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IN THIS ISSUE—THE DEVELOPMENT OF YAGI ANTENNAS

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The cardioid (high directivity at all frequencies) pickup pattern enables you to have a *real* "arm chair QSO." The forward gain of 5 db** allows you to speak at nearly twice the distance you have been working to a conventional microphone. Unwanted sounds in the shack are rejected nearly twice as effectively as by ordinarily-used non-directional microphones.

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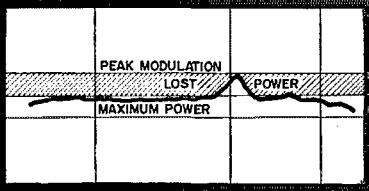

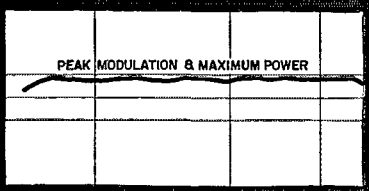

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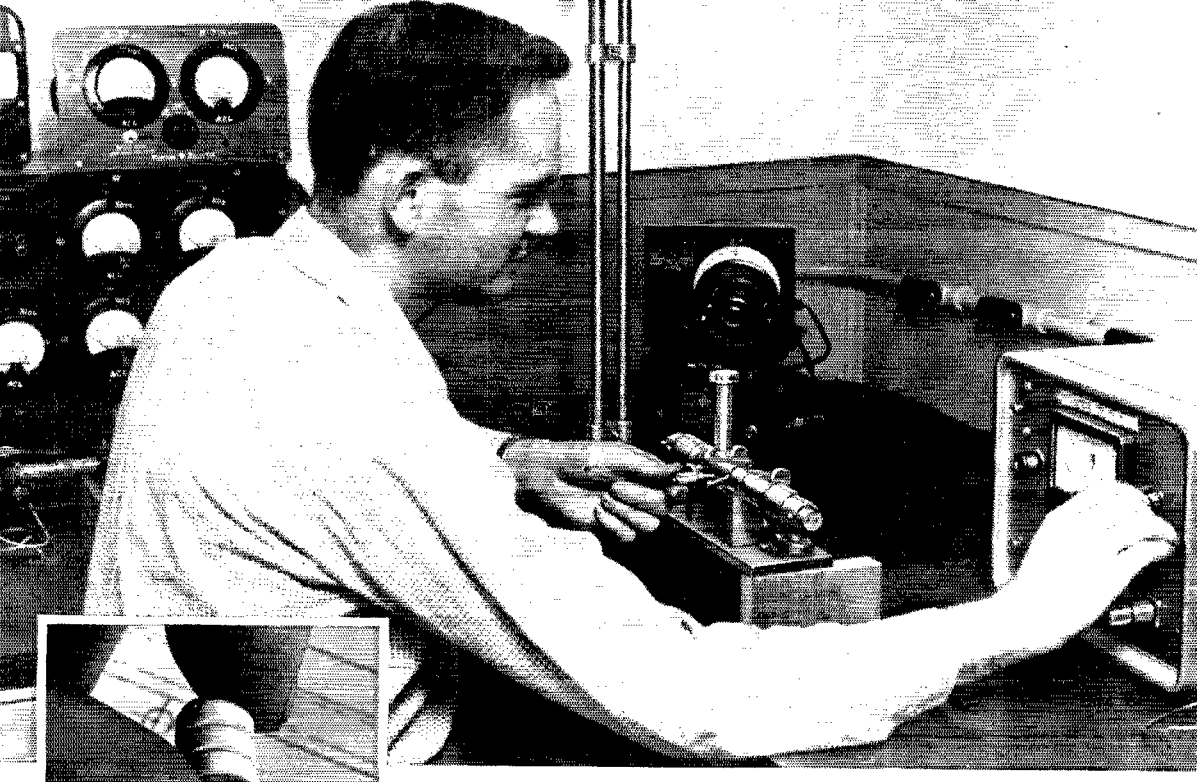

Left: smallest receiving tube—a General Electric 6BY4, only $\frac{3}{8}$" high! **Above:** Robert Bailey tests a micro-miniature tube at 900 megacycles for noise factor and power gain.

Amateur know-how is asset to W4JZO in development work on G-E micro-miniatures!

ROBERT BAILEY, W4JZO, is a development engineer in General Electric's Owensboro, Ky., receiving tube plant. His work centers on u-h-f, and he has taken active part in the design of G-E micro-miniature tubes—new ultra-compact metal-ceramic types with outstanding performance. A TV-tuner triode, the 6BY4 is the first micro-miniature, with others to follow.

U-h-f designers are helping to shape the electronic world of tomorrow. According to Bailey, they need the amateur's willingness to search for new solutions to new problems. Bailey strongly endorses ham philosophy as an approach to creative effort in his field. He stresses this in a G-E engineering course he conducts, and takes every opportunity to keep active as a ham by working the 75, 40, 20, and 10-meter bands with mobile phone equipment he has designed.

W4JZO has been a radio amateur since 1946. Like hundreds of other hams who design, build, and test G-E tubes of all types, he brings to his work extra experience and resourcefulness—qualities reflected in a superior G-E product. Buy the tubes that hams help build! Your G-E tube distributor stocks them. *Tube Department, General Electric Company, Schenectady 5, N. Y.*

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AUGUST 1956

VOLUME XL • NUMBER 8

PUBLISHED, MONTHLY, AS ITS OFFICIAL ORGAN, BY THE AMERICAN RADIO RELAY LEAGUE, INC., WEST HARTFORD, CONN., U. S. A.; OFFICIAL ORGAN OF THE INTERNATIONAL AMATEUR RADIO UNION

OFFICES

38 La Salle Road
West Hartford 7, Connecticut

TEL.: ADams 3-6268 TWX: HF 88

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Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1102, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1925.

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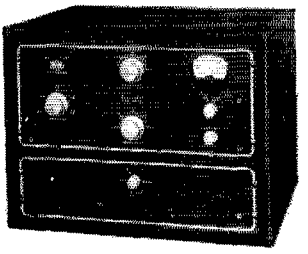
— CONTENTS —

NEW

table-top kilowatt amplifier



The B&W Model L-1000-A is a carefully engineered Grounded Grid Linear Amplifier with a power packing punch which will stand out in signal eloquence whenever the going gets rough. The clean design eliminates unnecessary circuits, yet all essentials have been included to give you long, dependable performance.

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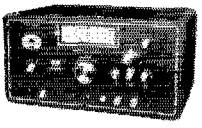

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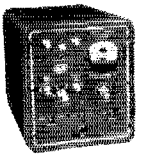

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• TVI suppression • unitized construction.

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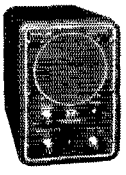

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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. 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.

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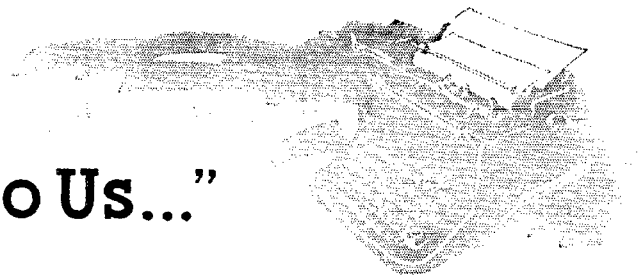
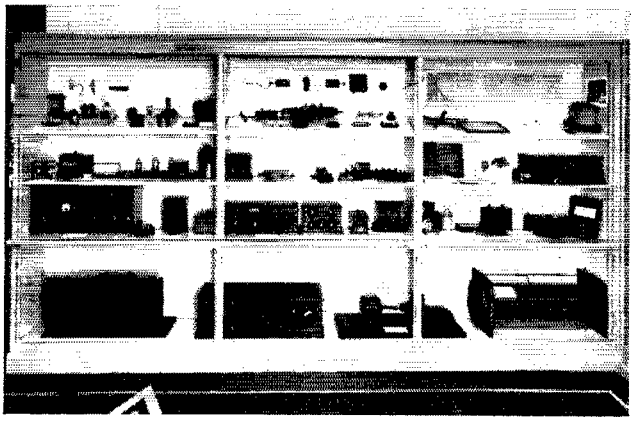


"It Seems to Us..."

Amateur Museum

Always popular with visitors is the Museum of Amateur Radio maintained at League Hq. Featuring several hundred exhibits, it runs the gamut of antique paraphernalia. Its interest is not confined to the old-timer either (though a faraway look has been noticed in many an eye) for it gives newcomers the opportunity to view for themselves an array of historic equipment that they would otherwise never see. One of the oldest pieces of gear on display is a Marconi Magnetic Detector, used commercially about 1901, while the oldest complete station that we know of, dating from 1907, occupies a prominent place on the second floor landing.



The historic achievements of our hobby literally jump forth when you read some of the important documents preserved here.

Among them are the originals of a scratch log recorded by Paul Godley while at Androssan, Scotland, for the League in 1921, indicating the first U. S. stations ever heard in Europe; the crumpled piece of paper on which was copied a message of greeting to American amateurs from the Radio Society of Great Britain in 1922, the first received here; and last, but not least by any means, a photostatic copy of the true log of 1MO, operated by the League's Traffic Manager, Fred Schnell, on the night of November 27, 1923, when he was the first station to accomplish the "impossible" and work two-way across the Atlantic on short waves. There is more to be sure, but it would take many pages. The only way you can see all of it is to be sure to stop in at Hq. yourself.

Hamfest Calendar

Arizona — The 1956 Southern Arizona Labor Day Hamfest at the Army Electronic Proving Ground, sponsored by the Fort Huachuca Amateur Radio Club, features a "chuck wagon" dinner and a reenactment of events historic to the "Wild West" days of Cochise County.

The program offers varied activities starting at 0800, Saturday, and ending at 1100 Monday. The Tombstone "Vigilantes" of Helldorado fame will stage the Wild West Day Entertainment, and prepare the chuck wagon dinner. An interesting tour of the Army Electronic Proving Ground and a display of the latest Signal Corps equipment will highlight the first day's activities. Group "songfests" around a camp fire will complete each evening's activities.

There will be camping sites in scenic Garden Canyon located in the heart of the Huachuca Mountains;

Nursery service for children, and a women's program organized and sponsored by the Fort Huachuca Women's Club;

Contests for OMs, Novices, XYLs and Junior Ops.

Prior to August 27, ticket prices including the chuck wagon dinner will be $2.00 with half price for children under 12. After this date, the price of tickets will be $2.50 for adults and $1.25 for children. Advance reservations may be made by writing to the Fort Huachuca Amateur Radio Club, P.O. Box 903, Fort Huachuca, Arizona. Tourist accommodations are limited and persons planning to attend should come prepared to camp if prior commercial reservations are not confirmed.

California — Second Annual Pomona Valley Hamfest-Picnic to be held Sunday, August 26, at Westmont Community Center, 9th & Goldenrod Streets, Pomona, Calif. Bring the family and a picnic lunch. Games and accommodations for the children. Starting time is 11:00 A.M. with adjournment no later than 5:00 P.M.

Illinois — The Fourth Annual Sideband Dinner of the Chicago area will be held Saturday evening at 6:00 P.M., August 11, at the Midwest Hotel, Hamlin Ave. and Madison, Chicago. Advance reservations and hotel accommodations may be made with E. L. Hanna, W9NWK, 640 Newton Avenue, Glen Ellyn. The dinner tickets are $5.00 per person.

Indiana — August 5, 1000 EST to 1600 EST, at the Highland Park Big Bull Pen. Games and fun for all. Bring your family and the lunch basket; plenty of tables and, in case of rain, we have a shelter house. Rides and playground for the Jr. Ops. Donations, $1.50 per person. We will be glad to take reservations in advance — address all queries to: Jerry Smiley, W9DKR, P.O. Box 200, Kokomo, Indiana.

Kansas — The Kansas-Nebraska Radio Club Hamfest *will be held on August 19, at the Armory in Concordia,* Kansas.

Maine — Maine's only hamfest this year — Stevie's Hamfest at Dexter, Maine, August 19. Reservations may be made by contacting W1BOK or W1VYA. Turkey dinner with all the fixings. Transmitter hunt and other activities. Tickets $2.50 each, payable in advance.

Massachusetts — The Minute-Man Net will hold its annual outing this coming August 12, starting at 11:00 A.M. at Point Breeze on Webster Lake, Webster, Mass. All interested in attending contact W1EJD, 440 Main St., Oxford, Mass. Reservations close August 6.

Michigan — The annual West Michigan V.H.F. Picnic will be held August 12 at Allegan County Park on the shores of Lake Michigan. Free admission, and all are invited. Many games and a v.h.f. demonstration.

Minnesota — The Saint Cloud, Minnesota, Mike and Key Radio Club is holding their annual family picnic on August 5 at Wilson Park, located in East Saint Cloud on the banks of the Mississippi, across the river from the hospital. All modern facilities, shelter house, picnic tables, playground equipment, swimming beach, and free coffee will be served. Signs will be posted on all highways.

Activities will include hidden-transmitter hunt, mobile field-strength contest, oldest ham present, ham from the furthest distance and games for the XYL and harmonics; *so bring the family.*

Registrations start at 10:00 A.M. — $1.00 per call includes the family. For further information, please contact Bob Molitor, WØRVO, 3135 — 7th Avenue North, St. Cloud.

Mississippi — The Jackson Amateur Radio Club will sponsor the annual hamfest at Legion Reservation, Hway East, Jackson, on August 5. Lunch on the ground, swimming, ragchew, and a playground supervisor for the children are a few of the activities scheduled. Donations $1.00; 50¢ for the ladies. Plenty of refreshments. For reservations or further info, write JARA, Box 8371, Jackson.

Ohio — The Findlay Radio Club, Inc., will hold its annual hamfest on Saturday, September 9 at Riverside Park in Findlay. Advance registration, $1.00; $1.50 at the gate. Mobiles listen for W8FT on 3812 kc. and 144.1 Mc.

A swap-shop and a mobile-transmitter hunt will be features. Bring your family and enjoy a nice picnic outing. Concessions will be open. For advanced registration, or any other information, write or call Phil Predmore, 1200 Country Club Drive, Findlay, Ohio.

Ohio — The Buckeye Shortwave Radio Association, Inc., is sponsoring its 10th annual Ham Outing on August 26. The location will be the Happy Days Camp of Virginia Kendall Park in Akron, Ohio, as in past years.

Rain or shine, there's plenty of shelter in the big lodge, so set aside the last Sunday in August for this, the second largest hamfest in Ohio.

Lots of events for OMs and XYLs, with games and free pop for the kiddies. Mobileers call in on 10 meters, and everyone bring gear for the Swap-Shop. Bring your chow and your appetite. Donation is $2.00. For tickets and information, contact Arnold Farkas, W8UPG, 804 Garson Drive, Akron 19, Ohio.

Pennsylvania — A picnic and swap-shop will be held by the Pennsylvania Fone Net, the Anthracite, and Eastern Pennsylvania Traffic Nets at Hershey Park on Sunday, August 12. Pavilions #7 and #8 near the band shell have been reserved for this purpose. Please remit $1.00 per ham *call to Jack Todd, W3UWP, Maple Crest Manor,* Rt. 88, Harrisburg, Pa. All Pennsylvania amateurs are invited; bring the XYL, kiddies, and your own lunch.

Virginia — The Annual Hamfest of the Shenandoah Valley Amateur Radio Club will be held Sunday, August 5, at Dickey Ridge on the beautiful Skyline Drive near Front Royal, Virginia.

There will be a ham-and-chicken dinner and very little speaking. So, come and meet the operators of those stations with whom you've talked. Plenty of room for the whole family. Prices are just $1.25 for the dinner, and $1.00 for registration.

There will be lots of stations on the air to guide you in.

For further information, or maps, write to: Holmes Bayliss, K4CYH, Secretary, Shenandoah Valley Amateur Radio Club, P.O. Box 139, Winchester, Virginia.

COMING A.R.R.L. CONVENTIONS

Sept. 1-2 — New Brunswick Province, Bathurst, N. B.
Sept. 15-16 — Dakota Division, Watertown, South Dakota
Sept. 30 — New Hampshire State, Concord
Oct. 21 — New England Division, Providence, Rhode Island

Strays

Members of the Disabled American Veterans are invited to join a new national chapter of DAV devoted to amateur radio. Mr. Louis M. Caron, W1TTF, prime mover in the group, and Commander of Chapter 97, Boston, states that the objectives are to provide a source of rehabilitation, furnish valuable training for employment, and further increase the number of trained radiomen for Civil Defense, at the same time giving disabled vets an interesting and important hobby. Those interested can write Mr. Caron at the Mass. Hq. of DAV, Room 517, State House, Boston, Mass.

Notes on the Development of Yagi Arrays

Part I — Multielement Beams

BY CARL GREENBLUM*

• Here is a wealth of information on the perennially-hot subject of beam antennas. The author is the chief project engineer for a well-known antenna manufacturer, and a close study of this article is well worth the while of any past, present or future beam builder. Part II will discuss stacked beams.

A DEVELOPMENT program at Telrex, Inc. has been concerned with the effects of the various parameters upon the performance characteristics of Yagi antennas. The objective was to try to establish a formal design procedure which would result in a minimum of experimental or breadboarding efforts to convert a specified set of characteristics into a final production model. Some of the data which resulted from this study are presented here and may be of use to those interested in this subject.

Of specific concern here is the treatment of arrays up to approximately four to eight wavelengths long. Short arrays of two and three elements are fully treated elsewhere [1] and are included here only for completeness. The mathematical treatment of Yagi arrays depends upon the solution of a number of equations involving the feed voltage, the currents in each element and the self and mutual impedances of all elements. These equations may be exactly solved if all the self and mutual impedances are known. Unfortunately, the mutual impedances for arrays of more than three elements are not known, so that a paper calculation for arrays of more than three elements is not possible at this time. Exact solutions will have to wait until accurate experimental data for the self and mutual impedances are compiled. In the meantime, a combination of mathematical and experimental methods will have to serve as the major means of designing long, multielement Yagis.

In general, the major requirement in the design of long Yagis is to obtain maximum gain for a specified over-all length and number of elements. The forward field is a function of the current amplitude and phase in each element and the interelement spacing. This field is directly on the array axis. Its mathematical description [2] involves a phase-lead factor with λ (wavelength) in the denominator, which indicates its direct dependence upon frequency. It is partially for this reason that the forward field or gain of Yagis varies with frequency. If the objective is to maximize the forward field, it would be a straightforward matter to do so if all the currents and their phases were known. Since this depends upon the solution of the equations mentioned earlier, our remarks pertinent to exact solutions made above are equally of import in connection with forward gain.

In the Uda book,[1] voluminous data are presented which show the effect of element tuning and spacing for two- and three-element arrays, the net result of which indicates that as far as gain is concerned, a wide variation of different spacing combinations may be utilized to yield gains whose optimum values are of the order of 10 per cent (1 db. approximately) of each other. The impedance bandwidth [3] for these different spacing conditions varies somewhat, and the choice of interelement spacing for 2- and 3-element Yagis would normally be made to satisfy either this requirement or other requirements such as front-to-back ratio.

Gain

The data presented here applicable to the design of long Yagis were obtained over a considerable span of time in connection with a Yagi development program for TV, amateur radio, and commercial communication arrays at Telrex, Inc. The data represent a compilation of results taken at a test site free from QRM, stray reflections, etc. They have been rechecked at various frequencies ranging from 7 to 500 Mc., and are presented in the form of curves which will enable a rapid preliminary design or an evaluation of a proposed design. An initial step in the design of a Yagi is to determine the number of elements and the overall array length required in order to satisfy some particular requirement of gain. Fig. 1 is a curve showing the variation in gain over a

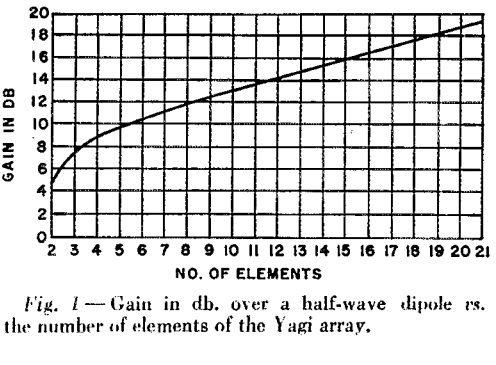


Fig. 1 — Gain in db. over a half-wave dipole vs. the number of elements of the Yagi array.

* Telrex, Inc., Asbury Park, N. J.

[1] Uda and Mushiake, *Yagi-Uda Antenna*, Maruzen Co., Tokyo, Japan.

[2] For brevity, the mathematical foundation supporting some of the material in this article was deleted. — ED.

[3] Frequency range over which the antenna impedance falls within stated limits. — ED.

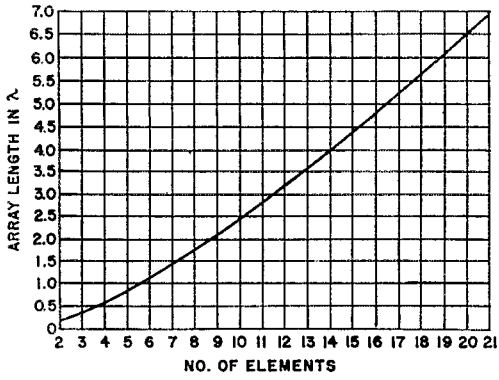


Fig. 2 — Yagi array length in wavelengths *vs.* the number of elements with optimum spacing.

tuned dipole as a function of the number of elements in the array.

Fig. 2 shows the length of the array in wavelengths *vs.* the number of elements. Figs. 1 and 2 used together enable both the length of the array and the number of elements to be picked directly from the curves for a specific gain requirement. For example, suppose we desire an array with a 10.5-db. gain. From Fig. 1 we get 6 elements required (1 reflector, 1 fed element and 4 directors) and from Fig. 2 we obtain an array length of 1.15 wavelength. Figs. 1 and 2 are readily reduced to an easily-remembered approximate formula:

$$G = 10 \log 10L - 1$$

where G = gain in db. over a $\lambda/2$ dipole
L = length of array in wavelengths

This formula is only a fair approximation to Fig. 2 up to 1λ and is more accurate for longer arrays. This formula indicates that it takes doubling the over-all length to produce gains of 3 db. which is interestingly in accord with the fact that two arrays vertically stacked will produce a gain of 3 db. Thus, the same gains may be achieved with the same overall array length by either vertically stacking two unit arrays or using one array of twice the unit length. The choice becomes one of structural simplicity or a choice of which polar patterns are more desirable. (We shall show the relationship between the number of elements and the polar patterns subsequently.) The net result for gain when ratios are used rather than decibels comes to an extremely, almost intuitively, simple result; namely, that for a given length of array its gain is doubled when doubling its length. We believe that so long as the losses remain very small, which is certainly the case for larger-diameter, high-conductivity elements, this will hold true. As a practical matter, Yagis up to 16 wavelengths long or longer may be built with a gain of 21 db. or more at frequencies which will not make the array structurally unwieldy or impractical.

[4] The "*E*" plane is the plane of polarization of the signal; it corresponds to the plane of the elements in this case. The "*H*" plane is at right angles to it. In a horizontal Yagi, the *E*-plane beamwidth is the so-called horizontal pattern in free space. — Ed.

Beam Directivity

Frequently, the requirement in an antenna design is the polar energy distribution where patterns in the "*E*" and/or "*H*" planes [4] are specified. Figs. 3 and 4 are curves which relate the variation of beamwidth at the half-power points to the number of elements employed. Obviously, Figs. 3 and 4 may be used with Fig. 2 to relate the variation of beamwidth in both planes to the length of array. These figures 1 through 4 make possible a very rapid preliminary design based upon a single requirement. For example, an "*E*" plane beamwidth of 25 degrees from Fig. 3 indicates the use of a Yagi with 13 elements. From Fig. 2 we obtain an array length of 3.6λ. From Fig. 4 we see that the "*H*" plane beamwidth is 26 degrees.

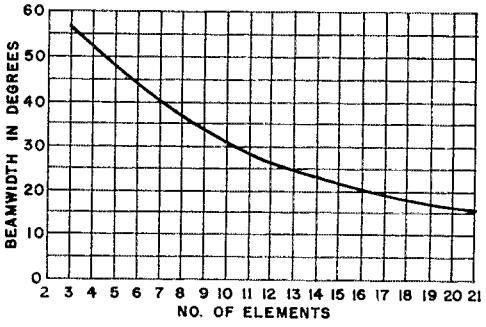


Fig. 3 — "*E*"-plane beamwidth *vs.* number of elements (including one driven element and one reflector).

In a Yagi, the patterns in both planes are interdependent where the "*H*" plane beamwidth generally is slightly broader than the "*E*" plane beamwidth. As the number of elements increases, the difference between the beamwidths continually narrows.

Element Spacing

After determining the length of the array and the number of elements required to satisfy a specified gain requirement, we require the spacing between elements. The equations show that the forward field for even a moderate number of ele-

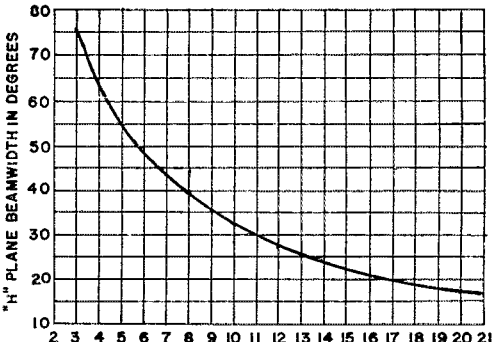


Fig. 4 — "*H*"-plane beamwidth *vs.* number of element (including one driven element and one reflector).

ments, such as 6, will depend on 5 spacing distances, and 6 element currents in both amplitude and phase. It is not surprising that there are large discrepancies in spacing arrangements in the literature on this subject. We have previously noted that for 2- and 3-element arrays there is a rather wide latitude in spacing arrangements. The following chart gives the range in which the spacing yields optimum gain from our data.

No. Elements	R-DE	DE-D1	D1-D2	D2-D3	D3-D4	D4-D5	D5-D6
2	0.15λ-0.2λ						
2		0.07λ-0.11λ					
3	0.16 -0.23	0.16 -0.19					
4	0.18 -0.22	0.13 -0.17	0.14λ-0.18λ				
5	0.18 -0.22	0.14 -0.17		0.17λ-0.23λ			
6	0.16 -0.20	0.14 -0.17	0.16 -0.25	0.22 -0.30	0.25λ-0.32λ		
8	0.16 -0.20	0.14 -0.16	0.18 -0.25	0.25 -0.35	0.27 -0.32	0.27λ-0.33λ	0.30λ-0.40λ
8 to N	0.16 -0.20	0.14 -0.16	0.18 -0.25	0.25 -0.35	0.27 -0.32	0.27 -0.33	0.35 -0.42

This chart shows the range for interelement spacing for which a variation in gain of less than 1 db. may be obtained. The elements, of course, must be optimum tuned for any value throughout the spacing range chosen. In a general way, the conclusion is drawn that the optimum inter-director spacings are close near the driven element and increase with the director number.

Element Tuning

The final step in Yagi design is establishing the current phase and amplitude in each element, which is done usually either by changing the length of the elements or by using tuning stubs or coil inductors to tune the elements. Fig. 5 is a plot of the length of a director required *vs.* its position in the array for optimum gain. Six

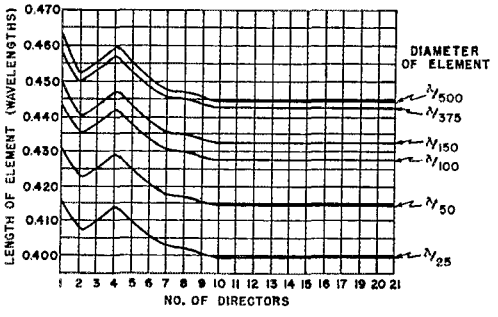


Fig. 5 — Length of director vs. its position in the array, for various element thicknesses.

curves are shown for six different element thicknesses in λ. It will be seen that there is an oscillatory condition in which the element lengths vary depending upon their position in the array. The perturbations become smaller as the position of the element goes farther out and gradually settles to a fixed value in the same way as the spacing. It will be noted that the largest perturbations occur in the first five directors. The overall difference in length of directors is approximately 0.017λ.

It will be re-emphasized that the thickness of the directors is enormously important in the tuning of the directors. These curves show that while a properly-tuned director with a thickness of λ/150 is equivalent electrically to one with a thickness of λ/25, the difference in length between these directors is 0.033, which may be a very large dimensional difference depending upon the frequency of operation. The curves in Fig. 5 may be used for intermediate element thicknesses by interpolation between the curves. In estimating the length of a Yagi director, we first determine the thickness factor (diameter of element in wavelengths) then the suitable curve from Fig. 5 is chosen (or an interpolated one therefrom) and the element length picked off, depending upon its position in the array. This procedure will result in a first approximation of length which will be quite close. These curves are based upon the elements piercing a boom approximately 2 to 3 times the diameter of the element. It is almost impossible to use these curves with any accuracy for elements of special shapes, such as tapered section, square cross sections, etc. The curves in Fig. 5 are based upon low-loss elements of cylindrical cross section.

Losses in a Beam

The efficiency of an antenna is determined by the power radiated divided by the power input.

$$\text{Efficiency} = \frac{\text{Power input} - \text{power lost}}{\text{power input}} = \frac{\text{Power radiated}}{\text{power input}}$$

Now the power radiated is equal to the power input minus the power lost. The power is lost in various ways among which a major item is that due to the loss resistance. This loss is the sum total of the losses in every element in the system.

The loss resistance is inversely proportional to the diameter (decreases with increased diameter), directly proportional to the square root of the frequency (doubles when frequency is quadrupled), and inversely proportional to the square root of the conductivity of the element. The only control we have in the design for a fixed frequency of operation is the radius and conductivity of the element. The relative re-

sistance of some different materials (using copper as a standard of comparison) is:

Silver	0.95	Nickel	5.05
Copper	1.00	Steel	8 — 52,
Gold	1.4		depending upon
Aluminum	1.64		constituents

The conductivity of the various metals varies widely with silver being the best and copper, gold and aluminum following closely behind. Such metals as nickel and steel have comparatively high losses and would be inefficient if used as radiating elements. Thus, aluminum is almost universally accepted because of its weight, strength and excellent electrical efficiency.

The loss resistance is inversely proportional to the conductor radius which indicates that from a loss point of view, the larger the radius, the lower the losses. The self-impedance of a radiating element is approximately given in the region of $\lambda/2$ by:

$$\text{Equation } Z = 73 \pm j\left[42.5 - 18\frac{\Delta L}{L}\ln\frac{\lambda}{\rho}\right]$$

where L = length of element
$\Delta L = \lambda/2 - L$
ρ = element radius

The reactive part of this impedance is shown in Fig. 6, where three different curves are shown for three different element radii. It is obvious

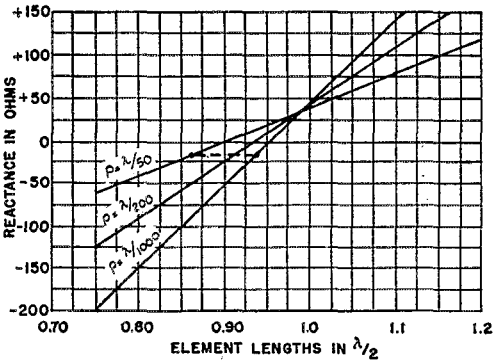


Fig. 6 — Variation of input reactance with length of an element in the region of $\lambda/2$.

that the rate of change of reactance is smallest for the thickest elements, which means that the bandwidth for the thicker elements will be larger. This comes about due to the fact that as the frequency changes, this will correspond to a change in length (in wavelengths) of the element. For a given change in electrical length, the reactance change will be smaller for thicker elements. This point will be taken up again when we consider the bandwidth factor of Yagis. It is sufficient to say here that to minimize losses in long Yagis, we desire thick, high-conductivity elements.

Minimum Rear Radiation

Maximum gain designs are not always the only requirement for Yagi arrays. Frequently, a requirement exists for minimizing the response in some particular direction; for example, the rear.

Both the rearward and forward field depend upon exactly the same factors (element tuning and spacing). Minimization of the rearward response and maximization of the forward field are almost never compatible, so that the tuning procedures which are normally recommended (see ARRL *Handbook*, for example) are compromises between best gain and F/B ratio. In theory, it is certainly possible to obtain very high F/B ratios by making the proper current amplitude and phase adjustments combined with proper spacings to minimize the rearward response. Indeed, the relationship between forward gain and F/B ratios for 2- and 3-element Yagis has been described in detail [1] and need not be repeated here.

A requirement for minimizing the rearward response for long, high-gain Yagis is of some importance in some communication links. A theoretical solution of this problem is of the same order of complexity as the maximum gain (forward field) Yagi. There is, however, a straightforward experimental method of adjustment which yields a very satisfactory solution to obtaining minimum rearward field for long Yagis.

Suppose we first design a long Yagi without any attention to the rearward response; namely, to produce a maximum-gain Yagi. This will result in a particular distribution of currents in both amplitude and phase and element spacings. A proper mathematical addition of these currents yields the rearward response. If now another element is added to the array, suitably spaced from the driven element and tuned so that its field, in amplitude and phase, will be equal and opposite to the net rearward field resultant without this element, a minimum rearward field will result.

In practice, cancellation of the order of 25–40 db. can be achieved by the utilization of 1 or 2 elements whose primary purpose is rearward field cancellation. These excess elements may be employed with negligible effect on the gain characteristic. The procedure depends upon a well-instrumented site free of reflections and where the forward and back field are simultaneously monitored. An element of length equal to the shortest element used is attached to an insulator and run along the boom of an array. It will be found that the position for minimum rearward response is quite critical.

Since the addition of an excess element to minimize the rearward response affects the forward response, we generally choose that position for the excess element which causes no decrease in gain. After the position of this element has been established, further tuning and slight repositioning of the element will be found to bring to an absolute minimum the value of the rearward response.

Bandwidth

The bandwidth of an antenna is generally defined as that frequency range over which the

gain will not vary by some specified limit; e.g., 1 db. Antenna bandwidth requirements differ widely, being extremely broad for TV use and narrow for single-frequency communication links. The bandwidth of a Yagi antenna is determined by the following factors:

1) The loss in power transfer to the antenna due to mismatch as the frequency varies.

2) The variation of forward field due to the currents (amplitude and phase) changing with frequency. It is also apparent that the rearward field is influenced by the same factors as the forward field and that the F/B ratio will also vary with frequency.

The variation of the s.w.r. with frequency in a Yagi depends upon the following factors:

1) The tuning of the elements.
2) The spacing of the elements.
3) The diameter of the elements.
4) The nature of the driven element (simple dipole, folded dipole, multiple driven elements, etc.)

The above characteristics determine the self and mutual impedances in the antenna, and they also determine the gain or forward field of the Yagi. There is a basic difference, however, in the action of these effects. The forward field is expressed by a distribution of element currents in space for which there is an optimum relationship. This results in an impedance at the antenna terminals which is some function of frequency. Now we can treat the antenna terminals as any other two-terminal circuit and furnish impedance compensation so as to improve the match. This matching technique in no way alters the phase relationship of the current distribution in the elements. It changes the current amplitudes by the amount of increased power furnished to the antenna terminals due to the increased power transfer resulting from the impedance compensation. The form of impedance compensation employed depends upon the impedance characteristics of the antenna and a technique for employing wide-band impedance compensation may be found.[5,6] The point we are making here is that, at least in theory, the additional line losses introduced by an increase in s.w.r. caused by mismatch between line and antenna can be made very small compared to the gain loss occasioned by changes in current and phase distribution in the Yagi elements. The theoretical limiting factors for the gain over a wide bandwidth are due only to the variation of the forward field with frequency.

The impedance bandwidth may be conveniently chosen as that frequency range over which the s.w.r. does not exceed 2.0 to 1. As an example, the bandwidth of a 3-element array with a spacing from reflector to driven element and from director to driven element of 0.12λ, element thickness of λ/800, stub-tuned, fed element is shown in Fig. 7. The solid curve shows the array

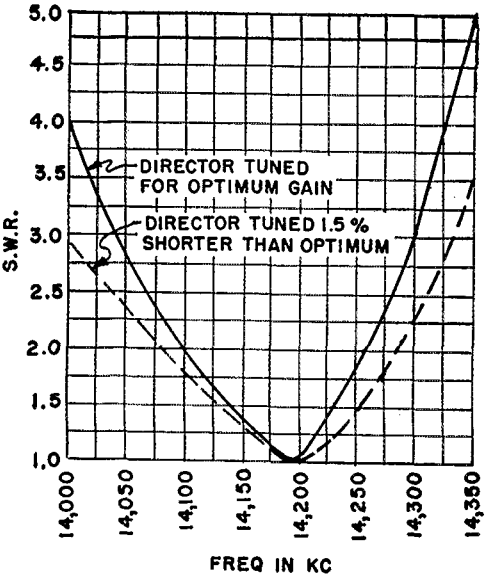


Fig. 7 — Standing-wave ratio *vs.* frequency; 3-element Yagi antenna.

tuned for optimum gain (maximum forward field) and shows a bandwidth of 160 kc. or 1.12 per cent of the operating frequency. The dotted line shows the same array with the director detuned 1.5 per cent shorter than optimum. The shorter director increases the impedance bandwidth to 200 kc. or 1.40 per cent of the operating frequency. The loss in gain due to the shorter director was 0.35 db.

The use of a fed element of the folded, "T," or "H" type increases the impedance bandwidth from the simple half-wave dipole type. For example, a 3-element array employing a folded dipole as the driven element with an element thickness of λ/300 covered a range of 8 per cent of the operating frequency with the s.w.r. less than 2.0 to 1. The "T" matched and "H" type dipole had impedance bandwidths of approximately 3 to 5 per cent.

We have previously discussed the change of self-impedance of parasitic elements in the λ/2 region and pointed out that the thickness of the elements determines the rate at which the reactance changes with length or equivalently with frequency (see Fig. 6). Naturally, the mutual impedance changes also with different thicknesses but here we can only guess that it will change with frequency in some similar fashion to the self-impedance. It is obvious from Fig. 6 that the use of thin elements with a $\rho = \lambda/1000$ or less will result in extremely rapid changes in self-impedance with frequency. We should, of course, like to use elements as thick as possible, but practical limitations generally restrict the maximum diameter to 1½ inches which is equal to a $\rho = \lambda/1100$ at 20 meters and λ/2200 at 40 meters, which indicates the narrow impedance bandwidth characteristics to be expected at low frequencies with practical elements.

[5] King, Mimno and Wing, *Transmission Lines, Antennas and Wave Guides*, McGraw-Hill.

[6] Radio Research Laboratory Staff, Harvard University, *Very High Frequency Techniques, Vol. I*, Van Nostrand.

Since folded dipoles are relatively impractical at such low frequencies, we are forced to the use of impedance-compensating devices to improve the impedance bandwidth for low-frequency Yagis. Ordinarily, the bandwidth required is usually small at these low frequencies; nevertheless, the 40-meter band is 300 kc. wide, representing a 4.2 per cent frequency excursion and, since we may obtain only about 1 per cent bandwidth with ordinary construction, we must be content with covering approximately 80 kc. without exceeding a s.w.r. of 2.0 to 1.

At 2 meters a ½-inch diameter element is equal to a $\rho = \lambda/320$, which enables us to obtain readily a bandwidth of approximately 2 per cent with no other change in the design of the array (same type of fed element, same electrical spacing and tuning).

In considering the impedance bandwidth of long Yagis we might surmise that the larger the number of elements, the smaller the impedance bandwidth. This, however, does not appear to be the case from a study of our data on long Yagis. A case in point is shown in Fig. 8, which is a plot of s.w.r. *vs.* frequency for one of our 15-element 2-meter arrays with an over-all length of almost 28 feet.

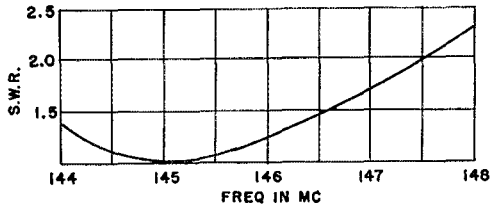


Fig. 8 — Standing-wave ratio *vs.* frequency; 15-element Yagi.

It will be observed that this array maintains a s.w.r. of 2.0 to 1 for over 3.5 Mc., or almost 2.5 per cent of operating frequency. This impedance bandwidth is about the same as our 6-element 2-meter array which is approximately a third the length of the 15-element unit. There does not appear to be a law of diminishing impedance bandwidth as the number of elements increases.

A possible explanation for the lack of diminishing impedance bandwidth as the number of elements increases is that the farther away we get from the fed element, the less coupling effect there is on the driven element. As an example, at 144 Mc. a parasitic element a mile from a driven dipole will have an insignificant reaction upon the dipole. The radiation field from the dipole will cause currents to flow in the parasite, which in turn will set up a radiation field due to the current flowing in it. The field at any point surrounding the parasitic element will be the (vectorial) sum of the original field from the dipole in addition to the reradiated field from the parasitic element which will result in reinforcement in some directions and cancellation in other directions, resulting in increased directivity or gain in the reinforced direction. The reaction of the parasitic element on the driven dipole will be extremely minute, for the electromagnetic coupling exists solely in terms of the radiated and reradiated fields. In the immediate region of a current element, we must, in addition, consider the effect of the induction fields sometimes called "near fields" or "Fresnel fields." These fields are rapidly damped out with distance since they are inversely proportional to the square and the cube of the distance. The near field, nevertheless, is greater than the radiation field at distances less than $\lambda/2\pi$ or 0.16λ, approximately. Since the coupling between elements depends upon the total field interaction, it is not very surprising that the spacing in the region of the fed element for long Yagis is different from those elements far away from the fed element.

In the same way, it is found that the tuning and spacing of those elements closest to the fed element have the greatest effect on the bandwidth. Since the first director has the greatest effect, our recommended spacing for this element is of the order of 0.2, due to bandwidth considerations in addition to that for maximum gain. We conclude that the effect on bandwidth of the number of elements is minor due to other factors such as nature of fed element, diameter, tuning and spacing of elements.

Dual-Fed Driven Elements

An example of a broad-band Yagi which employs a dual-fed driven element is of great practical interest for TV and other applications where impedance bandwidths of the order of 12 per cent are required. Fig. 9 is a sketch of such a unit (a broadband Channel 5, 76–82 Mc. TV antenna) of six elements, reflector, two fed elements and three directors. The fed elements are cross-fed somewhat less than 180 degrees out of phase. The two driven elements resemble a dual-driven, end-fire array. The rear fed element is tuned to the bottom end of the band and the forward fed element is tuned to the upper edge of the band.

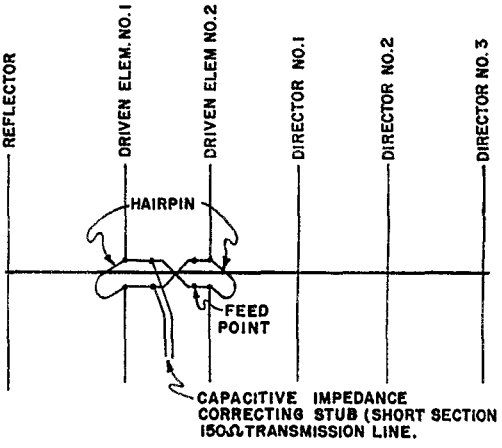


Fig. 9 — Broad-band dual driven element Yagi array.

The hairpins at the centers of the fed elements are used for tuning. The reflector is tuned for peak response slightly above the low-frequency edge of the band and the directors are tuned so that their gain is peaked somewhat below the upper frequency limit of the band. A capacitive stub consisting of an open section of transmission line is then placed on the connecting harness, its length and position selected so as to compensate for impedance variations with frequency. Fig. 10 is a plot of the s.w.r. *vs.* frequency for this array from 76 to 82 Mc. This plot indicates

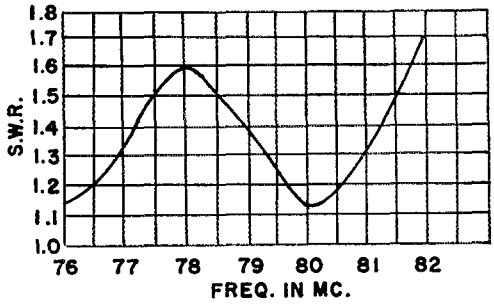


Fig. 10 — Standing-wave ratio vs. frequency for dual-driven 6-element Yagi array.

that the s.w.r. over the entire 6-Mc. band (7.5 per cent of center frequency) never goes beyond 1.7. Variations of this technique may be employed to an extent where the impedance bandwidth is not of any consequence in limiting the over-all gain bandwidth of the Yagi array.

We have previously made the assertion that the limiting factor in the gain bandwidth of Yagi arrays was essentially due to variation in forward field caused by changes in current amplitude and phase and the spacing of the elements as the frequency was varied. We have given at least one illustration above of a device (dual-fed driven elements) to show that an excellent match over a considerable frequency

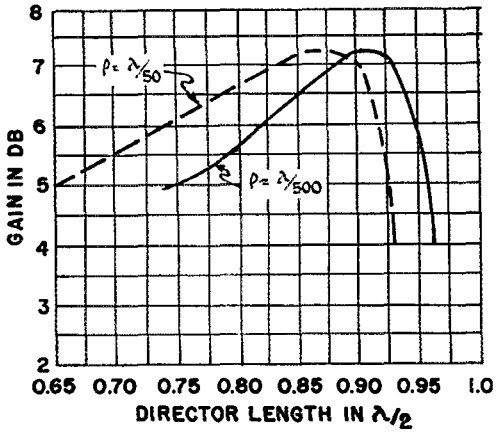


Fig. 11 — Gain of a 3-element Yagi over dipole as a function of the length of director.

band may be achieved without a major increase in complexity. The complexity, of course, depends upon the frequency; the higher the frequency, the simpler the construction.

Gain vs. *Spacing*

The basic factor to be considered with regard to the effect of frequency on the gain bandwidth is the effect of change in current phase and amplitude, and the change in spacing in wavelengths as the frequency is varied. Fig. 11 is a plot of the change in gain *vs.* length for a director whose spacing was 0.2λ from the fed element. The reflector was also spaced 0.2λ from the fed element. Fig. 12 is a plot of the change in gain *vs.* director spacing from the fed element. From these figures we can see that the element tuning has a much greater effect on the gain than the element spacing. Although not included herein, the gain *vs.* relative spacing of the reflector where the director spacing is maintained at 0.2λ will remain constant to within 0.75 db. over a spacing variation of from 0.1–0.3λ.

From Fig. 12 we observe that the variation in gain with change of spacing is not rapid, and in a region over approximately 0.1λ (0.15λ to 0.25λ) the variation in gain due to spacing is

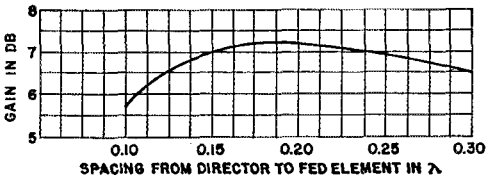


Fig. 12 — Gain of 3-element array over dipole *vs.* spacing of director.

negligible. For long Yagis we have previously observed that for each element there is an optimum position.

We have also observed that this position is actually a region in which the element adds gain to the array. Outside of this region, the element may yield no gain or actually decrease the gain of the array. The region over which we can get some gain from the director will be approximately 0.15λ. The actual position of the element was covered in the prior discussions of optimum spacing.

The fact that we can derive gain from a director over a fairly wide spacing region enables us to use paired sets of parasitic elements which are set within the range over which the spacing of the director will yield gain. As the frequency shifts, the optimum spacing point for the director will move so as to engage either one director or the other, depending upon which direction the frequency is moved. This device might be called "stagger spacing" in analogy to "stagger tuning" as used in broadband amplifier design. It makes possible minimizing the gain variations with frequency due to changes in spacing.

(*Continued on page 114*)

"Tattoo"—Automatic C.W. Transmitter Control

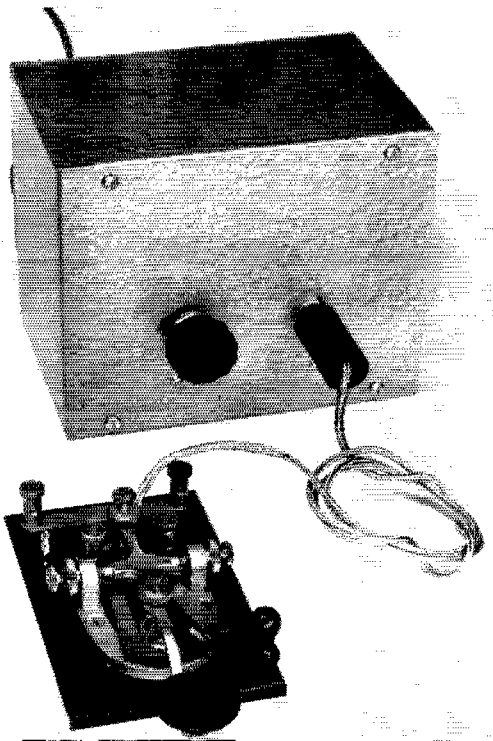
A Simple Device for Semibreak-In Operation

BY E. LAIRD CAMPBELL, W1CUT

ONE OF THE FEATURES contributing to the popularity of single-side-band phone is the convenience of voice-controlled operation, which permits a semibreak-in type of operation. The gadget to be described permits a similar type of operation on c.w. With simple connections to the transmitter and receiver, "Tattoo" (The Automatic Transmitter Turner Onner Offer) will turn the transmitter and antenna relay on automatically when the key is closed and, if desired, at the same time silence the receiver. This condition holds true as long as the key is closed and for a short period after the key is lifted. The period of "hold in" is adjustable by the operator. Thus the use of Tattoo offers a type of "poor man's break-in" without the need for a separate receiving antenna and sometimes-difficult transmitter and receiver changes. The adjustable time delay can be set to drop out between characters, words or complete transmissions, within limitations set by the normal sending speed of the operator. Since Tattoo is a complete station control unit, it can also be used with phone by substituting a push-to-talk switch for the key. Completely self-contained with its own power supply, it can be installed in the station by making a few simple connections to receiver and transmitter.

[1] Hiehle, "An Automatic Transmitter Turner-Onner," *QST*, May, 1950.

[2] Stein, "Some Hints on Relay Operation," *QST*, June, 1956.



The Circuit

The principle of this automatic device was first described by Hiehle.[1] In its latest version we have included a few refinements: one side of the key is grounded as a safety measure, keying-relay techniques described by Stein[2] have been incorporated to permit relay keying that can follow any bug perfectly, and modified circuit constants allow the transmitter to turn on slightly faster than it did with the original model.

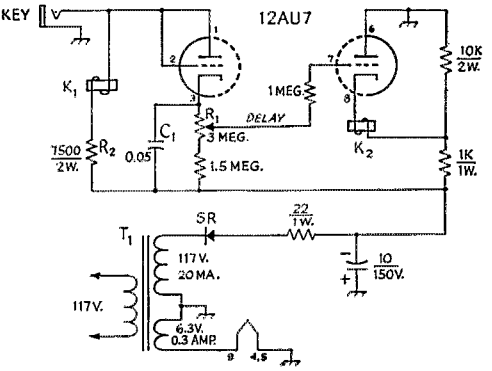


Fig. 1 — Schematic diagram of Tattoo. All resistors ½ watt unless specified otherwise; all capacitances in μf.
C_1 — 0.05-μf. 600-volt paper capacitor, good quality.
K_1 — 2000-ohm s.p.d.t. keying relay (Sigma 41F-2000FK-TUN).
K_2 — 10,000-ohm sensitive relay (Potter & Brumfield LB-5 or LM11. See text).
SR — Low-current selenium rectifier (Federal 1002).
T_1 — Small power transformer (Thordarson 26R32).

Referring to the schematic diagram in Fig. 1, a simple power supply using a selenium rectifier furnishes about 120 volts. The keying relay, K_1, operates from this supply through dropping resistor R_2, which has a value that gives both current and voltage overdrive[2] of the relay and makes it follow a bug perfectly. The relay contacts (not shown) are connected to the keyed circuit in the transmitter.

♦

Tattoo does for the c.w. station what voice control does for phone. It turns on the transmitter with the first dot or dash, and holds in for a period of time determined by the setting of the panel control.

♦

QST for

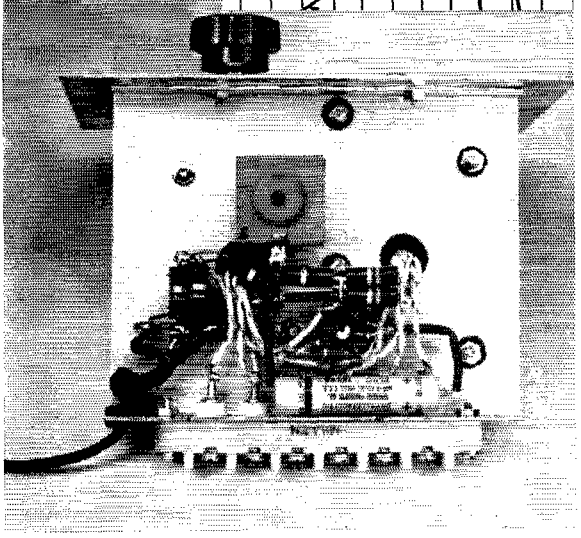
Resistors and the selenium rectifier are mounted under the chassis on tie points or tube-socket pins.

When the key is closed on the first dot or dash, C_1 is charged through the diode-connected section of the 12AU7. This voltage overcomes the bias on the triode section of the 12AU7, plate current flows, and relay K_2 pulls in. The contacts (not shown) on K_2 are used to turn on the transmitter power, close the antenna relay, and turn off or mute the receiver. If the key is opened, C_1 starts to discharge through the two resistors shunting it. If the key is not closed again, C_1 will eventually discharge, but before this time relay K_2 will have opened, depending upon the setting of R_1. The higher the arm is set on R_1, the longer K_2 will hold in. The values in the cathode circuit of the diode are such that you can go from a condition where K_2 will open between words at about 12 w.p.m. to where it won't open between sentences at 15 w.p.m.

Construction and Wiring

Although there are obviously a number of ways in which Tattoo can be incorporated in the station, we elected to build it in a 4 × 5 × 6-inch cabinet. A U-shaped chassis was bent from a piece of scrap aluminum; the chassis is 1¼ inches high at the rear but has only a ½-inch lip at the front to clear the cabinet. The chassis is 3¾ inches deep and 4 13/16 inches wide. The 6-terminal Millen strip (37306) mounts on the rear lip, and the a.c. line cord is brought out through a grommet in the lip. By cutting a 1 5/16-inch strip off the back cover, an opening is provided for the terminal strip and the line cord.

A little juggling of the parts on the chassis should bring you a reasonable facsimile of the arrangement shown in the photographs. The two relays were mounted with screws and small rubber grommets, to minimize any noise that might otherwise have been transmitted to the chassis and cabinet. A couple of tie points were required under the chassis, but otherwise practically all of the wiring is point-to-point on components. The selenium rectifier is supported by soldering one of its terminals to a tie point. The paralleled resistors evident in the photograph are the 2-watt resistors mentioned in Fig. 1; we used suitable 1-watt resistors in parallel rather than



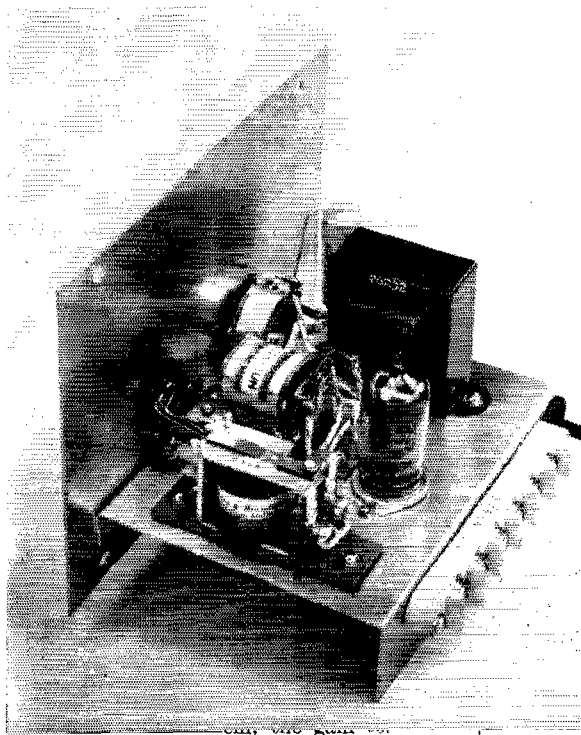
wait for the local dealer to replenish his supply of 2-watters.

Operation

You may have noticed in Fig. 1 that there is no switch for turning on the a.c.; this was considered unnecessary because we plan to get the a.c. from the transmitter, so that when the transformer filaments are turned on a.c. is applied to Tattoo.

To check Tattoo, connect the a.c. and plug in your key at the key jack. The keying relay K_1 should follow your bug nicely If you're a purist and want to check the keying relay, turn off Tattoo and remove the key plug from the jack. Connect an ohmmeter across your bug and send a few strings of dots. The ohmmeter should hover around half scale; its exact setting will depend upon how you have the bug adjusted. Now disconnect the ohmmeter from the key and

Continued on page 116)

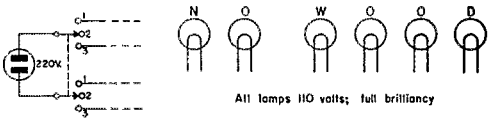


The two relays, the power transformer and the tube are mounted above the chassis. Capacitor C_1 and a 1.5-megohm resistor are mounted directly on R_1.

Quist Quiz

To add an international flavor to this "stump-the-experts" department, Mr. Jacques Vernet, F9TV, submits this teaser for the circuit masters who found the earlier quizzes too simple.

In an unnamed town in France a coal-and-wood dealer has an electric sign in his shop window. When there is wood for sale four lamps light in the sign and the word WOOD is illuminated. When the wood is gone six lamps are lit and the words NO WOOD are illuminated. The power line is 220 volts (no neutral) and 110-volt lamps are used. The dealer controls the lamps through a two-pole three-position switch; for safety reasons the center position is "Off" and, in this position, no voltage appears past the switch. The basic problem is shown in the sketch; all you have



Lamps WOOD light in switch position 1, lamps NO WOOD light in switch position 3. Use only the four leads from the switch contacts (none from the 220-volt line).

to do is draw in the connections. Hint: There are several possible solutions, but look for the simplest, with a minimum of extra components, if any.

ABOUT JULY'S QUIZ

Did you figure out what was in the box? You were right if you decided it had to be some kind of rapid interrupter device (possibly clockwork driven) that provided a short circuit half the time and an open circuit the other half of the time. When it was closed the voltage would be zero and the current would be limited by R_1. When it was open the current would be zero and the voltage would be that of the battery. Since the interrupter works at a rapid rate, the voltmeter and the ammeter would indicate half the peak readings. However, no power would be consumed past the wattmeter, because $W = EI$, and E or I is zero at any instant. The wattmeter would indicate only the small amount of power used by the voltmeter and ammeter.

For the meters to read half these peak values when the switch is at 1, $R_2 = R_1$.

August 1931

In *QST* 25 years ago, Ross Hull described equipment for Duplex Phone on 56 Mc., with the editor pointing out that it would be much more sensible for the local ragchewers to use the 5-meter band than 75 meters. (Sound familiar, gang?) At that time, amateur mobile operation was not permitted, but Hull's experiments showed that mobile operation could be quite practical.

—•••—

Robert Brooke, W9CH, delineated a portable receiver completely self-contained in a box 5 by 6 by 9 inches and using type '30 tubes. Battery-powered, it was used both at home and portable locations, and also came in handy for tracing interference.

—•••—

Paul Hendricks, W1AXV/W1XP, explained the standard frequency transmitter at W1XP.

—•••—

George Grammer, assistant technical editor, describes the addition of an amplifier to any low-power transmitter.

—•••—

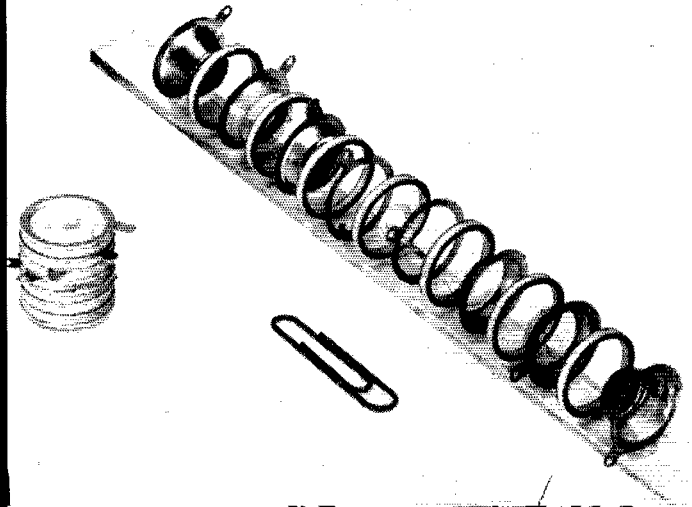
Boyd Phelps, W2BP, points out the advantages of frequency-tripling over doubling, while James McLaughlin and James Lamb discuss the mystifying decibel.

—•••—

Ev Battey reports on the very successful Fourth International Relay Competition. The big news was that six of the U. S. stations participating managed to work all six continents!

—•••—

Clinton B. DeSoto reported on the formation of a new society entitled the Wives and Mothers of Radio Amateurs.



«

We thought you'd be interested in seeing this view of a stacked ceramic receiving tube recently announced by Eimac. The tubes feature long life (they will be wired directly into circuits, thus eliminating the need for tube sockets) and a type of construction which will enable them to withstand shock, vibration, and high temperatures. At the present time the price is rather high for ordinary amateur use, but extended use will undoubtedly lower the cost. The photograph at the left shows the size of the tube as compared with a paper clip, and also an exploded version indicating the construction.

Changing the 6146 Oscillator into an Amplifier

80 Watts Input on 80 Through 10

BY LEWIS G. McCOY, W1ICP

As evidenced by the mail to Headquarters, the two-band 6146 crystal oscillator described a year ago[1] was built by many amateurs. Several of the letters asked for information on converting the unit to an amplifier. This article describes how the change can be made from the original oscillator to an 80-watt band-switching amplifier capable of operation in the ham bands 80 through 10 meters.

The changes consist of rebuilding the grid circuit to a link-coupled bandswitching circuit, and the tank circuit to a pi network designed to operate into a 50- to 75-ohm load. As a convenience during tune-up periods, a 25-ma. meter and a switch have been added, to permit reading either grid or cathode current.

If the reader has built the oscillator and wishes to make the changes to be outlined, it is suggested that he study Fig. 1 here and the circuit diagram of the original oscillator, to familiarize himself with both circuits. Most of the components used in the original unit are incorporated into the amplifier If the reader has not built the oscillator and wishes to construct the amplifier, the details given in this article are complete enough so that no previous reference should be necessary.

[1] McCoy, "One Tube—80 and 40 Meters—75 Watts," *QST*, August, 1955.

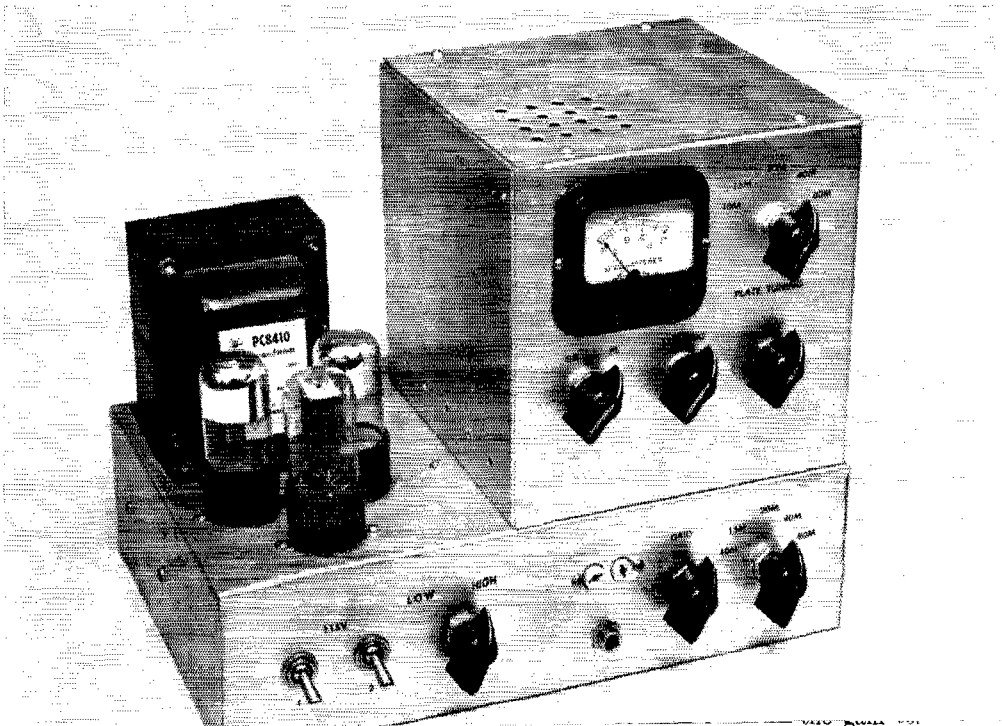
Circuit Details

The inductances in the grid circuit are made up from two lengths of B & W Miniductor stock. By shorting out sections of L_2 and L_4 with S_1, it is possible to resonate the circuit to the desired band.

The tank circuit of the 6146 employs a pi network that is designed to work into a 50- to 75-ohm load. A 400-$\mu\mu$f. variable capacitor is used as a loading control in the output of the pi. When the pi-network circuit is switched to 80 meters, a fixed capacitor, C_6 is switched in parallel with the variable. This furnishes enough capacitance in the output circuit for matching to 50- to 75-ohm loads. A similar system is used for 40 meters. By using the bandswitch to connect the fixed capacitors in parallel with the variable, the customary "coarse" loading control is eliminated.

The original power supply is used, one of the "economy" type that utilizes a replacement type transformer in a bridge circuit. The supply can be switched from high to low voltage to facilitate tune-up without danger to the tube.

The 6146 oscillator is now an amplifier. Comparing this photograph and the one on page 26 of August 1955 *QST* will show the panel and chassis changes. As mentioned in the text, the crystal holder becomes the r.f. input jack. The dial light that was below the crystal socket has been removed and the key jack installed in its place.



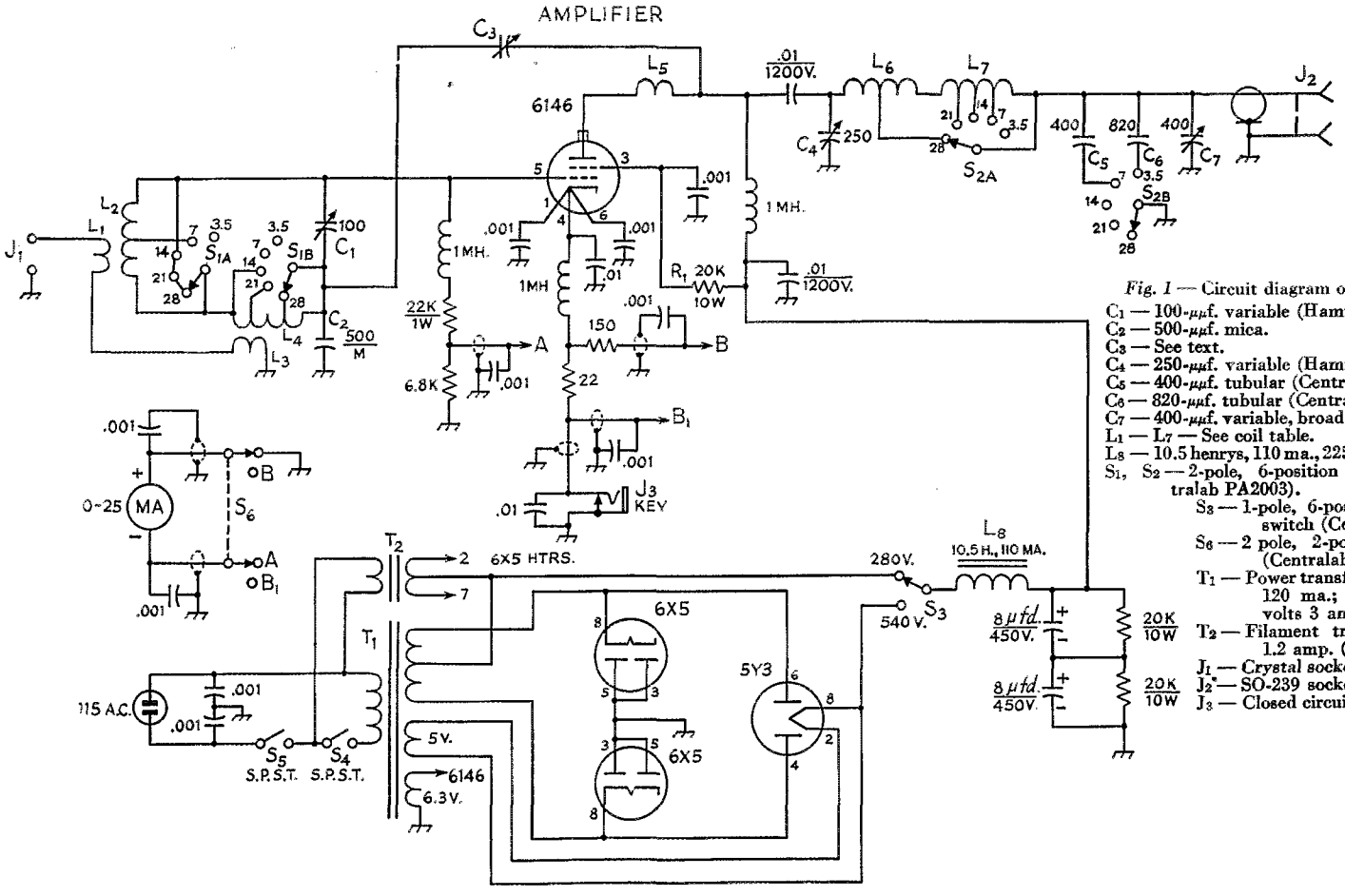


Fig. 1 — Circuit diagram of the 6146 amplifier.

C_1 — 100-$\mu\mu$f. variable (Hammarlund MC100S).
C_2 — 500-$\mu\mu$f. mica.
C_3 — See text.
C_4 — 250-$\mu\mu$f. variable (Hammarlund MC250S).
C_5 — 400-$\mu\mu$f. tubular (Centralab D6-401).
C_6 — 820-$\mu\mu$f. tubular (Centralab D6-821).
C_7 — 400-$\mu\mu$f. variable, broadcast replacement type.
L_1 — L_7 — See coil table.
L_8 — 10.5 henrys, 110 ma., 225 ohms (Stancor C100).
S_1, S_2 — 2-pole, 6-position wafer switch (Centralab PA2003).
S_3 — 1-pole, 6-position (2 used) wafer switch (Centralab 1401).
S_6 — 2 pole, 2-position rotary switch (Centralab 1464).
T_1 — Power transformer: 360-0-360 volts 120 ma.; 6.3 volts 3.5 amp; 5 volts 3 amp. (Stancor PC8410).
T_2 — Filament transformer: 6.3 volts, 1.2 amp. (Stancor P8190).
J_1 — Crystal socket.
J_2 — SO-239 socket.
J_3 — Closed circuit jack.

Metering of the amplifier is accomplished by a 25-ma. meter that can be switched to read either grid or cathode current. In the grid position the full scale reading is 25 ma. and in the cathode position, 250 ma.

Construction

An 11 × 7 × 3-inch chassis is more than large enough to take care of the power supply and r.f. section. TVI shielding is provided by using a 6 × 6 × 6-inch aluminum box as an enclosure for the r.f. components. To provide ventilation, a row of ¼-inch holes is made along the bottom sides of the box and in the lid over the tube. The face of the box serves as a panel for the meter and tank-circuit controls.

The power transformer and rectifier tubes are mounted on the chassis top at one end. All of the other power-supply components are mounted below the chassis. In the original oscillator unit, the 6146 socket was mounted 1½ inches in from the front of the chassis. This is sufficient to permit the use of the Shurite meter shown in the photographs. However, if the builder is starting from scratch, the 6146 socket should be mounted at least 2 inches from the chassis front to permit greater clearance behind the panel. One other suggested change from the original model is to mount an RCA phono jack on the back of the chassis. This will accommodate coax input from the driver stage. In the unit shown here the crystal socket was used as the r.f. input connector.

The variable capacitor, C_7, is mounted on a bracket positioned approximately 2 inches in from the back of the chassis. A panel bearing and shaft coupler is connected to the rotor of C_7 to allow for panel control of the capacitor. The tank capacitor, C_4, is mounted on the panel to the right of C_7. The meter switch, S_6, is mounted to the left of C_7.

As can be seen in the top view, the inductance L_7 is mounted on two isolantite stand-offs which are mounted on the side of the box. The plate coil L_6 is mounted at right angles to L_7. A standard two-terminal tie-point is used for a mounting point for the neutralizing capacitor C_3. The coax output receptacle is mounted on the rear side of the box.

COIL TABLE

The coils L_1L_2 are made from a single length of B & W Miniductor stock. Unwind 8 turns from the support bars and using side cutters, snip off the projecting bars. Snip the unwound piece of wire off about one inch from the coil stock. Next count off 13 turns and bend the 13th turn in toward the axis of the coil and cut the wire at this point. At the cut, unwind ½ turn from each coil. This leaves two coils on the same support bars. Unwind ½ turn at the end of the large coil. The 12-turn coil is L_1 and the 42-turn coil is L_2. Similar procedure is followed in making L_3L_4.

L_1 — 12 turns of No. 24, 1-inch diam., 32 turns per inch (B & W 3016).

L_2 — 42 turns of No. 24, 1-inch diam., 32 turns per inch (B & W 3016).
40-meter tap is made at 25th turn counting from junction of L_2L_4.

L_3 — 4 turns of No. 20, ⅝-inch diam., 16 turns per inch (B & W 3007).

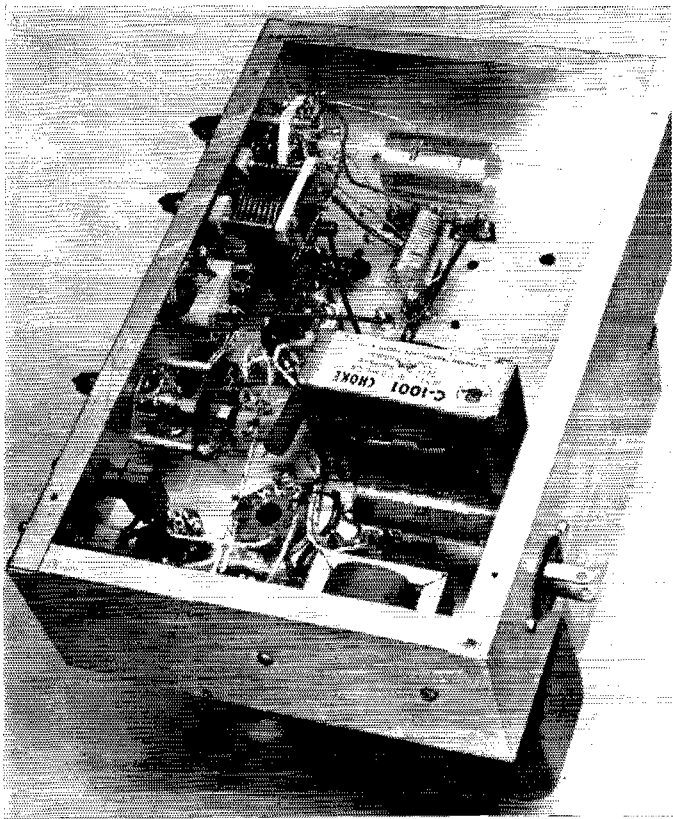
L_4 — 13 turns of No. 20, ⅝-inch diam., 16 turns per inch (B & W 3007).
20-meter tap is made at junction of L_2L_4.
15-meter tap is made 7½ turns from junction of L_2L_4.
10-meter tap is made 4½ turns from junction of L_2L_4.

L_5 — 4 turns of No. 14, ¼-inch diam., turns spaced wire diam.

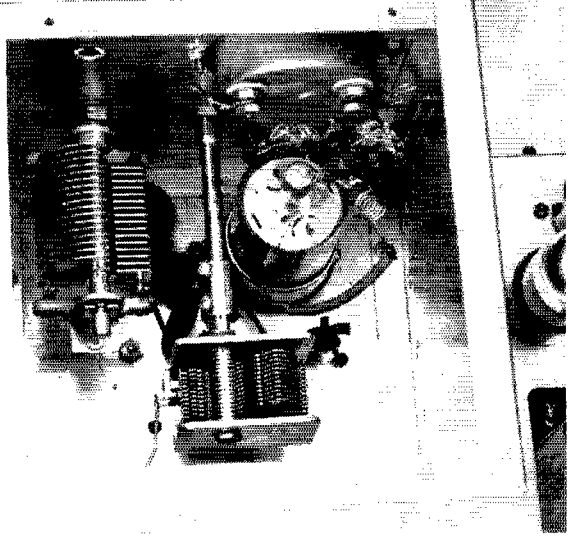
L_6 — 5½ turns of No. 12, 1-inch diam., turns spaced so that coil is 1-inch long.
10-meter tap is made 1½ turns from junction of L_6L_7.

L_7 — 17½ turns of No. 16, 2-inch diam., 10 turns per inch (B & W 3907-1).
15-meter tap is made 2 turns from junction of L_6L_7.
20-meter tap is made 5 turns from junction of L_6L_7.
40-meter tap is made 9 turns from junction of L_6L_7.

The grid tuning capacitor C_1 and the grid band-switch S_1 are mounted on the chassis front, below the 6-inch box. Two four-terminal standard tie-points are used to mount the coils L_1L_2 and L_3L_4. The bottom-view photograph shows the placement of the two coil assemblies. The turns on the coil that are on either side of the tap points should



This below-chassis view shows the mounting details of the grid circuit components. All of the parts in the foreground are power supply components. If the builder is constructing the unit as an amplifier and not a modified oscillator, the r.f. input terminal could be mounted on the rear chassis wall which would allow more space on the chassis front for greater spacing of the grid switch and variable capacitor.



Looking down into the amplifier box before the output coils and bandswitch are mounted in place. The meter switch is between the 6146 and the front panel. The output capacitor is mounted on a bracket and is turned by the extension shaft. Twisted wires to the right of the loading capacitor form the neutralizing capacitor.

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be bent in toward the axis of the coil. This will allow sufficient space to solder the tap lead without shorting to adjacent turns.

The neutralizing capacitor C_3 is made from two lengths of insulated wire approximately 4 inches long. Only a very small amount of capacitance is needed to neutralize the amplifier, and the two wires twisted around each other furnish the necessary capacitance. The ends of the wires are connected to a standard two-terminal tie-point that is mounted on top of the chassis to the rear of the 6146 socket.

Testing

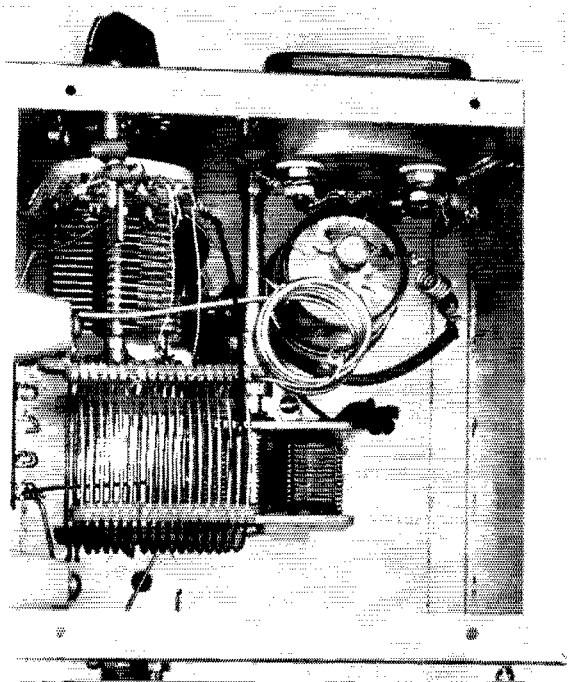
The amplifier is designed to be driven by a low-power driver capable of at least two watts output. There is *not* enough output from the usual one-tube v.f.o. to drive the amplifier.[2] A Heathkit AT-1 was used to drive the amplifier described here. The output from the AT-1 was fed into the amplifier by means of a short length of RG-59/U.

For test purposes, a 60-watt lamp bulb was used as a dummy load for the amplifier. The amplifier was tuned up on 80 meters first and all initial tests were made on low power. The output stage of the driver and the grid circuit of the amplifier should be adjusted to give a grid current of 2 to 4 milliamperes. With the rated grid current, the output circuit can be adjusted for resonance and loading to a plate current of about 75 ma. To check for neutralization, turn off the excitation and hit the key for a couple of short dots. No grid current should be indicated, although the plate current will kick up quite high. (That's why the dots should be short, to avoid overheating the tube.) If grid current is indicated, it shows that the stage is not neutralized. Turn off the power and untwist a turn from the neutralizing capacitor. Repeat the test for neutralization. It may be necessary to make several adjustments of the neutralizing capacitor before the correct amount of capacitance is found. Usually it will be found that the neutralization will hold on all bands but it is a good idea to check it. If you find that the neutralization doesn't hold on the higher frequency bands, then the amplifier should be neutralized on the highest band used.

With the amplifier fully loaded to draw 150-ma. the plate voltage on the high-voltage switch position will be approximately 540 volts. Screen voltage should be about 150.

If this is your first use of a pi-network tank circuit there are a few things you should know about the use of one. It is recommended that an antenna coupler be used to couple the output to the antenna feedline. Preferably, the coupler should be a tuned job and link coupled. This will greatly assist in reducing harmonic radiation. Several suitable couplers and methods for using them are described in *The Radio Amateur's Handbook*. Though your best friend may tell you to connect a long wire ("long" being anything from 20 feet on up) to the output terminal of a pi tank, avoid like the plague such a system. It will produce contacts but is also likely to produce from the FCC a QSL card for harmonic radiation . . . and who wants such cards?

[2] Several current v.f.o. units were tried and none furnished enough drive. These included the Heathkit, World Radio, and Knight. A driver-multiplier stage between the v.f.o. and amplifier is needed to furnish adequate drive.



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This view shows the completed output circuit. The tubular capacitors on top of the bandswitch are the output capacitors C_5 and C_6. The output coax fitting is mounted on the outside of the box.

Simple LC Filters for Amateur Use

A Wide-Band Filter for Receiver R.F. and Exciter-Multiplier Stages

BY HENRY RICE, JR.,* W1PMT, EX-W4FWW, EX-W9YZH

• While band-pass r.f. filter circuits can admittedly be built by the "by-guess-and-by-gosh" method, there is another way. Here is an account by a man not in the electrical engineering field who did a little digging into the other way and found that it wasn't too tough and that it was actually interesting once he got into it. We think you will have the same reaction.

NOAH WEBSTER'S hobby, like ours, was concerned with communication. He was deeply interested in the correct usage of words. It has been told that one day his wife caught him kissing his secretary and exclaimed, "Why, Noah — I'm surprised!" As might be expected of a technical man, he considered the matter quite carefully before answering. Then he said, "No, dear. You mean you are amazed. I am the one who is surprised." Here there were two thrills, the original smooch and the perfect answer. This article is concerned with just one of the many thrills in amateur radio: the thrill that a person without a technical background experiences in learning to design on paper a simple circuit that will do a specific job.

The basic wide-band filter circuit we elected to use is not new to ham radio. It has been used in several exciters described in *QST* and will be familiar to all constant readers. It is shown schematically in Fig. 1 and will be recognized as two parallel-tuned circuits coupled to give the desired bandwidth. The quantity M is merely

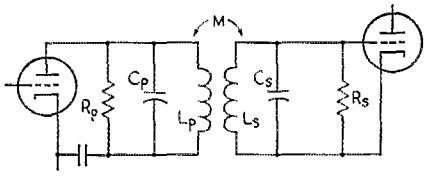

Fig. 1 — Basic diagram of the double-tuned circuit under discussion.

the effective coupling between primary and secondary. This statement does not imply carelessness in the choice of a coupling method, but in this case only one type of coupling will be considered. (A combination of inductive and capacitive coupling is sometimes used.) The secondary response curve of a band-pass filter of this type depends solely on k (coupling coefficient) and the actual Q of the loaded resonant circuits. It makes no difference how the coupling or Q of the coils was obtained. This is important to a clear understanding of the following procedure.

It should be pointed out that the primary circuit in Fig. 1 does not necessarily have to be the plate load for a vacuum tube — it can, and will, be used as an antenna load, as will be shown later. But from this point let's work with specific examples that can be built and tested and used. Things are more constructive that way.

A Receiver R.F. Amplifier

Let's get to work on an r.f. amplifier stage for a 14-Mc. receiver. Of course, the input and output *LC* circuits could be tuned separately, ganged together or ganged with the high-frequency oscillator but (you've guessed it!) we have just decided to make them bandpass. This means that the completed amplifier will have a response curve of the general shape of Fig. 2. Here f_o is

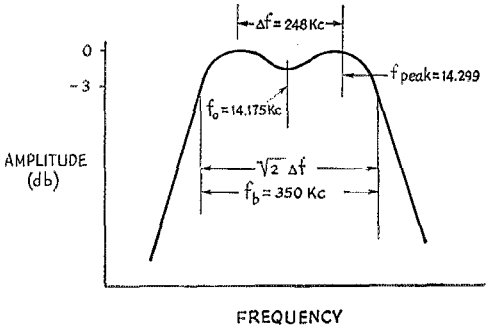

Fig. 2 — A typical response curve of a double-tuned circuit. This one is centered on 14,175 kc.

the center frequency in the passband, and also the frequency to which the two circuits are tuned. Further, Δf is the deviation frequency (peak to peak) and f_b is the bandwidth measured at the −3 db. points. The double-humped characteristic disappears at a value of coupling = k_c (critical coupling), but we have decided on a double-peaked curve (coupling coefficient > k_c) because we want good amplitude near the edges of the band and reasonably good attenuation of strong adjacent-channel signals. Obviously we are shooting for a curve that is roughly symmetrical about f_o both in the location and relative amplitude of the peaks, and this is all that the curve shows or implies. Further, we assume that $L_p = L_s$ and $Q_p = Q_s$, and that $k \ll$ unity. I'm sure our technical friends will bear with us long enough to establish that > means "greater

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than", ≪ "a lot less than", and "unity" means "one." And now we have just completed *Step 1:* establishing f_o, f_{peak} and the fact that we plan to use the customary —3 db. band-edge response. And perhaps we have learned a fact or two — I'm sure I have.

Step 2: If we had a chart of universal response curves (Fig. 3), it would show that f_o down 2 db. from the peak response results from $kQ = 2$, an easy relation to remember.

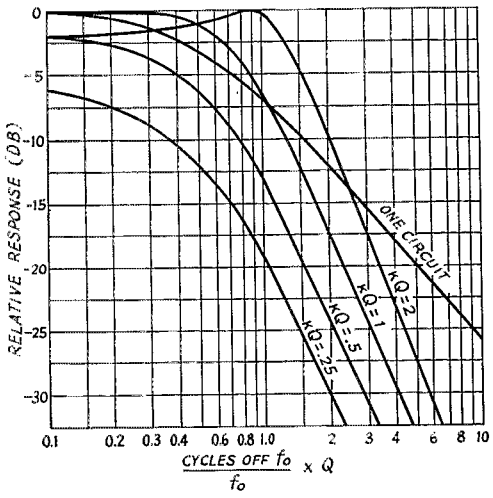


Fig. 3 — Universal response curves for a pair of tuned circuits for various products of Q and coupling coefficient, k.

Step 3: Because we have decided on 2-db. peaks and assumed k small compared with unity, the equation to use in figuring the approximate coefficient of coupling is

$$\frac{f_{peak}}{f_o} = 1 \pm \frac{k}{2}$$

Thus $\frac{14.299}{14.175} = 1.0087, \frac{k}{2} = 0.0087, k = 0.0174$

($k = 0.02$ is close enough and will move the peaks out a little more and bring up the weak signals near the band edges just a whisper.)

Somewhere I read a rule of thumb that states a "reasonably flat response" will result if the bandwidth is not much greater than 1.2 k f_o. Well, $1.2 \times 0.02 \times 14.2 = 340.8$ kc. I'm sure Mr. Webster would agree that a "reasonably flat response" defines what we are after, and that 340.8 is near enough to 350.

Step 4: We made $kQ = 2$ (Step 2), so $Q = 2/k = 2/0.02 = 100$.

Step 5: Decide the value of capacitance to use. If we use 3- to 30-$\mu\mu$f. mica trimmers, and take average input and output capacitances of tubes into account, we can cut 19 turns off a length of ½-inch diameter 32 turns-per-inch Miniductor and get neat little coils of about 3.4 μh. with Qs of about 200. There is no black magic involved in arriving at this — the ARRL Type A Lightning Calculator gives a close approximation, or you can arrive at it with a grid-dip oscillator and a little patience, by removing turns from a coil until it resonates at 14.2 Mc. with the assumed capacitance shunted across it.

Step 6: Find the equivalent parallel resistance of one unloaded LC circuit where the coil $Q = 200$. We can ignore the effects of the plate resistance of the tube (the plate resistance of pentodes is very high) and choose R_p and R_s as follows:

$Q = R/2\pi fL$ (the reciprocal of the usual equation involving the resistance in series with the inductance).

$R = 2\pi fLQ = 2 \times 3.14 \times 14.2 \times 3.4 \times 200 = 60{,}800$ ohms.

When $Q = 100$ the corresponding equivalent parallel resistance is half as much, or 30,400 ohms. To find the resistor needed in shunt with 60,800 ohms to bring the resultant down to 30,400 ohms, $RR_1/(R_1 - R) = (30.4 \times 60.8)/(60.8 - 30.4) = 60.8 = 60{,}800$ ohms, and we can use 62,000 or 56,000 ohm ½-watt resistors. (The answer was obvious in this case, but we wanted to record the formula for resistors in parallel).

Step 7: Make two coils as described in Step 5 or, better yet, make four at once if you have an inclination to build a complete stage. It is wise to look them over carefully to be sure there are no shorted turns or any lossy crud between turns. The little 32 t.p.i. coils are usually high Q, but once in a while something gets on them and knocks their Q way down. Assuming that you do not have ready access to a Q meter, a simple check is to use a grid-dip meter and find the self-resonance point of the coil alone. This will be up around 100 Mc. and, if the Q is up where it should be, you will get a clean indication and a sharp dip even with the coil several inches from the grid-dip meter. Naturally, if a Q meter is available you would check the Q and use the value in figuring the shunt resistors (Step 6).

Couple two of the coils closely by sliding them over a dowel or cardboard tube. The objective now is to determine the separation between coils that will give the value of k determined in Step 3. There are methods for this with a Q meter or inductance bridge, but it can also be done with a grid-dip meter and calibrated capacitor. The coils are connected in parallel and brought to resonance at a convenient frequency by the capacitor. Call this capacitance value C_1. The leads from one coil are then reversed and the circuit brought back to resonance with the capacitor, and call this value C_2. From these two values,

$$k = \frac{\Delta C}{C_1 + C_2}$$

where ΔC is the difference between C_1 and C_2.[1] Continue this reading and reversing process for different spacings between the coils until a value of $k = 0.02$ is obtained. Record the final spacing

[1] Langford-Smith, *Radiotron Designer's Handbook*, p. 1034.

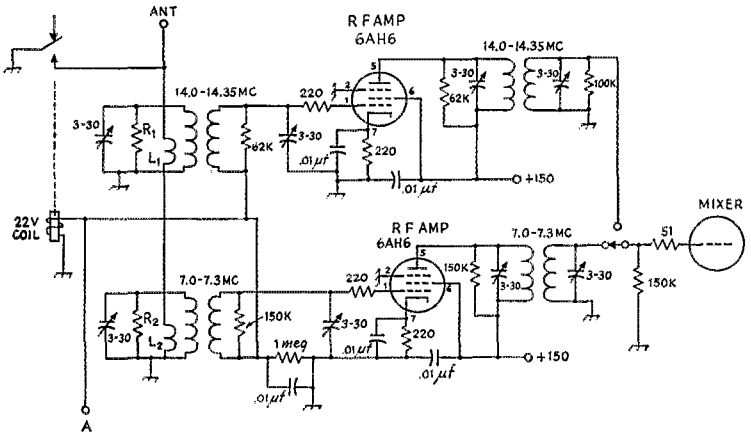


Fig. 4 — Practical schematic of the two-band broad-banded amplifier. The values of the coils are given in the text. Terminal A connects to a −22 volt source and the key.

to the nearest 1/32 of an inch and use that dimension when the coils are mounted in an actual circuit.

That's the whole story for this particular band. Stage gain has not been considered because it seemed advisable not to confuse the issue by including it. For the same reason, perhaps we should let well enough alone and stick by our guns with the $kQ = 2$ (Step 2). However, for those who would like to choose their own curve, we can perhaps help a little by noting that $kQ = 1 = k_c$ or the flattest top we can get without double peaks (0 db. down at f_o). Also, $kQ = 2.3$ gives 3 db. down at f_o and $kQ = 2.75$ gives 4 db. down at f_o. As these kQ figures increase, the peaks move out and become sharper and the skirt slope becomes steeper at the top. Fig. 3 shows the start of this effect.

Another Example

We have all been sitting for quite a spell now and I, for one, have a slight case of weaver's bottom. But let's see what we have learned, by applying the procedure to the 40-meter band. We certainly don't need to draw any pictures, and we will number the steps as we did previsouly.

1) $f_o = 7.15$ Mc. $f_b = 300$ kc., and $\Delta f = 300/1.414 = 2.2$ $f/2 = 106$ kc., so one peak will fall at $7.15 + 0.106 = 7.256$ Mc.

2) Set f_o at −2 db. again.

3) $7256/7150 = 1 + (k/2)$, $1.0148 = 1 + (k/2)$, $k/2 = 0.0148$, $k = 0.0296 = 0.03$. But the rule-of-thumb check shows that $1.2 \times 0.03 \times 7.15 = 257$ kc., so we will increase the coupling to $k = .034$, which (working backwards) puts one f_{peak} at 7.272 Mc., brings Δf to 0.244 Mc., and makes $f_b = 0.345$ Mc.

4) $Q = 2/k = 2/0.034 = 59$.

5) We can use 3 −30-μμf. mica trimmers for this band, too. Make any kind of small coils of about 12 μh. inductance. The $\frac{5}{8}$-inch by 32 t.p.i. Miniductor (B&W 3008) would be satisfactory, and again the Q would be around 200.

6) $R = 2 \times 3.14 \times 7.15 \times 12 \times 59 = 31{,}800$ ohms equivalent parallel resistance of a loaded LC circuit with $Q = 59$. The equivalent parallel resistance of the unloaded circuit is $R = 2 \times 3.14 \times 7.15 \times 12 \times 200 = 108{,}000$ ohms, and the necessary shunt resistor to bring the Q to 59 is $R = (31.8 \times 108)/(108 - 31.8) = 3430/76 = 45\text{K} = 45{,}000$ ohms.

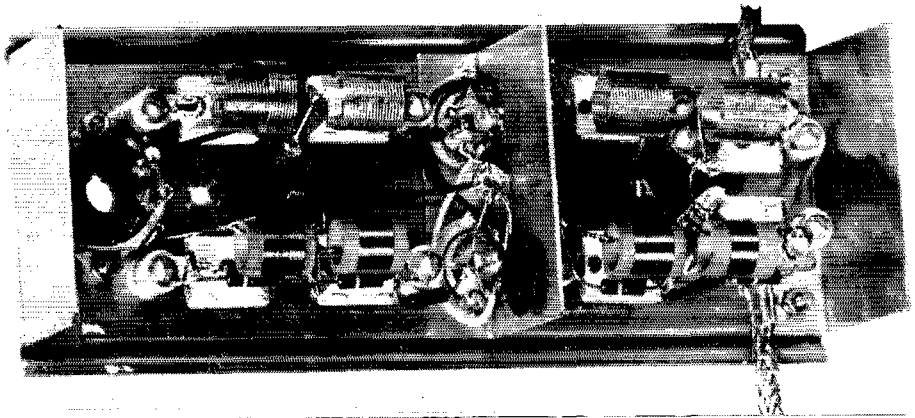
7) Determine coil spacing for $k = 0.034$ and record it.

Construction

The coils, spaced and loaded as previously outlined and tuned with 30-μμf. mica trimmers, were used in the circuit shown in Fig. 4 The antenna coils have about 1/3 the number of

(Continued on page 118)

A two-band broad-banded r.f. amplifier, with the shield cover removed. The partition straddling the sockets isolates the input and output circuits and permits running the stages at high gain.



Multiple V Beams

High Gain in All Directions with Four Wires

BY LLOYD D. COLVIN,* DL4ZC

• This is a description of the V-beam antenna system used at DL4ZC. Although it is impossible to "design" such a system for more than one band, since the optimum angle varies with frequency and leg length, experience has shown that such a combination of long wires at a compromise angle can be quite effective as a multiband antenna. For those who have the necessary space, an advantage is that no rotating mechanism is required.

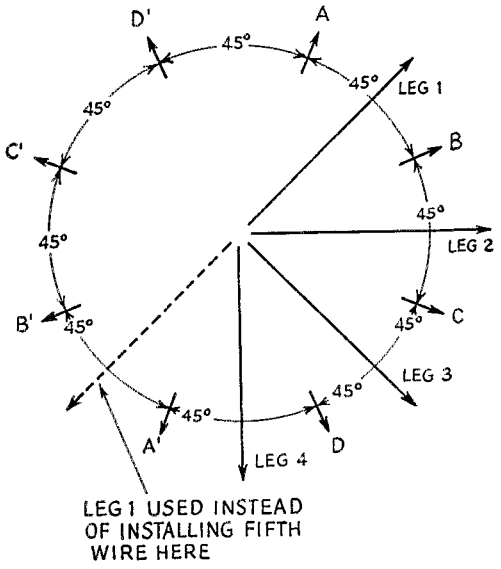


Fig. 1 — Directions covered by the DL4ZC V-beam array. Direction A-A′ is covered by legs 1 and 4 working as an obtuse-angle V beam.

ARE YOU tired of erecting separate rotary beams for 10, 15 and 20 meters plus dipoles or "all-band" antennas for 40 and 80 meters? If so, and if you are lucky enough to have the required area, multiple V beams may be the answer to your problem.

A simple multiband arrangement of multiple V beams may be switched instantly for high gain in eight different directions (two at a time), covering 360 degrees. It may be simply built with just four radiating wires and two relays, if you can find several hundred feet of antenna space over 135 degrees on any side of your QTH.

*Lt. Col., Signal Corps, U. S. Army, 4th Signal Group, APO 403, New York, N. Y.

The theory and feeding of V beams is well covered in many radio books. However, a few simplifications were employed by DL4ZC that may make your next V-beam installation easier. An unterminated V beam is bidirectional. Gain and directivity is about the same in either of two directions 180 degrees apart. If 45-degree spacing is used between legs, five radiating wires are normally required to cover all directions. In the DL4ZC installation the fifth leg was eliminated and the first leg is used, in combination with the fourth leg, to form an obtuse-angle V.

An obtuse-angle V radiates in a direction at right angles to the bisector of the obtuse angle. This combination is used to cover the missing sector A-A′ in Fig. 1. Although according to theory the gain of an obtuse-angle V is not as great as with one having a proper acute angle, in actual operation the gain in directions A-A′ compares favorably with gain in the other directions. The standing-wave ratio as measured in the coaxial line between the antenna coupler and the transmitter changes only a minor amount when switching to any of the available directions.

Switching of the beams is accomplished by installing two double-pole double-throw relays in a box at the apex of the beams. Standard 115-volt antenna relays were used and a plastic box of the type used to store foods in a refrigerator, mounted upside down, provides a cheap all-weather housing for the relays. To keep the box dry, a low voltage is applied to the antenna relays during all periods the antennas are not used. The voltage need not be enough to operate the relays but just enough to generate a little heat in the box. A few protected small holes on the under side of the box will help prevent sweating. The wiring of the antenna relays is shown in Fig. 2. It is advisable that the relay control line be installed

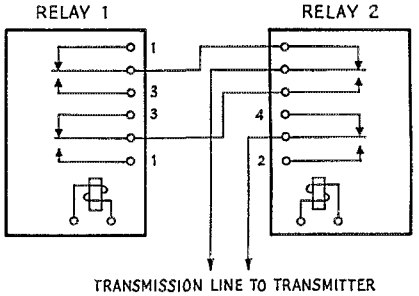


Fig. 2 — Circuit showing how two d.p.d.t. relays are used to switch V-beam legs. Numbers indicate connections to leg designations in Fig. 1. For direction A-A′ (Fig. 1), both relays are unenergized as shown. For direction B-B′, both relays are energized. For direction C-C′, Relay 2 is energized, and for direction D-D′, Relay 1 is energized.

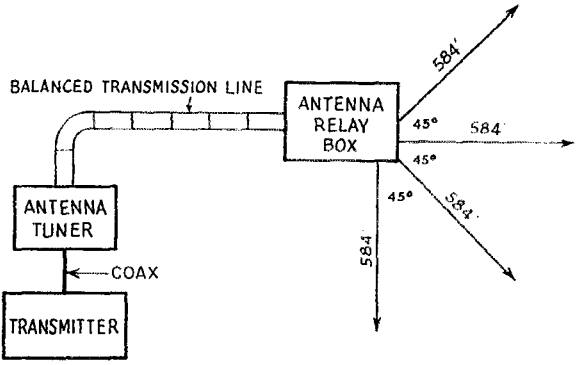


Fig. 3 — Feeding arrangement for the V-beam array. The antenna tuner is a conventional one for coax input and balanced output. An s.w.r. bridge may be installed in the coax line between the transmitter and antenna tuner for matching the antenna system to the coax line.

as far away from the antenna transmission line as possible. Different routes for the two lines should be followed if practicable.

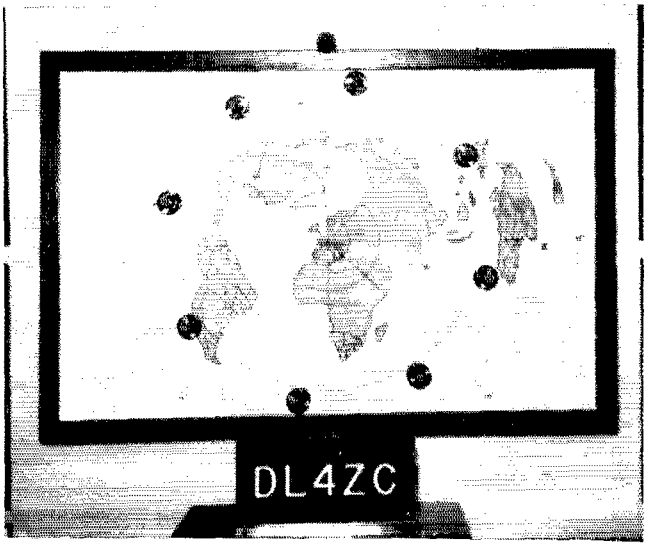
The 45-degree spacing used between legs is a compromise value which permits reasonably high gain on any frequency between 3.5 and 30 Mc. The length of the four wires is not critical, so long as all four wires are exactly the same length. It is recommended, however, that the length used be approximately that shown in Fig. 3. Each leg should be approximately the same distance from ground and other obstacles. The apex of the legs and the far ends of the legs should be close to the same distances above ground.

A well-designed 600-ohm open-wire line is recommended in textbooks for use between the antenna tuner and the feed point of the V beams. Open-wire TV line should also be satisfactory for low- or medium-power transmitters. Transmitting-type Twin Lead for high power, or TV-type for medium or low power, might be satisfactory if the line is short, but standing waves will run the losses up on longer lengths.

At DL4ZC the final "dressing up" of the installation consists of placing a great circle map in a frame on the wall and mounting eight light bulbs around the map spaced every 45 degrees in the primary directions of the beams. The lights are operated in pairs and are switched by the station operator at the same time the antenna relays are switched. A multiple-contact switch is used to control the operation of the antenna relays simultaneously with the lighting of lights on opposite sides of the great circle map. A quick glance at the map shows which beam is in use and what two directions it will operate in with maximum gain.

Operation on all bands has netted 171 countries worked in one year. Experience has shown that on the higher-frequency bands transmission reports are in general better than when using three-element rotary beams, while reception, on a relative basis, is generally poorer because of the bidirectional characteristics of the V beams.

• OM Colvin is well-known in DX circles. Besides eleven different W calls, he has been FA8JD, KL7KG, J2AHI, JA2KG, J2USA, JA2US, and now DL4ZC. As you might suspect, the list of DX awards he holds is a yard long!

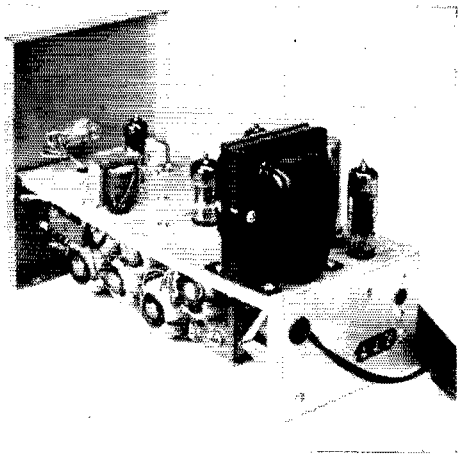


Lights may be installed around a great-circle map to indicate direction of beam in use.

• Recent Equipment —

RA-1 Single-Sideband Receiving Adapter

SOME AMATEURS have the erroneous impression that a single-sideband receiving adapter is a gadget that will eliminate the necessity for careful tuning in the reception of s.s.b. signals. That would be nice, but it isn't true. An s.s.b. adapter



The toroidal filter section of the RA-1 kit is pretuned and requires no adjustment by the builder.

is a device that adds single-sideband selectivity to a receiver, enabling the operator to receive only one side band of an a.m. signal, to provide good reception when the other sideband has interference on it. In the reception of s.s.b. signals, it has the advantage that it passes only the single sideband and nothing else, giving the maximum chance for QRM-free reception. By removing the vestigal sideband of a mediocre s.s.b. signal, it presents a better s.s.b. signal to the detector and makes tuning seem to be an easier job, since inadequate sideband suppression makes a signal hard to "clear up" on a receiver that doesn't have s.s.b. selectivity.

S.s.b. adapters are closely related to s.s.b. generators; they use either the filter or the phasing principle of operation. In the RA-1 kit, made by D&R Ltd. of Santa Barbara, Calif., the manufacturers have elected to use the filter system. The adapter is complete with power supply, and connecting it to the receiver requires no modification of the receiver, a point resale-conscious hams always consider. As the block diagram of Fig 1 shows, the i.f. signal of the receiver is picked off and fed to a 6BE6 converter stage. Assuming the receiver i.f. to be 450 kc. (the RA-1 will work with input frequencies of 450 to 500 kc.), the 6BE6 oscillator can be on 425 or 475 kc. and still heterodyne the incoming signal to 25 kc. This oscillator frequency is determined by a panel switch marked AM-UPPER-LOWER. The heterodyned signal passes through a sharp filter and then into a ring demodulator.

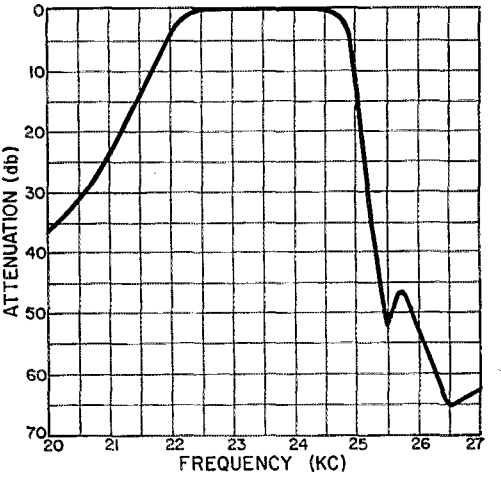


Fig. 2 — Selectivity characteristic of the toroidal filter.

The ring demodulator is a detector circuit using four copper-oxide diodes, driven by a 25-kc. oscillator. The ring demodulator is one of the family of "product" detectors, in which the local oscillator has complete control over the incoming signals. Unlike in diode detection, a strong incoming signal does not mask, or "take over," a weak one unless, of course, they are both on the same frequency. The output of the detector is fed to a 12AU7 triode audio amplifier and then to a 6AQ5 output stage.

Toroidal coils are used for the transformers and tuned inductors in the sharp filter. The selectivity curve of the filter is shown in Fig. 2. A toroidal coil is also used in an output coupling transformer following the demodulator which, together with *R-C* filters in the audio stages, minimizes the 25-kc. at

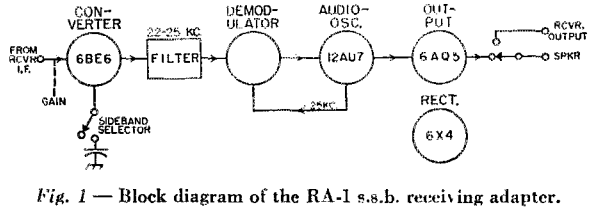


Fig. 1 — Block diagram of the RA-1 s.s.b. receiving adapter.

the output-audio-stage grid. The 6BEB oscillator frequency is controlled by a slug-tuned inductor, and a mica compression trimmer is used as a pad that is cut in when the oscillator is shifted to a lower frequency. When the oscillator is on 475 kc., and an incoming carrier at 450 kc., a 452-kc. side frequency would be heterodyned within the pass band of the filter, while a side frequency of 448 kc. would fall outside. Switching the oscillator to 425 kc. leaves the heterodyned carrier at 25 kc. but throws the 448-kc. side frequency into the pass band. This is the familiar principle of selectable-sideband reception. In operation, when a signal is properly tuned in, it requires only the flick of the switch to investigate either sideband.

The AM position of the switch changes the external loudspeaker and the panel phone jack over from the adapter to the normal output of the receiver.

A GAIN control on the panel determines the amount of signal fed to the 6BE6 grid from the receiver, and also handles the a.c. switch for the adapter.

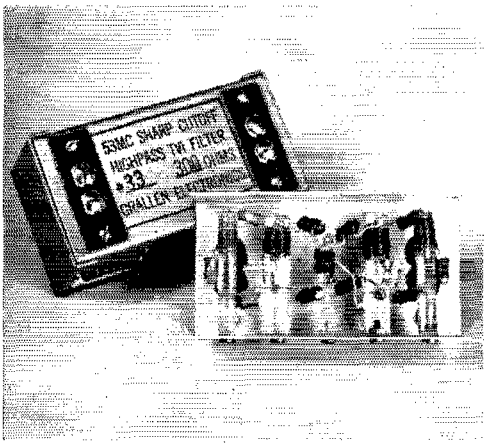
The RA-1 kit comes complete with all of the necessary components, with the filter wired and pretested, and with the 25-kc. oscillator circuit pretuned. A 16-page instruction book gives a step-by-step story on assembly, wiring, testing and operation, and 8 line drawings and diagrams supplement the written instructions.

— *B. G.*

High Pass Filters for the 50-Mc. Operator

HIGH-PASS FILTERS that will take care of TV receiver overloading from amateur signals on all bands through 10 meters are common today. Their general availability has been a major factor in the solution of our TVI problems. But they are no help to the 6-meter operator. The cutoff frequency of the usual high-pass filter may be anything between 30 and 54 Mc. and it will still do the job for the ham who is operating below 29.7 Mc., but designing and building filters that will reject 50 Mc. and pass 54 Mc. is a more critical task than most filter makers have cared to attempt.

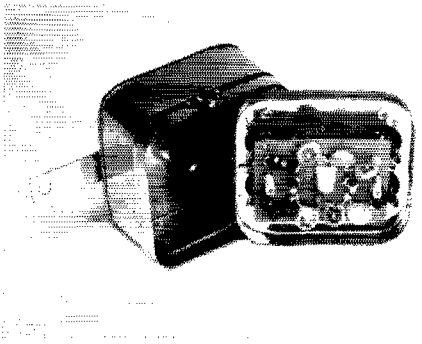
That it is possible to build such filters was demonstrated by W2IDZ, in his prize-winning two-part article in June and July, 1954, *QST*.



The Grallen Filter

The Grallen Filter, shown herewith, is a duplicate of the W2IDZ design. Each filter is individually tested, and an attenuation curve supplied to the purchaser. They are manufactured by Grallen Electronics, P.O. Box 245, Hanover, N. J., and distributed by Hudson Radio and Television Corp., Newark 2, N. J.

The Drake Type TV-300-HP Filter (R. L. Drake Co., Miamisburg, Ohio) is a 4-section ladder of unusual design. Tiny bifilar-wound coils



The Drake Filter

on iron cores are used to achieve perfect center-tapping and close coupling between each half of the windings.

Where the interference is mild in nature both the Grallen and Drake filters may be used without grounding them to the TV chassis. Insertion in the 300-ohm lead at the back of the receiver will do the trick. If the interference is severe the case of the filter should be bonded to the TV chassis, and provision for this is made in both filters. Connection of the filter right at the point where the lead enters the tuner may also be important.

It should be pointed out that these filters are not solely for use where 50-Mc. operation is a source of TVI. They are the first commercial products that will help the 6-meter man, but they also do an equally-good job of preventing fundamental overload from any lower amateur frequency as well.

— *E. P. T.*

Simple Voice Control for the A.M. Station

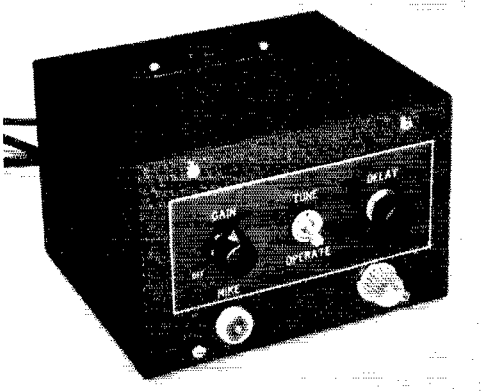
An Easily-Constructed Unit for Break-in Operation

BY ARTHUR FARRINGTON, W2NDG* AND ROBERT E. DRUMMOND,** K2DKD

• Here is a simple system that turns on the phone transmitter when you start talking and shuts it off when you stop. It can also be used to control the antenna change-over relay.

THERE IS LITTLE NEED to discuss the advantages of a voice-controlled break-in system. Recent articles in *QST* have already done so. However, once sold on voice control, it remains for the amateur either to purchase a commercial unit or to find and construct the circuit best suited for his particular needs.

The unit described herein was designed to be built on a budget yet retain the best points of the more elaborate systems. Our original desires were as follows:



The voice-control unit is assembled in a 4 × 5 × 6-inch box. The gain control R_1 is at the left, and the delay control R_2 at the right. S_2 is between these two controls. The microphone connector and pilot lamp are below.

1. A "use" or "not-use" item, simple to connect or disconnect, and one that would require no modification of the receiver or transmitter.

2. Flexible operation, preferably with some means of limiting sensitivity and with adjustable delay (cut-off) time.

3. Small physical size, but self-contained.

4. Construction as cheap and simple as possible, consistent with the features desired.

We were obviously limited to a relay-type keyer. Further, since sensitive plate-circuit relays are not designed to handle heavy loads nor to feature the plurality of necessary contacts, it should be assumed that a push-to-talk system is already in use or can be installed.

The unit shown in the photographs has been in use at this QTH for over six months and has fully satisfied the authors in every respect. No alterations have been made to our equipment other than installing the push-to-talk relay recommended for the Viking Ranger by the Johnson Service Manual. The total cost should run $20.00 or under.

Circuit Details

The voice-control input is fed in parallel with the speech-amplifier input from a crystal mike. (If the speech amplifier has no blocking capacitor between the microphone connector and the grid of the first speech-amplifier tube, the connection can be made simply by plugging into the speech-amplifier microphone jack.) The 12AX7 twin-triode, V_1, is in a two-stage amplifier with a variable-resistor sensitivity control in the cathode of the first stage. The a.c. voltage output from V_{1B} is rectified by the detector tube V_{2A}, filtered by R_3 and C_1, and the resultant negative d.c. voltage is applied to the grid of the relay tube V_{2B}. The d.p.d.t. relay K_1 in the plate circuit of V_{2B} keys the control circuit, and is shown in the schematic in the "transmit" (relay coil de-energized) position.

With no signal input from the mike, there is no output from the detector, and therefore the control-grid voltage of V_{2B} is effectively 0 volts (actually the grid is slightly negative due to the cathode resistor R_4); V_{2B} is conducting and the relay is energized.

When an adequate signal is supplied by the mike, the grid of V_{2B} is driven in a negative direction, reducing the conduction through the relay tube sufficiently to de-energize the relay which keys the transmitter. Simultaneously, the relay switches C_2 into the grid circuit. As a result, C_2 acquires a negative charge. Thus, when the source signal ceases, the grid of V_{2B} will stay negative (leaving the transmitter on) until the RC delay network, consisting of C_1, C_2 and R_2, discharges to ground. This cut-off time is adjustable within limits by potentiometer R_2.

Power Supply

The power supply was included to make the unit self-contained, and to reduce the number of connecting cables required. However, if desired, power may be taken from the receiver or transmitter.

* 552 Milton Road, Rye, N. Y.
** 632 Milton Road, Rye, N. Y.

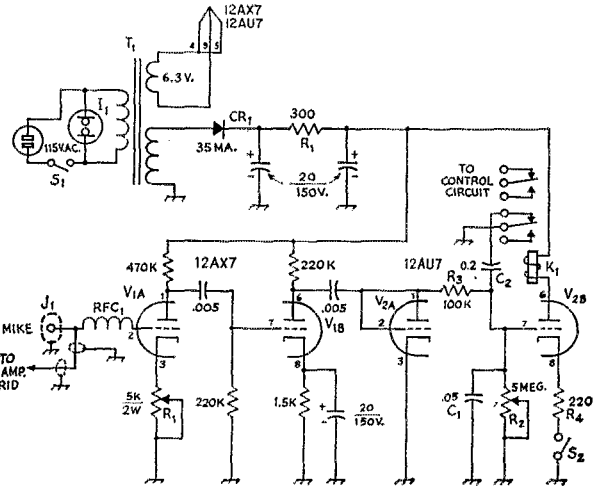


Fig. 1 — Circuit of the voice-control unit. All capacitances are in μf. Capacitors marked with polarity are electrolytic. All resistors are ½ watt unless otherwise specified.

CR_1 — 35-ma. selenium rectifier.
I_1 — NE-51 neon pilot lamp.
J_1 — Microphone connector.
K_1 — 10,000-ohm d.p.d.t. sensitive plate-circuit relay (Potter and Brumfield LM-11).
R_1, R_2 — Linear taper.
RFC_1 — 1.8-μh. (Ohmite Z-144).
S_1, S_2 — S.p.s.t. toggle.
T_1 — Half-wave power transformer: 150 r.m.s.v., 25 ma.; 6.3 volts, 0.5 amp. (Stancor P-8181, Merit P-3046, etc.).

The power supply shown is conventional, excepting only the substitution of a resistor for a filter choke.

Construction

The only critical wiring of the unit is in the grid circuit of V_{1A}, and care should be taken that the unshielded portions of this wiring be kept as short as possible. This was accomplished by placing the 12AX7 directly behind the mike connector. Notice that there is no grid-return resistor in this stage; the grid resistor in the speech amplifier performs this function. However, if the speech amplifier used has a capacitor between the microphone connector and the first speech-amplifier grid, a 1-megohm resistor should be connected between Pin 2 of V_{1A} and ground. The small choke in series with the grid of V_{1A} prevents r.f. from the transmitter entering the voice control and causing erratic operation.

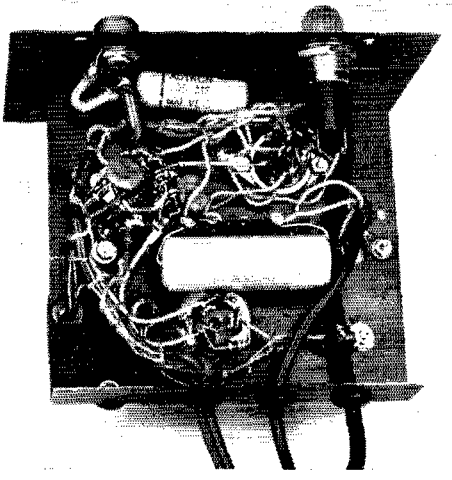
The entire voice control is built in an inexpensive 6 × 5 × 4-inch utility box (with removable covers on the 6 × 4-inch sides) (Insuline 3821). The tube sockets are mounted close behind the front panel, with the 12AX7 on the left behind the mike connector. The relay is positioned behind the 12AU7, and the power supply is laid out across the back edge. Three grommet holes along the back apron are for the power cord, the control cable and the shielded mike cable lead to the speech-amplifier input. The sensitivity control is on the upper left panel, the delay control on the upper right panel and the tune-up switch centered between them. The on-off switch and the pilot are mounted under the chassis in line with the two controls.

Operation

The switch S_2 is included to allow the operator to turn the transmitter on manually for tuning up, etc.

(Continued on page 118)

Wiring underneath is simplified by the use of a multiterminal tie point across the middle of the chassis.



Inside view of the voice-control unit. Power-supply components are lined up across the rear of the chassis.

Improved Keying for the DX-100

BY ROGER MACE,* W8MWZ

MORE THAN ONE HAM has observed that the keying of the DX-100 leaves something to be desired. Cathode keying of the v.f.o. and buffer stages results in rather "hard" keying, a polite way of saying that the signal has key clicks. This article is intended to show DX-100 owners how to become friends with the ham in the next block, provided the improved signal does not result in a higher Sweepstakes or DX score. The basic change is to key the buffer stage in the grid circuit, instead of keying the v.f.o. and buffer stages simultaneously in the cathode circuit. While buffer keying precludes the use of break-in on one's own frequency, it was felt that the advantages of the improved keying outweighed the disadvantages of not being able to operate good break-in. The few additional components required for the conversion are readily available. One hole must be added to the panel, for a pushbutton "spotting" switch. The appearance is not impaired a bit by the addition of the switch; in fact, it tends to balance the panel a little better.

Circuit Description and Operation

Referring to the partial schematic of Fig. 1, the 22K resistor provides isolation from the bias supply. It also controls the charging time of the shaping capacitor C_1.

The 10K resistor in series with the key controls the discharge time of C_1. The 100K resistor isolates the grid of the 12BY7 stage from the keying circuit and the 0.005-μf. capacitor provides an r.f. ground at this point.

In operation the v.f.o. and buffer cathodes are returned to ground through one side of the plate switch. This turns on the v.f.o. and keeps it operating as long as the high voltage is on. The buffer stage is prevented from operating by the −50 volts applied to its grid. When the key is closed, the voltage on the buffer grid drops to approximately −17 volts, allowing this stage to excite the rest of the r.f. stages. The shaping capacitor C_1 has to discharge through the 10K resistor, providing a time constant in the keyed stage. This introduces a slope on "make" and prevents the click. When the key is opened, C_1 must charge through the 22K resistor. Thus the buffer grid voltage does not rise instantaneously to the cut-off value, and the trailing edge of the envelope is again rounded off. The overall effect is to soften the keying and prevent the starting and stopping transients which cause key clicks.

A double-pole push-button switch on the panel duplicates the effect of the cathode side of the plate switch and also the key. It turns on the first three stages of the transmitter without applying high voltage to the final. It is handy for checking v.f.o. frequency on the receiver, and it also helps to save 6146's during tune up.

Modification Procedure

It will be necessary to drill a $\frac{3}{8}$-inch hole in the panel for the push-button switch. This hole can be located on the right hand side of the front panel, 3 inches in from the side and 4 $\frac{15}{16}$ inches down from the top. As the average ham probably doesn't have a $\frac{3}{8}$-inch drill, the best way to do this is to drill a small hole first and then drill larger and ream to size. To protect the filter capacitors, place a wood block behind the panel while drilling.

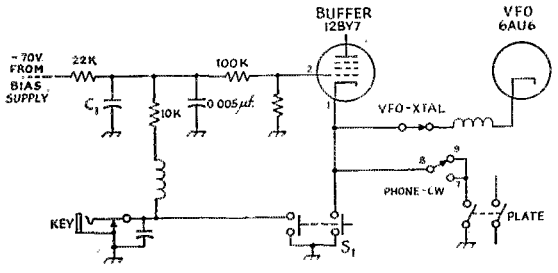


Fig. 1 — Schematic diagram of the DX-100 wiring changes. Values are shown on the additional components only. Resistors are $\frac{1}{2}$-watt.
C_1 — 0.1 to 0.25 μf. See text.
S_1 — D.p.s.t. normally-open push-button switch (Switchcraft 1004).

Wire the push-button switch before mounting it on the panel. Connect two terminals of the switch together as shown in Fig. 1, and attach a wire about 7 inches long to this junction. Either use a different colored wire for this connection, or tie a knot in the end of the wire for identification. Attach 7-inch wires to the two other terminals. Pass all three wires through the hole between the filter capacitors and mount the switch.

Now turn the transmitter over and, using the capacitor mounting screw near the key jack, mount a one-lug terminal strip. Remove the end of the line choke from terminal 9 on the PHONE-CW switch and connect it to the strip; also connect a wire 14 inches long to this point and run it over into the center compartment near the 12BY7 buffer stage socket. Of the three wires coming from the push-button switch, connect the knotted or otherwise identified wire to the grounded

(*Continued on pag 120*)

* Project Engineer, Heath Company, Benton Harbor, Mich.

Portable Beam for 50 and 144 Mc.

BY EDWARD P. TILTON, W1HDQ

MOBILE WORK on 6 and 2 is fine, but to get the full value out of a v.h.f. rig in the car you need something better than a simple whip. Even where vertical polarization is in general use, the mobile whip is nothing to get excited about for coverage. Some sort of portable beam antenna that can be set up readily when time and circumstances permit will extend the sphere of influence of the mobile station tremendously.

If the station works only on the 144-Mc. band the problem of a portable beam is easily solved. Most 2-meter beams now on the market can be dismantled and stowed in a small space, and a cut-down TV antenna is a practical and inexpensive solution if you want to save some money. An efficient antenna for 6 takes a little more room, however, and something in the way of sectional elements is desirable if the array is to be carried in the average family car.

The arrays for 6 and 2 described by the writer in *QST* for August, 1955, and in the 1956 edition of the *Handbook*, have been used in five call areas since they were built last spring. They have been well worth their small cost, but what ham is ever satisfied with anything for long? We decided that something still more compact and light in weight was in order for a long trip coming up this summer.

This was accomplished by making the 6-meter elements in sections of such length that the middle portions would be suitable for 2-meter elements as well. The result is a 3-element array for 50 Mc. and a 5-element one for 144 Mc. with a combined weight of 2½ pounds, including the boom. The latter was made in two sections, so elements, boom and 16-foot support carry easily in the smallest size canvas golf bag. Either array can be set up in less than ten minutes' time, and their performance is as good as that of home station arrays of similar size. The 6-meter assembly looks a bit flimsy, but has taken mountaintop winds in its stride so far.

As may be seen from the photographs, the center section of the reflector element for 50 Mc. is also the 144-Mc. reflector. A separate driven element is used for 144 Mc. The middle of the 50-Mc. driven element doubles as the first director for 144 Mc. One of the extensions for the 50-Mc. director is used for the second 144-Mc. director, while the forward director dismantles to serve on both bands. Both driven elements are gamma matched. This feed method provides a means for matching at any frequency, and also is readily adapted to dismantling. The basic features of the arrays are shown in Fig. 1. The elements are $\frac{5}{16}$-inch dural tubing. This size was

A 5-element 2-meter beam becomes a 3-element 6-meter beam in a matter of seconds. Four extensions all the same length screw onto the reflector and middle element. One of them is the second 2-meter director, which is slipped out of the boom for this purpose. Two shorter extensions screw onto the forward director. The coaxial cable is shifted from one gamma section to the other, and the 6-meter beam is ready for use.

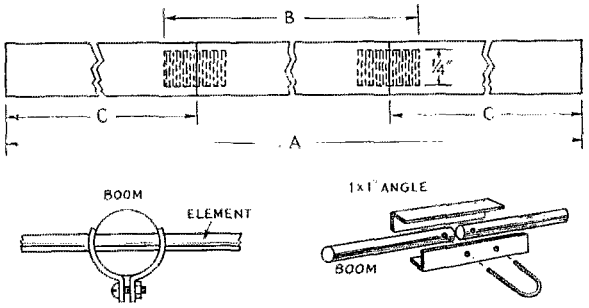


Fig. 1 — Details of the portable 6–2 array. In the upper drawing, Dimension A is the length of the 50-Mc. element. Dimension B is the length of the center portion that acts as a 144-Mc. element, including one-half inch of the threaded insert at each end. Dimension C is the length of the element extension that converts an element from 144 to 50 Mc. Figures for these dimensions for the various elements are given in Table I.

At the lower left the method of holding the elements in place in the boom is shown. At the right is the clamping device for joining the two sections of the boom and mounting them on the vertical support.

selected because it may be tapped for ¼-20 threaded inserts. The latter can be made by threading ¼-inch aluminum rod, or sections of aluminum ¼-20 bolts can be used. Such aluminum hardware is readily obtained from "do-it-yourself" hardware stocks. Brass or cadmium-plated steel bolts may be substituted, if necessary. Slip-on inserts can be used, but the threaded rod method is preferable. Dimensions for the various elements are given in Table I.

The method of mounting the elements to the boom was taken from a neat idea we first saw in use on Telrex v.h.f. arrays. The boom is drilled to pass the element, and then two small clips of sheet aluminum hold it in position. When the nut is tightened, pulling the clips together, the element is clamped tightly in place.

The boom can be anything around 1-inch diameter. It is made in two 36-inch sections and clamped together (and to the vertical support) between two pieces of aluminum angle stock and a TV U-clamp as shown at the lower right in Fig. 1, and in a photograph. The angle stock braces are about 6 inches long.

The series capacitors and the coaxial fittings for connecting the feedlines are mounted permanently to the boom on small U-shaped brackets of sheet aluminum. The capacitor should be about 50 $\mu\mu$f. maximum for the 144-Mc. driven element and 75 $\mu\mu$f. for the 50-Mc. one. We used shaft-type Hammarlund MAPC trimmers. With low-powered portable rigs of 25 watts or less the smallest available capacitor is operating well within its voltage breakdown rating.

The gamma sections are supported on ¾-inch ceramic cones. Their lengths should be about 13 inches for 50 Mc. and 5 inches for 144 Mc. Be sure that the sliding clamp makes solid contact to both the arm and the driven element. To facilitate dismantling, a flexible copper strap connects between the capacitor and the matching arm. The strap slips under the head of the screw that holds the arm to the cone insulator.

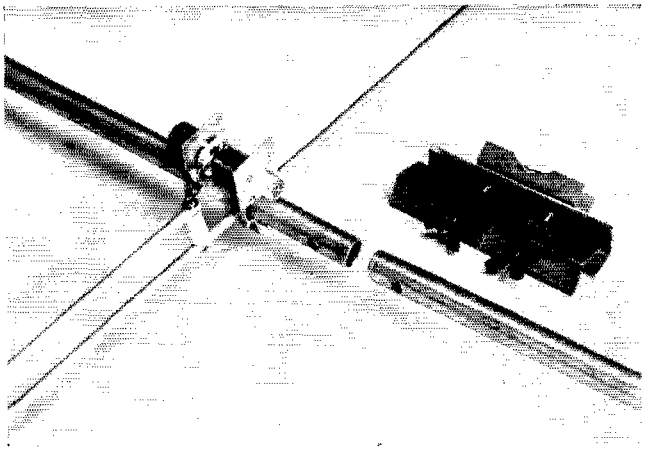
In adjusting the matching an s.w.r. bridge should be used. The position of the adjusting clamp and the setting of the series capacitor are varied, first one and then the other, until the reflected power indication is made to go to zero. If this is done at some frequency near the middle of the range over which you want to work, the setting will be close enough for operation over the major portion of the 2-meter band and over

TABLE I

Dimensions for the elements of the portable array, in inches

	A	*B*	*C*
50-Mc. Ref.	114.5	40.5	37.5
50-Mc. Dr. El.	110.5	36.5	37.5
50-Mc. Dir.	107	35.5	36.25

The 144-Mc. driven element is 38.5 inches. Boom is six feet overall, in two sections. Reflector to driven element, 50 Mc.: 32½ inches. Driven element to director, 50 Mc.: 38½ inches. 144-Mc. element spacings are, back to front, 21, 11¾, 16, 22½ inches. None of these element spacings is particularly critical, and other combinations could be worked out readily enough.



Detail view of the 50-Mc. driven element, showing the tuning capacitor and gamma matching arm. The clamp that holds the two portions of the boom together, and to the vertical support, is seen at the right.

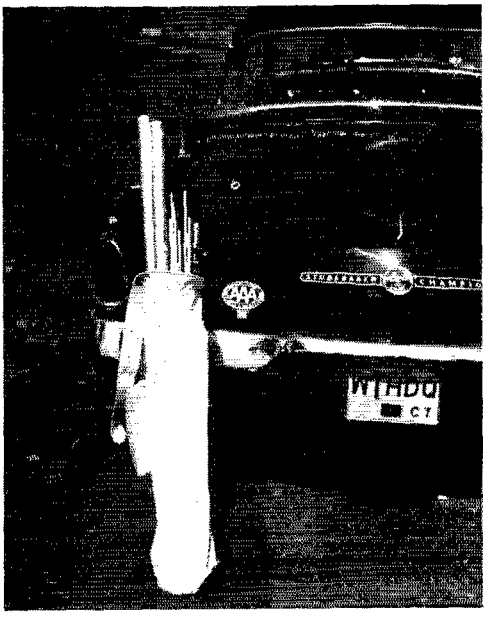
better than one megacycle at 50 Mc. Any type of coaxial line may be used, with RG-58/U and 59/U being preferable for portable work because of their small size and light weight. Line loss is negligible with the 20 feet or so needed for this installation.

The vertical support is made from sectional aluminum TV masting. Originally the sections were 10 feet long. We bought two and cut them in half, using three of the 5-foot sections that resulted. This was fine, except that the rear compartment of our car wasn't quite long enough to take 5-foot lengths, without laying them crosswise. When a long trip loomed, and with it the problem of accommodating baggage for two people for seven weeks travel, we had to devise a package that would lay along one side of the luggage space, over the spare tire.

The solution, which incidentally also gave us another foot of height, was to cut each length of masting to 4 feet, and add another 4-foot section. The four lengths of masting, the boom sections and all the elements now stow neatly in a canvas golf bag of the type commonly known as a "Sunday bag." The zipper pocket carries the miscellaneous hardware, a screwdriver and a socket wrench, to use in assembling the array. The entire package weighs under 10 pounds and it fits into a space that is of little value for anything else.

The mounting arrangement for the mast is the same as described previously: a sheet aluminum clamp that was made to fit the masting and the car door handle. The mast is held firm at the ground by pushing an old screwdriver into the ground and setting the bottom mast section down over it. Rocks piled around the bottom will serve the same purpose, if you're on a rock ledge, where you can't drive a pin into the ground.

We've added a few refinements to the mast since the original description last summer. It is now keyed to prevent the beam from turning in the wind as one section slips on another. This was done by notching the end of each mast section, and then putting a self-tapping screw into the sleeve of the adjacent section, to catch in the notch. The section just above the bottom one has a four-inch $\frac{1}{4}$-20 bolt through it, at a point so that the bolt just rides on the top of the section below. This makes a bearing surface inside the mast, and the portion outside the mast serves as a turning handle and direction indicator. It should be lined up with the boom, of course, to perform the latter function. It may be seen in the two assembled views, just below the top of the car window.



Packing up for a cross-country trip, the 16-foot support and all the parts of the knock-down beam stow neatly in a Sunday golf bag. Pocket holds hardware and simple tools needed to assemble the array. From bag to beam is less than ten minutes work.

Strays

Concerning the June *QST* item on "Mobile Laws," W2DKH points out that the law in New York State was amended some time ago to exclude amateurs from the provisions which require a local police permit for mobile installations capable of tuning to certain frequencies. Since the amendment of the law, Section 1916 of the Penal Law of the State, there has been no problem of permits.

—•••—

K2MPB, "Methodist Preacher Bill," has perhaps been an over-zealous operator during his first year of amateur radio. An error in the spelling of a sermon title posted on the bulletin board outside his church has almost convinced him that he had better employ more of his time with church work and less with amateur radio. Recently his sermon title was "Our Brother Man." On the bulletin board it read "Our Brother Ham."

—•••—

Add recent QSOs — K2HOG working W2PIG.

—•••—

Who says the FCC doesn't have a sense of humor? W1HAG was just issued to Sandra Burke.

—•••—

The American Bible Society of 450 Park Avenue, New York 22, N. Y., will be pleased to send a supply of their Bible Stamps to amateurs who wish to paste them on QSL cards in order to encourage reading of the Bible.

Modulation Monitor Using an Electron-Ray Tube

Negative-Peak Overmodulation Indicator in a Simple Unit

BY J. G. CORMACK,* W4ERE

• Although the cost is negligible and the construction shouldn't occupy more than an evening's spare time, this circuit not only gives you an approximate idea of how well you're modulating your Class C amplifier but gives positive indications of negative-peak overmodulation. No calibration is needed.

EVERY RADIO amateur who operates an a.m. transmitter needs a method for measuring the modulation percentage. This need, in practice, reduces to two "measurements" to answer the following questions.

1) Is the modulation sufficient, and

2) Is overmodulation occurring?

While the need for these measurements is widespread, it is the author's observation that many hams have no method of measuring modulation percentage except the plate-current meter of the Class B modulator — or perhaps a neon bulb attached to one of the antenna feeders!

The inexpensive modulation monitor described below provides, simultaneously, three items of information:

1) Whether or not the transmitter is on the air,

2) Whether or not the carrier is being modulated, and

3) A definite indication whenever negative-peak overmodulation occurs.

Negative-peak overmodulation, which is a principal cause of severe sideband splatter, is easy to detect with this monitor.

The indicator is a type 6AL7GT tube, commonly used as the tuning indicator in f.m. broadcast receivers. Fig. 1A shows the presentation on the 6AL7GT when the transmitter is off the air. This is the normal pattern for this tube when no voltages are impressed on its deflection plates. Fig. 1B shows the indication when the transmitter is on the air unmodulated. The right half of the pattern has increased in height but no other change has taken place. When the transmitter is modulated, the indication is as shown in Fig. 1C; i.e., the bottoms of both halves of the pattern wiggle up and down with modulation. With some experience with this modulation indicator it is possible to estimate roughly the modulation percentage by the amount of wiggle. When negative-peak overmodulation occurs, the top portion of the left half of the pattern moves up and down with each overmodulation peak as shown in Fig. 1D. In addition to these visual indications, the transmitter can be monitored aurally by plugging a pair of headphones into J_1, Fig. 2, and adjusting the headphone volume with R_3.

* LCDR, USN, 9 Moore Drive, Westwood, Charleston, S. C.

How It Works

The theory of operation is simple. R.f. energy is fed in through link L_1, which is loosely coupled to the final amplifier tank coil. The r.f. is rectified by one diode of the 6AL5 and the audio component of the detected signal is impressed on plate P_1 of the 6AL7GT. P_1 controls the deflection of the bottom parts of both halves of the pattern. The detected signal also is filtered by the low-pass filter composed of the two 0.05-μf. capacitors and the two 2.2-megohm resistors to remove the audio, and the resulting d.c. is impressed on plate P_2. This plate controls the deflection of the top part of the right half of the pattern as seen in Fig. 1B.

To obtain the overmodulation indication, a

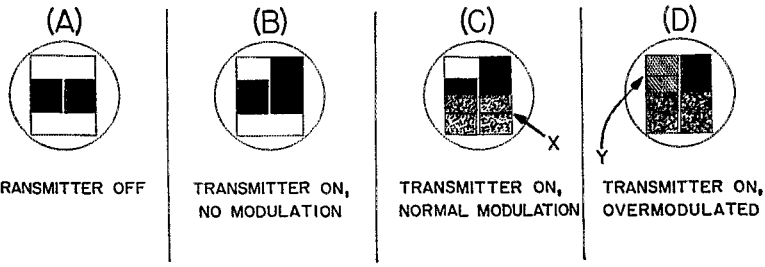


Fig. 1 — Patterns on the 6AL7GT indicator tube under various conditions. With modulation (C) the dotted area expands about the lower edge, X, of the pattern line in proportion to the modulation percentage. Negative-peak overmodulation is indicated by a similar movement about the upper edge, Y, of the left-hand side of the pattern.

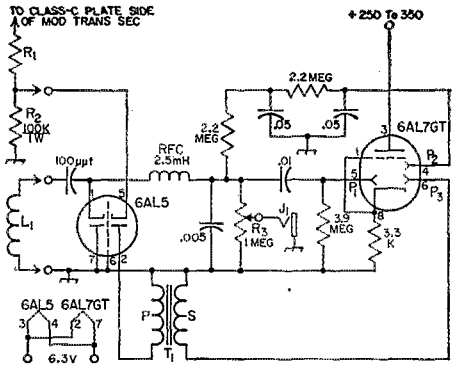


Fig. 2 — Circuit of the modulation indicator. Capacitances are in μf. except where indicated otherwise. Resistors ½ watt unless otherwise specified.

J_1 — Open circuit phone jack.
L_1 — Pick-up coil; one or two turns coupled to final-amplifier tank. Adjust coupling for suitable deflection on 6AL7GT.
R_1 — Depends on modulated-amplifier plate voltage. See text for method of determining value. Power and voltage ratings of resistors making up R_1 should be observed.
R_2 — Volume control potentiometer.
T_1 — Microphone-to-grid transformer (Stancor A-4706).

portion of the modulated plate voltage of the Class C amplifier, taken through voltage divider R_1R_2, is fed to the remaining 6AL5 diode. Negative-peak overmodulation occurs whenever the instantaneous plate voltage of the plate-modulated final amplifier goes negative. When this happens the diode conducts and current flows in the primary of transformer T_1. The voltage developed across the secondary and applied to plate P_3 causes the top part of the left half of the pattern to wiggle, as seen in Fig. 1D.

Resistors R_1 and R_2 are mounted inside the transmitter as a safety precaution to avoid bringing the final amplifier plate voltage out of the transmitter. Their values were chosen so that the peak inverse voltage rating of the 6AL5 tube would not be exceeded at 100 per cent modulation. The author's transmitter uses 1250 volts d.c. on the plate of the final amplifier, and therefore the peak plate voltage with 100 per cent modulation is 2500 volts. The peak inverse voltage rating of the 6AL5 is 330 volts. For R_2= 100K, the correct value for R_1 can be found by the following formula:

$$R_1 = 300\ (2E_{bb} - 330)\ \text{ohms}$$

where E_{bb} is the final-amplifier d.c. plate voltage.

No constructional details are necessary since the circuit is very simple and construction is not critical. The author's unit is built in a homemade cabinet 3 inches wide by 4 inches high by 4 inches deep, with a sloping front panel. A commercially-made cabinet of slightly larger dimensions, with a sloping front panel, is available for less than one dollar. B+ and filament voltages were obtained from the station receiver since the current drain is negligible.

This unit has been in use for several years, and is now considered indispensable.

A.R.R.L. NEW BRUNSWICK CONVENTION

Bathurst, N. B. — September 1–2

The North Shore Amateur Radio Club is sponsoring the big affair of the year at Kent's Lodge on Chaleur Bay, Bathurst, on September 1st and 2nd. Activities start at 9:00 A.M. Saturday, and arrangements have been made for the Jr. Ops, YLs, and XYLs. You will be treated to a great display of Swap and Shop gear, so be sure to bring along all your excess gear. If you can't trade it, sell it, and if you can't sell it, we'll help you throw it away. Refreshments? Food? Your between-meal snacks have not been forgotten, and there will be a banquet to satisfy any gourmet. Lots of entertainment, but to appreciate it you just have to wait until you get there. Advance registrations may be made through Lawrence Anderson, VE1WF, 243 St. John Street, St. John, Bathurst, N. B.

FEEDBACK

We hasten to call to the attention of the Confederate Signal Corps an error in the map of 160-meter band privileges, page 66 of July *QST*. The table on page 67 is correct, and South Carolina *is* allowed to operate 200 watts during daylight hours and 50 watts at night on 1800–1825 kc. and 1875–1900 kc. Thanks to W4PVT for catching this one.

Strays

That famed radio station, NAA, closed down permanently on June 30th, after 43 years of service. You young squirts might find it hard to realize how many of the old-timers learned the code from the weather and news that was transmitted from NAA. Back in "the good old days" NAA's signal went out on a wavelength of about 3000 meters!

—···—

On June 27, 1936, W8NAF worked his first out-of-state DX on 5 meters. On June 27, 1956, W8NAF worked his first out-of-state DX on 6 meters. What will he have to report on June 27, 1976?

—···—

Dr. John Kraus reports that signals which in many ways resemble radio telegraphy are being picked up on a sky radio telescope pointed at Venus. (See p. 17, May 56 *QST*.)

MEMBERSHIP CHANGES OF ADDRESS

Four weeks' notice is required to effect change of address. When notifying, please give old as well as new address. Advise promptly so that you will receive every issue of *QST* without interruption.

Single-Ended Push-Pull Modulator

Class B without a Modulation Transformer

• The audio system described here, originally developed for high-quality audio amplifiers, has some interesting possibilities in amateur equipment. A practical application in the kilowatt a.m. transmitter at WØAJL, Denver, is discussed.

IN THE FEW YEARS that have elapsed since a single-ended push-pull audio amplifier was described by engineers of the General Radio Company,[1] it must have occurred to some amateurs who saw the circuit that it might have an application in Class B modulators. Walt Nettles, WØAJL, thought so and proceeded to try it. The practical circuit information given below is based on WØAJL's experience.

The basic circuit is shown in Fig. 1. The two tubes are connected in series, cathode of V_1 to plate of V_2. This requires that the plate

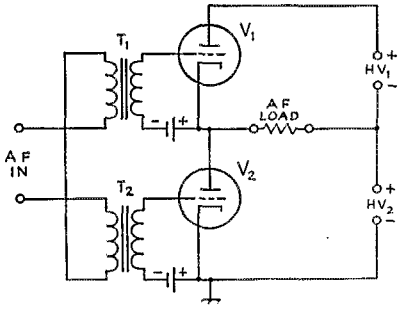


Fig. 1 — The fundamental single-ended push-pull arrangement. The output connections of one tube are inverted across the load with respect to the other tube, giving true push-pull operation without a balanced load. Separate input circuits are used since the tube cathodes are not at the same d.c. or a.c. potentials.

supply have twice the output voltage that would be used for the same tubes in the conventional push-pull arrangement. However, the total current is the same as that for one tube, so the power consumption is not altered from that of the standard circuit. The audio load is connected as indicated.

The grids of the two tubes are driven out of phase with audio in the normal push-pull fashion. Transformer input is shown in Fig. 1, separate input transformers — or at least a transformer with two separate secondaries — being necessary because the cathode of V_1 is at a different d.c. potential than the cathode of V_2. (Resistance coupling between the driver and amplifier is perfectly feasible when the amplifier is operated without grid current, as shown in the referenced article.[1]) The polarities of the windings are such that the grid of V_1 is driven positive when the grid of V_2 is negative, and vice versa. Now since the plate of V_1 is connected to one end of the load (through the plate supply HV_1, which is assumed to have negligible audio impedance), while the plate of V_2 is connected to the *other* end of the load, the output is true push-pull in the load, although no center-tapped transformer is needed.

Let us assume that the two high-voltage supplies have the same output voltage. The voltage drops from plate to cathode in each tube can be made to be the same if the individual bias voltages are adjusted to that end. Then there is no d.c. potential across the terminals of the load and no direct current flows through it. In fact, it is not necessary to have a d.c. path through the load — that is, between the junction of the cathode of V_1 and the plate of V_2, and the junction of the two plate supplies. A blocking capacitor of appropriate value for the frequencies to be handled can be used here, if desired, giving the effect of parallel feed without the necessity for using a shunt choke or resistance. When such a blocking capacitor is used the end of the load shown connected to the junction of the two supplies in Fig. 1 may be grounded. A single plate supply of the proper total voltage will suffice, of course.

Note that since the two tubes are working into the same load without any transformer to change the impedance picture, the load resistance is the same as it would be were the two tubes working in parallel with the same operating conditions. That is, the optimum load for straight Class A operation would be one-half the optimum Class A load resistance for each tube working alone. In pure Class B each wants the optimum Class B "per tube" load resistance — i.e., one-fourth the plate-to-plate load resistance as given by the data sheets — and this is also the total load resistance since the two tubes work alternately.[2] This figure also applies in Class AB_1 or AB_2 operation.

There may be cases where the required value of load resistance is essentially the same as the modulating impedance of the Class C amplifier that is to be modulated. If this is so, then no modulation transformer is needed, and simple capacitor-choke coupling will suffice. The fact that a judicious choice of tubes and operating voltages will permit the use of a comparatively inexpensive choke instead of a modulation transformer would appear to be one of the principal advantages of the circuit from the ama-

[1] Peterson and Sinclair, "A Single-Ended Push-Pull Audio Amplifier," *Proc. I.R.E.*, January, 1952.

[2] For discussion on load impedances, see "Twice or Four Times?", *Tech. Topics, QST*, April, 1956.

teur viewpoint, particularly in high-power transmitters.

In some cases it may not be possible to match the Class C amplifier and modulator so simply, and a transformer will be required. If so, a multimatch transformer will provide the proper match if it is capable of matching the Class C load to the same modulator tubes in the normal circuit. The circuit difference is that the two windings that normally would be connected in series for the primary (plate-to-plate winding with center tap) will simply be connected in parallel. In making the parallel connection the end of one winding that formerly went to the plate must go to what was formerly the B-plus or common center-tap connection of the other winding. Once the windings are properly paralleled it does not matter which end of the combination is connected to the tube junction, in the single-ended circuit.

From the audio-quality standpoint, an outstanding feature of the circuit is that it eliminates the "commutation" transients that occur with conventional transformer output. These occur at the crossover point where the cycle swings from positive to negative and vice versa, and cause some distortion which can appear as splatter if there is no splatter filter between the modulator and Class C stage. The cross-over is smooth in the single-ended circuit whether or not a transformer is used.

A Practical Circuit

The modulator circuit as used by WØAJL with a pair of triode Class B tubes (810's) is shown in Fig. 2. T_1 is an audio input transformer of conventional design, made for coupling a pair of push-pull 6B4G drivers to 600 ohms. T_2 is a 600-to-600-ohm transformer having sufficient insulation to stand the voltage at the plate of V_2, which at full output will reach an instantaneous peak equal to nearly twice the no-signal d.c. voltage between its plate and cathode.[3]

Bias supply B has no special insulation requirements to meet, but bias supply A, like T_2, has to be insulated for twice the plate voltage on V_2. With one exception, the insulation problem here is not a difficult one since ordinary components can be used and the entire assembly can be given the necessary voltage rating to ground by mounting it on stand-off insulators having adequate height. The exception is the power transformer used in the supply which, for a low-voltage unit, would have to be exceptionally well insulated and thus not readily obtainable as a catalog item. This problem was neatly dodged on a suggestion from WØLMB, a filament transformer connected to the filament of V_1 being used so that the primary rides up and down with the voltage at the plate of V_2. The circuit of the supply is given in Fig. 3, about 80 volts bias

[3] The transformer is made by E. C. Stockman, 618 So. Williams, Denver, Colo.

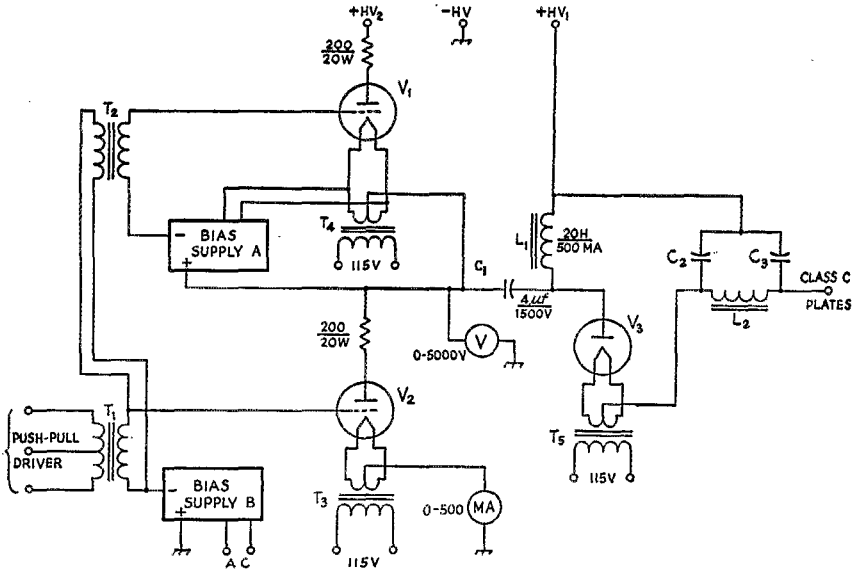


Fig. 2 — The modulator circuit used by WØAJL in a kilowatt transmitter. This has choke coupling to the modulated stage and eliminates the customary modulation transformer. Bias supply A must be insulated from chassis for about twice the d.c. voltage appearing at the plate of V_2. See Fig. 3 for bias-supply circuit. The 200-ohm resistors at the tube plates are for parasitic suppression.

C_2, C_3, L_2 — Splatter filter (see text).
T_1 — Driver transformer, 6B4G plates to 600 ohms.
T_2 — 1-to-1 transformer, 600 ohms, 10,000-volt insulation (see text).
T_3 — 10-volt filament transformer for 810 or 822.
T_4 — 10-volt filament transformer, 10,000-volt insulation.
T_5 — 5-volt filament transformer for 872A, 10,000-volt insulation.
V_1, V_2 — 810.
V_3 — 872A.

Power supply HV_1 delivers 2500 volts; HV_2 delivers 5500 volts.

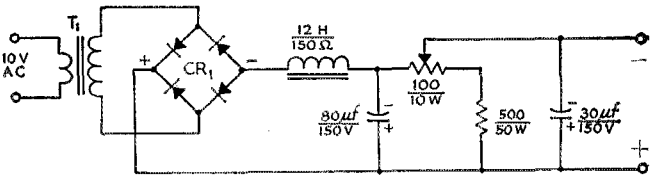


Fig. 3 — Bias supply circuit. T_1 is a 7.5-volt, 6-amp. filament transformer with its low-voltage winding connected to T_4, Fig. 2. Bias supply *B* in Fig. 2 uses the same circuit but a transformer having a 115-volt primary and 150-volt output can be substituted. CR_1 consists of four 100-ma., 130-volt selenium rectifiers.

being required for the 810 grid. The circuit of bias supply B is the same except that a transformer delivering about 150 volts and working from the 115-volt line is used.

The audio output voltage is developed across L_1, which is coupled to the tubes by C_1. C_1 must be insulated from the chassis for the maximum instantaneous voltage at the plate of V_2, but the capacitor itself only has to stand the difference between the d.c. voltage on V_2 and the voltage on the Class C stage. Hence the 1500-volt rating shown, even though WØAJL uses 2500 volts (HV_1) on the Class C amplifier and 5500 volts (HV_2) on the modulator tubes.

As with all plate-modulation systems in which no modulation transformer is used, the d.c. voltage on each modulator tube must be higher than the d.c. voltage on the modulated amplifier in order to get 100 per cent modulation. Just how much more voltage must be used depends on the minimum permissible instantaneous voltage, for undistorted amplification, at the plate of the modulator tube. The exact figure has to be obtained from the characteristic curves of the modulator tubes. It is about 100 volts in WØAJL's case.

The normal method of adjusting the system would be to set the output voltages of the two bias supplies so that the voltage at the plate of V_2, as read by voltmeter V, is one-half the total supply voltage. It is possible, however, to adjust the biases so that the d.c. voltage on V_2 is somewhat less than that between plate and cathode of V_1, although V_2's plate voltage should not be less than the voltage applied to the Class C stage. Using unequal voltages in this way permits V_1 to swing up farther than would be the case with equal division of voltages, hence gives increased upward modulation. If the voltage on V_2 is about the same as that on the Class C stage, a certain amount of negative-peak clipping will take place in V_2. This, in conjunction with a following splatter filter, will prevent overmodulation downward. In WØAJL's arrangement a diode, V_3 (an 872A), is used to accomplish the same result, so the voltage on V_2 is ordinarily adjusted to be equal to the Class C voltage.

$L_2C_2C_3$ is a low-pass filter for splatter suppression, and may be designed from the ordinary formulas based on the modulating impedance of the Class C amplifier.[4]

The system should be set up with the aid of an oscilloscope. The two biases should be adjusted for the type of operation wanted, as described above, the values being chosen to give a no-signal plate current that results in 100 per cent modulation with the least observable distortion, using sine-wave audio input. The scope can be used as a modulation monitor in the regular way if the wave-envelope pattern is used. The modulator plate current with voice input may be checked against the scope pattern to determine the value that results in full modulation.

For the high-voltage supply, a bridge rectifier can be substituted for the familiar center-tap arrangement to double the output voltage. Filter capacitors of adequate rating must be used, of course. A combination supply, built around an already-available center-tap system, is used by WØAJL. As shown in Fig. 4, it requires the addition of two rectifiers, V_3 and V_4, two rectifier filament transformers, T_3 and T_4 (or a single transformer with two separate secondaries), and the filter components C_3, C_4, L_3 and L_4. This supply gives two output voltages, one the voltage that normally would be obtained from the center-tap rectifier, the other approximately twice as high. A strict 2-to-1 relationship between the two

[4] *The Radio Amateur's Handbook*, chapter on modulation equipment.

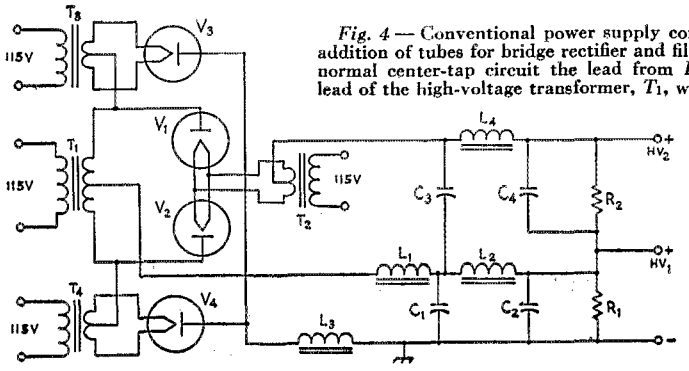


Fig. 4 — Conventional power supply converted to dual-voltage supply by addition of tubes for bridge rectifier and filter for high-voltage output. In the normal center-tap circuit the lead from L_1 shown going to the center-tap lead of the high-voltage transformer, T_1, would go to the filament winding of T_2. This is the only rewiring needed in such a circuit, all other components simply being added on. The additional components are T_3, T_4, L_3, L_4, C_3, C_4, R_2, V_3, and V_4.

Values are normal for the voltages and currents to be handled. L_3, L_4, C_3 and C_4 should have the same ratings as L_1, L_2, C and C_2, respectively. The same is true of R_2 and R_1, the bleeder resistors.

voltages would not permit full 100 per cent modulation, but in practice the voltage between terminals HV_1 and HV_2 is somewhat more than the voltage between HV_1 and negative because the upper section carries only the modulator load while the lower section has both the Class C and modulator loads. There is thus less voltage drop in the upper section, so that the total voltage available from HV_2 is greater than twice that available from HV_1. Although C_3, C_4 and L_4 may have ratings as suggested in the caption, these components are at considerably higher voltage to ground and should be mounted on insulators.

Parallel Plate Supply

It is possible to operate triode modulators with the same plate supply that would be used with the normal push-pull arrangement, provided a modulation transformer having separate windings for the two halves of the primary is used. Most multimatch units are of this type. The circuit is shown in Fig. 5. The input side is the same as Fig. 1. On the output side, the plate voltage for V_2 is applied through primary P_1 of modulation transformer T_3, and the d.c. return circuit of V_1 is completed through primary P_2. This places the plate circuits of the tubes in parallel for d.c. as well as audio.

Capacitor C_1 is an audio by-pass for the purpose of bringing the cathode of V_1 and the plate of V_2 to the same audio potential. It should have low reactance compared with the plate load resistance required by one tube. A capacitance of 4 μf. should suffice for most modulators, although a larger capacitance will do a somewhat better job with low load resistances at low frequencies.

Choice of transformer ratio is based on the same consisderations as discussed above — i.e., the load reflected to the tubes through either P_1 or P_2 should be one-fourth the rated plate-to-plate load resistance for the desired power output. The transformer manufacturer's sheet can be followed, except that the two primary terminals designated for connection together and to B+plus should *not* be connected together. One lead (from the lower end of P_1 in Fig. 5) goes to the plate of V_2 and the other (from the upper end of P_2 in the figure) goes to the B-minus terminal.

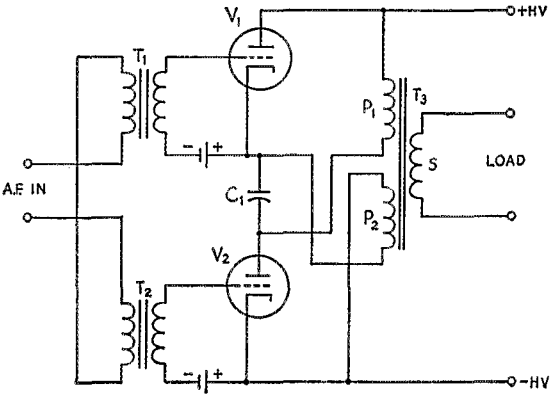


Fig. 5 — In this arrangement the d.c. plate circuits of the two tubes are in parallel and thus the same power supply that would be used with a conventional push-pull circuit will suffice. The direct currents in the two primaries produce opposing fluxes in the core.

Unfortunately, this circuit cannot readily be applied to tetrode modulators because of the complications caused by the necessity for supplying screen voltage. With a double-voltage supply, however, a somewhat similar arrangement of dual primaries will permit screen current to be series-fed through the transformer windings.[1]

— *G. G.*

Strays

W6HS writes that he worked W9WBH, Westmont, Illinois; W8TOZ, Dayton, Ohio, and W8YHO, Akron, Ohio, all within a short time and that later, while writing QSLs, he discovered that all three stations have QTHs on Roslyn Avenue.

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One of the more interesting accessories available from the telephone company is their Speakerphone. This unit has a microphone built into the base of the set, and a separate loudspeaker. Thus, any sound present in your shack would be picked up by the Speakerphone, and any voice coming over the Speakerphone could be picked up by another microphone.

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Amateurs desiring information on types of tubes not available from the *Handbook* may obtain it from the National Bureau of Standards, Washington, D. C., where a tube information service for accumulating and disseminating technical data on both domestic and foreign radio tubes has been established. At this time nearly 10,000 cards, filed by tube type number, are appropriately referenced to manufacturer's source material.

An Outboard Automatic Band-Scanner

Monitoring the Bands with a Simple Motor-Driven System for the Receiver

BY CHARLES M. ARNOLD,* W3YDF

• An automatic tuning system for the receiver can save a lot of effort in keeping an eye out for band openings and rare DX. This motor-driven system can be quickly adjusted to cover an entire band, or a portion of it as desired. It requires no alteration of the receiver except replacement of the original tuning knob.

THE OPERATING ACTIVITIES at W3YDF are mostly on 10 and 15 meters, with a smattering of 40 and 75 thrown in. Anyone acquainted with the higher-frequency bands knows that they open up sometimes without notice, and you have to be there in the right spot at the right time to grab a rare one. Even after a band has opened up, it is often a great convenience to have some sort of automatic tuning device so that you won't have to stay glued to the receiver in order to keep tabs on any new DX that may show up.

The photograph shows a simple outboard motor-driven tuning system applied to a Collins receiver. The same system may be adapted to most other makes of receivers. You don't have to touch the inside of the receiver to install it. It doesn't impair the normal functioning of the receiver in any way. You can set the automatic stops to cover as much or as little of the band as desired.

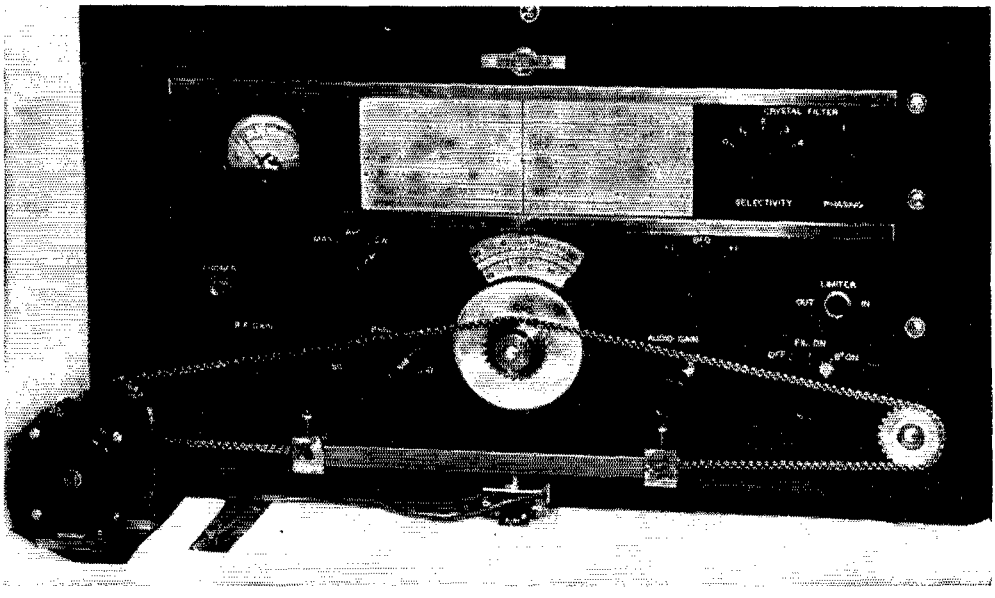
* R.F.D. 1, Cheswick, Penna.

Construction

In this sytem a small reversible motor drives the receiver tuning shaft by means of a chain engaging in sprockets. The chain carries a bar with adjustable stops. The stops operate a d.p.d.t. toggle switch which reverses the motor.

In this instance, the original tuning knob was replaced with a knurled brass knob 3 inches in diameter, turned out in a lathe, as shown in the sketch of Fig. 1. A $\frac{5}{16}$-inch shaft to fit the hub of the sprocket is turned out on the front of the knob, and a hole to take the tuning-knob shaft on the receiver is drilled out on the back.

The sprocket is CA-24 (24 teeth) obtained from Boston Gear Works, 14 Hayward St., Quincy 71, Mass., if you cannot find one of their distributors locally. For normal manual operation, a thumb set screw on the sprocket releases the sprocket from the tuning shaft. Similar sprockets are mounted on the motor drive shaft and on a section of shaft threaded into one of the panel-screw



The automatic band-scanner installed on a Collins receiver. The motor-driven chain that operates the tuning shaft of the receiver carries adjustable stops that actuate a reversing switch. As much or as little of the band can be monitored as desired.

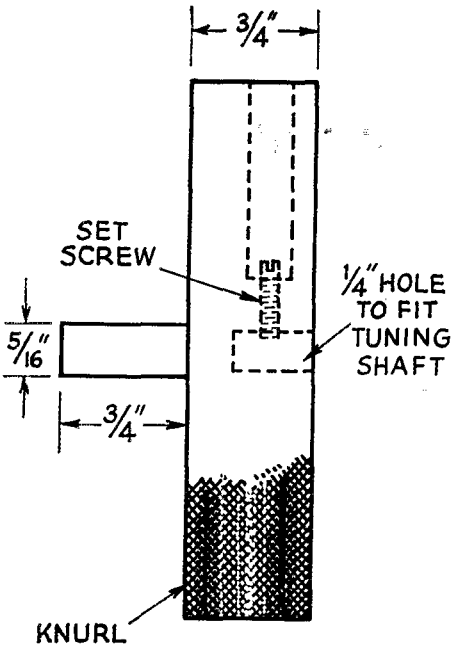


Fig. 1. — Sketch showing the details of the 3-inch brass knob that replaces the original tuning knob.

holes. The drive chain is No. 1A brass ladder chain also obtainable from the firm mentioned above. About 4 ft. of chain is required.

The motor is a Bodine KVC-22-1RPM obtainable from Bodine Electric Co., 2254 West Ohio St., Chicago 12, Ill. I found the 1 r.p.m. perfect for the purpose. At this speed, a few words can be caught from each signal as it passes by.

The bar carrying the adjustable stops is made

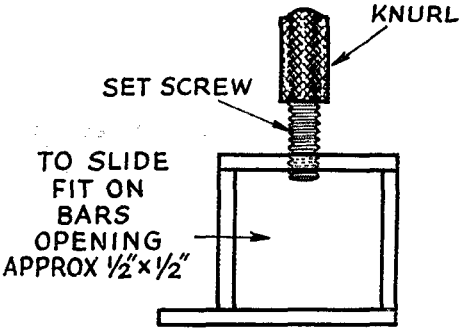


Fig. 2 — The automatic stops are made to fit the aluminum bar that rides on the drive chain. The set screw permits adjustment to any position along the bar.

up of two pieces of ½ × ¼-inch aluminum strip 8 inches long. A channel 5/16 inch wide and 0.08 inch deep is milled into one of the ½-inch sides of each piece. When the two pieces are placed with their grooved sides together, a rectangular hole to take the chain is formed.

The adjustable stops are made of pieces of brass soldered together as shown in Fig. 2. When the stops are slid over the aluminum bars and the set screws tightened, the chain is clamped between the two bars. The projections at the bottom of the stops operate the reversing switch as the chain passes back and forth. Other methods of construction may be used, of course, to arrive at the same objective.

I find a 2-kc. coverage handy for spot-frequency skeds, and a spread of 300 kc. for monitoring the 75-meter band. The usual setting for 15 meters is 100 kc., covering 21.2 to 21.3 Mc.

The effort that is saved by a device of this type is hard to believe until you have tried it.

NEW BOOKS

TV Repair Questions and Answers, by Sidney Platt; 3 volumes of a series. Vol. 1, *Front Ends;* Vol. 2, *Video Circuits;* Vol. 3, *Sync and Sweep Circuits;* each 128 pages, 5½ by 8½, paper covers. Published by John Rider Publisher, 480 Canal St., New York 13, N. Y. Price, $2.10 each.

Typical TV receiver faults discussed in question and answer form. Vol. 1 covers antennas, transmission lines, and mechanical and electrical features of various types of TV tuners; Vol. 2 the various sections of the video system, including i.f. amplifiers, detectors, video amplifiers, and a.g.c. systems; Vol. 3, horizontal and vertical sync systems and oscillators, and a.f.c. circuits.

Basic Electronics, by Van Valkenburgh, Nooger & Neville, Inc. Published by John F. Rider Publisher, Inc., 480 Canal St., New York 13, N. Y.; 6 by 9 inches, paper covers; in five volumes; price, $2.00 per volume or $9.00 per set.

This is the second set of a "basic" series, the first of which (on basic electricity) was described briefly on page 138, *QST* for November, 1955. The same style of pictorial presentation is used, the average length of each book being about 100 pages. Vol. 1 covers diodes, dry rectifiers, power supplies, filters and voltage regulators; Vol. 2, triodes, tetrodes and pentodes, audio voltage and power amplifiers; Vol. 3, video amplifiers, r.f. amplifiers, and oscillators; Vol. 4, transmitters, transmission lines, antennas, c.w. transmission and amplitude modulation; Vol. 5, receiving antennas, detectors and mixers, t.r.f. and superhet receivers. Those who have trouble in learning their fundamentals ought to find these books helpful with their easy-to-grasp illustrations and minimum of text.

Picture Book of TV Troubles, by the John F. Rider Laboratories Staff. Published by John F. Rider Publisher, Inc., 480 Canal St., New York 13, N. Y.; 5½ by 8½ inches, paper covers. Vol. 2, *Vertical Sweep and Deflection Circuits,* 96 pages, $1.80; Vol. 3, *Video I-F and Video Amplifier Circuits,* 96 pages, $1.80; Vol. 4, *Automatic Gain Control Circuits,* 90 pages, $1.80.

These three volumes are a continuation of the series initiated a year ago (see p. 126, *QST* for February, 1955). Kinescope pictures showing the effects of typical faults are shown, together with associated oscilloscope waveforms at significant points in the circuits. Each book has a "fold-out" insert on the inside rear cover repeating the important illustrations in convenient reference form.

Socorro Island—1956

BY LEE BERGREN,* WØAIW/XE4A AND F. A. CARMICHAEL, M.D.,** WØMAF

• In June there was a flurry of activity on the DX bands as Socorro Island was on the air for a brief but productive session. XE4A was manned by WØAIW, WØEIV, WØIEV, WØMAF, WØOJW and WØUQV, who battled weather and land crabs to make over two thousand contacts. Socorro has subsequently been added to the ARRL Countries List, as noted on page 80 of this issue.

WHEREAS the never ending hunt for new DX continues, the geographical choices fitting such criteria have been diminishing to the vanishing point. For a DXpedition, Socorro Island seemed the most desirable of the remaining spots, and was thereby chosen in spite of the sparse amount of geographical information available. This island is one of the group of four which comprise the Revilla Gigedo Islands owned by Mexico, the location being about 18° 20′ N Longitude, 110° 45′ W Latitude. The group was apparently named for Count Revilla Gigedo an early administrator of Mexico under the Spanish Conquistadors. The only previous amateur operation from this group of islands occurred a few years ago when a radio operator with a temporary Mexican weather station had a limited number of contacts on 40 meter phone, in the Spanish language only.

The expedition had been conceived in the minds of several Kansas City hams, notably WØAIW, WØUQV, and WØMAF. Once preparation for the DXpedition was under way, WØEIB, WØOJW, and WØIEV quickly threw in their oars. WØMAF's son, Mike, along with Dr. Lipscomb, a neurosurgeon of Denver, and Dr. White, an anesthesiologist of Kansas City, intrigued by the fishing possibilities, rounded out the party.

Obtaining a license to operate in the Revilla Gigedo group of islands presented a considerable obstacle when information obtained on weather conditions dictated that these forboding islands must be visited not later than the first half of June if the most desirable of weather conditions were to be availed this year. This occasioned a rather tight time schedule which could not have been consummated without the timely and efficient aid of XE1H, XE1AX, and the Liga Mexicana de Radio Experimentadores. With such excellent assistance, a license for XE4A was obtained in about two weeks.

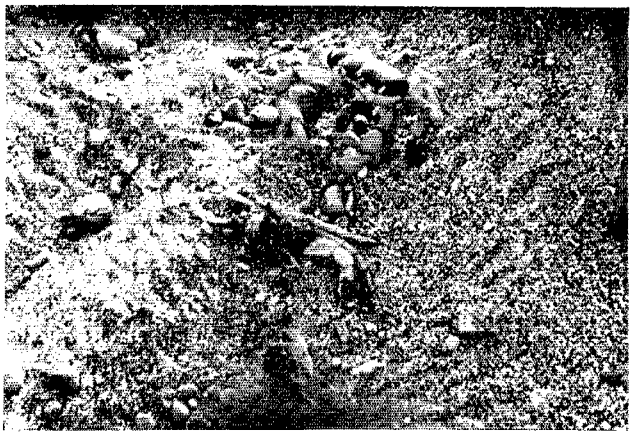
The diesel yacht *Malibu*, skippered by Capt. Leslie Thuett, was chartered to sail from Mazatlan, Mexico, on June 4. The *Malibu* is a twin screw, 100-foot boat fitted with excellent navigational gear and is extremely seaworthy. Even so, the Pacific tossed the *Malibu* about like a cork in a mill race.

On May 30, WØUQV at the wheel of his grossly overloaded station wagon, and accompanied by WØIEV and WØAIW, weighed anchor in Kansas City, bound overland for Mazatlan. The vehicle somewhat resembled its western predecessor, the Prairie Schooner, except possibly for the "putting" gas-powered generator mounted on the top luggage carrier and one of the Rangers and 75A4s mounted in the rear compartment, ready for mobile operation. All of the other various gear was somehow wedged in the remaining spaces, which was rather miraculous considering the displacement of WØUQV himself. The equipment selected for the trip consisted of a pair of Ranger-75A4 combinations powered by two PE214B generators. The generators were generously loaned by the Johnson County Radio Amateurs

On the beach at Socorro, in front of the "shack"—WØAIW, WØUQV and WØOJW (*l. to r.*)

* Radio Industries, Inc., 1307 Central Ave., Kansas City, Kansas.

** Plaza Time Bldg., Kansas City, Missouri.



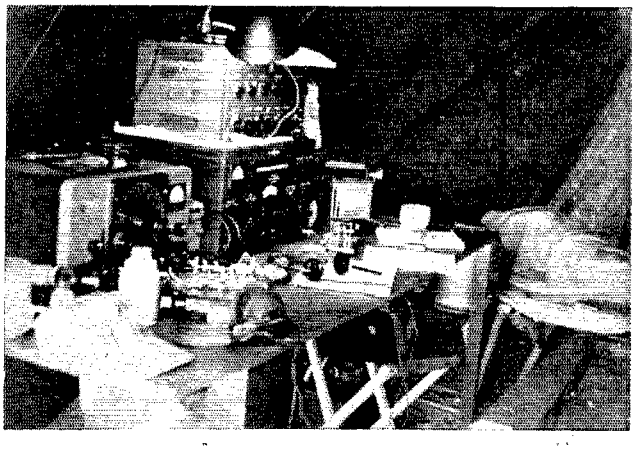
These are the land crabs that launched the counter-attack. This black-and-white reproduction doesn't do justice to the brilliant colors in the 35 mm. slide sent in by WØAIW.

Club of Mission, Kansas. A Central Electronics 20A was also taken along for s.s.b. transmission. After picking up WØOJW in Tucson, Arizona, the trip was successfully pursued to Mazatlan without serious event, but with the expenditure of two tires which succumbed to the ravages of overload and road hazards. WØMAF, WØEIB, and the fishing contingent were all met at dockside in Mazatlan on schedule, in itself a remarkable feat of synchronization. The radio gear was quickly stowed aboard the *Malibu* and set up for maritime-mobile operation of XE4A.

The Captain was not long in acquainting everyone with the fact that this volcanic island group was particularly unsavory weatherwise at this time of year. Chubascos, the Mexican term for hurricanes, of unpredictable violence seem to swirl about these islands during the summer months with an average frequency of one about each 10 or 12 days. Landing facilities and shelter from these storms were said to be particularly meager. Also, the surrounding waters were rather copiously infested with Manta Rays and sharks of various sizes, types and ravenousity. All of these facts were to be verified beyond all doubt!

Mazatlan, the Pearl of the Pacific, is the largest west coast port of Mexico. Its picturesqueness was amplified in the brilliant afternoon sun as the *Malibu* set out on June 4, passing in turn, elements of the Mexican Navy, charter fishing craft, and small skiffs much farther at sea than caution would dictate. The passage to Cape San Lucas at the tip of Baja California was uneventful and smooth, allowing continuous operation of XE4A, maritime-mobile. Near the Cape, sea life was everywhere in evidence; marlin could be seen finning and leisurely sunning themselves. Two of the marlin struck trailing handlines, promptly breaking off the fishing gear and suspending all ham operations as everyone watched their graceful leaps for what seemed like miles astern. Giant green turtles, sharks, and fishing birds were likewise abundant. After a brief pause at Cape San Lucas to accomplish necessary formalities with the Mexican authorities, the DXpedition put out into the Pacific late the afternoon of June 5.

Immediately on rounding the Cape to the seaward side, the heretofore tranquil Sea of Cortez became the not-so-peaceful Pacific. Spray came aboard and the ship lurched rather unpredictably, necessitating the removal of all radio gear from the fantail to the aft cabin and the rerouting of the generator cables and antenna lead which descended from the boat deck above. This was accomplished rather rapidly but not without jeopardy to the equipment due to the inadequacy



This is operating position number one at XE4A. The body in the background is unidentified.

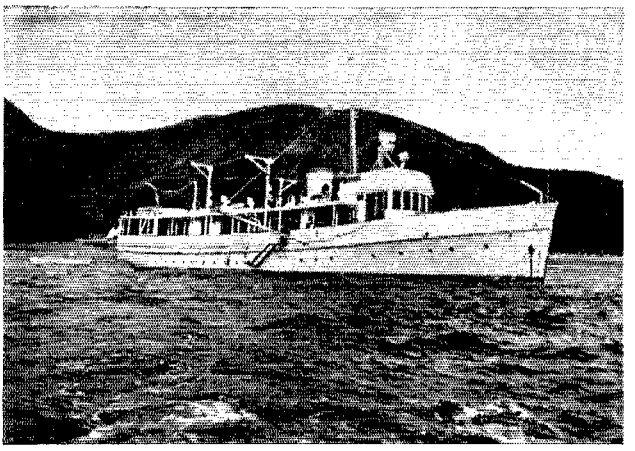
With the operation of XE4A cut short by the impending hurricane, some of the operators wait for the ship's boat. (*l. to r.*) WØMAF, WØOJW, WØAIW, WØIEV.

of landlubber legs which poorly anticipated the aquabatics of the ship. Actually, the next 24 hours of open sea passage to the islands were so rough that marine operation was accomplished only by placing all of the gear on the cabin floor and operating from a prone position. Even so, speakers, logs, personnel, and equipment were rather loosely coupled to the surrounding fixed objects of the cabin.

San Benedicto Island was sighted early in the afternoon of June 6, but could be seen only as the ship crested the very large swells which had prevailed during the past 20 hours. Approaching the island, it revealed itself as a very blunt, low-lying cone of gray and black stone entering the sea by precipitous palisades against which the unrelenting onslaughts of the sea seemed to have made no impression. Its visage was distinctly forboding and barren of any vegetation. From a blunt peak of several hundred feet it seemed to reach down to the sea in curving redundant folds of black lava, broken here and there by fissures and crevasses into which the sea pounded, forcing beautiful geysers of fine spray 50 to 100 feet skyward. There was no shelter, no harbor, no beach, only magnificent desolation. Contemplation of the island was interrupted by activity of a major nature on the trailing handlines astern which were undergoing a vicious attack by several large and beautiful Wahoos. Three measuring five and one-half feet in length were boated with some difficulty. Socorro, 32 miles to the south, was not yet in view.

Some interesting medical problems arose on this overwater passage. The two main ones presenting themselves were the well known *turista* and *mal-de-mer*. WØIEV, WØEIB, and WØAIW stoutly contended they were impervious to both maladies though the best medical consensus was to the contrary. The medicos (Lipscomb, White, and WØMAF) were in a fair way to judge but in a poor way to administer to suffering hamhood since they were obviously afflicted with at least the *mal-de-mer*. WØOJW was strangely mute which attested to his degree of disease, and young Mike, now the cabin boy, simply didn't feel well. All this time, the deplorable status of the ailing medicos was being transmitted to all listening ears via the A3 being emitted from XE4A/MM. WØUQV presented a knotty problem inasmuch as he professed the "reverse tourista" and pleaded for medical relief.

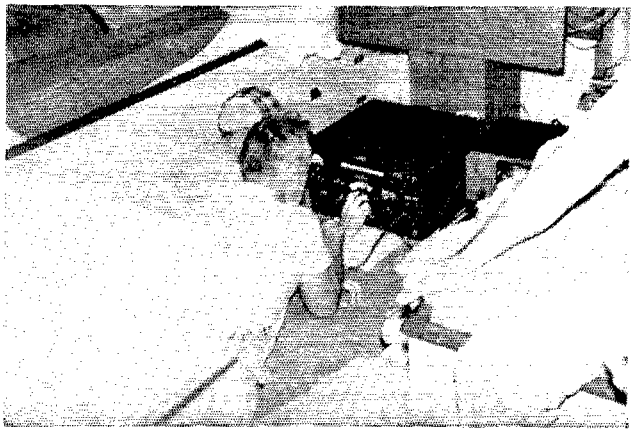
Socorro became a reality about 3 P.M., June 6, as a low-lying blur above the horizon. On nearing



The *Malibu* anchored at Socorro, with the inaccessible peaks in the background.

the approach, the 4,000 foot peak of the island became apparent though its summit was obscured by clouds which were ever-present. The overall impression of lush emerald green was a decided contrast to the rocky and barren appearance of San Benedicto. Seeking a safe haven for the *Malibu*, the Skipper spotted a small opening to the northeast which afforded entrance between jagged, menacing rocks protruding from the rough sea. With the aid of the electronic depth recorder, he adroitly maneuvered all 100 feet of the *Malibu* into this semi-sheltered cove and dropped anchor.

Meanwhile, furious activity was in progress aboard as WØIEV, WØOJW, WØUQV, and WØAIW prepared for the electronic assault of the island. At the head of the cove was a semi-lunar strip of steep beach about two city blocks long and flanked by rugged sea-rounded rocks inclining to impending cliffs. A skiff was quickly lowered overside and loaded with equipment while



There seem to be several prone bodies in this picture. At least a couple of them are interested in continuing the maritime-mobile operation, but what about those men on the bunks at the sides?

all onlookers held their breaths, as even the bay was not entirely calm.

The landing party immediately perceived upon reaching shore that the choice peak which flanked the beach was unattainable by reason of dense low-growing cacti, briars, and other flora, all abundantly armed with sticking equipment. A later attempt on this small peak returned medicos Lipscomb and White to the beach, bowed and bleeding to mid-thigh.

Wishing to begin operation immediately, the beach site was selected and the tent quickly pitched, although the tent stakes would not hold in the sand, and volcanic rocks had to be substituted for stakes. The antenna masts were constructed from remnants of an old shipwreck and two long wire antennas, 275 feet long, were strung about 30 feet in the air. By this time, darkness had intervened, but XE4A was ready for operation. A short CQ was promptly answered by W6DZZ and the c.w. fracas was off to an excellent start.

The steady grind of several QSOs per minute was well under way when the first counter-invasion was begun by the Socorro Island land crab army. After dark, literally thousands of dinner-plate size, brilliant orange-colored land crabs descended upon the operating tent from the surrounding hills and mountains, being attracted by who-knows-what. This necessitated a constant vigil by the machete detail who discouraged the invaders with difficulty, but with considerable carnage. For peaceful radio operation, the "crab patrol" had to mobilize and function hourly during nighttime operation.

With the crab population reduced, at least locally, to a size of competitive decency, radio contacts continued at a furious pace. The skiff was almost constantly plying between the *Malibu* and the beach, reinforcing the radio garrison with fuel for the generators, food, water, and operator replacements. After the first day of activity, the off-duty operators took time off for sleep, limited exploration of the island, or fishing as inclination dictated. Further circumvention of the island by motorboat verified that Socorro is no place for a land-based tourist of the pleasure seeking type. Actually, the anchorage which the Skipper found was the only semi-protected one around the entire periphery of the island. The sole population seemed to consist of crabs, lizards, and a few wild goats.

From the *Malibu*, myriads of exotically colored fish were observed through the clear water of the cove. Pompano, groupers, parrot fish, grunts, triggers and an occasional small shark seemed voracious and were caught with great facility from the deck. Fishing off shore from a motor launch was a matter considerably different. Here the seas were continuously rough and the fish large, speedy, and durable. Wahoo and tuna predominated though many other types were raised. This off shore fishing was accompanied by some hazards. It was quite difficult on occasions to boat a fish at sea before the sharks attacked and either removed all of the hooked fish, or reduced the residue to shreds. This spectacle admittedly discouraged even the more avid fisherman.

XE4A operation continued at a mile-a-minute clip until the afternoon of June 9. At this time

(Continued on page 126)

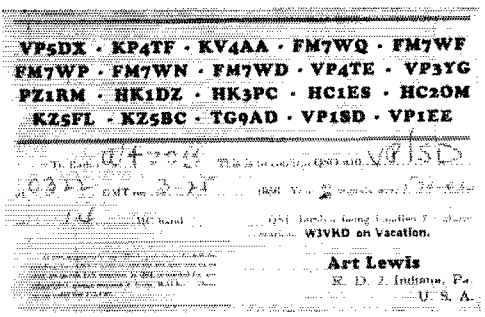
Ham Vacation à la W3VKD

ONE frosty morning last January, Art Lewis, W3VKD, accompanied by his XYL and 10-year-old daughter and equipped with a fistful of airline tickets, tallyhoed off to the Caribbean. The move climaxed some 5 months of planning. Art's objective was threefold: (1) to provide the W/VE gang with DXCC help and contest multipliers by operating from 4 countries during the 22nd ARRL International DX Competition; (2) to visit as many on-the-air amateur friends in the Americas as possible and, where regulations permitted, to operate their stations; (3) to indulge in some plain, old-fashioned sightseeing.

Highly successful, the trip took the Lewises around the West Indies, Central and South America, to these 23 countries: VP5 (Jamaica), HH, HI, KP4, KV4, VP2 (Leewards), FM7, VP4, VP3, PZ1, FG7, YV, HK, HC, OA4, KZ5, CO, TI, YN, HR, YS, TG9 and VP1. At almost every stop the "red rug" was lavishly unfurled as delegations of enthusiastic amateurs showed up at airdromes to whisk the W3VKDs to especially-arranged club meetings, banquets of native cooking, radio shacks or local landmarks.

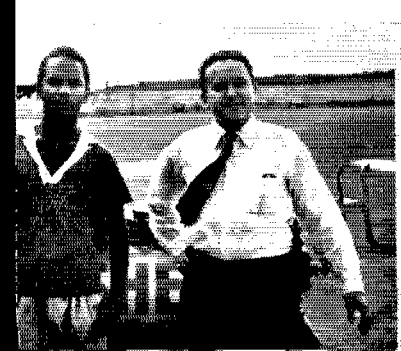
Back home again in Indiana (Penna., that is!), Art fondly thumbs through his Kodachromes and tingles as he recalls the hospitality accorded him on the ten-week whirlwind journey. He urges that any wanderlusting ham due for a vacation investigate the thrill of being the cause of a pileup, and suggests that would-be travelers obtain *New Horizons*, available at any airline office, for currency, customs, passport and other tourist information.

"Then write some letters and try your luck at meeting some of the DX gang face to face, or in OA4AI's words, *'QSO cara a cara, pecho a pecho.'*" — *P. S.*



Calls of the 20 stations operated appear promin on face of "W3VKD on Vacation" card, 2000 of which were mailed to QSL Bureaus on May 19th.

Above: Widely-known *aficionados* abound at this Lima Radio Club meeting. *Front row* — Secy. OA4AT, Vice-Pres. OA4AV, W3VKD, OA4CM (first YL to obtain a Peruvian license), OA4J, OA4AO, SWL; *second row* — OA4AH, President OA4B (just re-elected for 26th consecutive year), SWL, Treasurer OA4DE, SWL, OA4AI; *on stairs* — Club-paid Secy. *Lower left:* Welcoming committee at Point-a-Pitre consisted of entire Guadeloupe ham population, namely FG7XB and FG7XA. *Center:* Martinique bull session stars FM7WP, FM7WD, FM7WF and FM7WN. Milo, FM7WF, chauffeured Art, precariously perched on rear carriage of motorcycle, from station to station. *Lower right:* W3VKD in action at PZ1RM in c.w. period of ARRL DX Test. Other contest week ends were spent at VP1SD, HC2OM and 5 FM7 rigs.



How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Whoa:

We bumped into an old friend the other day, one Sunspot Sam McSquegg. Sam moves in rather eccentric ham circles but we weren't quite prepared for the weird yarn he spun in response to our casual "What's new, Sunspot?" Sam looked around furtively, established the absence of kibitzers, and proceeded in a voice not far above a whisper. . . .

It seems that Orson A. Roundalot, the hottest DXperimenter among the old gang, had been diddling around with a variety of midget indoor loop antenna configurations. His shack, normally a maze anyway, was really making like The Web. He was continually rearranging one particular 14-Mc. loop circuit, striving for lowered *Q*, when suddenly he *hit* something. Hooked to his rig, that small jumble of copper began to load as smoothly as a wide-spaced one-element beam.

Orson immediately switched the thing onto his receiver, slid between the phones, and tuned in an S7 FW8. He swung the loop a bit to establish its directivity, and the signal appeared to drop out. It didn't fade out, though; it was now *blocking* his receiver. Orson next switched to his 8-element 80-foot-high rotary for a comparison. He found there just wasn't any. The FW8 was barely audible on the big beam!

Using the loop, Orson gave the FW8 a shout, raised him, and was forthwith accused of being a Wallis Island bootlegger signing, of all unlikely things, a W call. He QRTd before fully explaining things to the FW8, however, for he noticed a smoking black hole in the shack wall, drilled right through the "D" in his treasured ZD8SC QSL. Obviously this radiator had practically *no* lobe width — it was as sharp as a needle, with enough forward gain to rival a Buck Rogers disintegrator![1]

Like the true scientist he was, Orson Roundalot grabbed a pencil and began to log details of this epochal experiment. Subject, date, time, weather, band conditions, dimens —

WHAM!! The whole works vanished before his eyes in a puff of smoke and flame, leaving only a residue of molten copper and the stench of vaporized insulation. Gone! Where? *Why?*

When Orson's hearing returned to normal he detected key clicks rattling the remains of his headset. It was Sunspot Sam McSquegg, calling his usual prebreakfast series of CQs DX. And Sam's QTH, just three blocks away, lay directly on line between Orson's location and FW8. . . .

"Yes, I guess I did it," moaned Sunspot Sam. "But how was I to know? Orson's taking it hard. Can't recall the hook-up. Plays cat's-cradle all day long with No. 14. Mebbe it was for the best, though. He 'mighta *killed* somebody with that darned thing."

Either that, or won next year's ARRL DX Test with a 6C5.

What:

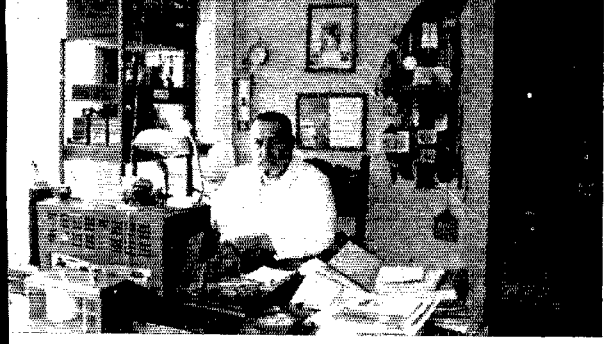
What a summer 1956 has handed to the world of DX! . . . 1) Conditions the best in years — "N8" at times, according to the Bureau of Standards — despite usually becalmed W/K h.f. midyear propagation. 2) DXpeditions by the *lofful;* both St. Martins, the Comoros, Aves Island, the Revillagigedos, Easter Island, San Marino, Liechtenstein, Monaco, Luxembourg, plus imminent Zanzibar, Seychelles and Nauru DXcursions. 3) Accelerated liberalization of Russia's world-wide ham QSO policy, permitting generations of new DX hunters to score their initial U.S.S.R. contacts.

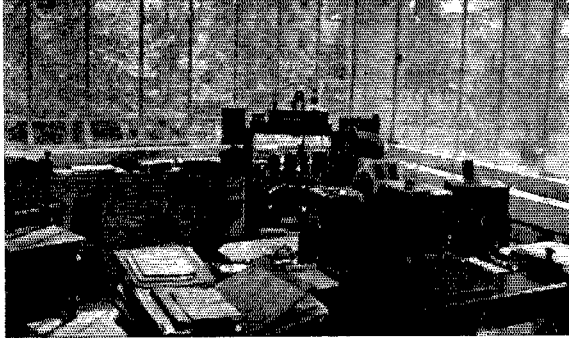
Ever since UB5s broke a four-year precedent by QSOing Yanks early last year (see p. 63, September 1955 *QST*) your reports to "How's" have documented an increasing relaxation of the long-constricted Iron Curtain QSO pattern. This summer's output of U-W/K communication, fired across the entire polar periphery from UN1 to UAØ, is a flashback to the postwar 1940s when QSOs and QSLs from 18 of the 19 U.S.S.R. DXCC entities were available for the calling. Now how about a DXpedition of U operators to Wrangel Island, rarest of the bunch? [Boss, gimme a drag on that before you throw it away. — *Jeeves.*]

20 c.w. frequencies were overrun by signals from **UA1s** AM AU BI BJ BQ DH KAE KAI KAQ KBB KBK KFA KMC KUA QT, **UA3s** AJ BF BN CR EG EK FG KAA KAH KBA MD TT VB WZ, **UA4s** FC FE KCE KKC KLE KNA KPA, **UA6s** UI UR, **UA9s** CC CR DA DB DN KAB KBA KCA KJA KYB OC VB YF, **UAØs** AB AF AG CE DN KAA KAB KCA KCH KFC KJA KKB OM RA SJ, **UB5s** AB BP CA CI CK CR CW ID KAA KAB KAD KAK KBB KBE KBR KEP UB WD WF, **UC2s** AA AB KAB KAC KAK, **UD6s** AF BM, **UF6s** AM FB KAF KPA, **UG6KAA, UH8KAA, UI8KAA, UJ8AF, UN1s** AA AO KAA, **UO5s** KAA KBA, **UP2s** KBC KPC KPS, **UQ2s** AN AS KAA KAO, **UR2s** AK and KAA. Kazakh, Kirghiz, Fridtjof Nansen Land and Wrangel Isle are the only Russian DXCC areas not reported worked. UL7s and UM8s are said to be active, however, and F.N.L.

* 4822 West Berteau Avenue, Chicago 41, Illinois.

[1] Apparently Mr. Roundalot managed to invert the field pattern of a small loop. In such case the usual broad-lobed sharp-nulled characteristic would be transformed into its reciprocal. — Ed.





The ham career of I1CW goes 'way back to collaboration with Marconi aboard radio yacht *Electra*. Giovanni's present hamshack breathes of sunny Italy particularly because his station is located at the Italian government's Treviso meteorological observatory where the OM studies electromagnetic wave propagation. I1CW is a past president of Italy's ratio society and a counselor of ARI. Ham hi-fi enthusiasts of classical bent will be interested to know that Mario Del Monaco, singer of tenor leads for the Met, is I1CW's son-in-law.

UA1s can't be far behind. Wrangel? Well, better not pass up any UA0s . . . . . Such transarctic doings are a distraction, but K6JQJ refused to neglect **BV1US** (14,046) 17 GMT, **CE0AD** (34) 4, **FE8AE** (7) 5, K4AMV/**KS4** (99) 3, **VS5NN** (42) 23, **XZ2OM** (47) 16, **YS1O** (20) 6, **ZB2T** (7) 4, **ZD3A** (36) 8, **ZSs 2MI** (27) 17 of Marion, 3VC (67) 17 and two ON4s in Luxembourg for a fast rise to 161. . . . . W9UKG shelved the 700-watter for a go at QRP DXing. **CP3CD** (11) 2, **KG6AFT** (19) 12-13, **LZ1SR** (20) 1, VQ3CF (37) 13, **VU2HW** (30) 11-12, **YO3RA** (36) 21 and assorted Us went for Doug's 20-watt 2E26. . . . . W9UDK accosted **CR7LU** (14) 4, **FK8AO** (86) 6, **HI8FR** (85) 23, **KJ6BN** (24) 4, **KR6QW** (56) 13, **KX6BU** (45) 3, **VRs 2CZ** (65) 7, 3B (90) 5, **VS6AE** (27) 13, **4X4FV** (18) 19 and **9S4BN** (45) 21 from the land of the Braves. . . . . W1YNP made it 96 by way of **EAs 6AW** (10) 19, **9AP**, **EL0B**, **HC7WK**, numerous JAs, a KW6, **KX6NC** (53) 8, **OD5LJ** (43) 12 and **SV0WO** . . . . . **CR6AI**, **VQ5GC** (38) 13 and **ZD6BX** (50) 12 kept W7VMF busy, while neighbor W7DJU picked on **DU7SV**, JAs and KAs, an FK8, **VS1s** GX (7) 15, GZ (89) 13 and HJ. . . . . The DX-100 and Telrex spinner at W9YSX cornered a **CE0**, **CP3CC** (50) 8, **CT2BO** (79), an EA6, **EA8BP** (23), an FE8, KG6 and KJ6, **IT1TAI** (62), **LZ1KEP** (57) 3, an MP4, **OD5LX** (65), **VQ2GW** (41) 13, VQ3 and VQ5, plus **ZC4RK** (64). . . . . W6WLY/**0** awaits cards from a **CE0**, **CE7ZY**, CT2 and CP3, **EA6AM** (47) 3, **FO8AK** (70) 23, **FY7YF**, **HH3DL**, **HZ1HZ** (26) 3-4, **LZ1KDP**, **OY5s** (25) 7, **VP3AD**, **ZB2R** (27) 5, a ZD3, **3V8s** AN (20) 5 and FA. . . . . **DU6IV** (80) 13, **VK9XK** (13) 12, a YS1 and 3V8, as well as **4S7-MR** (35) 12, clicked with W4GUV. . . . . K6DNH worked **CE0**, **CR9AI** (58) 14, **CT3AB** (36) 2, **KW6CA** (23) 12, **OQ5BT** (46) 14, **VK9SD** (27) 10, **VSs 1HA** (85) 14, **2CR** (70) 16, **2FB** (94) 14, **6CG** (4) 13, **6DE** (12) **ZS3AN** (40) 20, VQ5, KS4 and KG6. . . . . **HS1SA** (18) 15-16, **I5RAM** (20) 22, **JZ0PS** (68) 12 and Tarawan **VR1A** (12) 1-2 gladdened K2GFQ. . . . . W0CKC welcomed **FB8BR** (14) 13-15, **FM7WP** 17, **LZ1KGZ** 2, **KG1FA** 0-1, **VK9OQ** 13, **YI2AM** (55) 13, **4X4BX** (10) 16, **9S4BW** 2, CT3, EA6 and VR1 customers. . . . . W4WOG passed 101 on **KA9MF** (70) 16, **TF2WBG** (60) 2, **UA4HR** (30) 3, **VQ6LQ** (4) 4, **VP5BE** (70) 4, **ZB1BF** (60) 5, FK8, KS4 and 4X4 contributions. . . . . **EA9DF** (60) 8, **FB8ZZ** (23) 3, **TF3SV**, **VP8BK**, **VQ2AB**, **VU2AL**, **XW8AB** (53) 16, **4S7WP** and Gough Islander **ZD9AE** (50) 16-17 collaborated with W6UQQ for 160. . . . . W6SUQ, 101/69, grabbed **KB6BA** (67) 8, **KW6CD** (45) 9, **TA3AA** (33) 8, Aussie ship X1NP, CR9, UA0 and VS2. . . . . Damocles had nothing on W4AUL. A neighbor 50 feet away is completing an 813 14-Mc. rig! John made 153/132 with assorted Us, **CE7ZV** (2) 3, **EL2F** (80) 21, **YO3RF** and **YJ1RF** (48) 12. . . . . In fast succession, good 14-Mc. code luck, at *K2JTS:* CP3, CR6, **EL12C**, **KG1CG**, SU1IC (75) 0, *W3TYW:* **HK4EF** (31), **HP1BR** (14), MP4 & la Qatar, *W4CEN:* Russians in 9 DXCC areas, *W4LDD:* **KG4AB** (100) 18, **SP6BY**, **YO6AL**, *W4UWA:* **CE3RE**, *K4ABE:* **CN8AS**, ON4/LX, **HH2Y**, *K4CHK:* **KV4AA** (80) 20-22, *W6DZZ:* **YJ1AA** (93) 12, *W6YBR:* UAs, a Marion ZS2, **XE4A** **GC4LI** (50) 8, **FQ8AY** (75) 6, **XZ2KM** (40) 14 and **ZS7C** 14 escaped. *W6YY:* notes activity of **CE0AC** (77) 5, **FB8BI** (50 T6) of Juan de Nova, **FD4BD** (20) 22-23, **SV0WN** of Crete, **VS9AS** (100), *W7YAQ:* JA/KAs galore, VS1s, **VS6DI** (100) 16, W7TEO/**KG6** (80) 8, *W0QGI:* VR3, *DL4ZC:* FE8, **FF8AL** 8, **HK3KG** 22, VS1, **3W8AA** 17. . . . . West Gulf DX Club's *DX Bulletin*, Northern California DX Club's *DXer*, Willamette Valley DX Club's *DX* and Ohio Valley Amateur Radio Association's *Ether Waves* talk up **ACs 3SQ** (73) 13, **5PN** (91) 16-17, **AP2s** C (43) 2, M (50) 19, RH (29) 14, **CN2AY** (20) 7-8, **CRs 4AG** 19, **7CK** (52) 15, **10AA** (34) 15, **DU1VQ** (80) 13, **EA9AZ**, **ET2s** LB (65) 16, PA (110) 15, US (25) 13, F9QV/FC 16-17, **FB8BF** (72) 12, **FG7XB** (66) 4, **FK8AE** (48) 10, **FQ8AX** (32) 16, **FR7s** ZA (55) 13, ZC (40) 13, **HZ1AB** 15, **I5REX** (61) 13, **KCs 4USV** (60) 2, **6AL** (75) 10, **KJ6s** BJ 12-13, BM (96) 12, **KR6s** AW (60) 13, SC (67) 14, **KW6CQ** (73) 13, **OQ5CA** (65) 15-16, **OY1R** (19) 17, **PZ1s** AH (50) 21, AM (8) 3, **ST2NG** (10) 15, **SV0s** WL (10) 17, WT 21, WU (48) 4, **VKs 1GA** (75) 10, **1IJ** (98) 13, **1RA** (96) 15, **9AU** (89) 12, **9DB** (80) 13, **9RM** (51) 12, **VP2s** DA 22, LH (50) 2, **VP8s** BS BR (45) 14, **VQs 2EW** (95) 15, **4AQ** (77) 12, **4ERR** (47) 9, **4FI** (79) 12-13, **8CB** (88) 12, **VR2BA** (25) 0, **VSs 2CP** (48) 11, **6CO** (10) **6CT** (49) 14, **6DE** (10) 12, **9AN** (22) 15, **VS4BO**, **VU2s** BK HW JJ JK JO KM all 12-15, **YI2OT** (78) 4, YN1CAA (98) 13, **ZA2KDP** (40) 4, **ZC5SF** (50) 7, **ZDs 1JA** (55) 12, **2ROC** (41) 6-7, **6BR** (80) 13, **6EF** (53) 16, **ZK1AA** (23) 4, ZSs 7D (43) 13, 7H (54) 17, 8F (100) 15, **4S7s** BW NG PT WG WM all 12-15, 4X4s CK FV GV GZ all 14-16, **9S4s** AX BN and BS. Untouchable H L1s AB AC and BA, all 15-20 and between 14,060 and 14,070 kc., flaunted Korea; several 3W8s teased W/Ks, too. And did you catch Dutch St. Martin's PJ2MC (W6ITH)?

20 phone feeling ran high on both short and long paths. W4HKJ collected **EA6AR** (140) 2, F9RY/**FC**, **HA5AP**, **KA3AC**, **KC4USA** of Deepfreeze, **KG6FAE**, **4X4HK**, **9S4AD** and a VR1 on return from a trip to Mexico. **TA3US** gets a new lease on life; new operator Don will stay a year, W4HKJ learns. . . . . **BV1US** (161) 18, **HC8GI** (144) 6 of the Galapagos and **ZK1BS** (205) jawed with young K6JQJ. . . . . Here and there, at *K2OAH:* hears **VR3C** scheduling VK4NC around 14,155 kc., 0700 GMT. *W4GUV:* **KM6AX** 6, *W6PJ:* first contact logged by **KX6BP** (240) 8 of Eniwetok. *W6SUQ:* K6KNY/**KW6** (270) 9. *W6SYG:* Formosan BV1US. . . . . **CR7s** AU (183) 13, CO (186) 12, **CT3AN** (123) 7, **EA9AZ** (108) 22, **FB8BC** (115) 13, **FK8AO** (87) 6, **FM7s** WM (95) 5, WN (125) 21, **FU8AC** (250) 7, **HA5s** KBA (100) 3, KBK, **HI6EC**, **HZ1TA** (122) 4, K4AMV/**KS4** (268) 22-23, **KC6CG** (226) 12, **KG6IG** 23 of Chichi Jima, M1B (125) 1, **MP4s** BBW KDS (100) 3, **OK1MB**, **OY2A** (120) 5, **ST2DB** (178) 19, **SV0WJ** (135) 3, **TF2WBG** (56) 21, **VK1IJ** (118) 2, **VPs 2AB** 2VA 5FH (187) 15, **VQ4EO** (105) 4, **VRs 3D 6AC** (140) 4-5, **VSs 1CZ** (140) 15, **2CR** (170) 15, **2CW** (170) 15, **2EE** (123) 15, **6AE** (180) 15, **6CG** (120) 15, **XZ2SS** (150) 15, **YJ1RF** (152) 9, **YK1AC** (115) 3-4, **YO3GM** (120) 3, **ZB1BG** (98) 5, **ZK1s** AB (130) 5-6, BS (166) 8, **3V8s** BA (140) 4, BL (165) 20, **4X4FF** (110) 4, **5As 1TZ** (155) 3, 2TZ (150) 6, **9S4s** AX (117) 5 and BN (185) 13 are 20-meter phones specified by aforementioned clubs, plus Milwaukee Radio Amateur Club's *DX Notes*. . . . . U.S.S.R. signals, now plentiful on c.w., still shy away from voice work. A few exceptions are **UB5KBR**, **UG2AA**, **UG6KAA**, **UP2KBC** and **UQ2AN**.

15 phone lacks the scintillating depth of twenty at this stage of the game, but the stuff seems to get passed around more freely. Here's W3YDF with **CR4AZ** (240), **ET2PA** (220) **I5RAM** (265) **KA5CL** (240), **MP4BBL** (150), **OD5AV** (190), **SV6FP** and **ZB2P** (375) to reach 108/87 on 100 watts. . . . . W4YOK checked off **KX6BU**, **LX1DC**, **PJ2MC** of Dutch St. Martin and 4X4FK. . . . . Mobiling down Florida way, W9KHJ appropriated **CN8JR**, **FM7WN**, **HIs 2Y 4DP**, **HI6EC**, **TG9CR**, **VPs 1PS** and **2DA**. . . . . Discriminating W9WHM selected **EA6AS** (280), **FK8AC** (340) and Ascension's **ZD8SC** (200) to boost his total. . . . . **ET2FM**, **GD3GMH**, **VP8BS**, **VQ4EO** and 4X4DK interested K2PIC. . . . . K6GSJ preferred **CR9AH**, **DU6IV**, **KG6s** AFX GX, **KM6AX**, **KR6s** AF AS, **KX6ZB** and **VR2BC**. . . . . At this shack and that shack, first *W3ABT:* **CN8JR**. *K4CHK:* **XE3AR**. *K4DRO:* **HP2ER**. *W6WLY/0:* YN4CB. *W6YY:* determined activity of **ZS7H**, **MP4KAC** (175). *W6ZZ:* KH6s, VK and ZLs in number, **VP1OLY**, plus /MM Ws 1 KS 2ZXM of *Enterprise* renown, 6BMO 7SYR. *W0QGI:* **EL2P**. . . . . The club dragnet seined 21-Mc. for the voices of **CP5EQ/CP6**, **CR5SP** (240) 16, OD5s, **ST2DB** (150) 16, **VP5BE** 15 **VQ5GC** (187) 21, **VU2JP** (125) and **ZS9G** (200) 15.

15 code goes well with W2PZI. Dick, nearing 100 countries confirmed on 21-Mc. frequencies, connected with *AC5PN (75)*, **FO8AK**, a KW6, **OD5AV**, **UC2KAB**, **ZDs** 3A 4BL 4BQ and several 4X4s . . . . . It's 53 at W5HEX because of **VP3YG**, **VR2BC**, **ZD1DR** and **4X4DK** . . . . . **GD3FXN**, three HA5s, an OD5, **OY2R**, **VQ2GR**, a VQ5, SV1AB, W2JNA/**ZD4**, **YO5LC**, a ZB1 and ZD4, **4X4s** BJ and FM returned K2PIC's 73 . . . . . W6WLY/Ø and FO8, **IT1s** AI ZGY, **PZ1AQ**, SV1, ZB1, ZD4, **4X4s** BT IE and **9S4AL** got together . . . . . Down the line, at *K2DSW:* **OY2Z**, **JA1CO**. *W3TYW:* **SP1KAA**. *W4EJP:* **OE2WC**. *K4DRO:* P.R. newcomer **WP4ACS**. *K4CHK:* YU2AI. *W6ZZ:* **SP8CK**. *W7YAQ:* **I1BLF/Trieste** (20) 0, **KX6NC** (80) 5 . . . . . The clubs offer **MP4BBL**, **VQ4s** CC RF, **VU2s** MD (42) 16, RM (60) 17, **ZE1JV** and ZP6CR for your pleasure.

15 Novice efforts encountered rough going during summer's doldrum period, but KN6OPF passed the DXCC halfway mark on **HA5s** BJ KBA, **KX6BU**, **TI2EA**, a GI3 and **UA3BN**. "Easy" ones like CM/CO and KP4 give Herb the go-by . . . . . WN1GTT slid to the edge of his operating chair for **UB5UB** 21 . . . . . **PJ2MC**, among the rarest of the rare, gave WN8IBX a QSO that many a General hungers for. Kurt is struck by the constant turnover of WN/KN personalities on fifteen . . . . . Briefly, now, at *WN8FHG:* **OE3HM**. *WN8GKY:* **OE3FS** (119), **ZB1HKO** (117). *KN5COU:* **KZ5AN** (150), **WH6BWL** (160), **WP4ACS** (120). *KN6QGO:* **SP5AR** . . . . . Via W2PZI, **ZD4BQ** states he's particularly interested in contacting Yank Novices around 21,100 kilocycles.

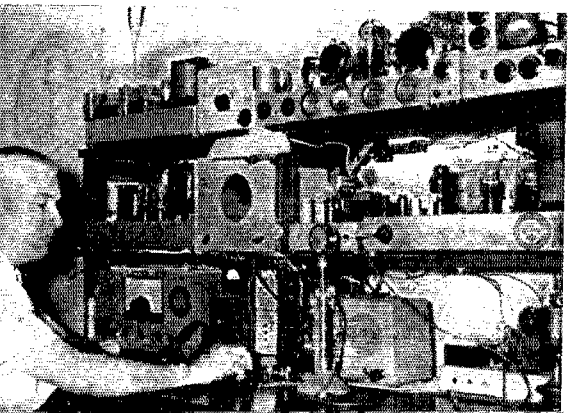
40 c.w. hung on desperately through the heat of midsummer, supplying occasional items of interest even for jaded connoisseurs. **ZB2s** Q and R, for instance, livened things up for K2DSW on the low edge . . . . . W7YAQ has the western slant on things: **DU7SV** (40) 9, **JA7HL** (20) 10, **KG6AGC** (70) 9, **KJ6BN** (10) and a helping of VKs . . . . . K2HXR borrowed K2EIU's Lettine 240 and wound up with 7-Mc. **HI8FR**, **HH3DL**, **HR1ØXYL** (!), IT1ZGY, **OE5WW** and **VP7BB** QSOs . . . . . Archive excerpts from random points. *K2JYH:* **4X4BX** (13). *K2PGP:* **HB1RW** idylling in Thurgovie canton, **KG4AV** (40) 2, many Europeans. *W6WLY/Ø:* **CT1s** CO NT. *W7QNI:* one **TI9AA** 6. *KN6QCF:* Hawaiian neophytes **WH6s** BUF BVD BWG BXF and BXW . . . . . As the nights now lengthen, and daylight m.u.f.s soar consistently higher, we'll be hearing from the boys and girls on **eighty** and **ten** again. The 1956 late-summer and fall DX season should see the favorable portion of the current solar cycle flowering into full bloom — *now* is the time for all good men to come to the aid of their country totals!

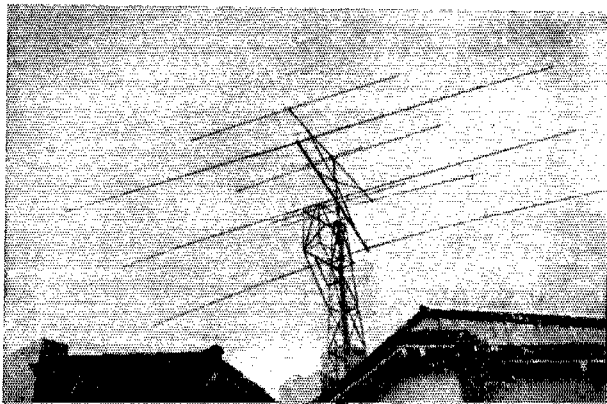
Where:

Encouraging augury this August: Russian amateurs are talking Box 88, Moscow, once again. Your ARRL QSL Bureau watchfully waits for Box 88 exhalations. Meanwhile, some U stations still specify RSGB, DARC, PZK and other bureaus, a few dispense direct mail addresses, and others murmur SRI NO QSL . . . . . Signal Section, Hq. SETAF, APO 168, New York, N. Y., has on file stacks of QSLs belonging to ex-OE13 hams. All concerned are urged to forward stamped self-addressed envelopes to that address before this backlog must be liquidated. This word from DL4HJ, ex-OE13AL, also radiant as W8EJC when home in Cleveland . . . . . On the same theme, a plea from DL4BY (W8NVT): "I am the new QSL manager for DL4 stations and currently hold many cards for ex-DL4s who returned to the States without leaving forwarding addresses. I ask these operators to send self-addressed stamped envelopes to the DL4 QSL Bureau, APO 757, New York, N. Y., to claim their cards." Ray also stresses that a single DL4 call may be identifiable with several operators and a variety of addresses, so the safest disposal of your DL4-bound pasteboards is via his bureau. DL4BY manages a bit of phone operation almost daily on 20, 15 or 10 meter . . . . . From ZS1TR, SARL prexy: "QSL confirming contact with ZS2MI will in future be issued only when a card from the other party in QSO is received. The *ZS2MI cards* will be made out by the department of the South African government under whose control the meteorological station on Marion Island falls. . . . The QSL bureau of SARL will distribute all ZS2MI cards and will also handle incoming cards for that station." Ken adds that his government has established a met station on Gough Island, using gear left ashore by the ZD9AD party. Ex-ZS6AJY now keeps the island workable as ZD9AE. The next Gough mailboat drops anchor in September . . . . . YO3RA tells K2JYH that all stations he worked prior to January of this year should have received his QSL. If not, he's willing to try again . . . . . W5DGV gratuitously offered his services as QSL agency for OD5LJ but, to this writing, hasn't heard from the fellow. "I still stand ready to fulfill my obligations in the event OD5LJ sends me a list of QSOs. Until then all I can do is wonder. . . ." W7PHO was similarly worried by JZØPS but, after a wait, the JZØ did come through with the necessary data . . . . . W4CEN admits to a share of responsibility concerning tardy VS9AS confirmations. Tom states that new VS9AS QSL stock, inadvertently delayed, should enable VS9AS cards to appear on the scene beginning next month . . . . . CR1ØAA tells W4CEN that his Portuguese Timor pasteboards will be getting around after delivery of stock by printer . . . . . K2OAH learns that KR6PI understudies KR6QC as OARC QSL chief. New Okinawa licensees include KR6s AD CF CG DF DL EJ EM HB ME MF MY OU RG RY and SF. Recent deactivations are KR6s OC QO RP and USA . . . . . MP4QAL filed his past MP4 operational itinerary with W1WPO and, in case you're confused as to which DXCC country your own MP4QAL confirmations represent, it goes like this: March to June 1, 1955, Halul Island (Qatar); July 12th-25th, Doha (Qatar); July 26th to August 28th, Halul Island; September 30th to October 18th, Manama City (Bahrein); November 14th to March 13, 1956, Ras Rakan (Qatar); and March 22nd, back to Halul Isle. Anybody work all MP4QALs? . . . . . VS9AN's last remaining QSL went to W6YY but C.C. promises another outpouring as soon as a fresh supply arrives . . . . . VR3D (VE7ASL, ex-VE7ASL/VR3-VR2CD) assures W6HUR he will QSL 100 per cent but that it will be some time before all cards can be prepared and shipped . . . . . Those new VK1s you've been hearing are probably mere Aussie mainlanders — see "Whence" . . . . . W1s CTW ODW VG WPO ZDP, W2s PZI SSC, K2s KNV OAH, W4WOG, W6s DZZ HUR PJ SYG UFS WLY/Ø YY, W8IUA, W9CFT, W0s CKC QGI, DL4ZC, YU1AG, ZB2R, NCDXC, WGDXC, WVDXC and MARTS supply the following individual items:

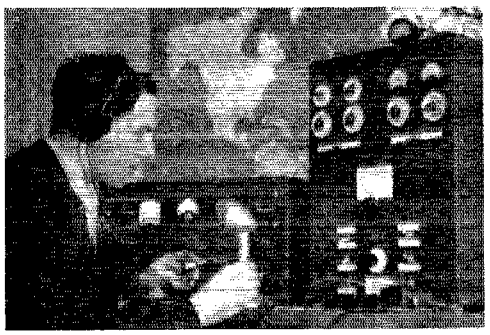
BV1US, Army Section, MAAG, SFAAT, APO 63, San Francisco, Calif. . . . . **CE2AT**, Casilla 307, Quillota, Chile . . . . . **CE3DZ**, Alfredo Quintana, Correo Nr. 25, Santiago, Chile . . . . . **CEØAC** (QSL via RCC) . . . . . **CEØAD** (QSL via RCC) . . . . . **CR1ØAA**, Ruy Trinidade, Post Office, Dili, Portuguese Timor . . . . . **EL2F**, Box 192, Monrovia, Liberia . . . . . **EL9B** (QSL to W8QOH) . . . . . **FB8BF** (QSL via REF) . . . . . **HI8WL**, Wm. C. Long, Maximo Gomez 29, Ciudad Trujillo, Dominican Republic . . . . . **K4AMV/KS4** (QSL to K4AMV) . . . . . **KG1FA**, APO 121, New York, N. Y. . . . . **KW6CD**, Robt. York, c/o CAA, Wake Island . . . . . **KX6BP**, S5 Office, APO 187, San Francisco, Calif. . . . . **KX6BQ**, Parry Island R.C., P.O. Box 2073, APO 435, San Francisco, Calif. . . . . ex-**MP4QAL** (QSL via EI9Y) . . . . . ex-**OE13AL** (QSL to DL4HJ) . . . . . **ON4FU/LX** (QSL via UBA) . . . . . **ON4QX/LX** (QSL via UBA) . . . . . **PJ2AW**, W.F.4, San Nicholas, Aruba, N.W.I. . . . . **PJ2MC** (QSL to W6ITH) . . . . . **PY1BIH**, Box 2353, Rio de Janeiro, Brazil . . . . . **SV6FP**, P.O. Box 564, Athens, Greece . . . . . **TF2WBG**, c/o IADF MARS Stn., APO 81, New York, N. Y. . . . . **UC2KAB** (QSL via PZK) . . . . . **UP2KBC**, S. Uzdavinys, Str. Tvirtoves Nr. 6, Kaunas, Lithuanian S.S.R. . . . . **VK1ALR** (QSL to VK2ALR) . . . . . **VK9OQ**, D. F. Lloyd, Box 56, Port Moresby, Papua Territory . . . . . **VP2AB**, W. G. Holcomb, Western Electric Co., MCB 6,

LU5DC, thoroughly worked on bands 20 through 6 meters, is home-constructed throughout. His rooftop rotary is a 6/10-over-15/20 of plumbers-delight design and the tower, too, is homespun. Jose, more familiar to veteran DXers as old LU2AJ, has scored radiotelephone WAS and verges on clinching his vocal DXCC.





FPO, New York, N. Y. . . . . **VP3WO**, Shemuel C. Wong, 28 Costello House, La Penitence, Br. Guiana . . . . ex-**VP5BN**, E. D. Squire, VE3EBN, 26 Gamble Ave., Toronto, Ont., Canada . . . . **VP9Y**, Jim Amos, Pitts Bay Rd., Hamilton, Bermuda . . . . **VR3C**, Phil Palmer, English Harbour, Fanning Island . . . . **VR3D**, Chas. H. Freeman, c/o So. Pac. Airlines, Honolulu, Oahu, T. H. . . . . **VS1EL**, C. B. Seaman, Cmmd. Sec., FAELF, GPO, Singapore . . . . **VS1HH**, C. C. Smith, No. 2, Sgts. Mess, RAF Seletar, Singapore . . . . ex-**VS2EL** (QSL to VS1EL) . . . . **VS2FA**, B. H. Phillips, Mengkibol Estate, Kiuang, Johore Malaya . . . . **VS2FB** (QSL to MARTS) . . . . **VS4BO** (QSL to MARTS) . . . . **W5OXJ/MM** (QSL to W5OXJ) . . . . **XE4A** (QSL to WØOJW) . . . . **XE6-COH/MM** (QSL to W6COH) . . . . ex-**YN1PC-HP1ZZ** (QSL to HK3PC) . . . . **YU0C** (QSL to SRJ) . . . . **YV0AA** (QSL to RCV) . . . . **YV0DD** (QSL to RCV) . . . . **ZB2U** (QSL via ZB2I) . . . . **ZC5SF**, G. Harrison,



SP5KAB, Central Radio Club, Warsaw, turned in one of the more impressive European scores in ARRL's 1956 International DX Competition. That's an AR-88 receiver and the operator is SP5AR.

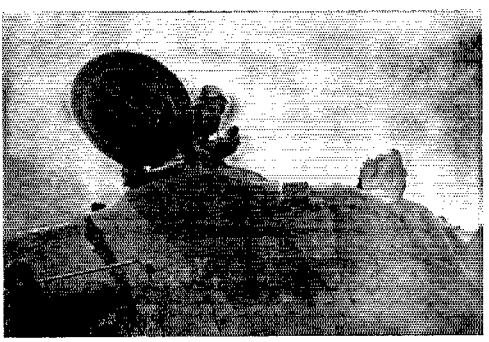
Box 232, Sandakan, No. Borneo . . . . **ZD2ROC** (QSL via ZD2DCP) . . . . **ZD9AE** (QSL via SARL) . . . . **ZP5HX**, USAFM Paraguay c/o U.S. Embassy, Asuncion, Paraguay . . . . **ZS2MI** (QSL via SARL) . . . . **3W8AA** (QSL via OK1FF).

Whence:

Asia — MP4QAL, a rare though familiar catch on DX bands since he fired up in early '55, can throw no light on the status of MP4JO other than that the call is unofficial. Fergus further states: "My MP4 countries total is now 122 with about 94 confirmed and I'm keeping my fingers crossed. . . . I go QRT for good in June and am returning to my home location in Dublin." . . . . From GM3BN comes a clipping announcing the marriage of ex-AC4RF, Bob Ford of unpleasant Red China prison memories, to a British girl of long acquaintance . . . . Another goal for certificate chasers: WTFKAS (Worked Twenty-Five KA Stations) sponsored by FEARL. Any 25 KA confirmations will do the trick, but check with Awards Mgr., FEARL, P.O. Box 111, APO 500, San Francisco, Calif., for full details before applying . . . . According to MARTS's *Malayan Radio Amateur*, only eight 4S7s have 100-watt permits (4S7s AE DJ GS KH MG MP and MG included) and the remaining 69 licensees rate 20-watt inputs. Also, VS6s AE and CG carry out DXperiments with two-band cubical quads; both OTs were licensed back in '29. VS6CW pioneers s.s.b. among Hongkong amateurs . . . . To W6YY, CR9AH reports a pair of brand new Macao workables signing CR9AK and CR9AL. That makes an even half dozen active CR9s to choose from . . . . From VS9AN via W6YY: "At present my transmitter is on a small chassis about 9x6x2 inches, having c.o., trebler, and 807 p.a. My input is 80 mils at 300 volts. . . . In 1947-'48 I used phone from Aden but only on 28 Mc. My input then was only 10 watts but I could work *anywhere*. Conditions are improving and maybe I can use phone again later." VS9AN's favorite haunt is 14,040 kc. around 1400-1600 GMT.

Africa — This is the month ZE3JO sallies forth to sign VQ1JO on Zanzibar (p. 49, July *QST*). QRV? . . . . More from W6YY's bristling file, from ET3AH: "I'm to get a new power plant shortly, and with the Viking and Vee beams should do real good." Frank occasionally is troubled by leopards lurking on his lawns. . . . ZS7H puts the finishing touches on his modulator and reports neighbor ZS7C digging for W6s. . . . ZD3s A and BFC shut down for U.K. holidays of several months, effectively shelving Gambia possibilities for the summer. . . . CR7CO reports the probability of stronger CR7 signals henceforth, for some Mozambique power facilities are switching from 220 volts d.c. to 240 volts a.c. . . . . According to ZS1TR, the new ZS2MI QSL is a real collector's item. "Green and gold, of the folded type, including a pictorial map of Marion Island." . . . . W2PZI finds W8QOH/MM signing ELØB when in Liberian ports. ELØC is another such maritime call now in use . . . . . Unhappy note from W6NTR concerning future Comoros availability: "In March of next year FB8BR returns to *la belle* France permanently — no more overseas assignments." . . . . Beginning this month or next, ZS8I will have a new QTH and new beams ready for DX action on 20, 15 and 10 meters. This from ZS4F via W2BUK, and ZS8I's input is pegged at 50 watts, A3 . . . . VQ3CF closes down his popular 150-watter for a year's relaxation in England, scheduled to return to Mwanza in late 1957. Sailor has an interesting project afoot, a long-path WAS. His toughest bottleneck is W1 but also needed are Del., Idaho, Nev., W. Va., and the Dakotas . . . . WGDXC grapeviners whet DX appetites with mention of FR7ZC, already reported active on Reunion with QRP and awaiting QRO gear from France.

Oceania — After an abortive ham prohibition on Eniwetok atoll, KX6s BP and BQ burst forth on DX bands, respectively located on Eniwetok and Parry islets along the atoll's southeast quadrant. KX6BP, a multioperator affair staffed by W1s GPK, ZPD, W5BVX, W8TOH and others, broke the ice with a W6PJ QSO on 20 phone. Writes W5BVX: "Present plans call for the station to be on the air 0600-0800 and 1000-1300 GMT, 14 Mc. only. Be on the lookout for the friendly station in the land of coconut crabs and killer clams! We'll QSL 100 per cent." Anent KX6BQ, W6UFS pens: "KX6BQ is the club station of the Parry Island A.R.C. and will use a BC-610 and 6-wavelength-per-side rhombic on 20 meters. QSLs will be issued for all contacts as requested." . . . . The face of ham radio changes slowly but surely and one recent subtle switch turned into a cute DX tease. Until this year the prefix VK1 meant "rare!" but W8IUA reports VK2s in Canberra Capital Territory now using that label. VK1ALR (ex-VK2ALR) indicates the possibility of former VK1s becoming VKØs and former Northern Territory VK5s becoming VK8s . . . . W5OXJ and ten fellow Oklahoma U. students embarked upon a summer excursion to the Philippines, Thailand and Bali as part of an extensive good will program. "Being a ham, I naturally thought of taking a rig along, since a total of six weeks will be spent aboard *President Cleveland* going and coming. . . . W5OXJ/MM will be on 10 and 15 meters from August 19th to September 9th, sailing between Manila, Hongkong, Yokohama, Honolulu and San Francisco. Since I will be strictly a passenger I will have quite a lot of time for QSOs." Everett takes with him a TBS-50, Gonset Super-6 and a small broadcast receiver . . . . W6ITH intrigues us with a series of UP dispatches about an international embroglio over a group of hitherto neglected islands in the South China Sea west of Palawan, P.I. They are the Spratlys, formerly a Japanese submarine base, and now claimed by a Philippines businessman in the name of



Everybody talks about those brawling 20-meter pile-ups but CT1NT is among the few who *do* something about 'em. Frank, an armorman in the Portuguese Army, suggests this technique as defense against an r.f. barrage. (*Photo via W2BIS*)

his country and also by Nationalist China. Hams aren't the only folk interested in "new countries"! . . . . KH6IJ, one of the all-time favorites among Oceanian participants in ARRL operating activities, is on the mainland attending summer doings at Stanford U. on a Shell Fellowship. Katashi also visited the East Coast and ARRL Hq., and will have picked up a new car in Detroit and operated mobile en route back to San Francisco if all went according to early plan . . . . W3WDF brings new blood into the BV1US operating staff. W6SYG finds him appearing regularly on 14,165-kc. phone, week ends . . . . Latest advice from ex-YJ1DL indicates a possible future Alaskan QTH for Dave and XYL. Ex-YJ1DL worked a few W/Ks from the shack of FO8AB while in Tahiti. W6LDD commendably

(*Continued on page 122*)

I.A.R.U. News

REGION I CONFERENCE

The Second Triennial Conference of IARU members in Region I was held in Stresa, Italy, on June 12–16 under the sponsorship of the *Associazione Radiotecnica Italiana.* About forty official delegates from 14 countries were present, and three other societies were represented by proxy. Present as observers were W1BUD, IARU and ARRL Secretary, and W1LVQ of ARRL.

R. G. Hammans, G2IG, president of the *Radio Society of Great Britain,* was elected chairman of the conference, after welcoming speeches by Sig. Roberto Sesia, I1FA, president of the host society and President of Honor of the conference; the Mayor of Stresa; the head of the Tourist Office; and Capt. Per-Anders Kinnman, SM2ZD, president of *Sveriges Sandare Amatorer* and chairman of the Region I Executive Committee.

The first session was devoted initially to the organization of the conference and to receiving the reports of the officers and of the Executive Committee. Jean Lips, HB9J, was elected chairman of the Administrative Committee and H. A. M. Clark, G6OT, chairman of the Technical Committee. After discussion, it was decided that it would not be necessary to send a delegation to the CCIR meeting at Warsaw in August. A number of recommendations by the Executive Committee dealing with routine business matters of the Region I Division were acted upon.

It was voted unanimously to send delegates to the next ITU Convention. A considerable fund has already been set up to cover the expenses of IARU representatives from Region I, and additional contributions to the fund were voted later in the meeting. The Executive Committee was authorized to appoint delegates when the time comes.

The Executive Committee presented a draft of Rules for the Region I Division of the International Amateur Radio Union. After discussion, the Rules were adopted with a few minor changes.

The next two days were devoted to meetings of the Administrative and Technical Committees, each of which forwarded recommendations to be acted upon at the final session. On Friday, the delegates and their wives and families enjoyed sightseeing tours, a banquet and a ball arranged by the host society.

The final session was held on Saturday. In connection with the problem of non-amateur stations in the amateur bands, the group adopted a standard form for reporting such stations. It was decided to limit reporting at first to broadcast stations and identifiable commercial stations with a wider range of monitoring to follow after the societies and their members have gained experience. The conference urged occupancy of all the amateur bands by all amateurs to discourage "squatters' rights" use of the bands by non-amateurs, but they disapproved of tactics involving deliberate interference to legitimate stations sharing the 80-meter band.

The delegates commended the growth of reciprocity in licensing, especially among European nations, and expressed the hope that work in this direction would continue. The Administrative Committee had discussed the possibility of Region I amateurs getting temporary permission to use the 50–54 Mc. band during the present part of the sun-spot cycle, but the chances appeared most remote since TV is operating there in Region I. The French and Russian amateurs already having a segment at 72–72.8 Mc., it was agreed that other Region I members seek privileges in that segment. An extensive paper submitted by the *Savez Radioamatera Jugoslavije,* concerning ways of increasing comradeship and good will among amateurs, is to be studied in greater detail.

The assembly also urged that more emergency networks be set up. This action followed reports

Continued on page 124)

Delegates from fifteen nations assemble at the Grand Hotel in Stresa.

YL NEWS and VIEWS

BY ELEANOR WILSON,* W1QON

Open Letter to OMs

The following is typical of a number of letters received by this department during the past few years. We are aware that sometimes the subject can have more serious aspects. We hope that in all cases the matter may resolve happily for those involved.

Dear Miss Wilson,

What can I do to interest my wife in amateur radio? I've tried everything but nothing seems to make her want to become a ham. Any suggestions you can offer will be greatly appreciated.

Yours truly,

OM ————

Dear Wishful OM,

You *do* have a problem. Or *do* you?

Let's see — you are an avid ham who thinks, lives and dreams amateur radio, and you simply can't understand why anyone, much less your wife, would decline to join you in the world's most fascinating hobby? Thus far your wife has preferred to be an adoring, dutiful spouse whose first concern is your comfort. Now you would like her to become a ham too. Are you braced for the possible consequences?

All too true experiences reveal that often when a wife becomes a ham, the husband loses his own identity and becomes recognizable only as Mr. (*insert wife's call here*). Coincidentally, said male often suffers other ego-deflating setbacks such as development of an acute inferiority complex resulting from the little woman's supremacy in the fields of QSL and certificate collecting, DX, etc.; forfeiture of rights to his own rig; sharp increase in the number of his household chores; and other complications too numerous to go into. Your very way of life may be recast. Still *think* you want your wife to get her ticket too? Okay, but never forget, you asked for it.

Here are some stock don'ts and dos which may or may not work for you. (Every wife is different, you know, praise be.)

Don't push too much or you'll be sure to push a hair too far, and that will be that.

Don't try to make her do anything she doesn't want to; she won't anyway so save your energy.

Don't throw at her all at once all of the radio theory you have picked up over the decades.

Don't read the *Handbook* to her word by word, or you'll be drying away tears of confusion pronto.

Don't hold other YLs as shining examples of accomplishment. Granted, some competition is stimulating, but this type has delicate implications and may boomerang.

Don't bark and wring your hands in despair when she forgets for the ninth time that $E=IR$.

Don't threaten divorce or beat her; the latter is probably against the laws of your state anyway.

Do develop your patience along the lines of Job. Gentleness, understanding, and encouragement are clues to winning any woman in any situation.

Do take things in short easy doses. Perhaps the kids and the neighbors' dogs have given her a hard time all day. Take her out to dinner first — homework will come easier after that.

Do put a time limit on practice and study sessions. Twenty minutes of intensive c.w. practice done faithfully each night will be more fruitful than a couple of hours of haphazard practice irregularly done.

Do gift her with a copy of that must guide-book for most expectant exam-takers, the *License Manual*. It will be something concrete for her to hang onto when she feels lost in the sea of theory.

Do keep your technical discourses simple, at first anyway. After she's licensed and has done some experimenting on her own, watch for a marked improvement in her comprehension of things technical. Then's the time to dig deeper for explanations.

Do send her to radio classes if any are available locally, again provided she's interested. Studying for a ham ticket is like learning how to drive in that one's husband may be the last person who should be the teacher — a total stranger may reap better results.

So, you followed our suggestions diligently and your fair spouse still isn't interested? Then why not give up grace fully, old boy, and count her other virtues. It could be too that someday she'll get her ticket all on her own, and won't you be surprised? 73.

Sincerely,

W1QON

P.S. It's Mrs. W., thank you, and the OM has taken to radio control of model planes and boats. No problem over whose turn it is at the rig now.

Some one hundred guests enjoyed the third annual Open House of the Chicago YLRL on June 2 at the club's rooms in Gomper's Park Field House. In the picture the unit's Vice President June Todd, K9CQF, is demonstrating two meter equipment of the club station, W9DEQ, to visiting OMs W9BWM, W9UZ; SCM W9YIX; ARRL communications manager W1BDI; and W9KLB. OMs W9UQT, ARRL Central Division Director; EC W9HPG, and W9KA were present and also spoke briefly. YLs who participated in the program were W9s BOC, CQF, GME, KFC, LKD, QV, QXI, RPC, SEZ, SJR, SSL, STR, UON, WZL, and YJC.

WAC-YL YL Firsts

The first YL to receive the Worked All Continents-YL certificate, issued by the YLRL, is VK3YL, Mrs. M. A. Henry of Murrumbeena, Victoria, Australia. Ten OMs preceded Mrs. Henry to the prized award.

With the receipt of award No. 12, multiple DX certificate-holder W6UHA, Maxine Willis, of Los Angeles, becomes the first W YL to make the grade.

Custodian of the WAC-YL, Opal Jones, W6PCA, brings the complete list of award holders up-to-date: No. 1 — W2QHH; 2 — ZL1BY; 3 — G4ZU; 4 — CE5AW; 5 — VK3CZ; 6 — JA1AA; 7 — G3DO; 8 — PY2OE; 9 — W8JIN; 10 — W6DLY; 11 — VK3YL; 12 — W6UHA; 13 — W7RT; and 14 — LU1CA.

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More OK YLs? — Gleaned from the English translation by W3AAZ of the editorial in the May, 1956 issue of the Czechoslovakian magazine, *Amaterske Radio:* "One of the more immediate problems to be discussed by delegates to the first convention of the Svazarm, a top organization of Czech hams and other related groups, to be held in Prague May 25th will be the question of how to recruit more YLs

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

or ham radio, and thus for the communications set-up of the Svazarm."

Perhaps the foregoing dont's and do's may aid the Svazarm in their recruiting program!

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From South Africa — Another quote from a periodical which we consider has real merit. As part of her editorial in *YL Beam*, April-May 1956 issue, published by the South African Women's Radio Club, Editress Marie Cormack, ZS6KK, has written:

"The exchange of lengthy recipes forms, if one has to judge by the reports in the newspapers, is the main topic of conversation between YL operators. Now although this may happen occasionally and there is nothing seriously wrong with it, I fail to see why this aspect is always highlighted in the newspaper articles.

YLs, don't, after all, discuss recipes only, and if publicity is to be given then why not enlarge on the other interesting and factual aspects of Amateur Radio — how exciting it is to contact people all over the world, how many true and lasting friendships are made, how interesting it is to hear about other lands, their way of life, and about everyday occurrences, the weather, the occupation of the operator at the other end, the different contests that are held, and the certificates which are offered for operating skill. Things like hams planning expeditions to remote islands to set up stations in order to give other hams a chance to establish contact with yet another country, the correlation of propagation conditions, and finally, the sterling assistance given by overseas hams to their local authorities in times of disaster, such as floods, hurricanes, etc. — *these* are the things which should be given prominence and which will increase the prestige and give the true picture of the activities of the Ham."

Marie has served us some of the proverbial good food for thought.

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The following item about the YLs who attended the 1955 Edison Radio Amateur Award Presentation dinner in February comes very late; nevertheless, we think it's still of interest.

W2JZX and W3s AKB, CDQ, MSU, and RKJ were the five YLs who were invited to attend the impressive ceremony honoring Robert Gunderson, W2JIO, for "his great service in opening the field of electronics to the blind as an occupation." Before the dinner, Under Secretary of State, Herbert Hoover, Jr., W6ZH/K6EH, specifically asked for Liz Zandonini, W3CDQ. The two chatted about days bygone and later during his formal speech, Mr. Hoover reminisced: "I remember that during those early tests I got permission to put up an antenna on the top of the old Bureau of Standards building out on Connecticut Avenue and to use their storage batteries to power a homemade rig. The signals from 3ZH (Liz' first call) were reported in Scotland along with many others to the complete amazement of the whole staff, including myself. Miss Zandonini, who is here, was out there with me at that time and it raised a lot of memories when I began to talk with her about it this evening."

The picture above is one of the happy outcomings of the Sixth Midwest YL Convention. With the North Star YL Club of Minnesota serving as the hostess club, this year's affair was held in St. Paul, Minnesota, May 25th and 26th. Chairman Lydia Johnson, WØKJZ, was assisted by WØs QXA, QXF, TQQ, UMK, and the rest of the members of the North Star Club. The two day program included a business luncheon, an address on TVI by Mr. George Anderson, FCC engineer, a tour of the Minn. Mining and Mfg. Co., and an entertainment program, with a skit on "Rare DX" by OM WØWET. That king-size replica of a hand-key (front and center in the photo) really works. Eva, WØUMK, created the two by three foot attention-getter from household odds and ends. An invitation to hold the 1957 convention at Flint, Michigan, was extended by W8ATB. Seated in the photo are, l. to r.: KØBTV, WØs UMK, QXF, IRJ, KJZ, MSW; KØBEA; WØQXA; W9s BCA and YWH. Standing: WØJMI; W9RUJ; W8ATB; W9AYX; WØQVQ; W9QXI; WØs PIK, IRD; W9s LDK, RTH; WØs IXR, KEN; KNØ???; WØs UAO, NZT; KN9CZQ; W9s UON IWP, and W8EIR.

You're looking at the largest group of YLs ever to get together in Oregon. The occasion was the annual convention of the Oregon Amateur Radio Association at Eugene, May 5th and 6th. Gathered for a business meeting, those in the photo are, seated left to right: W7s SBS, ZKY, WDC, UEL, QKU, HHH, ZLT, ENU, CPV, ITZ, SPC, CLV. Standing, W7s WTK, SPA, YHO, ZLS, GLK, FKS; K6CXZ; W7s QWX, VLC, RAX; WN7DIC; Lena Weston; W7s SBX and CLY. Six girls who eluded the photographer were W7s AFV, NJS, NTT, RIC, SJW, and WN7DLC.

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From W8QOM comes a special letter of praise for Esther, W8ATB, and her husband W8QBO. Anne relates how the Stuewes again gave selflessly of their time, energies, and radio facilities to the people of Flint, Michigan, when the city suffered a second tornado disaster this Spring. In 1953, following the first Flint tornado, the Stuewes assisted similarly, only in the newest disaster, they suffered considerable personal loss to their own house and garage. For more than 40 hours Ester and John worked without sleep to do what they could for the city radiowise. A job well done.

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Can you add any others to our list of YLs who are Registered Nurses? *W1s* TRE WPX; K2INQ; W5FBM; *W6s* OLP QYL; W7SBX, WN7DAT; W8UVV, and WN8VJO.

Happenings of the Month

ELECTION NOTICE

To All Full Members of the American Radio Relay League Residing in the Central, Hudson, New England, Northwestern, Roanoke, Rocky Mountain, Southwestern and West Gulf Divisions.

An election is about to be held in each of the above-mentioned divisions to choose both a director and a vice-director for the 1957–1958 term. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the Articles of Association and By-Laws will be mailed to any member upon request.

Nomination is by petition, which must reach the Headquarters by noon of September 20th. Nominating petitions are hereby solicited. Ten or more Full Members of the League residing in any one of the above-named divisions may join in nominating any eligible Full Member residing in that division as a candidate for director therefrom, or as a candidate for vice-director therefrom. No person may simultaneously be a candidate for both offices; if petitions are received naming the same candidate for both offices, his nomination will be deemed for director only and his nomination for vice-director will be void. Inasmuch as all the powers of the director are transferred to the vice-director in the event of the director's resignation or death or inability to perform his duties, it is of as great importance to name a candidate for vice-director as it is for director. The following form for nomination is suggested:

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

We, the undersigned Full Members of the ARRL residing in the.....Division, hereby nominate.....of..... as a candidate for director; and we also nominate..... ..... of ....., as a candidate for vice-director; from this division for the 1957-1958 term.

(Signatures and addresses)

The signers must be Full Members in good standing. The nominee must be a Full Member and the holder of an amateur license, and must have been a member of the League for a continuous term of at least four years at the time of his election. No person is eligible who is commercially engaged in the manufacture, sale or rental of radio apparatus capable of being used in radio communications, or is commercially engaged in the publication of radio literature intended in whole or in part for consumption by radio amateurs.

All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon EDST of the 20th day of September, 1956. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates both for director and for vice-director but members are urged to interest themselves equally in the two offices.

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

Voting by ballots mailed to each Full Member will take place between October 1st and November 20th, except that if on September 20th only one eligible candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are as follows: *Central:* Harry M. Matthews, W9UQT, and George E. Keith, W9QLZ. *Hudson:* George V. Cooke, jr., W2OBU, and Thomas J. Ryan, jr., W2NKD. *New England:* Philip S. Rand, W1DBM, and Clayton C. Gordon, W1HRC. *Northwestern:* R. Rex Roberts, W7CPY, and (no vice-director). *Roanoke:* P. Lanier Anderson, jr., W4MWH, and Theodore P. Mathewson, W4FJ. *Rocky Mountain:* Claude M. Maer, jr., WØIC, and Walter M. Reed, WØWRO. *Southwestern:* Walter R. Joos, W6EKM, and Robert E. Hopper, W6YXU. *West Gulf:* Robert E. Cowan, W5CF, and John F. Shelton, W5MA.

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

For the Board of Directors:

A. L. BUDLONG
Secretary

July 1, 1956

Strays

Several years ago, as part of its long-time and continuing policy for gaining suitable newspaper publicity for amateur radio, the Headquarters wrote a publicity manual for amateurs and included therein a number of sample press releases. This material is distributed to the League's 700-odd affiliated clubs, and reminders are sent out ahead of special events such as Field Day and the like.

Now, in order to avoid confusion, we had picked (we thought) a non-existent club name and some other individual and place names that seemed quite innocuous. Our sample (and supposedly fictitious) Field Day press release was built around a "Catalpa Amateur Radio Club" operating from "Bald Mountain" and with a secretary named "Smith." But look what happened this year! That press release caused considerable confusion in the Catalpa Amateur Radio Society (Michigan), because their president's name is Smith, and they had almost decided to operate from a hill known as (you guessed it!) Bald Mountain.

The World Above 50 Mc.

CONDUCTED BY EDWARD P. TILTON, W1HDQ

THE MAIN PURPOSE of a *QST* department like this one is to report the goings-on in the field the column serves. It should be your monthly newspaper, in effect. To perform this service effectively the conductor of the department must be in constant touch with the hams who are making the news.

But some fellows simply will not write letters. And the reliable range of v.h.f. communication being what it is, regular on-the-air activity doesn't give the reporter the coverage he needs, though it helps. If he is to be familiar enough with the v.h.f. picture in all parts of the country to report the news of the world above 50 Mc. with some degree of accuracy and geographical balance, he must travel around the country and meet v.h.f. men personally.

When this is being read your conductor will have just returned from several thousand miles of such travel that will have included the West Gulf Division Convention in Galveston, the National Convention in San Francisco, and dozens of stops along the way in the south and Southwest. A *QST* deadline will have passed somewhere about the middle of the jaunt, while W1HDQ was /5, 6 or 7.

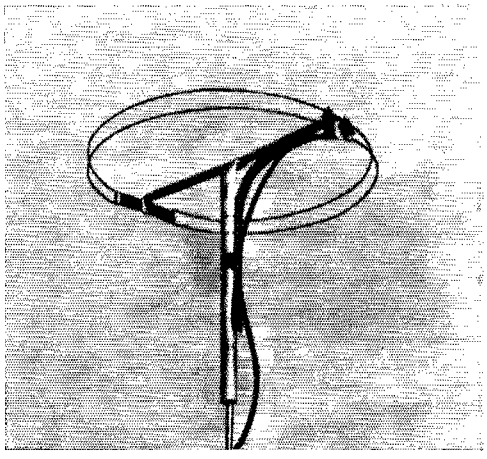
So, as we have done on a few occasions in the past, we've been saving up some interesting v.h.f. ideas that fellows have sent in over the past several months. This issue won't have dated news, but we hope that you will find it both interesting and useful. Our heartfelt thanks to the v.h.f. men whose brainchildren made it possible.

A 2-Meter Halo — W3SST

THOUGH cross-polarization is not nearly so bad in mobile work as we once thought it would be, it is only natural that a horizontal mobile antenna will be more effective than a vertical whip in working with horizontally-polarized fixed stations. A simple way to build a horizontal antenna for the car is to adapt the W1MUX "Halo" that has been described in *QST* and the *ARRL Antenna Book*. The original was intended for 50-Mc. use, but adaptation to 144 Mc., sent in by W3SST, Dover, Penna., is very simple.

The halo is a folded dipole, bent around into a circle, so that its ends nearly touch. The 6-meter version had capacitor plates at the ends of the dipole, to reduce its size to convenient car-top proportions, but this loading is not needed on 144 Mc. A folded dipole 39 inches long makes up into a circle of about 12 inches diameter. This can be mounted in a variety of ways.

The experimental model shown in the photograph was made of No. 14 copperweld wire. Its sides are about a half inch apart, and the ends 1½ inches apart. These ends can be fastened to a piece of insulating material about 1½ inches long. The center of the folded portion need not be insulated from the metal support, but the fed portion must be. The horizontal cross member is a piece of tubing about ¼ inch in diameter, flattened and bent over at the left end, as shown in the photograph, to bolt to the insulating material separating the ends of the dipole. The right end of the support is also flattened and wrapped around the top portion of the dipole. The fed ends are supported on two small insulating blocks, though a single piece would serve just as well.



A 2-meter halo by W3SST, Dover, Penna. It is shown here with its vertical support slipped over a broadcast whip. An advantage of this type of mounting is that it permits varying the height of the antenna above the car top.

The 2-meter halo can be fed with 300-ohm Twin-Lead, or through a coaxial balun. The latter is to be preferred, as it permits grounding the outer conductor of the coax at any point in its run to the mobile rig. The vertical support for the antenna can be mounted in any convenient fashion, the primary consideration being that it be somewhat above the highest point on the car. Here it is shown slipped over the car broadcast whip.

The pattern of the antenna, mounted in this position, is slightly oval, like a race course, with the long sides more or less parallel to the direction of travel. Some interesting effects can be

observed by raising and lowering the telescoping whip. Stations more than 100 miles distant have been heard on many occasions, in the hilly country of Eastern Pennsylvania. Early in the use of the halo, W3SST was surprised to hear the signal of W2GLV, Glassboro, N. J., at about this distance. He was even more surprised when he got an S7 report from Ernie over a hop of this kind.

W3SST acknowledges, with thanks, the assistance rendered by *W3s* QEM EDO and OCI in the testing of the 2-meter halo.

Two-Meter TVI Hints — W1VSE

There's always something new on the TVI front. You think you know all the answers — and then along comes a new model with some special TVI features built in. Such is one of the 1956 RCA receivers. It has a top-tuning setup that requires long leads to the volume control — and, of course, they would turn out to be almost exactly a quarter-wavelength long at 144 Mc.!

W1VSE, New Britain, Conn., ran into a hornet's nest with several of these receivers, the trouble being audio rectification. No picture interference, but W1VSE and any other 2-meter station within a half mile or so came in S9 on all channels. The manufacturer shielded the volume control leads, but the length being what it is the shielding is ineffective at 144 Mc. The solution was twofold.

First, the bracket on which the tuner and volume control are mounted should be bonded to the chassis with a strip of copper or aluminum about one inch wide. Then the shielded volume control leads should be tied together to the strap in at least three places.

Another suggestion that works with all forms of 2-meter TVI where the interfering signal comes in on the TV antenna: Insert traps in each side of the 300-ohm antenna lead. These may have to go right at the point where the lead enters the tuner, if the field around the TV set itself is strong. The traps are made of three turns of No. 18 wire, about ¼ inch diameter, tuned with a 3-30 $\mu\mu$f. trimmer. These can be tuned up at home by putting them on your own TV set and resonating the traps with a grid-dip meter.

No grid-dip meter? No TV set? You can still do it. Put them in the antenna lead to your 2-meter receiver and null out a strong signal near your regular frequency. If your converter uses coaxial input, use a balun to provide a balanced line in which to insert the traps for adjustment purposes.

Coaxial Antenna for 50-Mc. Mobile — W6OJF

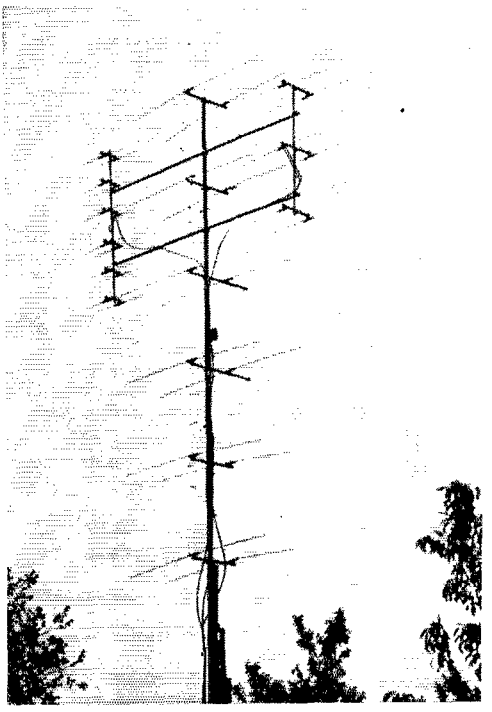
After experimenting with several types of mobile antennas, W6OJF settled on the coaxial described herewith as the best of the lot, at least where vertical polarization is in general use. It also works out well when the band is open, as is demonstrated by a contact with Argentina during the spring openings, made with a 6-meter Communicator.

The antenna is made from a Master Mobile job with an 80-meter loading coil in the center, using the portion above the coil for the radiator. This should be about 59 inches long for use near the low end of the band. The first step is to disconnect the coil winding from the screw that made contact to the upper portion of the whip. If the winding is taped firmly in place it can be reconnected at any time, and the antenna used for its intended purpose again.

The skirt of the coaxial antenna was made by slipping braided copper sleeving over RG-59/U coax, to a length of 59 inches. The top end of this sleeve is soldered to the outer conductor of the coax. Scotch electrical tape was then wrapped over the sleeve throughout its length.

The inner conductor should then be connected to the top section of the whip, using a soldering lug that can be inserted under the screw that was formerly connected to the coil winding. The taped-up skirt can then be taped to the bottom portion of the whip, and the whole works mounted in the same way as any whip normally used on lower bands.

As one can never be quite sure what the impedance of a car antenna will turn out to be, feed problems will be reduced if the coaxial line is held to some length that will be a multiple of a half wavelength. When the propagation factor of coax is taken into account, a half wavelength of line at 50 Mc. is about 77 inches long.



W8JLQ, Toledo, Ohio, is loaded for bear on three bands. The main support carries a 24-element collinear array for 144 Mc. At the left is a similar array for 432 Mc. Balancing it on the right is a 12-element job for 220 Mc.

Using the T-23/ARC-5 on 220 Mc.

Hundreds of ARC-5 rigs are in use on 144 Mc., a frequency where they work without modification. It's not much of an operation to convert one of the channels to 220 Mc., according to K2GNJ, Moonachie, N. J. Here's how:

He converts Channel D to 220 Mc. The oscillator plate coil is changed to 11 turns No. 24 enamel, 5/16 inch long. The 1625 tripler plate winding requires 5 turns No. 20 enamel, 3/8 inch long. The 832A tripler grid circuit has 7 turns No. 22 enamel, 3/8 inch long. Its plate circuit has 1¾ turns No. 20 enamel, 3/8 inch long. The final plate circuit requires 2½ turns of the original coil, 5/8 inch long.

Crystals between 8150 and 8200 kc. are used, providing operation between 220.05 and 221.4 Mc.

Shifting Frequency with Crystal Control

In v.h.f. work we've never worried much about QRM, but the way activity is growing on both 6 and 2 the days of the "private frequency" are at an end, for v.h.f. operators in populous areas. There's a lot of talk about going to v.f.o., and some action, but the results, especially on 144 Mc. and higher bands, are almost invariably awful to behold. Building a satisfactory v.f.o. for v.h.f. use is definitely not easy.

Actually, what we need is not the ability to swish across the whole band at will, but rather to be able to move the frequency slightly to avoid trouble when it does develop. This can be done with crystal control in innumerable ways. A variable-pressure crystal holder that you can rig up for some of your surplus crystals was described by W4RMU in February *QST*. A two-crystal trick that should be fine for v.h.f. work was shown by W6EI in the same issue.

Another idea that can be adapted to most crystal oscillators is to tune the crystal. W9KLR uses 4-Mc. crystals in his 2-meter rig. With a 30-$\mu\mu$f. variable across the crystal he can get 15- to 30-kc. frequency change at 144 Mc. with little or no effect on the over-all operation of the exciter. One of the old-style 1-inch square crystals shifts about 15 kc. An FT-243 surplus rock moves 30 kc.

Overtone crystals are more "rubbery" in their reaction to tuning capacitance. W3OJU uses a 50-Mc. overtone crystal, but operates it on its fundamental frequency, followed by multipliers. With a variable capacitance across the crystal he can pull the frequency a considerable amount at 50 Mc. The degree of frequency change varies from one crystal to another, but it is always more than enough to slide out from under a heterodyne.

W4IKK uses the flexibility of an overtone crystal to advantage in his converters for 6 and 2. An 11-$\mu\mu$f. variable across the crystal enables him to tune it so that the receiver frequency calibration works out precisely. Nice tip for one-dial receivers, especially.

Using the Viking II Modulator and Power Supply with Auxiliary Equipment — W9VZP

Possibly other Viking II owners would like to use their power supply and speech equipment to run transmitters for 6 or 2 meters. Here is how it was done at W9VZP. Modifications for remote control are also included. The basic idea is that the plate voltage is applied to both the Viking and the external transmitter r.f. section. You merely light the heaters in whichever unit you want to use at the moment. The meter on the Viking reads the same currents in the auxiliary rig, and all operating features apply on both r.f. sections. Keying in the Viking jack keys the oscillator of the external unit, so special keying arrangements may be desirable on the other rig if it is to be for v.h.f. use.

Remote Control Modifications

1) Remove transmitter from cabinet. Remove large filter capacitor and brackets.

2) Install 4-prong miniature socket on rear apron of chassis. Cut clearance hole for plug in back of cabinet. Connect Pin 1 to ground.

3) Install a 3-terminal tie-point strip on the chassis at a convenient point. Be sure it won't interfere with the filter capacitor when it is replaced.

4) There is a brown wire running to the tie-point near the v.f.o. socket. Run a wire from this terminal to the new tie strip, and connect a 4.7-μh. choke[1] from this point to Pin 2 of the socket. By-pass Pin 2 with a .005 disk ceramic.

5) Wind a choke of 15 turns No. 20 hookup wire, ¼-inch diameter. Connect another tie point to the back end of the line filter choke, and run the new choke from this tie point to Pin 3. By-pass Pin 3 with .005.

6) Locate orange-and-blue wire on tie point near v.f.o. coax connector. Wire this to remaining tie point and install choke and by-pass between this point and Pin 4, as in previous step.

Check the operation of the Viking with remote control. A d.p.s.t. switch or relay is used to close the circuit between Pin 1 and 2, completing the 6AU6 oscillator cathode circuit to ground, and Pins 3 and 4 to apply the a.c. to the plate transformer primary.

Power Takeoff for V.H.F. Transmitter

7). See previous instructions. Install octal socket on rear apron. Cut clearance hole in cabinet. Install tie points near socket for 5 connections.

8) Remove 4 green wires (2 on each socket) from 6AU6 and 6AQ5 sockets. Twist together and tape. Remove green wires from back end of filament choke on 6146 socket. Twist, solder and tape.

9) Install s.p.d.t. toggle switch on Viking front panel 2½ inches above bandswitch.

10) Run wire from center pole of toggle switch down through grommet above buffer capacitor to

(Continued on page 128)

[1] IRC Type CL-1

Correspondence From Members-

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

NEWCOMER TRENDS

55 South View St.
Waterbury, Conn.

Editor, *QST:*

The April "It Seems to Us" on "Newcomer Trends" sums up a situation which in part is one of your own making. How many articles in *QST* can the newcomer or Novice understand? Why not have a column in *QST* devoted to newcomers!

— *Peter J. Miller, W1AMJ*

96 Euclid Avenue
Hastings-on-Hudson, N. Y.

Editor, *QST:*

In my opinion, W2OLU (p. 78 June *QST*) and others are running their ham radio more as a business than as a hobby. His arguments seem pretty weak. As others have said, we seem to be developing our skill with the a.c. plug rather than with the soldering iron. The League does a fine job in trying to promote more home construction. What do you think is in *QST* and the *Handbook?*

— *Thomas Smith, K2JVX*

1519 Main St.
Lexington, Mo.

Editor, *QST:*

. . . Mr. Johnson says that the League has offered little in the way of halting the trend toward commercialization. Leafing through my latest *QST*, I can find little that looks like an equipment catalog.

— *Bob Ball, ex-WNØVNO*

Barcliff Ave.
Chatham, Mass.

Editor, *QST:*

I find my feelings much the same as yours regarding the trend to manufactured equipment.

When listening to the bands at times it seems as if the amateur bands are becoming citizen bands to a considerable extent.

However, I do think the League is partly responsible. For instance, how many transmitters have been designed by the League staff and published in *QST* in the last few years which are equivalent to some of the very popular commercial jobs? It almost appears intentional that the League has avoided designs in competition with the manufacturers. The units described in *QST* never seem to have all the features available in commercial equipment.

I also note that in your description of "Recent Equipment" you seldom publish a complete circuit diagram. Is this done to discourage us from copying some of the manufacturers new ideas?

Let's not blame it all on the manufacturers and newcomers.

— *William C. Ryder, W1JNM*

Adams State College
Alamosa, Colorado

Editor, *QST:*

Help! Am I going to have to turn in my license because I am not a radio engineer? What's with these radio amateurs who look down their noses at those who use commercial gear? They say, "Whatever else it is, it is not amateur radio." Whose definition of "amateur radio" are they using? Does FCC think I'm not legal? . . .

. . . Maybe we should be reminded that we do not all enter the field of amateur radio in our early teens and we do not all have several decades to spend on radio theory; we are not all radio engineers by temperament but that does not mean we cannot make a very solid contribution to the cause of amateur radio through willingness to accept responsibility in the ARRL field organization and through operating in the public interest. In other words — "PICON!!" Remember?

— *Irene H. Craft, WØKQD*

THEY LIKE HIM

2314 Lake Shore Blvd.
Jacksonville, Florida

Editor, *QST:*

While reading your April article, "A Radical Approach to VFO Design," I found that any stupid imbecile in the least interested in radio could, at the first glance, see that it was a good article written for the enjoyment of amateurs. When I saw the letter written by K6WVH, I nearly blew the roof off of the house. I am a relatively new amateur, having had my ticket for less than a year, and I can find absolutely no fault in this article. . . .

— *Stan Cooper, KN4DRD*

610 Long Road
Pittsburgh 35, Pa.

Editor, *QST:*

. . . In days gone by, a much lighter vein prevailed in the pages of *QST*. It was a lot more plain fun to read it and the technical articles were just as good (but not as elegant) as they are now. And in those days you built almost all of it. I would recommend the Proceedings of the IRE to those who want their publications all dead serious. . . .

But for the kids of the Southern Countries Radio Club — they are in more of a bad way than they know. They don't even realize that the boys that grind out this mag every month were giving them credit for enough intelligence to know what they are reading. If they had read some of the articles by The Old Man they would pass a resolution condemning the whole bunch at HQ because they couldn't run right out and lay their hands on a Wouff-Hong. If they can't do anything else, they should get somebody to explain Rapp's articles to them — it's first rate humor. At any rate, if I were a bona fide member of that bunch, the last thing in the world I would do is to let the world know what kind of shape we were in . . .

— *J. D. Wells, W3EKA*

IT'S STILL ROUGH

19 Abeling St.
Canajoharie, N. Y.

Editor, *QST:*

On page 79 of June *QST* a statement in the "Long Winded CQs" paragraph caught my eye and intrigued me.

As a teacher of secondary mathematics my viewpoint differs somewhat from others during a discussion of topics pertaining to mathematics.

In this article is found the sentence: *Imagine 100,000 Ws calling CQ DX with only 20,000 DX stations to answer them!* Mathematically this means that there are a total of 100,000 trials going on with but 20,000 events that can be successful. The *probability* of being successful is ⅕ and the *probability* of failure is ⅘. It seems that the term *probability* gets mixed up quite often with the term *odds!* The odds in this case are 1 to 4 *for a success* but since the DX contact is treasured we would commonly state it in reverse, the *odds* are 4 to 1 against a success (*for a failure*)!

You can see why this article caught my eye. It states that the *odds* are 5 to 1 against getting an answer.

I am sure that this information will not change the price of butter in Chicago but, as I have said, such things intrigue me.

— *Arthur H. Pedley, W2ZZG*

Results—Armed Forces Day 1956

Receiving Competition

ONE hundred and ninety-one contestants have been mailed certificates of merit signed by the Honorable Charles E. Wilson, Secretary of Defense, in recognition of making perfect copy of the special Armed Forces Day message to radio amateurs. A total of two hundred and twenty-four individuals participated in this phase of the special activities conducted by the Army, Navy and Air Force. The message was transmitted at 25 w.p.m. by military stations at 1900 EST on May 19, 1956.

Voice, single sideband and military-to-amateur radioteletypewriter contacts were introduced for the first time during this year's Armed Forces Day activities. The large increase of contacts made with amateurs indicate that the new features were very successful. Certificate winners of the c.w. message are as follows:

W1s AIJ BB BDI FZ HXI KGH LQD QMB URM WPR XGV ZR, **WN1KFX, W2s** ALD ALZ AQE CIP COG CPA CVN EER EQD FSN GEX GVO GWG GWW HGY ICU JCA KAT KGB KTF LYH MZB PF PKG SAV SSC TUK VEH WH WVC LRW NWI, **W3s** ADE BKZ CSW ECP FYZ JPW NRC OZV QLZ UIF VZJ WG WKH WZL ZJ, **W4s** ASV AWK BCT BJA DBC DYI ESG OMG URF ZPR ZTF, **W5s** CPE HBZ JET JPC LFE NDV RKS, **W6s** ASH BHG CFC CLB CUF DTY DU DUD DYX FP FYW FZC GK GYK HJK IAL JHT KTT MCY NAA NAZ OES OGS RYR SBB WPI YDK ZLE, **W7s** FIX FZB HRM JFU KQX LT MCU, **W8s** BID FFK FLA GVI KNX QLJ **W9s** AKP CXY HTO MMO UBW, **W0s** ARO ECE KXL TDH TKX.

R. B. Abels, R. L. Allen, F. O. Archer, J. E. Beaton, J. L. Becknell, W. J. Beetham, A. Betos, J. J. Bodin, J. F. Bremer, M. H. Caldwell, C. W. Cerwick, B. I. Cohen, V. K. Combs, C. P. Cook, A. Cruz Uribe, F. L. Culp, J. F. Duran, F. A. Dzieciolowski, R. C. Emerson, W. L. Fletcher, F. Floresch, C. C. Force, J. A. Gewin, K. Gray, S. G. Harper, W. F. Henderson, M. K. Hodo, J. R. Hofman, U. F. Huntsman, R. B. Jacobs, P. L. Keruella, G. T. King, J. L. Lambert, S. Liner, J. R. Manion, B. J. Michel, E. S. Moses, R. W. Neto, J. J. Newman, F. J. Newson, B. Panek, R. L. Rather Jr., N. W. Reece, W. R. Rerryman, J. J. Rielly, R. D. Schmidt, J. J. Sheeran, F. W. Stagg, W. F. Steadman, B. Steele, R. E. Thomas, D. C. Timmons, H. T. Tomm-Orr, O. H. Trowbridge, M. Vittum, J. W. Vollrath, R. J. Vontell, J. J. Ware, B. Weeks, J. L. Weeks, R. J. Yellen.

Military-to-Amateur Contacts

Operating on military frequencies, AIR, NSS and WAR worked amateurs in the 80-, 40- and 20-meter bands using c.w., a.m., s.s.b. and RATT. The three military stations made a total of eight hundred and eighty-six QSOs with amateur stations during the six hour test. Special Armed Forces Day QSL cards have been mailed to all stations worked by AIR, NSS and WAR.

Radioteletypewriter Receiving Competition

The radioteletypewriter receiving competition featured a joint message from the Chief Signal Officer, U. S. Army Director, Naval Communications and the Director of Communications, U. S. Air Force. A total of one hundred and fifty-eight entries were received with one hundred and four of these making perfect copy. A letter of

(Continued on page 134)

Text of Armed Forces Day Message From The Secretary Of Defense

Observance of Armed Forces Day emphasizes the basic principle that our national security and freedom depend upon power derived from American teamwork and unity. Public demonstrations and displays in hundreds of communities give evidence of the close working relationship and technological progress achieved by all components of our Armed Forces.

Radio amateurs through their productive efforts in the fields of auxiliary emergency communications, research and development, affiliation with Armed Forces training programs, and furtherance of international understanding, have made tangible contributions to the spirit of unity and preparedness which expands our resources for peace.

As Secretary of Defense I am pleased to acknowledge the accomplishments of radio amateurs working together throughout the free world, and to welcome your participation in Armed Forces Day Activities.

C. E. WILSON
Secretary of Defense

Radioteletype Message to All Amateurs

On the occasion of this Armed Forces Day, the communications services of the Army, Navy and Air Force extend congratulations to Amateur Radio Operators for the excellent progress in radioteletype communications. This operational proficiency has provided an especially effective public service during emergencies such as hurricanes, floods, blizzards, and so on. The military services wish to express due compliment to your achievements and will give every possible support to this and other amateur radio operations.

GORDON A. BLAKE
Major General, USAF
Director of Communications-Electronics
J. D. O'CONNELL
Major General, USA
Chief Signal Officer
H. C. BRUTON
Rear Admiral, USN
Director of Naval Communications

Hints and Kinks For the Experimenter

GANGING MULTISECTION CONDENSERS

MANY devices requiring a variable capacitor of four or more sections are not built, or are functioning unsatisfactorily, because of the difficulty of ganging multisection variable capacitors of modern design. The rear capacitor bearing, usually a single ball, and the lack of a rear shaft extension, are not well suited for coupling to the shaft of another capacitor.

By removing the vertical rear section of the capacitor frame, the rear shaft is exposed, so that it can be coupled to the front shaft of another capacitor. This usually does not work very well, as "radio" couplings are not true enough, and chassis warp makes alignment difficult and impermanent.

These problems can be eliminated by mounting the capacitors to be ganged on a stiff subbase, such as a piece of 3/32-inch steel; and by using a machine-type shaft coupling (such as those made by Boston Gear Works) in place of the "radio" type coupling. With this arrangement, chassis warpage is eliminated as a cause of misalignment, and the coupling, being precision machined, runs true.

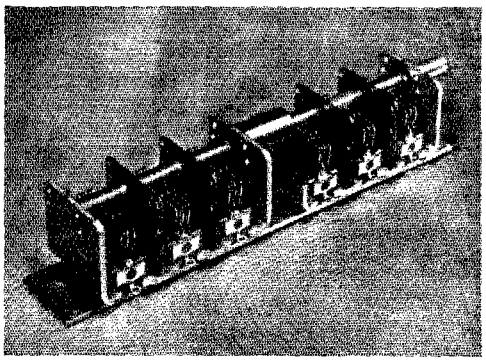


Fig. 1 — Satisfactory ganging of two three-section capacitors by use of precision shaft coupling and rigid subbase.

An example of this type of ganging is shown in Fig. 1, the capacitors used being two three-gang Miller F-M tuning capacitors.

— *Ronald L. Ives*

DEMAGNETIZING TOOLS

SCREWDRIVERS and other small tools which have accidentally become magnetized may be made to lose this undesirable property with the aid of soldering gun. After the trigger of the gun has been pulled to the on position, pass the tool to be demagnetized through the "hairpin"-shaped tip. One or two passes through the strong magnetic field that surrounds the tip will usually free the tool of bad habits such as clinging to iron filings, picking up steel wool, screws, etc.

— *Leslie E. Downs, WØYSZ*

RELAY-CONTROLLED SEND-RECEIVE CIRCUIT

THE CIRCUIT shown in Fig. 2 was built into a small control box for use with a type BC-458-A transmitter. However, it may be used with any transmitter that uses a separate power supply for the oscillator.

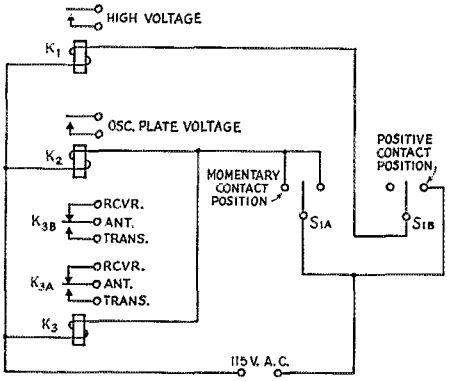


Fig. 2 — WØYVA's send-receive circuit. K_1, K_2 and K_3 are 115-volt a.c. relays. S_1 is shown in the "receive" or neutral position.

In the arrangement, K_1 and K_2 are normally-open s.p.s.t. relays. K_3 is a normally-open d.p.d.t. antenna changeover relay. S_1 is a d.p.d.t. switch having a center-off position in addition to the momentary- and positive-contact positions. Of course, if this particular type of switch is unavailable, any d.p.d.t. switch having a neutral position will do the trick.

The circuit functions as follows: With S_1 in the "receive" or center position, all relays remain open and the contacts of K_3 connect the antenna to the receiver. For zero-beating or other adjustments involving only the oscillator section of the transmitter, S_1 is thrown to the momentary-contact position. This causes K_2 to apply plate voltage to the oscillator and K_3 to disconnect the antenna from the receiver. In the "transmit" or positive-contact position, S_1 feeds 115 volts a.c. to all three relays, thereby activating the entire transmitter.

— *Bob Miller, WØYVA*

CENTER INSULATOR FOR FOLDED-DIPOLE ANTENNA

A SIMPLE and rugged center insulator for folded dipole antennas is shown in Fig. 3. The Mosley type 263S connectors are intended for coupling feedlines to TV antennas, but they beat

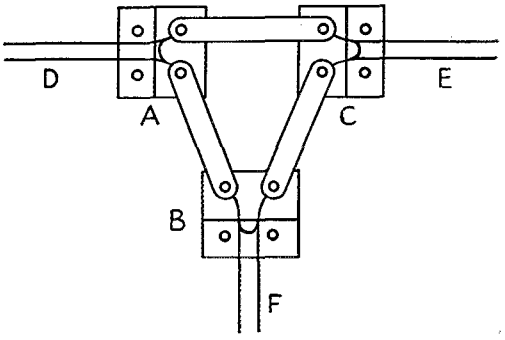


Fig. 3 — Drawing of the center insulator described by W1CSP. A, B and C are Mosley type 263S connectors. D, E and F are radiator and feedline elements made with 300-ohm Twin-Lead.

egg insulators by a mile when used at the center of a ham-band folded dipole. One big advantage of the system is that each Twin-Lead member of the antenna is firmly clamped ahead of the point where the electrical connection is made. This relieves the stain and prevents snapping at the soldered junctions.

If high power is used, it may be advisable to solder the Twin-Lead to the metal bars. If soldering is not deemed essential, the ends of the conductors may be clamped under the screw-type terminals provided for the purpose.

The small amount of "fanning" caused at the junction of feedline and antenna does not appear to create an impedance problem. My antenna checks out with an s.w.r. of 1.2 to 1. And, best of all, it has stayed up under weather conditions which no other methods of construction — at least, those tried here at W1CSP — have been able to take.

— *Norman Sheingold, W1CSP*

"QUIK-DIP" CRYSTAL CLEANING

IN THE PROCESS of building a c.w. receiver using surplus crystals in Type FT 241 holders, the crystals were checked for oscillating activity in the Pierce circuit. I reasoned that a crystal that would oscillate would serve in the lattice filters. Several, however, did not oscillate. When these were opened, all showed heavy tarnish on the silver plate. These were dipped, as assembled, into "Quik-Dip" (a liquid silverware cleaner) for several seconds, rinsed under running water, and then *very* carefully, so as not to break the fine wires, swabbed to remove the black loosened deposit. Of 8 inactive crystals dipped, 6 were reactivated by this method. Some silver is no doubt removed, so it is best to dunk them no longer than necessary; I used 7 to 12 seconds.

The average frequency of the batch of 6 was measured 330 cycles higher than the average frequency of 7 that were not dipped. "Quik-Dip" is a drugstore item as is the "Q-Tip" medicinal cotton swabs used.

— *W. A. Monahan, W6GTR*

"MAGIC EYE" TUNING INDICATOR

OCCASIONALLY the need arises for a really low-cost transmitter, one such as might be built and paid for by an individual and then left to sit at the local civil defense station. Here is a suggestion that will help cut the cost. The author makes no claim of originality of the idea because it has been used in both amateur and commercial designs.

The idea is that of using an inexpensive "magic eye" tube as the tuning indicator for the output stage of the transmitter. If you can not *steal* a type 6E5 from an old broadcast receiver, a new one won't cost much more than a dollar. Properly installed, this simple indicator will serve the purpose just as well as its more expensive counterpart, the customary plate milliammeter.

A typical installation is shown in Fig. 4. In this case, the power-amplifier tube is a type 2E26

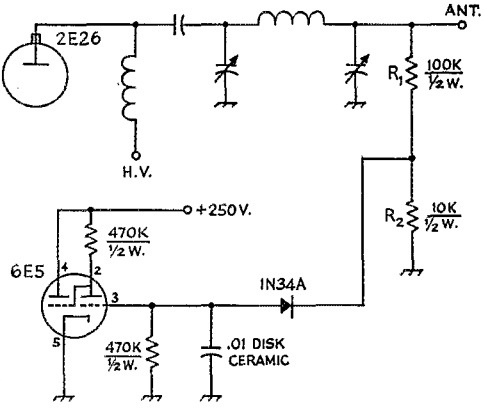


Fig. 4 — Circuit of the "magic eye" tuning indicator as connected to W9KLJ's transmitter. Components without values are parts of the power-amplifier output circuit.

running at 16 watts input. For other values of power input, the resistance of R_2 can be altered from that shown. Indicator tubes other than the type 6E5 will require appropriate changes in both R_1 and R_2.

— *John W. Wilder, W9KLJ*

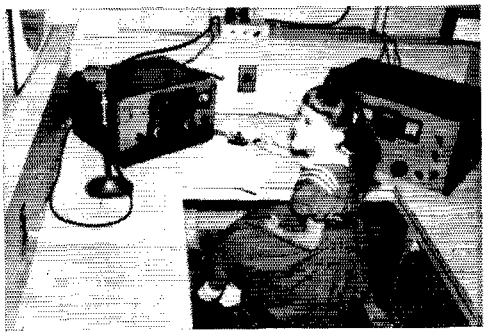
COIL WINDING HINT

THE SPACING between turns of homemade solenoid-type inductors can frequently be controlled by using ordinary sewing thread as a spacer. Naturally, the diameter of the thread should be equal to the desired spacing between turns. Usually, thread suitable for the purpose can be found either in the XYL's sewing cabinet or at the local dime store.

(Continued on page 134)

Strays

Our guess is that the youngest of the "Young Ladies" of amateur radio is Miss Leslie Brown, KN6RJI, who took her exam the day before her 6th birthday. Dad is W6EQH, Mom is KN6QWN



KN6RJI

and her 12-year-old brother is KN6QWE. There's a sister who sticks to the piano keys, leaving telegraph keys for the rest of the family. Here Leslie operates K6CXI, at Hamilton High School, where Dad teaches electronics.

—•••—

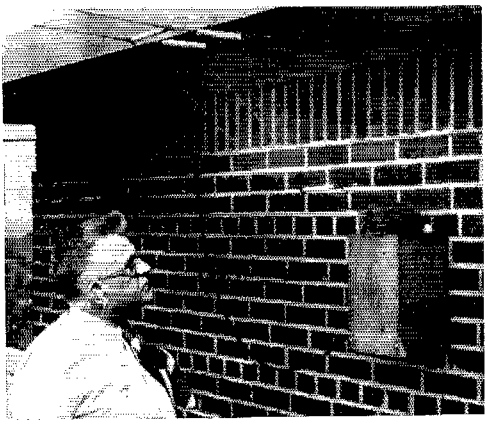
Overheard at the recent Field Day site of the Bedford (Mass.) Radio Club. The lady visitor said, "My, these amateurs seem to be having a lot of fun! If the men are called hams, do they call the lady amateurs 'sows'?" — *W1QJB.*

—•••—

Speaking of calls, KN6JMP was issued to John M. Porter, while Jim Rourke received GI3JIM.

—•••—

The K4HEZ family is now fully equipped with A.C. D.C., following their recent birth announcement of a daughter named Adrienne Claire Don Carlos.



Is 75 meters for the birds? At W8CVQ this seems to be a fact. Here we see OM Marburger inspecting a family of robins nesting on his antenna matcher, with no ill effects noted to either birds or signal.

For those amateur wireless operators who are interested in getting QSLs from foreign stations (aren't we all?) the International Reply Postcard is of interest. First of all, don't confuse this item with the International Reply Coupon. The International Reply Postcard is a complete two-way exchange in itself, and all the DX station has to do is mark down the QSO details, sign his name, drop the card in the mail box, and there you are. The I. R. Postcard is much simpler than the I. R. Coupon because it is not necessary for the DX station to make a trip to his post office to obtain the equivalent in postage of his own country's issue. It will be less expensive, too.

These International Reply Postcards are two cards in one, folded just like the business reply card that is so common here in the States. By international agreement, the stamps of the country of origin are good at the office addressed for return to the sender.

Here's how you use them. On one half, write your message to the DX station and on the other side of that half carrying your message put down the address of the overseas station. On one side of the other half of the card, put your *own* name and address and leave the reverse side of that blank for use by the DX station. Then, on both halves of the card, affix either 4¢ postage for surface mail or an appropriate amount for airmail. Do *not* staple or tape the open sides of the cards together. Away it goes.

The man on the receiving end of the card merely crosses out his own name and address, gives QSO details on the blank side, signs his name, reverses the fold (don't tear off the other half), and drops it back in the mail.

These International Reply Postcards are available at any post office. If not in stock, your postmaster can order them for you.

Our thanks to M. S. Brainard of Brookings, Ore., for calling these to our attention.

Silent Keys

IT IS with deep regret that we record the passing of these amateurs:

W1LYR, Hazel I. Kempton, Presque Isle, Maine
K2DS/CN8DS, Col. Casper R. Offringa, U.S.A.F., Ridgewood, N. J.
W2FBG, Edward T. Curry, Plainfield, N. J.
W4GTH, Calvin H. Burkhead, Southern Pines, N. C.
W4HHB, James P. Baker, Whites Creek, Tenn.
W5FSW, Robert W. Beaty, Oklahoma City, Okla.
W6JCR, Sterling Gardner, Oakland, Calif.
W7FAG, Roy L. Weeman, Missoula, Mont.
W7IWO, James E. Wetrich, Tacoma, Wash.
W8ZKV, Lauri A. Keranen, Chassell, Mich.
W9DIJ, Oliver E. Zander, Milwaukee, Wis.
W9LXJ, James L. Dare, Marion, Ill.
W9QLY, Frank Maruna, Berwyn, Ill.

(No. 19 of a Series)

Good Things To Come

EVERY AMATEUR is familiar with the heterodyne principle by which two frequencies are combined in a nonlinear impedance, usually a vacuum tube, to produce a third frequency. The most common example is the superheterodyne receiver where the incoming r.f. signal combines in the first detector with the output of a local oscillator to produce a third signal at the frequency of the i.f. amplifier. The same principle applies in a.m. transmitters where the carrier and the audio modulation combine in the Class C stage to produce sidebands. In s.s.b. transmitters, as frequency multipliers cannot be used to go to higher output frequencies, heterodyning must also be employed.

WHAT MANY of us fail to remember is that whenever we combine two frequencies, or heterodyne, we do not get just the desired third frequency in the output of the nonlinear impedance; we actually get the two original frequencies, the sum of the originals, the difference of the originals, and the sums and differences of all these resultant frequencies and their harmonics combined in almost infinite variety. Normally these unwanted frequencies are all suppressed in tuned circuits following the mixer stage but sometimes they can be a real problem.

IN AN ORDINARY superheterodyne, the local oscillator is arranged to track 455 kc. above or below the incoming signal in order to produce the i.f. signal. It is evident that another incoming signal on the opposite side of the local oscillator and only 910 kc. from the desired signal will also come through. On the higher bands, especially ten meters, top quality receivers have long used two r.f. amplifier stages in front of the first detector to minimize this image. Of recent years a better method has come into use, namely double conversion which employs a high 1st i.f. to place the image at least 3 Mc. away from the desired signal and a low 2nd i.f. with high Q for maximum selectivity. A modern receiver such as the SX-100 does not depend entirely on front end selectivity for image rejection — with double conversion the images are not just minimized, they are practically gone.

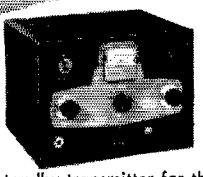
IN SSB transmitters the problem is even more serious. The best way to eliminate the unwanted sideband is by means of a highly selective filter network. Up to the present such networks were not commercially practical above 500 kc. It has been necessary, therefore, to heterodyne the low frequency s.s.b. signal at least twice to reach the desired amateur band. This process introduces images just as in a receiver but in this case the images appear as additional signals one Mc. or less from the desired signal and almost always outside of an amateur band unless a number of tuned circuits are provided to suppress them.

HALLICRAFTERS' laboratory has been working on this problem for over three years and we are happy to say that success has been achieved. The new Hallicrafters bridged Tee crystal network can be operated successfully to 10 Mc. instead of 500 kc. Using several crystals of the same characteristics it remains extremely stable in operation, provides a degree of sideband suppression not before possible, and because of its higher frequency, eliminates the need for a multiplicity of tuned circuits.

— CY READ, W9AA

Bill Hallgan Jr. W. J. Hallgan W9AC for hallicrafters

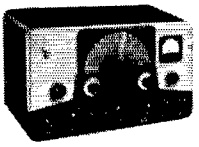
PICK YOUR POWER ...CHOOSE YOUR FEATURES



50 watts CW input . . . bandswitching 80 through 10 meters!

VIKING "ADVENTURER" — An ideal CW transmitter for the beginning amateur . . . the perfect standby transmitter for the experienced amateur. Effectively TVI suppressed . . . built-in power supply. Professional in appearance and design — easy to assemble and operate! Packs enough power for world-wide contacts. Wide range pi-network output tuning — no antenna tuner needed. Kit is furnished complete with tubes, cabinet, wiring instructions and antenna suggestions, less crystal and key.

Cat. No. 240-181-1 Kit.....**$54.95** Amateur Net

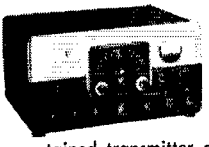


75 watts CW input . . . 65 watts phone! Bandswitching 160 through 10 meters!

VIKING "RANGER"—Effectively TVI suppressed . . . completely self-contained. Serves as a transmitter or an RF and audio exciter for high power equipment. Extremely stable built-in VFO or crystal control — 100% AM modulation — high gain audio. Pi-network antenna matching from 50 to 500 ohms. Timed sequence, break-in keying. No internal changes required to switch from transmitter to exciter operation. Complete with tubes, less crystals, key and mike.

Cat. No. 240-161 Kit.....**$214.50** Amateur Net

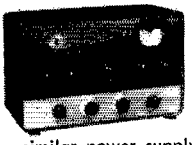
Cat. No. 240-161-2 Wired, tested **$293.00** Amateur Net



90 watts CW and SSB (P.E.P.) 35 watts AM! Bandswitching 80 through 10 meters!

VIKING "PACEMAKER" — More than just a single sideband exciter . . . a completely self-contained transmitter as well. Extremely stable, temperature compensated built-in VFO. "Fool-proof" voice controlled operation — effectively TVI suppressed — completely self-contained. Pi-network antenna matching from 50 to 600 ohms . . . plenty of power to drive conventional or grounded grid kilowatt power amplifiers. With tubes and crystals, less key and mike.

Cat. No. 240-301-2 Wired, tested **$495.00** Amateur Net



150 watts CW input . . . 100 watts AM! For 6 and 2 meters!

VIKING "6N2" — New for VHF! Designed for use with the Viking "Ranger," Viking I, Viking II or similar power supply/modulator combinations capable of at least 6.3 VAC at 3.5 amp., 300 VDC at 70 ma., 300 to 750 VDC at 200 ma. and 30 or more watts audio. Operates by external VFO (with 8-9 mc output) or built-in crystal control. All circuits metered. Complete with tubes, less crystals, key and mike.

Cat. No. 240-101 Kit.....**$99.50** Amateur Net

Cat. No. 240-101-2 Wired, tested **$129.50** Amateur Net

(Prices subject to revision at time of delivery)

For more effective AM power!

JOHNSON AUDIO AMPLIFIER — A self-contained 10-watt speech amplifier complete with power supply. Speech clipping and filtering designed to raise average modulated carrier level . . . improves the performance and effectiveness of your AM transmitter. Inputs provided for mike or line. Complete with tubes.

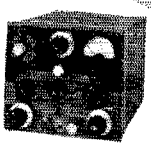
Cat. No. 250-33 Kit.....**$73.50** Amateur Net

Cat. No. 250-33-2 Wired, tested..**$99.50** Amateur Net

See your distributor

Johnson Amateur Equipment is sold only through Authorized Johnson Distributors — most offer convenient time payment plans. For complete information see your distributor.

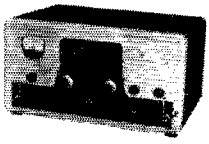
from the complete Johnson transmitting line!



60 watts maximum PA input! Bandswitching 75 through 10 meters!

VIKING "MOBILE" — Designed for under-dash mounting — all controls readily accessible to operator. Coupling system engineered for maximum power transfer — all stages ganged to a single tuning knob. 3 separate ganged coupling links provide maximum power transfer to the antenna. Unit may be wired for either 6 or 12 volts — requires power supply delivering 300 volts (30 watts PA input) to 600 volts (60 watts PA input) at 200 ma.

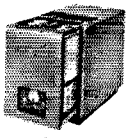
Cat. No. 240-141 . . . **$99.50** Amateur Net



275 watts CW and SSB* . . . 200 watts phone! Bandswitching 160 through 10 meters!

VIKING "VALIANT" — Designed for outstanding flexibility and performance. Built-in VFO or crystal control. Pi-network antenna matching from 50 to 600 ohms — final tank coil is silver-plated. Timed sequence, break-in keying — TVI suppressed — high gain push-to-talk audio system — low level audio clipping — built-in low pass audio filter. As an exciter, will drive any of the popular kilowatt level tubes. Complete with tubes, less crystals, key and mike.

Cat. No. 240-104 Kit . . . . . **$349.50** Amateur Net
Cat. No. 240-104-2 Wired, tested **$439.50** Amateur Net
*P.E.P. input with auxiliary SSB exciter.



1,000 watts AM, CW and SSB!

VIKING "KILOWATT" — Boldly styled — contains every conceivable feature for safety, operating convenience, and peak performance. Low power or maximum legal input with the flip of a switch. Continuous tuning 3.5 to 30 mc — no coil change necessary. Compact pedestal contains complete kilowatt — rolls out for adjustment and maintenance. Excitation requirements: 30 watts RF and 15 watts audio for AM; 2-3 watts peak for SSB. Completely wired and tested with tubes.

Cat. No. 240-1000 "Kilowatt" . . **$1595.00** Amateur Net
Cat. No. 240-101-1 Matching accessory desk top and 3 drawer pedestal, FOB Cory, Pa. **$123.50**

600 watts CW . . . 500 watts AM and SSB* Bandswitching 80 through 10 meters!

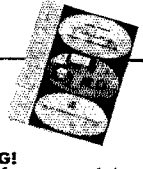
VIKING "FIVE HUNDRED" — A complete 500 watt transmitter . . . VFO and all exciter stages ganged-tuned! Two compact units: RF unit is small enough to place on your operating desk beside your receiver . . . power supply/modulator unit is compact enough to be placed in any convenient location. Built-in VFO or crystal control — effectively TVI suppressed — high gain push-to-talk audio — timed sequence, break-in keying — low level audio clipping. Complete with tubes, less crystals, key, and mike.

Cat. No. 240-500 Kit . . . . . **$649.50** Amateur Net
Cat. No. 240-500-2 Wired, tested **$799.50** Amateur Net
*P.E.P. input with auxiliary SSB exciter
(Prices subject to revision at time of delivery)

E. F. Johnson Company

2835 SECOND AVENUE SOUTHWEST • WASECA, MINNESOTA

Capacitors • Inductors • Knobs • Dials • Sockets • Insulators • Plugs • Jacks • Pilot Lights



FREE CATALOG!
Write for your free copy of Amateur Catalog 956, covering the complete Johnson Amateur Equipment line.

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
GEORGE HART, W1NJM, Natl. Emerg. Coordinator
PHIL SIMMONS, W1ZDP, Asst. Comm. Mgr., C.W.
ROBERT L. WHITE, W1WPO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ELLEN WHITE, W1YYM, Asst. Comm. Mgr., Phone

Hidden Transmitter Hunting. Transmitter hunting tournaments have long been a popular and engrossing radio club activity. We'll gladly dig out a copy of the early '56 club bulletin with details for any club new to this pastime that would like to get in the swim. *HARC News* (Houston, Texas) reports that transmitter hunting has been a regular twice-a-month feature ever since the ARRL National Convention there in '53. Hunts really started in Houston back in the days when the six-meter band was known as five meters. "Hunts are well attended by both OMs and XYLs and even YLs. The gals make excellent navigators, being accustomed to telling the OM where to go. They make up in enthusiasm and instinct what they lack in experience and theoretical background. The occasions are always highlighted by refreshments and picnics."

Should You Get a Cooperative Notice. The Official Observer mission is to render a friendly service to brother amateurs. Should you receive a cooperative notice from an OO for some violation, off-frequency harmonic or other, don't ever take it in other than the spirit in which the system is set up. Remember, the Observer is going to quite a lot of trouble just to help you in particular, and ham radio in general, to keep our service reputation good, and especially to make it unnecessary for FCC to have to take disciplinary measures or enter complaints against *you*. Especially serious in recent months has been the large number of off-frequency harmonic-radiation reports.

Many Novices, either through lack of know-how or extreme carelessness in tune-up, leaving a 3.7 Mc. crystal in the transmitter, have resonated the output tank so that it doubles or triples. The correct dip must be used; checking output frequency with an absorption wave meter or grid-dip meter is important. Use of an antenna coupler, arrangement of antenna system to tune to just *one* proper band, elimination of pi-output networks that emphasize harmonics are remedies some have adopted. To make sure you are not radiating a harmonic, check with the ham across town who has a general coverage receiver. Log the point of correct dip. Take these proper precautions to protect your own interests and those of all amateurs.

Descriptive Bulletin Names. Besides worthy "newsletters" and plain bulletins this is just a look at special club bulletin names. Our list shows the high degree to which the spirit of operating amateur radio and communications technique shines through the names of so many of the club bulletins. Current bulletin receipts only are represented, so this isn't by any means a complete listing.

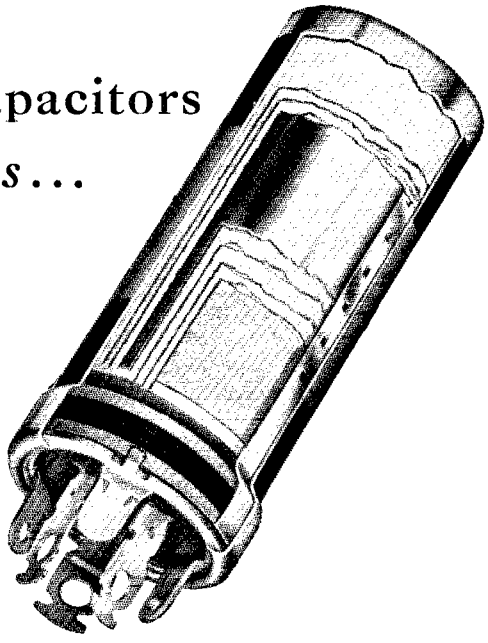
Bulletin Name	*Club*
Equipment:	
Spark-Gap	St. Petersburg Amateur Radio Club
Gridleaks	Jamaica (*N. Y.*) Amateur *UHF* Club
JARS Beam	Jacksonville Amateur Radio Society
The Oscillator	Hartford County Amateur Radio Assn.
The Oscillator	The Tri Town Radio Amateur's Club, Inc.
Metro Modulator	Metro (Ont.) Amateur Radio Club
Carascope	Columbus Amateur Radio Assn.
Omnigraph	Fayette County Radio Club
Operating Abbreviations:	
QTC	Wyoming Valley Amateur Radio Club
QTX	Blossomland (Mich.) Amateur Radio Assn.
QRM	TCARA (*Pomona, Cal.*)
QRM	Kanawha (W. Va.) Radio Club
Quinte QRM	Quinte Amateur Radio Club
QUA	York Road Radio Club
DARA QMN	Detroit Amateur Radio Assn. and Mich. Net
Q-5	The Springfield (O) Amateur Radio Club, Inc.
Radio Terms:	
Ground Waves	Joliet Amateur Radio Society
Key Klix	Santa Barbara Amateur Radio Club
The Micro-Mike	Fort Bennings Electronics Club
SARC Sparks	Sidney (N. Y.) Amateur Radio Club
Static	Starved Rock Radio Club (Ill.)
Side Bands	St. Louis Amateur Radio Club, Inc.
Short Skip	Manchester Radio Club (Conn.)
Sparks	The Brandon Amateur Radio Club
The Round Table	The Denver Radio Club
Richon Listening Post	Rio Hondo (Cal.) Radio Club, Inc.
Short Circuits	Electric City Radio Club (Mont.)
Key Klix and Feed Back	Hocking Valley Radio Club (O)
Auto Call	Washington Mobile Radio Club, Inc.
Ham Gab	Hamfesters Radio Club, Inc.
Ham-Fax	South East Amateur Radio Club, Inc.
Hi-Mu	Framingham Radio Club
PARA Graphs	Palo Alto Amateur Radio Assn.
Ham Hum	Ak-Sar-Ben Radio Club, Inc.
Zero Beat	Victoria Short Wave Club
Zero Beat	Hamden County Amateur Radio Club (Mass.)
Zero Beat	Providence Radio Assn. (R. I.)
Kilowatt Harmonics	The Steel City Amateur Radio Club
Dits and Dahs	Camp Gordon Radio Club
B+	Albany Amateur Radio Assn.
Ether Waves	Ohio Valley Radio Assn.
TARC Sardine Wrapper	Tamaqua Amateur Radio Club
Splatter	Minneapolis Radio Club
The Blurb	Phil-Mont Mobile Radio Club

For 100% QSLing. KNØDYJ writes to suggest an addition to "There ought to be a law," (April *QST*) on this subject of the QSL. He sadly lists stations worked from whom a confirmation is needed. At the time he wrote he had but seven states confirmed. Ham sentiments were even more clear on a recent card submitted for WAS. It had a little cartoon carrying the words "people are no damn good — unless they QSL." Thousands of stations have excellent printed cards. But the typewritten or *penciled postal card* like

(Continued on page 72)

MALLORY HAM BULLETIN

Why Mallory FP Capacitors ...with *etched cathodes*... won't develop "Middle Age Hum"



Ever notice how some electrolytic capacitors allow hum to develop after a few weeks of service? Even though they test out OK when installed, they let filter hum grow to an objectionable level in a relatively short time.

This is "middle age hum." It's caused not by capacitor leakage current, but by loss of capacitance. It's a common ailment of capacitors with plain foil anodes. And it won't happen with Mallory FP capacitors, because they are made with *etched cathode* construction.

Here's the explanation. Maybe it's something you never realized goes on inside a capacitor. Actually there are *two* capacitors in series inside every electrolytic; one at the anode, and one at the cathode. The anode capacitor is the one that is formed electrically during manufacture. The cathode "parasitic" capacitor is due to the naturally formed oxide coating on the cathode foil. In a *new* capacitor, this cathode film is so thin, and capacitance thus so high, that the net microfarad value you measure at the capacitor terminals is hardly affected.

In a circuit having heavy ripple currents, the cathode can be driven positive with respect to the electrolyte during reverse peaks of the cycle. This action causes the oxide film to increase in thickness . . . *reducing* cathodic capacitance. The net series value goes down. And when the cathode capacitance gets comparable in size to the anode, the loss in filtering ability can be serious enough to cause considerable hum.

A capacitor with a plain anode has no built-in "safety factor" to protect against capacitance loss, because its available cathode area is limited.

An etched cathode—as you'll find in Mallory FP's—eliminates this source of trouble. Because etching produces so much greater capacitance per unit area, the cathode capacitance is extremely high when the component is new. And build-up of the film during service doesn't reduce capacitance to a magnitude that will cause appreciable change.

Etched cathode is standard at *no extra cost* in Mallory FP capacitors and in popular Mallory metal and cardboard tubulars. It's another of the premium features that you're always sure of getting from Mallory, to assure the best in performance in your amateur rig or in repair jobs that you do in your shop.

See your Mallory distributor soon. He has Mallory capacitors with *etched cathodes* in the ratings you need.

P. R. MALLORY & CO. Inc.
Distributor Division
P. O. Box 1558
INDIANAPOLIS 6 INDIANA

P.R. MALLORY & CO. Inc.
MALLORY

the one a new amateur sent in yesterday (humbly labeled "this is a QSL card") is just as welcome as the most elaborate. That is, of course, *provided* it has the vital statistics that *prove the QSO.* Call, date, time, frequency, mode signal report and the validating signature or characteristics that identify it as a genuine QSL of the originating station.

The first QSLs were created when certain early amateurs discovered that families and friends would not believe they had made contact by radio with the distant point. We should remember that the QSL is to prove something. It's really (or should be) regarded as an official document. We here go on record as endorsing KNØDYJ's plea to QSL. Be *sure* that new stations worked are taken care of by this fraternal exchange: The QSL doesn't have to be a fancy job to become a ham's most prized position: It is indeed an old and a true saying that *the final courtesy of a QSO is the QSL.*

DX and WAS Suggestion. A letter from Ken Indart, CX2BP, 28.4 Mc. (looking for a Utah-Uruguay QSO) points to the possible stepping up of the pace of USA DX QSOs. It is his notion that amateurs should give the names of their states more frequently when operating. He writes, "With the increasing interest shown now in WAS, I would suggest the advantage of U. S. hams mentioning their states at frequent intervals; this is especially true for the 14, 21 and 28 Mc. bands." ARRL's Worked All States Award rules are detailed on page 6 of the League's booklet, *Operating an Amateur Radio Station.* Be sure in sending WAS cards to ARRL (1) to place the confirmations in alphabetical order by states. (2) to include the postage to finance their return.

—*F.E.H.*

JUNE V.H.F. PARTY — FIRST RETURNS

Following are some high claimed single-operator totals registered during the ARRL V.H.F. QSO Party of June 9th and 10th: W1FOS 3360, W1FZ/1 6372, W1KCS 3248, W1OOP 6090, W1UIZ/1 13,904, W1VNH 4752, W2BVU/1 6541, W2FHJ 2970, W2YHP 2835, K2HPN/2 3744, K2IEJ/2 2720, W3CGV 2737, W3HYJ/3 2058, W3TDF 4732, W3TOM 2180, W4DWU 1284, W4JCJ 1665, W4UCH 924, W4UMF 1695, W5LFQ 600, W6AFC 1575, W6AJF 2538, W6BAZ 2436, W7LHL 511, W7UFE 972, W7VMP 1748, W8LAH 970, W8RMH 1368, W8SRW 1012, W9BRN 567, W9USI 792, WØJAS 576, WØUOP 296, VE3AIB 936, VE3DIR 1066. Outstanding multioperator scores reported include W1MHL/1 31,344, W1QAK/1 11,070, W1RFU 10,520, W2RHQ/2 4374, W3KX/3 15,040, W6QED/6 10,933, K6OEE/6 11,520. Full details will appear in *QST.*

A.R.R.L. ACTIVITIES CALENDAR

July 28th-29th: CD QSO Party (phone)
Aug. 3rd: CP Qualifying Run — W6OWP
Aug. 16th: CP Qualifying Run— W1AW
Sept. 1st: CP Qualifying Run — W6OWP
Sept. 13th: Frequency Measuring Test
Sept. 14th: CP Qualifying Run — W1AW
Sept. 15th-16th: V.H.F. QSO Party
Oct. 5th: CP Qualifying Run — W6OWP
Oct. 13th-14th: Simulated Emergency Test
Oct. 15th: CP Qualifying Run — W1AW
Oct. 20th-21st: CD QSO Party (c.w.)
Oct. 27th-28th: CD QSO Party (phone)
Nov. 3rd: CP Qualifying Run — W6OWP
Nov. 10th-11th, 17th-18th: Sweepstakes
Nov. 13th: CP Qualifying Run — W1AW

BRIEF

A correction on the 1955 W/VE Contest Results (p. 57, February *QST*) comes from VE2BB of the Montreal Amateur Radio Club's Contest Committee. VE6AJ, listed in third position in Alberta with 4133 points, should have been shown as the section winner with 41,325 points.

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 August 16th at 2130 EDST. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7080, 14,100, 21,010, 50,900 and 145,600 kc. The next qualifying run *from W6OWP only* will be transmitted on August 3rd at 2100 PDST on 3590 and 7128 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of *all* qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

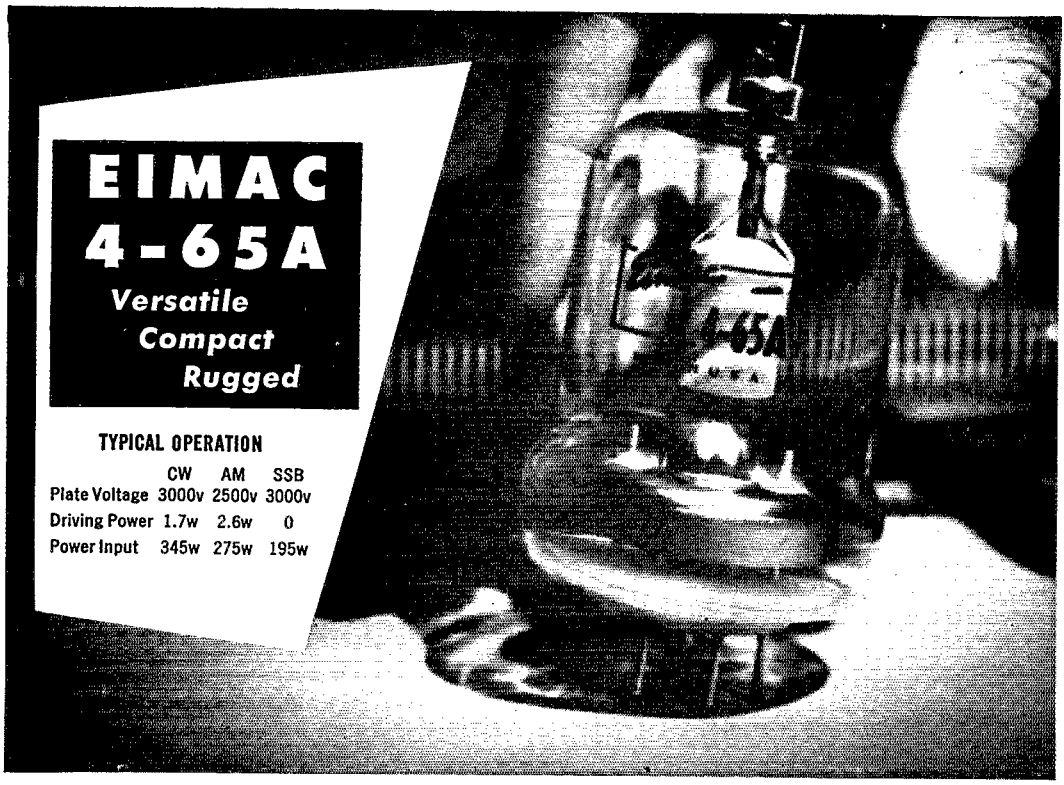
Code-practice transmissions are made from W1AW each evening at 2130 EDST. Approximately 10 minutes' practice is given at each speed. References to texts used on several of the transmissions are given below. These make it possible to check your copy. For practice purposes, the order of words in each line of *QST* text sometimes is reversed. To get sending practice, hook up your own key and buzzer and attempt to send in unison with W1AW.

Date	Subject of Practice Text from June *QST*
Aug. 1st:	*Conelrad Alarm Circuits*, p. 17
Aug. 7th:	*Some Hints on Relay Operation*, p. 21
Aug. 9th:	*The 10–10 Antenna*, p. 30
Aug. 14th:	*The Novice Special*, p. 34
Aug. 20th:	*Modern Design of a High-Power Final*, p. 42
Aug. 23rd:	*22nd ARRL Sweepstakes Results*, p. 48
Aug. 29th:	*Procuring Funds for RACES Gear*, p. 54
Aug. 31st:	*The 8th National ARRL Convention*, p. 59

(*Continued on page 74*)

♦

The Swampscott (Mass.) High School Radio Club, under supervision of W1UNA (standing), recently conducted a presentation of amateur radio for the public at the school Science Fair. During the open house, each ham at the front table had a station on the air. From front to back, they are: W1BYB, an SWL, WN1HDK, WN1EVJ, WN1ETW, WN1EUU and W1EUT. (*Photo by W1VRK*)



For low to medium powers, mobile or fixed station, the Eimac 4-65A is truly one of the most versatile tubes in amateur use today. The least expensive and smallest of the Eimac internal-anode tetrodes, this compact, rugged tube is ideal for all-band CW, AM, and SSB rigs.

Short, heavy leads and low interelectrode capacitances contribute to stable, efficient operation of the 4-65A at high frequencies. The tube operates over a wide range of plate voltages — 600 to 3000 volts with power inputs from 90 to 345 watts — and as with all Eimac tetrodes, it requires low driving power and simplifies transmitter construction.

For mobile use, the radiation-cooled 4-65A is a natural. Its instant heating filament eliminates battery drain during stand-by periods. And through application of filament and plate power simultaneously, no warm-up periods are required.

For further information on the 4-65A, write the Eimac Amateur Service Bureau or visit your Eimac distributor.

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The World's Largest Manufacturer of Transmitting Tubes

There are a number of ECs who feel that AREC administration and administrative procedures sometimes are not compatible with operational requirements of the service we are often called upon to render. This is true, but it is also inevitable. It happens in all large multi-purpose organizations, and while the purpose of AREC can be stated singly (i.e., service to the public), it is part of a large, multi-purpose organization with a common administrative setup — your ARRL itself. Administration of the AREC has to be accomplished by the existing setup under the SCM, by sections with well-defined boundaries of jurisdiction. We realize as well as you that emergency requirements seldom are respecters of geographical or political boundaries. That's why the AREC organization has been made deliberately flexible, and has become more flexible through the years.

And it *is* flexible. The EC normally has jurisdiction over a community, but these jurisdictional areas can be changed at the discretion of the SEC, with the acquiescence of the SCM, to cover counties, groups of counties, or "districts," "zones," "areas" (whatever you wish to call them) defined in other ways. The internal section organization is strictly subject to the wishes of the SCM, the SEC and the appointed ECs within it. In some cases, if desired, one EC can have several others under his jurisdiction, as a county EC might have jurisdiction over an entire area served by a number of community ECs.

Where the need for emergency organization transcends section boundaries, there is seldom any jurisdictional dispute involved. AREC units, even if in different sections and administered by different SCMs, can and should get together to work out their mutual problems, and in a great many instances, especially along natural river boundaries, this has been accomplished. Where the desirability for special nets seems especially apparent, nets are formed under a control station or manager agreed upon by the ECs, SECs or/and SCMs involved, and net members are recruited from among the AREC units at desired points. All administration requires is that each appointee be appointed by the SCM of the section in which he happens to reside, and that appointees be limited to those designations which are official. For the purposes of administration, within the AREC the only appointments are EC and SEC. Sure, we could set up new appointments, like County EC, Regional EC, Assistant EC, Assistant SEC, etc. ad infinitum. But, why? That would just tie things down, remove the flexibility we now have for each section to organize pretty much along the lines of its requirements, and at the same time increase the administrative overload at SCM and headquarters levels. An administrative setup, as one correspondent says, is for the purpose of serving an operational purpose and therefore should be subordinate to it. We agree with this. That's why we don't want to create additional or special appointments, but think the purpose is best served by preserving the utmost simplicity and flexibility in an overall administrative system which must serve all operational purposes.

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The MARS Director at Holloman Air Force Base, N.M., has sent us, via the SCM, a detailed version of the Lincoln National Forest fire in which amateurs participated April 27th to April 29th (see July *QST*, this column). We list herewith additional calls of participating amateurs not previously reported: *W5s* AGX ANB ARD AXJ BMA BXP CEE CKU DWN FVY GEM GGO HHX HXF ICG KBP KMC KWR KWU MYM OLE PCO QKA RAQ RHU SEP UET VLZ WPA YFN; *K6s* AOQ AVZ CEV CTC CYV DAA DAB EMC EMT FAB FER, W3CJC, W7ZET/Ø.

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When a tornado ripped through Berlin, Wis., on April 3rd, the Badger Net went into operation on 3950 kc. at 1500 and remained operative until 1300 April 4th. W9RHS got on the air from Berlin, while W9NGT acted as NCS. W9UFX formed the link to Madison and the American National Red Cross and state civil defense. W9FFC was active in Plainfield, another area hit by the storm, and W9MPO, EC for Fond du Lac and Green Lake Counties, drove to Berlin to offer the assistance of his operators, mobiles and emergency radio units. Over 100 messages were handled, official messages being given first priority.

A hundred miles west, at Tomah, a dike broke flooding the city as a result of the storm. W9PTJ handled emergency traffic from this point, putting it into BEN, and W9AAA/m provided communications for local operation.

Good publicity was received from radio and TV stations, as well as newspapers, and the BEN received high praise from Red Cross officials. All operations were smoothly handled due to years of experience gained by operators in the state nets. — *W9OVO, SEC Wisconsin.*

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Shortly after 2200 May 12th, the west side of Cleveland and the suburbs of Rocky River and Lakewood were struck by a severe windstorm. The West Park Radiops Emergency Net immediately went into operation on 28,520 kc. with W8INW as NCS. At 1230 the following day Westlake Civil Defense Station W8ZEU commenced operation on 28,600 kc. and the West Park net joined forces with this operation. The amateurs, both fixed and mobile, cooperated with c.d. and police authorities so effectively that the c.d. director of Cuyahoga County paid them special tribute. Amateurs participating: *W8s* AEU AGA AJH AZU BDZ BUQ FKS HFE HYG HXH INO INW JUK KBW LEW LHJ LQU LVM LYD MWE MWJ NGY NOX NWJ OPX OXS PFO PVC QAV QYT QXW SNW TAK UDL UYJ YHR YPT WLM ZEU ZSK, K8ADY, K4IKF/8. — *W8AJW, SCM Ohio.*

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Members of the East Kootenay Amateur Radio Club of Kimberly, B.C., saw action on May 21st when Mark Creek overflowed and seriously threatened low lying areas. With a central station at the fire hall, mobiles patrolled the full length of the creek and were located at strategic points along the way as well as at two available sand pits. In this way, they were able to dispatch sand bags efficiently to threatened spots. Much praise was given by the Kimberly civil defense officer for the operation. Amateurs participating: *VE7s* XM AIO CR ADN AGB ALX and HH. — *VE7HH.*

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The well-organized Winthrop (Mass.) Emergency Net went into action on March 23rd at 1915 when a sudden rain storm wiped out telephone service at the Community Hospital. Within 15 minutes after notification radio communication was established between the hospital and telephone central to handle emergency calls. This system functioned for over an hour before service was restored. Quick action was due to planned preparedness for sudden emergencies. WN1TQT was first to notify, and first on the air was W1DPN. Relay was established through W1BB, W1DEL and W1DLY. — *W1BB, EC Winthrop, Mass.*

(*Continued on page 76*)

ORS W1TYQ, mainstay of Connecticut's Nutmeg c.w. Net, also savors contests and DXing. Vic grabbed Connecticut c.w. honors in the '55 Sweepstakes and '54 ARRL DX Contest, and consistently fares well in quarterly CD Parties. Now and then, however, his novel vocation causes Vic to forsake hamming — to earn his daily bread, W1TYQ flies a DC-6B to Saudi Arabia 20 times a year!

THE NEW FO-6

6 METER and 2 METER

Oscillator Assembly!

the Sure-Fire way to achieve . . .

STABLE CRYSTAL CONTROL *with High Frequency Crystals*

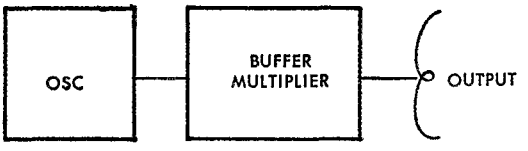
IT'S A 3-WAY UNIT! . . .

1. **MIDGET 6 METER TRANSMITTER**—Provisions are made for separate B+ connections to the buffer stage for modulation.

2. **DRIVER UNIT** for a higher power 6 meter transmitter. Will work into 5763 tube which will provide ample drive for a 6146 final. For 2 meter operation the pentode section of the 6U8 tube may be used as a tripler, or the unit can operate straight through on 48 MC and drive a 5763 tube as a tripler.

3. **RECEIVER LOCAL OSCILLATOR FOR 2 METERS.** By using the pentode section of the FO-6 as a tripler, this unit will provide injection voltage for 2 meter converters.

6U8 Tube
Crystal Oscillator Range
48 MC to 54 MC
Output 50-54 MC or 144-148 MC
(Specify When Ordering)
Crystal Required—3rd Overtone
Type FA-5
Plate Voltage—250 volts @ 20ma



Filament Voltage—6.3 volts @ 450 ma
Size—2" x 2¾" x 2¾"

HOW TO ORDER: For fastest possible service, crystals and Oscillator Assemblies are sold direct. When cash accompanies order, International pays postage. Otherwise, shipment made C. O. D.

Kit (less tube and crystal)	5.95
Complete wired and tested with tube (less Crystal)	9.95
Crystal Type FA-5 48-54 MC (Specify frequency when ordering)	3.90

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During the tornadoes in Ottawa and Kent Counties, Mich., last spring, amateurs set up emergency communication facilities to handle official tornado traffic. Shown at the temporary operating position are, left to right, W8GEH (EC Ottawa County), W8IQQ and his XYL, and W8SWN (seated).

On May 26th the National Search and Rescue Council was called out to find a girl skier lost on Mt. Hood, Ore. In accordance with prearranged plans, W7NGW was notified and asked for help. He asked W7QKU to contact W7OUS and W7RVN, who were contacted and started for the scene. W7PPQ, rescue headquarters was in communication with W7WFO, and later W7ENU took over. W7ENU put a QST on the Oregon Emergency Net at 1800 asking for a clear frequency from 0430 until the search was over. W7RVN/M and W7OUS/M left for the mountain at 0200 and were stationed at search headquarters at Twin Bridges and at the Forest Service Hdq. at Zig Zag respectively. W7ENU acted as relay station at Portland. W7RCL backed up W7ENU as NCS. W7BLN checked in at 0600. The girl was found shortly after 0700, May 27th, and quick relay of the information by the mobiles enabled the rescue group to call off the additional help that had been requested. The information was also relayed to local radio stations for spot announcements. — *W7RCL, EC Multnomah Co., Ore.*

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The Marion County (Ind.) AREC was activated May 27th to furnish communication for flood stricken areas in and around Indianapolis. Continuous watch was maintained on 3910 kc. from 0850 May 28th to 0200 May 30th. An information link was maintained throughout Indiana to the Indiana Flood Control Commission and the U. S. Weather Bureau. The net on 147.3 Mc. was activated May 30th and mobiles were stationed at various airports around the city to furnish communication between the Weather Bureau and the various fields to get weather reports for planes before taking off. IFN manager W9EQO reports the following participants on 3910 kc.: *W9s* JYO JVF SWD IQP VVX/m MWR EQO DUD ZKX NTA JWI PRL ZTD/m AUN DOK ELR EGV HST AMC/9 MMY, *K9s* WBH AIO/m, W7SEI/9, W8FY.

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Idaho had a state civil defense alert on January 16th last in which some 70 amateurs throughout the state took part, making contact with 25 of Idaho's 44 counties. Outlets were used on 75 meter phone, 80 c.w. and 160 meters, using established net frequencies of 3935, 3638 and 1995 kc. The test started at 1830 and lasted until 2100 MST. Local communication was also established on two meters, mostly mobile. A critique of the test revealed that the weakest point was availability of emergency power facilities. — *W7IWU, SCM Idaho.*

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On February 19th at 0630 a drill was conducted involving the Dade County Sheriff's Department, Florida Highway Patrol, American Red Cross and the local AREC simulating a super airliner crash at Miami International Airport. Temporary headquarters were set up at Tamiami Airport where a portable mobile station swung into operation with a ground plane antenna atop the administration building. The Dade Emergency Net was alerted and mobiles proceeded to temporary headquarters for assignment. One aeronautical mobile was in operation on ten meters. Five other mobiles participated, with a total of sixteen operators. The sheriff was very much impressed with the efficiency of the AREC and personally thanked them for participating. — *W4IVT, SEC Eastern Florida.*

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Fifteen SECs reported April activities for 4253 AREC members. This is an increase of one in number of reports over last April, but a decrease in number of AREC members represented. Sections reported: Mo., San Joaquin Valley, Tenn., E. Fla., New Mexico, Minn., Los Angeles, Ky., Santa Clara Valley, NYC-LI, E. Pa., Ore., Ala., Wis. and Ontario.

RACES News

FCDA now has on hand receiving and transmitting equipment at regional control centers of all seven FCDA regions, following their plans to activate each regional control center for closer liaison with RACES groups within the region. The equipment will not be used for contact between FCDA National Headquarters in Battle Creek and its regional offices. The regional setups will be used only as deemed desirable to provide radio backup of c.d. communications channels to the regional level, not to make use of RACES frequencies to conduct communications between federal government offices.

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FCDA is looking for qualified electronics engineers to work in the national offices in Battle Creek. Several openings are available. People with four years college education in electrical engineering, or an E.E. degree, or equivalent in experience are desired. If interested, it is suggested you apply to Warning & Communications Office, Federal Civil Defense Administration, Battle Creek, Mich.

— • • • —

How goes the RACES in your area, fellows? Each month we hit up FCDA for material for this column, but we also want some dope from the doings at local levels, too. Drop us a line once in a while to let us know how things are going; we will want to summarize any items of general interest.

BRIEFS

According to the *Halifax Amateur Radio Club Bulletin*, edited by VE1FQ, Nova Scotians can receive call-letter plates to attach to their car license plates. A QSL to the Canadian Assemblies, Ltd., Amherst, N. S., will bring the plate, free of charge.

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Our apologies to WØPRZ for not listing his 94,924 points as top WØ in the SS phone results in June *QST*.

TRAFFIC TOPICS

We get quite a few requests for ARRL "recognition" of nets, and publicity for same. A few general comments on this subject would seem to be in order.

ARRL recognizes all nets that perform a service, whether they be fundamentally traffic or emergency nets. This recognition takes the form of registration and publication in our net directory, and inclusion of brief net data in this column when or if submitted. Unfortunately, we do not usually have *QST* space available for net publicity, recruiting requests, write-ups of special events, etc., but will include any such material when we can. The League supports and encourages all traffic activities, a policy of many years standing, and will continue to do so; but most of our material has to be general so that it can apply to and be about *all* traffic nets.

There is a difference between recognition and sponsorship. The League sponsors only the National Traffic System, a nationally-integrated system of nets specifically designed for participation by all amateurs interested in traffic work. Its net managers are appointed by ARRL officials. Complete details of how the system works are available from headquarters on request, and all amateurs are invited and encouraged to take part at a level commensurate with their operating ability and time availability. Naturally, being the official ARRL system, the NTS gets more *QST* publicity than independently-sponsored nets, but this does not mean

(*Continued on page 78*)

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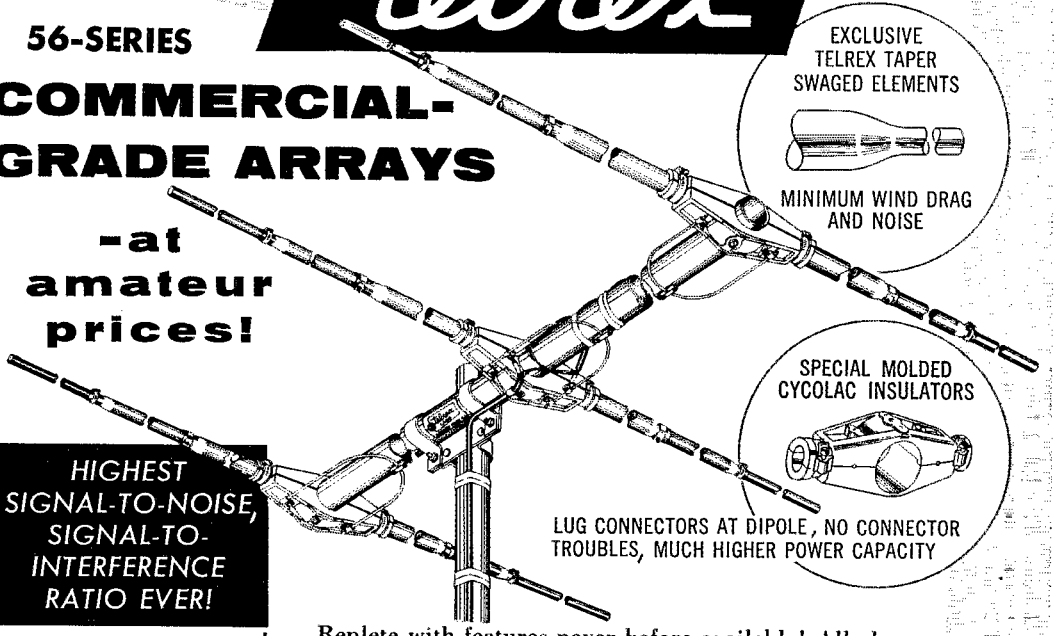

HIGHEST SIGNAL-TO-NOISE, SIGNAL-TO-INTERFERENCE RATIO EVER!

- Gusset plate mounting
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- Wind drag reduced 55%
- Rugged, lightweight aluminum construction
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ASK THE AMATEUR WHO OWNS ONE!

Whether you are limited for space or money, or whether money is no problem, Telrex has the best suitable array for you. Every Telrex array is fully integrated mechanically and electrically to provide outstanding performance per element. The unsurpassed superiority of Telrex arrays is why the most outstanding radio amateurs, including the world's champion DX'er, use Telrex.

Replete with features never before available! All elements are insulated from the boom by a sturdy molded phenolic element support. Each element is taper-swaged and hair-pin resonated. Every model equipped with the famous Telrex balun match for balanced pattern and minimum TVI. All models are precision tuned and matched, then calibrated for easy assembly and duplication of our laboratory specifications at your site. No experimenting required!

Arrays come fully equipped with an extra heavy-duty gusset-plate mounting for easy attachment to a 2-inch OD support mast. No masting holes are required. The reduced wind drag and gusset-plate mounting make multi-band "christmas tree" installations (best, for outstanding, clean cut patterns on more than one band) much more practical and less costly!

The variety of models available in this series enable the amateur to dominate one or more bands from 3/4 meters through 80 meters. In fact, Telrex "Big Bertha" rotating masts can be equipped with arrays with gains exceeding many commercial service installations.

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ORIGINATORS AND MANUFACTURERS OF THE WORLD'S FINEST TV AND COMMUNICATION ANTENNAS

that we are "agin" such other nets or that we disapprove of their existence or operation.

You want recognition of your net? Okay, you've got it. On August 1, we start re-registering all nets. Send us the dope on your net and we'll register it (see Sept. 1955 *QST*, p. 72 for net registration info) so that it will appear in *QST* and in the annual cross-indexed net directory which, this year, we're again hoping to get out early.

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Miscellaneous Net Reports: W2KEB reports a traffic total of 3167 for Transcontinental Phone Net in May, divided as follows: First call area, 993; Second Call Area, 1389; Fourth, Ninth and Tenth Call Areas (combined), 785. W2KFV reports a May traffic total of 767 for the Early Bird Transcontinental Net. W3CVE reports 31 sessions, eight stations totalling 2129 in May in the Transcontinental Relay Net.

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National Traffic System. Finding summer conditions a little different this year? We are. Not better, just different. Especially, more QRN. Summertime is a bad time for traffic, no question about it. What we want to emphasize is that it is also no time to get discouraged about NTS operation. *Sure* things start to fall apart in the summer: NCS don't show, liaison stations fail to appear, no outlets are available for points of greatest traffic destinations, some of those who do show up (bless their hearts) can't receive anything because of the QRN, or have to QRT because of an electric storm. It's wicked, no doubt about it. Don't let it get you down. The faint of heart, in the dead of summer, turn off their rigs and quietly steal away. The stalwarts slave away and suffer miseries trying to get the traffic through. The really smart ones, though, do the best they can and don't worry about it. Life is too short.

May reports:

Net	Sessions	Traffic	Rate	Average	Representation (%)
EAN	25	1229	1.65	49.0	94.7
CAN	23	1595	1.41	69.2	100
PAN	26	1016	0.69	39.0	100
1RN	26	412	0.56	15.8	87.9*
2RN	27	383	1.30	14.2	100*
3RN	57	341	0.70	6.0	69.0
RN5	50	917	0.72	18.3	67.0
RN6	56**	659	0.41	11.8	54.1
RN7	49	166	——	6.7	27.4
8RN	49	223	——	4.6	81.6
9RN	31	916	0.81	29.5	94.4*
TEN	73	1526	——	21.0	57.7
TRN	23	70	——	3.0	79.7
Sections***	685	5583		8.2	
TCC Eastern	68#	918			
TCC Central		1176			
TCC Pacific	107#	714			

Summary —					
Total	1200	17,854	EAN	12.5	——
Record	1200	17,854	1.65	22.1	100

* Regional net representation based on one session per night.

** Out of 62 scheduled.

*** Section nets reported: IFN (Ind.); CN & CPN (Conn.); AENI, AENB & AENP (Ala.); QKS, QKS SS & QKM (Kans.); GSN (Ga.); TLCN (Iowa); Iowa 75 Phone; S. Dak. Emerg. Phone; SCN, NCN & CVN (Calif.); NTX (Tex.); MSN & MJN (Minn.); Tenn. Sectional C.W. & Tenn. 160; WVN (W. Va.); KYN (Ky.); Hi Noon Net (Colo.); Colo. WX Net & Colo. SS Net.

TCC schedules reported, not included as net sessions.

This was the most active month of May in NTS history, as records continue to topple. The traffic total of close to 18,000, aside from being the highest May total ever recorded, is second highest in history, the other being December 1955, always a high month. The number of sessions reported for May is also second high, the highest being in March of this year (1239). Of course the statistical increase to some extent reflects the increased number of NTS section net reports; but this is an indication of better organization as well as an increase in traffic handled, so we can be justifiably proud of our NTS progress.

W9DO reports that CAN will soon start a regular Saturday session. Conn., Maine and R. I. made every 1RN session. K2GHS has earned his 2RN certificate; 2RN may change frequency to avoid local b.c. station beats. W4COU is the new RN5 Manager, an old timer and traffic man *par excellence;* RN6 certificates were issued to W6s REF YBV WPF EOT and K6EHT. 8RN Manager W8DSX congratulates West Virginia on best 8RN attendance in May, the first time this has ever happened. On June 1, 9RN changed its schedule to 1730 CST. TEN is suffering from "summeritis" (note that "low" traffic total!); TRN has dropped Saturday sessions and late sessions for the summer, now operating Monday thru Friday at 1945 EST.

Transcontinental Corps: Eastern Area TCC will miss W2AEE which, being a college (Columbia Univ.) station, will be off for the summer. Our sincerest thanks to Art, W2AIP, and Dick, W2PHX, for the excellent TCC job they did for us during the past active season. Eastern Area reports were received from W1AW, W1EMG, W1NJM, W2AEE, W2ZRC, K2GHS and W3BUD. High traffic was reported by W1EMG.

WØSCA reports that Central Area TCC is running smoothly, with no turnover. WØBDR continues to run up traffic total. May traffic was handled by WØBDR, WØSCA, WØKJZ, WØLGG, WØDQL, W9DO and W9CXY.

Pacific Area TCC continues its good work under the able tutelage of WØKQD. Twelve stations participated, to wit: *W6s* ADB BPT IPW RFW TDO ZRJ YHM K6DYX

(Continued on page 80)

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for May traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	105	1427	1301	93	2926
W3WIQ	38	1133	1209	83	2463
W7PGY	18	1132	1039	93	2282
W7BA	27	1053	1013	38	2131
W2KEB	49	1008	713	227	1997
WØBDR	58	958	915	7	1938
WØCPI	17	944	881	63	1905
WØSCA	4	770	754	12	1540
W2KFV	11	727	541	128	1407
W9DO	18	677	653	42	1390
W5DTA/5	16	645	604	60	1325
K5FFB	34	454	735	15	1238
W9SHR	12	529	481	39	1061
KH6QU	62	549	386	53	1050
W7APF	2	4	513	487	1006
W4PL	5	484	444	32	965
W7QKU	35	51	419	363	868
K4MC	20	431	409	4	864
W9NZZ	216	320	6	314	856
W3CVE	50	359	310	49	768
W3ZSX	31	364	344	14	753
W8VTP	6	367	362	9	744
WØLCX	5	358	345	13	721
W9JYO	344	188	174	14	720
WØLGG	32	332	296	9	669
WØBJP	19	321	318	3	661
WØKQD	43	279	218	117	657
W8RJC	5	320	298	22	645
WØGAR	16	297	308	5	626
W1EMG	1	338	253	27	619
W9YYG	13	299	262	36	610
W6GYH	352	147	69	35	603
W3WV	15	354	162	63	594
W3WZL	31	279	261	14	585
W9MAK	38	271	233	31	573
W9ZYK	22	241	250	12	525
W6DDB	200	153	153	0	506
W9CXY	12	247	219	28	506
W9TT	202	283	0	17	502
Late Report:					
KH6QU (Apr.)	148	299	272	50	769

More-Than-One-Operator Stations

Call	Orig.	Recd.	Rel.	Del.	Total
W6IAB	66	1768	1470	198	3502
W6YDK	56	1193	1086	107	2442
K7WAT	88	529	482	49	1148
KØWBB	144	415	383	19	961
K6WAY	60	275	285	12	632

BPL for 100 or more *originations-plus deliveries:*

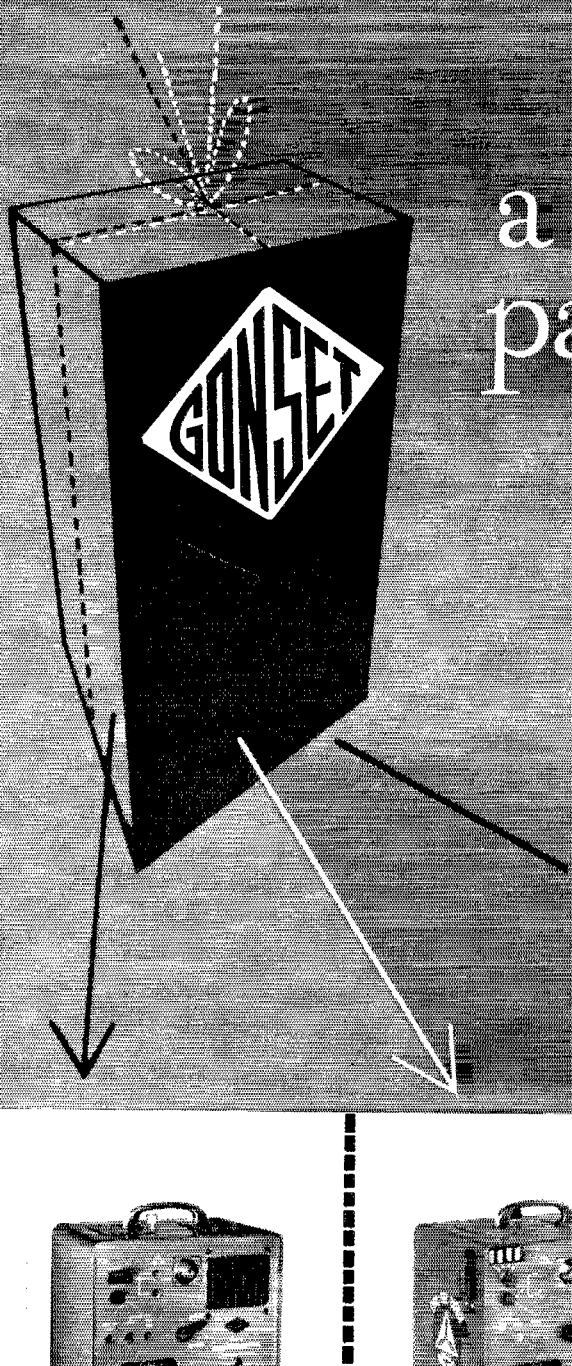
W8PHA	289	W4DDY	117	W4ZIZ	104
K2GHS	134	W8NOH	117	W4WQT	101
W9UBI	130	K2EQP	107	W9KTX	100
WØNIY	126	K4DKA	106	KP6AK	100
W3RV	124	W4DGA	105		

More-Than-One-Operator Stations

W9SIM/9 370 K1AIR 234

BPL medallions (see Aug. 1954 *QST*, p. 64) have been awarded to the following amateurs since last month's listing: K2DEM, K5AOV, W6GYH, W9JOZ, W9SVZ, WØRDN, WØWVO.

The BPL is open to all amateurs in the United States, Canada, Cuba, and U. S. possessions who report to their SCM a message total of 500 or more, or 100 or more originations-plus-deliveries for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt, in standard ARRL form.



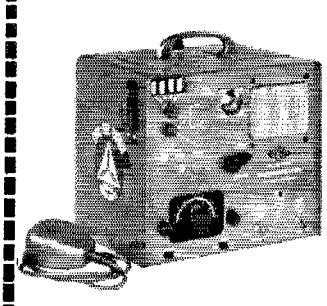
a neat package....

A neat, tidy package, the Gonset Communicator long ago set the pace for commercial-built VHF Amateur and emergency equipment. This practical, resourceful scaled-down of a complete VHF station into "Package" form serves as the basis for Gonset's well known Communicator slogan, "Compactness without compromise".

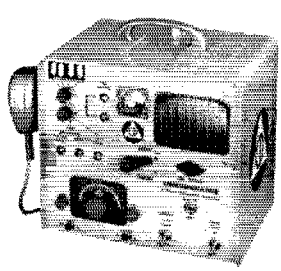
Communicators—"Packages"—for 2 and 6 meters. For ground-to-air. For industrial. For C. D. Now a special new model for C.A.P. Pace setters—winners—all.

Today, thousands of 2 meter Communicators are in use. The demand for the comparatively new, but already performance-proved, 6 meter models increases daily.

2 and 6 meter models.



New models for C.A.P.



Civilian Defense models

Available RF power amplifiers increase output power ten fold

GONSET CO. 801 SOUTH MAIN STREET, BURBANK, CALIF.

W7FRU W7KZ WØKQD and KØWBB. W6VZT, K7NBK and WØKHQ are also on the roster but submitted no reports. Irene wants to congratulate the gang on bettering their April record on total traffic despite increasingly FOUL conditions.

W1AW OPERATING NOTE

The summer W1AW operating schedule appeared on page 78 of last month's *QST*. See that issue for full information on when and where to look for the Headquarters station.

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. This notice supersedes previous notices.

Nominating petitions 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 prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested: (Signers will please add city and street addresses to facilitate checking membership.)

Communications Manager, ARRL. [place and date]
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the.....
.....ARRL Section of the.....
Division, hereby nominate.....
as candidate for Section Communications Manager for this Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence 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

Section	*Closing Date*	*SCM*	*Present Term Ends*
Yukon*	Aug. 10, 1956	W. R. Williamson	Mar.17, 1949
West Indies	Aug. 10, 1956	William Werner	Aug. 15, 1952
Idaho	Aug. 10, 1956	Alan K. Ross	June 17, 1956
Nevada	Aug. 10, 1956	Ray T. Warner	Aug. 16, 1956
Western New York	Aug. 10, 1956	Edward G. Graf	Resigned
NorthernTexas	Aug. 10, 1956	Cecil C. Cammack	Resigned
Northern New Jersey	Aug. 10, 1956	Lloyd H. Manamon	July 26, 1956
Arkansas	Aug. 15, 1956	Owen G. Mahaffey	Oct. 15, 1956
New Hampshire	Aug. 15, 1956	Harold J. Preble	Oct. 26, 1956
Kansas	Aug. 15, 1956	Earl N. Johnston	Oct. 29, 1956
Vermont	Aug. 10, 1956	Robert L. Scott	Resigned
Western Massachusetts	Sept. 14, 1956	Osborne R. McKeraghan	Nov. 10, 1956

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

DXCC NOTE

Announcement is hereby made of the following addition to the ARRL Countries List. The addition will be Revilla Gigedo. This group of islands is located approximately 420 miles west of Colima, Mexico, in the Pacific Ocean and includes the islands of San Bernedicto, Socorro, Clarion and Roca Partida.

DXCC credit will be given for Revilla Gigedo starting October 1, 1956, for confirmations dated on or after November 15, 1945. This will permit foreign amateurs to start receiving credit at the same time as those in the U.S.A. Do not submit Revilla Gigedo confirmations before October 1, 1956. Revilla Gigedo confirmations submitted before October 1 will be returned without credit.

DX CENTURY CLUB AWARDS

HONOR ROLL

W1FH....266
W8HGW....265
W6AM....264
W6VFR....259
W6MX....259
W6ENV....258
W9NDA....258
PY2CK....257
W6SYG....257
W8NBK....256
W3GHD....255
W3BES....254
G2PL....254
W2AGW....254
W6DZZ....254
W3JTC....253
W8KIA....253
W7AMX....253

Radiotelephone

PY2CK....249
W1FH....240
VQ4ERR....239
ZS6BW....237
W8HGW....231
W9NDA....227
GM3DHD....226
W9RBI....225
W1NWO....224
W3JNN....224
W6AM....222

From May 15 to June 15, 1956 DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

NEW MEMBERS

W6KSM....157
W5CFG....133
DL1ZN....112
W7FAW....104
W6KBC....103
WØBPA....103
W2UOL....102
W5TTB....102
OK3MM....102
VQ4EO....101
W1ISX....100
W2KTF....100
W2SSC....100
W2ZY....100
W5TIZ....100
W5VGR....100
W9VOD....100

Radiotelephone

VU2EH....111
G2ALO....104
SM6SA....104
W8TMA....103

ENDORSEMENTS

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G6ZO....250
W6VE....240
W1HX....231
W9LNM....230
W1JYH....222
W2YW....222
W4KFC....222
W7HXG....220
G3DO....210
G4ZU....210
W8UPN....203
W1AB....200
W1KFV....200
W3ECR....197
W9QLH....197
W6YY....194
W8TMA....191
W2BRV....190
W2GVZ....190
W4QCW....187
W9AMU....185
W2JB....184
DL7BA....184
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W1TX....180
W3EYF....180
W6BYB....180
W2WC....175
W9LI....171
W5UX....170
W6ATO....170
W9UXO....170
WØANF....170
DL1QT....170
W9VIN....161
W2AZB....160
W2CWK....160
W2IJU....160
W3MDE....160
W4TP....160
VK3YL....160
W6SWG....157
CT1DJ....154
W6ALQ....153
F9RM....153
W2CR....151
W5DGV....151
DL1GU....151
W1JDE....150
K2GMO....150
W2GVP....150
W3FMC....150
W4HYW....150
W4UXI....150
W8OGV....150
ZS6KK....148
W3WDC....145
PAØHP....143
W1LQ....142
WØQGI....142
VE3ADV....142
W2BXY....141
DL3FM....141
W1LHZ....140
W9RKP....140
DL1HA....140
KP4JE....140
W1KXN....137
W4EEO....137
W2SUC....131
W1NHJ....130
W2MUM....130
W2PZM....130
W3PGB....130
W4FID....130
W5OGS....130
W6OXS....130
W6UQQ....130
W6QNA....129
KT1EXO....129
W1ZDP....123
GM3CMB....122
W9ESQ....120
G3CCN....120
VE7AIH....116
ON4FP....112
VE1CU....112
W4YHD....111
K6EWL....111
W9DYG....111
W4AVY....110
W6NJU....110

Radiotelephone

W9RNX....180
CO2BL....180
W6YY....176
CO2BK....170
W9QLH....168
W3UIP....163
PY2JU....161
ZL1KG....153
W5GXP....150
F9RM....150
W7HXG....144
DL7BA....143
G2AJF....141
W6SYG....140
W4ANE....135
W4EEF....135
K2CJN....134
DL4BY....134
W9EZD....131
W2YYL....120
WØCPM....120
VS2DQ....120
W4BVX....115
VE7AIH....112
W7MBW....111
WØGFO....111
W8MRC....110
DL1SD....110

W/VE/VO Call Area and Continental Leaders

W4TO....245
W5ASG....251
WØYXO....250
VE1HG....159
VE2WW....189
VE3QD....210
VE4XO....118
VE5QZ....140
VE6VK....130
VE7ZM....211
VE8AW....181
VO6EP....190
ZS6BW....243
4X4RE....218
ZL2GX....252

Radiotelephone

W2BXA....203
W4HA....197
W5BGP....217
W7HIA....185
WØAIW....201
VE1CR....120
VE2GQ....118
VE3KF....163
VE5YE....140
VE7ZM....163
ZL1HY....205
ZL2GX....205
OD5AB....170

Station Activities

• 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 SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, Clarence Snyder, W3PYF — SEC: NNT. PAM: TEJ. RM: AXA. EPA nets: 3610, 3850 kc. With the summer months upon us, the EPA C.W. Net has ceased operation on its usual time, but the AN Net invites all interested c.w. operators to call in on EPA frequency for AN activity. Plans for the EPA-C.W. AN, and PFN joint picnic at Hershey Park on Aug. 12th are going ahead. Mail your $1.00 registration to UWP. The IRC Radio Club, through its paper, the *Resistor Circuit*, is planning a transmitter-receiver as a club project in order to participate in CD nets. Another club project was the construction and installation of an amplifier for the Big Brother Camp. Central High School, in Philadelphia, has a new radio club called the 807 Society of CHS. A new paper is being printed under the editorship of BWI. DQK is conducting code and theory classes and officers include WHJ, pres.; YXX, vice-pres.; FIT, secy.; and DSI, treas. CGZ now is operating from DL4-Land and is on 20 meters s.s.b. and a.m. EAN made 82 QSOs while operating portable from the Philadelphia Electric Company's Hobby Show. BNR is Radio Officer from Carbon County. UEU is now EC for Carbon County. YGX enters Villanova working for his E.E. degree. New General Class licensees in the Hazelton Area are ZOZ, ZQB, and ZQA. BUR won the WAS Contest sponsored by the NPARC. AMC and OWP now are on 2 meters in Carbon County. CUB has a new tower. BJW is back on the air after years off the air. BES has a new 3-band cubical quad for 10, 15, and 20 meters. UBO is back on 6 meters. Once again NNT, our SEC, requests the cooperation of ECs in getting reports to him every month, whether or not there are any changes. Doug is trying to do a good job. Let's cooperate with him. ZBE built an s.s.b. unit from *QST* using a BC-457. PYF will be operating mobile and fixed portable on the Jersey shore during the first two weeks of August. ZOM, Northampton County EC, has moved to Ohio. Anyone with equipment for checking frequencies accurately and who is interested in Official Observer appointment, please contact me (PYF). Traffic: W3CUL 2926, ZSX 753, TEJ 310, DHJ 182, YDX 134, BHC 98, OGD 95, OK 87, AXA 70, NF 52, BNR 50, NOK 42, BFF 24, PYF 23, CNO 21, SMC 21, KAV 20, BBM 19, WUE 19, NQB 12, CSP 8, UEU 8, CCQ 7, WQL 7, EJQ 5, DGM 4, DUI 3, YGX 2, ZLX 2.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, John W. Gore, W3PRL — WV, Leo, reports that Leo, jr., 5RVI/3, is back home and that his other harmonic, W3PZW/KL7BPG, is slated to return home soon. CDQ reports code classes are finished and 8 graduates, plus last year's crop, comprised the Field Day group under CAB/3. MSN is on s.s.b. with an LA-400 Linear and 20-A on 20 meters. New officers of the Baltimore Polytechnic Institute Radio Club (CDI) are YTW, pres.; ZNH, vice-pres.; WTD, secy.; and BOQ, treas. ZGN now has a 100-watt 2-meter transmitter. WBJ has a new DX-35 and VF-1. CQS is now mobile on 10 meters with a Gonset Super 6- and 10-meter transmitter. BWT reports the Washington Radio Club elected the following officers for the coming year: BKE, pres.; ECP, vice-pres.; CDQ, treas.; AKB, rec. secy.; BWT, corr. secy. Officers will take over the first meeting in September. The Mountain Amateur Radio Club elected officers for the coming year as follows: UAC, pres.; CKW, vice-pres.; BDV, secy.; ECU, treas. The club station call is YMW. OYX reported the ARA used the club call, CWC, during Field Day activities, with antenna designs varying from beams and verticals to rhombics, and operated on 80, 75, 40, 20, and 15 meters. Sam also reported that during the first part of May the ARA was asked for assistance in repairing second-hand radios for the Goodwill Industries of Hagerstown. Those participating were EHA, EPV, NHR, OXL, OYX, RAH, WNs EDA, EPX, CXM, GRH, and Dick Evans and Roy Kinna. OYX also reported that the following have received their Novice tickets: GRH, GVO, GVX, GWE, GWF, GWG, and HBG, who is Sam's 11-year-old daughter, Susan. GVX and GWF comprise a father-son combination. LZY reported that 5HQN, formerly AFY, visited with him the last two weeks of May. During World War II, AFY was in charge of WERS for Montgomery Co. He is now working in Albuquerque, New Mex. MGO reported that in the Cumberland Area 6 Novices have graduated to General Class. It has been noticed that activity has increased in the mobile ranks by notifications received of applications for call letter license plates, and a perusal of the applications indicates many old-timers have joined this phase of activity. HEC presented an interesting talk with a demonstration on Q Multipliers at the May 28th meeting of the CARC. A review of group schedules for May indicated that rather than specialized subjects, meetings were generally based on discussions, planning, etc., for Field Day. The Rock Creek Amateur Radio Assn. announced the following officers elected for the coming year: PWB, pres.; FPT, sr. vice-pres.; VHK, jr. vice-pres.; FWP, treas.; QFS, secy. Traffic: (May) W3CVE 768, WV 594, WZL 585, BUD 311, WG 281, RV 241, UCR 205, K3WBJ 141, W3PQ 140, ZGN 136, COK 88, PRL 56, PKC 40, W5RVI/3 21, W3ECP 19, WBJ 15, NNX 6, OYX 6, FY 3, CDQ 2. (Apr.) W3WG 61, COK 41, CQS 31, W4RVI/3 27, W3TMZ 16.

SOUTHERN NEW JERSEY — SCM, Herbert C. Brooks, K2BG — SEC: YRW. PAM: ZI. Please note the appointment of YRW, Haddonfield, as SEC. All ECs are urged to report their activities each month to YRW. We regret losing ZVW because of the adjustment of the section boundaries which added four counties to the Northern New Jersey section of the Hudson Division. LS, Pleasantville, continues to do an outstanding job as OO in reporting 53 discrepancies. Other OOs reporting are K2CPR and K2CWJ. K2JGU hopes to have a c.w. rig on the air soon. Hal has been doing a fine job on the phone nets. A traffic total of over twelve hundred is reported by those operators listed below. W hope to announce the appointment of a new EC for Camden County and Salem County in the near future. ADA, K2HOD, and K2JAK are regulars on a 2-meter round-table each night. ADA has a new 24-element horizontal beam atop his 60-foot tower. Chris also expects to have 2-meter mobile soon. Several Burlington County Club members are conducting code classes. The instructors are EBW, K2GWK and WUP. RG's transistor DX is now nearly 1200 miles on one-third watt. K2CWJ will be operating from Camp Drum for two weeks this summer. Form 1 reports have been very fine but no club reports were received this month. We have lost a number of appointees because of the transfer of four counties, so will welcome applications from those interested in participation in League activities. Section RACES stations are urged to take part in Fri. night drills on 3505.5 kc. at 1930 EDT. RG/2 and UA/2 are active in these drills. Traffic: W2YRW 459, RG 214, HDW 205, K2EWR 167, JGU 57, W2ZI 56, QBH 36, BZJ 8, K2CPR 3.

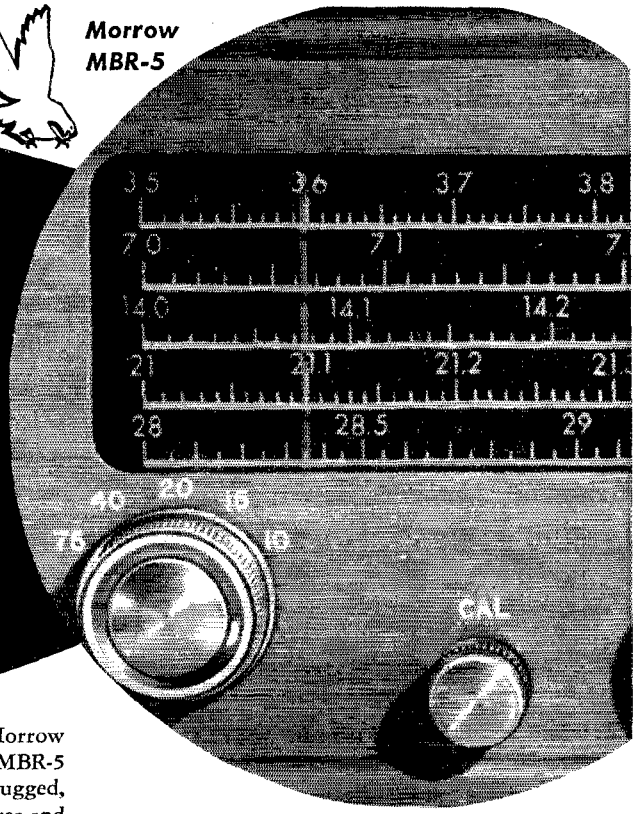
WESTERN NEW YORK — SCM, Edward G. Graf, W2SJV — SEC: UTH/FRL. RMs: RUF and ZEC. PAMs: TEP and NAI. NYS c.w. meets on 3615 kc. at 6 P.M.; ESS on 3590 kc. at 6 P.M.; NYS phone on 3925 kc. at 6 P.M.; TAR on 3570 kc. at 4 P.M.; NYS C.D. on 3509.5 and 3993 kc. at 9 A.M. Sun.; TCPN 2nd Call Area on 3970 kc. at 7 P.M.; SRPN on 3980 kc. at 10 A.M.; USN on 3970 kc. at 3 P.M. On the advice of my physician, I have submitted my resignation as SCM, to ARRL. I will continue to be as active as possible until you have elected by successor. I wish to thank all amateurs for the wonderful cooperation you have given me during the past years. It has been a pleasure to be associated with ARRL and the amateur fraternity. Best wishes for the continued success of ARRL and the Western New York section. TBD and YLG visited SJV. Congrats to K2s JIR and KIR on winning the code sending and receiving test, respectively, at the RARA Hamfest. NYS Net certificates were issued to W2s KHR, TIY, 4VFR/2, K2s AHG, CSN, DXE, DXY/2, DYE, EAZ, EGV, GRP, IJT, IQH, GQU, KXE, LLL, LLO, LTN/2, QKK and MWL. K2s HBL and HAO have moved to W1-Land. CCR has moved to W6-Land. KN2SLA, age 11, is the youngest member of the ARATS to receive a Novice license. HQY has a DX-100 on the air. KN2PKT now has WAS and WAC confirmed and is waiting for his General Class license. The IBM toured the Westinghouse Electronic Tube Dept. and has an emergency net on 28.7 Mc. Mon. at 1930. The RAWNY had SSC, GIH, LXE, and K2HUK, all mobilers, act as a panel for discussion on mobile operation. BNQ and OZR are on s.s.s.c. Reports are that the Western New York Hamfest sponsored by RARA was the best ever. We welcome the Kenmore H.S. Club and the Otsego ARC as ARRL affiliates. ZRC spoke at the ARATS on Field Day operation. KBT held a gadget night. K2CUQ has a new HQ-140X. EMW received OHA

(*Continued on page 84*)

Morrow
MBR-5

GREATER SELECTIVITY

"13 tubes, and what do you get? The power and performance of a 20-tube set!"



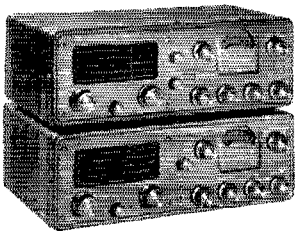
Advanced Morrow circuitry gives the MBR-5 amazing performance in a rugged, compact unit offering more features and more value for your money.

HIGHLY SENSITIVE (½ microvolt on all bands) 100 kc. Crystal Standard built in.

EXCLUSIVE SQUELCH CIRCUIT eliminates interstation noise, but opens on the weakest signal.

SSB, CW, AM RECEPTION. Separate AVC switch.

ILLUMINATED "S" METER measures incoming signals, doubles as field strength meter for tuning transmitter.



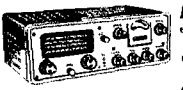
COMPACT AND HANDSOME. 4" high, 11¾" long, 6½" deep. Hammertone case matches MB-560.

MBR-5 Amateur net, $224.50

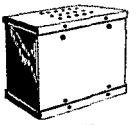
less power supply

FOR CONVENIENT TERMS, SEE YOUR NEAREST JOBBER

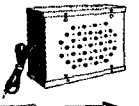
Matched Accessory Equipment



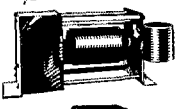
MB-560 TRANSMITTER
"More talk power" on all bands. 90-watt CW, 60-watt Phone.
Amateur net **$214.50**



RVP-250 POWER SUPPLY
Mobile vibrator pack for MBR-5 and exciter of MB-560.
Amateur net **$39.50**



SH-7 SPEAKER
5"x7" speaker in sturdy hammertone case. Amateur net. **$11.50**



MLV-50 INDUCTOR
Motor driven for remote control tuning of whip. Amateur net. . . . **$24.95**

FS-1 FIELD STRENGTH METER
Measures field intensity.
Amateur net **$19.50**

FREE DATA SHEETS — WRITE TODAY!

MORROW
radio manufacturing co.

2794 MARKET STREET • SALEM, OREGON

801 Dominion Bldg., Vancouver, B. C.

Prices and specifications subject to change without notice.

from Finland. E.A. Neal, of G.E., addressed the SARA on transistors. The Oneida Hamfest is scheduled for Sept. 29th. K2KTK has worked 18 countries with 10 watts on 20-meter c.w. K2ITN is experimenting with 2-723A Klystrons on 10 meters. K2s KXE and LAN converted surplus gear to 220 Mc. GHU and CYD renewed as EC. Anyone interested in a Western New York QSO Party next fall? It is reported that ESS now is on a weekly basis on Sat. at 1800 on 3590 kc. K2KIR is sending code practice on 3550 kc. at 1900 EDST each Fri., he also is sending Official Bulletins and would like to know the best time and frequency for future Bulletins. Traffic: W2RUF 404, K2IYP 258, W2ZRC 210, K2KIR 67, DSR 65, CUQ 64, W2RUT 57, OE 50, EMW 40, K2KNV 40, W2COB 30, BKC 19, RQF 15, K2KTK 11, KXE 9.

WESTERN PENNSYLVANIA — SCM, R. M. Heck, W3NCD — SEC: GEG. RMs: GEG and NUG. PAMs: AER and LXE. The South Hills Brass Pounders and Modulators Hamfest, to be held Aug. 5th in South Park, Pittsburgh, promises to be a splendid outing for the whole family. RKT's rotary beam won't rotate. VKS is installing mobile. QNI soon will be s.s.b. LDB is building mobile. EUL is completing a 4-400A final. BEX again is on the air. UJP has a new Globe Scout. The Breeze Shooters Hamfest was a success. JT won the main prize of an NC-300. The new PNN gave good cooperation. The XYLs of PII and TVW helped with the job. The net meets at 9 P.M. DST to avoid skip QRM. UUH, SDV, ZSP, and WNs ERK, ERJ, and GCB appeared in a ham broadcast over WDUQ/-FM. The Bucktail Amateur Radio Club has almost completed incorporation. NMJ is converting receivers. SUL is completing the mobile and fixed rigs. ZKY has a new Elmac in the car. PTU is leaving for a new job in Milwaukee. TYC moved to Keystone Manor in May. LEL is on 80-meter c.w. RMX is adding TVI filters to the rig. NGZ's Ranger still is FB and he has a new receiver. The Allegheny Kiski Amateur Radio Association's c.d. coordinator will meet with the local and county c.d. soon. BJZ is using a new DX-100 from a larger shack. The members of the Cumberland Valley ARC took an educational tour through the Potomac Edison Power Co. They were shown the plant operation, and power distribution and use of radio between sub-stations. Mobiles were used on the trip to keep units in touch. The Radio Association of Erie now has its emergency communications truck near completion. The Erie Clubs' mobile stations took part in Armed Forces Day exercises under the supervision of Erie County Civil Defense Radio Officer KLD and assistant YKE. WBA and QWL are opening a new business. VNB, of Erie, is reported in charge of all communications at his base. His dad now a Novice graduate, is CSM. At a recent meeting of the RAE LKJ was reelected as a director and OIH was elected director. OIH visited with AVW in Corry and while there met DUB, AGD, and AGR via his mobile. Traffic: W3WIQ 2463, YUL 152, ZEG 94, UHN 39, SIJ 33, KNQ 21, LSS 6, BZR 3, PWN 1.

CENTRAL DIVISION

ILLINOIS — SCM, George T. Schreiber, W9YIX — SEC: HOA. Cooke County EC: HPG. RM: BUK. PAM: UQT. Section News: ILN, 3515 kc. Mon. through Fri., 7 P.M.; 1EN, 3940 kc. This is the picnic and hamfest season. The Hamfesters' picnic comes up Aug. 12th at Sante Fe Park. The committee in charge promises a good time for all and plenty of prizes. The SRRC picnic at Ottawa was successful as usual. 1BDI was the principal speaker and DO, of 1LN, was awarded a plaque for making BPL 33 successive months. WPY was the oldest ham present but we didn't catch the call of the youngest. 1BDI also made an appearance at the YLRL Open House June 3rd and met many of the boys and gals. He was escorted there by UZ, who formerly held his job at West Hartford. Jim, the second voice at GME, now is licensed as K9CUM, another husband and wife team. Other new calls heard in the section are KN9s CWQ, CWD, CVQ, CYX, CYY, CYZ, CZA, DDP, DEX, DFC, DLA, and DLQ. All were trained by the Kankakee Radio Club. QYA's antenna blew down. The Y Radio Club of Sterling now has 14 voting members. Illinois clubs newly affiliated with ARRL are the Rochelle Township High School Radio Club, the Kankakee Area Radio Society, the Mississippi Valley Radio Club, and the Montgomery County Amateur Radio Corps, Inc. New officers of the Greenville College Radio Club are HAW, WØFBX, KN9DNZ, and KN9DKL. The club station, K9BJV, is actively on the air. KHJ is proud of the 16 foreign stations he worked mobile while in Florida on 20 meters. Add to Silent Keys LXJ, EL, and YNE. BRD measured the living room, plus the dining room, and came up with a twin-plex 8JK beam for 20 meters. He got heck from the wife, raspberries from the kids, and $8 from VP9Y with 20 watts. UIN has discontinued his code lessons for the summer, but promises to return in the fall. The Midwest V.H.F. Club puts out a fine bulletin filled with v.h.f. news. Fritz Franke, of Hallicrafters, spoke on engineering v.h.f. receivers at the June meeting. LI has been appointed Radio Officer of the c.d. set-up in Elgin and is seeking fifteen operators. DSO reports that Smitty, ex-9NRB, now 4AIX, has had a heart attack and must rest for six months. MRQ, ex-ILN, Asst. Route Manager, is now retired in Winter Haven, Fla. Additional calls heard in the section are KN9s DKL, DNZ, DNN, CJB, CMI (mother of BHF), and DEE. A new General Class licensee is CJB, who is burning the midnight oil to complete his DX-100. K9ABQ also is staying up late on his 6-meter rig. The following made BPL: DO, SHR, YYG, MAK, UBI, and SIM/9. Items for this column must reach us by the fifth of the month. Traffic: (May) W9DO 1390, SHR 1061, YYG 610, MAK 573, UBI 487, SIM/9 370, OKI 139, CTZ 86, SXL 81, FAW 70, YIX 64, DUA 48, K9CFJ 47, W9BUK 42, FRP 40, STZ 38, LL 20, EDH 19, VSX 19, BRD 16, WJQ 15, PCQ 10, KLD 2, UIN 2. (Apr.) W9EHY 11.

INDIANA — SCM, Seth Lew Baker, W9NTA — Asst. SCM: George H. Graue, 9BKJ. SEC: QYQ, RMs: DGA, JBQ, TQC, and UQP. PAMs: CMT, EQO, and UXK. More stations are needed to check into QIN. This net meets at 1900 EST on 3656 kc. Mon. through Sat., and RFN on the same frequency at 0800 Sun. If you are a little slow on c.w. the fellows will gladly slow down and help you. This is a vital link in our traffic system so your participation will be welcome. Appointments: JIY as OES; ALL and JOZ as ORSs. AJA has a regular sked with Scotland on 15 meters. RMA, K9AQM, and K9BBO are now General Class. APO is going teletype. EHH has a Ranger. NTR made WAS and will spend the summer in Wyoming. STW attends Cornell. New calls: KN9DCV, KN9DCX, KN9DGF, KN9DJU, and KN9DNK. EQO reports IFN evening traffic as 307, morning 235, total 542. UQP gives QIN as 249. RFN had 85, as reported by TQC. EHZ gives 55 for CAEN. The Armed Forces Day Parade in Muncie was directed by 6-meter stations. VDS now is Tech. Class. New officers of the Martinsville ARC are SWC pres.; NTA, vice-pres.; DUD, secy.-treas. JKR had his DX-100 damaged by lightning. LVL, KEP, and MUO are mobile. The Mobile ARC of South Bend elected YRW pres.; MYI, vice-pres.; JCF, secy.-treas.; NAR, act. chairman. KN9-AVA is active on 2 meters. AB has an NC-300. Those making BPL are NZZ, JYO, ZYK, TT, KTX, and DGA. Congratulations to all who helped during the May floods. A fine job was done and a letter thanking the amateurs was received from the Indiana Flood Control and Water Resources Commission. An early report of a bad storm in the Columbus Area enabled the Army to track it by radar. IQP received special mention for this. Don't forget the Evansville Hamfest to be held Aug. 26th at Bauers Grove. OSH received his 20-w.p.m. certificate. The State RACES plan was approved by Region 4 Headquarters and sent to FCC for final action. ZKX has a new Elmac in his car. The XYL Club of Marion Co. is being organized. OSH made WAS. Traffic: (May) W9NZZ 856, JYO 720, ZYK 525, TT 502, EHZ 376, JOZ 366, EQO 335, SVL 317, TQC 250, KTX 210, UQP 142, ALL 126, DGA 124, SWD 101, AB 70, NTA 61, ACW 48, QYQ 47, WBA 45, VNV 43, CC 30, BKJ 27, UXK 24, WUH 24, WTY 23, DKR 21, AZF 18, PQZ 16, CMT 15, WHL 13, LFN 12, DOK 11, EGV 11, NSY 11, HST 10, LGD 10, SVZ 10, QR 8, YB 8, YVS 8, EJW 7, BUQ 6, FHA 6, BDP 5, DZC 4, JGS 4, RZS 4, HPO 3, NTR 3, QXL 1, WAC 1. (Apr.) W9EHE 45, WUH 15, FHA 10, LDB 9, NH 9.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — SEC: OVO. PAMs: AJU, NRP, and ESJ. RMs: KQB and BVG. Nets: WIN meets on 3535 kc. at 7 P.M. daily; BEN 3950 kc. 6 P.M. daily; WPN at 1215 Mon.-Sat., 0930 Sun. Wisconsin mobile and emergency frequency: 29,620 kc. Your attention is directed to the new WIN net frequency of 3535 kc. CXY put up a new 5-band doublet and scores with another BPL. KQB's DX total stands at 70 countries worked with 57 countries and 28 zones confirmed. JCL now is using an SX-24. MCK has been active on 9RN. SZR is home for the summer and has turned in the trusteeship of GOC. FFC is working in Madison. SQM converted his mobile to 40 meters. The Point Radio Amateurs acquired a 1-KW gas-engine generator. The Oshkosh Club has a net on 1815 kc. Sun. at 9 P.M. MRAC officers for the coming year are LJU, pres.; ZPV and DOS, vice-pres.; HDH, secy.; CUW, treas.; and MOT, ONY, YFW, and RXS, directors. GFL has been active with mobile, but his doctor, LON, says to take it easy. IZD has been making skip contacts on 50 Mc. OVO received May reports from the following ECs: APU, EIZ, JLU, KCL, MYG, NRP, RQQ, RUF, UFY, YCY, YQH, and AKY. The BEN picnic was held at Power's Bluff Park July 8th. New in the Janesville Area are KN9s DCO, DFN, DEA, DFR, DBV, DGT, DGM, DHT, DBR, and DGL! Congrats to YNO and his new XYL. KJJ's sister received her call, KN9DDX. FZC has a new NC-300. GMY is changing QTH from Superior to Milwaukee. KXK added a Heath Q5-er to his HRO. Traffic: W9CXY 506, KQB 98, SAA 43, EIZ 42, JCL 40, MCK 35, SZR 30, AKY 13, FFC 12, SQM 10, RQM 9, OVO 5, RTP 5.

DAKOTA DIVISION

SOUTH DAKOTA — SCM, Les Price, WØFLP — SCM assistants are APL, YKY, HOH, GQH, FKE, RMK, TI, MZJ, and GDE. PAM: UVL. RM: SMV. The 75-meter Emergency Phone Net had 29 sessions: GDE (NCS) 9, UVL 9, RMK 5, OII 4, SCT 2; QNI 659, high 42, low 9, average 21.25; QTC 81, high 10, low 0, average 2.6; in-

(*Continued on page 86*)

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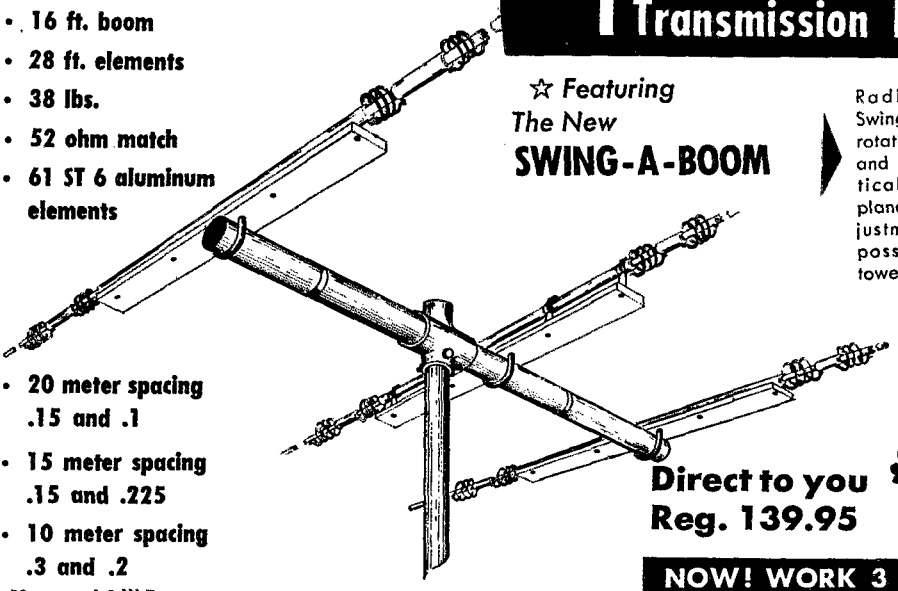

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formals 79, high 11, low 0, average 2.55. The South Dakota C.W. Net: SMV (NCS), QNI 63, high 7, low 2, average 4.8; QTC 35, high 8, low 0, average 2.6. The net will be QRT until Sept. 3rd. RRN reports new calls in the SFARC are KNØEYY and KNØGJX. The club has produced 8 Novices who are now studying General Class theory with IGG. CYY built a new DX-35. The SFARC now publishes a monthly bulletin called *Feedback*. ZWL has been on vacation. DTB has returned home to Centerville from French Morocco, where he held the call CN8GN. Harry Scholten, Vermillion, is now VIM. His mother received her General Class license in April. KØACX dropped the "N" from his call. HON, the son of DIY, is on 144.9 Mc. VMM, Huron, has a Mosley 10-meter beam and an NC-300. ELV and MMQ, Yankton, are now mobile. EUJ has the mobile installed in the station wagon purchased during the winter. Officers of the Mitchell ARC are WCN, pres.; WLU, vice-pres.; GWS, secy.; GWL, treas.; GCP, act. mgr. Traffic: (May) WØSCT 170, SMV 30, GWS 25, BQH 22, BQS 16, DVB 12, FLP 12. (Apr.-May) WØZWL 303.

MINNESOTA — SCM, Charles M. Bove, WØMXC — Asst. SCM: Vince Smythe, ØGGQ. SEC: GTX. RMs: KLG and DQL. PAMs: JIE, LUX, and UCV. The YL Convention was a huge success and we must give credit to the North Star YL Club and the various committees who worked so hard for its success. There were 35 licensed YLs on the registration books. Total attendance at the smorgasbord was 135 OMs and YLs. QXI won the main prize, which was a National receiver. 8ATB said that she will be host at the next YL Convention, which will be held in Flint, Mich. The St. Paul Radio Club, Inc., will sponsor a Dakota Division Convention in St. Paul sometime in 1957. Save your nickels for this event as the convention committee says it will be the biggest one ever put on in the Middlewest. DQL, ITQ, CGK, RLQ, and KJZ attended a Tall Corn Net dinner in Iowa. KNØGFM is the youngest YL to receive her license. She is only 10 years old. GIZ and GJA are now licensees. The Teen Age Net, which meets at 1730 on 3810 kc., held an election of officers and CKE was elected as the new net manager. GKI is a new ham at Blue Earth. ZBL will be off the air for the summer so will be rebuilding his rig. We should salute DQL, KJZ, and ITQ as they have just received their A-1 Operator Club certificates for their excellent operating and handling of the traffic nets. More of us should strive for this coveted certificate. It is the mark of an excellent operator. ALW has received a TCPN certificate for traffic-handling. RGJ has erected a 45-foot tower for a 10- and 15-meter beam. OMC is building a 6-meter rig and plans to be on the air this summer. RLQ won a Johnson Adventurer transmitter at the YL Convention. VBS received his WTO (Worked Toledo, Ohio) certificate. VBS is working for Univac for the summer. Bob worked PY1AE and KH6DQ on 40 meters. PAM just got on 20-meter c.w. LIL has a new 1-kw Viking. Traffic: WØWVO 423, KJZ 256, KLG 194, RLQ 152, TUS 113, WDW 105, IRJ 79, VEP 72, ALW 66, KFN 56, QVR 49, ZEL 38, IMJ 33, ZLV 31, UMX 30, WMA 30, ZBL 25, BUO 21, LUX 20, VXO 20, KNR 19, GTX 18, OSJ 17, KXW 16, OJG 16, LST 14, UMJ 14, EMZ 13, QXF 12, QDZ 10, TCK 9, LIG 8, FCU 5, MXC 5, UBD 2, VBS 1.

DELTA DIVISION

ARKANSAS — Owen G. Mahaffey, W5FMF — ZBX renewed his EC appointment and reports a complete civil defense and emergency set-up in West Helena with an emergency radio unit at the City Hall, a patrol car and two fire trucks radio-equipped, and one of the finest and best-trained volunteer fire departments in the state, also an active auxiliary police force. All of these departments are interested in emergency work and have had a thorough course in emergency first aid. TID is the new OO at Conway. KN5GCF is a new ham in Warren. KRO soon will have a new 500-watt all-band rig on the air. KN5EUY, GMH, and GHG are three new Novices in Booneville. K5BOC has moved to Fort Worth, Tex. I wish to remind all Arkansas hams to start thinking about a new SCM as my term expires in October and ill health won't permit me to accept the nomination next time. Traffic: W5KRO 11, K5BOC 10, DKT 10, W5YHC 4.

LOUISIANA — SCM, Thomas J. Morgavi, W5FMO — The Baton Rouge ARC reports activity on 6 and 2 meters is picking up; also there is mobile activity with hidden transmitter hunts. The mobile frequency is 3805. K5AGJ reports TFQ is president of the Jefferson ARC. Recent grads of Jefferson ARC are KN5s GGR, GGT, and GHJ. Several others are awaiting receipt of their tickets. JFB expects to move south of the border. BSR changed over his mobile from 6 to 12 volts. He now is using the new Gonset 66 receiver. ZNI is building a 20A to drive a pair of 813s. K5AHF is a new ORS appointee. He operates on 75, 40, and 20 meters. EKY is EC for Morgan City and vicinity. EA has moved to West Monroe and now is R.E. for KNOE. NDV is active on MARS, NTS, and TXN. MXQ is the new trustee for the New Orleans ARC. After some horse-trading, HSM will be on 75- and 40-meter mobile. NUH should be on soon with a Viking Ranger. EIH runs a kw. on 75 and 20 meters, s.s.b. DLR is chasing the bugs in his DX-100. SVP is getting his share of DX on 20-meter s.s.b. KHX has ordered an s.s.b. exciter and expects to drive an 813 final with it. VAS still is struggling with his s.s.s.c. exciter. CUV is probably the youngest sideband operator around New Orleans. Most CD appointments in the Louisiana section expired during June. Check the date on your appointment and forward your certificate to the SCM if you want your appointment continued. Please check the mailing address of the SCM on page 6 *QST*. Mail reports promptly at the end of each month. Monitor 3905 kc. Louisiana calling frequency. Traffic: W5MXQ 143, K5AGJ 120, W5NDV 74, YSN 69.

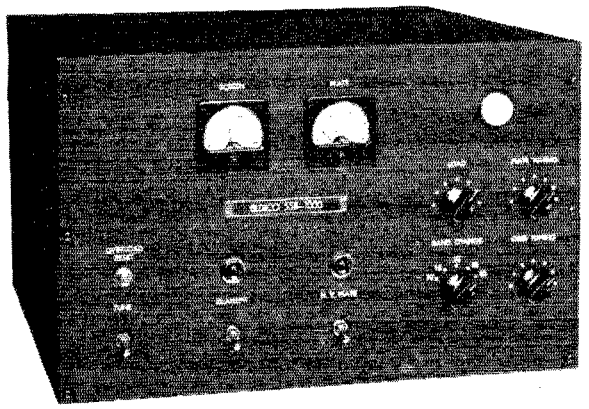
TENNESSEE — SCM, Harry C. Simpson, W4SCF — SEC: RRV. PAM: PFP. RM: WQW. It is with regret that we report the passing of HHB, husband of K4DIZ, and father of K4DHA, breaking up a 100 percent ham family. PFP reports an average of 38 stations reporting into TPN, with a Sunday average of 47. IV reports TN is closed for the summer, but a new summer net now is in operation. The net handled 354 QTC in May. IV is taking a 3-week rest in Florida, leaving matters in the capable hands of WQW. IHDQ spoke at the Memphis meeting, en route to the Galveston Convention. Memphis hams had a busy week during the Cotton Carnival. To open festivities K4DSI, W4HSX, HUT, BAQ, HHK, and SCF manned units on the Royal Barge, Ceremonial Barge, and Mud Island, coordinating all riverfront activities to split-second timing. GQQ, IBG, YMB, FRB, WTI, BAQ, UDI, WBK, YMG, CLQ, IQX, BAO, ADM, WSP, LI, DCH, LVW, VVQ, K4CTA, and K4GII were responsible for the smooth handling of four major parades. SCF, a Carnival Director, narrated two parades, a portion of the riverfront activities, and a portion of the Children's Ball, where STI, WSP, and K4GPZ were utilized to advantage in coordinating the various events. BAQ, FYJ, CLQ, IQX, NBN, STI, UDI, K4BMC, K4CTA, and K4GII assisted with communications at the mammoth Water Regatta. UIO reports ETPN will continue throughout the summer and had 301 QTC during May. WQT spent a week in Albuquerque, then attended the Birmingham Fest with CVM and was back in Clarksville in time for the Armed Forces Day traffic. K4GFL has a new shack, with a new house around it. PL is back in the big traffic again. TYW is mobile again. UVU reports KN4JJN is the first YL ham in Maryville. Congratulations to the Chattanooga High School ARC on its recent ARRL affiliation. BKT, secy-treas. of the Tri-County ARC, reports ARRL's slide collection, "The First Thirty Years of Amateur Radio," is really worth seeing! Traffic: W4PL 965, WQT 222, TZD 149, IV 125, UIO 96, VJ 73, K4DIZ 54, W4PQP 51, PFP 46, SCF 45, WQW 39, UVL 31, K4BMC 27, GFL 27, W4PAH 25, HIH 22, BAQ 12, HUT 6, TYW 6, DCH 4, HSX 1, PVD 1.

GREAT LAKES DIVISION

KENTUCKY — SCM, Robert E. Fields, W4SBI — SEC: CDA. PAM: YYI. RMs: ZDB and ZDA. Traffic on all nets is slowing down because of the warm weather and the fact that a lot of our people like to get out in the old gas buggy and get some fresh air with the family. To all the fellows who expected to see "LUM" at the Mammoth Cave hamfest, on that day I was in the hospital. I am not well yet and may have to return to the hospital. The SEC, CDA, urges all stations to contact their ECs and apply for AREC. Let's organize Kentucky to meet emergency communication needs. KKW, manager of 9RN, says conditions have been very bad because of rain and storms. K4DLI says he has a new 10-meter ground-plane antenna up and it is doing a good job. SZL says he is in the process of forming a ham club in Glasgow. SBI has a new 20-meter ground plane up and it is doing an FB job. OMW is a new Class II OO. ZDA our RM, has just recommended three new stations for Section Net certificates (c.w.). They are NGN, K4AIS, and K4CIA. YYI, our PAM, has recommended two stations for Section Net certificates (phone). They are BQG and 5IYT/4. Traffic: W4KKW 140, NIZ 94, K4HEV 83, W4RPF 47, CDA 43, NGN 40, SZB 34, AUD 24, JSH 24, K4DLI 22, W4SBI 20, K4CIA 15, W4ZLK 6, BZY 3 SZL 2.

MICHIGAN — SCM, Thomas G. Mitchell, W8RAE — Asst. SCM (phone) Bob Cooper, 8AQA; Asst. SCM (c.w.) Joe Beljan, 8SCW. SEC: GJH. Look who is our top traffic man this month. RJC came up with BPL on his second month back in service — it sure is good to have Herb back with us. The top three stations this month made BPL. Congrats to all and more so to PHA, who now has three in a row to put him in line for one of those coveted traffic medals. The total May traffic count was about 140 per cent of the April total. Who says that conditions and yard work are hurting the traffic business? NOH is back in action with an eighteen-element beam on 2 meters. The Annual West Michigan V.H.F. Picnic will be held this year on Aug. 12th at the Allegan County Park. New officers for that organization are EYD, pres.; JUQ, secy.-treas.; and NOH, act. mgr. FX says that his new QTH requires more non-ham work than he planned on. WXO worked sixty locals in their QSL Contest. The Holland Area Radio Club is installing equipment for its station in the Holland Red Cross Headquarters. HSE reports on the Southeastern Michigan Radio Association mobile tornado

(*Continued on page 88*)



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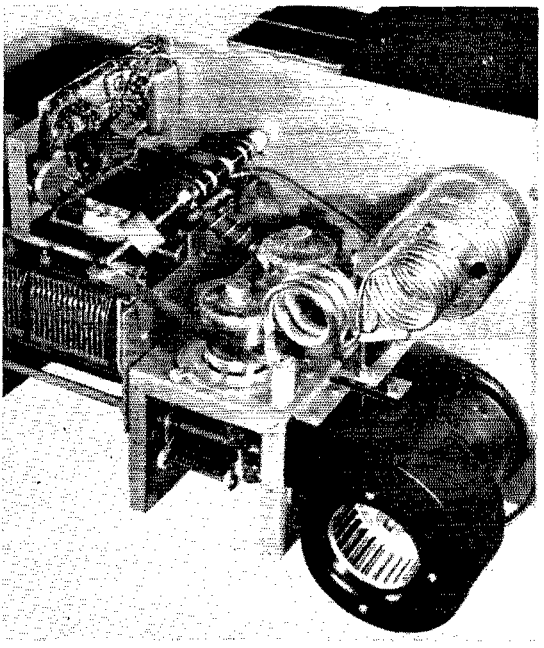

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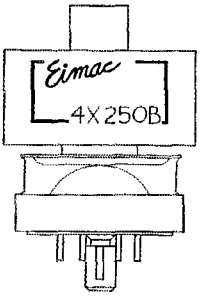

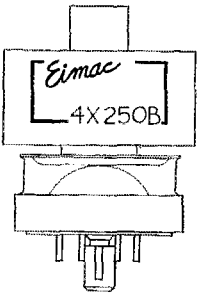

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warning net on 1806 kc. This is in conjunction with the Detroit Weather Bureau and QNK is the NCS. Newly-affiliated ARRL clubs in Michigan are as follows "Brass Pounders" Amateur Radio Club (Mueller Brass Co., that is), Port Huron; Mike and Key Club of Detroit; and the Holland Area Radio Club. SYV reports that 6-meter activity is on the increase in the GR region and that ESR is lacking only Arizona and Wyoming for 50-Mc. WAS. In recent exchanges of correspondence with the MOCD regarding our part in the RACES plans I have been assured that we are being included in the plans being currently worked out in cooperation with our SEC. Traffic: (May) W8RJC 645, PHA 322, NOH 319, SHP 178, ILP 172, NUL 119, QQO 106, FWQ 103, SCW 68, DAP 56, IKX 47, FX 44, RVZ 41, WXO 40, ZLK 32, QIX 31, SJF 20, GKT 16, TQP 16, RAE 13, EGI 10, FGB 9, PHM 9, AUD 7, SRK 6, SWN 6, DLZ 3, HSG 3, HKT 2, UCN 2. (Apr.) W8TQP 12, SWN 2.

OHIO — SCM, Wilson E. Weckel, W8AL — Asst. SCMs: J. C. Erickson, 8DAE; and E. F. Bonnet, 8OVG. SEC: IPB. RMs: DAE and FYO. PAMs: HPP and HUX. WE was in the hospital recently for an operation. The Ohio Novice Net meets Mon., Wed., Fri. and Sun. on 3735 kc. at 1830 EST. WRN has a new four-element beam for 50 Mc., a sixteen-element for 144 Mc. and will put up a twenty-element beam for 220 Mc. and sixteen-element for 432 Mc. when the winds cease. EVY worked Argentina on 50 Mc. BAX has a new transmitter, receiver and antenna on 432 Mc. LPD has worked 7 states on 220 Mc. All of us regret the passing on of Lt. Cmdr. Donald A. Hoffman, USNR Ret., FRY (ex-8ADU and 8UX). It was he who suggested the QSL card that is used the world over. Your SCM and Don had been friends since the spark days. IVE was presented a son by his XYL and has a new NC-300 receiver. Another son was presented to TNF by his XYL. DL has a new NC-300 and is installing an Elmac rig and receiver in his boat on the Ohio River. ARO built the 5-tube Super in the '56 *Handbook*. NAF worked 2BV, 2CXY, 9AAG, 9EGH, and 9GAB on 144 Mc. GDQ reports the Lorain County RACES plan is up for final approval. HXB has worked 30 states mobile. PMJ reports the Geauga County net now is on 52,400 kc. OHP has gone mobile. JHJ has moved to Midvale. BCB has a KW on 75 meters. WTU has his General Class license. THF was home on leave from the Navy. MQQ is Toledo's ham of the month; he graduated from high school and the BN sure misses him. Sorry to report the passing on of CRA. The 3rd Annual Side Band Dinner was attended by 86. QOT has a new son. WMD and KN8AMT have new DX-35s. ZNU and his XYL have twins and KPJ has a new daughter. HPP graduated from school and is net control of the Doghouse Net. PHR has a new modulator and his v.f.o. working. VWX has a jr. operator. Again I am begging some station in Youngstown to report into the Buckeye Net on 3580 kc. at 7 P.M. EST or into the Ohio Phone Net on 3860 kc. at 5 P.M. EST. It is hard to understand why a city as large as Youngstown does not have a station in either or both of these nets. This also applies to Warren, for we have a lot of traffic for these cities. The Hocking Valley Radio Club's picnic was held on July 15th at Lake Burr Oak near Glouster, Ohio. Traffic: (May) W8VTP 744, FCJ 439, UPH 430, PLQ 193, DAE 142, UPB 119, HXB 80, RO 56, AL 55, DG 52, HZJ 44, EQN 42, OPU 40, IIR 38, CVZ 30, ARO 26, STR 17, HPP 15, UHW 14, SDI 11, GZ 8, UOS 8, RN 7, PZS 6, EEQ 5, MGC 5, QXH 5, BBW 4, ELF 4, ILE 4, PIJ 4, QIE 4, VCP 4, JMD 1, MYV 1. (April) W8UPH 90, SDI 45, UOS 42, STR 30, HPP 10, EQN 8, PBX 8, UHW 8, USU 6, PZS 5, URN 5, STB 3, HNY 2, IA 2, SES 2, VCD 2, LMB 1.

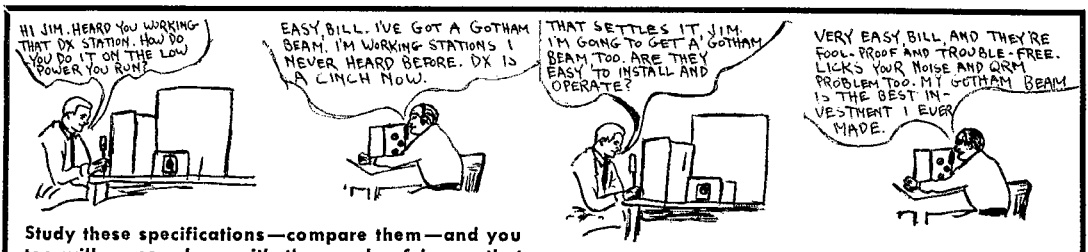
HUDSON DIVISION

EASTERN NEW YORK — SCM, George W. Tracy, W2EFU — SEC: KGC. RM: BXP. PAMs: GDD, IJG, and NOC. Section Nets: NYS on 3615 kc. at 1900 EDT; ESS on 3590 kc. at 1800 EDT; NYSPETN on 3925 kc. at 1800 EDT; SRPN on 3980 kc. at 1030 EDT; IPN on 3970 kc. at 1530 EDT. We introduce our new SEC, KGC, and thank RTE for a job well done. The IBM Club had a transistor night and auction in May. New officers are MHE, pres.; LWI, vice-pres.; K2ICM, secy.-treas. The Albany County boys who handled the Memorial Day Parade by mobile included AAO, GTI, K2AYH, and HQI and Novices OZS and QPO. New appointments: NOC as PAM, K2OSY and PPB as OPS, PHX as ORS, EWO and K2HPQ as OOs. Family team EWO and VDX are the proud parents of a new daughter. LWI works W8 and 9 on 2 meters. The Rip Van Winkle Club's new officers are JKJ, pres.; JYU, vice-pres.; ESL, secy.-treas.; EYG and JYU, program comm. Movies of his world trip were shown by APF at the Schenectady Club dinner in June. Congratulations to WQL and his XYL on the arrival of their third harmonic. K2GJC is heading out to W6-Land to stay about a year. FW is sending code practice each Sat. at 1100 EDT on 1815 kc. New ticket-holders include K2SJX as Technician and K2KFH and QIX as General Class. The new editor of Harmonic Hill's *Zero Beat* is K2DRN. All Eastern New York is sorry to learn of the resignation of SJV as SCM of Western New York. We wish you a speedy recovery, Ed. The July dinner plans at IBM were headed up by K2EKE. All ECs are reminded to drop a line to the new SEC outlining fall AREC plans. Traffic: (May) W2BXP 346, EFU 130, K2HPQ 85, JEQ 41, W2ATA 18, GTC 10, K2BBJ 9, W2BGO 9, HNW 6, AWA 4, EKS 3. (Apr.) K2PPB 108, HPQ 58, JEQ 17, EDH 16, W2BGO 14, K2EHI 12.

NEW YORK CITY AND LONG ISLAND — SCM, Harry J. Dannals, W2TUK — SEC: ADO. PAM: OBW. RM: WFL. Section nets: NLI 3630 kc. nightly at 1930 EDST and Sat. at 1915 EDST; NYC-LIPN 3908 kc. Mon. through Sat. from 1730 to 1830 EDST. WFL reports that NLI handled 224 messages during the month. OBW and the NYC-LIPN group are doing a fine job. KEB, KFV, and K2GHS made BPL. AEE has sent in reports to the SCM for 51 consecutive months. K2DEM has contacted 80 YLs toward YLCC. With a new all-Elmac mobile in the car, BO visited the Rocky Mountain Division Convention in Colorado. K2CUI is visiting in Europe for the summer. K2OPJ moved to Syosset. CKQ is the newest Tu-Boro RC member. LGG is home from Purdue for the summer. A new Heath Q-multiplier has been added to HAC's HQ-129X. UGF has a new phone patch. K2KRJ has a new Ranger and is working on a 10-meter mobile. PF is using a multiband trap antenna. His son, IVA, has returned from his first year at M.I.T. A new Communicator II and v.f.o. are in use at K2DDK. K2JTS is using a B&W 5100B. K2ICU now has 300 watts on the air. Seven countries have returned calls from K2JZR's DX-35 rig. BQM now has 131 countries on phone. HVC runs a Viking II. IGS holds the Amateur Extra Class license. K2CF worked his 101st country. K2GRE has an 811 on 80 to 20 and a 6146 on 10 meters. K2KRC added Florida and Wisconsin on 6 meters. The Fordham Prep RC now signs K2TAY. Officers of the club are K2RDN, pres.; K2RFT, vice-pres.; KN2SHI, secy.; and KN2RJI, treas. New officers of the Nassau RC are K2MFD, pres.; K2EVO, vice-pres.; NYN, secy.; and CB, treas. After a layoff of eight years, HAE has returned with a Ranger. Hicksville H.S. has started a club with K2JNE as prexy and K2JOY as veep. The Nassau 6-meter Net holds hidden transmitter hunts on 50.25 Mc. at 8:30 P.M. on the first Fri. of each month. New mobiles with the group are ACH and K2s IBG, MOF, and RMA. Other new 6-meter stations are K2s JDI, RZP, and SUU. Officers of the newly-formed Bethpage RC are K2PQL, pres.; K2CVM, vice-pres.; K2ESO, secy.; CTR, treas.; YKM, activities.; and KN2RIV, publicity. Columbia U., AEE, lost prexy K2DPG to Uncle Sam. Veep K2JYD took over as pres. pro-tem. K2QMF and K2KNC dropped the "N." GQP, EC for the Five Towns Area, reports weekly AREC drills on 144 Mc. K2MYR has a Ranger and an HQ-140X on the air. New officers of the Fordham RC are K2MIR, pres. IVG, vice-pres. KN2QBC, secy.; K2CQY, treas.; K2CWQ, activities. IN has moved to Staten Island. K2PWH has a new 75A-4. Frank also has added a 6-meter beam 50 feet off the ground. Officers of the Fieldston School RC are K2KND, pres.; K2GHS, vice-pres.; KN2RCX, secy.-treas. K2IZI worked his first VK on 20-meter phone. K2LEP and his new DX-100, with OBW present, worked 23 states on 75 meters in a single all-night session. New officers of the NYRC are CMM, pres.; SUC, vice-pres.; ATT, secy.; and OGX, treas. New members of the NYRC are MDG and K2KGU/KP4IO. New calls heard at the Brooklyn Civic Center RC are KN2s SLE, SOD, SOJ, and SQP. The Suffolk County RC goes over 60 in membership, with DCI and K2s EHH, EHB, LEP, QKR, and QLC as new members. JUN sports a new DX-100. K2LUR is communications head for Uniondale. KN2QOV made WAS with his Adventurer. K2KSP is handling traffic. RZH uses an ARC-4 on 2 meters. K2s KTU and OPT received their General Class licenses. K2MQV is enjoying an SX-100 and has a KW Matchbox for his 4-250A rig. Traffic: W2KEB 1997, KFV 1407, K2GHS 460, W2AEE 270, WFL 149, K2DEM 146, W2ZUM 94, BO 91, K2CUI 77, W2GP 71, K2OPJ 69, W2TUK 61, JGV 47, OBW 29, LGK 22, K2EQH 16, W2FTV 13, HAC 12, K2IHD 12, RJO 12, W2EC 11, UGF 10, IAG 9, K2KRJ 9, W2PF 6, K2DDK 4, W2DUS 4, IVS 4, K2JTS 4, KSP 4, W2WL 3, YBT 3, K2ICU 2, JZR 1.

NORTHERN NEW JERSEY — SCM, Lloyd H. Manamon, W2VQR — SEC: IIN. PAM: CCS. RMs: MLW, CGG, and NKD. VCZ has a full kw. and a new two-element beam on 40-meter phone. K2CHI has been doing some experimenting with short beams on 20 meters. K2GFX has a new electronic keyer. ZPD is moving to a new QTH. The NJN monthly activity report shows a total of 27 sessions, attendance 309, and a traffic total of 260 for the month of May. The Tri-County Radio Assn. operated under the call LI/2 on Field Day. The OCARA held Field Day at Tuckerton under the call AFU/2. The Northern New Jersey section wishes to welcome the following counties into the section: Hunterdon, Somerset, Sussex, and Warren. All active appointments previously issued by the SCM of Southern New Jersey are being transferred to Northern New Jersey and new certificates are being issued. Your SCM will appreciate hearing from all active amateurs residing in the mentioned counties. We would like to hear from you regardless of whether you are a League member or not. The SCM solicits your help in expanding the ARRL field organization in these areas. The fine cooperation of the Southern New Jersey SCM in making the changeover

(*Continued on page 90*)



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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.)

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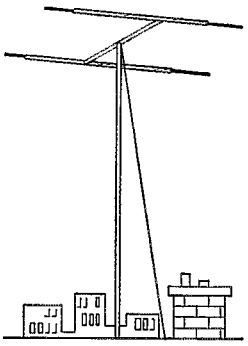

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☐ Std. 4-El Gamma match	16.95	☐ T match	19.95
☐ Deluxe 4-El Gamma match	25.95	☐ T match	28.95
10 METER BEAMS			
☐ Std. 2-El Gamma match	11.95	☐ T match	14.95
☐ Deluxe 2-El Gamma match	18.95	☐ T match	21.95
☐ Std. 3-El Gamma match	16.95	☐ T match	18.95
☐ Deluxe 3-El Gamma match	22.95	☐ T match	25.95
☐ Std. 4-El Gamma match	21.95	☐ T match	24.95
☐ Deluxe 4-El Gamma match	27.95	☐ T match	30.95
15 METER BEAMS			
☐ Std. 2-El Gamma match	19.95	☐ T match	22.95
☐ Deluxe 2-El Gamma match	29.95	☐ T match	32.95
☐ Std. 3-El Gamma match	26.95	☐ T match	29.95
☐ Deluxe 3-El Gamma match	36.95	☐ T match	39.95
20 METER BEAMS			
☐ Std. 2-El Gamma match	21.95	☐ T match	24.95
☐ Deluxe 2-El Gamma match	31.95	☐ T match	34.95
☐ Std. 3-El Gamma match	34.95	☐ T match	37.95
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☐ Beam #R15 (15 Meters, 3-El)..... 49.95

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is greatly appreciated. Many thanks to SCM Brooks, K2BG. We consider this added territory to Northern New Jersey the big news of the month and it all came about through the efforts of Director Cooke, OBU, with the assistance of the other Board members. FSL kept K2NR active in the amateur bands during his tour of duty as RM3 with the Navy. The Avenel Radio Club has the following new members: KN2SMJ, SMO, SMP, SOH, SYV, and TBC. The Avenel Club meets the 1st and 3rd Sat. of each month at its headquarters in Avenel. KFR reports increased s.s.b. activity in the New Jersey Phone Net. Art has a 20A followed by an 814 final. GVU is rebuilding the s.s.b. rig. CJX is out of the hospital. Best of luck for a speedy recovery, OM. K2EQD was on a Naval Reserve cruise with K2KFE to Havana. While there he visited the Radio Club of Cuba. AMB was speaker at the Raritan Bay Radio Amateur Club and gave a very fine talk on s.s.s.c. techniques. The IRAC had Mr. M. McCade, of Bell. Tel. Labs., give a talk and demonstration on transistors at a recent club meeting. The Bloomfield RACES group handled all communications for its c.d. director during the recent statewide alert by radio. All land lines were declared out. It was a real cool QSO the other evening when K2ICE worked KN2SNO. PWX is experimenting with a "Long John" on 144 Mc. K2HNA has a new 144-Mc. array atop his tower. The same goes for K2ARQ. KBI has a new QTH in Sea Girt. K2DHE has a new steel tower in the back yard. K2IPR is very active on 144 Mc. with RTTY. DVD has joined the ranks of the RTTY society in Monmouth County. NIE has taken to the high seas for the summer season. Traffic: (May) W2MLW 298, K2EQP 173, W2VMX 67, BRC 58, ZVW 54, CFB 22, OXL 17, K2BWQ 10, W2KFR 10, K2EMJ 9, W2CVW 4, NIY 2, GVU 1. (Apr.) W2VMX 62.

MIDWEST DIVISION

IOWA — SCM, Russell B. Marquis, WØBDR — The TLCN held its 9th annual party at Marshalltown with 37 attending. LGG was elected the new manager and has received an RM appointment. The present and all four past managers of the Tenth Regional Net were present. The Iowa 75-meter Phone Net picnic will be held in Marshalltown on August 5th. GUD has an RTTY outfit going and is looking for AFSK contacts on 144 Mc. The Cedar Valley Club furnished communicatins for a local 60-mile motorcycle run. Mobiles reported time checks from several points along the route. VCM is on vacation in Arizona. KGX and PIK are taking their vacations in California. EFL finally has his Ranger on the air. KØEFS has a new DX-100 and AUU is using a DX-35. The Waterloo Club is now incorporated, thanks to the efforts of PFS. KØAAH and BRD have their General Class tickets. KNØEZK is a new Novice in New London. KØEFW and KNØEZY are new hams in Waterloo. ZPM is a new member on TLCN. NTA has a new KWS-1. TYK has his 50-foot towers up and is going to string about 1000 feet of wire between them. BBZ was home on leave from the Navy. KØARN has joined the Air Force. Traffic (May): WØBDR 1938, SCA 1540, LCX 721, LGG 669, BJP 661, CZ 372, QVA 143, LJW 120, KØDBW 81, WØBLH 69, SQE 64, PKT 62, YI 62, UTD 45, NGS 28, FDM 25, NYX 22, VWF 22, KVJ 21, YCL 21, KØBEC 17, WØPTL 17, HNE 13, YUA 12, KØCLS 5, WØFSK 5, GJN 5, DJY 4, KØBAX 3, WØQQA 2; (Apr.) WØBSG 9, WPM 8.

KANSAS — SCM, Earl N. Johnston, WØICV — SEC: PAH. PAM: FNS. RM: QGG. The Larned Amateur Radio Club is now affiliated with ARRL. Congratulations. Christy's Picnic, held May 20th, was well attended, as was that of the CKRC, of Salina, June 3rd, with a record-breaking crowd. NAS, of Wichita, with his mini-power mobile rig (3 watts), was heard over 25 miles on ground wave and has worked many stations via skip. Bill must have a real efficient set-up. ZJB has a new 32-element beam up and CDH now has a sixteen-element job. MXG and KKF, of Topeka, won 2-meter beams at the CKRC picnic. V.h.f. activity in Topeka is picking up. We have seven on 2 and three on 6 meters now. The WARC and the ACARA, in Wichita, competed for high honors in Field Day scores. A number of clubs are going out for colored shirts and insignias. The Wheat Belt Club and the Johnson County Radio Amateur Club are the most recent groups acquiring such. CJI, of Arkansas City, reports a club is being formed there with plans to affiliate with ARRL. Traffic is holding up quite well so far this year. Traffic: (May) WØBLI 430, NIY 236, FNS 174, QGG 164, TOL 155, YVM 86, SAF 50, RXM 42, ABJ 41, FDJ 30, FCE 29, ONF 28, IHM 25, QGB 23, KØAHW 7, WØLQX 7, LIX 5, IHX 4. KNØEAM 3, WØECD 3, EIM3, LOW 2, UAT 2. (Apr.) WØLQX 9.

MISSOURI — SCM, James W. Hoover, WØGEP — GCL is on vacation and working 75-meter mobile in California. JHY is building a new shack in his basement. GEP's activities were curtailed somewhat with the arrival of a new YL jr. operator. GAR reports that he became a grandfather. The Howard County Amateur Radio Club has just been organized with KØBSE, pres.; LSQ, vice-pres.; VTF, secy.-treas.; and ORL, act. mgr. BZK received the degree of BS in E.E. from the Mo. School of Mines. He plans to attend the U. of Illinois in the fall after working in New York this summer. New officers of the Mo. School of Mines Radio Club are ZEK, pres.; IFY, vice-pres.; KNØDEY, secy. WFF is working on his Master's Degree thesis, and will work in St. Louis this summer. The Northwest St. Louis, Kirkwood High School, and Three Rivers Radio Clubs are now ARRL Affiliated Clubs. Lightning melted the antenna and damaged the transmitter of PME. New officers of the St. Louis U. Radio Club are: KØAWM, pres.; ZQV, vice-pres.; W9SBW, secy.; UVD, treas. SAK was the valedictorian of his high school graduating class, and his brother, ZOI, carried the same honors at eighth-grade graduation. VPQ and OMM received Traffikers certificates for 1000 and 2500, respectively. New officers of the Bandhoppers Radio Club are: EXN, pres.; NOA, vice-pres.; FIN, secy.-treas. OUD has a new bug — a present from the OM. The following Springfield stations are on 15 meters: FNN, WEP, TWL, ICW, GCL, QWS, and YWS. Traffic: (May) WØCPI 1905, GAR 626, GBJ 349, OMM 120, KIK 89, VPQ 83, OUD 75, IJS 67, HUI 59, CKQ 52, IIR 46, BVL 36, RTW 29, YKC 16, GEP 11, KØACK 10, WØBUL 10, WAP 5, MFB 4, OIV 4, KA 2, SAK 2. (Apr.) WØIJS 51, WFF 33, KØACK 8.

NEBRASKA — SCM — Floyd B. Campbell, WØCBH — Asst. SCM: Tom Boydston, ØVYX. SEC: JDJ. PAM: MAO. The Lincoln Amateur Radio Club is in possession of a big school bus which will be the Lincoln-Lancaster County Communication Center for emergency work as well as c.d. It seems that the c.d. people did the buying, licensing, and insuring. JDJ has put in double conversion (85-kc. i.f.) in his BC-348 and now needs another stage of audio. VEY is EC for Seward and County. ZWG is Assistant EC. The Tri-State Club was out in force for Armed Forces Day, with CIO as NCS on 10 meters with mobiles WFX, ZIN, ZXP, AWN, DJU, YRY, and FBY. KØEMU and CIO have completed reconditioning work on a 5-kw. generator for emergency use. The Western Nebraska Net handled 22 pieces of traffic with 27 sessions held. 7CQL and 7ZDT are new members. QKR will be heard from Sidney. The Nebraska 75-meter Emergency Phone Net is holding morning sessions at 0745 CST on 3983 kc. with PNS as NCS. TIP, KØCDG, and ZJF are alternates and from reports the band is more like the olden days at that time of the day. DGW is on 75-meter phone. RIG is down in Arkansas but must not be able to get hold of a ham station. Traffic: WØZJF 359, DDT 119, UJK 118, MAO 99, TIP 70, ZWG 44, KØCDG 41, WØEGQ 40, KØFBD 32, WØNIK 25, FXH 24, ORW 23, KØBDF 15, WØMJK 12, KØBYK 9, WØPDJ 8, SPK 7, KLB 6, PNS 6, PPT 6, DHH 5, TFZ 5, ZWF 5, KØFDU 4, WØHQE 4, ZIN 4, ZOU 4, KØBQY 3, WØGTW 3 EFV 2 KFY 2 BOO 1.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Milton E. Chaffee, W1EFW — SEC: LKF. RM: KYQ. PAM: YBH. Traffic Nets: MCN meets Mon. through Fri. at 0645 on 3640 kc.; CN meets Mon. through Sat at 1845 on 3640 kc.; CPN meets Mon. through Sat. at 1800 on 3880 kc., plus Sun. at 1000. YBH reports for CPN: Traffic 241 in 30 sessions averaging 7.8 per session, with DHP and YBH on 30 times and RRE and VWL 27 each. MCN handled 74 in 22 meetings for a 3.36 average, with RFJ, BVB, and TYQ the most consistent reporters. KYQ reports for CN: Traffic 309 in 27 sessions, averaging 11.4 per session, and notes QNI honors to RGB, AW and LV. EFW and RGB also report to Morning Watch (7080 kc. at 0700 daily) which is managed by former Nutmegger 4IA (ex-1UE). ZZK has cracked the DXCC list with 111 confirmed. GST has a new Viking II and is planning a higher-power final for it. BDI puts out Official Bulletins on RTTY using tape at 63 w.p.m. Ed also has a new Lazy H antenna for 20, 15, and 10 meters. GIX continues active on the phone nets and maintains his OBS schedules. TD is working the "swing shift" and changing too often for schedules. DHP is a regular on CPN using an AT-1 rig. OO reports were received from BVB, GIX, and RFC. FVV is having fun on 6 meters with his Gonset and submits the only OES report for May. APA records a new NC-300 and much success on 20 meters, including KC4USA and SVØWN on Crete. YBH, our new PAM, and your SCM would be interested in knowing if there is any traffic-handling on 6 or 2 meters and whether a PAM appointment for v.h.f. will help matters. How about your comments? As of this writing we also need an SEC to relieve LKF. Any volunteers or suggestions? How about more news from clubs or individual operators? We can't fill the space without your help. Traffic: (May) W1YBH 388, AW 376, TYQ 222, KYQ 171, RGB 157, EFW 140, CUH 102, LV 62, ULY 56, RFJ 48, DHP 40, BDI 36, BRE 34, YNC 31, BVB 30, KV 13, APA 12, HYF 8, AVS 6, GVJ 6, GIX 5. (Apr.) W1GVK 11. (Mar.) W1YNP 112.

MAINE — SCM, Allen D. Duntley, W1VYA/BPI — SEC: TVB. RM: EFR. The Barn Yard Net meets Mon. through Sat., 1800–1930, on 3960 kc.; the Sea Gull Net Mon. through Sat., 1700–1800, on 3940 kc.; the Pine Tree Net Mon. through Sat., 1900–1930, on 3596 kc.; and the State C.D. Net Sun., 1100–1200, on 3993 kc. Please note the change in the Horse Traders Net from Sun. at 1100 to Sun. at 1700 on the same frequency, 3940 kc. DAW is now located at Millinocket, but what is that station we still hear in Greenville Junction? It is with regret that we accept the resignation of WTG as PAM. All Maine was

(Continued on page 92)

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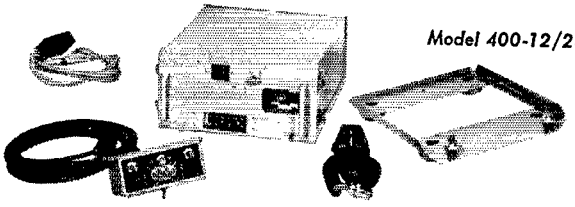

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saddened at the untimely passing of Hazel Kempton, W1LYR, June 8th. 4BU/1BRU is back from the Southeast and says he has his work all done so he can play with you guys and gals this summer. There is more and more activity on 2 meters. Congrats to the new Novices and General Class boys and gals. Tactical calls are being issued for RACES use in the c.d. More and more county plans are getting approvals. Your SCM is Radio Officer and has his in for Cumberland County. WSV is trying to get transferred back to Maine. Are WTG and WTH going to move south, South Augusta that is? "Kilowatt City," progressing on Heart Break Ridge has enough stray r.f. to light the street lights. We are sorry to hear about LVR. See you all at Dexter on the 19th; your SEC also will be there. Traffic: W1LKP 184, WTG 141, CEV 74, NXX 23, UDD 16, BCD 14, BX 12, K2MVP/1 2.

EASTERN MASSACHUSETTS — Frank L. Baker, jr., W1ALP — Appointments endorsed: ALP Radio Officer for Sector 1-B, JSM Waltham, BWH Attleboro, DWY Beverly, AWA North Reading, ICU Amesbury, VVZ E. Bridgewater, ZYX Area 1 Radio Officer, VYI Topsfield, CLF Norfolk, ISU Holbrook, PJ Everett, SS Lincoln, LQQ Hamilton as ECs; JSM as OES; QMJ and SS as ORSs; AWA and LQQ as OBSs; UKO, DJ, LQQ and SS as OPSs; LQQ, AYG, and MKW as OOs. Heard on 2 meters: KMW, IJQ, LQN, LQ, ADL, IVF, IFR, IB, FJE, KCO, IOO, KFG, SYV, LXR, PZA, JQA, 2BR/1, and 3KTR/1. HAJ is on 10 meters. Heard on 75 meters: LI, DY, ATD, ZFS, EUI, WTY, ELA, EMZ, ACC, LIU, HWE, PCO, ZGW, UGC, OFO, GJA, DEI, and ZDD. KWD went to Canada on a trip. Quincy has a RACES license. KXY is new in Quincy. FEY is now General Class. IAP has moved to California. OTZ now is in Braintree. HKK had his 6th child. UGA says that AF helped out with auto races in New Hampshire supplying transmitters. BGW says the East Coast RTTY Net is on 3622 kc. The Braintree Radio Club held its annual banquet and installed the following new officers: MME, pres.; CTR, vice-pres.; Ronald Russell, secy.-treas. CTR is back on 2 and 10 meters. WN1KIA is new in Hingham. BW has a new 60-ft. 10-meter ground plane. JOT is moving to Needham. DMS is working at WBET, Brockton. AYG has a 20-watt mobile. NF is on 20-meter c.w. Area 1 Radio Comm. held a meeting with KTG, TQP, LLY, QQL, ALP, and ZYX present. Radio Amateur Open House held two meetings. BFV is teaching at Natick High. The South Shore Club held a meeting. BPW is working DX. EMG made BPL again. WZJ, who has been operating K1AIR, will be out of the Air Force in June and will be on from Hartford. CDU has been helping out and DNF and 7MEF/1 will be at K1AIR. EPE is on 160 meters some and is NCS of APN, 7080 kc. Mon. at 5. CSS has a new DX-100. DGY has a 60-ft. tower and beam on 10 and 20 meters. ALP and his XYL had their 25th wedding anniversary. AUQ says there is not as many Novice out-of-band harmonics as there were. SMO took part in the Red Cross drill in Belmont with 5 other mobiles. He has a DX-100 and an SX-96. The Twelve Hundred Radio Club, JNX secy., is now affiliated with ARRL. VHH is going to college. New officers of the T-9 Radio Club are MVQ, pres.; TJP, vice-pres.; KON secy.; ISX, treas. The Cape Cod & Islands Amateur Radio Assn. held its picnic in the USO Hall in Falmouth because of wet weather and had over 100 present. An auction was held for the benefit of SGL. FGL and WEW are in the RTTY Net. JFS has a ground-plane antenna for 10 meters. NWS has a four-element beam on 10 meters. AGX has a new two-element beam. LUS is in Boston Hospital. The Minute Man Net is now on 3970 kc. at 0730. AZU is learning Spanish by working the LUs. SPE has a v.f.o. for the TBS50-D. WGN's rotor on the beam is bothering him. JHZ has a Heath-35 transmitter. MHN is having local noise QRM. UIE is going to California. DIR has a vertical coax antenna on 10 meters. MUM is recovering slowly from his injury. Old-timers in New Bedford still active are AGW, AVY, AWD, and AIQ. The QRA held a meeting with a movie on "Texas Towers" by TVD. IGK has a new daughter. AWO is on 2, 10, 15, and 75 meters. The Medford Amateur Radio Assn. has been holding classes for code and theory. ZQN, AOG, ENS, and ZDN are helping out. MJA is on 10 meters with a low-power rig. SXD has a DX-100. UG still is on a cruise. CFU is rebuilding the receiver. ADL is on 6 meters. PIW is working on TVI. CGU and VYS are on 6 meters. EK is converting the ARC-5 for 2 meters. CMT is building the 829 for 2 and 6 meters. AGR is in New Jersey. BL has an NC-183. LMU is on 2 meters again. The Winthrop drill had the following on: DLY, AGB, DEL, BDU, CMW, DJ, OIR, GBI, MQB, IRV, SAM (ex-K2CCQ), TTH, TEO, EHZ, UOC, NMX, and IOO. They also had an unexpected net emergency at the hospital when a rain storm cut out all phones and TQT, DPN, BB, DEL, and DLY filled in with communications. UOC rescued three boys from an overturned sailboat at the Boston Airport. Traffic: (May) W1EMG 619, K1AIR 327, W1EPE 218, NUP 71, UKO 51, GNX 48, AVY 47, DFY 44, CUW 36, AUQ 28, JFS 16, TY 16, WU 14, QLT 12, AKN 11, BGW 11, SMO 8, BB 7, DUO 3, BY 2. (Apr.) W1BGW 18, AOG 11.

WESTERN MASSACHUSETTS — SCM, Osborne R. McKeraghen, W1HRV — SEC: RRX. RM: BVR. Asst. RMs: DVW and ZUU. PAM:QWJ. The WMCW Net meets on 3560 kc. Mon. through Sat. at 1900 EDST. The net

(Continued on page 94)

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5-Element 6-Meter Beam

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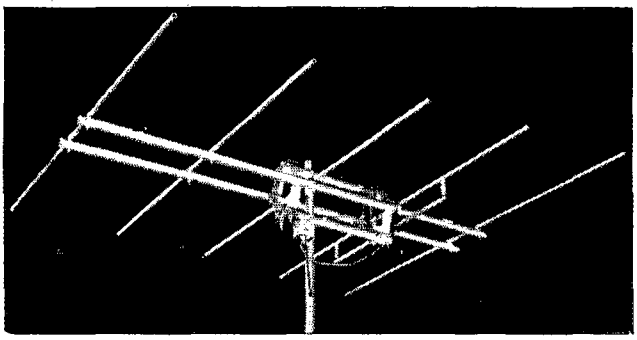

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Massachusetts; New Bedford; E. A. Ross & Co., 1663 Purchase St.
Cambridge; Selden Distributing Co., 800 Massachusetts Ave.
Michigan, Ann Arbor; Purchase Radio Supply, 605 Church St.
Battle Creek; Warren Radio Co., 308 W. Columbia.
Detroit; M. N. Duffy & Co., 2040 Grand River Ave.
Grand Rapids; Radio Parts, Inc., 542 Division Ave., S.
Jackson; Matteson Electronics, 1617 East Michigan Ave.
Kalamazoo; Ralph M. Ralston Co., Park at Water Streets
Kalamazoo; Warren Radio Company, 713 Portage Street
Minnesota, Minneapolis; Electronic Center, Inc., 107 N. Third Ave.
St. Paul; Hall Electric Co., 566 N. Robert St.
Missouri, Butler; Henry Radio
New Hampshire, Concord; Evans Radio, P.O. Box 312
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Also available with Baluns at slight extra cost.

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Model HM2-7AK	**7-element**	**12.60**
Model HM2-10AK	**5-over-5**	**13.95**
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NEW—2 meters

Model HCR2-1AK	**Corner Reflector**	Net, **$27.95**

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Model HM22-7AK (220 mc.)	**7-element**	Net, **$ 5.10**
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needs more c.w. men to help get better coverage and take some of the load off the regulars. AJX has joined the MARS system. ORS endorsement goes to ZUU. The new EC for Southbridge is TTN. All you appointees, please check your certificates and mail them in for endorsement. VNH has two states to go for 6-meter WAS and has a kw. ready with which to go after them. New Novices in Fitchburg are WN1KJA and KGJ. WN1FSJ, in South Hadley, has passed the General Class exam and will be active on several bands with an Adventurer and an NC-57. The Hartford County v.h.f. group received the gavel again from the HACRA v.h.f. gang, following the annual v.h.f. dinner at Tinti's in Agawam recently. The interclub contest found Hartford the winner again. The Pequoig Amateur Radio Klub has been formed in Athol with nine full members and meetings will be held the 2nd and 4th Mon. of each month. Officers are WPW, pres.; BKO, vice-pres.; GUB, secy.-treas.; BGR and BGC, directors. The Central Mass. group held its annual fine gabfest at the Army Reserve Center in Worcester on May 12th and had an excellent turnout. Over 200 were at the banquet. Speakers were RO, FZJ, and HRV In a recent c.d. test of communications in Sector 4C, the sector control station in Belchertown was activated and established excellent two-way communication on 6 meters with Easthampton C.D. Headquarters. Easthampton also had a rig on 10 meters in operation and acted as liaison between sector control and a group of seven 10-meter fixed and mobile stations that included Northampton and South Hadley c.d. headquarters stations. Traffic: W1BVR 102, ZUU 79, DVW 43, TAY 16, HRV 12, RWR 12, AGM 9, BYH 2.

NEW HAMPSHIRE — SCM, Harold J. Preble, W1HS — SEC: BXU. RMs: CRW and COC. PAM: CDX. NHEN meets Sun. at 1300 on 3850 kc. The Granite State Phone Net is on summer schedule and operates Mon., Wed., and Fri. at 1800 on 3842 kc. with ragchew sessions at 0900 Sun. The Concord Brasspounders held a supper meeting and initiation May 12th. Thirteen new members were initiated. JNC was MC and a good time was had by all. The Great Bay RC held its annual chowder party at Hampton Beach on May 12th. EVN has received his General Class license. QGU is back at Snowville for the summer. YHI reports FB mobile activity in Manchester on 10 meters. ARR has been reappointed OO. GMH is doing fine and hopes to be back on the air soon. VP7BG, formerly W1TBS, is looking for the New Hampshire gang on 20 and 15 meters, phone or c.w. AOQ is pleased with the QSL from Yasme. WBM expects to receive RACES equipment for Strafford Co. early in June. He soon will be mobile with a new Elmac AF67 and Gonset Communicator. Welcome to Novices IUW, IXH, IYE, JDR, JEM, JFJ, JFP, JHH, JIH, JNQ, JNZ, JQY, JWU, JWW, JYY, KCE, KCZ, and KND. Traffic: (May) W1HOU 68, HS 30, FZ 17, BYS 16, VZS 14, EVN 12, QGU 8. (Apr.) W1YHI 4.

RHODE ISLAND — SCM, Walter B. Hanson, jr., W1KKR — SEC: TQW. RM: BTV. PAM: VXC. All interest in the section is now centered on the ARRL New England Division Convention to be held at Rhodes on the Pawtuxet on Oct. 21st. It will be an all-day affair sponsored by the PRA. The *BCRA Bulletin* has burst into print with club news. UTA recorded a perfect mouth's attendance with RIN. YKQ is now RIN manager. CMH received a first grant at the R. I. Science Fair. Ground has been broken and the foundation is down for the new PRA club house. BTV was honored by many hams on his 25th wedding anniversary on June 2nd. VXC reports RIIN (29,260 kc. at 1930) averages 7-plus stations nightly and TGD reports CDN (29,000 kc. at 2000) averages 8 stations. NZR has left the post of Rhode Island's most eligible bachelor wide open, and we congratulate him! BIS did a fine job with the Red Cross Open House demonstration May 20th. LU and the PRA cooperated in the event. CPC was awarded the PRA outstanding amateur trophy at the Dinner Dance May 19th and SGA received a special award for meritorious leadership and service. Traffic: (May) W1BXN 155, UTA 118, VXC 75, BBN 51, BTV 49, CMH 33, TGD 15. (Apr.) W1BXN 94, UTA 91, BTV 89, BIS 49, YKQ 39, BBN 34, CMH 18, ZDS 8.

VERMONT — SCM, Robert L. Scott, W1RNA — SEC: SIO. RM: OAK. I suppose the biggest news of the month is that OAK is on phone!! By golly, it is good to hear you on, Ann. I haven't had the official word yet from Headquarters but I *think* the Vermont C.D. operation came off well as far as the radio operators were concerned in spite of very bad band conditions. Wonder if the ones who operate v.h.f. and 75 meters came to the same conclusions as I. As most of you know, I have resigned as your SCM. I wish to thank all of you for your fine cooperation during my term of office. It has been greatly appreciated. Ann, OAK, has been appointed Acting SCM. I hope that you will see fit to elect her to the office when the time comes. She has done an excellent job as your RM, and you know what a fine *RF Bulletin* she gets out. Traffic: W1OAK 81, VZE 33, AVP 27, IT 24, RNA 16.

NORTHWESTERN DIVISION

ALASKA — SCM, Dave A. Fulton, KL7AGU — AIZ is now running two transmitters, one on 75 and one on

(*Continued on page 96*)

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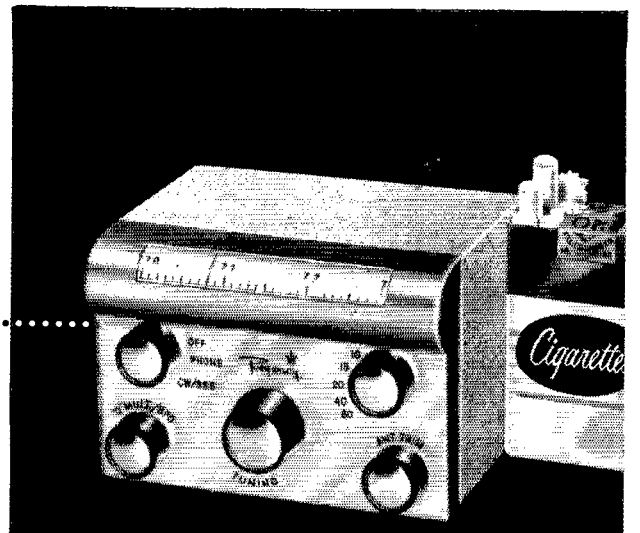
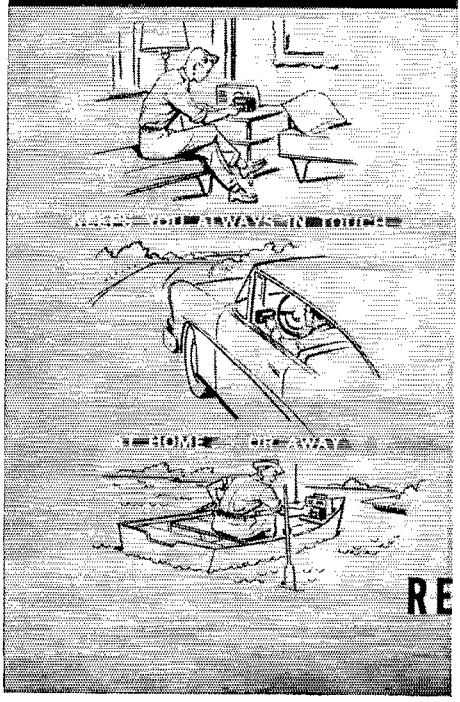


4¾"x 3¼"x 4⅛"—weighs only 30 ounces

a tiny self-powered converter that connects INSTANTLY to any receiver



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The ATC-1 provides AM, CW and SSB reception on the 80, 40, 20, 15 and 10 meter amateur bands. Sensitivity is 5 to 10 mv for 6 db signal-noise ratio. A modified "Q" multiplier circuit improves sensitivity and selectivity for phone operation. Smartly styled aluminum cabinet is covered in dark grey tweed with satin finished aluminum front.

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20 meters, using a BC-610 into a doublet on 75 and a kilowatt on 20, a.m., s.s.b., p.m. and c.w., using an 8JK antenna. Operating time on 75 meters is from 8:00 to 10:00 P.M. Adak local time. AIZ is handling phone-patch traffic and is looking for contacts with the eastern part of the U.S. The radio club at Adak recently was reorganized and is giving instructions to beginners. Three new operators are expected soon, as they have passed the exam and are awaiting their tickets. ANO, president of the Anchorage Amateur Radio Club has left for W6-Land and CF will become the new president with a new vice-president in the offing. AMS is the new SEC for the territory. Del has just taken over, and as soon as he has time to get things organized we hope for some AREC activity. The spring floods in Alaska kept local hams on the go, with ANO and PJ pulling most of the night shifts.

OREGON — SCM, Edward F. Conyngham, W7ESJ — The OARS Net shows a high percentage of activity. LRT has taken over as net director. RXO, SRK, YQK, KJN, NQE, DWO and LRT received new net certificates. During May 70 stations reported in, with a total check-in of 554 stations, 24 pieces of traffic, and 61 contacts. The past month the net was relaying the river reports from Longview, Wash., to PJO at the river forecasters office. Plans are being made to work with the Mountain Rescue Service. TMF made a speech at the Salem Lions' Club on amateur radio. HDN reports garden activity up, ham activity down. UHN is active on SAN training Novices. WFO is pounding brass on 80 meters. RGS, working DX on 6 meters, reports several good band openings. UJL had v.f.o. trouble but got help from VN (his algebra teacher), and turned up with some nice DX contacts. TSH spent most of the month ragchewing. YUY has a new multiband center-fed doublet. VXC is running parallel 813s with a Ranger for a driver. BLN has slowed down on activity because of his health. QYS is busy as SEC. The PRA showed a drop in activity because of vacations. WPW has the Lane County AREC Net going on 3865 kc. at 1730 PST. TMF is preparing for the OEN picnic at which the Salem Club will be host. ABJ is changing QTH. YZM has a new three-element 10-meter beam. RCL is busy as new EC for Multnomah County. QKU, OUS, RVN, PPQ, WFO, ENU, BLN, WFP, and VLE participated in mountain rescue work at Mount Hood recently. Reports of the communication service furnished were glowing. JCJ has a new Z match and is heading for VE7-Land on vacation. Traffic: (May) W7APF 1006, QKU 868, YZM 68, ENU 55, PRA 53, HDN 35, YUY 32, OMO 25, BLN 23, GUR 20, TMF 19, WPW 10, RCL 8, VXC 7, QYS 6, ABJ 4, JCJ 4. (Apr.) W7TMF 23, QWE 16.

WASHINGTON — SCM, Victor S. Gish, W7FIX — Activity on 6 meters includes W7s YJE, TMU, FEG, DYD, BKT, BEY, VOG, and mobile W6AXY/7. The Royal Order of Hoot Owls meets at midnight PST each Sat. on 6 meters. OE is back home after being /6 for a while. AIB installed a keyer circuit in the Ranger and has a new receiving antenna. AMC is getting a printing outfit together for QSL card work. FZB has been on the road and missing out on some skeds. WN7BEC reports high noise level because of his dad, WN7CIN, using a power saw while building a new house. YFJ is rebuilding while doing OO work. K6BDF/7 still is going to school but is down to two nights per week for the summer. BXH has a new antenna up and is working on an 80-meter ARC-5. AVM is drilling AREC and RACES twice a month. BA deplores the lack of good traffic routing and the amount of fouled-up words. JHX, SFO, and LRF are working on 432 Mc. HDT reports the 2-meter bug has bitten the Clarkston gang. WLK will be /7 at Port Orchard for the summer months. KTL is planning on s.s.b. AIB, YQA, and YQB now are MARS members. Please get your reports in to the SCM by the seventh of the month. Traffic: (May) W7PGY 2282, BA 2131, K7WAT 1148, W7OE 39, AIB 31, LVB 22, AMC 17, FZB 9, GVV 9, WN7BEC 4, W7KTL 2, YFJ 2. (Apr.) W7EYF 45, BXH 24, TH 23, WAH 15, TIQ 4.

PACIFIC DIVISION

HAWAII — SCM, Samuel H. Lewbel, KH6AED — KH6ABI has accepted appointment as Section Emergency Coordinator. Leon will handle all of the AREC activities in addition to the RACES operation for the Island of Oahu. KH6AVO and his XYL, KH6AWL, Dick and Violet Hoyt, have left Kona on the big isle for the States. KH6s AW, AOX, and BHB are converts to s.s.b. with all three using a Collins KWS-1. KH6BCA, George Dixon, and BMT, George jr., are leaving the Islands. This military transfer follows BBZ, Montgomery, and the Leeward Club will miss these boys. Hams visiting the Islands and bringing portable 2-meter gear should carry a crystal on 147.0 Mc., the local calling frequency. Traffic: (May) KH6QU 1050, KP6AK 101. (Apr.) KH6QU 769, KP6AK 98.

NEVADA — SCM, Ray T. Warner, W7JU — KRG, the only ham in Storey County, is on 40-meter c.w. CCA, who is on 40-meter c.w., has moved from Boulder City to Las Vegas. WN7CEY, of Henderson, is active on 40 and 15 meters with an AT-1. BRX was elected president of the Southern Nevada Amateur Radio Club. JU completed a grid-block keying modification on his Viking II which

(*Continued on page 98*)

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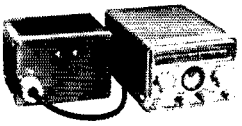

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2 or 6 Meter Linear RF Power Amplifier **149.50**

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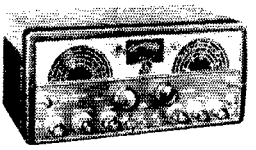

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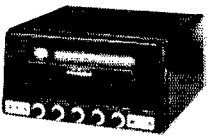

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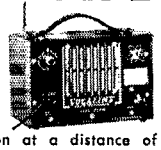

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resulted in increased activity on c.w. because of the smooth keying. The Las Vegas mobile gang continues to hold weekly mobile transmitter hunts, meeting at Sills Drive-in at 1 P.M. every Sun. Eight to ten mobiles have been showing up for these hunts. YLO has moved to Paradise Valley, thereby solving his TVI problem. My second term of office as SCM expires at this time. I wish to thank the appointees for their cooperation in promoting Nevada activities.

SANTA CLARA VALLEY — SCM, R. Paul Tibbs, W6WGO — SEC: NVO. The summer mobile season will be in full swing as you read this. In connection with your mobile operation this year try some emergency drills. Prepare your equipment for use in emergency work. Make your services available to the EC in your area. Ask him to organize problems for your group to use in drills, ironing out the weak spots in both equipment and operating procedures. K6DYX now is working a TCC sked along with his NCS spots on RN6 and NCN. VZT is going to rebuild the rig, working on key clicks. WGO is building a patio. The XYL of BPT underwent surgery and is improving each day. EOA is getting settled in his new home. HC is relaxing after scoring students on their finals. YHM reports he will have to make only a couple of short trips to Alaska this summer. ZRJ will attend summer school, piling up credits toward his degree at San Jose State. NCN members held a picnic on June 17th with a good turnout. ESQ is working on a new rig for c.w. operation. Henri expects to work in some traffic nets with medium power. VSV spoke at a meeting of the SCCARA. Now is the time for all you men working c.w. to help with the section and higher level nets during the summer. Spots will be open while those steady operators are on their vacations. You may have your choice of section distributing nets or long-haul TCC skeds. NCS spots also are available. Cut yourself in on some pleasant hours of operating this summer. Traffic: (May) W6YHM 438, YBV 376, K6DYX 338, W6BPT 277, K6GID 201, W6AIT 97, HC 26. (Apr.) W6HC 117.

EAST BAY — SCM, Roger Wixson, W6FDJ — Asst. SCMs: Harry T. Cameron, 6RVC and Oliver A. Nelson, jr., 6MXQ. SEC: WGM. PAM: LL. RMs: EFD, JOH, and IPW. From all reports at this writing the National Convention is going to be a great one. I hope to have seen a lot of you out-of-towners there and know that you will not have been disappointed. Around the clubs in the East Bay Section: The SARO celebrated its 20th anniversary. Fifty-six members, past and present, were in attendance. Out of the eight charter members who formed the SARO in Feb. 1936, five were present. Historical recordings, slides, movies, and photo albums brought back many memories. A display of old-time radio gear was featured, which included Kennedy receivers, Brookland detectors, loose couplers, vario couplers and a UV 202. King Lear, Kennady Medows Harring Medows Handy Award, Cold Hands, and Double DC all came to life again. The East Bay Club had an auction where all hands had a chance to unload their white elephants. The club enjoyed the event and came out on top. The Oakland Club had as a guest speaker Ralph Bykerk, from Telebeam, who gave a talk and practical demonstration of the new all-band beam known as the Adda beam, which gets its name from the fact that you can buy the various elements and traps separately to add bands to your beam. Wish I could have more reports from club secretaries on club activities. Traffic: K6WAY 632, TK 145, EPC 93, W6IPW 66, UPC 53.

SAN FRANCISCO — SCM, Walter A. Buckley, W6GGC — "Industrial Applications of Microwave", with slides to illustrate and a talk by Mr. Dent, engineer for Westinghouse Electronic Division, was enjoyed by all San Francisco Radio Club members at its May meeting. The San Francisco Ladies Club worked on "swoop" for the ladies attending the National Convention. Fran Wells, of San Francisco, spoke on "Feed Lines" at the Tamalpais Radio Club and from all reports the talk was enjoyed by all members who attended. The San Francisco Naval Shipyard Club and HAMS (Red Cross clubs) joined together to make Field Day a success. A question heard about in this section: Is Field Day a CD affair or is it getting to be a battle to see which club can get the most points? Has the original purpose of Field Day changed? A little thought should be given to these questions. MGZ has moved to Eureka from Southern California. KN6SGI tried to get his deceased father's call but was unsuccessful. K6KNX returned to Eureka to work for Ma-Bell after five years pounding brass for the Navy and one year for the Telephone Co. in San Francisco. K6BBS has been seriously ill in the hospital but is improving slowly now. TVI showed up twice in Eureka after no reports had been received for the past few years. K6DGA is in Oklahoma for three months for special schooling. LE, who runs the weather office in Eureka, was in Washington, D. C., at radar school taking a two-week course on new storm-detecting radar Installation of same is expected in Humboldt County soon. HSD is building a 15-meter rhombic, 3 half waves per leg, beamed on Europe. BYS added a 40-ft. vertical on top of his roof and is working DX with 300 watts. K2ANP is trying for DX with a new four-element 10-meter beam. KJ is very happy with the receiver and transmitter which he bought at the San Francisco Radio Club auction for $32 and is able to contact East Coast with the set up. KN6LRN

(Continued on page 100)

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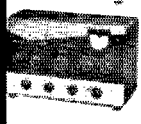

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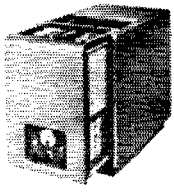

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worked 30 stations in 9 countries from Grizzly Peak in the last CQ U.H.F. Contest. K6HYW, K6HHI, KFS, and TDT made 96 contacts in 14 countries using a converted BC-522, an array of antennas and emergency power. Cathay Club members worked 6 and 2 meters with K6EOW, K6GOW, K6CKE, ZHO, SIV, and K6KTP working the rigs. The latest luncheon held by the 6-meter club was attended by 87. The Boy Scout Exposition held in San Francisco had communications on 2 and 6 meters with K6LIC and K6HYA manning the rigs. K6LCH is operating on 75 meters from the Coast Guard radio station at San Bruno. He is using a Heathkit DX-35. GQA reports that it's almost impossible to copy the Novice harmonics because of the QRM from Novice harmonics. FEA has daily skeds Mon. to Fri. with K6WAY, Parks A. F. Base. QMO acts occasionally as liaison station for RN6 and PANN and handled 223 messages for May, all c.w. K6TFM is working on a monitor and an antenna for break-in work. CBE reports that DX is terrific on 20-meter c.w.; he is now up to 97 countries. Traffic: W6FEA 236, QMO 223, K6IFM 68, W6GGC 28, WJF 18, GHI 10, GQA 2.

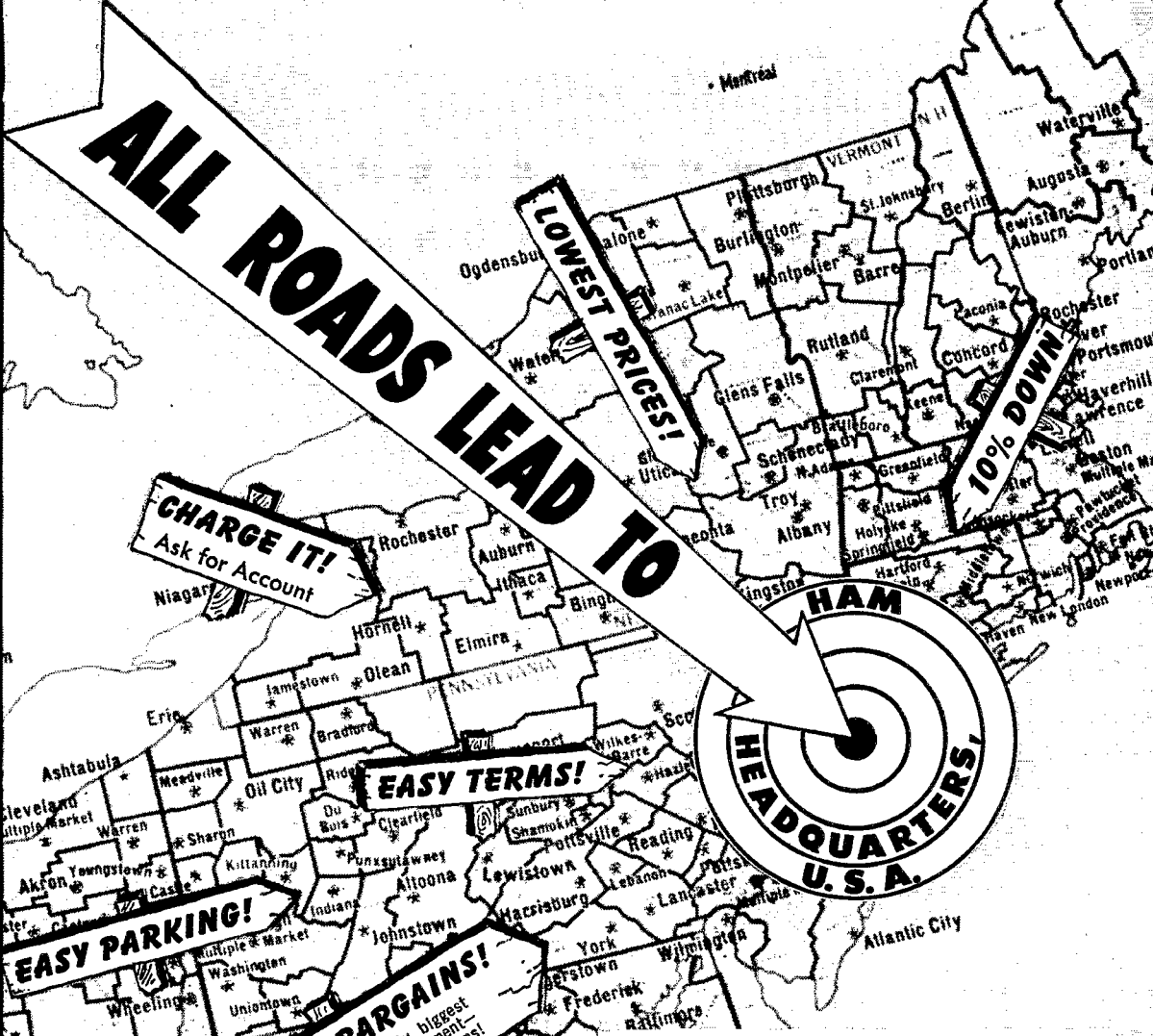
SACRAMENTO VALLEY — SCM, Harold L. Lucero, W6JDN — Fellows, emergencies will come again. Are we really prepared? How many really can handle traffic in the correct manner? We have nets that will teach us just that. Let's get on the band wagon and be in a real condition to cope with anything. Let's check the nets, RN6, CVN, and any other that appeals to you, but do your best to be prepared. The RAMS of Sacramento paid a return trip to the Yuba-Sutter Club, at Gridley, and a fine time was had. Even the SCM turned out. LIZ sent in a nice picture of the picnic. K6ER probably will go down in history as the best OO. RXX is now on with the 75A-4 and is really doing a fine job. KKI has recovered from mumps. OXC has not been heard from for some time. What's doing? HGW has his 75A-2 in for repair. CMA is doing great on RN6, CVN, and ALN. Why don't you fellows jump in and give Ed a hand? It would be appreciated. K6EHT also is doing a fine job. K6KPG will be heard on the top 50 kc. of 20 meters soon. Look for him. PKU, formerly 2PKU, is chief engineer for KGMS. Let's hear more from the 2-meter gang. JDN is collecting aluminum tubing for 2-meter beams. Look out, fellows, it's coming soon. Hi. I wonder what fellows will get the meaning? The Shasta County Amateur Radio Club enjoyed a picnic along with a transmitter hunt. This is the second of that nature and I do hope more will follow. Traffic: W6CMA 300, K6EHT 145, W6MWR 83, JDN 9, ILZ 6.

SAN JOAQUIN VALLEY — SCM, Ralph Saroyan, W6JPU — All Emergency Coordinators are requested to send in reports monthly to your Section Emergency Coordinator, EBL. It takes only five minutes a month to make up your report, so let's do it. Activity on 6 and 2 meters seems to be on the increase here. The club 2-meter repeater is doing a very fine job for the mobiles. An 8080-kc. crystal will trip it and it transmits on 146.7 Mc. LTQ, ex-SSO, is back on 75-meter mobile. Many thanks to JPS and DVL for their work on the c.d. 110-volt generator. It is capable of 9 kw. and was used on Field Day, which was held at the KJEO television site. UJU has a Leece-Neville in his Mercury, and his battery problems should be at an end. VBQ has moved the store and all to Berkeley. EBL is sporting a new 75A-4. The Pleasant Valley Radio Club is now meeting in the Naval Reserve Electronics Center. K6GOX has an 80-foot tower with a three-element 6-meter beam. ADB is a new Official Observer in Turlock. DVL bought a bus and converted it into the finest communications rig I've seen. OUX has a very fine mobile antenna farm. Remember the weekly check-in on 3990 kc. for the Fresno Civil Defense Net every Monday night. See you next month. Traffic: W6ADB 184, EBL 28, GCS 3.

ROANOKE DIVISION

NORTH CAROLINA — SCM, B. Riley Fowler, W4RRH — SEC: ZG. PAM: DRC. Your SCM is very happy that all ECs except one made a report on Form 5. TQU made the most complete report received. Congratulations to the Winston-Salem group. DKE sent a complete report of the Havelock meeting. The Forest City meeting was a success in every way. As a matter of general interest to the amateurs in the section we have registered for AREC the following: 247 members, 225 full members and 22 supporting; 18 local nets that conducted 56 tests last month; 25 Assistant ECs; 106 official mobile units and 46 emergency power units. This is an excellent report in many ways. We have 25 Emergency Coordinators who are working and at least 25 Assistant Coordinators who are really getting this job done. Thanks so much, fellows. During the month we had two conferences with the SEC and plans are shaping up for a complete coverage of the State in case of a communications emergency. Your SEC visited the Asheville Radio Club and your SCM attended the Forest City meeting. Emergency Coordinators should secure a copy of the Emergency Plan for the Winston-Salem group. I am sure TQU would be happy to send you a copy. Groups interested in forming a RACES organization should communicate with ZG or the State civil defense director. Traffic: W4DTI 77,

(Continued on page 102)



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(Of course, if you can't visit us, my mail and phone

K4DJZ 71, W4VBO 44, FDP 42, DSO 35, DRC 33, K4ARP 31, W4ZWF 31, RRH 28, CVX 2.

SOUTH CAROLINA — SCM, Bryson L. McGraw, W4HMG — Welcome as new ECs, ZGP, EKG, FVV, TPE, CCE/4, and VPN, with ZRH, our SEC, reporting more to follow. New AREC members are W4s SWT, USW, VPN, TPE, and K4s CSB, GGK, AAH, CNG, and AQB, KL7BLD/4, and AUD/4. SOY, a new ORS, is doing a great job. ZVY is a brand-new Official Observer. K4BEG takes on the ball and chain Aug. 18th. FFH is authoring an FB article in the RH bulletin. The Spartanburg Club was active in the Peach Blossom Golf Tourney with mobiles DFR, BEW, NTO, UUB, HDX, YAA, HME, and ZFC relaying in the scores to club station K4BEW/4 with KN4IRJ assisting. UUB, now on RTTY, is believed to be the first in the state. Orchids to the K4FAI gang for the FB traffic work. CXJ (Lois) and KGQ (Ted) are the proud parents of a new son. The Shaw-Sumter Club has a new club house and its own club newspaper with GIF as editor as well as its own 10-meter net with BWC as NCS on 29.626 Mc. CXJ and ALM are proud owners of WAS pasteboards. Congrats to CWO on dropping the "N." ASA is the proud papa of a new YL. Congrats to the Greenville Club on its swell hamfest and many FB prizes, with HDR taking the big one. ILQ and his committee can be proud of another good 'fest. GQV reports the RH fellows are proud owners of an emergency-equipped bus completed and sporting a 150-watter, all bands, emergency powered. Your SCM had an FB meeting with the Aiken Club with ZVY as M.C. Thanks, ETB (Betty), for your consistent reports on the Edisto Club doings. DXW and our mobile net make swell listening Sun. at 1400 on 3930 kc. Checking on AKC and the c.w. net nightly on 3795 kc. makes for good listening and learning how good c.w. men can handle a job. FFH and the phone net are growing almost nightly. Traffic: W4AKC 180, ZIZ 176, FFH 104, HMG 36, CAL 4.

VIRGINIA — SCM, John Carl Morgan, W4KX — There was a pretty fair turnout for the Virginia QSO Party despite atrocious propagation conditions and the fact that the Roanoke 'Fest took place the same day. Top scorers were K4BUI first; K4ASU second; JUJ third. Novices: KN4IIQ first; KN4HKL second. Only 12 logs were received at deadline, including two Novices, although at least 150 stations were known to have participated, including a couple of dozen KNs. Full details will appear in the *Virginia Section Bulletin*. JLS reports 74 were known to have participated in the Richmond Spring Tune-up. Top honors go to KN4DIF, with JHK runner-up. There was a fine turnout at the V.F.N. picnic held at the NV/SB farm in Fluvanna County. K4AET was elected VFN mgr.; K4ASU, asst. mgr.; and ONV was reelected secy.-treas. 3WDP, of K4MC, took over PFC's skeds. K4DKA BPLed, the hard way. ATQ reminds us of the Annual Shenandoah Valley ARC Hamfest to be held Sun., Aug. 5th at Dickey Ridge. K4BUI announces the formation of the Old Dominion ARC at So. Boston. Fine bulletins were received from CXQ and AAD for the Peninsula and Petersburg Clubs, respectively. IA has his DXCC certificate on the wall, and son TFX, home from G.W.U., is close on Ev's heels. BIJ has racked up 85 countries since December and keeps busy with OO work. JUJ really makes a career of contests, the latest the Delaware and Vermont QSO Parties. Speaking of persistence, KN4IYE bemoans only TWO answers out of 88 CQs! (Any antenna, Billy?) LW is building a 160-meter rig for VON when he gets ashore soon. K4DBC and W4s FKY, CZB and HMK operated a station at the High School PTA Achievement Night. UWS was elected president of his class at N. C. State. PWX has orders to go to Okinawa. VQZ is completing the portable/mobile v.h.f. rig he plans to use in the V.H.F. Contest. VSN is QNT for the summer but VN continues unabated, as of course does VFN. Traffic: K4MC 864, W4IA 251, KRR 173, K4DKA 137, ASU 118, W4FKP 88, IKF 60, K4DBC 49, EAQ 41, W4SZT 41, AAD 33, UMC 18 TYC 15, CZB 13, CXQ 10, K4CZB 6, W4VQZ 4, LW 1.

WEST VIRGINIA — SCM, Albert H. Hix, W8PQQ — The Princeton Club is to be congratulated on the fine picnic which it sponsored recently. ETF and WVF have been appointed Deputy Radio Officers for the civil defense organization for West Virginia. Let's all get behind HZA, ETF, and WVF and assist them in their efforts to provide an adequate emergency communication system. NYH attended the Roanoke, Princeton, and Forest City, N. C., hamfest recently. Frank rarely misses a ham get-together. BWK renewed ORS appointment. KBT became an OBS and an OO. The No. Panhandle Radio Club is sponsoring a TV program called "Have Hobby" to acquaint the public with amateur radio. Officers of the club (Wheeling Area) are BWK, pres.; ENJ, secy., and DFA, treas. EYP received his General Class ticket and has his 20-w.p.m. c.p. certificate. WN8AXU is a new Novice in Elkins. In less than two months he has worked 31 states, which is an excellent record. KN8AGA is working in Ohio temporarily. GIU is quite active on all bands. TKT and TQB operated their rigs at a Science Open House Demonstration at Union High School recently. VMM is a new Conditional Class licensee. He formerly was a Novice. PBO and GAD are very active. Both plan RACES activities. KN8BIT is a new Novice in South Charleston. He is on with 50 watts and an HQ-129X

(Continued on page 104)

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receiver. Results of the W. Va. QSO Party are: KXD 1st prize, 3VKD (ex-8CNZ) 2nd prize. GBF 3rd prize, PZT 4th prize. Congratulations, fellows. Traffic: W8KXD 198, PBO 132, HZA 67, BWK 44, NYH 10, PQQ 2.

ROCKY MOUNTAIN DIVISION

COLORADO — SCM, James B. Simpson, WØHEM — SEC: NIT. RM: KQD and MYX. PAM: IUF. At the request of KRDO, our local BC station, the El Paso Radio Club put on an emergency drill, which was recorded by the station, and was used on its public interest program. In a surprisingly short time, 12 mobileers answered the roll call. RZY was control from the QTH of CVG. Mobileers were Bill, SRM; Harold, HHR; Jim, HEM; Jim, ANX; Cecil, TV; Claude, WNW; Nip, CVG; Charlie, VLX; KØs Dave, BOJ; George, VLH; Mike, DJK; and W1VXN/Ø. Things moved along smoothly and all concerned were pleased. Because of the press of other business, TV has resigned as EC for this area. The newly-appointed EC for the Colorado Springs section is James Merrill, ANX, 1508 Edith Lane, Colorado Springs. IUF is operating s.s.b. now, and his mobile rig is well on its way to being ready. HXX reports 2-meter activity in and near Aurora but none on 6 meters. He and 8HAD/Ø are testing the knife-edge effect over and in the mountain area on 430 Mc. Warning: Be careful of your equipment. 7WNE had his car stripped of his mobile gear recently. Traffic: KØWBB 961, WØKQD 657, EKQ 290, NVU 134, TVI 92, SWK 85, KØDMW 75, WØAGU 51, HOP 35, TUT 19, IUF 16, DGP 13, NWJ 10, VSN 10.

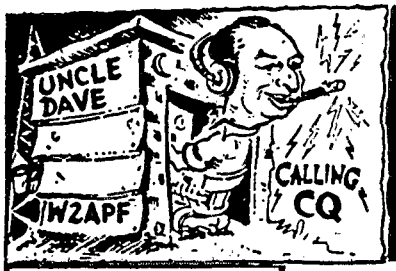
UTAH — SCM, James L. Dixon, W7LQE — OCX is now OBS and ORS, working 40 and 15 meters and teaching a MARS class with LQE. HHW is on 75-meter phone with a Globe Scout. NHL has a new 6-meter Gonset Communicator. RPY is on 80 through 10 meters with a kw. to a 304. QDS has a new Mosely 20-meter beam and is building a modulator. JJD is installing RTTY at the MARS station at Ft. Douglas, and is working 40- and 20-meter phone. LQE, VTD, VTJ, VTC, VHS, and YDZ gave talks and a demonstration of ham radio for the Kaysville Rotary Club. BRV is ragchewing on 10-meter phone. NMK is rebuilding antennas. The Salt Lake Club officers are YPC, pres.; ACR, vice-pres.; WN7DUG, secy.-treas.; VEL, executive vice-pres. The Ogden Club has incorporated. VSS is on with 400 watts phone, 500 watts c.w., on 40 meters. WN7CRZ has 60 watts on 80 and 40 meters, and is the son of TAE. WN7AAN moved and is putting up antennas. WN7CQP is the dad of VSS. Traffic: W7MWR 8, LQE 2, OCX 2, UTM 2.

SOUTHEASTERN DIVISION

ALABAMA — SCM, Joe A. Shannon, W4MI — Teenagers are invited to join in with AENT daily at 1630 on 3910 kc. We have had some good hamfests at Birmingham, Montgomery, Mobile, and Huntsville. K4ANB now is a member of all three section nets and NCS on AENB. Those with new DX-35s are YRO, K4AJG, K4ANB, and KN4IPQ. The Muscle Shoals Club has a new DX-100. VUO has a new all-band 813 job running 400 watts. WOG has his DXCC except for the cards! KN4ILL, new in Tuscaloosa, is the XYL of KN4HQJ. DGH is mobile with a 2E26 rig. New in the Tri-Cities Area are K4JKV, K4JLL, and K4IXT. YFN, Huntsville EC, had a successful AREC drill and reports the fellows did a good job. FBZ has a 20-meter quad going in place of the old three-element. PRS sprained his arm when he stepped off the top of a stepladder! IAX and AAN are building a new shack. WHW has a new 813 job under way while recuperating from an operation. What's going on around your shack? Give us the dope each month so the word can be passed. Traffic: (May) W4WOG 476, RLG 153, KIX 146, K4AOZ 76, W4AVX 57, UJJ 57, K4AJG 46, W4EVD 45, YRO 33, EJZ 32, K4ACO 23, W4TXO 21, K4ANB 17, W4DGH 17, HON 17, GUV 15, TKL 10, CRY 9, RTQ 7, HHG 6, EWB 5, K4APF 4, W4WAZ 4, CNU 2, YFN 2. (Apr.) K4ANB 27, W4EJZ 26, ZSH 19, VUO 8, K4DSJ 5, W4WAZ 5, BMM 4.

EASTERN FLORIDA — SCM, Arthur H. Benzee, W4FE — Asst. SCM: John F. Porter, 4KGJ. SEC: IYT. DVR is using a 5-band doublet with good success and has been reappointed Coordinator of all Florida nets on the Coastal Emergency Net. PJU won the primary election as County Commissioner in Hendry County. BWR has WAS for 75-meter phone. ZJZ has a 10-meter ground plane up 40 feet. Dade County: There are now four FCC-sponsored TVI Committees. LFL has a 3-bander beam. The SMRC is backing a new county zoning ordinance favorable to hams; DTV is committee chairman. ES is operating from Cuba. MVR is on 2 meters. Miami: IKC is now KW6CA. GFA has a DX-100. SKC has been laid up with a bad leg. DEN has 12 NCSs trained, with others in training. IYT ran 40 one-hour code lessons on 28.7 Mc. with good results. JOCO-3 went off smoothly, with 13 ECs participating in 20 counties. Interest is high on 6 and 2 meters with GGO, UIW, ANW, FLH, LXZ, PBS, RNV, and others active. K4IWT is ARCACS Red Cross Headquarters with new antennas on all bands. Broward County: AB, the BRC station, is on the air at C.D. Headquarters with a new antenna layout. BMR was in Cuba. Fishing, Dave? FNR

(*Continued on page 106*)



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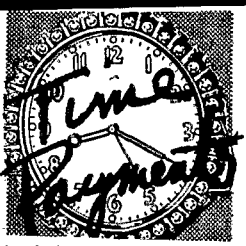

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is on 2 and 6 meters with an 829A final. IEH is on s.s.b. His second contact was KC4USA. JZB lost his 2-meter beam in a hail storm. VCQ has a new mobile rig and bought a Nash to fit it. K4CXR is on 6 meters with a three-element beam. Lake County: The LARA is publishing a monthly bulletin. YGT is editor; AYV is publisher. Traffic: W4DVR 103, WS 102, IYT 68, PJU 54, GOG 47, ZIR 45, K4AHW 27, W4BWR 26, ZJZ 26, EHW 22, FSS 20, KGJ 19, GGQ 12, YNM 12.

WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — SEC: PLE. ECs: HIZ and MFY. RMs: AXP and K4AKP. K4DKG is now trustee of the Gosling Amateur Radio Club station, NBF. K4ECF sends in a nice report from Panama City way. HJA is getting the rig into a studio-type station. ZFL is heard working 10-meter DX. HBK is racking up the countries on 15 meters. KN4IYQ is on with an Elmac. KN4EHI is after General Class. K4AGM is starting a states list on 50 mc. EQR dug the 50-Mc. rig out of the attic. NRX is on with 10 watts. K4EAA is doing FB mobile work. K4DDD has a new *three-element job on 10 meters.* K4BZN *is chopping a hole* in 10 meters. We see NOX but never hear that swell fist anymore. TTM meets only a YL Net nowadays. OWN spends his time spear-fishing. PAA is heard fooling around with the NC-300. K4AH is changing his QTH and talking towers. Lots of the gang made that swell Mobile Hamfest but we wondered where CCY was. UCY had his first failure in a transmitter in ten years. BGG and YRF graduated from Pensy High. K4AFF, the Pensy High club station, will be really going this fall as all equipment is on hand. QK sticks to 75 meters. GMS is home from F.S.U. and going after the 15-meter DX and building beams. KN4IVE is heard working 40 meters. KN4IVD is after his General Class license already. ZPN works 40-meter phone. 6TOR/4 is another West Fla. s.s.b. station. NJB is building an all-band receiver. FHQ quietly keeps 40 meters hot and is aided by VR. JLW will be more active now that junior college teaching chores ease off. MUX enjoys ragchews with his old Navy pals. MS is working on a mobile s.s.b. rig and an antenna farm. PQW still is the top hidden transmitter sleuth. DAO enjoys the Ranger on 75 meters. YES now sports Florida call letter plates. CDE keeps Blountstown on the map. Let's hear from more of the gang. A postcard to the ARRL will bring activity report cards for your convenience. Traffic: K4ECF 44, DKG 18.

GEORGIA — SCM, William F. Kennedy, W4CFJ — SEC: K4AUM. PAMs: LXE and ACH. RM: PIM. Nets: GCEN, 3995 kc., 1830 EST on Tue. and Thurs.; 0800 EST on Sun. ATLCW 7150 kc., 2100 EST Sun. GSN, 3590 kc.; 1900 EST Mon. through Fri. PIM is NC. The 75-meter phone mobile net meets each Sun. at 1330 on 3995 kc. UUH is NC. The 10-meter mobile net meets each Sun. at 2200 on 29.6 Mc. VHW is NC. Newly-appointed ECs are K4AYQ, UFD, VWO, K4DMK, PMJ, and DDQ. Your newly-appointed SEC is K4AUM, in Hephzibah. KL sent in an FB report as OO. FEZ, president of the Dublin Amateur Radio Club, and his officers and members are doing a good job building up the club. AAY is doing a nice job as EC and working with the c.d. in Augusta. The Warner Robins Amateur Radio Club is a very active club and big plans have been made for a mobile emergency net. The Atlanta Radio Club again turned out a very successful hamfest. NS, activity manager, did an FB job of arranging the hamfest along with his fine hard-working committees. The Atlanta Teenager Club is increasing in membership. MA reports work is giving him QRM. PBK is getting material for an all-band antenna. FZO has a new receiver, transmitter and VFO. K4IWN's QTH now is College Park. OPE now has his Conelrad alarm system operating. YR is doing an FB job on nets. K4BAI reports new hams are KN4ICR and KN4HVG. DDY did an FB job on traffic-handling this month. At its regular monthly meeting, the Confederate Signal Corps had as guest speaker Capt. John L. Reinartz, K6BJ, who spoke on "Metering in the Ham Shack." Will see all at the Georgia Cracker Radio Club meeting to be held as a picnic at Macon on Aug. 19th. AREC members are reminded to watch the expiration dates on their cards, and send them to the EC for endorsement when required. Traffic: W4PIM 301, DDY 254, K4BAI 220, W4PBK 40, YR 36, CFJ 16, ZD 13, OPE 10, K4IWN 3, CFO 2.

WEST INDIES — SCM William Werner, KP4DJ — SEC: HZ. The following renewed membership or are new members of AREC: CB, CI, CO DJ, DV, MC, PQ, PW, QA, QS, RA, RD, RM, TI, WT, AAA, ABN, and AFK. DL is mobile on 3925 kc. with 20 watts to a 2E26 final. AEF and ABX have new NC-300 receivers. ES has a new KWS-1 for s.s.b. Stations participating in civil defense "Operation Preventiva 1956" May 20th, 27th, and 28th were BX, DC, DJ, DL, DV, HG, HM HZ, PQ, PZ QA, QM, QS, RA, RE, WR, WT, YD, and KV4ABA. DL, PQ and QM also operated mobile during the alert and QS, piloting a CAP plane, contacted KP4DC using ¼-watt v.h.f. transmitters at both ends. The c.d. director spoke to amateurs on 3925 kc. from control at Gurabo using v.h.f., which was transmitted by the c.d. station at Rio Piedras Control on v.h.f. to KP4DC, who retransmitted on 3925 kc. by holding the microphone in front of the v.h.f. receiver speaker. MP, civil defense communications officer, advises the c.d. now has

(Continued on page 108)

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v.h.f. stations in 15 towns of the Island. KV4BA is Acting NCS of the Antilles Amateur Weather Net at 5:30 P.M. AST on 3815 kc. Stations reporting are KP4FAC, RE, WT, YD, ZW, VP2s VA, KB, KF, DN, DA, DJ, DL, GE, GX, AJ, LA, PJ2AO, KV4BD, and KV4BA. W6SIF, USWB Supervisor of Hurricane Research, will visit these islands preparatory to setting up observer stations. WT received a Spanish edition of the ARRL *Handbook* as a gift from Director Born, W4ZD. W1TIN/KP4 is now KP4TIN. TIN, chief engineer of WPRA in Mayaguez, has just acquired an XYL, an Extra-Class amateur license, and radar endorsement on his commercial ticket. HZ is building a pilot-model 6-meter mobile that can be mass-produced as a club project for use by all amateurs. RD has a new Micro-Match 261-262 SWR meter and finds all his antennas are operating properly. RA is gathering information re Conelrad Alarm. ZC replaced his folded dipole with a 125-foot doublet fed with KW 75-ohm Twinlead. WP4AEF is now KP4. KP4AAB received a printed circuit 6-meter converter. The KP4 QSL Bureau will be closed from June 18th through Sept. 1st as KP4KD will be vacationing in the States. ABA has a cubical quad on 28 Mc. ZW is handling mostly phone-patch traffic. UH, Sabana Seca, phones weather reports to the USWB in San Juan from the Antilles Weather Net. Traffic: KP4WT 138, ZW 28, DC 19.

CANAL ZONE — SCM, Roger M. Howe, KZ5RM — Many of the KZ5 gang are Stateside on their vacations. Among those absent are BC, BD, DW, FL, ML, HA, RV, and VR. DG is acting secretary of the CZARA for HA while he is gone. MN and his XYL are leaving the Zone permanently. GB has been elected to fill MN's shoes as treasurer of the CZARA. Tex and Dee, ex-KZ5TB and NN, are leaving the good old U. S. A. again; this time they are bound for Tokyo, Japan. Some of the gang had a nice chat with Hendy, ex-KZ5GT, and his XYL, Dee, who are now up in Alaska. Their calls are KL7AOS and KL7BUH. GH has his 10-20-meter interlaced beam up and reports that it works FB. The first night he had it up the gang on 20-meter c.w. kept him up until the wee hours. DG and GD have increased power. They now have a DX-100 on the air. Traffic: KZ5WA 113, DG 64, KA 9, RM 3.

SOUTHWESTERN DIVISION

LOS ANGELES — SCM, William J. Schuch, W6CMN — Asst. SCM: Albert J. Hill, jr., 6JQB. RMs: BHG and GJP. PAMs: MEP and PIB. Here we go into vacation time but reports are very good. Keep it up, gang. LVQ is s.s.b. now. CRV, chief operator of K6FCY, soon will be a civilian. RNY is QRL the SCN Net. GYH is taking traffic from Japan direct. DDE still is QRL the UTL Net. LYG still is pitching in the traffic gang. BHG makes the A-1 Operators Club. Congrats. TDO has a nice traffic score. LDR lost his tower in a recent wind. USY also made the A-1 Operators Club. K6DQA is doing lots of patch work for Japan stations. KN6OZJ is doing a nice job on the 2X4X6 Net. GJP is rebuilding the shack. LIP is very very QRL the c.d. organization. UED makes DXCC. ORS is doing swell on traffic. K6EA is skeding east for traffic. MEP is working hard on the 2X4X6 Net. K6LVL is doing FB on three nets. INH is QRL MARS. KN6RCN has a nice traffic count. MLZ is back in the nets. K6KJN is C.D. RO for District 17, Los Angeles. K6EIA is busy with the YLRL. K6BWD is in a new QTH, with lots of new skywires with the help of about twenty of the gang. CK is back from vacation and is OO again. 8SVL/6 has moved right into local traffic activity. Welcome, OM. K6COP is on 6 meters now. BUK is rebuilding all beams. K6PLW is DXing these days. K6EXQ has 33 for YL-WAS. K6QLG is QRL school. Many appointees are reporting too late to make my monthly report. How about a bit of help, gang? Get them to me *before* the fifth. Now the OM is going on his own trip for a month. CUL. Traffic: (May) W6GYH 603, DDE 506, K6FCY 338, W6LYG 229, BHG 205, TDO 200, USY 180; K6DQA 164, KN6OZJ 157, W6GJP 156, LIP 149, RNY 112, K6MON 109, GUZ 97, W6ORS 80, K6EA 74, LVL 58, W6MEP 57, VSH 50, WRT 40, K6EPY 34, W6INH 30, K6HOV 24, KN6RCN 19, W6MLZ 16, K6KJN 14, W6CMN 12, K6EIA 10, W6KTZ 10, K6BEQ 9, W6CK 8, CBO 6, W8SVL/6 6, W6BUK 4, K6COP 4, ELX 2. (Apr.) K6FCY 300, DQA 140, KCI 131, W6RNY 120, K6HOV 42, W6IIP 42, K6LVL 20.

ARIZONA — SCM, Cameron A. Allen, W7OIF — Asst. SCM, Fred W. Wilgus, 7LJN. SEC: JYH. PAM of AEN: ASI. RM: PKW. The AEN meets Tue. and Thurs. at 7 P.M. MST on 3865 kc.; the Arizona C.W. Net Tue. and Thurs. at 8 P.M. MST on 3690 kc. and daily Mon. through Fri. at 4 P.M. MST on 7115 kc.; the Grand Canyon Net Sun. at 9 A.M. MST on 7210 kc. A very fine time was had by all at the Ghost Town of Jerome in May. Hosts were SNI, YLR, RLC and ZZA. A visit to the old mine was a highlight of the week end. Among those present were NEL, UXK, BFA, OIF, UCA, RIJ, KOY, MAE, PMQ, OUE, NYN, PLW, MDD, OAS, TNY, TBR, SNI, YLR, RLC, ZZA, UXZ, WKM, YWF, WN7DAW, WØWUN, EAW, MHE, MWD, DJH and 1WYJ. The Maricopa County V.H.F. Club is now one year old. New officers are QNO, pres.; ZIA, vice-pres.; SUJ, secy.-treas.; YWD, pub.; and LED, liaison officer for c.d. The club holds regular transmitter hunts the

(Continued on page 110)

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2nd Sat. of each month. An invitation to participate is extended to all. OQF and VLN, of the V.H.F. Club, provided emergency communications on very short notice for a girl scout camping trip in the Sierra Estrella Mts. Phoenix contact was SUJ. JYH, KYE and LED took part also. LVR is setting up a new mobile to be used in both his new cars. TNY, with the help of JYH, has moved his mobile to a new car. K6IQM and 9WPT have moved to Phoenix. New calls are WPX, DRI, EBI, and WN7DLF. WKM has gone to Boston for awhile. Skin diving and chasing wild burros for a boys' camp has WYY off the air. Margie Haberman, RCJ, of the all-ham family of Tucson, received a nice write-up in the *Arizona Daily Star* about her hobby. Traffic: W7LVR 15, OIF 5.

SAN DIEGO — SCM, Don Stansifer, W6LRU — JVA traveled to Ohio and Kentucky for his vacation. K6SLA is a new licensee in Vista. NAT and KVB are working on RTTY equipment for 144 Mc. The Chula Vista Club plans ARRL affiliation. New officers are IFJ, pres.; K6ACY, vice-pres.; FEM, treas.; K6GQ, secy.; K6BCG, corr. secy. The Coronado Club was active during Field Day from the Silver Strand. GBG was given a royal send-off by the DX Club. K6RWM and LRU are proud fathers of boys born recently. K6HKY enjoyed a 45-day cruise on the USS *F. D. Roosevelt*. Silvergate members graduated from high school were K6CTQ, K6DNO, K6HKY, and K6HLQ. GTZ is the new secy.-treas. of the Upper Ten Club. K6ATS has left for the East. VFT is spending 15 weeks in training at Ft. Sill, Okla. K6BEC is working for Convair while home from M.I.T. this summer. The local DX gang all worked XE4A in jig time. ZWK has a new three-element 14-Mc. beam up 70 feet. CRT has a new quad antenna. SNQ is now a Class III OO. SK, FVA, and UZL continue to work good DX on 21-Mc. phone as late as 11 P.M. local time. K6EC needs 9 cards for DXCC. K6DAM and LRU were awarded their Masters Degrees from San Diego State College in June. BGX has a new kw. final and a 75A-4 receiver. BZE leads the local DX gang with 221 countries worked. CHV has built a new double conversion super for c.w. work that is worth hearing. FMJ vacationed into the Northwest via the coast route. Traffic: W6IAB 3502, YDK 2442, SK 176, K6BPI 134, DBG 130, JYO 56, W6CRT 32, K6DXA 7.

SANTA BARBARA — SCM, William B. Farwell, W6QIW — New appointments: KCD, EC for Oxnard; PWK, EC for Lompoc; K6CVB, EC for Ojai; ENR, EC for San Luis Obispo. A new ham is KN6SDE, of Santa Barbara. K6ELR has a new harmonic, a boy. The Paso Robles Radio Club had a Memorial Day pot-luck supper at BRY's house. After the feed, AGO opened a package belonging to BRY and assembled a Heathkit impedance meter, and put it into operation within one hour. BRY received an Armed Forces Day message on RTTY and FYW contacted NSS on c.w. Mr. Short Wave (MSW) has just completed a successful trip to Texas, keeping the folks at home posted via his mobile. New Ventura Club officers are WDS, pres.; QKO, vice-pres.; K6EEJ, secy.; K6JRT, treas.; and K6IVB, pub. IGH flew to New York to attend a musicians' convention. Traffic: W6QIW 14, FYW 5, K6KPU 4.

WEST GULF DIVISION

NORTHERN TEXAS — Acting SCM, Ray A. Thacker, W5TFP — SEC: PYI. PAMs: TFP and IWQ. RMs: KPB and PCN. WRZ won a cool five bucks for the winning name, *Sparks from the DARC*, the monthly paper published by LR for the Dallas Club. DTA/5 has assumed the NCS post of the Yankee Net's A.M. session. 9HYI spent a week visiting his father, CF. AHC reports NTX traffic is on the upswing. UBW has 107 countries on 15 meter-phone. RHP reports 75 per cent attendance on NETEN for May. K5BSY is now a General Class licensee. KAS has broken out mobile, sporting all Elmac equipment. JXU still is working 6-meter DX, and reports LU, CO, and XE during May. SWV is now OES and keeps a daily sked with Ohio on 2 meters. There has been a terrific increase on 2- and 6-meter activity. AF MARS sure is helping to further this movement with the issuance of equipment. BKH's OO report indicates that Novices are not the only amateurs with second-harmonic trouble. Better check, fellows! VEZ has become the most popular vendor of mobile antenna coils in the Ft. Worth-Dallas Areas. NEW/5 is the new NCS on NT-O. KVA is finishing up the new shack and probably will get with the new kw. grounded grid final. JFX is sporting a whopping signal with a new 813 final. The new North Texas Storm Warning Net has been very active. RED is a new mobile in the Dallas area. TFY is now a Dallasite and a Collins engineer. Mobileers, remember, Oct. 1st is the deadline for applying for Texas mobile call letter license plates! Let's shoot for 100 per cent! Traffic: W5DTA/5 1325, K5FFB 1238, W5UBW 305, KPB 257, AHC 129, NEW/5 116, RP 89, FJB 82, VHF 65, FCX/5 64, TFP 49, BKH 44, YKT 10, JFX 6, ZTG 6, LGY 5, CF4, SWV 4.

OKLAHOMA — SCM, Ewing Canaday, W5GIQ — Asst. SCM, James R. Booker, 5ADC. SEC: KY. PAM: MFX. RM: GVS. The Northfork Hamfest held at Quartz Mountain on May 19 through 20 was well attended by hams from Oklahoma, Texas, New Mexico, and Missouri. The

(*Continued on page 112*)

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'fest coincided with the formal opening of the new lodge and Governor Gary, on hand for the ceremonies, took time out to visit with the hams about c.d. work and talk about proposed new license plate legislation. SVR won the grand prize of an Elmac mobile transmitter. New officers of the Pittsburg County Amateur Radio Club are UAO, pres.; WDD, vice-pres.; GXH, secy.-treas.; and AKH, pub. dir. The Enid Amateur Radio Club was active on Field Day. KL7ADQ and W6NHX are new members of the staff at the Aeronautical Center in Oklahoma City. They will be getting K5 calls soon. LDM gave an interesting demonstration at the ACARC June meeting of a device for enabling blind persons to tune a transmitter. VAX has been on the sick list after a minor operation. ZWT has received a call from Uncle Sam's Navy. FU writes that he will be out of town a few months because of his duties as a painting contractor. K5CYD is operating his station at the Civil Defense Headquarters in Okmulgee. Traffic: K5AOV 445, W5GVS 139, ITF 112, PNG 40, FEC 39, GIQ 36, KY 34, CCK 28, VAX 27, MFX 26, RST 22, ADC 20, EHC 9, UCT 9, GXH 2.

SOUTHERN TEXAS — SCM, Morley Bartholomew, W5QDX — SEC: QEM. STEN members enjoyed another successful convention at Kerrville. A free barbecue with all the trimmings got the program under way. New officers of the net are: FNH, NCS; EV, alt. NCS; LRK, secy.-treas.: N. G. Morris, pro; VLF, c.w. NCS; LP, alt. NCS; CWS, pro; NSA, Zone 1 ZC; LOW, alt.; DIV, pro; ZPD, Zone 2 ZC; EGD, alt.; GMM, pro; OMP, Zone 3 ZC; UNE, alt.; EXU, pro; BSO, Zone 4 ZC; HDV, alt.; YNZ, Zone 5 ZC; KBP, alt.; YNZ, pro. OWS is operating 2-meter mobile. LFG and his XYL, TSE, are back in San Antonio for a short visit. PDE worked Cuba on 6 meters with 15 watts. KNs 5GCK and GHE are new Novices in Freer. AQN visited ALS while in Dallas. DTJ has worked 43 Texas YLs. The Corpus Christi Red Cross Disaster Committee called a surprise simulated emergency May 9th. The first mobile was there in four minutes and the first fixed rig was operating in forty-five minutes. Fifteen mobiles and five fixed stations participated. If you haven't been through the Houston ARC clubhouse, by all means do so at your first opportunity. The group, which planned it, did itself proud. FEK publishes the *Harc News*. GMT, PMT, AQK, DQQ, MSA, and members of the Corpus Christi ARC will handle communications again this year during the 110-mile walkathon from Padre Island to Corpus Christi. QEM visited in Elgin. Traffic: W5ZWR 66, DTJ 9, GAH 2, HEX 2.

NEW MEXICO — SCM, Einar H. Morterud, W5FPB — SEC: FHP. RM: RKS. PAM: DVA. The NMEPN meets on 3838 kc. Tue. and Thurs. at 1800 MST, Sun. at 0730; the NM Breakfast Club meets on 3838 kc. daily except Sun. at 0700-0800 MST; the NM C.W. Net meets on 3633 kc. daily at 1900 MST. Sixteen-year-old ECS received his radiotelephone 2nd-class license. Congratulations to NSJ and his XYL, FGZ and her OM, and K5CXN and his XYL; all had daughters. GEM is moving into a new shack. ARD and family are spending the summer in Ohio. ZU and his XYL are spending the summer in England and France. The *Albuquerque Journal* had a picture and article about DRA and KH6TI. Fifty-seven amateurs were registered at the picnic held at Portales May 20th, including one amateur from Oklahoma and six from Texas. BAG moved to White Rock, near Los Alamos. MPR moved to California. How about some of the clubs sending in news for this column? Traffic: K5FHU 57, W5GEM 15, FHL 10, FPB 7, LEF 2.

CANADIAN DIVISION

MARITIME — SCM, D. E. Weeks, VE1WB — Asst. SCMs: Fritz Webb, 1DB, and Aaron Solomon, 1OC, SEC: RR. Considerable public interest has been aroused by the daily schedules between the Maritime Net and Expedition Raft, *L'Egare Deux*, on its Atlantic crossing. New owners of DX-100s are YM, VO1L, and W5LVK/VO. NH is using a 32V-3 on 20 meters. The Moncton Club's new officers are YM, pres.; ACX, vice-pres.; ACB, secy. OL is knocking off DX with a new mobile set-up. AEB and DB have remodeled their shacks. Late delivery of AO's logs by the Postal Dept. caused a revision of the VE1 Contest results, so congratulations go to Mel on his winning score. The Bathurst Club is hard at work on preparations for the Maritime Hamfest to be held during Labor Day week end. Details are available from VC. Congratulations to VO1J and his XYL on the arrival of a new jr. operator, to OM on his DXCC certificate and to the Newfoundland Radio Club on its fine new bulletin. New calls in the VO district are VO1AQ, K4AVP, K2RMO, and W5YRR. WR has his phone endorsement. XE has installed a vertical ground plane. Traffic: (May) VE1FQ 97, AV 84, YO 84, PX 78, OC 57, WP 46, UT 36, WK 21, BL 15, ME 15, OM 11, YB 9, DB 6, BN 4. (Apr.) VE1UY 8, BN 4.

ALBERTA — SCM, Sydney T. Jones, VE6MJ — PAM: OD. RM: XG. WL reports that his YL, Pat Kirkby, now is VE6IL. TL has moved to greener pastures in British Columbia. RE and IC, along with BW, are heard almost nightly on 3.5-Mc. mobile. HM and his XYL are vacationing in England. YE and his XYL are visiting San Francisco. The Alberta report was missing last month because your SCM was in Arnprior, Ontario, attending the civil defense

(*Continued on page 114*)

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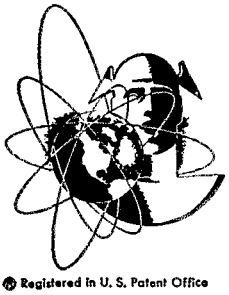

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forum on communications. Of the 38 attending the forum, 28 were amateurs. The Federal Civil Defense authorities expressed their appreciation for the interest shown by the amateurs in the communications field. Traffic: (May) VE6HM 156, YE 27, OD 12, WL 2. (Apr.) VE6HM 148, YE 26, OD 18.

BRITISH COLUMBIA — SCM, Peter M. McIntyre, VE7JT — We are sorry to report that DH has resigned as Section Emergency Coordinator. We want to thank Bill for a job well done and for his tireless efforts on behalf of the AREC and the amateurs. Thanks to RS for his realistic outlook on no column lately in *QST*. Instead of beefing he decided that unless the SCM was given the news to write he could not make a column. Thanks, Ron. The Chilliwack Amateur Radio Club was formed in May with AFA and RS sparkplugging the effort, and AFA the charter president. From the Dawson Creek *Grid Leak* we learn that the boys just scraped the bottom of the money bag on the recent hamfest held there. ADM is fooling the gang with a newer auto so they can't hear him coming from a mile away. ADR is moving to Camp Borden and EV, with new antennas, is complaining because the band conditions are so poor. Hope you all had good fun on Field Day. Thanks to RS and the Dawson Creek gang, through the *Grid Leak*, for the basis of this column and to AIO, who religiously reports even though he is off the air at the time of this writing. We wish more of you, instead of thinking about sending in reports, would follow RS's idea and send in reports on your activities. For once I would like to have too much to report in the space allotted. Try it!

Development of Yagis

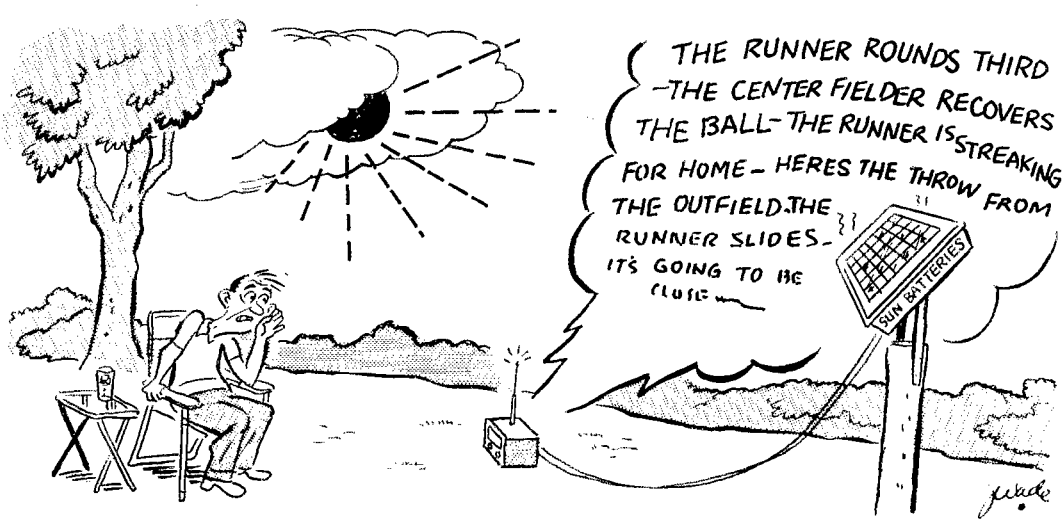
(Continued from page 17)

Gain vs. Tuning

This leads us finally to the most decisive element in connection with the gain bandwidth of Yagi arrays. Fig. 11 illustrates the point that over a range of from approximately $0.75\lambda/2$ to $0.92\lambda/2$ ($\rho = \lambda/500$) the director will exhibit gain. We take the 5.0-db. point as the gain available without a director. Between the 5.0-db. points on the curve defines the range in director length over which it adds gain. It is this tuning range and the variation of gain in this interval which will determine the gain bandwidth of the array. It will be noted from this curve that a variation in length of $0.115\lambda/2$ occurs before the gain varies by 1 db. This corresponds to a change of approximately 6 per cent in frequency and we would therefore estimate that for the conditions stated, namely a 3-element array with the spacing between elements of 0.2λ and an element thickness (radius) of $\lambda/500$, the variation in gain due to tuning changes in the director would be approximately 1 db. It will be noted that in the direction of small director lengths (low-frequency operation) the gain of the director asymptotically approaches a value of approximately 5.0 db., which is the gain available without the director. In other words, by the time the director is $0.76\lambda/2$ long it is contributing practically zero gain. It is obvious that operation at a frequency at which the length of the director were greater than $0.96\lambda/2$ would cause the gain to decrease rapidly below what it would be without the director at all. Thus, a frequency at which the length of director is $0.96\lambda/2$ represents the upper frequency limit of operation and, as we noted before, $0.76\lambda/2$ represents the lower limit.

Relating Fig. 11 to Fig. 6, we see that the reactance variation in the director gain region is from approximately 175 ohms to 20 ohms, with

(Continued on page 116)



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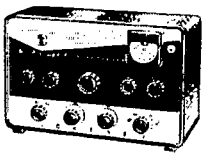

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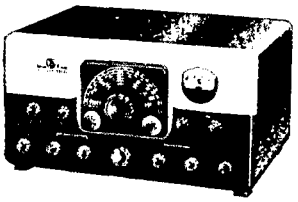

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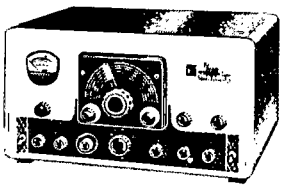

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the peak gain at approximately 30 ohms. We have extrapolated between the $\rho = \lambda/200$ and $\rho = \lambda/1000$ to obtain the $\rho = \lambda/500$. From Fig. 6, we can readily see that the slope of the thicker elements is considerably flatter than for the thinner elements. This means that the change in reactance with frequency (corresponding to changes in electrical length) will be smaller than for the thinner elements. On Fig. 11 we have drawn in dotted lines the change in gain for a considerably thicker element $\rho = \lambda/50$, to show the effect on the gain bandwidth. As expected, the slope on the short length side of maximum gain is considerably steeper for the thinner-diameter elements.

Compensated parasitic elements may be used to extend the frequency range over which parasitic action may be obtained. For example, a director may be constructed as in Fig. 13. In an

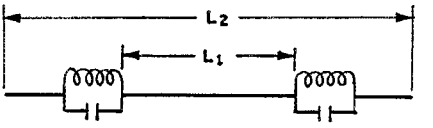

Fig. 13 — An example of a compensated parasitic element.

ordinary director the upper frequency limit is set at that frequency at which the reactance becomes positive. If in Fig. 13 the coil-capacitor combination is resonant at the upper frequency limit of operation, it will effectively disconnect the ends of the element leaving L in the circuit only and since L is short it results in a negative reactance and thus continues to operate as a director. This is only one very simple example of a compensated parasitic element, there being a very large number of types which may be employed to extend the over-all bandwidth of operation.

"Tattoo"

(Continued from page 19)

connect it to the contacts of the keying relay, plug the key back in the jack, and warm up Tattoo. Sending a string of dots, the ohmmeter should hover around the same spot as before. This indicates that your keying relay is following your dots, and you can stop worrying. If you have used a different relay than specified, you will probably require a different value at R_2 to give you the necessary amount of overdrive.[2]

But you have probably left checking the keying relay to last, and by now you have observed that your first dot closes K_2 and holds it in for a time determined by the setting of R_1. That's all there is to it. You can check the limits of operation by connecting the keying contacts, and the closing contacts on K_2, and the ohmmeter in series. Then, by backing off on R_1 and making single short

(Continued on page 118)

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dots, you can see on the ohmmeter when K_1 is closing without K_2 closing. This is the bottom limit of operation, and you really don't have to go to all the trouble just mentioned; watching the relays and changing the setting of R_1 will give you most of the information and confidence you need.

How you control your transmitter, receiver and antenna relay through K_2 is up to you. If your antenna relay has auxiliary contacts, as some of them do, the relay can be controlled by K_2 and the auxiliary contacts can handle the transmitter and receiver. Lacking either of these possibilities, a versatile system can be made by using a Potter & Brumfield LM11 d.p.d.t. relay for K_2 and modifying the construction to provide additional terminals in the output.

Simple Voice Control

(*Continued from page 33*)

The sensitivity-control setting dictates the voice level necessary to key the system. Close talking will require less sensitivity, while more sensitivity will increase the tendency of the unit to key from background noise. To a slight extent the sensitivity will also affect the turn-on time delay. It will, therefore, require a little practice to determine the best setting for any particular location, the optimum being the highest sensitivity point that exhibits no tendency toward keying from background or loudspeaker noise.

In practice we have found that, with a little discretion in placement of the loudspeaker and operation of the gain control (plus close-talking in exceptionally noisy locations), no antitrip circuit is needed; it would in fact be more trouble than it was worth.

The delay control varies only the cut-off time (from 0 to approximately 2½ seconds) and can be adjusted as desired for fast or slow break-in work.

Simple *LC* Filters

(*Continued from page 27*)

turns of the filter coils and are wound tightly over the filter coils at the grounded ends. The antenna should connect to the 14-Mc. coil as shown. No values are given for R_1 and R_2 because they will vary with the antenna and the coupling of L_1 and L_2. This method of antenna coupling is acknowledged to be a compromise, but it is satisfactory for use with a non-resonant length of wire. The values of R_1 and R_2 will be higher than 62,000 and 150,000 ohms.

Some of the constructional details can be seen in the photograph. The 6AH6 is a hot little tube, and careful shielding must be used between grid and plate at these frequencies if all of the tube's capabilities are to be utilized. A shield

(*Continued on page 120*)

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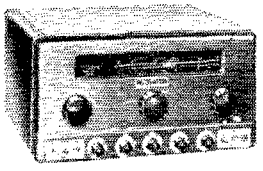

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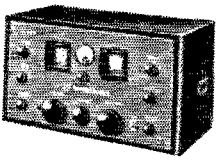

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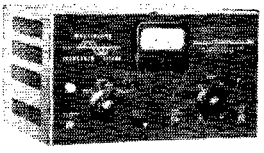

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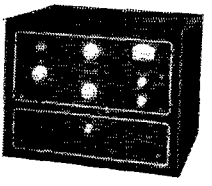

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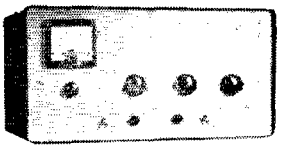

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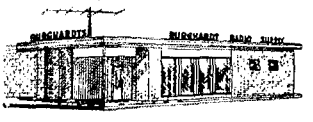

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was used across the sockets, with arched openings just large enough to clear the socket contacts. The shield runs across contacts 3 and 7 because crescent tapped straps with ground lugs were used to secure the sockets, and it seemed desirable to have the lugs (they come in the space between Pins 1 and 7) out from under the arch. Grounds were made directly to the chassis and the cross shield — not all to one place. When a shield of this kind is used, all connections (including grounds) concerned with plate and screen are made on the output side. The screen by-pass capacitors are mounted right at the sockets.

The relay shown in Fig. 4 plugs into the octal socket shown in the photograph — the relay is for break-in operation. When the coil is energized, the antenna coils are shorted and $-22\frac{1}{2}$ volts is applied to the r.f. stage grids. This is a part of the break-in system that has been in the *Handbook* for a number of years.

This two-band amplifier was built to go with the double-conversion 5-tube receiver now in the *Handbook*. I am grateful to Mr. Robert Price for this assistance in getting the design steps into a form which, it is hoped, others will find useful.

DX-100 Keying

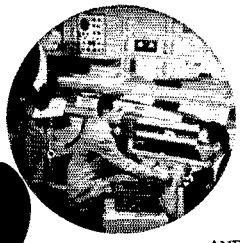
(Continued from page 84)

terminal of the key jack. Connect either of the other wires to the same key jack terminal to which the line choke is connected. Connect the remaining wire to terminal 8 of the PHONE-CW switch. Connect a jumper between terminals 7 and 9 of this switch.

Behind the 12BY7 stage mount a three-lug terminal strip using the screw that holds the octagonal loading capacitor. This must be the type of terminal strip that has the center lug grounded, or a two-lug ungrounded strip and a solder lug may be used. The 100K resistor is supported on its leads between the 12BY7 socket and the lug nearest the chassis deck. The 10K resistor and the 0.005-μf. ceramic capacitor mount on the three-lug terminal strip. Then run a wire from the terminal strip (junction of 100K, 10K and capacitor) over to Pin 7 of the 5V4 socket in the adjacent compartment. Dress this wire close to the chassis, to minimize r.f. pickup.

The 22K resistor can be mounted between Pins 1 and 7 on the 5V4 socket, and C_1 is connected between Pin 7 on the 5V4 socket and an unused ground terminal on the nearby electrolytic capacitor. The job is completed by running a wire from Pin 1 on the 5V4 socket over to Pin 1 on the tie-point DD, to pick up the — 70 volts.

The value of C_1 is a matter of individual preference. A value of 0.1 μf. will give hard keying. A value of 0.25 μf. will result in much softer keying, for slower speeds. The author used 0.15-μf., which seems to offer a happy medium.



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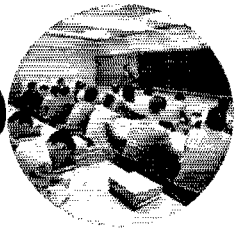

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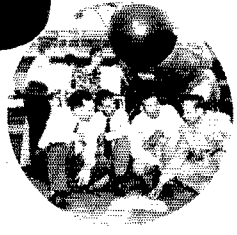

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How's DX?

(*Continued from page 54*)

carries through on YJ1DL QSL chores . _ . _ . _ ZL3CN made many friends for amateur radio through exhibition demonstrations at the New Zealand Industrial Fair, Christchurch. K2OAH noted a large 20-meter signal from the installation.

Europe — Reminder: DJ1BP, DLs 1CR 3AO and 9CI this month head for a gala week of Luxembourg c.w. operation on 10 through 80 meters. Except for recent code work by visiting firemen ON4s FU and QX, Luxembourg continues to be regularly raisable only on 10 and 15 phone . _ . _ . _ EA6AW burns the candle at the middle and both ends, searching for Ark., Del., Me., Miss., Mont., Nev., N. Mex., Utah, Vt., Wyo. and the Dakotas. W7CFA finds Arcadio using a 30-watt 807, 7-tube homemade super, and ground-planes for 14, 21 and 28 Mc., assuring 100-per-cent QSL . _ . _ . _ G8PL, reaching for No. 150 via an indoor antenna, passes along notes received from The Rock: ZB2R finds his QSOs in high demand and picked off 45 countries in three days of noncontest operation. Wirelessmen for RAF, ZB2s Q R and T keep Gibraltar contacts available almost around the clock. Their old 803 rig soon may cool off in favor of new 813s with TZ40s modulating. In addition to a heavy 20-meter attack, 40- and 80-meter coils are plugged in when conditions beckon . _ . _ . _ OH5NJ, with a 141/118 DX record, tells W7DJU he has worked all 48 U.S.A. but still needs seven cards. Pen is a QRP man at heart, putting it this way: "Fifty watts is best power. A kilowatt is too much and only makes QRM. With 50 watts and a good antenna you are a DX shark, hi." Jeeves puts it differently: The power required to work consistent DX is inversely proportional to the relative rarity of one's prefix . _ . _ . _ W3TYW notices garden-variety Europeans rather shamelessly signing such calls as AC5PN, apparently to test W/K reflexes on the "long path" . _ . _ . _ YUØC was operated on 20 phone at the Belgrade International Ham Meeting, July 7th-9th. YU1AG specifies new U.S.S.R. amateur allocations at 38–40, 144–146 and 420–425 Mc. . _ . _ . _ W3AAZ's translation of Czechoslovakian *Amateur Radio* mentions the following participation levels for the October, 1955, WSEM test: 215 U entries, 110 OKs, 26 SPs, 20 LZs, 15 DMs, 14 YOs and 12 HAs. OK1KNT and UA3KAE were high scorers . _ . _ . _ SM6ID confirms via K2DSW that the WASM-II DX certification by SSA (Sweden) now is available world wide, based on contacting an SM in each of Sweden's 24 provinces, plus Stockholm city, for 25 QSLs. Check with SSA for complete up-to-date details . _ . _ . _ WVDXC's *DX* mentions availability of WDT (Worked District Tampere) diplomas to amateurs who confirm QSOs with five OH3 members of Finland's Tampere ham club. Contact OH3TH for information . _ . _ . _ WGDXC sources have it that LA8YB may draw a Spitzbergen assignment this fall.

Hereabouts — W6COH describes "one of the screwiest ham expeditions ever," in recounting his experiences aboard Navy carrier *Essex* on May 12th-13th. Assigned to do a special TV show on the vessel, Jim brought along a Communicator and an 8-element collapsible beam in the hopes of a little 2-meter DX. As things worked out, W6COH obtained special temporary permission to put an *Essex* kw. rig on 20 meters, which same he did while cruising some 100 miles off the Todos Santos Isles. Notification through XE2BM to LMRE (Mexico) cleared use of the call XE6COH/MM. Numerous stations were worked including some fair 14-Mc. voice DX — M1B, VK9RT and an OX3. W6COH believes this to be some sort of amateur-U.S. Navy first, and that it certainly appears to be . _ . _ . _ New Easter Island actives CEØs AC and AD, nonamateurs to begin with, are reluctant to face the pile-up music on DX bands. RCC (Chile) has hopes of ameliorating this situation and works to ensure resultant QSLs . _ . _ . _ K4BHY, formerly W6WIL and W9IMB, had his suitcase-portable 6CL6-6146 functioning down in Antigua as VP2AB. Modulating with an overworked 6N7 and radiating with a 90-foot vertical, Wade scored many U.S. contacts on 14-Mc. phone. K4BHY initiated an attempt to set up a permanent ham installation on Antigua for the use of a future U.S. Navy complement . _ . _ . _ In lines to W1ZDP, HK3PC points up the interesting fact that a national of either Colombia or Spain, licensed in either country, can ham freely in both countries. The same arrangement is to be tried out by other Latin-American nations. HK3PC, formerly active as HP1ZZ and YN1PC, is assisted by the XYL as 2nd op on c.w. as well as phone . _ . _ . _ The TI2BXs completed an enjoyable summer tour of the States, visiting hamband acquaintances all along the route . _ . _ . _ W7VMF offers Idaho schedules to 20-meter WAS seekers . _ . _ . _ W6ZZ was 20 minutes late in catching XE4A on Socorro. Miles had to be content with an XE4A/MM contact shortly after a storm terminated the Revilla-gigedo revelries of WØAIW and friends . _ . _ . _ W4UWA's better half boned up on the Novice exam in time to keep skeds with the OM's summer ROTC encampment. All will go fine unless she suddenly gets smitten by the DX bug and refuses to QSY from 15 . _ . _ . _ W2AYJ, six years quiescent, succumbed to another DX-

(*Continued on page 124*)

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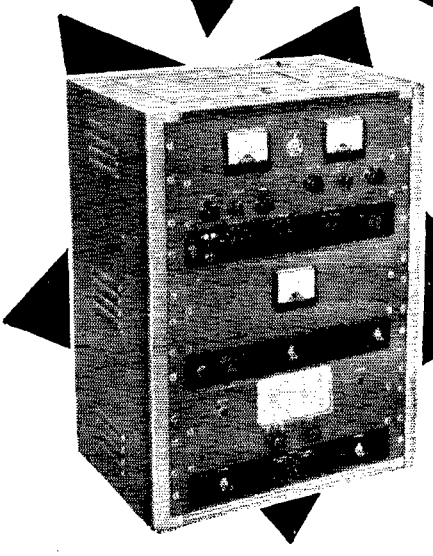

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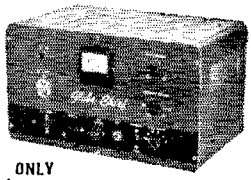

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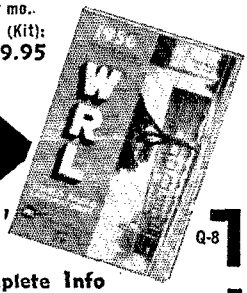

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fever relapse . . . . . VE3EBN (ex-VP5BN) and CM8BS, brothers, continue regular schedules around 14,050 kc. . . . . W9WHM is interested in the present call of VP8BD's ex-operator Bernard; also, information on the current whereabouts of ex-KG6SB personnel . . . . . This year's meeting of the W9-DXCC Club, W9EU president, is slated for September 8th at Chicago's Hotel Sheraton . . . . . K2EQD visited Cuba while performing summer duties aboard a U.S.N. destroyer escort and reports the CM/CO gang embattled by TVI. "The Miramar and Mariano sections of Havana are *loaded* with rotary beams — almost busted my neck counting them from a moving taxi." K2EQD brought back a six-inch stack of Cuban QSLs which he'll dispatch to W/K destinations via bureaus . . . . . As if in reply to our recent query about Swan Island, WGDXC comes up with K4AMV/KS4, active this summer on 40 through 10 but due for an early Swan swan song.

Ten Years Ago In "How's DX?" — DXers eagerly dust off their 40- and 20-meter coils for pursuit of rare prefixes on 7150-7300 and 14,100-14,300 kc., frequency ranges newly reopened to amateurs . . . . . Meanwhile, ZS6DW *logs all U.S. call areas except W7 on 75-meter phone. Other* 3.5-Mc. DX reported: **CSZ** of Lisbon, **EA1D**, **W8LZK/NY4** and **W8QEN/CT2** . . . . . Ten-meter specimens hotly pursued are **AK1LO** (Korea), **ET6MI**, **EZ4X**, **OD2AC**, **PK6VK**, **PAØTC/PK6**, **W8CJR/XU8** and **XZ4AQ** . . . . . W1JPE closes the column on a DX terminological note, reporting that the kilowatt is rapidly giving way to the "gallon" on 28-Mc. phone.

I.A.R.U. News

(Continued from page 55)

by several societies to the Administrative Committee on the systems in use in their countries. The European Band plan was hailed as a fine example of international cooperation, and the only change voted was to move the limit for exclusive c.w. operation in the 20-meter band from 14,125 kc. to 14,100 kc.

The conference encouraged the growth of s.s.b. after reports on progress to date were heard at the Technical Committee sessions. It was further recommended that more use be made of transistors, especially in emergency gear. To foster exchange of technical information, and thus speed up technical progress, it was agreed that each editor of a society magazine will send English abstracts of the main articles in every issue to the other societies in the region.

Mr. Budlong, in his capacity as Secretary of the IARU, was invited to speak on the problems of amateur representation at International Telecommunications Conferences. Pointing out that only governments have voting rights at these gatherings and that the main business is to arrive at compromises of plans formulated long before the actual conference by each government, he urged that amateur groups start to work with their administrations a couple of years in advance so that the government's recommendations in each case will be as favorable as possible toward amateurs.

A budget of 1200 pounds sterling per annum was adopted, with each society contributing an amount in proportion to its membership. A permanent v.h.f. committee was set up, with DL3FM as chairman and ON4BK as secretary; membership is open to any of the societies.

The following were elected to serve on the Executive Committee for three years: HB9GA, Chairman; G2MI, Secretary; F9DW, Treasurer; DL1KV, I1XX, SM2ZD, and YU1AA.

F9DW, Treasurer; DL1KV, I1XX, SM2ZD, and YU1AA.

The delegates commended the *Associazione Radiotecnica Italiana* on its excellent preparations for the conferenc, under the supervision of Secretary Schiff, I1AXD. Simultaneous translations of all the speeches were made in English and French; clerical arrangements were well-planned; and the personal arrangements for the delegates were of the best.

The next conference of the Region I Division will be held in 1959, at a place to be decided. The *Deutscher Amateur Radio Club* is considering sponsorship.

Those present were: SM2ZD, G2MI, G6CL, PAØDD, G2IG, and HB9GA, Executive Committee members 1953-1956: DL1WA, DL1KV, DL3FM, and DL1JB of DARC; G6OT and G2WS of RSGB; ZS5KL of SARL; ON4BK and ON4QZ of UBA; OZ2NU of EDR; EA2CA and EA2CQ of URE; OH2TK of SRAL; F9DW and F8GB of REF; PAØLR and PAØNP of VERON; I1FO, I1BDV, I1BEY, I1ABR, and I1BBE of ARI; CN8MM of AAEM; SM5MN and SM6SA of SSA; HB9J, HB9FH, HB9RS, and HB9FF of USKA; YU1A, YU1AC, YU1AA, and YU2CF of SRJ; W1BUD and W1LVQ of ARRL; and HB9SI of United Nations.

Socorro Island

(Continued from page 49)

the medicos returned to the *Malibu* with information gleaned from a passing tuna fishing boat that a violent chubasco had formed and was rapidly approaching Socorro from a position 150 miles to the south. This bit of bad news was a grave disappointment to all because operation had been planned for several more days. However, prudence and impending weather would brook no procrastination. Therefore, with regret that the DXpedition should come to such an untimely and abrupt halt, XE4A was dismantled. In one hour all the gear was again safely transported from the beach to the *Malibu* in the skiff. A hoisting cable parted when the two motorized launches were raised aboard ship; this further delayed leaving. However, by 4 P.M. on June 9, all phases of fixed station operation of XE4A were at an end. Later weather reports stated that the chubasco responsible for the exodus struck the island at 11 o'clock the night of departure.

San Diego was finally reached six long and stormy days after leaving Socorro. The entire San Diego DX Club was on hand to meet the *Malibu* and a wonderful evening was spent rehashing the DXpedition. The trip home to Kansas City was then an anticlimax.

In summary, the DXpedition was an adventure which none of the participants will ever forget. All continents and 48 countries were worked in less than three days of operating time, with a total of 2037 contacts. The operating proficiency and courtesy of the amateur fraternity will not be forgotten.

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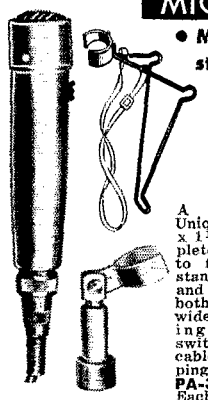
Lafayette Brings You Super Values!

New! TRIPLE PURPOSE SLIM CRYSTAL MICROPHONE



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- **May be hand-held, stand mounted or suspended by lavalier cord!**
- **Frequency 60-10,000 CPS**
- **On-Off Switch**

A tremendous value! Unique design, only 4⅝" L x 1⅛" diam. Comes complete with swivel adapter to fit all standard mike stands, and lavalier cord and bracket which leaves both hands free. Smooth wide range response. Locking type on-off slide switch. Detachable 7 ft. cable and connector. Shipping weight 2 lbs.

PA-31
Each in lots of 3 ..... **5.65**
Singly, Each **5.95**

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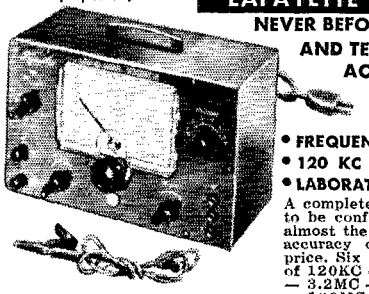

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NEVER BEFORE HAS A COMPLETELY WIRED AND TESTED INSTRUMENT OF SUCH ACCURACY AND QUALITY BEEN OFFERED AT SUCH A PRICE!

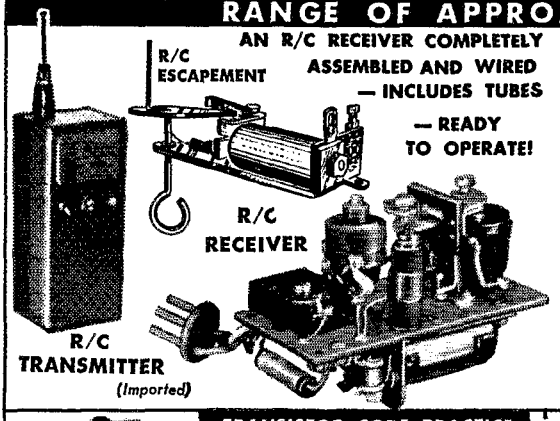
- **FREQUENCY 120 KC TO 260 MC**
- **120 KC TO 130 MC ON FUNDAMENTALS**
- **LABORATORY ACCURACY AND QUALITY**

A completely wired and tested instrument not to be confused with units sold in kit form at almost the same price, but with a quality and accuracy of instruments 3 to 4 times its price. Six overlapping ranges generate signals of 120KC — 320KC, 320KC — 1000KC, 1MC — 3.2MC — 11MC, 11MC — 38MC and 37MC — 130MC all on fundamentals with calibrated harmonics from 120MC to 260MC. Selector switch gives instant choice of ranges. Switch gives choice of internal modulation of 400 CPS or use of any external source at other frequencies. For audio testing the 400 cycle signal can be used separately. Outputs are unmodulated RF, modulated RF and 400 CPS audio. RF output is in excess of 100,000 microvolts and jacks are provided for choice of either high or low RF output. Stability is insured by special circuit design. Has a fine adjustment RF control. AF output is 2-3 volts, AF input is 4 volts across 1 megohm. Large clear 5 inch etched dial plate and pointer are protected by transparent plastic bezel. Common AF terminals for EXT-MOD input and INT-AF for audio tests eliminate need for special AF output connectors. Machine engraved panel lettering. Handsome gray metal case with carrying handle. Measures 6½" x 10" x 4½". Comes complete with pair of leads. AC line cord and plug. Operates on 105-125V 50-60 cycle AC. Shpg. wt., 8 lbs.

LAFAYETTE LSG-10 SIGNAL GENERATOR **22.50**

R/C RECEIVER AND TRANSMITTER

RANGE OF APPROXIMATELY 1 MILE



AN R/C RECEIVER COMPLETELY ASSEMBLED AND WIRED — INCLUDES TUBES — READY TO OPERATE!

R/C Receiver is completely assembled and wired, with tube and ready to operate on exam-free 27.255 MC remote control band. Size: 1⅜" x 1-15/16" x 3". Wt. 3.3 oz. Requires one 1.5 volt and one 45 volt battery.
F-208 ..... Net **7.95**

R/C Transmitter is completely assembled, tested and guaranteed, and includes tube and 27.255 MC crystal. 6 section telescoping antenna. Size: 4" x 4" x 12". Less batteries. Shpg. wt. 3 lbs.
F-249 ..... Net **19.95**

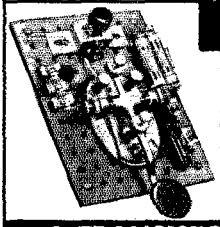
TRANSMITTER 1 Burgess, 2D or RCA VS069 Net. Ea. **.45**

BATTERIES: 2 Burgess XX45 or RCA VS016 ..... Net. Ea. **2.28**

R/C Escapement is completely wired, sturdy and self-neutralizing. Weighs ½ oz. Low current drain. Size: 1⅝" L x ½" W. Shpg. wt. 5 oz.
F-194 ..... Net **2.45**

SPECIAL COMBINATION OFFER

Consists of R/C Transmitter (F-249), R/C Receiver (F-208) and Escapement (F-194). All three at a super special price.
F-250 ..... Net **28.95**



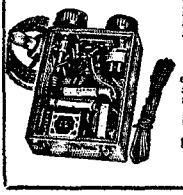
TRANSISTOR CODE PRACTICE OSCILLATOR KIT

For those interested in mastering the international code, an audio tone oscillator is essential. The circuit of this transistorized feedback oscillator has the simplicity of the neon glow, the signal strength of the vacuum tube, and requires only two penlite cells for weeks of service. It may be used for solo practice, or two may send and receive with the same unit. Kit comes complete with Transistor, Telegraph Key, Resistors, Condensers, Masonite Board, etc., and Schematic Diagram.

KT-72 ..... Net **2.99**

Cannon ECI—Single Headset ..... Net **1.13**

2 TRANSISTOR POCKET RADIO KIT



Packed into a 2½"x3½"x1¼" plastic case This Two Transistor plus crystal diode radio kit offers many surprises, utilizing a regenerative detector circuit with transformer coupled audio stage, gives you high gain and excellent selectivity. Pulls in distant stations with ease with more than ample earphone volume. Kit comes complete with two transistors, crystal diode, loopstick, Argonne transistor audio transformer, resistors, condensers, plastic case, etc. Including schematic and instructions.

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Include postage with order.

■ **Send FREE TRANSISTOR CATALOG**

FREE

Name_____

Address_____

City_____ Zone____ State____

World Above 50 Mc.

(Continued from page 61)

green wires on tie point at rear of chassis near v.f.o. socket.

11) Run wire from one pole of toggle switch through same grommet to Pin 6 of 6AU6 socket, Pin 6 of 6AQ5 socket, and to back end of filament choke on 6146 socket.

12) Run wire from other pole through grommet to new tie point near the octal socket, and connect choke from there to Pin 1 of the socket and by-pass as noted in Step 5. (6.3 volts a.c.)

13) There is a tie-point strip near the large wire-wound resistor. Run a wire from the terminal nearest the front panel to a terminal on the new tie strip. Connect to Pin 2 of the octal socket through a 4.7-μh. r.f. choke.[1] By-pass Pin 2 with .005. (75 volts bias.)

14) Connect red wires on tie point near v.f.o. socket to new tie point and through choke [1] to Pin 3 and by-pass, as in Step 13. (Plus 300 volts.)

15) Connect brown wires to Pin 4 through tie point and choke [1] and by-pass, as in Step 14. (Cathode lead of oscillator and doubler of external rig.)

16) Locate wire-wound resistor on phone-c.w. switch. Run wire from end nearest buffer capacitor to tie point, and through choke [1] to Pin 6. By-pass with .005-μf. 1000-volt ceramic. (Plus 600 volts.)

17) Connect Pin 8 to ground.

18) Replace filter capacitor and brackets. Be sure it does not short out any of added wiring or terminals. Replace chassis in cabinet.

This modification allows all voltages to be applied simultaneously to both transmitters, but only the one in which the heaters are energized will function. The newly-installed heater switch on the front panel selects transmitter to be used. The modulator, speech amplifier and rectifiers operate in the same manner for either rig.

A safety precaution: Be sure to enclose the high-voltage circuits of the external transmitter. They will have lethal voltages on them whenever the Viking itself is in operation.

The transmitter used with the Viking at W9VZP is a 50-Mc. rig with an 829B in the final, but a wide choice of r.f. lineups can be used with the Viking power equipment.

Using the 20A as a V.H.F. Exciter—WØBJV

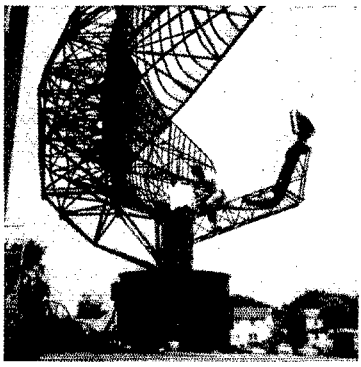
When single sideband first began to take hold some years ago, it made quite a hole in the v.h.f. activity picture. Seems that s.s.b. and v.h.f. both appeal to the same sort of ham. So, fellows who have wandered from the v.h.f. fold may be interested to know that the Central Electronics 20A exciter can be used as a source of excitation for a v.h.f. rig. The setup can be operated phase-modulated, if one so desires. The trick is to get 24-Mc. output from the 20A. Here is how WØBJV does it.

He uses the 20A in conjunction with a BC-458 v.f.o. With the v.f.o. dial clockwise practically all the way the frequency is approximately 5 Mc.,

(Continued on page 150)

FIELD ENGINEERING

WITH A FUTURE - AT RAYTHEON



40 ft. high-gain radar antenna.

Your opportunity: Raytheon needs men qualified for field engineering who are interested in building a future in electronics. Field experience has enabled many of our engineers to become Raytheon executives. Here's a partial list of former field engineer-hams who are now executives at Raytheon:

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W1CLS—A. A. Farrar, Asst. Vice Pres. & Mgr., Gov't. Relations Div.
W1SZ —C. C. Rodimon, Mgr., Field Requirements, Gov't. Relations Div.
W1GWD—O. L. Dewey, Mgr., Gov't. Service Dept.
W1EEE—E. K. Doherr, Asst. Mgr., Gov't. Service Dept.
W1CMU—G. E. Dodge, Supervisor, Field Engineering
W1PAW—W. R. Burrows, Supervisor, Technical Section

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which is multiplied by 3 to give 15-Mc. injection to the 20A. This is mixed with 9 Mc. in the 20A to give 24-Mc. output, which is then multiplied to 144 Mc. in conventional fashion. The 20A is tuned as follows: The bandswitch is placed in the 10-meter position and the mixer and amplifier are peaked at approximately 14 Mc. on the roughly calibrated dials. The frequency can be shifted to 25 Mc. for use with 50-Mc. exciters readily.

Since WØBJV sent this information in to us he has also put on s.s.b. on 50 Mc. What was probably the first two-way s.s.b. DX contact on 50 Mc. was made May 29th, when Stan worked W1CLS, Weston, Mass. It should be understood that the above method does not permit the use of s.s.b. on the v.h.f. bands, however. The only way to change the frequency to a higher band with s.s.b. is by heterodyning.

Those States-Worked Boxes

The intense activity of summer and the influx of many new operators are causing some major changes in our activity boxes these days. We had 35 requests for changes in standings last month alone! Please check the 6- and 2-meters boxes in July *QST* carefully. If your listing is not correct, please send us the full information at once.

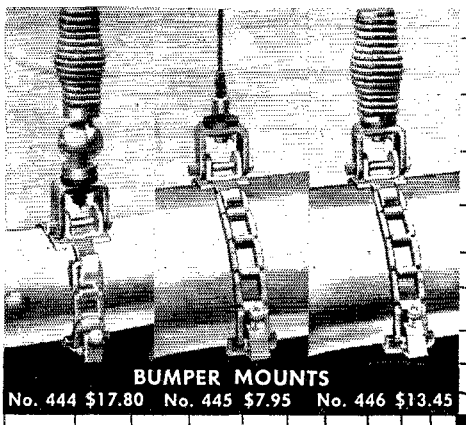
For the 50-Mc. box, all you need is the number of states you have worked. Confirmations are not required until you apply for WAS. (There is a special award, remember, for the lucky and persistent fellows who can nail down all 48 on 6.) To make the 2-meter box, send us the total number of states and U. S. call areas you have worked, plus the call and location of the most distant station you have contacted. He can be in any country.

There were many new calls in the standings last month, and we hope to have more. Don't feel that you have to be an old-timer to get into the listings. If you're active regularly on either 6 or 2, and your record is equal to or better than the ones listed for your vicinity, send it in. The boxes are intended to reflect current accomplishments, not ancient history. Anyone we don't hear from at reasonable intervals will be dropped from the listings any time new claimants appear with meritorious records.

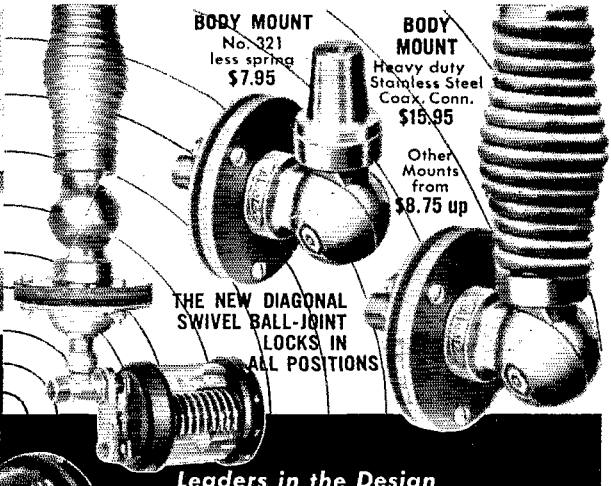
Once you've sent in a listing, keep it up to date. And if you know of any calls now in the boxes that do not represent active stations, please let us know that, too, so we can weed out any deadwood that may still be in there. Quite a few calls came out last month; we hope none of them unjustly. Those boxes are supposed to be news. Please help us to keep them that way!

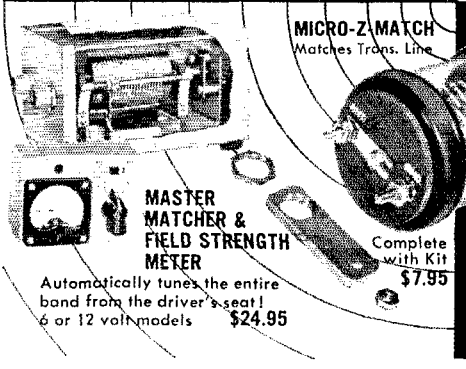
W9KLR threw us a hot one recently by suggesting that we use bold-face listings for the 2-meter stations that can confirm their claims with cards. W5AJG likes that idea. We might go to it; what do *you* think?

For those who want to know when we'll start a box for 220- and 420-Mc. work, we report that this will happen as soon as we get enough listings. We're collecting them — how about yours?



BUMPER MOUNTS
No. 444 $17.80 No. 445 $7.95 No. 446 $13.45





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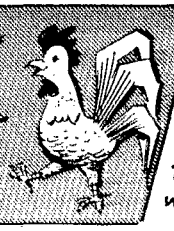
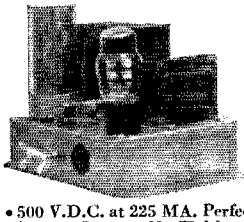
HERE 'TIS!

The PALCO BANTAM 65



The smallest, most compact **MOBILE TRANSMITTER** with 65W-Phone 90W-CW

MOBILE POWER



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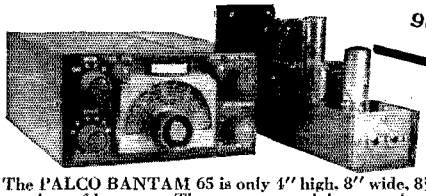
- Low current — low voltage switching.
- Heavy duty components for dependable, long life operation.
- Small, compact, rugged. Only 4" x 10" x 6¾" H.
- No ventilation problems. Mount on firewall near battery.

Model 606 — 6 V.D.C. Kit.....$32.50
Model 612 — 12 V.D.C. Kit.....$35.50
FACTORY WIRED, either model .$7.50 extra
Combination 6 and 12 V.D.C. — 115 V. AC Model also available. We can supply power cables of any required length.



The PALCO BANTAM 65 is only 4" high, 8" wide, 8¾" deep — leaves you lots of leg room. The separate modulator section on a 2" x 2⅝" x 11" chassis may be mounted in any convenient location. The exclusive new "tune up" meter was designed with *highway safety* in mind. No more stooping, no more squinting — you'll like this new idea!

OTHER OUTSTANDING FEATURES

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- Gang tuned VFO and exciter stages.
- Efficient pi-section output.
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NOVICES! Use the BANTAM 65 as a fixed rig now — as a mobile when you get your "General."

BANTAM 65, complete with tubes and power connectors.....$159.50
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A.R.R.L. 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 4¼ by 9½ 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, W1IPQ, 99 Flat Rock Rd., Easton, Conn.
W2, K2 — E. F. Huberman, W2JIL, Box 746, GPO, Brooklyn 1, New York.
W3, K3 — Jesse Bieberman, W3KT, P.O. Box 400, Bala-Cynwyd, Penna.
W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
W5, K5 — Robert Stark, W5OLG, P.O. Box 261, Grapevine, Texas.
W6, K6 — Horace R. Greer, W6TI, 414 Fairmount St., Oakland, Calif.
W7, K7 — **Joseph P. Vogt, W7ASG, 3599 Karen Ave., Salem, Oreg.**
W8, K8 — Walter E. Musgrave, W8NGW, 1294 E. 188th St., Cleveland 10, Ohio.
W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wisc.
WØ, KØ — Alva A. Smith, WØDMA, 238 East Main St., Caledonia, Minn.
VE1 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
VE2 — Harry J. Mabson, VE2APH, 122 Regent Ave., Beaconsfield West, Que.
VE3 — Leslie A. Whetham, VE3QE, 32 Sylvia Crescent, Hamilton, Ont.
VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
VE6 — W. R. Savage, VE6EO, 883 10th St. N., North Lethbridge, Alta.
VE7 — H. R. Hough, VE7HR, 2316 Trent St., Victoria, B. C.
VE8 — W. L. Geary, VE8AW, Box 534, Whitehorse, Y. T.
VO — Ernest Ash, VO1A, P.O. Box 8, St. John's, Newfoundland.
KP4 — E. W. Mayer, KP4KD, 1061, San Juan, P. R.
KH6 — Andy H. Fuchikami, KH6BA, 2543 Namauu Dr., Honolulu, T. H.
KL7 — Box 73, Douglas, Alaska.
KZ5 — Catherine Howe, KZ5KA, Box 407, Balboa, C. Z.

Hints & Kinks

(Continued from page 66)

When employing this old construction hint, first coat the coil form with a thin layer of coil dope. Allow the dope to dry until "tacky" and then wind the required turns of wire. Space the turns with a winding of thread. Carefully remove the layer of thread after the dope is completely dry.

The inductor may then be covered with a light coating of dope. Avoid using an excessive amount of dope because a heavy, slow-drying application may cause the turns of wire to slip out of position.

— *J. Herm Rickerman II, K2HXP*

Results

(Continued from page 68)

acknowledgement was sent to each amateur participant who submitted a copy made from the radioteletypewriter transmission of this message. Perfect copies were submitted by the following participants:

W1s BDI(2) RBF(2) WEW WPR ZQM, **W2s** DOB DXD GHH HHJ JAU(2) JAV OEM RMB, **W3s** CRO FYZ(2) LWQ MHD SSL YMA, **W4s** AIY PHL, **W5s** DGZ EVO JBW TJE YMT, **W6s** AEE ASJ BRY BYS CAP CBF CBY CG CLW CQI DNT DNX DOV EER EGZ(2) EJM EKC FZC HXQ ILW IZJ(3) JAV JJP MSG NAA NR NSS OGG OUR OVZ OWP PYM RSJ VPC VVF WOC YDK ZGC, **W7s** KWB KQX, **W8s** BNL HWP SWZ, **W9s** IHO OCV TCJ VNZ VVF BK, **WØ**JHS.

C. F. Bailey Jr., W. B. Baker, J. E. Blanchett, M. H. Caldwell Jr., A. L. Charlton Jr., F. L. Culp, J. F. Duran(2), W. J. C. Fahey, J. Halapoff, R. F. La-Violette, T. A. Myers, W. T. Phillips Jr., G. F. Rose, N. D. Rosenberg, G. C. Stephens, J. W. Stevens, R. M. Todd, K. W. Tuskind, F. C. White(2), USS Douglas H. Fox (DD-779).

SEE PAGE 132 FOR A COMPLETE LIST OF A.R.R.L. QSL MANAGERS

OUR COVER

Our cover this month shows one of the polar diagrams from next month's conclusion to the article on Yagi antennas. That beam direction indicator that you see behind the diagram is controlled by the conventional selsyn arrangement, and has a specially-prepared translucent map based on the ARRL Map. The indicator box was supplied by Middletown Mfg. Co., Middletown, Conn. Elbow grease expended in making the indicator was supplied by W1VG.

RADIO OPERATOR-TECHNICIANS

The U. S. Government has a continuing requirement for single and married men with radio operator-technician experience. Individuals with less than minimum required experience can qualify for training. Persons with past applicable experience, who for some time have been out of touch with this type of activity, will be refreshed. Assignments are overseas at interesting foreign posts.

Starting annual salaries, which will be determined by the applicant's experience and ability, range from $3670 (GS-5) for trainees to $4970 (GS-8) for fully qualified men. Normal promotional progress within this salary range may be expected when quality of performance dictates. Beyond this latter level, advancement possibilities exist on a selective and competitive basis. Standard government allowances are paid in addition to the salary.

A variety of foreign posts are available. Rotation of the employee and his family from post to post is accomplished in accordance with standard government regulations and usually involves tours of 24 months duration at each post followed by Stateside leave between assignments. Work is challenging and varies from post to post. If you are in good health, will not be subject to military draft under selective service regulations for at least one year, and are interested in the above openings, please write —

DAVID R. RINGLAND
U. S. Government Personnel
Post Office Box 6478
"T" Street Station, Washington, D. C.

When writing please give us the following information: 1. Name, address, telephone number, and hours when you can be reached; 2. Date of birth; 3. Military history including dates, schools, experience, grade or rank, and MOS (primary and others); 4. Civilian training and experience; 5. FCC license if any; 6. CW speed; 7. Typing speed; 8 Marital status and dependents. If your letter indicates that you have the required qualifications, a local interview will be arranged in the near future.

WANTED! Amateurs with engineering degree or equivalent experience.

Write, telephone or wire Chief Engineer

ELDICO CORP.

Subsidiary of **Dynamics Corp. of America**

72 East Second Street, Mineola, L. I., N. Y.

RADIO and TELEVISION

Over 30 years N.E. Radio Training Center. Train for all types FCC operators' licenses. Also Radio and Television servicing. FM-AM broadcasting transmitters at school. Send for Catalog Q.

MASS. RADIO SCHOOL

271 Huntington Avenue **Boston 15, Massachusetts**

Lic. by Comm. Mass. Dept. Educ.

LEARN CODE!

SPEED UP Your RECEIVING *with G-C*

Automatic Sender

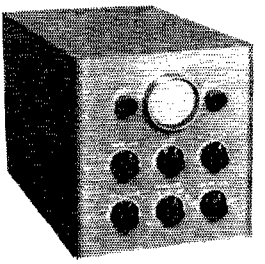
Type S
$28.00 Postpaid in U. S. A.

Housed in Aluminum Case Black Instrument Finished. Small—Compact—Quiet induction type motor. 110 Volts—60 Cycle 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 50c per roll.

GARDINER & COMPANY

STRATFORD • **NEW JERSEY**



- **Automatic changeover**
- **Sine or trapezoid pattern . . .**
- **Automatic brightness control . . .**
- **Works on SSB . . .**

NOW!

Monitor Both Transmitted *and Received Signals*

Here at last for the amateur radio operator is a compact modulation monitor. Any novice can use the Moniscope. Monitors continuously from 3.8 to 30 MC. No connection needed at the transmitter — only one to the receiver. See your dealer now.

Representatives wanted—Inquiries invited

Write on your letterhead.

AMERICAN ELECTRONICS ENTERPRISES

3603 East 10th Street • Long Beach, California

P & K TRANSMITTERS, CONVERTERS, RECEIVERS, POWER SUPPLIES

- Quality craftsmanship; attractive and practical design
- Creative engineering
- Available for 220, 144 or 50 Mc.
- Where perfection is standard
- Designed and built by Amateurs

MODEL 504C

Fixed or Mobile Transmitter

- One MC bandspread without having to retune oscillator or doubler stage
- Designed to operate with 8 MC crystals
- Antenna output, 50/72 ohms • Crystal or Carbon mike
- 2¼" Tuning meter • Modulation indicator
- 10 watts input • Power requirements—300 volts, 120 mils • 6 or 12 volts • Tube lineup—6BK7 speech amp., 6AQ5 plate mod., 6BK7 Osc. doubler, 5763 final amp.

MODEL 504M

Mobile Converter

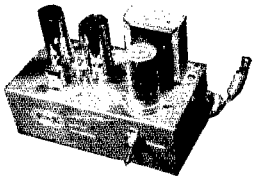
- Crystal controlled
- Car radio as tunable IF
- Adaptable for voltages from 4 to 8 volts
- Low noise grounded grid RF amp.
- Hi impedance antenna input
- Power requirements 150V plate, 6V fil.

NEW! 504R

Mobile or Fixed Station Receiver

- Crystal controlled front end, double conversion tunable 10–14 MC IF, utilizes regenerative 1600 KC last IF amplifier stage, low noise grounded grid front end, cross modulation minimized, uses two X 155, 150V B plus Planetary drive tuning, built in speaker, all connections in rear of unit, matches transmitter. Available for 220, 144 and 50 MC, 6 or 12 volts.....**$79.95**

MODEL 504H



Fixed Station Converter with Built-in Power Supply

- Utilizes 2 X-155 as a low noised grounded grid front end, crystal oscillator and mixer
- IF freq. 10–14 megs. (other IF frequencies available at slight additional cost)
- Designed to operate on low impedance coaxial antenna input, 50/72 ohms
- Cross modulation minimized, tunes entire six meter band
- Will operate with any standard communications receiver

MODELS

- 504C Transmitter 50–54 MC.....**$79.95**
- 504M Mobile Converter 50–54 MC..... **19.95**
- 504H Fixed Station Converter 50–54 MC..... **49.95**
- 504P Power Supply, 6, 12 or 115V in, 330V @ 120MA..... **39.95**

For More Extensive Technical Information Write Dept. J

P & K ELECTRONICS John, W6SDN—Jim, W6JAA
7 Washburn Street, San Francisco, Cal. KL 2-0373
Territories open for experienced factory representatives. Write Dept. O

CODE SENDING—RECEIVING **SPEED**

Be a Radio Ham or Commercial Operator. Pass FCC code test in few weeks. Fascinating hobby. Good pay, interesting work in Commercial field. Same system used by radiotelegraph specialists. FREE book explains how Amateurs and Operators learn code and develop amazing skill and speed.
Candler System Co., Dept. 4 J, Box 928, Denver 1, Colo., U.S.A. and 52b, Abingdon Rd., Kensington High St., London W. 8, England

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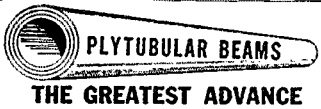

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THE GREATEST ADVANCE IN ROTARY BEAM DESIGN OF THE PAST 20 YEARS.

See your distributor or write

FOR FULL DETAILS SEE PAGE 171 DEC. 1955 QST.

TENNALAB - QUINCY, ILLINOIS

LMB BOX CHASSIS OFFERS FREE

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10 tested kit diagram projects for the builder. Each one of these kit diagrams built by a recognized expert. Kit projects are complete in every detail. Circuit diagram, photo of project both front and rear photo. Rear photo shows wiring and parts. Detailed instructions for building, complete parts list and approximate cost. Complete to build, except parts and your distributor can supply the parts. Ask your distributor for the list of LMB kit Diagram Projects. If he does not have, write to

LMB 1011 Venice Blvd., Los Angeles 15, Calif.

He Heard it!

the hottest thing in the business!

the new HAMMARLUND

HQ-(Shhhhh—censored till September)

HEATHKIT

DX-100

PHONE AND CW

transmitter

KIT

The Heathkit Model DX-100 Transmitter is rapidly becoming the "standard" ham rig in its power class. The high quality and outstanding performance it offers can be matched only in equipment costing many dollars more. It features a built-in VFO, modulator, and power supplies, and is bandswitching for phone or CW operation on 160, 80, 40, 20, 15, 11, and 10 meters. The kit includes a detailed construction manual, the cabinet, all tubes, prewound coils, and all other parts necessary for construction.

Push-pull 1625 tubes are used to modulate parallel 6164 tubes for RF output in excess of 100 watts on phone, and 120 watts on CW. May be excited from the built-in VFO or from crystals. Features pi network output circuit, illuminated VFO dial and meter face, and 5-point TVI suppression. High grade, well-rated parts supplied. Schematic diagram and technical specifications on request.

FEATURES

Design proven through actual signal reports.

★

Only top-quality components used throughout.

★

5-point TVI suppression, and pi network output to match 50 to 600 ohms.

★

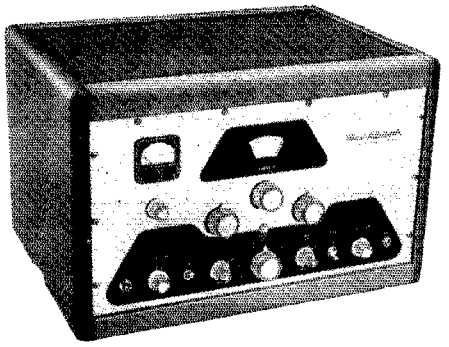
Detailed construction manual for simplified assembly.

★

100 watts output on 160, 80, 40, 20, 15, 11, and 10 meters.

★

Attractive and functional physical design.



MODEL DX-100

$189.50

Shpg. Wt. 107 Lbs.

Shipped Motor Freight unless otherwise specified. $50.00 deposit required on all C.O.D. orders.

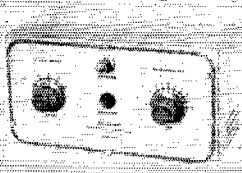
HEATHKIT

antenna coupler

KIT

MODEL AC-1

$14.50



Shpg. Wt. 4 Lbs.

In addition to matching a low power transmitter to an end-fed long wire antenna, this antenna coupler incorporates a 3-section low-pass filter, to attenuate output above 36 mc and reduce TVI. Handles up to 75 watts, 10 through 80 meters. 52 ohm coaxial input—tapped inductor and variable capacitor—neon RF indicator. Ideal for use with the Heathkit AT-1 Transmitter.

HEATHKIT

grid dip meter KIT

The Model GD-1B is a time-proven instrument. It will enable you to accomplish literally hundreds of jobs on all types of equipment. Frequency range is from 2 mc to 250 mc. A 500 ua meter is employed for indication, and a sensitivity control and headphone jack are provided. Includes pre-wound coils and rack. Indispensable for the ham, serviceman, and engineer. Extra coils available to extend frequency down to 350 kc.

MODEL GD-1B **$19.50**

Shpg. Wt. 4 Lbs.

HEATHKIT

antenna impedance meter KIT

Used with an RF signal source, the AM-1 will enable you to match your antenna-receiver-transmitter system for optimum operation. Will double as a phone monitor or relative field strength meter. Uses 100 ua meter, and covers 0 to 600 ohms. Frequency to 150 mc.

MODEL AM-1

$14.50

Shpg. Wt. 2 Lbs.

HEATH COMPANY

A Subsidiary of Daystrom, Inc.

BENTON HARBOR 9, MICHIGAN

HEATHKIT communications-type all band receiver KIT

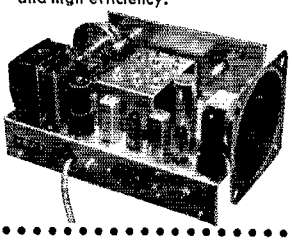
Slide-rule dial —electrical bandspread—ham bands marked.

Slug-tuned coils and efficient IF transformers for good sensitivity and selectivity.

Transformer-operated power supply for safety and high efficiency.

The Model AR-3 receiver features new high-Q slug-tuned coils, new layout, and new-type IF transformers. The result is high sensitivity and selectivity and better image rejection on all bands.

Transformer-type power supply, electrical bandspread, RF and AF gain controls, antenna trimmer, AGC, BFO, headphone jacks, socket for Q multiplier, 5½" PM speaker and illuminated dial.



SPECIFICATIONS:

Frequency Range—550 kc to 30 mc on four bands.
Tube Complement—1—12BE6 oscillator and mixer • 1—12BA6 IF amplifier • 1—12BA6 second detector, AVC, first audio amplifier and reflex BFO • 1—12A6 beam power output • 1—5Y3 full wave rectifier

$27.95 *(Less Cabinet)*
• MODEL AR-3
Shpg. Wt. 12 Lbs.

CABINET: Fabric-covered cabinet available. Includes aluminum panel, speaker grille, and protective rubber feet. Measures 12¼" W. x 6¾" H. x 7¾" D. No. 91-15. Shpg. Wt. 5 Lbs. **$4.50.**

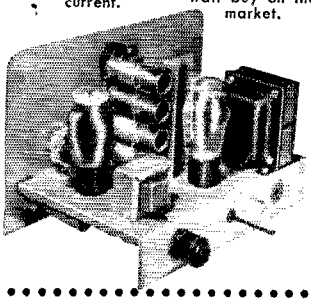
HEATHKIT CW amateur transmitter KIT

Single-knob bandswitching for 80, 40, 20, 15, 11, and 10 meters.

Panel meter monitors final grid or plate current.

Plate power input 25-30 watts.

Best dollar-per-watt buy on the market.



The AT-1 is complete with its own power supply, and covers 80, 40, 20, 15, 11, and 10 meters with single-knob bandswitching. Designed for crystal or external VFO excitation. Incorporates key-click filter, line filter, copper plated chassis, pre-wound coils, 52-ohm coaxial output, panel meter, and high quality components throughout. Easy to build, even for the beginner. Employs 6AG7 oscillator and 6L6 final. Up to 30 watts power input.

$29.50
• MODEL AT-1
Shpg. Wt. 15 Lbs.

SPECIFICATIONS:

RF Amplifier Power Input . . . . 25-30 watts
Output Connection . . . . . 52 ohms
Band Coverage . . . . . 80, 40, 20, 15, 11, 10 Meters
Tube Complement:
5U4G . . . . . Rectifier
6AG7 . . . . . Oscillator—Multiplier
6L6 . . . . . Amplifier—Doubler

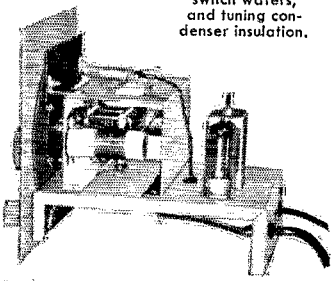
OA2 voltage regulator tube for stability.

Covers 160-80-40-20-15-11-10 meters.

Smooth-acting, illuminated and pre-calibrated dial.

6AU6 electron-coupled Clapp oscillator.

Copper plated chassis—aluminum case—profuse shielding—ceramic coil forms, switch wafers, and tuning condenser insulation.



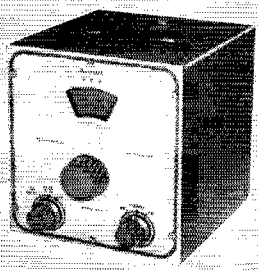
HEATHKIT vfo KIT

The Model VF-1 features illuminated and pre-calibrated dial scale. Cable and plug provided to fit the crystal socket of any modern transmitter. Covers 160-80-40-20-15-11 and 10 meters with 3 basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Derives operating power from transmitter power supply. Has VR tube for stability. Go VFO for more operating enjoyment.

MODEL VF-1

$19.50

Shpg. Wt. 7 Lbs.



SPECIFICATIONS:

Output Frequencies—1750-2000 kc, 7000-7425 kc, 6740-6808 kc. **Calibrated Bands**—160-80-40-20-15-11-10 meters. **Tube Compliment**—6AU6 Oscillator OA2 Voltage Regulator. **Power Requirements**—250-350 VDC @ 15-20 ma. and 6.3 VAC @ .45A.

ORDER DIRECT FROM THIS AD . . . OR WRITE FOR FREE CATALOG. Describes more than 65 interesting "build-it-yourself" projects. Amateur equipment, hi fi amplifiers, and the complete Heathkit line of test instruments. Get yours today!

HEATH COMPANY
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HAM-ADS

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

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously noncommercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly. Typewritten copy preferred but handwritten signature must accompany all authorized insertions.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

QUARTZ — Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 248 Madison Ave., New York City 16.

MOTOROLA used FM communication equipment bought and sold. W5BCO, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

WANTED: Cash or trade, fixed frequency receivers 28/42 Mc. W9YIV, Troy, Ill.

CODE slow? Try new method. Free particulars. Donald H. Rogers, Ivyland, Penna.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0800 to 1730 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 605 Church St., Ann Arbor, Michigan. Tel. NOrmandy 8-8698. NOrmandy 8-8262.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

WANTED: All types aircraft & ground transmitters, receivers, ART-13, RT18/ARC1, R5/ARN7, BC610E, ARN6, BC788C, ARC3, BC342. Highest prices possible paid. Dames, W2KUW, 308 Hickory St., Arlington, N. J.

RECEIVERS repaired and aligned by competent engineers, using factory standard instruments. Hallicrafters, Hammarlund, National. Collins authorized service station. Our twentieth year. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

ATTENTION Mobileers! Leece-Neville 6 bolt 100 amp. system alternator, regulator & rectifier, $45.00. Also Leece-Neville 12-volt 100 amp. system, alternator, regulator & rectifier, $85.00. Good condition. H. A. Zimmermann Jr., K2PAT, 570 Jamaica Ave., Brooklyn 8, N. Y. Ulster 2-3473.

CASH for your gear. We buy as well as sell. Write for cash offer or trade. We stock Elmac, Gonset, Hallicrafters, Hammarlund, Johnson, Lysco Master Mobile, Morrow, National and other ham gear. H & H Electronic Supply, Inc., 506 Kishwaukee St., Rockford, Ill.

MIAMI and vicinity: Communications receivers repaired. Byrant Electronics, 13341 N.W. 7th Ave. Phone 84-4001.

URGENTLY need AN/APR-4 items particularly tuning units for important defense contracts. New high prices. Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio.

FLORIDA Bound? Stop at Tamishaw Motel, a Ham's Haven. North Trail, Ft. Myers, Fla. "Eb" Long, K4GEW.

HAM Guest Register Books, $2.00 in U. S. A.; $2.25 in Canada postpaid. Gratton George, W4PJU, Clewiston, Fla.

MEDICAL Hams! Swap Burdick EK-2 for Globe King, 500-A, C. R. Faulkner, M.D., K4AXE, 106 No. Main, Somerset, Ky.

OUTSTANDING ham list revised monthly. Our prices are realistic and attractive. Standout values in used Barker & Williamson, Collins, Central Electronics, Elmac, Gonset, Hallicrafters, Hammarlund, Harvey-Wells, Johnson, Morrow, and National units. We deal easy and offer time payments tailored for you. All leading brands of new equipment always in stock. Write immediately for this month's Bulletin and our new exclusively amateur catalog just out. Stan Burghardt, WØBJV, Burghardt Radio Supply, Inc., Box 746, Watertown, S. Dak

WANTED: Two-way FM equipment. Ronald Phillips, Communications, 1312 McGee, Kansas City, Mo.

VIKING I, TVI-suppressed transmitter and Viking VFO in excellent condx for sale: $180. John M. Pincomb, W2SIM, 2 Great Oaks Road, Roslyn Heights, N. Y. New York City hams please call RO 3-0574.

PLASTIKASE rubber stamp, your call name and address. Economy with pad $1.00. Top quality with handle, $1.50, pad 35¢. El-Kay Stamps, Box 5-WT, Toledo 12, Ohio.

QSLS? SWLS? Finest and largest variety samples 25¢ (refunded). Callbooks (latest), $4.00. "Rus" Sakkers, W8DED, P. O. Box 218, Holland, Michigan.

QSLS-SWLS. Meade WØKXL, 1507 Central Avenue, Kansas City, Kans.

QSLS — Colorful new designs. Samples free. Rogers, KØAAB, 737 Lincoln Ave., Saint Paul 5, Minn.

QSL-SWLS. 100, $2.85 up. Samples 10¢. Griffeth, W3FSW, 1042 Pine Heights Ave., Baltimore, Md.

QSLS Samples Free. W3EHA, Jones, 840 Terrace North, Hagerstown, Md.

QSLS beautiful brand new designs in 3 and 4 colors on glossy stock, special low price $3.00 per 100 or $5.00 for 200. 48 hour service. Satisfaction guaranteed or your money refunded. Constantine Press, Bladensburg, Md.

QSLS. Nice designs. Samples, Besesparis, W3QCC, 207 S. Balliet St., Frackville, Pa.

QSL Samples. Dime, refundable. Roy Gale, W1BD, Box 154, Waterford, Conn.

DELUXE QSLS — Petty, W2HAZ, Box 27, Trenton, N. J. Samples 10¢.

QSLS-SWLS. Samples free. Bartinoski, W2CVE Press, Williamstown, N. J.

QSLS "Brownie," W3CJI, 3110 Lehigh, Allentown, Penna. Samples 10¢; with catalogue, 25¢.

QSLS-SWLS. Samples 10¢. Malgo Press, 1937 Glendale Ave., Toledo 14, Ohio.

WOODY'S QSLS. Box 164, Asher Sta., Little Rock, Ark.

QSLS. Western states only. Fast delivery. Samples 10¢. Dauphinee, K6JCN, Box 66009, Mar Vista 66, Calif.

QSLS, Taprint, Union, Miss.

QSLS. Postcard brings samples. Fred Leyden, W1NZJ, 454 Proctor Ave., Revere 51, Mass.

QSLS, SWLS. High quality. Reasonable prices. Samples. Bob Teachout, W1FSV, 204 Adams St., Rutland, Vt.

QSLS, sharp, 200 one color, three bucks. Multi-color samples dime refunded. Edward Green & Sons, 4422 Marquette Drive, Ft. Wayne, Ind.

QSLS samples 10¢. Bob Morris, W2IHM, 230 Rose St., Metuchen, N. J.

QSLS-SWLS, rubber stamps, letterheads, bargain prices. Craigprint, Newark, Arkansas.

QSLS, SWLS, 2-colors. 100 for $2.00. Bob Garra, W3UQL, Lehighton, Penna.

QSLS — All kinds and prices, samples 10¢ fast service. DX Card Co., Kulik St., Clifton, N. J. GR 3-4779.

QSLS-SWLS. Samples free. Backus, 5318 Walker Ave., Richmond Va.

QSLS. Samples, dime. Printer, Corwith, Iowa.

C. FRITZ for better QSLS-SWLS! Samples 10¢. 1213 Briargate, Joliet, Ill.

QSLS-SWLS. 1¢ each. Rusprint, Box 7507, North Kansas City 16, Miss.

QSLS. Glossy samples 10¢. W1OLU Press, 30 Magoun, Medford, Mass.

QSLS. Cartoons, colors, etc. Samples 15¢ (refunded). Chris, W9PPA, 365 Terra Cotta, Crystal Lake, Ill.

QSLS-SWLS two color, $2.00 hundred. Samples. W4DQK Press, Box 67, Pearson, Ga.

QSLS of distinction. Three colors and up. 10¢ brings you samples of distinction. Uncle Fred, Box 86, Lynn, Penna.

QSLS-SWLS. Reasonable. Catalog, 25¢. Speedy delivery. Dick, K6GJM, 10558 E. Olive, Temple City, Calif.

QSLS. Printed book matches and memo pads. Free samples. Freismuth, W2SUN, Bayville, N. J. P. O. Box 169.

QSLS, QSLS. Harrison, 8001 Piney Branch Road, Silver Spring, Md.

U. S. A. DX QSL Co-op. We are now saving more than 50% of mailing costs for hundreds of DX QSL'ers. We are clearing cards to every known QTH in the world. Only 2¢ a card after membership. Send name, call sign, and address along with membership fee. $1.00 for two years; $2.00 for five years. U. S. A. DX QSL Co-op, P. O. Box 5938, Kansas City 11, Mo.

DXCC Directory. $1.00 postpaid anywhere. W8VHO, Norm Thompson.

FOR Sale: Leece-Neville 6 volt system 100 amp, alternator, rectifier, voltage regulator with mounting brackets, schematic in exc. condx: $49.50. Samuel Lieberman, K2IFL, 130-29 228 St., Laurelton, Queens 13, N. Y. Tel. LAurelton 7-1642.

WANT: May 1916 *QST*. Sell 1932 to date and CQs 25¢ ea. four or more. WØMCK, Art Jablonsky, 1022N Rockhill, Rock Hill 19, Mo.

WANTED: ART13, ARC3, BC788, BC348, BC312, BC342, BC610, ARC-1, BC-221 and other military surplus. W4VHG, Box 5878, Bethesda, Md.

ATLANTIC City vacation! Commodore Hotel, Kilowatt accommodations at low power prices. Luxury rooms with bath and radio. Budget special rooms with running water. Write for information and reservations. Ben Robin, W2BIG, Manager, Commodore Hotel, 715 Pacific Ave., Atlantic City, N. J.

FABRICATED chassis and panels described in this magazine and the ARRL *Handbook* are available. Send for prices. Chicago Electronic Laboratories, 1214 W. Madison St , Chicago 7, Ill.

WANTED: BC610E transmitters and BC342 or BC312 receiver. Advise price and condx. R. Anderson, 4908 Hampden Lane, Washington 14, D. C.

SELL or Trade: Radio magazines. Bob Farmer, Plainview, Texas.

FOR Sale: Collins 30K-1, complete, new condition: $800 F.o.b. Pittsfield, N. H. A. J. Brizzolari, R.F.D. 1.

HAMFESTERS Radio Club's 22nd Annual Picnic, the liveliest and friendliest gathering in the midwest. August 12, 1956, at Santa Fe Park, near Chicago. See July Hamfest Calendar or write W9IWR for information.

SELL: New 65 watt Deluxe mobile station complete..6 volt Vibrapacks, recvr, Morrow 5BRF and FTR, speaker, xmitter Elmac AF67, mike, coax ant. relay, all band antenna and mounting, $325. Sell in like-new condx complete 1 Kw SSB xmittr., Cenco 20A, 458 all band VFO, Adams #1010 KW linear with spare 4-400A, B&W TR switch and xtal mike, $925. No trades. Need cash. F.o.b Lynchburg, Va. W4IWA, 1602 Morrison Drive, Lynchburg, Va.

PHOTO-HAMS: Swap: Rolleicord V, Rolleikin 35. 2 lite strobe, 5 x 7, complete accessories and darkroom. Want: DX-100, 20-A, etc. Also: SW-54, $25; AT-1, $20, AC-1, $7; S-40, $60; ATD 100 w fone rig with 3 pwr supp., TVI suppressed, $90. W9TGH, 320 Greenwood, Greencastle, Ind.

WYOMING DX QSOS: W7HYW, W7PSO, W7UFB monitoring 14050, 21050 daily 1400 and 1915 GMT.

SHORTWAVE converter for car radio. Easily installed on any car radio. Model 500A covers 1600 to 6000 kilocycles, Model 600A covers 16, 19, 25, 31, and 49 meters. Price: $29.95. Write for folder. ABC Radio Laboratories, 3334 N. New Jersey, Indianapolis 5, Ind.

MOVING! Must sell 120-watt bandswitching xmitter with pwr supplies, relay controlled, phone NBFM & CW (1951 and 1952 The Radio Amateur Handbooks) with spare tubes, VE2JI, Lac St. Denis, Quebec P., Canada.

WANTED: #18 Copperweld wire ; Jap mike AIWA-M18; KW ant. tuner 1.8-30 megs. Box 746, GPO, Brooklyn 1, N. Y.

TELEPHONE Transmitter. Hand-set type. Suitable for interhouse phones, speakers or any communication purpose. Delivered two for $1.00. No C.O.D's! Dept. C-230, 1760 Lunt, Chicago 26, Ill.

FOR Sale: Wilcox Type 99A, 4-channel, 500-watt transmitters; Link Radio, Type 1498 and Type 2118 FM transmitters/receivers; Dictaphone Type A2H belt recorders. Hawaiian Airlines, Box 3287, Honolulu, T. H

FOR Sale: Millen exciter, Millen VFO, 6 ft. cabinet. W1OER.

KILOWATT amplifier for sale. SSB, AM, CW 10-40 meters 304TH grounded grid, TVI suppressed. Tremendous bargain price includes 304TH modulator, all tubes and power supplies, six meters. Drive with Collins 32V, Viking or equivalent power. UTC Stancor components. Power supplies alone worth $150. Asking $225 for complete rig. S. D. Cowan, Jr., W1RST, 45 Park Ave., Old Greenwich, Conn.

MULTIBAND Antennas. As designed by W3DZZ. See QST March 1955 and Radio & TV News, December 1949. Write for details now! Frederick Tool & Engineering Corp., 414 Pine Ave., Frederick, Md.

SELL: Johnson Ranger, three months old. Factory wired, $225. Hallicrafters S-76 with xtal calibrator, $120. Howard McDonald, Shelby, Mich.

FOR Sale: BC-610-C transmitter, complete with speech amplifier. Modified to 6AG7, 813, 250TH. Coils for 80, 40, and 20 meters. Price $275. F.o.b. Goldsboro, N. C. Wayne County Amateur Association, P. O. Box 132. Henry A. Simmons, Jr., Pres.

SELL: Viking II and VFO, both factory wired by the Johnson Co. Transmitter and VFO both incorporate Viking timed sequence (grid block) keying. In excellent condition. David Smith, K2CHS, 84 Butler Rd., Scarsdale, N. Y.

SELL: Central Electronics 10A rack model with all coils. Reasonable price. W2WFV, 255 Eastern Parkway, Booklyn, N. Y.

FOR Sale: Complete station of the late W5BJI: Factory-wired Viking II and VFO; GPR-90 receiver with speaker, used three months. Coax ant. relay, and key. Some spare parts, ant. wire, all for $600. Contact his widow, Mrs. H. H. Wheeler, 709 Melrose, Pineville, La.

FOR Sale: AT1 Heath transmitter, AC-1 coupler and home-constructed modulator, $40. W. H. Baker, W1TUK, 16 Central St., Turners Falls, Mass.

FOR Sale: HQ-129X, $110; Meck T60-1, W/10, 20, 40 m. coils; $35.00; Globe King 400A like new condx w/10-80 m. coils, $300; Sonar CFC VFO, $25; Test equipment, Eico model 566 multimeter, new, $15; Eico model 625 tube checker, like new, $30; Eico model 145 signal tracer LN, $15; Eico model 320 signal generator LN, $15; Weston model 785 industrial tester, $25; Gonset mobile noise limiter, $5; T-32 desk carbon mike, $4.00; 2" surplus meters 0-100, 0-200, 0-300, 0-500 Ma., $2.00 each. 0-15 VDC and 0-30 VDC, $1.00 each; new 3" RD meters Simpson 0-300 Ma. & Westinghouse 0-500 Ma. $5.00 ea.; J-38 key, $1.00; 2 new 24UDC DPDT relays, $2.00 ea. All F.o.b. John H. Ashley, Box 254, Ware Shoals, S. C. W4OSC.

CLEANING House: PP 813 linear, H.F.M. all band mobile xmittr, all band 813 pi output final, 300 w/mod. 811A's, 1500 VDC 300 Ma., P.S. rack mounted; 50 w. audio amp. dual ch. FM Pilotuner; UTC xfrmr LS 15X, LS 55, LS 37, 2 μfd 6000 VDC cond. B&W CX-950, BC-625A, Measurements Corp. VTVM Mod. 62 Heathkit audio osc. and audio wattmeter, meters, xfrmr, parts. Send for list. W2WTO, 127 Monroe St., Honeoye Falls, N. Y.

SACRIFICE! National NC-183D receiver and speaker, like new: $249.50; Stancor ST-203A mobile transmitter converted to 60 watts and 75 meters, $30; A.C. power supply for above, all new parts on small chassis with cover, 600 volts at 225 Ma. $30; above items priced for quick sale. All in excellent condition. No false claims. F. S. Tibbetts, W1TMY, Box 65, Caribou, Me.

FOR Sale: Collins KW-1, perfect condition, like new. Priced for quick sale. Any reasonable offer considered. W9LWS, R.F.D. 2, Platteville, Wis.

FOR Sale: National NC-183 with speaker. In excellent physical and electrical condition. Recently realigned by factory experts. Asking $190. Wally Holl, 538 Luzerne St., Johnstown, Pa.

BOOKS for sale: "Mathematics for Electricians and Radiomen" by Cooke, $4.50 and "Radio Engineering Handbook" by Henney $10.50. Both prices reduced, perfect condx, never used. Paul Helfer, Brookside Place, Pleasantville, N. Y.

HAVE Surplus target plane receiver-selectors, selectors BC-464, five channel receiver-selector. Would like to contact someone owning target plane or control head. W8FHD.

CANADIANS! 3-element close spaced beam, gamma match built by professional engineer, complete with prop pitch selsyns, 300' RG11U cable, attractive hamshack control and 45' tower, self-supporting, complete with tuning instructions, $250. VE3DZY, Atikokan, General Delivery, Ont., Can.

COMMUNICATIONS receivers repaired and realigned, using factory methods. Associated Electronics, 167 So. Livermore Ave., Livermore, Calif.

SALE: HQ129X, gud concdx $115. Alperson, 22 Sky-View Dr. W. Hfd. Conn. AD 3-2817. Local deal only.

SELL: Johnson Ranger, Matchbox, 10-pass filter, HQ-140X w/spkr, D104 w/stand. All in excellent condx: $425. Cannot ship. Mort Brody, 248 Locust, Indiana, Pa.

SELL: *QST*, ARRL *Handbook*, CQ, Radio-TV News, Radio Electronics 1950–55, W8UML.

SELL: BC-312M with speaker, S-meter, Q-multiplier, excellent condition, $60; BC-453 Q-5er, $10. F.o.b. Want MB-40-SL. W8VIQ, 931 Harvard, Dayton 6, Ohio.

GONSET: Superceiver and Super Six combo; 1955 purchase, used only once. Not butchered. Will ship anywhere USA for first offer of $100. Complete; plugs, instructions, etc., ready to go. W1YYE, 77 Reservoir Rd., Quincy.

SELL: Gonset 10-11 meter converter $15; Elmac PMR6A receiver with power supply, $85; Carter dynamotor, 6v.-500v., 200 ma, $15; 40 watt p.p. 6L6s modulator, $18; 100 watt p.p. 807s modulator, $22; 800v. 300 ma. supply, $18; Vibrapack 400v.-90 ma., $8; Globe King 500, new WRL VFO, BUB low pass filter, push-to-talk D-104 mike, the works $575. W8QKU, 2748 Meade St., Detroit 12, Mich.

SELL: Hammarlund Super-Pro, SP-400X, wid spkr, and pwr supply; best offer takes it. Also, Heath AR-2 and AT-1, wid modulator, both in gud condx. Stephen King, K2SAR, 63 Tanners Rd., Great Neck, N. Y. After 1700 call Great Neck 2–8170.

WANTED: Johnson Matchbox. State condx, price. Wm. Paul, Blair, Wis.

FOR Sale or trade: Globe-King, Model 400B with instruction book. Need two V-70-D's. Trade for Viking Ranger or equivalent, $150 cash. Van Kirby, WN1JCO, 576 E. Main Rd., Middletown, R. I., Phone 4182-M. Must sell before August.

SELL or trade: Rek-O-Kut model M-5S 16" overhead recording mechanism with 8 ohm magnetic recording head, also Rek-O-Kut model G-2 16" 2-speed turntable for above. Both new, still in the original carton. A $390 value. Will sell or trade for ham transmitter in good condx. Make an offer. All letters will be answered. Bob Mehrer, KN9CWF, 670 So. Lincoln Ave., Kankakee, Ill.

FOR Sale: Johnson Viking Kilowatt Matchbox, brand new, never used, $90. Joseph Calamia, 3399 12th Ave., Brooklyn, N. Y. Tel. UL 3–7726.

WANTED: To buy or borrow schematic of Link Transmitter and receiver unit. Type 50 UPS serial #742, needed for Civil Defense purposes. Write John Moran, W1ZKQ, Radio Officer, P. O. Box 343, Danbury, Conn.

TELREX Christmas Tree, 5-el. 20 #505A, 3 El. 15, #153A, 3 El. 10, #303A. All with loop ends and 20 ft. support mast, factory drilled. Used less than 1 year. Perfect condx. Net $464.25. Will ship prepaid for $350. Terms if desired. Jim Leonard, W4FPS, 2644 Avenel, S.W., Roanoke, Va.

QST 1929 to 1956, Proceedings of IRE, 1939 to 1956 for sale or trade. Want HRO or Collins receiver. Sell Kay Electric Marka-Sweep model Video. W4FR, 701 Southview Drive, Louisville, Ky.

SELL: Elmac PMR6A, Mobile receiver with Elmac PSR6 power supply, in good condition, $75. Sooner Electronic funnel audio speech compressor $15. W2ADB, 27 Grayson Pl., Teaneck, N. J. Tel. Teaneck 7–2004.

FOR Sale: RCA plate transformer 2000 on each side, tapped at 1500, at 1.75 KVA secondary output with 115 volt tapped primary 50/60 cycles, $30.00; BC791 code tape recorder with MC310 tape puller, $35; puller alone $15. All items new. Ben Woodruff, W9UE, 6140 N. Harding Ave., Chicago 45, Ill.

WANTED: Viking Ranger. State price, condition. De Wall, KØEPK, 2324 E. Exposition Ave., Denver, Colo.

READY Sale: Viking II transmitter, in excellent operating condx and appearance, with Heathkit VFO and Astatic N-30 mike and switch and stand — complete, $205.00. W3OJW, 6913 Churchland St., Pittsburgh 6, Pa.

WANTED: Collins 32V-2, 32V-3, or 310-B1. Might consider factory w/t Viking Ranger. Also need receiver such as 75A-3. I have for trade the finest in camera equipment such as Leica, Cannon, and Contax. Please state your offer. K6DCA.

WANTED: BC-221 frequency meters, ARC-1 and ARC-3 transceivers. Cash or swap against any new National receivers. Lectronic Research, 715 Arch St., Philadelphia 6, Pa.

NOVICES! Excellent condition National NC-46 w/spkr: $80; Viking Adventurer, $50. W1FZY, Pralinsky, 173 So. Main St., Athol, Mass.

SELL: Collins 75A3 with matching spkr, $325; Army Super-Pro rcvr BC-1004A freq. range .55 Mc. to 20Mc., $100. Both in exc. condx and appearance. Joseph P. Skutnik, Box 57, Pine Island, N. Y.

FOR Sale: NC-98, in excellent condx, $115; K2KOA, Albert Dorrmann, 391 First Pl., Uniondale, L. I., N. Y.

WANTED: Used laboratory type parts and equipment. For sale: Used equipment and new and used parts. Free list. Clarence Bigelow, 105 No. Main, Bluffton, Ohio.

WANT: Three National type XR-5 or XR-4 coil forms used or new. Dick Rice, W9LOC, 1503 So. Anderson, Urbana, Ill.

SELL: Eico 5-in. 425 'scope, $20; Eldico 100W AM modulator $20; Q5er BC453 in rack with matching power supply $20; RCP 322A tube-tester, $20. W4UYH, 11421 SW 40th Terr., Miami, Fla.

FOR Sale: 60 ft. Alprodco tower consisting of 10 six-ft. sections, guying brackets, rotator mounting plate, mast kit, base plate. Can be shipped. $50. Wanted: Coils for Silver 903 wavemeter. W9PWV, 821 Waveland Rd., Lake Forest, Ill.

SWAP for gud condx Johnson Matchbox or $35: Heath AT-1 transmitter and AC-1 antenna coupler. W1FID, Bellevue Dr., Athol, Mass.

QSTS excellent, 1930 thru 1955, each 17¢ plus postage. Send list and money order. W3RSB.

FOR Sale: National NC-183. Best offer. Francis Walton, Browning, Ill.

SELL: Several good clean schematic diagrams of ART-13, BC-610, BC-348, ARC-5, 25¢ each. S. Consalvo, 4905 Roanne Dr., Washington 21, D. C.

FOR Sale: Linear amplifier 2-807 G-F, $50, pictures and information. 1 Kw. power supply. BC band Command receiver with power supply, $15. KØACG.

1951 Ford V-8 Tudor, good mechanically, needs paint job. Elmac AF-67, PMRG-A, Webwhip, power supplies, installed and operating. Car with rig: $750. W9LTN/2, Capt. Ross, Dept. of Electricity, USMA, West Point, N. Y.

MUST sell factory-wired Viking II with built-in VFO, push-to-talk, low-pass filter, Astatic T3 mike with grip-to-talk stand, $280; NC-125, in excellent condition, $125. R. N. Bransom, W5BSX, Burleson, Texas.

DX-100 wired, tested, never used, $225. Kings Radio Club, E. J. Bungue, Pres., 473 11th St., Brooklyn 15, N. Y.

MULTI-BAND Antenna, 80-40-20-15-10, $19.95. Patented. Send stamp for information. Lattin Radio Laboratories, Owensboro, Ky.

TREMENDOUS Bargains: New and reconditioned Collins, Hallicrafters, National, Johnson, Elmac, all others. Completely reconditioned with new guarantee. Hallicrafters S38 $29.00; S40A $69.00; S40B $79.00; S85 $89.00; S76 $119.00; SX71 $149.00; SX42 $149.00; SX96; SX100; National SW54 $29.00; NC88 $79.00; NC98 $99.00; NC125 $129.00; NC183 $189.00; Super Pro $99.00; HQ129X; Collins 75A1; 75A2; 75A3; 75A4; 32V3; Viking Ranger; Viking II; AF-67; mobile receivers, transmitters, converters, many other items. Easy terms. Shipped on approval. Write for list. Henry Radio, Butler, Missouri.

BARGAINS: With New Guarantee: S-38D $35.00; S-77 $69.00; Lysco 600 $69.00; S-27 $79.00; SX-28A $149.00; S-76 $109.00; SX-62 $189.00; HRO-60 $319.00; HQ-129X $149.00; SP400X $179.00; NC-173 $129.00; NC-183 $169.00; NC-183D $269.00; HRO-50T-1 $279.00; SOJ $9.95; National HRO50T $199.50; Collins 75A2 $299.00; Sonar VFX 680 $14.95; Eldico TR75TV $35.00; HT-17 $24.50; EX Shifter $35.00; Globe Scout 40A $69.50; Globe Trotter $49.50; HT-18 $45.00; Harvey-Wells Sr. $69.00; Elmac PMR6 recr. $89.00; PSA-500 $19.95; Johnson Matchbox $39.50; Viking FVO $29.50; Viking II $229.00; Globe King 500 $495.00; Globe King 400A $299.00; 32V1 $275.00; Collins 310B $175.00; and many others. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

FOR Sale: 32V-2, HQ-129X, R-9er, 10 m 3-ele. w.s. 20-m 3 el. w.s., prop pitch rotator, cable, relays, clipper, mike, key, control box — a complete 150 watt home station: $650 or best offer. Contact Steve Kanne, W9JQJ, 555 Sheridan Rd., Glencoe, Ill.

PASS Amateur theory exams. Check yourself with sample FCC-type questions and Novice and General Class examinations. All for only 50¢. Ameco Electronics, 1203 Bryant Ave., New York 59, N. Y.

CENTRAL-Electronics "A"-Slicer $49.95, 10-B $139.95; Collins 32V1 $395.00, 32V2 $450.00, 32V3 $550.00, 75A2 $299.95, 75A2A $395.00, 75A3 $395.00; Elenco SS-75 $175.00, PA-400 (new) $199.95; Gonset 10-11 $19.95, Triband $24.95, Superceiver $79.95, 2m std communicator $149.95, 2m deluxe communicator $179.95; Hallicrafters SX-62 $250.00, S-76 $139.95, SX-88 $429.95, SX-96 $199.95, HT-9 $89.95, HT-17 $34.95, HT-18 $49.95; Harvey-Wells TBS-50A $49.95, TBS-50C $59.95, VFO $29.95; Johnson Viking-I $169.95, w/TVI kit $199.95, Viking-II $249.95, VFO $39.95, Mobile transmitter $79.95, Matchbox $39.95; Lakeshore PM-Deluxe (new) $149.95; National NC-183D $275.00, HRO-50T $224.95, HRO-60 $399.95; other used items available. Write for latest list. Evans Radio, Box 312, Concord, N. H.

WANTED: ARN-6, APR-4, ARC-1, BC-221, LM, BC-342, BC-312, BC-348, Teletype. All types transmitters, receivers, test equipment taken in trade for new National, Hammarlund, Barker Williamson, Gonset, Elmac, Morrow, Telrex, Hallicrafter, Electro-Voice, Fisher, Harmon Kardon, Johnson Pacemaker, Valiant, Ranger, Viking, Telewriter receiving converter for teletype. Write or phone: Tom, W1AFN, Alltronics, Box 19, Boston, 1, Mass. Richmond 2-0048. Stores: 44 Canal, Boston. 60 Spring, Newport, R. I.

SELL! Complete station: "Ranger," excellent condx, used less than 10 hours; two extra final tubes; SX-71 rcvr, with matching R-46 spkr, gud condx, new tubes, coax relay, new Vibroplex bug. First $300 gets them. Need money for school. Wm. J. McIntire, 1912 Rowan St., Phila., Penna. DA 4-5267.

COLLINS p.t.o. built into a band-swtching, band-pass exciter. Self-contained power supply, electronic keyer. Completely shielded, will drive 813; $75. F.o.b. Chicago. C. Getter, 1401 E. Hyde Park Blvd., Chicago, Ill.

LEICA 3F case, Summicron F2, red dial, feet, self-timer, Chico flash. Want: SSB equipment. Consider offers. Camera new. Milton Gordon, M.D., 12 N. 27th St., Camden, N. J.

V.H.F. 2nd V.H.F. Round-Up at Syracuse, N. Y. in October!

$1 Buys fifty (50) assorted imported resistors, 100 ohm to 2.2 megohm. W9VTZ, Haunfelder, 900 W. Glendale Ave., Milwaukee 9, Wis.

FOR Sale: Heath AT-1, VFO and impedance meter, Gonset 2-meter converter; 2 meter mobile xmitter and pwr supply; E200 C signal generator; 220 Mc. xmitter and recvr, power tools, etc. Send stamp for list. Everett T. Smith, 2 Geoffrey Ave., Syosset, L. I., N. Y.

BC-610 modulation transformer. First check over fifteen dollars. Shipped express collect from near Ft. Wayne area. Don Droegemeyer, c/o Fought, Wolcottville, Ind.

QSTS: October and November 1916 of Volume 1, plus all copies and separate indices May 1917 to December 1924, except September 1917; August–September 1919, November 1922. With covers, fine condition. Best liberal offer. Old catalogs. KH6CU, 3010 Monsarrat Ave., Honolulu, T. H.

FILTER cons. Must sell out or no college. Have four big filter cons. 120μfd at 3000 wvdc. Just the thing for that extra filtering you wanted: $50 each postpaid in U. S. S-76, gud condx, $100; plate xfrmer, pri. 107.5, 115, 122.5 Sec. 1425-0-1425 at 1000 mils or better, ICAS, $40. All postpaid. Paul James, W5EIX, 2228 N.W. 56, Oklahoma City 12, Okla.

GLOBE-CHAMPION 175 w xmitter (TVI suppressed) with 10, 20, 40, 80M coils, l.p. filter and Johnson Viking VFO, both in excellent condition. Total cost over $425. Will sell for $225 and deliver up to 100 miles. W4AHN, Merle McBlain, 3203 Old Dominion Blvd., Alexandria, Va.

SWAP 1955 Automatic Rolleiflex with Tessar f/3.5 lens, incl. case paralex corrected close-up lenses, hood, filters, all in gud condx for Viking Ranger. Cameron Mitchell, KN5GJZ, Box 60, Henderson, Texas.

DALLAS, Tex., and vicinity: Equip. from estate of late W5HGD for sale: Collins 75A1, Hammarlund 129X, Viking II, 1937 National 600 watt xmitter, lots of test equip. Inspect and leave bid at Kern Chaney's, R-1, Anna, Texas.

ILLUMINATED "S" Meters for Communicators. No cutting, soldering, or disassembling to attach. Also new and used Gonset Communicators, linear amplifiers, V.F.O's, G-66s, mobile converters and transmitters, etc. Graham Company, Bob, W1KTJ, Stoneham, Mass. Tel: ST—6-1966.

BARGAINS! Reconditioned! 90-day new set guarantee! SX-43, $129.00 (4); SX-71, $159.00 (4); S-72L, $49.95 (5); SX-96, $199.00 (3); HT-9, $130.00 (3); HT-18, $49.95 (3); HT-20, $285.00 (3); NC-98, $120.00 (11); NC-125, $129.00 (4); HRO-50 & coils, $249.00 (5); HRO-50T1 & coils, $299.00 (3); HRO-60 & coils, $399.00 (4); 75A3, $375.00 (2); 32V2, $375.00 (3); TBS-50D, $89.50 (6); TBS-50C, $79.00 (3); APS-50, $24.50 (6); HQ-129X, $149.00 (6); HQ-140X, $189.50 (5); Viking I, $199.00 (6); Meissner Signal Shifter, $39.50 (8). Send for complete list. Easy pay terms. Allied Radio, Chicago 80, Ill.

SAVE, with safety! Come see the World's Greatest Array of good, slightly used Ham equipment! Tremendous assortment, every piece bargain-price tagged. Money-back guarantee. Easy terms. Bring along your old equipment for our liberal trade-in allowance. Harrison ("Since 1925"), 225 Greenwich St., New York City. (Big Jamaica Store — Hillside Avenue at 145th St.)

MOBILE Receiver or converter needed. Will swap TV set or supplies, prefer local deal. K2QEZ, LU 8-8000. 23–59 128th St., College Point 56, N. Y. C.

SELL or trade for best offer: together or separate, late Model SX-71, gud condx, tubes just checked; Gonset Super-Six, 2 years old and Model B clipper; home-built 75-watt transmitter for 80 C.W., plug-in coil. Would convert to other bands; 6L6OSC, 807 final could be clamp tube modulated; includes pwr supp, all on 19" rack panel, two meters mounted in panel. Jim Kannair, W3DJK, 210 S. Dallas Ave., Pittsburgh 8, Pa.

CARTER 6-535 volt dynamotor 135 ma. including relays, mount and filter, $20. Gardiner code machine 10 tapes, $15. Leigh Robartes, W2EHA, 168 Pine, Garden City, N. Y.

FOR Sale: Lysco 600-S transmitter with built-in modulator, TVI suppression and model 50 antenna coupler. Equipment just like new with original packing boxes. Cost me over $210. Will sacrifice all for $95 or sell to best reasonable offers. Will ship prepaid in California area only. Write: Eugene Lai, 644 West Second St., Chico, Calif.

NC183D, like new, $259. Also excellent HQ-129X, $149. Electronic Labs, Station A-21, Lincoln, Nebr.

2-METER Final amplifier: 100 watts input fone, 150 watts C.W. Uses 5894/AX9903, silver-plated lines, clamp tube, plate meter and other features on attractive, shielded aluminum chassis. Drive required: approximately one watt. $32.50 less tubes. $49.50 with tubes. Descriptive literature on request. Amplex Radio Products, Inc., 1195 West Lake Drive, Walled Lake, Mich.

SELL: 813 pwr. amp., kw. pwr. amp., kw & pwr. supply, much miscellaneous equipment. Xmitters excellent condition, TVI suppression. Need cash. Any offer considered. W2INE.

FOR Sale: Viking Ranger, factory-wired, push-to-talk relay installed: $165. Central Electronics 20A, factory-wired, with QT-1 and BC458 VFO in matching cabinet $175; 811As Lazy Linear final, $50. All in perf. condx. W8AQA.

LINEAR amplifier 280 watt continuous tuning, 10B exciter and VFO, all for $238. Photographs on request. WØQFZ, 2318 Second Ave., Council Bluffs, Iowa.

SELL to best offer, mobile rig, Elmac trans Tri-Band converter, noise clipper, Master Mobile Mount antenna, remote tuner, PE-103 Dynamotor, relays and cables. A. G. Thompson, 201 Fir St., Forest Park, Glendive, Montana.

WANTED: 2-meter transceiver, batt. operated, crystal controlled. Send description and price to W2KAC, F. Schnupp, 5 Everett St., Valley Stream, L. I., N. Y.

SELL eight (8) Westinghouse dynamos, like new, removed from equipment; 5.6 V 30 amps, 600 V. .155 amps. Shipping weight 18 lbs., $15 each or $100 for lot. O. H. Uhrbrock Sr., 200 N. 4th, Edinburg, Texas.

PERFORATED Aluminum sheets .051, 5/64" OD holes, ¼" centers, $1.20 sq. ft., cut to size. Send for listing on beams, aluminum tubing, etc., Radcliff's, Fostorio, Ohio.

SELL: NC-98 w/spkr, $105; BC454, converted, $6; Eico #1040 eliminator, $15; Heath V6, VTVM, $20. Send stamp for list of parts, xtals, resistors, tools, etc. M. J. Marshall, 455 Washington Ave., Dumont, N. J.

75A-2, excellent, $295; Collins 310-B1, $185 like new; Phasemaster II, SSB 60 watts factory-wired, $275. Could use a 32V2 in trade. WØBNF, Byars, Box 105, Kearney, Nebr.

FOR Sale: Mobile Elmac A54H and PE-101 Dynamotor, $85 or best offer. W2FFH, Frank Segalla, 316 Jerusalem Rd., Scotch Plains, N. J.

SELL: NC-173 recvr and matching spkr, $125; Viking II xmitter and matching Viking VFO, both factory-wired, $250; Mic w/stand and connector, $7.50 or $375 for the whole group. Elmac A54H xmitter, $75. Harvey-Wells Bandmaster Deluxe xmitter, $95; Bandmaster VFO, $35; HW APS-50 pwr supply, $25; Shure 707A mic w/stand and plug, $7.50. All in vy gud condx. Bandmaster group, $155. Best offer buys it. J. R. McCabe, K2CBT, Rte #2, Malone, N. Y.

WILL pack and ship to the highest bidder Johnson Viking II with Viking VFO as unit and NC-183 D and speaker as unit and Central slicer. All perf. condx. W5FHU, Aldrich, Box 24, Buchanan Dam, Texas.

REAL Bargains in new and used gear. AM — SSB — CW — RTTY. High trades. Bonus for cash. Easy budget terms. Lowest finance rates anywhere. Get the whole story from the Yellow Flyer. Free. Write Marshall Electronics, 855 Burlington, Frankfort, Ind.

SELL: Like-new Millen 2-6-10 meter xmitter, $65; Millen 90281 pwr supp., $38; modulator (40 watts) with power supply, $25. Wanted: 4D32 tube. Roy Sawdey, 5255 Harper, Solon, Ohio.

HIGH Power rotary inductors. Suitable for pi network in all band kw. final. Send for details & photo. Paulson Electronics, 138 E. 6th St., Clifton, N. J.

NATIONAL NC-183 D receiver, with spkr, in exc. condx. Two years old. 50 Kc. frequency standard from July 1955 *QST* without 100 kc xtal also. Price for both: $220. K2GLR, Tom Powers, Mt. Kemble Lake, Morristown, N. J.

TO Hams within driving distance of Elgin, Ill.: For sale: Telvar 60-watt xmitter, $45; 250-watt AM rig, $125; RCA 3-band console, $20; McMurdo-Silver Micro Match $12. No shipping. Al schmidt, W9VKS, 207 Elm St., Tel. SH 2 8818.

VIKING II, in excellent condition, one year old, first $215 takes it, end free delivery within 200 miles, otherwise via express collect. John Scobey, W5JDP, 807 Cuthbert, Midland, Texas.

SELL Or trade: New Gonset Deluxe 2-meter Communicator in original carton, $180 cash or will trade and pay cash difference for B & W or Collins transmitter. L. M. Newberry, W6UDJ 2, 366B Princeton Road, Haddonfield, N. J.

TRADE Tower F2 camera, 35 mm Nikkor lenses. Synchronized for flash and strobe, with leather carrying-case. Also wide angle Nikkor lens. Special view-finder for all lenses; Norwood light meter; polaroid and other filters. Self-timer. In perfect condition. Worth $500. Will trade for 75A1, -2, or 3 or 4 receiver. E. Leavenworth, M.D., 516 Laurel, San Diego 1, Calif.

NOVICES! Excellent Hallicrafters SX-99 rcvr, $125; Heathkit AT-1 xmittr and AC-1 ant. coupler, $30. K2JOQ, E. Schollmann, 917 Clinton St., Hoboken, N. J.

FL 8 AUDIO filters, 2 for $2.00 prepaid in U. S.; Brush BK401 Tape Recorder, dual track, in good condition $65.00; RME-DB23 preselector, like new $35.00; BC1031A Panadaptor, perfect condition with instruction book and extra C.R.T. $75.00; I-177 tube checker, in good condition $20.00; Precision E200C Signal generator, in good condition $35.00; 300-600 MC Frequency meter, perfect $7.50; BC348 shock mounts $1.00; Heath O-S8 Scope $35.00; 250W converter, 110V DC to 110V AC, $10.00. Wanted mobile equipment, 6-15 meter bandspread coils for HRO 50T1. M. D. Haines, W5QCB, 1316 S. W. Military Drive, San Antonio 21, Texas.

FOR Sale: Two units of Model TBV-8 complete radio equipment. Used very little. Write: Sophia Prager, Garrett, Wyoming.

WOULD like to contact ham to take trip around the U. S. A. in a house trailer, visiting places of interest, sharing expenses. Harry P. Rogers, 1424 Burton St., Whitestone, L. I., N. Y.

HQ-129X w/spkr and manual, in exc. condx. $125. W2DTI, Tel. LO 7-7347, 231 Sherman, New York 34, N. Y.

NOVICES! New Heath AR3, $30; Q multiplier, $9; ARC-5 xmitter with pwr supply, $30. Excellent condx. Ralph Britton, 119 N. Philips Rd., Niles, Mich.

WANTED: Back issues of CQ magazine by years. L. N. Chambers, 3019 Jefferson, Davenport, Iowa.

TRANSMITTER, Lysco 600, $49.50. K6CHY, Seches, 1352 Vista Grande, Millbrae, Calif.

SELL: LM-10 freq. meter with AC pwr supp. and case, $60; LM-14 freq. meter without pwr supp. and case, $40, both with original calibration books and hit WWV on all ranges. Set of 4 Millen absorption meters, 1.5 Kc to 40 Mc, in perfect condx, $10. Zimmerman, K4HPF, Apt. 2, 2040 Columbia Pike, Arlington, Va.

WANTED: QST 1919, July, September, December; 1917, January, February, May, September. W1CUT, Box 1, West Hartford, Conn.

FOR Sale: Heathkit AT-1 Transmitter, $25; Heathkit AC-1 Ant. coupler, $7.00 and Shure model 50S "Ranger" mobile mike, $12. All in gud condx. No C.O.D.'s. Craig Hummel, WN8GIH, 2516 Ralph Ave., Cleveland 9, Ohio.

FOR Sale: Like new Johnson Viking Mobile with 12V Dynamotor power supply, also Elmac PMR6A receiver best offer. Lowell Warshawsky, W9NGV, 1900 S. State St., Chicago 16, Ill.

SELL: 250 watts, 3-band transmitter, fone or c.w.; home built commercial appearance. Deliver within 300 miles. $150. Bob Wright, W5YBI, Belen, New Mexico.

WANTED: 75A3 or 75A4 for cash. Give details and best price. W5DWT, Mitchell, 7303 Hirsch, SE, Albuquerque, N.M.

FOR Sale: 110V BC-348N with instructions, $65. F.o.b. Waltham, Mass. Prentice, W1EHM, 23 Barnes St. Tel. IV 4-6821.

FAMOUS "Lunenburg Beams." Completely assembled, 6-meter 5-element, $14.95; 2-meter 6-element, $6.95. Rugged seamless aluminum. Tubing, castings, etc. to make all types of antennas. We pay shipping charges. Wholesale Supply Co., Lunenburg, Mass.

SELL: Complete 12V mobile rig in a like-new condx, AF67, 5BR2 Master Matcher, 600-D, Vaaro All-Bander and whip, Dynamtor, and all wiring. Will take $275 for this $400 value. Guy Hollis, Scottsboro, Ala.

WANT Good receiver. Will trade portable mill and NRI Multitester. C. Bennett, 94 Westfield Road, Holyoke, Mass.

SELL: VFO, Meissner Signal Shifter, 5 watts output on 10, 15, 20, 40 and 80, $20; UTC S-50 3000V, 300 Ma., $20; Communications portable typewriter, gud condx, $17.50. Need: $44, 4-250A, transformer 2500V – 400 + Ma. W2AEV, Jones, 14 Carol Rd., Bethpage, L. I., N. Y.

KILOWATT transmitter, AM-CW, VFO, All-Band complete transmitter. Calibrated bandswitching exciter uses 6AB7 osc., 6AG7 buffer, 6AG7 buffer-doubler, 6L6 doubler-amp., 807 final amp. Exciter well designed and extremely stable. Final amplifier uses PP-813's in class C, 6000 v. Transformer adequately provides for maximum permissible input. Am is a Marmax modulator KW-2 using Rothman screen grid modulation. Need money for school. First check for $300. F.O.B. Chicago. Pictures and Skematic upon request. Paul J. Skinner, W9QXR, 2726 W. Argyle, Chicago, Illinois.

CHEAPER By the pair. New tubes, 813s, $12.50; 810s, $12.50; 811As, $6.00; 832As, $6.00; 807W/5933, $4.00; 3B28s, $4.00. Also new Bendix TA-12D transmitter, dandy rig for a Novice, $25; BC-456 modulation unit, $10; T-14D/TRC-1 link transmitter, 829 final, makes a swell 6-meter rig, $65; SCR-522, $15.00; U.T.C./L.S. 99 choke, $35.00; Thermador new K.W. modulation transformer, $35.00; Jap crystal mikes, $4.85. All shipped postpaid insured. W4FHY, Box 178, Ellenton, Fla.

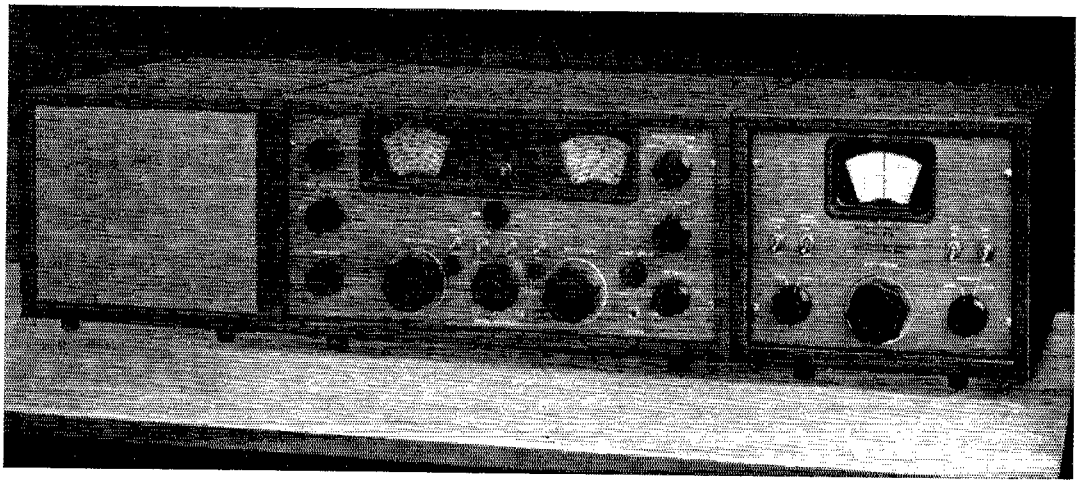
FOR Sale: Meissner 150-B 270 watts fone or c.w. with VFO; Abbott TR-4A without power supply. All reasonable offers considered. W4IBJ, 6624 33rd St., N., Falls Church, Va.

WANTED: 4-1000A with sockets if possible; two 4-400A. Please state condx would like to purchase or make trade. State your needs. Have 750TL, several 450 T.L. and 304THs, all new. Write W6RNR, 2312 Youst, Sacramento, Calif.

ELMAC PMR6A, 12 volt model with power supply, $90. K2DNG, Arthur Andersen, 245 Knight Ave., Collingswood, N. J.

Index of Advertisers

Single Sideband Adapter- GSB-1



The TMC Model GSB-1, Single Sideband Adapter is a filter type slicer permitting accurate and simple tuning of SSB signals.

The 455 Kc input is converted to a low frequency by means of a mixer and oscillator combination which allows selection of either sideband. The difference frequency is fed to a carefully designed and manufactured bandpass filter, which restricts the band width to 3 Kc at the 6 db points. This filter is so effective that the skirt width 40 db down is only 4.5 Kc. The filter output, in turn, is fed through a second mixer, or product detector, where it is combined with a stable 17 Kc local oscillator. The result is once again passed through a filter having a cutoff at 5 Kc, thus eliminating all unwanted mixer products. The output is a relatively noise and interference free audio signal.

The TMC Model GSB-1 contains a number of features which make it a more useful device. Since single sideband signals require critical frequency adjustment, this unit has been provided with electrical band spread which reduces tuning to the point of greatest simplicity and ease. In addition, AVC is provided within the Model GSB, over and above that which already exists within the receiver, thus serving to further prevent powerful local stations from overloading the slicer. A noise limiter, which reduces impulse peaks, has also been included in this unit.

The Model GSB-1 although originally designed for use with the Model GPR-90 receiver (which already provides the proper terminals) may be used with any receiver which will provide .3 volts (rms) R.F. input at approximately 455 Kc and where access to an audio grid is available.

FRONT PANEL CONTROLS:

- Power ON/OFF Switch
- AVC ON/OFF Switch
- SSB-AM Selector Switch
- Upper or Lower Sideband Selector Switch
- Noise Limiter ON/OFF Switch
- AVC FAST/SLOW Switch
- Main Tuning

SPECIFICATIONS:

FREQUENCY RANGE:
452-458 Kc.

TYPE OF RECEPTION:
AM, SSB (Upper or Lower), CW

IF INPUT VOLTAGE:
0.3 volts rms (normal) for 0.3 volts rms audio output.

IF INPUT VOLTAGE RANGE:
0.1-10 volts rms (with AVC).

AVC CHARACTERISTIC:
With 40 db change in input signal, output remains constant within 9db

INPUT IMPEDANCE:
High-from IF.

OUTPUT IMPEDANCE:
To match audio grid.

INPUT POWER:
115 volts, 50/60 cycles, 46 watts.

CABINET SIZE:
12" wide x 10" high x 15" deep. Matches GPR-90 for height & depth

Illustrated with the GSB-1 (right side) is the TMC Receiver GPR-90 (center) and the companion speaker - Bulletin 179Q.

The TECHNICAL MATERIEL CORPORATION

TMC Canada, LTD.
OTTAWA, ONTARIO

MAMARONECK, NEW YORK.

TMC Single Sideband Adapter GSB-1 (Bulletin 194Q) Complete with all instructions

AMATEUR NET

$149.50

YOU GET **MORE** in **knight-kit** HAM GEAR

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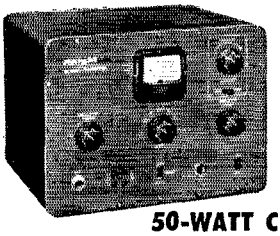
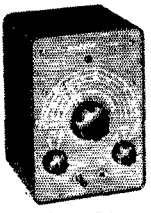


Save On This Easy-to-Build *Transmitter* only **$42.50**

knight-kit
50-WATT CW TRANSMITTER KIT

Compact and versatile—the perfect low-power rig for the Novice. Features: 50 watts input to 807 final; 6AG7 modified-Pierce oscillator takes crystal or VFO without circuit changes; band-switching coverage of 80, 40, 20, 15, 11-10 meters; pi-section antenna output to permit use with any type of antenna; crisp cathode keying of oscillator and final; power take-off plug supplies filament and B-plus voltages for other equipment; excellent TVI suppression; meter reads either plate or grid current of final; jacks for VFO, crystal and key. Size, 8⅜ x 11⅛ x 8¾". Supplied with all parts, tubes and step-by-step instructions (less crystal and key). Shpg. wt., 18 lbs.

83 SX 255. 50-Watt Transmitter Kit. Only... **42.50**



Save on This **knight-kit** Self-Powered **VFO KIT** only **$27.50**

Complete with built-in power supply! Careful design and voltage regulation assure high stability. Excellent oscillator keying characteristic for fast break-in with clicks or chirps negligible. Full TVI suppression. Has plenty of bandspread: separate calibrated scales for 80, 40, 20, 15, 11 and 10 meters; vernier drive mechanism. 2-chassis construction keeps heat from frequency determining circuits. Output cable plugs into crystal socket of above Knight-Kit or any other transmitter. Output on 80 and 40 meters. With Spot-Off-Transmit switch. Extra switch contacts for operating other equipment. Complete kit with tubes, all parts and instructions for easy assembly. Shpg. wt., 8 lbs.

83 S 725. Self-Powered VFO Kit. Net..... **27.50**

knight-kit
CODE PRACTICE OSCILLATOR KIT
only **$3.95**
Transistorized—Powered by Flashlight Battery

An ideal new code practice oscillator. Uses transistor circuit. Extremely low current consumption—powered by single penlight battery. Provides crisp, clear tone (400 to 600 cps). Has input jack for earphone; screw-type terminal strip for key. In compact bakelite case (2¾ x 3¾ x 1½") with anodized aluminum panel. Complete with all parts, battery and easy-to-follow instructions. Shpg. wt., 1 lb.

83 S 239. Code Practice Oscillator Kit..... **3.95**

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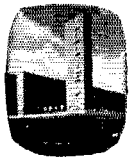

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a progress report . . .

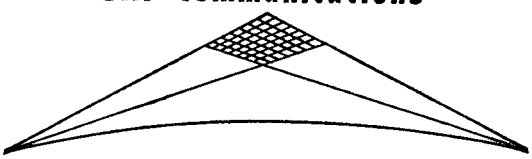
ACHIEVEMENTS IN ELECTRONICS *by* National NC *1955-1956*

For 42 years, National Company has enjoyed an outstanding reputation as a leading manufacturer of communications receivers and components. Less widely known to hams, but equally important, are National's endeavors in other fields. These add up to an impressive total of achievement in vital areas of national defense, scientific research, advanced communications, and standardization of time and frequency measurement. The following paragraphs outline briefly some of the major contributions National Company has made in these fields.

A New Standard of Measurement of Frequency and Time

ATOMICHRON . . . the first commercially feasible atomic primary frequency standard . . . is typical of the advanced research and engineering that typifies National Company these days. Because it is a full order of magnitude more precise and stable than any primary frequency standard now available, the National ATOMICHRON opens new horizons of accuracy for navigation, crystal calibration, frequency monitoring and control, and elapsed time measurement. For example, its use in communications can effect a substantial increase in the number of channels available in the now-crowded radio spectrum.

Advances in Specialized UHF Communications

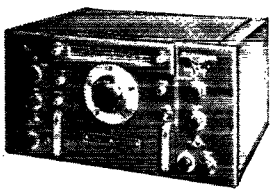


National TRANS-HORIZON "scatter" propagation systems are now in active use in installations including the nation's first "Texas Tower" offshore radar station. National Company provides both Tropospheric and Ionospheric TRANS-HORIZON systems, the former effective on all types of signals at distances up to 400 miles, and the latter for pulse signals for transmission over 1500-mile distances.

Electronics for Defense

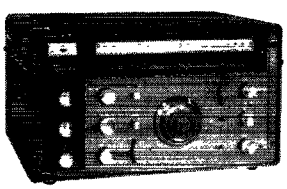
National Company is also active in both development and manufacture of a variety of electronics devices for National Defense use. Typical products include a low-powered portable radar system for Semi-Military use; an exceptionally stable "Stabilidyne" receiver of revolutionary design; automatic alarm systems for radar receivers; radar search receivers; and digital data transmission equipment.

Advancing Scientific Knowledge



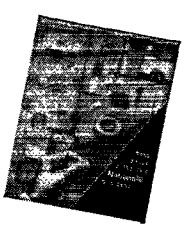
One of National's recent achievements was having its HRO-60 communications receiver selected to accompany Ohio State University's scientific expedition to Viet Nam for observation of a total solar eclipse. Eleven HRO-60's were used in a communications net extending from Khartoum to Formosa, and an HRO-60 served as the monitor receiver to insure satisfactory recording of time signals from WWV, some 10,000 miles away!

Amateur Communications



National's NC-300 communications receiver has been the talk of the hams since before its introduction in 1955 . . . and no wonder! It is designed specifically to serve only the amateur bands. It is the first receiver ever designed after a search for "dream receiver" design suggestions from hams. And it sells for an amazingly low price, in spite of all its extra-value features.

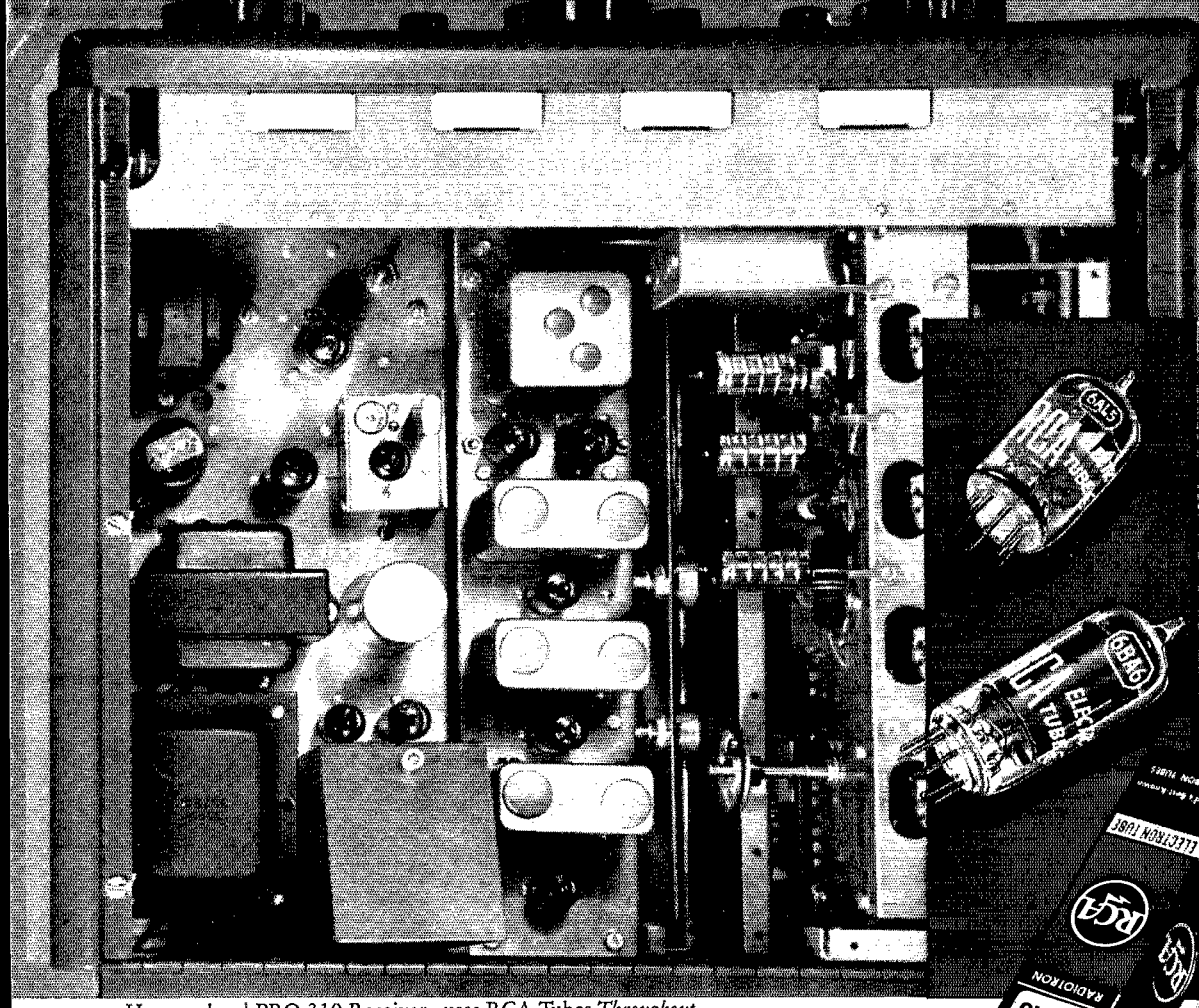
Perhaps you'd like more information about events at National Company that insure continued progress in the design and construction of superior quality electronic equipment. If so, simply write for a copy of the informative 8-page brochure, "Take a Look at the New National Company." Ask for Bulletin QST-8.



National NC

COMPANY, INC. 61 SHERMAN STREET, MALDEN 48, MASS.

tuned to tomorrow

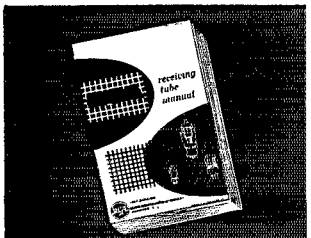


Hammarlund PRO-310 Receiver—uses RCA Tubes *Throughout*

Leading amateur designs ...USE RCA TUBES

This is the Hammarlund PRO-310 receiver—designed and built by the company famous for a long line of "Super Pros" since early days of CW. The PRO-310 features a unique front-end with a printed circuit rf stage for improved performance, double IF conversion, and voltage regulation—and it's equipped with *RCA Receiving Tubes throughout!* Here's why RCA Receiving Tubes make the difference. (1) "Back-ground quietness" enables the operator to get better signal-to-noise ratio—through increased sensitivity. (2) Low hum factor makes it easier to pull weak signals "out of the mud". (3) Excellent uniformity of electrical characteristics simplifies tube replacement. (4) High stability assures *more* satisfactory operation under normal voltage variations.

If your present receiver is losing its "hop", "re-tube" with new "RCA's"—and give it new snap. See your RCA Tube Distributor for the types you need. For tube technical data, write RCA Commercial Engineering Section H37M. Harrison, N. J.



RCA RECEIVING TUBE MANUAL RC-17

Includes basic electron tube theory, characteristics, application, installation, and circuits. Handiest reference in the "shack", 60 cents, from your RCA Tube Distributor.

TUBES FOR AMATEURS

Radio Corporation of America • Harrison, N. J.