles 30-meter traffic for relays with the Weather Bureau and does the same thing on the 75-Meter Phone Net. DPO is building a new rig. JNF is a new ham in Huntington. CVW has a new mobile rig. ARF is active on 9 meters as a 1BB. IEQ has a 1/4-wave five-element 2-meter beam. K8GW dropped the "N" from his call. NTH is very active. K9HL has a new 20-meter ground-plane antenna. Traffic: (Mar.) W8N 145, VY8 108, HZ8 03, BWK 41, HZ8 02, 4BW 23, HRO 4, LDB 2, (Feb.) W8SNF 7, (Jan.) W8N 27, SNP 19.

ROCKY MOUNTAIN DIVISION
COLORADO—SCM, B. Eugene Spoonmore, W8DMJ
-SEC: N1T, PAM: CNW and IJH. OBS: KB9TU, OOE: OTL and RVV. VY8 tells us that the Rocky Mountain Radio Club in Gunnison is composed of 10 active members. K8KFW is running an HT-32, an HT-33 and an 86-101. K8CEN is remodeling his shack and putting up antennas. KV9NX has moved to Thornton from W6-Land. YHL works 40-meter cw, and 2 meters mobile. IA has been under the weather, but is doing fine, using 2 meters and running 380 watts on 6 meters. New 6-meter members are KB9YV and K9HTF. According to the R.F. Column, K6QY and Q6L are chairman of the Western Slope Disaster Committee. CNM is working 2 meters. K9DCW, JCV and BAG are charter members of the Day Amateur Radio Chapter in Colorado. Contact K9DCW for details. BWJ says VE3EAM worked enough dinner stations for the Nite-In Award Sunday afternoon Mar. 2, K8KXZ and K8AXK are ventilators and K8JYK is inkslinger for the Splatter Chatter. K8QOA, FCC engineer, gave a technical talk to the El Paso Radio Club, HFR records won a set of phonograph records for OM UP8 in a contest. Traffic: (Mar.) K8CQ0 008, W8KDO 61b, IA 586, W8KX 001, K8UXF 130A, IA 586, W8QOT 131. K8DCD 96, W8NYU 65, K8KZM 1, VY8Z 27, MDT 24, W8HJO 21, K8QF 19, CBI 14, EFA 13, RAY 18, NIT 8, K8GUY 4, (Feb.) W8RV 13.

UTAH—SCM, Thomas H. Miller, W7QWJ. Ass.-SCM: Col. John H. Sampson, Jr., 70CX, SEC: FSC. RM: UTM, PAM: RHN. V.H.F. PAM: SN. QOC gave the Novice exam to 16 candidates during March. UTM has both vertically and horizontally polarized antennas for 2 meters and can work both Ogden and Salt Lake from Bountiful, but he has to change polarization for each. QOC has earned the Rocky Mountain certificate. The minimum requirement is at least 37 per cent of the total check-list for any three consecutive months and RAU meets five days each week. John also is liaison station from RMN to PAM. K8KPO spent his spring vacation in the Club, K8KPO in Richfield, is back on the air after 30 years with a DX-100. The Beehive Net, with NCSs CQZ, VY7 and ZBL, has run smoothly. HHK is an elected NCS for the ARM Net, QW8 was married Mar. 24. Traffic: W7DZM 21, OCR 15, BOD 17, ZBL 10, QWH 8, FSC 6, UPM 1.

NEW MEXICO—SCM, Allan S. Harwood, K8DDA—SEC: CNW, PAM: ZU, RM: DWB. V.H.F. PAM: PPR. OOE: LRF and 8CS8/S. ORS: DWS, W8U, RFF and K8KXK. OBS: 8CS8W. The Breakfast Club meets Mon. through Sat. on 7272 kc at 0700; NMPEN, Tue. and Thurs. on 3588 kc at 1500 MIST and Sun. on 7272 kc at 0700 MIST. RAU, Mon. through Fri. on 3800 kc at 1900 MIST. A total of 153 students signed up for the Alamogordo Radio Club's code and theory classes. K8KZM is leaving the Club. K8EAZ is working back as EC for Santa Fe. Remember the Rocky Mountain Convention to be held June 13, 14, 15 in Santa Fe. For further information write W8N 214 in Santa Fe, K8AO and BZ8 have relinquished their ham shack. YNN received an RCC certificate. The Caravan Club will help Santa Fe with the forthcoming convention. The EC Net meets Sun. at 1900 MIST on 3580 kc. All officers are urged to check-in. The Total Amateur Radio Club will spend Field Day at Four Corners in USA, and contacts will count for the club's "507 Award" if a QSL is sent the club at P. O. Box 24, Farmington, N. M. Traffic: W7H 07, W7Z 23, NQG 16, C1N 8, K8GDU 7, LOV 7, DAA 6, GYB 5, W8Y 6, ZU 5, K8GUY 4, LDB 2, LFF 2, LOU 2.

WYOMING—SCM, James A. Masterson, W7PSO—(Continued on page 191)
For Every Ham Requirement...

the complete WRL Electronics line...

... More "Workable Watts" per Dollar!

Globe King 500C

Complete, Bandswitching 10-100M, Built-in VFO, 90w CW, 300w AM, 50v AM, 400V DC, Bult-in Power Supply.

W/T: $549.50
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Complete, Bandswitching 10-100M, Built-in VFO, Power Amplifier, 90w CW, 300w AM, 50v AM, 400V DC, Built-in Power Supply.

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For voice operated control, with extra contacts for auxiliary circuits in addition to the standard contacts for Xmitter.

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WRL's Power Attenuator PA-1

Use with Xmitter up to 70w input, for adjusting drive to linear amplifiers. Three power reductions, positions: 1. Classic input and output. 2. VFO and output. 3. VFO only.

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WRL's Voice Modulator UM-1

Versatile Modulator. Plate Modulator. 300w CW, 200w AM, 90w VFO.

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Kilt $299.95

Power Attenuator for Xmitter.

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Shielded Cabinet.

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W/T: $28.50
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Excellent for Xmitter and Hi-Bander. clipping prevention, harmonics at minimum, maximum output, 900-3500 cycles input, modulation indicates.

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Easy to assemble. Operates on 75 thru 10 meters. Has TVI suppression; meter circuit for RF voltage input, plate current, RF amp output, low Z input, 400-watt P.E.P. input with only 20 watts drive; pi-net, output; four Mod. 1625 Tetrodes. Especially effective for SSB; also AM, PM, CW signals. Complete with power supply, tubes. Only $149.95

LA-400-B, same as above, wired & tested $199.95 Also, Modified 1625 Tetrodes—each, $3.75

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Model 8020 plugs into 75A-2, 3, 4, Collins receivers; needs no changes or adjustments; Collins VFO controls freq. for both transmitter and receiver. For all SSB phasing type exciters using 9mc mixer freqs. Automatically zeroes in Xmt and freq. received. Operates upper and lower SB on 75 and 20 meters. Complete with power supply. only $129.95 Model 8010 for KWS-1 75 thru 15..only $179.95

RF CHOKES

HI Power Model 160-6 has max. rating of 5000 volts DC at 2.5 amps. Inductance 162 uh at 1 kc. Designed to operate on all amateur bands, 160 thru 6 meters. Each. $3.50 Chokes custom designed to your requirements also available.

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SEC: MNW, RM: BHH. The Pony Express Net meets Sun. at 0830 on 3920 kc. with AMU and MNW alternating as NCS. The VO Net meets Mon., Wed., and Fri. at 1830 on 3610 kc. with BHH, DXV and NMW alternating as NCS. QPP, charge of the DXV Manifest, will be held West of Buffalo, Wyo., on U.S. Highway 16, reports that plans are complete for the annual net-get-together July 12 and 13. The Sheridan County Radio Club is sponsoring the event, which promises to be first-class operation with plenty of prizes. Additional details may be had by writing QPP, 602 E. Long, St. Louis, MO. Sheridan. K7CSW is a new call in Casper, Wyo. Art has a DX-100 and an SX-70. N7UJ has a new NO-300 and a 85W 916A. P&H has moved to Casper from Arizona. Ray has a DX-35 and an SX-90. Triffics: WITQV 20, BHH 12, NMW 8, VHW/7 4.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Clarke A. Simmons, jr., W4HKK—SEC; EBD, PAM's; DGH and K4BTO, RM: RLG, With AREC membership climbing again, we are on the go. Still more members are needed, however, to fill gaps in the organization, particularly in the southern part of the State. If you don't know who to contact in your area to join, drop me a line. I'll be happy to assist you in getting organized. Congratulations to K4BWR and K4GRO, the first on a new shack and the second on a new boy. K4J is working the world with a new beam, LYA also has a new 3-band beam on a 90-ft. tower, ZSH got WAS and YK5T has a 25-w.p.m. cert. The Aug. issue of W4 is in the mails, and wants Alabama contacts on 10 meters. Let's help him. Montgomery has shifted to 3065 kc. because of BCI. This net still meets Sun. at 1600. The DX-100 meter net, needs representatives in the southern section. Contact K4JSP for details. K4KZJ is winner of the plaque as outstanding NCS for the last quarter. Triffics: (Mar.) WKLG 189, K4TTO 57, W4KXK 82, W4VOQ 43, W4QMO 41, W4VWZ 34, W4KAOZ 32, JDA 29, W4MDX 26, K4PQOZ 25, W4MDX 22, W4K 19, W4KBM 17, CXC 13, K4FDJ 13, WACM 12, C1U 11, W4KZQ 11, SJH 10, W4EIZ 8, R7QG 7, A7Q 5, W4KXK 5, K4RZK 4, W4QMO 4, W4KAOZ 4, W4MDX 2, W4VOQ 2, W4YWO 2, DGH 48, TOI 6, K4IAQ 4.

EASTERN FLORIDA—SCM, John F. Porter, W4KQK—SEC; JVT, RM: K4SSJ, PAM, TAM; TAS, Section nets: FPTN, 3945 kc. 0700 Mon., through Sat.; FMTN, 7330 kc., 12 noon Mon. through Sat.; FPTN, 3945 kc., 1730 daily; FN, 3075 kc., 1900 Mon. through Sat.; CN, 2100 kc., Mon. through Sat., last session 0000 to 0200 and slow session 0200 to 0300; FEPN, 3910 kc., 1900 Tues. only. K4EXN is off to Georgia Tech. 2CUL is visiting again in Florida and is active with her portable rig. Two Floridora YLs participating in the YL-QM Phone Contest were BIL and KOM. Fran scored 15.104 and Ennie 1660 points. The Floridora held their annual meeting at the Seabird Springs Hamfest at Orlando, in order to create more interest in the Annual ARRL Field Day, to be held the 1st weekend in June, the Staff of Florida Skip will sponsor an FD Trophy to the Florida Field Day net. The trophy will be held for one year by the winning club then passed along the following year to the next winner. New General Class licenses in Dade are W4F0 2, W4HON 2, K4AIQH 2, W4TOI 2. (Feb.) W4YRO 22, W4TOI 21, K4JSP 20, W4KZT 19, K4LNU 19, BWR 17, K4IWT 16, W4SJZ 15, K4MTP 14, W4BJI 13, TLB 13, W4FSS 12, CO2UG 11, R4JZ 10, RLL 17, CCF 11, F4KZQ 11, SIB 11). W4EOn 8, R7QG 8, R4KZQ 8, W4KXK 8, K4RZK 7, W4QMO 7, W4KAOZ 6, W4K 6, W4VOQ 5, W4MDX 5, W4YWO 5, DGH 48, TOI 6, K4IAQ 4.

WESERN FLORIDA—SCM, Frank M. Butler, jr., W4HKK—SEC; PQW, RM: AXP and BVE. The USNMLD Club at Panama City, K4NDD, has a DX-100. ARRL Director ZD spoke to a large gathering in Ft. Walton in April. New or renewed appointments have been given to ODL, CEF, APE, DLO, DMO and BVE. APE is an active ODI in the Tallahassee Area. ODI is QRT for transmitter pairs. DSH checks into the MARS and Alabama Phone Nets. CEF has made WAS, WAC and worked 70 countries with the Valiant. AXP is working on a high-power rig. Florida Skip, the all Florida ham newspaper, needs more support in this section. Write me or IVT. The Pensacola
Now, new improved weatherproofed and tunable “Insu-Traps” make them even better! Pre-tuned by the factory for positive performance, but color code calibrated for ease in peaking from phone to CW, or to any favored part of the bands. Rated at full KW. Perfect match (lower than 1.65 to 1 SWR) to a single 50 ohm coax line on all three bands—10, 15, and 20. Ruggedly constructed, for years of dependable performance.

NOW, WITH THE NEW AND EXCLUSIVE TRI-AXIAL GAMMA MATCH

“MONOBANDERS”
With the new GAMMA XIAL 1:1 SWR MATCH.
Here’s real top-grade performance and dependable long service—at reasonable prices!
Hy-Gain’s line of single band, three element beams will give you an average 8.5 db power gain, a front to back ratio of 24 dB. And, their exclusive, new GAMMA XIAL matching system guarantees a perfect 1:1 SWR match to 50 ohm coaxial cable—without any fuss of fiddling!

HY-GAIN BEAM ROTATOR
New, complete heavy duty rotator system, with built-in rotto-brake. Mounts in any standard tower. Has 16” diameter illuminated great circle map to automatically indicate beam direction. Complete, with control box $139.95

EASIEST TERMS
With a Harrison Charge Account you need pay only one-tenth each month. Send a few references and deposit with your order for quickest service.

THE TRIPLE BAND BEAMS THAT HAMS ALL OVER THE WORLD HAVE BEEN RAVING ABOUT!

THREE ELEMENT
The favorite! Now with separate 10 meter reflector. Greatest power gain per dollar, 8 db on all bands! 18 foot boom, 29 foot element. Weight 58 lbs.
Model 152-TG3, $99.75
(Additional 10 meter director element, for even more boost in power. Model AD-1, $14.95)

TWO ELEMENT
A space saver that can give you a healthy 5.8 db gain in signals transmitted and received! Boom only 6 feet long. Weight 36 lbs.
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ONE ELEMENT
Single three-band dipole, may be rotated or fixed in favored position. 28 feet long, weight 10 lbs.
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NEW! SELF-SUPPORTING MULTI-BAND VERTICALS

Only 21 feet high, but capacity top hat and 3 Insu-Traps give low SWR match to 52 ohm coax, on 10, 15, 20, and 40 meter band. Use with radials or on ground. Complete with new, improved fibre glass nylon base, hardware, and complete instructions. Model 14-AV—$27.95
Combination Radial and guy wire mounting kit. Complete with 5 ft mast. Model 14-RMK—$9.95

NEW! FULLY AUTOMATIC, 10 thru 80 without taps or switching! 38 feet high. With insulated mounting for side of house, tower, or pole.
Model 18-AV—$69.50

Newly designed Radial and guy wire mounting kit. Complete with 5 ft mast. Model 12-RMK—$8.95.

NEW GROUND PLANE for 2 and 6 meters.
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Club Ladies Auxiliary got a full-page spread in the Sunday paper. LJK and his XYL have been transferred to Alaska. Mary was succeeded by the XYL of OOW president at the PABO Auxiliary: K4MDO and K4OFP combined efforts on 40 and 10 meters to get an urgent message from IQU in Tennese to his XYL. SFT is on s.s.b. with an HT-22 on 20. W4FJ has swapped the NC-300 for an SN-101. CEP suggests a W. Fla. net for traffic handling and emergency work.


WEST INDIES—SCM, William Werner, K4PDJ—SEC: 4AAA, AET and AHH are new on 3925 kc. from Arecibo. ZC now has dipoles coax fed. WX is mobile with Genetus twin. RK now has a Tri-Bander beam 40 feet high. ACQ installed a Q multiplier on the HQ-120. FAE put up antenna systems on 60-ft. poles in small communities. KG4QF is on s.s.b. with 2000 watts. ZC is building a 2500 volt power supply for p.p. 813s. ADR uses voice, contra! on his transmitter. FW is back on the air, e.w. only.

CANAL ZONE—SCM, P. A. White, KZ5WA—W6BMO/MM, on the SS San Juan Eliza, and W2EZV/MM, on the SS San Juan, visited RV and VR/ when their ships passed through the Canal in March. Ex-BE, former RM of the Canal Zone, is now residing in Seattle, Wash., and is studying for his General Class license. The Caribbean Army MARS Net is active on 27,994-ke. phone through the month of March. A new W6MRS director is “Twigg” Braneh, AC5.TS, who plans other nets as participation warrants. New KZ5s are QQ, J. Smart, WR, L. Wrazen, and AG, W. Preston, Jr.

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Albert F. Hill, jr., W63OB—SEC: LSP, RM’s BEG and GJP, PAMS: K6BWD and W6ORS. The following stations earned BPL for the month of March: K6ICA, K6LHR, GYH, K6MILL, K6ZI, and Z6F. New appointments include K6KZJ as AA, K6FLR as OOS, K6KXJ and K6GLS as OBS. K6ICA lost a 75-ft. Telrex tower in the wind storm. W2H has a new batch of new equip-

(Continued on page 150)
**Featuring 3 Modes**

**AM - CW SIDEBAND**

in the new WRL Sidebander DSB-100

No Obsolescence: Adaptable to Present AM Equipment: Standard Crystals & VFO Used

- **100w PEP DSB Input, Suppressed Carrier; 40w AM, 50w CW; completely bandswitching, 80-10M; continuous coverage 3-9 mc and 12-20 mc** ... a complete transmitter, ready to go.
- **Minimum 35 db carrier suppression on all bands; if one sideband QRM'ed, receiving operator can switch to other.**
- **Three-stage RF section allows straight through operation.**
- **Internal tone generator facilitates tuning.**
- **PI-Net output 52-600 ohms; speech clipping and filtering for powerful communication punch and minimum band width.**
- **600V power supply has ample reserve for external accessories; socket supplied on rear of chassis.**
- **Thoroughly TVI-protected; provisions for antenna relay control.**

**In Kit Form:** $119.95

**Wired & Tested:** $139.95

COMPANION FOR THE SIDEBANDER . . .

**WRL's Globe Linear LA-1**

Operates Class B or C with Grounded Grid Final. 200w input operated AM Class B, 300w DC input, or 420w PEP input, Class B Linear SSB or DSB. Requires 15w RF driving power. 300w Class C for CW (15w driving power). Included well-filtered power supply, PI-Net output covers 80-10M, matches loads 50-150 ohms, 52 ohm PI-Link coupled output on 6M. Extensively bypassed, filtered & shielded for TVI.

**Wired & Tested:** $124.50

**In Kit Form:** $99.50

SUCCESSOR TO THE MODEL 755 VFO

**WRL's VFO Model 755A**

For 10-160M; output on 40 and 160M. Vernier drive with shock absorbing features. Completely self-contained, well-filtered power supply with voltage regulation. Temperature compensated for extra stability for SSB or DSB. Ideal for use with Sidebander. Approx. 50V RF output; will drive oscillator stage of any Xmttr. on market; simply plug in crystal socket. New Forward Look Cabinet.

**W/T:** $59.95

**Kit:** $49.95

**NEW BANDSWITCHING XMTTR. FOR 6 & 2 METERS**

**the new Globe Hi-Bander**

- **Completely bandswitching for 6 & 2M. Power input: — 6M, 70w CW, 80w AM; — 2M, 60w CW, 50w AM.**
- **Three-stage RF section allows straight through operation; all RF stages metered; all stages TVI-bypassed.**
- **52-72 ohm coaxial output matches all beams and most doubles. Variable antenna loading control.**
- **Regulated screen supply; adequate harmonic and TVI suppression.**
- **Ideal for operation with VFO Model 655; suitable for use as mobile Xmttr.; provisions for plug in mobile power supply.**
- **Adquate reserve power for operating VFO, speech clipper, relay, etc., from auxiliary socket on rear chassis apron.**

**Wired & Tested:** $139.95

**In Kit Form:** $119.95

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Write or telephone Tom, WA1FN

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(Continued on page 152)
At ARROW....Summertime Is Mobile Time

Mosley MA-3 Trap-Mobile
3-band mobile operation at its best. "Trap-Mobile" by Mosley offers the convenience of band-switching right at the transmitter and receiver. No mechanical gadgets or relays. Stainless steel whip sections & polished aluminum traps. Space wound coils never change inductance—weather sealed traps and potted base coil. New anti-sway design and slim profile cut down wind resistance & drag. Trap-Mobile has radiating qualities equal to an 8 ft. whip on each band—you save space by using only 3' length from base to tip. Low SWR over full width of 10, 15 or 20 meters. Amateur Net $19.95

12 Volt Dynamotor
Rated output: 625 volts DC at 225 ma. High efficiency; compact; no battery string; latest design. Brand new, recent military production. 5" diameter, 9" long. Shpq. wt. 14 lbs. Worth two to three times this low price $13.95

6 Volt Dynamotor
Rated output: 425 volts DC at 375 ma. High efficiency; compact. 4" diameter, 7½" long. Shpq. wt. 13 lbs. Worth two to three times this low price $12.95

Attention DX Men! "GUAM RADIO"
Central and South American call book, including a complete listing of all Mexican, West Indies and Brazilian (PY's) stations. 386 pages. Amateur Net $2.95

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A HI-PAR PRODUCTS CO.

2-pc. foldable aluminum mast, bracket, universal clamp. Fits standard mounts. Weight under 2 lbs.

Fits standard mounts. Weight under 2 lbs.

OKLAHOMA—SCM, Richard L. Hawkins, W5FEC—SEC: LXH. PAAMS: EJX and MF5KX is retiring from the Army and moving to California. Paula, IOZ, is the funds of the State Spelling Bee. EJC funds the high school. OK has good for local contacts. K5BQ is busy with nominations for YLRL offices. OJD is heard on the nets again; we used OKX here in the old times. K5INC was appointed as OPS. EJX resigned as PAW for 40 meters. Thanks for the PB job, Chief. MF5KX was busy mounting a new 28 Me. AMDX worked 60 countries the first week end of the DX Contest. K5M was busy with a law suit and missed the DX Contest. GOL is heard checking into all the nets. YJ, at O.S.U., operated portable in the Student Union during Engineers Week and stirred up a lot of interest. EKA is due a line band for his work in helping KN5QYF, who is blind, to get his transmitter working. The Lowton-Pt. Sill ARC originated a lot of traffic at the Easter Pageant. Oklahoma's Ham of the Month: K5BAH, for his PB reporting job from Bartlesville. Traffic: (Mar.) W4CSC/3 408, WS8E 133, K5CCC 86, W5KY 88, JFJ 68, K5GK 70, K5BC 68, K5LX 62, K5RU 61, KS6X 58, K5G 56, MF5X 56, K5FK 55, K5CSB 53, W5CQ 53, W5FC 52, K5DNQ 50, K5M 49, K5K 49, W5BF 48, K5BC 42, K5C 40, W5L 40, K5N 31, K5L 31, W5V 30, K5DR 29, W5V 29, K5L 29, W5V 28, W5CF 25, K5DNQ 22, ACD 18, BZJ 15, W5R 14, K5R 13, W5D 12, K5R 11, W5L 10, K5R 10, DJU 9, WSIER 3.

SOUTHERN TEXAS—SCM, Roy K. Englestadt, W5GEM—SEC: QRO, KM, FCX, PAAM: ZIN. It is with the greatest regret that we record LIIJ as a Silent Key. He, his XYL, and son were killed in a car wreck. The Houston Amateur Radio Club C.D. Net participated in its first emergency following an explosion at a rubber plant. Congratulations to K5SCAN on being made vice-president of F. H. Maloney Company. The good news has been received from the Oklahoma City UHF Club for the West Gulf Division ARRL Convention from the Baltimore Hotel—single $4.50, double $7.50. It is good to hear DEW on 40 meters again. GHL has returned to Texas A & M College. The Six-Meter Net in Houston had 21 stations check in on drill. It is Silent Keys for K5QYF. She passed away at the NAS hospital in Corpus Christi. ZIN is a new PAJ, KMLI is a new ORS, AKQ is activities manager for the Corpus Christi Amateur Radio Club. A hearty welcome to the Beaumont Radio Club on its affiliation with ARRL. There was a nice write-up in the Kingsville Naval Air Station paper (The Flying A) about the station amateur radio club. K5EGP has a new SX-101 and a three-element 10-meter beam. NZX has been working DX on the low edge of 80 meters with 75 watts. The 7220 Net had 44 sessions, 1148 station check-ins and 597 messages. The STS C.W. Net had 38 sessions, 229 station check-ins and 283 messages. It is time to plan to attend the ARRL West Gulf Division Convention in Oklahoma City, July 31, 31, and 27; Traffic: (Mar.) W5PHA/A 298, W5QD 225, UMY 206, NZX 174, K5JCC 104, W5ZIN 88, FCX 66.

CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, VE1WV—Asst. SCM: Aaron Solomon, IOC, SEC: AEB. Al reports that the former N4AREG Net has been changed to the Maritime ARSEC Net and meets at the usual times (1330 Wed. on 3796 kc.). Field Day competition will be heavier than ever with more clubs making plans for participation. The Maritime ARC's Net (3650 kc. at 2030) ties in with the Eastern Canada and Eastern Area Nets and provides an excellent outlet for long-haul traffic. Maritime amateurs are on the air and DX on 40 and 80 meters, making contact with two well-known amateurs. FG and SL, PZ is the second to make the WAZ Honor Roll. It is DX and hunting the DX the usual routine. DX is a must for all on the air at this time. DX is a must and DX is on the air.

Fig. 21-30—Dual-range r.f. voltmeter for use in coaxial line, using a 0-1 d.e. milliammeter. The voltage-divider resistors R1 and R2 (Fig. 21-29) are at the center in the lower compartment. The by-pass capacitors and Rs are mounted on a tie-point strip at the right.

This handy instrument may be just what you need to tune up that transmitter for maximum output. Or it may be used as a null indicator in an r.f. bridge you may use when matching feedline to your antenna. A complete description of this useful device, and many others, appears in the Measurements Chapter of the big 1958 Radio Amateur's Handbook: 746 pages, over 1350 illustrations, charts, diagrams and tables.

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**Standing-Wave Ratio Indicator**

(Continued from page 18)

do harmonics or overtones in the transmitter output.9 These days most transmitters are fairly clean, but the point is mentioned on the off chance that one or two readers may beat their brains out trying to match up something that is matched all the time. Most hams don’t try to match this close, but there are a few persnickety ones and we want them to be happy, too.

---

21.4 Me. The f/b ratio at best forward gain was 18 db. The coax recommended in various articles runs from 52 ohms to 125 ohms. It was found by trial that the s.w.r. ran 3:1 with 52-ohm coax and 2:1 with 75-ohm line. Fifty-two-ohm line with a quarter-wave transformer of 75-ohm line brought the s.w.r. down to 1.3 to 1, or better, over the whole phone band.

The 10-meter antenna uses 75-ohm coax and shows an s.w.r. of 1.4:1 at 28.5, and 1.5:1 at 20 Me. Since 52-ohm coax is used from the transmitter through the filter, Micromatch and coax switch, a 52-ohm unbalanced to 75-ohm unbalanced matching transformer (Lynnmar) was used between the coax switch and the 10-meter 75-ohm transmission line.

I cannot understand or find out from anyone why the dimensions in other articles seem to work for me on 10 meters, but are way off on 15 meters. If I were to do it over again, I would make my 15-meter elements 11 feet 9 inches on each leg.

Results have been gratifying, and I think the (Continued on page 48)

---

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W5FPT ........ 12,750-149-36-A-28
W5ST ........... 11,520-98-16-A-12
W5HL ........... 9,680-149-36-A-28
K5FPP ........ 7,940-36-5-A-1
K5HKW (K6HKW, K5HOQ) .... 3860-19-11-B-23
K5HTF ........ 395-19-11-B-3
South Carolina
W5STL ........ 60,900-200-64-A-24
W5KHS ........ 54,991-222-57-A-24
K5BDE ........ 25,200-149-51-A-1
W5STK ........ 17,525-242-39-B-10

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K6MBA ........ 10,520-149-51-A-1
W6USL ........ 11,200-149-51-A-8

Southeastern States
W6JTM ........ 25,200-149-51-A-24
K6HT ........... 11,520-98-16-A-12
K6FPP ........ 7,940-36-5-A-1
K6HKW (K6HKW, K5HOQ) .... 3860-19-11-B-23
W6BDE ........ 3860-19-11-B-23
K6HTF ........ 395-19-11-B-3

Sweepstakes Results

(Continued from page 84)

K6ZCL ......... 18,250-129-44-A-17
K6TOP ........ 222-42-2-A-20
K6BNT ........ 37,044-200-64-A-23
K6PTF ........ 4752-66-24-A-10
K6HIE ........ 96,001-505-66-A-36
K6GRW ........ 11,200-149-51-A-1
K6TX ................ K6HIE (4 opns)
W5CC ........ 312-304-12-A-19
K6GDS ........ 12,200-112-36-A-27
K6MBA ........ 10,520-149-51-A-8
W6HMQ ........ 11,200-149-51-A-8
K6HTF ........ 395-19-11-B-3
K6FPP ........ 7,940-36-5-A-1
K6HKW (K6HKW, K5HOQ) .... 3860-19-11-B-23
W6BDE ........ 3860-19-11-B-23
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Answers to Field Day Quiz

(Continued from page 70)

1. True. Novices must observe FCC regs for their class of license on FD as well as at all other times.

2. False. Either ARRL Sections or specific indications of QTH will do.

3. False. Filament power doesn't contribute to the plate circuit power. However, the plate input to the driver stage must be added to the plate input to the output stage when computing the input to a grounded grid amplifier, because the driver stage does furnish r.f. power to the antenna.

4. True. Although his licensing privileges permit him to operate just on certain v.h.f. bands, a Technician may serve as logger on any band provided that (1) his code speed is high enough to enable him to keep an accurate log, and (2) the station is under the control of a higher-class licensees. Some Techs are excellent c.w. men too!

5. True. Orville is a Class D home station because his driveway and beam antenna are at

(Continued on page 160)
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the site of a customary fixed station location. As such, he receives a total multiplier of 1 and credit for working FD portables only. His score therefore is $50 \times 1 = 50$.

6. False. This heart-rending tale of woe is deeply touching. In fairness to the thousands who have taken part since FD’s inception, however, ARRL never lists claims in QST when no log is on hand for inspection.

7. False. Clubs are free to use batteries but are ineligible for the 1.5 multiplier, available solely to unit-individual (Class B) and mobile entrants.

8. True. You gotta be in the field to earn any multipliers.

9. False. Although this message is in perfect form, it is worth no points to home station W9RQM. Only portables and mobiles are entitled to score credit for originating a FD Message.

10. False. Club portables can get a maximum multiplier of $3 \times 3$ or 9. See answer to question 7.

11. True. Class B or C entries with batteries and low power can earn a total multiplier of $13.5 \times 3 \times 1.5 = 13.5$.

12. True. To qualify for the independence-of-mains multiplier of 3, all radio equipment — including receivers, of course — must be independent of commercial power sources.

13. True. Despite the “slant one,” WD1X/1 may be a fixed station ineligible for multipliers.

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**D SERIES** (Standard)
Continuous operation at 30 watts. Selective taps at 200, 230 and 300 volts; intermediate voltage at ½ selective taps. Both voltages can be drawn simultaneously if total power does not exceed continuous ratings. Positive or negative ground operation. Input and output filtering included except for intermediate tap.

Size: 4¾“ x 3¼“ x 1½“  Wt.: 10 oz.  6- or 12-V Input: $39.95  24-V Input: $61.95

**DA SERIES**
Continuous operation at 45 watts. 450 volts and 225 volts simultaneous if total power does not exceed continuous ratings. Intermittent duty to 90 watts, 450 volts at 150 MA; 225 volts at 100 MA (5 min. on, 20 min. off). Positive or negative ground operation. Input (primary voltage) filtering; partial high voltage filtering provided.

Size: 4½“ x 3¼“ x 1½“  Wt.: 14 oz  12-V Input: $57.50  24-V Input: $79.50

---

**Toroid Transformers for Transistor Power Supply Application**

**H SERIES**

<table>
<thead>
<tr>
<th>Model</th>
<th>Input Voltage</th>
<th>Output Voltages</th>
<th>Power Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-6-450-1</td>
<td>6-VDC</td>
<td>450-VAC center tapped</td>
<td>450 and 225 VDC from bridge rectifier</td>
</tr>
<tr>
<td>H-14-450-12</td>
<td>12/14-VDC</td>
<td>450-VAC center tapped</td>
<td>450 and 225-VDC from bridge rectifier</td>
</tr>
<tr>
<td>H-28-450-15</td>
<td>24/28-VDC</td>
<td>450-VAC center tapped</td>
<td>450 and 225-VDC from bridge rectifier</td>
</tr>
<tr>
<td>H-6-100-125-150-D</td>
<td>6-VDC</td>
<td>Voltage doubler configuration. Secondary tapped for either 100, 125 or 150-VAC. DC Output: 200, 250 or 300-V at 125 MA.</td>
<td></td>
</tr>
<tr>
<td>H-12-100-125-150-D</td>
<td>12/14-VDC</td>
<td>Voltage doubler configuration. Secondary tapped for either 225 or 300-VAC. DC Output: 450 or 600-V at 200 MA.</td>
<td></td>
</tr>
<tr>
<td>H-24-100-125-150-D</td>
<td>24/28-VDC</td>
<td>Voltage doubler configuration. Secondary tapped for either 100, 125 or 150-VAC. DC Output: 200, 250 or 300-V at 150 MA.</td>
<td></td>
</tr>
</tbody>
</table>

Without Encapsulation (2 ozs.). 1-10 units: $16.00 ea.  With Encapsulation (3 ozs.). 1-10 units: $18.50 ea.

**HD SERIES — 2000 CPS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Input Voltage</th>
<th>Output Voltages</th>
<th>Power Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD-14-225-300-3-D</td>
<td>12/14-VDC</td>
<td>Voltage doubler configuration. Secondary tapped for either 225 or 300-VAC. DC Output: 450 or 600-V at 200 MA.</td>
<td></td>
</tr>
<tr>
<td>HD-28-225-300-3-D</td>
<td>24/28-VDC</td>
<td>Voltage doubler configuration. Secondary tapped for either 225 or 300-VAC. DC Output: 450 or 600-V at 200 MA.</td>
<td></td>
</tr>
</tbody>
</table>


**HDS SERIES — 2000 CPS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Input Voltage</th>
<th>Output Voltages</th>
<th>Power Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDS-14-225-300-3-D</td>
<td>12/14-VDC</td>
<td>Voltage doubler configuration. Secondary tapped for either 225 or 300-VAC. DC Output: 450 or 600-V at 300 MA.</td>
<td></td>
</tr>
<tr>
<td>HDS-28-225-300-3-D</td>
<td>24/28-VDC</td>
<td>Voltage doubler configuration. Secondary tapped for either 225 or 300-VAC. DC Output: 450 or 600-V at 300 MA.</td>
<td></td>
</tr>
</tbody>
</table>


**400 CYCLE SERIES**

<table>
<thead>
<tr>
<th>Model</th>
<th>Input Voltage</th>
<th>Output Voltages</th>
<th>Power Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-115-1.5-400</td>
<td>12/14-VDC</td>
<td>115-V at 1.5 amp.</td>
<td></td>
</tr>
<tr>
<td>24-115-1.5-400</td>
<td>24/28-VDC</td>
<td>115-V at 1.5 amp.  Dim: 3” dia. x 1” thick.  Without Encapsulation (12 ozs.).  With Encapsulation (16 ozs.). Per Unit: $76.00.</td>
<td></td>
</tr>
</tbody>
</table>

**OEM Prices on Request**

All fully performance tested, 100% guaranteed. Manufactured by makers of world-famous SUNAIR H.F. Aviation Transceivers.

**SUNAIR ELECTRONICS, INC.**
Broward County International Airport
Fort Lauderdale, Florida, U.S.A.
New Greenlee Ball-Bearing Drive Nuts and Drive Screws reduce friction and make it easier than ever to cut smooth, accurate holes with Greenlee No. 730 Round Radio Chassis Punches. The new faster drives are available for all round-type Greenlee Punches sizes 11/16" through 2-25/32". Operate with ordinary wrench for quick socket openings, etc., in metal, Bakelite, or hard rubber.

GREENLEE TOOL CO.
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WE'VE GOT "QSHT" *
World famous "Wonder Post" exclusively E-Z Way
- Crank up or down - 1 minute!
- Tilts over for easy access to beam!
- Brute steel in attractive design!
- 30 types from which to choose!
- No material lost in moving . . .
no guys, no concrete!

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"QUICK, STURDY, HAM TOWERS"

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P. O. Box 5491, Tampa, Florida
Send me your FREE catalogue on the following towers:

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- Ham Radio
- Two-Way Communication

I am interested in a tower . . . . . . . . . . . . . . . . ft. high.
I will use a . . . . . . . . . . . . . . . . . . . . . . antenna.

Type of Rotor
Name
Address
City . . . . . . . . . . . . . . . . . . . . . . State

E-Z WAY TOWERS, INC.
P. O. BOX 5491 - TAMPA, FLA.

14. False. Anyone who attaches a.c. mains to his mobile rig is no longer mobile for FD purposes. See answer to question 22.
15. False. W8QAV/Mobile handled all kinds of traffic: 60 QSOs + 25 points for his FD Message + 26 messages received + 26 messages relayed = 146 points before multipliers. 146 \times 13.5 = 1971 points.
16. True, but the front seat of a Model A can get awfully crowded!
17. False. There could hardly be six transmitters on the air simultaneously with only five available.
18. False. Remember, traffic other than FD Messages (as defined in rule 9) may have been handled. Such work would not boost the W1EH/1 score above 433 \times 9 or 3897 points.
19. True. Control locations for equipment operating under one call must lie within a 1000-foot diameter circle, but antennas may be at any distance.
20. False. A given entry receives credit for a consecutive operating period of 24 hours. VE1OM/1 can thus earn a maximum of 240 QSOs.
21. True. It is not a FD Message because it is not addressed to the SEC or SCM and the text does not state the number of AREC members. Just for fun, see how many other boo-boos you can discover in this message as received at ARRL.
22. True. Rule 4 reads: "Mobile stations are complete installations including power source and antenna, mounted in or on vehicles and capable of being used while in normal motion." The 160-meter zep reclassifies W0MFV/0 from mobile (Class C) to portable (Class A).
23. True. TCDRA is an emergency-powered home station because it is not at a site away from customary fixed-station locations. Since Class D participants receive no multipliers, TCDRA can score 250 points at best.
24. False. This was a unit-individual setup until the third operator sat in, whereupon it automatically became a Class A group ineligible for the battery multiplier.
W3ELIS/3's score is 650 \times 530 = 34500 (not 650 \times 13.5 = 8775) points.
25. True. Compute LARA's mobile aggregate as follows:

<table>
<thead>
<tr>
<th>QSOs</th>
<th>Tff</th>
<th>Mult.</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1CUT</td>
<td>20 + 25 = 45 \times 13.5 = 607.5</td>
<td></td>
</tr>
<tr>
<td>W1FXK</td>
<td>25 + 1 = 26 \times 9 = 234</td>
<td></td>
</tr>
<tr>
<td>W1HCP</td>
<td>30 + 2 = 32 \times 4.5 = 144</td>
<td></td>
</tr>
</tbody>
</table>

985.5
NOW!

READ THE AMAZING TRUE LIFE STORY OF HAM RADIO
AND THE DARING ADVENTURES OF ROBERT FORD, AC4RF
OF LHASA, TIBET! READ ABOUT HIS CAPTURE BY CHINESE
‘LIBERATORS’ AND HIS IMPRISONMENT IN CHUNGKING IN
“WIND BETWEEN THE WORLDS”

by Robert Ford, AC4RF

AC4RF’s personal account of his life in far-off Tibet and his experi-
ences with ham radio make exciting reading for any amateur!
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• Read about Bob Ford’s trial for radio-espionage! Read about his five
year imprisonment in a Chinese prison for being a ham!
• Read about Red China’s indictment of ham radio! Read how AC4RF
tried to explain ham radio and QSL cards to his Chinese captors!
(How would YOU explain a DX contest to a “brain-washer”?)
• Read about AC4RF’s struggle against Red China’s indoctrination—his
chilling account of five years of mental torture!
• Read how Bob Ford’s ham station in Tibet almost cost him his life!
• Read how his every QSO was monitored and logged by the Chinese
Reds! Read how his contacts with American hams were judged to be
espionage! Amateur radio on trial!

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a full-size replica of AC4RF’s exotic QSL card!
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How to hunt DX! How to get verification cards! ‘Do-it-yourself!’ radio projects! How to buy a second hand receiver! DX tuning hints!

Entirely devoted to the construction, adjustment and installation of rotary beam antennas! This book will make your antenna work! Eliminate guesswork in your new beam!
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Complete and concise information about beam antennas. Dimensional charts, SWR data, and construction data on parasitic arrays for the 6, 10, 11, 15, 20 and 40 meter amateur bands! Invaluable!

NOW HEAR THIS!
KASMC worked over 500 DX stations in all continents on 28 mc. phone with 12 watts and received 59 plus on five continents with 3 watts using a home-made beam designed from specifications in this Handbook!

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__________copies of NOVICE AND TECHNICIAN HANDBOOK at $2.85 per copy
__________copies of BEAM ANTENNA HANDBOOK at $2.70 per copy
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Street_______________________

Enclosed find: □ check □ cash □ money order

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I.A.R.U. News

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Tel. Victor 2-8350
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TURN COUNT DIAL
Registers Fractions to 99.9 Turns

FOUR roller inductances, INDUC-TIONERS, fine tuning gear reducers, vacuum and other multturn variable condensers. One hole mounting. Hand lever type. 2" x 4" dial — 1 1/2" knob. TC 1 has 2 1/2" dial — 2 1/2" knob. Black bakelite.

TC 1 $4.25—TC 2 $4.75—Spinner Handle 75¢ extra

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Automatic Sender
Type S
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Housed in Aluminum Case, Black Instrument Finished, Small—Compact— Quiet induction type motor, 110 Volts—60 Cycles A.C.

Adjustable speed control, maintains constant speed at any setting. Complete with ten rolls of double perforated tape. A wide variety of other practice tapes available at 50¢ per roll.

GARDINER & COMPANY
10099 Franklin Ave., Franklin Park, Ill.

YL-OM Contest Results

(Continued from page 82)

K5CC............9 6 68* K6KDK............6 6 45*
K5ID............5 5 31* SMTCAB............2 2 5*
W5MPE............2 2 5* OH9RD............1 1 1*
K68XA............45 29 1,581* V03AQO...........20 11 273*
K6JWA............61 27 1,579* V5BLS.............13 9 167*
K6KQM............23 14 405* V6E01Y.............21 13 273*
K6KFT............15 8 150* V6RNR.............14 11 103*
K6KLU............6 6 36 VE6CKR..............10 7 88*
K7TJ.............34 14 257* VE6SLL..............9 7 70*
W6EU............16 13 260* VE6DLB..............7 6 53*
W7TDT............13 13 247 VE6DUD..............8 4 40*
W7FKF............7 7 55* VE8XK.............19 11 261*
K7FHR............7 7 45* VO5NA.............16 11 176*
W7BLH............5 5 25

OM PHONE

W6LJQ............48 37 1,630* K2DSW............68 31 2,411*
W6TJW............47 37 1,625* K2RMW............39 37 1,212*
W66ZW............47 37 1,589* K2TMC............37 37 1,077*
W6TJG............45 37 1,519 K2TMS............30 21 788*
W6RKP............41 36 1,335* W2HSM............30 17 744*
W6CDT............38 34 915* W2WTH............37 17 710*
YO6LF............34 21 306* W9TCR............20 16 520*
W6ZBR............35 20 865* W5VMU............17 12 255*
W6YDO............28 17 503* W0VVF............18 11 283*
W6OT6............21 17 510* K0PDF............31 20 710*
K6DWK............26 14 455* W6UVC............33 12 156*
K6DYG............20 17 125* K2JVE............9 8 90*
W6GWO............20 11 275* K2OUT............2 2 5*
K6BCT............32 19 760* W6G1R............28 16 800*
W61X............25 14 600* W6W1U............47 34 2,848*
W6RJF............26 21 546 W6RLV............30 21 1,500*
K09EM............19 12 300* K6ST............43 25 1,341*
W6WYA............18 11 218* K6WJW............13 21 1,206*
W6WQO............17 10 110* W6ARK............45 27 1,218*
W6SGB............10 4 112* W68QA............39 22 1,058*
K01W............8 7 70* W6ZHQ............32 22 1,058*
W6BLL............8 4 10 W6QUV............34 20 850*
W6MDQ............28 25 905*
DLIGT............6 7 55* W5XLL............21 27 509*
FASCR............20 15 300* W6XQG............24 16 480*

(Continued on page 166)
PLYTUBULAR CONSTRUCTION

CONSTRUCTION

Traps, Coils, Baluns or Gadgets
Insulators at Points of High Voltage.
Element Tuning—All Fixed and Full Size.
No Ungrounded Elements Exposed to Lightning.
Plastic to Support or Insulate Elements.

THE 9L-101520RG IS A BETTER BEAM ON 10, 15 AND 20 THAN THE AVERAGE STACKING OF THREE SEPARATE SINGLE BAND BEAMS HAVING 8 DB GAIN AND 24 DB F/B. ALL THREE TUNERS REACHABLE FROM THE TOWER FOR UNITY MATCHING.

PLYTUBULAR CONSTRUCTION IS A PROCESS OF FABRICATING MULTI-PLY ALUMINUM BOOMS AND ELEMENTS, PERMITTING SMALLER DIAMETERS FOR GREATER STRENGTH AND LESS ICE LOADING, WIND LOADING, VIBRATION AND TORQUE.

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9L-101520RG 10-15-20 $217.50
6L-1015RG 10-15 105.00
6L-1020RG 10-20 157.50
6L-1520RG 15-20 165.00

ALSO A COMPLETE LINE OF SINGLE BAND BEAMS FOR AMATEUR AND COMMERCIAL USE.

2 METER CORNER REFLECTORS AND YAGIS AVAILABLE SOON
SEE YOUR DISTRIBUTOR OR WRITE—

TENNALAB - QUINCY, ILL.

3 COGENT REASONS WHY YOU SHOULD USE THE NEW DELUXE TECRAFT 1¼, 2 and 6 METER CONVERTERS

1 OUTSTANDING PERFORMANCE
Finest engineering — best design techniques — years of experience — all assure you of Tecraft's superior performance.

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Critical comparison of technical features, constructional details, wiring and components reveals Tecraft is your best buy!

3 THE ULTIMATE IN HIGH SENSITIVITY
Proved on every communication band from 50 through 220 mc.

SPECIFICATIONS
1. I/10 uv uv input will provide an output signal at least 6 db above noise.
2. More than 30 db over-all gain.
3. Adjustable RF gain to minimize cross modulation.
5. .005% crystals provide maximum calibration accuracy.
6. Extensive shielding and L/C-R/C isolation of power wiring prevents coupling to local RF fields and interference therefrom.

CRYSTAL CONTROLLED CASCODE CONVERTERS FOR AMATEUR, COMMERCIAL AND SPECIAL FREQUENCY APPLICATIONS — USE WITH ANY COMMUNICATIONS RECEIVER.

A Tecraft converter, connected to the antenna terminals of such a receiver, provides the finest reception and control of VHF signals. The resulting system is ideal from the point of view of LOW NOISE, EXTREME SENSITIVITY, HIGH GAIN AND MAXIMUM STABILITY. Virtually any receiver may be used, since Tecraft Converters are built with a wide choice of I.F. output frequencies — to suit the tuning range of the receiver.

FEATURES
- Sufficient output to operate several receivers simultaneously.
- Exceedingly low noise figure.
- High signal to noise ratio.
- Freedom from spurious responses:
- Minimum cross modulations
- Maximum rejection of IF feed through.

$44.95

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always under perfect control, and the signals are strong, clean and muscular tension common to old-fashioned keys, and it’s arm work for you. No special skill necessary. It is free of nervous usage. Gives years of the nest, easiest sending service. Take the and easy to read. Touch control provides the touch you like for That’s because its semi-automatic action performs all the tiring advice of the world’s finest operators and get your Vibroplex S33 Broadway New York 3, N. Y.

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That’s because its semi-automatic action performs all the tiring arm work for you. No special skill necessary. It is free of nervous and muscular tension common to old-fashioned keys, and it’s trouble proof. Adjustable to any desired speed — fast or slow always under perfect control, and the signals are strong, clean and easy to read. Touch control provides the touch you like for best work. Vibroplex is precision built for long life and rough usage. Gives years of the finest, easiest sending service. Take the advice of the world’s finest operators and get your Vibroplex today — its easy operation will amaze you.

Choice of five models standard or deluxe, priced from $15.95 to $29.95. Left-hand models, $2.88 more. Carrying case, $6.75. Order yours today. At dealers or direct.

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The following logs were submitted for fair-checking purposes only:

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That’s because its semi-automatic action performs all the tiring arm work for you. No special skill necessary. It is free of nervous and muscular tension common to old-fashioned keys, and it’s trouble proof. Adjustable to any desired speed — fast or slow always under perfect control, and the signals are strong, clean and easy to read. Touch control provides the touch you like for best work. Vibroplex is precision built for long life and rough usage. Gives years of the finest, easiest sending service. Take the advice of the world’s finest operators and get your Vibroplex today — its easy operation will amaze you.

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VIBROPLEX

Ends Sending Fatigue Forever
NEW! CONVERTER FOR TRACKING U. S. SATELLITE!

Now all radio amateurs can use their existing receivers to track the satellite signals. Our newest TC-108 converts the 108,000 mc satellite transmission to 14.4 mc standard output.

- Power Gain: 2000 (33 db).
- Noise Figure: 2.1 db.
- Image Frequency Rejection: 65 db.
- Rejection of all other Spurious Responses: greater than 65 db down.
- Intermediate Frequency: 50 ohms normal.
- Output Bandwidth: 300 kc at 1/2 power points.
- Tube Complement: 417A/5842, 6BQ7A/6BZ7, 6CB6, and 12AT7.
- Power Requirements: (a) 6.3 volts at 1.3 amperes. (b) +150 volts DC at 60 ma. regulated.
- Dimensions: 9 1/2" x 5" x 2 1/2" shielded base. Maximum seated tube and tube shield height 2 1/4".

Write for free TAPETONE instruction booklet on how to assemble equipment for tracking U. S. Satellite.

DAMPP-CHASER®
Reduces frequency drift
Protects your TX, RX, test or electronic equipment against moisture damage:

Ends leaky condensers
High voltage arc-overs
And corroded Xformers

The safe, efficient Thermo-Electric Dehumidifier that chases moisture before it strikes. Never needs attention — refills, baking out or emptying.

Model 1E 12½" Long, 8 Watts, 117V
Model 3E 16½" Long, 12 Watts, 117V

Comes complete with clips and instructions. Order longest size that will fit inside chassis. 24" attached cord solders to power SW terminals. Original equipment in Hallicrafters SX-101 and over 12 leading Electronic Organs.

DOUBLE GUARANTEE: Your money back if not satisfied after 30 days trial PLUS 5 Year Factory Guarantee.

AIRMAIL ORDER TODAY — WE SHIP TOMORROW. Postpaid anywhere in the world. Be sure to state models required. Sorry—No C.O.D.'s.

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P. O. Box 520 Hendersonville, N. C.

Also: Model TA-33 "Jr." (2 el.) $69.50
3 Bands, 10-15-20
Gain 5.5db, F-B 20db, SWR 1.5/1
Max. element length 24 ft.
Aluminum construction
Boom 6 ft.

For complete information, write for Catalog H-58.

'Hey Hams! "Trap-Master JUNIOR'S" here'!

Model TA-32 "JR." Designed specifically for low and medium power transmitters... 300 watts or less!

$49.50

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3 Bands, 10-15-20
Gain 5.5db, F-B 20db, SWR 1.5/1
Max. element length 24 ft.
Aluminum construction
Boom 6 ft.

For complete information, write for Catalog H-58.

Mosley Electronics, Inc.
8622 ST. CHARLES ROCK ROAD, ST. LOUIS 14, MISSOURI
**DOW-KEY**

**ANTENNA SWITCH**

**MODEL DKC-TR**

The DKC-TR features a gain of 0 dB at 60 mc to plus 6 dB at 3.5 mc. Can be close-coupled to the transmitter for easy, compact installation with a Dow DKF-2 connector. Instantaneous recovery, powered from transmitter accessory terminal. Matches 52 and 72 ohm impedance without insertion loss. Handles one KW with ease.

**POWER SPECS:** B plus 125-150 volts, consumption at 125 volts, 6.2 milliamps, .450 amps at 6.3 volts; uses 6AH6 tube.

**GUARANTEED!** Fully backed by factory warranty for unit replacement. **PRICE, $12.50** (price subject to change without notice).

**DOUBLE MALE-CONNECTOR (DKF-2)** for mounting relay directly onto output of transmitter. **$1.45**

See your local electronics dealer or write direct for complete specifications.

**DOW KEY CO., INC.**

**THIEF RIVER FALLS, MINNESOTA**

---

**Crystals**

(Continued from page 88)

Crystals in the FT-243 type holders are suitable, but those in the FT-241A type holder are not. Likewise, some crystals of current manufacture mounted in holders that are similar externally to the FT-243 have plated electrodes, as do the small metal-can type assemblies.

Last but not least, don’t try to grind your crystals too close to the edges of the Novice bands. Although a crystal is a remarkably stable device, its frequency can be changed — by temperature, by the kind of oscillator circuit in which it is used, and by the tuning of that circuit. Stay at least a couple of kilocycles away from a band edge — and make sure you know where that band edge really is before you try crowding it!

---

**Working WLP**

(Continued from page 69)

G3KVA, SM7BPO, FF8AD, EA8BF, K7CDF, KH6AHQ, HC1LE, OA4AS and 4X41X. Before I had even been able to realize it, I had worked all continents, and during the same period I had also picked up another 21 states, bringing the total up to 41 states worked.

Things were going swimmingly. I was getting glowing reports from all over, the QSL cards were rolling in under the door, my bug was purring from its insulated box; and I had wonderful visions of certificates all over the wall of the shack: WAC/WLP, WAS/WLP.

I had a barrow full of DX cards, and I was beginning to firm up a beautiful vision of the DXCC/WLP certificate and where I would put it in the shack and the party I would have to celebrate it.

The landlord thought it was quite an accomplishment, too.

I would like to amend the qualifying rules for the WLP certificate to include: “An eviction notice will serve in lieu of landlord’s verification.”

I was watching Alfred Hitchcock’s program on TV the other night, and he added at the end of his play, this little gem: the perfect murder, like the perfect marriage, owes its success to not getting caught. If Mr. Hitchcock should ever present a play about ham radio, he can add to the juicy bit: Working WLP.

---

**LOOKING FOR A TOWER?**

Check the ad on page 132 of QST for Feb. — or send for catalog.

**KTV Towers, Box 294, Sullivan, Ill.**
Tired of formulas and living on ur roof? Wanna enjoy ur hobby and live-a-little too?

If so, latch onto and install a TELREX Model TB-7E. It's the only no-compromise one-transmission line "Tri-Band"® providing satisfying top-man-on-the-frequency results on 3-bands with a genuine gain of 5.5 db and a F/B ratio of 19 db, without traps to break down, or tricks and formulas to fiddle with!

How much for TOP PERFORMANCE AND THE FINEST MATERIALS, TOO? ONLY $158.00 f.o.b. AP.—N.J.

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□ Cash □ M.O. for $ .
□ Send C.O.D.

SCIENTIFIC RADIO PRODUCTS, INC.

215 So. 11th St. OMAHA, NEBRASKA

TWX OM 458

169
9 X 10-inch walls of 1/8-inch aluminum sheet. These walls were fastened to the sides of the chassis on which the remainder of the components were mounted. In the circuit of Fig. 3, the collectors (which are connected to the outer shells of the 2N278s) are connected directly to the negative side of the battery. In systems where this negative side is grounded, the transistors may be mounted directly on the aluminum walls. Otherwise, very thin insulating material should be used between the transistors and the aluminum walls to provide electrical insulation while maintaining maximum heat conductivity.

All of those who participated in this project had a lot of fun and we are now looking forward toward a more compact and efficient transmitter using transistors in at least the modulator, leaving the high-voltage supply free to deliver its full output to the r.f. section.

The transformers mentioned in the text may be obtained from the following addresses:


It is interesting to note that the conclusions drawn from this independent investigation of transistor-type mobile supplies closely parallel those of the work done by W1YOR described in the April issue. — Ed.
CHECK YOUR QSLs

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Fine quality clock gives you 2400-hour time every hour of the day in every time zone all over the world. Key cities clearly shown. Direct reading, no computing or calculating necessary. Regular $15. value. Order your NC-300 now while this special offer lasts...

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The 3-band Mobile Antenna, with all the plus features, is at your Ham Dealer NOW!
Covers 10, 15 or 20 meters. Stainless steel whip sections, weatherproof traps, polished aluminum trap cover and...coils that never change inductance. "Trap-Mobile" by MOSLEY — your best buy!

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Walter Ashe Radio Company 1125 Pine Street, St. Louis, Mo.

Rush "Surprise" Trade-In Offer on my...

Send new FREE 1958 Walter Ashe catalog. 0-6-58

Name...

Address...

City...

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Ten Years Ago in "How's DX?" — An attempt is made to catalog DX log species systematically in the introductory paragraphs of your June 1948 columns. . . . Eighty-meter WACs are the current rage with Ws 5SC and 7KYU filing their claims. W4HBB's score of 45 appears to lead the 3.5-Mc. countries-worked race. CT3AB, F66BQ, F65AB, HICUB, J3AAB, KS1AI, MD5KX, UA8KAA and VR5FL are among items most sought after on 80 . . . . Forty is rather quiet. DX wise but 20 c.w., busiest as ever, distributes AP2B, CSYR, CZCA/NC, EK1AA, F66BQ, FT1AN, H1AI2, MD5PS, M16Z1, PK05A, UA1KEC, VS4WL, W3CMV/CG XYQT/CGG AMF/CI CO2Z/K6CO/PSK/K6K/RK, XS1KE, ZC5C/AC NJ and ZD8B favor . . . . Phone on 28 Mc. still is profitable: AR5AB, FB7JY, H1AI2, HZ1AB, J2L ACS/VC SCS, K5GW/VK9, MD5GW, P5KRR, VR6AA, XARC and ZC1AF are there. Even 11 meters comes to the party with EL5A, J9AI2 and OX3GE . . . . According to "Tiddbits", W4ZPB is back home attending to his Andaman Islands QSL backlog . . . . A striking photograph of His Worship the Mayor of Coventry, England, in full robes of office — OC G6WX to the DX gang — graces our DX pages.

June, 1933

"If successful we want to make it an annual affair" was how F.E.H. concluded his first Field Day announcement of twenty-five years ago. It was successful, apparently!

George Grammer discussed parasitic oscillations in neutralized amplifiers, a couple of broadcast engineers described some duplex portables, and James Lamb told how to convert standard superhetrodines to single signal receivers.

Power supplies were treated in one article on transformerless plate supplies and in another article on getting transmitter power from low-voltage d.c.

A loaded antenna for restricted space was described by W1EDY, W1CGB described a tube checker and circuit analyzer.

Ev Batty reported on the 1932 Third All-Section SSB Contest, in which the highest score was 55,420 points. No QSO totals were reported, but one station worked 63 out of a possible 69 ARRL sections! And this SSB ran not for two separate weekends but for 10 straight days!

DX notes: Using four OIAs, W6FTV worked F8BD on 3.5 Mc. ZS1H worked all continents in 2 hours and 2 minutes.

VACATION IN

FABULOUS NEW YORK CITY!

VISIT THE WORLD-FAMOUS SIGHTS—

- Statue of Liberty — United Nations
- Radio City — Empire State Building
- "Ham Headquarters, USA" (Bring along your old gear, and save enough on a trade to pay for part of your trip.)
- Chinatown • Ebbets Field (For Rent)
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FREE!

A postcard to Bill Harrison, W2AVA, 225 Greenwich Street, New York 7, will bring you an illustrated Visitor's Guide, calendar of Summer festival events, map, etc. — EASY PARKING

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Requires no tuning! Mounts in limited space. All aluminum construction. Use 52 ohm feed line. Complete with guy rope, hardware and instructions.

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LAMPKIN TYPE 205-A
MODULATION METER
Range 25 to 500 MC
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TIME PAYMENT PLAN AVAILABLE

LAMPKIN LABORATORIES, INC.
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At no obligation to me, please send free booklet and dope on time-payment plan.

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Are you having troubles? Let the latest edition, Volume Five, of ARRL "Hints & Kinks" give you a helping hand and save you grief and time. You'd be surprised at the shortcuts and tips listed in this book.

As its cover says, it is a symposium of 333 practical ideas for the station and workshop, and the Ready-Reference Index, a new feature, will help you find information quickly and easily.

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Here, in less than 120 square inches of desk space you can have a complete amateur station including the T-90 transmitter, R-9A receiver and the now famous Z match. More power and sensitivity per square inch than offered in any other package. See the H-W Bandmaster line today or write for details:

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An ideal connector for dipole antennas. Install in minutes. Completely moisture proof. For use with coax cables RG-8, RG-58, RG-11, RG-59 and 300 ohm twin tubing. Has eye pull up for inverted V's. One piece aluminum alloy construction. Weighs only 2 oz.

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Léo says: Now... Go Sideband... Inexpensively!
WITH THE NEW WRL SIDEBANDER DSB-100
100w PEP DSB Input
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3 Modes
  AM - CW
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$139.95 cash
$14.00 down
Only $1155 per mo.
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Kit $990 per mo.

Continuous band coverage 3-9mc and 12-30mc, covering the popular MARS and CAP frequencies. Designed for DSB, AM or CW, adequately protected for TVI, and adaptable for converting your present AM equipment to Sideband. Standard crystals and regular VFO can be used. Min. 35 db carrier suppression on all bands. If one sideband QRM'ed, receiving operator can simply switch to other. Will drive any of the popular commercial linear for sideband service, 3-stage RF section allows straight through operation for maximum efficiency. Internal tone generator facilitates tuning. Pi-Net output, 52-500 ohms. Speech clipping and filtering assures powerful communication punch and narrow band width. 600V power supply has ample reserve for external accessories. Provisions for Antenna Relay Control.

Globe Linear LA-1
IDEAL COMPANION FOR THE SIDEBANDER AND THE SCOUT!

$1077 per mo.
or $124.50 cash
Kit: $99.50
$8.21 per mo.

GROUNDED GRID CIRCUIT
Complete with well-filtered power supply, operates Class B or C, with grounded grid final. 200w input, operated AM Class B, 300w DC input, or 400w PEP input, Class B linear SSB or DSB. Requires 15w RF driving power. 300w Class C for CW (low driving power). Pi-Net output circuit covers 80-10M bands, matches loads 30-150 ohms. 62 ohm Pi-Link coupled output on 6M. Extensively bypassed, filtered and shielded for TVI.

Globe Scout 680A

$990 per mo.
or $119.95 cash
Kit: $99.95
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65 watts CW; 50 watts tone Plate Modulated
A compact, self-contained bandswitching transmitter for operation of the 6-m)M bands, with built-in power supply. High level modulation is maintained. TVI-suppressed cabinet. Pi-Network output on 10-60M; link-coupled on 6M, matching into low impedance beams. New type, shielded meter. Size: 8x14x8, with the bright new "Forward Look". Works like a charm with the new WRL Globe Linear, LA-1.

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HAM-ADS

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(2) No display of any character will be accepted, nor can any copy be accepted excepting those of the above character, together with the capitalized letter caps that would tend to make one advertisement stand out from the others. No Box Reply Service can be arranged, and nor may commercial type copy be signed solely with amateur call letters.

(3) All copy must be typed in double spacing using 20-point or larger type as noted in paragraph (6) below.

(4) All rewriting, retransmitting, or copying in any form must be approved by the Editor.

(5) Closing date for Ham-Ads is the 22nd of the second month of issue.

A special rate of 75¢ per word will apply to advertising which in our judgment, is obviously non-commercial in character, the putative ads are sought in their entirety or for the grade or character of the products or services advertised.

(a) This rate will not apply to announcements in columns where this rate may apply.

(b) Because error is more easily avoided, it is requested copy, signature and address be printed plainly and legibly.

(6) No advertiser may use more than 100 words in any one issue of Ham-Ads, or ad in one issue.

Ham-ads made no investigation of the advertisers in the classified columns except those obviously commercial in character, the putative ads are sought in their entirety or for the grade or character of the products or services advertised.

QUARTZ — Direct importers from Brazil of best quality pure crystal, and quartz, and quartz crystal, $25 per 100. Diamant Delphi Carbon Co., 240 Madison Ave., New York City 16.

MOTOROLA used U.S. communication equipment bought and sold.

WANTED: cash or trade, fixed frequency receivers 28/24 Me.

MICHIGAN Ham Amateur supplies, standard brands, Store hours 8:30 to 1730 Monday through Saturday. Roy J. Purchase, 1831 E. Hampton, Detroit 6, Mich. Tel. 8421/4.

WANTED: cash or trade, fixed frequency receivers 28/24 Me.

ATTENTION Molders! 82-312, 400 amp, system alternator, regulator & rectifier, condition unknown. The Purchas, 1226-120 M., Hammond, Ind. Tel. 313-402.

WANTED, 100 amp, system, alternator, regulator & rectifier, $50.00. Good working order. Robert V. Herz, 5907 West 39th Ave., Chicago, Ill.

ATTENTION Molders! 82-312, 400 amp, system alternator, regulator & rectifier, condition unknown. The Purchas, 1226-120 M., Hammond, Ind. Tel. 313-402.

QSL? 1097 SWLRS finest and largest variety samples 25¢ (refunded), booklets (Summer) $2.00 postpaid, "Take" Hackers, WNDY, 518, Box 218, Holland, Michigan. (Religious type qsls on request).

QSLs, Near, Attractive, samples 10¢, W0QG, Box 164, Asher, Idaho, Little Rock, Ark.

QSLs — We've printed a million Samles 10¢. QSLs 1704 BL, P.O. Box 140, Ft. Wayne, Ind.

QSL, Reasonable, 3 Week Delivery, samples dime coin. Dick, K8GJ, Box 204, Temple City, Calif.

QSLS, SWLRS, 100, $2.55 up, samples 10¢, Griffith, W3FFW, 1042 Pine Heights Ave., Baltimore, Md.

QSLS, SWLRS, 100, High quality, Reasonable prices, Samples, Bob Teach- en, K8ZY, 350 Adams St., Lewiston, Me.

QSLS, SWLRS, 100, $2.55 up, samples 10¢, Griffith, W3FFW, 1042 Pine Heights Ave., Baltimore, Md.

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tubes: $12.00. H. Hedden 333 Gullum St., Clinton, Temu
iters with new guarantee. 10% down witn up to 24 montbs to pay. m
mables, handset, control box, dynamotor, $35; commercial ship-«iiore,
used but excellent, $5.00 ; mobile dynamotors, 6v input, 645v 155 Ma.
condx and prlce. Col. E. VV. Sears, U.S.A. (ret), 4725 Bridle Trail,
Wulff, Mount V'ernon, Maine.
2475 Grande Ave., S.E., Cedar Rapids, Iowa.
ra&rlund. Gonset, ELmac, Drake, Central Electronics, B&w, Hy-
SELL* Viking II with CJollins VFO, TVI fllter, suppression and
deal, F, Yates, K2DZS, 58 Wayside bane, Trenton, N. J.
WANTED: Used 8X-28 cabinet, gud condx. Kent Hughes, 113
Road, Scarsdale, N. Y, Tel. 8C 3-5493.
WANTED: Senior S-meter. Wanted: Old HRO or ColIIns recelver. Emmet C.
6-METER Gonset Communicator 11, in original carton, 12 volt
NOVICE 15 mtr. 30 w. c.w. $10m. 10 mtr. convertette. $3.50
WANTED: RT-32 senor cols with band-sound. Also National Senor S-meter.
WANTED: Old IRO or Collins receiver. Emmet C. Weber, 31 Woolcot Rd., Chestnut Hill, Mas.
8-METER Gonset Communicator II, in original carton, 12 volt
WANTED: tower, over 50 ft., cover-up or all-weather, Tri-Band beam,
randy, turntable, klystron, rubidium, 6v input, 145v Ma.
prize. Please describe fully and quote price. Stan Cienty, KD 41, Burnt Hills, N. Y.
CC-80, matched set of high-power output tubes. Make reasonable offer.
SELL: Collins II VFO, RT-30, 10 watt output. Make reasonable offer.
WANTED: National receiver 1-0 with or without power supply. A working
Mosley, 12 volt motor. Keeps antenna alaways résonant, $35. Regency ATC-1
SXL-104 Eecorder. Fatr condx. Highest btdder. ARB.L Tratolmt Alds
FOR Sale: For sale, mint cond, with push talk. Used little
cash offer over $175. Herb Abrams, K2ZEP, 81-31 267 St., Floral Park. L. N.
VIKING Ranger for sale, mint cond, with push talk. Used little
cash offer over $175. Herb Abrams, K2ZEP, 81-31 267 St., Floral Park. L. N.
WANTED: HC-243-D receiver, same electrically as the 348 series, with
FOR Sale: SX-101 Mark III, latest production, in orig. factory carton and used only a few hours. Must sell: $300. W1R0X, 56 Canal St., Medford, Mass.
CANADIANS: Mobile equipment, all brand new 3 months ago; Gonset GT7 with modulator and 12 v, poor supply; $275; Raffles automo-
tor; 25 watt mor. Mail to Edw. E. Willson, 223 Graphic Blvd., New Millford, N. J.
SXL-104 Eecorder. Fatr condx. Highest btdder. ARB.L Tratolmt Alds
FOR Sale: W2ROX, 56 Canal St., Medford, Mass.
FOR Sale: Globe king 500R, very little use, like new, $475; 20A
caster, late model with less than 100 hours use, with factory build
WANTED: New HRO咨询服务 usable, in orig. factory carton, used
FOR Sale: Wook 500, very little use, like new, $475; 20A
caster, late model with less than 100 hours use, with factory build
VINGK Ranger for sale, mint cond, with push talk. Used little
cash offer over $175. Herb Abrams, K2ZEP, 81-31 267 St., Floral Park. L. N.
WANTED: PE103-A dynamotor, complete with cables. 6 or 12 voit
FOR Sale: SX-101 Mark III, latest production, in orig. factory carton and used only a few hours. Must sell: $300. W1R0X, 56 Canal St., Medford, Mass.
CANADIANS: Mobile equipment, all brand new 3 months ago; Gonset GT7 with modulator and 12 v, poor supply; $275; Raffles automo-
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SXL-104 Eecorder. Fatr condx. Highest btdder. ARB.L Tratolmt Alds
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caster, late model with less than 100 hours use, with factory build
WANTED: New HRO咨询服务 usable, in orig. factory carton, used
FOR Sale: Wook 500, very little use, like new, $475; 20A
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WANTED: PE103-A dynamotor, complete with cables. 6 or 12 voit
FOR Sale: SX-101 Mark III, latest production, in orig. factory carton and used only a few hours. Must sell: $300. W1R0X, 56 Canal St., Medford, Mass.
S WAP or For Sale: Combination tube multimeter tester RCP-804A, wave reeeiver same value. Also Sams No. 1 to 201, in exc. condx. with adapter or late tubes. For RME DB-22A Preselector or short-$6 each. Want: 20A cabinets A NC-101X, Phone PO 7-2271, Charles 4X250B, AB1 modulator. Raek mounted with power supplies, Send HELL: Custom-built kilowatt linear amplifier using new 4(3X1000A. Copp. W2ZSD. 3 West Drive, Port Washington, N. Y., plate xfrmr 4700v et, 300 Ma,, $20; new UTC PA108 choke, 10 hy. AM 40 modulator, $75. Ail in A-l condition. Larry Gittings, 117—

FOR Sale: New oil condenser 50 /xfd 3000 vdc, $30; new Chicago for détails on this. too. W6HHW, Wolfe, 3476 Rambow Dr., Palo 239th St., Eîmont. N. Y.

HQ-129X with matching speaker, $125; Viking II (factory-wired); $175. RUN-A-JUST, 10 Accon Lane, Cincinnati, OH. Phone Jackson 1-7534.

FOR Sale: Complete Edwinne mobile rig, PAR-6A receiver, 6A-25 transmitter, 10 watt output. Needs motor or charger power for recer Edwinne, all coilers, filter condenser, 120 volt antenna relay, Webster all band antenna, 90° whip for 10 meters lengths on L antenna with power for 20. 40. 80 meters. Can be ruised off by powerfeed Only $25 postpaid. Bussieck's, 1216 West Clwy, Houston 16, Texas.


HG-129X with matching speaker, $125; Viking II (factory-wired); $175. RUN-A-JUST, 10 Accon Lane, Cincinnati, OH. Phone Jackson 1-7534.

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ALLIED needs your used equipment!

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EASY PAY TERMS: Only 10% down—your present equipment should more than cover the down payment—and you have up to 18 full months to pay.

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Fine quality clock gives you 2400-hour time every hour of the day in every time zone all over the world. Key cities clearly shown.

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At your National Distributor now... SPECIAL OFFER AVAILABLE:

TUNED OSCILLATOR $10.00 down, $39.95 at most National Distributors

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Since 1914 National COMPANY, INC., MALDEN 48, MASS.

tuned to tomorrow
Pictured here are some of the sweetest power tubes ever designed and built for amateur transmitter service. High-perveance tube design—an original RCA advancement—makes it practical to get full power at relatively low plate voltages. Great reserve of cathode emission carries you through the power peaks. Conservative tube ratings assure long-life performance.

RCA high-perveance triodes and beam power tubes are available to you in a wide choice of powers to meet every amateur transmitter requirement—whether the application is 'phone or CW, HF, or VHF.

For more watts for your "transmitter dollar", it will pay you to design around "RCA's"—the power tubes that leading transmitter designers specify. Your RCA Industrial Tube Distributor handles a complete line of RCA power triodes and beam power tubes. Technical data on any of the types shown here is available from RCA, Commercial Engineering, Section F-37-M Harrison, N. J.
Board Meeting Highlights

The Board of Directors of The American Radio Relay League, Inc., held its 1958 meeting at Hartford, Connecticut, on May 9. During the meeting the Board examined at length the status of the amateur radio service in preparatory committee work for the forthcoming International Telecommunications Conference.

To promote v.h.f. DX and further amateur contributions to knowledge of long-distance propagation in that portion of the spectrum, the Board voted to request amendment of the amateur rules to provide exclusive c.w. band segments of 100 kc. each at the low ends of the 50- and 144-Mc. bands, with a special plea for prompt action by the Commission so that, if adopted, the new provisions could be useful in amateur participation in the program of the International Geophysical Year. Reviewing its 1956 request of FCC for a 50-ke. expansion of the 14-Mc. voice band (not yet acted upon by FCC), the Board decided to amend its petition by deleting the proposal to limit use of the band segment to Advanced or Extra Class licenses.

In view of the imminence of an international conference, the Board voted to oppose the Commission's proposal in Docket 10237 but countered with a request for amendment of the amateur rules to provide coastwise operation on all amateur bands with all modes of emission. It instructed the filing of League comment in support of the FCC proposal to shift the amateur 21,000-Mc. band to 22,000-23,000 Mc.

An application by the Galveston County Amateur Radio Club to conduct an ARRL National Convention in Galveston, Texas, during 1959 was approved, but the Board also indicated its feeling that national conventions henceforth should not be held oftener than once in three years. The Housing Committee was continued another year, to study the problem of Hq. facilities. The Board re-elected present officers and members of the Executive Committee, and rescinded its 1957 actions which limited the functions of that Committee.

The Board continued its authorizations for reimbursement of travel by SCMs, SECs and QSL Managers in furtherance of League field organization aims, commended the Hq. training aids program and urged expansion of the scope of its visual aids materials, and expressed approval of the general conduct of League contests and formulation of rules by the contest committee.

The General Manager was directed to investigate the feasibility of several proposals — discontinuing conelrad monitoring now required of amateurs, more low-power sharing of the loran bands, amateur operating privileges in 1750-1800 kc., and eliminating the requirement of A-1 or A-3 identification when using other modes of emission.

Readers will be interested in some of the things the Board did not do. It rejected proposals to permit Technician voice operation in 146-148 Mc.; to expand 80-, 40-, and 15-meter voice assignments; to restrict Novices to A-1 emission only; and to open a part-time information office in Washington, D. C.

The Board adopted a resolution of greeting to the IARU Congress to be held at Bad Godesburg, Germany, in July, and also instructed the Secretary, while in attendance at the 26th EMRE Annual Convention in Mexico City, to convey to the IARU its best wishes for a successful meeting. Resolutions of appreciation were adopted expressing thanks to the Field Engineering & Monitoring Bureau of FCC for its cooperation in amateur affairs, to vice-directors and field organization officials of the League for their fine performance during the past year, and for the outstanding communications service provided both by amateur stations in the Antarctic and the U.S. stations working with them.
VIKING "PACEMAKER"
TRANSMITTER/EXCITER
This exciting transmitter offers you the ultimate in single sideband... 90 watts SSB P.E.P. and CW input... 35 watts AM. Self-contained—effectively TVI suppressed. Instant bandswitching 80, 40, 20, 15, and 10 meters. Excellent stability and suppression. Temperature compensated built-in VFO... separate crystal control provided for each band. VOX and anti-trip circuits provide excellent voice controlled operation. Pi-network output matches antenna loads from 50 to 600 ohms. More than enough power to drive the Viking "Kilowatt" or grounded-grid kilowatt amplifiers. (Requires Cat. No. 250-34 Power Divider with Viking "Kilowatt"). With tubes and crystals, less key and microphone.
Cat. No. 240-301-2, Wired and tested...... $495.00

VIKING "KILOWATT" AMPLIFIER
In a class by itself... the ultimate in contemporary transmitter design! The Viking "Kilowatt" is the only transmitter available that provides full, maximum legal power in all modes—SSB, CW, and AM. Class C final amplifier operation provides plate circuit efficiencies in excess of 70% with unequalled broadcast-type high level amplitude modulation. A pair of 4-400A tubes in Class AB, easily deliver 2000 watts P.E.P.* in SSB mode—provides a full 1000 watts input in AM mode with a pair of push-pull Type 810 tubes in Class B modulator service. 1000 watts input in Class C CW mode. High efficiency pi-network output circuit will match 50 to 500 ohm antenna loads.
Compact pedestal contains the complete kilowatt—rolls out for easy adjustment or maintenance. Excitation requirements: 30 watts RF and 10 watts audio for AM; 2-3 watts peak for SSB. With tubes.
Cat. No. 240-1000, Wired and tested................ Amateur Net $1595.00
Matching accessory desk top, back and three-drawer pedestal.
Cat. No. 251-101-1, FOB Corry, Pa. $132.00

*The F.C.C permits a maximum of one kilowatt average power input for the amateur service. In SSB operation under normal conditions this results in peak envelope power inputs of 2000 watts or more depending upon individual voice characteristics.

E. F. Johnson Company
126 SECOND AVENUE S.W. * WASECA, MINNESOTA
VIKING "NAVIGATOR" TRANSMITTER/EXCITER
This flexible CW transmitter/exciter has enough RF power to excite most high powered amplifiers on CW and AM. 40 watts input—6146 final amplifier tube. Bandwitching 160 through 10 meters. Built-in VFO or crystal control—TVI suppressed—timed sequence keying. Pi-network output will match 40 to 600 ohm loads. With tubes and self-contained power supply, less crystals and key.
Cat. No. 240-126-1...Kit Amateur Net $149.50
Cat. No. 240-126-2...Wired and tested Amateur Net $199.50

VIKING "ADVENTURER" TRANSMITTER
This completely self-contained 50 watt CW transmitter was used to earn the first novice WAC (Worked All Continents) Instant bandswitching 80 through 10 meters. Operates by crystal or external VFO control. Rugged 807 transmitting tube—wide range pi-network output—TVI suppressed—timed sequence keying. Easy to assemble—complete with tubes, less crystals and key.
Cat. No. 240-181-1...Kit Amateur Net $54.95

SPEECH AMPLIFIER/SCREEN MODULATOR—Designed to provide phone operation for the "Adventurer". High gain—use with crystal or dynamic microphones. Simple installation. With tubes.
Cat. No. 250-40...Amateur Net $12.25

Pick your power...choose your features

VIKING "RANGER" TRANSMITTER/EXCITER
This popular 75 watt CW or 65 watt phone transmitter will also serve as an RF and audio exciter for high power equipment. Completely self-contained...TVI suppressed...instant bandswitching 160 through 10 meters. Extremely stable built-in VFO or crystal control. Final amplifier tube is a 6146. Easy to assemble—with tubes, less crystals, key and microphone.
Cat. No. 240-161-1...Kit Amateur Net $229.50
Cat. No. 240-161-2...Wired and tested Amateur Net $329.50

VIKING "VALIANT" TRANSMITTER
Here is power to slice through terrific QRM! 275 watts input CW and SSB (P.E.P. with auxiliary SSB exciter) and 200 watts phone. Instant bandswitching 160 through 10 meters—operates by built-in VFO or crystal control. Pi-network output matches antenna loads from 50 to 600 ohms...final amplifier utilizes three 6146 tubes in parallel. TVI suppressed—timed sequence keying—low level audio clipping—built-in low pass audio filter—self-contained power supplies. Complete with tubes, less crystals, key and microphone.
Cat. No. 240-104-1...Kit Amateur Net $349.50
240-104-2...Wired and tested Amateur Net $439.50

VIKING "FIVE HUNDRED" TRANSMITTER
Rated a full 600 watts CW...300 watts phone and SSB (P.E.P. with auxiliary SSB exciter.) Compact RF unit designed for desk-top operation—power supply/modulator unit may be placed in any convenient location. All exciter stages ganged to VFO tuning—also may be operated by crystal control. Instant bandswitching 80 through 10 meters—TVI suppressed—high gain push-to-talk audio system—low level audio clipping. Final amplifier uses a 4-400A high efficiency tetrode. Pi-network output will match a wide range of antenna impedances. Complete with tubes, less crystals, key and microphone.
Cat. No. 240-500-1...Kit Amateur Net $749.50
240-500-2...Wired and tested Amateur Net $949.50
for mobile...

VIKING "MOBILE" TRANSMITTER
Rated at 60 watts PA input—powerful PP807 modulator provides extra audio punch! Instant bandswitching 75 through 10 meters. All stages ganged to a single tuning knob. Under-dash mounting. Specify 6 or 12 volts. Less tubes, crystals, microphone and power supply.
Cat. No. 240-141-1. Kit. Amateur Net $107.00
Cat. No. 240-141-2. Wired and tested on special order only.

Cat. No. 240-152-1. Kit. Amateur Net $23.95
Cat. No. 240-152-2. Wired and tested. Amateur Net $52.50

"WHIPLOAD-6"—High efficiency base loading for mobile whips. Bandswitching 75 through 10 meters. High "Q". Fibre-glass housing.
Cat. No. 250-26. Wired and tested. Amateur Net $16.95

for UHF... VIKING "6NZ" TRANSMITTER
Rated at 150 watts CW and 100 watts phone—bandswitching 6 and 2 meters! TVI suppressed—may be used with Viking I, II, "Ranger" or similar power supply/modulator combinations. Operates by crystal control or external VFO with 8-9 mc. output. With tubes, less crystals, key and microphone.
Cat. No. 240-201-1. Kit. Amateur Net $129.50
Cat. No. 240-201-2. Wired and tested. Amateur Net $169.50

TWO METER VFO—Replaces 8 mc. crystals in most two meter equipment. Temperature compensated—excellent stability. Output range: 7.995 mc. to 8.255 mc. Lucite dial calibrated 144 to 148 mc. Requires 6.3 volts at .3 amp. and 250-325 volts at 10 ma. With tubes and power cable.
Cat. No. 240-132-1. Kit. Amateur Net $29.50
Cat. No. 240-132-2. Wired and tested. Amateur Net $46.50

2 exciting desk-top linear amplifiers...

VIKING "COURIER" AMPLIFIER
Rated a solid 500 watts P.E.P. input with auxiliary SSB exciter as a Class B linear amplifier; 500 watts CW or 200 watts AM linear. Self-contained desk-top package—may be driven by the Viking "Navigator", "Ranger", "Pacemaker" or other unit of comparable output. Continuous coverage 3.5 to 30 mcs. Drive requirements: 5 to 35 watts depending on mode and frequency desired. Employs two 811A triodes in parallel. Pi-network output will match 40 to 600 ohm loads. TVI suppressed. With tubes and built-in power supply.
Cat. No. 240-352-1. Kit. Amateur Net $244.50
Cat. No. 240-352-2. Wired and tested. Amateur Net $289.50

VIKING "THUNDERBOLT" AMPLIFIER
The hottest linear amplifier on the market—engineered to provide maximum "talk power" to smash through QRM. 2000 watts P.E.P. input SSB; 1000 watts CW; 800 watts AM linear; in a completely self-contained desk-top package. Delivers a dominant signal on all amateur bands—continuous coverage 3.5 to 30 mcs—instant bandswitching. May be driven by the Viking "Navigator", "Ranger", "Pacemaker" or other unit of comparable output. Drive requirements: approx. 10 watts in Class AB, 20 watts Class C continuous wave. Final amplifier employs two 4-400A tetrodes in parallel, bridge neutralized. Complete with tubes and built-in power supply.
Cat. No. 240-353-1. Kit. Amateur Net $524.50
Cat. No. 240-353-2. Wired and tested. Amateur Net $589.50

*The F.C.C. permits a maximum of one kilowatt average power input for the amateur service. In SSB operation under normal conditions this results in peak envelope power inputs of 2000 watts or more depending upon individual voice characteristics.
Station Accessories...

**VIKING “MATCHBOXES”—**Self-contained, bandswitching 80 through 10 meters. Provides integrated antenna matching and switching, tunes out large amounts of reactance. No load-tapping or plug-in coils necessary.
- Cat. No. 250-23...275 watts, wired................ Amateur Net $ 54.95
- Cat. No. 250-30...Kilowatt, wired................ Amateur Net $124.50

**DIRECTIONAL COUPLER AND INDICATOR—**Provides continuous reading of SWR and relative power in transmission line. Coupler may be permanently installed in 52 ohm coaxial line—handles maximum legal power specified by FCC. The Indicator is a 0-100 microammeter calibrated in SWR and relative power.
- Cat. No. 250-37...Coupler................................ Amateur Net $117.75
- Cat. No. 250-38...Indicator............................ Amateur Net $225.00

**T-R SWITCH—**Provides instantaneous break-in on SSB, DSB, CW or AM. Excellent receiver isolation. Gain: 2 db at 30 mc.; 6 db at 3.5 mc. Rated at 4000 watts peak power. With tube, power supply and provision for RF probe.
- Cat. No. 250-39...Wired................................ Amateur Net $72.75

**VIKING AUDIO AMPLIFIER—**Self-contained 10 watt speech amplifier, complete with power supply and tubes. Speech clipping and filtering improves performance and effectiveness of your AM transmitter.
- Cat. No. 250-33-1...Kit................................ Amateur Net $73.50
- Cat. No. 250-33-2...Wired and tested............. Amateur Net $99.50

**LOW PASS FILTER—**Handles more than 1000 watts RF. 75 db or more attenuation above 54 mc. Wired and pre-tuned.
- Cat. No. 250-20...52 Ohms Impedance................ Amateur Net $14.95
- Cat. No. 250-35...72 Ohms Impedance................ Amateur Net $14.95

**SWR BRIDGE—**Provides accurate measurement of SWR for effective use of low pass filter and antenna coupler.
- Cat. No. 250-24...52 Ohms Impedance................ Amateur Net $9.75

**POWER REDUCER—**Provides up to 20 watts continuous dissipation, permitting 100-150 watt transmitters such as Johnson Viking, Collins 32V to serve as exciters for the Viking “Kilowatt”. Completely shielded.
- Cat. No. 250-29........................................ Amateur Net $13.95

**CRYSTAL CALIBRATOR—**Provides accurate 100 kc check points to 55 mc. Requires 6.3 volts at .15 amps and 150-300 volts at 2 ma. With tuben and crystal.
- Cat. No. 250-28...Wired and tested.................... Amateur Net $17.95

**“SIGNAL SENTRY”—**Monitors CW or phone signals up to 50 mc. Powered by receiver. With tubes.
- Cat. No. 250-25...Wired and tested.................... Amateur Net $22.00

**KEYS AND PRACTICE SETS—**See your distributor or write for descriptive literature on Johnson’s complete key line.

*The E. F. Johnson Co. reserves the right to change prices or specifications without notice and without incurring obligation.*