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INDEXED BY

Applied Science and Technology Index
Library of Congress Catalog Card No. 21-9421
Visitors to the Eimac display at the 1959 Institute of Radio Engineers Show and Convention in New York City last month were able to demonstrate to themselves the simple, non-critical operation of economic Eimac external cavity klystrons by tuning an on-the-air klystron amplifier. Most participants found that the amplifier was as easy to tune as a ham transmitter. This demonstration, focal point of the Eimac display, consisted of an Eimac klystron amplifier operating at 800 megacycles with an output power of one kilowatt. The tube is typical of the broad line of ceramic-metal, external-cavity power amplifier klystrons manufactured by Eitel-McCullough, Inc. Eimac Klystrons have seen extensive service in such tropo-scatter systems as Dew Line, White Alice, and Texas Towers with exceptional reliability and performance.

Also of considerable interest was an animated display designed by Dr. Oskar Heil, head of Advanced Research at Eimac who invented the technique of velocity modulation in 1933. This display showed graphically the velocity modulation and bunching of a klystron electron beam as it passed through the interaction gaps of a klystron mock-up.

A wide selection of Eimac klystrons, reflex klystrons, traveling wave tubes and negative grid tubes were displayed. The Eimac line consists of over 100 commercial tube types. Of these, more than 40 now incorporate the advantages of Eimac ceramic-metal design which results in rugged, compact, high-performance tubes.

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Of particular interest to amateurs as well as commercial equipment designers were the ceramic-metal 4CX250B, 4CX300A and 4CX1000A tetrodes, all ideally suited for SSB use. Eimac's popular internal-anode glass tubes were also shown. Many of these tubes, developed by Eimac 20 years ago, still enjoy widespread use in commercial and amateur equipment of all types.

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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Reports from Sections are also determined by SCM for inclusion in QST. SCM terms of appointment are available to Novice and Technician Class or above. These include ORS, CES, OPS, O0 and OBS. SCMs also desire applications for SEC, EC, RM, and PAM where vacancies exist. OBS appointment is available to Novices and Technicians.

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"It Seems to Us..."

RACES EXPANSION

Recently the Federal Communications Commission, at the instigation of the U. S. Civil Defense Amateur Radio Alliance, proposed to make certain additional frequencies within the amateur bands available for the use of the Radio Amateur Civil Emergency Service. Our subsequent correspondence from several amateurs indicates a misunderstanding of what is involved in this proposal, inasmuch as they protest "this invasion of amateur bands."

One of the fields of public service in which the amateur radio body takes particular pride is an ability to provide emergency communication. In the past, we have exercised this ability during peacetime through the medium of our own Amateur Radio Emergency Corps (AREC) with its nationwide organization and its amateur leaders: the Emergency Coordinators and the Section Emergency Coordinators. Through the experience accumulated while serving in numberless emergencies under the AREC banner, amateurs have developed skill in spontaneous communication organizing that cannot be matched in any other field.

But this is a peacetime service. It is only logical that in time of war, when our country is marshalling all its efforts, this skill should be put to good use in furnishing vital civil defense communications on the home front. Much of this ability was lost to the nation in World War II because there had been no advance planning. Belatedly, a War Emergency Radio Service was established, manned largely by amateurs, but not in name or import giving amateurs credit for their efforts. Had there been any direct enemy attack it would have been a case of too little, too late.

Seriously concerned with this problem, in the immediate postwar years the League discussed with federal agencies a plan for setting up a communications system in advance of any national emergency, so that amateurs enrolled in such a system would be ready to go at a moment's notice. The principal problem, aside from security clearance of each individual, was frequency space in which to operate since in time of war the military customarily takes immediate charge and occupancy of all peacetime amateur (and many other) frequencies. These lengthy negotiations resulted, in 1950, in the establishment of a Radio Amateur Civil Emergency Service. The outstanding achievement from the amateur standpoint was the concession, by our military people, to earmark certain portions of the amateur bands for amateur-controlled civil defense communications in the event of national emergency. In other words, the military agreed not to include these particular channels or bands in their service plans.

The current proposal (p. 63, February QST) is simply an expansion of the original principle of earmarking frequencies and small band segments for such use. Again, the military has agreed that it will not move its operation into these specified frequencies in time of national emergency, and that they may remain available for use by amateurs in manning and supervising civil defense communications. It is another step in furthering the ability of the amateur body to be of service to our country.

Unfortunately, a few amateurs who read the proposal and misinterpreted parts of it have since been dispersing misinformation on the air or through circular letters. Each amateur has a right to his individual opinion on the merits of RACES, of course, but that opinion should not be formed on the basis of inaccurate information.

One misstatement has been that the proposed new RACES segments will be withdrawn from general amateur operation. This is wholly untrue. No present amateur privileges will be affected.

Another misstatement is that any civil defense official would be able to order other amateur stations off the specified frequencies. This is also wholly untrue. No priority whatsoever will be granted RACES operations under the proposal, nor does such priority exist now. No RACES station nor civil defense official now has nor will he have any such authority. However we hope it goes without saying that common courtesy should prompt any amateur voluntarily to shift frequency if notified he is interfering with a RACES net operation in the same manner he should if he happens to intrude on a frequency being used by a regular amateur traffic or emergency network.

A third misstatement is that RACES is not an amateur service. Those who put forth this argument point out that certain non-amateurs may operate in the RACES service. This is true. When RACES was created it was felt by all parties concerned that there simply would not be a sufficient number of amateurs to handle the absolutely colossal task that would

(Continued on page 172)
Alabama — The annual family hamfest sponsored by the Birmingham ARC will be held at the State Fairgrounds on May 3. For further details contact Aubrey H. White, W4OLG, P.O. Box 603, Birmingham, Ala.

Illinois — The Western Illinois Radio Club of Quincy will hold a smorgasbord dinner on Saturday, May 9, at the Durst Restaurant Flamingo Room. This is an affair that serves the tri-state area of Missouri, Iowa, and Illinois. Entertainment, prizes, and a speaker. Further info available from William S. Starkey, Secretary, Western Illinois Radio Club, P.O. Box 283, Quincy.

Illinois — The Western Illinois Radio Club will hold a smorgasbord dinner on Saturday, May 9, in the Flamingo Room of the Durst Restaurant, Quincy. Entertainmen and a speaker. Further information contact William S. Starkey, Secretary, Western Illinois Radio Club, Box 283, Quincy.

Louisiana — The annual Lake Charles field day and picnic will be held May 2 and 3 at the Ward Four park. Admission is $3.50, with special rates available for children.

Missouri — The annual WB-DXCC dinner and meeting will be held in St. Louis on Saturday, April 25, at the Statler-Hilton hotel. The informal meeting begins at 1:00 p.m., and dinner will be served at 7:00 p.m. Tickets are available from Sam Halley, W0LIW, 5022 Queens Ave., St. Louis 18, for $6.00. Advance registration is requested. The meeting is open to all those interested in DX.

New Jersey — The 14th Annual Old Timer’s Nite Roundup and Banquet, sponsored by the Delaware Valley Radio Association, will be held on Saturday evening, April 18, in the Grand Ballroom of the Hotel Stacey-Twent in downtown Trenton. As usual, it will be stogy. A turkey dinner will be served promptly at 6:30 p.m. W2ZKE will speak on his experiences in Antarctica. A silver cup will be awarded to the DX radio operator present who has the longest service in the wireless game. Tickets are by reservation only, and may be obtained by mailing $6.00 on or before April 13 to Ed. G. Raser, W2ZI, 19 Blackwood Drive, Trenton 8, N.J. Latecomers may be able to buy a ticket for $7.00 at the door. W2ZI’s antique wireless gear will be on display.

New York — The Crystal Radio Club will hold its 28th anniversary dinner at the Wayside Inn, Route 9W, Stony Point, N. Y., on May 2 at 8:00 p.m. Tickets at $4.00 per person may be purchased by sending money order or check, payable to the Crystal Radio Club, to Tony Maiorano, W2EHZ, 14 Peck St., West Haverstraw.

Ohio — The Dayton Amateur Radio Association will sponsor its 49th annual Hamvention on Saturday, May 9, at the Dayton-Biltmore Hotel. The one-day program will feature speakers and demonstrations on many phases of ham radio. Forums will be held throughout the day on such subjects as DX, sideband, v.h.f., and so on. There will be a program for the XYLs. The Grand Banquet will get underway at 7:00 p.m. Saturday. Tickets ordered before May 5 are $5.50, including both registration and banquet. After May 5 the price will be $6.00. On Friday evening, May 8, there will be a sideband dinner and a v.h.f. dinner at the hotel. These tickets must be purchased in advance and are $4.00 each. Reservations, more information and an attractive brochure may be obtained by writing to DJA, Box 426, Dayton.

Oklahoma — The second annual hamfest sponsored by the Oil Capital Mobile Club will be held on May 3. For more info contact Marvyn W. Price, W5VDN, P.O. Box 5181, Tulsa.

Oklahoma — The Northfork ARC is holding its 7th annual hamfest at Quartz Mountain State Park near Altus on Saturday evening and Sunday, April 26 and 27. Pre-registration fees are $1.50 and may be sent to the Northfork Amateur Radio Club, P.O. Box 321, Carter, attention Pauline M. Cooksey, KS1ZP.

Pennsylvania — The 14th annual banquet of the Lancaster Radio Transmitting Society will be held on Saturday, April 18, at the Arcadia Ballroom, 37 West Orange St., Lancaster. Festivities will commence at 6:30 p.m. Entertainment is planned for OMs, YLs and XYLs. Advance registration are required and may be obtained (price not given as of press) by writing to Arthur C. Jacoby, W30Y, 130 Springhouse Rd., Lancaster. Phone Express 2-6993.

OREGON STATE CONVENTION

Roseburg — May 2–3

The annual convention of the Oregon Amateur Radio Association will be held at the Hotel Umpqua, Roseburg, on May 2 and 3, 1959.

There will be commercial displays and demonstrations of ham gear by dealers and manufacturers. Other program highlights will be lectures and movies on various subjects of interest to hamdon, banquets for hams and XYLs and YLs, entertainment and music, a mobile hunt and tours to points of interest. Several fine speakers will be on hand, as well as the usual meetings of the OEN and MARS nets.

Pre-registration dates are March 1 to April 5. Tickets between these dates: Hams, $6.50; non-hams $3.50. After April 5: hams $7.50; non-hams, $4.00. Come to Roseburg, Oregon and have some fun. Order your pre-registration tickets and make your hotel and motel reservations early. Write Don L. Bell, W7SIIA, Box 153, Roseburg, Oregon.

MICHIGAN STATE CONVENTION

Grand Rapids, April 18

The twelfth annual conclave of Michigan hams sponsored by the Grand Rapids Amateur Radio Association will be held at the Manger Rowe Hotel on April 18, preceded by an informal Friday evening get-together. All the program mainstays which have made this event a pleasant and rewarding one for hundreds of midwestern hams will again this year be much in evidence, including the famous "swap and shop" setup. Pre-registration is $1.50 ($1.75 at the door). Address the Grand Rapids Amateur Radio Association, Box 303, Grand Rapids, Michigan.

Hams within 200-megacycle propagation distance of Philadelphia are warned not to sleep late on Saturday morning, April 18 — for at 7:30 A.M. that date WCAU-TV's Channel 10 program, "The Big Blackboard," will present a one-hour feature on amateur radio. A number of amateur radio clubs in the Delaware Valley are banding together to assemble program material and take part in the presentation. Here's a fine public-relations opportunity — so get your friends and neighbors up early, too, to watch the show. Incidentally, check local program listings in advance for possible change of time.
This is not a constructional article of the usual sort, where every last component is readily available at the local radio store. In fact, you would probably find it impossible to duplicate this converter as it is shown here, since the tuning capacitor W6VX used is practically impossible to come by. But you can use some of the ideas presented here, if you want to get variable selectivity with fixed filters, a good noise figure and excellent image rejection.

A Selective 21-Mc. Converter
Variable Bandwidth with Fixed Filters

BY DAVID H. ATKINS,* W6VX

There are many “good old” receivers with adequate stability in their lower-frequency ranges which may be given the dual i.f. treatment by the addition of a converter. To achieve all the advantages now to be found in a first-class up-to-date receiver, however, is difficult. Such things as ideal a.v.c. and limiter circuits, one-finger movable bandpass tuning, and one-kilicycle tuning resolution, are a few of the things you may pay for in a modern receiver. Here is a way to acquire some of the most important features you can get nowadays without blowing the family reserves.

High Selectivity and Low Noise

It is not too difficult to lash up a crystal-controlled converter for the band or bands you need most. The outcome of this approach is good stability, thanks to the crystal. Usually another result is a much better signal-to-noise ratio.

If you are the Earnest type about wanting to keep up with the art and down with the QRM, or you may be fortunate and have stowed the extra old dog on the shelf and been down to see your smiling dealer. If you are the former type, and care for a project that will give you the new deal in passband bliss without keeping the old receiver off the air, a converter will give you the low noise and selectivity without the large tab. Changes in the receiver itself may be added when the spirit moves.

A Solid Foundation

The 1936 HR0 here (serial F-235) was a good old set. When 2.5-volt tubes got scarce, it didn’t get traded in. When the 4-volt glass tubes got tired, it wasn’t put out to pasture. It “worked,” even on 30 Me. In its original state the purest of “p.d.c.” signals turned out to be thoroughly modulated on the higher frequencies unless p.d.c. was used on the heaters. As the commercial signals got more numerous, the image problem on the higher bands sounded worse than feeding time on a turkey farm. Changes were gradually made, such as using a 6BA7 mixer tube, 6BA6 h.f., oscillator, product detector, a.v.c. from a 6C4 cathode follower and diode hooked in before the detector to provide isolation from the b.f.o., and to top it off the noise was reduced by the addition of a quiet first r.f. stage. A 7F8 was used in this circuit until the advent of the 6BK7A. (Same circuit as shown in the r.f. stage of the converter described later.) Main results of all this were low noise with antenna disconnected and better image rejection. Three years ago a 3.1-ke. Collins mechanical filter was added to give still lower noise and good selectivity.

The New 3-Mc. Filter

Recently an h.f. crystal bandpass filter was announced by Blackhawk. This unit at 3 Me. has characteristics essentially the same as the mechanical type has at 455 ke., and is about the size of a sawed-off i.f. transformer, approximately 1½ inches cube. A quick check in an ARC-5 of the 2830-ke. i.f. variety was a revelation. The i.f.’s were moved up 170 ke. after tossing the input can to make room for the filter. Since the receiver was the R-27 type with double-tuned transformers, the five tuned circuits (including the

*542 So. Irving Blvd., Los Angeles 5, Calif.

1 Blackhawk Engineering Co., Janesville, Wise. Other filters include an s-a-b filter for 5 Me. to pass the upper sideband, and another on 9 Me. of 4 kc. bandwidth for u.h.f. conversion applications.
b.f.o.) were raised \(^2\) to 3000 kc. For a 6-tube portable, this ARC-5 has the makings of an up-to-date receiver. The results on 40 are startling! The front end was changed to lower the noise and let the weak ones through, and coil sets were rebuilt to run on 14 Mc. and 21 Mc., too.

**What Happens**

Well, the old HRO is still here, and it's getting late. Before going on to the converter with the bandpass filter in its output, the following comparison may help. There is a Czechoslovakian kw. located on 21,000 kc. (plus a few cycles, minus nothing). He is an old-timer on the band, and while his f.s.k. takes up some of it on good days, he is welcome as far as I am concerned. He marks the edge and tells me how things are over the North Atlantic path. With the HRO (modified) and the general-coverage coils, he puts in a strong Q5 signal on N6 days. At the same time, with the converter to be described, OLU is just 20 db. stronger, and the noise still does not show on the S gauge. In this case the only other change is that the HRO is looking at the 3-Mc. output of the converter.

The best one can do along selectivity lines to date is to place the sharp filter immediately following the first mixer. This produces a minimum of intermodulation products by providing a knothole as close to the antenna as possible.\(^3\)

Wishing to get the utmost efficiency from the converter, a band was chosen (21 Mc.) and the only switch in the box is one which allows changing the antenna from the old receiver antenna coax input to run it into the converter input and through the receiver. The cabinet is of welded steel construction, and the châssis is bolted firmly to the bottom. Pressing on the sides will not disturb the oscillator frequency, and neither will raising the lid. If you feel brave and have what you think is a good band switch and a little

\(^2\) 0.001-uf. miniature may be used to go in series with the fixed padders, or remove the 50-uf. tubular ceramics and replace with Centralab TC243 (NPO) tubulars, 2 per cent tolerance.

\(^3\) Goodman, "What's Wrong With Our Present Receivers?" QST, Jan., 1957.
The 3-Mc. crystal filter, selective element in the converter, is in the box marked "3000-A." Can next to it (Ls) houses the oscillator inductance.

more room in the box, go ahead with making the thing band switching, but first go out and buy a hatful of the small temperature compensating capacitors from about 2 µf. and -100 p.p.m./°C. on up to 150 µf. by -750 p.p.m./°C. temperature coefficient. Remember, this box uses an oscillator running on about 18 Me., so you will have to conjure up all the v.f.o. techniques you can think of and stick with rigidity and avoid compression-type padders. Although be of stout heart! This first model stands a reasonable amount of table pounding as do some high-frequency receivers. It also uses no (intentional) temperature compensators except for the two shown in the local oscillator (see Fig. 1). The heaters do run continuously, though, which saves the price of a warming rod. The single section of the second 6BQ7A operating as local oscillator takes 1 ma. at 40 volts d.c. input. Control of the oscillator output is afforded by the capacitance divider C3C4. The oscillator slides smoothly into stable oscillation with the variation of these adjustable ceramics via holes in the rear of the chassis.

A Backbone

The three-gang variable capacitor C1 is the result of much searching. Unfortunately, the brand is unknown and no ofinary vendor would be able to help much. This one came out of "overseas wrapping," all bright and clean, complete with heavy ceramic shafting and insulated rotor sections. This unit, besides being sturdily built, allows the ground returns to be routed back to the proper points and d.c. run through the tank circuits where desired. Torque required to turn the rotors is minimum, facilitating a good reduction drive and smooth band coverage. Try to find yours with nice clean precision-type ball bearings! Here's a tip: look at the General Radio catalog.

By checking your Type A Lightning Calculator you will quickly discover that the change in capacitance required to cover the chosen band will amount to as little as 2 µf., depending on the total padding. Get the straight-line capacitance type, to give straight-line-frequency tuning with heavy padding.

Coils

While the adjustments on the tuned circuits seem unduly bountiful, this way of doing it will afford exact placement of the bandspread and afford an even kc. per division tuning rate of change, so that the scale may be uniform. About the inductances, use air where possible for the coil forms. This material will not do where mechanical stability counts, as in the oscillator. Miniductors were chosen for the antenna, r.f., and mixer circuits, but the oscillator coil is wound on a 6-9-Mc. ARC-5 receiver ceramic form. The ferrite slug was removed, since it wasn't known if this material was good at 21 Mc. If you have a Q meter, give the slug a try. Save the shield, too, and figure on anchoring it down tight with the coil in a location close to the tube and variable capacitors. Where padders are used, they are the APC type. Hammarlund and Oak are two that make the kind with plated brass plates rather than the staked aluminum variety. Johnson and Hammarlund make some miniatures that are smaller still.

Shielding

The Faraday shield between the antenna and r.f. tuned circuits is cut from half a length of B & W No. 3016 Miniductor. Scrape with sandpaper a narrow strip on the wires between two of the insulating spacers, and solder a 4-inch length of clean No. 14 wire parallel to the spacers. Make sure all "turns" are soldered to the No. 14. Cut with tin snips and open out the coil at one side of the No. 14 wire. The ends of the No. 14 wire may be formed to take small screws with which to fasten the shielded end of the screen to the chassis, so that the shield lies vertically between the closely-coupled antenna and r.f. inductances. The
Pig, 2—A Faraday (anti-capacitance) shield is made by dipping a piece of 32 t.p.i. coil stock (B & W 3016 Miniductor) flattening it out, and soldering it to a length of No. 14 wire. The top end of the shield is left open and may be given a bead of Duco cement to keep the ends from shorting accidentally during handling.

Other shielding consists of using coaxial fittings for the incoming antenna and the use of coax at the switches, as indicated in Fig. 1. A metal partition serves as the important shield between the input and output of the 3000-A bandpass filter, to keep the filter-rejected portions of the mixer output from sneaking around to reappear in the 3-Mc. output to the receiver. To shield the receiver input from strong signals that may show up on or near 3 Mc, coax should be used between the output of the converter and the input to the receiver. No off-band uninvited signals have given trouble (nor have “birdies” been noted) with this converter and receiver combination.

Alignment, Out of the Cabinet

In tuning up, set the coil padders at about half capacitance, and the series padders near minimum. Set the main tuning gang about 10 degrees from minimum capacitance. Also set the capacitors shunting the ganged sections to equal settings so that the change rate will be equal in the three sections. The amount of shunt gang capacitance in these last three padders will depend on how you wish the kc. per degree of rotation to vary over the band. With none in the circuit, of course, the dial will be very crowded at the high-frequency end.

With a g.d.o. check for activity in the oscillator circuit. An alternative is to connect a voltmeter to show about 50 volts across the resistor leading to the r.f. choke and B+ connection on the oscillator coil. A finger placed on the grid terminal of the oscillator section will usually cause the oscillator to give up and the meter to show an increase. The capacitance divider (C3C4) on the grid end of the tank should be set at or near maximum (both units) as a starter. Then, with the padder across the coil, set the frequency to 3 Mc. below the high edge of the band (18.15Mc.). With the main tuning control, tune to the low-frequency end of the scale, and check the new oscillator frequency. This may now be adjusted to its position 3 Mc. lower than the low end of the band, using the series padder and an alignment tool.

With a receiver running to check the frequency of the g.d.o., the other two circuits may be tuned and checked in a like manner. As usual, the procedure may have to be repeated twice or more to get the two ends of the band to fall within the chosen limits of maximum and minimum setting of the main tuning control, because the setting of the series padder affects to some extent the other edge of the band. Because the band is relatively narrow, no trouble will be experienced with tracking over the band.

Initially, a gain control was installed in the cathodes of the first 6K7A, and a variable cathode follower cathode resistor was tried in the coupling stage to the output. However, both additions only tended to decrease the signal to the receiver. If less signal is needed, the usual gain control in the receiver will suffice. No a.v.c. is used in the r.f. stage, as it takes a very strong local signal to affect the linearity at this point, so the stage is better off running at maximum gain continuously.

Use Your Good New Receiver

You may have a bandpass filter in your existing receiver. If such is the case, you have an added advantage: that of being able not only to move over and minimize an interfering signal, but of narrowing the overall passband with very little loss in intelligibility in the case of a.m. or s.s.b. signals, or further cutting the passband to any width desired! For c.w. reception this is a decided

Fig. 2—A Faraday (anti-capacitance) shield is made by dipping a piece of 32 t.p.i. coil stock (B & W 3016 Miniductor) flattening it out, and soldering it to a length of No. 14 wire.

Fig. 3—By cascading two bandpass filters on widely different frequencies (e.g., 3 Mc. and 455 kc.), it is possible to vary the effective over-all bandwidth by tuning the oscillator that heterodynes to the lower frequency.

(A) Selectivity characteristic of a single filter.

(B) Resultant selectivity when two such filters are "in register."

(C) When the filters are "offset," the bandwidth is reduced. Cross-hatched portion shows effective selectivity of system.
The 21-Mc. converter of W6VX uses a homemade dial consisting of a \( \frac{3}{4} \)-inch shaft turning the 4-inch rubber-rimmed disc from a tape recorder. A Faraday shield is used between input coils at left.

help, since the passband may, by staggering the two center frequencies with respect to one another, be reduced to as few cycles as desired.

**Bandspread and Bandpass**

Familiarity with the magnitude and direction of the controls is a necessity, and this includes the b.f.o. Bandspread on the converter, receiver, and b.f.o. are a help. In that case, touching up any one of the three, which may have this feature, allows fine control of pitch, or beat note. When the two bandpass filters are in register — that is, centered on the signal — the ultimate in skirt steepness is achieved because the loss in db. is additive. For instance, if both filters are 6 db. down at 3 ke. bandwidth, and 60 db. at 10 ke., in theory the combined results are 12 db. and 120 db. for the respective bandwidths, when there is no leakage around the filters through lack of shielding. When the filters are staggered to reduce the bandwidth (Fig. 3), the skirt steepness of either predominates, and the former advantage (steeper skirts) is no longer in effect. Since the various knobs are not ganged, it is up to the individual to learn how to fly the combination. Doing it is much easier than talking about it!

**More Bandspread**

The HRO here (modified) has a spare set of coils covering 3.5 to 4 Mc. on bandspread setting. By resetting the padders (series) the low-frequency edge was lowered to put 3 Mc. at 18 on the dial. This gives a fine tuning control for moving the 3-Mc. center of the received signals at the rate of change of about 500 cycles per division on the HRO dial.

The spread of the converter dial is about 500 ke. Mechanical bandspread of the main shaft is 16 times via the tuning control, giving just over 60 ke. per tuning knob revolution. This is no great hardship with a smooth-operating (non-sticking) system. An added help on most receivers would be to have an auxiliary control on the h.f. oscillator with plus or minus about 2 ke. in 180 degrees for good measure.

**Flying It**

With the two-filter system, as the bandpass is narrowed by tuning the HRO off 3 Mc. a few hundred cycles in either direction, the b.f.o. may be adjusted a short way off the narrowed band the same as has been the practice for years using a “single signal” crystal filter. Once the selected width has been established, the b.f.o. and HRO tuning settings are hands off, and further tuning remains to be done with the converter alone. This is similar to the technique used with single-signal c.w. reception, and also to the present technique of tuning s.s.b., or A-1 on exalted carrier. If you are careful in tuning, it is possible to stack the two filters, and the old i.f. crystal, with an audio filter at the top. This really quiets the band down, but stand by when Zero-beat Algernon gets on frequency!

**Strays**

Want a free wall chart (22" × 28") of schematic symbols? Write to Electronic Instrument Co., Inc., Long Island City 1, New York.

The longest QSO to end all long QSOs (we hope). K6MH and K6JYL maintained continuous contact on 75 meter phone for 39 hours. They even recorded the marathon on tape!

And if you think that's bad, listen to this. A mobile phone gathers no morse.

K6BX, Box 385, Bonita, Calif., would like to hear from anyone who has modified a Viking Valiant for use with a B&W 51SB, and from anyone who has converted the 11-meter band to 6 meters on the Valiant.

April 1959
The Audofil

Audio Selectivity for the Novice

BY LEWIS G. McCoy,* WIICP

One of the less expensive ways to increase the selectivity of a receiver is to add a Q multiplier. However, if you are using a small receiver that has no b.f.o. but makes the i.f. stage oscillate when you switch to c.w. the Q multiplier does no good. The solution then is to add audio selectivity, and the unit described here will do a bang-up job in the application. With all new parts it will cost about 50 percent more than an inexpensive Q-multiplier kit; with a little shrewd buying and bargaining you can do much better.

Many newcomers start out in ham radio with what can be best classed as a “minimum” receiver. By minimum, we mean one that doesn’t have features usually found in higher-priced models, particularly the ability to separate the signals in crowded bands. In some instances these poorer receivers could be improved by changing or adding circuitry. However, there seems to be an impression among many amateurs that only the chief engineer of a receiver factory is qualified to remove the bottom plate of a receiver. In fact, most hams break out in a cold sweat at the thought of using a soldering iron on their receivers.

We aren’t going to ask you to dig into your receiver to improve the selectivity. Instead, you will be shown a fairly simple method of obtaining selectivity without doing any more to your set than exchanging plugs at the headphone jack. You will have to build the unit, but it is independent of the receiver.

What It Is and What It Will Do

The Audofil is essentially a filter network for audio frequencies and its circuit, Fig. 1, is similar to one originally described by W3FQB.1 Audio from the receiver is fed into the filter, and any frequencies below 500 and above 900 cycles are attenuated. The filter output “peaks” at approximately 700 cycles. By restricting the audio-frequency range, a good deal of interference can be eliminated. We tried the filter in the crowded Novice 80-meter band, using a receiver with poor selectivity. Many signals that were masked by high-frequency notes became good copy when the filter was switched in.

In order for a filter to work properly it must be terminated in a load for which it is designed. This is accomplished in the Audofil by having the correct load at $L_1$ in the grid circuit of the second section of a 12AU7 twin triode. Output is taken from the plate circuit of the second section.

While we weren’t looking for additional audio gain, it was noted that the unit did provide a slight amount. If your receiver is lacking in gain you may find that the Audofil will make up for this deficiency.

The Audofil could be powered by a voltage source giving approximately 125 volts d.c. at 25 ma. and 6.3 volts at 300 ma. However, we think it is a pain in the neck to try to find the voltages in your receiver or transmitter, so a simple power supply was built into the unit. The d.c. output voltage from the supply shown in Fig. 1 is approximately 125.

One thing more. The filter is designed for copying c.w., not phone. On phone its selectivity attenuates the “highs” and “lows” and you may not find it to your liking in voice work.

Construction Details

A 2 × 5 × 7-inch aluminum chassis was used for the unit shown in the photographs. However, any chassis large enough to accommodate the components can be used. When mounting $L_1$ and $L_2$ on the chassis, their cores should be set at

* Technical Assistant, Q&T.


The Audofil is a two-section selective audio amplifier designed to sharpen up a broad c.w. receiver or to use where a Q multiplier won’t work. Complete with its own power supply, it requires no modification of the receiver. The two filter inductors at the right are output transformers with the cases removed; they are held in place by cardboard clamps.
Fig. 1—Circuit diagram of the Audofil. Unless otherwise indicated, capacitances are in μF, resistances are in ohms, and resistors are ½ watt.

C1, C6—25-μF, 25-volt electrolytic.
C2, C3—0.005-μF, mica, 20 per cent tolerance.
C4, C5—0.03 μF, paper, 20 per cent tolerance (Mallory type GEM-413, or Sprague type 4TM-53).
C7—Dual 20-μF, 250-volt electrolytic.
C8—0.1-μF, 400-volt paper (Mallory GEM-401 or Sprague 4TMP1).
CR1—Selenium rectifier, 130 volts, 65 ma. (Federal type 1002A or 1386, or equivalent).

right angles to each other and on the side of the chassis away from the power transformer. This mounting minimizes chances of hum pickup.

An inductance of approximately 4.5 henrys is required at L1 and L2, and it was found that the primary winding of a Triad S-53X audio output transformer had this value. (The primary center tap and the secondary were not used.) In order to increase the Qs of the chokes their iron mounting frames were removed. These frames are easy to remove by first bending back the small tabs and then slipping the frames off the cores. Cardboard strips were made to replace the frames, to provide a nonmetallic clamp for the cores.

Standard terminal tie points were used for mounting components under the chassis. Layout of the parts is not critical, and no difference

(Continued on page 158)

Underneath the chassis the power-supply components are grouped in one corner (lower lefthand in this view). The shielded wire runs to the input plug, P1.
C.W. Monitor for the Mobile

We've known a microphone manufacturer or two who operated mobile c.w. by choice, and there have been others from time to time. But this article is by one who was forced to it by the simple desire to make a contact now and then through the evening QRM.

Should you read this article? Perhaps this little test will help you decide: You have just spent all day on the road and you finally pull into a motel for the evening at least 50 miles away from any large city. Which of the following statements is true?

1) You can go to a local drive-in and enjoy the show.
2) You can read a good book.
3) You can have lots of good QSOs with your mobile rig.

If you have checked No. 3 you had better read on, brother, because you aren't going to do it — that is, unless you know how. It's a known fact that unless you were lucky in hitting a short skip opening, the 10-meter band will be deader than a doornail and the lower-frequency phone bands will be impossible with QRM from high-power home stations. Nature is so perverse that when you finally have time to settle down to an evening's enjoyment of ham radio there isn't a QSO to be had. Perhaps you had counted on keeping in touch with some of your buddies back in the home town while you were on the road. Too bad; you won't get them on the crowded bands.

The answer, gentlemen, is c.w. — ugh! yes, c.w. (This is where I lose half of the readers.) I have found a whole new world of possibilities with the use of mobile c.w. It's no trick at all, brother, because you aren't going to do it — that is, unless you know how. It's a known fact that unless you were lucky in hitting a short skip opening, the 10-meter band will be deader than a doornail and the lower-frequency phone bands will be impossible with QRM from high-power home stations. Nature is so perverse that when you finally have time to settle down to an evening's enjoyment of ham radio there isn't a QSO to be had. Perhaps you had counted on keeping in touch with some of your buddies back in the home town while you were on the road. Too bad; you won't get them on the crowded bands.

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In the course of my mobile c.w. operations with either the XYL driving the car or myself at the wheel of the parked car, I soon found that operating the key was much more difficult than at the home station. The key clicks get lost in the high ambient noise from the engine and, to further confuse the issue, the dynamotor whine changes frequency several seconds behind the key closing. It rapidly became apparent that a keying monitor was essential unless I didn't mind sounding like a "lid." (After all, I could blame it on the excusable conditions.) I chose the former solution.

Keying monitors are of two types — those actuated by the r.f. output and those operated directly by the key. The r.f.-actuated variety have the advantage of providing proof of r.f. output but have the disadvantage of requiring coupling to the r.f. output. In a completely shielded transmitter driving a coax line this may present a problem. Some r.f. voltage could be taken from the final tank or output circuit but its amplitude will change drastically from 10 to 80 meters because of the large differences in mobile antenna impedances at these frequencies. Manual adjustment or attenuation would be required to prevent the r.f. from overloading the keying monitor and possibly blowing it up if it were transistor operated.

With these thoughts in mind, I settled on the key-operated type. It was also to be transistorized to conserve space and d.c. power. W1ICP in September 1957 QST described a keying monitor using a neon bulb oscillator that was both simple and inexpensive. The only objection I have to it is that it generates just enough audio power to drive headphones. The circuit shown in Fig. 1 is an adaptation of the idea with improvements for mobile use.

Figure 1

V₁, V₂ and R₁ form a voltage-regulator circuit that supplies +120 volts to the neon-bulb oscillator. V₁. Voltage regulation is very essential for mobile operation, otherwise variations in dynamotor voltage caused by motor acceleration, load varying because of antenna swaying, and similar changes, will cause large audio-frequency changes and erratic operation. With the voltage regulator there is no change in audio tone under any conditions. V₁, R₂, R₃ and C₁ form the neon-bulb relaxation oscillator, with C₁ performing the dual function of coupling capacitor and timing capacitor for the oscillator. Q₁, the transistor amplifier, acts as a Class B amplifier because there is no path for quiescent base current. With no input signal the collector current is very small, being just the leakage current of Q₁.

which now becomes a low impedance of approximately 1000 ohms. The pulse of base current produces a corresponding but much larger pulse of collector current. \( C_1 \) continues to discharge into the base resistance until the voltage on the neon bulb drops so low that it extinguishes. The voltage on the plate of the neon bulb then rises as \( C_1 \) charges up to the point where \( V_1 \) will break down and fire again, thus repeating the cycle. The familiar sawtooth voltage is observed at the terminal of the neon bulb but it is not used directly. Fig. 2 shows actual waveforms measured from ground to the upper electrode of \( V_1 \) and between ground and the base of \( Q_1 \), the negative terminal of the 12-volt battery being grounded.

Just about any transistor will work in this circuit so long as the collector breakdown voltage is greater than 12 volts. Typical usable units are the 2N256 and the 2N301 of the power variety, and the CK700 and 2N107 of the 50-100-milliwatt range. Lower voltage units such as CK722 can be used if the supply voltage is reduced from 12 to 6 volts and a decrease in audio output is tolerable. Six volts can be taken from the junction of two 220-ohm \( \frac{1}{2} \)-watt resistors connected between 12 volts and ground.

\( Q_1 \) must be a p-n-p type transistor. An n-p-n unit cannot be substituted by reversing powersupply polarity, because the input pulse is unidirectional in the negative direction and would drive an n-p-n unit farther into cutoff. The dissipation in the transistor is very low because of the normally biased-off condition when the key is up and the low duty-cycle pulse input when the key is down. The components are all small enough to be incorporated in nearly any existing rig, but the monitor can be built as an independent auxiliary if desired. The number of interconnections is very small. \( B+ \) may be anything in the range of 200 to 600 volts and can be taken from either the transmitter or receiver power supply. \( R_1 \) should be 820K if \( B+ \) is between 400 and 600 volts and 470K if \( B+ \) is between 200 and 400 volts.

To place the monitor into operation, first close the key and then turn \( R_3 \) until a tone is heard. \( R_3 \) may be used to adjust for the most pleasing tone. \( R_3 \) is also used to turn the monitor off, during phone operation. Simply turn the control to the end of its rotation in the direction that lowers the pitch of the audio note. \( V_1 \) will extinguish completely.

If the tone jumps occasionally, change \( V_1 \). Some neon bulbs are subject to instability. This phenomenon is caused by the ionization path wandering around between the two electrodes and sometimes may be visually detected as well.

The monitor may be used for home-station operation as is. The 12 volts or less may be taken from batteries, a voltage step-down network, or from a cathode-bias resistor.

Perhaps it won't be too long before the expression "U R first mobile worked on c.w. OM" becomes less frequently heard on the amateur bands.
That there are power losses in coaxial cable is well known, but just how those losses are distributed among the various parts of the cable is not-so-common knowledge. The variability of some of the factors is probably even less well known.

Coaxial cable attenuation can be attributed to two factors: basic losses in the cable components themselves, and the additional losses resulting from operating with an excessive standing-wave ratio. The ideal coaxial cable would consist of two highly polished, silver-plated copper tubes placed concentrically, using dry air as a dielectric material, with no variation in concentricity of the tubes. Such cable construction is obviously rather difficult to attain, and indeed can only be approximated in rigid applications.

For flexible applications, a precisely constructed cable utilizing a low-loss plastic material for a dielectric and braided copper wire for the outer conductor is the only satisfactory answer, and so most of our well-known coaxial cables are of this type.

![Graph](image_url)

Fig. 1.—Relative cable component losses vs. frequency.

Examination of Fig. 1 reveals that at 100 Mc, 80 per cent of the attenuation of a solid-dielectric cable using a low-loss dielectric such as polyethylene is due to copper loss in the center conductor. The remaining loss — approximately 20 per cent of the total attenuation — is divided between dielectric losses and copper losses in the outer conductor. As is obvious, at this and lower frequencies the center conductor more directly affects attenuation than any other cable component, and the design of low-attenuation coaxial cables revolves about this fact. Skin effect is no less evident in coax than in other h.f. or v.h.f. circuitry, and the surface of the center conductor should have as low r.f. resistance as possible.

Type RG-11/U, for instance, uses a stranded tinned copper center conductor. RG-11/U was designed for short runs or for inter-set coupling where ease of soldering was a prime factor. For transmission-line use, the 6.7 times greater resistivity of tin over bare copper results in greater attenuation, together with the use of a stranded instead of a solid center conductor. This attenuation increase (1.3 times) is a result of the spiralling effect of the r.f. current along the center conductor, coupled with the higher resistivity of the center conductor because of contact resistance between individual strands. JEL-101 is equivalent in every dimension to RG-11/U, but utilizes a solid copper-weld conductor. Fig. 2 shows that the attenuation of JEL-101 is 16 per cent less than that of RG-11/U.

However, the size of the center conductor affects attenuation even more than the above factors. Compare the attenuation of RG-59/U and JEL-104 (Fig. 2), the former having a No. 22 center conductor and the latter having a No. 17 center conductor; the only factor here that has any significant effect on attenuation is the size of the center conductor. Obviously, if the size of the center conductor can be increased the attenuation will be decreased. Cable impedance, however, is dependent upon the ratio between the diameters of the inner and outer conductors, together with the dielectric constant of the dielectric material. The formula for determining the characteristic impedance of a coaxial cable is as follows:

\[ Z_0 = \frac{138}{\sqrt{\kappa}} \log_{10}(D/d) \]

where: 
- \( Z_0 \) = characteristic impedance
- \( k \) = dielectric constant
- \( D \) = diameter of dielectric (i.d. of outer conductor)
- \( d \) = diameter of inner conductor.

Therefore, assuming the usual solid polyethylene as the dielectric material (\( k = 2.3 \)), it is obvious that the size of the center conductor cannot be increased without changing the diameter ratio and consequently the impedance of the cable. If an increase in the over-all diameter of the cable can be tolerated, the size of the conductor can be increased, thus allowing an increase in \( d \) without changing the diameter ratio and impedance. Such an approach results, naturally, in logarithmically increased bulk and weight.

1 The JEL and JT type designations are those of the Times Wire and Cable Co., and indicate sweep-tested cables using solid and cellular polyethylene dielectric, respectively. These cable types are available through Times distributors in various parts of the country. Information concerning distribution can be obtained from the company at its home-office address, 358 Hall Ave., Wallingford, Conn.—Ed.
Reducing the Dielectric Constant

A much better method is to decrease the dielectric constant of the dielectric material, thus allowing an increase in the size of the center conductor without necessitating a corresponding increase in the diameter of the outer conductor. Air has a dielectric constant of 1.0, and rigid cables using a center conductor supported by beads of insulating material to achieve a low dielectric constant have been used for purposes of low attenuation for years. Such constructions, however, are very expensive, besides requiring rigid support and the complicated plumbing necessary to insure pressurization to prevent moisture condensation.

Results similar to those obtained by the use of a gas-filled line can be attained with all the advantages of flexibility and lack of maintenance of the solid-dielectric cable by the use of cellular polyethylene as a dielectric material. Formed by means of a foaming agent intimately dispersed in the polyethylene granules before melting and extrusion, this material consists of a compact unicellular combination of polyethylene and air, each isolated air cell only a thousandth of an inch in diameter. The ratio of polyethylene to air is approximately one to one, with a resulting dielectric constant of 1.5.

Type JT-204 cable is equivalent to RG-11/U in all dimensions except conductor o.d., but utilizes a cellular polyethylene dielectric material permitting an impedance of 75 ohms with a No. 14 A.W.G. solid copper center conductor. RG-11/U has a 7/26 A.W.G. stranded (approximately equivalent to No. 18) tinned copper center conductor, and at 100 Mc. exhibits an attenuation of 2.25 db. per 100 feet. The attenuation of JT-204 at 100 Mc. is 1.5 db. per 100 feet, a decrease in attenuation of approximately 40 per cent as a result of the larger solid bare copper conductor.

Times Wire & Cable type JT-200 is a 75-ohm cellular polyethylene dielectric cable with a jacket o.d. of 0.675 inch and a No. 10 A.W.G. solid copper conductor. As a result of the large conductor, JT-200 exhibits an attenuation of only 0.92 db. per 100 feet at 100 Mc.

Other benefits result from the use of cellular polyethylene — the weight of the cable is greatly decreased, and the tensile strength of the cable is increased (because of the larger center conductor).

Effect of Impedance Variations

Coaxial cable attenuation is also a function of v.s.w.r. in the cable itself. Cable with a certain nominal characteristic impedance does not exhibit the same impedance over the entire spectrum. Any eccentricity with respect to the location of the center conductor in the dielectric material results in a change in the effective diameter ratio and a consequent change in impedance. Cable core is manufactured by pulling the center conductor through the cross-head die of a thermoplastic extruder, which extrudes a continuous coating of dielectric material around the conductor. The polyethylene-covered conductor is then passed through a temperature-controlled water bath to cool the hot plastic material properly.

If eccentricity is combined with periodic variations in dielectric o.d. because of "surging" of the extrudate, discontinuities develop at frequencies at which the surges are one-quarter wavelength apart. These periodic resonances result in impedance variations of much greater magnitude than the variations resulting from eccentricity alone, and are coincident with sharp increases in attenuation at the resonant frequency. This phenomenon is present in all conventionally extruded cable. The degree of periodicity depends on manufacturing techniques.

It is possible to measure these impedance discontinuities with suitable equipment. Two techniques are used for production testing at Times Wire, one measuring frequency vs. impedance, and the other measuring frequency vs. attenuation. The first technique utilizes motor-driven variable-frequency oscillators, covering the range 0.5-250 Mc., mechanically coupled with a strip recorder. The output signal from the oscillator is fed to a voltage-divider network, the output of which changes as a function of the impedance of the network (cable sample) to which it is connected. The recorder is calibrated by establishing limits.
with known impedances. An a.g.c. feedback circuit is incorporated to insure a constant output voltage. Impedance variations appear as "grass" on the graph, with variations caused by periodic discontinuities appearing as high-amplitude spikes. The frequency at which an impedance discontinuity appears is immediately identifiable by reference to the frequency-calibrated base line of the recording. Although the theoretical impedance variation of RG cables in the 75-ohm class is ±10 per cent, most standard RG cables so measured vary ±5 to 10 ohms over the entire frequency range, with occasional periodic variations of 15–20 ohms or more, as shown in Fig. 3A.

Attenuation vs. frequency is measured by means of a visual display. The signal from a sweep generator covering the range 0.5–250 Mc. is fed into one end of the cable under test. The output signal is amplified by a flat broad-band band-pass amplifier, rectified, and fed into the vertical plates of an oscilloscope through a calibrated attenuator. The sweep signal is displayed on the scope face as in Fig. 4 (50–250 Mc. is the swing of the sweep generator in this case). The over-all attenuation characteristic, on a comparative basis, of the cable is now visible, and amounts to a total attenuation increase at the high end of the band of approximately 30 db. (cable sample consists of 1500 feet of RG-11/U). Attenuation suck-outs resulting from periodicity in the cable are evident at 75 and 175 Mc. The amplitude of the suck-out is determined with the calibrated attenuator, and the frequency is determined by means of a marker generator coupled to the broad-band amplifier. Suck-outs of 3 to 8 db. are quite common in standard RG cable, and 60-db. suck-outs have been observed in 30 db. of cable. In long runs, suck-outs can be disastrous if they occur at a critical frequency. By means of very close control of extrusion processes, coupled with 100 per cent sweep inspection of each reel of cable, the JT and JEL series cables are held to impedance variations of ±3 ohms (Fig. 3B) and are flat within 0.5 db. in 30 db. of cable.

Resonant periodicity only becomes a problem above approximately 30 Mc., but impedance variations resulting from conductor eccentricity exist throughout the spectrum. As frequency increases, the v.s.w.r. of the cable limits its usefulness in application. As can be seen from Fig. 1, the dielectric material and braid become increasingly important above 150 Mc. The percentage of dielectric loss increases as a result of the increased power factor of dielectric materials at high frequencies. Resonant periodicity becomes more pronounced, but is relatively stable with physical movement of the cable in comparison with capacitance changes (with coincident impedance changes) resulting from flexure of the braid when operating at ultrahigh frequencies. As frequency increases to 5–10 KMc., relatively minor flexure of the cable results in large-order variations in attenuation. At 10 KMc. 70 db. of cable may only be fifty feet in length, and variations of 10 or 12 db. can result from flexure.

These variations are primarily a result of the manner in which r.f. current flows along the inside of the braid. As frequency increases, the current tends to zigzag along individual wires, rather than follow the spiral of the braid. Because shield braid is made of many strands of wire in a basket-weave pattern, contact resistance at each crossover point contributes to the r.f. resistance of the outer conductor, and the greater the number of strands the greater the contact resistance. However, by suitable choice of braid angle (that angle the strands make with the longitudinal axis of the cable) and coverage, an increased number of strands can result in increased braid pressure and consequent decreased contact resistance at crossover points. The net result is that although contact resistance is theoretically increased by the additional strands, the actual contact resistance is decreased to a much greater degree by the greater braid pressure, the net result being a decrease in attenuation. The greater braid pressure also results in a more stable braid, with less change in attenuation with flexure. The application of a suitable tight jacket will also stabilize the braid configuration.

It is important to note at this time that losses resulting from excessive v.s.w.r. in coaxial cables are actually very small in comparison with the attenuation resulting from direct component losses. Excessive v.s.w.r. should primarily cause concern for the dielectric strength of the cable, since the maximum voltage in the line increases with the v.s.w.r. A glance at the attenuation vs. v.s.w.r. curves in the Handbook shows that v.s.w.r. must reach values in the order of 3:1 or 5:1 before appreciable attenuation is apparent. Any additional attenuation resulting from v.s.w.r. is a
function of the component attenuation already existing in the cable.

Jacket Material

One more factor results in coaxial cable attenuation — contamination of the dielectric material by plasticizers used in the vinyl jacket. Most flexible coaxial cables use polyvinylchloride (vinyl) as a jacket over the braid to protect the cable from moisture, sunlight, and abrasion. Vinyl in its natural state is a very stiff material, which resists any flexing. In order to make vinyl pliable, or plastic, certain plasticizers are added to the vinyl compound. In the case of JAN cables such as RG-8/U, RG-11/U, RG-58/U, and RG-59/U, a non-resinous plasticizer is used. Upon exposure to the elements, particularly summer temperatures, the plasticizer leaches out of the vinyl and migrates into the polyethylene dielectric, contaminating it to the point where the dielectric constant and power factor are raised. As a result, the v.s.w.r. of the cable is increased, as is the attenuation. As a secondary result of the migration of the plasticizer out of the jacket, the vinyl becomes brittle and loses its pliability, with consequent cracks and breaks. The life of cables jacketed with contaminating types of vinyl is between three to seven years before contamination increases to the point where attenuation is extraordinary. The degree of contamination increases exponentially beyond this point, rising to very high values. One to two db. per hundred feet in RG-11/U at 30 Mc. is a common attenuation increase after contamination has begun.

The above cable types and other RG cables using contaminating type jackets have been largely supplanted by cables electrically and dimensionally identical, but with non-contaminating type jackets. Cable types like RG-8A/U, RG-11A/U, RG-58B/U and RG-50A/U, for instance, utilize resinous plasticizers and offer life expectancies in excess of fifteen years. The price differential between cables using the two types of jackets is approximately one dollar per hundred feet.

High-molecular-weight carbon-black-loaded polyethylene \(^2\) jackets such as Xelon contain no plasticizers of any nature, and offer life expectancies in excess of 25 years, in addition to being ten times less permeable to moisture than polyvinylchloride. For this reason, polyethylene jackets (which, incidentally, are usually specified for submarine cables) permit direct burial of coaxial cable.

I would like to thank Larry DeGeorge, W1ISV, for his invaluable assistance in preparing this paper, and also the Engineering Department of the Times Wire and Cable Company for the preparation of the graphs and charts used as illustrations.

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Strays

Here are the April schedules for the various MARS technical nets.

**First Army MARS**
(Wednesday evenings 2100 EST, 1030 kc., upper sideband)
April 1 — Variable Reactance (Parametric) Amplifiers.
April 8 — Electro-mechanical Filters.
April 15 — Phosphors and Electro-luminescence.
April 22 — Atlas-Score Communications System.
April 29 — Interchanging Scientific Information by Multilateral Radio Communication.

**AF-MARS Eastern**
(Sundays 1400 PST, 79225, 3295 kc.)
April 5 — Comparison of Analog and Digital Computers.
April 12 — Characteristics of Transistorized Digital Computers.
April 19 — Installation and Maintenance of Radiotelegraph.
April 26 — Physiological and Psychological Effects of Air Ionization.

**AF-MARS Western**
(Sundays 1400 PST, 79225, 3295, 143400 kc.)
April 5 — Automatic Multipurpose Electronic Checkout System for Military Weapons Systems or Industrial Systems.
April 12 — Compressor Amplifiers, Transistorized Telephone Repeater Amplifiers and 24-Volt Power Supplies for the Air Force "Quick Fit" Program.
April 19 — Silicon Rectifiers.
April 26 — Equipment Utilization and Conversion Information.

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\(^2\) Not to be confused with dielectric polyethylene which does not stand up well as jacket material in outdoor service. — Editor.
An Inside Picture of Directional Wattmeters

What They Do—How They Do It

BY WARREN B. BRUENE,* WQ7TK

Instruments for measuring the standing-wave ratio and r.f. power in coaxial transmission lines are becoming increasingly popular. They are not only very useful but are becoming almost a necessity in setting up a modern amateur station. It is the writer’s purpose to discuss the differences between some of these devices and to give a clear picture of how they work.

The basic principle of directional coupler operation is common to all of them so it will be discussed first. This will make it easier to understand the differences between the various types.

Standing Waves

Fig. 1 shows the voltage and current that can be measured at various points along a transmission line that is not terminated in its characteristic impedance. These are called standing waves because they have a fixed position for any given load impedance. The wave shape is not a sine wave and is not to be confused with the shape of an r.f. cycle. The voltage plotted in Fig. 1 can be measured using an r.f. voltmeter, and the current, can be measured by cutting the line at various points and inserting an r.f. ammeter. The readings are the r.m.s. value of the sine-wave r.f. voltage or current existing at each point.

Forward and Reflected Components

Textbooks tell us that the voltage on a line can be considered to have two components: a forward component, $E_F$ (sometimes called the incident component), and a reflected component, $E_R$. As shown in Fig. 2, the phasor sum of $E_F$ and $E_R$ represents the actual r.m.s. voltage, $E$, at any point along the line. When the two components are in phase a voltage maximum occurs and when they are out of phase a voltage minimum occurs. The same is true of current.

An important thing to note is that at any point along the line the reflected components of voltage and current are exactly 180 degrees out of phase. This agrees with the well-known fact that a voltage maximum occurs at a current minimum, and vice versa.

Forward and Reflected Power

The forward power in the transmission line is

$$ P_F = \frac{E_F^2}{Z_0} = I_F^2 Z_0 $$  \hspace{1cm} (1)$$

where $Z_0$ is the line impedance.

The reflected power is

$$ P_R = \frac{E_R^2}{Z_0} = I_R^2 Z_0 $$  \hspace{1cm} (2)$$

The actual power, $P$, delivered to the load is the forward power less the reflected power

$$ P = P_F - P_R $$  \hspace{1cm} (3)$$

This is all fine and dandy, but we need some way of measuring the forward and reflected components of voltage and current to make much practical use of it. This is what a directional coupler does.

How the Directional Coupler Works

The directional coupler can sense either the forward or reflected component by taking advantage of the fact that the reflected components of voltage and current are 180 degrees out of phase while the forward components are in phase. A small voltage derived from the current in the line is added to a sample of the voltage across the line. If these two samples have the right amplitude relationship, the two reflected components cancel. The sum then represents only the forward component. By reversing the phase of the current sample 180 degrees, the forward components cancel and the result is the sum of only the reflected components.

We wouldn’t attempt to guess the numerical value of the ratio

Hams who use s.w.r. bridges and don’t know how they work

but it must be pretty high. If you want to move from the numerator to the denominator of the expression above, here’s the article to help you do it.

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Fig. 2—(A) Phasor diagrams of forward and reflected components of voltage of several points along the transmission line. (B) Phase relationships between forward and reflected components of current at points corresponding to those in A. The letter designations are the same as in Fig. 1.

Fig. 3 shows a "Micromatch" type directional coupler. A small resistance, $r$, is placed in series with the line. The line current, $I$, flowing through $r$ develops a voltage $e_r$, which is directly proportional to the line current. The + and − signs indicate the voltage polarity at a given instant. At the same instant a voltage $e_v$ of the indicated polarity is developed across the capacitive voltage divider. Point C is common to the two voltages so their sum appears between points A and B. A diode detector can be used to rectify this voltage and feed it to a meter through a pair of r.f. chokes to indicate the forward component. Voltage or current. It follows, then, that power also varies as the square of the forward and reflected components detected by the directional coupler. The meter scale can be calibrated to read power directly. If the voltmeter is linear its scale calibration will follow a square law as shown in Fig. 5. One-quarter power is at half scale and one-sixteenth power is at one-fourth scale. In other words, the meter scale is made to do the squaring required by equation (1).

Fig. 3—The basic "Micromatch" circuit. With proper circuit constants, the voltage between A and B is zero for the reflected wave, hence any voltage that appears between these two points is caused by the forward wave.

By reversing the transmitter and antenna connections, the current will flow through the resistor in the opposite direction. This reverses its + and − signs and the voltage across the detector is the difference between the two voltages, so the meter will indicate the reflected component. This is illustrated by the phasor diagrams of Fig. 4.

As mentioned previously, the amplitude of $e_r$ must be adjusted so that its reflected component is equal and opposite to the reflected component of $e_v$. When this condition exists the forward components are also equal in magnitude but are in phase. To achieve this balance the variable capacitor in the voltage divider is adjusted so the reflected-power meter reading is zero when the line is terminated in its characteristic impedance. A good dummy load with zero reflection coefficient is used for this adjustment.

The voltage at the diode detector is derived half from the current, $I$, and half from the voltage, $E$. It doesn't matter what you call it, so we'll just call it a voltage proportional to the forward or reflected component. As stated previously, the power varies as the square of either

Fig. 4—Phasor diagrams showing current-voltage relationships existing when the Micromatch circuit of Fig. 3 is connected in the line at point Q, Fig. 1. (A) Connected to read forward component; (B) connected to read reflected component.

Fig. 5—Square-law scale for a directional wattmeter. For any full-scale power calibration, calibration points for a linearly-calibrated scale (such as is on a d.c. milliammeter) can be found from $S \sqrt{x/W}$, where $S$ is the maximum value of the linear scale, $x$ is the value of power to be calibrated, and $W$ is the maximum power (full scale value coinciding with $S$).

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gives the same meter readings no matter where it is located in the standing wave. This is because the forward and reflected components as shown in Figs. 2 and 4 have the same magnitude at every point along the line, when line loss is ignored.

**Standing-Wave Ratio**

A convenient and common method of defining how well the load is matched to a transmission line is to express it by the standing-wave ratio. The following equation,

\[
S.W.R. = \frac{1 + \sqrt{\frac{P_R}{P_F}}}{1 - \sqrt{\frac{P_R}{P_F}}},
\]

(4)

can be used to calculate s.w.r. from forward and reflected power measurements. A new chart, Fig. 6, was devised by the writer to eliminate all of this calculating, however. To use it, just find the point where the ordinate and abscissa representing the measured values of reflected and forward power intersect, and read the s.w.r. by interpolating as necessary between the diagonal s.w.r. lines. For example, with 250 watts forward power and 10 watts reflected power, the s.w.r. is 1.5 to 1.

**S.W.R. Meters**

An examination of equation (4) shows that only the ratio of forward to reflected power need be known to establish the s.w.r. In other words, the actual power in watts is unimportant.

An s.w.r. meter, like the directional wattmeter, has a directional coupler for sensing the forward and reflected components. A meter sensitivity control is provided so that, when sensing forward power the meter can be set for a full-scale reading. The meter scale can be calibrated to show s.w.r. directly when switched to sense the reflected component. The scale calibration can be theoretically obtained from equations (1), (2) and (4). In practice it may be modified some because the r.f. diode detectors are not perfectly linear, especially at low signal levels.

An important feature of s.w.r. meters is that it is possible to use a simple and inexpensive coupler, since ability to read actual watts accurately is not required. The Monimatch is a typical example. As shown in Fig. 7, a pickup wire placed parallel to the inner conductor samples the line current by inductive coupling. The voltage \(e_i\) induced in the pickup wire is determined by spacing, length, line current and frequency. The mechanical dimensions determine the mutual inductance, \(M\). The induced voltage due to line current is

\[
e_i = -j\omega M = -j2\pi fM
\]

where \(f\) is frequency in c.p.s. This shows that the higher the frequency, the larger the induced voltage.

The sample of voltage is picked up by capacitive coupling from the inner conductor to the pickup wire. A current due to this capacitance flows through \(R\) and develops a voltage across it; this voltage also increases with frequency because the reactance of the coupling capacitance goes down with frequency. That is,

\[
e_v = \frac{E}{X_C} R = \frac{ER}{j} = j2\pi fERC
\]

when \(X_C\) is much larger than \(R\). Since the current and voltage pickups both increase with frequency, their ratio will stay the same. The variation in pickup just means that the sensitivity goes down at lower frequencies. This is why the minimum power required to get a full-scale reading is greater on the low-frequency bands.

The \(j\) term means that the pickup voltages are 90 degrees out of phase with the line voltage and current. This does not matter, because both voltage and current pickup voltages are shifted in phase. The value of \(R\) must be kept very small in comparison with the capacitive coupling reactance.

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1 Measurements chapter, ARRL Handbook; also QST, October 1959 and February 1957.

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**Fig. 7—Basic "Monimatch" circuit.**

**Fig. 6—Standing-wave ratio chart for use with directional wattmeters.**

These charts can be used to determine the s.w.r. from the power measurements. The chart is calibrated for 1000, 600, 300, 150, and 75 ohms. The power measurements are in Watts and the reflected power is a percentage of the forward power.
of tan $-\frac{R}{X_C}$. However, the resistance $R$ must not be too small either, because the voltage developed across it depends upon its resistance. Phase error can be caused in the current pickup if the inductance of the pickup wire is appreciable compared with the effective series resistance in the loop. $R$ contributes some of this, but most of the effective series r.f. resistance is attributable to the diode detector and its load circuit. Proper choice of physical dimensions and component values will permit good operation over all h.f. amateur bands. Of course, the voltage and current pickups must be equal, and they are normally balanced by bonding the pickup wire to change its relationship to the center conductor.\(^2\)

Usually, two identical elements are employed, connected in reverse so one senses the forward component and the other the reflected component. To use it, you switch to the forward-power pickup and set the meter sensitivity control to get a full-scale reading, which also is at infinite ($\infty$) s.w.r. Then switch to reflected pickup and the s.w.r. is read directly. To minimize error, both sides should be identical, of course. Actually, a principal cause of error probably is the non-linearity of the diodes. This would show up as a different s.w.r. reading when measuring with low power than when measuring with high power.

In addition to simplicity and low cost, the s.w.r. meter is almost burnout proof and can be calibrated for direct s.w.r. readings.

**Directional Wattmeter**

These instruments are designed to indicate r.f. watts flowing in the transmission line. The s.w.r. coupler just discussed could use a meter calibrated directly in watts, but for a given setting of the sensitivity control the calibration would be good for only one frequency. A preferable couple circuit is one that is independent of frequency over the desired range. One such type is the "Micromatch" coupler shown in Fig. 3. Another type of coupler is shown in Fig. 8. It has the advantages of eliminating the resistor in series with the line and the attendant heat generated, and it also gets the detector circuit off the "hot" center conductor which greatly simplifies the r.f. choke problem.

The voltage sample is independent of frequency because it is taken through just a capacitive voltage divider. The current is sampled by inductive coupling to a toroid coil. The line current induces a voltage in the coil and as a result current flows through the coil and its series resistor. The value of resistance is kept small compared with the coil reactance so it has little effect on coil current. The coil current then is determined by the induced voltage and coil reactance:

$$i = \frac{e_1}{X_L}$$  \hspace{1cm} (7)

The voltage drop across the resistor, $R$, is $iR$. Putting all this into one equation for the voltage sample of line current,

$$e_1 = iR = \frac{e_1}{X_L} = \frac{-j\alpha M R}{j\omega L} = -\frac{M}{L} R$$ \hspace{1cm} (8)

The effect of frequency cancels out because the coil reactance goes up with frequency at the same rate as the induced voltage goes up. Thus the current in the coil is independent of frequency.

One interesting thing that surprises many people at first is that the voltage across the resistor increases when you take off coil turns. The reason is that the reactance varies as the square of the number of turns but the induced voltage in the coil only varies directly with the number of turns. Another point of interest is that the voltage induced in the coil actually does not appear between any two points, providing the circuit isn't opened.

The theoretical induced voltage may be 100 volts yet the highest voltage in actual existence is across the series resistor and may be only 1 volt or so.

The useful frequency range is limited at the low-frequency end when the coil reactance becomes so low that the series resistor causes a noticeable phase error. Low values of resistance — 10 to 50 ohms — are therefore used. The high-

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\(^2\)The value of $R$ also may be varied to bring about the null reading in the detector circuit, since a change in $R$ changes the capacitively-coupled voltage, $e_1$, across it (and thus the voltage applied to the detector) without affecting the voltage induced through the mutual inductance. This method generally is more "sensitive" i.e., leads to more pronounced changes in the capacitive/inductive voltage ratio — than changing the position of the coupling wire. — Ed.
frequency end is limited by the series self-resonance of the coil. Another limitation is the effect of lead inductance of the resistors which must be kept to an absolute minimum. Proper design for a given frequency range calls for proper choice of coil material, physical size and number of turns.

The meter scale for the directional wattmeter can be calibrated to take into account any diode nonlinearity. Separate scales are generally necessary for different power ranges.

Directional wattmeters have the unique ability to indicate the actual watts of power in a transmission line even in the presence of standing waves. The value of measuring actual transmitter r.f. output needs no elaboration. The s.w.r. on the line can also be determined with the aid of Fig. 6.

**Monitoring S.S.B. Power Level**

Directional wattmeters are calibrated with an unmodulated radio frequency. A speech signal or a two-frequency test signal may not give the readings expected unless their peculiarities are understood. The r.f. detectors in directional wattmeters are simple amplitude detectors. This amplitude has to be squared to convert to a power indication.

The average level of speech is quite low as compared with its peaks, and it is generally accepted that the average level is 18 db. below peak. Speech processing or a good a.l.c. circuit will increase the average level substantially, but because of the nature of speech waveforms and meter response time the meter doesn't kick up as one would like. Ideally, the meter should show actual peak output power. This could be accomplished by replacing the conventional microammeter indicator with a peak-reading instrument. One make of coupler (Collins 302C series) made a substantial improvement by adding a capacitor in the r.f. detector output circuit to make it more of a peak-reading device.$^2$ It isn't perfect, but this simple addition increases the peak wattmeter reading on s.s.b. voice by about four times. This gives the operator a much better indication of his signal level although it still only kicks up to around 65 per cent of the actual peaks. The meter reads about 77 per cent of actual peak power with a two-tone test signal. The added capacitor has no effect on the single-tone power readings, of course.

An instrument without these peaking capacitors should theoretically indicate 40.5 per cent of the actual peak power of a two-frequency signal. Why 10.5 per cent instead of 50 per cent? Let's take a look at Fig. 9. The rectified envelope of a two-frequency signal is the shape of half sine waves. The r.m.s. amplitude is 0.707 of the peak. When squared this gives 50 per cent, which is the actual average power output as a percentage of peak power. However, conventional meters show the average value instead of the r.m.s. value. The average value of half sine wave is $\frac{1}{\sqrt{2}}$ or 0.637. Squaring this gives 0.405 or 40.5 per cent. Errors can easily creep in because of distortion, unequal tone amplitudes, and detector nonlinearity. The meter scale squares the total error, also, so power readings up to 10 per cent high are common.

A nice project for the ambitious gadget builder is a peak-reading amplifier for connecting between the coupler and the indicator to show actual peak power. Collins couplers are well suited for this because the indicators have 1000 ohms resistance and all calibration is done in the coupler. A peak-stretching amplifier with exactly 1000 ohms input resistance and unity peak gain will do the job. It may be best to disconnect the 4-mfd electrolytic capacitor in this case. Other instruments can also be used by designing the proper input impedance, output impedance and gain characteristics into the amplifier for the particular instrument involved.

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**Strays**

Allied Radio of Chicago reports a record enrollment in its Novice code and theory course. 110 students registered for the 14-week winter session, which meets Monday nights in Allied's cafeteria. There is no charge for the course, which is conducted by W9WOV and W9BHJ. Allied provides tapes and records, while theory is taught using ARRL's License Manual as a guide.

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$^2$ The capacitor must be connected to the detector side of the calibrating resistors. A 4- to 8-mfd. 6-volt electrolytic is suitable.
Hey Mister! Do you have TV in your car?"

This is the question usually asked when a bystander sees the turnstile antenna shown in the photograph. The antenna is not designed for TV reception, of course, but does perform as a nondirectional two-meter horizontally polarized antenna.

In mobile service, a horizontally polarized antenna has a considerable advantage over a vertical whip, although the vertical is easier to mount. This advantage is especially marked when working with a horizontally polarized station over a line-of-sight circuit — and most fixed stations on two meters are horizontally polarized. Horizontal polarization helps reduce pickup of ignition noise from other cars — and from one’s own car, too — since this type of noise tends to be vertically polarized.

A mobile antenna should have omnidirectional characteristics since its position will be constantly changing with respect to the station being worked. The turnstile has this feature.

What Is a Turnstile?

A turnstile is simply two 1/2-wave dipoles crossed at right angles to each other, with the two fed equal currents in 90-degree phase relationship. The resulting radiation pattern is practically a circle. Fig. 1 shows the pattern of a turnstile compared with that of a simple half-wave dipole. When the turnstile is mounted on a car the pattern will be modified somewhat but will remain generally omnidirectional.

A quarter-wave line section between the two dipoles is used for providing the 90-degree phase shift, as shown in Fig. 2. Since each dipole has an impedance of about 70 ohms, the quarter-wave section must have a characteristic impedance of the same value if the currents in both elements are to be equal. This results in a feed-point impedance of about 35 ohms.

Feeding the Turnstile

It is desirable to transform the 35-ohm antenna impedance to a value that can be matched by available types of transmission line. For 73-ohm line, this transformation can be done easily with a quarter-wave impedance transformer or "Q" section. The required characteristic impedance of a matching section can be calculated from the formula:

\[ Z = \sqrt{Z_1 Z_0} \]

where \( Z_1 \) is the turnstile feed impedance and

The turnstile mounted on the car body near the trunk lid. Electrical connections are made by means of a coaxial feed-through connector adjacent to the base mount.
HALF WAVE DIPOLES

Fig. 1—Pattern of turnstile antenna (solid line) and simple dipole (dotted line).

$Z_0$ is the characteristic impedance of the transmission line. Substituting 35 ohms for $Z_1$ and 73 ohms for $Z_0$ (RG-59 U feed line) the required characteristic impedance of the "Q" section is very close to 50 ohms. Thus RG-58A/U cable can be used for the impedance transformer. A "70-ohm" line of any length can be used to feed the antenna through the "Q" section. Fig. 2 shows the electrical connections.

To calculate the physical length of the quarter-wave sections the following formula is used:

$$\text{Length (inches)} = \frac{5540}{f} \cdot \frac{1}{v}$$

where $f$ is the frequency in megacycles and $v$ is the velocity factor of the transmission line. The velocity factor of both RG-50/U and RG-58A/U is 0.66, so a quarter-wave section for 145 Mc. will have a length of 13.3 inches. Lengths for other frequencies may be found by substitution in the formula.

Mechanical Details

Fig. 3 shows the mechanical details of the turnstile. The antenna may be considered to be made up of three major parts — the base, the support-

ing mast and the top section. The latter includes the supporting hub and the elements.

The supporting hub is a short cylinder cut from plastic rod. Polystyrene rod is available from most mail-order houses, but any type of low-loss plastic or bakelite may be used. The hub should be at least 1 inch in diameter and about 1 inch thick. A $\frac{1}{4}$-inch hole is drilled through the center to fit over the $\frac{1}{4}$-inch supporting mast. Five other holes are drilled as shown in Fig. 3 with a No. 36 drill, and then tapped for 6-32 threads.

The dipole elements are $\frac{1}{4}$-inch aluminum rods; these can be welding rods, usually obtainable in small quantities from local welding shops or suppliers. The antenna shown in the photograph uses $\frac{1}{4}$-inch rods of 2024-T4 (24S-T4) aluminum, which were obtained from a local metal supplier. This type of rod is springy and hard enough to take a 6-32 thread.

Assembly of the turnstile involves the attachment of the elements to the hub along with the solder lugs, nuts and lock washers, as shown in Fig. 3. The rods should not penetrate the hub far enough to make contact with the mast. The assembly is slid over the mast and secured by tightening the 6-32 set screw. Then the electrical connections shown in Fig. 2 should be made. The junction between the 50-ohm "Q" section and 70-ohm feed line can be made conveniently by using the small BNC coaxial connectors. A type UG-89/U connector is used for the "Q" section and a type UG-260, U connector for the feed-line end.

A standard mounting collet, Ward type 89-358, is used for the turnstile base. The collet comes with a $\frac{1}{4}$-inch hole in one end and a $\frac{5}{8}$ SAE stud on the other. The $\frac{5}{8}$-thread is standard for mating with mobile spring-base mounts. The collet has set screws for anchoring a $\frac{1}{4}$-inch rod in the hole. Other types of collets, with different hole sizes, are available. If one having the desired hole size is not obtainable the hole may be shimmed or enlarged to fit the diameter of the supporting mast.

Rod or tubing inch in diameter is strong enough to support the turnstile if it is mounted on the rear deck of the car as shown in the photograph. If bumper mounting is used, requiring a longer mast, a larger diameter should be used. Of course this means a larger hole will be needed in the collet and element hub.

A coax feed-through connector (Amphenol 84-1F) can be mounted beside the base mount to feed the transmission line through the car body, or the line can be routed under the car or through the trunk lid crack to the transmitter. The quarter-wave sections and feed line can be taped to the mast with Scotch electrical tape.

Experience has shown that it is best to mount the antenna on the driver's side of the car. This will reduce the chance of hitting low-hanging tree branches. A height of about 6½ feet above ground is recommended. This is low enough to pass safely under most trees, overpasses, and toll gates but high enough to avoid knocking off a traffic policeman's hat!
Turnstile Operation

Mobile operation with a turnstile antenna will be a pleasant experience for those who have been restricted to vertical polarization. Signals from other horizontally polarized stations will have less fading and flutter than before. Noise, the real demon of mobile operation, will be reduced to the extent that some of those weak ones can be copied. Practical tests have shown that the turnstile gives better over-all performance in mobile use than the horizontal halo antenna.

Turnstiles are not restricted to mobile operation. They make good omnidirectional fixed-station antennas, either singly or stacked at \( \frac{1}{2} \) wavelength intervals. An installation of this type will make an excellent base-station antenna for civil defense groups.

Turnstiles can be constructed for other bands by substituting the appropriate frequencies in the formula for the quarter-wave line sections given earlier in the article. The regular formula for half-wave dipole length should be used for each turnstile element. However, horizontal antennas become impractical for mobile use on the lower frequencies because of their size.

One can judge for himself as to the ruggedness of the antenna. The one shown in the photo has had two years of mobile operation.

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Strays

We've let you off easy on these "coincidence" strays lately, eh? Well, here's another one. W2BOT and W8CAS QSOed on February 7, 1928, and again on February 7, 1959 — 31 years almost right to the minute, and purely by chance.

W7AFL and W7CIO both live in Seattle.

K2VSO has his call letters on his Pennsylvania license plates. He's in the Air Force, has always kept his home plates on his car, and says he was not questioned by the Pennsylvanian authorities when he applied. [See "Correspondence From the Members" this month (p. 162) for another example of this. — Ed.]

KN8LRD (YL, age 16) is disrupting the on-the-air activities of KN8LFT and K8IKM (OMs, age 15).

Oregon hams are inviting fellow hams around the world to come to the Oregon Centennial celebration, which is being highlighted by the Oregon Centennial Exposition and International Trade Fair June 10 through September 17. Using special QSL cards provided by the Centennial Commission, with postage paid by the amateurs, some 15,000 of the invitations will go out during the next few months. Here W7QFY (left) discusses the scheme with K7FY. W7QFY and W7FJ sold the idea to the Centennial people on the basis that hams could reach more places in the world faster than any other group. W7FY is the oldest of Oregon's 1800 hams, having been active for over 50 years.
Converting the Viking Ranger for 50-Mc. Operation

Swap 11 for 6, Retaining All Ranger Operating Features

BY STU ROCKAFELLOW, W8NIH

Conversion of the Viking Ranger for 6-meter operation is about a 5-hour job, but if you are interested in the band the time is well spent. Following the process outlined here results in 6-meter output with the bandswitch in the 11-meter position. In view of the recent loss of the 11-meter band, this is a highly desirable exchange. V.f.o. operation is retained, and the final stage of the Ranger operates straight through on 50 Mc., with efficiency nearly comparable to that obtained on lower frequencies.

Many conversions of bandswitching commercial gear achieve 6-meter performance of a sort by running the final stage as a doubler. This was tried with the Ranger, but the efficiency was very low. The plate of the 6146 ran a dull red with only 40 watts input, and the output was less than 10 watts. Changing to straight-through operation made it possible to run 60 watts input without plate color, and the indicated output was nearly 40 watts.

The v.f.o. is padded so that it tunes from 6250 kc. up on the 11-meter range. This is quadrupled to 25 Me., and then doubled to 50 Mc. in an added stage, to drive the final amplifier. The output stage is neutralized by the link method. Addition of a simple low-pass filter helps to prevent spurious radiations and TVI. The conversion process and the low-pass filter have no effect on the operation of the Ranger on lower frequencies.

V.F.O. Conversion

The tuning range of the v.f.o. with the bandswitch in the 11-meter position starts at 6750 kc. This can be dropped to about 6500 kc. with the trimmer included in the original circuit. We want it to go down to about 6200 kc., so extra capacitance is added across the tuned circuit.

Remove the side cover from the v.f.o. enclosure by first removing the two holding nuts at the bottom of the chassis. Then remove the two rectifiers and the two 6CL6 tubes from their sockets to give more working room. Connect a 20-mfd. capacitor (preferably silver-mica) from Terminal 11 on the switch on the bottom of the v.f.o. case to ground. This is the second terminal to the left of the support post of the switch. Lead lengths here are not critical, because of the low frequency involved.

With the added capacitor in place, set the bandswitch to the 11-meter position and the v.f.o. dial to the low end of the range. Put tubes back in their sockets, set the operation switch on the “tune” position and turn on the power. Adjust the trimmer ("t" until the signal is heard at 6250 kc. If you do not have a receiver capable of tuning to 6250 kc., run a wire from the antenna connection of your 50-Mc. receiver to a point close to the buffer coil under the shield in the center of the chassis. This will give an indication on 50 Mc., even though a frequency multiplication of 8 times is involved. The left end of the dial now represents 50 Mc., and the v.f.o. will cover 50 to 52 Mc. Replace the v.f.o. cover with whatever screws you have not lost by this time.

With the drive control set at about 9 o’clock, adjust the buffer tuning capacitor for maximum output on 25 Mc. (This can be read as maximum output on 50 Mc. on your receiver, as before.) The capacitor will be near maximum setting when the circuit is tuned to 25 Mc.
Adding the Doubler Stage

Remove the shield covering the buffer coil and switch assembly. This will serve as the chassis for the extra doubler stage. Holes to be drilled are shown in Fig. 2. Looking at the shield as it appears in the drawing, the hole at the right is for the switch. The shaft protrudes into the shield, and it is driven through an extension shaft that runs out to the front panel. The knob for this switch is between and just below the bandswitch and the auxiliary coupling control, and is the only addition that shows externally. The hole adjacent to the narrow slot in the shield is for the miniature variable capacitor that will tune the doubler plate circuit. The largest hole is for the tube socket. The socket, capacitor and all extra parts except the switch are inside the shield.

The circuit of the doubler stage and the changes in the Ranger circuitry are shown in Fig. 1. The original Ranger wiring is shown in light lines, the doubler and changes in heavy lines. Wire the doubler stage completely, except for the switch connections for the final tank. Leave the heater, cathode and B-plus wires about a foot long. Make the input and output wires (to arms of S1a and S1b in Fig. 1) about 5 to 6 inches long. Solder all wires into the circuit as shown, with the shield hanging loose, but grounded, for tests. Parts designations in the text are those used in the Johnson Ranger manual.

The B-plus wire is connected to the red 300-volt wire going to the buffer switch. The heater wire is soldered to Pin 2 on the 6146 socket. The cathode wire should go to a point which is grounded by the “operate” switch. It may be tied in with the cathode of the crystal oscillator or buffer. Pick the connection that is not grounded in the standby position. Changes made in the Ranger for timed keying may put one or the other of these cathodes at ground potential. Be sure to make this connection to the switch side of the resistor.

Unsolder the mica capacitor, C1b, connecting the buffer plate coil to the 6146 grid, lifting it at the r.f. choke end. As shown in the schematic diagram, this capacitor is then wired to couple into the doubler grid circuit, when the auxiliary switch is in the 50-Mc. position. The other section of this switch also couples the doubler output to the 6146 grid, in the same position. To check the wiring before applying power, turn the switch to the 6-meter position and read resistance across the doubler tuning capacitor. It should show high. Check continuity from the doubler cathode to ground. This should be open in the standby position of the operate switch, and closed when this switch is set for voice operation.

Three different types of tubes have been tried in the doubler, the 6CL6, 12BY7 and 5763. Except for the different socket connections re-
Interior of the buffer shield, showing parts mounted for the doubler stage. Twisted wires at the top of the picture are for the link and coupling loop to the final grid circuit, required, there was little difference between them.

The tuning capacitor in the doubler is a miniature, Johnson 100-110, this smallest type being preferred because of the limited space available.

**Testing the Doubler**

With the temporary connections having been made and the wiring checked, turn on the power, with the operation switch in the tune position. Turn the drive control to about 10 o'clock, and tune the doubler capacitor for maximum drive to the final. This should be at least 2 ma., and it may go as high as 2½ ma. It should now be possible to vary the drive from zero to over 2 ma., with the "drive" control, but there will be little increase in grid current beyond about 12 o'clock on the control.

Some extra grid current may be obtained by adjustment of the coil L₅ in the Ranger. This is a slug-tuned coil in the 6CL6 plate circuit. Some compromise adjustment may be necessary to get adequate drive on 50 Mc. and all lower bands, but even a small adjustment may help out on 50 Mc.

When these checks are complete, unsolder the temporary connections. Take about three feet of insulated hookup wire, and at the center form a 2-turn loop around a pencil. Fasten this loop within the doubler plate coil, at the B-plus end, with household cement. Twist the remaining wire together. This will be the link to the final plate circuit, for neutralization.

Fasten the extension shaft for the switch assembly in place, and drill a hole in the Ranger front panel to pass this shaft. Remove all temporary connections and install the shield and doubler in place. It may be necessary to bend the buffer coil downward in order to make room for the added parts. Make sure that all parts are clear. With the shield fastened and permanent connections made, adjust the doubler tuning for maximum grid current in the middle of the portion of the band you intend to use most often.

With a 2½ ma., maximum drive the current should hold up to at least 2 ma. over any 400-ke. section of the band. At least 1.5 ma. is necessary for good phone operation.

**Converting the Amplifier**

Using one of the remaining switch sections in the final amplifier switch, SW₂₃, connect a solid wire from one terminal to any one of the wires running to the final plate coil, L₆. All the tap leads are connected together when the band-switch is in the 11-meter position, so connection to any wire is permissible. From the other switch terminal run a solid insulated wire up through one of the available holes to the final plate coil, connecting it one turn from the end. Now cut out the last turn in back and substitute a 2-turn ½-inch diameter coil. Be sure that this is wound in the same direction as the large coil.

Connect a 50-watt light bulb to the Ranger output and tune the final for maximum output at 50 Mc. The plate tuning capacitor should be as near minimum capacitance as possible, and still tune. The auxiliary coupling is on position 7 and the coupling capacitor in the pi network will be at about 2 o'clock, or closed about one-fourth of the way. Check again to be sure that the final plate circuit actually tunes through resonance.

**Final Adjustments**

With the final stage tuned to 50 Mc., turn the operate switch to "tune." With an indicating wavemeter or grid-dip meter coupled to the final plate coil, tune the plate circuit and the meter control for maximum indication. (Even without power on the final plate there will be some indication of 50-Mc. output.) Note the reading.

Now with the two-wire neutralizing link from the doubler plate coil, make a 2½-turn ½-inch loop for coupling to the final plate coil. Adjust its position with respect to the plate coil for minimum feed-through indication on the meter. If the meter indication will not drop, turn the coil around and try again. The purpose of this link is, of course, to feed back energy out of phase with that fed through the tube, to neutralize the effect of the latter. The adjustment should be made carefully for lowest feed-through, and then the loop should be fastened in place so that its position with respect to the plate coil will not change thereafter.

The trap assembly connected across the coaxial output need be used only if TVI problems arise in the operation of the converted rig on 50 Mc. When tuning the transmitter up the capacitor in the series trap should be left wide open. Once the transmitter is operating satisfactorily on 50 Mc, the capacitor in the trap circuit should be turned slowly toward maximum, noting the 50-Mc. output and the degree of TVI. If the interference is in Channel 2 (and it is caused by oscillator harmonics in the channel) it will be necessary to tune the trap down to a point where the output of the transmitter just begins to drop. Reduction of the output by 10 per cent or so will have a negligible effect at

(Continued on page 156)
Diode Time-Sequence Keying for the DX-100

BY PHILLIP J. REICH,* W2HUG

The Heath DX-100 is probably the most popular ham transmitter in its power class. However, its c.w. performance is outclassed by other transmitters using time-sequence keying, which minimizes key clicks and v.f.o. chirp. A simple, new keying circuit was developed for the writer’s DX-100 which gives excellent performance equal to that of older time-sequence circuits but uses no tubes and fewer components. The cost of the parts runs to about $4.

The circuit can be used in other transmitters with possible minor changes in component values.

The advantages of time-sequence keying (also called “differential” keying) are well known, and this type of keying is pretty much standard in the more polished amateur transmitter designs, both home-built and factory-made. It is particularly desirable for chirp-free break-in c.w. operation. In t.s.k. (time-sequence keying) one or more amplifier stages are keyed normally, with proper shaping circuits to give click-free output. The time-sequence circuits provide for turning on the oscillator quickly, before the keyed amplifier(s) can conduct, and for turning off the oscillator after the keyed amplifier(s) no longer conducts. As a result, the output signal is similar to one from a transmitter with a continuously-running oscillator and one or more keyed amplifier stages, and if there is sufficient isolation between oscillator and keyed stage there will be no chirp. The oscillator is turned off long enough between dots and dashes, however, for the operator to hear a breaking signal.

Bearing in mind that while t.s.k. can suppress oscillator chirp in the first and last few milliseconds of each character, it cannot eliminate chirps that occur in between. Hence, the v.f.o. must be pretty clean to start with. Also, if later stages in the transmitter have parasitics, use fixed bias beyond cut-off, or are badly regenerative, key clicks may be again introduced.

The diode circuit for obtaining t.s.k. uses grid-block keying which is modified by resistance-capacitance time constants to obtain the required turn-on and turn-off sequence. Fig. 1 shows a simplified schematic of the keying circuit with typical component values. While the key is up, cut-off bias is applied to the grids of both the oscillator and amplifier stages, keeping the transmitter turned off. Depressing the key removes the bias, and both oscillator and amplifier stages will operate.

When the key is depressed, the bias voltage stored in the 0.1-μf. C1 is discharged relatively instantly through the diode. This turns on the oscillator rapidly. The bias voltage stored in C2 must discharge through R2 and it will take 3 milliseconds for the bias to drop from —60 volts to about —20 volts and maybe a few milliseconds more to attain full r.f. output from the amplifier.

When the key is opened, C1 will charge up relatively slowly to cut-off bias through R2, because the diode CR is nonconducting for this direction of current flow. Resistor R4 forms a voltage divider to apply only a portion of the total bias supply voltage to the v.f.o. grid. This allows the oscillator to continue running for perhaps 20 milliseconds after the key is opened. The (R3 + R4) C2 time constant allows the bias to rise and cut off the amplifier in a few milliseconds. Resistor R4 prevents drawing excessive current from the bias supply when the key is down but increasing its value also softens the “break” characteristic of the keying.

Some words about the diode are in order. While it could be a vacuum tube diode, a semiconductor (crystal) diode is preferable, since it eliminates the need for a filament supply and a tube socket, and it should never wear out. The best semiconductor type here is a silicon junction diode because it has much higher leakage (back) resistance than germanium diodes. The leakage resistance is important in this application because it shunts resistor R1, and if too low it will cause changes in timing. Also, the silicon device withstands high temperature much better, including the heat of soldering in place. The peak inverse voltage rating of the diode must be 220 Linden Place, New Milford, N. J.

*The circuit is similar to one described by Hayes, W5QNZ, in the July, 1955, QST. Mr. Reich was unaware of the Hayes article and arrived at a similar circuit independently. However, the Reich circuit uses different time constants that provide differential keying instead of the “automatic turn-on” action of the Hayes circuit.

—Ed.
greater than the bias supply voltage: a 200-volt peak inverse rated diode is safe enough. The d.c. through the diode is below one milliampere and is not important because most diodes have far greater current ratings. The type IN538 was selected as being quite suitable electrically and also because it is produced by a number of manufacturers, making it readily available. The IN538 is of the "top-hat" type of construction — the "top hat," or case end, is the cathode which connects to C1 in the circuit. Correct diode polarity must be observed or else the oscillator sequence will be reversed, giving slow starting, fast stopping and intensified chirps and clicks.

Now fasten a terminal (tie) strip having one insulated lug and one ground lug to the main chassis top deck, using a convenient screw near the rear of the v.f.o. compartment. Find the lug on the v.f.o. boardswitch that connects to the 6AU6 control grid (Pin 1); this is switch lug No. 12 in Pictorial No. 1 of the DX-100 construction manual. Place the new 47,000-ohm grid resistor, R1 in Fig. 2, from switch lug No. 12 to the insulated terminal strip lug. Put a 0.005-µf. ceramic disk bypass, C1, between the insulated and the ground lugs of the terminal strip. Crimp a wire to the insulated lug and route it against the main chassis away from any frequency-

![Diagram of VFO Buffer-XTAL and DRIVER 5763 circuits](attachment:diagram.png)

**Into the DX-100**

Now for the incorporation of this circuit into the DX-100. The schematic diagram, Fig. 2, shows the keying circuit and those portions of the DX-100 that require changes. It should take no more than four hours to change over a DX-100 providing you are a reasonably fast worker. Except for inside the v.f.o. compartment, the changes are in noncritical portions of the circuit which are not particularly sensitive to lead lengths or stray capacity, etc. The following instructions for step-by-step modification procedures assume that your DX-100 has the original oscillator cathode keying circuit and naturally can't be followed to the letter if the DX-100 has some circuit changes already.

After removing the DX-100 from its cabinet, the side cover of the v.f.o. compartment must be taken off. An offset screwdriver will be helpful in removing some of the hard-to-reach screws. Then locate the 2200-ohm and 22,000-ohm v.f.o. grid resistors which must be removed. These resistors are quite difficult to reach with a soldering iron but if you have long-nosed pliers with a cutter at the tip you can easily clip out these resistors. Another way is to break each resistor at the center by crushing it with pliers and then bending the remaining pieces back and forth until the leads break off from fatigue. Be careful not to disturb other wiring and components in the v.f.o. circuit, to minimize changes in frequency calibration. In any case, the calibration will change a few kilocycles and should later be corrected by going through the v.f.o. alignment procedure described in the DX-100 manual.

Now fasten a terminal (tie) strip having one insulated lug and one ground lug to the main chassis top deck, using a convenient screw near the rear of the v.f.o. compartment. Find the lug on the v.f.o. boardswitch that connects to the 6AU6 control grid (Pin 1); this is switch lug No. 12 in Pictorial No. 1 of the DX-100 construction manual. Place the new 47,000-ohm grid resistor, R1 in Fig. 2, from switch lug No. 12 to the insulated terminal strip lug. Put a 0.005-µf. ceramic disk bypass, C1, between the insulated and the ground lugs of the terminal strip. Crimp a wire to the insulated lug and route it against the main chassis away from any frequency-

**determining components to go through the grommet hole at the front of the v.f.o. compartment. Let about 8 inches of wire protrude through the grommet. This wire should come into the underside of the main chassis just behind the boardswitch knob. Solder the connections.**

The next step is to unsolder the grounded end of the 100K grid resistor of the 12BY7 buffer. Mount another terminal strip having one insulated and one ground lug to a convenient screw at the shield wall alongside the 12BY7 socket. Now terminate the 100K grid resistor on the insulated lug and mount a 0.005-µf. ceramic disk bypass, C2, between the lugs of this strip. Run a wire from the insulated lug along the shield wall to the area where the wire from the v.f.o. is dangling and allow an extra 6 inches before cutting off.

Now find the green wire that runs from the bias supply bleeder to the 5763 stage grid resistor (27K). Cut this wire off at the bias bleeder end which is at lug 3 of terminal strip EE (Pictorial 5 of the DX-100 manual). Run this green wire to the same area where the other wires end.

Solder a new wire to lug 1 of terminal strip DD (Pictorial 5). This is the bias supply output voltage point. Run this wire to where the other wires end.

Locate lug No. 8 of the phone-c.w. switch (see Pictorial 6) and unsolder the blue wire which is the cathode lead of the 6AU6 and 12BY7 stages. Add a ground lug under a nearby screw and solder the blue lead to ground. Now solder a new wire to lug 8 of the phone-c.w. switch and route it to where the other wires are dangling.
Mount the rest of the components on a terminal strip as shown in Fig. 3. If you can't get this exact style of terminal strip, use another since the layout is not critical. Do not solder yet. Slip the strip into place against the underside of the chassis close to the front panel and between the bandswitch and crystal-V.F.O. switch shafts (shafts J and K, Viorial 7). Fasten it to the screw that holds the v.f.o. front wall. Now connect the 5 wires to the appropriate lugs, as shown in Fig. 3.

This completes the job, but before you put the DX-100 back in its cabinet, make a careful check of the wiring against Fig. 2. Also, inspect for loose screws, poor solder joints and shorts, and shake out any stray pieces of wire or solder. Take it from the voice of experience; this can save you lots of headaches later.

The reason for grid-block keying the 5763 stage may be of interest to the technically minded. The 5703 stage was first included in the time-sequence keying circuit by returning its grid resistor to the same point as the 12BY7 stage. This resulted in considerable loss of r.f. drive to the final so instead the 5763 grid was changed to the connection shown. This gives a good keying characteristic and has the further advantage of giving more r.f. drive by eliminating the fixed bias on the 5763 stage.

This circuit, as applied to the DX-100, appears to be relatively noncritical of tube variations and component tolerances, and the use of an adjustable control was not deemed necessary. If it is desired to use this circuit in a different type of transmitter, it might be desirable to make $R_4$ (Fig. 1) a 100,000-ohm variable resistor. It should be adjusted with the oscillator alone being keyed (other stages disabled by removing tubes). Set the resistor to give a slight barely-noticeable elongation to the keyed characters. If you hear a chirp in this test at the start or end of each character, don't let it worry you; the later stages will not pass the chirp, provided the v.f.o. is otherwise clean.

Before ending, a few notes on DX-100 v.f.o. keying chirp may be helpful. In the original circuit the oscillator was prone to chirp if the key-contact resistance varied. Hard tungsten contacts were bad, and so were dirty key contacts. The new circuit is quite free from this effect. Also, the use of a rather low resistance (2200 ohms) for the high-band grid leak in the v.f.o. was found undesirable. The original DX-100 keys much better when this grid leak is changed to 47,000 ohms. Finally, replacing the 6AU6 v.f.o. tube may help appreciably, as the 6AU6 seems to develop a chirp after considerable service.

W3AXT, of DXerama fame, now has available a Build-A-Ward QSL Album, to be used in preserving those QSLs which you are collecting for some particular award. Gummed labels which are supplied with the album enable you to identify which of the awards the album is being used for.

About that February cover, W6ZOL wonders if the cigarette and smoke indicate that the receiver contains a thinking man's filter.

If you are strictly a short-wave listener, not a licensed amateur, you will be interested in the “Monitoring Station Registry Bureau” being set up by Tom Kneitel at Popular Electronics, 1 Park Ave., New York 16, N. Y. Send him your name, address, list of receiving equipment, and a dime. He will issue a certificate of registration.

Want a free circular slide rule? If you are an engineer or executive and can request it on your business letterhead, write to General Industrial Co., 5738 N. Elston Ave., Chicago 30, Ill. If you don't qualify as a "wheel" of some sort, this 4-inch paper slide rule will set you back half a buck.

The Land God Gave to Cain, a novel by Hammond Innes (Alfred Knopf, $3.95) is the exciting story of a rescue in the wilds of Labrador, a rescue that came about because of the receipt of a wireless message by a ham in England. It is a story of courage and determination, and it's the sort of yarn that you'll find hard to lay aside until you finish the last page. Fortunately for the piece of mind of those hams who will read it, the ham radio angles ring fairly true. If you like adventure and an element of mystery, read it!
The Groundpole Antenna

Low-Impedance Feed on All Bands

BY R. W. JOHNSON,* W6MUR

In a previous article,1 the author described a vertical antenna using inexpensive, strong, aluminum irrigation tubing as a vertical antenna. Reports have been received from many amateurs who have tried this antenna and found it very satisfactory. The present article describes a combination vertical and horizontal antenna, again using aluminum irrigation tubing for the vertical elements.

The new antenna has been termed the "groundpole" for reasons that will become obvious. Basically, the antenna involves a means of feeding an array of vertical radiators without requiring that they be insulated from ground. This feature simplifies the construction problem since the elements can simply be set in post holes. The groundpole antenna has the following general advantages:

1) It provides multiband operation, with “current” feed on the fundamental and all harmonics. Input impedance is not highly frequency sensitive.

2) Permits use of open-wire feeders or ribbon line which is less expensive than coaxial cable, although coaxial-line feed can be used if desired.

3) Requires a minimum of guy wires; in fact, it can be built without any.

4) Requires a minimum amount of real estate: it can be erected on the average city lot.

5) It is inexpensive and simple to construct.

One configuration of the groundpole is shown in Fig. 1. Two vertical radiators, each one-quarter wave long, are grounded and connected together by a wire at the top. Separation between them is one-half wavelength. If both vertical elements and the horizontal element were of the same diameter, equal currents would flow, and the radiation pattern would be roughly omnidirectional in azimuth, representing a combination of the horizontal broadside figure eight and the vertical end-fire figure eight. On the second harmonic, the horizontal portion becomes a full-wave antenna with a cosine current distribution, which has a pattern similar to the ordinary full-wave antenna, a clover leaf. The two vertical radiators on the second harmonic also have a clover-leaf pattern, with the maxima about 20 degrees away from the maxima of the horizontal section. The combined pattern is thus a rather broad clover leaf, with nulls normal to and coincident with the plane of the elements.

Because of the fact that the horizontal antenna is not the same diameter as the vertical elements, however, the current does not divide equally, but rather divides according to the ratio of the characteristic impedance of each section, in a manner somewhat analogous to a folded dipole. In a practical case, the current amplitude in the horizontal section is only from one half to two thirds of the current in the vertical section. Thus the radiation pattern of the vertical elements predominates, and the Type I groundpole shown in Fig. 2 has a directional characteristic tending to be more end-fire than broadside at the fundamental.

It will be noted from Fig. 1 that the antenna is current-fed on the fundamental, as well as on the second (and all higher) harmonics. This is because the feed point is located an integral number of half wavelengths away from a current maximum (the grounded end). Thus the antenna has one important feature: its input impedance

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In the orthodox form of resonant antenna system, a voltage maximum exists at the end of the antenna. For some selected frequency, a low-impedance feed point will be found at a quarter wave, or any odd multiple of a quarter wave from the "far" end. However, for all harmonics the impedance at those points will be high. In the system described, the situation is reversed. The "far" end of the antenna is grounded. Then a low-impedance feed point for harmonics as well as the fundamental will be found at a point a half wave, or any multiple of a half wave at the fundamental, from the "far" end. With the system shown, various pattern configurations are possible, and basic elements can be combined in an array.

is moderately low and not highly sensitive to frequency.

Fig. 2 shows another configuration, called the Type II groundpole. In this case, the horizontal section is a half-wave transmission line, and radiation from the horizontal portion is cancelled completely, leaving only the two vertical radiators, which are now in phase rather than 180 degrees out of phase. On the fundamental, the antenna is now a broadside array, with pattern maxima normal to the plane of the array. On the second harmonic, we now have two half-wave verticals in phase and a full wave apart, which gives essentially an end-fire pattern with a pair of minor lobes broadside. The feed-point impedance again, as in the Type I case, is moderate and not sharply dependent on frequency, being at a current maxima on the fundamental and all harmonics.

A third configuration is shown in Fig. 3. The Type III groundpole has half-wavelength vertical elements, spaced one-half wavelength on the fundamental. In this case, the vertical currents come out in phase, and the pattern from the two vertical elements reinforces the pattern of the horizontal element to give a strongly broadside array. In this case, too, the horizontal section is higher above ground than for the Type I, so its vertical pattern has a lower angle of radiation, and reinforces the vertical pattern of the vertical radiators. This antenna is particularly useful for DX work in the preferred direction, broadside to the array. At the second harmonic, a current feed point also exists, and the vertical elements now become generally end-fire, with the horizontal pattern being a clover leaf.

In Fig. 4A is shown another method of feeding the Type I antenna. In this case, a quarter-wave inverting section is used at one end of the horizontal section. The vertical radiators are now in phase, and so the antenna becomes more broadside than end-fire (remembering that the current in the horizontal section is substantially less than that in the vertical sections). Fig. 4B shows the quarter-wave inverting section combined with the vertical element.

Many other configurations of the groundpole are apparent. For example, the vertical sections can be made 3/8 wavelength long and the horizontal section 1/4 wavelength long, with the feed point in the center of the horizontal section. Since the feed point is one-half wavelength away from the grounded end, we again have a current-feed situation on the fundamental and all harmonics.

Coaxial Feed

Coaxial feed can be used if desired, either by insulating one of the masts (a difficult mechanical problem) or by tapping up one of the masts in the fashion discussed in the author's previous article. This type of feed is essentially the "gamma" match applied to the vertical radiator. Unless a special multiband network is used, neither of these feed methods will produce unity s.w.r. on the coaxial cable on more than one band except by accident, and it is recommended that balanced feed be used with the groundpole antenna if harmonic operation is desired.

Polarization

The polarization of radiation from the ground-
pole antenna is variable with the type of antenna and with the point in space. There is a region where the polarization is linear, and a much larger region where it is elliptical. With ionospheric propagation, the actual polarization is of little consequence.

**Groundpole Arrays**

In Fig. 5 is shown a three-bay broadside bidirectional array of groundpole antennas. Each bay has a strong broadside pattern at working elevation angles, and since each bay is fed out of phase from its neighbor but is spaced from it by one-half wavelength, the broadside patterns are reinforced. One can expect appreciable gain from this combination, yet the three-bay array for 14 Mc. will take up a plot of ground only 33 by 66 feet. Because the vertical metal poles, if made of 3-inch or 4-inch irrigation tubing, are self-supporting and require no guy wires, even for heavy winds, when set in solid ground a few feet, they can be lined up along the edges of a city lot with the horizontal wires spanning the lot between them. The 33-foot height and pole separation is sufficient to clear most houses or garages that may be underneath, and is within most zoning ordinances.

Fig. 6 is a two-bay driven array of groundpoles, with separation of 0.25 wavelength between bays. This gives a unidirectional radiation pattern, switchable by reversing connections on the interconnecting feed section.

Fig. 7 shows a fixed parasitic array of groundpoles, using one bay as a reflector. Another bay could be added as a director if desired. Dimensioning should be such that both the vertical and horizontal portions of the reflector are made about 5 per cent longer, and the dimensions of the director (if used) about 5 per cent shorter, than the corresponding sections of the driven groundpole. Purists may argue the point, but practically this rule-of-thumb has worked out very satisfactorily in a good many beams.

**Physical Factors**

If aluminum irrigation tubing is used as suggested, it will be found that the extreme lightness of a 30-foot length (23 lbs. for 4-inch diameter)
is such that each pole may be easily erected by one person. The author has merely set the poles in the ground in a post hole a few feet deep, and one such untreated pole was in Pasadena soil for over three years with negligible corrosion evident when the pole was taken down. In highly acid or alkaline soils, it might be desirable to use some neutralizer in the post hole, and also to treat the underground portion of the tubing to retard corrosion but still permit good r.f. conductivity.

Since the horizontal antenna is electrically connected to each pole in many types of the antenna shown, the usual rope-and-pulley arrangement cannot be used. The horizontal wire can be attached to each pole and the post holes measured in advance as to their distance apart. It will be found that the second pole can be erected with only minor difficulty, with the horizontal wire attached. Because of the tubing flexibility, it will not be possible to pull the horizontal section extremely taut unless the poles are guyed at the top in line with the horizontal wire. If guying is used, it should be remembered that the top of the pole is a voltage maximum in many cases, so that either nonconducting guys (plastic rope) or insulators must be used. Another method of connecting the horizontal section is to use a good brass pulley of fairly large diameter, with flexible (standard) antenna wire pulled through it. A pulley type should be chosen that will provide good r.f. conductivity, since appreciable r.f. current must flow through it. This pulley may give trouble later on from corrosion or oxidation, producing a rectifier action that may increase TVI, so it should be used with care; a firm connection is preferable, soldered with aluminum solder.

The author has used guyed 4-inch aluminum irrigation tubing at heights up to 70 feet above the ground with good success. In this case, splices are made using standard-size (thick wall) dural pipe having a 4-inch o.d., turned down to fit the i.d. of the irrigation tubing. Each splice section is 18 inches long, and is fastened by two rows of No. 10 sheet-metal screws spaced about 1 inch apart, and running around the circumference on each section (a total of four rows of screws). About 40 feet of such a mast can be boomed without fear of buckling, so that the mast can be picked up about 30 feet from the bottom by a block and tackle rigged over a gin pole in the rear. A pole of this length requires guying. Thus a Type I groundpole for frequencies as low as 3.5 Mc. is a physical possibility, though it must be admitted that an array of the Type III groundpoles for 14 Mc. is much more attractive from a structural standpoint.

The fact that standard irrigation tubing has a maximum length of 30 feet per piece is of no serious consequence. Allowing for three feet in the ground, each vertical radiator will be 27 feet high if a 30-foot length is used. About 10 to 12 feet can be added to the horizontal section (and hence the vertical-element spacing) to make up for the shortage, and the pattern will not be seriously affected. Alternatively, a section can be spliced to the top of each vertical pole to make the correct length, or small loading coils can be added.

The groundpole antenna is no different than any other vertical insofar as the requirement for grounding is concerned. A good radial system should be used at the base of each vertical, but if room for this is lacking, just a single wire connected between the bases of the verticals will improve matters considerably over no connection. Also, as with any other antenna system, all radiating elements, in this case especially the vertical elements, should be as much in the clear as possible, away from surrounding obstructions.

Results

A groundpole antenna of the general configuration of the Type I has been constructed and tested with excellent results. In this case, the author was blessed with two existing tapered steel light standards, supporting an array of floodlights for a large back yard, which poles fortuitously happened to be spaced about 74 feet and were 27 feet long. A No. 12 plated copper wire was connected between the tops of these two poles, fed in the center with 500-ohm open-
The National NC-303 Receiver

Presumably the designation "NC-303" for National's new receiver is intended to suggest that this is the NC-300 three years later. If so, it is an excellent choice, because the NC-303 is the NC-300 brought up to date. For example, the 300 used a crystal filter at 2.215 Mc. to furnish some skirt selectivity and a rejection notch. Crystal-filter rejection notches are limited in their usefulness, in that they can appear on one side or the other of the passband but not in the center. A better device for furnishing a rejection notch is a Q multiplier; the NC-303 eliminates the 2.215-Mc. crystal filter of the 300 and replaces it with a Q multiplier at 80 kc. (the second i.f.) where it can really go to work on an interfering carrier. The NC-300 had no noise limiter that would work with the b.f.o. on: a diode clipper is included in the NC-303. The a.v.c. in the 303 features a fast attack and slow decay, in keeping with s.s.b. requirements.

Referring to the block diagram in Fig. 1, the NC-303 is a double-conversion ham-bands-only superheterodyne. The first i.f. is 2.215 Mc., and the coupling between the 6B7 mixer and the 6BE6 converter consists of four tuned circuits. The 6BE6 converter is now crystal-controlled; it was self-controlled in the 300.

Selectivity really takes over in the 80-ke. second i.f., amplifier, where the Q multiplier provides a rejection slot and a 5-position selectivity switch provides four degrees of selectivity. (If you are wondering why five positions for four conditions, just be patient: we'll get there eventually.) A choice of detectors is provided, a diode for a.m. and a 6BE6 conversion detector for heterodyne reception of c.w. and s.s.b. The a.m. detector has an automatic noise limiter associated with it, and the d.c. component from the a.m. detector is used for a.v.c. on a.m. and s.s.b. On s.s.b. a 1-µf capacitor is connected from the a.v.c. bus to ground and charged through a 1N1082 fast-attack a.v.c. connected and the latter has the a.v.c. cut out: the S meter is inoperative in the c.w. setting.

The audio amplifier uses a 12AT7 triode and a 6AQ5 output stage. A four-position tone control allows the operator to select an audio characteristic most suitable for the job at hand; the four positions allow for normal, high-frequency emphasis, low-frequency emphasis and peak (reduced highs and lows).

The power supply section uses a 4H4-C current stabilizer in series with the heater of the 6AH6 high-frequency oscillator, and regulated +105 volts at +105 volts at the 6B2 is used on the 6A16 plate and screen, the screen of the 6BE6 converter and the plate of the S-meter amplifier.

Selectivity

Earlier it was mentioned that the selectivity switch had more positions than bandwidths, and now is as good a time as any to clarify the point. The four available (−6 db.) bandwidths are 0.4, 2.0, 3.5 and 8 kc. All but the 2.0-ke. bandwidths center on the 80-ke. i.f. The 2.0-ke. bandwidth is obtained at either of two switch positions marked sb 1 and sb 2; these pass bands occur just above and just below 80 kc. Their usefulness is that by setting the b.f.o. on 80 kc. (pointer straight up) and switching between the two positions you
have a selectable sideband system. And of course it does away with that old wondering of where to set the b.f.o. for sideband reception. The several bandwidths and tuning conditions are obtained by switching in various capacitors and resistors.

**Physical**

In appearance the 303 is quite similar to the 300, although it has been jazzed up a bit through the use of black and light gray coloring. The same smooth-running tuning knob and slide-rule dial is used, but a logging scale has been included on the knob, and a rubber rim drive is provided to give the necessary slow tuning for s.s.b. on 28 Mc. and higher. Speaking of the higher frequencies, the NC-303, like the 300, has three extra dial ranges for the 6-, 2- and 1½-meter bands. In these ranges the receiver actually tunes 30 to 35 Mc., and of course crystal-controlled converters are to be used ahead of it. Like the earlier receiver, the dial can be “spun” to get you from one end of the band to the other in a hurry.

One criticism of the 300 was that you needed another receiver to copy WWV, but that has been corrected in the optional XCU-303 crystal calibrator unit. This is a 6AK6 100-ke. crystal oscillator, together with a 12AT7 mixer-oscillator, that plugs into a socket provided for it. By switching the NC-303 to the 7-Mc. range and the calibrate switch to WWV, the 10-Mc. WWV signal can be copied at 7070 on the tuning dial. After checking the 100-ke. oscillator against WWV, any slight discrepancy in dial calibration can be corrected by the front panel correction knob.

In the 300 there were two possible combinations of r.f. gain control. A switch on the audio gain control permitted running the r.f. stage wide open at all times or else putting it on the manual control along with the two i.f. stages. Apparently this led only to confusion on the part of most consumers, because this feature has been omitted from the NC-303 and the manual control handles the r.f. and i.f. stages at all times.

The 28-page instruction book is quite complete, and we were glad to see the thorough instructions for using the muting arrangements possible with the 303, and for connecting the receiver into the station.

— B. G.
Model FS-3 Test-O-Matic Meter

The name of this instrument doesn’t begin to describe all its uses. Here are a few: The FS-3 can be used to indicate field strength, check transmitter modulation, test for harmonic content of the transmitter, give standing-wave indications, and check for neutralization.

The circuit of the FS-3 is shown in Fig. 1. Rf. from the pickup antenna is tuned by \( L_1C_1 \) and rectified by the crystal diode \( CR_1 \). If \( S_1 \) is in position 1, the rectified d.c. will flow through the meter, giving a relative indication of the signal strength. When \( S_1 \) is in position 2, the .033-μf. capacitor will couple audio to the base of the transistor, \( Q_1 \), which amplifies it. A small earphone \( HS \) built into the side of the Test-O-Matic box is connected in the collector circuit of the transistor and allows monitoring of modulation quality of the signal under test. \( S_1 \) is a spring return switch, and in normal position disconnects the penlight cell power supply.

The frequency range of the Test-O-Matic is 2.5 through 160 Mc. Six coils plugged into the front panel of the unit cover this range. Also included on the panel are the indicating meter, tuning control and the transistor circuit on-off switch. The collapsible r.f. pickup antenna can be extended out to about 26 inches.

The Test-O-Matic measures \( 6\frac{1}{2} \times 3\frac{3}{4} \times 2\frac{1}{2} \) inches and is manufactured by Shell Electronics Mfg. Corp., Brooklyn, New York, N. Y.

— E. L. C.

Transcon R.F. Field-Strength Meter Model H310

The Model H310 field-strength meter, manufactured by Creative Electronics Corp., Stamford, Conn., is designed primarily for mobile applications and uses the car’s b.c. antenna to pick up r.f. from the mobile transmitter. It is intended for installation in the lead between the car antenna and b.c. receiver, and has a switch on the meter box which allows the meter to be switched in or out of the circuit. When switched out of the circuit the b.c. antenna bypasses the meter and goes directly to the b.c. receiver input circuit. The unit requires no power except that picked up by the antenna. No direct connection to the transmitter is needed.
The circuit of the field-strength meter is shown in Fig. 1. R.f. from the pickup antenna is rectified by the crystal diode, $CR_1$, and the d.c. is measured by the 0-1 milliammeter. A variable resistor, $R_1$, in shunt with the meter acts as a sensitivity control. The crystal diode is connected to the antenna even when the unit is switched to straight-through operation. This arrangement might possibly lead to some cross-modulation in b.c. reception under certain conditions, but this trouble did not occur during our test of the unit.

The meter is housed in a hammertone box measuring approximately $4 \times 2\frac{1}{2} \times 2$ inches. The indicating meter is $2\frac{1}{4}$ inches square.

—E. L. C.
The tetrode may be connected for high-$
\mu$ triode operation by operating both grids at the same d.c. and signal voltages. This is the circuit shown in Fig. 3A, page 35. If low-$\mu$ triode operation is desired, the screen may be connected to the plate. This provides a $\mu$ nearly the same as the grid-screen amplifier factor shown in the published data. It is not recommended for grounded-grid operation.

Some tetrodes in their high-$\mu$, grounded-grid, grounded-screen configuration (Fig. 3A), are very unsatisfactory amplifier tubes. For proper operation of the tetrode the screen requires much larger voltages than the control grid, while the control electrodes are tied together, the control grid draws tremendous currents and there is grave risk of destroying it. For example, in the table below, the control grid current of 4X150A is 1.3 amperes at the positive peak of the driving cycle, and the screen current is about 0.5 amperes, the same instant, the plate current is only about 0.8 amperes.

In other words the plate is getting only a third of the current emitted by the cathode, instead of nearly all the current. By any standards, such a triode is a sad thing. Observe that the grid dissipation in the table below is 1000 times as great for the "high-$\mu$" connected tetrode as it is for the "tetrode-biased" tube.

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<tr>
<td>4X150A</td>
<td>2000 Vols</td>
<td>0.50 A</td>
<td>200 A</td>
<td>200 Vols</td>
<td>0.19 A</td>
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<td>200 W</td>
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<td>20 W</td>
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<tr>
<td>4X125A</td>
<td>2000 Vols</td>
<td>0.50 A</td>
<td>200 A</td>
<td>200 Vols</td>
<td>0.19 A</td>
<td>0.50 A</td>
<td>200 W</td>
<td>200 W</td>
<td>20 W</td>
</tr>
<tr>
<td>4X250B</td>
<td>2000 Vols</td>
<td>0.50 A</td>
<td>200 A</td>
<td>200 Vols</td>
<td>0.19 A</td>
<td>0.50 A</td>
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By far the best way to operate such tetrodes as the 4X150A, 4X220B, or 4X660A in a cathode-driven amplifier is to ground the grid and screen through bypass capacitors and operate them at their rated d.c. voltages, as shown in Fig. 3B. The grid dissipation reduces to little or nothing when this is done, and the stage gain is greatly increased. The grid dissipation in cathode-driven, tetrode-biased operation is vanishingly small, but the screen dissipation is nearly the same as in the high-$\mu$ connection. Greater stage gain can be obtained with Fig. 3B, largely the result of the fact that the driver does not have to supply large screen and grid losses. If it is desired to dissipate some excess of driving power for some reason, it will be far better expended in a linear, resistive load than in a nonlinear grid-circuit load.

By any standards, such a triode is a sad thing. Observe that the grid dissipation in the table below is 1000 times as great for the "high-$\mu$" connected tetrode as it is for the "tetrode-biased" tube.

In general, the SCR-274N and the ARC-5 units are similar. All, except the R-124-A/ARC-5 X (14 volts d.c.) are built for 24-28 volts operation. Of course, one can use a Radio Transmitter T-23/ARC-50 100-156 Me. recommended for grounded-grid operation.

The tetrode tubes may be classified as high-tube, medium-tube, and low-tube with respect to their high-frequency tube characteristics. The high-tube characteristics are those of the tube with the highest resistance in the d.c. plate circuit. The medium-tube characteristics are those of the tube with the medium resistance in the d.c. plate circuit. The low-tube characteristics are those of the tube with the lowest resistance in the d.c. plate circuit.

GROUNDED-GRID TETRODES

San Carlos, Calif.

December 11, 1958

The differences in the grounded-grid characteristics and the grounded-cathode characteristics are relatively small, when high-$\mu$, high-perveance tube are considered. The calculations based on the grounded-cathode characteristics curves will usually serve very well as the basis for cathode-driven designs. However, many manufacturers of electron tubes can furnish curves not usually given in the published information. The information applies especially to the grounded-grid curves, which are often available upon request.

— James R. Welch, Manager, Application Engineering, Eitel-McCullough, Inc.
SLOW-SPEED PHONE?

8841 Amboy Ave.
Sun Valley, Calif.

Technical Editor, QST:
A buddy and I were just discussing an extremely interesting idea, and I thought I'd pass it on to you as having possible applications for amateur communication.

Basically, it's an extremely narrow-band method of phone communication, accomplished with tape recorders. Say that a sentence five seconds long is recorded on a standard tape ing idea, and I thought T'd pass it on to you as having Technical Editer, QST:

cetver, resulting from the possible increased seiectivity.

other end records it slow and plays it back rapidly.

with a nominal 300-3000 cycle bandwidth, the slowed-down recorder running at 16 inches per second. The operator then changes the speed of the recorder to 0.8 inches per second — a 20:1 reduction — and plays it out over his transmitter. It takes 100 seconds to send it, for sure, but the transmission occupies only 1/20 of the bandwidth. On s.s.b., for example, with a nominal 300-3000 cycle bandwidth, the slowed-down transmission would take only 15-150 cycles! The man at the other end can't send and plays it back rapidly.

The advantages are:
1) A 20:1 increase in available spectrum space. Five kilocycles in the upper end of a band would handle 55 channels.
2) A 13 db. increase in signal-to-noise ratio in the receiver, resulting from the possible increased selectivity.
3) Short-term static pulses would "wash out" during the high-speed playback.

It might be possible, under some conditions, to use this system simultaneously on the same carrier frequency with normal phone signals, particularly s.s.b. signals where the bandwidth is restricted and the a.v.c. doesn't kick around.

Others may suggest themselves as the idea takes hold. Some disadvantages are:
1) The obvious — you spend a whole of a lot of time walking around to say something.
2) Some modification of the receiver and transmitter would be required to handle the low-frequency response required.
3) A special spindle would be required on the tape recorder to obtain the extremely slow speeds.

Principal applications:
1) Traffic handling. Most messages are essentially short, and "stretching out time" should result in nearly 100 per cent copy, even under very poor conditions.
2) The "leave a message" technique, used in RTTY. A pulse could trigger on the other station's recorder, and you would simply play your message to be read out later.
3) Last, but not least, "leisurely" rag-chews. More or less free from QRM and other problems. A 5:1 or 10:1 reduction might be more practical here, increasing the "active" talk time sufficiently to maintain interest.

How about that?

— Bob Bunce, KO9KZ

DUMMY LOADS

221 Shennecossett Parkway
Groton, Conn.

Technical Editor, QST:
On reading over the excellent article on dummy loads by WA2ANU in the December issue I was impressed by the amount of effort necessary to make a usable load for v.h.f. As I had need for one but am a naturally lazy type, I decided to see if a simpler solution could be found.

The problem appeared to be complicated by the residual inductance usually found in the wire-wound bifilar types made by Sprague and Ohmite. A search of the literature shows that truly noninductive resistors are commercially available from The Carborundum Company of Niagara Falls, N. Y. I have before me their Bulletin GR-1 which describes their line of ceramic resistors designated type "CX." Globar. These are made of a silicon-boron composition by a heavy increase in the mud load here with inquiries how one gets started in this interesting hobby. Reading W1OUO's article should have the customary effect in stimulating interest among non-RTTYers. However, we would like to take issue with Gordon's use of the word "gadgeteer" as the type "CX." Looking over the data on the temperature coefficient it is of interest to note that the "CX" has a slightly positive (0.11 per cent) coefficient while the type "A" is 0.01 per cent in the negative direction. It is obvious that it would be possible to attain a zero coefficient by combining type "A" and "CX" units. While this may not be necessary for use in a dummy load or bridge element which is to be used indoors, where there is little change in temperature, it may be worth considering for constructing movable antenna terminations for use outdoors where ambient temperatures may vary a hundred degrees or more.

It should be practical to make up a load capable of handling over a hundred watts by paralleling 5 type "CX" units each 5 inches long and ¾ inch in diameter.

— Carl T. Milner, W1FVY

[Global resistors are well known in the industry but are not "distributor" items, except for the thermistor types (not suitable for dummy antennas) used in TV receivers. The types mentioned by W1FVY should be excellent for the purpose if the prospective user can find a source of supply.

— Editor.]

THE ORIGIN OF BELL BREAK

Amateur Radioteletype Society 38-06 61st St.
Woodside 77, N. Y.

Technical Editor, QST:
It is always a pleasure to us to see articles on amateur radioteletype appear in the pages of QST, ever since our founder's now-famous initial article was published in October 1948.

The article by W1OUG in the latest (Jan. 1950) issue, page 44, should be of interest to the "gadgeteers" among us as is usually the case when the slightest mention of RTTY appears in amateur literature of the type "A" by a heavy increase in the mud load here with inquiries how one gets started in this interesting hobby. Reading W1OUO's article should have the customary effect in stimulating interest among non-RTTYers. However, we would like to take issue with Gordon's statement that the "bell-break" method originated with W3LGM in 1956, although Fred did obtain a clarification of (Continued on page 184)
Simulated Emergency Test—1958

AREC Groups Turn Out for One of the Best SETs in Years

BY GEORGE H. ART,† W1NJM

Judging by the results of the 1958 SET, the AREC is continuing to gain strength. All of our figures were up over last year. More reports were received, more traffic was handled, apparently more amateurs participated than in any recent year. The total point accumulation exceeded last year's by about 50%.

Encouraging as these data may be, what was even more gratifying was the "sound" of the SET during the week end when most of the AREC groups were conducting their tests. Participation by many groups far exceeded the expectation even of the EC concerned. One EC was actually swamped by over 100% more participants than he had counted on. Civil defense stations turned out in greater numbers than ever before, indicating increasing recognition by c.d. for AREC and a growing desire to work together. Red Cross had its usual fine turnout of stations and personnel for their part of the program. And the ARRL long haul nets stood up manfully under the week end deluge of ARRL, Red Cross and civil defense traffic.

When something like this happens, we start asking ourselves how come. What caused the upsurge of activity this year? It would be nice if we could just pat ourselves on the back and assume that we are just getting on the ball, but we know that there is something deeper than this behind it. We think that what is really happening is that amateurs are beginning to wake up to the realization that the civil defense honeymoon is over, that RACES is an extension of AREC facilities and potential, not a substitute for it, and that our own organization is still the "stuff" out of which really effective amateur emergency communication grows; for when we operate as the AREC we are amateurs operating as amateurs and we can exercise to the utmost our characteristic ingenuity and versatility in our own field.

What the SET Is

Each year, usually early in October, units of the Amateur Radio Emergency Corps, sponsored by ARRL but open to all amateurs, put on a simulated emergency to test their facilities, the practicability of their emergency communications plan, the versatility and stamina of their operating personnel, and at the same time put on a demonstration for the public showing that amateur radio is willing and ready to serve them in any emergency in which communications are affected.

The SET takes on many forms, depending almost entirely on the circumstances of the community, city, county, area or state in which it is conducted. In some places, a natural emergency is simulated. In others, a man-made disaster, either war or other, is assumed. Services are performed, either on a simulated or actual basis, for a great number of different agencies, depending on what agencies locally need them or, and will cooperate. Such agencies include civil defense, the Red Cross, law enforcement, public safety, weather bureaus, railroads, newspapers, broadcast stations and public utilities.

Beside this local aspect, there is also a nationwide activity by means of which local organizations are linked. Red Cross and civil defense officials originate messages to their state, regional or national headquarters, and amateurs who participate originate messages to ARRL indicating their presence. Messages from civic and state officials fly thick and fast. All are handled by amateur radio—mostly efficiently, some not so efficiently, a few, alas, very poorly. But that's one of the things the test is for: to show up our own weaknesses and shortcomings. Let's dwell for a few lines on the national aspect before we talk about local activities.

Red Cross Activities

The Red Cross has always been, you might say, our "first love" when it comes to emergency communication. From the very beginnings of the AREC, almost 25 years ago, the American National Red Cross and its affiliated chapters nationwide have been served by amateur radio communications, and through the years a firm cooperative agreement has sprung up between Red Cross and ARRL. This year (i.e., the 1958 SET) as in previous years, four Red Cross-sponsored amateur stations were activated to

† National Emergency Coordinator, ARRL

Muskingum County, Ohio, threw a hidden-transmitter hunt for its SET on Sept. 28. Sitting at the hidden transmitter controls are K8LAV and K8.JPN. It was found in 27 minutes by EC W8RVU.
act as collecting stations for messages from chapter chairmen throughout the nation to national headquarters. In addition, a number of regional collecting stations were set up to facilitate the flow of traffic from chapters to regional stations to the "big four": W3PZA in Washington, W2CRD in Syracuse, N. Y., W9DUA in Springfield, Ill., and W6CXO in San Francisco. Regional stations active numbered about 15, but no specific reports received tell us just how many were active. One thing for sure: The Red Cross was conspicuous by its presence in the 1958 SET, as it always is, thanks to the interest and efforts of W4PHL and Red-Cross-affiliated amateurs everywhere.

**Civil Defense**

As already mentioned, this was a big year for c.d. in the SET. Not only did national headquarters in Battle Creek have stations on the air, but several of the OCDM Regions were also active. Region I was represented by W7GFT/1, who handled several messages for Region I headquarters at Harvard, Mass. In Region III, W4P0I and W4YB received 50 messages from c.d. officials and others in that region. Region IV was represented by K8JAL and considerable traffic was handled. The Region VI RACES network was activated under the control of W0WBC. Region VII had KGHA on the air but no traffic was received at this station; however, several messages were delivered by local amateurs who received them through regular amateur networks. Of the seven OCDM regions, only Regions II and V were not heard from.

At national headquarters in Battle Creek, K8ERA was activated and 8 messages received during the test. In addition, OCDM staffs W8DUA and W8DD had their home stations on the air. A total of 44 messages were received, most of them via W8YAN, the Michigan SEC. This was a far better turnout than we have ever had for federal c.d. in previous SETS, and we cannot help but be greatly pleased by it.

**ARRL Traffic**

Your own headquarters received 1701 messages in the SET, 1457 of which were from participating AREC members. Many NTS nets were swamped with them, the Connecticut nets in particular, and several Connecticut amateurs made BPL on SET traffic alone. As usual, W1AW took the brunt of the load, handling 783 of the total. Other Connecticut amateurs who worked hard included W1YBH (289), W1NJM (224), W1FYF (201), W1TUW (78) and K1AZG (54). We could have used many more.

But this wasn't all the traffic handled by the ARRL nets. We were kept busy not only with relaying traffic from AREC members to headquarters, but also with relaying traffic from various officials to Red Cross, c.d. and ARRL headquarters. It was a big week end for traffic-handling, and most of our nets had a good workout.

Many messages of greeting, praise and pledges of support for our efforts were received from high officials, among them messages from Senator Strom Thurmond of South Carolina, the governors of North Dakota and Georgia, and officials of the following entities: Rock Hill, S. C.; Spartanburg, S. C.; Ft. Mill, S. C.; Barnwell, S. C.; Menlo Park, Calif.; Stutsman County, N. Dak.; Ft. Pierce, Fla.; Hayward, Calif.; Jamestown, N. Dak.; Brown Co., Wis.; McCurtain Co., Okla.; Edmond Co., Okla.; Warraees, Okla.; Bethany, Okla.; The Village, Okla.; Oklahoma City; Midwest City, Okla.; Del City, Okla.; State of Oklahoma; Miami Springs, Fla.; Brevard Co., Fla.; Miami; Bradenton, Fla.; Carlshad, N. M.; Eddy Co., N. M.; Redlands, Calif.; State College, N. M.; York Co., S. C.; Lacrosse Co., Wis.; Eau Gallie, Fla.; Ottawa, Ill.; Painesville, Ohio; Willoughby, Ohio; Palo Alto, Calif.; Charleston, S. C.; Summerton, S. C.; Columbus, S. C.; Cayce, S. C.; Greenville, S. C. We hope we have not omitted anyone, but probably we have. To those, our apologies.

Last year we printed the call letters of each AREC member from whom we received a message. Space limitations will not permit us to do so again this year, but we do want to mention that the W/K4s came through again

Landslides caused by heavy rains were simulated in the Canal Zone Section, where this gang put on an effective SET. Standing, l. to r., are KZ5s RM BW VR (SEC) and RV (SCM, extreme right); kneeling, KZ5s HO JJ EP.
with by far the greatest number of messages. A total of 399 was received from the fourth call area. The ninth call area was a poor second, with 211 and the eighth with 189. Down at the bottom were the tenth and Canal Zone with only 20 messages were received. The VEs contributed only 7, and Canal Zone 10.

**Local Activities**

The increase in number of reports of activity this year, and therefore the increase in total points, was attributable to an increase in mail reports received — 154, compared to 125 received last year. While encouraging, this upturn is not exactly phenomenal, and neither does it represent a maximum over the years. But improvement is improvement. Let's not look askance at it.

We list the reports of activity by states, footnotes indicating anything unusual. Those marked "hearsay" are indications of activity which were apparent from messages or other information received but no word received from the EC himself. The "person reporting" is usually the EC, but now and then in a case where the EC was out of town an assistant EC or some amateur put on the test. Comparable figures for the 1957 SET is given in parentheses:

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**Total reports of activity — 216 (806)**
- By mail — 184 (185)
- By radio — 188 (189)
- By "hearsay" — 24 (84)

**AREC members represented by mail reports — 5496 ($457)**

**Total known participation — 2712 (1971)**

**EC radio reports dispatched to ARRL — 1488**

**FLORIDA**
- Broward County 2
- Collier County 2
- Columbia County 14
- Dade County 1
- Volusia County 1, 13
- Gulf County 2
- Manatee County 2
- Marion County 2
- Monroe Co.
- N. Brevard County 3
- Okaloosa County 16
- Osceola County 2, 16
- Orange County 16
- Sarasota County 5
- Seminole County 1
- S. Brevard County 1, 2
- Pinellas County 1, 2
- St. Johns County 3
- St. Lucie County 4
- Vero Beach

**GEORGIA**
- Athens
- Fulton County 4
- Taft, Cook & Irwin Counties
- Thomas County 4

**IDAHO**
- Nez Perce

**ILLINOIS**
- Cook County 2
- DuPage & Vermilion County 2
- Evanston 2
- Fulton County 4
- Greene, Jersey & Calhoun Cos. 1, 2
- Johnson County
- McHenry County
- McLean County 2
- Monroe County 11

**INDIANA**
- Clark County 4
- Floyd County 4
- Harrison County 4
- Jackson County, Seymour 4
- Marion County 2
- Monroe County 1, 2
- Porter County 1, 2
- Vanderburgh County 15
- Wabash River Basin 1

**IOWA**
- Clayton County
- Des Moines County 2, 16

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The Control Center Station, W1KOO, was a busy place during the SET in Chittenden and Grand Isle Counties. Vi. Shown operating, left to right, are W1ZFA on ten meters, K1BNL on 2 meters and W1HIN on 75 meters.

W1VSA is the EC.

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**CONNECTICUT**
- Bethel
- Bloomfield 12
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<tr>
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<td>Davis, McLean, Ohio, Milford &amp; Butler Counties5</td>
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The Carlsbad (N. M.) c.d. director sits in at the operating position of K5DAB, right, EC for Eddy County, during the SET.

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<td>Luzerne County 11</td>
<td>W3DUI</td>
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<tr>
<td>Montgomery County 2</td>
<td>W3ZCV</td>
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<td>Schuylkill County 2</td>
<td>W3ZIQ</td>
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<td><strong>RHODE ISLAND</strong></td>
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<td>Narragansett 1, 2</td>
<td>W1YGD</td>
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<td>Newport 1, 2</td>
<td>W1JFF</td>
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<td><strong>SOUTH CAROLINA</strong></td>
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<td>Aiken 4</td>
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<td>Barnwell 4</td>
<td>W4ZRH</td>
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<td>Charleston 4</td>
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<td>Claffey 1</td>
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<td>Richland County 3</td>
<td>K4AVU</td>
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<td>Rock Hill, Ft. Mill, Ft. Lawn 1, 14</td>
<td>W4VIF</td>
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<td>Spartanburg County 3</td>
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<td>Sumter 4</td>
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<td><strong>SOUTH DAKOTA</strong></td>
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<td>Lawrence County 3</td>
<td>W9DQK</td>
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<td>Matanuska County 3</td>
<td>K6YJR</td>
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<td>Turner County 5</td>
<td>W8EUJ</td>
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<td><strong>TENNESSEE</strong></td>
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<td>Chattanooga &amp; Hamilton County 2</td>
<td>W4JVM</td>
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April 1959  51
In control of fixed stations in the Cabell County (W. Va.) SET was K8HRO, shown at the mike. That's EC W8FUM at left, and K8GXR standing. Both K8HRO and K8GXR are assistant ECs in the Cabell County AREC group.

Huntington (W. Va.) Herald-Dispatch Photo.

Memphis Area
Nashville, Davidson County
Oak Ridge
Washington County
W4BAQ 241
W4DAIU 112
W4CXY ... 86

TEXAS
Haytowna
Harris County
Nueces County
Tarrant County
Taylor County
W5ZTB 70
KAPEQ 404
W6AIR 336
K5AEX 104
W4ANL 104

VIRGINIA
Arlington
Bristol & Washington County
Fairfax County
Falls Church
Norton & Wise Counties
K4JM 241
W3THM 24
W4ZLN 119
W4OP 59
W4CFV 23

VERMONT
Bennington County
Chittenden & Grand Isle Cos.
Lamoille County
Orange County
Washington County
K1BGC 112

WASHINGTON
Kitsap County
Spokane Area
W7UWT 105
W7EQU 185

WEST VIRGINIA
Cabell County
Kanawha County
Marshall County
W7EFM 170
W8CLX ... 110
W8KXD ...

WISCONSIN
Brown County
Eau Claire County
La Crosse County
Marathon County
Racine County
W9IDV 186
W9BEW 109
W9VRI ...
W9VIV ...
W9SXL 125

WYOMING
Sheridan
W7EWV ...


Miscellany

South Carolina had a statewide exercise under W4AKC-

Beneath traffic was originated to W4AW and the Red Cross stations, and answers received back in 15 minutes.

W4EOH (Ala.) suggests a standard participation message to simplify traffic into headquarter, to be published in QST with the SET announcement.

"Not much of a score, but will be easy to beat next season—SEC instructions didn't arrive until 24 Oct. I suggested metering." — K6JWV. "Everybody preoccupied with civil defense, so no SET in Grand Junction, Colo." — W8PZK.

"Had promises of more participants but they didn't show. Typical!" — W3SWZ, Colo. (Usually, but not this year—G.H.) "Trying to work along with the people here to gain a further understanding between AREC and RACES, a slow but sure battle." — W4EOR, SEC Conn.

"All broke loose! So many stations checked in so fast we made no attempt to take personal station traffic to ARRL, when you expect about 10 or 15 stations and you end up with 56 in all, it's most encouraging. . . . Never underestimate a ham, . . . This was the best turnout we have ever had." — W4JJP, St. Pete, Fla. "The 1958 ARRL SET was without a doubt the best Florida has ever had." — W4YIT, SEC E. Fla.

"Everything considered, the test was an unqualified success in all ways—pointed out a lot of things that need hashing over." — W8VXL, Meacon Co., Ill. "All traffic was made up in advance and there was something for everybody to do. Our score is getting higher each year." — W8BIE, Porter Co., Ind. "Under 'Computation of Score' I object to limitation in message counts. We should count many more which we handled for ECs and AREC members." — W5PTT, Wabash Valley. "The fellows in R Stony County, Iowa, are working very hard on AREC." — K6EXY. "I have no suggestions. I think you are doing a fine job. Competing against previous scores is fair, and hardly see how it would be practical to compete with others." — W4QON, Davie's, etc., Counties, Ky. "Suggest two copies of form be furnished so can keep copy without having to retype entire form." — K2JMP, Simpsonville, S.C. "Excellent cooperation from area nets in taking traffic." — W5WFR, Barnstable, Mass. "More test alerts are necessary; we need an emergency generator; we all got a lot of good experience from the SET. — W8JTD, Enamul-Chabungas Co., Mich. "Getting feedback publicity is difficult and hardly see how it would be practical to compete with others." — W8QKQ, Berrien County, Mich. "We find that drills free interest without some contact feature." — W8BYI, Midland County, Mich. "We are all very pleased; the AREC and RACES, coordinated, is doing an excellent job. We are proud to be a part of it. We need a coordinated operation." — W4HNG, Mohave County, Ariz. "Fourteen new members signed up due to SET." — W5WNU, Albuquerque, N. M. "A covering success, Messages were slow in coming, but all we wanted to do test out as long as possible." — K5LYN, Dona Ana County, N. M. "This year I believe that New Mexico had one of the best SETs that has ever been put on." — K5DLJ, Socorro, N. M. "It is our opinion that this was the best SET effort to date. — W8HZZ, Fountaingrove, N. Y. "Our first SET, all the fellows were really enthused. Amazed at volunteers who relayed messages to W8ZPA and K8JAL, they surely deserve lots of credit." — W8ELT, W. Haven, N. Y. "W2RJG mobile modulator broke down during drill and his message was sent out sayings of the other stations. — W5JAG, Queens Co., N. Y. "We staged a simulated test once each month, sponsored by AREC and c.d. alternately." — W5AWB, N. C. Areas 8A & 8B. "Throughout the state, the best turnout for the ARRL and c.d. ever." — W8JPF, Newport, R. I.

The Oak Ridge Team, gang under W4CXY waited for the customary statewide alert via the SEC on 75 meters, but decided to go it alone when nothing happened. A hurricane was simulated. The statewide alert was called later in the day.

"Too much football and murder stories down here for the newspapers to pay much attention to the slowly ham who causes TVI, but we are going to make believers out of them into the newspapers to pay much attention to the lowly ham." — K5AEX, Tarrant Co., Texas. "We have done well because of the members in the organization. They are certainly of the best caliber. We act as the AREC. — K6MJZ, Arlington, Va. "Practically all the work and planning was done by the assistant ECs—yours truly just observed." —
W8FUM, Cabell County, W. Va. "These statewide phone and c.w. nets are extremely well operated, with all hands adhering to the instructions of the NCS. But, after seven years of drills, should it be otherwise?" — W2BOO, Radio Officer, N. Y. State.

Many ECs, some old and some new, went all out to put on a good show. Those who were successful are usually prone to give all the credit to the AREC members making up their organizations, but, as we have always said, leadership is important. We compliment all those who conducted the SET or tried to, especially those who succeeded in bettering their last years' scores, and in particular those big-city ECs who underwent the considerable difficulty of coordinating complicated operations in heavily-populated districts involving hundreds of members. From many big cities we received no reports, but to the following ECs, whose groups were responsible for 800 or more points, we offer our sincere congratulations: WOLYF, San Diego, Calif.; W6DEF/K01EE, Redwood City, Menlo Park, Atherton, Calif.; W4SYZ, Dade County (Miami), Fla.; W9HPG, Cook County (Chicago), Ill.; W2GBX, Erie County (Buffalo), N. Y.; W2PI, Nassau County, N. Y.; W6LEU, Cuyahoga County (Cleveland), Ohio; W5LAM, Allegheny County (Pittsburgh), Pa.; W5AIR, Harris County (Houston), Texas; W5LOW, Nueces County (Corpus Christi), Texas.

Some of the larger cities were conspicuous by their absence. Where, for example, were the big scores that should have been forthcoming from Boston, New York City, Washington, Philadelphia, Detroit, St. Louis, Kansas City, Milwaukee, Minneapolis, Dallas, Denver, Seattle, San Francisco and Los Angeles? Had these come through in the same way that the above came through, what an SET this would have been! Next year, fellows?

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 4 1/2 by 9 1/2 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 — G. L. DeGrenier, W1GGEK, 109 Gallup St., North Adams, Mass.
W2, K2 — North Jersey DX Association, Box 56, Arlington, New Jersey.
W3, K3 — Jesse Bieber, W3RT, P.O. Box 400, Bala-Cynwyd, Pa.
W4, K4 — Thomas A. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
W5, K5 — Brad A. Beard, W5ADZ, P.O. Box 26172, Houston 8, Texas.
W6, K6 — Horace R. Green, W6TI, 414 Fairmount Avenue, Oakland, Calif.
W7, K7 — Salem Amateur Radio Club, P.O. Box 61, Salem, Oregon.
W8, K8 — Walter M. Musgrave, W8NOW, 1245 E. 187th St., Cleveland 10, Ohio.
W9, K9 — J. F. Oberg, W9DSO, 2601 Gordon Drive, Florence, Ill.
W10, K10 — Alva A. Smith, W1DAMA, 238 East Main St., Oaktonia, Alman.
V1A — J. F. Fuder, VE1AQP, P.O. Box 663, Halifax, N. S.
V2 — George C. Goede, VE2YA, 188 Lakeview Ave., Point Claire, Montreal 33, Que.
V2E — Leslie A. Whetham, VE2EQM, 32 Sylvia Crescent, Hamilton, Ont.
V4 — Lon Cuff, VE4LC, 266 Holland St., St. James, Man.
V5F — W. R. Savage, VE5FOS, 833 19th St., North Lethasrd, Atla.
V7 — W. R. Hough, VE7TH, 1881 Freeman Rd., Victoria, B. C.

W3ZRO, EC for Schuykill County (Tamaqua), Pa., explains the SET plan to C.D. Director Richard Bassier. Standing, left to right, are W3s PTM RZV LDV and CPR.

V01 — Ernest Ash, V01AA, P.O. Box 8, St. John's, Nfld.
V02 — Donald B. Ritcey, Dept. of Transport, Goose Bay, Labrador.
K14 — E. W. Mayer, KP4KD, Box 1081, San Juan, P. R.
K16 — Andy H. Fuchikami, KH6BA, 2543 Nanamu Dr., Honolulu, H. H.
K17 — KL7, 310-10th Ave., Anchorage, Alaska.
K55 — Catherine How, K55KA, Box 407, Balboa, C. Z.

IS YOURS ON FILE WITH YOUR QSL MGR?

YV5ABD asks us to point out that Danny Weil ("Yasme II to Aves Island," December QST) was not the licensee of YV0AB. The calls YV0AA and YV0AB were issued to the Radio Club of Venezuela and YV5GO respectively. Mr. Weil was allowed to be only a second operator because in Venezuela a foreigner cannot be issued a call.

Various Canadian amateurs are getting together to establish an 11-meter trans-Canada network, meeting every Sunday at 1100 PST on approximately 27,100 kc.

Longest club name: The Louisiana State University and Agricultural and Mechanical College Air Force Reserve Officers Training Corps MARS Station and Amateur Radio Club. — K5ELP

April 1959 53
Portable and Mobile Rules

A Summary of the Regs for Operation Away from Home

I am about to go on a trip across the country, and I plan to take my rig along. How do I notify FCC and what address do I write?

Along about the time that the snow melts, the grass springs up, and the boss puts the vacation roster on the bulletin board, this question pops up in the League's bulging mailbags. This year we're trying to beat you wandering hams to the punch — and avoid steno overtime in answering queries. Let's cover whom you should notify, under what conditions, how often and what the notice should contain.

First of all, we want to remind readers that the pertinent regulations were made more liberal effective a year ago. Thus, if this article departs from the way you have been notifying for your previous travels, don't be confused — this way is now the right way.

When: Anytime you are going to operate away from home for more than 48 hours without a return to the address shown on your license, whether portable or mobile, you need to be covered by a notice to FCC. Formerly, such notices were valid for 30 days; under present rules they are valid for periods up to a year provided there is no change in the facts contained in your notice. For example, if you always go up to your country place the last week end of the month and operate from there, you can now send one notice for the whole year, giving the expected dates and the other information mentioned in this discussion. If you're a traveling salesman who always follows the same route, again you may submit one notice a year, giving the approximate dates and places for all your trips. If, after sending in a notice for either type of activity, you decide to change the routine in any respect, then an additional notice is required; otherwise, you need send a notice only once a year.

To Whom: There are 24 FCC districts scattered around the country and its possessions, each headed by an Engineer-in-Charge and encompassing a certain amount of real estate. The approximate district boundaries are shown on the map; a list of counties can be found in the chart on page 79 of the 41st or 42nd edition of the License Manual. You mail notices to the Engineer-in-Charge of each district in which you plan to operate. The point is that FCC wants to be able to reach its licensees within a reasonable time, and if you're not home it wants to know just where you can be reached. You may mail a postcard, carbon copy or even mimeographed notice early enough for the notification to reach each engineer before the operation begins. It's wise to make a notation in your log as well.

What: Here it's probably best to quote directly from the rules; you can peel off the parts of the notification not applicable to your particular case:

Section 12.91. Notice of operation...

The notice required by this section shall contain the following specific information:

(a) Name of licensee,
(b) Station call sign,
(c) Authorized fixed transmitter location,
(d) Portable location(s), or mobile itinerary as specifically as possible, or temporary fixed transmitter location, or new permanent fixed transmitter location,
(e) The dates of the beginning and end of each period or operation away from the location specified in the station license,
(f) The address at which, or through which, the license can be readily reached.
(g) In the case of mobile operation, the official name, registry number or license number (including the name of the issuing state or territory, if any) of the aircraft, vessel, or land vehicle in which the mobile station is installed and operated.

Temporary Fixed Stations: You will see by paragraph (d) that the present rules also apply to temporary fixed locations of amateur stations, such as college dorms and Army barracks. For the college boy, one notice at the start of the school year is now enough; the only difference is that this notice for a temporary fixed station should go not only to the District Engineer, but also to the Federal Communications Commission, Washington 25, D.C. Another notice is required when you go back home, if the original notice did not specify an ending date.

Canada: American hams whose vacation travel will take them into Canada can get permission from the Department of Transport, Ottawa, Ontario, to operate under their U.S. calls in Canada. (Since there is no Canadian equivalent of the U.S. Novice and Technician Classes, holders of these classes are not eligible.) You should request the necessary forms from the Department of Transport a few weeks before your planned departure. A reminder: when a U.S. licensee operates outside the country, he is required to notify the FCC Engineer of his home district in advance.

Canadians coming south can get application blanks from the Secretary, Federal Communications Commission, Washington 25, D.C. The VE's also notify FCC Engineers for the districts in which travel is contemplated, in the same manner as W/K licensees.

Mexico: Foreign visitors to Mexico who hold licenses in their own countries can secure mobile licenses for Mexico. Application is made through the Liga Mexicana de Radio Experimentadores, Liverpool 195-A, Mexico 6, D.F. (For further details, see page 84, QST for December, 1957 and page 77, April, 1958.)

Identification: When you are operating mobile, you must show your approximate geographical location. Some examples of correct phone procedure follow:

"W9XXX this is W1XXX mobile in Pittsburgh."
United States Radio Districts
Address the District FCC Engineer-in-Charge

1—1600 Customhouse, Boston 9, Mass.
2—748 Federal Building, 641 Washington St., New York 14, N. Y.
4—400 McCawley Building, Baltimore 2, Md.
5—402 Federal Building, Norfolk 10, Va.
6—718 Atlanta National Building, Atlanta 3, Ga.
7—312 Federal Building, Miami 1, Fla.
8—608 Federal Office Building, New Orleans 12, La.
9—324 U. S. Appraisers Stores Building, 7300 Wingate St., Houston 11, Texas.
10—401 States General Life Insurance Building, 708 Jackson Street, Dallas 2, Texas.
11—Mez 50, 849 South Broadway, Los Angeles 14, Calif.
12—323A Customhouse, 555 Battery St., San Francisco 26, Calif.
13—502 U. S. Court House, 620 S. W. Main St., Portland 5, Oregon.
14—802 Federal Office Building, First Avenue and Marion, Seattle 4, Wash.
15—521 New Customhouse, 19th St., Denver 2, Colo.
16—208 Federal Courts Building, 6th & Market Streets, St. Paul 2, Minn.
17—3100 Federal Office Building, 911 Walnut St., Kansas City 6, Mo.
18—826 U. S. Court House, 219 South Clark St., Chicago 4, III.
20—328 Post Office Building, Ellinett & Swan Streets, Buffalo 3, N. Y.
21—502 U. S. Customhouse, Court House & Post Office, Honolulu 1, Hawaii.
22—322-323 Federal Building, Post Office Box 2987, San Juan 13, Puerto Rico.
24—718 Jackson Place, N.W., Washington 25, D. C.

"W0XYZ this is WA6XYZ mobile about 15 miles east of Houston on Route 90."
"W3QQRK from W4QSA portable on Cape Cod."

Incidentally, FCC accords no recognition to that oft-heard phrase, "fixed-portable" or to the equally-well-worn "mobile One," "portable Four," or variants of either.

When you operate c.w. away from home, it's simpler: No matter whether you're on dry land, in the air, afloat, or motoring down route 6, so long as you are in the United States the only proper way to sign is with the slant bar and district numeral — e.g., "W0XYZ de W7XXX/2."

The only times the words "aeronautical mobile" or "maritime mobile" (or the c.w. equivalents "/AM" and "/MM") are correctly used by American amateurs is when they are engaged in communications from aboard a plane or ship over or on international waters.

Examples of Notices: First, a college student plans to operate his rig as a temporary fixed station:

The Secretary,
Federal Communications Commission
Washington 25, D. C.
Dear Sir:
This is notice that amateur station W2QRT will be operated at a temporary fixed location, Dormi-

April 1959
tory 9-F, Podunk State Collège, Kansas, from Oc-
tober 1, 1959 to December 15, 1959; January 4,
1960 to January 31, 1960 and February 10, 1960 to
May 31, 1960, During these periods, mail tnay be
addressed to Box 295, Podunk Station, Kansas.

Sincerely yours,
John A. Smith, W2QRT
1434 North Rattlesnake
Horseheads, New York

Copy to: District Engineer-in-Charge
2300 Federal Office Building
Kansas City 6, Missouri

Next, a two-week vacation involving portable
operations:

Engineer-in-Charge
Federal Communications Commission
1600 Customhouse
Boston 9, Massachusetts

Dear Sir:
This is notice that amateur station W4ABC wili
be operated in portable status at Johnson's Camp,
Algonquin, Maine, between April 25 and May 10,
1959.

John A. Smith, W4ABC
1357 W. Evergreen Ave.
Springfield, Ala.

Another for an extended mobile trip, with
multiple copies in separate envelopes addressed
to each district office involved:

Engineers-in-Charge
Federal Communications Commission
Districts 18, 17, 15, 11

Gentlemen:
This is notice that amateur station W9XYZ will
be operated in mobile status along the itinerary
and for the dates shown below. Installation is in a
1957 Ford sedan, Illinois license plates 327-918,
May 4-6, 1959 U. S. Routes 80 and 6, Chicago to
Omaha
May 7-9, 1959 Routes 6 and 30, Omaha to
Denver
May 10-12, 1959 Routes 40 and 189, Denver to
Provo, Utah
May 13-16, 1959 Route 91, Provo to Los Angeles,
Mayfair Motel, Ocean View Ave., Los Angeles,
Calif.

Yours truly,
John A. Smith, W9XYZ
327 Brandon Avenue
Glen Ellyn, Illinois

Mobile Laws

In several states and municipalities, there are
laws which deal in one way or another with mobi-
le radio communications. While they affect
normal amateur operation but little, it is well at
least to know about their existence. We present
herewith a summary of such laws on which we
have been able to obtain information, with no
guarantee of its completeness:

California: Los Angeles has a city ordinance
prohibiting the installation in a motor vehicle of
receiving equipment which can tune to munici-
pal (fire and police) frequencies.

Connecticut: The law prohibits the operator
of a motor vehicle from using two-way radio
while such vehicle is in motion, but is intended
primarily to cover subscribers to the telephone
company's mobile service, and specifically ex-
empts amateurs, RACES, and most other mobile
services.

Florida: The law prohibits the use in a motor
vehicle of equipment capable of receiving on
police frequencies; however, amateurs are spe-
cifically exempted.

Indiana: Prohibits use in motor vehicles of
equipment capable of receiving on police frequen-
cies.

New Jersey: Prohibits use in motor vehicles of
equipment capable of receiving on police frequen-
cies, unless user has a permit from local chief of
police.

New York: Same as New Jersey. Additionally,
the city of New York prohibits the operator of a
motor vehicle in motion from using two-way
radio equipment; no exemption for amateurs.

North Dakota: Prohibits installation and use
of mobile short-wave receivers without a permit.
(Like many others of this nature, the law was
originally passed to give authorities a means to
control "ambulance-chasers." To our knowledge
it has never been applied to amateurs, though
technically it could be.)

South Dakota: Same as North Dakota.

As a matter of interest, the states of Connecti-
cut and Vermont prohibit the installation of a
television set in a motor vehicle in a location
where it can be seen by the driver!

It goes without saying that any amateur oper-
ating mobile should double-check to make certain
he has both his motor vehicle operator license,
registration, and amateur license always in his
possession. — P. W.
Edison Award to K2KGJ

Julius M. J. Madey K2KGJ, of Clark, N. J., was chosen to receive the 1958 Edison award, sponsored by the General Electric Co. Madey, an 18-year old high school student, was selected from a large field of worthy candidates because of his outstanding public service in handling more than 12,000 messages and telephone calls for isolated South Pole personnel.

Ceremonies were held at the Sheraton-Carleton Hotel in Washington, D. C., on February 26, and were attended by many prominent amateurs, military personnel, FCC Commissioners, and other government personnel. In fact, this annual Edison award ceremony always brings out many of the well-known names in communications along the East coast and is one of the best "ham-fests" that we get to attend. We'd like to see a few more of them outside the fold of amateur radio. To us who are actively engaged in this hobby, the ham is something more than this. Gur socalled "ham" means to others outside the fold of amateur radio, solely with a personal aim and without pecuniary interest, holding a valid license issued by the FCC authorizing him to operate licensed amateur stations. That is the definition on paper, and perhaps that is all the self-called "ham" means to others outside the fold of amateur radio. To us who are actively engaged in this hobby, we know that the ham is something more than this. Our group is made up of all sorts of people — wealthy and poor, learned and unlettered. Protestant, Catholic and Jew, young and old. They and we are no more of a handicap than is a physical disability. There are old timers and there are novices. We are quite a cross section of America. Amateur radio, however, permits us to do a lot of things that others cannot do — whether enter the homes of one another, and meet people on the opposite side of the earth; we can know almost everything that goes on in another man's life, what he or she works at in their business; their ambitious; their sports; their physical ailments; where they have traveled to; what their weather is at the moment; how many members in their family; their favorite dessert; their favorite book; their favorite presidential candidate; their complaints; their woes — we know almost everything about them, except what they look like. An amateur too, is a very friendly person — not only willing to help another but eager to do so. Witness the number of amateurs who take so much of their own time to run code classes for beginners; how all hands will rally around to help raise a new tower for an antenna; how many will volunteer their time to help work on your rig. Listen to the advice that is given over the air on how to improve this or that piece of equipment — it is not just boasting and showing off ones superiority — it is relaying knowledge that someone else gave to him in the past. Witness how amateurs will allow themselves to be regulated into a "net" that they may be of greater aid to the group at large; how they participate in field day activities or rush to aid in time of disaster, whether it be flood, hurricane or fire. The contributions of time, equipment and effort on the part of some in Civil Defense Work is a public contribution that is beyond cost. To the amateur these things are a sort of duty, a voluntary service, if you will, that has been born in a spirit of generosity and the desire to be friendly. Perhaps one of the outstanding exemplifications of this duty is the program of handling and relaying messages to all parts of the country. Today amateur radio has become almost a necessary link between Americans in exile and their families at home.

Men in the service, scientists on some remote project, artisans on some distant construction job, have found that amateur radio has made their lot the more easy to bear.

For such as these the novelty of the new land they are visiting soon wears off and they are forced to settle down to a routine existence. Barracks life at its best is not the easiest form of life for an American. The constant eating of the same food day after day, looking at the same faces, forced to live with the same personalities, — not everyone can be happy under these conditions and although he longs to be back with his family and loved ones, there is no way out, and the thought of this being bound in can affect many a man's outlook. We know how morale officers and others in charge try to arrange programs to take care of recreation and to ease the men's lot, but such efforts are only partly successful.

Stories of expeditions of other years immerge one with the feeling that "cabin fever" is one of the necessary psychopathic diseases of any expedition to a remote land. We read how people living under confined conditions away from home for a year or so begin to loathe one another. Usually the relief party that arrives to replace them will find a cast of characters that are familiar to him. You may ask about the morale of a group as you visit it and invariably it is the same boast, "We have the best base in Antarctic." You really have to question pretty closely to find any complaints. What has (Continued on page 29)

April 1959 57
BANDSPREADING THE BC-45S

This modification to the popular 6-9.1 Mc. Command receiver should appeal to both old hands with surplus equipment and those newcomers who are using this receiver as a mainstay of their stations. The end result of about an hour's work on the BC-45S will double its bandspread so that the 40-meter band covers about 2½ inches of dial circumference compared with the original one inch it occupied.

First, take off the outer dust cover of the receiver and remove the cover over the tuning capacitor. In order to do this it will be necessary to remove two of the i.f. cans and several tubes unless a right angle screwdriver is available. This provides access to the two bolts on the cover of the plate that supports the 12K8 grid cap lead. Now remove all rotor plates from the capacitor except the right-hand three in each section (looking at the capacitor from the rear of the receiver). Replace the dust covers. The dial will now have to be recalibrated. First paint it completely with black enamel. Locate the 40-meter band with a transmitter, signal generator, or the 7.335-Mc. Canadian Observatory signal. The rest of the calibration is best done with a 100-kc. crystal calibrator that has been checked against WWV. The dial can be calibrated by setting it at 100-kc. intervals. Commercial decal numbers will dress it up and give it a professional appearance.

— Hovey M. Cowles, W3JWZ

PENCIL LIGHT FOR DARK CHASSIS CORNERS

The 110-volt pencil soldering irons with screw-in tips will also accept the small 7½-watt “night light” bulbs. This makes a convenient light for searching dark chassis corners, and is also useful when you're looking under the workbench for small parts.

— C. Cool, W2EBZ

FINDING PORTABLE GENERATOR FREQUENCY

Browsing through old copies of QST, I came across an article in the October, 1956 issue, page 30, entitled, “Checking the Frequency of Portable A.C. Generators.” Having wrestled with the same problem recently myself, this article interested me, but the author specified one thing that I did not have — commercial power of accurate known frequency. I am now located in the southern part of the Philippines, and the nearest commercial power of any accuracy is 200 miles away!

I had heard that ordinary electric clock accuracy is controlled by the frequency of the power. If the clock were plugged into a generator with an output frequency of 60 c.p.s., it should keep perfect time. However, if the generator frequency were fast or slow, the clock would gain or lose time. When I want to check the speed of the generator I plug in an electric clock and time the interval for the sweep second hand to make one complete revolution with a stop watch. If it takes over a minute I know the frequency is low, and if it takes less, the generator is running fast. The formula used to find the generator frequency is 3000 divided by the number of seconds for a complete revolution of the clock second hand.

— John Lawless, WIYEF

SOCKETS FOR 1625S

While building a new transmitter, I found I needed 7-prong tube sockets for the 1625 tubes. The ARC-5 transmitter from which I obtained the 1625s contained 7-prong sockets but they were useless in their original state since there was no convenient way to mount them on the new chassis. I checked the tube tables in the Handbook and found that pins No. 2 and 5 on the 1625 have no internal connections. So, I drilled out the rivets of pins 2 and 5 on the socket, enlarged the holes a bit and placed a small strip of metal to each of the holes as shown in Fig. 1. This arrangement permitted me to mount the socket on the new chassis.

— Richard Niessen, K2SRA

NOISE SNIFTER

Transistorized b.c. receivers are very useful in locating pockets of motor noise. Tune the receiver to a spot at the high end of the b.c. band. Move the receiver around the engine compartment and over the various panel instruments while listening for noise hot spots. This technique can also be used around the fixed station for locating noisy electrical appliances.

— Eli H. Laakko, WSQMP
SEALING OUTDOOR ANTENNA CONNECTIONS

Have you ever been plagued with eroded antenna connections? Erratic loading of the transmitter, or noises in the receiver can sometimes be traced to just such a condition. Some amateurs use candle wax to seal open antenna connections; however, this provides only a temporary seal. Constant beating by the weather will cause this type of seal to crack and allow moisture to enter the connection. What to do about it? Use that old piece of coax! Remove the outside jacket and shield from a piece of the cable. Strip about 1/2 inch of the insulation from the conductor. Holding the exposed piece of the center conductor with a pair of pliers, bring the flame of a match under the insulation at the other end of the cable. After a few seconds, the insulation will melt and start dripping off in a molten form. Tuck the cable over the connection to be sealed and let the drippings fall onto the connection. When the joint is sealed, let it set for an hour or so. Now you have a sealed connection that even old man weather can't touch!

— David L. Cabaniss, W1TUW

CRYSTAL MICROPHONE TIPS

Most crystal microphones contain a Rochelle salt crystal which should be protected from high temperature, humidity, and high voltage. The Rochelle salt crystal can be permanently damaged by temperatures above 125 degrees F. (50 degrees C.) and by excessive humidity. The best service from a crystal microphone will be obtained if it is used at room temperature, at a humidity of about 50 per cent. Since inside automobile temperatures rise to high values in the summertime, it's not a good idea to use crystal microphones for mobile service during hot weather. Be careful when soldering connections to a crystal mike. Don't connect the mike to speaker or power outlets carrying high voltage.

— R. Bruce Campbell

MANUAL CONELRAD MONITOR

It is still necessary to monitor the broadcast band for conelrad purposes and here is the way I do it.

My receiver has a phono input position on the "mode" switch which switches out the front end and i.f. stages of the receiver but leaves the audio stages connected.

A simple crystal set (a diode across a coil will do in areas with strong b.c. stations) is connected across the audio-stage input terminals. To check for conelrad, quickly flip the mode switch to the "audio" position and see if there are any b.c. stations on. With the simple circuit mentioned above, it is likely that more than one station at a time will be heard. It may be necessary to add a ground and small antenna to the crystal set circuit.

— Dan Kruss, K6GDQ

LOW-POWER V.H.F. DUMMY ANTENNA

An easily constructed dummy antenna and relative power output indicator is shown in Fig. 2. The indicator is a 32-volt 15-watt lamp which can be obtained at most electrical supply distributors. Capacitor C₁ is inserted in series with the center conductor. C₁ should have an approximate value of 40-μf. for frequencies between 28 and 50 Mc., and 3-μf. for 144 Mc. A miniature variable capacitor or trimmer can be used in place of the fixed value so that the dummy is useful on several bands without need for changing capacitors.

The dummy antenna will give a visual indication of output at relatively low power. The popular Communicator transmitter will light the bulb to a useful brilliance.

— Motorola

ILLUMINATING METERS

A simple and effective method of providing illumination for most of the standard panel meters is to cut a small slot in the top of the meter case, as shown in Fig. 3, and mount a pilot lamp directly above the slot. The meter scale will have to be bent back slightly and the slot covered with transparent cellophane or plastic material to keep dust out of the instrument.

— William Vandermay, W7DET

April 1959
It's probably just old age creeping up on us, but as we listen on the v.h.f. bands these days we get the impression that some fellows are not getting as much out of their hamming as they should. How can this be, in view of the tremendous potential of all our bands today, compared to what we considered to be the almost certain limitations of the world above 50 Mc, a generation ago?

For perspective we dug out a 1934 Handbook. (It cost a buck, and it was about a third the size of today's $3.50 version.) As we thumbed its pages we wondered if it was just that we were 25 years younger then that enabled us, and thousands of other newcomers to amateur radio, to build up such a head of steam over the possibilities of the 5-meter band?

Certainly it wasn't any sales talk in the Handbook that did it. Right at the start it warned the potential user of the "ultrahigh frequencies" that this portion of the spectrum could not be expected to provide DX. Prominently displayed was the formula for the distance to the visual horizon:

\[ d \text{ (miles)} = 1.32 \sqrt{h} \text{ (ft)} \]

If you can get 100 feet above flat terrain you can see 13.2 miles. Use the same formula for the location of the fellow you want to work, add the result, and if the sum is less than the distance between you, a contact can be made — maybe! But don't count on it, for intervening hills will cut down this range. The fellow in a valley? Well, frankly, the ultrahighs are not for him.

But thousands of hams, newcomers and old-timers alike, did get on 5 meters, and they had the time of their lives. They even got on in valleys! But don't count on it, for intervening hills will cut down DX. Certainly it wasn't any sales talk in the Handbook that did it. Right at the start it warned the potential user of the "ultrahigh frequencies" that this portion of the spectrum could not be expected to provide DX. Prominently displayed was the formula for the distance to the visual horizon:

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we work. The fellow who seems to be getting less enjoyment than he should from his use of the v.h.f. bands usually turns out to be one who has gone no further than to learn which way to throw the send-receive switch on a Communicator. Chances are he got started too easily, with a by-mail license and a store-bought station. Is there any hope for him? We think so.

First, he needs some boning up on the various forms of DX available to him. He need not be a scientist; the Handbook of today tells him most of what he needs to know. Once interested, he'll learn the rest soon enough. V.h.f. men in the know realize that right now we are passing through a period of radio conditions the likes of which we may never again see in our lifetimes.

Second, it would pay our newcomer to investigate all the modes of communication on the v.h.f. bands. Perhaps he needs, for example, to appreciate the true worth of c.w. in weak-signal v.h.f. work. The v.h.f. operator with no b.f.o., or without a means of keying his transmitter, is automatically cut off from some of the biggest thrills available to today's occupant of the world above 50 Me. Is learning to use the code effectively too high a price to pay for a 17-db. improvement in station effectiveness? How else can you get the effect of increasing power from 10 to 500 watts so easily as by plugging a key into your transmitter?

Last, a bit of research through QST and the Handbook for the past 30 years or so can be rewarding. Though reading about it is a poor substitute for having lived it, the day-to-day story of the early years of v.h.f. endeavor should be must reading for anyone who would understand and appreciate the world above 50 Me. as we know it today.

**Here and There on the V.H.F. Bands**

"How about giving us something besides all that guff about 50-Me. DX?" So runs a common complaint from readers, if any, who are not interested in the 50-Me. DX news. Gladly — but that this is a news column. What goes into it is what comes through the mails to us in the form of reports. And this month's mail, like that of many months before, has 10 50-Me. DX reports to 1 of any other kind of news. This even though the 50-Me. DX has tapered off considerably in recent weeks.

What happens when a good contest man catches a 5-meter opening? This answer is not exactly news, but it does show what can be done. Contest man from w4 back, KH6JG, has been making passes at the 6-meter band occasionally. One of these was on Nov. 27, 1958. Ketash's log shows 51 QSOs on 6 between 1005 and 1205 HST on that date; 21 9s, 15 8s, 11 7s, 3 8s, and 1 each of 2 and 3. Several WIs and VEIs were heard.

More recent news from Hawaii comes from KH6CCT. The last part of January was very quiet, Esther says, but things picked up a bit thereafter. Only one opening was heard in the period from Jan. 18 to 31, that to KL7 on the 20th. On Feb. 4, VEAFA and 7W1KM were worked. The following day brought in 10 stations in Arizona, Colorado, Oregon, Nevada and Washington. On the 6th Esther worked W7EXQ in Arizona and heard one Illinois station, W4HHK, Collierville, Tenn., reports reception of KH6UK at 1035 EST Feb. 7. KL7R was heard, and E68 was a hot one via W4PM; CE1Z, Juan Fernandez Island, 50.2 Me., is reported worked by XE1GE.

Though the path to Europe showed a marked drop in the number of openings, there was some sign of life across the North Atlantic up to at least Feb. 29. On that date your conductor was hearing unidentified video signals, believed to be of European origin, as early as 0825 EST. CT1CO, Laschín Portugal, was heard on automatic v.e. up to about the middle of February. E12W, Dublin, Ireland, reported working into the United States on Feb. 8 during an opening of an hour's duration beginning about 0600 GMT. Harry found the band very good on Feb. 1, but his permit for 50-Me. operation had not then been officially renewed, so he spent the day in frustration, listening to one of the best openings observed since back in the full of '58. E12W is now set for operation on 50 Me. for the present, whenever the band is open at 52 DX. His record through Feb. 8, 501 transatlantic QSOs, with 305 different U. S. stations, 22 Canadians (VO, VE1, VE3), and 1 XE. He has 37 states, the highest 50-Me. total for a station outside North America.

Our principal DX circuit during February was to South America. True to expectations, transequatorial openings have been more frequent than before in this solar cycle. The morning of Feb. 1 produced something never before observed in these parts on 50 Me.; a simultaneous opening to Europe and South America. At about 0915 HIC1FS, Quito, Ecuador, began coming through, and from about 1000 to 1010 he was S9-plus.

Simultaneously CTICO was in well, and European TV signals indicated that the North Atlantic m.u.f. was at least 52 Me. HC1FS faded out at about 1018 EST, but conditions to Europe seemed to improve. The BBC Channel 3 sound, 53.25 Me., was in as late as 1210, and before this the band began to open to the West Coast. The Western and eastern openings overlapped for at least an hour.

South America and Europe were heard again on Feb. 8, though it was a more marginal opening. PZ1AE, Surinam, and CTICO were heard on the 12th by WL1GE. Ed also heard PZ1AE and HC1FS on the 10th. HIC1FS says that
this was a good one, lasting from 0830 to 1000, to W1, W2, 3, and 4. HC1PS was reported by K1JS, K2Y, W4HP and others on the 22nd, and he worked W2, 4, 5, and 8 on March 1. Note that most of these South American observations are for Sunday mornings. This is almost certainly not the result of any natural causes, but rather the limited operating habits of shortwave men. We're sure that the band was not DX more often than most people realize.

To help in catching South American openings of the evening scatter type, a TEW (transponder DX) net has been set up by W4HLL and others on the 220 and 420 Mc. A chain of consistently-active stations extending from Ft. Lauderdale, Fla., to Canton, Conn., will be on the watch for any sign of South American openings after 1600 EST. Anyone making an opening will call the next station to the north and south in the chain by telephone. Presumably most calls will be made to the north, as openings are expected to be observed more frequently in the lower latitudes. Each station has an alternate who will be called if the regular TEW net member is not available by telephone. These net stations and alternates include some of the most active operators in each area along the Atlantic Seaboard. If TE openings develop during this spring season this net should help materially to spread the word. The chain of net stations includes W4PVR W4HO W4MMU W4LG K4SM K4AIK W4HJW K2RMG and W1DQH. Alternates are K4HFL W4KQK K4GUM W4FRW W4KPG K4BFP W3AAM W2IDZ and W4SUZ.

It should be noted that this net is to function only after 1600 EST. Its purpose is to aid in observation of evening TE scatter. The morning openings, presumed to be normal FEs, are most likely to occur following isoscrone disturbances, but any morning after about 0830 local time we should be on the watch. The frequencies just below 50 Mc. are usually alive with Spanish speech at such times, but don't rely on this. We've heard HC1PS when there was no evidence of commercial activity on the frequencies just below the band edge, just as CTICO seems to pop in at times when all indications are that the transatlantic m.f. is well below 50 Mc.

Other times there may be commercial signals but no hams. Such a morning was Feb. 26. There had been a good aurora the night before, so we were camping on the 220-Mc. band from early morning on, and we had plenty of company. By 0830 there began to be a couple of Spanish-speaking stations coming through, one at 40.6 and another at 49.8. Back-scatter W sigs showed up soon after. W4KKH was easily workable on c.w. throughout the morning. Other stations worked included W5DAA, Kingsville, Texas, and W4HJG. Three hours duration.

There were no ham openings worth of special mention any more. From here on, to make openings, RE and RI calls will be called if the regular TEW net member is not available by telephone. These net stations and alternates include some of the most active operators in each area along the Atlantic Seaboard. If TE openings develop during this spring season this net should help materially to spread the word. The chain of net stations includes W4PVR W4HO W4MMU W4LG K4SM K4AIK W4HJW K2RMG and W1DQH. Alternates are K4HFL W4KQK K4GUM W4FRW W4KPG K4BFP W3AAM W2IDZ and W4SUZ.

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Records Boxes — New Style

For years now the hardy souls who make a specialty of working 220 and 420 Mc. have been badgering us about including these bands in our tabulations of states, call areas and DX worked. "No one knows about them," we have been told. "Start something, and you'll get 'em," they counter. So we're starting them. For want of a better way of doing it, we're listing the information we presently have, incomplete though it may be, in alphabetical-numerical order. If you are in this list, and your record as published is incorrect or not complete, please send us the latest and complete information. If you're not in the list, and you are consistently active on either 220 or 420, send us your standings. Include the states, call areas, and the call and location of the most distant station you have worked.

To keep this department from becoming all boxes, we've done some pruning on the records for 50 and 144 Mc. Let's face it, men, making WAS on 50 is not quite the ordinary thing once was — and working 40 states or so is too easy to be worthy of special mention any more. From here on, to make the 50-Mc. list you must have submitted cards to ARR and have received WAS, an award issued to people who can prove some paring on the records for 50 and 144 Mc. Let's see if we can get the balance of the VD transponder DX working.

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20-METER PHONE EXPANSION

Responsive to ARRL request, the Federal Communications Commission has now issued a notice of proposed rule making to add the top 50 kc. of the 20-meter band as part of the segment where voice operation is permitted. (For the information of members, the League's initial request sought limitation of use of the proposed 50 kc. phone addition to holders of Advanced or Extra Class licenses; by subsequent Board action, this condition was withdrawn, and current proposal likewise contains no special license restriction.) Final date for comments is May 1. The text of the notice is published at the end of this department.

LICENSE RENEWALS

FCC regulations governing the amateur service provide that if an amateur submits an application for renewal of his license in advance of its expiration date, he may continue normal operation past that date even if he has not received his renewal authorization from the Commission. This provision is particularly important at times when, through overload, FCC gets behind in its license-processing work—a situation which exists at the moment of writing. A great many amateurs who have applied for renewal become concerned, however, at lack of response from the Commission and bombard Washington with inquiries as to what has happened. This only slows up the entire operation. So, if you have submitted a timely renewal application, go ahead and operate and don't bother FCC with letters of inquiry which only further clog the machinery.

WYOMING LICENSE PLATES

SCM W7AMU furnishes the good news that Wyoming, as a climax to five months of intensive work by a special amateur committee and many other hams throughout the state, has adopted legislation permitting use of call letters on license plates. The bill became law with Governor Hickey's signature on February 9. One result will be an intensive drive by the SCM and SEC to organize each county into efficient AREC units and integrate amateur facilities with the civil defense setup.

Forty-three of the 49 United States now authorize amateur calls on license plates.

RACES FILING

In accord with instructions of the Executive Committee, the League has filed comment with FCC as shown below in the matter of a proposed expansion of frequencies available for the Radio Amateur Civil Emergency Service. (See the editorial in this issue for further discussion.)

COMMENT OF THE AMERICAN RADIO RELAY LEAGUE, INC.

Pursuant to Paragraph 7 of the Notice of Proposed Rule Making in Docket 12719, The American Radio Relay League, Inc., files these comments on behalf of some 70,000 FCC-licensed amateurs who are members of the League. The League offers no objection to the proposal to make additional portions of the amateur frequency bands available for use by amateur stations authorized to operate in the Radio Amateur Civil Emergency Services (RACES). The League believes that the arguments submitted by petitioner are valid and meritorious.

STAFF NOTES

We welcome to the ARRL Hq. Ten Year Club two employees who have recently completed ten years with the League’s staff: Frank L. Higgins, building custodian, and J. Murray Powell, W1QIS, in charge, of the Maxim Memorial Station, W1AW. Frank came to us at the start of 1949 and, although actually over retirement age, likes the job so well he is continuing; the feeling is mutual, for in addition to being one of the most pleasant fellers we know, he is one of the most reliable—an important attribute in a job where many duties are involved both before and after regular working hours.

Murray Powell, whose anniversary date is February 21, is well-known to thousands of hams as “chief op” at W1AW, and is responsible for the station’s numerous activities including regular transmission of bulletins, twice daily on eight c.w. frequencies simultaneously and eight voice frequencies similarly; a daily hour of code practice on the same c.w. channels; several net and traffic schedules; general operations for contacts (or ragehew, when time permits) with amateur stations using all major bands and modes of emission; and welcoming visitors from all parts of the country. (Next time your rig acts up, think of the headaches involved in keeping eight of the ornery critters constantly in line!) It is mighty reassuring to know that the responsibility for such extensive and intricate operations is in such capable hands. Drop in at W1AW some time and see if you don’t agree.

With regret, but with good wishes for success
in his new post in industry, we announce the resignation of David L. Cabaniss WITUW, for the past year a loyal and hard-working member of the Secretarial Department.

TRIBUTE

The public service of amateurs in general, and Texas hams in particular, was recently accorded high praise in the Senate of the United States by the Hon. Ralph Yarborough of Texas. We publish below an excerpt from the Congressional Record of January 23rd quoting the Senator:

Mr. President, in our modern world, the field of communications is especially valuable and important. This is particularly brought to our attention in times of emergency. And there is one group of people who are always on hand to help in any way possible in this field. They are the amateur radio operators of this Nation.

The services this group provides are innumerable and invaluable. They have assisted law enforcement officers both in the apprehension of criminals and finding persons who are lost. Amateur radio operators have received distress messages from ships at sea and downed aircraft and have notified authorities so help can be sent. During times of serious fire and flood, these people — often endangering their lives and valuable equipment which they purchased with their own funds — have stood by authorities, relaying messages from home to our servicemen and scientists in remote outposts. As an example of the type of service these “hams” render, it was an amateur radio operator who first got out word of the disaster which had befallen Cameron, La., and parts of my own State when struck by Hurricane Audrey in 1957. As a result, aid was quickly dispatched to the scene.

FAMILY MEMBERSHIP

For families with two or more amateurs, ARRL By-Laws provide that, after one individual has become a Full Member of the League at the regular dues rate ($1 in the U.S.), additional amateur members of that family may join the League for a special dues rate of $1, with all rights and privileges except the receipt of additional copies of QST. Our correspondence indicates some misunderstanding of this arrangement. Please note:

1) All participants in the Family Membership plan must be Full Members — i.e., holders of amateur license. Unlicensed persons do not qualify.

2) There must be an immediate family relationship — i.e., husband or wife, brother or sister, father or mother, son or daughter.

3) The rate for the initial membership is the standard $4 ($1.25 in Canada). The rate for additional amateur members of the family is $1 — not $2 as many seem to believe.

4) All Family Memberships must be concurrent — i.e., expire in the same month.

So if you are part of a ham family, slip in an extra dollar for each other ham in your clan next time you renew your League membership.

Wherever these amateur radio operators are needed, they are on hand, helping in any way possible. They specifically prepare themselves to be able to give highly mobile assistance in any emergency.

Mr. President, in recognition of the outstanding services performed by these people, I ask unanimous consent to have printed in the Appendix of the Record an article by Woody Montgomery which appeared in the Temple, Tex., Daily Telegram for Sunday, January 11, 1959, under the heading “Central Texas Hams Set for Emergency Work.”

There being no objection, the article was ordered to be printed in the Record, as follows:

CENTRAL TEXAS HAMS SET FOR EMERGENCY WORK

(1) By Woody Montgomery)

In some circles when a fellow is called a big ham he’s liable to resent the implications, but in amateur radio circles being called a big ham is a compliment.

Temple has about 25 active hams, the radio variety, as members of the Temple Amateur Radio Club and they’re ready for any emergency.

Central Texas has not called for their services to a great extent since the Waco tornado a few years back, but the Temple club hasn’t relaxed in preparing for any emergency.

And the rigs, a term the amateurs fondly call their transmitters and receivers, range from a small mobile job to the near-maximum 1-kilowatt jobs.

The Temple club is equipped to move on short notice to any location and is ready to set up to aid in flood, fire and any disaster.

The local club at one time had a fully equipped mobile unit for use in emergencies, but the van truck had its limitations and was abandoned.

Now, according to Club President Paul Gardner, the club has a portable generator mounted on a small trailer that can be towed behind any car.

An another trailer, furnished by the Red Cross, can be mounted at a moment’s notice a fully-equipped transmitter and receiver.

“With the separate units they can be moved by any member when needed and as a number of the hams have mobile units in their cars it makes the operation doubly effective,” Vernon Starnes, a club member said.

“Right now things are running smoothly but no one knows just when the amateurs may be pressed into emergency service,” Gardner said.

Amateurs never seem to be satisfied with their equipment and are always either working on it or building something new to add to their present rig.

And the hams are the “tradingest” bunch of people in the Nation. They never buy a part if they can trade someone out of what they need.

The Temple club meets the first and third Tuesday of each month; the members engage in a swap session, swapping either information or radio parts.

The Temple club, boasting members from the radio, photography, medical, electrical and just about every field, is getting ready for their annual nationwide field day, which isn’t until June, but then the members of central Texas clubs will journey to the Ed Brod farm near Cameron and set up camp.

During the field day, operated only on emergency power, the clubs across the Nation vie for the honors in contacting the most other stations over the world.

It’s a fascinating hobby and pastime, but as one ham puts it, “It takes up a lot of time.”

NATIONAL CONVENTION

Several south Texas amateur radio clubs are assisting the Galveston County Amateur Radio Club in preparation for the ARRL National Convention June 19–21. The Houston Amateur Radio Club, besides supplying chairmen for some of the technical sessions, is going to sponsor a unique exhibition and demonstration in one of the booths. The Electronic Technicians and Amateur Club of Texas City will greet all visiting mobiles by operating on all bands. The Royal Order of the Wouff Hong initiation ceremony will be conducted by the Bayshore Radio Club of
Galveston County Amateur Radio Club members f. to r., KS5Y, W5JSU, Exhibits Manager National ARRL Convention; W52G, General Manager, K5OHB; and, seated, W5DMM, president GCARC, at a portable rig in the lobby of the Galvez Hotel. The demonstration was held to acquaint manufacturers and representatives at the Southwest Electronics Conference with the exhibition hall plans for the ARRL Convention. As a result of this and other activities the 11th National ARRL Convention will have the biggest exhibit of amateur gear ever displayed in Texas.

LaPorte. Hidden transmitters for mobile hunts will be placed and manned by members of the Brazoria County Amateur Radio Club of Angleton.

Activities for licensed YLs will be planned by the GAYLARKS of Houston, under the chairmanship of Lillian Beebe, W5EGD. With special attention to unlicensed YLs, the ladies program is in charge of Dorothy Fulton, W5JSV. Features of the general program are now being planned, and complete information will be published in an extensive article in May QST. Or firm up your plans now by writing Box 73, Route 1, Galveston, Texas, for data and registration forms.

21 KILOMETERS

A year ago FCC, as part of a general shuffling around of assignments of microwave frequencies to various services, proposed to move our 21,000 Mc. (megacycles — not kilocycles) band to 22,000-23,000 Mc. It has now been decided that the shift will not be necessary after all, so the band will remain at its present location, 21,000-22,000 Mc.

Before the FEDERAL COMMUNICATIONS COMMISSION

In the Matter of

Amendment of Section 12.111(d) of Part 12 of the Commission’s Rules to Permit Radiotelephony Between the Frequencies 14,200 kc. and 14,350 kc.

NOTICE OF PROPOSED RULE MAKING

1. Notice is hereby given of proposed rule making in the above-entitled matter.

2. The Commission has before it for consideration an amended petition filed by The American Radio Relay League, Inc., 88 LaSalle Road, West Hartford, Connecticut, requesting amendment of Section 12.111(d) to allow radiotelephony operations (A3 emission) on the frequencies between 14,200 kc. and 14,350 kc., rather than on the frequencies 14,200 and 14,300 kc. as presently allowed. In an earlier petition, The League asked that such operations be restricted to holders of an Advanced or Extra Class license. However, the amended request does not contain this limitation. In other words, the effect of this requested amendment would be to widen the permissible limits for A3 emission by 50 kc.

3. The League points out that in 1954 the Commission, when faced with an identical request to permit radiotelephony between the frequencies 14,200 kc. to 14,350 kc., dismissed the proposed amendment. At that time, the Commission in Docket 10927, in the Matter of Petitions of the American Radio Relay League for Amendment of Part 18, Rules Governing Amateur Radio Service stated: “In view of the fact that the effect of the availability of the 21 Mc. amateur frequency band upon congestion in the 14 and 28 Mc. bands cannot be assessed until sometime in the future when propagation conditions are such as to encourage increased activity in the 21 and 28 Mc. bands, the Commission believes it to be in the best interest of the Amateur Radio Service to defer further consideration of expansion of the 14 and 28 Mc. sub-bands for telephony.”

4. In support of its petition, the League states that although optimum conditions operation in the 21 Mc. telephony sub-band have not been reached, “there are openings almost daily for long-distance communications at the 21 Mc. frequency. During these regular occurrences, the 21 Mc. telephony sub-band is also extremely crowded. But the slightest decrease in congestion of the 14 Mc. radio-telephony sub-band has been noticed. With even better propagation conditions yet to come, it is already obvious that use of the 21 Mc. band is no answer to overcrowding in the 14 Mc. band.”

5. The petitioner further states that since 1954 when the 21 Mc. band became available, the number of amateur licenses has increased by approximately one-third. Since all indications point to a continuation of this rate of growth, the problem of overcrowding will become more serious. In addition to the contemplated larger number of licensees, the League avers that “the trend to voice operation in recent years has resulted in a condition of overcrowding to an extreme unusual even in amateur experience.” It would appear that this mode of operation will correspondingly increase in the future thus creating a need for relief to lessen the ever-growing radiotelephony congestion in the 14 Mc. band.

6. The Commission is persuaded that the facts stated by petitioner in support of the requested amendment warrant reconsideration of the conclusions rendered in Docket number 10927.

7. In view of the foregoing, the Commission is on this date issuing a Notice of Proposed Rule Making to amend Section 12.111(d) in accord with this petition by permitting radiotelephony operations on the frequencies between 14,200 kc. and 14,350 kc. rather than the present 14,200-14,300 kc. limit.

8. The authority for the amendment proposed herein is contained in Sections 4(f) and 303(1) of the Communications Act of 1934, as amended.

9. Any interested person who is of the opinion that the proposed amendment should not be adopted or should not be adopted in the form set forth herein, and any person desiring to support this proposal, may file with the Commission on or before May 1, 1959, a written statement or brief setting forth his comments. Replies to such comments may be filed within ten days from the last date for filing original comments. No additional comments may be filed unless (1) specifically requested by the Commission, or (2) good cause for the filing thereof is established. The Commission will consider all such comments prior to taking final action in this matter, and if comments are submitted warranting oral argument, notice of the time and place of such oral argument will be given.

10. In accordance with the provisions of Section 1.54 of the Commission’s Rules and Regulations, an original and (Continued on page 170)
L. A. Council to Demonstrate

Amateur Activities for

CCIR Delegates

Using the specially assigned call letters K6USA, the Los Angeles Council of Radio Clubs will install and operate an elaborate amateur station in the Biltmore Hotel for the purpose of demonstrating activities of the amateur radio service to foreign delegates attending the Ninth Plenary Session of the International Radio Consultative Committee (CCIR) commencing April 1.

CCIR is an organization which conducts studies of technical radio problems of international radio interest and recommends solutions for consideration by the administrative radio conferences, such as the one scheduled to meet in Geneva later this year. (It does not deal with allocations, however.) Some 90 nations will be represented at the Los Angeles meeting, which is expected to last six weeks.

Sponsored by the Department of State, which acts as host for the overall meeting, a Government-industry committee is planning various outside activities for the visiting delegates. Under this group, an Amateur Activities Committee has been established with Herbert Hoover, jr., W6ZI, as honorary chairman, and Ray Meyers, W6MLZ, ARRL Southwestern Division Director, as chairman. Vice-chairmen are William S. Grenfell, W4GF, Chief of the Amateur & Disaster Services Section of FCC; Howard Shepherd, jr., W6QJW, attorney; and Merrill Swan, W6AEE, of Cannon Electric Co. George W. Bailey, W2KII, is chairman of the overall budget committee.

K6USA will operate on all modes and most bands. Amateurs throughout southern California — and perhaps some from Arizona — will volunteer to stand watches at the station. The Southern California DX Club will furnish DXperts as chief operators, since special emphasis will be on foreign contacts and third-party messages will be handled where regulations permit. ARRL literature will be distributed to acquaint foreign delegates with amateur radio and its public service functions.

The Biltmore Hotel is furnishing a room on its eleventh floor for the amateur installation and providing engineering help in rooftop antenna installations. Cooperating manufacturers include Cannon, Collins, Eldico, Halleraiters, National Wire & Cable, Pearson-Holt, and Tri-Ex. Special QSL cards will be provided by Haggerty Radio.

Watch for K6USA starting April 1.
The QS-59 is a radically new approach to receiver design. Two oscilloscopes on the panel provide simultaneous panoramic observation of three adjacent amateur bands and continuous monitoring of the selectivity settings and threats of QRM.

The group of concentric knobs at the left control the bandwidth and slope characteristics of the i.f. amplifier and the depth and position of the Q multiplier notch. The three knobs at the right handle i.f. and a.f. gain and the b.f.o. pitch.

Die-cast panels and chassis contribute to the mechanical stability of the receiver, and its compactness is obtained through the use of printed circuits and transistors in the i.f., audio and control circuits. The r.f. sections use saturable reactors for tuning.

The QS-59 Communications Receiver

One of the best-kept secrets of the radio industry has been the development of the QS-59 communications receiver. In contrast to the usual advance publicity and trade-show scuttlebutt, this receiver is being offered to the amateur with none of the traditional fanfare that accompanies such an event. However, the receiver is so far ahead of anything that has been available that the immediate acceptance of the receiver is a foregone conclusion.

Some of the ARRL Headquarters staff were fortunate enough to have enjoyed the confidence of the manufacturer and to have been in on the advance planning of this revolutionary approach to amateur reception, and as a result the first receiver off the production line was shipped to the League lab for appraisal and evaluation. Frankly, we don't know where to begin to describe it!

Basically the receiver is a single-conversion superheterodyne using an i.f. at 2.3 Mc. It covers the amateur bands only, from 80 through 10 meters inclusive. The accessory equipment and operating aids are what make it so strikingly different. Looking at the die-cast panel of the receiver, the large 3-inch tuning knob is in the center, below a slide-rule tuning scale that shows only the band being tuned. A square-faced oscilloscope to the left of the dial gives a panoramic presentation of the signal being received and the spectrum ±5 kc. either side. The i.f. selectivity is continuously variable, and the slope and frequency of each side of the pass band are also continuously variable. To indicate to the operator how the signal is positioned in the pass band, where the interference is and how it can be rejected, the selectivity positioning controls (slope and frequency) are ganged to individual transparent masks on which are stamped white lines showing the sides of the pass band. As the frequency of one side of the pass band is changed, the corresponding mask moves horizontally, and as the slope is changed the mask is canted accordingly. A third mask, carrying the rejection notch offered by the Q Multiplier, moves up and down with a notch depth control and horizontally with the Q Multiplier frequency control. A fourth mask, carrying a single engraved vertical line to represent the b.f.o. frequency, moves back and forth across the pass band as the b.f.o. pitch control is changed. When the b.f.o. is switched off, edge-lighting of the b.f.o. mask is also removed and the b.f.o. line becomes invisible. As a result of these overlapping masks on the scope face, the operator has at all times a visual picture of the received signal, how it is positioned with respect to the i.f. pass band, and the relative position of any potential interference. No S meter is required, of course, because the amplitude of the signal in the scope is a measure of the signal strength. Dynamic compression in the panoramic channel provides an 80-db. range that will take care of most conditions without running off the scope.

The continuously-variable selectivity in the i.f. amplifier is obtained through the use of recently-developed low- and high-pass crystal lattice filters that can be varied in cut-off frequency and slope. The block diagram of the basic receiver, Fig. 1, shows the position of the filters in the i.f. amplifier. The first filter following the mixer is a fixed bandpass filter 7 kc. wide and -6 db. and 10 kc. wide at -60 db., which affords initial protection to the i.f. amplifier. The range of adjustment of the high- and low-pass filters is such that effective bandwidths of 180 cycles to 7 kc. at -6 db. can be obtained, with 6- to 60-db. shape factors of from 1.19 to 3, within the restrictions imposed by the 10-ke. pass band at -60 db. of the fixed filter. Following the Q multiplier (second i.f. stage), the signal channel is quite conventional in the detector, audio and b.f.o. circuits.

The single bit of circuit wizardry that makes so many of the operating innovations possible in this receiver is the use in the tuned circuits of saturable-reactor tuning. Instead of the conventional variable capacitors or permeability-
tuned inductors, the r.f. circuits (r.f., mixer and oscillator) all use saturable reactors that are tuned by the current changes through control coils on the small toroid forms. Manual tuning of a "front end" for any band is accomplished through a three-gang potentiometer that varies a small direct current through the applicable control coils. This resistance tuning, through a 15:1 reduction drive, is unusually smooth, with no trace of backlash (or hysteresis), although we would have liked it a bit better if the dial could be "spun" a little faster. However, this is really a personal prejudice, because three tuning rates (10 kc., 50 kc. and 200 kc. per knob rotation) are available at the flip of a switch that cuts in suitable shunts and biases. It will seem strange to many operators to find miniature potentiometers used for trimming the r.f. circuits along with the more familiar adjustable capacitors, but there are a number of new concepts in this receiver one must become accustomed to.

One of the more attractive features of the QS-59 is to be found in its perfected automatic frequency control for use in the reception of single sideband. It is a conventional type of a.f.c. (aside from its use of a quartz-crystal discriminator), and its inclusion is made possible through the use of the saturation-tuned front end and the extreme sensitivity of the receiver. Most sideband signals suppress the carrier only 40 or 50 db., enough to be negligible in the usual receiver but a usable signal in the QS-59. As a result of the a.f.c., a sideband signal that is mistuned by as much as 150 cycles will be pulled back immediately to perfect phase synchronization by the a.f.c. working in conjunction with the h.f.o. Of course the b.f.o. has to be set up properly on the pass band, but this is a simple matter of checking on the positioning of the masks on the signal oscilloscope. Using this feature for the reception of s.s.b. is a revelation, and it makes tuning in a sideband signal no more difficult than tuning in a broadcast station on a car radio. With this feature switched in, it is just as easy to recognize a sideband operator by his voice as it was in the old days of a.m.

**Triple Panoramic**

So far of course the receiver is merely a superlative job that any one of three or four enterprising manufacturers might have developed within the next 10 years. But the real feature, the one that will endear the QS-59 to the hearts of DX and contest men everywhere, is the inclusion of "triple panoramic reception." A 4-inch 3-trace scope to the right of the tuning scale furnishes a panoramic representation of three bands at any instant. The middle trace shows the band in use, the top trace the next low-frequency band, and the bottom trace the next high-frequency band. These traces are controlled by the band switch, so that the middle trace is always the band the operator is tuning. The middle trace moves horizontally with manual tuning as in conventional panoramic reception, but the top and bottom traces remain fixed and show the entire bands at all times. Thus when the operator is tuning the 15-meter band, he can watch 20 and 10 for pile-ups and openings! When tuning 10 or 80, the next two lower or higher bands are shown on the outside traces.

It probably isn't "cricket" to criticize a receiver that represents such a giant stride forward, but after several weeks of operation with it we were able to spot an improvement that should be considered for the next model. The 3-band panoramic reception was found to be invaluable for spotting desirable signals, but a directly-calibrated frequency scale on the panoramic traces would have allowed us to tune more quickly to a pile-up on another band. When there is more than one pile-up it is sometimes confusing to know which one to tackle first.

A feature that will appeal to any DX man with over 275 countries is the auto-tune device. This is simply a very slow sweep of the signal channel by automatic means. The sweep automatically stops on each signal that is weaker than S7, and holds on that signal for approximately 30 seconds before releasing and moving on to the next. This allows the tired DX man to rest on a couch in the shack while keeping an
of the woes that come pouring through your receiver to a man and the next time you are the Gabriel who is bringing him news of joy; you hear his little child trying to pipe a "Hello Daddy" over thousands of miles of the other; and you smile as you hear a fond mother reminding her bearded son to keep his feet dry and not to eat cold. In every case, the amateur operator is in the middle and in the midst of every family. I don't know which area gives the greater thrill to operate from here or to operate from there, as the gratitude expressed is most rewarding. We have all experienced the difficulty in trying to hang up the telephone with a mother you have just completed a contact for — you learn all about her boy from infancy to the present day as she thanks you for bringing him back to her; or the exultation punctuated with sobs of the wife who has just been reunited with her husband on the other side of the world. Perhaps the operators at the base see their efforts more clearly rewarded. There you can watch a man's face as you hand him a ham-

**Edison Award to K2KGJ**

*(Continued from page 37)*

happened in Antarctica has also happened in other camps of America to the exiles away from home... These are the real heroes who have brought a good deal of gratitude expressed is most rewarding. We have all experienced the difficulty in trying to hang up the telephone with a mother you have just completed a contact for — you learn all about her boy from infancy to the present day as she thanks you for bringing him back to her; or the exultation punctuated with sobs of the wife who has just been reunited with her husband on the other side of the world. Perhaps the operators at the base see their efforts more clearly rewarded. There you can watch a man's face as you hand him a ham-

*(Continued on page 170)*
CONDUCTED BY ELEANOR WILSON,* WIQON

TO RESORT TO AN OLD PROVERB: "ONE PICTURE IS WORTH A THOUSAND WORDS." HERE'S THE PICTURE WE'LL SPARE YOU THE THOUSAND WORDS WE MIGHT HAVE WRITTEN IN AN EFFORT TO STIR UP A LITTLE ENTHUSIASM FOR "DO-IT-YOURSELF" BUILDING OF RADIO GEAR. (YES, WE KNOW THAT ANY OMS WHO PERCHANCE ARE READING THIS HAVE ALREADY HAD THEIR ENTHUSIASM AROUSED, AND NOT NECESSARILY FOR BUILDING EQUIPMENT, BUT WE'RE THINKING OF YLS ONLY NOW.)

HANDY HINTS

THE FOLLOWING IDEAS CONTRIBUTED BY MARGE CAMPBELL, K4RNS, ARE REPRINTED FROM THE JANUARY 1959 ISSUE OF FLORIDA SKIP, A FLORIDA AMATEUR PUBLICATION EDITED BY OM W4IYT. IF YOU HAVE HAPPENED UPON SIMILAR LITTLE HELPFUL HINTS WHICH ENABLE YOU TO ENJOY HAMMING MORE THAN EVER, HOW ABOUT SHAREING YOUR DISCOVERIES WITH US TOO?

1. I WATCH ALL PUBLICATIONS FOR PICTURES OF OMS AND YLS WHO I HAVE WORKED AND FOR WHOM I HAVE QSL CARDS. I CUT OUT THE PICTURE AND ATTACH IT TO THE QSL, SO WHEN I QSO WITH THEM ANOTHER TIME I HAVE ONLY TO LOOK AT THE CARD AND KNOW WHAT THEY LOOK LIKE. MAKES IT MORE INTIMATE—Huh?

2. BEING A CERTIFICATE HOUND AND NOT HAVING HANG-UP SPACE FOR A LOT OF FRAMES, I PRESERVE MY CERTIFICATES IN THE FOLLOWING MANNER: PLACE CERTIFICATES ON CARDBOARD THE SAME SIZE AS THE CERTIFICATE, COVER WITH CLEAR PLASTIC PAPER (SARAN WRAP IS PERFECT) OR ANYTHING SIMILAR, WRAP AROUND SO IT CAN BE SECURED IN BACK OF THE CARDBOARD. THEY CAN BE TACKED UP LIKE QSL CARDS OR Laid FLAT IN A DRAWER.

3. I LIST ALL OF MY CONTACTS IN A LOOSELEAF BOOK IN ZONES, AND ALPHABETICALLY WITH OMS AND YLS SEPARATELY. IT IS VERY HANDY FOR QUICK REFERENCE, ESPECIALLY IN CHECKING FOR CERTIFICATE CONTACTS. I PLACE THE DATE OF THE CONTACT IN PENCIL AND WHEN I RECEIVE THE QSL CARD, I ERASE IT, THEN I KNOW I CAN COUNT HIM DEFINITELY.

THE GULF AREA YL AMATEUR RADIO KLUB PLANS TO DISPLAY EXAMPLES OF VARIOUS CERTIFICATES OFFERED BY YL CLUBS THROUGHOUT THE COUNTRY AT ITS BOOTH AT THE FORTHCOMING ARRL NATIONAL CONVENTION IN GALVESTON. GAYLARK REQUESTS CERTIFICATE CUSTODIANS TO SEND SAMPLE CERTIFICATES AND INFORMATION ON HOW TO OBTAIN THEM TO LILIAN BEEBE, W5EGD, 2503 FOREST OAKS, HOUSTON, TEXAS.

THE BEAUTEOUS YL GRACEFULLY WIELDING THE SOLDERING GUN AND LONG-NOSED PLIARS IS MISS JOAN THOMPSON OF WASHINGTON, D. C. ALAS, KN3AMT'S NOVICE TICKET JUST EXPIRED BUT EXPECT TO HEAR JOAN BACK ON THE AIR WITH A GENERAL CLASS LICENSE AFTER SHE RETURNS FROM CHINA, WHERE SHE HAS BEEN ON A MISSION FOR THE CHINESE EMBASSY.

WE'LL RECOMMEND JOAN FOR AN AD FOR KIT-BUILDING ANYTIME. WHAT MODEL COULD EXHIBIT BETTER TECHNIQUE? SHE MAKES BUILDING LOOK LIKE THE THING TO DO, DOESN'T SHE, GIRLS?

* YL EDITOR, QST: PLEASE SEND ALL NEWS NOTES TO WIQON'S HOME ADDRESS: 318 PISHER ST., WALPOLE, MASS.
KEEPING UP WITH THE GIRLS

CLUBS:

Polar Amateur Radio Klub of Alaska — Eighteen members attended the monthly meeting in February. Announcement was made of Rose Cowles, KL7ZR's appointment as YLRL district chairman. Gert, KL7ALZ, co-editor of the PARKA Hi-Lites newsletter, reminds all amateurs of the PARKA certificate which is issued upon proof of contact with seven members of the club. Stamped addressed envelope for return of QSLs and sufficient postage for return of the certificate should be mailed to custodian KL7ALZ at her new address: Star Route "A", Box 4017, Spenard, Alaska.

YLRL — The new custodian of the DX-YL award is Maxine Willa, W6UFA, 6509 Wyneopa Ave., Los Angeles 15, California. Vada Letcher, W6CJE, has been appointed club Historian.

N.Y.C. YLRL — New officers pres. K2PDN; v.p. W2EUL; treas. W2EBO; and sec'y. Helen Zuparn, were installed at a February luncheon in the big city.

Camelot Capital Chirps—1959 officers pres. K6PWH; v.p. K6TVJ; sec'y. K6GKR were installed at the second anniversary dinner in January. Guest dinner speaker OM W6BYB told of his recent South Seas trip.

Chirp net meets Thursday at 8:00 p.m. PST on 3915 kn. At 9:00 P.M. members stand by for CM calls.

Hoosier Amateur Wameris Klub — The passing of member Lulu Perrine, K9BZU, on Dec. 19, 1958, is sadly noted. Lulu received her amateur license in 1957 at the age of 75. Shortly before her death she was appointed and enthusiastically accepted the office of membership chairman for the HAWK. Lulu will be greatly missed by her ham friends in Indiana and throughout the country.

Technician Linda Stephens Grant, K4JZN, operates six meters, mobile and fixed, in between senior Home Economics classes at the University of Tennessee. Last June Linda was married to OM W4UVU in a ceremony which was officiated by minister K4DOC and which included several Athens, Tenn. hams in the wedding party.

Coming YL Get-Togethers

Women Radio Operators of New England

May 2, Pillar House, Newton, Mass. on Route 128 near Route B. All W1 YLs cordially invited to attend annual Spring luncheon of WRONE. Contact Onie Woodward, W1ZEN.

Ninth Midwest YL Convention

May 22-24, Milwaukee, Wisconsin, at the Polly Valley Motel. Mary Meyer, W8RJL, Chairman.

Eleventh ARRL National Convention — YL Program

June 19-21, Galveston, Texas. Program for licensed YLs will be handled by members of GAYLARK, W5EGD, Lillian Beebe, President.

ARRL New England Division Convention — YL Program

Sept. 5 and 6, Hartford, Connecticut, at the Statler Hotel. YLs from the six New England states won't want to miss this one. Convention attendance will be limited, so reserve Labor Day week end right now and watch for further details.

Licensed as a novice in 1956, Miss Velma Keister of Oakmont, Pa., received her general class license last November at the age of 69. As K3AIF Miss Keister operates in the 3.5 Mc. band, c.w. or phone, each morning. Her brother, W3DHU, is on the air from the same QTH. K3AIF and W3DHU are both retired high school teachers. (photo via W3HKV)

April 1959
Smiling sprightly at the birdie are 15 members of the GAYIARK (Gulf Area YL ARKib) who got together for the klub's first anniversary party. K5BJU was presented with a linen tablecloth made by K5SFD in appreciation of Harriett's outstanding efforts as the group’s first president. Installed as 1959 officers were W5EGD, president; K5PFF, v.p.; K5SPD, secy.; and K5HTO, historian. The photo shows K5SYT, KNSTW, K5SPD, K5PFF, and W5JED in the first row; K5ALF, K5MIZ, W5ERH, K5BJU, W5CXM, and W5DRA in the second row; and K5JGC, W5ZPD, K5MET/S without seats, looking at them all from left to right.

Miscellany

In an appearance on the CBS Chicago TV show “Shopping with Miss Lee,” K9BUS, Dolly, and W9STR, Betty, contacted KG1FR in Greenland, using a sideband rig set up on the stage. A salient selling point of ham radio was effectively demonstrated when a member of the studio audience stepped forth to chat with her son in Greenland. The show was arranged by the Chicago Radio Council. In Mexico for four months doing biological research, WH2F, Dot, will help her OM write a book on their findings . . . K1LAM, Ethel, is editor of a new edition of the Washington Area Ham Index of the TVI Committee . . . During a month’s vacation in sunny Sarasota famous BPLer W5CUL, Mac, was made an honorary member of the Floridora YL club . . . K1CLX is another “YL deer-slayer.” Alice skipped duties as treasurer of the Blue Ridge Net long enough to shoot a deer for her freezer . . . K0KLR’s phone score of 555 points was inadvertently omitted in the YLRL AP results given in the Feb. column . . . Baby girls were born in January to well-known D.C. YL W3TSC, Camille, and to V6RL Harmonie’s V6ENK, Wanda. W3TSC was recently commended for the excellence of her work by the Office of the Secretary of Defense. K9CZQ, Pat, recently joined the ranks of YLs who have six or more junior operators . . . Have you read any of the “Dear Mabel, Love, Glades” letters in the Florida Skip reprinted in HAWK’s Blue View?

Please Write Your Postal Zone Number

• By including your correct zone number each time you write your address you can speed delivery of your own mail and help cut Post Office costs. The Post Office must do extra work to deliver each letter, parcel and magazine that does not show the correct postal zone number in the address. It will help you — it will help the Post Office — and it will help us. Thanks.
How:

A young Greek DX man of about 2400 years ago flung away his blazing fagot in disgust and took off down a hill in the darkening Aegean night. Peer and squat as he might, he had failed to perceive clear acknowledgment of his efforts to signal the Acropolis. The only recourse: an eleven-mile run to headquarters.

As he loped along the surest paths toward Athens he thought grimly of bitter days that had befallen his homeland. The Peloponnesian and Boeotian confederacies had joined to attack the Athenian empire in force while horrors of plague terrified the fading glory of Pericles. The Fates apparently had agreed to sever the imperial destiny and lie sensed Atropos running softly behind him, her shears sharpened and poised.

Signal fires from distant hills had told him that the Spartans were moving on Salamis. Why had his own signal failed to relay these grave tidings? Or, if his light had been seen, why had the heights of Athens failed to respond? The leaders must be warned without delay, so he increased his reckless pace, jamming his lungs with crisp valley air. It was conceivable that his message spelled life or death for empire. He sped courageously on.

At length our courier reached the Acropolis signal center on route the Athenian GHQ. He stopped off, caught his breath, and learned with great relief that his relay had been solidly copied. He then politely informed the signal officer that the headquarters beacon was indistinct and forced him to confirm receipt in person.

"Oh yeah?" rasped the lieutenant. "Well, the chief wants to see you. And, after he's through with you, report right back here on the double for some real cool k.p."

The hapless runner whipped a scribbled potsherd from his tunic and pointed out to the signal officer that he was an accredited member of the Honest Reports Club. "Nuts, OB," snapped his superior. "I'm HRC, too — the Honest Reactions Club — and I don't like it. That'll be k.p. for a solid season, soldier."

Our exhausted signalman next staggered into the commander's quarters and officially confirmed that Sparta was out to make mincemeat of Salamis. This was the last straw for the harried O.O., already burdened by bad news, so he meted out some Eastern justice and clapped the unfortunate lad into solitary confinement.

A few days later some joker dashed into those same headquarters with the false but cheery report that Phormio had dabbled from Aegina and that all the Spartans were rushing up to

weed. The muttonhead wound up with a promotion, a land grant and a wealthy marriage.

This racy yarn's moral, as old as history, is plain to see: You can dish out all the frankly honest reports you want, OM, but you'll find scant enthusiastic appreciation.

What:

Poor heat Nick played a sort of rosin' roulette but somebody else hit the jackpot. And have you heard the latest definition of the most honest generation? Flic-ups in an ARL DX Contest, and it's true. The great pitched battle on DX fronts is over for another year, so we settle back to the usual heavy amplifying, patrol and commando actions. Here's a late reconnaissance report from front line observers in all DX sectors...

80 c.w., aided by a timely DX Test fillip, enjoys a lively spring. Reporters Win TS YIS, KICMR, KG5DV and W8GQ, scored with DMR4IN 21 hours (GMT, EBD 1, F8 2967, STF 925 ke. above the lower band edge. 8c snore. DD8UB 0, HH151 19. KV4AA (23) 1. PI4AK (15) 3, KB4SK 4 (25), USSUR 6, YL41 DEP 10) 23, SHB 1) 1 and several ZL troopers. And in addition to the usual bar of garden-type Europeans — I7/M, DL 151, LA 1011, OZ, GMV, etc. — this strip of Cacha appeared: Oka 1U 99 (5) 5, KAM 2 (18) 4, KAY (3) 5, KLV 0-1, LIR (1) 1, SKAQ 25 (5), SKAS 1-5, SKB 0-1, SKQ 38 (3) 5 and SKIE (26) 5, most of these reconnaissanced by HQ's own WITS of insomnious fame.

40 c.w. completed its comeback conveniently, supplying staff like CN29HK 21-25, D8KAGH (3) 0, H4V 3 (6), S4GK 15-21, AH3VR 6 (25) 4, H14KH, H8BEP 6 (1) 1, JA5 1A5, IA50 1A5H, IA5J 1B5K, IC2I 1D1, I11K 1MK, I121 2AQ, IA1S 3AKX 3BJ 3DV 55Y 4HLM, 4AK 6YB 8AE 8F0 (most of these engaged by WP6J, LJZ 1A 4, KU, MP38BE, ODSIA 2) 4, OE0M1 3) 0, SPD 1KAA 3), I171 21-21, OH1 1J1, 05V 1-2, SCP 155 4, T49B 1I 3, VS, U85S KAB UW VPT WP ZF, OR2KAS 3, VP7BP 4 (2), YJ4S F1 (10) 0 and LA, plus the usual bandy AMC 21 KZ, and 75 crowded a few unfortunate operators Win NY TS, KICMR, K3AHT, KL8Q, K3BT, WGBD, KG6Y, W75 DJU YCB, W8YGR, KNGAB, CO1TS and KP4AOO — Forty phones slip in a sleeper now and then, CO2US, K3BVY and W8QKB (115 worked on 7 Me.) chopped through to G3BID, HAIM, P77VBR, SM10L (50) and VP3IG (274), mostly between

*4822 West Berteau Avenue, Chicago 41, Ill.
6 and 8 hours. . . . Forty Novice news is light. KN6-TUN specifies the workability of WH6CXO. But K6DVI writes, "I8AE6 says many KN6 and WV6 lads are being heard in Japan but they fail to spot our 7190 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls. Our Novices should be informed that it's not illegal to listen below 7150 kc. With 15 meters sniffing off liam freshmen, heard in Japan but they fail to spot our 7149 kc. 300-watt calls.

15 c.w. slackens pace, as we last implied, but W1TJ, K1s CBR CDN, K3s BVN CTV, K4s AYU VY3, K5s CDN W4D, K6s CDN LA5, K7s BWN, K8s CDN K6H (70/53), K9s BWN, K10s CDN (30/12), K11s BWN (10/07), K12s CDN, K13s BWN, K14s CDN, K15s BWN, K16s CDN, K17s BWN, K18s CDN, K19s BWN, K20s CDN, K21s BWN, K22s CDN, K23s BWN, K24s CDN, K25s BWN, K26s CDN, K27s BWN, K28s CDN, K29s BWN, K30s CDN, K31s BWN, K32s CDN, K33s BWN, K34s CDN, K35s BWN, K36s CDN, K37s BWN, K38s CDN, K39s BWN, K40s CDN, K41s BWN, K42s CDN, K43s BWN, K44s CDN, K45s BWN, K46s CDN, K47s BWN, K48s CDN, K49s BWN, K50s CDN, K51s BWN, K52s CDN, K53s BWN, K54s CDN, K55s BWN, K56s CDN, K57s BWN, K58s CDN, K59s BWN, K60s CDN, K61s BWN, K62s CDN, K63s BWN, K64s CDN, K65s BWN, K66s CDN, K67s BWN, K68s CDN, K69s BWN, K70s CDN, K71s BWN, K72s CDN, K73s BWN, K74s CDN, K75s BWN, K76s CDN, K77s BWN, K78s CDN, K79s BWN, K80s CDN, K81s BWN, K82s CDN, K83s BWN, K84s CDN, K85s BWN, K86s CDN, K87s BWN, K88s CDN, K89s BWN, K90s CDN, K91s BWN, K92s CDN, K93s BWN, K94s CDN, K95s BWN, K96s CDN, K97s BWN, K98s CDN, K99s BWN.

16 phone, apparently the spectral capital of the VP world as indicated in the sampling to follow, provided K1CDN, W2TFE*, K3LYD* (57/06), K3s BWN CXC, K1s LRA 4YPY 4VJ 4/3, W6QQW, K9QGT, W7CVB, K7ABY, K9COC, W8TS, 1500: 0800: phone and CO2BUS with the

17 world's busiest bureaus. (Photo via W4CYY) QST for
Reykjavík's TF3PI is fairly new to the DX scene but already has supplied many first-TFs contacts on 20 c.w. that Dakar (305) 11, ZS9 and ZS2DW.

3V8s AC AO, 4X4s HK O. JK (48) 21, JLO 0-1, 5A3TQ 23 and 15 meters when Pall receives A3 authorization. That has supplied many first-TFs contacts on 20 c.w. That has supplied many first-TFs contacts on 20 c.w.

From K9EAB: "I have a supply of ZD2JM cards and will correspond to W/K requests for QSLs when s.a.e, are furnished. Any W/K who already has sent a card to John via bureau or direct to Reja or Kuduna, Nigeria, at drop a note giving date, GMT and RST of QSO: as soon as a check can be completed a ZD2JM QSL will be returned. On future contacts or on past contacts where no QSLs have yet been sent to ZD2JM, applicants' QSLs should go to K9EAB. Non-W/K stations can send their cards direct to ZD2JM via the address in March QBT or via bureau. John soon will receive a supply of blanks and then will pick up all back QSLs still due. Everyone sending QSL will receive one if QSL was bona fide. Regarding the VK9XU listing to follow, K2UYG understands the espn will return to W/EFT in June.

Oceania—Concerning his QSL endeavors on behalf of FO8AU and ZKI1A. W3GJY stresses the need for petitioners to use his current QSL Book address. "I now have FO8AU logs on hand for the period October 2, 1958, to January 17, 1959. My ZKI1A logs are complete from March 24, 1958, to February 2, 1959. Requests accompanied by s.a.e. must be answered by s.a.e. in bureau. In about a month John will begin clearing all unclaimed QSLs and will close to any further requests. John will close his QSL Book for card, "declares KQIP/KWQ, XYL of KWT>CQ.

In a recent report, W5SFT in June.

Where:

Asia—WZ7TH QSL service via W2CTN now terminates with a log transcript dating from October 15 through November 28, 1958. If no log transcript is received, the QSL manager will reply informing W5SFT in June.

The saints apparently corne marching in too noisy to suit visitor UB5DW as friend UC2AA steps on out with his usual DCF.

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April 1959
with the call SV8WT, possibly on 15 and 20 meters, mostly s.s.m. phone. Last week I visited that area and had a very successful trip. However, very little advance notice was given and the QSL situation was a tough one. This time, with advance information dispensed and the goodness of W1TAJ, the operation should be much more satisfactory. W1TAJ has a list of QSLs and my logs will be sent to him upon completion of this DXpedition."

"I will take care of QSL service for LA1LZ/p on Hope Island, Spitzbergen," announces OZ7FG. "At present I am receiving his log over the air (some 300 contacts so far) because Odd will not return to Norway before Avust and there is no mail boat. Addressed envelopes and International Reply Coupons are required." SM5AHK confirms, "I am handling QSLs for SM5WLN/LA/p, Murensen, Son, Spitzbergen. Logs go via radio because there is no winter mail. SM5WLN will remain there until summer.*

*W/K/V/X who work O3s FOR LTD MPN or CQs on their way to the Isle of Man this week, QD club supplied. Can obtain QSL satisfaction via K0FL. "Stamped self-addressed envelopes will be appreciated as well as use of QMT."

Here about…--Pastehonders for the W9EVT & Co. DXpedition to Serrana Bank, K5s BA and/or BB, can go to W9JU¥Y pending other advice. Mac writes, "S.s.m. will be required for direct QSL, otherwise through the bureau." K52EC, ex-WB6IWA and former ARRL director, reminds us that U.S. postage is n.e.c. down Canal Zone way and cannot be exchanged there. "Although the idea of sending foreign stamps to bring back rare or wanted QSLs is not original, the problem of acquiring such stamps has always loomed large. Regular stamp dealer just aren't interested in selling single stamps for this purpose and are not always aware of the correct value required to pay the cost of return mail," points out W2SAW. "With the QSL return problem being what it is, I decided to start my DX Stamp Service for those who want quick direct replies. This procedure also eeks the immense existing in areas where QRCs are not convertible. Check with Q9 for more detailed details."

The man from MLRS responsible for K5H matters writes W1TUW that OX3s should be QSLd via EDR (Uenmark) or direct, not through the K5H bureau. And OX3QG, as listed hereafter, tells W6GQ he desires his QSL direct."

"All F8/PX4A cards now have been sent out," says K2YX. "Any still lacking QSLs should comply with s.s.m." "At my W0BUR QTH I have been receiving cards for KG1CH. I know nothing of the situation, but do advise the problems of QSL senders. Possibly they have miscopied the call." This from KG5AT/W0BUR who, along with KG0BR and KG2QF, offers to assist overseas I.X with bona-fide QSL difficulties... VP3BY emphasizes that his call is usable except when otherwise indicated during QSO (see preceding text) and that W0BUK/CTH offers K5H cards of 100 per cent QSL upon return to Haverford. Perhaps one or more of the following will come in handy for you:

CE2SIC, Box 13006, Santiago, Chile
CE2WJO, Box 8951, Caracas, Venezuela
CN8TJ (via WW8J or via AAE6)
CRAAX (via 4RA1A)
CRACL (see preceding text)
DJ4KQ, G. Gudin, Blumenstrasse 4, Goepzingen, Germany
E11AE (via E11AQ)
P7GC (via WW8J)
P7TF, Lt. H. Riddle, III, 40th Troop Carrier Sdn., APO 296, New York, N. Y.
F6BA, Pierre Minot, B. P. 77, Yaounde, Camerouns

F88BX, c/o PTT, Ootzandendijk, Haute-Volta, F. W. A.
F9WQ (via WW8F)
F0WJID, Box 894, Braunschweig, F. R. A.
F85EC, Y. K. Mendel, Box 78, W.N.S. New Hebrides
F77AE, L. Charnont, Sainte, New Hebrides
G3NBE (via VE7ABE)
H6AB, 2nd. Central Radio Club, P. O. Box 183, Budapest 1, Hungary
H1ITC (to H1ITC(1)
H5AHI, 14th. Transit Transport, U.S. Embassy, Quito, Ecuador
H1TVE, P.O. Box 59, Quito, Ecuador
H1IAD, P. O. Box 143, Port-au-Prince, Haiti
H3BFE, P. Box. Maximo Gomez 26a, Ciudad Trujillo, D.S.D., Dominican Republic
H1GKJ, M. Pehnora, P.O. Box 50, Cartagena, Colombia
H1OF2C, C. Coleman, Casa 6, Colonizia Victoria, San Pedro Sula, Honduras
H4GN, J. Nuttson, Box 16, Mogadisho, Somalia
I81GQ (via OZ7FG)
K0CC, USCG, Lornen Sdn., APO 815, San Francisco, Calif.
K1AD, APO 815, San Francisco, Calif.
K2TAZ, 3rd Radio Club, P. O. Box 20, Navy 230, FPO, Seattle, Wash.
K1QWV, F. Reed, Jr. (W6WQ), 2875 OEEIA Sdn., Box 26, APO 324, San Francisco, Calif.
KS1s BA BB (via W9JUW)
L8JF, c/o OZ7FG
LU6DFY, A. Dacrun, Grand Hotel International, Ezeiza Airport, Buenos Aires, Argentina
MW7OBG, Box 37, Aerodrome, Balicob Island, Persian Gulf
MT4TQ, O. Perez, Calle Canal 62, Sevilla, Spain
OH3AAA/OH3K (via OH3JF)
PIAER, R. Stolz, Box 71, Gießen, Rheinland-Pfalz, Oostenrijk
Q0EB, J. Schmier, P.O. Box 20656, Elisabethville, Belgian Congo
Q1JG, S. Jorgensen, Upernavik, Greenland
PL1LDB, 21 Radio Cie, Orgele Nassauro Karonen, Bergen on Zoom, Netherlands
Q4RRS, RMAF Radio Amateur Club, Luchtmechanische School, Koninquiez 29a, Scheerfontein-Armen, Netherlands
ex-PK4DA (via P47PM)
PYBNA, F. Serrano, Coixa Postal 5392, Rio de Janeiro, Brazil
Q1A1, A. Sjoberman, c/o Radiodienst, Zandery Airport, Surinam
SM5WN/LA/p (via SM5AIHR)
W4TAJ/4 (via W4TAJ)
TF2DW, APO 1, New York, N. Y.
TF3T, APO 1, New York, N. Y.
TG9HB, P. Lanezegner (HB9PFL), Box 680, Guatemala City, Guatemala
ULSAY, A. Malys, Poste Restante, Moscow, U.S.S.R.
VK4AI (to VK3DI)
VK5RO, c/o 4E3T, Port Morebey, P.T., via Australia
VK9XN (via MA1HRS; see preceding text)
WP1A, Box 337, Belize, British Honduras
WP2G, A. Muro, P. O. Box 46, St. Georges, Grenada, W.I.
WP2HR, C. Henderson, Salt Pond Alley, St. Kitts, W.I.
WP2K, Golden Rock Airport, St. Kitts, W.I.
WP2SK (via W4FL)
WP3IG, P. O. Box 231, Georgetown, British Guiana
VP4KR, 70 St. James St., San Fernando, Trinidad
VP8GC (via RO8H)
VP8CV, P. O. Box 182, Port Stanley, Falkland Islands
VP8DN, P. Catlow, FIDS, via Port Stanley, Falkland Islands

The ladies are away, the fellowship is admirable and the QRN is nil—what a night for DX! W1BB's camera seems to have captured the essence of ham spirit in this photo of HB9CM (pipe) and HB9SM (camera), hunting 160-meter DX in HB9CM, is admirable and the QRN is nil—what a night for DX!
VS9AM's Don Trampler got plenty of DXercise dishing out Maldives QSOs prior to his recent return to England where he now awaits a G label. Don's distinctive side-wiper rests on a notepad near that DX-35 and AR-88 combo. "I've operated regular a.m., s.s.b. and c.w., and I say give me the key every time!" VS9AM's electronic assets fall to Vic Rendez, VS9MI, so continued Maldives availability seems assured.

points. For your total score multiply all QSO points by the number of Netherlands band-multipliers collected, these based on Dutch provinces as indicated by the following suffixes appended to PA callsign: D/H, Drente; F/R, Friesland; G, Gelderland; GR, Groningen; LB, Limburg; NE, Noord-Brabant; ZZ, Zuid-Holland; and ZL, Zeeland. To be eligible for merit certificates to be awarded to high scorers in selected areas, log transmits must be mailed to Contest Manager P. v.d. Berg, VERON, Keizerstraat 54, Gouda, Netherlands, no later than June 15, 1959. The battle cry is "CQ PA" and we hope to sign an undisclosed QSL card for several days commencing April 11. Phone and c.w. action is contemplated on all bands 3.5 through 28.0 MHz. Concerning his SV0WT/Crete project scheduled for this month, 1L4LS (W4WWNY) communicates: "Not positive as to the exact dates of operation yet although at any rate it will be early in April around 1600 on work days, no time limit on work ends." W1WPO of the ARRL DXCC desk tells us that ZZ1AF is program manager for a major ARDF (Radio Direction Find) project scheduled for the future, 1LDLS (W4WWNY) commenting: "Not positive as to the exact dates of operation yet although it will be early in April around 1600 on work days, no time limit on work ends." W1WPO notes: "This station is expected to sign an undisclosed call and the current working location is still under operation; the site is expected to be in the U.S.A. by 1000-1030 and 1000-1040 GMT on April 21, first Saturday of each month. Bob's initial monitoring produced no Radio News Radio Club, Japan DX Club, Ohio Valley Amateur Radio Association, Southern California DX Club, West Gulf DX Club, Williamette Valley DX Club and VERON's DXpress.

Whence:

Europe — Contest buffs, mark this: VERON (Netherlands) invites amateurs worldwide to participate in the Fourth Annual PACC DX Test to be held (c.w.) 1200 GMT on the 19th through 23rd of April this month (or 0100-0130 and 0100-0430 GMT the first Saturday of each month, 1L4LS (W4WWNY) communicates: "Not positive as to the exact dates of operation yet although at any rate it will be early in April around 1600 on work days, no time limit on work ends." W1WPO of the ARRL DXCC desk tells us that ZZ1AF is program manager for a major ARDF (Radio Direction Find) project scheduled for the future, 1LDLS (W4WWNY) commenting: "Not positive as to the exact dates of operation yet although it will be early in April around 1600 on work days, no time limit on work ends." W1WPO notes: "This station is expected to sign an undisclosed call and the current working location is still under operation; the site is expected to be in the U.S.A. by 1000-1030 and 1000-1040 GMT on April 21, first Saturday of each month. Bob's initial monitoring produced no Radio News Radio Club, Japan DX Club, Ohio Valley Amateur Radio Association, Southern California DX Club, West Gulf DX Club, Williamette Valley DX Club and VERON's DXpress.

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UA6UF does his share and more to keep Astrakhan on the DX map. Igor's 40 watts, 9-tube super and 66-foot wire are frequently found on 14 and 21 Mc. (Photo via W7DJU)
Jolly El8X has a host of W/K/VE phone friends on 10 and 15 meters and is 140/120 on the coax DXCC leader. The trim console houses Bryan's 100-watt 1625s modulated by a host of W/K/VE phone friends on 10 meters. El8X's potent two-band quad is a salient feature of County Limerick's verdant pastoral.

20.7, 72.0-72.8 and six higher ranges, phone or c.w. as you choose. Power below 21 Mc. is limited to 50 watts, 100 on higher freqs. Now that I have a European license I will be easier for me to pick up tickets for operation in PX DX A. J. Have recently visited such interesting spots as EP and YA, WGSA and W ASM-II matters. Sax is the first W2 to nab HS1E, works mostly 20 c.w. around 14,020, also a.m. with v.f.o.

SAX-1 to Iwo Jima from JA-land. KA0IM is noted near KWE-1000 on 28-Mc. c.w. 'Tis also said that AC4NC currently resides in Sierra Leone. . . . "There was no difficulty obtaining a VK call although we found ourselves second to Shilla, Japan, for some thirty years. "Receiving conditions are ideal down around 1100 GMT. VK0CC welcomes DX contacts with special reference to the VKCC DXCC. and expects to keep HSlC roiling till Stateside activity at this time.

Asia — HS1C (K2VOV, ex-W4-5-6-7RIM) sketches the Thaiiland picture in lines to W8KX: "HS1B is active on phone, a.s.a.p. on 10 and 15, also a little 20. HS1C works mostly 20 c.w. around 14,020, also a.m. on 10, and 15 meters in contests. HS1E is active on 20 and 15 phone plus some c.w. at times. HS1G has a gas generator with him on his jungle jaunts and hopes to add a portable home. . . . HS1J has a special keyer unit. . . . HS1K is on 14,020 kc. at times. . . . HS1L returns in September. "The ZK1AK shack has been overrun with bugs, crabs and flying pests that get under my shirt and tickle. This is enough, and then I pack up and leave. Bugs also get under the 829B and cause flais. . . . HS1M Field Lab is again on 7-Mc. Novices will be working 7000-7150 kc, beginning next month. High local QRM will cause them to do much listening, . . . . HS1N has a QST for.

Africa — ZL4JA, a field geologist for British Shell, signed W6AT's call for a short while before his own bureau was assigned to him. (Continued on page 158, QST.)

Oceania — VS5JA (ZL4JA), a field geologist for British Shell, signed W6AT's call for a short while before his own bureau was assigned to him. (Continued on page 158, QST.)

Andorra D/Exemtions for August . . . VK20L is intrigued by the 75-Mc. bands and reports on Tito ZGY and 6YW. . . . RAFIM still maintains there is no Franz Josef Land activity at this time.

Third Marine Division's 1600-staff 1625s modulated by 1625s, modified HRO-MX receiver and associated gadjetry. El8X's potent two-band quad is a salient feature of County Limerick's verdant pastoral.
Editor, QST:

I can’t help but express my appreciation for the fine business articles published in QST and written by David B. Fell, W7TN. I haven’t been a member of a National Traffic System net very long. These two articles have helped me greatly in the proper handling of traffic from beginning to end. Becoming a member of the NTS has helped me to more fully enjoy my hobby. The dealing with the “third party” is every bit as enjoyable as the dealing I have with my brother hams.

The proposition of “selling” an individual on the value of dispatching a non-essential message in the hope that later on something of greater importance will be handled is peculiar. I find that some people will accept with eagerness and delight; others will have no part of it. I go back to those who seem to enjoy being the “third party” and obtain additional traffic.

I have become interested in radio collecting and photography because such are the hobbies of others; they in turn have become interested in my hobby. It’s a kind of Golden Rule. I may be a philosopher for a moment.

Thank you again for making ham radio of greater enjoyment. The XYL is not an operator but does enjoy the traffic I handle for her. Now she thinks that ham radio might be O.K. after all, Hi!

— Hal Moore, W6DEP

121 Spencer Avenue
East Greenwich, Rhode Island

Editor, QST:

The February issue of QST was terrific. The articles on the c.w. equipment were very interesting and prove that the c.w. art has not been forgotten. Keep up the good work.

— Stephen E. Silverman, W5JMT

235 Harbor Road
Southport, Connecticut

Editor, QST:

. . . . Heartiest congratulations on the February issue of the hams’ “Matera Medica” — one reminiscient of the old tradition of “something for everybody.” I imagine by now others of the Old Guard must have buzzed you with the same sentiments. . . .

— Carlton A. Weidenhammer, W1ZL

2625 Hemlock
Vancouver 9, B. C.

Editor, QST:

You have certainly outdone yourselves in the February edition! I think it’s the best issue in a long time. Perhaps I like it so much because of a few articles that seem to have been written especially for the c.w. traffic fan, in which direction I already have a heavy list, Hi! So both the article on break-in appealed to me and to at least two other members of B.C.R.N., as I believe their problems will be answered by either of those particular setups.

Other than the above, I have no particular favorites — they were all good!

— Frank M. Oeurard, VE7AOT

LOVE OF THE SPORT

Old Mystic, Connecticut

Editor, QST:

Recently, I have been reading in QST much about the Novice operators. As the Novice has come in for such attention, my curiosity was stirred to the point of contacting a few and finding out something about them. I have come to the conclusion that other hams should do likewise. All in all, it was very much like going back in time some quarter century to the days when a 215 in the Hartley gave up enough soup to light the loop bulb.

On eighty I found them jammed into their frequency allocation with the 1, 2, 3 and 8 districts Novice stations all very audible, and well blended, and the QRM terrific. Cutting down the power to the final in order not to worsen the situation, I contacted about thirty novices in the above districts.

My investigation revealed them to be young and interested in ham radio in a way which would have pleased the Old Man. One little fellow, who boasted of running a solid ten watt input, could only go on the air when he could borrow a receiver from another ham who lived eight miles away and was not at home on week ends. This situation was due to improve in a matter of a few weeks as a birthday was approaching and there were high hopes that parts might become available then to construct a three-tube regenerator job (tubes already at hand).

One evening I heard a very faint CQ-PSE, CQ-PSE, coming up from the sixth or seventh depth of QRM, gave a call, and was answered at once by a rather shaky fist trying to send with first-class precision. This Novice was running 18 watts, had made two contacts in one week, had been on the air a little over a month, had worked three states so far toward a W5S, and wanted desperately to test antennas with someone at a distance. He had been studying the Handbook, tried two antennas (one put up in a snow storm), but couldn’t decide which gave the best result and was a little uncertain where his life was heading.

Another young gentleman sought advice about bringing up his code speed and asked for any criticism of his “fist.” He thought his ability to copy had increased and wondered if his sending was doing better. And, to be sure, there is the other type. Running the legal Novice limit and the fast running bug, they really stand out. Even so, the edges come off, and the bugs slow down. We are all human.

Based on my Novice contacts, I personally find the Novice operators a very deserving group. They are having a hard struggle due to very bad band-crowding conditions. They want to QSO to any length and they are not “report and run” contacts. I feel that they deserve and warrant the help of every ham operator.

The future of amateur radio in the years to come rests with those Novices who make the grade and carry forward the spirit.

— George E. Denecke, W9IGU

WASTED QSLs, II

Tekoa, Washington

Editor, QST:

I have just finished reading your section “Correspondence From Members” for February. I agree with most of the points mentioned in the letter “Wasted QSLs” by KBAGJ who works in the Davenport, Iowa, post office — except for one statement: “Please remember post cards are never forwarded unless the addressee guarantees forwarding postage.” According to the Postal Manual, post cards are first class mail and therefore are entitled to be forwarded to the addressee if such an address has been filed at the post office.

— Lloyd S. Hule, W7EAA

210 No. 4th Ave.
Pocatello, Idaho

Editor, QST:

I wish to correct KBAGJ in the statement “cards are never forwarded unless the addressee guarantees forwarding postage.” I quote from “Postal Manual — United States (Continued on page 161)

April 1959
About Giving Signal Reports. It's no news to those who read Correspondence that some amateurs very often place pleasant conversation and fine-spoken signal reports above strict scientific accuracy or honesty. No wonder this makes such descriptive terms as "clicks" and "ripple" etc. presently capable or difficult of memorization. (It was suggested that "thumps" and "back wave"). Any word, such as "chummy and frank" with your fellow amateur. Be vocal and share your problems. Ask his help in making RST Work. Of course we must not expect too much in the unsolicited report. Experienced operators judge conditions very quickly from knowledge of how much intelligence was got across, and if the answers were pertinent. How can we really get fully reliable on detailed reports when it seems vital? Our thought is to get really chummy and frank with your fellow amateur. Be vocal and share your problems. Ask his help in giving a critical report or conducting a test. You will invariably find him a fine fellow, just like yourself, willing to cooperate in a report by sending speed and operating procedures accordingly. For correct reporting of R, S or T it is highly important to follow the definitions in the reporting scales. Strength is a matter of audibility alone; readability depends on other conditions, such as the presence of noise or interference. The readability depends on how you are actually copying. July '58 QST (page 74) elaborates on this.

Those of the gang who find RST unsatisfactory in any way can always make checks with each other, consulting the available S-meters and tabulating their behavior as changes are made. Then too, there's the regular five-point QRK- and QSA-systems, which are shown in the League's Operating booklet.

QST for
FCC Confirms License Suspension. On page 78 of QST for last September, we reported that Samuel J. Roley, W6VUP of Beverly Hills, California had appealed a June 16, ’58 FCC order which would have suspended for a period of six months his Extra Class Amateur Radio Operator License. The matters at issue were (a) his use of power in excess of 1000 watts on Feb. 22, ’58 and (b) alleged failure to observe Sec. 12.151, which requires operation in accordance with good engineering and good amateur practice. This matter, FCC Docket No. 12524, was reviewed at a hearing held before an FCC Examiner Oct. 22, 1958 in Los Angeles, California; a 12-page FCC report covers the findings of fact and conclusions of law.

FCC designated the hearing (1) to determine whether licensee committed the violations set forth in the Order of Suspension; and (2) to determine if the facts or circumstances would warrant any change in FCC’s Order. By W6VUP’s own instruments the input to the 15-meter final on the occasion of FCC’s visit was measured at 1581 watts; FCC’s instruments gave 1381 watts; these when calibrated against the U. of C. standard indicated the true power as 1624 watts. “All the measurements showed the power input substantially in excess of 1000 watts. The power supply in the garage . . . appeared capable of developing power of 5000 watts. The final amplifier on this band used a single RCA 6166, a tube rated when new for 18 kilowatt service on 25 Me. This tube as well as others in the finals had been used in a TV station and given to him after being no longer satisfactory for commercial operation . . . the engineers recalled that Mr. Roley stated . . . that in initial operation power was in excess of 1000 watts but that in a half hour or so, due to a gassy condition of the tube, power would drift down to where it was under 1000 watts. This was deemed an admission that the operator was aware of the fact that on occasion he was using power in excess of 1000 watts . . . ."

"The amateur suggested that FCC’s observation of the signal from W6VUP during these tests was inaccurate . . ." (The transcripts indicate that the engineer in one car had parked this 200 yards away, from which point he could observe the position of the rotary beam and monitor the transmissions. The other engineers were in direct radio communication with this observer, from the amateur station, as the measurements were made. The FCC testimony indicated its engineer in 16 years with FCC had made over 5000 field intensity and other measurements, and that the observations this same day on this and other stations confirmed the fact that the operational conditions were stable and accurate and also that in each test instance, the needle indicating transmitted field strength went to the same identical spot.

Confirming its initial finding, FCC ordered (9 Dec. ’58) that effective Feb. 9, ’59 the Extra Class Amateur Radio Operator License (W6VUP) of Samuel J. Roley be suspended for a period of six months.

On Safety, "FCC will not permit any license it issues to be used as justification for an installation violating elementary standards of safety and good engineering practice . . . ." In addition to the violation of the rule establishing maximum authorized power (Sec. 12.131) which requires measurement equip-ment to be installed for any inputs to the final exceeding 900 watts, the four pages of FCC conclusions stress that amateur licensees installations in accordance with Sec. 12.151 . . . shall be operated in accordance with good engineering and good amateur practice." In the operating room was one final amplifier and in the garage, some 15 feet away, were the three final amplifiers for 15-, 20-, and 40-meter bands.

Noting that there was no shielding (common good engineering practice), the FCC report stated that the high voltage power supply was connected to the various amplifiers with open leads. There was no indication that any attempts had been made to install any protective device which would prevent a person from accidentally coming into contact with either the high voltage connections or the antenna leads. It was described as an obvious hazard of life and limb. "Statements of the amateur in this case include an apparent admission that the garage door was not locked and that he relied on the weight of the door and the noise that it made as a means of assuring himself that outsiders, including children, could not enter the garage." FCC’s conclusions emphasize that there was no statement in the record that the garage door was locked at any time or was equipped with a lock.

In FCC’s conclusions it was the Commission’s contention that the installation was an attractive nuisance in a legal sense.

"It was attractive in that the open bread-board type of construction with visible and easily accessible power lines invited inspection of all parts of the equipment, an invitation which many, particularly children, and difficult to refuse. It was a nuisance in the sense that the power was such that it was capable of electrocuting or seriously injuring any person who accidentally or otherwise came in contact with the exposed high voltage leads. Such installation in a garage which was and could be entered merely by raising the door, even a noisy door, ignored the most elementary principles of safety and good engineering practice."

FCC’s summation includes a reference to page 543 in the 1958 (35th edition) of ARRL’s The Radio Amateur’s Handbook stating that this is a quotation of the American Radio Relay League: "Of prime importance in the layout of the station is the personal safety of the operator and of visitors, invited or otherwise, during normal operating practice. If there are small children in the house, every step must be taken to prevent their accidental contact with power leads of any voltage. A locked room is a fine idea . . . ." — F. E. H.

CONTEST NOTES

REF announces the phone section of the French DX Contest from 1400 GMT April 11 to 2200 GMT April 12, 1959. The exchange consisting of QSO report plus QSO number starting at 001. Complete rules are unavailable but probably follow the pattern shown in the box on page 80, February 1958 QST. Mail logs to REF, BP 42-01, Paris X.E., France and hope for the best.

Too late for last month’s issue, the U.S.R.R. Central Radio Club advised us of an International Phone Contest March 14 and 15. Full information, however, was transmitted by radio from W1AW and Official Bulletin Stations starting February 18, and sent to all ARRL affiliated clubs and certain league officials via postal card mailing. Entries go to CRC, Box 101, Moscow.

On January 15, 1959, certificates were mailed to all ARRL Section, Novice, Technician and multiple-operator station winners in the September, 1958, V.H.F. QSO Party.
With the AREC

There are two kinds of information we receive here at headquarters from ECs and SECs — tangible and intangible. Naturally, it is impossible to consolidate information on the basis of intangible factors, yet many of the factors which make or break the efficiency of any particular AREC organization are strictly of an intangible nature. The attitudes of the AREC members, the degree of co-operation between local officials, the popularity of the EC and his leadership qualities — all these are things most important to the success of any group. They can be described in paper and even evaluated to some extent, but you can’t add them up, tabulate them, average them or summarize them to give you an over-all look at the general state of our preparedness. All you can do is keep them in the back of your mind so you can always remember that figures aren’t everything.

A good many of the questions we receive here at headquarters are of this nature. They do not deal in figures and quantities, but rather in evaluation of results and qualities. They do not tell us how many AREC members they have, how many mobiles, how much equipment; instead, they tell us what has been accomplished and how, and dwell on the good and bad aspects of activity, and discuss plans for the future.

This is bad? Not at all. In fact, quite the contrary. The tangible figures which can be consolidated and surveyed into an over-all perspective are less important, perhaps, than the vital imponderables mentioned above; but this does not mean that they are not important. Throughout the years, reports of various kinds have flown thick and fast from the AREC members in general are prone to shrug this off as something that is not their responsibility. But, fellows, we are all involved. Let’s get not into the all-too-common rut of these days of designating someone to do the leading, then sitting back waiting to be led. Support your EC in his local efforts. If he is or appears to be making no efforts, build a fire under him, needle him, heckle him. There are a few ECs who supply the enthusiasm and energy as well as the leadership for their AREC groups, but there are many more (about 80 per cent) who have to be dragged into the fray. If you continuously exert pressure on the ECs to do their job; but our pressure has to be distributed among about 1800 ECs, so no one of them feels it very strongly. Now if you will exert some pressure from somewhere else, you may bring some results. What kind of pressure? Just show him you are interested and concerned and would like to see something done. This will be enough to push many of them for the brink and get them started. For others, more pressure is needed. Maybe it’s time to sit down, sort out and clean out the certificate-holders among our ECs. We’ll never do it, OMs, unless you insist on having an active man in charge of your AREC unit. Hey!

Some of you may remember that last June a terrible tornado hit El Dorado, Kansas. No report of amateur participation in this emergency came to us directly, and we were impressed with the impression that there was little activity. Now, however, W8MIF sends a copy of The Log, a publication of the Flint Hills Amateur Radio Club, in which appears a full account of amateur participation written by K0IZM, who was on the Kansas Storm Net on 3840 kc. Shortly before the storm hit, June 10, 1958, at 1730, KG6HC and K5ATB had witnessed the twister forming from the west city limits.

At approximately 1720 the police department called KG6HC and requested a weather report from the weather bureau. At 1730, K5ATB and KG6HC burst into K0IZM with the information that the tornado was forming northwest of town. They watched, fascinated, as the funnel descended to the ground and started moving rapidly toward El Dorado. K0IZM informed the net, then power failed just as the information was passed to K5ATB in Wichita. Emergency communication then went into effect.

Amateur mobile units were the first communications units on the scene, vied by the black buck. The Butler County mobile frequency was put to work at once with K0CKN/m, assisted by K0CTY and K0OMM/m; K0OMM/m, assisted by K5ATB and K5BXD, and K5ATB/m, operated from his fixed location on emergency power, handling hundreds of messages into and out of the stricken area on 3920 kc., the Kansas Phone Net frequency. In this, he was assisted by W8TSY of Wichita and others throughout the long night.

W0ECD’s station was transported, the evening of June 10, to the Kansas Turnpike interchange, where it was operated from emergency power. This enabled him to break into KBTO transmission with the location of K0OMM. Operation commenced at 0600 the following day on 7220 kc., the frequency of the Kansas CW Net, primarily for the processing of street address inquiries. W8QGG, Kansas R1, monitored the frequency and contact was maintained with Wichita. Assisting at W0ECD were K0S/PDX EHC, and K0ATB/m, operated by K0ATB; and K0ADV/m, operated by from his fixed location on emergency power, handling hundreds of messages into and out of the stricken area on 3920 kc., the Kansas Phone Net frequency. In this, he was assisted by W8TSY of Wichita and others throughout the long night.

The night of the storm, W8GIP from Blackwell, Okla., transported his entire station to El Dorado and set it up at the location of K0OMM. Operation commenced at 0600 the following day on 7220 kc., assisted by K0OMM and W8RFY, taking traffic from the mobiles in the disaster area. This operation continued for five days, with mobiles and fixed stations operating all day in four-hour shifts. K0JBG/m operated in similar fashion for three days, from the basement of Salvation Army headquarters in downtown El Dorado, using equipment loaned by K0OMM. Early in the emergency, the FCC in Kansas City had been contacted and had cleared the frequencies of 7280, 7220, 3920 and 3810 for emergency use. This clearance was maintained until the afternoon of June 11, when wire communications had been restored.

K0OMM and W8MIF maintained communication on 7220 all day June 11, when traffic was heaviest, and on June 12 at the K0OMM/m in Raytown took over the schedule.

Flint Hills Amateur Radio Club, In which appears a full account of amateur participation written by K0IZM, who was on the Kansas Storm Net on 3840 kc. Shortly before the storm hit, June 10, 1958, at 1730, KG6HC and K5ATB had witnessed the twister forming from the west city limits.
The advent of a real emergency forced the Okaloosa County (Fort Walton), Fla., AREC group to change their SET plans on October 20. EC W4BPJ was notified that a defense, power companies, téléphoné companies, broadcast and K9BJJ did the operating under the former call.

A storm in the Pacific Beach area in Washington state, W7UNI, W7HZZ and K7AJT were of material assistance in handling communications for the naval facility at Pacific Beach in the absence of téléphoné and power facilities between that point and Aberdeen. All three amateurs received a letter of gratitude from the commanding officer.

While driving along route 230 in Ferncliff, Va., 100 miles southeast of Washington, D. C., W4TVO/m came upon a truck trailer upside down with the wheels still spinning. This was on Friday, January 16, during a sleet storm. W8AEU was in contact with W4TVO/m and reported his telephone out of order, but W8BH, who was listening on the frequency (3835 kc.), telephoned the Arlington police and state police aid was summoned at once. W8BH then advised the net, where he found W4LTO doing the same thing. W8XJ and W4YU were also on frequency to assist. It seems that the truck had gone into a skid on the slippery road to avoid hitting a skidding car and had plunged down an embankment, injuring the driver. The car driver also smashed his car and injured himself. Thanks to prompt action by W4TVO/m, state and county police, fire and rescue squads all arrived at the scene in less than 20 minutes. — W8BH

Amateurs in and around Clinton, Ill., were of great service to the Illinois Central Railroad when an extensive ice and sleet storm hit the area from January 20 through January 24. On Jan. 21, W9KRF was set up in the ICHR yard office in Decatur, with a makeshift antenna. W9XN and K9BIJ did the operating under the former call. W9FM was also installed in the chief dispatcher’s office in Clinton. Traffic was handled on the Illinois Emergency Net on 3940 kc. This included train orders and traffic for civil defense, police, telephones, telephone exchanges, hospitals, stations and individuals. W9FM was operated by W9s FMR KRH PEK UZE LYE, K9s ISZ MDS. This circuit was maintained until January 25. W9s FLOQ MGXD and K9LDM figured highly in this operation. Net control was passed around, but W9s KCX ACZ AEX and FAW did particularly good jobs. Other stations participating included W8s BIL BEJ BWJ CMX CFY CZG CBZ EAZ PJL FVD STD JFL GUL OVL IBV 100 JMG JXV JVC JGB JOZ KNY LZE LFRZ NEZ RNB OFF OPE QSU QAT TTT TGB TSS TUC VPT VVW YS ZWT ZOW ZEN ZIM BIK, K8s APD AMD AXO CR7 CIL CSA DCQ DDI DJJ DLR DZJ EAX ESP (UTZ UIC LHV TRI JBU JPR, W8JOP, K9BBQ WERB. — W9KRF

In Montgomery County, Ill., the same storm called out the AREC group under EC W9YWJ to provide services for the New York Central Railroad and the Consolidated Phone Company. The emergency lasted for three days, with more than two dozen AREC members involved. W9WWJ lists as outstanding among them the following: W8s BEJ JFW, K8s ESY AMD AX5 KYK KYW IXA.

Ohio had a tough time of it in January, what with sleet, snow, freezing rain, high winds, fog and floods. Luckily, the AREC and RACES are highly organized in most parts of Ohio, so amateurs were very much in the picture. We have reports from three different sources that we shall summarize herewith.

The EC for Cuyahoga County (Cleveland), W8AEU, reports that during the period Jan. 16-Jan. 20 the “Traffic Patrol” of the AREC was kept busy in connection with emergencies caused by winter storms. For the most part, this involved reporting of accidents, obtaining help for stalled cars hindering the flow of traffic, reporting of king-sized traffic jams extending over large areas, and correction of incorrect road information being broadcast by local radio stations. The following amateurs were involved in this work: W8s AEU BIZZ CPP CZM IV NZI OXY UZJ VFU YMJ ZEP, K8s AAG HCS IZHG.

But this was only the beginning. Starting on January 20, amateurs in the area were called upon to furnish emergency communications because of flood conditions in Cuyahoga, Lake, and Lorain Counties. Thirty-six amateurs were involved in Cuyahoga County alone, and facilities were offered as well to the ECs of the other two affected counties. Countless messages and communications of the usual emergency type were handled for police, red Cross, news media, and individuals. W8AEU, the county EC who always does a magnificent job, gives us the following highlights: (1) K9HIIC/m was requested to enter the flood zone in Lake County to furnish information on road conditions and other disaster data; this was done under great difficulties, and he remained to furnish important communications for officials there. (2) Winds of hurricane force accompanying an advancing cold front were forecast by relay from K9/DX, EC for Lorain County, to W8AEU, so that emergency workers were forewarned and additional damage forestalled. (3) After the above winds had passed through, K8KJ/m toured the West Side area to report any additional dam or water breakage. A boat had to be used to buck the current on the Cuyahoga River was placed on the net, and K8KKO volunteered his boat. However, this was 15 miles from the disaster area and had to be transported through heavy winds and ice conditions. (4) K8MKF, W8YFV, W8NZD and the police department, the transfer was successfully made, after which K8KKO, at great personal danger, launched the boat and proceeded with rescue operations among floating ice and debris. Sixteen families were evacuated, with as many as ten people in each house. (5) Amateur radio was used to scotch a rumor that the dam at Cuyahoga Falls had burst. Had this been true, it would have meant wholesale evacuation of the lower Cuyahoga Valley. At the request of W8MDL, W8AEU contacted K8STK at Cuyahoga Falls, who reported that the dam was intact and in no danger. (6) NBC duty was admirably performed by the following: W8s LFY NZD NZI TFW, K8s AAG JGJ MBV.

The following is a comprehensive list of other stations involved in the emergency operation: W8s ANB ASW BAH BUZ BHR BPN BUQ CPP CZM DGR EFB ENB EPN FAG FAT FEZ FQM HEG H3M L77 KKR LHX MMF MPP MVU MWE OYO OXY SLD, K8s HHM JXJ JAX, K9s FKX KRE KRG KRX MBE AAD AAP ABA BWII CDA CF8 CTT DBF DKU DPA DBG BHE GCF GVK GYZ HCS IST HJIH ILG ILX IMP IPS JGH JHZ JIC KBE KKP KNI LMV, W8JTY/S.

Early on the morning of Jan. 21 the Kokosing River started flooding at Mt. Vernon. Club station KS8EN went into action handling “worry” traffic into and out of town. Shortly after noon W8CTZ took over, and later W8HJJ took over with high power. A number of emergency situations were handled. On the 22nd at 1:30 a.m. the Seicota River in Columbus broke and local amateurs went into action to assist police and fire departments in evacuation work. On the 22nd, Chillicothe started evacuation, and W8AOD/S was set up at the armory to handle traffic on 72 and 2 meters; when the armory flooded, W8TJG took over and was the mainstay for traffic until late Friday night, along with W8CSN.

On Wednesday the 21st the rapid rise of the Little Miami River caused the sending of a message to Loveland, near Cincinnati, to handle communications for two shelters erected there by the Red Cross. The c.d. unit handled much traffic until the Queen City Emergency Net established six meter communication. W8LPC and W8MOP assisted in this area.

At Tiffin, the Sandusky River started “backing up” because of an ice jam on the 21st. The e.d. director alerted EC W8SWAB and the AREC group went into action. A mobile unit accompanied auxiliary police to Mount Gilead.
in this emergency: WSs AOX BQJ DM M FEM F NI FPZ
following List of other amateurs who did outstanding work
the 24th. SEC W8XTPB and OEN-NCS W8HZJ give us the
84
operated there under the call W8SGT/8.
by an ice jam. The state e.d. communications trailer was
where it was planned to dynamite the ice jam.

In 1958, other sections reporting: NYC-LI, Ga., E. Fia.,
Santa Clara Valley, Mont., Ont. The record for the year, however, shows quite an improvement.
we received 30 NBD reports for December activities, representing 0045 AREC members, and a new section, Western Mass., is added to the list of sections heard from in 1958. Other sections reporting: NYC-LI, Ga., E. Fia., Santa Barbara, E. Bay, Minn., San Joaquin Valley, Wash., Wis., Texas, N. Mex., Colo., Nev., B.C., Ala., Mich., Santa Clara Valley, Mont., Ont.

The Ohio Emergency Net on 3860 was closed at 1343 on the 24th. SEC W8UPB and OEN-NCS W8HJZ give us the following list of other amateurs who did outstanding work in this emergency: W8s AOX BQJ DM M FEM F NI FPZ.

KX8s UXQ IGO JUM KKF LGK LT LWJ NTP NTZ

January CD Parties

Last minute demands on QST space crowded out the scores of the leaders in the CD QSO Parties of January 17-18 and 24-25 but we can advise that K8SXA topped e.w, entrants with 299,300 points while W4ICF’s 33,600-pointer paced the radio telephone appointees. The usual listing of high claimed scores will appear in the May issue.
Some c.d. officials are prone to regard the RACES frequencies as exclusively c.d., and claim on which they can do just as they please. It is up to us amateurs to remind them that these are amateur frequencies, and that RACES is an amateur service, to be used strictly in accordance with specific regulations set down by FCC. We amateurs have not abdicated any portion of our hands to civil defense and don't intend to. The RACES frequencies are set aside for our use in c.d. communications, not for indiscriminate c.d. use.

The new FCC proposals for expanded RACES segments on certain bands and new ones on other bands will greatly improve the potential of this service and will be a boon to our present RACES groups in providing for much-needed medium and long range facilities. This will make it possible for amateurs to expand their implementation of RACES on a shared basis with other normal amateur communications.

Attention: Code Practice Stations

We're getting together a new up-to-date listing of all individual-on-the-air code practice stations. Those who have not registered with ARRL are urged to do so by sending for form CD-62, or by mailing in the following info: call name, complete QTH, exact frequency of transmission, day(s), times in EST, CST etc., and if known, the date schedule concludes. Data must be in by April 15, 1959. Be sure to include all information requested.

ELECTION NOTICE

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

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

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 case 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 to have 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]

39 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the...

ARRL Section of the...

Division, hereby nominate...

as candidate the 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. R. Handy, Communications Manager

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Vermont

Harry A. Preston, Jr., W1VSA Dec. 10, 1958

Mrs. Helen M. Maillet, W7GGV Feb. 10, 1959

San Francisco Valley

Jon J. O'Brien, W6GDO Feb. 5, 1959

Los Angeles

Albert F. Hill, Jr., W6JQB Apr. 18, 1959

In the Eastern Florida Section of the Southeastern Division, Mr. John F. Porter, W4KKG, and Mr. Adam F. Morano, K4IWU, were nominated. Mr. Porter received 294 votes and Mr. Morano received 152 votes. Mr. Porter's term of office began February 27, 1959.

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 April 20 at 2130 Eastern Standard Time. Identical texts will be sent simultaneously by automatic transmitters on 3550, 7080, 14,000, 21,075, 28,080, 50,000 and 145,600 kc. The next qualifying run from W60WP only will be transmitted April 1 at 2100 PST on 3590 and 7128 kc.

Any person can apply. Neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 30 w.p.m. you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening at 2130 EST. Approximately 10 minutes' practice is given at each speed. Reference to texts used on several of the transmissions are given below. These make it possible to check your copy. For practice purposes, the order of words in each line of QST text sometimes is reversed. To improve your list, hook up your own key and audio oscillator and attempt to send in step with W1AW.

Date Subject of Practice Text from February QST

Apr. 2: A 600-Watt Package, p. 21

Apr. 6: Solving Your TVI Problem, p. 18

Apr. 9: A Simple Electric Key, p. 36

Apr. 14: The C. W. Man's Friend, p. 40

Apr. 17: DX-Dream, p. 51

Apr. 22: Portable ZZ6, p. 52

Apr. 28: Delivering Messages, p. 60

April 1959 85
reports 40 sessions. 491 messages with 1355 check-ins. Sun-
sages in January. Early Bird Transcontinental Net had 31
messages. Transcontinental Phone Net handled 3068 mes-
totals, traffic 1485, check-ins 358.

From January 1, to February 1, 1969 DXCC certificates
and congratulations have been issued to 100 or
more countries by the ARL. Communications
Department to the amateurs listed below.

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<th>NEW MEMBERS</th>
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<th>U.S.-Canada Area and Continental Leaders</th>
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<th>TRAFFIC TOPICS</th>
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| Net Reports. Hudson traffic net reports 30 sessions, 273
check-ins, 231 messages handled. The 7290 Traffic Net
reports 40 sessions, 491 messages with 1355 check-ins. Sun-
down Traffic Net had 31 sessions, 286 check-ins, 102 mes-
sages; Sundown Novice Net fifteen sessions, 87 check-ins, 14
messages. Transcontinental Phone Net handled 3068 mes-
sages in January. Early Bird Transcontinental Net had 31
sessions in which 971 messages were handled. Interstate
SSB Net report: 75 meters, 31 sessions, traffic 911, 1912
check-ins; 20 meters, 19 sessions, traffic 572, 258 sessions;
totals, traffic 1485, check-ins 558.

National Traffic System. Once again, for the third straight
year, we have to acknowledge 9RN as the "statistical chump"
of the NTS. This midwestern region made top ranking in traffic, rate and average per session, was fourth in number of sessions and sixth in representation. Second
place goes to RN5, which was not tops in any single category
but which maintained a level near the top in all of them. And
third place went to the other Central Area regional. TEN,
for first place in number of sessions, second in traffic and
rate and fourth in average per session, but falling to tenth in
representation. Thus, the Central Area this year makes a
clean sweep of the NTS statistical standing.
The final standing is an average of the standings in five
factors, most of which have a tendency to balance each other.
That is, a net with a lot of sessions will place high in
that category, but this will make it difficult for them to
place high in average per session and representation on the
other hand, if they're really good, they can do it. Conversely,
net with a low number of sessions will place low in that
category but may do better in some of the others, if they
make the sessions they have good ones.

We thought you might be interested in how the various
regional nets stack up against each other according to these

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five factors: number of sessions, total traffic, rate, average per session and representation — and the average of all those resulting in that net's over-all standing for the year.

You can argue all night about which of the above factors is the most significant, but the fact remains that the general impression is borne out that the midwest is the traffic-handling center of NTS as it is of the rest of the traffic world. Anyway, congratulations to 9RN, RN5 and TEN for their high 1958 standings, January reports:

In January, we broke all records again, and again by a long way. This time including even the average traffic per session — and the average of all traffic reporting now than in previous years. The increase in traffic from last January is greater than that handled by the whole system in January, 1954, and greater than that handled by the whole system as recently as June, 1956. Dunno how long we can keep this up, but we're sure riding high now!

W6SCC has put out a new EAN bulletin to let the boys know he's still on the job; EAN keeps going with a minimum of supervision from the manager. In his January report, W6DO comments that CAN has quite a turnover in personnel, but no lapses for this reason. W6YJL for PAN in the absence of W6PLG on sick leave; Olen is coming along fine but will have to convalesce a while. K2RTE is bowing out as 2RN manager; 2RN certificates have been issued to Kaja UYK QSO Q8W YBJ and W2FEB, W3UEL reports that 3RN is "slipping upwards." The Third, Fourth and Fifth Regional Nets are putting out a combined bulletin, edited by W4QDY who previously edited the 4RN Bulletin; we have received a couple of issues, and they're real fine. W4QDY is careful to point out that only the bulletin is combined; the nets operate as before. 4RN certificates have been issued to K4GPI and W4FED. RN5 certificates have been issued to Ksa NQF OEA JGZ, Ksa UBFB SSF, W4SRK. K6HLR has announced the KN5 Service Award which is issued to the top three RN5 participants on the basis of cumulative points over a year's time as follows: one point for each net's attendance; two points for each session as NC8; two points for each performance as PAN liaison; 2 points for each "utility station" performance; 1 point for representing a section. It is hoped in this way to increase interest in RN5. The following have been awarded hard-earned 5RN certificates: W6SY VRG QBO PBO BJK SQU 4PU HX3 QLJ VTY FWQ 80K QOC TLP QOD ELW, K6s IID BPP DDD. 

Transcontinental Corps, January reports:

The TCC roster: Central Area (W0BDR, Dir.) — W6s NC6 SCA BDR LGB; Pacific Area (W6BPT, Dir.) — W5DBW, K6s DXY ORT FWY ELR LVR GLD, W6s ADR PLG RPT KOT V7T LLC ELW YHM, W7a VIU (GMC Z6 BDIU, W6KQD.

A.R.R.L. ACTIVITIES CALENDAR

<table>
<thead>
<tr>
<th>Month</th>
<th>Event</th>
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<tr>
<td>March 20-22</td>
<td>DX Competition (c.w.)</td>
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<tr>
<td>Apr. 1-12</td>
<td>CP Qualifying Run — W60WP</td>
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<td>Apr. 11-12</td>
<td>CD Party (c.w.)</td>
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<td>Apr. 11-19</td>
<td>CD Party (phone)</td>
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<tr>
<td>Apr. 20</td>
<td>CP Qualifying Run — WIAW</td>
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<td>May 7</td>
<td>CP Qualifying Run — W60WP</td>
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<td>May 19</td>
<td>CP Qualifying Run — WIAW</td>
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<td>June 3</td>
<td>CP Qualifying Run — W60WP</td>
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<td>June 13-14</td>
<td>V.H.F. QSO Party</td>
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<td>June 17</td>
<td>CP Qualifying Run — WIAW</td>
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<td>June 27-28</td>
<td>Field Day</td>
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<tr>
<td>July 2</td>
<td>CP Qualifying Run — W60WP</td>
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<tr>
<td>July 18-19</td>
<td>CD Party (c.w.)</td>
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**OTHER ACTIVITIES**

The following lists date, name, sponsor, and page reference of QST issue in which more details appear.

Mar. 11-15: USSR Phone DX Test, Central Radio Club (p. 81, this issue).
Apr. 4-5: Helvetia-22 DX Contest, USKA (p. 76, last month).
Apr. 4-11: Goose Bay QSO Party, Goose Bay ARC (p. 114, last month).
Apr. 11-12: French Phone Contest, REF (p. 81, this issue).
Apr. 11-12: Ohio Inter-State QSO Party, Ohio Council of ARCs (p. 116, this issue).
Apr. 25-26: PACC Contest (c.w.), VERON (p. 77, this issue).
Apr. 25-26 and May 9-10: Bermuda-U.S.-Canada Contest, Radio Society of Bermuda (p. 78, this issue).
May 2-3: PACC Contest (phone), VERON (p. 77, this issue).
May 8-10: West Virginia QSO Party, Mountainaire ARA (next month).

April 1959 87
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, Richard B. Mesrovn, W2NOQ—SEC; DVB, RJN: AXA, PAM: TEL, FPW meets Mon., Fri. at 1800 on 3610 kc. Net meets Mon. through Fri. at 1330 on 3610 kc. New appointments: K3AXX as OES; K3DZN as ORS and OWQV as the Keystones ARC Chair. K3PAM, vice-pres.; K3KFU, secy.; K3AIX, treas. New officers of the Carlson ARC are: PVY, pres.; K3KBF, vice-pres.; K3WOK, secy.; T3L, treas. New officers of the Central HS (Phila.) “707” Club are: EYT, près.; K3KDF, vice-pres.; K3BNE, secy.; T3L, treas. New officers of the Keystone ARC are: GSB, près.; K3WKB, vice-pres.; K3RR, secy.; K3XN, treas. New officers of the South Am. for the last QSO. CUL reports good the DX Test. K3AHT made the BPL on deliveries and final exams. An average of 15 stations report m on the in his SX-100 for an NC-300. K3ALD was QRL with vision after a two-month siege, and does NOT conflict with other nets. The net meets on the 3rd Mon. at 2130. 70 Call reports the following WMIRC members made the Philmont Mobile Radio Club Annual Dinner on Jan. 17 at Philadelphia: CN, IN, NL and XYL, K4IKK and XYL KN4EAJ, K3AXX and K4LMB. The E. Pa. Net has resumed its Monday night meeting on Jan. 16. PZZ is monitoring 145.2 kc. for those who wish to check into the MEPN at the regular net times. W2YRW and WZL. The DVRA announces that its 14th Annual Old-Timers Nite will be held Apr. 13 at the Tracey-Tracey Hotel, Tracey, N.Y. W2TBD has been assisting Haddonfield Explorer Port barne at the 19th Annual Old-Timers Nite will be held Apr. 13 at the Tracey-Tracey Hotel, Tracey, N.Y. W2TBD has been assisting Haddonfield Explorer Port barne at the 19th Annual Old-Timers Nite. W2TBD has been assisting Haddonfield Explorer Port barne at the 19th Annual Old-Timers Nite. W2TBD has been assisting Haddonfield Explorer Port barne at the 19th Annual Old-Timers Nite.
TRANSMITTING TUBE RATINGS

The various manufacturers of transmitting tubes specify the highest current and voltage conditions under which their tubes should operate. Most of these manufacturers also supply graphs which show various conditions under which their tubes operate at peak efficiency, and optimum tube life.

One of the commonly considered values is plate dissipation. This is the difference between the D.C. plate power input and the R.F. power the tube delivers to its load. Most amateurs consider this factor important in the design of their amplifiers.

However, another point, equally important in the design of linear amplifiers, is the relationship of plate voltage to plate current. Some transmitting tubes in the kilowatt class are designed to operate under high voltage—low current conditions. These tubes, if operated as recommended by the manufacturer, do an excellent job as linear amplifiers. On the other hand, if we scrimp on voltage and run higher current, we lose efficiency, and plate dissipation increases. Thus, we get a smaller percentage of our power input delivered to the antenna.

In addition—operating these tubes under the wrong conditions can result in a loss of linearity and an increase in distortion, which contributes to splatter and broad signals on our ham bands.

Therefore, it is recommended that we study the tube manufacturers' specifications, and select tubes that match the voltage we have available. Even in the purchase of a commercially built linear, the canny buyer will compare the conditions under which the tube operates with those recommended by the tube manufacturer.

Needless to say, this important factor was considered in the design of the HT-33A, and the selection of the PL-172, with its 1000 watts of plate dissipation, was based on sound engineering practices.

Tom Stuart, WØREP
WHETHER THEY BUY 'EM WIRED . . . OR BUILD 'EM . . . AMATEURS WILL TELL YOU

Viking transmitters outsell all others!

Yes, dollar-for-dollar and feature-for-feature you'll get more of everything in a Viking transmitter . . . that's why Viking transmitters outsell all others! Write for your free Viking Amateur Catalog and you'll soon see why your best transmitter buy is a Viking!

NEW! . . .
"6N2" CONVERTER

This compact, new Viking "6N2" Converter provides instant front panel bandswitching from normal receiver operation to either 6 or 2 meters. Designed for maximum sensitivity and low noise figure . . . offers excellent image and I.F. rejection.

With tubes.

Cat. No. Amateur Net
250-43-1, or -2, or -3. . Kit $59.95
250-43-12, or -22, or -32. . Wired, tested $89.95

NOTE: Specify either Kit or Wired plus your choice of the following ranges: 26 to 30 mcs.; 23 to 30 mcs.; 14 to 18 mcs.

"6N2" TRANSMITTER

Instant bandswitching 6 and 2 meters. Rated 150 watts CW; 100 watts AM phone. Use with "Ranger", "Viking I", "Viking II", or similar power supply/modulator combinations. With tubes, less crystals.

Cat. No. Amateur Net
240-201-1. . Kit $129.50
240-201-2. . Wired, tested $169.50

"6N2" VFO

Compact—stable! Replaces 8 to 9 mc. crystals in frequency multiplying 6 and 2 meter transmitters. With tubes and precalibrated dial.

Cat. No. Amateur Net
240-133-1. . Kit $34.95
240-133-2. . Wired, tested $34.95

"RANGER" TRANSMITTER/EXCITER

This popular, superbly engineered transmitter also serves as an RF/audio exciter for high power equipment, 75 watts CW or 65 watts phone input. Built-in VFO or crystal control—instant bandswitching 160 through 10. 6L46 final amplifier—wide range pi-network output. Timed sequence keying. TVI suppressed. With tubes, less crystals.

Cat. No. Amateur Net
240-161-1. . Kit $229.50
240-161-2. . Wired and tested $329.50

"VAUANT" TRANSMITTER

Here's effective power, wide flexibility, and many unique operating features combined in a compact desk-top transmitter! 275 watts input CW and SSB (P.E.P. with auxiliary SSB exciter) and 200 watts phone. Bandswitching 160 through 10. Built-in VFO or crystal control. Final amplifier utilizes three 6146 tubes in parallel—wide range pi-network output. With tubes, less crystals.

Cat. No. Amateur Net
240-104-1. . Kit $349.50
240-104-2. . Wired and tested $439.50

E. F. JOHNSON COMPANY
2804 SECOND AVENUE S.W.
**NAVIGATOR** TRANSMITTER/EXCITER

More than a novice transmitter—serves as a flexible VFO—Exciter with enough RF power to excite most high powered amplifiers on CW and AM! 40 watts CW input—6L6 final amplifier tube—wide range pi-network output. Built-in VFO or crystal control—bandswitching 160 through 10. Timed sequence keying. TVI suppressed. With tubes, less crystals.

Cat. No. 240-126-1. Kit .................................. $149.50
240-126-2. Wired and tested .......................... $199.50

**ADVENTURER** TRANSMITTER

Perfect for novice or experienced amateur! 50 watts CW input—instant bandswitching 80 through 10 meters. Crystal or external VFO control. With tubes, less crystals.

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

**CHALLENGER** TRANSMITTER

Ideal for fixed station or portable use! Fast, easy tuning—excellent stability and plenty of reserve drive. 70 watts phone input 80 through 6; 120 watts CW input 80 through 10 ... 85 watts CW input on 6 meters. Wide-range pi-network output—effectively TVI suppressed—excellent keying system. For crystal or external VFO control. With tubes.

Cat. No. Amateur Net
240-182-1. Kit .................................. $114.75
240-182-2. Wired ................................. $154.75

**KILOWATT** AMPLIFIER

Here's the most exciting unit you've ever seen ... the unit that puts the whole world at your fingertips! Brilliantly designed and engineered, the Viking "Kilowatt" is the only power amplifier available which will deliver full 2000 watts SSB* input and 1000 watts CW and AM! Continuous coverage 3.5 to 30 mc. Excitation requirements: 30 watts RF and 10 watts audio for AM; 10 watts peak for SSB.

Cat. No. Amateur Net
240-1000. Wired and tested .......................... $1595.00
251-101-1. Matching desk top, back and 3 drawer pedestal. FOB Corry, Pa. .................................. $132.00

*The FCC permits a maximum of one kilowatt average power input for the amateur service. In SSB operation, under normal conditions this results in peak envelope power inputs of 2000 watts or more depending upon individual voice characteristics.

**FIVE HUNDRED** TRANSMITTER

More than one-half kilowatt of power and operating convenience! 600 watts CW input . . . 500 watts phone and SSB (P.E.P. with auxiliary SSB exciter)—instant bandswitching 80 through 10 meter! All exciter stages ganged to VFO tuning. High gain push-to-talk audio system. Highly stable, built-in VFO or crystal control. Wide range pi-network output. Low level audio clipping—effectively TVI suppressed. With tubes, less crystals.

Cat. No. Amateur Net
240-500-1. Kit .................................. $749.50
240-500-2. Wired ................................. $949.50

**PACEMAKER** TRANSMITTER/EXCITER

An outstanding power bargain when used as a transmitter or exciter! 90 watts SSB P.E.P. and CW input . . . 35 watts AM. Highly stable built-in VFO. Instant bandswitching 80, 40, 20, 15 and 10 meters. VOX and anti-trip circuits. Wide range pi-network output. Effectively TVI suppressed. With tubes and crystals.

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

**THUNDERBOLT** AMPLIFIER

Here's real power and peak performance in a compact desk-top amplifier. Rated 2000 watts P.E.P. input SSB; 1000 watts CW; 800 watts AM linear! Continuous coverage 3.5 to 30 mc,—instant bandswitching. May be driven by the "Ranger", "Pacemaker" or other unit of comparable output. Two 4-440A tetrodes in parallel, bridge neutralized. Wide range pi-network output. With tubes.

Cat. No. Amateur Net
240-353-1. Kit .................................. $524.50
240-353-2. Wired ................................. $589.50

Viking

FIRST CHOICE AMONG THE NATION'S AMATEURS

WASECA, MINNESOTA
"SENeca" VHF HAM TRANSMITTER KIT
Beautifully styled and a top performer of highest quality throughout. The "Seneca" is a completely self-contained 6 and 2 meter transmitter featuring a built-in VFO for both 6 and 2 meters, and 4 switch-selected crystal positions, 2 power supplies, 5 radio frequency stages, and 2 dual-triode audio stages. Panel controls allow VFO or crystal control, phone or CW operation on both amateur bands. An auxiliary socket provides for receiver muting, remote operation of antenna relay and remote control of the transmitter such as with the Heathkit VX-1 Voice Control. Features up to 120 watts input on phone and 140 watts on CW in the 6 meter band. Ratings slightly reduced in the 2 meter band. Ideal for ham operators wishing to extend transmission into the VHF region. Shpg. Wt. 56 lbs.

HEATHKIT VHF-1 $159.95

HEATHKIT DX-20 $35.95

DX-20 CW TRANSMITTER KIT
Designed exclusively for CW work, the DX-20 provides the novice as well as the advanced-class CW operator with a low cost transmitter featuring high operating efficiency. Single-knob bandswitching covers 80, 40, 20, 15 and 10 meters using crystals or an external VFO. Pi network output circuit matches antenna impedances between 50 and 1,000 ohms. Employs a single 6DQ6A tube in the final amplifier stage for plate power input of 50 watts. A 6CL6 serves as the crystal oscillator. The husky power supply uses a heavy duty SU4GB rectifier and top-quality "potted" transformer for long service life. Easy-to-read panel meter indicates final grid or plate current selected by the panel switch. Complete RF shielding to minimize TVI interference. Easy-to-build with complete instructions provided. Shpg. Wt. 19 lbs.
Mobile Gear...for the Ham on the Go!

"CHEYENNE" MOBILE HAM TRANSMITTER KIT
All the fun and excitement...plus the convenience of mobile operation are yours in the all-new Heathkit "Cheyenne" transmitter. The neat, compact, and efficient circuitry provides you with high power capability in mobile operation, with low battery drain using carrier controlled modulation. All necessary power is supplied by the model MP-1 described below. Covers 80, 40, 20, 15 and 10 meters with up to 90 watts input on phone. Features built-in VFO, modulator, 4 RF stages, with a 6146 final amplifier and pi network (coaxial) output coupling. High quality components are used for long service life and reliable operation, along with rugged chassis construction to withstand mobile vibrations and shock. Thoughtful circuit layout provides for ease of assembly with complete instructions and detailed pictorial diagrams to ensure success. A spotless switch is also provided. A specially designed ceramic microphone is included to insure effective modulation with plenty of "punch". Plan now to enjoy the fun of mobile operation by building this superb transmitter. Shpg. Wt. 19 lbs.

"COMANCHE" MOBILE HAM RECEIVER KIT
Everything you could ask for in modern design mobile gear is provided in the "Comanche"...handsome styling, rugged construction, top quality components...and, best of all, a price you can afford. The "Comanche" is an 8-tube super-heterodyne ham band receiver operating AM, CW and SSB on the 80, 40, 20, 15 and 10 meter amateur bands. A 3 mc crystal lattice-type IF filter permits the receiver to use single conversion without image interference, and at the same time creates a steep sided 3 kc flat top IF bandpass characteristic comparable to mechanical type filters. The neat, compact and easy-to-assemble circuitry features outstanding sensitivity, stability and selectivity on all bands. Circuit includes an RF stage, converter, 2 IF stages, 2 detectors, noise limiter, 2 audio stages and a voltage regulator. Sensitivity is better than 1 microvolt on all bands and signal-to-noise ratio is better than 10 db down at 1 microvolt input. One of the finest investments you can make in mobile gear. Shpg. Wt. 19 lbs.

MOBILE SPEAKER KIT
A matching companion speaker for the "Comanche" mobile receiver. Housed in a rugged steel case with brackets provided for easy installation on fire wall or under dashboard, etc. Uses 5 PM speaker with 8 ohm voice coil. Measures 5" H. x 5" W. x 2¼" D. Shpg. Wt. 4 lbs.

MOBILE POWER SUPPLY KIT
This heavy duty transistor power supply furnishes all the power required to operate both the MT-1 Transmitter and MR-1 Receiver. It features two 2N442 transistors in a 400 cycle switching circuit, supplying a full 120 watts of DC power. Under intermittent operation it will deliver up to 150 watts. Kit contains everything required for complete installation, including 12' of heavy battery cable, tap-in studs for battery posts, power plug and 15' of connecting cable. Chassis size is 9½" L. x 4¾" W. x 2½" H. Operates from 12-14 volt battery source. Circuit convenience provided by self-contained relay which allows push-to-talk mobile operation. Shpg. Wt. 8 lbs.

POWER METER KIT
This handy unit picks up energy from your mobile antenna and indicates when your transmitter is tuned for maximum output. A variable sensitivity control is provided. Features a strong magnet on a swivel-mount for holding it on a car dashboard or other suitable spot. Has its own antenna or may be connected to existing antenna. Sensitive 200 ua meter. Shpg. Wt. 2 lbs.
"APACHE" HAM TRANSMITTER KIT

The many features and modern styling of the "Apache" will provide you with just about everything you could ask for in transmitting facilities. Emphasizing high quality the "Apache" operates with a 150 watt phone input and 180 watt CW input. In addition to CW and phone operation, built-in switch selected circuitry provides for single-sideband transmission using the SB-10 External adapter. The newly designed, compact and stable VFO provides low drift frequency control necessary for SSB transmission. A slide rule type illuminated rotating VFO dial with full gear drive vernier tuning provides ample bandspread and precise frequency settings. The bandswitch allows quick selection of the amateur bands on 80, 40, 20, 15 and 10 meters. This unit also has adjustable low-level speech clipping and a low distortion modulator stage employing two of the new 6CA7/EL34 tubes in push-pull class AB operation. The final amplifier is completely shielded for TVI protection and neutralized for greater stability. A cooling fan is also provided. The formed one-piece cabinet with convenient access hatch provides accessibility to tubes and crystal sockets. Die-cast aluminum knobs and control panel escutcheons add to the attractive styling of the transmitter. Pi network output coupling matches antenna impedances between 50 and 72 ohms. A "spotting" push button enables the operator to "zero beat" an incoming frequency without putting the transmitter on the air. Equip your ham shack now for top transmitting enjoyment with this outstanding unit. Shpg. Wt. 110 lbs. Shipped motor freight unless otherwise specified.

HEATHKIT SB-10 $89.95

SINGLE SIDEBAND ADAPTER KIT

Designed as a compatible plug-in adapter unit for the TX-1 "Apache" transmitter, this unit lets you operate on SSB at a minimum of cost, yet does not affect the normal AM and CW functions of the transmitter. By making a few simple circuit modifications, the DX-100 and DX-100-B transmitters can be used, utilizing all existing RF circuitry. Extremely easy to operate and tune, the adapter employs the phasing method for generating a single-sideband signal, thus allowing operation entirely on fundamental frequencies. The critical audio phase shift network is supplied completely preassembled and wired in a sealed plug-in unit. Produces either a USB, LSB or DSB signal, with or without carrier insertion. Covers 80, 40, 20, 15 and 10 meter bands. An easy-to-read panel meter indicates power output to aid in tuning. A built-in electronic voice control with anti-trip circuit is also provided. 10 watts PEP output. Unwanted sideband suppression is in excess of 30 db and carrier suppression is in excess of 40 db. An EL84/6BQ5 tube is used for linear RF output. Shpg. Wt. 12 lbs.

MODIFICATION KIT: Modifies DX-100 and DX-100-B for use with the SB-10 Adapter. Model MK-1. Shpg. Wt. 1 lb. $8.95.

HEATHKIT AR-3 $29.95

(less cabinet)

ALL-BAND RECEIVER KIT

A fine receiver for the beginning ham or short wave listener, designed for high circuit efficiency and easy construction. Covers 550 kc to 30 mc in four bands clearly marked on a slide-rule dial. Transformer operated power supply. Features include: bandswitch, bandspread tuning, phone-standby-CW switch, phone jack, antenna trimmer, noise eliminator, RF gain control and AF control. Shpg. Wt. 12 lbs.

CABINET: Opt. extra. No. 91-15A. Shpg. Wt. 5 lbs. $4.95.

HEATHKIT OF-1 $9.95

"Q" MULTIPLIER KIT

Useful on crowded phone and CW bands, this kit adds selectivity and signal rejection to your receiver. Use it with any AM receiver having an IF frequency between 450 and 460 kc that is not AC-DC type. Provides an effective "Q" of approximately 4,000 for extremely sharp "peak" or "null". The OF-1 is powered from the receiver with which it is used. Shpg. Wt. 3 lbs.
**ACCESSORY SPEAKER KIT**

Handsome, well-designed speaker for the "Mohawk" receiver. A speaker with a 4.7 ounce magnet provides excellent tone quality. Housed in an attractive plywood cabinet with perforated metal grille. Speaker impedance is 8 ohms. Shpg. Wt. 7 lbs.

HEATHKIT AK-5

$9.95

**"MOHAWK" HAM RECEIVER KIT**

Styled to match the "Apache" transmitter, this "Mohawk" ham band receiver provides all the functions required for clear, rock-steady reception. Designed especially for ham band operation, its 15-tube receiver features double conversion with IF's at 1682 kc and 50 kc and covers all the amateur frequencies from 160 through 10 meters on 7 bands with an extra band calibrated to cover 6 and 2 meters using a converter. Specially designed for single sideband reception with crystal controlled oscillators for upper and lower sideband selection. A completely preassembled wired and aligned front end coil bandswitch assembly assures ease of construction and top performance of the finished unit. Other features include 5 selectivity positions from 5 kc to 500 CPS, bridge T-notch filter for excellent heterodyne rejection, and a built-in 100 kc crystal calibrator. The set provides a 10 db signal-to-noise ratio at less than 1 microvolt input. Each ham band is separately calibrated on a rotating slide rule dial to provide clear frequency settings with more than ample bandspread. Various gain controls, a bridge T-notch filter, and a built-in 100 kc crystal calibrator ensure top performance. The set provides a 10 db signal-to-noise ratio at less than 1 microvolt input. Each ham band is separately calibrated on a rotating slide rule dial to provide clear frequency settings with more than ample bandspread.

**REFLECTED POWER METER KIT**

The AM-2 measures forward and reflected power or standing wave ratio. Handles a peak power of over 1 kilowatt of energy and covers 160 through 6 meters. Input and output impedances provided for 50 or 75 ohm lines. No external power required for operation. Use it also to match impedances between exciters or RF sources and grounded grid amplifiers. Shpg. Wt. 3 lbs.

HEATHKIT AM-2

$15.95

**BALUN COIL KIT**

Match unbalanced coaxial lines, found on most modern transmitters, to balanced lines of either 75 or 300 ohms impedance with this handy transmitter accessory. Capable of handling power input up to 200 watts, the B-1 may be used with transmitters and receivers covering 80 through 10 meters. No adjustment required. Shpg. Wt. 4 lbs.

HEATHKIT B-1

$8.95

**ELECTRONIC VOICE CONTROL KIT**

Eliminate hand switching with this convenient kit. Switch from receiver to transmitter by merely talking into your microphone. Sensitivity controls allow adjustment to all conditions. Power supply is built-in and terminal strip on the rear of the chassis accommodates receiver and speaker connections and also a 117 volt antenna relay. Shpg. Wt. 5 lbs.

HEATHKIT VX-1

$23.95

**VFO KIT**

Far below the cost of crystals to obtain the same frequency coverage, this variable frequency oscillator covers 160, 80, 40, 20, 15 and 10 meters with three basic oscillator frequencies. Providing better than 10 volt average RF output on fundamentals, the VF-1 is capable of driving the most modern transmitters. Requires only 250 volts DC at 15 to 20 ma, and 6.3 VAC at 0.45 a. Illuminated dial reads direct. Shpg. Wt. 7 lbs.

HEATHKIT VF-1

$19.95
DX-100-B PHONE AND CW TRANSMITTER KIT

A long standing favorite in the Heathkit line, the DX-100-B combines modern styling and circuit ingenuity to bring you an exceptionally fine transmitter at an economical price. Panel controls allow VFO or crystal control, phone or CW operation on all amateur bands up to 30 mc. The rugged one-piece formed cabinet features a convenient top-access hatch for changing crystals and making other adjustments. The chassis is punched to accept sideband adapter modifications. Featured are a built-in VFO, modulator, and power supply, complete shielding to minimize TVI, and a pi network output coup ng to match impedances from 50 to 72 ohms. RF output is in excess of 100 watts on phone and 120 watts on CW. Band coverage is from 160 through 10 meters. For operating convenience single-knob bandswitching and illuminated VFO dial on meter face are provided. A pair of 6146 tubes in parallel are employed in the output stage modulated by a pair of 6L25's. Shpg. Wt. 107 lbs. Shipped motor freight unless otherwise specified.

DX-40 PHONE AND CW TRANSMITTER KIT

An outstanding buy in its power class the DX-40 provides both phone and CW operation on 80, 40, 20, 15 and 10 meters. A single 6146 tube is used in the final amplifier stage to provide full 75 watt plate power input on CW or controlled carrier modulation peaks up to 60 watts for phone operation. Modulator and power supplies are built in and single-knob bandswitching is combined with the pi network output circuit for complete operating convenience. Features a D’Arsonval movement panel meter. A line filter and liberal shielding provides for high stability and minimum TVI. Provision is made for three crystals easily accessible through a “trap door” in the back of the cabinet. A 4-position switch selects any of the three crystals or jack for external VFO. Power for the VFO is available on the rear apron of the chassis. Easy-to-follow step-by-step instructions let assembly proceed smoothly from start to finish even for an individual who has never built electronic equipment before. Shpg. Wt. 25 lbs.

Free Send now for latest Heathkit Catalog describing in detail over 100 easy-to-assemble kits for the Hi-Fi fan, radio ham, boat owner and technician.
1959 EDITION

The RADIO AMATEUR'S HANDBOOK

An invaluable reference work and text for everyone—hams, engineers, lab men, technicians, experimenters, students, purchasing agents.

Distributors throughout the Nation have the 1959 Edition in stock. Better get your copy of this complete Handbook now. The demand is terrific!

In the pages of this latest edition will be found, in addition to accumulated knowledge since the first Handbook was issued in 1926, the latest proved findings and experiments invaluable to ham and engineer alike. Every field of ham radio is covered: transmitting, both c.w. and 'phone; receiving; propagation; antennas; construction; theory; charts; diagrams; circuits; transistors; miscellaneous data; procedures; station operation, etc.

For instance, the 1959 Edition carries


- Sections which include How-to-make-it articles dealing with Receivers, Transmitters, Power Supplies, Radiotelephony, V.H.F., U.H.F., Antennas, Mobile Equipment, radioteletype, transistorized equipment, etc.

- A separate section on test and measuring equipment

- 32 pages of data on vacuum tubes and semiconductors, a great time-saver to both engineer and ham

- Many pages of valuable catalog/advertising sheets, containing manufacturers' and distributors' products and services...a useful supplement to the editorial section

- Plus thorough treatment of such subjects as assembling and operating a station, BCI and TVI, construction practices, etc.—and fully indexed and completely illustrated throughout. You can locate in a jiffy what you want.

$3.50 U.S.A. Proper $4.00 U.S. Possessions and Canada. Elsewhere, $4.50.

Buckram bound Edition, $6.00 everywhere. All prices postpaid.

The AMERICAN RADIO RELAY LEAGUE, INC.

West Hartford 7, Conn. • U.S.A.
IS K6INI THE WORLD'S CHAMPION DX OPERATOR?

Judge for yourself! Read his letter and count the DX he has worked—with only 65 watts and a $16.95 Gotham V-80 Vertical Antenna.

2405 Bowditch, Berkeley 4, California
January 31, 1959

GOTHAM
1805 Purdy Avenue
Miami Beach 39, Florida

Gentlemen:

I just thought I would drop you a line and let you know how pleased I am with your V-80 vertical antenna. I have been using it for almost two years now, and am positively amazed at its performance with my QRP 65 watts input! Let me show you what I mean:

I have worked over 100 countries and have received very fine reports from many DX stations, including 599 Miami Beach 39, Florida. Several other awards. And all this with your GOTHAM reports from every continent except Europe (589)! I have amazed at its performance with my QRP 65 watts input! GOTHAM

I limited budget. In my opinion, the V-80 beats them all in V-80 vertical antenna and ADXC awards, and I am in the process of working for all of your GOTHAM V-80 vertical antenna!

Frankly, I fail to see how anyone could ask for better performance with such low power, limited space and a limited budget. In my opinion, the V-80 beats them all in its class.

I am enclosing a list of DX countries I have worked to give you an idea of what I have been taking about. Wishing you the best for 1959, I am Sincerely yours,

Thomas G. Gabbert, K6INI (Ex-T12TG)

List of 105 countries/stations worked with 65 watts and a V-80 vertical

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<th>Country/Station</th>
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<td>BV1US</td>
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SOME QUESTIONS AND ANSWERS

Why are all Gotham beams of the Yagi type, all metal, and grounded at the center? Answer: To get the maximum strength for the minimum weight, to get maximum efficiency, and to avoid the use of wood, tuning stubs, traps, or other substitute devices, all of which are undesirable and unnecessary. In addition, grounded beams are lightning-proof and protect your home.

How do Gotham beams gain compare with higher priced antennas? Answer: No beam, regardless of price, can give more gain, for a given beam size, than a Gotham beam. Obviously, the more elements, the more gain. Our gain figures are published in our literature, and are available, free, on request.

Why is the Gotham price so very low? Doesn't the low price mean a lack of quality? Answer: The Gotham price is low because we sell in quantities and make only a fair profit on each antenna. We do not load on a tremendous overhead and engineering charge. As for quality, we have always used the best materials, and every antenna is doubly inspected before shipment. Thousands of Gotham antennas are in use the world over.

What is the difference between the Standard and the Deluxe beams? Answer: The Standard beams in the 6, 10, and 15 meter bands use 7/8" tubing. In the 20 meter beams, the Standard beams have a single boom, while the Deluxe beams use twin booms. All 20 meter beams use full 12 foot booms. In the 20 meter beams, and in the Twobanders and Tribanders, only 7/8" tubing are used.

Is it advantageous to use a Gotham Twobander or Tribander beam? Answer: Hundreds of these beams are in daily use. They are compromise beams, but by having each element a full half-wave, their gain figures are more than reasonably good. Of course a single three element beam on a single band will outperform a Tribander on that band, but the Tribander permits beam operation on three bands.

Do the Gotham Verticals perform well on all bands? Answer: Yes, thousands of users attest to their efficiency on all bands from 6 to 160 meters. Reports of tremendous DX on low power are common.

Are mounts supplied with the vertical antenna? Answer: Yes, four mounting straps for side mounting are furnished with each vertical.

Are radials needed with a Gotham vertical? Answer: No, except a few rare locations. 99% of the installations are done without radials.

How much power can be used with a Gotham vertical? Answer: Anything up to the legal limit.

Is much space required for installing a vertical antenna? Answer: No, only a few square inches are needed.

Can you give details on the loading coil used in the Gotham verticals? Answer: Yes, it is made for us by Barker and Williamson. It is 37" in diameter and exceptionally rugged. No other loading coil in the antenna industry has a higher Q.

Do you need a separate loading coil for each band? Answer: No, a V60 loading coil will cover 60, 40, 20, 15, 10, and 6; a V80 loading coil will cover 80, 40, 20, 15, 10, and 6; a V40 loading coil will cover 40, 20, 15, 10, and 6 meters.

What antennas are best for a novice? Answer: The V80 vertical and the S153N beam are the most popular choices.

Why should a ham buy a Gotham antenna? Answer: The tremendous progress of the amateur radio art makes it imperative that hams graduate from the antiquated antennas of years past to a modern antenna system. A Gotham antenna will be glad to send, free of charge, our technical literature on our 50 antennas, or you can order for immediate shipment.
FREE literature? YES
FREE specifications? YES
FREE beam gain calculator? YES
OR ALL THREE AND IMMEDIATE SHIPMENT
IF YOU ORDER FROM THIS LIST OF 50 ANTENNAS

Airmail Order Today — We Ship Tomorrow

GOTHAM Dept. QST
1805 PURDY AVE., MIAMI BEACH, FLA.

Enclosed find check or money-order for:

TWO BANDER BEAMS
A full half-wave element is used on each band. No coils, traps, baluns, or stubs are used. No calculations or machining required. Everything comes ready for easy assembly and use. Proven Gotham Value

6-10 TWO BANDER $29.95
10-15 TWO BANDER $34.95
10-20 TWO BANDER $36.95
15-20 TWO BANDER $38.95

TRIBANDER
Do not confuse these full-size Tribander beams with so-called midgets. The Tribander has individually fed (52 or 72 ohm coax) elements and is not frequency sensitive, nor does it have baluns, coils, traps, or other devices intended to take the place of aluminum tubing. The way to work multi-band and get gain is to use a Gotham Tribander Beam.

□ 6-10-15 $39.95 □ 10-15-20 $49.95

2 METER BEAMS
Gotham makes only two different two meter beams, a six-element job and a twelve-element job. They are both Yagi beams, with all the elements in line on a twelve foot boom.

□ Deluxe 6-Element $9.95 □ 12-El $16.95

6 METER BEAMS
New records are being made every day with Gotham six-meter beams. Give your rig a chance to show what it can do, with a Gotham six-meter beam.

□ Std. 3-El Gamma match 12.95 □ T match 14.95
□ Deluxe 3-El Gamma match 21.95 □ T match 24.95
□ 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
Ten meter addicts claim that ten meters can't be beaten for all-around performance. Plenty of DX and skip contacts when the band is open, and 30-50 miles consistent ground wave when the band is shut down. Thousands of Gotham ten meter beams have been perking for years, working wonders for their owners, and attesting to the superior design and value of a Gotham beam.

□ 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

New! Ruggedized Hi-Gain 6, 10, 15 METER BEAMS
Each has a TWIN boom, extra heavy beam mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.

□ Beam #R6 (6 Meters, 4-El) $38.95
□ Beam #R10 (10 Meters, 4-El) $40.95
□ Beam #R15 (15 Meters, 3-El) $49.95

15 METER BEAMS
Fifteen meters is the “sleeper” band. Don’t be surprised if you put out a quick, quiet CQ and get a contact half-way around the world. Working the world with low power is a common occurrence on fifteen meters when you have a Gotham beam.

□ 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
A beam is a necessity on twenty meters, to battle the QRM and to give your signal the added punch it needs to over-ride the high power boys. Hundreds and hundreds of twenty meter beams, working year after year, prove that there is no better value than a Gotham twenty meter beam.

□ 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
□ Deluxe 3-El Gamma match 46.95 □ T match 49.95
(Note: Gamma-match beams use 52 or 72 ohm coax.
T-match beams use 300 ohm line.)

ALL-BAND VERTICAL ANTENNAS
You could work the whole world, and get fantastic reports, with a Gotham vertical and only 55 watts, like VP1SD.

You could work tremendous skip and DX, and be surprised at the way your Gotham vertical brings them in, as R. E. C. of Washington, D. C., found out.

You could have a simple, easy-to-install-and-operate vertical antenna, and switch from band to band, as thousands of Gotham customers have done.

□ V40 vertical for 40, 20, 15, 10, 6 meters $14.95
□ V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters $16.95
□ V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters $18.95

HOW TO ORDER. Send check or money order directly to Gotham. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

FREE! WITH EACH ANTENNA OR REQUEST FOR FREE BROCHURE,
THE NEW GOTHAM BEAM CALCULATOR.

Name ...................................................
Address ...................................................
City .................................................... Zone ...................................... State .................
A RADIO SHACK EXCLUSIVE!

20% BONUS!

YESSIR! WE'RE ADDING AN EXTRA 20% BONUS TRADE-IN ALLOWANCE (Above Our Usual Liberal Allowance) TOWARDS ONE OF THESE 5 GREAT

hallicrafters
OF YOUR CHOICE!

PLEASE ACT NOW! We can't keep this offer open for long and remember this... Radio Shack has the largest stock of ham equipment READY FOR IMMEDIATE SHIPMENT THE DAY WE RECEIVE YOUR ORDER!

SEE RADIO SHACK'S EASY-PAY-PLAN ON NEXT PAGE

HALLCRAFTERS AVAILABLE ON THIS OFFER
SX-100: Broadcast 538-1580 kc, three S/W 1720 kc-34 Mc. Double conversion superhet over entire frequency range.
SX-101-IIIA: 13 tubes, voltage regulator, rectifier, Powerline fuse. Covers 7 ham bands—160, 80, 40, 20, 15, 11-10 meters.
SR-34: 2 & 6 Meter receiver/transmitter. Complete fixed, portable or mobile. AM or CW. 49.5-143.5-148.2 mc range.
HT-32A: New amateur band, transmitter. S.S.B. AM or CW output on 80, 40, 20, 15, 11 and 10 meter bands.
HT-33A: Linear amplifier. Complete coverage of amateur bands: 80, 40, 20, 15 and 10 meters.

NEW IDEAS are born at HALLCRAFTERS
In the limitless world of communications, new ideas are the real measure of leadership. In the past quarter-century, Hallicrafters engineers have brought to amateurs, novices and listeners more than 100 major communications designs. That is why Hallicrafters is a leader in this field... acknowledged by over a million satisfied users.
Radio Shack's Al Coe Will Be There!

WHERE: At the New Ocean House in Swampscott, Mass.
WHEN: May 17, 1959.
WHY: To attend what promises to be the biggest and best Ham Convention of the year!

USE RADIO SHACK'S EASY-PAY-PLAN

EXAMPLE: (No Down Payment Required)
If the price of the equipment you want is $200.00
And the trade-in allowance on your equipment is 80.00
The balance would be 120.00
Payments are only $10 Monthly

IF YOU DO NOT TRADE IN A RECEIVER.
If Equipment price is $200... Down Payment $20... Monthly $13
Small monthly payments while you’re enjoying the superb performance of your HALLICRAFTERS that has ALL the newest electronic features!

TRADE BY MAIL AT RADIO SHACK!

There is no other concern that has a larger stock of ham equipment than Radio Shack. With our tremendous mail order facilities our store is near to you as your door. You can trade with utmost confidence at Radio Shack, a favorite source of equipment for hams since 1923. Everything sold with a MONEY-BACK GUARANTEE!

OUR LARGE AMATEUR DEPARTMENT HAS OPENINGS FOR HAMS THAT HAVE SALES ABILITY. WRITE IN.

FILL IN AND SEND TODAY!

RADIO SHACK CORPORATION, Dept. 4D, 730 Commonwealth Ave., Boston 17, Mass.
Please quote me an allowance on my present equipment:
Model ___________________________
I would like to trade for the following Hallicrafters:
Model ___________________________
Name ___________________________
Address ___________________________
City ___________________________ Zone ______ State ______

Radio Shack’s new mail order headquarters and electronic shopping center covers 80,000 square feet. An entirely new system fills your order with the greatest speed in the industry!
The STATIONMASTER collinear gain antennas meet the demand for high antenna gain in minimum space. The STATIONMASTER consists of a unique arrangement of collinear radiating elements fed inphase and encapsulated in a continuous weatherproof fiberglass housing. The STATIONMASTER is much lighter in weight than other antennas of equal gain and therefore offers less mounting problems.

SPECIFICATIONS
- **VSWR (50 ohm cable)**: 1.5:1
- **Bandwidth**: 0.3%
- **Direct ground lighting protection**
- **Input impedance**: 50 ohms
- **Omnidirectional gain**: 5.8 db
- **Copper radiating elements**
- **Fiberglass element housing**

**Station Activities**
(Continued from page 88)
More "Workable Watts" per Dollar!


**Globe Champion 300A**

Sidebander DSB-100

100w PEP DSB, Suppressed Carrier

**Globe Linear LA-1**

Grounded Grid. Class B or C

For 6-80M, complete with well-filtered power supply. 200w input AM Class B. 400w DC or 420w PEP input Class A linear SSB or DSB. 3000w Class C for CW. Pi-Net 60-10M. 52 Ohm Pi-Link coupled on 6M. Extensively TVI-suppressed. Meter for monitoring final plate currents also indicates approx. RF output voltage enabling operator to tune for max. efficiency and output.

**Globe VFO 755A**

10-160M

Complete, VFO-suppressed power supply with voltage regulation. Output on 40 & 160M. Venier-driven with shock absorbing features. 13:1 tuning ratio. Approx. 50 RF volts output. Temperature compensated for utmost stability for SSB, AM, CW.

**Vox, Model 10**

For voice-operated control of the DSB-100 as well as the Champ and other similar transmitters. Extra contacts for auxiliary circuits. Simply plugs into rear of DSB-100.

**Globe Matcher Sr., AT-4**

Antenna tuner with built-in SWR bridge for any Xmttr. with final RF input up to 600w. 60-10M. Fixed link; coupling. Coax input, 2wire balanced or unbalanced output. Built-in switch allows bypass of tuner sections for coax input and output. Special calibrated panel meter for monitoring actual SWR. Venier dial.

**Globe Matcher Jr., AT-3**

Antenna tuner for power input of 100w CW, 75w phone or less. Substantial amount of harmonic attenuation when properly tuned. Aids matching Xmttr. to various antennas. Control switch output. Forward Look cabinet of steel for TVI-prevention.

**Globe Scout 680A**

for 6-80 Meters

Plate Modulated — 65w CW; 50w AM Completely bandswitching, self-contained, with built-in power supply. Hi-Level level modulation maintained. TVI-suppressed cabinet. Picot output on 10-80M. Link-coupled on 6M. Matching into low impedance beams. New type, wide view shielded meter. Kit contains all parts, tubes, pre-punched chassis and complete manual.

**Power Booster PB-1**

For straight-through operation on 6M (Champ 680A or 6B only) ports internally into Globe Scouting. Approx. 50% more power output, while attenuating harmonics and further suppressing TVI.

**Globe Boosters**

Power Booster PB-1

Watch for Announcement of Globe’s NEW CITIZEN’S BAND TRANSCEIVER

Coming Soon!

**Globe Scouting**

Visit Your Favorite Distributor for Details!

**OTHER TOP FLIGHT GLOBE PRODUCTS**

Globe King, wired $795.00; Globe Chief, w/t: $74.95, kit: $59.95; Hi-Bander, w/t: $149.95, kit: $129.95; VFO 6-2, w/t: $59.95, kit: $49.95; Power Attenuator, w/t: $19.95; Plate Modulator UM-1, w/t: $49.95, kit: $32.95 (less tubes); Screen Modulator Kit, $11.95; 6-Meter Converter 6PMC, w/t: $29.95, kit: $19.95; Speech Booster, w/t: $24.95, kit: $15.95.

**GLOBE electronics**

3417 W. BROADWAY
COUNCIL BLUFFS, IOWA

103
Get acquainted with World Radio! Discover, as so many other hams have, why it pays to do business with "the world’s largest distributor of amateur radio equipment!" Our Reconditioning Department works full time to supply a ready-made ham market with "like factory new" used equipment. Because this demand is so great, we can most often offer you the very top trade-in prices on your present gear. Try us! We keep tremendous stocks of equipment from the nation’s leading manufacturers at your disposal continually. Yet our turnover is so rapid, we can guarantee you the latest serial numbers always. personalized attention to your questions and your orders and shipment from the center of the U.S. guarantees the sincerest, promptest service available anywhere. And since World Radio finances their own paper, we can offer the easiest E-Z Pay plan with up to 24 months to pay. Here are just a few of the Name Brands of Amateur Equipment in our stock:

Only 10% Down
Up to 24 Mos. To Pay

In Stock... Plus
THE COMPLETE LINE OF

GLOBE electronics
PRODUCTS!

FREE CATALOG
Containing thousands of ham bargains, specialties, tools, parts and gear for the amateur, experimenter, hi-fi enthusiast and service-dealer. Order your free copy today!

maximum punch, power & popularity
IN THESE GREAT REMODELED

Globe Transmitters
from
"the house the hams built!"

POWERHOUSE PUNCH with this KING of TRANSMITTERS

Bandswitching 10-160M, 540w on AM and CW, 700w max. watts on DSB or SSB (P.E.P.) with 15-20w external exciter. Housed in specially designed cabinet, 31x22x14½”, for TVI-suppression. Built-in antenna relay, built-in VFO (may be used for Xtf, operation, also), separate power supply for modulator for better overall voltage regulation. Commercial type compression circuit keeps modulation at high level. Grid block keying for signal clarity. Pi-Net matches most antennas 52-300 ohms. Single Sideband input and operation with external exciter, Push-to-talk. A sturdy table-top transmitter for the amateur who wants the best.

$7995 Down $3578 per mo. or $795.00 ham net

the CHAMPION of HAMDOM

NEW!!

★ New filtered keying circuit virtually eliminates key clicks.
★ Improved VFO circuitry for greater stability.
★ Tailored for more "power punch" in the voice frequency range.
★ Improved shielding for TVI-protection and stability, eliminating RF feedback.

★ Bandswitching 10-160M, 350w CW, 275w AM, 450w SSB (P.E.P.) with any 10w external exciter. Extensively TVI-suppressed, filtered and by-passed. High level class B modulation maintained without usual clipping distortion with new commercial type compression circuit. Pi-Net output circuit 52-300 ohms, built-in VFO, push-to-talk, antenna changeover relay, and improved time sequence keying. Final tubes air-cooled. Single knob bandswitching. Modern, advanced-look cabinet 12x21½x17".

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or $495.00 ham net
"Mini-tribander... Maxi-Value!"

SAYS LEO I. MEYERSON, PRESIDENT, WQFO

"After looking over the entire field, I believe this is one of the greatest values in Amateur Antennas!"

We carry the largest stocks of Hy-Gain gear in the country — over 400 antennas in stock!

Take Maximum Legal Power:—1 KW AM, 2,000w P.E.P.

As much as higher priced tribanders, more than 3 times the power handling capacities of others!

NO NEED TO LIMIT YOUR PRESENT or FUTURE POWER TO 300 WATTS!

* May be rotated by most heavy duty TV rotators
* Carefully tuned for maximum gain & F/B ratio available in small size array
* Hy-Gain guarantees as much or more gain as any other 2 and 3 element split dipole fed 3-band beams regardless of price
* As large, but superior in construction to beams selling for $30 more

Boom is 1 ½" dia. by .065" wall thickness, hot dipped galvanized steel. Elements are 6061T6 high strength aluminum alloy. Telescoping sections of 1", ½", ½". Heavily plated 10 Ga. steel channels attach all elements to boom and boom/mast with positive grip. High quality, galvanized and iridite treated hardware used throughout.

* Featuring the famous, light-weight insu-traps

LESS THAN 1½:1 SWR WITH 52 OHM COAX

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Enclosed is my check (money order) for the □ 2-Element □ 3-Element Mini-Tribander

Please also send □ latest Reconditioned Equipment List.

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analogue RF up-conversion to 40 dB or better. Continuons circuit holds carrier suppression and floating grid clipping and filtering as function switches. Speech feedback for high quality facilitates tuning. Inverse external tone generator facilitates through operation, for section allows straight tuning. MARS and CAP frequencies 3-9 mc and 12-9 mc, inclusive. Exclusive automation balances 10-80 MHz, too. Power output: Plugs into XTAL. WI for use...
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A streamlined, improved version of the world-famous HQ-129-X

The amateur fraternity asked for it — Hammarlund did it! From out of the past we took one of the all-time greats, applied improved, modern circuit techniques, and out came the HQ-145...

This general-coverage receiver offers all the long-lasting features of the HQ-129-X, plus new features geared to today's reception requirements. The HQ-145 is a receiver with a future — proved by the HQ-129-X and its lasting value.

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HAMMARLUND MANUFACTURING COMPANY, INC., 460 West 34th Street, New York 1, N.Y.
ALLIED SAVES YOU $50.00 ON THIS FAMOUS GONSET MOBILE “SUPER-CEIVER”

SPECIAL FACTORY CLOSEOUT PURCHASE
YOU SAVE OVER 40%!
Regularly $119.50
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Quantities Limited... Order Now!

► Built-in power supply; furnishes regulated power to any converter; makes a sensitive dual-conversion ham receiver when used with a converter.

► Crystal-controlled; 8 tuned circuits at 256 kc adjustable squelch

► BFO, AF-RF controls, noise clipper and speaker

► 1430 kc input. With crystal, cables and power supply wired for 6-volt; can be converted to 12 volts

► 6% x 5½ x 6½”; control head 2” high. Shipping weight, 8 lbs.

STOCK NO. 845914
Regularly $119.50. SALE PRICE... $69.50
EASY TERMS: only $6.95 down

SAVE EVEN MORE!
Complete mobile package including “Super-ceiver,” plug-in conversion crystal, and famous MORROW 5BR-2 CONVERTER (80-10 meters).

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STOCK No. 925X468
Ship. wt. 80 lbs.

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DAKOTA DIVISION
NORTH DAKOTA—SCM, Harold A. Wengel, W9HVA
SEC: K9JLV, PAM: YCL, NC for the Mayo Phone Net are K9AZX, CJN, JLV, MBG, GSM and HVA, with YCL acting as alternate for all NCs. The 160-Meter Phone Net reports 27 members. South Dakota—Bout report K9AAW, and a total of 81 check-ins; the highest number 24 resulted in a very pleasant evening; OK. KH is cooperating from a heart attack. K9ALP received WAVE and WACAN certificates. New Novices in the Ramsey County Club include: P9Q, P9H, Q9B, Q9G and Q9K. GFL, CJN, CJM, JLV, GCJ and HVA. The weekly schedule, Mon., through Sat., at 3007 kc. A visit by the Minnesota DX operators to the Madison DX group on Jan. 21 resulted in a very pleasant evening; OK. KH is cooperating from a heart attack. K9ALP received WAVE and WACAN certificates. New Novices in the Ramsey County Club include: P9Q, P9H, Q9B, Q9G and Q9K. GFL, CJN, CJM, JLV, GCJ and HVA. The weekly schedule, Mon., through Sat., at 3007 kc. A visit by the Minnesota DX operators to the Madison DX group on Jan. 21 resulted in a very pleasant evening; OK. KH is cooperating from a heart attack. K9ALP received WAVE and WACAN certificates. New Novices in the Ramsey County Club include: P9Q, P9H, Q9B, Q9G and Q9K. GFL, CJN, CJM, JLV, GCJ and HVA. The weekly schedule, Mon., through Sat., at 3007 kc. A visit by the Minnesota DX operators to the Madison DX group on Jan. 21 resulted in a very pleasant evening; OK. KH is cooperating from a heart attack. K9ALP received WAVE and WACAN certificates. New Novices in the Ramsey County Club include: P9Q, P9H, Q9B, Q9G and Q9K. GFL, CJN, CJM, JLV, GCJ and HVA. The weekly schedule, Mon., through Sat., at 3007 kc. A visit by the Minnesota DX operators to the Madison DX group on Jan. 21 resulted in a very pleasant evening; OK. KH is cooperating from a heart attack. K9ALP received WAVE and WACAN certificates. New Novices in the Ramsey County Club include: P9Q, P9H, Q9B, Q9G and Q9K. GFL, CJN, CJM, JLV, GCJ and HVA. The weekly schedule, Mon., through Sat., at 3007 kc. A visit by the Minnesota DX operators to the Madison DX group on Jan. 21 resulted in a very pleasant evening; OK. KH is cooperating from a heart attack. K9ALP received WAVE and WACAN certificates. New Novices in the Ramsey County Club include: P9Q, P9H, Q9B, Q9G and Q9K. GFL, CJN, CJM, JLV, GCJ and HVA. The weekly schedule, Mon., through Sat., at 3007 kc. A visit by the Minnesota DX operators to the Madison DX group on Jan. 21 resulted in a very pleasant evening; OK. KH is cooperating from a heart attack. K9ALP received WAVE and WACAN certificates. New Novices in the Ramsey County Club include: P9Q, P9H, Q9B, Q9G and Q9K. GFL, CJN, CJM, JLV, GCJ and HVA. The weekly schedule, Mon., through Sat., at 3007 kc. A visit by the Minnesota DX operators to the Madison DX group on Jan. 21 resulted in a very pleasant evening; OK. KH is cooperating from a heart attack. K9ALP received WAVE and WACAN certificates. New Novices in the Ramsey County Club include: P9Q, P9H, Q9B, Q9G and Q9K. GFL, CJN, CJM, JLV, GCJ and HVA. The weekly schedule, Mon., through Sat., at 3007 kc. A visit by the Minnesota DX operators to the Madison DX group on Jan. 21 resulted in a very pleasant evening; OK. KH is cooperating from a heart attack. K9ALP received WAVE and WACAN certificates. New Novices in the Ramsey County Club include: P9Q, P9H, Q9B, Q9G and Q9K. GFL, CJN, CJM, JLV, GCJ and HVA. The weekly schedule, Mon., through Sat., at 3007 kc. A visit by the Minnesota DX operators to the Madison DX group on Jan. 21 resulted in a very pleasant evening; OK. KH is cooperating from a heart attack. K9ALP received WAVE and WACAN certificates. New Novices in the Ramsey County Club include: P9Q, P9H, Q9B, Q9G and Q9K. GFL, CJN, CJM, JLV, GCJ and HVA. The weekly schedule, Mon., through Sat., at 3007 kc. A visit by the Minnesota DX operators to the Madison DX group on Jan. 21 resulted in a very pleasant evening; OK. KH is cooperating from a heart attack. K9ALP received WAVE and WACAN certificates. New Novices in the Ramsey County Club include: P9Q, P9H, Q9B, Q9G and Q9K. GFL, CJN, CJM, JLV, GCJ and HVA. The weekly schedule, Mon., through Sat., at 3007 kc. A visit by the Minnesota DX operators to the Madison DX group on Jan. 21 resulted in a very pleasant evening; OK. KH is cooperatin

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MODEL V-5. For 10, 15, 20, 40, and 80 with one antenna section. Rope base line.

Designed and built to meet United States Air Force electrical and structural specifications. The V-5 is 100% rust proof and performs brilliantly on each of the bands. It is capable of handling power of 1 KW to the antenna. Weatherproof trap assemblies are used throughout...no external loading coil needed.

Maximum length of antenna is 46 feet 3 inches. Supplied complete with polyethylene guy rope, heavy duty base with internal core fitting and all necessary hardware. For best results, radials (not supplied) should consist of 12 wires, each approximately 64' in length.

Amateur Net $118.50

HEAVY DUTY BASE MOUNT supplied with Models V-5 and V-4-8.

MODEL V-4-8. For 40 and 80 meter bands. Equivalent to a separate 1/2 wavelength vertical on each band. Heavy duty 100% rust proof construction. Husky over-size trap assembly handles 1 KW (AM) in the antenna. Maximum overall length of the antenna is 52 feet 3 inches. The antenna requires 12 radials each 64 feet in length for best performance. Antenna comes complete with base mount described above, polyethylene guy ropes, hardware and detailed instructions.

Amateur Net $65.00

Mosley Electronics, Inc.
8622 St. Charles Rock Road
St. Louis 14, Mo.
Single Sideband at its Best!

Triple conversion HQ-170 • 20 monthly payment $17.77. $35.90 down. CASH PRICE

receivers, antennas, rotators, towers, parts, accessories, equipment. Henry has ALL the new equipment first.

HENRY HAS THESE HAMMARUND ITEMS

HQ-145 RECEIVER $269.00
HQ-110 RECEIVER  249.00
HQ-160 RECEIVER  379.00
HQ-100 RECEIVER  189.00
MATCHING SPEAKER  14.95
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Complete stock of all transmitters, receivers, antennas, rotators, towers, parts, accessories, equipment. Henry has ALL the new equipment first.

Prices Subject to Change

TRADE — CASH — TERMS

Write, wire, phone, Henry now

DELTA DIVISION

ARKANSAS—SCM, Ulom M. Goings, WZZZY—SEC; KSCIR, PA6; DYL. The club at Jonesboro has started its training program again. There have been more than a dozen prospective hams attending. Out of last year's class II of the boys passed the exams with most of them still active. KBO is now an Official Observer, RTTY is gaining more popularity in the State. The Hazor Hams Net is in session each Tue., at 2030 on 3624 kc. RTTY, YM, the club station at Fayetteville, is N6C. Reported as active in the net are SXJ, FPD, VQD, K5GXH, GRT, FIM, GOP and LFQ. The hams held recently at Russellville and El Dorado were a success. 7BED/5 is now getting as active as FM for this section. John Rose is doing a fine job with the nets. The Tri-State Teenagers Net has been started on 3975 kc, at 1600 Sun. A code and theory class has been started by 6BMM/5, MPP and LFQ. The hamfests held recently at Monticello by 6BMM/5, Robert M. Nelson, W0KLG—SCM, are doing a fine job with the nets. The Tri-State Teenagers Net has been started on 3975 kc, at 1600 Sun. A code and theory class has been started by 6BMM/5, MPP and LFQ. The hams held recently at Monticello by 6BMM/5, Robert M. Nelson, W0KLG—SCM, are doing a fine job with the nets.
Easiest Terms
90 days open account or 10% down, 20 months or more. We finance at a low 6%. Payment within 90 days cancels all interest. Compare terms and prove to yourself that you save money at Henry. Write today to start your 90-day open account.

Personal Service
Fast Delivery
Your inquiries and orders handled same day. Write, phone or wire.

Big Trade-In
We want to trade and we trade big. Truly liberal allowances on your old equipment. Tell us what you want to trade. We also pay cash for used equipment.

A-1 Reconditioned Apparatus
Nearly all makes and models. Big savings! Ten day trial—90 day warranty. 90 day full trade back on new apparatus. Write for bulletin.

Introducing Collins New S Line
32S-1 Transmitter—3.5-29.7 mc, 175 watt PEP input on SSB; 160 watt on CW. Incorporates time-proved features of KWS-1, KWM-1 including Mechanical Filter-type sideband generation; stable, permeability-tuned VFO; crystal-controlled high frequency oscillator; RF inverse feedback for better linearity, and automatic load control for higher average talk power. 6½" H, 14½" W, 11½" D.

Henry Radio Stores
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"World's Largest Distributors of Short Wave Receivers"
lately as he is building a new Heath Apache transmitter, ML, active on 144 Mc., is now located at Vivian. A new Novice is KN5TF. KASHE is now AF MARIS. The Nutwits held a hamfest at Biloxi, Tex. KAWA won the transmitter hunt. KSSJ now has a GP-11 on mobile. The Jefferson ARC had a chicken dinner that was a grand success. CEZ seems to be the only ham in the section who is able to make QRP. The Baton Rouge ARC’s new officers are K4NJH, pres.; K4DAC, vice-pres.; K4SNNC, secy. K5DMN is active on MARIS and in the Gulf Coast Hurricane Net. K2ANN reports that K4NJH has been appointed Asst. EC for the Crowley Area. K4ABJ and K3AAN are active on 10 meters since they put up new beams. K5ELA still is having trouble with his rig! W5WYN, net control for the Delta 73 Net, which meets Sun., 7:30 a.m., 3905 kc., built up an Apache TX-1 transmitter and the 14-10 adapter for his 50-watt rig. He is rebuilding the old 313 final to handswitching to put some muscles on the TX-1. BY is on s.s.b., with a horn-shaped 3-W adapter while his is a 2-meter rig. He has a fixed, recently your SCM had the pleasure of visiting Director BSR and PAM CEW. Traffic: W5CEZ 901, MXQ 169, K5XLC 520, DMA 16, WA6A 8, K4ANN 6.

MISSISSIPPI—SCM. J. Adrian Houston, Jr., W5EHH—DEJ reports ham activity in Meridian at an all-time high. The club meets the 3rd Fri. night of each month. About 25 stations are very active on the air. The club net meets each Sun., at 0800 kc., at a p.m., with an average attendance of about 15. Civil defense work is the main project with the Meridian Club. DEJ reported 400 stations in 30 sections in the January CD Party for a score of 24,000. AAZ reports the Tupelo Club is very active with K5CIT, pres. EH3X has a new triband beam. Working board is on BX, FS3 and K5AYA. The Tupelo Club has a new 200-watt emergency rig. The Tupelo ARC placed 3rd in the Delta Division 1958 Field Day Class A. The Cleveland Amateur Radio Club has set the 2nd Sun. in June for its hamfest, the place 5 miles north of Meridian on highway 49W at the Weber Place. The CARC is re-equipping its mobile emergency unit. The club has requested the call Q4. K4JRPC reports the completed chassis. K4JRPC, EC Sunflower County; K5QF, OPS and ORS. Traffic: W5FPI 85, K5AUR 67, QNE 59, W5J5H 57, K5OPS 50, QNE 13, HHQ 11, MUR 9, W5TR 8, VNIE 3.

TENNESSEE—SCM. R. W. Ingram, W4UJO—K4EN reports recognition of a U.T. Amateur Radio Society, ONO, with K4EMN, pres.; WTX, exec.; WTX, pres.-treas.; AEG, secy. The club operates 40- through 15-meter c.w. with a kw, and 80- through 15-meter phone with 350 watts using an SX-99 receiver. The home rig of K4GEP is a DXY-100 and an SX-99. OGG also is proud owner of a DX-100. K4NJK has his new equipment is a v.t.o. and electronic key. K5KEL reports that a low-pass filter eliminated a 6-meter signal in his receiver that was the result of a difference between a TV signal and a THP transmitter, AOY reports that the Johnson City Club is installing equipment in the club trailer. A note from FT7Y/W4ZJ says that he has applied for WAC and is looking for W7 for WAS. The lock Ridge ROC tells us that SGI is s.s.b. with a 23-81 and K4AAR has lost a carrier and a sidelobe. K4JAG is keeping daily skeds with ZSIO on 7, 11, 21 and 28 Mc. For propagation studies, PVD says that his DX record now stands at 153/156. TDZ reports his missing activity is a little of everything. VRM has a new EQO-10 in his system and has completed a relocation of his shack and we welcome him back to TN. K4LTA reports s.s.b. operation with an SX-99 and a Viking linear and his DX total is now 152/148. TZG reports he operates 300 watts phone. 500 watts c.w., and s.s.b., on a Globe linear. Traffic: W5IRC 782, W5MOG 219, K5JIT 36, K5JW 4, R6S 12, R8T 41, CXY 36, T5Z 28, D5U 22, D5U 5, POP 29, K5LTA 18. QDR 11, WVUJ 12, EIN 12, TVV 19, JYM 1, PAF 9, WOJ 7, PV9 7, VINE 8, K5KLY 4, W7D9Z 4, YRM 1.

GREAT LAKES DIVISION

KENTUCKY—SCM. Robert A. Thompson, W5SUD—Asst. SCM; W5SUO—W4JLF reports reorganization of a Rainbow Amateur Radio Society, ONO, with W4JLF, pres., MUR, exec.; W5SUD, secy. The club reports a major activity for propagation studies, PVD says that his DX record now stands at 153/156. TDZ reports his missing activity is a little of everything. VRM has a new EQO-10. K4JC has completed a relocation of his shack and we welcome him back to TN. K5LTA reports s.s.b. operation with an SX-99 and a Viking linear and his DX total is now 152/148. TZG reports he operates 300 watts phone. 500 watts c.w., and s.s.b., on a Globe linear. Traffic: W5IRC 782, W5MOG 219, K5JIT 36, K5JW 4, R6S 12, R8T 41, CXY 36, T5Z 28, D5U 22, D5U 5, POP 29, K5LTA 18, QDR 11, WVUJ 12, EIN 12, TVV 19, JYM 1, PAF 9, WOJ 7, PV9 7, VINE 8, K5KLY 4, W7D9Z 4, YRM 1.
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Former field engineer to be Washington Representative

Fred Browning, K1IGQ—former field engineer and Marine Corps Field Project Supervisor—has recently been appointed Raytheon's Government Services Division Washington (D.C.) Representative. Fred's rapid advancement during the past eight years is typical of what the company means by field engineering with a future.

You may qualify as a Raytheon field engineer if you have field experience plus an E.E. degree or the equivalent in practical experience in communications, missiles, fire control, ground and bombing radar, sonar or radar countermeasures.

Attractive salaries, assistance in relocating, insurance—a friendly close-knit group including many hams. Please write R. E. Guittarr, address below, for details.

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It requires less than 20 W PEP driving power. Exclusive metering circuit reads GRID Ma, PLATE Ma, WATTS input and WATTS Output directly in WATTS on the meter. Wide range PI network output circuit.

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HARRISON IS "HAM HEADQUARTERS, USA" since 1925

PHASEMASTER "II-B"

$459

BUILT IN VFO. • BAND SWITCHING: 10, 15, 20, 40, 80, 160. • 10 Meters. • 65 WATTS PEP OUTPUT from 6146 Power Amplifier. • VOICE CONTROL and Anti-trip Circuits built in.

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HARRISON IS "HAM HEADQUARTERS, USA" since 1925

PHASEMASTER "II-B"

$459

BUILT IN VFO. • BAND SWITCHING: 10, 15, 20, 40, 80, 160. • 10 Meters. • 65 WATTS PEP OUTPUT from 6146 Power Amplifier. • VOICE CONTROL and Anti-trip Circuits built in.

Phasemaster No. II-A same as above spec. except VFO not built in. $329.50

Requiring less than 20 W PEP driving power. Requirements for 20 W PEP driving power. Requires less than 20 W PEP driving power. Exclusive metering circuit reads GRID Ma, PLATE Ma, WATTS input and WATTS Output directly in WATTS on the meter. Wide range PI network output circuit.

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PHASEMASTER "II-B"

$459

BUILT IN VFO. • BAND SWITCHING: 10, 15, 20, 40, 80, 160. • 10 Meters. • 65 WATTS PEP OUTPUT from 6146 Power Amplifier. • VOICE CONTROL and Anti-trip Circuits built in.

SEVENTH ANNUAL OHIO INTRASTATE QSO PARTY
April 11 and 12

The Ohio Council of Amateur Radio Clubs will sponsor a QSO Party, open to all Ohio amateurs, which will be held from 6:01 p.m. EST Saturday, April 11, until 6:00 p.m. EST Sunday, April 12. All Ohio amateurs may take part in one county, ten contacts only, phone or c.w., may be counted. Any and all amateur bands and any mode of emission may be used. There will be no power restrictions. Scoring: multiply the number of Ohio stations worked by the number of counties contacted. Each station may be worked but once regardless of band or mode of emission used. Logs should include calls of stations worked, time, date, and the county in which the station is located. Operation near the following frequencies is recommended: 3550, 3740, 3860, 7100 and 7250 kc. On the other hand, take your pick. The call "CQ Ohio" should be used on both phone and c.w. A cup and four appropriate certificates will be awarded to the highest scoring stations. Certificates will also be awarded to Novices, the number of certificates contingent upon the degree of activity. All contest logs must be postmarked no later than May 1, 1959, and should be sent to the contest manager, Hamlin King, VV8EQN, 353 S. Arlington Ave., Springfield, Ohio.

HIGHEST ACCURACY AND READABILITY

EXPANDED SCALE VOLTMETERS eliminate unused portions of scale for maximum readability over critical range. Minimum scale span ±15% mid-scale point. High accuracy: i.e. ±0.6% at 100 volts. Economically priced. Low current drain, 6 standard ranges. Also available as low as 2.0 volts, without external assembly in Models 1145 and 1135 only.

MODEL 173 LONG SCALE METER: 300" scale, 3.4" scale length (comparable to conventional 4½" meter). Accuracy: ±3% of full scale. Standard ranges: 0-100 dcua, 0-500 dcua, 0-1 dcma, 0-10 dcv, 0-32 dcv, 0-500 dcv.

HEADQUARTERS for MINIATURE COMPONENTS

IN SMALLEST PANEL AREA

EXPANDED SCALE VOLTMETERS eliminate unused portions of scale for maximum readability over critical range. Minimum scale span ±15% mid-scale point. High accuracy: i.e. ±0.6% at 100 volts. Economically priced. Low current drain, 6 standard ranges. Also available as low as 2.0 volts, without external assembly in Models 1145 and 1135 only.

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HEADQUARTERS for MINIATURE COMPONENTS

HIGHEST ACCURACY AND READABILITY

EXPANDED SCALE VOLTMETERS eliminate unused portions of scale for maximum readability over critical range. Minimum scale span ±15% mid-scale point. High accuracy: i.e. ±0.6% at 100 volts. Economically priced. Low current drain, 6 standard ranges. Also available as low as 2.0 volts, without external assembly in Models 1145 and 1135 only.

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Another Gonset advance brings added performance and value

6 METER
fixed station
COMMUNICATOR

Now... Model G-50, a highly compact, beautifully designed unit, adds materially to the pleasure of local contacts... to the thrill and excitement of 6 meter DX.

Everything's in one cabinet: 50 watt transmitter with pi-network and calibrated VFO (or optional xtal)... sensitive, selective communications receiver... AC power supply. All elements are completely integrated, operate perfectly together. This is Gonset's exclusive "packaging" concept... eliminates extra cost of several individual units... gives you excellent performance, exceptional value.

Simple, straightforward in operation and adjustment, G-50 will put a crisp 6 meter signal with real authority on the air in little more than the time required for connection of antenna and power. This is the sure, easy, inexpensive way to net on 6 meters. G-50, at your dealer soon. Amateur Net $319.50

Model No. 3221

GONSET'S NEW 10 ELEMENT, 6 METER YAGI

Gives more than 12 db forward gain... 23 db minimum FBR... tripped driven element provides excellent match... usable frequency range, 50-54 mc, husky 16 foot boom... light but balanced and rigid construction... no sag or droop... rotated by any heavy-duty TV rotor... makes 50 watts approach a KW...

Model 3282... net 27.50.
E-Z WAY, 3-Section, Series X, are the tallest Ham towers in the world! 3-sections - crank up or down and tilt over for quick, easy maintenance and adjustment. In tilt position, less space is required than on many smaller 2-section models!

Sturdy, heavy-duty construction throughout. Models to fit any requirements.

Get set for real DX results - because with E-Z Way, You Put Your Beam Where You Want It!

Write for Catalog No. 21-1

Sold by Top Flight Distributors Everywhere!

CRANKS UP and DOWN — FAST

TILTS OVER for CONVENIENCE

BUILT TO E.I.A. (R.E.T.M.A.)

Standard Tr-116


NEW YORK CITY AND LONG ISLAND—SCM, Harry J. Dannals, W2TUK/SEC: W2ADO. RMs: W2VDT, PAM: W2UFG. V.H.F. PAM: K2EQH. Section nets: NLL, 2650 kc. nightly at 1930 and Sat. and Sun. at 1915 EST. NYC-LIPX, 3008 kc. Mon., through Sat. from 1730 to 1830 EST, NYC-LI AREC, 3008 kc. Sun. at 1730 EST. V.H.F., Traffic Net, 145.5 Mc. Tue. through Sun. at 2000 EST. BPL cards were earned by W2RZB, W2VDT and W8ANX, the latter two on occasion plus deliveries. K2VDT very cleverly was awarded the A-1 and 2RN certificates. W2VDT requests that NLL could use additional coverage throughout the section, particularly in Suffolk, Brooklyn and Manhattan. How about it? Join the traffic gang on 3695 kc. K2ZKXT built a keyer unit to help this traffic break-in operation.

K2VDD has a new Novice and plans a high-powered final. W2VGGF is operating on 75-meter s.s.b. W2HQL/2 is heard keeping skeds from his new location in Poughkeepsie. New officers of the Rio Club of B.C. are W2WW/C and W2KFR, press.; K2KVR, vice-pres.; K2IC and treas.; K2HTG.

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CRANKS UP and DOWN — FAST

TILTS OVER for CONVENIENCE

BUILT TO E.I.A. (R.E.T.M.A.)

Standard Tr-116

Hams Everywhere Depend on QUALITY International Crystals and Components and GET 'EM FAST!

**FO-1L 100 KC OSCILLATOR**
- Kit with tube and crystal $12.95
- Wired and tested $15.95
- 100 KC crystal only $8.50
- for use with FMV-1 10 KC multivibrator
- Shipping Weight 2 lbs.

**FMV-1 MULTIVIBRATOR**
- for use with FO-1L 100 KC oscillator
- Kit, less tube $5.95
- Wired, with tube $8.95
- Shipping Weight 2 lbs.

**STP-50 6 METER TRANSMITTER**
- Kit, less tubes & crystal $21.50
- Kit, with tubes & crystal $26.50
- Wired, with tubes but less crystal $32.50
- Crystal, FA-5 12MC $4.00
- Shipping Weight 5 lbs.

**STP-10 10 WATT MODULATOR**
- Designed specially for International's STP-50 transmitter.
- Kit, less tubes $22.75
- Kit, with tubes $25.25
- Wired and tested, with tubes $30.50
- Shipping weight 3 lbs.

**FCV-1 6 METER CONVERTER**
- Kit with crystal less tubes $10.95
- Wired with crystal and tubes $15.95
- Shipping Weight 2 lbs.

**FMV-1 100 KC OSCILLATOR**
- Kit with tube and crystal $12.95
- Wired and tested $15.95
- 100 KC crystal only $8.50
- for use with FMV-1 10 KC multivibrator
- Shipping Weight 2 lbs.

**ONE-DAY SERVICE ON CRYSTALS**
- for Amateur or Commercial use!
- See catalog for crystal prices.

**FCV-2 CONVERTER**
- Model 50, 6 Meters
- Model 144, 2 Meters
- Kit with crystal less tubes $12.95
- Wired with crystal and tubes $17.95
- Shipping Weight 2 lbs.

**MODEL T-12 12-WATT CRYSTAL CONTROLLED TRANSMITTER**
- T-12 kit less tube and crystal $8.95
- T-12 wired with tubes and less crystal $13.95
- FA-5 crystal (specify frequency) $3.00
- Special T-12 kit less tubes with 80 or 40 meter crystal (specify frequency) $10.95
- Special T-12 kit wired with tube and 80 or 40 meter crystal (specify frequency) $15.95
- Shipping Weight 2 lbs. For 80 or 40 meters

**STP-50 MULTIVIBRATOR**
- for use with FO-1L 100 KC oscillator
- Kit, less tube $5.95
- Wired, with tube $8.95
- Shipping Weight 2 lbs.

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**STP-50 MULTIVIBRATOR**
- for use with FO-1L 100 KC oscillator
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- Wired, with tube $8.95
- Shipping Weight 2 lbs.

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**STP-50 MULTIVIBRATOR**
- for use with FO-1L 100 KC oscillator
- Kit, less tube $5.95
- Wired, with tube $8.95
- Shipping Weight 2 lbs.
Introducing Nu-gain's New
Trap Traveller
The World's Most Progressive
Portable Antenna System

MOBILE • PORTABLE • DIPOLE • BEAM

★ Automatic 10, 15 & 20 meter operation with entire whip operative on all three bands for maximum efficiency.
★ Hi-Q, air wound, 20M loading coil, and 10 & 15M series resonant circuits, weather-sealed in air foil designed plastic container only 1½" wide.
★ Operating height: 8 ft. 5 in.
★ High tensile strength, stainless steel whip with ¾" OD bottom section added up to maximum mechanical stability.

Prices

TO BE ANNOUNCED!

Trap Traveler Micro-Dipole and
Micro-Beam

Two Trap Traveler Mobile Whips may be combined with specially designed Universal Bracket to form a 3-band portable dipole. Mounts anywhere. Matches 52 ohm coax. No tuning or external matching device necessary.

Convenient canvas carry bag ready for both Dipole and 2-Element Beam Trap Travelers.

Available Soon from All Distributors of Nu-gain antenna products

1135 NO. 22ND • LINCOLN NEBRASKA

120


MIDWEST DIVISION

IOWA—Russell B. Marquardt, W0BDR—New officers for the Fairfield High School Club are K2EC, pres.; IQY, vice-pres.; BRK, secy.-treas.; WRF, act. mgr., with DIA and FKA as assistants. Sioux City Club officers are BFA, pres.; MJC, vice-pres.; K2KMM, secy.-treas.; IGL, act. at arms. Newton Club officers are FNR, pres.; K2BDX, vice-pres.; ETX, secy.-treas.; CDJ, act. mgr., Fort Dodge Club officers are K2SP, pres.; NGS, vice-pres.; NEN, secy.; WWI, act. mgr., and 10 & 15M series resonant circuits, weather-sealed in air foil designed plastic container only 1½" wide.
★ Operating height: 8 ft. 5 in.
★ High tensile strength, stainless steel whip with ¾" OD bottom section added up to maximum mechanical stability.

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Convenient canvas carry bag ready for both Dipole and 2-Element Beam Trap Travelers.

Available Soon from All Distributors of Nu-gain antenna products

1135 NO. 22ND • LINCOLN NEBRASKA

120
THE ONLY TUNABLE VHF CONVERTER, MODEL VHF 126

VHF pioneers designed and built this versatile VHF Converter. It will extend the range of any communications receiver through the 6, 2 and 1½ meter bands. All bands are tuned with equal ease since the 50mc tuner does the tuning for the higher bands in the same way it tunes the 50mc band. Sensitivity ½ microvolt with very low noise figure. Built-in power supply. Simple to install and requires no circuit modification to select either VHF or standard communication ranges. Designed and manufactured to the requirements of costly astronomy receivers.

Experience the finest VHF reception, ever! $239.00 Amateur Net.

DX COMPUTER...

an operating aid designed to make available DX information about all countries recognized officially by the amateur societies of the world. This unusual computer is a complete DX guide to the ham operator in a handy, compact form. It gives all call letter prefixes; time differentials; international postage rates; continent, zone, and country. In addition to an address listing of all the QSL Bureaus of the World. By sliding the center plate to the desired prefix, you can read all the above mentioned guides at one setting. The call letter prefix column has extra spaces to fill in your own QSL record, sent and received. Size: 13½” x 4½” $1.00 Amateur Net.

RME DB23 PRESELECTOR...

improves the performance of any receiver. Three 6J6 twin triodes are used as neutralized push-pull stages in a unique combination of selective and wide band RF amplifiers. You get a minimum gain of 20 db throughout all ham bands from 3.5 to 30 mc. and signal-to-noise improvement can be as much as 7.5 db over that of the receiver alone. Input circuits are accurately matched to any standard type antenna. Operation is simple; merely set band selector and adjust peaking control for maximum signal... $49.50 Amateur Net.

Check any receiver, then check the RME 4330A.

It has everything you want and need. Study and compare these features usually found in only high-priced receivers. Efficiency concentrated for ham bands only. IF curve is 2.8 kc wide without crystal, down to 100 cycles with crystal. Sensitivity one microvolt with low noise figure. Dual conversion for image rejection of at least 34 db. Six-pound cast panel with heavy gauge steel chassis and enclosed gives maximum stability. 100 kc crystal calibrator. Single dual speed dial for easy tuning. Engineered for maximum performance on SSB, CW and Phone. Ideal for contests and DX under all receiving conditions. FCCA Item R-16. $249.00. Amateur Net. Model 4302 Matching Speaker $17.50 Amateur Net.

HERE'S WHY RME LABORATORY ENGINEERED EQUIPMENT IS UNMATCHED

Regardless of price, RME equipment is engineered specifically to balance performance against cost. Each RME product, each RME accessory has this cornerstone for its design.

KD 88 OPERATING TABLE

Now, get a convenient operating position that will complement any decor. Ample space holds the exciter, receiver, sidetone slicer and key; special tilt makes meter readings easy. Hard masonite top provides excellent writing surface with elbow room for comfortable operating. Log, call book, and other records in handy shelf. Hide-away table leaf can be inserted to operator's left for extra writings or typing space. The KD 88 comes completely knocked down. Constructed of rugged gumwood, ready to be custom finished with your choice of six E-V finisheks. Exposed edges are covered with handsome grained wood. With easy step-by-step instructions, you need only a hammer and screwdriver. Terrific value... just $57.50 Amateur Net.

Write Dept. QT-4 for free literature on RME equipment—built by hams, for hams.
With the broad CAMBION line to choose from, you can finish many a do-it-yourself job on your ham equipment with speed, satisfaction and economy.

CAMBION Coil Form Kits, as shown, hold 3 each of 5 ceramic coil form types. Coil Kits contain 10 equipment with speed, satisfaction and economy. The guaranteed electronic components... guaranteed...

COMPONENTS

sions. CPI missed the BPL list for the first time in many months. Lou is making preparations for moving to Texas. OAM enjoyed YL talks with KP0 in OKU-J, both of whom visited her recently. K0NK improved her signal on MN with some antenna changes. K0JC made W4X. OYV was whistled about two weeks after losing some high-voltage filter and final components. The Tri-State Radio Society provided traffic control for the Christmas Parade in Joplin with K0JAY. But K0KJIY running in the parade line. K0SGJ has a 6-meter, eight-element beam on a 7-bt tower. EPI has a Comsoctor 111 on 6 meters. IRE, formerly of Parsons, Kans., is working with GCT. K0JEP has received his General Class license and is using a DX-100. K0MPD is enjoying full break-on operation with a new Johnson t.t. switch. The Westminster Amateur Radio Society has been formed at Westminster College, Fulton, Mo. The club call is K0FJ. KM0K7 is between Linn and St. Louis. The Northwest St. Louis Amateur Radio Club members suggest that crank-up towers should be clamped in the "closed" position. Thoms fell when the cable broke but no one was injured. Traffic (Jan.) K0KJJ 595, K0BD 573, K0HJG 523, WB0CPI 306, BV1 239, V0P 181, OX1 128, K0J8F 117, W0QO 96, K0R 96, OYV 87, K0JCQ 78, WHBT 58, K0JFM 58, K0LGZ 32, W0BUL 30, W0F 21, GEP 20, K0FFM 9, OEP 7, H0J 4, K0QG 2, W0B 1, W0X2C 106, K0LVX 42, W0WFF 35, K0JHIN 31, K0X 18, DGT 9, H0LMI 6. (Nov.) K0HIIA 106, (Oct.) K0HIIA 345.

With the broad CAMBION line to choose from, you can finish many a do-it-yourself job on your ham equipment with speed, satisfaction and economy.

CAMBION Coil Form Kits, as shown, hold 3 each of 5 ceramic coil form types. Coil Kits contain 10 forms in overlapping inductance ranges; 2 mh to 800 mh. Choke Kits have 14 RF chokes; fixed inductance ranges and 65 types of solder terminals, 100 terminais of single types in single packages.

CAMBION packaged items include phenolic and ceramic coil forms, separate coils in standard inductance ranges; 2 mh to 800 mh. Choke Kits have 14 RF chokes; fixed inductance ranges and 65 types of solder terminals, 100 terminais of single types in single packages.

CAMBION Coils, as shown, hold 3 each of 5 ceramic coil form types. Coil Form Kits contain 10 forms in overlapping inductance ranges; 2 mh to 800 mh. Choke Kits have 14 RF chokes; fixed inductance ranges and 65 types of solder terminals, 100 terminais of single types in single packages.

COMPONENTS

With the broad CAMBION line to choose from, you can finish many a do-it-yourself job on your ham equipment with speed, satisfaction and economy.

CAMBION Coil Form Kits, as shown, hold 3 each of 5 ceramic coil form types. Coil Kits contain 10 forms in overlapping inductance ranges; 2 mh to 800 mh. Choke Kits have 14 RF chokes; fixed inductance ranges and 65 types of solder terminals, 100 terminais of single types in single packages.

CAMBION packaged items include phenolic and ceramic coil forms, separate coils in standard inductance ranges and 65 types of solder terminals, 100 terminais of single types in single packages.

CAMBION distributors are in key locations, coast to coast. Contact yours for prompt service.

CAMBION makes many different easy-to-get

compounds.
EXTRA HEAVY DUTY

Ground Planes

COMMERCIAL - AMATEUR - CITIZEN BAND
Single or Multi-Frequency Operation
100 MILE PER HOUR RATING

These High-Quality, Hy-Gain Ground Planes are designed to cover all Amateur, Commercial and Citizen Band communications frequencies from 25 through 500 mc. Especially designed decoupling stub Add-On Kits available, making possible multi-frequency operation with a single feed line. The antennas and Add-On Kits are factory pre-tuned and complete with easy-to-follow directions for quick assembly on any single or multiple frequency up to 41. Precisely adjusted drooping ground plane radials make possible perfect 52 ohm match. All hardware hot dip galvanized and teflon treated for maximum weatherability.

- Input Impedance: 50 ohms
- Coaxial Termination: Type 80259
- Maximum Power Input: 1,000 watts
- VSWR: Less than 1.3:1 at Resonance

Unity Gain

MODEL CP-1

Net $10.95

GP-1
Radiator and ground plane radials telescoping ¾" and ¾" heavy wall aluminum tubing type 6061T6 heat treated alloy. Heavy duty extruded base insulator and heavy universal base casting. Fits all mast diameters up to 1½".

MODEL CP-2

Net $16.95

GP-2
Radiator and ground plane radials telescoping ¾" and ¾" heavy wall aluminum tubing type 6061T6 heat treated alloy. Polyethylene base insulator and heavy universal base casting fits all mast diameters up to 1½".

MODEL CP-3

Net $12.95

GP-3
Radiator ¾" and ¾" heavy wall aluminum tubing type 6061T6 heat treated aluminum alloy. Ground radials ¾" diameter solid aluminum rod.

MULTI-FREQUENCY ADD-ON DECOUPLING STUB KITS

MODEL 2AK:
Attaches to Models GP-1 or GP-2 Hy-Gain Ground Planes, making possible low SWR single feed line operation on any additional frequency in the 50 to 88 mc spectrum. Net: $7.50

MODEL 3AK:
Attaches to Models GP-1, GP-2 or GP-3 Hy-Gain Ground Plane, making possible single feed line low SWR operation on any additional frequency in the 108 to 500 mc spectrum. Net: $4.50

SEE YOUR FAVORITE DISTRIBUTOR

1135 NO. 22ND - LINCOLN NEBRASKA

antenna products
A WORD FROM
WARD
MAKE
MINEx MOBILE!

If your electronic computer is handy, make a "guestimate" as to the total number of mobile radios there are in this country. What's your total? 100,000? 300,000? A half-million? Wrong! Close to 900,000 transmitters have actually been authorized for two-way voice communication between two stations, at least one of which is mobile!

As an amateur friend of mine put it: "If you haven't discovered the joys of working a rig that's foot-loose and fancy-free, man, you haven't lived!"

Well, that may be putting it a bit strongly. But the fact remains that amateurs, in steadily increasing numbers, are going mobile.

If you happen to be one of them, let me say this: In no field of communications do intelligent selection and wise buying pay a greater premium than in mobile radio. Of the multitude of AM, SSB, DSB and CW transmitters and receivers; of all the antennas and speakers, dynamos and vibrators, on the amateur mobile gear market—which is best for you?

Frankly I don't know. But if you'll come into our store or drop me a line and let me know what you'd like your mobile gear to do, there's a good chance I might come up with some pretty sensible advice.

Trusty old Adirondack Radio, you know, has been operating since 1936. And let's face it: you have to find an awful lot of answers for an awful lot of people to stay in business that long!

WARD J. HINKLE

BEFORE YOU BUY OR TRADE
WIRE, WRITE OR CALL
WARD, W2FEO
AT
ADIRONDACK RADIO SUPPLY
185-191 W. Main St., Amsterdam, N.Y.
Tel. Victor 2-8350

WARD J. HINKLE, Owner
OUT OF THIS WORLD PERFORMANCE...

with RMC Discap® Ceramic Capacitors

The same dependability that prompted the selection of RMC Discaps for the power supply of the Explorer IV satellite can now be yours for use in servicing TV and radio sets. These quality ceramic capacitors, favorite of original equipment manufacturers, will help cut time-consuming callbacks, and at the same time, brighten your profit picture.

RMC Discaps are available from your distributor in a handy 5-pack that prevents tangling of leads, and stores as easily as a file card.

Another veteran of outer space—Mallory Mercury batteries. They've gone up with every U.S. satellite. In satellites or transistor radios, they can't be beat for long, fade-free life.

FP Capacitors — the original 85°C filter.
Gem Capacitors — tops in moisture proof design.
Gold Label® Vibrators — quiet, long-lasting.
Sta-Loc® Controls — custom duals in 30 seconds.

*Trademark of Radio Materials Company, a division of P. R. Mallory & Co. Inc.
WORLD'S FINEST AND MOST PRACTICAL 3-BAND SYSTEM

"CHRISTMAS TREE"

"THE STANDARD OF COMPARISON"

2" O.D. x .134 Wall x 16 ft. Diamond "E" 1025 Mech. Steel Masting — $50.00

10 Meter 3 Element Model 10M-314 — $96.00

15 Meter 3 Element Model 15M-318 — $130.00

20 Meter 3 Element Model 20M-326B — $215.00

Separately "Balun" fed Optimum design, 10, 15 and 20, for no compromise 3-band performance!

"Beamed-Power" "Balanced-Pattern"

By far the most powerful and practical 3-element "Tri-band" System ... guaranteeing no compromise, 3-band performance, and reliability — rain or shine! "Balun" fed and optimum antenna design assures ... maximum gain, and impedance bandwidth, plus pattern symmetry with minimum TVI, BCI and harmonic radiation qualities—not possible with so-called "Tri-banders." Install Telrex "Tri-band — Christmas-Tree" for "top-man-on-the-frequency" results!

Lower Cost "Tri-band" Systems Available

ANTENNAS LABORATORIES

Communication and TV Antennas

TELREX "BEAMED-POWER"—"BALANCED-PATTERN" ARRAYS COST A LITTLE MORE... WORTH MUCH, MUCH, MORE!
NEW UNIVERSAL MODULATOR-DRIVER #730
KIT $49.95  WIRED $79.95
Cover E-5 $4.50
Superb, truly versatile modulator at low cost. Can deliver 50-10,000 watts, or c.w. or c.w. No plate meter required. Ideal for homebrewers. New 6146 final amplifier for full "clean" 90 W input.

NEW GRID DIP METER 
KIT $29.95  WIRED $49.95 including complete set of coils for full band coverage.

RHODE ISLAND—SCM, Mrs. June R. Burket, W1XXC—SEC: PAZ, PAMs: KCS, YBC, RM; BBN, NCRB officers installed Jan. 12. W1VSG, pres.; ETM, vice-pres.; KN1FFY, rec, sec.; P. Guudette, corr. sec.; KICUY, tres. Speaker for the evening was 4GQE/1, who demonstrated a single-sideband unit built entirely by him. The PRA elected VZF, pres.; OTR, vice-pres.; HJL, rec, sec.; UX, corr. sec.; HIK, tres.; KKL, YBC, KN1FY, and 1QW, board of directors. A Field Day committee has been elected: A-1, Bill Adams; A-2, John Laflin; A-3, Hank Bouchard. 60 W.H., N. Y. Nets (Wed. and Fri. at 2030 NCS on 50.7 Me.), for all stations with traffic for these net sessions are asked to check in when entering the 60 W.H. nets. K1ABR is chairman and K1EOD, W2K, K2EOD and KN1LL serving with him. Our two 60 W.H. nets have been relaxed and are now the 60 W.H. nets. W1VH, Nets (Wed. and Fri. at 2030 NCS on 50.7 Me.), for all stations with traffic for these net sessions are asked to check in when entering the 60 W.H. nets. K1ABR is chairman and K1EOD, W2K, K2EOD and KN1LL serving with him. Our two 60 W.H. nets have been relaxed and are now the 60 W.H. nets.

TENTH NEW HAMPSHIRE QSO PARTY
The Concord (N. H.) Brasspounders, W1OC, announce their sponsorship of the Tenth New Hampshire QSO Party, and cordially invite all interested radio amateurs to participate. Here are the details:

(1) Contest period: Saturday, April 25, 6 P.M. EST to Sunday, April 26, 6 P.M. EST.

(2) No time limit and no power restrictions.

(3) Scoring: N. H. stations count 1 point for each N. H. contact, plus 2 points per outside contact; stations outside the state count 2 points per N. H. contact; both multiply by the number of counties worked (10 maximum).

(4) Engraved certificates will be issued to all participants reporting, with special endorsements for the highest-scoring stations, both in N. H. and outside in the following categories; phone only, c.w. only, combined phone and c.w.

(5) The same station may be scored for additional credit on more than one entry in each category, but no station can be scored more than once in any category. Suggested frequencies to congregate near are as follows: 1810, 3550, 3842, 7050, 7200, 14,100, 14,250, 21,075, 21,350, 28,100, 28,800 kc.; 51,145 and 221 Mc.

(6) General call: "QQ NH" on c.w.; "QQ NH QSO Party" on phone. All stations are requested to sign de NH W1OC K or give other indication of the fact they are from N. H.

(7) Contact information required May 30, 1964, and should be mailed to the Concord Brasspounders, P.O. Box 339, Concord, N. H.

(8) The WNH (Worked New Hampshire) certificate will be awarded to stations working all ten counties during this QSO Party, participating logs confirming.

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BUILDING THE AMATEUR RADIO STATION by Julius Berens, W2PIK. If you intend to buy the equipment for an amateur radio station, or build one, you will find this volume indispensable. This book is the next step for the amateur radio enthusiast who has earned his operating license. An all-inclusive guide for construction of the novice and general ham stations. Also includes instructions for receiver and transmitter-on-the-air operation. #221, $2.95.

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Mike & Key Clubs are planning emergency trailers, the first of this type in Vermont. Army MARS system is quite active with BXT as leader. Traffic: Jan. 31.

WASHINGTON—SCM, Robert B. Thurston, W7PGY

—New officers of the Radio Club of Tacoma are K7ATD, pres.; K7CZY, vice-pres.; and K7ZTY, asst. secy. (Continued on page 132)
“HAM-M” ROTOR
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COMPLETE PACKAGED SYSTEM.
Nothing else to buy. Can be installed atop any tower, and inside most towers.

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AZT, trustee, Washington State Net (WSN) now operates on a new frequency of 3535 kc. All Washington State hams desire better coverage in the northern part of the state. WYO rebuilt the modulator, WXW is working DX, ACA and JHS have a new Valiant, a new Novice in the Prosser Area is KRGTH. The next meeting of the QCWANW Chapter is scheduled for Yakima, probably some time in June. ZUM acquired an HX-100, GCHM is looking for a new receiver. KFASY sent a very good QSO report. FIX is awaiting a new transformer for the 300-watt rig and is planning on mobile operation. GNP has a new Morroan receiver, and the station is new. GNN has a new high-fidelity receiver. Select the equipment you want from the new Walter Ashe 1959 catalog. It's packed with everything in Ham Gear from parts to complete home receivers and transmitters...plus the latest transceivers! There's no limit to what we'll offer! Walter Ashe—Your complete one-stop radio supermarket.

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**Pacific Division**

NEVADA—SCM, Charles A. Rhines, W7YHU—The Nevada Net meets Mon., Wed. and Fri., at 1700 PST on 7106 kc. The net call is NVN and we will QRS for anyone who needs it. We will tie in to NTS through KN5. So far we have had JCY, Babbitt; NIV, Hawthorne; IWT, Egan; AZF, Reno; AIB, Elko. We still need more—come on in, gang. TKV is the new Asst. EC for Boulter City, SNP is attending Colorado State U. IWT has an 8-meter adapter for the DX-100. PNB is considering moving to Seattle. GSI is being transferred to a new station in the South Pacific. OEB received Tacoma Loggers Certificate No. 43. The VARC code program held at the local high school is progressing well. Code practice is held on 29.51 Mc., Tues. and Thurs. K7Z works for Boeing in Seattle. ETV is in progress in Wash., Land. The SCM expects to visit a number of the clubs in Washington this summer and would appreciate any information or meeting dates and times from the clubs.


SANTA CLARA VALLEY—SCM, W. Conley Smith, K6YQX, 6th St. S.C., SCM: Frank J. Parer, W5TWI, SEC: W5WNO, Division Director WHC and your SCM attended the Santa Cruz RC February meeting and Russian Students reception KSCO. The club has lots of life and interest under the able slate of officers headed by Prexy W4AEC. Meetings are held the first Fri. of the month. K6WY reports new ORSs, W6WP, W6DE and W6EZE. W6AZ reports new OPS, W4CDELT. We also have a new ORS, W6IC, W6JS, W6TG and W6EDE. VF6R, K6YQG and W6EZE upon recommendation of RM W6QKO, K6GID has moved his operating position inside. W6M has the station under his new manager, K60SX. K60SX has been burned out of his shack, but幸运ly was covered by insurance. We welcome W6STY back to S.C.R.C. where he should fit in. K6TQV is on leave thanks to KGM for helping with the Novice and Technician Class tests. K6YQG's jr. operator copped the prize at the West Valley Club but the XYL approved it—a 19-minute record for a 4-meter single sideband. W6EZE is really the generator for the S.C.A.R.S. Field Day. W6YHM rolls from station to station W6YHM in the hospital. K6GID has a new 15-meter rig in the hospital. K6GID has a new 80-meter rig. W6EDE has a new 80-meter rig. W6EZE reports on an active 6-meter net in Santa Cruz. W6MYL is chairman of the ARC's committee to put on the 1960 Pacific Division Convention in San Jose.
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EAST BAY—SCM, B. W. Southwell, W6QWJ—Asst. SCM; Mary L. Zoren, W6PWR, SEC; W6CAN, EOC; W6ZQ, W6ZPF, W6KZ, K6IDN, and K6QGZ. W6AAGA has a ten-element beam on 144 Mc. and a new Heath 'scope, K6OSO was in the 6th Circuit QSO Party. The C6C held its January meeting at HAMS clubhouse in San Francisco. The members heard a report of radar speed equipment at their January meeting. W6HRP is on 40 and 20 meters with 40 watts from W1-Land and is looking for the East Bay gang. K6EPC will be back from a week's stay in G-Land by the time you read this. W6MAF/4 is president of the G.L. Radio Society. W6TMO, W6BZOY and W6NDR are now Novices and W6NBZ is a new General Class Licensee in the Bay Area Creek Area. K6MIAF has a new Jr. OAI operator, K6YXU is v.f.o. on 30 Mc. K6VLI sold his S-36 receiver to a W6RPY who has a new DX-100. W6PRX now has a K-35 built by K6JAY. K6LII won the 2nd Semi-Annual E.E. V.H.F. Sweepstakes. The Contra Costa A REC Net meets on 2000 kc. at 10:30 a.m. Sun. W6PRX working portable 7 in Washington. K6HDD and W6BHR lost their antennas in a windstorm. The K6F9 officers of the HARC are K6Tlx, pres., W6QOF, vice-pres.; W6KSVY, treas.; K6SWY, treas. W6DK/E6H8 is on 15 meters and seeing the Looking for the Hayward gang. K6UBF and K6UQG are new members of the HARC. The Alameda County Emergency Net meets on 3050 kc. Sun., nights. John Reinartz, K6B9, was guest speaker at the January HARC meeting. The NCQG are planning their annual get-together in Fresno Jun. 24 and 25 and it is well attended. W6TI has a DX total of 270/270, and is stepping down as W6/K6 Ma Manager of four years. An FB Job, Horace. Thanks from us all. W6DJD has a Viking mobile, v.f.o. and a G-56 in a suitcase portable. The HARC has a net on 2000 kc. at 10:00 p.m. Sun. and had 31 check-ins. K6GDG has a new Ranger. K6KK is back from Arkansas. K6BLN stepped up his VHF after a one-year lay-off. W6PWF is on the NCN C6QG is the new manager of NCN. K6K8G has busy with traffic skeds and made BPL. W6ASJ is putting out Official Bulletins and reports in the CD Party. K6SRD and W6LGE are new A REC members. Welcome. Traffic: (Jan.) K6GK 500, K6MIW 103, W6QI 64, W6ASJ 20, K6OSO 12. (Dec.) K6OSO 1M, W6AAGA 5.

SAN FRANCISCO—SCM, Fred H. Lauwers, W6-
OPL—Asst. SCM; Edwin L. Olmstead W6L CF. The Tampanis Amateur Radio Club of Marin County held its Installation Dinner Jan. 24. Officers for the year are W6AQQ, pres.; W6BFR, vice-pres.; W6QXO, sek.; K6HJP, master at arms. Fifty-one members and their wives attended. First action on the part of W6-
AQQ and K6HJP is to turn their antennas in California Highway Patrol. An excellent job well done. K6JKC reports the Tri-County Emergency Net is now one year old and growing. W6KQG is back in business again. K6LRN, Asst. EC San Francisco, reports the gang was active in the big mobile competition held in San Luis Obispo in March, with mobiles coming from Los Angeles and the Bay Area. K6KSH has worked out a formula to allow high and low power to compete on an even basis. A nice trick if you can do it. K6LRN also reports the Hand Spanners ARC is celebrating its first year of ARRL affiliation. New officers are K6LRN, pres.; W6AES, vice-pres.; W6KTC, sek.; K6OJJ, treas.; K6ANP, acting mg. A further report from W6OHJ on the mobile gathering states that the most efficient station will receive a gold-plated six-foot whip. K6KDM has been elected 1st Vice-President of the Band Spanners. W6MQM, from Fortuna, reports rig troubles, a new keyer and two new Novices, W6BPX and W6VYK. W6VZC's new Viking mobile, a v.f.o, and a G-66 in a suitcase portable. W6MQM has returned. We receive her with open arms and great plans for the future. Jeri reports that K6QPB is temporarily off the air because of health reasons. K6SRZ, W6B9J, W6FAX and K6QPG are active on NCN; W6YOM, NCS-NCN on Thurs. and liaison to E5Q on Tue. Buns of Golden Gaters can fame, reports that the San Francisco YLRL has a new name "The BAYLARCS" (The Bay Area Young Ladies Amateur Radio Club Society). Officers are Esther Givens, pres.; (Continued on page 158).
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SAVINGS VALLEY—SCM, LeVaughn Shipley, KM0K—This is my final report as SCM of the Sacramento Valley section. I would like to take this opportunity to thank each and every one of you for your reports and splendid cooperation during the past two years. I sincerely hope that I have, in some small way, contributed something to amateur radio. My successor is a young "live-wire." He is enthusiastic and most worthy of the office he is assuming. I trust he will enjoy the same unqualified support which I have received. Welcome to Jay O'Brien, KM0DJ, our new SCM. May this brief report add something to officially appointed and especially to the Official Observers who have worked so diligently in behalf of our fraternity. Some of the inexpensive items of the fraternity do not seem to realize the importance of co-operation from officials. They are not trying to "sell the wrap" or even advertise—just as they do not pay attention to the cards as they pass by. They are only a few small reminders of possible FCC infractions; truly the most important of amateur radio. The Chico club has a collection of idle code machines. How about warming 'em up? Your D-8, W5KL is as snug as a bug in a rug, having just finished her 8-meter shack. It says the shack has to be built! Beautiful! A cordial welcome to KB3PB and KS0JH, who are operating portable in Sacramento. W6KAP has 94 countries confirmed on 10 meters. You have not heard of such "outright success!" The local RTTY group in Sacramento is termo. Thanks goes to an outstanding W6RRD group and a lot of hard work. Traffic: K6BY 1001, W6DY 112, K0SX 8.

SACRAMENTO VALLEY—SCM, Ralph Sarayan, KM0LPC—The Tandumic Amateur Radio Society has elected the following officers: W6RC, pres.; W6AK, sec., K6YDX, treas.; W6WEB, public relations. K6PK received an Apache from the XYL. The TARS assisted in the cross-country miniature rally, and point relays with good results. W60BUH and W6BBSN both worked K4CBB on 15 meters, W6OIV is teaching code to the Horne Squad; W6CMC is running 150 watts on 12 meters in 1978. Mon. through Fri. K6JMM is teaching theory at night at Downey High School. W6ABB is improving from arthritis. The new officers of the Downey High School Radio Club are K6PFA, pres.; K6UVT, vice-pres., W6USV, secretaries, K6AZL is running a pair of 4X156s on all bands s.s.b. W6VX is running a pair of 4X156s in GG on s.s.b. K6KZ is running a pair of 877a in GG on 50- and 20-meter s.s.b. W6USV is building some new 6-meter gear for his new car. The TARS officers of the Stockton Radio Club are W6AUN, pres.; W6BFK, vice-pres.; K6BB, sec.; K6NZ, a.g. at arms. The Stockton Radio Club is having a contest this month to determine the best home-brew 2-meter rig. W6OQX is building a new 6-meter car. W6BGK is running 500 watts on 2 meters. W6WPS is rebuilding his mobile gear to hit his new station waxon. W6UBK got his standing waves down to normal on his chome. Traffic: K6VQ 112, K6RLX 110, W6ABB 98, W6LQ 8, W6USV 14, K6RSA 2.

ROANOKE DIVISION

NORTH CAROLINA—SCM, B. Riley Fowler, W4RRH—SEC: HUL. PAM; DRC. V.H.F. PAM; ACY. The following is reported by the SEC: We have a total of 804 AREC members, 132 full members, 29 supporting members. There are 112 official mobile units, 68 emergency units and 19 local emergency nets that hold 40 AREC drills and tests during the reporting month. All 124 AREC members are tied to one or more long-haul traffic nets. Most of the local nets are on the over-populated band 7 meters, 76 meters. Next high on the list is 10 meters with only two on 2 meters and one on 0 meters. 1 wish more AMBE nets could be located on 2 meters. District 8-A is using 2 meters, as is District 9-C. District 10-A is just converted to 2 meters. Each of these districts report excellent results. There must be more if we could only get the information. NY, L.F.C., and K6OAB in his district with ACY offering a prize of $100.00 for the best home-brew 2-meter rig. VSO reports reactivation Monday evening at 2100 kc. of the Northeastern North Carolina Amateur Radio Club. Officers are VJ, pres.; K4PU, vice-pres.; W6AYQ, sec. We extend a cordial welcome to the new officers of the Early Bird Net handled 10,005 pieces of traffic in

(Continued on page 188)
BASEMOUNTS NEW MULTIBAND ANTENNA COILS

New Plug-in type coils for the Ham, designed to operate with a standard 3' base section and standard 5' whip.

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FG-60 60" $4.95
FG-72 72" $4.95
FG-84 84" $5.15
FG-96 96" $5.20

EMERGENCY • COMMERCIAL • AMATEURS

Super Hy-Gain Citizen Band

Citizen band mobile stacked coaxial antenna provides 5 to 6 DB gain. 42" high from ground plane. Furn. with 12" extension for bumper mount.

$21.95

New easy-to-install, single side, top-loaded plastic covered fiber glass mobile antenna provides maximum performance at the most useful radiation frequencies.

EMERGENCY • COMMERCIAL • AMATEURS

SUPER HY-GAIN CITIZEN BAND

BUMPERS MOUNTS WITH NEW X-HEAVY DUTY CHAINS

Adjustable to any bumper. No holes to drill, easy to attach. High polished, chrome plated 3/4"-24 thread, to fit all antennas. Precision engineered.

No. 444 $17.80
No. 445 $7.95
No. 446 $13.45

10 Met.-5 Ft. L $12.95
15 Met.-5 Ft. L $12.95
20 Met.-5 Ft. L $12.95
40 Met.-6 Ft. L $14.95
80 Met.-6 Ft. L $14.95
NEW CITIZENS BAND
27.255 mc $12.95

NEW CITIZENS BAND

27.255 mc $12.95

NEW CITIZENS BAND

27.255 mc $12.95

NEW CITIZENS BAND

27.255 mc $12.95
Carton TO Contact in 47 MINUTES WITH THE POWERFUL HU-GAIN TRAP VERTICALS

The Model 14-AV is only 21 feet high and weighs just 13 pounds. It incorporates the exclusive Hu-Gain capacity hat assembly which increases the electrical length of the antenna maintaining high efficiency on all bands.

Model LC-50 loading coil adds 80 meter operation to the 14-AV Vertical. Only $2.00 Ham Net.

Supporting the Self Supporting 14-AV for 6*, 10, 15, 20 & 40 M

$27.95

MULTI-BAND OPERATION

Completely factory prepared for 6, 10, 15, 20 & 40 M. Available as an accessory, the specially designed decoupling stub adds 6 meter operation with low SWR (14-AV with 6 meters). $3.95 Ham Net.

Weatherproof internal coax allows full legal limit on 6 and 10 meters. Polyethylene cover & cap. Combination mast and radial roof mounting kit complete with hardware, $8.95 Ham Net.

INSU-TRAP BASE MOUNT


NYLON BASE MOUNT

Glass impregnated nylon base assembly makes possible self support. Heavy cast aluminum mounting bracket is adjustable for various sizes of masts. Weatherproof internal coaxial fitting supplied.

$19.95

*Available as an accessory, the specially designed decoupling stub adds 6 meter operation with low SWR to Models 12 or 14-AV.

SEE US FOR HY-GAIN'S COMPLETE LINE

-Augie" Graf, K9GWD • "Buck" Ryan, K9EZI

Bruce Electronics

1120 E. CAPITOL • PHONE 8-7523

Springfield, Illinois


SOUTH CAROLINA—SCM, K4GVR, W4GQV—SEC; K4DZ, HM: K4AVU. We all regret that W4YOS is retiring as PM after his appointment runs out because of the pressure of his work. The following QSLs were recorded as ORS: CJD, DAW, AKC, CHD, PED, K4HRW, GAT. Newly appointed ORSs are K4IV1 and PA1. The new editor of SCQ is K4BXY: the hamnet manager K4PIK. At an SCQ meeting in Columbia Jan. 18, K4AVU was announced as RJ1 and K4GAT was appointed net manager. PED was reappointed as RJ2.


VIRGINIA—SCM, John Carl Morzina, W4KX—The Richmond ARC has started planning for the fall Roanoke Division Convention. HY says the City Fathers may give the Danville Club quarters at the airport. The Blue Ridge ARS (Roanoke) is holding code and theory classes. New officers of the Old Dominion ARC (Norfolk, Boston), in the usual order, are K4E8A, K4H1P and K4GSP. BGP reports formation of the Tech. Inst. ARC at WM, & Mary, Norfolk Div., with W4GSP as-prop. He conducted a 16-way round table to W4FFH on the occasion of his recent hospitalization. K4AMI and ALM are learning for a foreign military commission. K4EGT and K4JFN have new daughters. HDR is now a "grandpappy.


See us for Hy-Gain's complete line.
Transistor Power Supplies* and Components

**D SERIES** (Standard)
Continuous operation at 30 watts. Selective taps at 200, 250 and 300 volts; intermediate voltage at 1/2 selective taps. Both voltages can be drawn simultaneously if total power does not exceed continuous ratings. Positive or negative ground operation. Input and output filtering included except for intermediate tap.

Size: 4 1/4" x 3 1/4" x 1 1/4"  Wt.: 10 oz.  6- or 12-V Input: $39.95  24-V Input: $61.95

**DA SERIES**
Continuous operation at 45 watts. 450 volts and 225 volts simultaneous if total power does not exceed continuous ratings. Intermittent duty to 90 watts, 450 volts at 150 MA; 225 volts at 100 MA (5 min. on, 20 min. off). Positive or negative ground operation. Input (primary voltage) filtering; partial high voltage filtering provided.

Size: 4 1/4" x 3 1/4" x 1 1/4"  Wt.: 14 oz  12-V Input: $57.50  24-V Input: $79.50

Toroid Transformers for Transistor Power Supply Application

**H SERIES**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Voltage (Center Tapped)</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-14-450-1</td>
<td>Input: 6-VDC. Output: 450-VAC center tapped</td>
<td>450 and 225 VDC from</td>
<td>45 watts.</td>
</tr>
<tr>
<td>H-14-450-12</td>
<td>Input: 12/14-VDC. Output: 450-VAC center tapped</td>
<td>450 and 225 VDC from</td>
<td>450 volts and 225 volts simultaneous if total</td>
</tr>
<tr>
<td>H-6-100-150-D</td>
<td>Input: 6-VDC. Output: Voltage doubler configuration.</td>
<td>either 100, 125 or</td>
<td>Positive or negative ground operation. Input</td>
</tr>
<tr>
<td>H-12-125-150-D</td>
<td>Input: 12/14-VDC. Output: Voltage doubler</td>
<td>150-VAC. DC Output:</td>
<td>(primary voltage) filtering; partial high</td>
</tr>
<tr>
<td>H-24-120-150-D</td>
<td>Output: Voltage doubler configuration. Secondary</td>
<td>200, 250 or 300-V at</td>
<td>voltage filtering provided.</td>
</tr>
<tr>
<td>H-24-125-150-D</td>
<td>tapped for either 100, 125 or 150-VAC. DC</td>
<td>125 MA.</td>
<td></td>
</tr>
<tr>
<td>H-24-120-150-D</td>
<td>Output: Voltage doubler configuration. Secondary</td>
<td>200, 250 or 300-V at</td>
<td></td>
</tr>
<tr>
<td>H-24-125-150-D</td>
<td>tapped for either 100, 125 or 150-VAC. DC</td>
<td>125 MA.</td>
<td></td>
</tr>
</tbody>
</table>

Without Encapsulation (2 ozs.), 1-10 units: $16.00 ea.  
With Encapsulation (3 ozs.), 1-10 units: $18.50 ea.

**HD SERIES — 2000 CPS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Voltage (Center Tapped)</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD-14-225</td>
<td>Input: 12/14-VDC. Output: Voltage doubler</td>
<td>450 or 600-V at 200 MA.</td>
<td>225 or 300-V from bridge rectifier to either</td>
</tr>
<tr>
<td>HD-28-250-2-D</td>
<td>Output: Voltage doubler configuration. Secondary</td>
<td>450 or 600-V at 200 MA.</td>
<td>225 or 300-V from bridge rectifier to either</td>
</tr>
</tbody>
</table>

Without Encapsulation (3/5 ozs.), 1-10 units: $18.50 ea.
With Encapsulation (4 1/2 ozs.), 1-10 units: $21.50 ea.

**HDS SERIES — 2000 CPS**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Voltage (Center Tapped)</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDS-14-225</td>
<td>Input: 12/14-VDC. Output: Voltage doubler</td>
<td>600-V at 300 MA.</td>
<td>225 or 300-V from bridge rectifier to either</td>
</tr>
<tr>
<td>HDS-28-250-2-D</td>
<td>Output: Voltage doubler configuration. Secondary</td>
<td>450 or 600-V at 300 MA.</td>
<td>225 or 300-V from bridge rectifier to either</td>
</tr>
</tbody>
</table>

Without Encapsulation (3/5 ozs.), 1-10 units: $21.50 ea.
With Encapsulation (4 1/2 ozs.), 1-10 units: $24.50 ea.

**400 CYCLE SERIES**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Voltage (Center Tapped)</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>14-115-1.5-400</td>
<td>Input: 12/14-VDC. Output: 115-V at 1.5 amp.</td>
<td>115-V at 1.5 amp.</td>
<td>115-V from bridge rectifier to either 115-V DC</td>
</tr>
<tr>
<td>24-115-1.5-400</td>
<td>Input: 24/28-VDC. Output: 115-V at 1.5 amp.</td>
<td>115-V at 1.5 amp.</td>
<td>225-V from bridge rectifier to either 225-V DC</td>
</tr>
</tbody>
</table>

Dim: 3" dia. x 1" thick. Without Encapsulation (12 ozs.),  
With Encapsulation (16 ozs.). Per Unit: $76.00.

Matched Pair HD Transistors:
12/14-V operation—$11.00 per pr.  
24/28-V operation—$21.00 per pr.

**OEM Prices on Request**
All fully performance tested, 100% guaranteed. Manufactured by makers of world-famous SUNAIR H.F. Aviation Transceivers.

SUNAIR ELECTRONICS, INC.  
Broward County International Airport  
Fort Lauderdale, Florida, U.S.A.
The Completely New S/Line from Collins. The Latest addition to its distinguished single sideband series of amateur radio systems.

**THE COLLINS 32S-1 TRANSMITTER $590.00**

The 32S-1 is an SSB or CW transmitter with a nominal output of 100 watts for operation on all amateur bands between 3.5 and 29.7 mc. Input power is 175 watts PEP on SSB or 160 watts on CW.

Frequency Range: 60, 40, 20, 15, and 10 meter amateur bands. Easily retuned to frequencies between amateur bands by using different crystals.

Output impedance: 50 ohms.

Frequency stability: After warm-up over-all stability due to temperature, humidity, pressure and voltage variation is 100 cps.

Calibration accuracy: 1 kc.

Oscillators: Double conversion circuit is used with CR-18/U crystals in the HF oscillator. A VFO tuning 2.500 to 2.700 mc, provides 200 kc bands. A crystal oscillator operating on either side of the Mechanical Filter passband provides carrier for SSB generation and choice of upper or lower sideband.

**THE COLLINS 75S-1 RECEIVER $495.00**

The 75S-1 provides SSB, CW and AM reception on all amateur bands between 3.5 and 29.7 mc. It is capable of coverage of the entire HF spectrum between 3.5 and 20 mc by selection of the appropriate high frequency beating crystals.

Frequency Range:
- 80 meters—3.4 to 4.0 mc.
- 40 meters—7.0 to 7.4 mc.
- 20 meters—14.0 to 14.4 mc.
- 15 meters—21.0 to 21.6 mc.

Choice of three 200-kc portions of 10 meters: 28.5 to 28.7 furnished.

Overtravel—7.5 kc on all bands.

Frequency Stability: After warm-up, over-all stability due to temperature, humidity, pressure and voltage variation is 100 cps.

Calibration accuracy: 1 kc.

Visual Dial Accuracy: 200 cps on all bands.

Sensitivity: The CW sensitivity is better than 1 microvolt (with a 50-ohm dummy antenna) for a 10 db single-plus-noise-to-noise-ratio.

Selectivity: 2.1 kc Mechanical Filter for SSB; 0.5 kc. Mechanical Filter for CW; 4.0 kc IF transformer passband for AM.

**THE COLLINS 30S-1 LINEAR AMPLIFIER**

The 30S-1 Linear Amplifier rounds out the S/Line to make a complete, high powered amateur SSB station.

Frequency Ranges: 3.5—4.0 mc; 7.0—7.3; 14.0—14.4; 21.0—21.45; 28.0—29.7; Covers entire spectrum from 3.5 to 30 mc by retuning cathode circuit.

Output Impedance: 50 ohms.

Input Impedance: 50 ohms unbalanced.

Power Input: SSB-1 kw average, CW-1 kw.

Power Output: SSB: 1000 watts PEP with 40 db signal to distortion ratio. 1000 watts PEP with 35 db signal to distortion ratio. CW: 600 watts with 1 kw input.

Controls: Band Change, Multimeter, Filament, H.V., Bias Control, Tuning, Loading.

**ACCESSORIES:**

- 312B-4 SPEAKER CONSOLE integrates the 32S-1, 75S-1 and accessories into an operating system. $185.00
- 312B-3 SPEAKER contains a 5"x7" speaker and connecting cable. $27.50

516F-2 AC POWER SUPPLY operates from 115V AC, 60-60 cps to provide all voltages for the 32S-1. $105.00

516E-1 DC POWER SUPPLY operates from 12V DC to provide all operating voltages for the 32S-1 and 75S-1 for mobile or portable operation. $225.00

---

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The first and only complete handbook devoted to the very high frequency spectrum, 12 chapters, 208 pages, with brand new antenna facts. Moon reflection transmission data.

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and Herbert G. Johnson, W6QKI
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Donald Stoner, W6TNS
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Entirely devoted to the construction, adjustment and installation of rotary beam antennas! This book will make your antenna work! Eliminate guesswork in your new beam!

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Complete and concise information about beam antennas. Dimensional charts, SWR data, and construction data on parasitic arrays for the 6, 10, 11, 12, and 10 meter amateur bands! Invaluable!

NEW! This all new handbook covers the complete field for the SWL and ham!

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State... Phone...
Enclosed find: [ ] check... [ ] cash... [ ] money order

108 in 61 sessions, AEKB 114 in 21 sessions, AEKO 10 in 10 sessions, AEKN 27 in 22 sessions. Congratulations to KFZ upon his election as net manager of AEKB; also the new Technicians in Northport, KACG and KBK, also the new Technician at KFZ.

The first radio text entirely devoted to the amateur newcomer! Covers transmitters, receivers, antennas in step-by-step, easy to follow instructions. Written so you can understand it! Get your copy!

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For your wonderful acceptance of our Mobile HELI-WHIP Antennas. Experience plus expanded production facilities enables us now to bring you these advanced designs at lower cost. To satisfy demand we also present a complete series of fixed station HELI-WHIP Dipole Antennas.

73 de

Ed Harris, W9ENK

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THANK YOU!

NEW HELI-WHIP *

MOBILE ANTENNAS †

HELICHOPTER DEVICES will greatly improve the performance of your mobile rig not only in effective radiated power but also in reception. HELI-WHIPS match 50 ohm coax without traps or adjustments. Very low v.s.w.r. across the band. Extremely durable plastic coated fiberglass construction—the original and by far the best of its type.

NEW LOW PRICES

<table>
<thead>
<tr>
<th>Model</th>
<th>Length</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW-10</td>
<td>10M</td>
<td>$9.95</td>
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<tr>
<td>HW-15</td>
<td>15M</td>
<td></td>
</tr>
<tr>
<td>HW-6</td>
<td>6M</td>
<td></td>
</tr>
<tr>
<td>HW-11</td>
<td>11M (27Mc Citizens)</td>
<td></td>
</tr>
<tr>
<td>HW-20</td>
<td>20M HELI-WHIP</td>
<td>$10.95</td>
</tr>
<tr>
<td>HW-40</td>
<td>40M</td>
<td></td>
</tr>
<tr>
<td>HW-80</td>
<td>80M</td>
<td></td>
</tr>
<tr>
<td>HW-815</td>
<td>Special 8' long</td>
<td>$18.00</td>
</tr>
<tr>
<td>HW-820</td>
<td>20M</td>
<td></td>
</tr>
<tr>
<td>HW-840</td>
<td>40M</td>
<td></td>
</tr>
<tr>
<td>HW-880</td>
<td>80M</td>
<td></td>
</tr>
<tr>
<td>HWM-1</td>
<td>Base Insulator Mount for above</td>
<td>$7.50</td>
</tr>
</tbody>
</table>

*TRADEMARK
†PATENTS APPLIED FOR

BIG NEWS FROM MARK

NEW HELI-WHIP *

FIXED STATION ANTENNAS

NEW SHARPLY REDUCED PRICES!

3-BAND HELI-WHIP
NOW ONLY $19.50

Cover 10-15-20 meters without antenna adjustments! No traps. Mobile DXers are working the world with this beautifully engineered antenna. Use with the HWM-1 Mount or any standard type.

NEW HELI-WHIP DIPLOLES FOR YOUR FIXED STATION

The famous radiation and matching characteristics of HELI-WHIP mobile antennas are now available for your home station. The HWD Dipoles are extremely simple to install in areas that otherwise would present problems because of lack of space. They are supplied with a type SO-239 connector for RG-8/U or RG-58/U coax.

<table>
<thead>
<tr>
<th>Model</th>
<th>Length</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>HWD-10</td>
<td>10M HELI-WHIP Dipole 8'</td>
<td>$22.50</td>
</tr>
<tr>
<td>HWD-15</td>
<td>15M</td>
<td>12'</td>
</tr>
<tr>
<td>HWD-20</td>
<td>20M</td>
<td>12'</td>
</tr>
<tr>
<td>HWD-40</td>
<td>40M</td>
<td>16'</td>
</tr>
<tr>
<td>HWD-80</td>
<td>80M</td>
<td>20'</td>
</tr>
</tbody>
</table>

CITIZENS BAND: 27MC DIPOLE AVAILABLE

MARK MOBILE, INC.
6416 W. LINCOLN AVE., MORTON GROVE, ILL.
PHONE Orchard 5-3940

Please send data on [ ] Mobile HELI-WHIPS [ ] Fixed Station HELI-WHIPS [ ] Please send the name of my nearest HELI-WHIP supplier

Please ship the following: (My [ ] Check [ ] Money Order is enclosed)
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ADDRESS
CITY ___________________ ZONE _______ STATE __________

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PHONE Orchard 5-3940

Please send data on [ ] Mobile HELI-WHIPS [ ] Fixed Station HELI-WHIPS [ ] Please send the name of my nearest HELI-WHIP supplier

Please ship the following: (My [ ] Check [ ] Money Order is enclosed)
NAME
ADDRESS
CITY ___________________ ZONE _______ STATE __________
with this club, KN4EM and KN4EFJ are new hams in Columbus. CJIC and BAB have dropped the "N."
K4VGI is now Technical Director and is the chief
engineer for K4BAA, K4AUM and OKL did an FB job
working the transmitter and antennas at 201A.
The South Ga. Rag Club is getting ready for its big
manifest in Thomasville May 9-10. Augusta will have its
big manifest May 15-17. Don't miss either or you will
be sorry. The Georgia State Net now meets seven days a
week on 5095 kc. at 1900 EST. K4CZB and CJF had a
wonderful visit with K4LTE. K4TND on Feb. 1, ET4D is
putting up an antenna farm at the new location in
Warner Robbins. Terry is doing a wonderful job as
Air Force MARIS new director. K4VGY has a new DX-100
and new Super-Pro receiver. K4FETT visited the hams in
Douglas during January. K4LEJ is back in Tech, grind-
ing away on lessons. K4HOU still is QHT while the
attic is being rewired for air-conditioning. The teen-age
net handled 27 messages in January. Traffic: W4DDY 8,
K4BAA 78, LYE 48, VGO 28, HJZ 16, OQY 14, W4WTZ
6, BXX 1, LEX 1.

WEST INDIES—SCM, William Werner, K4PDJ—
SEC: AAA. KD renewed OHS appointment, AQL ex-
K5GCV, is active from Poone using a Viking 4, an HQ-
100, a triband beam and trap-loud. AET, AFL and
AQL are now stations reporting to the 3925 kc. Net
WQEL, JA, has a new QTH on a farm outside of Arciebo.
RA's son-in-law, K4HSR, visited here during the holi-
days. DJ put up a 10-meter beam and chased a 60-Mc.
parasite out of the 813 final. WT once again
2925 kc. from 7 a.m. to 10 a.m. since AGO repaired her
HC-454 receiver. Grandmother WT now has 13 grand-
clock signals, VQ built s.s.b. equipment and is heard on
7 Mc. EC AAM is on 15-meter phone with a ground-plane
antenna. EC, ex-K4FIR, joined Silent Keys. KD is up to
84 countries on phone and worked CQDM on 191Mc.
c.w. and KBZB on 28-Mc. phone. KD applied for part
of the 1/2W filter, Koosfoad (Z84) Award, VK Award
and Belgium "Diploma First Country" award. KD re-
ceived his DXCC-230 sticker. APW and his XYL, APX,
are living near International Airport. AJZ and his XYL.
AJL, are now in San Angelo, Tex. JM has a 458-20A-
600L and a Telrex Christmas-tree array 6 through 30
meters. K7QCL visited KP4-Land and wants a skel
on 15 and 20 meters from the Detroiter KP4-MODE.
KDICK, at Thule Air Base, Greenland, wants a s-lel
with KP4 on 21,045 kc. between 1500 and 0200 EST.
W2DAK is on 21 Mc. with Globe Scout and an
AMG now is located in Battle Creek, Mich. AMU is on
28-Mc. c.w. with a Ranger. AMG assembled an Apache
transmitter. HZ assembled a Maharaja receiver. KD also
completed an Apache and s.s.b. generator. KW moved to
KP4-Land and wants a skel on 10 and 20 meters from the
Des-tion. K7QPE and K7QK, at Thule Air Base, Green-
land, want a s-lel with K4P on 21,045 kc. between 1500
20th and 0200 EST. W2DAK is on 21 Mc. with Globe
Scout and an

SOUTHWESTERN DIVISION

LOS ANGELES—SCM, Albert F. Hill, Jr., W6JQB
—SEC: W6LIP, RMIs; WEBH, K4HLR; PAMs:
K4LWV, WGOHS. The following stations earned BPL:
W5GOH, K4HLR and K4FAR. I think W5GOH has a
record, 35 consecutive BPLs. Congrats, Cavi, on a
fine job. K4LWV is now a TCC station and K4GOB is work-
ing some fine DX between classes. K4OYU reports the Turn-
Age Net is active on 3940 kc. at 2200 PST Sat. W4GDPW
is the new call of W6LIP. K4FEM was appointed Asst.
NSC of the SoCal 6 Net. W6JBAQ has a new LP
vertical. W6BHE put up a twin 5-2-meter beam. K4LWV
has a new "Blim-Mike" mobile antenna. W6OZE
put in a new operating console. W6AAM added rhombi
No. 13 to the antenna farm. K4ZDJ now is on 230 Mc.
K4GJK reports that the 220-Mc. gang is going to hori-
zontal polarization. W5LDQ is the new chairman of the
Whittier Radio 50 Club. A new reporter this month is

(Continued on page 140)
Here are the great

**Hy-Gain VHF Yagi's for**

2M, 1/4M & 3/4M operation

9 db GAIN

Model No. 25
2M, 5 Element

$695

13.4 db GAIN

Model No. 210
2M, 10 Element

$1295

14.2 db GAIN

Model No. 311
11/4M, 11 Element

$995

16.1 db GAIN

Model No. 212
3/4M, 13 Element

$995

These Hy-Gain VHF Antennas are OPTIMUM SPACED for maximum forward gain. Parasitic elements are constructed from solid 6061-T6 alloy aluminum rod for high Q, resulting in tremendous efficiency. The booms are large diameter heavy wall aluminum tubing. All hardware is hot dipped galvanized iridite treated for maximum weather ability. Guaranteed for 1 full year.

Now Available! COMPLETE STACKING KITS & MOUNTING FRAMES for Construction of Extremely HIGH GAIN Dual & Quad Stacked Arrays!

Add 3db GAIN

Stacking two of any of the above hy-gain VHF beams results in an additional 3 db gain with considerable reduction in vertical beam width, concentrating maximum power at low vertical angles which are so important in VHF propagation. Stacking kits include all phasing lines, matching transformers, all necessary hardware (less mast), and complete assembly instructions.

Complete Stacking Kit for any two Hy-Gain VHF Yagi's

Order by Model No.

25S (for 2-2M, 5 Element Beams) $495 Net.
210S (for 2-2M, 10 Element Beams)
111S (for 2-11/4M, 11 Element Beams)
313S (for 2-3/4M, 13 Element Beams)

All kits complete with detailed instruction manuals. For use with most types of transmission lines. Completely factory pre-tuned.

Add 6db GAIN

Stacking four of any of the above hy-gain VHF beams results in an additional 6 db gain, together with the all important reduction in both vertical and horizontal beam width. The quad stack arrangement results in the maximum concentration of radio frequency energies within the mechanical limitations of most Amateur installations. Stacking kits include all phasing lines, matching transformers, all necessary hardware (less mast), and complete assembly instructions. Stacking Frame assemblies (SF) include all necessary heavy duty steel and aluminum tubing specially designed positive grip brackets and hardware (less mast).

Complete Stacking Kit for any four Hy-Gain VHF Yagi's

Order by Model No.

25QS (for 4-2M, 5 Element Beams) $1595 Net.
210QS (for stacking 4-2M, 10 Element Beams)
111QS (for 4-11/4M, 11 Element Beams)
313QS (for stacking 4-3/4M, 13 Element Beams)

Stacking Frames for use with any of the above.
Quad Stacking Kits, $59.50

Order by Model No.

25SF (stacking frame for the 4-2M, 5 Element Beams)
210SF (stacking frame for the 4-2M, 10 Element Beams)
111SF (stacking frame for the 4-11/4M, 11 Element Beams)
313SF (stacking frame for the 4-3/4M, 13 Element Beams)
for BIG savings

build your own linear amplifier from the outstanding
LA-400-C KIT

More For Your Money
With Top Quality Parts

Puts out an outstanding signal. Free of parasitic and harmonic radiations, unit permits operation in fringe TV areas.

Operates 75 thru 1000 watts. Up to 500 watts DC input. Can be driven on SSB, AM, FM, CW from 20A; DX20, 35, 40; and all other 10-20 watt exciters or transmitters.

Easy to assemble, clear instructions. Complete with:
- Heavily filtered well-filtered 300 watt CCS, 500 watt ICS power supply with two 816 mercury vapor rectifiers
- Four 1625 tubes in grounded grid operating Class B
- Three-position meter reads: 1. RF drive voltage (tune)
- Four 1625 tubes in grounded grid operating Class B
- Blocking bias strip

Choice of grey table model (437×370×203 in.) or grey or black rack models. Ship. wt. 50 lbs.

LA-400-C Kit, complete for assembly.............$129.95
LA-400-B, same unit Wired and tested .......$199.95

New Hi-Power VHF Linears

Model L600M for 6 meters ...............$289.95
Model L200M for 2 meters ...............$289.95

(Introductory prices, subject to change)

RF CHOKES

Hi power Model 160-6 has max. rating of 5000 watts DC at 2.5 amps. Inductance 162 uh at 1 kc. Designed to operate on all amateur bands, 10 thru 6 meters.

Each..................................................$3.50

Chokes custom designed to your requirements

V-F-O-MATIC Frequency Control

8020 for 7SA-2, 3, 4 Collins receivers.............$129.95
8010 for KWS-1 75 thru 15......................$179.95

Six Meter Transmitter Converter

Model 600A Complete, less Power Supply ....$49.95
Model 600-B Power Supply for above ............$29.95
Model 600A-PR Complete with Power Supply ....$87.50

See your distributor or write:
P & H ELECTRONICS, INC.
424 Columbia, Lafayette, Ind.

W6QR. Glad to have you, GIL! W6CMN has the new Hy-Gain all-band vertical going. New officers of the Hughes Amateur Radio Club are KAVTO, pres.; K6YFO, secy.; K6TH, treas. K6QMK is building a new shack. W6BSB is sporting a new A-15. The repeater station, K5AMY, is now operating on 145.18 Mc. K6TGJ made WAS on 15-meter phone with his DX running 75 watts to a beam. He received a Victoria and an SX-96 for Christmas, our new Director, W6MLZ, has really been touring the division from Tucson, Ariz., north. Nice going, Ray! W6HAL made DXCC. Congrats Leon! Support your national contest. SoCal 6 Net, 50, 4 Mc, at 1830 PST; e.w., Southern California Net, 300 kc. at 1830 PST daily. Traffic: (Jan.) W6GHz 926, K6DLR 84, K6LRV 80, W6AX 78, W6WQ 74, WA6BQA 340, K6PQX 100, K6EA 124, W6BHJ 123, K6WYV 114, W6QR 109, K6GKX 107, K6TLP 46, K6PZM 47, K6WSS 11, W6WZ 9, K6KLW 8, K6GCC 8, W6SY 8, W6CH 4, W6WUK 4, K6COP 2, W6GB 2, W6SRE 2, W6CMN 1; (Dec.) W6BHJ 114, K6MCU 173, K6LYR 185, K6OE 237, K6TLP 126, K6QOD 114, K6QMK 73, K6TLP 63.

ARIZONA—SCM, Cameron A. Allen, W7OIF; SEC: W6Q, PAM CN 2890 kc; PMZ, NLR, has a new shack and is modifying some h.f. gear for it. The AARC held its Jan. picnic in South Mountain Park. The transmitter hunt was won by CF and PMZ. Our Director, BMLZ, spoke to a joint meeting of clubs in Tucson and also the Ft. Huachuca Club. He reached Phoenix on a Saturday night and visited with the Board of Directors of the AARC. Don't forget that the Northern Arizona Hamtest will be held at White Horse Lake near Williams this year. As usual it will be over Memorial Day week end. There will be more details later. Traffic: W7PLR 73, PMZ 11, K7EBB 10, W7OIF 3.

SAN DIEGO—SCM, Don Stansifer, W6LRR; W7AHR is active in El Cajon operating from the trailer in which he and his wife live. We are happy to welcome CFQ back, in San Diego this time. Ed is now ORS and very active. K6HTO has moved, but still is active on 430 Mc. from National City. K6ZCR, in Fullerton, is an OBS. She is active on all bands, c.w., and phone. RFC, on both a.m. and s.s.b., was very active during the ARRL DX Phone Test from San Diego. K6IPV is up to 46 countries on phone, and has simplex dial. W7EIC, on LRU got a Heath Apache for Christmas with an SR-10 s.s.b. adapter. IQY spoke on sideband at the February Felic Club meeting. Any who missed F7Y and worked him, can secure cards from W6KSM with the usual envelope ready to go. The February meeting of the San Diego DX Club was at the home of FFD in La Jolla. New officers of the DX Club are CAF, pres.; ZVQ, vice-pres.; CHV, secy.-treas. New officers of the San Diego Council of Amateur Radio Organizations are K6GKX, chairman; K6DJB, vice-chairman; K6GQX, secy.; K6BPL, treas. K6ZV is active from Imperial Beach on 6 meters. Recent endorsements in this section are K6EC, chairman; K6DBJ, vice-chairman; K6GQX, secy.; K6BPL, treas. K6ZV is active from Imperial Beach on 6 meters. Recent endorsements in this section are K6EC, chairman; K6DBJ, vice-chairman; K6GQX, secy.; K6BPL, treas. K6ZV is active from Imperial Beach on 6 meters. Recent endorsements in this section are K6EC, chairman; K6DBJ, vice-chairman; K6GQX, secy.; K6BPL, treas. K6ZV is active from Imperial Beach on 6 meters. Recent endorsements in this section are K6EC, chairman; K6DBJ, vice-chairman; K6GQX, secy.; K6BPL, treas.
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Ameco 5-Meter Converter And Power Supply
Crystol controlied. 6BZ7 coscode RF amplifier and 6Cf8A mixer-o«ciltator. Special Pi-net output coll with tape & tube & crystal for 7-11 MC or 14-18 MC.

Model CB-6K (Kit) .............. $19.95
Model CB-6W (Wired & tested) $27.50
Kit or wired model for any other output frequency ......................... $1.00 extra

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Transcon Model H600
Transistorized Mobile Power Supply
Continuous duty output 120W. Single output 600 VDC at 200MA. Dual output (Simultaneous) 600 VDC at 100MA and 300VDC at 200MA. Perfect for Elmac AF67 and many other mobile emitters.

Amateur Net (Kit) ............... $59.95
Amateur Net (Wired & tested) ... $68.95

NEW
Transcon MARK II
6 or 10 Meter FVD or Xtal Xmitter & Xtal Controlled Broad Band Converter
Improved model. Phone or CW. Push-to-talk operation. Carbon orystal mic. Constant modulation indicator. TVI suppressed. Quick switch to B.C. Up to 4 watts using auto radio or home station receiver for power supply - 12 watts with external supply. Compact 5" x 5" x 7". 6 volt and 12 volt operation. 6 or 10 meter models. Switch on rear panel to demodulate Final & supply audio drive for Transpower or any other higher power amplifier.

Amateur Net ...................... $99.50

Transcon Twin Noise Squelch
Can be installed in any car radio rapidly. Tubes: 6AK5 & 12AX7. DC power input: 150V. DC to 225V. DC. Filament 6 or 12V. Noise Level Attenuator: 82. Size: 1/2 x 1/4 x 7/8".

Amateur Net ...................... $12.95

Field Strength Meter. For both mobile or fixed station use .................. $11.95

Sub-Miniature 0-200
Microamperes Meter
A high quality instrument made by international Instrument Co. (Model 100). "Ideal for any professional, industrial or government use that requires precision in the highest degree. All applications & transistorized circuits. A natural for transistorized grid dip oscillator as described in June '58 QST.

Amateur Net $3.95 ea. 2 for $7.50

Weston 2"-0-4 amp RF meter Model 507. A giveaway at $2.95 ea. 2 for $5.50

6 Volt Dynamotor
Rated output: 425 volts DC at 75 ma. High efficiency, compact. 4" diameter, 7" long. Shpg. wt. 13 lbs. Worth to 3 times this low price .............. $12.95

12 Volt Dynamotor
Rated output: 625 volts DC at 225 ma. High efficiency; compact; no battery stream; latest design. Grand new, recent military production. 6" diameter, 9" long. Shpg. wt. 16 lbs. Worth two to 3 times this low price .............. $13.95

Central Electronics
100V Exciter-Transmitter
NO TUNING (except VFO), uses famous CE BROADBAND system. PRECISION LINEAR VFO - 1 kc calibration. Single knob bandswitch 80 thru 10. SSB—DSB—AM—PM—CW and FSK. RF output adjustable 10 to 100 watts PEP. Meter reads Watts Input, Amps, Output and Carrier Suppression. 2" RF scope. Speech level & load mismatch indicators. Audio filter — Inverse feedback — 50 db Carrier and Sideband Suppression.

Amateur Net ...................... $79.50

Amateur Net $99.50

Versatile Miniature Transformer
Same as used in W2EML SSB Rig — March '56 QST. 3 sets of CT windings for a combination of impedances: 600 ohms, 22,000 ohms. By using the center tap, the impedances are quartered. The ideal transformer for a SSB transmitter. Other uses: interstage, transistor, high impedance choke, line to grid or plate, etc. Size only 2" h. x 5/8" w. x 3/4" d. Brand new. Fully shielded.

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With this ASP-177 (130-174 Mc) Roof-Top Antenna you can hear and talk to more mobiles than before. Why pay $300.00 for a more powerful transmitter when the ASP-177 will do the same job. See this new antenna at your distributor or write us for literature.

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includes 12 ft. R. G. 58/U Cable and PL-259 connector

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**transmit**

**TO INCREASED DISTANCE**

**receive**

**FROM INCREASED DISTANCE**

**new HT-32A and an HT-33A, K5IL and K5KEM made BPL for January, RVI made WAG running 40 watts, MBB has a new Communicator on 6 meters, VEZ is a new OQ, EPO has a new Tri-band on a 50-ft. tower and is working plenty of DX, SJÇ, Convair KBC, keeps a daily sked with K5ME/KL7. This schedule helps to keep the special mission group in contact with friends and barks home. The Terry County ARC will hold surprise emergency drills this summer. No one will know when the call will come but we expect it ready. HGR and AAO will be on s.s.b. soon. Many swapfests are planned for West Texas in the coming months—Snyder Apr. 11, Avalanche May 3 and elsewhere sometime in August. Traffic: W5SMK 369, GY 214, K5HLL 204, K5BB 173, PVX 173, W5EHI 148, K5IDZ 128, JUN 122, W5DGO 74, K5AL 48, W5PFX 9, K5HC 41, DNQ 40, LEB 21, LR 19, LNH 18, SQY 11, W5MBR 6, RYT 316.*
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FOR OVER 25 YEARS ONE OF THE WEST'S OLDEST AND LARGEST FIRMS
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5X101 MARK III—IT'S ALL AMATEUR—
Has full ham coverage: 80-10 meters. Has full gear drive from tuning knob to gang condenser with slide rule dial with 40:1 tuning knob ratio. Built-in 100 kc. crystal calibrator and precision temperature compensation with heat cycling for lowest drift with second conversion oscillators being crystal controlled. The sensitivity is one µv or less. Has exclusive upper-lower sideband selection with dual conversion and 5 steps of selectivity—5 kc. to 500 cycles at 6 db down. Heterodyne reduction controlled by tee-notch filter. Satin black or light gray finish.
NET, less speaker..............$399.50

HT32A—SSB-AM AND CW XMT—Cov-
erage 80-10 meters. Gear driven VFO with vernier calibration—200 cycles all bands, plus crystal controlled high freq. heterodyne oscillator, 5 mc. crystal filter suppresses unwanted sideband 20 db or more. Transmits both sidebands on AM and has built-in voice control system as well. Full TVI suppression, control circuits and AC power line filtering. Two 6146 final output tubes 144 watts input, P.E.P., 50 ohm pi network output (provisions for RTTY); 20" w. x 10½" h. x 17" d. Shpg. Wt. 88 lbs.
NET..............................$695.00

HT33A LINEAR AMPLIFIER—This is conser-
atively rated at 1 kw. and is great for HT-32 companion unit. Excellent stability is given by a PL-172 pentode operating Class AB1 with greater capacity for over-load and higher efficiency. The 50-75 ohm resistive input does not require any tuning or neutralizing. Has one knob for bandswitching 80 thru 10 meters. The metered circuits are grid, screen, cathode current-plate voltage, R.F. output tuning indicator. Has variable pi network output. Size: 10½" h. x 20" w. x 17" d., and shpg. wt. 130 lbs.
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Band 3055 m 3055 m 3055 m 3055 m 3055 m 3055 m 3055 m
Approx. Length 4" 4" 4" 4" 6" 6" 6"
Price 15.50 15.75

Special 40 & 80 meter bumper mount antennas in 7' lengths — $21.

*marked for intermediate frequencies.

Amateur net

ONTARIO — SCM, Richard W. Roberts. VE23NG—NF was guest speaker at the Quinte club. DTO has returned from Kilo-Land. The Canadian Amateur Maga-azine was received 100 per cent in Ontario. Good luck.

7JB, RW is the new OBS for 75 meters. The V.H.F. group held a 2B meeting at Oakville in spite of a snow-storm. LY visited Toronto hams. Check to see Amateur license was paid up last year. If not, you will be minus a call in 30. Ontario P.A.M.s are fed up with the carrier over 800 packets each evening. D.W. is asking us to get rid of this pest. Let the local D.O.T. inspector know as soon as you have information. O.O.s, also keep watch. Certificates are to be issued by your SCM for Field Day winners in their respective groups for last year's efforts.

Nortown of Toronto won the Marconi Award for the highest Ontario score. RW is rebuilding. R.K. is going s.s.b. ELH is going high power. Your SCM has visits planned for St. Kitts, Belleville, London, Windsor, Hamilton and possibly Ottawa. The Nortown, Scarboro and Oshawa Clubs will hold annual dinners soon. D.F.W. is active on 6 meters. D.W. is on 10 meters. B.S.A. put out an FB bulletin for the Niagara RC. The Queens Club had its 8-2-1 P.M. meeting. VE2JC had an FB ban-quet. AQM is a new comer. DCX and RW do an FB liaison job between the c.w. and phone nets. D.S.S. is rebuilding. V.C.L. has a new call. VE25P is the call of the Porcupine Civil Defense station. Operator DCX, CFR is the new control on the Ontario Phone Net. VE36X is an old timer—look for the spiral mark-ings of VE36X. VE36X is the new OBS for 75 meters.

Quebec—SCM, C. W. Starkstedt. VE2BDR—More activity is requested on c.w. net QN, daily at 1900 EST on 3533 kc. The Queb é 1 hour Net on 3790 kc. at 1845 has good-attendance. New club officers of the Montreal AKC are MW. pres.; AM, 2nd vice-pres.; GZ, treas.; HI. secsy.; QQ, VV, NB, AKT and DB. directors. The South Shore AKC elected 1K, pres.; AQM, vice-pres.; D.M., treas. The ARRC is again pulling up stakes and will sign VE3 shortly. ZG returned after 5 years' silence. VE25Q is expected to be- come an AKC. AQM, ALO, L.I., VE and VI joined the AREC. VE25Q, CA's well-known XYL, is resting after a recent illness. OK, operators of Carier new Collin 8-line station. Recent heavy storms played havoc with beams. BK was one of the sufferers. IQ is on s.s.b. with home-made gear. IQ also is expected on s.s.b. with a new rig. IQ soon will be heard from a new "shack" at Blue d'Urfée. Ex-3ACN may apply for a VE2 call. APR, Sherbrooke EC, is active with a 500-watt on 80 meters and reports ADE is a new ham in that city. Traffic: VE2BDR 81, EC 39, APR 17.

Alberta—SCM, Gordon W. Hollingshead, VE6VM
—Amateur radio courses are sprouting up all over. The Calgary Amateur Radio Club reports an enrollment of 68, the Cypress Club 30 and Red Deer 60. CA, TG, HM and DJ recently returned from a c.d. course in Ariprio. CE is handling through Dewline traffic. NX is on s.s.b. and AK now is in the R.T.T.Y. racks. VE25Q is active on 80 meters with a DX-1000B, so activity reports should now perk up in this column. TG has been appointed as communications officer manager for Lethbridge C.D. Executives of the Red Deer Club are PD, pres.; RP seev.; UI, treas. Traffic: VE6VM 18, VE 38, TC 28, OD 23, SE 11, CP 7, PS 7, PV 7, MJ 6, SS 5, SF 3, BL 2, CO 2, UK 2.

British Columbia—SCM, Peter M. McIntyre, VE7JT—SEC: KK. At the time of writing I have not seen the second issue of JB's new publication but from the comments heard via the ham bands its reception was very favorable, not only in Canada but also in other lands.

The BCEN C.W. Net has just passed its first year of operation and is gradually growing in stature. All we need now are some good outlets in VE6 and VE7-land. 

(VES & 6 SCMs and RMS, please note) and an all-Can-adian c.w. net from coast to coast to tie into all the re-

(Continued on page 10$)
SPRING! ROBINS, BLUEBIRDS, CROCUSES — AND THE JOYS OF CQ'ING WITH A MOBILE RIG. NEED ONE? WRITE US!

MORADCO SBT
Complete coverage: 3.8-4.0; 7.1-7.3; 14.1-14.3; 21.25-21.45; 28.5-28.7 mc. VFO calibrated 0-200 kc.
Mechanical filter for long term maximum suppression (50 db) of carrier and unwanted sideband.
Emission — upper or lower sideband, CW-AM (SSB with carrier added).
12-volt DC, 115-volt AC, Universal Power Supply.

$349.50

GONSET

6 Meter Communicator
Complete unit. Transmitter: 50 watt with pi-network and calibrated VFO. Receiver: sensitive, selective. AC power supply; all elements integrated to operate perfectly together. Excellent performance; exceptional value.

Model 3221
$319.50

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700 watt (A712) Shpg. wt. 77 lbs. $142.50
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2500 watt (A2512) Shpg. wt. 222 lbs. $325.50
Sizes to 3500 watts. F.O.B. factors.

Dual voltage models, automatic controls, etc., available.

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NEW 60-FT. 4-BAND ANTENNA
40-15-15-10 METERS
Hi-power design. 4 bands in 60 ft. over all.
Will handle 2 KW of well over-modulated AM carrier.

40-M C 4 band KW coils
40-M A 4 band KW antenna
25-M A 4 band KW antenna
15-M A 4 band KW antenna
10-M A 4 band KW antenna

FIVE-BAND ANTENNAS

HC-F 5 band KW coils
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40-MC-C 4 band CW coils
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88 ft. Kw tandem, Heavy-duty insulators, copperweld wire.

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How's Dx?

(Continued from page 78)

W4UDEA) opines, Working DX from West Coast, is by no means a fish-in-a-barrel setup, simply because the W4 and W6 groups are not yet active. To rate a slot at an airline ticket to Bermuda plus a week's sojourn for two at one of the island's leading hotels, or a certificate of merit for top scores in your rail area, is being actively urged by the Governor of Bermuda's government, Mr. GMT. Log transcript and calculated score with Contest Committee, RSB, Box 275, Hamilton, Bermuda, in order to get active again. We are still waiting for 20-meter hams who will handle northern traffic on the West Coast.

NEW 60-FT. 4-BAND ANTENNA

How's Dx?

(Continued from page 78)
Just 10% Down—and It’s Yours!

For easy terms and liberal financing—you can’t beat Burghardt’s. Our exclusive time payment plan can be tailored to suit your budget—and you can take 6 months and, in many cases, up to 24 months to pay. Payment in full within 90 days cancels all interest charges. You’ll get fast delivery with just 10% down—and in most cases our generous trade-in allowance serves as the down payment on your new gear. Best of all, you’re always covered by our money-back guarantee—which means that if you’re not completely satisfied with your new unit after a 10-day trial—your money will be refunded in full! Remember, for terms, trades, and fast delivery—you’ll always do better at Burghardt’s!

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HALLICRAFTERS HT-32A TRANSMITTER—Proven superior, the HT-32 transmitter with exclusive 5.0 quartz crystal filter system. Designed for SSB, AM, or CW transmission—unit operates on 80, 40, 20, 15, 11-10 meter bands. Puts out one of the cleanest signals on the air.

HT-32A ..................... $675.00 NET

HALLICRAFTERS HT-33A LINEAR KILOWATT AMPLIFIER—All important circuits metered. Pi-network for effective harmonic suppression. Complete coverage of 80 thru 10 meter bands. Input is conservatively rated at the maximum legal limit.

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Telrex rotary way up on the DEW line, 10, 15 and 20 preferred. K9BFK tells us that club station KL7AIZ now is multiplexed with a sweep of renewed interest that keeps the B-plus on for 10 and 12 hours daily. Collins gear predominates at this Adak co-op and the antenna scene is a robuf. In addition to s.h., s.w.b. and e.w. work on our favorites, 15 and 20 meters, a portion of each day is set aside to work the Novice boys on 7 Me.

QST and ARRL Membership $1
$1.25 in Canada, $6 elsewhere

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The Groundpole Antenna
(Continued from page 41)

wire feedline. The distance from ground to the feed point is almost exactly one-half wavelength at 7 Mc. As measured at the end of 70 feet of feedline, the antenna impedance was resistive, and about 200 ohms on both 7 and 14 Mc. Impedance was not sharply dependent upon frequency. The first night this antenna was used on 14 Mc., WAC was made in a little over two hours with the following reports: HK4, 569; ON4, 579; K1, 599; KB6, 599; ZD1, 589; JA2, 589. On 7 Mc., consistent 599 reports were received from the East Coast. The antenna is oriented with the horizontal wire running north and south. Feeder currents are balanced, and very little r.f. is observed at the base of each vertical, even though no radials were added. (Underground conduit for the electrical wiring to the floodlamps probably helps the ground connection, however.) The antenna performs well in about any direction on both 7 Mc. and 14 Mc. With it, second place nationally was won in the July CD Party (see QST, Oct., 1958, p. 96). It has not yet been tested on 21 and 28 Mc., although it should perform on these two bands also. A grid-dip meter indicates resonance in the vicinity of these bands.

Many thanks are due to Mr. Fred D. Clapp, W6DSZ, of the University of California Antenna Laboratory, for his extremely helpful comments and suggestions in connection with this article. The author would appreciate having comments and suggestions from amateurs who try the antenna in the various configurations.

Viking Ranger
(Continued from page 86)

any station you're going to work.

Tuning is similar to that on other bands with the Ranger, except that the final stage will tune very sharply. Set the auxiliary coupling to position 7 and the coupling to about 2 o'clock for 50-ohm load. Final adjustment of the loading should allow the 6146 to draw about 120 ma. at resonance.

Crystals in the 6- or 8-Mc. ranges can be used in place of the V.F.O. if you desire. Keying of the transmitter is done in the same manner as for lower bands.

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AMERICAN RADIO RELAY LEAGUE
West Hartford 7, Connecticut

The Audofil

(Continued from page 17)

in performance was observed between the breadboarded and the completed version.

If this is your first construction job, there are a couple of things you should be careful about. Always be sure that correct polarity is observed when connecting electrolytic capacitors into the circuit. Such capacitors are shown in Fig. 1 with + and - marks. The selenium rectifier CR1 must also be connected correctly. You’ll find a + (or red) mark on one side of the rectifier, and this terminal should be connected to the junction of C7 and the 1000-ohm resistor.

Mount the parts and wiring parallel to the chassis sides. This gives a much neater appearance than just a helter-skelter arrangement of wiring and components. (It may not work any better, but you won’t be ashamed to show the wiring to a visitor!)

Switch S1 is a single-pole, 4-position unit with an a.c. switch S5 mounted on the back. In the first position the Audofil is turned off. When the switch is advanced to the next position the filter is turned on and ready to be used. The next terminal is grounded and in order to switch the filter out the switch must be advanced to the fourth position. The third terminal is grounded to reduce any capacitive coupling around the filter, which would reduce the selectivity.

Using the Audofil

When the unit is completed, plug in the line cord, turn on S1 and allow a minute or two for the tube to warm up. Plug P1 into the headphone jack on your receiver and your phones into J1. Adjust the audio and r.f. gains in your receiver to a comfortable level and tune across a c.w. signal. You’ll notice as you tune across the signal that it peaks up somewhere near 700 cycles.

If you want to see just how good the filter is, switch it out (position 4 of S1) and find two signals that are close together. Not zero beat with each other, but about 1000 cycles apart. Now switch in the filter and tune across the signals. You’ll probably find that you can hear but one signal at a time. If you do hear both signals, one will be much weaker. Get accustomed to using the filter, and you will be very pleased with the results. It should make for many “solid” QSOs that weren’t possible before.

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Ab D. Adams — W4FNR
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The "hump" (around 12 words) is the thing that tells you you have wasted your time by starting out wrong. Thirty years ago when we started teaching Code our students too ran head-on into the "hump." We went to work to find out why. TWO-PHASE, STEP BY STEP instruction is the perfect answer. In this method dot-dash is not A. The SOUND resulting from dot-dash is A. There is also the important factor of correct timing. If the signals are not timed correctly the resulting sound will not be correct. There are many, many things connected with proper Code instruction, many of them so small they seem inconsequential. Others are so technical that many so-called experts fail to understand them. It's a long story but I have it all written up and will be glad to send it to you. A postcard will bring you the full story.

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Correspondence

(Continued from page 70)

Post Office Department" Sec. 107.3a: "No charge is made for forwarding first-class mail, including postal and post cards, when postage has been prepaid by the sender . . ." Therefore a QSL card can be forwarded as many times as the Post Offices have forwarding addresses of the addressee. The cards are never returned unless return postage is guaranteed by sender.

QSL cards are often wasted because the addressee has not taken time to file a "Change of Address" card at the Post Office of last address.

— David B. Blalock

3322 West 17th St.,
Davenport, Iowa

Editor, QST:

Best way to get a reaction is to misquote something. For some time now we have attempted to draw up a list of Post Office names for the express purpose of starting a not of these people to ready ourselves in event of any move- ment to re-location site, and furnish communication under emergency.

My letter published in QST deliberately misquoting regs is really bringing results. The letters and cards are pouring in. It is my opinion that no magazine gets the careful scrutiny that QST does.

I sincerely hope the letters keep pouring in. I have self-addressed cards all ready to send to any 'IO ham that writes me, requesting his opinion on starting a c.w. net.

— David David, KO44J

MORE 599

54 Allendale Road
Rotherham, Yorkshire, England

Editor, QST:

I'm afraid I can't let you in Robert's letter (January QST) pass without comment. He's completely up the pole.

Bill appears to assume that all W and K signals are TO, whilst we foreigners (I prefer "overseas stations") automatically have ST-77 signals. Baloney! Bill — absolute baloney! As for being "sharp operators" and knowing we have poor notes — that takes the cake! Collecting QSLs is only a minor offshoot of our hobby, and giving a dishonest report in order to obtain a QSL is something I find difficult to understand.

I'll cede one point — some poor notes do come from the minor Iron Curtain countries, notably TU and SP, but I understand that large value smoothing capacitors are hard to come by in those countries, and when available, cost the earth. Perhaps we may excuse them on that count.

Getting back to signal strengths, Bill, the station doesn't require a kilowatt, a super beam, and be two blocks away to have poor notes. Baloney, Bill — absolute baloney! We've worked 'em — and given them '77. They're often only '55 as well! (Funny good old United States too you know: I've worked 'em — and given them '77. They're often only 55 as well! (Funny things, distance and conditions!)

Best wishes to the editor and staff of QST. It's my favorite radio monthly.

— H. N. Kirk, Q6JDK

ALL THAT'S COMING TO ME

5017 So. Atlanta Place
Tulsa, Oklahoma

Editor, QST:

Is there a way we can get the manufacturers of S meters to expand the scale by starting S9 where 80 is and calibrate the whole scale in 2 db. units to 100 or 150 db. over S9? Over half the scale is now wasted. No one nowadays gets less than 80 + 20. I have received some fantastic reports of 60-70 and once 85 db. over S9. This I like, but I want all that's coming to me and the way the meters are calibrated

(Continued on page 102)
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RST AGAIN

113 Tulip Ave.
Dorval, Quebec, Canada

Editor, QST:

I read with interest W2MQB's letter in February's issue wherein he gave his suggested example of a new much-needed, up-to-date RST system.

His views reminded me of when I preached the same theme back in March 1949 when I had my suggestions published in the Canadian ham magazine "X7AL." The following month I sent the same data into QST but no publication of it resulted.

To revive my original cause in support of W2MQB's views, I would like to quote my RST list from my letter to QST of April 6, 1949:

1. NIL
2. Slight
3. Considerably difficult
4. Slightly difficult
5. Perfect
1. Faint
2. Fair
3. Good
4. Strong
5. Very Strong
1. Rough broad a.c., bad clicks
2. Clicks, d.c.
3. Chirpy d.c.
4. Ripple d.c.
5. Pure d.c.

Our present system is far too cumbersome for quick interpretation. In my version above I have used reduced wording, retained the original five R steps, but have reduced the former S and T steps from nine to five.

Perhaps a combination of our two suggestions might form the basis for further "batting around" by the gang. Anyway, count me in for a change so that if we hear a really punk signal we can give the guy the RST (Really Sounds Terrible) quickly and sureiy, 'cause the way it is now we're taking the easy way out with the rubber-stamp 579!

— Floyd G. O'ribben, VE8XR

(Continued on page 161)
NEW 100V EXCITER-TRANSMITTER
NO TUNING (except VFO), uses famous CE BROADBAND system. PRECISION LINEAR VFO—1KC Calibration. Single Knob Bandswitch 80 thru 10, SSB—DSB—AM—PM—CW and FSK. RF Output adjustable 10 to 100 Watts PEP. Meter reads Watts Input, Amps Output and Carrier Suppression, 2" RF Scope. Speech Level and Load Mismatch Indicators. Audio Filter — Inverse Feedback — 50 db Carrier and Sideband Suppression.
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See Page 118
EUGENE G. WILE
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Two sizes fit any RX/TX or Electronic Equipment. 24" attached cord solders to power SW terminals. Mounting clips and simple instructions included.

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Money back if not satisfied after 30 days trial. PLUS 5 Year Written Guarantee.

Editor, QST:

With reference to Don Miller, W2MQB, and his note suggesting a revised RST system, I disagree — 100%. The standard RST system now in use was carefully planned before being put into operation. To an interested amateur, this system offers a good measurement of how his signals are being received. I have given many reports of 575 or so and without hesitation.

When we think of amateurs, we usually think of an honest group of fellows. Then why don’t we give each other honest signal reports? We must not make the easy way out through a 3-point RST, but strive to uphold what we have. I feel that most active amateurs will agree with me in this.

— R. M. Brown, K5ESQ

Editor, QST:

A new RST reporting system as presented by Don Miller in the February issue of QST certainly seems to be a more efficient and probably a more accurate form of reporting than our present system which is being misused. Let’s adopt this new form now — W9OCF. . . . Think W2MQB has a very sensible idea. I am for it! — W7TJS. . . . Hurrah for W2MQB and his comments on the antiquated RST system. I have felt since the beginning that this system is cumbersome. In wanting to give accurate sig reports, I have often been confused as to the difference between an S-7 & S-8 signal — KN8RXQ. . . . Don Miller’s suggestion of the 123 report makes sense. I have always considered the RST report a waste of time. It was started with good intentions but any operator today knows the report is meaningless. I have noticed that old timers are reluctant to give the childish “579” — K0DY. . . . Very few of us actually give true reports because of the complicated points under our present system. In W2MQB’s system you can give an honest report and the other station knows exactly what his signal is. We need a simple RST system with the ever-increasing Q/G. — K6SRK. . . . When I hear members of the fraternity splitting it up into kindling with S-5/6 and similar fractional numbers (somewhere between 5 and 6 in this case), then I am sure that we need to simplify the whole structure of signal reports. The nuances of particular cases can easily be clarified in the continuing QSO. 99 cases out of a 100 would find the simplified report completely adequate. I hope something comes of this but I have my doubts, and we will continue here on out to give meaningless reports. — W70MO. . . . Couldn’t we get enough of the boys behind this to adopt it as standard ARRL procedure? With this we wouldn’t have to spend so much time trying to choose the right report. I disagree, though, on one point. It seems to me that the standard signal report is “ur rst is 579.” — KNAIVY. . . . I have grown apathetic toward giving a true report. I gave one station an RST 463 report and suggested he leave the air to correct the trouble. He said “okay” and signed. Within two minutes he was calling “CQ” on a different frequency with the SAME signal, T3! With this we wouldn’t have to spend so much time trying to choose the right report. I disagree thus it seems to me though the standard signal report is “ur rst is 579.” — KN4Y5V. . . . I have grown apathetic toward giving a true report. I gave one station an RST 463 report and suggested he leave the air to correct the trouble. He said “okay” and signed. Within two minutes he was calling “CQ” on a different frequency with the SAME signal, T3! However, I’m for the new RST list as submitted, and stand ready to change over to it as soon as made official. — W4FTD. . . . We of the Hampton Roads Radio Club agree with W2MQB that the present RST system is outmoded. We feel that the system described by W2MQB would be an improvement and would like to see a change in that general direction. — W4PRO

[See “Operating News,” page 80 this issue for further discussion, and also turn to “How’s DX?” page 73, for a report (!) on this same problem in ancient Greece. — Ed.]

Technical Correspondence

(Continued from page 47)

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TOWERS
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See Page 118
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World Above 50 Mc.

(Continued from page 68)
fading signals, of a noise pulse simulating a bona-fide "bell"character and unintentionally causing the bell-break change-
over. It is highly improbable that any combination of noise impulses could duplicate two bell signals in rapid succession.

The modulator circuit shown in December 1958 QST—
"Two-Tube Mobile Transmitter"—is the same as WENTU's
"Carter Modulation," as published in December, 1950, in
the Bay Area Mobilier.

World Above 50 Mc.

(Continued from page 68)
THE **NEIL ALPHA 6** Six Meter Phone Transmitter

**NOW AVAILABLE IN KIT FORM...** **$58.50**

**MOST PARTS PRE-MOUNTED!**

- Only 3 inches high, all enclosed, ideal for mobile or fixed station.
- Two tuning meters eliminate meter switching, ideal when operating mobile, or to give rapid performance checks when you QSY.
- Built-in crystal switching for rapid QSY, socket for 3 crystals.
- Uses 8mc crystals, no expensive high frequency crystals needed.
- No frequency multiplication in final amplifier for highest efficiency.

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**POWER SUPPLY FOR FIXED STATION (300v @ 200ma - 6.3v @ 3.65a)** **$39.95**

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**TOWERS**

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See Page 118

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Activity on 432 Mc has developed as a regular thing across the Great Lakes area. W8HCC, Sandusky, Ohio, reports that he has worked W8DMR and WBTY in Columbus, W8RQI W8LJQ W8UST W8VCO and W8YQZ in the Toledo area, and W8RMI W8BDX and K8AIY around Detroit, all with fair regularity. Stations as far away as W8GAB, Beloit, Wis., has been worked when conditions are good. Mike hopes that eastern stations will be on 432 Mc, regularly enough to catch good tropospheric openings when they develop during the warm months.

W8LJQ, Toledo, sent us photographs of two of the TV stations operating in the 432-Mc. band in Columbus and vicinity. There is more TV activity on the Toledo-Columbus-Detroit circuit than we've heard about in any other area. How about others actually on the air with amateur TV sending us information on your work? We're not interested if you simply have a closed-circuit setup, or if you're working on TV gear. We want details of stations actually on the air.

Probably the only practical way to get started in amateur microwave communication is to make use of gear available on the surplus market, to at least some extent. Trouble is that equipment usable for amateur purposes is hard to

(Continued on page 170)
**NEW B& W T-R SWITCH MODEL 381**

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This compact electronic T-R switch (4 3/4" x 4" x 4 1/2") does a big job in automatic break-in operation on CW-SSB-AM-DSB. Bandswitch covers 80 through 10 meter bands. Integral power supply. For commercial applications, it will handle more than 1KW AM phone and up to 5KW SSB. “Fail-safe" design automatically keeps transmitter connected to antenna when unit is not energized. Matches 52-75 ohm coaxial lines.

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No. 1—NOVICE CODE COURSE. You get and keep 10 recordings (alphabet through 8 W.P.M.). Includes typical FCC code type exams. Free instruction book on learning how to send and receive code the simplest, fastest way; plus charts to check your receiving accuracy; plus an album; all for the low price of only: $5.95 33 1/3 r.p.m. $4.95 78 r.p.m. $6.95

No. 2—SENIOR CODE COURSE. You get and keep everything given in the Novice Course except that you get 22 recordings (alphabet through 18 W.P.M.) plus typical FCC code type exams for General class and 2nd class commercial telegraph licenses. 45 r.p.m. $10.50 33 1/3 r.p.m. $9.50 78 r.p.m. $11.50

No. 3—ADVANCED COURSE. Prepares Novice operators for the amateur general class and second class commercial license examinations. Contains 12 recordings (8 through 18 W.P.M.) plus typical FCC code exams for General class and 2nd class commercial telegraph licenses. All for only: 45 r.p.m. $4.95 33 1/3 r.p.m. $4.95 78 r.p.m. $5.95

No. 4—COMPLETE AMATEUR RADIO THEORY COURSE. A complete, simplified home study course in radio covering the Novice, Technician, Conditional and General classes—all under one cover—with nearly four hundred typical FCC type questions to prepare you for license exams. No technical background required. You also get, FREE, a guide to setting up your own Ham station. All for the amazing low, low price of: 45 r.p.m. $4.95 33 1/3 r.p.m. $4.95 78 r.p.m. $5.95

No. 5—RADIO AMATEUR QUESTIONS & ANSWERS LICENSE GUIDE. A “must” if preparing for Novice, Technician or General class exams. Over 250 questions (most multiple choice type) similar to ones given on FCC exams. Has 2 typical FCC type exams. Other questions by subjects, easier to study. Low, low price of: $2.95

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IDENTIFY, and even harder to figure out. W6VHS, Van Nuys, Cal., lists inexpensive publications available from the Superintendent of Documents, Washington 25, D. C., that may be helpful. These include:

- Radar Electronic Fundamentals, Navships 900,016 — $1.25
- Radar System Fundamentals, Navships 900,017 — $1.25
- Microwave Technique, Navships 900,028 — $3.50

Price list 82, Radio, Electronics, Radar and Communications, (no charges) lists these and other publications that may be of interest.

HIGH CLAIMED SCORES 1959 V.H.F. SWEETSTAKES

Growth in interest in the V.H.F. SS has been meteoric. From the first holding in 1948 through 1953, the logs recorded hovered between 300 and 400. Then the boom began. In 1954, there were 610 and the figure held around 750 the next two years. By 1957 it reached 837, only to be followed by a giant 41 percent increase to nearly 1200 logs in 1958.

Both in amount and complexity, the checking at ARRL has risen apace. Contact totals in the hundreds are registered and duplicate QSOs on a given v.h.f. band must be removed. The higher claimed section multipliers need attention. More mathematical errors occur weekly. Every effort must be made to guarantee that the right individual wins the award.

The V.H.F. SS is firmly established as a major contest. This, coupled with the later scheduling (January 10 and 11 this year), requires a new reporting system. While we await the final standings, which we can’t get ready by April QST deadline, let’s examine some high claimed scores.

Single operator: W1RFU 15,530, W1HOY 13,216, W1RJA 12,420, W1HQQ 10,899, W2BLV 17,294, K4HILA 13,341, W2PAU 12,848, W3BV 12,538, W3TVX 18,032, W3HYJ 18,140, W3KKN 16,107, W3TDF 13,586, K4HJO 6000, W4KLU 5022, K5MWW 8986, K5RCZ 3658, K6TYW 9520, K6NIZ 7781, K6HRQ 7130, W6BAZ 7058, W7RY 6772, W8RLT 10,014, W8PLD 9072, W8NNM 8832, K8BPC 7360, W9DOE 13,920, W9ROS 13,332, K1CSC 12,012, K2GQX 10,003, W2JCI 8700.

Multiple operator: W1MHL/1 19,343, K1CRQ 11,400, W1HTM 8148, K2TTP 36,001, W2ADE 23,764, W2EPE 14,444, W3KHI 14,290, W4Z/4 5460, K5STI 12,903, W6SW/6 12,328, WA6CJD 11,508, K6TJ/6 7946, K6SLQ/6 7614, K9KGI 6300, K900Q 5010.

Dozens of other excellent totals were run up around the U.S. and Canada. We’ll tell you about these, identify all Novice, Technician, club and ARRL Section winners, and present a full list of all entries to QST as soon as the scoring and checking is completed. Figures on participation are not yet available but, man, what a stack of logs!

Happenings

(Continued from page 66)

14 copies of all statements, briefs, or comments filed shall be furnished the Commissioner.

FEDERAL COMMUNICATIONS COMMISSION

MARY JANE MORGAN

Secretary

APPENDIX

IT IS PROPOSED TO AMEND PART 12 OF THE COM-MISSION’S RULES AS FOLLOWS:

Amend Section 12.111(d) to read as follows:

(d) 14,000 to 14,250 kc. using type A1 emission, 14,000 to 14,200 kc. and 14,300 to 14,350 kc. using type E1 emission and on frequencies 14,000 to 14,250 kc. type A3 emission or narrow band frequency or phase modulation for radiotelephone.

QS-59

(Continued from page 69)

with automatic antenna-coupling control that provides the best match regardless of the antenna characteristics.

Although the price of the QS-59 has not yet been definitely fixed by the manufacturer, we suspect that it will sell for around $4,000. For further information on how to get one, see your banker or bookmaker. — L. E. R.
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5. .005% crystals provide maximum calibration accuracy.
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COMPLETE COURSE. Both above tapes $11.00
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See Page 174

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be required of a civil defense communications system during modern warfare. As a result it was agreed that holders of FCC commercial operator licenses, except the very lowest grades, would also be permitted to operate RACES installations. The League insisted on safeguards in this connection, however: (1) the lower grades of license, including Novices in the amateur field, were not to be permitted any equipment adjustments; they could operate, period; even in operating they are restricted to duly authorized RACES drills. Still more important (2) station licenses would be issued only to holders of amateur station licenses other than Novice or Technician. In effect, this puts complete control of the RACES system in amateur hands.

A few instances have come to our attention where amateurs have enrolled in RACES and, perhaps with an exaggerated sense of their importance in the civil-defense system, have tended unduly to subordinate amateurs to civil defense. In any group of 185,000 people such as we have in ham radio, such instances are bound to occur. But, to quote a modern version of Aesop, that shouldn’t prompt us to “throw the baby out with the bath water.”

RACES is the amateurs’ baby. We asked for it, because we wanted to be able to perform an essential service for our country in the event of another war. Minor aspects of the rules might not be wholly to our liking and there is no doubt there have been some abuses by civil defense people; but the overall picture is what counts, and that is certainly satisfactory to us.

If we hams want to decide we’ll have no part of making our self-acquired skills available to the national defense interest, let’s pull out and get RACES abolished. But if an overwhelming majority of amateurs want, as we believe, to be prepared should there be another war, let’s stop this sniping, get down to business and support RACES.

As a matter of fact, why not join up yourself?

K6HV says that the stunt of connecting a key up to your auto horn (See March QST, p. 18) was tried way back in about 1932 by W5IQ (who is now W4FPD). During the course of a Delta hamtest in Pine Bluff, Ark., W5IQ drove up and down the main streets of town in the wee small hours carrying on a QSO with another ham, and was eventually pulled in by the local gendarmes for disturbing the peace. K6HV suggests Navy type blinkers, instead. Well, at least they’re quieter!
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“Largest Exclusive Manufacturer of TV-Communications Towers”

HALO ANTENNAS
Fixed and Mobile, for both 6 and 2 meters, by the pioneers in horizontal polarization for mobile communications.

Hi-Par also manufactures a quality line of antennas for amateur, TV, FM and commercial services.

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These are the publications which every amateur needs. They form a complete reference library for the amateur radio field; are authoritative, accurate and up to date.

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<tr>
<td>The Radio Amateur's Handbook</td>
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<td>The Log</td>
<td>50c</td>
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<td>How to Become a Radio Amateur</td>
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<td>The Mobile Manual for Radio Amateurs</td>
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<td>Lightning Calculators:</td>
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<td>b. Ohm's Law (Type B)</td>
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<td>Learning the Radiotelegraph Code</td>
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<tr>
<td>A Course in Radio Fundamentals</td>
<td>$1.00</td>
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*Subscription rate in United States and Possessions, $4.00 per year, postpaid; $4.25 in the Dominion of Canada, $5.00 in all other countries. Single copies, 50 cents. **$3.50 U.S.A. proper, $4.00 U.S. Possessions and Canada, $6.00 elsewhere.

![Towers Ad](Image1.png)

**NEW PALCO BANTAM B-65A**

The smallest, most compact Mobile Transmitter with 65 watts phone... 90 watts c.w.

The PALCO B-65A is only 4" high, 8" wide and 8½" deep. It can be mounted right at your finger tips, leaving lots of leg room. Companion modulator is only 4" x 4" x 9", can be mounted alongside RF unit or tucked away under the dashboard. Exclusive new tuneup meter designed with highway safety in mind. No squinting — no squatting with this one.


Amateur Net: inc. mount, RF and Mod. units, w/tubes and interconnecting cables and pur. input cable socket... **$179.50**

At Your Dealer or WRITE DIRECT

PACO ENGINEERING COMPANY
355 N. Columbia
Frankfort, Ind.
"WHY BE FLUSSY?"

**APPEARANCE DOES MAKE A DIFFERENCE**

We allow more for equipment that has been handled with care and is in prime condition. We handle the principal ham lines, offer terms and fast service. If you're trading in your transmitter or receiver on new equipment, get our quotation first. Send your trade-in details on a card to me, Art Brown, W9HZ, and get our quotation.

**BROWN ELECTRONICS Inc.**
1032 Broadway • Fort Wayne, Indiana

**UNUSUAL OPPORTUNITY**
for inexperienced man who wants on-the-job training in TV transmitter operation. First phone required.

BOX 185, QST

---

**TOWERS**
ALL THE WAY - IT'S EZ WAY

See Page 118
ELECTRONIC SUPPLY
MIAMI-MELBOURNE, FLORIDA

---

**HOLD AUDIO DISTORTION DOWN**
**BRING TALK POWER UP**

with a

**P&H COMPRESSOR-AMPLIFIER**

It's a fact — 100% modulation on most ham rigs is a "sometime thing". Uncontrolled, instantaneous audio peaks can ruin an otherwise clean signal. **THERE'S A SIMPLE SOLUTION — install a P&H compressor-amp in the mike line of any AM, SSB, DSB or PM transmitter — adjust audio gain for full 100% modulation and forget it!** TALK POWER IS UP — FLATTOPPING IS GONE. The net result is the CLEANEST, MOST POTENT AUDIO your rig is capable of. Single knob control. Works on AVC principle — like broadcast compressors. **TWO MODELS:** The AFC-1 (3x3x5") requires an external power source and has a built-in 90-3500 cycle band pass audio filter... sells for only $29.95. The AFC-2 (5x5x7") has a built-in power supply, a switch controlled (Broad-Medium-Sharp) audio filter and costs you only $49.95. Also available the AFC-2CW, a sharp filter model for CW reception.

If you are interested in what either of these "Little Grey Boxes" can do for your phone signal... Or what smooth, instantaneous, non-blasting phone and CW reception you can get from that older model receiver with a P&H compressor in the speaker line... See your dealer, or drop a cord to DEPT R-11.

**P&H ELECTRONICS INC.**
424 Columbia • Lafayette, Ind.

---

**The CUBEX MK III De Luxe 3 BAND QUAD**
FOR 10 — 15 — 20 METERS

- HUSKY CAST ALUMINUM END SPIDERS
- HEAVY ALUMINUM BOOM-TO-MAST FITTING
- RUGGED 2" x 8 ft. TUBULAR ALUMINUM BOOM
- GAIN: 10 db on 10 and 15, 8 db on 20 • FBR: up to 24 db

Low Wind Resistance — Light Weight, only 27 lbs. — TV Rotor Handles — Low SWR — Pre-tuned Reflector Coils — No Stubs

The CUBEX MK III gives you 3 FULL SIZE, FULL EFFICIENCY, beam antennas with separate FULL WAVE driven elements on each band. All this in half the horizontal space required by a 3 el, 20 mtr. beam.

**WRITE FOR FREE BROCHURE "MK"**

**CUBEX COMPANY**
3322 TONIA AVENUE • ALTADENA • CALIFORNIA

---

P.O. Box 185 • QST • Box 125, W9HZ
LIKE your radio “on the move”? Then don’t be without this useful and informative guide to mobile operation. It is a collection of many articles on tried and tested equipment, presented in an orderly fashion for easy reading and reference.

CONTENTS include a section on receiving, with valuable information on automotive noise suppression; a group of articles describing over 30 different mobile transmitters; sections on mobile antennas and power supplies; and excerpts from FCC’s regulations governing mobile operation. The Mobile Manual for Radio Amateurs should be on the bookshelf of everyone interested in the installation, maintenance and operation of mobile stations.
TORIOUS: Uncased $88 mhy llke new. Dollar each. Fivë, $4.00 P.P.

TtfBKS: 829B. «10.00; 4X150A. «25.00; 4X5ÛÛA, $75.00. used 200

Jack Karp, H.F.D fl. Millville, N. J. aud 20 meter Helwils with mount. $1200. Aiso DX-100, $175. inductors, 4D32. 813 Milieu GDO. Bend stamp for llst, W5BZB, TRANSFORMËRS, tubes, chokes. command transmltters, variable

guaranteed. Ail ma or makes. AmpUflers. tuners, speakers, etc. Our

înput brushes for DM 34 DM 35. DY 88 12 volt Dynamotors. Ralph

SËLL: 25-44 me used EM Receivers 25 to 42 me. $16.00 each with

, Sell separateiy or ail for «145. Wanted: 3 blâment xlmrs for RBfiA's,

CLEANING House! 1KW ris, IÛ KW rlg, 6 and 1 4 meter convert-

tion Island south of the Republic of Texas. Treasure hunters will

^alem. oregon.

KWM-1, AC and DC power supplies, car mountîng wlth cables. 15
dition. W9PNB, 128 Bereta Ave., Elmhurst, 111.

choke, $12, f.o.b. K8JIE, Box 113. Bay Village, Ohlo,

Six meter converter. $12. 1400V C.T 400 Ma plate xfrror with 10 hy

CLEAN B&W 51003 xmttr aiid BX-101 Mark TTI reevr, $295 each. BELL: Gonset G-66B perfect condition with 3-way power suppiy, $75.00; Gonset Super Six, $50; Heath Q-multlplier, $9.00; Heath Grid Dip, $20: Johnson low-pass. $15; Johnson SWR Bridge,

FOR Sale: Viking IL SX-100, Vlklng "Matchbox and mode! EX

FOR Sale: Viking 1X SX-100, clean, $200. New condx Tecraft 2-rneter

FOR SALE; 8X-100 receiver, clean, $20. New condx Tecraft 2-rneter

FOR Sale: Heath SX-100 receiver, clean, $200. New condx Tecraft 2-rneter

FOR Sale: Heaths SX-100 receiver, clean, $200. New condx Tecraft 2-rneter

FOR Sale: Viking 1X SX-100, clean, $200. New condx Tecraft 2-rneter

FOR Sale: Viking Ranger, push-to-talk, operating manuai. Am going

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FOR Sale; 8X-100 receiver, clean, $200. New condx Tecraft 2-rneter

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FOR Sale: Viking Ranger, push-to-talk, operating manuai. Am going
TRCan Two 4 West Mod. 2211 thermometers 50 to 500 degrees Fahrenheit for 64 cents; two Boyoatin Fit 203 gas air pressure gauges, 75 cents each, two and one-half inch flanged 45 degree angle valve new or like new for $4.50. Write for DX-100, parts, 20A, etc. Warren Feder, P.O. Box 30, Peoria, Ill.


CLEANING out all odds and ends; SC-5522, complete, used; $30; SC-9999, new in original box, unused, originally $60; Collins 821A transmitter, used, $50. Many other Ham gear, odds and ends, send for list. W2EUG, 721 Carroll, Trenton, N. J.

LOCAL SALE, New York area city. Complete rig; Viking 1 TV superheterodyne, commercial and electronic, sold by Piper of Ohio; $150. Included is matching microphone and commercial bi-concentric preamplifier to give extra quality amplification. Arrangements can be made for pick-up or delivery. A. F. Butcher, 260, 356 Central Park West, New York City, Phone A-Clyde 2-7309.

FOR SALE: Two Hallicrafters S-100, $10 each; Col. Johnson dynamo base, kit $50, 100 receiver, $45. 100 transmitter, $50. 10 meters. All in perfect condition. P. A. Haltma, Ia.

Selling: I have TV with TVI suppression and VFO, in fair condition, with full report; Magnatone Twin-Trax tape-recorder with mike. $55. Local delivery if desired. J. W. Walls, 1120 South 10th St., Neenah, Ia.

FOR SALE: Two Ham radio magazines, $2 each; one Johnson dynamo base, kit $50, one Magnetic Mobile Mounts, $44. 50. All in perfect condition. P. A. Haltma, Ia.

FOR SALE: Universal power supply, WE2FL, special with 110 AC and 6V DC power supplies, whip and coil for 27M; mobile and antenna, $90. Best offer takes all or parts. W1MUY, Box 267, Conway, Mass.

S.B.B. xifemes, exact set of (hermetically sealed) for WE2FL Special sale new; $3.00; new, 3000 volt vacuum contactor, $15.00; SHR-10 miniature transmitter, multi-impedance (10 ohm), $26; new; 300vacuum contactor, $10.00; old; 1000 vac. plus min. 4 for $7.70; 6 amp at 2000 vac. (6000 volt) $4 for $8.00; Parts or Restores. Please include postage, no c.o.d.s. L. T. Tucker, W2HDL, 11-10 57th Ave., Neenah, Wis.

FOR SALE: Two 10 meters, $10 each; one Johnson dynamo base, kit $50, 100 receiver, $45. 100 transmitter, $50. 10 meters. All in perfect condition. P. A. Haltma, Ia.

FOR SALE: Ten 10 meters, $10 each; one Johnson dynamo base, kit $50, 100 receiver, $45. 100 transmitter, $50. 10 meters. All in perfect condition. P. A. Haltma, Ia.

TRANSMITTER BC-191-F in brand-new condition. 100 watts input. 12 volt power supply. Complete with tubes and transmitter, both have black legs. $25. Eric B. Jordan, 3200 E. 145 St., Kansas City 57, Mo.

FOR SALE: Globek I with TVI suppression and VFO, in fair condition, with full report; Magnatone Twin-Trax tape-recorder with mike. $55. Local delivery if desired. J. W. Walls, 1120 South 10th St., Neenah, Ia.

FOR SALE: 914A, complete with power supply; $190; 1016A, complete with power supply; $200. Write for details. John Williams, 2236 Parkway Dr., Winston-Salem, N. C.

TRADE FOR Sale; One completely equipped radio and TV mobile shop, 20277 Avon, Detroit 19, Mich.


FOR SALE: General Radio CR-184, in very good condition; $50. Larry Kleber, K9LKA, Belvidere, Ill.

FOR SALE: 466 with Universal power supply, WE2FL, special with 110 AC and 6V DC power supplies, whip and coil for 27M; mobile and antenna, $90. Best offer takes all or parts. W1MUY, Box 267, Conway, Mass.

FOR SALE: Nine 10 meters, $10 each; one Johnson dynamo base, kit $50, 100 receiver, $45. 100 transmitter, $50. 10 meters. All in perfect condition. P. A. Haltma, Ia.

FOR SALE: Ten 10 meters, $10 each; one Johnson dynamo base, kit $50, 100 receiver, $45. 100 transmitter, $50. 10 meters. All in perfect condition. P. A. Haltma, Ia.

FOR SALE: Ten 10 meters, $10 each; one Johnson dynamo base, kit $50, 100 receiver, $45. 100 transmitter, $50. 10 meters. All in perfect condition. P. A. Haltma, Ia.

FOR Sale: You carry away! HQ-110X, $170.00; Collins 3100B with commercial grid-network output, $100; Collins 702F-8 original carton, $30; J&W 50A & Jennings U9900 variable vacuum original control, both $27; Trylon 10-ft roof tripod tower with CIB rotor and theory, $25; Two 1000-watt (2) relays, $25. MONO OF WIRE: $1 at low prices to those buying listed equipment. W2UNL, a Brown A. O. Smith half-wave or bridge for 3800 volts at 1.35 amp, $69.50; matching supply 10 hrs use only, in new condition, latest serial number. Everythlng will be willing to ship or you pay freight. W2BZR, P.O. Box 273, Chatham, N. J. 

SALE: Heath AR-3 receiver, factory-tested, complete with case. Jason O. Johnrud, Dahlen, N. Dak.

FOR Sale: Williams Mobile, speech clipping, VFO, $85; 12V. 50A. K5CCO. Box 119, Sapulpa, Okla. WALTHERS: T-12 International xmttr, xtal, (3625), $10; PCV-1 dual condenser filter, $10; Telefunken heater, $10; Heath 715 600 volt, $5; Telefunken 1500 volt, $10. S-125. Heath QF-1, $150 or will sell these items individually. Ralph Emore, 2490 69th PL, La Salle, Colo. SELL: Club de Racing, speedometer, $5. HY-Gain 6M. beam, $8; home brew "M" transmitter, $30. 10G mobile mount, $10. 10-ft. sections with Telex 2M-15C 2-meter 15-element optimum beam, $125. First check gets antenna. $5: Hy-Gain 6M. beam, $8; home brew "M" transmitter, $30. 10G mobile mount, $10. 10-ft. sections with Telex 2M-15C 2-meter 15-element optimum beam, $125. First check gets antenna. $5: Hy-Gain 6M. beam, $8; home brew "M" transmitter, $30. 10G mobile mount, $10. 10-ft. sections with Telex 2M-15C 2-meter 15-element optimum beam, $125. First check gets antenna. 

FOR Sale: HQ129X, $100; HC-10, $125; Morrow MBR5, best offer $45. 10B factory-wired with xtal. $125. WM1-4K3U with servor modulator, $40. W1ULB, 100 N. Reus, Pesca, Fl. HAMVENTION Day at Dayton, Ohio, May 3, 1959. Be there? WANTED: Central Electronics 300A, new, in factory carton, f.o.b. local dealer or you pay freight. $150. M. Samuels, W2NTX, Miller Place, L. I., L. N. Y.

For Sale: Late Globe Scout 860, $85; Knight VFO, $25; both in like new condition. 4-100A, 4-125A, $75; 5X150A, $50. Equipment and
antennas, transformers, potentiometers, tubes and much more, 99
percent of it new. All items good condition. Write: George Lewis, K4GAL,
1863 Glenview, Memphis 14, Tenn.

New Boats. Mercury outboards. will take half price on trade. Write:
Roy Reeter, KH8MO, Roy's Marine Shop, Clinton, Iowa.

Offer: RF c.r. 1%, 51J4 Coils. receiver. Robert Ireland, Pleasant Valley,
PE-134, $15; SOR-625, $25. Need: Frequency meter, accurate AM
and SSB meter. $12. Free delivery in the Tidewater area. C. E. Donaldson
2318 Becond Ave., Council Bluffs, Iowa.

F.O.R. Sale: For list. All Hamcrafters, Hamcrafts, used. UC-110,
3028 Kinmont St., Cincinmati 8, Ohio.

For Sale: Johnson King 275 compléte set of coils; needs exciter repaired, $95,
and 50 watt transceiver. Must see it in operation. Best offer $300 or beter.
Mosley beam, 84.95; resistnr kit, $1.00; ceramic condenser
per volt VOM, $12; new Falrchild tone artn. $30. Hammarlund
mounts, $40; Heath DX-20, $30; Heath AR-2, $20; Eico 1000 ohm
transformer, $12. Rev, J. F. O'Reilly, W9UFL, St. John's Hospltal,
Springgted, Ill.

FOR Sale; Heathkit DX-35, wired but never used, $45. William
Legendre, M2-44, 36 West Madison St., Peoria, Ill.

BARGAINS: Recondltioned and guaranteed. Shipped on trial.

Sacrifice Sale! Heath! HQ-100, $120; Tapetone TXG-50 with power
supply, $50; Teleco 5-6, 6 meter beam, $10; used very little! Alliance
transformer, $35; 500 watt amplifier, $85; A-2000A3s. 4-125A3s, 829Bs,
502A 1" scope tubes, T-40s. 41 Middlefleld Dr., West Hartford 7, Conn.

FOR Sale: Kilowatt single ended 4-400A pi-net, husky power supply, 200
watt AM plate modulator F PA16, modified Super Pro
power supply, $50. "Malone" radiator; 6V6 3-150A, $24; 6-150A,
4-125A, $7; free delivery in the Tidewater area. C. E. Donaldson
2318 Becond Ave., Council Bluffs, Iowa.

FOR Sale: Early Heathkit DX-35. $95; Heathkit DX-22. $75; Heathkit
SA-100, $75; Heathkit BC-100, $50; Heathkit BC-200, $40; Heathkit
SA-80, $25; Heathkit BC-225, $25. 300 watts output. R. M. Jones,
W4WR, 1604 No. 17th St., Birmingham 4, Ala.

WANTED: Mobile 75M antenna, Shure 505C mike, all cables for complété mobile
station. Write to Gordon Laubaeh, K3DOX, 416 Oakwood Dr.,
Fullerton, Penna.

WANTED: Complete Amateur radio station: Heathkit DX-40, $63; Heathkit
AR-3, $20 and WRL VFO Mod. $20. $45. It was set up at WRL
factory. Ad three for $17 with instrux manuals, c.c. Free
delivery! K2QQQ, Tel. EL 6-5960.

FOR Sale: Gray receiver, hardly used, $35. Also AR-22 CDU rotator, $150 or beat or
other. W9U1K, 1860 Cedar, Homewood, 111.

WANTED: 6040A, $20. $3 for 81.00 postpaid. New one-inch meters. 0-200 HA or 0-1 Ma...
3028 Kinmont St., Cincinnati 8, Ohio.

WANTED: Complete Ham Radio Station: Kenwood Transverter, $25; B.G.
400 A amplifier. $10. Sorry, can't ship. Richard Weaven, K4TOW, 2244 Darlington Ave., Pittsburgh, Pa.

WANTED: Single Sideband exciter and suitable tubes for KW final.

FOR Sale: LC-150, $10; Heathkit DX-21, $15; Heathkit DX-22, $15; Heath
SA-80, $25; Heathkit BC-225, $25. All are in good condition. Must clean out stack, bargain list of crystals, speakers,
 enlarger, printer, developing equipment, etc. $1800 worth of equip-
ment. Hoy Tooman, K.R #5, Muscatine, lowa.

WANTED: Single Sideband exciter and suitable tubes for KW final.

Ham TV, complete, $90, or oscilloscope only $45 (5527): 8-27 rev
(9-10 meters). Both work well. Goodman, 182 Alta Mesa Rd.,
San Juan, Calif.

Rs4: Late Globe Scout 860, $100; 75A2, $30. 75A3, $25; 75A4; 32Vs; KWM1; KWS1; Globe;
Gonset; BARGAINS: Recondltioned and guaranteed. Shipped on trial.

FOR Sale: Heathkit DX-35. $95; Heathkit DX-22. $75; Heathkit
SA-100, $75; Heathkit BC-200, $40; Heathkit
SA-80, $25; Heathkit BC-225, $25. 300 watts output. R. M. Jones,
W4WR, 1604 No. 17th St., Birmingham 4, Ala.

WANTED: Mobile 75M antenna, Shure 505C mike, all cables for complété mobile
station. Write to Gordon Laubaeh, K3DOX, 416 Oakwood Dr.,
Fullerton, Penna.
THE NO. 37001 SAFETY TERMINAL

An old favorite in the line of exclusive Millen "Designed for Application" products. Combination high voltage terminal and thru-bushing. Tapered contact pin fits firmly into conical socket providing large area, low resistance connection. Pin is swivel mounted in cap to prevent twisting of lead wire. Easy to use. 1/4" o.d. insulation high voltage cable fits into opening in cap. Bared conductor passes thru pin for easy soldering to pre-tinned tip of contact plug.

Standard 37001 available in either black or red bakelite. No. 37501 is low loss mica filled yellow bakelite for R.F. applications.

3/4 SIZE

Designed for Application
MARS Broadcasts in April
Feature Talks
by Philco Engineers

MARS Network to carry interesting Technical Talks from AF3H1X on 3295KC, 7540KC and 15,715KC.

The regular Sunday afternoon Educational Broadcasts of Headquarters U.S.A.F. Military Affiliate Radio System will carry talks of topical interest by Philco Corporation executives on all four scheduled Sunday broadcasts in April. The topics of the talks are all currently of interest, embracing such subjects as: Analog and Digital Computers, Transistorized Computers, Radio Teletype and the Effect of Air Ionization.

Each speaker is an expert in his respective field. Hams should find the talks interesting and informative.

Question and Answer Period to follow talks
Following each talk, the MARS Network will be open for a Question and Answer period, with the speaker of the day on hand to answer questions from MARS members tuned in to the broadcast. Non-members can ask questions by mail, with answers provided on the broadcast the following Sunday.

Philco Club has own Ham Station
Philco employees have formed their own ham group, the Mike Farad Radio Club, W3YDX, and are active on all bands. Philco's TechRep Division, one of the world's largest electronics field engineering organizations, provides space in their quarters laboratories for the Mike Farad Club's ham shack.

Sunday, April 5, 1959
2-4 P.M. E.S.T.
COMPARISON OF ANALOG AND DIGITAL COMPUTERS
by H. W. Merrithew, Supervisor of Course Preparation
The Philco Technological Center
Merrithew has prepared numerous computer courses. His talk covers operation and application.

Sunday, April 12, 1959
2-4 P.M. E.S.T.
CHARACTERISTICS OF A TRANSISTORIZED DIGITAL COMPUTER
by J. L. Maddox, Engineering Section Manager, Computer Laboratory, Philco Corp.
Active in research and development, Maddox talks on one of the newest fields of electronics.

Sunday, April 19, 1959
2-4 P.M. E.S.T.
INSTALLATION AND MAINTENANCE OF RADIO TELETYPE
by R. M. Clemick, Chief Instructor, Radio Communications Section, Philco Technological Center
Clemick's talk provides information to help MARS station operators in organizing a RTTY Net.

Sunday, April 26, 1959
2-4 P.M. E.S.T.
PHYSIOLOGICAL AND PSYCHOLOGICAL EFFECTS OF AIR IONIZATION
by F. P. Speichler, Chief Biologist, Advanced Study Group, Philco Corporation
Speichler presents a most interesting talk on a most unusual application of electronics.
the time to MOBILIZE is now... 
the place is ALLIED!

SALE

Allied's Mobile Special!

COMPLETE Master MOBILE ALL-BAND ANTENNA PACKAGE

Regular Price

SALE PRICE $24.99

YOU SAVE $9.00

Consists of: 666 "All-Bander" coil for 10 through 75 meter use; heavy-duty swivel base mount with double taper spring and coax fitting; 96" stainless steel whip in two sections for use with "All-Bander" coil.

Reg. Price

All-Bander Coil......$14.65
88-60 Whip...........$7.70
232XC Mount..........$6.65

Regularly $34.00

No. 925X520
Complete Package,
SALE PRICE ONLY ...... $24.99

ORDER NOW AT SALE PRICE!

KING-SIZE TRADES: We're trading highest—just try us. What have you got—what do you want? Write to us today for the sweetest deal anywhere.

EASIEST TERMS: Only 10% down (your trade-in will probably cover the down payment) and the remainder in convenient monthly payments to fit your budget.

ALLIED has the largest stocks—everything in mobile equipment—ready for immediate delivery!

COMPLETE SELECTIONS OF:

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JOHNSON
MULTI-ELMAC
NATIONAL
MASTER MOBILE
MARK PRODUCTS
MORROW
MOSLEY
VOCALINE

SEE YOUR ALLIED CATALOG
For everything in mobile gear, refer to pages 369-391 of your 452-page 1959 Allied Catalog. If you haven't a copy of this leading Amateur supply guide, write for it today.

100 N. Western Ave., Chicago 80, Ill.

our 38th year
The NC-400 is a modern, multiple-purpose, general coverage receiver. Tuning range is 540 kc to 31 mc in 7 bands, with dual conversion on all frequencies above 7 mc. Its unique design provides maximum flexibility of operation to satisfy a wide variety of communications requirements.

The NC-400 may be used as a self-contained unit, either manually tuned or crystal controlled on pre-selected frequencies. In addition, external master oscillator provisions make possible use of modern synthesizer techniques in applications where extreme frequency stability is required. It may be operated in space or frequency diversity applications. Provisions are made for interconnection of any required outputs or for feed to external loads or combiners. All frequency determining circuits may be internally or externally controlled. The NC-400 also provides optimum versatility of bandwidth, either through the use of internal IF circuits or the use of optional mechanical filters.

**FREQUENCY RANGE:**

<table>
<thead>
<tr>
<th>Band</th>
<th>General Coverage</th>
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<tr>
<td>1</td>
<td>0.54 - 3.1 MC</td>
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<tr>
<td>2</td>
<td>1.7 - 9.1 MC</td>
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<tr>
<td>3</td>
<td>2.1 - 11.1 MC</td>
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<tr>
<td>4</td>
<td>4.1 - 18.0 MC</td>
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<tr>
<td>5</td>
<td>10.5 - 20.4 MC</td>
</tr>
<tr>
<td>6</td>
<td>15.6 - 31.0 MC</td>
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**Note:** Bandspread dial provided with 0-100 logging scale and calibrated for 8, 40, 20, 15 and 10 meter amateur bands.

**FREQUENCY STABILITY:** Long-term stability after warmup -0.002%

**SENSITIVITY:** 1 microvolt for 10 db signal/noise ratio

**SELECTIVITY:** 4, 8, 16 and 32 kc positions provided with 6 tuned circuits. 3.5 kc wide upper and lower sideband positions provided with 6 tuned circuits. 3.5 kc sharp position activates plug-in crystal filter providing 5 additional degrees of selectivity below 3 kc plus phasing notch. Plug-in accessory available which will provide front panel selection of three mechanical filters without modification of receiver. Proper choice of filters will enable selection of bandwidths from 500 cycles to 16 kc, or will enable filter type or sideband selection from front panel.

**SSB PROVISIONS:** Separate SSB heterodyne detector uses pentagrid converter and separate beat oscillator. Beat oscillator may be crystal controlled. Special "fast" tuning system release" AGC. Shunt release can be accomplished by exclusive, new National passband switching techniques. In the event of commercial-type SSB reception, single sideband mechanical filters may be installed and switched from front panel.

**FIXED CHANNEL OPERATION:** HF oscillator has 5 crystal sockets for use in fixed channel operation. Channels may be selected by front panel switch. In addition, HF oscillator may be controlled from external master oscillator selected by front panel switch. "Get on "tune" position permits rapid tuning of receiver to crystal controlled channel.

**DIVERSITY PROVISIONS:** Basic receiver may be operated from master oscillator as noted above. An accessory Diversity Modification Kit (NC-400 DMK) allows choice of internal or external control of all oscillators. Rear panel selector provisions make possible use of any receiver either as master control, or slave fed from other oscillator sources. IF, detector and AGC outputs available for feed to external loads or combiners.

**POWER REQUIREMENTS:** 110-220 volts, 50-60 cycles AC

**MANUFACTURER'S SUGGESTED LIST PRICE:** $895.

**OPTIONAL ACCESSORIES:**

1. XCU-400 crystal calibrator. Output frequencies of 100 kc and 1 mc.
2. NT-2 matching speaker.
3. NC-400 DMK diversity modification kit
4. NC-400 FM mechanical filter housing

*Manufacturer's suggested list price. Sold only by National Authorized Distributors.*

In Canada by Canadian Marconi Inc., 830 Bayview Ave., Toronto, Ontario.

Export by Ad Aurlena, Inc., 80 Broad St., New York City.
For the man who prefers power triodes, RCA offers a choice of world-famous and time-proved types to meet every amateur power-input requirement, up to the legal limit.

Known for conservative ratings and great reserve of filament emission, these RCA high-perveance power triodes deliver high power output at low plate voltages. Benefits: You can (1) use more reasonable values of pi-network components, (2) design with lower voltage-rated plate transformers and filter capacitors, (3) use lower voltage-rated tank circuits.

RCA High-Perveance Power Triodes are available at all RCA Industrial Tube Distributors.

For technical bulletin on any of these six RCA Power Triode types listed in the chart, write RCA Commercial Engineering, Section D-37-M, Harrison, N. J.