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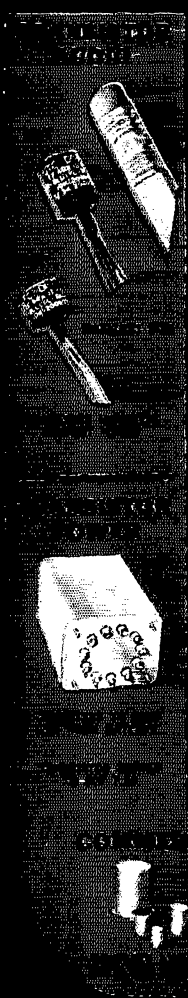
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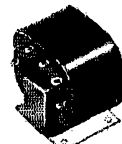
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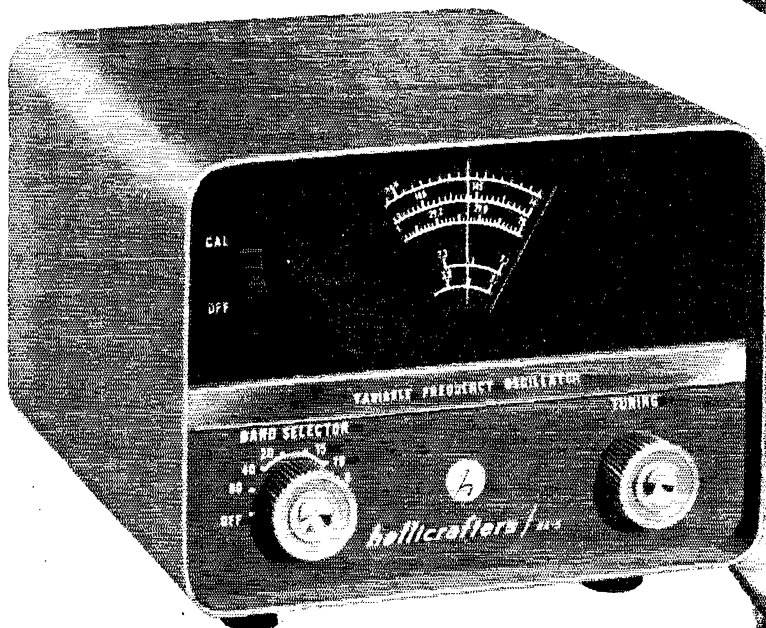
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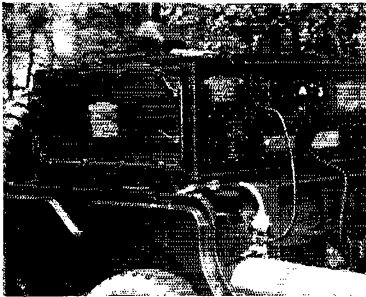
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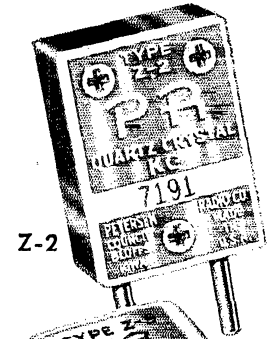
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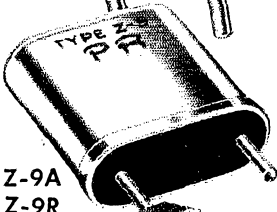
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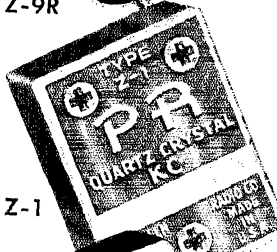
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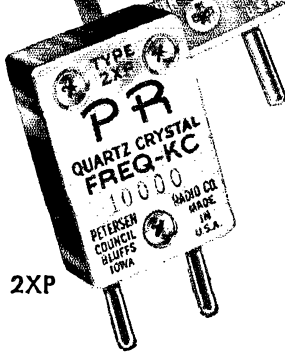
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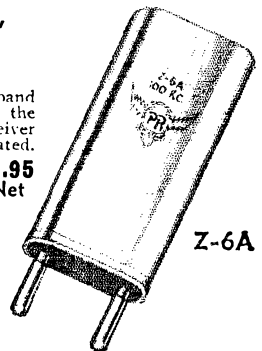
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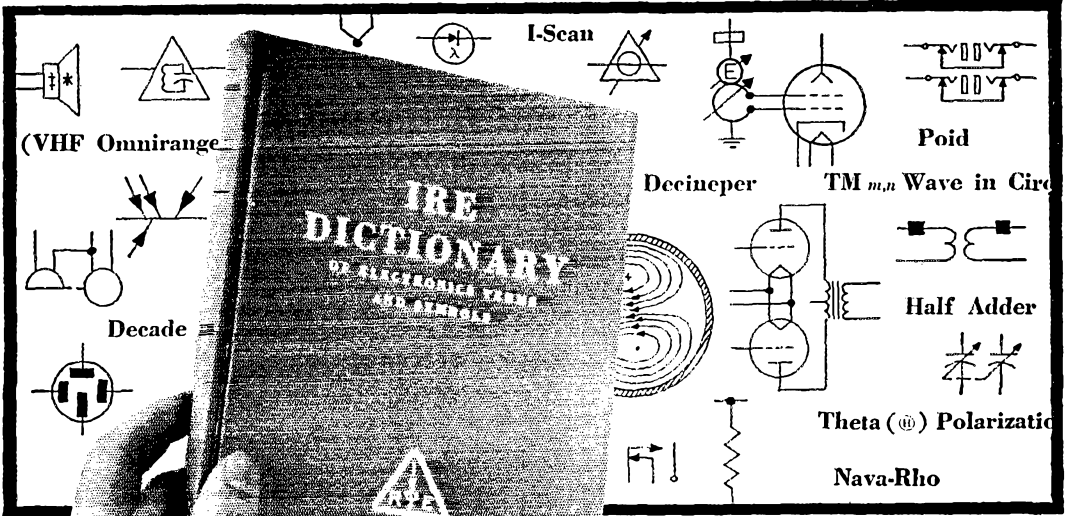
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**Vice-Director:** Robert B. Cooper . . . . . W8AQA  
132 Guild St., N.E., Grand Rapids 5, Mich.

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MORTON B. KAHN . . . . . W2KRR  
22 Birch Hill Rd., Great Neck, N. Y.  
**Vice-Director:** Harry J. Dannels . . . . . W2TUK  
RFD 1, Arbor Lane, Dix Hills, Huntington, L. I.

### Midwest Division

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**Vice-Director:** Sumner H. Foster . . . . . W0GQ  
2315 Linden Dr., S.E., Cedar Rapids, Iowa

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28 Keussner Rd., Southington, Conn.  
**Vice-Director:** Rigelow Green . . . . . W1EAE  
12 Gloucester St., Boston 15, Mass.

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**Vice-Director:** Robert B. Thurston . . . . . W7PGY  
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**Vice-Director:** Ronald G. Martin . . . . . W6ZF  
1573 Baywood Lane, Napa, Calif.

### Roanoke Division

P. LANIER ANDERSON, JR. . . . . W4MWH  
428 Maple Lane, Danville, Va.  
**Vice-Director:** Joseph F. Abernethy, Jr. . . . . W4AKC  
768 Colonial Drive, Rock Hill, S. C.

### Rocky Mountain Division

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**Vice-Director:** John H. Sampson, Jr. . . . . W7OCX  
3618 Mount Ogden Drive, Ogden, Utah

### Southeastern Division

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**Vice-Director:** Thomas M. Moss . . . . . W4HYW  
P.O. Box 20644, Municipal Airport Branch,  
Atlanta 20, Ga.

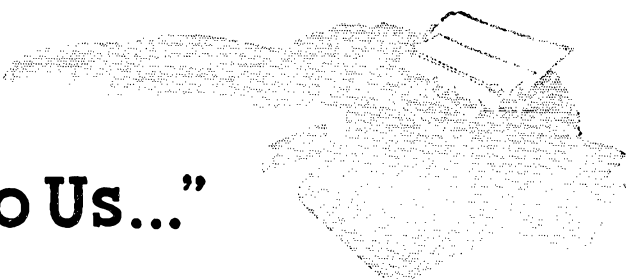
### Southwestern Division

RAYMOND E. MEYERS . . . . . W6MLZ  
Box E, San Gabriel, Calif.  
**Vice-Director:** Howard F. Shepherd, Jr. . . . . W6QJW  
127 South Citrus, Los Angeles 38, Calif.

### West Gulf Division

ROEMER O. WEST . . . . . W5QRF  
P.O. Box 1656, Corpus Christi, Texas  
**Vice-Director:** Ray K. Bryan . . . . . W5UYQ  
2117 S.W. 61st Terrace, Oklahoma City 19, Okla.

# "It Seems to Us..."



## HOME BREW

Nobody builds anything these days!" You may have often heard this comment lately. One recent magazine catering to the ham field makes its pitch on the basis of a crusade to "revive the lost art of home-brewing ham gear." Is the ham radio version of do-it-yourself really a lost art? Listening casually on the hambands, or at a radio club meeting or hamfest, you might get the idea that almost everyone buys ham radio in ready-made packages.

It ain't necessarily so.

How do we know? There are ways to find out. Next time you're with a large group of hams, ask the question: "How many here built some major portion of their station equipment, kit projects not included?" We'll bet that more than half will raise their hands. In some sessions we've found the showing as high as 90 percent.

Look in the Headquarters mailbag. Any day it can be counted on to contain a dozen or so letters asking technical questions. Most of these have to do with construction projects underway, or about to be started.

Consider the response to *QST* constructional articles. The 4-part series, "A Complete Two-Band Station for the V.H.F. Beginner," concluded in October *QST*, brought in an avalanche of mail, and it is still coming. Drilling templates for the principal surfaces of the tuner, transmitters and converters described in this series were offered free of charge if a stamped self-addressed envelope accompanied the request. We're still sending these out at the rate of two or three a day, after almost a year, and at last count more than 1000 envelopes had been stuffed with templates and mailed back to hams and would-be hams waiting impatiently to start drilling holes in boxes and cover plates. Interest in the project triggered off a demand for components to the extent that at least one manufacturer found it desirable to stockpile the specified items with his better distributors.

Take the case of a complex multiband transmitter built and described by W1JEQ some years ago. We're still getting mail on this one, yet we once thought it so complicated and costly that nobody would attempt building it. Vern's article brought in over 1200 pieces of mail, up to the time we stopped

counting, and a substantial number of writers plunked down \$5.00 for a set of prints from the original negatives. Surely these fellows were not just going to look at the pictures.

Even on as exotic an item as the "Ultimate" keyer, Hq. received several hundred orders for an enlarged schematic drawing of what was a rather complicated circuit.

We used to think that hams build transmitters and buy receivers, but this is open to question, too. Note the rash of receiver articles in *QST* in the last few years, and the wide-spread enthusiasm for the HBR-14 and HBR-16. Author W6TC still gets mail on the *QST* descriptions, now 5 and 3 years old respectively, from hams in the process of construction. "Hints & Kinks" items have appeared subsequently reporting minor improvements or modifications found by enthusiastic builders. Converters of various kinds are part of this picture of increased receiver-consciousness. Well over half of the template requests in connection with our v.h.f. station series are for the converters.

Nobody building anything? Don't you believe it! For more reasons than you might think of right away, a lot of people are collecting parts, drilling holes, wiring or testing a wide variety of home-construction projects, from field-strength meters to complete stations. These fellows are busy. You may not hear them on the air as you tune the hambands. They may even miss a few club meetings. But they are living through one of the great experiences of ham radio — the making of something that will eventually be a source of pride in a way that a store-bought package could never be. If you haven't sampled that feeling yet, you're missing something.

## LEAGUE SUPPORT

SCHELDOM has the true extent of membership backing of the League been so evident as in ARRL's two current campaigns for increased membership and a Building Fund.

In response to the "every-member-get-a-member" announcement in April *QST*, hams everywhere rallied to help the roster grow.

(Continued on next page)

<sup>1</sup>This service is available on any piece of equipment built in the ARRL Laboratory, or photographed here. Prints are 8 by 10 inches, glossy, from the original *QST* negatives. The price is \$1.50 each, postpaid. Templates, however, are available only when specifically mentioned.

It actually caused us some slight embarrassment, for our initial supply of "booster" pins was quickly exhausted, requiring an immediate re-order. These emblems are, we think, quite handsome and ones that members will wear with considerable pride. When you see a ham with an "ARRL booster" lapel pin, you will know he has done his part in the growth of the League. Have you done yours? April *QST* has the details and the form. You have until July 1st.

Early response to the Building Fund has been similarly gratifying. An interim report

appears on page 65 of this issue. Particularly pleasing is the general reaction to the grassroots suggestion of \$1 per year of holding a ham ticket. In sending one such contribution, a member said, "Have had this call for 34 years. Without ARRL, it is possible that I might not be able to say that. Hope the rest of the gang will look at it in the same light."

The real strength of the League lies in its membership support. With this kind of backing, ARRL — and ham radio — cannot fail.

**QST**

## WEST VIRGINIA STATE CONVENTION Jackson's Mill, Virginia — July 7-8

An outstanding program of speakers and events is set for the ARRL West Virginia State Convention (formerly West Virginia Hamfest) at Jackson's Mill (near Weston) on U.S. Route 19. An expanded program this year will include many technical discussions, displays and demonstrations of electronic gear; also swimming, hiking, softball and other activities in the park-like setting of Jackson's Mill.

A Royal Order of the Wouff Hong Initiation is planned for midnight, Saturday. Presentation of the "West Virginia Amateur of 1962" award is to be made during the convention. Special activities are on the program for the women and children.

Registration is \$7.00 per person; children, eight years old and under, \$5.00. The fee includes dinner Saturday evening, breakfast and dinner on Sunday, lodging on Saturday night and admission to all convention activities. The lodging is dormitory style with separate cottages for the men and women. For those desiring more privacy, there are motels and hotels in Weston (three miles away) and Clarksburg (20 miles). Individual meals may be obtained at the Mill, provided the convention is not sold out. Tickets are being sold on a "first-come, first-served" basis. Registration tickets for \$2.00 per person (without meals and lodging) may be purchased. Since the capacity of the dining hall and cottages is 400, the \$7.00 ticket-registration is limited. When ordering a \$7.00 registration, be sure to state male or female to assist the registration committee on cottage assignments. Registrations may be ordered from Ticket Chairman Paul Kesling, W8NYE, Box 1074, South Charleston, West Va., Keith Chambers, W8SSA, Box 62, Bluefield, West Va., or Don Morris, W8JMI, 1111 Alexander Place, Fairmont, West Va.



**California** — The San Fernando Valley Radio Club will hold its 6th annual hamfest on Sunday, June 17, at Northridge Park in Northridge, Calif. The program will include transmitter hunts on 75, 6, and 2 meters, code proficiency awards, swap table, tube guessing contest, and games and entertainment for the children and YLs. Registration is \$1.00. Bring your own lunch, but coffee and doughnuts, ice

cream, and soda included in the registration. For further info, contact Larry Johnson, W6GKLQ, 16456 Tribune St., Granada Hills, Calif.

**Georgia** — The Atlanta Radio Club hamfest will be held June 2-3 at Lenox Square. No other details available.

**Indiana** — This was a late notice, but you may still have time to get to the third annual Columbus Amateur Radio Club ham picnic and swapfest, being held Sunday, May 27, at Donner Park, Columbus. Take along your family, friends, and a basket lunch. Refreshments also available in the park. Plenty of shelter and facilities. Registration \$1.50. For further info, contact Scott Henkle, K9VXZ, 2885 Thompson Drive, Columbus.

**Iowa** — The Iowa 160-meter picnic will be held at Newton on June 10. No other info available.

**Kansas** — The Ham Butcher Net picnic will be held at Leavenworth on June 10 — joint with Army and Air Force MARS. Everyone is invited. No other details at hand.

**Kentucky** — The 3rd annual Breaks Interstate Hamfest will be held at Breaks Interstate Park, Elkhorn City, Kentucky on June 10. Further info available from Jackie T. Hewlett, W4EON, Langley, Kentucky.

**Kentucky** — The annual Mo-Ark-Ky hamfest, sponsored by the Paducah Amateur Radio Club, will be held on Sunday, July 8, at Noble Park Community House, Paducah. This is an all-day get-together with a big noon meal. No registration fee. Entertainment for children and non-hams. For further info, contact U.C. Morris, W1KCH, 3628 Gregory Ave., Paducah.

**Maine** — The 6th annual Augusta hamfest, sponsored by the Augusta Radio club, will be held on June 17 at the Calumet Club, Highway 104 North, West River Road. Doors open at 0900, turkey dinner served at 1230. Advance registrations (prior to June 13) \$3.00, at the door \$3.50. Children under 12, \$2.25. Net meetings, mobile hunt, swap table, informal dance at the Club the previous evening. Send for reservations and overnight accommodations to Wilfred E. Lemieux, W1VXU, 151 Cony St., Augusta, Me.

**North Carolina** — The 8th annual Charlotte hamfest will be held Sunday, July 1, at the National Guard Armory, Municipal Airport, Charlotte. Activities for hams and family. Barbecue lunch. Tickets are \$3.50 per person, except \$1.25 for the lunch only or for children.

(Continued on page 152)

### COMING A.R.R.L. CONVENTIONS

June 1-3 — Southwestern Division, Anaheim, California.

July 7-8 — West Virginia State, Jackson's Mills (near Weston).

July 21-22 — Rocky Mountain Division, Denver, Colorado.

August 3-5 — West Gulf Division, Corpus Christi, Texas.

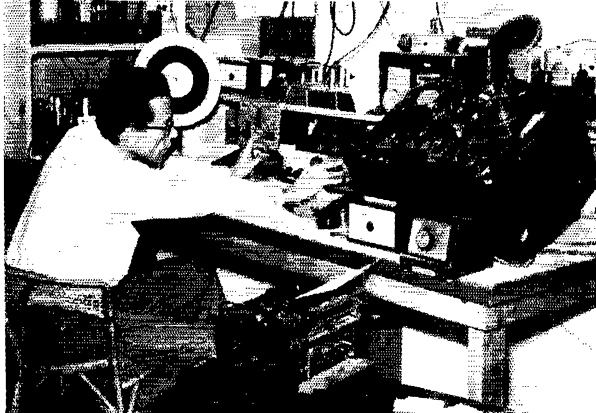
September 1-3 — ARRL National, Portland, Oregon.

September 1-3 — Delta Division, New Orleans, Louisiana.

October 13 — Hudson Division, New York, N. Y.

October 19-20 — Ontario Province, Toronto.

Chuck Kunze, WØWVM, hard at work in his satellite-tracking shack. At his left hand are three switches for azimuth and elevation control of his beam, and lobe switching for accurate fixes. The black and white disk is the face of the high-accuracy azimuth indicator. Converters for 108, 136 and 144 Mc., communications receiver, tape recorder and typewriter are also visible. In addition to taping signals, Chuck "talks to himself" on the tape recorder in order to log information in greater detail than would be possible by more conventional methods.



*Right from the launching of Sputnik I in 1957, WØWVM has been listening to satellite signals and gathering all kinds of data from them. On 20 and 40 Mc., on 108 and 136 Mc., and finally with Oscar I on 145 Mc., Chuck very likely has run up as many hours of satellite listening as any amateur in this field. Along the way he has come up with many ingenious ideas for antennas and tracking devices. Here are a few of them, of interest to the earth-oriented user of beams, as well as to the would-be space communicator.*

## Space-Age Antenna Ideas

### *Practical Hints for Oscar, Echo or Moonbounce Arrays*

BY E. C. KUNZE,\* WØWVM

THE launching into orbit of Oscar I opened to hams everywhere an opportunity to build a foundation of technical knowledge and experience necessary to push the frontier of ham communications far beyond any dimension even dreamed of a few years ago. In the five years since the sudden arrival of the space age, possibilities have become practicalities: Buck Rogers fiction has become fact. Now, with more Oscars earmarked for hams to handle, we can contribute directly to a challenging project. In the coming space age, as before, hams will no doubt continue to provide ideas, techniques, and facilities to improve and simplify present methods of communication.

Many hams in the United States have already been exposed, in varying degrees, to such space-communication experiments as moonbounce, satellite tracking, deep-probe monitoring, ion cone reflection attempts, and so on. Those who followed the Soviet efforts on 20 and 40 Mc. have become familiar with the mechanics of orbits, Doppler effect, ionospheric diffraction, intensity levels, and other related details. From experience gained in five years of rather intensive activity in satellite tracking and in the design and construction of the equipment necessary for such a project, I have learned a number of things which might be worthwhile passing along in the form of hints and kinks or simply for comment and comparison by other hams.

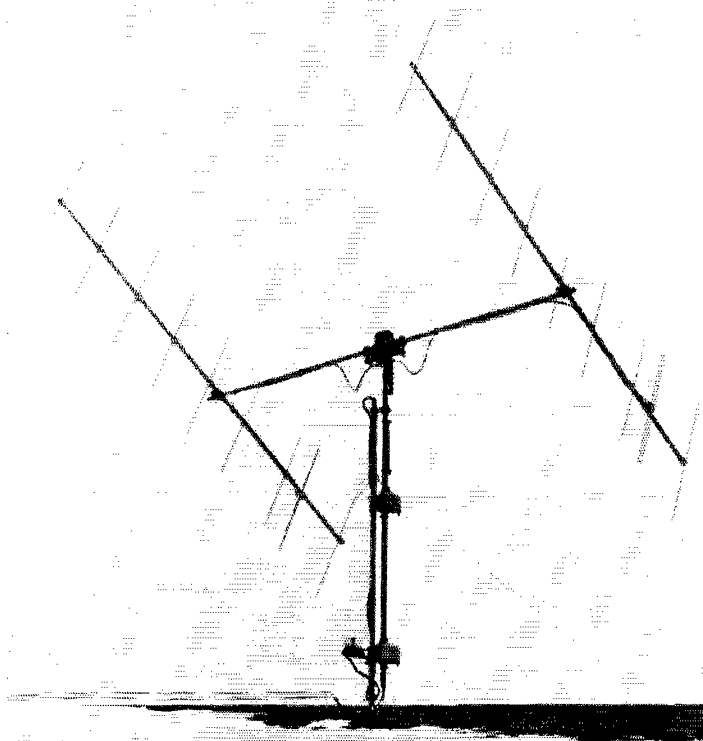
#### *Satellite Listening Before Oscar*

Here at WØWVM, all satellites carrying transmitters on the 108-Mc. band have been tracked intensively. The log book and tape recordings show information on hundreds of satellite passes. Tracking in the v.h.f. region differs from lower-frequency Sputnik-type tracking in that the higher frequency necessitates the use of low-noise, high-gain converters ahead of the communications receiver. Accurate tracking with the use of highly directional antennas is, however, far easier to accomplish in the v.h.f. region.

At the time of launching of 1958 Alpha (Explorer I) in early 1958, a small stacked beam was used to pull in the signals when the satellite passed to the south of WØWVM on or near its 33-degree north vertex. Many checks were run on the Explorer I low-power transmitter in an effort to determine how propagation was affected by distance, elevation, time of day, terrain at the sub-satellite point, etc. Vanguard I provided the opportunity and necessity to start looking *up*, instead of on or near the horizon (at apogee it is about 60 degrees above my southern horizon). A series was run to determine the solar power blackout pattern. Circular polarization was tried in the effort to smooth out the spin pattern. The long-term torque transfer effects on the signal were noted.

Tracking of Explorer IV provided a few tapes showing effects of Project Argus — which experiment was not announced until a year later. The paddle-wheel satellite was followed over

\* 2895 Arona St., St. Paul 13, Minn.



One of several satellite tracking antennas used at WØWVM. This one, for Oscar I, has two 144-Mc. Yagis with separate feed lines, elevation control by means of the TV rotator at the top of the vertical support, high-torque rotation with two TV rotators in parallel, and high-accuracy indicating system driven by the worm gear in the lower rotator. A selsyn is housed in the box to the left of the rotator just above the roof.

the hump at least once and the retrogression effect at apogee was noted. Paddle-wheel at apogee required the use of a high-gain antenna, provided with azimuth and elevation controls. With parallax, the DX was something over 26,000 miles and was, incidentally, just within the capability of the receiving system.

Echo I gave a chance to check the accuracy of the system used to take radio fixes on the various satellites. All sightings by radio, naked eye, and optical instrument provided enough data to predict meridian crossings for a week or two later.

On 136 Mc., several Discoverer satellites have been followed for the purpose of getting the feel of tracking in a near-polar orbit. Currently a fix is taken occasionally on Courier and Tiros III on 108 Mc. and on Transit IVa and IVb, TRAAC and Tiros IV, all on 136 Mc.

The helical antenna used on 1958 Beta showed the advantage of being able to point the array above the horizon. Magically, the noise arriving horizontally would disappear and it became much easier to pull through the very low-power signals. This experience led to the construction of the pair of 8-element horizontally-stacked Yagis capable of being rotated both in azimuth and elevation from the ham shack. A lobe-switching facility was added to improve the accuracy of the fixes taken with the system. The lobe switcher immediately proved its effectiveness and will be described in detail later.

#### *The Oscar Antenna*

The antenna system designed for the Oscar

project is quite similar to the tracking antenna used on 108 Mc. Improvements have been made to insure added strength, higher efficiency, and more precise direction control and indication. The antenna proper consists of two 9-element Yagis, stacked 9½ feet apart in parallel planes perpendicular to the horizontal cross boom. The cross boom and the booms carrying the elements are 10-foot lengths of 1¼-inch diameter TV mast sections. The configuration can be considered as being vertically polarized when at zero degrees elevation.

The method used to mount the Yagi booms near the ends of the cross boom is simple and effective. Four-inch diameter circular steel plates are drilled to hold four U bolts, each pair lined up at right angles to the other. Variations of this method are shown in v.h.f. antennas described in the *ARRL Antenna Book*. To fasten the elements to the Yagi boom, 2-inch sections of aluminum U channeling are force-fitted over the 1¼-inch boom and fastened to it with two sheet-metal screws. The elements can then be mounted on the flat center section of the channel material with metal straps, and the fed sections of the dipoles supported on ceramic standoffs. No drilling through the elements is necessary. Caution — any unplated steel parts must be protected against rust. A base coat of rust-preventing paint, covered with a mixture using equal parts of white enamel and aluminum paint, is satisfactory and wears well.

Folded dipoles and balanced feeders are used to insure that there is no skewing of the lobes due

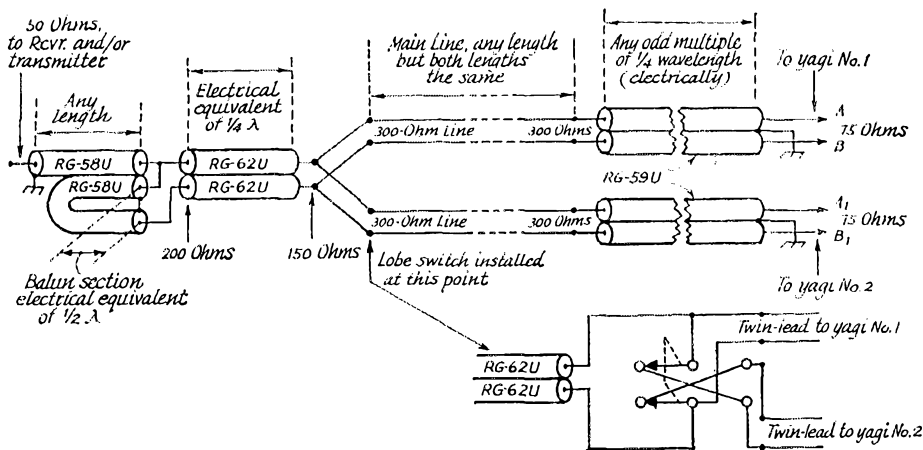


Fig. 1—Transmission-line system for the satellite-tracking array. Two Yagis of 75-ohm impedance are fed through pairs of 75-ohm coax any odd multiple of an electrical quarter wavelength long. These pairs are connected to 300-ohm balanced line for the main run, to a Q section of 93-ohm coax and a balun which converts to 50 ohms for connection to the transmitter or receiver. The lobe switch, lower right, is connected at the lower end of the balanced line run. Any other combination that will provide for matching of the antennas and switching of their phasing should work equally well.

to unbalanced currents being induced in the line runs. Each antenna is assumed to present a basic impedance of 19 ohms. The folded dipole is made with  $\frac{3}{8}$ -inch tubing and the 4-to-1 step-up ratio (characteristic of the folding) brings the effective input impedance close to 75 ohms. Each dipole is fed with two RG-59/U cable sections, the inner conductors providing a balanced 150-ohm impedance. The outer conductors are simply connected together at the ends and grounded.

The physical length of the pairs is such that the electrical length is an odd multiple of a quarter wavelength. Any convenient number of half wavelengths repeats the impedance of the dipole. The additional quarter wavelength acts as a linear transformer. As the characteristic impedance of this transformer section is 150 ohms, it will act to transform the repeated antenna input impedance of 75 ohms to 300 ohms according to

the formula  $Z_S = \frac{Z_0^2}{Z_R}$ . The main line run can

then be 300-ohm ribbon. The reason for using pairs of coax at the antenna end is that the outer conductors provide a fixed impedance to ground, and the pairs can be run along or through booms and around rotators without upsetting the  $Z_0$  or introducing losses.

Random but equal lengths of 300-ohm Twin-Lead are run into the shack. The lobe-switching device is connected at this point, and another matching transformer section is inserted to bring the impedance to approximately 200 ohms. Then a balun made of 50-ohm coax converts the impedance to an unbalanced 50 ohms for connection to the receiver and/or transmitter. The transmission-line system is shown in Fig. 1.

### El-Az Control

In addition to having an efficient antenna and transmission-line system, it is important that the rotation, control, and indicating mechanisms be

designed to provide control in both azimuth and elevation, and to give an accurate indication of the direction the antenna is pointing. Provision for changing the angle of elevation from the horizon to zenith is desirable for several reasons: (1) Noise generally comes into the antenna from the horizon. Elevating the antenna to, say, 15 degrees above the horizon will attenuate such noise to a great extent. (2) Most passes that are appropriate for tracking are at angles above the horizon and, of course, are at times overhead, so with elevation equipment a good solid signal can be maintained at all times. (3) Making provision for elevation puts the antenna in the running for tracking deep space probes, moonbounce, and other experiments involving weak signals, such as communication via passive satellites.

The mechanical system on our Oscar antenna consists of three Alliance T12 rotators, one to provide elevation, the other two in tandem to provide azimuth rotation. This type of rotator is useful in several ways: (1) A mast section can be slipped through the rotating mechanism. This is handy when designing elevation facilities. (2) The worm-gear drive has less play than a spur-gear type. (3) The action is smooth, sufficiently fast (1 r.p.m.), and is (in my experience) trouble-free. (4) The fact that the worm turns 30 times during one revolution of the main drive to the antenna can be used to advantage in designing a highly accurate direction indicator. (5) As there are no switching impulses set up in the control unit, the system is quiet electrically.

The horizontal boom supporting the two Yagi antennas is driven at the mid-point by one rotator. TV-type mast bearings are added to give more stability to the cross boom and to prevent teetering. The elevation rotator is fastened to the azimuth mast by appropriate hardware.

For rotation in azimuth, two T12 rotators are used. This provides double torque and double holding power at rest. About two feet of masting

must be allowed to project above the top rotator in order to provide some torque take-up to relieve strain on the mechanisms. The azimuth rotators are controlled from the shack by simultaneously switching both control units. This is done by running the control contacts out to a d.p.d.t. key switch with spring return to the center off position.

The elevation rotator is controlled by the rocker switch on the control box, and the rough elevation reading can be taken from the magnetic balance pointer on the unit. Azimuth accuracy is important in the Oscar project or in any other tracking-project work, so a far more accurate system is called for.

#### **Getting Accurate Fixes**

Why the accurate indicating equipment when the antenna itself has a broad lobe (25-30 degrees to the half power points)? The lobe switcher mentioned earlier is used to get accurate fixes by the flick of a switch. It is of the utmost simplicity. Remember, each Yagi has a transmission line running all the way into the control room. Ordinarily these two line runs would be connected so as to put the two antenna segments in phase, thereby realizing a gain of about 3 db. If, however, the connections are reversed, the two antennas will be 180 degrees out of phase. Then, instead of a major lobe off the front end of the system, there will be a major null. This null is many times sharper than any major lobe that can be set up by having even an outlandish number of in-phase antenna segments. Experience has shown that with a well-designed system, this null is accurate to the vicinity of a degree.

Some satellites under certain conditions provide signal strengths as high as 30 db. above the noise level. Even under such a strong-signal condition, switching to the null position will cause the signal to drop into the noise and be undetectable for a few seconds, until the satellite begins to move out of the null. The signal then increases in intensity rather quickly because the slope of the null is so very steep. In the out-of-phase, split-lobe condition, the antenna has a pair of lobes adjacent to the null, about 25 angular degrees apart. The gain of these split

lobes is down about 3 db. from the major in-phase lobe. That fact should not be interpreted as a deficiency in the system because, with 8 or 9 elements on the individual segments, there still remains a gain of 10 to 12 db. over a dipole.

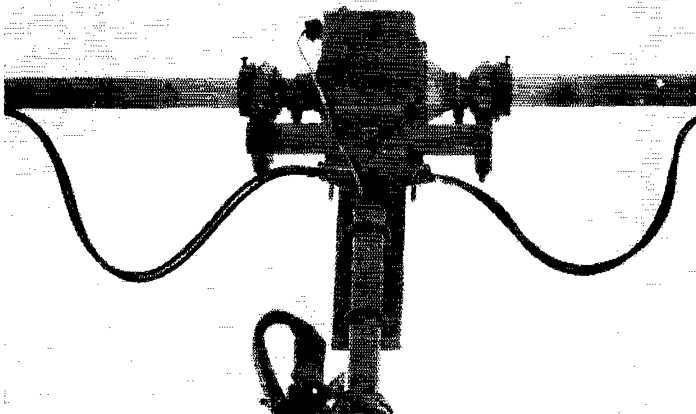
I suspect that the use of a lobe switcher becomes of even more value in the case of a pair of low-gain segments: say, 3 or 4 elements on each boom. The in-phase lobe would be very broad in that case, but the null would be just as deep, even though the split lobes would be wider apart angularly, and the slopes would not appear to be as steep.

In addition to being of value in taking fixes during ordinary passes at medium distances and lower angles of elevation, the lobe switcher can be used to advantage in proving a zenith or near-zenith pass. The method that has been used here is to slew the beam 90 degrees to the direction of approach and to raise the elevation to 90 degrees (straight up). Then, when the satellite passes through the null, an accurate fix can be taken. This method was used because it is virtually impossible to follow a low overhead pass because of the high angular velocity of the satellite.

#### **High-Accuracy Indicator**

Now that an accurate fix can be taken, it is necessary to design indicating equipment to at least an equivalent degree of accuracy. The simplest selsyn system calls for a unit coupled to the rotating mast, and a mate at the control room to repeat the reading. By experimenting extensively with such a setup it has been found that the necessary accuracy simply cannot be obtained. The system is seldom within 5 per cent of the actual, and it is virtually impossible to return to any given orientation with an accuracy of better than 10 or 15 degrees.

This is where the worm-gear drive in the T12 rotator steps into the picture. It turns 30 times for each revolution of the mast. Making up a torque take-off from the worm is not hard to do. A hole was drilled into the end of the worm shaft in the lower azimuth rotator, and an extension shaft of small dimension was force-fitted into the hole and brought out through the white metal housing. This extension was connected to a sur-



Close-up view of the elevation rotator. The conventional TV unit is stabilized through the use of shaft bearings at either side. The main cross boom runs through the rotator.

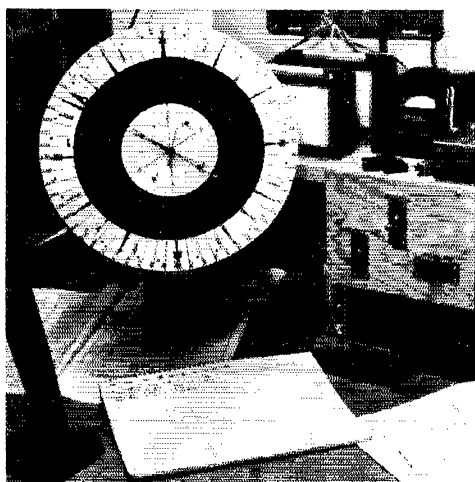


plus 400-cycle G.E. selsyn, operating with 35 volts at 60 cycles. The 30 revolutions are then repeated by the other selsyn in the control room, multiplying the angular accuracy by a factor of 30. The revolutions are then multiplied by 2, using a small gear train removed from a telephone dialing mechanism. After removal of the unnecessary parts of the dial, three gears remain — an input, an idler, and an output. Both the in and out gears have enough shaft extension to use as coupling stubs. We now have 60 revolutions for each 360-degree turn of the antenna. An electric clock mechanism was adapted so that these 60 revolutions could be coupled directly to the clock's second-hand shaft. The second hand turns 60 times for one antenna revolution. The clock mechanism reduces those 60 turns to one turn of the minute hand. The minute hand now goes through 360 degrees for each revolution of the antenna.

The minute hand (now the azimuth pointer) was extended and counterbalanced, and a 12-inch face added and lettered to read out in degrees. Multiples of 6 degrees are shown because the second hand can be put back on its shaft and the circumference it sweeps can be divided into six one-degree-of-arc intervals. The second hand will then act as a vernier to indicate to the nearest degree or better. One degree is equal to 60 degrees on the vernier circumference.

Most electric clock mechanisms have some looseness which results in a small amount of play in the works. It is necessary to gravity-load one of the idler gears to correct this. Conveniently, the setting shaft is an ideal place to apply this back loading. Clamp a larger diameter sleeve on this shaft, wrap a string around the shaft, run the string up and over a smooth bar acting as a pulley, and tie a weight onto the end of the string. This gives a linear back load to the clock-works, and any inaccuracy is eliminated. Spring loading doesn't work as well because of the non-linear characteristic of the back tension. Another hint: Small-size rubber tubing is handy to couple the various shafts to each other. This prevents binding due to slightly inaccurate mounting of the various units.

A cable of 17 control wires is needed between



High-accuracy azimuth readout system. Ingenious yet relatively simple combination of selsyns and clock mechanism gives an indication accuracy of about plus or minus 1 degree. Elevation, azimuth and antenna lobe switches are on the plywood panel at the right.

the antenna and the control units. Telephone cable containing 41 pairs of about No. 20 wire is used here, with pairs used in parallel in order to reduce the  $I^2R$  loss. No phase-shift effects have been noticed in the selsyn circuit even though the units are 75 feet apart. The accuracy of the entire system is about  $\pm 1$  degree.

Such equipment will make your tracking project more interesting and certainly more accurate. After following a few passes of an Oscar, you will find that you will be able to manipulate the system with surprising accuracy. The system provides the basic requirements for an effective v.h.f. tracking setup. The antenna proper has the gain necessary to bring in substantial signals even at extreme distances. Strong, accurate rotating and indicating equipment will guarantee that the gain of the system is being used to advantage. A lobe switching device will prove that the antenna is looking at the satellite. In the later and more challenging phases of the Oscar Project, and in work with the projected Echo A-12, an efficient and versatile system will be of even greater value.

### Some Thoughts on Polarization

Vertical or horizontal polarization has no meaning for a satellite in space. For us, "vertical" can be taken as linear polarization perpendicular to the plane tangent to the surface of the earth at the antenna location, when the system is looking at the horizon. When looking at a satellite in orbit, polarization can be considered only as linear in a certain direction with respect to the attitude of the satellite at a given moment. This complicates matters, but it provides a handy tool for picking up additional information on the various attitudes of the vehicle.

During the first two weeks of Oscar I there was no particular difficulty in acquiring on the northbound passes using vertical polarization.

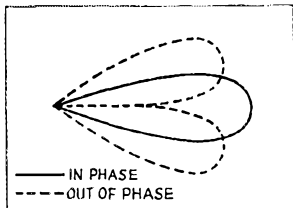
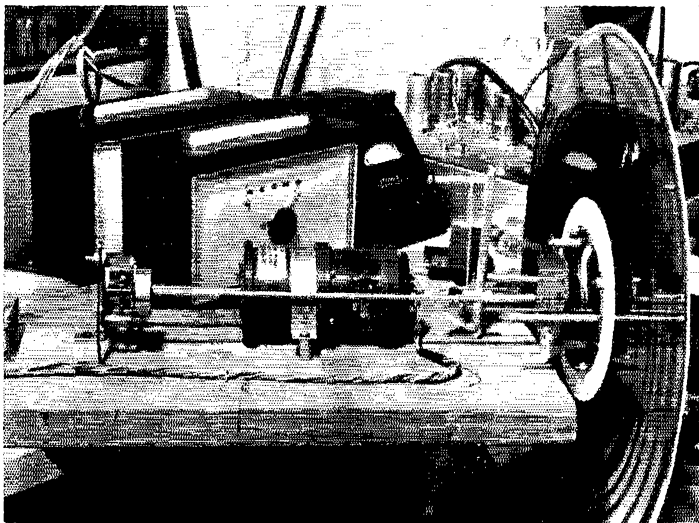


Fig. 2—Patterns available with the lobe-switching device used by WØWVM. When the Yagis are in phase the pattern is the normal one shown with a solid line. Switching the bays 180 degrees out of phase results in a very sharp null between split lobes, shown in a broken line. The null provides a very close check on the position of a signal source, when high-accuracy indicating devices are employed.



Rear view of the azimuth indicator, showing Selsyn, center, 2:1 gear multiplier, left, and clock-mechanism readout device at the right.

During the third week a trend became noticeable. By this time W0AUS and W0JHS were deep in the project with horizontal polarization. Both were beginning to acquire earlier and hold longer than I was, and it dawned on me that Oscar's attitude might be changing to favor horizontal. On Dec. 29 (northbound) I had sporadic results. On the 30th I had negative results on a pass to the east. W0AUS and W0JHS were getting progressively better results!

Equipment and antenna checks showed nothing wrong, so I set up a 14-element horizontal beam fixed northwest, for a Dec. 30 pass to the west. The path was followed with the vertical until both systems were looking at Oscar. There was no signal on the vertical up to this time, but the signal pounded in on the horizontal. Switching back to vertical, the signal was heard, but down at the noise level. After Oscar walked out of the fixed horizontal beam's pattern the signal was detectable for some time with vertical, by tracking.

Southbound passes during this time should have become easier to acquire with vertical. During the interval between the early western pass mentioned above and the daylight pass to the east, Oscar's keying went bad and the signal level dropped markedly, yet acquisition was made on the southbound pass to the east, and the pass following it. Results were not good, but they were better than the horizontally-polarized boys were able to achieve. None of them heard the 9:50 A.M. pass, but W0AUS held a few seconds on the next one. On the 31st (daylight) I held one pass for 6 minutes, when AUS and JHS held in only briefly.

Conjecture on Oscar's orientation in space was that the satellite was not spinning on the axis of the antenna, but in a plane perpendicular to the axis of the antenna. (The antenna was

spinning like a propeller.) Northbound over the USA, the plane of spin was nearly parallel to the plane tangent to the earth's surface, but southbound the plane of spin was nearly *perpendicular* to the plane tangent to the surface of the earth.

Note that this is all conjecture, but it fits the evidence. It triggered off a train of thought and preparations for the next Oscar. Shortly before Oscar I was officially pronounced dead I had a chance to play with the orientation of the elements in the antenna. The left-hand boom was turned 45 degrees in a clockwise direction, and the right-hand boom the same but counterclockwise. This made the plane of the elements part of the two sides of an isosceles triangle, with its imaginary base horizontal.

This reorientation was made while I was under the impression that the lobe-switching facility would probably be destroyed, but such was definitely not the case. It developed that with this cross-polarized arrangement a major lobe responsive strictly to horizontal polarization is obtained with the booms 180 degrees out of phase. A major null is realized when the booms are switched *in* phase. Lobe effects with vertical polarization are exactly the reverse of this. These facts were confirmed in observation of the 2-meter signal of horizontally polarized W0JHS, and the vertical signals of the Minneapolis taxicab service. (It's more fun tracking Oscar than cabs!)

It seems likely that, with elements realigned this way, the use of a 90-degree line segment and appropriate switching facilities would provide for circularly polarized reception with either right-hand or left-hand sense.<sup>1</sup> This would be handy for tracking an Oscar having a circularly polarized antenna, and for moonbounce or satellite-reflection work, where Faraday rotation is a problem with linear polarization.

**QST**

<sup>1</sup> Late report: this has been tried and found to work nicely.

# Recent Trends in Receiver Front-End Design

## Noise Figure and Cross-Modulation Characteristics of Tube and Transistor Front Ends

BY E. A. ANDRADE,\* WØDAN

*Building a receiver for immunity to cross-modulation calls for compromising on other desirable features. Here is a discussion of receiver front-end design that the man who makes his own can't afford to miss.*

EARLIER *QST* articles,<sup>1,2,3</sup> have painted a fairly comprehensive picture of the performance to expect of a modern high-quality communications receiver. Superheterodyne front-end performance has certainly come a long way from the days of the National FB-7 (a very advanced receiver for its day, indeed!), with its two 20-meter bands 910 kc. apart, to the modern double-conversion crystal-controlled s.s.b. receiver.

Two recent trends in receiver design, the band-passed front end and the transistor front end, will be discussed in this article. Means of minimizing some of the problems will also be discussed.

Before proceeding, it might be well to review the requirements for a good communications receiver r.f. section.

### Sensitivity

The receiver must have enough amplification to make the weakest signals audible in the loudspeaker. Such amplification is fairly easy to attain in the modern superheterodyne, where gain may be obtained at several different frequencies. The gain can be relatively low at any one of the frequencies, so gain stability is not a serious prob-

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<sup>1</sup> Goodman, "How Sensitive Is Your Receiver?," *QST*, September, 1947.

<sup>2</sup> Pappenfus, "A Discussion of Receiver Performance," *QST*, January, 1955.

<sup>3</sup> Pappenfus & Andrade, "Modifying 75A-2 and 75A-3 Receivers," *QST*, July, 1955.

lem. The gain from antenna to loudspeaker in a typical communications receiver may be as high as 10 million.

However, all this gain will not allow the operator to copy a weak DX signal unless the signal-to-noise ratio is adequate. This means that the noise contributed by antenna coupling circuits, r.f. amplifiers and mixers must be held to a minimum.

The best way to express receiver sensitivity is either in terms of signal-to-noise ratio or — even better — in terms of noise figure.

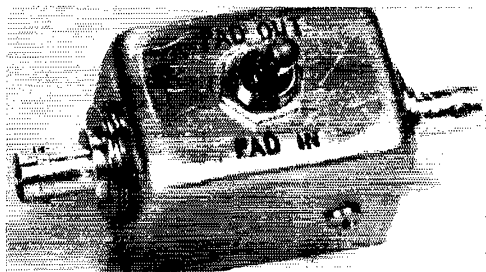
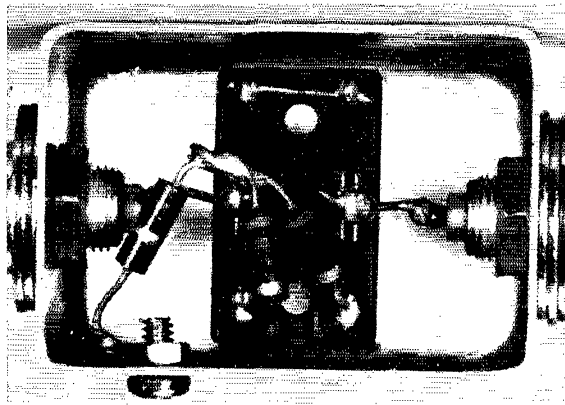
It is generally agreed that in the h.f. spectrum (2 to 30 Mc.) a noise figure of 6 to 7 db. is all the sensitivity that can be used because of the masking effects of antenna noise, provided that a matched antenna system is used. In our discussion we will consider this sensitivity adequate. For a further discussion of noise figure, see references 1 and 2.

### Cross-Modulation

Unfortunately, adequate gain and sensitivity are not the entire story in a communications receiver. An often neglected area of front-end design is its performance in the presence of strong signals out of the pass-band.

If we are listening to a weak DX signal with an S-meter reading of, say, S2 and a strong local comes on the air, perhaps 50 kc. removed from our DX station's frequency, the modulation of the undesired signal may appear on the weaker

One way of assembling a 20-db. 50-ohm pad for checking receiver cross-modulation. The pad should be shielded to prevent stray pickup, and the construction should be such as to minimize capacitive coupling between the input and output connectors.



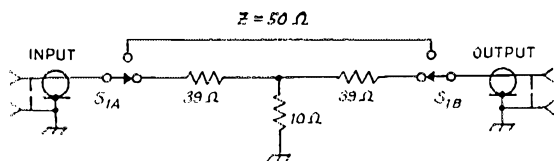


Fig. 1—Circuit of 20-dB. T pad for insertion in coaxial line. Values given are for 50-ohm line. Resistors are 1/2-watt composition.  $S_1$  is a d.p.d.t. toggle switch. Coax connectors may be any type.

signal. This effect is known as cross-modulation. In the case of single-sideband signals, the splatter that you have been blaming on the other fellow's signal could be generated in your own receiver by its cross-modulation.

Another effect, closely related to cross-modulation, is desensitization, or blocking. This occurs when a strong off-channel signal actually drives the r.f. amplifier or a mixer into grid current so the tube biases itself toward cutoff. Generally, if the cross-modulation capabilities of a receiver are adequate there is no trouble from blocking effects.

Cross-modulation performance of a receiver is usually plotted for a fixed level of desired signal in the passband against various levels of undesired signal that cause cross-modulation 10 db. below the desired-signal audio level.

If you suspect that your receiver is cross-modulating, an easy check may be made by inserting a 20-dB. pad between the receiver and the antenna. The desired signal is usually strong enough so that it may still be heard. However, if the interfering signal is the result of receiver cross-modulation, it will disappear when the pad is inserted. Fig. 1 gives the circuit and values for a 20-dB. pad.

### The Band-passed Front End

A considerable simplification in the tuning mechanism of a multiple conversion receiver may be accomplished by replacing all signal-frequency

tuned r.f. circuits with suitable broad-band transformers, usually designed just to accommodate one ham band. The receiver band switch then selects the proper transformer for the desired band. The reduction in mechanical complexity is certainly very attractive, particularly to the home constructor. Unfortunately, a serious penalty in cross-modulation performance, and to a degree sensitivity, is incurred.

Curve *D* in Fig. 2 shows the cross-modulation of a typical commercial receiver having a broad-band front end, compared to one (Collins 75A-4) which uses two tuned circuits at r.f., Curve *B*. The curves were taken with a 5- $\mu$ v. desired signal, both the desired and undesired signals being fed to the 50-ohm receiver input. For undesired signal levels of 0.1 to 1.0 volt, the cross-modulation occurs essentially in the r.f. amplifier tube of a tuned receiver. In a broad-banded receiver it usually occurs in the first or second mixer. Cross-modulation of undesired-signal levels below 0.1 volt generally occurs in the mixer stages, in a tuned receiver, unless extremely low r.f. amplifier gain and very high antenna-coil gain are used. The noise figure of the broad-band receiver was considerably poorer than the 75A-4, as a result of a compromise in antenna-coil gain in order to minimize cross-modulation as much as possible.

The poorer performance of band-pass circuits would be most noticeable on the three lower-frequency bands, 3.5, 7 and 14 Mc. As the signal frequency is increased, the effective selectivity of the simple r.f. tuned circuits decreases. At 30 Mc., with an operating  $Q$  of 40 in each tuned circuit, the 6-dB. response points with two tuned circuits would be 1.4 Mc. apart. Thus at this frequency there is very little choice between the band-pass characteristics of the usual two-tuned-circuit r.f. amplifier and mixer, or the band-passed system.

Let's say that in spite of the problems outlined above, we've decided to build that "dream receiver" with broad-band r.f. circuits, in the interests of simplified home construction. What can we do to minimize the problems? Cross-modulation is caused by two factors: lack of selectivity, and insufficient dynamic range in the r.f. amplifier and mixer tubes. We have sacrificed front-end selectivity for broad-band r.f. circuits, but if we are able to find some tubes with a very low equivalent-noise resistance, we can use low antenna-coil and r.f.-amplifier gain. This would have the same effect as increasing the dynamic range of the tubes, thereby allowing us to handle stronger undesired signal levels than previously. While the same approach applied to a tuned receiver would provide outstanding strong-signal performance, a fairly

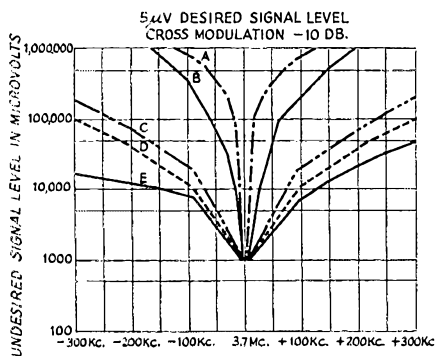


Fig. 2—Cross-modulation characteristics of various types of receiver front ends. The curves show the undesired-signal input, as a function of frequency, required to produce cross-modulation 10 db. below the output from a 5-microvolt desired signal on 3.7 Mc.

- A—Tuned r.f. amplifier using a 6386 tube.
- B—Collins 75A-4.
- C—Broad-band r.f. amplifier using 6386.
- D—Commercial broad-band receiver.
- E—Transistor front end.

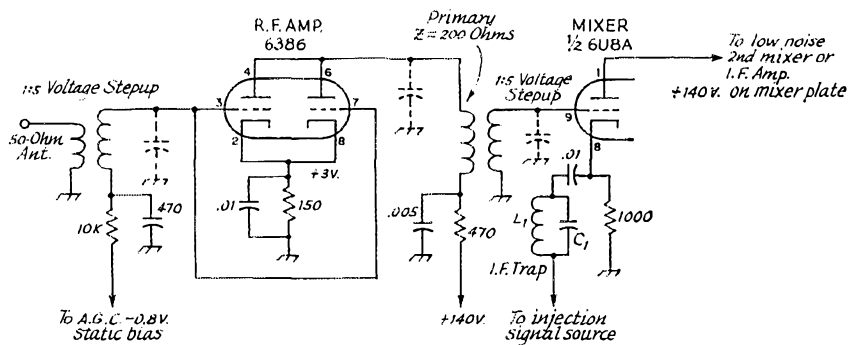


Fig. 3—Low-noise triode r.f. amplifier-mixer circuit with good cross-modulation characteristics. Resistors are  $\frac{1}{2}$ -watt composition.  $L_1C_1$  is a trap circuit tuned to the i.f. output frequency of the mixer. See text for adjustment of interstage transformers.

acceptable band-pass receiver could be built.

Fig. 3 shows a rough schematic of such a front end. A 6386 remote-cutoff dual triode, with both sections in parallel, was selected for the r.f. amplifier. The plate load for the 6386 is very low, about 200 ohms. This keeps the voltage gain between the grid and plate less than unity, and no neutralization of the r.f. stage is necessary. Voltage gain to the mixer is obtained in the broad-band coupling transformer. A transformer voltage gain of 5, combined with a tube voltage gain of 0.8, provides an over-all r.f. stage gain of 4, which is adequate to overcome the mixer noise.

When setting up the transformer, adjust primary turns and coupling for a voltage gain of 0.8 from grid to plate of the 6386. Then recheck the secondary voltage to make sure there is a gain of 5 in the transformer.

The mixer is the triode half of a 6U8 or one section of a 12AT7, with cathode injection. These tubes used as mixers have an equivalent noise resistance of about 2000 ohms, compared with 60,000 ohms in a pentagrid mixer such as a 6BA7. It is this low mixer noise resistance that allows us to use a total r.f. stage gain of only 4 and still realize a 6.5-db. over-all noise figure. To accomplish similar sensitivity with the 6BA7 as a mixer would require an r.f. stage gain of nearly 25. This would result in severe degradation of mixer cross-modulation performance because of the very high levels of undesired signal that would appear at the mixer grid.

By using no more antenna-coil gain than is necessary to provide our 6.5-db. noise figure, we keep undesired-signal levels relatively low at the r.f. amplifier grid. The 6386 equivalent noise resistance under these operating conditions is 750 ohms, including the effect of first-mixer noise. An antenna-coil voltage gain of 5 will satisfy the noise-figure requirements.

The broad-band version of this front end has not been breadboarded to date. However, the tuned-version cross-modulation is shown in Fig. 2, curve A. A projected curve, C, based upon the gains and known cross-modulation levels in the tuned circuit, indicates the performance to be expected with broad-banding.

A word of caution is necessary concerning the injection signal for the triode mixer. To fully realize its low noise resistance, it is quite necessary to have a low-noise injection system as well as a source impedance of 50 ohms or less. The most troublesome noise in injection sources is generally the white noise occurring at intermediate frequency. In most cases a parallel-tuned i.f. trap, inserted in the lead to the mixer cathode, is sufficient to reduce this noise to an acceptable level ( $L_1C_1$  in Fig. 3). If a variable i.f. is used following the first mixer, it may be necessary to substitute a high-pass filter with a cutoff frequency below the lowest injection frequency.

A simple way of checking source impedance is to connect the r.f. probe of a v.f.v.m. across the unloaded output circuit of the injection oscillator. Then try different values of resistance across the output circuit, looking for the oscillator voltage to drop to one-half its unloaded value. The resistor value that causes this to happen is equal to the source impedance of the oscillator.

### The Transistor Front End

Certainly a general article on receiver design these days should include a discussion of transistorized circuitry. Unfortunately, although it is fairly easy to obtain excellent sensitivity with the newer r.f. transistors, there is a severe limitation on strong-signal performance. In fact, unless a very severe reduction in sensitivity is accepted, a transistor front end may be expected to cross-modulate with 20- to 30-db. less undesired signal than an equivalent tube receiver. A typical transistor receiver cross-modulation curve is shown in curve E, Fig. 1.

Textbooks tell us that there is no significant difference in the noise figure of a given transistor in any of the three amplifier configurations: common base, common emitter, and common collector. This has been pretty well confirmed in practice as well as theory.

It is now possible to attain a transistor noise figure of 4 db. as high in frequency as 200 Mc., with transistors in the three- to five-dollar class, thus making a 7-db. noise figure in the 3- to

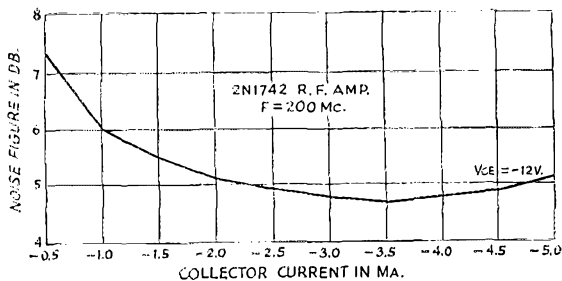


Fig. 4—Typical curve of noise figure vs. collector current for a 2N1742 transistor as an r.f. amplifier, at 200 Mc.

30-Mc. range a relatively easy job. It should also be possible to design some excellent 6- and 2-meter portable equipment using these types. Some transistors that will do this job are the Philco types 2N1742, T2012, and T2028, Texas Instrument types 2N2189 and 2N2191, and the Amperex Universal type 2N2084.

In order to realize the best noise-figure capabilities of an r.f. transistor, careful attention must be paid to both the recommended collector current for minimum noise figure and the recommended source impedance. The source impedance for minimum noise figure is generally near the value of the input impedance of the transistor in the *common-emitter* configuration. This value does not change significantly when the transistor is used in the other amplifier configurations. Fig. 4 shows how collector current and noise figure of the Philco 2N1742 are related.

Fig. 5 is a schematic of a typical common-emitter r.f. stage and mixer stage using the 2N1742 and 2N1743. The r.f. stage available power gain is partly a function of frequency, and varies from 45 db. at 3 Mc. to 35 db. at 30 Mc. A noise figure of 7 db. is attainable if the coil tap to the transistor is set to match the input impedance of the transistor. A collector current of 3.5 ma. corresponds to the recommended value for minimum noise figure, and is adjusted by selecting the proper value for  $R_1$  (approximately 12,000 ohms).

Fig. 6 is a plot of input capacitance and input impedance vs. frequency, for various values of collector current, for the 2N1742. If the 2N1742 is used in the 3-30-Mc. frequency range, neutralization will probably not be necessary. However, if it is used at higher frequencies than 30 Mc., it would be desirable to add the network shown dotted in Fig. 5, to realize maximum power gain and minimum noise figure.

### Cross-Modulation in Transistor R.F. Stages

As stated previously, cross-modulation is a serious problem in transistorized receivers. R.f. transistors have an inherently limited dynamic range and will cross-modulate with some 20- to 30-db. less signal than a tube stage. Although to date no one has come up with a good answer to the problem, there are a few design tricks that help to minimize it.

The most simple device to minimize cross-modulation would be a 20-db. attenuator with a switch to connect it between the antenna and the receiver input stage when a strong off-channel signal is cross-modulating. Perhaps this sounds a bit agricultural, but it works, provided the desired signal is strong enough to overcome the 20-db. loss. Admittedly, this ruins the noise figure of the receiver, but there's not much point in having a 6- or 7-db. noise figure when a strong local is wiping out the whole band.

A more exotic way of improving the r.f.-stage cross-modulation would be to improve the r.f. selectivity by using two or even three tuned circuits ahead of the r.f. transistor. Noise figure would suffer to a degree, but this is a compromise that the receiver designer is frequently required to make, even in a tube receiver.

Another means of improving the cross-modulation is to introduce degeneration in the emitter lead of a common-emitter r.f. stage. Caution must be exercised to assure that no more than 3 or 4 db. of degeneration is used, or the noise figure will deteriorate excessively. Other negative feedback schemes have been considered, but

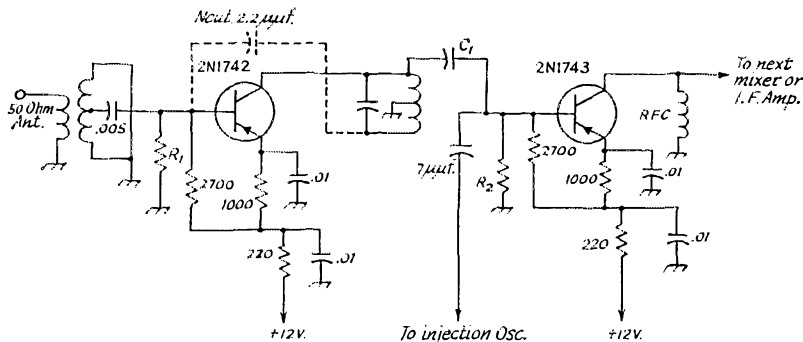


Fig. 5—Transistor r.f. amplifier and mixer circuit. Capacitances are in  $\mu\text{f.}$  except as indicated; resistances are in ohms; resistors are  $\frac{1}{2}$  watt. See text for adjustment of antenna coil tap. Interstage coil center-tapped.

$C_1$ —Selected for desired r.f. stage gain; typically  $7 \mu\text{f.}$   
 $R_1$ —Approximately 12,000 ohms; adjust for 3.5-ma. collector current.

$R_2$ —Approximately 18,000 ohms; adjust for 1.0-ma. collector current.

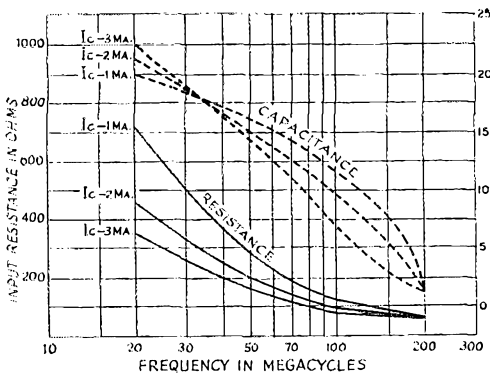


Fig. 6—Typical equivalent parallel input resistance and capacitance, 2N1742 with  $V_{CE} = -10$  volts, for selected values of collector current, output short-circuited.

stability becomes a problem if any great amount of r.f. feedback is used.

### Transistor Mixers

A transistor used as a mixer will generally provide about 3 db. less gain than the same transistor operated as an r.f. amplifier. This is considerably different than tubes, where the conversion gain is approximately 25 per cent of the tube's gain as an amplifier. R.f. gain in transistor front ends must be held to the minimum consistent with the desired noise figure, just as in a tube r.f. section; otherwise, mixer cross-modulation will become excessive.

A 10- to 12-db. mixer noise figure is fairly common for transistor mixers such as the Philco 2N1743. In order to realize this noise figure, careful attention must be paid to the recommended collector current and oscillator injection power requirements for the particular transistor being used. Fig. 7 shows the effect of collector current on noise figure, and Fig. 8 shows oscillator injection power vs. mixer gain.

The formula for computing the effect of mixer noise figure on r.f.-stage noise figure is

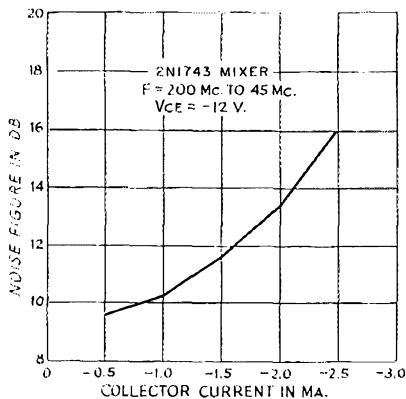


Fig. 8—Noise figure vs. collector current, 2N1743 as a mixer, 45 to 200 Mc.

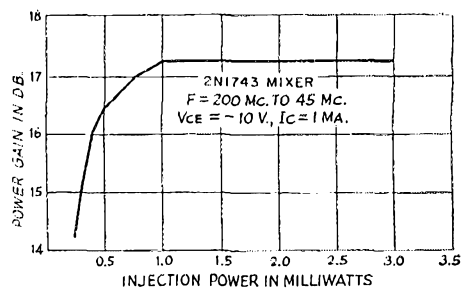


Fig. 7—Gain vs. oscillator injection power, 2N1743 as a mixer with  $V_{CE} = -10$  volts,  $I_{CE} = 1$  ma. This curve applies over the frequency range 45-200 Mc.

Noise figure (power ratio)  $F_{AB} = F_A + \frac{F_B - 1}{A}$  where  $F_{AB}$  is the total noise figure,  $F_A$  is the noise figure of the r.f. amplifier, and  $F_B$  is the noise figure of the mixer. These are expressed as power ratios. To get the noise figure in db., take 10 times the  $\log_{10}$  of the power ratio.  $A$  is the power-gain ratio of the r.f. stage including all coupling losses between stages. A numerical example is given below:

$$F_A = 4 \text{ db.}; \text{ power ratio} = 2.5$$

$$F_B = 10 \text{ db.}; \text{ power ratio} = 10$$

$$A = 10 \text{ db.}; \text{ power ratio} = 10$$

$$\text{Therefore, } F_{AB} = 2.5 + \frac{10 - 1}{10} = 2.5 + \frac{9}{10} = 3.4$$

$$10 \times \log_{10} \text{ of } 3.4 = 5.3 \quad F_{AB} = 5.3 \text{ db.}$$

The noise figure (5.3 db.) is now referenced from the base of the r.f. amplifier transistor. Antenna-coupling-circuit losses must also be considered in determining the over-all noise figure of the receiver. Although it is possible to compute the over-all noise figure including the antenna-coil tuned-circuit losses, it becomes somewhat involved because three variables affect it. These are the losses inherent in the tuned circuit ( $Q$ ), losses due to mismatching, and the effect on transistor noise figure with change in source impedance. The computation of this is somewhat beyond the scope of this article. However, a good approximation may be made by setting the transistor tap on the input coil to match the input impedance of the transistor, measuring noise figure, and then moving the tap as close to the ground end of the coil as you can get, while still maintaining a 7-db. noise figure. This will keep signal levels to the r.f. stages as low as possible, thereby minimizing cross-modulation.

Needless to say, it is very desirable to use as high a tuned-circuit coil  $Q$  as possible in order to maintain the maximum r.f. selectivity for best cross-modulation performance.

### Automatic Gain Control

The choice of an a.g.c. system in transistorized r.f. sections may have a considerable effect on cross-modulation characteristics of the receiver. In general, "forward" a.g.c., which reduces

(Continued on page 154)

# Research, Tracking and Reporting

## More About V.H.F. DX Possibilities

BY RAPHAEL SOIFER,\* K2QBW

IN A previous article<sup>1</sup> we described plans for the launching this year of NASA's "bigger and better" passive communications satellite, Echo A-12, and those station modifications that will be necessary for advanced v.h.f. operators to make use of the satellite. To review briefly, Echo A-12 will be a 135-foot inflated sphere constructed of laminated aluminum foil and Mylar, launched into a circular polar orbit of approximately 800 miles altitude. The scheduled launch date has been postponed, and the orbital attempt from Vandenberg Air Force Base, California, is now slated for the third quarter of 1962. A sub-orbital test of the new Echo balloon is slated to go from Cape Canaveral late in June. WIAW will carry news of both firings as they approach.

The purpose of this article is to discuss sporadic enhancements of the reflected signal which offer the possibility of greatly increased DX for the best-equipped stations, and an opportunity for contacts by those not so well equipped — contacts that could not be expected to occur by normal passive reflection from the satellite.

But first, an important correction:

### On Circular Polarization

In the discussion on standardized circular polarization in the April article we said that a plus-sign antenna which transmits clockwise will receive counterclockwise. This is true, from the antenna's own point of view. However, as seen by the incoming wave, the clock is turned around, and what was counterclockwise to the receiving antenna is clockwise to the wave. Since the convention goes with the wave and not with the antenna, we should have said that a quadrature-fed antenna constructed according to the article will not only transmit clockwise, but receive that way as well.

Inasmuch as the sense of rotation is reversed upon reflection of the wave from the moon or a satellite, the clock convention means that our standardization section was wrong, and *oppositely-polarized* antennas must be used. This means that if you are using the feed system described in the April article, which receives and radiates clockwise, then any station wanting to work you *via reflection* must use a counterclockwise antenna (or vice versa). Don't neglect this in setting up your schedules!

The antenna's sense of rotation can be reversed at will by using identical stacking harnesses to make separate antenna systems out of the horizontal and vertical elements of the plus-sign

array. Then run a line from the station to the vertical array, and a second line from the station to the horizontal array. These lines must be exactly the same length. At the station end connect a quarter-wave phasing section between the two. By transferring the transmitter feed from one end of the quarter-wave line to the other the direction of rotation can be reversed.

### Propagational Anomalies

From work conducted on satellite-ionization phenomena at other frequencies, we know that whenever a satellite encounters enough ionized particles moving at high enough relative velocities, the resulting interaction produces a reflecting region or cloud.<sup>2</sup> Depending on the kinetics of the situation, this sporadic cloud may either travel with the satellite or break up into fast-moving trails. Also, magnetic field perturbations may enable the ion clouds to coagulate and move slowly away from the satellite, or even to form far from the satellite to begin with.<sup>3</sup> Such traveling ion cloud effects have been observed by radar.<sup>4</sup> In the case of Echo A-12, we may consider such signal-enhancing phenomena as resulting from four principal causes: The re-entry sheath, spread-F clouds, auroral clouds, and fast-moving radio-active streams.

### The Re-Entry Sheath

In a satellite's last days or hours, the above conditions are often met, and a highly-ionized plasma sheath is formed around the satellite.

Signal enhancements resulting from the re-entry sheath may be expected to exhibit Doppler shifts at, or fairly close to, the predicted passive-reflection frequency, with the discrepancies, if any, caused by the traveling ion clouds. Although coherent reflections from ion concentrations of this type have been observed, be on the lookout for some form of garbling in the sound of the c.w. note. This is more common.

### Spread-F Clouds

At night, the F layer has exhibited a tendency to break up and form patches of ionization, known

<sup>2</sup> Jastrow, "Artificial Satellites and the Earth's Atmosphere," *Scientific American*, Vol. 201, August, 1959, pp. 37-43.

<sup>3</sup> Singer and Walker, "Wake of a Charged Body Moving in a Plasma," *Bul. Am. Phys. Soc.*, Vol. 5, 1960, p. 47.

<sup>4</sup> Singer and Walker, same title but different paper, *Bul. Am. Phys. Soc.*, Vol. 5, 1960, p. 231.

<sup>5</sup> Kraus, Higgy, Scheer, and Crone, "Observations of Ionization Induced by Artificial Earth Satellites," *Nature*, Vol. 185, No. 4712, Feb. 20, 1960, pp. 520-521.

<sup>6</sup> Kraus, Higgy, and Crone, "The Satellite Ionization Phenomenon," *Proc. IRE*, Vol. 48, April, 1960, pp. 672-678.

\* 3 Ames St., M.I.T., Cambridge 39, Mass.

<sup>1</sup> Soifer, "Amateur Participation in Echo A-12," *QST*, April, 1962.



as the spread- $l'$  phenomenon. In the later stages of the satellite's life, interaction with particularly intense spread- $l'$  clouds may produce enough interaction to result in signal enhancement. Little quantitatively is known about this one. In theory, Doppler shifts should again be at or close to predicted values, with some garbling possible.

### Auroral Clouds

There are two things which contribute to satellite ionization interactions — the number of electrons striking the satellite per second, and their relative velocity. In the case of auroral clouds, fluxes of up to  $10^{11}$  or  $10^{12}$  electrons per  $\text{cm}^2\text{-sec}$  may be encountered by the satellite, more than enough to produce significant interactions. These are low-energy particles, so the relative velocities involved in collision will be nearly those of the satellite itself.

The K2JMG-K2GQI results with Shotput IV passing through an intense auroral electron cloud exhibited Doppler shift very close to the predicted value. The received signals were fairly coherent, yet 20 db. stronger than those obtained from other Shotputs at the same position in the absence of clouds. We know auroral clouds to be more prevalent at lower regions of the ionosphere (100 miles or so), so we will have to wait a few years for the best effects. Auroras have been observed at Echo A-12's altitude, though, so don't give up the ship.

### Fast-Moving Radioactive Streams

At Echo's nominal launch altitude, these represent the most likely cause of quasi-passive phenomena. The most likely reason for the streams' existence is Van Allen belt leakage; the satellite itself will be passing through the belt's lower regions, and will definitely encounter some in their native habitat. Kraus' experiments with Explorer VII, which carried radiation-measuring equipment, showed abrupt rises in the counting rate coinciding with WVV signal enhancements. Radar observations<sup>4,5</sup> of satellites in the altitude region of Echo A-12 showed effects traceable to interaction with fast-moving streams of particles, which in all probability were radioactive.

The stream hypothesis is borne out by Doppler study of signal returns. Applied to Echo A-12 at 144 Mc., the theory of stream interactions would indicate that the signal returns from such phenomena would probably come back at Doppler shifts far removed from the passive-reflection value. Shifts of up to 75 kc. may be expected, with most coming at perhaps 20-40 kc. away. These high shift deviations stem from the high relative velocities of the reflecting ion concentrations; the major contributor to these velocities is not the satellite but the stream velocity itself.

<sup>5</sup> Kraus and Higgy, "The Relation of the Satellite Ionization Phenomenon to the Radiation Belts," *Proc. IRE*, Vol. 48, December, 1960, pp. 2027-2028.

Kraus, "Evidence of Satellite Induced Ionization Effects Between Hemispheres," *Proc. IRE*, Vol. 48, November, 1960, pp. 1913-1914. See, also, Kraus, correction to *op. cit.*, in January, 1961 issue.

Such stream-interaction signal returns will show serious frequency instability, since the velocities of the streams with reference to the stations are fast changing.

Secondary traveling ion clouds have been observed in such interactions which exhibit near-satellite velocity, but these are rare. More frequently, streams may split into two or more components following their encounter with the satellite, with the resulting signal returns being split into two or more simultaneous Doppler components. The "Doppler smear" effect, as this is called, will require the development of new operating techniques if full use is to be made of it at v.h.f. For example, if the receiver is continually kept tuned to the passive-reflection component, it will, in all probability, miss the stream-interaction components completely, since these will be too far away in frequency. Tune around, OM!

### Communication Possibilities

With the exception of the one aurora case mentioned, we have no idea of the magnitude or frequency of occurrence to be expected of these phenomena at 144 Mc. Hence the research interest in them.

From your point of view as an amateur interested in communication, these interactions are useful because they will sporadically increase the effective scattering area associated with the satellite, and hence will mean stronger signals. For example, should a 20-db. enhancement occur at 800 miles altitude, stations whose tropo-scatter range was only 470 miles before Echo A-12, and whose satellite-bounce range under normal conditions is 1000 miles or less, would find themselves able to work all the way out to 4500 miles with the same signal strength. The same 10-db. reduction in one-way path loss applies to the threshold as well, and stations whose tropo-scatter range is only 320 miles (instead of 465) will find themselves able to make sporadic use of the satellite. Should this same enhancement occur at 100 miles altitude — and the chances of this occurring *and being noticed* are much greater here — the threshold in terms of maximum permissible path loss will drop from 203 to 183 db., meaning that stations whose reliable tropo-scatter range is but *sixty-four miles* — nearly everyone on the band — would find the satellite sporadically accessible. Remember, these figures all assume the use of c.w. The types of fading and frequency shifts associated with these interaction enhancements will tend to render voice modulation unintelligible.

Besides making the satellite accessible to very many more people, it is quasi-passive reflection (satellite scatter to you) which holds the key to European QSOs for eastern stations and Hawaiian contacts for those in the plains or mountain states. Southerners may even find themselves working South America. Floridians might work Alaska, if they would just keep trying and keep tuning for those far-removed Doppler components.

We know these interactions to be inversely

frequency dependent. Users of 220 Mc. probably will experience considerably less of them than will the two-meter men. If any of you six-meter enthusiasts are still with us, this may be your big chance. Interaction phenomena should be a good deal stronger and more frequent on 50 Mc. than on 144, and will probably prove your only chance for successful, albeit sporadic, Echo work. Doppler shifts will be but a third of what they are at two meters, further helping your chances. The same considerations of equipment engineering apply to you as well, since losses in s.n.r. on any band hurt you in your most sensitive area — your QSL file!

### Reporting

Most of the information on anomalous behavior given in this article is derived from extrapolation of results achieved at lower frequencies. There is a real need for more experimental data in the v.h.f. spectrum, both to confirm what we already think we know and to discover such new effects as may be presently unknown. In this area, the radio amateur may help by providing data on the results of his own experimentation.

In addition to its over-all project management responsibility, OSSC is also responsible for the technical-research phase of the program, and is handling it in two ways. First, its Research Group on 144-Mc. Techniques, under the able leadership of K2LMG, plans extensive research work of its own in conjunction with the launching. Amateurs interested in working directly with the group are invited to contact K2LMG either directly or through the author. The work will involve schedules with group members, monitoring, and so on.

For those who would rather not get involved in organizational activities, but who would still be in a position to contribute information, we have prepared a questionnaire which we would like each of the participants to fill out to the best of his ability after each successful QSO using Echo A-12. These will be available from the ARRL Technical Department when you need them, and should be returned to E. P. Tilton, W1HDQ, V.H.F. Editor, 38 LaSalle Road, West Hartford 7, Conn.

### Tracking

It is expected that orbital predictions covering Echo A-12 passing over the United States and surrounding coastal waters will be transmitted by W1AW during the regular Official Bulletin periods. Foreign amateurs interested in participating in the Echo program are invited to contact the author; arrangements will then be made to have orbital information sent to these DX stations directly. In addition, foreign societies in countries have stations suitably equipped to attempt Echo reflection can be supplied with predictions in a form suitable for transmission over the societies' own headquarters stations. The predictions will be based on information supplied by NASA.

If schedules are arranged and efficient operating techniques employed, it should not be neces-

sary to follow the satellite across the sky with a continuously-moving antenna. K2LMG has calculated that at typical long-range distances the satellite will take long enough to pass through the beam of a fixed antenna to permit two-way transmission and reception of the information required by ARRL for WAS credit, if techniques normally employed for meteor-scatter communication are used.

As an aid in acquiring the satellite and in lining up antennas, two beacon transmitters have been placed aboard, at 136.1702 and 136.1738 Mc., each putting out a steady carrier. You will not be able to hear both at once, but they are close enough in frequency to permit reception within a single properly adjusted receiver pass band. Antenna and converter details, supplied by W1HDQ, may be found on page 15 of April 1962 QST.

### June Tests

In cooperation with the M.I.T. Office of Public Relations, OSSC is also handling the public information phases of the program, and for that reason we will be soliciting direct telephone reports from amateurs who make successful QSOs during the June sub-orbital test, and within 24 hours after the satellite launching. (We are *not* looking for tracking reports from stations hearing the beacon transmitters.) It is expected that W1AW will carry the details of this as the time approaches.

Inquiries of a general nature concerning either the Echo program or the OSSC organization as a whole should be addressed to the author, who is serving both as chairman of the Echo committee and as director of OSSC. The organization address is Office for Satellite Scatter Coordination, Room 10-206, 77 Massachusetts Ave., Cambridge 39, Mass.<sup>6</sup>

Good luck!

QST

<sup>6</sup> Until September 15, letters to the author should be sent in care of the A.R.R.L. Technical Department, 38 LaSalle Road, West Hartford 7, Conn., for forwarding. — Editor.



W4OWI, who long ago realized what gold was hidden in old TV chassis and how they could be used as an inexpensive source of parts for beginning hams, now points out that a similar situation exists with old auto radios. He says that many of these can be obtained from auto salvage yards for \$5 or \$10 each, and that a simple converter ahead of something like this is an easy way to set yourself up for receiving mobile.

K2DBM reports that while a group of scientists were conducting some experiments involving a cat, a high-gain audio amplifier, an oscilloscope, and various recording electrodes attached to the cat, their efforts were rudely interrupted by the loud voice of an amateur operator. Seems as though there must have been some stray (!) rectification between the electrode and the cat.

# Getting Started in RTTY

## Basic Requirements for Beginners

BY JOHN E. MAGNUSSON,\* W0AGD

**T**HE interest in RTTY increases daily as more and more machines become available. Used machines can be obtained from a number of very reliable societies, as well as through the MARS program, and will cost from \$15 to \$75. These will be page-printing machines, and the cost may also include local servicing, crating and transportation charges. (You can spend considerably more than this amount by buying the machine through a commercial outlet.) By dropping a QSL card to ARRL Headquarters, you can obtain a list of reliable sources of machines.

### Machines

Two popular machines are the Model 26 and the Model 15. The Model 26 is an older machine using a type wheel that is stationary, while the paper moves back and forth behind the type wheel. The Model 15 is a more recent machine, in which the paper and the roller are stationary, while the type carriage moves back and forth in front of the paper. The latter is probably a more familiar machine, as you will see a number of these page printers in television shots of newsrooms, and in your local broadcasting studios as well as in Western Union offices. These machines are gradually being replaced by a newer machine, the Model 28. You will run across fellows on the band who are using the Model 28 machine already. If you would like to obtain a Model 28, I think you will find that the waiting list is relatively long, and the cost is between \$2500 and \$3000.

### Basic Connections

Once you have the machine, it is important to consider what the machine actually does. Studying the wiring harness of the teletype machine may be a little confusing at first, but a large part of the wiring can be ignored. Only six terminals are important. (See Fig. 1.) The first of these is the pair of terminals that require 115-volt 60-cycle a.c. to run the motor, usually controlled

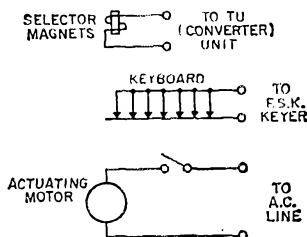


Fig. 1—Basic terminals on an RTTY machine.

Where can I buy an RTTY machine at reasonable cost? What else do I have to have? And how do I connect it up when I get it? These questions and others often heard from potential RTTYers are answered here. Included is the circuit of a simple f.s.k. adapter that can be applied to most transmitters. A second article dealing with tuning aids will follow in a later issue.

by an on-off switch on the machine. The second pair of terminals delivers the impulses from the keyboard contacts to the transmitter keying system. The last two terminals receive the impulses, from the receiving equipment, that energize the printer magnets which control the typing mechanism.

### Local Operation

After you receive your machine, about the first thing you do is hook it up in a d.c. loop to see if you can type. In both of the previously-mentioned machines we have selector magnets, and either machine can be operated without a polar relay. (Some proponents of RTTY highly endorse the use of a polar relay, whereas others of us prefer to use neutral operation, because we feel that the printer magnets are a better filter than a polar relay. Articles on terminal units deal with both types of operation.) Fig. 2 shows how you can connect up the machine to practice sending to yourself. In effect, you have the equivalent of an electric typewriter. This requires a small d.c. power supply, capable of delivering either 20 or 60 ma. at 120 volts. The power supply is connected in series with the keyboard terminals and the printer terminals. In both the Model 26 and the Model 15 machines the printer selector magnets can be operated on either a 20- or 60-ma. d.c. loop, depending on whether the two coils of the selector magnet are connected in parallel or in series. Some machines have a switch with a lock tab that makes it convenient to switch from series to parallel operation. Normally, the equipment is operated on a 60-ma. loop, whether you use "polar" — a relay-controlled source to the printer selector magnet — or "neutral," where the selector magnets are connected directly into a vacuum-tube circuit.

Now, when you press a key on the keyboard, the motor turns the mechanism one complete revolution. (We won't go into the details of

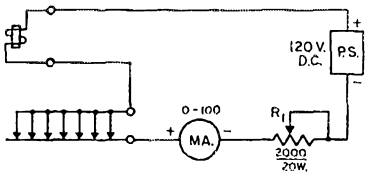


Fig. 2—This circuit permits you to operate your printer from your own keyboard to gain experience.  $R_1$  is a slider-type adjustable resistor adjusted for a magnet current of 20 ma. or 60 ma. as required.

machine functions and operations, as that would require a lengthy discourse in itself.) The device that is actuated by the keyboard is essentially the same as an electrical distributor that you find in an automobile. When you press the key, the result is either the presence of, or the absence of, an impulse during various portions of the complete revolution or cycle, much in the same manner as we send International Morse code by the use of short and long impulses at a definite rhythmic rate. In addition, in order to synchronize the machines at opposite ends of the circuit, it is important to have a starting pulse and a stop pulse.

Experimenting with the equipment on a d.c. loop, as shown in Fig. 2, will be time well spent, as you can actually see the mechanical operation of the equipment and develop good operating habits. At the end of each line, be sure to hit the carriage return twice, line feed once, and letters twice. This allows the machine at the opposite end of the circuit to perform these functions more positively in the event there should be a slight fading of the signal. There is nothing more discouraging than to walk over to the machine and find that it is sitting at the end of the line and making a big black glob out of perfectly intelligible copy.

A frustrating fact, in comparison with a typewriter, is that you cannot back space to make corrections without running to the end of the line and sitting on the space bar until you get back to the point that you wish to overstrike. You will soon agree that this would be impractical in communications, so the standard procedure is usually to make two or three Xs, and then start over and type the word correctly.

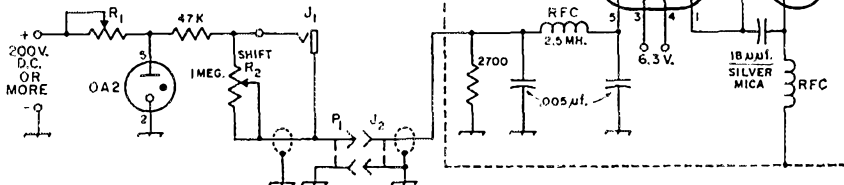


Fig. 3—Circuit of the f.s.k. adapter. Resistances are in ohms and fixed resistors are  $\frac{1}{2}$ -watt.

- $J_1$ —Open-circuit jack (must be insulated from ground).
- $J_2$ —Phono jack.
- $P_1$ —Phono plug.
- $R_1$ —Adjust value to keep VR tube just ignited with key closed (approx. 50 ohms per volt in excess of 150 volts).

### Receiving

Once you get the feel of the machine on a d.c. loop, the urge will become greater to build a receiving converter, to receive signals off the air. Only the two printer selector-magnet terminals are involved, and these can be connected to a commercially-available terminal unit, as it is called, or you can build a terminal unit as outlined in a number of periodicals.<sup>1</sup>

With the receiver audio output connected through the terminal unit, and the terminal unit connected to the printer magnets, you have one half of an RTTY station. You are now able to copy signals in the amateur bands as well as the commercial teletype circuits. A tuning indicator, which will be described in a second article, is almost essential until you develop an ear for the two tones that will be emanating from the speaker. Even after you become a veteran RTTY operator, you will find it more convenient to use a scope than to go by ear. First of all, a scope tells you whether or not the signal is right side up or inverted, and lets you tell at a glance if you have tuned too high or too low. It also gives you a monitor on the amount of shifting, so you can easily tell if the received signal is being shifted too much or if the station is using narrower than normal shift. At the present time, the standard shift is 850 cycles (FCC allows a maximum shift of 900 cycles). You will, on occasion, find stations experimenting with considerably narrower shifts.

### An F.S.K. Unit

After you have the terminal unit constructed and operating satisfactorily, the urge becomes greater to modify the transmitter so as to begin

<sup>1</sup> *The Radio Amateur's Handbook*, 1958 ed. et seq. *The Radio Amateur's RTTY Handbook*. Kretzman, "An Improved Radioteletype Converter," *CQ*, April, 1958. McCoy, "Radioteletype Conversion From Receiver I.F.," *QST*, January, 1960. McCoy, "Radioteletype Reception by Tone Conversion," *QST*, December, 1960. RTTY Col., *CQ*, March, 1961.

$R_2$ —Carbon control, linear taper.  
 Note: Cathode connection to enclosed v.f.o. tubes in Viking transmitters is available at Terminal 6 of SW-1 in the Ranger, Valiant and Navigator; Terminal 6 of SW-101 in the "500;" Terminal 2 of SW-7 in the Pacemaker; and Terminal 5 of SW-50 in the Model 122 v.f.o.

full RTTY operation. Fig. 3 shows a very simple arrangement to provide frequency-shift keying in a variety of commercially-available transmitters. Any v.f.o. that uses a Clapp oscillator can be modified in this manner to provide f.s.k. control. This arrangement has three distinct advantages: (1) You don't have to deface the equipment. (2) The voltage across the keyboard contacts is great enough to burn off any machine oil that could cause intermittent operation or misprints. (3) Last, but not least, the shift is right side up for normal f.s.k. operation.

The 6AL5 is nothing more than an electronic switch; a high-priced relay could be equally well controlled by the keyboard. The tube, when it conducts, connects the 18- $\mu$ mf. capacitor to ground. This automatically shifts the frequency of the v.f.o. to a lower frequency. The potentiometer allows you to control the amount of shift. This is important in any transmitter where you do not use the same v.f.o. frequency on all bands of operation or if frequency multiplying takes place after the v.f.o. If you have to double from the v.f.o. frequency to the operating frequency, it becomes necessary to reduce the shift to one half because the amount of shift will be doubled also. For instance, in the Ranger transmitter, if you are operating 10 meters, you would use one-fourth the normal shift that you would use on 40 meters, as the equipment is operating on the fourth harmonic of the v.f.o., and the shift would be automatically increased four times.

If this reactance shift is used in s.s.b. transmitters, the shift remains the same on all bands of operation, because the mixing provisions in the exciter result in no change in the degree of shift with change in the band of operation.

At this point, you might well ask how is all this accomplished with two tones. Originally, as we began the discussion, we referred to a closed circuit. In the closed circuit there was either the presence of current flowing through the line, or the absence of current that made up the code combination for each figure or letter available on the machine. This presence or absence of information from the keyboard is transformed into one of two tones by the f.s.k. network. The amount of shift would not be a serious consideration, except that it is well to standardize on one value around which all the equipment is built to simplify tuning operations. The two signals have been named "mark" and "space" and, according to present standards, the frequencies are 2125 and 2975 c.p.s., giving a separation or shift of 850 cycles.

As the transmitter transmits these two different frequencies in a sequence following the intelligence transmitted by the keyboard, the receiver picks up this same information and through the application of the receiver beat-frequency oscillator, we hear two distinct audio tones in the receiver output. These two tones are now demodulated, so to speak, by the terminal unit so as to present the same type of signal to the printer magnet as it would normally see if it were connected in the d.c. loop discussed earlier.

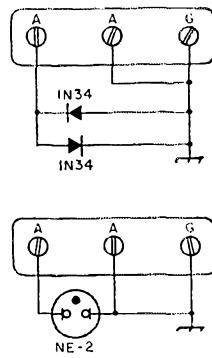


Fig. 4—Two methods of preventing receiver overload when monitoring local RTTY signal.

To check out the system when you first begin, connect the two keyboard contacts to the f.s.k. unit. With only the exciter on, and the receiver connected to the terminal unit, and the terminal unit connected to the printer, you should be able to send to yourself from your own transmitter through the receiver and obtain copy. Once you have your shift set and you are satisfied that the system is adjusted and operating properly, it is time to get on the air and give RTTY a try.

In my own case, even using a full kw. on f.s.k., I monitor myself through the receiver and the converter, or terminal unit, into the printer. This is a little awkward in that you must always operate on the same frequency as the calling station. Two diodes were connected back-to-back across the input terminals of the receiver to limit the amount of voltage to the receiver to a reasonable level, as shown in Fig. 4.

At the outset, all of this may sound extremely complicated, but as you obtain more and more experience with the mechanics of the machine, as well as with the electronics of the transmitting and receiving equipment, you slowly begin to realize that RTTY is essentially very simple. It is also extremely fascinating, and has lured some very devoted c.w., s.s.b. and a.m. men in both high-frequency and v.h.f. bands in the past ten years. And I am confident that you will find it equally attractive and challenging. As yet, there is a limited amount of commercial equipment available to be used as the receiving converter or terminal unit. I think it is reasonable to say that in the next few years we will find a gradual increase in the number of commercially-available equipments that can be used. If you enjoy building your own equipment, then this should be just the ticket for you, and many very relaxing and satisfying experiences lie in store for you.

It is also important to consider that one should join one of the active RTTY societies, so as to obtain latest information on equipment available, the people who wish to trade equipment, new techniques developed among other amateurs for the reception and transmission of RTTY, as well as news of interest around the country among other active RTTY operators. As the saying goes, "See you on the green keys." **QST**

# 1962 ARRL Field Day Rules

## Annual Test for Emergency-Powered Stations, June 23-24

### FIELD DAY TIMETABLE

Time	Start	End
	June 23	June 24
GMT	2100	2400

(Operate no more than 24 consecutive hours out of the total 27-hour period)

**G**ET ready for Field Day, June 23-24. Thousands of amateurs in the ARRL Field Organization are busily readying generators, planning operating schedules, allocating assignments and otherwise impatiently awaiting this official radio-amateur way to start the summer season.

With emergency preparedness the theme, clubs and groups will take to the field and set up and operate stations independent of normal power facilities. You can participate with a club or non-club group portable; one- or two-man portable station; mobile; emergency powered home station or as a regularly powered home station. Whatever your class of participation, you're sure to gain valuable operating experience under atypical conditions as well as have a grand time.

The rules and entry classifications are unchanged from last year. Pick any consecutive 24-hour period from the Field Day timetable. To raise contacts call "CQ FD" on c.w. or "calling any Field Day station" on phone; then swap signal reports and ARRL sections or specific locations.

Here are examples to assist score calculations:

#### Example 1

Assume a 25-watt rig wholly on batteries, not originating or relaying any messages, and not having more than two operators.

40 points (40 stations worked)  
 $\times 3$  (power below 30 watts)  
 -----  
 120  
 $\times 3$  (all radio equipment independent of commercial mains)  
 -----  
 360  
 $\times 1.5$  (If Class B or C and everything on batteries)  
 -----  
 540 claimed score

#### Example 2

Same as Example 1 but one Field Day Message to the SEC or SCM is originated and passed in good form.

65 points (40 QSOs + 25 points for FD message)  
 $\times 9$  ( $3 \times 3$  - power multiplier multiplied by independence-of-mains multiplier)  
 -----  
 585  
 $\times 1.5$  (everything on batteries)  
 -----  
 877.5 claimed score  
 (Copies of all messages originated and relayed must accompany Field Day reports.)

#### Example 3

The Podunk Hollow Radio Club (or any group of three or more licensed operators), portable at its FD site, operates two transmitters simultaneously. Each rig runs 75 watts input and batteries or generators furnish power. One message is started in good form (25 points), 1 is received and relayed onward (2 points), and 230 stations are contacted.

257 points (230 QSOs + 25 + 2)  
 $\times 2$  (power input over 30 and under 150 watts)  
 -----  
 514  
 $\times 3$  (all gear independent of mains)  
 -----

1542 claimed score

(No battery multiplier for either clubs or groups.)

Mobiles are an important part of Field Day too, and clubs should strive to get all member-owned mobile units on the air during Field Day and report their mobile scores for the mobile aggregate scores to appear in the final results. Mobile units are the key to any emergency communication.

Log forms and summary sheets are now available on request from ARRL. Your best bet is to send for some, but the sooner the better. You may also use the summary on the next page, or prepare a facsimile. All reports should include starting and ending time of operation, bands used, dates and contact times, calls of stations worked, signal reports sent and received, and locations of stations worked, as well as power sources and inputs, location and call of station, number of transmitters in simultaneous operation, number of persons participating, club name (if any), and score computations. Results must be postmarked no later than July 23 for listing in *QST*.

Portable stations are reminded to be sure they comply with FCC regs in signing portable. C.w. stations follow their calls with a slant bar followed by the numeral of the area in which they are operating; phone stations follow their calls with their geographical location. See Sec. 12.82 2(b) of the Amateur rules for details (in License Manual).

Check these FD rules, which follow below, very carefully; a scan of last year's FD results (November 1961, *QST*) may give you some hints.

### Rules

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

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

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

**4. Entry Classification:** All entries will be classified according to number of transmitters in simultaneous operation. They will be further classified as follows: "A," club or nonclub group portable stations; "B," unit or individual portable stations; "C," mobile stations; "D," home stations

operating from emergency power; "K" stations operating from commercial power sources. Thus a club or group running three transmitters simultaneously will be in the 3A classification, or a mobile station with one transmitter will be in the 1C classification.

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

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

**Unit or individual participation** is that portable-station work accomplished by either one or two licensed operators.

**Mobile stations** are complete installations including power source and antenna, mounted in or on vehicles and capable of being used while in normal motion. If they utilize antenna supports not normal or suitable for use during motion, installations must be classified as portable instead of mobile. Each mobile entry call must be different from any other FD station participating.

**Home station participation** is that work by fixed amateur stations not operating portable or mobile.

A transmitter used to contact one or more stations may not subsequently be used under more than one other station call during the Field Day period.

**5. Field Day Period:** All contacts must be made during the period indicated elsewhere in this announcement. An entry may be operated no more than 24 consecutive hours of the 27 hours available.

**6. Bands:** Each phone and c.w. band is regarded as a separate band. The following (and additional u.h.f.-s.h.f. bands) constitute separate bands: A1: 1.800-1.825 "east" or 1.975-2.000 "west," 3.5-4.0, 7.0-7.3, 14.0-14.35, 21.0-21.45, 28.0-29.7, 50-54 and 144-148 Mc. A2, radio-teletype and frequency-shift keying are grouped with A1, in the bands where they are allowed. A3: 1.800-1.825 "east" or 1.975-2.000 "west," 3.8-4.0, 7.2-7.3, 14.2-14.35, 21.25-21.45, 28.5-29.7, 50.1-54, and 144-147.9 Mc. All forms of voice transmission will be grouped with A3, in the bands where they are allowed. (In Canada the respective phone bands apply.)

The use of more than one transmitter at one time in the same band is not allowed.

**7. Exchanges:** Signal reports and ARRL section (or specific location) must be exchanged in proof of contact.

**8. Valid Contacts:** In Class A, B and C, a valid contact is a complete exchange with any amateur station. In Classes D and E, a valid contact is a completed exchange with any station in Class A, B or C. Cross-band contacts are not allowed. Contacts by mobile stations may be made in motion or from any location(s). A station may be worked more than once only if the additional contacts are made on different bands.

**9. Field Day Message:** A Field Day Message is one originated by a Class A, B, or C station and addressed to the

SEC or SCM (see address in QST, p. 6) stating the number of operators, the field location, and the number of ARRL members at the Field Day station. Only one Field Day Message may be originated.

**10. Scoring:**

**Points:** Each valid contact counts 1 point.

**Message Credit:** Credit for handling messages may be obtained only as follows: 25 points for originating one Field Day Message to SEC or SCM. In addition, each Field Day Message received for relay will score 1 point when received by radio and 1 point when sent onward by radio. No FD Message may pass through the same station twice. There will be a deduction of 10 points for omission of handling data or for defects in form. Copies of all messages originated and relayed must accompany Field Day reports.

**Multippliers:**

**Power:** Output-stage plate input 30 watts or less: 3. Output-stage plate input between 30 and 150 watts: 2. Output-stage plate input between 150 and 1000 watts: 1. The plate input of a grounded-grid amplifier is its plate input plus the plate input to the driver stage.

**Independence-of-Mains:** All radio equipment independent of commercial power source: 3. All radio equipment not independent of commercial power: 1.

**Battery Power:** (applies to Class B and C only): 1.5. The battery capacity or size shall in all cases be adequate to permit one hour's continuous operation of the station. Charging batteries from commercial mains while batteries are connected to transmitter or receiver voids the "independence-of-mains" and "battery power" multipliers.

Multipliers do not apply to Class D and E entries.

**Final Score:** The final score equals the total "points" multiplied by the "power multiplier" multiplied by the "in-

(Continued on page 146)

# ARRL FIELD DAY SUMMARY

STATION CALL..... FD LOCATION.....  
 (Indicate / where applicable)

CLASS OF ENTRY (check only one) ENTER NUMBER OF

A. Club or group portable. TRANSMITTERS IN

B. Unit or individual portable. SIMULTANEOUS OPERATION

C. Mobile IN THIS BOX:

D. Home -- Emergency power. [ ]

E. Home -- Commercial power.

If club entry, name of club.....

If Class B entry, call(s) of operator(s).....

Number of people participating at this station.....

Period of FD operation: Starting time..... Ending time.....

POWER SOURCE (check)

Generator.  Commercial Mains.  Battery.  Other.

Description of power source (generator type etc.).....

Bands	Nr. stns. worked	Multiplier	Score	Transmitter	Input
3.5 Mc. CW		X			
3.5 Mc. A3		X			
7 Mc. CW		X			
7 Mc. A3		X			
14 Mc. CW		X			
14 Mc. A3		X			
		X			
		X			
		X			
FD message points	2				
		X			
	1				
TOTALS		X	CLAIMED SCORE	Enter total number of stations worked here (should equal box 1 minus box 2)	

Entries must be accompanied by this summary sheet. You may obtain the summary shown here plus log forms free on request from ARRL. Or you may use the very one shown here or prepare a facsimile. Attach logs of all Field Day contacts and copies of all messages originated and relayed with your entry.

This certifies that the station whose call appears above was operated in accordance with the current Field Day rules and that, to the best of my knowledge, the points and score as set forth in the above summary are correct and true.

.....  
 (Date)

.....  
 (Signature of club secretary or licensee of station whose activities covered in this FD entry)

# • Beginner and Novice

*The Novice likes to look ahead a little — to operating in any ham band, to more power, to v.f.o. — in short, to his "Generalship." This transmitter has that "look-ahead" design — five bands, 150 watts input — but complies with all Novice requirements in the meantime. Based on TV-receiver salvage, it's an economical set to build.*

## 80 Through 10 Meters Using a Pair of 6GJ5s

BY LEWIS G. McCOY,\* W1ICP

### A "Novice Gallon" or General 150-Watter

THIS article describes the construction of a transmitter capable of 150 watts input on c.w. and 120 watts for plate-modulated a.m. phone. Recent articles have demonstrated the appeal of using components scrounged from old TV sets, and this same idea was followed in this rig. In addition, the two amplifier tubes, 6GJ5s, are medium-priced (about \$2.00 each) tubes designed for use as horizontal sweep amplifiers in color TV sets. They work very well as r.f. amplifiers.

Novices, 150 watts input is more than you are permitted, but it is a simple matter to reduce the loading to the legal input. Then when you graduate to the General Class you will have a transmitter capable of phone or c.w. work at a higher input.

The transmitter covers the bands from 80 through 10 meters, and is crystal controlled, with provision for v.f.o. input.

#### Circuit Details

The circuit as shown in Fig. 1 is set up for c.w. work only. It was felt that some amateurs would not be interested in a modulator, so the rig can be built as shown and the modulator added if desired. The modulator and its incorporation into the rig will be treated in a later issue.

The first stage is a 5763 oscillator in which either 80- or 40-meter crystals can be used, depending on the output frequency. The oscillator circuit is of the electron-coupled grid-plate type with an adjustable feedback control,  $C_1$ . The plate circuit of the 5763 uses slug-tuned coils when operating on 20, 15 and 10. With the switch in the 80- and 40-meter positions, the combination of  $L_1$ ,  $L_2$  and  $L_3$  is resonant in the 40-meter band. When using an 80-meter crystal for 80-meter output, there is adequate excitation to the following stage even though circuit is not resonant on 80.

Output from the oscillator drives a 5763 buffer/

\* Technical Assistant, QST.

multiplier. Its plate circuit is tuned to each band.  $S_3$  is a two-section switch, switching both the oscillator and buffer tank circuits as required. The amount of drive from the multiplier can be controlled by varying the screen voltage on  $V_2$  with the potentiometer  $R_1$ .

The amplifier is neutralized to prevent self-oscillation. In addition, parasitic suppression precautions are taken by using 10-ohm resistors in the grid leads and  $L_6$  and  $L_7$  in the plate leads. The tank circuit of the amplifier is a pi-network consisting of  $C_4$ ,  $L_8$ , and  $C_5$ . Band changing is accomplished by shorting out turns on  $L_8$  with  $S_4$ . The tank circuit is designed to work into 50- to 70-ohm loads.

An 80-meter crystal is used for operation on 80, 40, and 20. A 40-meter crystal can be used for work on 40, 20, 15 and 10.

The supply for the screens of the oscillator and amplifier is regulated at 150 volts by use of an 0D3. Regulating the oscillator screen voltage insures better keying characteristics. The transmitter is keyed by opening the cathodes of the oscillator and amplifier tubes. The buffer stage is not keyed, but is cathode-biased for protection when there is no excitation to the stage.  $S_2$  is a double-pole switch with one pole connected to the keying line. In the event the transmitter is not used for break-in c.w.,  $S_2$  can be used as a transmit-standby switch. The other arm of  $S_2$  is used to control 115 volts a.c. for an externally-mounted antenna changeover relay.

For tune-up purposes, the screens of the amplifier tubes can be grounded with  $S_6$ . There is still enough plate current flowing in the amplifier with the screens grounded to give sufficient indication for tuning up.

#### Metering

A 0-1 milliammeter with shunt scale multipliers is used for metering the various stages in the rig. In the first position of  $S_5$  plate current of the buffer stage can be read. The full-scale reading is



100 ma. In the second position a full-scale reading of 20 ma. is used for reading amplifier grid current. The third position is left blank for later use in checking modulator current. The fourth position, full scale 400 ma., monitors the amplifier plate current. In the fifth and last position the meter is connected to read the high voltage with a full scale of 1000 volts.

### Power Supply

As mentioned before, costs are held down by using parts obtained from an old TV set. The biggest saving here is represented by the power transformer  $T_1$  and the choke  $L_{10}$ . The rectifier circuit is a bridge using a pair of 6DE4s and a 5U4. The choke-input filter consists of  $L_{10}$  and two 40- $\mu$ f. electrolytic capacitors connected in series for adequate voltage rating. Two 20,000-ohm, 10-watt resistors connected in series across the two electrolytics serve the dual purpose of providing the correct voltage division across the two capacitors and also as a bleeder resistor for the high-voltage line.

The low voltage is taken from the center tap of  $T_1$ . It also uses a choke-input filter,  $L_9C_9$ .

The a.c. line is fused with 115-volt, 5-ampere fuses. These mount in a fused-type 115-volt line plug.

### Construction

The complete transmitter is built on a  $3 \times 12 \times 17$ -inch aluminum chassis, with an aluminum front panel measuring 9 by 12 inches. Before attempting construction the photographs should be carefully studied. While layout is not particularly critical, it is a good idea to follow the general arrangement as closely as possible. The power supply and its components are mounted along one side toward the rear of the chassis. All the r.f. section is installed toward the front. One area is left clear to provide room for the modulator.

Considerable time was spent in arriving at a panel arrangement that would be pleasing to the eye while still providing a good electrical arrangement. The oscillator tube socket is mounted near one edge of the chassis and the buffer is near the amplifier tubes.  $S_3$  is positioned below the chassis between the oscillator and buffer. The two slug-tuned coils,  $L_1$  and  $L_2$ , are mounted between the oscillator socket and the rear wafer of  $S_3$  (bottom view). Most of the components on the grid side of the oscillator were mounted on a terminal strip before installing the strip in place. This makes the wiring easier than trying to install the components after the strip is already mounted.

Only one length of the B & W 3016 coil stock is needed to make both  $L_3$  and  $L_5$ . Be careful when cutting the coil into two sections, as it is easy to deform it. One method of cutting the coil stock is to heat a razor blade and slice through the poly support bars.

The multiplier plate capacitor,  $C_2$ , is mounted next to  $S_3$  and is at the exact center of the front of the chassis. This capacitor must not make electrical contact with the chassis, so insulating washers should be used.  $L_5$  is installed just behind



The completed transmitter with all shielding in place. The controls along the bottom, from the left, are the a.c. switch, oscillator/buffer band switch, grid tuning capacitor, level control, tune-up switch, and transmit-standby switch.

Grouped at the upper right are the amplifier band switch and the tuning and loading controls. The meter switch is directly below the meter.

$C_2$  and is cemented to a 1-inch isolantite standoff.  $L_4$  is supported by its own leads and is mounted on the rear wafer of  $S_3$ .

The amplifier tank circuit components are all mounted above deck. The coil assembly is mounted from the panel on 2-inch isolantite standoff insulators. When installing the coil, be sure to allow enough height so that the rotors of  $C_4$  and  $C_5$  will clear the bottom of the coil when they are opened.  $C_5$  is a three-gang t.r.f. type capacitor with the three stators connected in parallel to give a total of about 1200  $\mu$ f.

$S_4$  is mounted on the panel between the two standoffs that support the coil. The parasitic suppressors used in the plates of the 6GJ5s are wound on 1-watt carbon resistors. Any resistor value over 1000 ohms can be used, because the resistors are only used as forms.

The neutralizing capacitor,  $C_3$ , is made from a piece of aluminum  $\frac{1}{2}$  inch wide and  $3\frac{1}{4}$  inches long. The piece is bent to form an L which is  $\frac{3}{4}$  inch long at the bottom. A hole is drilled in the bottom portion and the strip is mounted on a 1-inch standoff insulator. The insulator is positioned between the two amplifier tubes so that the upright  $2\frac{1}{2}$ -inch strip faces toward the plates of the tubes.

The power transformer  $T_1$  and choke  $L_{10}$  were obtained from an old TV set. Nearly all TV transformers have three filament windings, one at 5 volts and two at 6.3 volts. One of the 6.3-volt windings has a current capacity of about one ampere and is used for the high-voltage damper tube in the TV set. We fell into a trap, wiring the rig described here, and encountered a great deal of trouble before finding the reason. Both the 6.3-volt windings on  $T_1$  were examined and the one that appeared to have the heavier leads was used. Unfortunately, it happened that this was the one with the 1-ampere winding. Running the

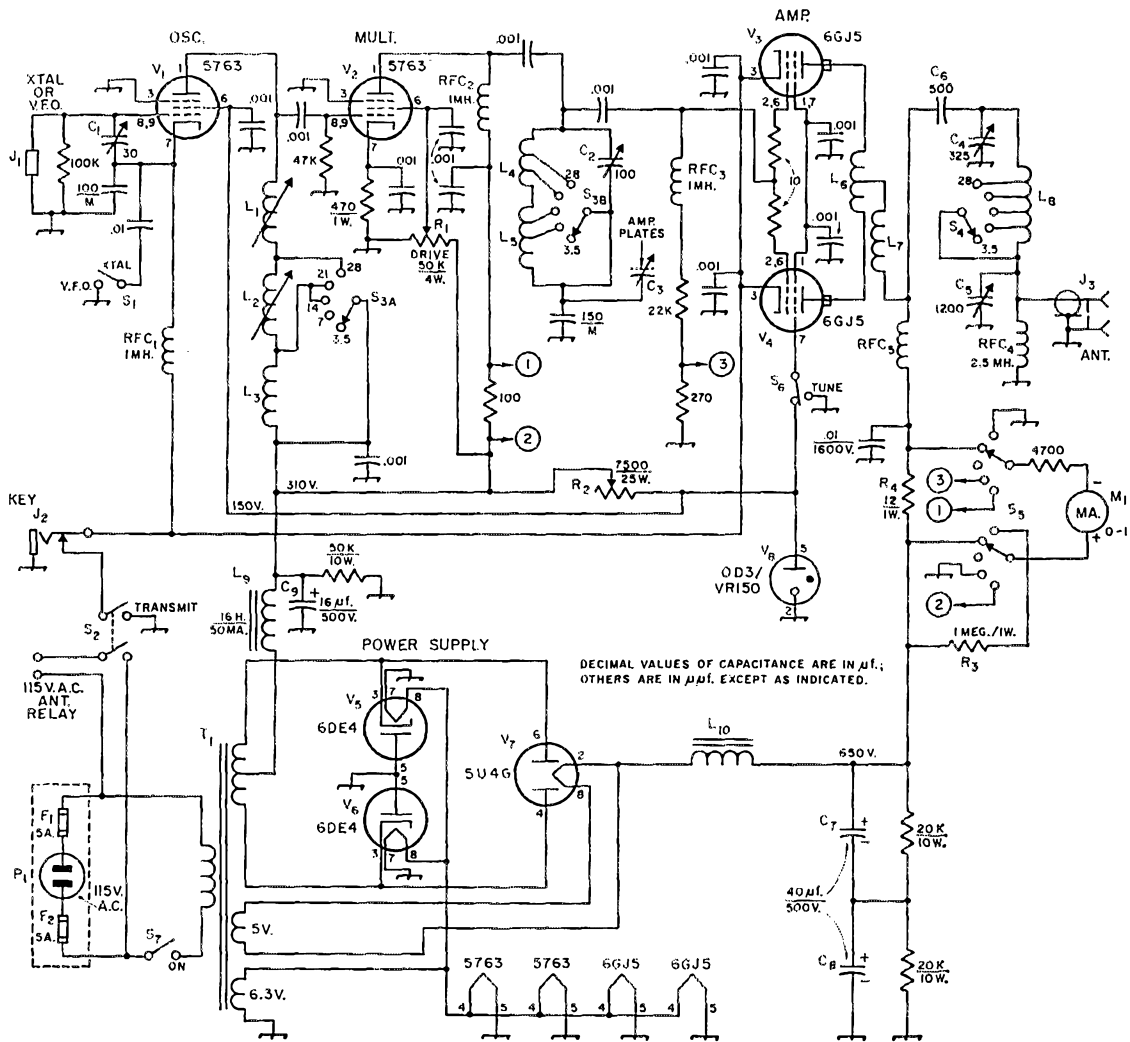
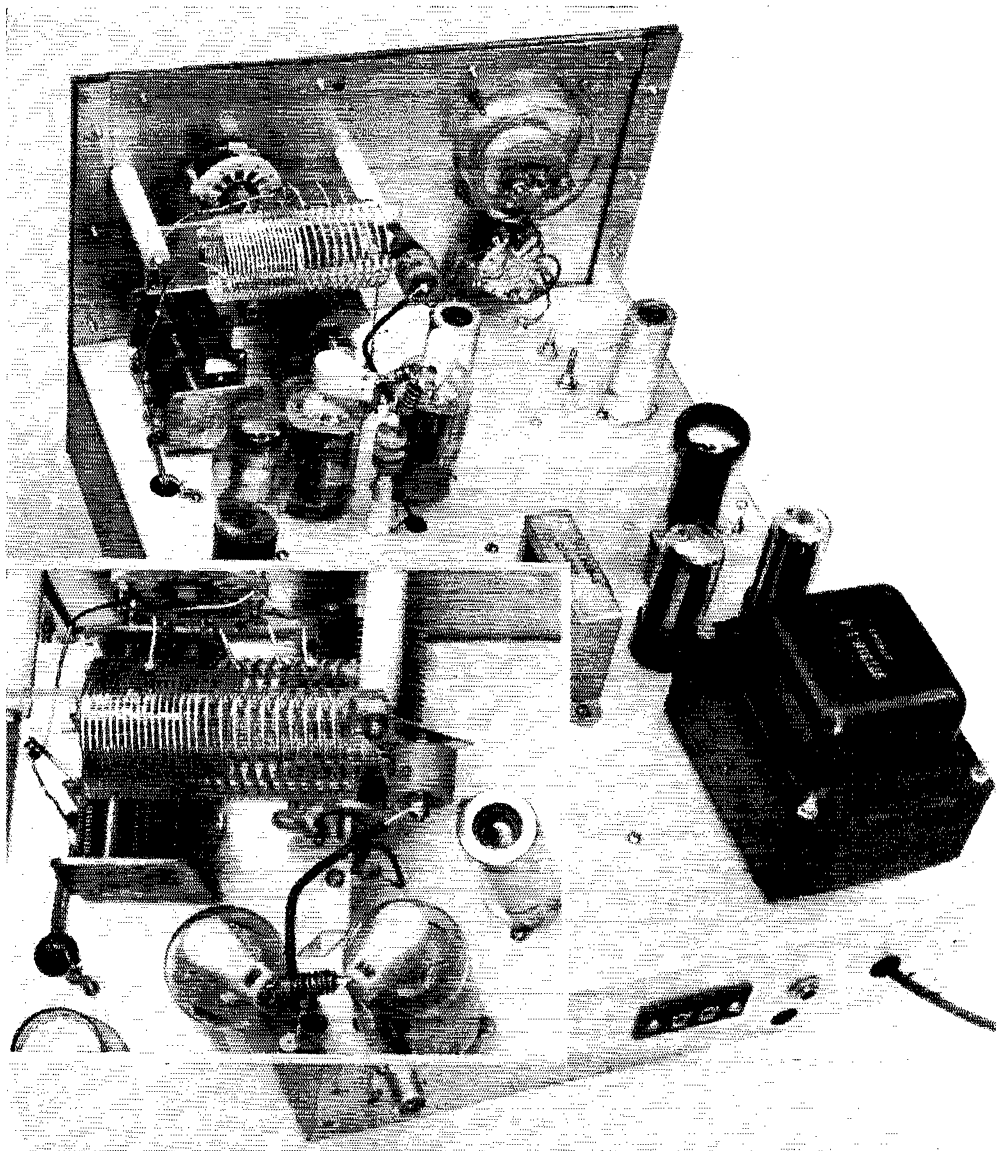


Fig. 1—Circuit diagram of the 150-watt transmitter. Except as indicated, resistors are 1/2-watt composition, fixed capacitors are 1000-volt disk ceramic; M = mica.

- C<sub>1</sub>—3-30- $\mu$ f. trimmer.
- C<sub>2</sub>—100- $\mu$ f. variable (Hammarlund HFA-100A).
- C<sub>3</sub>—See text.
- C<sub>4</sub>—325- $\mu$ f. variable (Hammarlund MC-325M).
- C<sub>5</sub>—3-section variable, 365-400  $\mu$ f. per section, with sections in parallel.
- C<sub>6</sub>—500  $\mu$ f., 20 kv. (from TV set), or 500  $\mu$ f., 3000 volts.
- C<sub>7</sub>, C<sub>8</sub>—40- $\mu$ f., 500-volt electrolytic.
- C<sub>9</sub>—16- $\mu$ f., 450-volt electrolytic.
- F<sub>1</sub>, F<sub>2</sub>—5-amp. type 3AG fuses mounted in fuse-in-plug holder.
- J<sub>1</sub>—Crystal socket.
- J<sub>2</sub>—Key jack, closed circuit.
- J<sub>3</sub>—Coax chassis connector, type SO-239.
- L<sub>1</sub>—L<sub>2</sub>, inc. See coil table.
- L<sub>3</sub>—16 hy., 50 ma. (Stancor C-1003).
- L<sub>10</sub>—Choke from TV set, approx. 2 hy., 300 ma.
- M<sub>1</sub>—0-1 d.c. milliammeter.
- P<sub>1</sub>—A.c. line plug, fuse-in-plug type.
- R<sub>1</sub>—50,000-ohm, wire-wound control, 4 watts (Mallory M50MPK).
- R<sub>2</sub>—7500 ohms, 25 watts, with slider.
- R<sub>3</sub>—1 megohm, 1 watt, 5 per cent.
- R<sub>4</sub>—12 ohms, 1 watt, 5 per cent.
- RFC<sub>1</sub>, RFC<sub>2</sub>, RFC<sub>3</sub>—1 mh. r.f. choke (Millen 34300-1000, National R50).
- RFC<sub>4</sub>—2.5-mh. r.f. choke (Millen 34103, National R100).
- RFC<sub>5</sub>—1-mh. r.f. choke (National R-300S).
- S<sub>1</sub>, S<sub>7</sub>—S.p.s.t. toggle.
- S<sub>2</sub>—D.p.s.t. toggle.
- S<sub>3</sub>—2-pole, 2-section, 5-position rotary, steatite insulation (Centralab type 2005, Mallory 176C).
- S<sub>4</sub>—1-pole, 5-position rotary, steatite insulation (Centralab 2501).
- S<sub>5</sub>—2-pole, 5-position rotary (Mallory 1215L, Centralab 1405).
- S<sub>6</sub>—S.p.d.t. toggle.
- S<sub>7</sub>—S.p.s.t. toggle.
- T<sub>1</sub>—TV power transformer; see text.



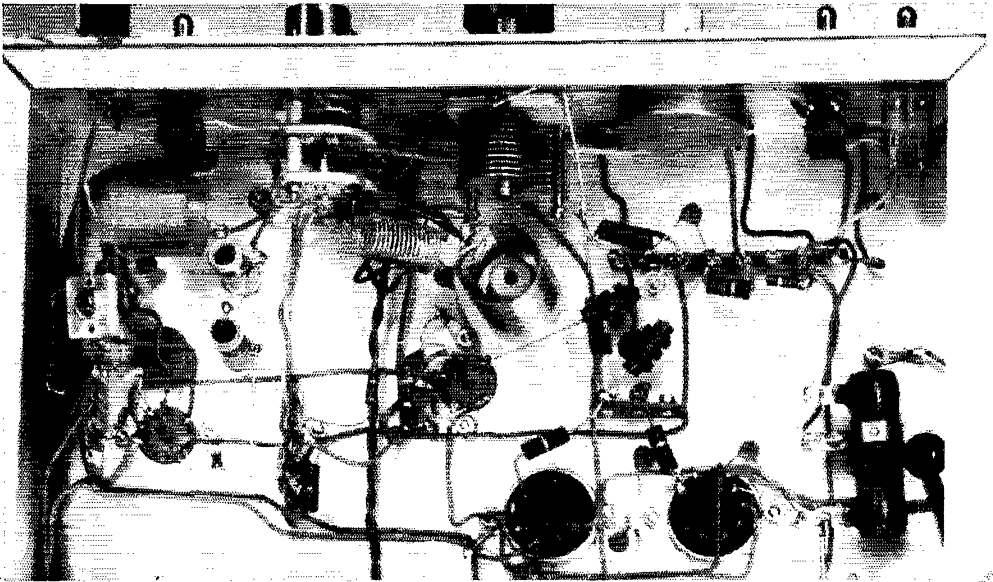
The oscillator tube (in shield) is at the right near the panel in this view. To its left are the two slug adjusting screws for  $L_1$  and  $L_2$ . The buffer tube is partly hidden by the right-hand final-amplifier tube.  $C_6$  is mounted on a small aluminum bracket from one of the standoffs that hold the amplifier tank coil.

The power supply components are mounted along the right-hand side of the chassis. Just visible to the right of the 5U4 rectifier is  $S_1$ , the v.f.o./crystal switch. The two terminals on the rear wall of the chassis are for the a.c. connections to an externally mounted antenna relay. The key jack,  $J_2$ , is to the right of the terminal strip.

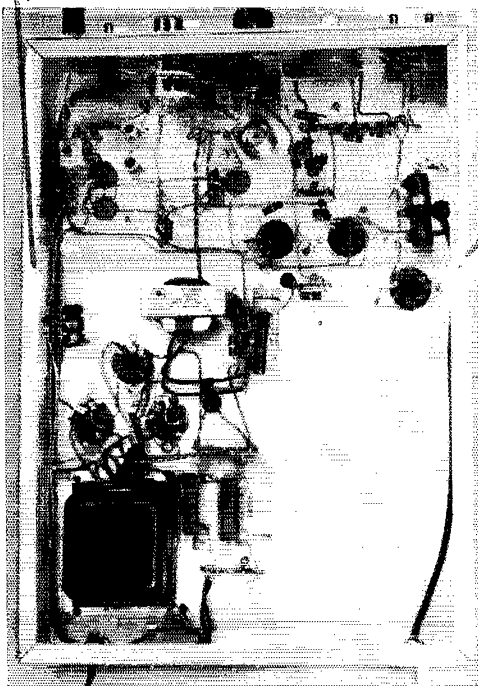
The insert shows the area around the final amplifier tubes. The piece of aluminum which forms  $C_3$  can be seen between the tubes at the lower center of the insert. The area on the main chassis underneath the insert is now blank, but a subsequent article will show that space filled with modulating components.

heaters in the rig from this winding resulted in low output from the amplifier, insufficient excitation, and other problems. After much checking we found that the heater voltage at the tubes was slightly less than 5 volts. Changing to the heavier-current winding cleared up all the trouble.

The plus-B voltages you end up with will, of course, depend on the voltage from your particular power transformer. However, the difference between TV transformers rarely amounts to more than 50 volts one way or the other. In our case the high voltage out of the filter was approximately 800 volts at no load and dropped to 650



The photo above is an enlargement of the area below shown outlined in red. The lower photo shows the entire under-chassis layout of the transmitter. To the right of the power transformer are  $C_7$  and  $C_8$  and the two 20,000-ohm 10-watt resistors. Just above this group are  $L_9$ ,  $C_9$ , and the 50,000-ohm bleeder of the low-voltage supply. The enlargement above shows the detail in the area of the r.f. section. The oscillator components are mounted on a terminal strip at the left side. Nearby is  $L_3$ , mounted between the terminal strip and  $L_2$ , the upper slug-tuned coil in this photo.  $L_1$  is just below  $L_2$ .  $L_4$  is the small coil mounted at an angle from the rear wafer of  $S_1$ .  $C_2$  is at the center of the chassis on the front wall.  $R_1$  is to its right. The large adjustable resistor in the lower right corner of this view is  $R_2$ .



volts with a load of 230 ma. on the amplifiers. Low voltage out of the filter was 310 volts. Letters from builders of previous rigs using old TV transformers have expressed concern over the current-carrying capabilities of such transformers. TV sets are designed for continuous duty and the current drain from the high-voltage winding is usually 300 ma. or more. The average TV transformer can easily handle a 150-watt rig plus a modulator, in intermittent service, without danger of burning out the transformer.

The r.f. portion of the transmitter is shielded by a piece of Reynolds perforated aluminum stock measuring 17 $\frac{1}{4}$  by 30 inches. The extra  $\frac{1}{4}$  inch on the 17-inch dimension is used to hold the piece to the panel. The sheet is bent to form an enclosure measuring 9 inches high and 17 inches long. Strips of aluminum or steel,  $\frac{1}{2}$  inch wide are drilled and tapped and attached to the panel as shown in the rear view. The  $\frac{1}{4}$ -inch lip on the perforated stock is clamped to the panel by these strips. Another section of perforated stock, 6 by 12 inches with a  $\frac{1}{2}$ -inch lip all around, is used for the back wall of the r.f. shield. This piece is secured to the perforated cover and the chassis top with screws and nuts. In the rig shown here, the back portion of the shield is approximately 7 inches from the front panel. A bottom plate on the transmitter completes the shielding.

If you live in an area where the TV signal is weak and you are likely to cause TVI, the meter hole also should be shielded. A shield in the form of a box can be made up from a piece of the perforated stock and used to cover the back of the meter. Make sure the shield doesn't touch the meter terminals.

In order to dress up the appearance of the transmitter, the panel and perforated cover were given several coats of gray acrylic spray paint and then the panel was lettered. We have had

many inquiries from hams asking how we letter our gear. They apparently aren't aware that decalcomanias ("Tekni-Cals") are readily available from radio supply houses. The decals are cut out, wet down, and then applied to the panel. After they have dried, the letters can be "set" by using lacquer thinner.

### Tune-Up and Adjustments

The first step in tuning up the rig is to adjust the oscillator and buffer stages. Before turning on the power, move the slider on  $R_2$  so that the entire 7500 ohms is in the circuit. Use an 80-meter crystal first, turn on the power and let the tubes warm up. Leave  $S_6$  in the tune-up position, the one that grounds the screens of the amplifiers. Put  $S_3$  in the 80-meter position and switch the meter to read amplifier grid current. Tune  $C_2$  for an indication of grid current. Make sure the drive control,  $R_1$ , is set at maximum — arm at the plus-B side of the control.

You'll probably find that the grid drive will be more than enough. Proper operation of the amplifier calls for 2 to 4 ma. This drive can be reduced with  $R_1$ . Change to 40 and make the same check.

If you find that you don't get any grid current indication on either band, check your wiring carefully for errors. You can find out if the oscillator is working by listening for the signal with your receiver. If you have a voltmeter you can check between the grid of the buffer and chassis to see if there is any grid voltage. The voltage should be on the order of — 50 volts. Use an r.f. choke in series with the negative test lead or your test meter will load the circuit, resulting in no grid voltage reading.

After checking on 80 and 40, switch  $S_3$  to the 20-meter position. With  $R_1$  full on, adjust the slug in  $L_2$  to give the maximum grid-current reading. When  $S_3$  is switched to 20 or 15, the plate circuit of the oscillator is peaked on 40 meters with  $L_2$ . The 40-meter drive from the oscillator is fed to the multiplier, which works as a doubler on 20 or a tripler on 15. You can also check the adjustment of  $L_2$  by measuring the grid voltage at the buffer/multiplier. The voltage should be between — 50 and — 100 volts when peaked. In both cases you will probably find that you have more grid drive than needed for the final amplifier. This, of course, can be controlled by  $R_1$ . Only the one adjustment of  $L_2$  is needed for both 20 and 15.

Next, change to a 40-meter crystal and switch  $S_3$  to 28 Mc. Use the same procedure for adjusting  $L_1$ . In this case, the oscillator plate is tuned to 20 and the multiplier works as a doubler. The amplifier grid current on this band should be 2 to 3 ma.

You should now be ready to check the final amplifier and also neutralize the stage. We found that without neutralizing, the amplifier was unstable on some bands. One method of neutralizing is to remove the plate and screen voltage from the amplifier (actually disconnect the plate and screen leads), apply grid drive, set  $C_5$  at maximum capacitance — plates fully meshed — and then turn the amplifier tuning capacitor,  $C_4$ . As you

### Coil Data

- $L_1$  — 3.1 to 6.8  $\mu$ h., slug-tuned (Miller 4405).
  - $L_2$  — 6.7 to 15  $\mu$ h., slug-tuned (Miller 4406).
  - $L_3$  — 32 turns No. 24, 1-inch diam., 32 turns per inch (B & W 3016).
  - $L_4$  — 13 turns No. 20,  $\frac{1}{2}$ -inch diam., 16 turns per inch (B & W Miniductor 3003). 21-Mc. tap 6 $\frac{1}{2}$  turns from junction of  $L_4L_5$ . 28-Mc. tap 10 $\frac{1}{2}$  turns from junction of  $L_4L_5$ .
  - $L_5$  — 46 turns No. 24, 1-inch diam., 32 turns per inch (B & W Miniductor 3016). 7-Mc. tap 17 turns from junction of  $L_4L_5$ . 14-Mc. tap 5 turns from junction of  $L_4L_5$ .
  - $L_6$  — 10 turns No. 18 wound on 1-watt resistor. Tap at center for connection to  $L_7$ .
  - $L_7$  — 4 turns No. 18 wound on 1-watt resistor.
  - $L_8$  — Vari-pitch Air-Dux coil type 1212D6 with 9 turns removed from close-wound (connected to  $C_5$ ) end. All taps counted from plate end of coil. 28-Mc. tap, 2 $\frac{1}{2}$  turns; 21-Mc. tap, 4 $\frac{1}{2}$  turns; 14-Mc. tap, 7 $\frac{1}{2}$  turns; 7-Mc. tap, 18 $\frac{1}{2}$  turns.
- Note: Air-Dux 1212D6 is a single coil with two different winding pitches, with 17 turns at 12 turns per inch and 10 turns at 6 turns per inch. The diameter is 1 $\frac{1}{2}$  inches, wire size No. 14. The 28-, 21-, and 14-Mc. taps are all made on the portion of the coil with 6 turns per inch.

go through resonance you'll notice a "kick" in the meter reading with meter reading amplifier grid current. Adjust  $C_7$  by bending it toward or away from the amplifier tubes, looking for the position that will result in the least kick in the grid-current reading when  $C_4$  goes through resonance. Actually, we found that the setting of  $C_3$  was not critical and the amplifier was neutralized at almost any position of the aluminum strip.

After neutralizing, connect a dummy load to the output terminals of the transmitter. A 100-watt light bulb is OK for this purpose. Set all the controls as you did for the initial tests and tune up for grid drive to the amplifier. Then switch the meter to read amplifier plate current and set  $C_5$  at maximum capacitance. Slowly tune  $C_4$  through its range and you will notice a slight dip at one point, indicating resonance in the amplifier. With  $C_4$  at this setting, switch  $S_5$  to the "operate" position and load up the amplifier by decreasing the capacitance of  $C_5$ . Use the dummy load as an indicator and always readjust  $C_4$  for maximum output after each change in  $C_5$ . With 150 watts input the 100-watt lamp should be at full brightness.

Next, key the transmitter while observing the VR-150 to see if it goes out when the key is closed.

(Continued on page 156)

resistance of  $R_2$  by moving the slider down the resistor. Only go a little at a time and check the VR tube action. When you reach the point where the VR tube stays lit with the amplifier loaded, that is the correct setting of  $R_2$ . If you have a 0-50 milliammeter you can open the ground lead of the VR tube and insert the meter. Adjust  $R_2$  for a no-load reading of 28 to 30 ma.; this will be a satisfactory setting.

In our setup the plate voltage under load was 650 volts at 230 ma. Plate voltage on the oscillator and multiplier was 310 volts. Screen voltage on the multiplier was 220 volts, and on the screens of the oscillator and amplifier, 150 volts. With the exception of the last, these voltages may not be the same with your transformer. A variation of about 10 per cent should not be important.

Using a 40-meter crystal, tune up on 15 or 10 and listen to the keyed signal on your re-

ceiver. Adjust  $C_1$  for best keying characteristics. You only have to adjust  $C_1$  once and then you can forget about it.

In order to keep the input down to the Novice 75-watt level, proceed as follows. Set  $C_5$  at maximum capacitance and resonate the amplifier with  $C_4$ . Gradually bring the loading up by decreasing  $C_5$  and keeping the amplifier in resonance with  $C_4$ . Check the plate voltage reading and, using the standard formula  $P = I \times E$ , adjust the loading (plate current) so that the amplifier runs at the 75-watt maximum for Novice licensees.

If v.f.o. operation is desired, the output from the v.f.o. should be fed into  $J_1$ , with  $S_1$  switched to the v.f.o. position. This grounds the cathode of  $V_1$  through a 0.01- $\mu$ f. capacitor. Tune-up is the same as with crystal input.

A plate modulator for the transmitter will be described in a coming issue of *QST*. QST

## • New Apparatus

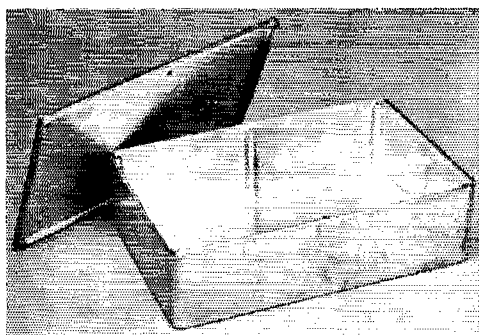
### Eddystone Full-Vision Dial

THE partially-disassembled dial mechanism shown in the photograph is the Eddystone No. 598 dial and drive. The dial escutcheon, which is finished in black crackle, measures 6 inches wide by 4 1/4 inches high (with a 3/64-inch lip) and the dial scale is marked on the perimeter from 0 to 100 over a 180-degree arc. There are four blank spaces for the addition of any other desired scales. Several spare cards are furnished with the dial. The backlash-free ball-bearing drive mechanism is of the epicyclic type with a reduction ratio of about 10 to 1. A ball-bearing driving head, similar to the unit in the left foreground of the photograph but without any pointer, is also available as a separate item (catalog No. 892). A 2 1/4-inch black fluted knob is part of the dial assembly. Input and output shafts are 1/4 inch in diameter. Eddystone products are distributed in the U.S.A. by the British Radio Electronics,

Ltd., 1742 Wisconsin Ave., N.W., Washington 7, D. C.

— E. L. C.

### Eddystone Die-Cast Boxes

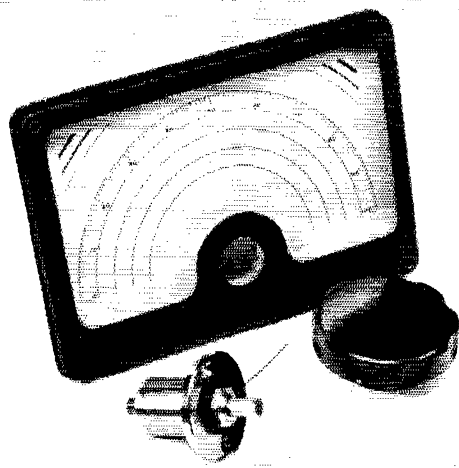


THE accompanying photograph shows a solid substantial box for v.f.o. construction or other applications where mechanical ruggedness and a high order of electrical shielding are desirable. The zinc-alloy die-cast box from Eddystone Works in Great Britain has a close-fitting flanged lid, held in place by counter-sunk screws which are furnished. Three box sizes are available with the following dimensions:

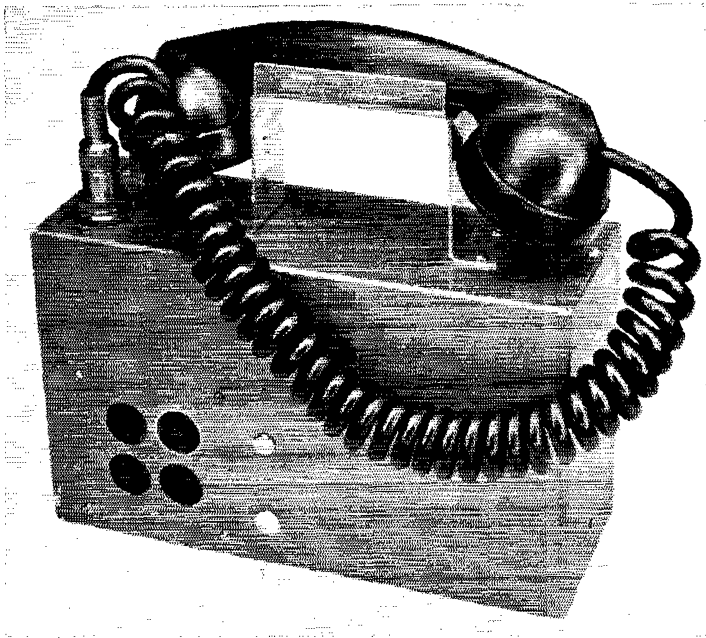
Model	Length (in.)	Width (in.)	Depth (in.)	Weight (oz.)
896	4 7/16	2 7/16	1	11 1/2
650	4 11/16	3 11/16	2 1/16	17 3/4
845	7 3/8	4 11/16	2 1/16	32 1/4

The box shown in the photograph is the Model 845, and its selling price is expected to be about four dollars. Eddystone products are distributed in the U.S.A. by the British Radio Electronics, Ltd., 1742 Wisconsin Ave., N.W., Washington 7, D.C.

— E. L. C.



A transistorized n.b.f.m. handy-talky for six meters with one-fourth watt output and one-half microvolt sensitivity. The circuitry employs 22 transistors and 5 diodes, and features very low receive power drain along with high transmitter efficiency. The unit is built in a  $3\frac{1}{2} \times 6 \times 10$ -inch Minibox and uses a standard mobile handset and an auxiliary  $3\frac{1}{2}$ -inch speaker.



## A Transistor Transceiver for 6 Meters

BY HALFORD R. GREENLEE,\* W3AXF

**I** NTEREST among radio amateurs in transistors has been on the increase as the devices have been developed and improved. However, few hams feel nearly as much at home with transistors as they do with electron tubes, which are slated to become obsolete for most of their present applications. I can almost hear the protests that this last statement will bring forth — “Tubes can do a lot of things transistors can’t” — “What about prices?” — “Transistors are very temperature-sensitive, aren’t they?” These comments would have been appropriate at one time, but transistor development and mass-production along with better understanding of transistor circuit requirements have changed the picture in their favor. In this article, I will try to bring you up to date on a few of the potentialities and applications of transistors in communications.

Let me list a few things about transistors you may not realize:

\* C/o Field Barracks Branch, N.A.S.A., Box 130, Port Canaveral, Fla.

- 1) Transistor life far exceeds that of tubes.
- 2) Transistors will operate effectively in many applications with less than a milliwatt of d.c. power — that is, less than  $1/3000$  the power that the usual tube circuit takes.
- 3) Transistors can be compensated with present techniques to operate from well below zero degrees F. to 150 degrees F. (germanium) or higher (silicon).
- 4) Transistors with low noise figures and good gain at v.h.f. are available at prices amateurs can afford. An example is the Philco 2N1742 which has a noise figure of less than 5 db. at 2 meters.
- 5) Power transistors for v.h.f. are on the way. A Western Electric mesa transistor, the 2N1645, will deliver more than a watt output at 2 meters. A Pacific Semiconductors mesa silicon now available will produce about 2 watts output on 2. Prices on such power transistors are still rather high, but will drop in time.

Perhaps these facts will bring a few possibilities

*Because their power drain is so low, transistors can be used freely in battery-operated equipment — so much so that circuits can be comparable in complexity, and performance, with line-powered tube equipment. The only limitation is transmitter power output — not a serious one in “handy-talky” gear of the type described here.*

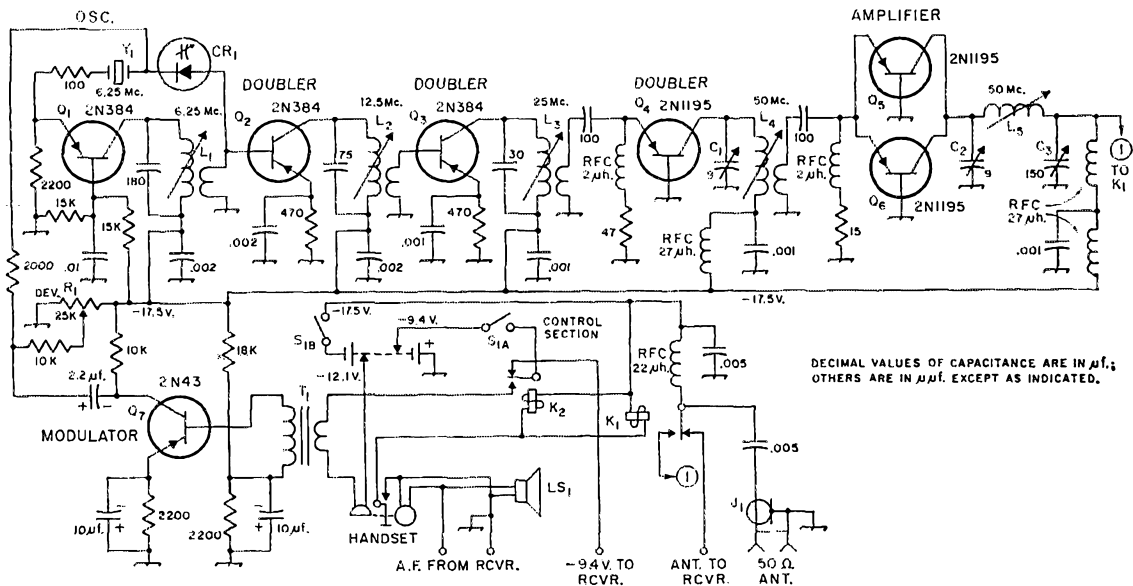


Fig. 1—Circuit diagram of the 50-Mc. transmitter. Unless otherwise specified, fixed resistors are 1/2 watt, resistances are in ohms, capacitors with polarity indicated are low-voltage electrolytic, other fixed capacitors are ceramic.

- BT<sub>1</sub>—13 penlite-size (RM-12R) mercury cells.
- C<sub>1</sub>, C<sub>2</sub>—Ceramic trimmer.
- C<sub>3</sub>—Miniature air variable or compression trimmer.
- CR<sub>1</sub>—Variable-capacitance diode (PSI V-47).
- J<sub>1</sub>—Coaxial connector, chassis mounting.
- K<sub>1</sub>, K<sub>2</sub>—S.p.d.t., 5000-ohm coil (Potter & Brumfield type PW).
- L<sub>1</sub>—35 turns No. 36 enam., close-wound; link 3 turns.
- L<sub>2</sub>—25 turns No. 32 enam., close-wound; link 2 turns.
- L<sub>3</sub>—15 turns No. 28 enam., close-wound; link 2 turns.

- L<sub>4</sub>—8 turns No. 24 enam., close-wound; link 1 turn.
  - L<sub>5</sub>—7 turns No. 24 enam., close-wound.
  - LS<sub>1</sub>—Miniature p.m. speaker, 3 1/2" dia., 3.2-ohm voice coil.
  - R<sub>1</sub>—25,000-ohm control, linear taper.
  - S<sub>1</sub>—D.p.s.t.
  - T<sub>1</sub>—Transistor audio output, 500/50 ohms; high-impedance winding to base of Q<sub>7</sub> (UTC DO-T2).
  - Y<sub>1</sub>—6-Mc. crystal, for desired final operating frequency.
- All coils wound on 3/16-inch diameter iron slug-tuned forms Miller 4300 or equivalent). R.f. chokes are miniature types in EIA inductance values.

for equipment to mind, such as a mobile receiver for s.s.b., a.m. and c.w., with double conversion and high sensitivity, fitting under your dash easily and pulling no more than 10 or 15 milliamperes from the car battery. How about a mobile transmitter with a tube power amplifier, such as a 6146, putting out 50 watts and drawing only 100 watts from the battery? Possibly you would like a very small low-noise converter for 6 or 2 for the car, using only a few milliwatts. My own interest in transistors has been mostly in applying them to portable, hand-held transceivers, pocket receivers and the like, where the low power drains allow small-size components and very compact construction.

The first transistor project I tackled was a 6-meter n.b.f.m. handy-talky. My club, the Anne Arundel Radio Club of Arundel County, Md., has an extensive Civil Defense emergency net; our equipment is commercial f.m. mobile and fixed-station gear, rockbound on the 6-meter band. A compact, dependable handy-talky with high performance and low battery consumption was a much-needed aid to our work, so it seemed a "natural" for a project. The final result was a unit having a highly sensitive, low-drain receiver and an efficient transmitter of 1/4-watt output. (A

high-power version of the transceiver has an additional 2F24 amplifier, transistor power supply, and nickel-cadmium battery. It delivers 15 watts — and it is still very portable.) Below is a description of the circuitry involved, which will perhaps suggest to you circuits of your own.

### 50-Mc. Transmitter

The transmitter uses a 6-Mc. oscillator and doublers to get to 50 Mc., as shown in Fig. 1. The last two stages use germanium mesa transistors in grounded-base configuration. Like grounded-grid tube circuits, grounded-base operation usually offers better stability, but lower gain. It might have been necessary to neutralize the final if grounded-emitter operation had been attempted. Over-all transmitter efficiency runs about 30 per cent.

Notice that only the oscillator and modulator have fixed bias, and all other stages are Class C, being cut off with no drive. For a transistor to run Class A and draw significant current without drive, it is necessary to bias the base toward the collector voltage, as is done in the oscillator. A Class C transistor stage does not usually present temperature problems, other than requiring slightly more drive at lower temperatures. How-



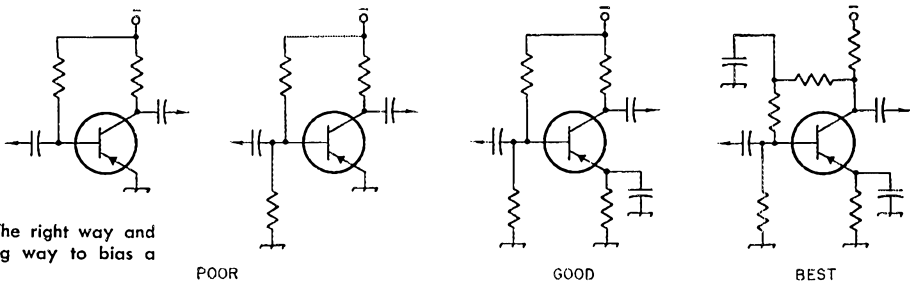


Fig. 2—The right way and the wrong way to bias a transistor.

ever, to stabilize the d.c. operating currents of a Class A stage, certain precautions are necessary. An emitter resistor provides degenerative d.c. feedback and tends to minimize any tendency for the emitter current to change. The larger the value the better, provided the power-supply voltage lost is not excessive. The base should be biased by a voltage divider, which will hold the base voltage fairly constant. Lower divider values increase stability, but waste power, so again a compromise is necessary. Values of all three bias resistors must be designed for the desired collector current. The d.c. bias network is very important. Circuits with poor bias arrangements such as shown in Fig. 2 may be very temperature-sensitive and force some builders to decide that the transistor will work at only one temperature.

### Modulator

The modulator consists of an audio amplifier coupled to a variable-capacitor diode. The capacitance of this diode varies from about  $50 \mu\mu\text{f}$ . down to  $2 \mu\mu\text{f}$ . if an applied voltage, in the reverse direction, is varied from a volt or so up to 25 volts. The crystal oscillator is a series-resonant type, and the diode in series with the crystal varies the oscillator frequency a little more than

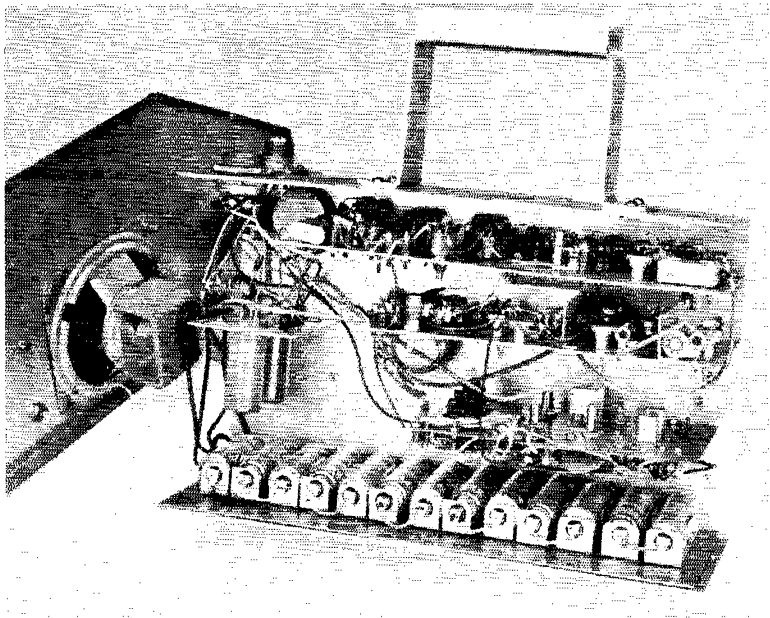
a kilocycle with modulation.  $R_1$  sets the operating point of the diode, and thus the center frequency. Multiplication is necessary to get the 10-ke. swing desired at 50 Mc. An a.m. transmitter could be simpler, having an oscillator, buffer and final plus a modulator for final.

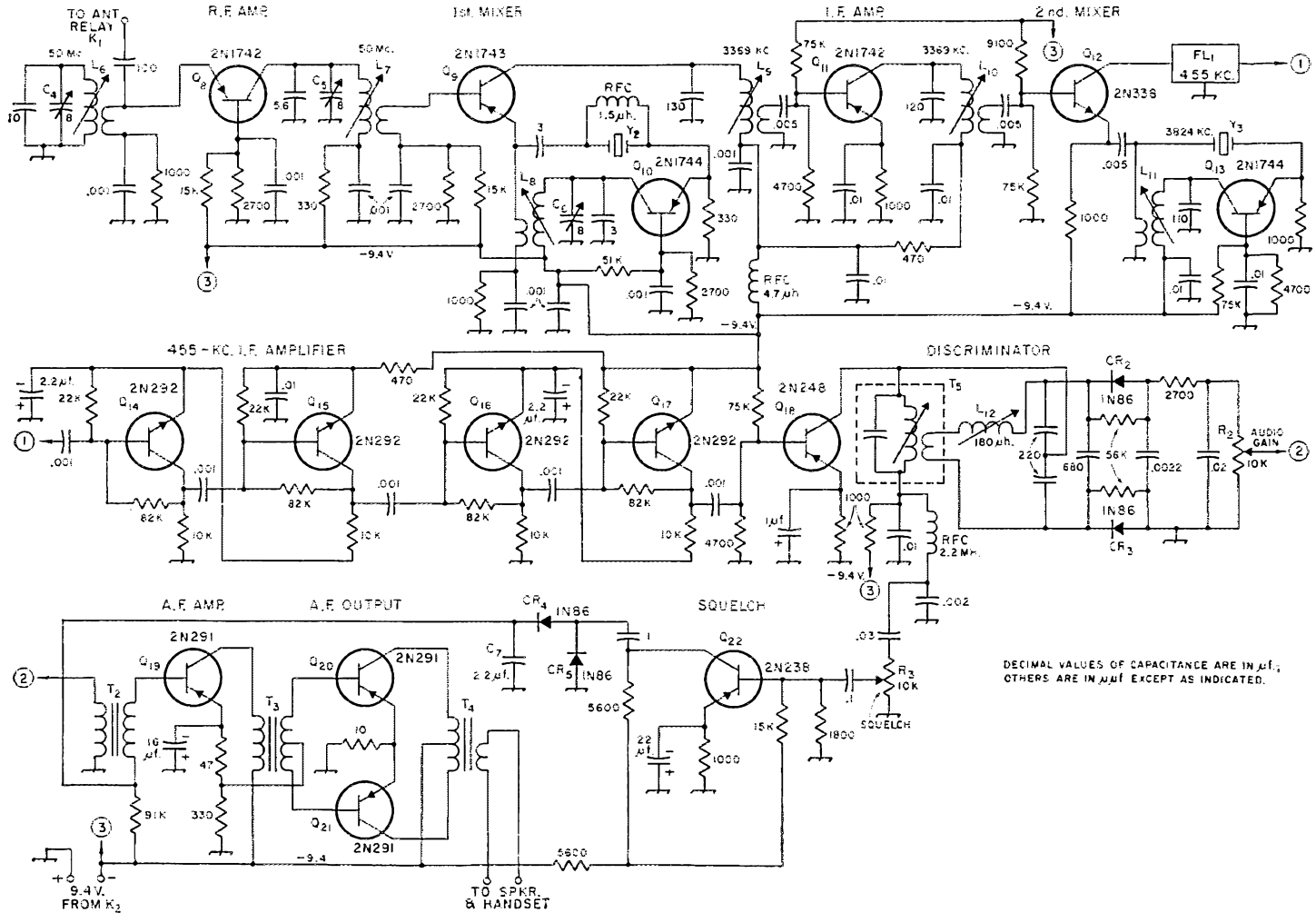
The high-power final (not shown) uses a 2E24, with the quick-heating filament and transistor power supply connected to the battery only on transmit. The battery is a nickel-cadmium 6-volt unit and can deliver the required 40 watts for nearly an hour. Although it is small, about  $4 \times 2 \times 3$  inches, the heavy drain does not damage it, as it would an ordinary lead-acid battery. The  $\frac{1}{4}$ -watt output of the transistor transmitter easily drives the 2E24 to 15 watts output.

### F.M. Receiver

The receiver, Fig. 3, is double-conversion, with intermediate frequencies of 3369 kc. and 455 kc. The low-noise 2N1742-series transistors are used in the front end. They are probably the best h.f. transistor bargain on the market. The r.f. stage is operated grounded-base to avoid having to neutralize it. Front-end noise figure is less than 6 db., giving an f.m. sensitivity of better than

This transceiver is a breadboard model, with no attempt at neat appearance. The top shelf is the transmitter, with the oscillator, doublers and final from left to right. On the second shelf, the receiver r.f. stage is on the right, shielded from the mixer and the antenna circuit. On the left are the high i.f. amplifier, mixer and oscillator. The bottom shelf has the low i.f. on the left, then the squelch and detector driver stages, and the audio on the right. The small shelf on the left holds the switching relays, and the batteries line the bottom of the case. The other half of the box holds only the speaker. The whip antenna mounts directly on the coax jack at the left top.





DECIMAL VALUES OF CAPACITANCE ARE IN μF., OTHERS ARE IN μμF EXCEPT AS INDICATED.

Fig. 3—The f.m. receiver circuit diagram. Unless otherwise specified, fixed resistors are ¼ watt, resistances are in ohms; capacitors with polarity indicated are low-voltage electrolytic, other fixed capacitors are ceramic.

- C<sub>4</sub>, C<sub>5</sub>, C<sub>6</sub>—Ceramic trimmer.  
 C<sub>7</sub>—2.2- $\mu$ f. 3-volt ceramic (Sprague HY-150).  
 FL<sub>1</sub>—455-ke. filter (Motorola Permakay).  
 L<sub>2</sub>, L<sub>7</sub>—8 turns No. 28 enam., close-wound; link 2 turns.  
 L<sub>4</sub>—8 turns No. 28 enam., close-wound; link 1½ turns.  
 L<sub>3</sub>, L<sub>10</sub>, L<sub>11</sub>—60 turns No. 36 enam.; close-wound; link 5 turns.  
 L<sub>12</sub>—One pie from 1-mh. r.f. choke with ⅓ of turns removed.  
 R<sub>2</sub>—10,000-ohm control, audio taper.

- R<sub>3</sub>—10,000-ohm control, linear taper.  
 T<sub>2</sub>, T<sub>3</sub>—Interstage audio, 20,000/800 ohms, c.t. (UTC DO-T23). Use ½ sec. of T<sub>2</sub>.  
 T<sub>4</sub>—Audio output, 640 ohms c.t./3.2 ohms (UTC-DO-T31).  
 T<sub>5</sub>—I.f. transformer, 25,000 to 500 ohms (Argonne AR-60 or equivalent).  
 Y<sub>2</sub>—Approx. 54 Mc., depending on operating frequency selected; 3rd-overtone series type.  
 Y<sub>3</sub>—3824 kc.

20 db. quieting for a ½- $\mu$ v. signal. The first oscillator uses a third-overtone crystal, making frequency multiplication unnecessary. It is coupled to the emitter of the mixer because this minimizes interaction between the oscillator tank and the mixer input circuit.

Although the receiver is crystal-controlled, replacing the front-end crystal with a short will make the oscillator tunable.

The front-end image and spurious-signal rejection was -35 to -40 db. with the circuit shown. When the receiver was used in the vicinity of other-service mobile transmitters, some trouble was encountered with blocking. An improved front end was used later in a pocket receiver which had double-tuned circuits (critically coupled) at the input and output of the first mixer. This increased all spurious signal rejection to -70 db., which is quite adequate although not always necessary. Little selectivity can be supplied by the antenna circuit ( $Q=10$ ), because it must be heavily loaded to avoid losses and reduced sensitivity.

The high-i.f. amplifier, second mixer, and second oscillator are very similar to the front end. The collector circuit of the mixer is connected to a very compact 455-ke. band-pass "Permakay" filter, made by Motorola. It has a 20-ke. useful band pass, a bit wider than necessary, to allow for misalignment and oscillator temperature drift. Better skirt selectivity is available by using subminiature mechanical filters developed by Collins for mobile receivers. The filters cost about \$30.00 and are available in 12-ke. and 32-ke. bandwidths. Clevite also makes an excellent ceramic ladder filter having the best characteristics that I've seen, housed in a tiny case 1½ inches long.

The following low i.f. stages are RC-coupled because they do not require alignment or neutralization and because they make good limiters. Their gain is low, about six times in voltage per stage, but they use less than a milliwatt each. Following the last limiter is a Foster-Secley discriminator using germanium diodes.

The squelch circuit amplifies and rectifies noise in the 15- to 20-ke. region, the resulting filtered d.c. being used to control the first audio stage. When a signal appears in the i.f. pass band, the front-end noise is quieted and the audio turned on. The first-audio stage also acts as a d.c. amplifier to turn on the Class B output stage. Audio output is 100 milliwatts to the four-inch speaker. This is sufficient volume for all but the noisiest surroundings. An a.m. receiver could be very

similar to this one, with the addition of a.g.c. circuits and substitution of a diode detector for the discriminator.

It is not recommended that a transformer-coupled i.f. amplifier be used for an f.m. receiver because such amplifiers will not make good limiters unless diodes are used across the transformers. When overdriven, they may break into a type of squegging oscillation, modulating the signal with an audio howl. This type of amplifier also presents problems for an a.m. receiver. Here the amplifier must have a.g.c., since limiting of strong signals cannot be permitted. When a.g.c. is applied by the usual method of controlling the base current, the transistor input and output impedances vary, shifting the loading on the transformers and, consequently, the bandwidth of the i.f. There is much to be said for selectivity lumped at the input of the amplifier. Trouble with feedback affecting alignment is minimized, as is the chance of cross-modulation of weaker signals by strong ones.

#### Power Supply

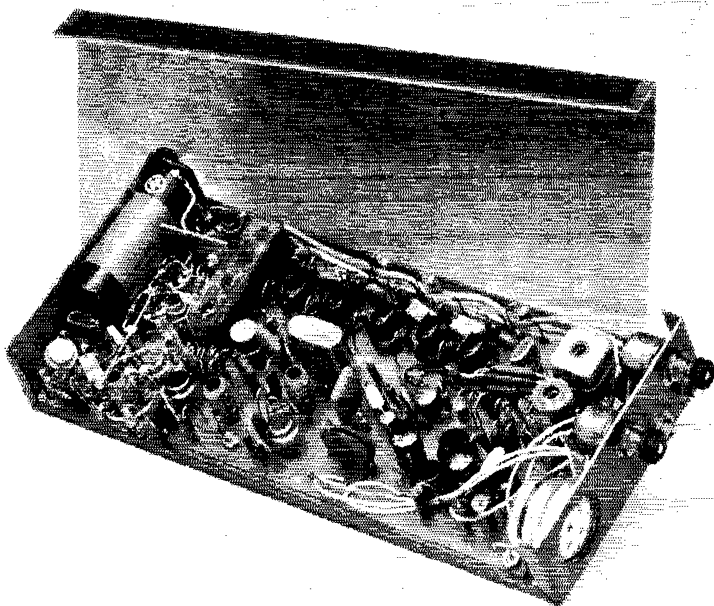
The batteries used for the receiver and low-power transmitter are mercury cells. The receiver, running from 9.4 volts, pulls only 10 ma. on standby (squelch closed), which is less than 1/10 the power used by a pilot bulb! The drain with full audio output rises to 35 ma.

The transmitter uses about 45 ma. at 17.6 volts. Despite the higher cost of mercury cells, they are to be preferred because of the much higher ratio of power to weight and size, and the very constant terminal voltage they deliver until complete exhaustion. Thirteen penlite-size cells are used, and will operate the transceiver for about 200 hours.

The battery power for the transmitter is controlled by the antenna relay, K<sub>2</sub>, the -17.5-volt line being connected to the transmitter through the antenna lead. This accounts for the use of blocking capacitors in series with the antenna and the antenna input to the receiver and also for the r.f. choke between the supply and antenna leads.

#### Construction Notes

Construction of the handy-talky was done in the simplest possible manner, in keeping with the experimental nature of the original unit. A 10 × 3½ × 6-inch aluminum Minibox was used for the housing. A cradle was made to fit the F-1 handset. Its side flanges are bent together far enough so that the handset snaps into place. A



This is a condensed, printed-circuit edition of the receiver, which fits into a shirt pocket for emergency channel monitoring. On the left is the front end, the only part not on the circuit board, and the small mercury battery. The lower left of the board is the high i.f., and the Permakay filler is at the upper left. The low i.f. runs along the upper edge, while the detector and audio circuits are at the lower right. Miniature controls and a 1-inch speaker were used. A later model had two improvements: a more selective front end and a bigger speaker. The case measures  $1 \times 3 \times 7\frac{1}{4}$  inches.

5-conductor coil cord was used; these are hard to find, but a rearrangement of the microphone circuit would allow using a 4-conductor cord. A 4-pin audio connector for the handset permits other microphone-carphone combinations, such as PBX headsets, to be used. The antenna is a car whip fitted with a male coax connector.

The electronics inside was built on four shelves which have flanges bolted to one side of the box. The other half of the box has only the  $3\frac{1}{2}$ -inch speaker mounted in it. The transmitter is on a single shelf, while the receiver was broken up into two shelves to fit the available space. The small shelf holds the two transmit-receive relays, which are 5000-ohm Potter & Brumfield units requiring only 60 mw. power each. The controls for volume and squelch and the power switch can be located wherever convenient.

The receiver layout incorporates shielding in the front end to isolate the r.f. stage, mixer, and oscillator. The six high-frequency inductors were wound on slug-tuned  $3/16$ -inch ceramic forms; a rough guide for the number of turns (close-spaced) for each is given with the diagram. Receiver and transmitter wiring is done with small standoff terminals mounted on the aluminum shelves wherever needed to support components and allow short lead lengths. Low-inductance standoff capacitors were used in the front end.

The 455-ke. RC-coupled amplifier must be laid out as much in a straight line as possible. Care must be used to avoid any feedback, because of the high gain at this frequency. The transformer between the last limiter and the discriminator is an Argonne AR-60; it should be possible to substitute any unit with similar characteristics. The audio transformers are UTC DO-T types and make possible a very compact audio section.

The transmitter layout is not very critical, except that long lead lengths should be avoided in the final. The transistors in the last two stages are mounted in low-capacitance insulated heat sinks. The power dissipation may seem very slight, but will produce excessive junction temperature if no sink is provided. Transmitter coil forms are also  $3/16$ -inch slug-tuned.

The holders for the thirteen type RM-12R mercury cells are mounted on a plate in the bottom of the box.

### Alignment

Receiver alignment begins with the adjustment of the 180- $\mu$ h. discriminator input coil,  $L_{12}$ , for zero d.c. voltage at the top of the gain control,  $R_2$ , with a strong 455-ke. signal injected into the second i.f. input. A sensitive meter or scope is needed. Then all high-i.f. and front-end tuned circuits should be checked with a g.d.o. to make sure they cover the desired frequency range. Supply voltage must be applied for this, or measurements will be meaningless. Listen with another receiver to determine if the two conversion oscillators are running. If they are not, check polarity of the feedback windings. Feed a generator on 50 Mc. into the antenna jack and hook a scope to the collector of the third or fourth 455-ke. stage. Looking at the 455-ke. signal when the generator is tuned in, peak all high-i.f. and front-end circuits. Keep the generator input level below the limiting point of the stage your probe is connected to. It should be possible to obtain good audio noise quieting at  $\frac{1}{2}$ - $\mu$ v. input. If all circuits are aligned and there is sufficient over-all gain, turning up the squelch control will cut off the no-signal noise and a signal of less than  $\frac{1}{2}$   $\mu$ v.

(Continued on page 148)

# Project Oscar

## Oscar II Flight Imminent

Get Your Two-Meter Gear Ready!

**O**SCAR II is about to fly! Perhaps even by the time you receive this issue of *QST*, but certainly within the next month, the little box will have been fired aloft from its west coast launching pad. If all goes well, Oscar II will be making a polar orbit and transmitting HIs on approximately 145 Mc. Listen to W1AW for the latest word on Oscar II and its orbit predictions.

Official Air Force permission for the shot was given in early April, again on a non-interference basis to the primary mission of the military space vehicle. And again, the Air Force has promised complete cooperation toward the success of this amateur radio experiment.

### Reporting

When you hear Oscar II, half the job is done — be sure to report what you hear. Three types of reports are requested for Oscar II. The first (and simplest) is merely your QSL card, mailed to the Project Oscar Association, P. O. Box 183, Sunnyvale, Calif. Jot down on the card the time you first hear the signal and the time it fades out. Also, if you have a stop-watch or watch with a second hand, count the number of seconds it takes the satellite to send 10 HIs.

A more advanced report makes use of the form printed in July, 1961, *QST*, page 59. Read this article for full particulars, or write to the Project Oscar Association for a reprint.

The most complete report makes use of a special tracking form which has been printed by the Project Oscar Association. Copies, with full information concerning Doppler measurements, are available from the Association.

An article on "Eyeball and Eardrum Doppler Tracking," by W6VMH in the April issue of *QST*, also gives procedures for advanced tracking techniques. And for dope on how to determine when to listen for Oscar II, see "Keeping Track of Oscar," by W8FKC and W8CWL, in the May, 1962, issue of *QST*.

### World-Wide Oscar Coordinators

In order to facilitate the distribution of special forms and information relating to the Oscar program, the Association has appointed a number of Oscar Coordinators throughout the world. Overseas hams are encouraged to contact whichever of the following Coordinators is nearest them for the latest Oscar data.

The signal that you will be hearing from Oscar II comes from a little 8-lb. package looking much like this. The transmitter is assembled on the circuit board at the left center, and the HI-keyer circuits are at the lower right. The case is packed with foam insulation before being buttoned up, and that mechanical trigger at the right releases the antenna into an upright position when Oscar is ejected from the parent vehicle.

Edgar Brockmann, DJ1SB  
Hasenspitz 56 — 16  
Wiesbaden-Dotzheim  
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Elidoro M. Claro, DU1CE  
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Manila, Philippines

Jesus Martin Cordova, EA1AO  
Paseo de Extremadura 170-4  
Madrid, Spain

Andre Bertemes, F3NB  
3 rue Leerivain  
Athis-Mons (S-et-O)  
France

W. H. Allen, G2UJ  
24 Arundel Road  
Tunbridge Wells, Kent  
England

Adolfo Carminati, I1BBB  
Via Castello, 4  
Bergamo, Italy

Kenzo Sano, JA1EC  
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Kofu, Yamainashiken  
Japan

Peter W. Brown, KL7DMB  
Box 183  
North Pole, Alaska

Thomas E. Talpey, KP4AXX  
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Henning Theg, LA1YG  
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Lysaker, Norway

Eugenio C. Fontana, LU9MA  
P. Mendocinas 262  
Rodeo del Medio (Maipu)  
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Olaf Karlsson, SM6PU  
Svalhult  
Malsyrd, Sweden

Gerhard Schifner, OE3SG  
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Hinterbruehl (N. Oe.)  
Austria

J. G. Lodeizen, PA0L0D  
Ruyschenstein, 29  
Amstelveen, Netherlands

H. G. Wightman, VE2UQ  
39 Malcolm Circle  
Dorval, Quebec, Canada

H. J. Hart, VK2HIO  
8 Killeaton St. East  
St. Ives, Sydney  
Australia

W. R. Hamer, ZL2CD  
c/o 2YZ Transmitter  
Opapa, Hawkes Bay, N. Z.

Bernard Pellaton, HB9WB  
Bois Noir 15  
La Chaux-des-Fonds (Ne.)  
Switzerland

Jos. DeDycker, ON4-1024  
Av. Eugene Demolder, 112  
Brussels, III, Belgium

Albert Solomon, ZS1SW  
4 Pinewood Street  
Somerset West, Cape  
Union of South Africa

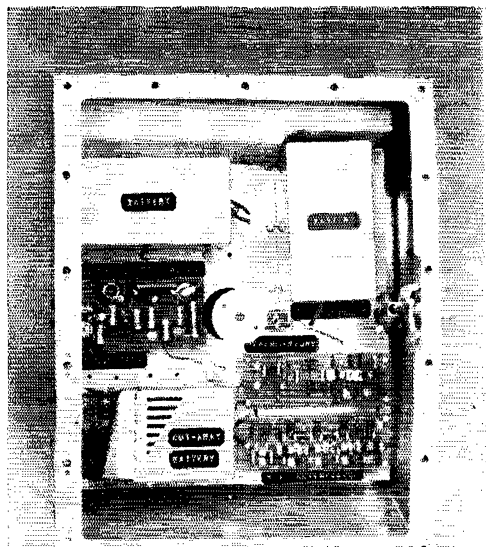
Peter D. Frith, VK7PF  
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25 Chatham Road  
Kowloon, Hong Kong

Listen for Oscar II on 145 Mc., and report what you hear to the Project Oscar Association, P. O. Box 183, Sunnyvale, Calif. **QST**





Contest contrasts. At the left is the lightly-dressed crew of K6DBZ/6, atop Sierra Peak, in the San Diego Section. They worked 477 stations on 50, 144, 220 and 1215 Mc., for 13,356 points, the West's top score. Look now at K1JDY and K1KOB, right, as they prepare to slide down the trail from Mt. Agamenticus, near York, Maine. All equipment, generator, and grub were dragged 1½ miles up the mountain road on toboggans, to set up K1NTC/1. The hard-to-get Maine Section was provided to 104 grateful 6- and 2-meter operators. Driving sleet during the trip up and through most of the contest period, didn't make things any easier.

## 1962 V.H.F. Sweepstakes Summary

### *15th Running Shows High Activity Despite Poor Conditions*

**T**HERE were few major records set in the 1962 version of the ARRL V.H.F. Sweepstakes. Thanks to practically no DX on 50 Mc., and tropospheric propagation at or near the winter minimum for the 144-Mc. operators, not many statistics of the 1962 contest equal the records set in 1960 and '61. That most 1962 categories even come close is a tribute to the steadily increasing level of v.h.f. interest in recent years.

Our tabulation shows 1506 valid logs, a drop of 5 per cent from 1961, but still above any other year. Of these, 1109 showed 50-Mc. activity — an all-time record. Operators reporting 144-Mc. contacts totaled 941, a slight drop from 1961, undoubtedly reflecting the discouraging conditions prevailing over much of the country. Club competition was stiffer than ever. There were 69 valid club entries, a new high, and the gavel-winning total run up by the Mt. Airy V.H.F. Club of the Philadelphia area, 694,552 points, is an all-time club record.

The country's top score by a single operator was turned in by W2EIF, Camden, N. J.: 521 contacts on 50, 144 and 220 Mc., for 24,960 points. Joe won the Southern New Jersey Section award, and was one of 5 contestants to work 14 or more ARRL Sections. Others were W3TYX, Philadelphia; W1MEH, Easton, Conn.; and W2LVI, Wappingers Falls, N. Y., who piled up his 14 on 144 Mc. The 15-section total of W2BLV, Haddonfield, N. J., is the lowest top in this department in many years, evidence of the dismal tropospheric conditions in the East.

The highest multiple-operator score reported was that of W1MHL/1, perennial record-setters of the June and September parties. With W1s

DDF, GEF and KSI doing the operating, W1MHL/1, Hogback Mountain, Vt., worked 461 stations in 18 sections, on 50 and 144 Mc., for 25,732 points. The Vermont Section bait was pushed to full advantage in collecting those 18 sections. W1MHL/1 was heard on c.w. on both 50 and 144 Mc. throughout the contest, whenever use of this mode would pay off.

Perhaps the most encouraging statistic that can be drawn from the contest as a whole is the country-wide nature of the participation. In years gone by, it took sporadic-*E* DX, with its potential for large numbers of contacts from areas of low v.h.f. activity, to bring contest entries from all parts of the country. This time we find 30 entries from North Carolina; 8 from Colorado (with section winner K0TSD working 55 stations); 28 from the Los Angeles Section (long an area of high activity, but low contest participation); 23 from North Texas; 10 from Oklahoma, where winner W5TKT worked 102 stations; and so on down the list.

At least 10 single-operator stations made more than 400 contacts. W2EIF had the top, 521. W3KKN, Willow Grove, Pa., with 514 was the only other to exceed the 500 mark. It helped to be within striking distance of Philadelphia, as witness 426 for W3TYX, 451 by W3HYJ, 434 by W3CL, 485 by K2TYW, 400 by W3HKZ, and 442 by W2AXU. Other sections of the country were not far behind. In fact, this may have been the best-balanced contest geographically that we have had on the v.h.f. bands. Note that W9ROS, Illinois Section, worked 432 stations; K6UMM/6, L. A. Section, 457 stations; W8CCI, Ohio Section, 402; and K6DBZ/6, San Diego Section, 477.

We remind everyone that these country-wide totals are cited merely as evidence of outstanding work. Awards are made only on the basis of competition within one ARRL section, as it is recognized that no satisfactory basis exists for national awards.

Though a high percentage of all contestants worked two or more bands, some very good records were made by concentrating on one favorite. K2MLB, West Orange, N. J., won the Northern New Jersey Section Award on 50 Mc. only, posting the country's top one-band score, 340-13-15,548. Section awards were won in Minnesota, New York City-Long Island, Missouri, Nebraska, Rhode Island, Oregon, South Carolina, Wyoming, East Florida, Los Angeles, North Texas and British Columbia on 50 Mc. Winners in San Francisco, Sacramento Valley and West Virginia were 2-meter men. W3IBH, Philadelphia, worked an even 300 stations on 144 Mc., for a score of 12,000 points. Charlie has missed recognition in some of our past contest reports, but he is always up there at or near the top of the 2-meter contingent. This time he was No. 1 by a wide margin.

Club activity and initiative continue to zoom upward. The Mt. Airy V.H.F. Club, taking part in only their 6th SS, put on the greatest club drive in the 15-year history of the contest. Putting practically every member on the air on

one or more bands, the Mt. Airy gang overwhelmed all competition, including that from 8-time winners, the South Jersey Radio Association. A glance at the totals in the SNJ and EPA Sections, below, will give the reader some idea of how intense this rivalry is.

It is of interest to note that the first three clubs are in the same spots as last year, and the only change in the top three since 1960 was the swap of first and second places by Mt. Airy and South Jersey last year. The 6-Meter Club of Chicago remains a strong threat, holding the number-three spot for three years running. The Dayton Amateur Radio Association made another valiant try, pushing the National Capital V.H.F. Society out of fourth place. A number of others will bear watching. It will be seen that Dayton, the Rochester V.H.F. Group, the 51.30 Club, the Mobile Sixers and the Central New Jersey V.H.F. Society all improved their standings over last year.

Competition for a spot in the "Top Ten" clubs provides almost as much interest as the battle for the annual gavel award. Many clubs recognize that they have little chance to hit the top spot, but that doesn't keep them from going all out each year. This kind of effort can be a great club-spirit builder. If your club hasn't tried it, right now is a good time to start planning for the 1963 running of the V.H.F. SS. — E. P. T.

## CLUB SCORES

Club	Aggregate	Valid	Certificate	Mid-Hudson V.H.F. Society (N.Y.)			
	Entries	Entries	Winner				
Mt. Airy V.H.F. Club (Pa.)	694,552	95	W2EIF	Greater Pittsburgh V.H.F. Society	11,722	12	W3BWU
South Jersey Radio Assn.	690,280	105	W2BV	Lake Success Radio Club (N.Y.)	11,640	8	K2JWT
6 Meter Club of Chicago	209,617	82	W9ROS	Amateur V.H.F. Institute of New York	10,154	9	K2DDK
Dayton Amateur Radio Assn.	171,268	78	K8REG	SWANI Radio Club	9,926	3	
National Capital V.H.F. Society	115,158	14	K4VWH	Seneca Radio Club (Ohio)	9,913	15	W8MVE
Waltham Amateur Radio Assn. (Mass.)	115,019	24	K1JCC	Providence Radio Assn. (R.L.)	9,033	5	K1NKR
Rochester V.H.F. Group	80,112	68	K2YCO	M. I. C. Radio Club (Pa.)	9,020	3	W3JXT
51.30 Club (Mass.)	76,408	42	W1DDV	Piedmont Amateur Radio Club (N.C.)	8,940	7	K4MHS
Mobile Sixers Radio Club (Pa.)	66,336	23	W3AWA	Haverford Township Emergency Radio Net (Pa.)	8,844	4	K3DEV*
Central New Jersey V.H.F. Society	54,787	25	W2GKR	Apple Pie Hill Amateur Radio Club (N.J.)	8,112	3	
Midwest V.H.F.-U.H.F. Assn.	53,232	38	W9AFD	6 Meter Club of Dallas	7,392	9	K5ARU
Southern California V.H.F. Radio Club	52,328	19	W6ADJB	Oklahoma Central V.H.F. Club	6,996	10	W5TKT
Keystone V.H.F. Club (Pa.)	35,373	17	K3JFL/2	Mohawk Radio Club (N.Y.)	6,980	4	K2OJQ
Hampden County Radio Assn. (Mass.)	33,564	16	W1RFU	Quinebaug Valley Radio Club (Mass.)	6,676	5	K1JNS
Syracuse V.H.F. Club	30,710	28	K2QWD	Ulster County Mike & Key Club (N.Y.)	6,654	6	K2VYN
Cleveland 50 Mc. DX Club	27,980	3		Marion V.H.F. High Banders (Ohio)	6,526	5	K8ZES
Fox River Radio League (Ill.)	27,352	20	K9WFA	Air Capital Amateur Radio Assn.	5,952	10	K0GHA
Germanatown Radio Club (Pa.)	26,542	8	K3KYK	Northern Kentucky Radio Club	5,230	3	K4NLZ
Rock Creek Amateur Radio Assn. (Md.)	24,386	19	W3UCR	Scarborough Amateur Radio Club	4,334	4	VE3ESE
1200 Amateur Radio Club (Mass.)	22,721	8	W1QIB	Nittany Amateur Radio Club (Pa.)	4,338	12	W3KJM
Hartford County Amateur Radio Assn.				Mira Costa High School Amateur Radio Club	4,022	5	WA6NMT
(Cont.)	22,018	4	K1EEW	Arlington High School Radio Club (N.Y.)	3,263	6	WA2HAQ
Greensboro Radio Club (N. C.)	20,484	18	W1ACY	Portage High School Amateur Radio Club (Ind.)	2,733	3	
Cowtown DX Club (Tex.)	20,020	12	K5RWR	La Porte Amateur Radio Club (Ind.)	2,680	6	K9JSI
Butler County V.H.F. Assn. (Ohio)	20,016	7	W8OEK	DeVry Technical Institute Amateur Radio Society (Ill.)	2,470	5	K9JVZ
Skokie Six Meter Indians (Ill.)	18,798	11	K9RRF	Amateur Radio Technical Society of St. Louis	2,268	5	W0IFC
Joliet Amateur Radio Society (Ill.)	17,814	9	K9PRB	Earl C. Batchelder Radio Club (Mass.)	2,140	3	K1TKV
Valley V.H.F. Club (Ill.)	17,798	12	W9BEH	Central Michigan Amateur Radio Club	2,128	4	W8CKK
Delaware 6 Meter Net	16,319	4	K3AZH	Auburn Amateur Radio Assn. (N.Y.)	2,008	3	WA2EIX
Dutchess County V.H.F. Society (N.Y.)	15,352	6	W2LWI	Fulton Amateur Radio Club (N.Y.)	1,292	4	WA2AND
Albany High School Radio Club (N.Y.)	15,189	3	WA2BAH	Bureau County Amateur Radio Club (Ill.)	917	5	WA9AZB
West Philadelphia Radio Assn.	14,842	5	K3LNU/3	Casper V.H.F. Society (Wyo.)	584	5	W7UFB
North Penn Amateur Radio Club	14,138	6	K3DAW				
Springfield Amateur Radio Club	13,290	6	K8MHJ				
Gloucester County Amateur Radio Club (N.J.)	13,218	6	W2LVW				
Argonne Laboratory Radio Club (Ill.)	13,172	10	K9YHH				
Oh-Ky-In V.H.F. Radio Society	12,367	3	K8TOH				

\* K3EGE, opr.

# SCORES

In the tabulation on the next pages, scores are listed by ARRL division and sections. Unless otherwise noted, the top scorer in each section receives a certificate award. The highest-scoring Novice also receives a certificate in each section where at least three such licenses submitted valid contest logs; footnotes denote these winners. Columns indicate final score, number of contacts, number of different sections worked, and the bands used. A represents 50 Mc., B 144 Mc., C 220 Mc., D 420 Mc., E 1215 Mc. Multioperator stations are shown at the end of each section tabulation.

## ATLANTIC DIVISION

*Eastern Pennsylvania*

W3KKN	22,616-514-12-ABC
W3TYU	30,424-426-14-AB
W3HYJ	18,040-451-10-ABC
W3CL	17,360-434-10-ABC
K3MKZ	16,359-390-11-AB
W3HKZ	16,000-400-10-ABCD
K3IUV	15,540-370-11-ABCD
W3SAL	14,095-371-9-AB
W3AWA	13,040-326-10-ABC
K3IHZ	13,020-310-11-AB
W3HFY	13,000-325-10-ABC
W3LHI	13,000-325-10-ABC
W3FSC	12,388-326-9-AB
W3IHB	12,000-300-10-AB
W3MXW	11,858-273-12-A
K3ADH	11,448-318-8-AB
K3HNE	11,200-282-10-AB
K3BHK	11,078-281-9-AB
W3FQD	10,506-309-7-AB
K3MVA	10,290-247-11-AB
K3EKK	8674-261-7-AB
K3JZZ	8670-289-5-AB
K3MSV	8670-255-7-AB
W3AIF	8668-252-7-AB
K3GAB	8160-255-6-ABC
K3NCX	8080-253-6-AB
K3BPI	8028-223-8-AB
W3ZVY	7920-220-8-AB
W3CFB	7848-218-8-A
K3JFL	7878-202-9-AB
W3AYG	7480-220-7-AB
W3FOZ	7420-205-8-AB
W3IZU	7380-205-8-AB
W3MVC	7350-245-5-AB
W3JGF	7344-204-8-AB
K3ATK	7320-241-5-AB
K3CHN	7280-260-4-AB
W3SMK	7232-226-6-AB
K3HWZ	7200-225-6-AB
W3BVR	7072-221-6-A
W3IPT	6944-248-4-ABC
W3NSI	6880-215-6-ABC
K3LNU/3	6870-230-5-A
K3DEV	6580-235-4-AB
K3DAW	6496-203-6-A
W3ZTL	6432-301-6-AB
W3BQU	6080-202-5-AB
K3IGX	6048-189-6-A
K3HGA	6045-242-7-AB
W3KXH	6020-115-4-A
K3LBT	5984-187-6-ABC
K3KYK	5910-197-5-A
K3DUW	5876-226-4-AB
W3UAM	5792-181-6-AB
K3HIG	5544-199-4-AB
W3BRU	5504-172-6-AB
W3JSD	5144-144-8-AB
W3GXN	5120-160-6-AB
K3HNS	5086-181-4-AB
K3ECP	4984-176-4-AB
W3HYO	4960-155-6-B
W3IKL	4928-154-6-A
W3IAB	4788-171-4-AB
W3QAS	4768-149-6-ABC
K3AIQ	4760-170-4-ABC
K3GGO	4706-181-3-A
K3IUV	4672-146-6-A
K3MTK	4494-162-4-AB
W3IEA	4424-158-4-A
K3IEM	4420-131-7-AB
W3CPT	4352-136-6-B
K3KZT	4272-134-6-A
K3CJG	4200-150-4-A
W3ZRU	4200-150-4-AB
K3HNG	3952-152-3-A
K3JXC	3944-116-7-ABC

W3FDH/3 (3 ops.)	11,571-309-9-AB
W3HZU (10 ops.)	10,080-240-11-AB
W3MKA (K3HWX, W3VND, W3JWK)	8942-267-3-AB
K3RGT (K3s BGT GMJ IQD)	6048-216-4-A
W3GFW (K3NDA, W3GFW)	6048-217-4-AB
W3VPJ (15 ops.)	3818-106-8-ABC
K3GFW/3 (6 ops.)	3776-118-6-ABC
K3MFI (K3s LVI MFT NLDG)	3540-149-2-AB
K3MGN (K3s MBS MGN)	2544-106-2-AB
W3ZGD (K3s DCU IMR DRG)	1878-67-4-A
W3AEQ (multiop.)	1800-40-8-AB
K3MTE (K3s MKZ MTT)	1344-56-2-AB
K3GZT (K3s GZT GZU)	1032-43-2-AB

*Md.-Del.-D. C.*

W3ASD	10,340-235-12-AB
K3AZH	7308-205-8-AB
W3NNG	6864-216-6-AB
K3LND	6368-200-6-AB
W3CGV	5627-166-7-ABC
K3HFV	5134-151-7-ABC
W3JNE	4800-160-5-AB
W3OTC	3298-97-7-ABC
W3MMC	3278-117-4-AB
W3TFA	2860-110-3-AB
K3LSW	2720-85-6-AB
K3DGG	2660-95-4-AB
W3HCR	2520-84-5-AB
W3HSE	2490-83-5-A
W3AHQ	2448-102-2-ABD
K3LNH	2240-80-4-ABC
K3JOSZ	2240-80-4-ABC
W3CPM	2156-77-4-AB
W3YLY	2130-77-5-B
K3BNV	2106-81-3-AB
K3EHS	2100-70-7-AB
K3MPZ	2040-69-7-AB
K3GMB	1862-67-4-ABC
W3AIR	1664-61-3-BCD
K3QRA	1536-64-2-ABC
W3ZSR	1430-55-3-ABC
W3LCC	1372-49-4-BCD
K3CRD	1328-51-3-AB
K3AIRH	1308-55-2-A
W3HPI	1300-50-3-ABC
W3DFS	1296-54-2-AB
W3AX	1200-50-2-AB
W3FFZ	1200-50-2-AB
W3SFP	1152-39-6-ABC
W3PZK	1118-43-3-ABC
K3CWK	1040-40-3-AB
W3AMO	1040-40-3-AB
W3CJT	1040-40-3-AB
W3ZOR	1032-43-2-ABC
W3BNL	984-41-2-ABC
K3KWO/3	960-40-2-AB
W3BHQ	912-38-2-ABC
K3BUI	910-35-3-ABC
W3YAG	910-35-3-ABC
W3VHK	832-32-3-ABC
K3BPP	816-31-3-ABC
K3BPR	816-31-3-ABC
W3ZQ	780-30-3-ABC
K3DRD	768-32-2-ABC
K3CFD	744-31-2-ABC
W9GLR/3	
K3LLR	696-29-2-ABC
W3WJ	688-27-2-ABC
K3NDA	582-24-2-A
K3NOG	552-23-2-A
K3GTL/3	552-23-2-ABC
W3GCO	528-22-2-ABC
W3MTC	442-17-3-ABC
K3BKA	432-16-2-A
K3JKA	432-16-2-A
K3LWD	374-17-2-A
K2UOP/3	360-15-2-ABC
K3DDP	176-8-1-A
K3CAZ	154-7-1-ABC
W3JJK (K3s W3JJO)	4310-155-4-AB

W3SSF/3 (K3s PHG PHL, W3SSF)	4288-134-6-AB
W3LUL (K3CFD, W3LUL)	4160-100-B
K3LUK (W3s COH DFB)	2821-110-3-AB
W3KZH (W3s KZH MBZ)	2800-100-4-AB
K3DIH (K3DLB, W3ZJC)	2790-93-5-AB
K3CEZ (6 ops.)	2136-81-2-AB
W8WUJ/3 (K3KNA, W8WUJ)	1700-63-7-AB
K3QPD/3 (K2GLQ, K3QPD)	1344-48-4-A
K3AGN (K3AGN, K3NRP)	1339-52-3-B

*Southern New Jersey*

W2EIF	24,960-521-14-ABC
K2TYU	22,310-485-13-AB
W2AXU	19,448-442-12-ABC
W2BY	17,756-386-13-AB
W2BLV	17,250-345-15-ABD
W2KPI	15,440-386-10-ABC
W2OSD	13,400-335-10-ABC
W2EMH	13,186-347-9-AB
W2ADW	12,600-315-10-AB
K2SMZ	12,420-315-8-ABC
W2PAU	12,180-305-10-AB
W2HTL	11,033-325-7-AB
W2ZUL	10,912-341-6-AB
W2AGU	10,780-245-12-AB
W2AKR	9072-284-6-AB
K2HJY	8806-259-7-AB
W2OQN	8262-243-7-AB
W2JAV	8170-215-9-ABC
W2ADA	7898-242-7-ABC
W21VW	7684-240-6-A
W2GJE	6440-161-10-AB
W2ESB	6192-173-8-B
K2OHM	5490-184-5-A
W2HTY	5440-170-6-AB
W2BLV	5370-179-5-AB
K2UHW	5200-200-3-AB
K2KCI	5188-144-8-A
K2EJY	4862-187-3-A
W21VN	4620-165-4-ABC
W2NSF	4556-134-7-AB
W2AKWS	4020-134-5-B
K2KTS	3948-141-4-AB
W2ANW	3900-150-3-AB
W2ONB	3638-107-7-A
W2AKZ	3536-104-7-B
K2SQM	3520-110-6-ABC
K2KVF	3500-125-4-ABC
W21VW	3418-115-6-ABC
K2EGH	3392-106-6-AB
K2QOK	3200-100-6-A
W2LY	3136-112-4-AB
W2JTF	3010-108-4-ABC
K2P4F	2996-107-4-A
K2SNL	2890-120-2-A
W2AZW	2860-110-3-A
W2YBR	2808-108-3-ABC
W2YNR	2782-107-3-A
W2MBO	2642-113-2-A
K2DFI	2612-113-2-AB
W2EJN	2600-100-3-AB
W2ZJJ	2600-109-3-AB
K2RRC	2520-93-4-AB
K2HLD	2496-104-2-AB
W2MVG	2400-100-2-AB
W2MBS	2392-92-3-B
W2MTU	2340-90-3-AB

W2AGS	2280-95-2-B
K2QOS	2250-75-5-AB
K2BG	2210-85-3-AB
W3ZSCJ	2128-76-4-A
K2STN	2106-81-3-AB
W3LEK	2072-74-4-ABC
W2ALM	1950-75-3-B
W2ABXV	1920-80-2-A
W2FXT	1846-71-3-ABC
W2AKOK	1794-69-3-ABC
K2PVM	1752-73-2-B
W2BTM	1710-72-2-B
W2ADYA	1690-65-3-ABC
W2QD	1680-70-2-A
W2ADT	1680-70-2-A
W2APPY	1608-67-2-A
W2BUI	1512-63-2-ABC
W2ZVR	1512-63-2-ABC
W2ATDR	1512-63-2-ABC
W2ASBG	1430-55-3-ABC
W2A3FY	1300-50-3-ABC
K2OYV	1222-47-3-A
W2AOGR	1200-50-2-ABC
W2MFO	1183-46-3-A
K2YBV	1152-48-2-ABC
W2AHSF/2	1118-43-3-A
W2UIHQ	1064-38-4-A
W2UYN	1014-39-3-ABC
W2ZX	972-41-2-ABC
K2MKD	960-40-2-ABC
K2KUI	858-33-3-A
W2HBE	832-32-3-ABC
W2UEE	812-38-2-ABC
W2DMU	800-25-2-A
W2YUO	600-25-2-ABC
W2SDB	576-24-2-ABC
W2VX	520-20-3-ABC
W2AKVP/2	520-20-3-ABC
W2ANXV	504-21-2-A
K2MGZ/2	
W2BTB	480-20-2-A
W2QAL	480-20-2-B
W2MFE	468-18-3-ABC
W2OWA	432-18-2-ABC
W2MMD	402-10-2-ABC
K2AQL	168-7-2-ABC
W2AIZS	168-7-2-ABC
W2MVG/2	10-5-1-A
W2AWA/2	96-4-2-B
W2REB (K2MPV, W2REB)	18,060-430-11-AB
K2UDA (K2s MKD UDA)	10,096-316-6-AB
K2HOD (K2HOD, W2AKAI)	5534-251-7-AB
W2AIE (W2AIE, HSP IEK)	7872-246-6-AB
W2GQO (K2PFW, W2GQO)	7844-273-4-ABC
W2AWL (W2AWL, AWE UHL)	7000-426-6-ABC
W2BAY (W2s BAY DAJ)	5460-210-3-AB
K2DFE (K2DFE, W2AKIK)	5202-153-7-AB
W2ATQI (2 ops.)	2616-109-2-ABC
W2VNY (W2VNY, HSP WNY)	2436-102-2-ABC
W2APL (W2A2, KVO PVL)	1690-65-3-ABC

## Western New York

K2YCO	3614-139-3-ABC
K2ZFP	3456-141-2-ABC
K2GUC	3304-118-4-ABC
W2UTH	3000-110-5-ABC
K2KFN	2976-93-6-ABC
K2QWJ	2816-88-6-A
W2KVN	2736-114-2-ABC
K2JJT	2616-109-2-A



WA2FYH	2436-87-4-1	WA2VGM	374-17-1-1	K9ZYF	2678-103-3-1	K9CZA	624-24-3-1	K9AID	2340-78-5-1	
W2TKY	2420-110-1-ABC	K2DQ	363-17-1-1	K9VTK	2660-95-4-1	K9RCN/9	616-28-1-1	K9VNM	1800-80-5-1	
WA2ILF	2352-98-2-1	K2AVA	352-16-1-1	W9ZQG	2660-95-4-1	K9EIV	600-25-2-1	W9UGH	1484-53-4-1	
W2IVR	2288-88-3-1	K2SKO	352-16-1-1	W9PKB	2470-82-5-1	K9WTV	501-25-1-1	K9BHT	1152-48-2-1	
WA2DVB	2280-95-2-1	K2MM	352-16-1-1	K9PBN	2436-87-4-1	K9NFB	576-21-2-1	W9VVE	192-8-2-1	
WA2KND	2208-92-2-1	K2TXX	330-15-1-1	K9VYA	2400-100-2-1	K9EWF	572-26-1-1	W9TQ	144-6-2-1	
K2LOK	1960-70-4-1	WA2KLT	308-14-1-1	K9YHI	2400-100-2-1	K9YJQ	550-25-1-1	W9HXX	132-6-1-1	
W2ZJL	1944-81-2-1	WA2STJ	308-14-1-1	W9VWY/9	2400-100-2-1	W9AFA	550-25-1-1	<b>DAKOTA DIVISION</b>		
WA2GCH	1848-66-4-1	WA2JTR	264-12-1-1	K9QGM	2410-24-1-1	K9SLT	528-24-1-1	<i>Minnesota</i>		
W2RRQ	1820-70-3-1	W22IE	242-11-1-1	K9RIN	2340-90-3-1	W9DTV	501-25-1-1	K9LAV	1500-63-2-1	
K2FXG	1752-73-2-1	W2WCH	154-7-1-1	K9EEC	2328-97-2-1	K9BMA	504-21-2-1	K9QVL	1164-49-2-1	
K2UXF	1728-72-4-1	WA2ZND	110-5-1-1	K9DTB	2304-96-2-1	W9PQJ	504-21-2-1	K9ZCK	864-36-2-1	
K2PKK	1608-67-2-1	W2RZN	110-5-1-1	K9BDJ	2288-88-3-1	W9NDA	480-20-2-1	<b>DELTA DIVISION</b>		
W2UTA	1628-73-1-1	W2RZN	110-5-1-1	K9DCZ	2288-88-3-1	K9ZPY	462-21-1-1	<i>Louisiana</i>		
WA2UHF	1584-72-1-1	W2RZN	110-5-1-1	W9BHP	2249-87-3-1	W9QVE	440-20-1-1	W5UQU	1768-92-7-1	
WA2OXL	1562-71-1-1	W2RZN	110-5-1-1	W9DJJ	2232-93-2-1	W9U9A	440-20-1-1	W5GQP	1710-58-5-1	
WA2GSC	1518-69-1-1	W2RZN	110-5-1-1	K9ZDV	2190-73-5-1	K9NFB	418-19-1-1	K6HN/5	1120-40-4-1	
K2JXZ	1474-67-1-1	W2RZN	110-5-1-1	W9AVB	2160-90-2-1	K9FTA	408-17-2-1	W5LDD	448-16-4-1	
WA2SFC	1474-67-1-1	W2RZN	110-5-1-1	K9JAL	2136-89-2-1	W9CEP	396-18-1-1	<b>GREAT LAKES DIVISION</b>		
K2ZRX	1452-66-1-1	W2RZN	110-5-1-1	K9UJL	2044-73-4-1	W9AZB	384-17-2-1	<i>Dunkirk</i>		
K2AQQ	1430-65-1-1	W2RZN	110-5-1-1	K9YLX	1988-71-4-1	K9ZHF	374-17-1-1	K4RZK	4592-164-4-1	
WA2SCT	1430-65-1-1	W2RZN	110-5-1-1	K9TXQ	1937-75-3-1	K9OWQ	360-15-2-1	K4NLZ	2132-82-3-1	
K2ZWI	1386-63-1-1	W2RZN	110-5-1-1	K9RBI	1920-80-2-1	K9UFT	352-16-1-1	K4NNO	1668-75-2-1	
W2ZEX	1326-61-3-1	W2RZN	110-5-1-1	K9OSB	1872-78-1-1	K9ARU	330-15-1-1	K4MGK	1430-55-3-1	
K2FDQ	1320-60-3-1	W2RZN	110-5-1-1	K9KWF	1848-73-2-1	K9LUR	330-15-1-1	<b>Michigan</b>		
W2YBK	1320-60-1-1	W2RZN	110-5-1-1	K9S2T	1800-75-2-1	K9USU	330-15-1-1	K8MDV	4407-170-3-1	
K2YQT	1276-58-1-1	W2RZN	110-5-1-1	K9T8N	1800-75-2-1	W9BBD	330-15-1-1	K8KIX	3282-128-3-1	
WA2LW	1276-58-1-1	W2RZN	110-5-1-1	K9WNB	1782-81-1-1	K9HLC	288-12-2-1	K8EKX	3000-110-4-1	
K2UCQ	1272-53-2-1	W2RZN	110-5-1-1	K9GUB	1764-74-2-1	K9DIO	286-13-1-1	K8OIB	2800-118-2-1	
K2EAY	1254-57-1-1	W2RZN	110-5-1-1	K9ZUF	1752-73-2-1	W9BYD	286-13-1-1	K8OID	2500-90-4-1	
K2QWQ	1232-56-1-1	W2RZN	110-5-1-1	K9TUM	1708-65-1-1	K9NFK	260-10-3-1	K8OCC	1534-59-3-1	
WA2HWC	1232-56-1-1	W2RZN	110-5-1-1	K9RKH	1690-65-3-1	K9H1N	220-10-1-1	W8BHW	1520-70-2-1	
WA2OXH	1232-56-1-1	W2RZN	110-5-1-1	K9PKW	1680-60-4-1	W9HFG	220-10-1-1	K8VTF	984-42-2-1	
WA2JMH	1176-49-2-1	W2RZN	110-5-1-1	K9QDU	1680-70-2-1	K9UIM	192-8-2-1	W8VRH	960-40-2-1	
WA2KUJ	1144-52-1-1	W2RZN	110-5-1-1	W9MRC	1668-70-2-1	W9KCM	96-4-1-1	K8GKX	754-29-3-1	
WA2OXX	1144-52-1-1	W2RZN	110-5-1-1	W9CEJ	1656-69-2-1	K9UJH	96-4-1-1	K8VNM	660-30-1-1	
WA2OXL	1100-50-1-1	W2RZN	110-5-1-1	K9CNA	1648-67-1-1	K9NLD	88-1-1-1	W8CXH	638-29-1-1	
K2RTU/2	1080-45-2-1	W2RZN	110-5-1-1	K9YHF	1584-66-2-1	K9TWS	132-6-1-1	K8IVV	396-18-1-1	
W2DJL/2	1080-45-2-1	W2RZN	110-5-1-1	K9TVC/9	1534-61-3-1	K9RUR	132-6-1-1	K8NZY	352-16-1-1	
W2DKJ	1080-45-2-1	W2RZN	110-5-1-1	K9RQY	1526-55-4-1	W9PDN	110-5-1-1	W8ZVW	286-13-1-1	
W2PFD	1067-40-1-1	W2RZN	110-5-1-1	K9YMM	1518-69-1-1	K9AQW	96-4-2-1	K8XFS	220-10-1-1	
W2SMZ/2	1056-44-2-1	W2RZN	110-5-1-1	K9UN1	1518-69-1-1	W9KCM	96-4-2-1	K8KQV	154-7-1-1	
WA2MQP	1032-43-2-1	W2RZN	110-5-1-1	K9WUZ	1496-68-1-1	W9DWE	88-4-1-1	W8EF	110-5-1-1	
W2YJK	1012-47-1-1	W2RZN	110-5-1-1	K9NJV	1488-62-2-1	W9WUW	88-4-1-1	K8IQW	88-4-1-1	
W2DBB	990-45-1-1	W2RZN	110-5-1-1	K9ALP	1482-57-3-1	W9YUC	88-4-1-1	K8YRF	(K8S YCQ YRF)	
WA2CGN	990-45-1-1	W2RZN	110-5-1-1	K9DKI	1474-67-1-1	K9E8K	77-5-1-1	3328-128-3-1		
W2DVA	990-45-1-1	W2RZN	110-5-1-1	K9OQW	1440-60-2-1	K9NGZ	77-4-1-1	K8IXH	(K8S LXH SCD)	
K2ZTN/2	984-41-2-1	W2RZN	110-5-1-1	W9YJF	1440-60-2-1	W9UJY	72-3-2-1	K8TYS	(K8S LXH SCD)	
WA2ADG	924-42-1-1	W2RZN	110-5-1-1	W9MJT	1404-54-3-1	K9KTA	62-3-1-1	572-26-1-1		
K2PFE	902-41-1-1	W2RZN	110-5-1-1	W9DRY	1400-50-4-1	K9RTG	44-2-1-1	<b>Ohio</b>		
K2GMZ	880-40-1-1	W2RZN	110-5-1-1	K9ARA	1392-58-2-1	UYG VOX	700-250-4-1	K8MMM	11412-317-8-1	
K2QIG	880-40-1-1	W2RZN	110-5-1-1	W9NYO	1378-53-3-1	K9S2X	(K9S RAO S2X)	K8REQ	9758-349-4-1	
W2ASB	858-39-1-1	W2RZN	110-5-1-1	K9IOA	1372-49-4-1	6282-175-8-1	K9QVY	(K9S HDE)	K8TFO	6375-213-5-1
W2ASML	858-39-1-1	W2RZN	110-5-1-1	K9IVB	1356-57-2-1	K9QVY	(K9S HDE)	K8HEF	5480-210-3-1	
W2IFYZ	814-37-1-1	W2RZN	110-5-1-1	W9VPU	1326-51-3-1	OOV QDO	6700-192-5-1	K8TKL	5376-224-2-1	
K2YFY	792-36-1-1	W2RZN	110-5-1-1	K9BCR	1320-55-2-1	K9WHC	(K9S DOC HVC)	K8MHL	5304-204-3-1	
W2AKM	792-36-1-1	W2RZN	110-5-1-1	K9MYG	1320-55-2-1	W9N2F	5460-210-3-1	K8MFL	5090-195-3-1	
W2PFG	751-36-1-1	W2RZN	110-5-1-1	K9WPU	1320-55-2-1	W9C9B	(K9H DU)	W8KKF	4872-187-3-1	
W2ARZ	770-35-1-1	W2RZN	110-5-1-1	K9AJZ	1274-49-3-1	W9C9E	(K9H DU)	K8UQA	4832-151-6-1	
W2ZURS	768-33-2-1	W2RZN	110-5-1-1	KN9EN	1272-53-2-1	W9C9E	(K9H DU)	W88VY	4706-181-3-1	
WA2AQW	748-34-1-1	W2RZN	110-5-1-1	W9GQZ	1272-53-2-1	W9C9E	(K9H DU)	K8GYU	4648-196-4-1	
WA2HCE	748-34-1-1	W2RZN	110-5-1-1	K9UOG/9	1248-52-2-1	W9C9E	(K9H DU)	K8YVU	4648-196-4-1	
W2PTFX	748-34-1-1	W2RZN	110-5-1-1	W9RHZ	1248-52-2-1	W9C9E	(K9H DU)	K8WNA	4342-167-3-1	
K2BEH	748-34-1-1	W2RZN	110-5-1-1	K9TVA	1224-51-2-1	W9C9E	(K9H DU)	W8JRN	4290-165-3-1	
WA2YFF	726-33-1-1	W2RZN	110-5-1-1	K9BCJ	1200-50-2-1	W9C9E	(K9H DU)	K8BSC	4160-160-3-1	
W2MFM	704-32-1-1	W2RZN	110-5-1-1	K9W8Z	1200-50-2-1	W9C9E	(K9H DU)	K8XJZ	4082-157-3-1	
W2QY	704-32-1-1	W2RZN	110-5-1-1	W9AVE	1170-45-3-1	W9C9E	(K9H DU)	K8DEO	3800-127-5-1	
WA2UHW	704-32-1-1	W2RZN	110-5-1-1	K9CIN	1144-52-1-1	W9C9E	(K9H DU)	K8QVT	3796-146-3-1	
W2AIKC	704-32-1-1	W2RZN	110-5-1-1	K9QIM	1144-52-1-1	W9C9E	(K9H DU)	K8ATY	754-29-3-1	
W2ANBB	704-32-1-1	W2RZN	110-5-1-1	K9WVZ	1128-47-2-1	W9C9E	(K9H DU)	K9LVK	624-26-2-1	
K2RZI	682-31-1-1	W2RZN	110-5-1-1	W9CEZ	1118-43-3-1	W9C9E	(K9H DU)	K9ZUP	546-21-3-1	
W2EHS	627-29-1-1	W2RZN	110-5-1-1	K9YHS	1104-46-2-1	W9C9E	(K9H DU)	W9OVL	504-21-2-1	
K2QUB	605-28-1-1	W2RZN	110-5-1-1	W9EHT	1054-46-2-1	W9C9E	(K9H DU)	K9ADI	447-20-1-1	
W2IFA	600-25-2-1	W2RZN	110-5-1-1	W9AIF	1046-46-2-1	W9C9E	(K9H DU)	K9UEE	384-16-2-1	
K2AJL	594-27-1-1	W2RZN	110-5-1-1	K9DFP	1040-40-3-1	W9C9E	(K9H DU)	W9MHP	336-12-4-1	
K2YBK	550-25-1-1	W2RZN	110-5-1-1	W9BEP	1040-40-3-1	W9C9E	(K9H DU)	<b>ABOVE</b>		
W2EIP	550-25-1-1	W2RZN	110-5-1-1	W9EQY	1034-47-1-1	W9C9E	(K9H DU)	K9STH	176-8-1-1	
WA2UGE	550-25-1-1	W2RZN	110-5-1-1	W9HVE	1032-43-2-1	W9C9E	(K9H DU)	K9BF3	154-7-1-1	
K2ZJY	495-26-1-1	W2RZN	110-5-1-1	W9WNV	984-41-2-1	W9C9E	(K9H DU)	K9BEZ	142-6-1-1	
K2PKL	484-23-1-1	W2RZN	110-5-1-1	W9OBY	984-41-2-1	W9C9E	(K9H DU)	K9BZK	132-6-1-1	
W2DAP	484-23-1-1	W2RZN	110-5-1-1	K9AZP	962-37-3-1	W9C9E	(K9H DU)	K9BOK	120-5-2-1	
W2A0K	462-21-1-1	W2RZN	110-5-1-1	K9WV9	960-40-2-1	W9C9E	(K9H DU)	W9AFV	72-3-2-1	
K2DVM/2	440-20-1-1	W2RZN	110-5-1-1	W9AAT	960-40-2-1	W9C9E	(K9H DU)	W9BZN	(16 oprs.)	
VE3DFY	440-20-1-1	W2RZN	110-5-1-1	K9GOW	946-43-1-1	W9C9E	(K9H DU)	K9YLA	(5 oprs.)	
K2YFG	396-18-1-1	W2RZN	110-5-1-1	W9W8Z	936-39-2-1	W9C9E	(K9H DU)	W9BF	(4 oprs.)	
		W2RZN	110-5-1-1	K9MTE	924-42-1-1	W9C9E	(K9H DU)	K9IOS	(2 oprs.)	
		W2RZN	110-5-1-1	K9TSU	916-38-2-1	W9C9E	(K9H DU)	K9SEF	(3 oprs.)	
		W2RZN	110-5-1-1	K9OZF	916-38-2-1	W9C9E	(K9H DU)	W9S2N	(3 oprs.)	
		W2RZN	110-5-1-1	K9FLB	902-41-2-1	W9C9E	(K9H DU)	96-4-2-1	<i>Wisconsin</i>	
		W2RZN	110-5-1-1	K9KBB	880-40-1-1	W9C9E	(K9H DU)	K9EUC	6004-158-9-1	
		W2RZN	110-5-1-1	K9FFR	864-36-2-1	W9C9E	(K9H DU)	W9UUI	3016-116-3-1	
		W2RZN	110-5-1-1	W9EXW	864-36-2-1	W9C9E	(K9H DU)			
		W2RZN	110-5-1-1	K9KWB	852-36-2-1	W9C9E	(K9H DU)			
		W2RZN	110-5-1-1	K9AYD	846-36-2-1	W9C9E	(K9H DU)			
		W2RZN	110-5-1-1	KN9CZ	816-34-2-1	W9C9E	(K9H DU)			
		W2RZN	110-5-1-1	W9BQL	816-34-2-1	W9C9E	(K9H DU)			
		W2RZN	110-5-1-1	W9BDL	816-34-2-1	W9C9E	(K9H DU)			
		W2RZN	110-5-1-1	W9EHN	814-37-1-1	W9C9E	(K9H DU)			
		W2RZN	110-5-1-1	K9ONV	792-33-2-1	W9C9E	(K9H DU)			
		W2RZN	110-5-1-1	K9N9S	770-35-1-1	W9C9E	(K9H DU)			
		W2RZN	110-5-1-1	W9CRB	768-32-2-1	W9C9E	(K9H DU)			
		W2RZN	110-5-1-1	K9ZAM	726-33-1-1	W9C9E	(K9H DU)			
		W2RZN	110-5-1-1	W9BQC	720-30-2-1	W9C9E	(K9H DU)			
		W2RZN	110-5-1-1	K9ASK	720-32-1-1	W9C9E	(K9H DU)			
		W2RZN	110-5-1-1	K9RBD	702-27-3-1	W9C9E	(K9H DU)			
		W2RZN	110-5-1-1	K9WNY	672-26-2-1	W9C9E	(K9H DU)			

W8ACW 1936-88-1-B	W2YFEC 7200-180-10-AB	WA2UZL (W2CCD, WA28 ONO) P1X 3439-91-9-B	K0KME 7098-30-2-A	K1KYB 3072-96-0-AB
K8DPT 1870-85-1-AB	W2LVL 6744-141-14-AB	WA2FUL (WA28 PUL) 2975-88-7-A	K0KMQ 594-27-1-B	K1QLD 2985-100-5-A
W8GVQ 1878-77-2-AB	K2CVG 5192-118-12-AB	WA2PNF (WA28 K1X PNF) 341-16-1-A	W0ZXX 396-18-1-B	K1DZY 2816-88-0-A
K8ADI 1824-76-2-AB	W2SFE 1536-126-8-B	Northern New Jersey	K0LWX 374-17-1-B	K1JZM 2688-84-0-A
W8KKF/8 1782-81-1-AB	W2HYE 1484-118-9-AB	K2MLB 15,548-340-13-A	W0PAG 374-17-1-B	KN1UAM 3520-84-5-B
W8SFF 1776-74-2-AB	K2HGU 4224-96-12-AB	WA2DHS 7650-213-8-B	K0QHE 700-10-1-B	KIPPM 2505-85-2-B
K8VFG 1728-72-2-AB	WA2MOY 3960-99-10-AB	WA2HFI 7612-173-12-AB	K0RQD 154-7-1-B	K1IOP 214-71-7-A
K8AAB 1672-76-1-A	K2TMB 3600-100-8-ABC	WA2RMD 4032-112-8-AB	MtSons	W1AQE 2368-74-6-AB
W8VME 1664-52-6-B	WA2ETB 2190-73-5	WA2VQC 4032-112-8-AB	W0KMW 4620-165-4-A	K1ROA 2352-84-4-B
K8TUY 1650-75-1-A	WA2HAQ 1600-50-6-AB	W2SXC 3672-102-8-AB	K0ZKO 4592-164-4-A	W1LNU 2250-75-5-A
W8NQU/8 1650-75-1-A	WV20QX 1560-52-5-B	WA2BDP 3400-100-7-A	W0FMS 338-128-3-A	K1WPC 2176-68-3-A
K8IGF 1584-66-2-AB	W2ZBY 1376-43-6-B	WA2JHR 3400-100-7-A	W0EKM 1968-82-2-A	K1KKS 2160-72-5-A
W8OIG 1584-66-2-AB	W2YEN 1230-41-5-AB	WA2HFA 7612-173-12-AB	W01FC 888-37-2-ABC	K1PMN 2142-63-7-A
W811L 1560-60-3-AB	K2YVN 1224-34-8-AB	WA2RMD 7612-173-12-AB	K0AHK 480-20-2-AC	K1IAG 2128-76-4-A
W81DF 1536-64-2-A	WA2QGS 1984-62-6-A	WA2VQC 4032-112-8-AB	W0BFX 408-17-2-AC	W1BDF 1938-57-7-B
K81TK 1495-75-1-A	W2ZBY 1376-43-6-B	W2SXC 3672-102-8-AB	K0HZZ 360-15-2-AC	K1ONL 1680-56-5-A
K8CFL 1474-67-1-A	W2YEN 1230-41-5-AB	WA2BDP 3400-100-7-A	W0CDA 132-6-1-A	W1LHW 1638-63-3-AB
K8LQX 1452-66-1-B	K2YVN 1224-34-8-AB	WA2JHR 3400-100-7-A	Nebaska	W1MHG 1635-55-5-B
K8CFY 1440-61-2-AB	WA2QGS 1984-62-6-A	WA2WAJ 3428-104-6-B	K0UYT 1352-52-3-A	K1PSJ 1680-50-6-AB
K81HS 1416-58-2-AB	K2OZT 1196-46-3-B	WV2UUG 3240-108-5-B	K9TVD (K0S JBV TVD, W0CCD) 2250-75-5-AB	W1B1L 1560-60-3-AB
W8PHX 1344-56-2-A	K2GCH 1008-36-4-AB	WA2OPQ 2958-87-7-AB	NEW ENGLAND DIVISION	K1BKN 1440-48-5-A
K8PYQ 1326-51-3-AB	WA2RFO 910-35-3-B	K2ROP 2432-76-6-AB	Connecticut	W1BRS 1428-51-4-AB
W8RLY/8 1298-59-1-AB	WA2RTF 884-34-3-B	WA2JSB 2370-79-5-B	W1MEH 14,304-301-14-AB	W1KPN 1378-53-3-A
K8WVO 1296-54-2-AB	WA2SPJ 871-34-3-B	WA2PVI 2250-63-8-A	W1HDP 894-205-12-AB	K1EYD 1326-51-3-AB
W8AJ 1200-54-2-B	WA2HQP 840-30-4-B	WA2KZP 2144-67-6-AB	K1EEW 6836-151-1-B	K1EYD 1326-51-3-AB
W8BSF 1200-54-2-B	W2ZVJ 832-29-4-B	WA2TNT 1984-62-6-AB	K1JOY 4824-134-8-AB	W1AGN 1079-42-3-A
W8BHZ 1118-43-3-B	K21GK 754-30-3-B	WA2HFO 1980-70-4-ABC	K1ILQ 4320-108-10-AB	KN1RZN 1084-38-4-AB
W8GQ 1100-50-1-B	W2DQW 738-23-7-B	WA2CNV 1860-62-5-AB	W1ECP 3660-92-10-AB	K1OKM 1021-37-4-AB
W8QHV 1100-50-1-B	WA2LPG 672-28-2-AB	WV2WIL 1856-58-6-AB	W1YDS 3752-94-9-ABC	K1SGS 1036-37-4-A
W8SNT 1100-50-1-AB	W2ZTKO 588-21-4-B	W22NYN 1820-65-4-B	KN1TOR 3400-100-7-B	W1EZW 1008-36-4-AB
W8VAI 1100-50-1-B	W2TNG 442-17-3-A	WA2ZNA 1728-54-6-ABC	W1LGE 2856-68-11-AB	W1FY 1008-42-2-A
K8SFW/8 1056-52-1-B	W2RQV 396-18-1-B	W2SMF 1530-51-5-A	KN1TKZ 2760-92-5-B	W1BK 900-33-5-A
K8TTV 1042-43-2-A	W2QB 390-15-3-A	W2SMJ 1430-55-3-ABC	K1RNC 2860-82-4-ABC	K1MJP 975-38-3-B
W8SQU 996-42-2-B	W2P 390-13-5-B	W2KQL 1260-42-4-ABC	K1RIR 1800-45-1-A	KN1NO 956-36-3-B
K8RFZ 880-40-1-B	WA2M1H 352-16-1-AB	W2JDU 1232-44-4-AB	K1OTQ 1652-59-4-B	K1WGL 944-38-3-A
K8UYG 836-38-1-AB	W2KSH/2 312-12-3-AB	WA2NEC 1200-40-5-B	K1RGO 1326-51-3-ABC	K1TKW 858-33-3-B
W8T8N/8 770-35-1-A	W2IEH 264-12-1-B	WV2UDT 1152-48-2-ABC	K1ISB 1138-41-4-ABC	KN1BMT 858-33-3-B
W8RRR 741-29-3-A	WA2HZW 224-8-4-AB	K2HHS 1148-41-4-AB	K1IYB 1148-41-4-ABC	W1LWU 832-32-3-B
W8KQX 726-33-1-A	K2AMX 68-3-1-A	W22ZY 920-65-4-B	K1IYB 1148-41-4-ABC	K1HGW 812-29-4-AB
W8QXO 726-33-1-A	WA2TIA (WA28 RXU TIA) 5400-150-8-AB	W2DZA 1728-54-6-ABC	K1IYB 1148-41-4-ABC	K1IPG 744-38-3-A
K1CRQ/8 720-30-2-B	K2YOU (5 oprs.) 1664-52-6-AB	WA2NEC 1200-40-5-B	K1IYB 1148-41-4-ABC	W1WLD 576-24-2-B
K8HNM 698-29-2-A	N. Y. C. - L. I.	WV2UDT 1152-48-2-ABC	KN1IEA 948-40-2-ABC	K1ICL 572-22-4-AB
W8TFL 660-30-1-A	WA2LRO 9114-218-11-A	K2HHS 1148-41-4-AB	KN1ISG 924-39-2-ABC	K1OIX 552-23-2-B
K8SVM 549-31-1-B	K2JWT 6400-160-10-ABC	K2VPT 1104-46-2-B	W1ICP 924-33-4-ABC	KN1TRK 528-22-2-B
K8KKK 638-29-1-B	W2AIKR 5640-142-10-B	K21QR 962-37-3-AB	W1IAX 912-39-2-ABC	K1OCG 680-22-2-ABC
W8SUT 638-29-1-A	K2RHD 5440-160-7-B	K21GK 848-30-4-A	W1UCA 845-34-3-B	K1NUN 132-18-2-A
W8TFL 624-26-2-AB	W2KXG 4824-134-8-ABC	W2AQV 808-31-8-A	K1BNO 768-32-2-B	W8UDL/1 312-13-2-A
K8RFD 616-22-4-B	K2SCD 750-25-5-AB	W2ZXP 792-33-2-B	K1BNO 768-32-2-B	K1RXR 220-10-1-A
W8J1L 616-28-1-B	K21PQ 3800-100-9-AB	W21VW 450-15-5-A	K1KVK 748-34-1-B	W1QHA 276-5-1-A
W801W 552-23-2-AB	W2EVE 3238-73-6-B	W2JCI 448-16-4-B	K1WIR 648-27-2-AB	K1DGM 274-8-2-A
K81DF/8 550-25-1-A	W2TUC 2100-75-4-BC	WV2SGK 403-16-3-B	K1OQE 390-16-3-B	K1AUG 120-5-2-A
K8RFG/8 550-25-1-A	W2V2BC 1960-70-4-B	WA2NMX 100-10-10-A	K1KVI 384-16-2-B	K1NOM 120-5-2-A
K8RHD/8 550-25-1-A	W2LFW 1938-57-7-AB	K21QR 264-12-1-BC	K1GSD 352-16-1-B	K1RAB 110-5-1-AB
W81N 528-24-1-A	W2ZPW 1900-50-9-A	WA2YA 242-9-2-AB	K1PAL 232-20-1-B	K1CXQ 96-3-1-BC
K8YXY 528-24-1-A	W2LJF 1856-58-6-AB	WA2CFE 182-7-3-B	KN1SR 110-5-1-B	W1NXY 60-3-1-B
K8AKH 484-22-1-B	WA2HQP 1680-60-4-B	WA2FNN 156-6-3-AB	W1IYU 448-16-4-ABC	K1OIX 48-2-2-ABC
K8KDW/8 462-21-1-B	WA2GFP 1652-59-4-A	W2SHU 110-5-1-A	K1QEO 390-16-3-B	W1QXQ (4 oprs.) 17388-378-13-AB
K8PTE 462-21-1-B	WA2TJU 1484-53-4-A	WA21FB 110-5-1-B	K1KVI 384-16-2-B	K1DIR (K1S DIR HVV) 956-230-10-AB
K8VZG 418-19-1-B	W28YX 1470-35-11-AB	K2VFT/2 72 3-2-A	K1GSD 352-16-1-B	K1HRM 850-14-1-AB
K8AZT 418-19-1-B	W2GMT 1344-48-4-AB	K2RGF (K28 RGF SCD, W2AFV) 7021-207-7-AB	K1PAL 232-20-1-B	HSD 856-194-12-ABC
K8LTV 396-18-1-B	WA2DRK 1248-39-6-B	W21VW 450-15-5-A	KN1SR 110-5-1-B	K1PLX (K1S K1B PLX PYE) 6920-173-10-AB
K8COT 384-16-2-A	W2EUS 1200-40-5-B	W2JDU 1232-44-4-AB	W1KBY (W1S K1B TLZ) 7150-164-12-B	K1TYW (K1TYW W1YK) 6800-200-7-A
K8OYT 374-17-1-B	W2QAN 1152-36-6-ABC	WA2NMX 100-10-10-A	K1NHT 5028-156-9-AB	K1DIR (K1S DIR HVV) 956-230-10-AB
W8ZOF/8 372-17-1-B	K2HGM 1065-36-6-A	K21QR 264-12-1-BC	K1JXB (2 oprs.) 4674-123-9-AB	K1HRM 850-14-1-AB
K8NZML 352-16-1-B	K2RTH 1026-27-9-ABC	WA2YA 242-9-2-AB	W1LUA/1 (4 oprs.) 3120-78-10-AB	HSD 856-194-12-ABC
W8WVQ/8 352-16-1-B	W2AFT 930-31-5-ABC	WA2CFE 182-7-3-B	W1HXG (K1GGS, W1HXG) 1560-65-2-B	K1PLX (K1S K1B PLX PYE) 6920-173-10-AB
K8RRQ 338-13-3-AB	WA21NK 910-35-3-B	WA2FNN 156-6-3-AB	KN1TD 1200-50-2-ABC	K1TYW (K1TYW W1YK) 6800-200-7-A
W8AJK 330-15-1-B	W2ZVJ 832-29-4-B	W2SHU 110-5-1-A	W1VJ 1200-50-2-ABC	K1QNG (K1S OBA QNG) 6403-160-9-AB
W8AL 330-15-1-A	W2YEN 1230-41-5-AB	WA21FB 110-5-1-B	W1W (W1S VLE) 984-41-2-ABC	K1QOG (K1QOG, KN1UAN) 6264-174-8-AB
W8VQ/8 330-15-1-B	WA2HQP 1680-60-4-B	K2VFT/2 72 3-2-A	W1HXG (K1GGS, W1HXG) 1560-65-2-B	K1CMU (2 oprs.) 4522-133-7-ABC
W81LC 330-15-1-A	WA2GFP 1652-59-4-A	K2RGF (K28 RGF SCD, W2AFV) 7021-207-7-AB	KN1TD 1200-50-2-ABC	K1IWI (K1S IW1 MCM) 3552-111-6-ABC
W8WKB 330-15-1-B	W28YX 1484-53-4-A	W21VW 450-15-5-A	W1VJ 1200-50-2-ABC	W1EPA (K1MOC, KN1SER, W1EPA) 2768-115-0-AB
W81UD 308-14-1-B	W2GMT 1344-48-4-AB	W2JDU 1232-44-4-AB	W1W (W1S VLE) 984-41-2-ABC	K1OQQ (4 oprs.) 1725-58-5-A
W8ODN/8 308-14-1-A	WA2DRK 1248-39-6-B	WA2NMX 100-10-10-A	W1HXG (K1GGS, W1HXG) 1560-65-2-B	K1JCU (K1S BFL JCU) 1410-47-5-B
KN8DQW 242-11-1-B	W2EUS 1200-40-5-B	K21QR 264-12-1-BC	KN1TD 1200-50-2-ABC	K1OPW (K1OPW, W1HQ) 1118-43-3-AB
W8CRC 242-11-1-A	W2QAN 1152-36-6-ABC	WA2YA 242-9-2-AB	KN1TD 1200-50-2-ABC	K1SXB (K1S SBX SEP) 816-34-2-A
W81CD/8 198-9-1-B	K2HGM 1065-36-6-A	WA2CFE 182-7-3-B	W1VJ 1200-50-2-ABC	K1NTS (K1NTS, KN1TQS) 754-29-3-B
K80WB/8 176-8-1-B	K2RTH 1026-27-9-ABC	WA2FNN 156-6-3-AB	W1W (W1S VLE) 984-41-2-ABC	Western Massachusetts
K81L 162-6-1-B	W2AFT 930-31-5-ABC	W2SHU 110-5-1-A	W1HXG (K1GGS, W1HXG) 1560-65-2-B	W1RPU 11,396-260-12-AB
K8JXE/8 110-5-1-A	WA21NK 910-35-3-B	WA21FB 110-5-1-B	KN1TD 1200-50-2-ABC	K1JLX 110,731-257-11-ABC
K8ADI/8 88-4-1-A	W2ZVJ 832-29-4-B	K2VFT/2 72 3-2-A	W1VJ 1200-50-2-ABC	
W8NAT 44-2-1-A	W2YEN 1230-41-5-AB	K2RGF (K28 RGF SCD, W2AFV) 7021-207-7-AB	W1W (W1S VLE) 984-41-2-ABC	
W8GCT (K8S H18 TCR, W8ULC) 14,472-402-8-AB	W2P 390-13-5-B	W21VW 450-15-5-A	W1W (W1S VLE) 984-41-2-ABC	
W81BI (5 oprs.) 11,736-326-8-AB	W2LJF 1856-58-6-AB	W2JDU 1232-44-4-AB	W1HXG (K1GGS, W1HXG) 1560-65-2-B	
K8LEP (K8S CGX LEP YV) 10,440-261-10-AB	WA2HQP 1680-60-4-B	WA2NMX 100-10-10-A	KN1TD 1200-50-2-ABC	
K8WPF (K8S WPF WTM) 2376-108-1-B	WA2GFP 1652-59-4-A	K21QR 264-12-1-BC	W1VJ 1200-50-2-ABC	
W8Y (K8S PHE VGL, W8DHG) 1118-43-3-A	W28YX 1484-53-4-A	WA2YA 242-9-2-AB	W1W (W1S VLE) 984-41-2-ABC	
	W2GMT 1344-48-4-AB	WA2CFE 182-7-3-B	W1HXG (K1GGS, W1HXG) 1560-65-2-B	
	WA2DRK 1248-39-6-B	WA2FNN 156-6-3-AB	KN1TD 1200-50-2-ABC	
	W2EUS 1200-40-5-B	W2SHU 110-5-1-A	W1VJ 1200-50-2-ABC	
	W2QAN 1152-36-6-ABC	WA21FB 110-5-1-B	W1W (W1S VLE) 984-41-2-ABC	
	K2HGM 1065-36-6-A	K2VFT/2 72 3-2-A	W1HXG (K1GGS, W1HXG) 1560-65-2-B	
	K2RTH 1026-27-9-ABC	K2RGF (K28 RGF SCD, W2AFV) 7021-207-7-AB	KN1TD 1200-50-2-ABC	
	W2AFT 930-31-5-ABC	W21VW 450-15-5-A	W1W (W1S VLE) 984-41-2-ABC	
	WA21NK 910-35-3-B	W2JDU 1232-44-4-AB	KN1TD 1200-50-2-ABC	
	W2ZVJ 832-29-4-B	WA2NMX 100-10-10-A	W1VJ 1200-50-2-ABC	
	W2YEN 1230-41-5-AB	K21QR 264-12-1-BC	W1W (W1S VLE) 984-41-2-ABC	
	W2P 390-13-5-B	WA2YA 242-9-2-AB	KN1TD 1200-50-2-ABC	
	WA2HQP 1680-60-4-B	WA2CFE 182-7-3-B	W1VJ 1200-50-2-ABC	
	WA2GFP 1652-59-4-A	WA2FNN 156-6-3-AB	W1W (W1S VLE) 984-41-2-ABC	
	W28YX 1484-53-4-A	W2SHU 110-5-1-A	KN1TD 1200-50-2-ABC	
	W2GMT 1344-48-4-AB	WA21FB 110-5-1-B	W1VJ 1200-50-2-ABC	
	WA2DRK 1248-39-6-B	K2VFT/2 72 3-2-A	W1W (W1S VLE) 984-41-2-ABC	
	W2EUS 1200-40-5-B	K2RGF (K28 RGF SCD, W2AFV) 7021-207-7-AB	KN1TD 1200-50-2-ABC	
	W2QAN 1152-36-6-ABC	W21VW 450-15-5-A	W1VJ 1200-50-2-ABC	
	K2HGM 1065-36-6-A	W2JDU 1232-44-4-AB	W1W (W1S VLE) 984-41-2-ABC	
	K2RTH 1026-27-9-ABC	WA2NMX 100-10-10-A	KN1TD 1200-50-2-ABC	
	W2AFT 930-31-5-ABC	K21QR 264-12-1-BC	W1VJ 1200-50-2-ABC	
	WA21NK 910-35-3-B	WA2YA 242-9-2-AB	W1W (W1S VLE) 984-41-2-ABC	
	W2ZVJ 832-29-4-B	WA2CFE 182-7-3-B	KN1TD 1200-50-2-ABC	
	W2YEN 1230-41-5-AB	WA2FNN 156-6-3-AB	W1VJ 1200-50-2-ABC	
	W2P 390-13-5-B	W2SHU 110-5-1-A	W1W (W1S VLE) 984-41-2-ABC	
	WA2HQP 1680-60-4-B	WA21FB 110-5-1-B	KN1TD 1200-50-2-ABC	
	WA2GFP 1652-59-4-A	K2VFT/2 72 3-2-A	W1VJ 1200-50-2-ABC	
	W28YX 1484-53-4-A	K2RGF (K28 RGF SCD, W2AFV) 7021-207-7-AB	W1W (W1S VLE) 984-41-2-ABC	
	W2GMT 1344-48-4-AB	W21VW 450-15-5-A	KN1TD 1200-50-2-ABC	
	WA2DRK 1248-39-6-B	W2JDU 1232-44-4-AB	W1VJ 1200-50-2-ABC	
	W2EUS 1200-40-5-B	WA2NMX 100-10-10-A	KN1TD 1200-50-2-ABC	
	W2QAN 1152-36-6-ABC	K21QR 264-12-1-BC	W1VJ 1200-50-2-ABC	
	K2HGM 1065-36-6-A	WA2YA 242-9-2-AB	W1W (W1S VLE) 984-41-2-ABC	
	K2RTH 1026-27-9-ABC	WA2CFE 182-7-3-B	KN1TD 1200-50-2-ABC	
	W2AFT 930-31-5-ABC	WA2FNN 156-6-3-AB	W1VJ 1200-50-2-ABC	
	WA21NK 910-35-3-B	W2SHU 110-5-1-A	W1W (W1S VLE) 984-41-2-ABC	
	W2ZVJ 832-29-4-B	WA21FB 110-5-1-B	KN1TD 1200-50-2-ABC	
	W2YEN 1230-41-5-AB	K2VFT/2 72 3-2-A	W1VJ 1200-50-2-ABC	
	W2P 390-13-5-B	K2RGF (K28 RGF SCD, W2AFV) 7021-207-7-AB	W1W (W1S VLE) 984-41-2-ABC	
	WA2HQP 1680-60-4-B	W21VW 450-15-5-A	KN1TD 1200-50-2-ABC	
	WA2GFP 1652-59-4-A	W2JDU 1232-44-4-AB	W1VJ 1200-50-2-ABC	
	W28YX 1484-53-4-A	WA2NMX 100-10		

# No-Holes V.H.F. Mobile Installations

*Some Car-Saving Hints for 6-  
and 2-Meter Mobile Enthusiasts*

BY EDWARD P. TILTON,\* W1HDQ

Latest in a long line of W1HDQ mobile installations. Antenna shown, a 2-meter turnstile, can be removed in a few seconds and whips for 50 or 144 Mc. substituted.



ALMOST since the first ham gear was installed in a car, the fellow who wants to work mobile has had to do battle with other members of the family, and stare down his car dealer, before getting clearance for installation of a mobile rig in the family chariot. This is not surprising, in view of what is done to some cars in the name of amateur radio. The writer speaks from experience in this department, having had his first mobile QSO in the summer of 1933 (when in-motion operating of a ham station had not yet been legalized) and he has owned mobile gear of some sort almost continuously ever since.

The Corvair Monza, bits of which appear in some of our pictures, is the 12th car to carry W1HDQ/mobile. Every new car presents new problems, but we have found it possible to make a good installation for 50 and 144 Mc. without upsetting the principal other occupant of the car too greatly. Perhaps it's just that she's well accustomed to this business by now, but even the dealer who sold the car agrees that nothing has been done to lower its trade-in value. Possibly some would-be v.h.f. mobileers will be interested in the means by which this desirable state of affairs is achieved.

### *No Holes — Almost!*

Now and then it is possible to make a true no-holes installation, but more often the term

\* V.H.F. Editor, *QST*.

used for our title requires a little modification. There are many ways to run wires and mount antennas, using holes that will not show. This may not always be easy when you have to accommodate a 10-foot, center-loaded whip, but the kind of antenna needed for 50 or 144 Mc. can be installed fairly simply and unobtrusively. Fixtures for v.h.f. antennas can be attached to the car body in various ways, or adapted to some kind of bumper mount. It is nearly always possible to design the entire setup so that it can be removed in a matter of minutes, leaving no visible evidence that the car formerly housed an amateur mobile station. If you trade cars fairly often, this is a considerable asset. Let's consider body mounts first.

If your car is equipped with a broadcast receiver, it probably also has a whip. The simplest mobile installation for 6 or 2 uses this whip, and nothing more. At something around 53 inches long, a whip will work passably on both 6 and 2, without too bad a mismatch to either 50- or 75-ohm cable. In fact, with 50-ohm coax and an adjustable whip there will be lengths that will give near-perfect match on both bands. This is not the world's best antenna, but it will work, and many v.h.f. mobiles use nothing more.

The usual place for a broadcast whip is not the best spot for a v.h.f. antenna, vertical or otherwise, but it will do in a pinch, especially for the aesthetically timid. Then there are ways to utilize the whip, or something more solid

mounted in the same way, as a support for a 2-meter halo<sup>1</sup> or turnstile, in order to capitalize on the advantages of horizontal polarization. One of the neatest jobs we've seen done with a turnstile is the 2-meter mobile setup of W1CUT. Laird modified one of his turnstiles<sup>2</sup> by installing very small-diameter white coax, in place of the original black vinyl-covered feed line. He taped the 90 degree phasing loop to the vertical support with white plastic tape, and then ran the main feed line down inside a 1/4-inch dural tube used for the main support. The mount is one normally used for broadcast whips, and it is in the usual place, on the cowl just ahead of the door on the driver's side. The turnstile is high enough to clear pedestrians, and with the partial camouflage described, it draws far fewer of those dreaded "What channels do you get on that thing?" comments than the installation pictured in the original turnstile article.

### Rear-Deck Mounting Methods

The rear-deck opening on most cars is a good place for whip mounts, if not for more ambitious antenna supports. A small piece of sheet aluminum only a little wider than a coax fitting and perhaps 3 to 6 inches long can be bent up to fit tightly into the rain gutter at almost any spot around the edge of the rear-deck opening. One or more self-tapping screws can be run into the bottom or side of the gutter to hold the mount in place, but often such fastening is not needed. No use making a sketch; the problem is different for every car. If RG-58/U or smaller coax is used, it can be run from the exposed coaxial fitting, over the edge of the gutter, and into the car wherever convenience dictates, or you can drill a hole in the rain gutter at the risk of a slight leak. A small hole in the forward wall of the rear compartment will permit the coax to be fed into the passenger area, and run under the rug up to the operating position, in any number of ways. Various W1HDQ mobile installations using versions of this technique have appeared in *QST*,

<sup>1</sup> For a 2-meter halo that uses the whip as part of the transmission line, see Breetz, "A Simple Halo for 2-Meter Mobile Use," *QST*, August, 1957, page 29.

<sup>2</sup> Campbell, "Turnstile for Two," *QST*, April, 1959, page 29.

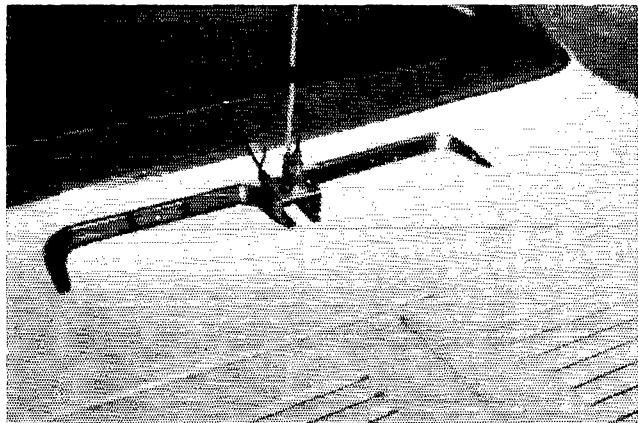
the *Handbook* and the *Antenna Book* on numerous occasions, one being clearly visible in the cover picture of September, 1958, *QST*.

Many cars have easily removable bits of trim that offer possibilities for hidden access holes. Pontiac of a few years back was a favorite with mobile enthusiasts, because of a removable emblem on the side of the rear fenders, just the right size to be replaced by a spring mount. Not many car makers are that considerate, but there's usually some gimmick that can be removed or drilled, and then either replaced or repaired when trade-in time comes around.

The Monza's contribution to v.h.f. mobile is in the form of two U-shaped decorations on the horizontal surface just in back of the rear window. Our photo shows one way of making use of these. The antenna mount, an inverted U of aluminum, is held in place by the two sheet-metal screws that fasten the trim to the car body. The trim is a stock item, inexpensive to replace, so you can drill it to your heart's content. The car body can also be drilled in back of the trim, and when the brightwork is replaced there will be no visible hole.

We drilled a quarter-inch hole in the sloping surface of the body in back of this trim. A couple of inches farther in there was a metal partition in the way. This was drilled through, keeping the drill pointing down at an angle of about 30 degrees below horizontal. Then a piece of quarter-inch tubing a couple of feet long was run down through these two holes, and the point at which it touched the fiber wall in back of the tilt-forward Monza seat was determined by probing carefully. Another hole was made at this point through the fiber backing, and the tubing was run into the passenger compartment through this hole. Small-diameter coax was snaked through the length of tubing, and then the latter was pulled out. The small coax is expensive, and its r.f. loss is high, so we used only a short length, patching on some RG-58/U to make the run under the carpet, up to the dash area.

The antenna mount has a coax fitting mounted on its upper surface. The bracket was made from 1/16-inch sheet aluminum, which turned out to be flimsy, even after being bent into the desired



Closeup of the antenna mount. Note that it is held in place with two sheet-metal screws that also are used to mount the U-shaped pieces of trim. The trim at the right is drilled to take small-diameter coax. In removing the installation, the trim can be repaired or replaced, covering the single small hole drilled in making the installation.

shape and fastened in place. The solution was to fit a piece of  $\frac{1}{8}$ -inch aluminum under the top surface, adding enough stiffness to support the turnstile steadily.

We now have a choice of simple whips, which can be attached by means of a coax fitting, or any more pretentious antenna that can be supported by the bracket. The turnstile support is quarter-inch tubing, slipped into a socket made from half-inch aluminum rod. This is about 2 inches long, drilled to a depth of 1 inch. A key point here is that the turnstile support is a sliding fit in this hole. Leaving it free to rotate in the mount will save many an element when the antenna brushes minor obstructions. It won't take a solid whack against a heavy tree branch, but it has survived many lesser encounters that might have wrecked a more-solidly-mounted turnstile.

Locating an antenna of this kind at some point where it does not overhang the edges of the car has many advantages, perhaps the most important being protection of pedestrians. A turnstile at eye level can be murder otherwise, and putting it high enough to clear tall pedestrians may mean risking a lot of tree-branch and garage trouble. Long experience with mobile antennas on the v.h.f. bands has convinced the writer that a few inches of height one way or another is of no real importance performance-wise, so this one was set only high enough to put it reasonably above the top of the car, and at a height that would not appear out of proportion to the car. Few people outside amateur radio will call this a beautiful installation, but any ham has seen worse! If we want to look our best, we can lift the turnstile off at a moment's notice, and substitute piano-wire whips for either 50 or 144 Mc., that are all but invisible except at very close range. The 6-meter job is only 30 inches long, base-loaded, but it works well enough so that we've had some good DX contacts with it when conditions were right.<sup>3</sup>

### Some Bumper Mount Hints

If you're going in for real eyesores like 6-meter halos or other large antennas, you'll need something more substantial than what we've been talking about up to now. Probably the simplest and least damaging to the car is some kind of bumper mount. There are several on the market that can be adapted to our purposes, but if you're a real scrounger you can make one just as good, or better, for a lot less money.

If the antenna is as heavy or clumsy as a halo, you'll probably want to support it on a length of tubing, 1 to  $1\frac{1}{2}$  inches in diameter. This can be held to the several available bumper mounts in ways too numerous to mention. A lighter antenna such as a 2-meter halo or turnstile can be supported with something a bit less obtrusive. An arrangement we've used on several cars is shown in Fig. 1.

Clamps of  $\frac{1}{8}$ -inch aluminum, A and B, hook over the inner edges of the car bumper. A U-

<sup>3</sup>Two base-loaded 50-Mc. whips are described in March, 1960, *QST*, page 18.

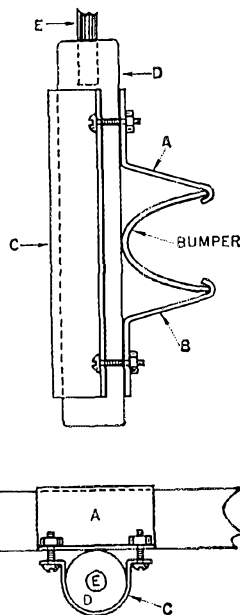


Fig. 1—Top and side views of a bumper mount for v.h.f. antennas. Clamps of  $\frac{1}{8}$ -inch aluminum, A, B and C, hold a round vertical member, D, tightly to the bumper. Large antennas such as a 6-meter halo will require a 1- to  $1\frac{1}{2}$ -inch aluminum support. Lighter antennas may employ a wooden dowel, E, as shown at D, drilled to take a  $\frac{1}{2}$ -inch aluminum rod, E, of any desired length. Dimensions are not given, as they will vary with each installation.

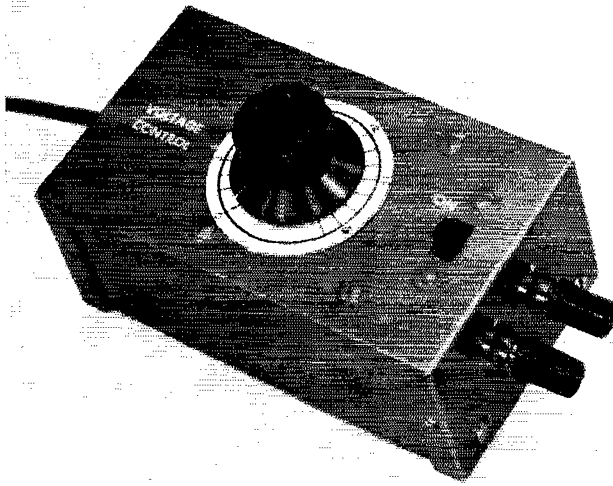
shaped clamp, C, is bent around to fit a round wooden dowel, D, which takes the support, E, for the antenna. If the aluminum parts are buffed clean and then sprayed with clear lacquer, and the wood dowel is treated with metallic paint, this inexpensive mount will look as good as anything you can buy, and it will cost very little. The wooden member need not be round, but round stock is easy to come by. It should be 1 to  $1\frac{1}{2}$  inches in diameter. If it is of hard wood it will last almost indefinitely. Soft wood may be strengthened by adding a strap of metal (a hose clamp is good) around the top, where the hole for the vertical support is drilled.

Our vertical antenna support was  $\frac{1}{2}$ -inch aluminum rod about 4 feet long. This was drilled at the top end to take the turnstile's  $\frac{1}{4}$ -inch support, in a manner similar to that shown for the short stub in the photograph. This left the turnstile free to spin, even more of an asset on a support mounted on the back bumper than where the antenna does not extend beyond the car body.

This type of mount has been used on several cars in conjunction with a rear-deck whip socket, and it can be removed in a moment's time and whips substituted, for appearance's sake. There are times when most of us want to muster whatever dignity we can, and 2-band halos<sup>4</sup> and other

(Continued on page 148)

<sup>4</sup>Tilton, "Two-Band Halo for V.H.F. Mobile," *QST*, September, 1958, page 11.



This compact unit is a battery substitute for use with transistor circuits. Output voltage is adjustable up to slightly more than 18 volts. The calibration scale shown is in terms of no-load voltage.

# A Transistor Power Supply

## Battery Substitute for Transistor Circuits

BY GEORGE GRAMMER,\* W1DF

IN ham circles the words "transistor power supply" are usually taken to mean a modern substitute for the vibrator supply. This one isn't. It's an a.c.-line-powered supply for transistors.

One of the nice things about transistors is that they take so little power — easily furnished by a few flashlight cells (it says here). There are two fallacies in this pleasant theory: (1) You never have any flashlight cells when you get the urge to try a transistor circuit; or (2) you have some, but they're dead. A few of both experiences prompted the construction of the low-voltage d.c. supply shown in the photographs. Its output voltage is adjustable up to 18 volts, depending on the current demanded of it. The maximum current at 18 volts is about 30 ma., but at some lower voltages the current can be as high as one-half ampere.

### The Circuit

The electronic filter circuit used by Joe Galeski in his "Imp-TR" <sup>1</sup> appeared to answer the prob-

\* Technical Editor.

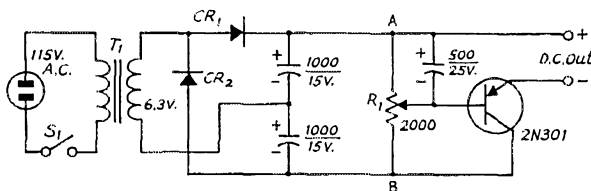
<sup>1</sup> Galeski, "The 'Imp-TR,'" *QST*, December, 1961.

lem of how to get adequate hum filtering. This circuit also suggested the possibility of getting continuously-adjustable d.c. output voltage, by installing a potentiometer for setting the base bias of the filter transistor.

To save the trouble of rewinding a transformer to give some desired output voltage, a 6.3-volt filament transformer was used, along with a voltage-doubling full-wave rectifier. This on the theory that a nominal 12-volt supply would take care of nearly all requirements, since 12 volts is standard for car electrical systems.

The parts were first haywired together on the bench to see how the circuit would work. It met expectations, so the version shown was built up. The Minibox is 5¼ by 2½ by 8 inches. Everything is insulated from it, so either side of the output circuit can be grounded.

The only part of the circuit that required any special attention was the potentiometer,  $R_1$ . A few measurements showed that the d.c. output voltage stayed more constant with load changes as the total resistance of  $R_1$  was made smaller. However, reducing the value of  $R_1$  also decreased

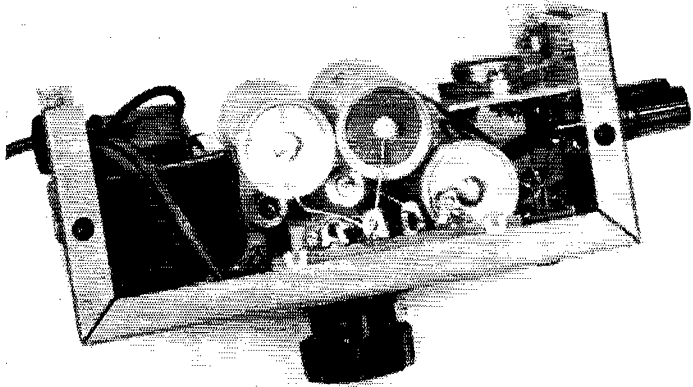


$CR_1, CR_2$ —Silicon, 750 ma., 50 volts or more inverse peak (1N536, etc.).  
 $R_1$ —2000-ohm control, linear taper.  
 $S_1$ —S.p.s.t. slide switch.  
 $T_1$ —Filament transformer, 6.3 volts, 1.2 amp.

Fig. 1—Circuit of the low-voltage power supply. Capacitances are in  $\mu\text{f.}$ , capacitors are electrolytic. Resistance is in ohms.

All circuit wiring is between tie points on two strips, one mounted as shown and the other in the corresponding position on the far side of the box. The two diode rectifiers can be seen below the two filter capacitors in the center; these capacitors are the 1000- $\mu$ f. electrolytics in the voltage doubler. The filter capacitor for the transistor base is at the right. The transistor is mounted on an aluminum shelf measuring 2½ by 1½ inches, with a half-inch mounting lip bent upwards. Insulating washers are used in bolting the shelf to the side of the case, since the collector is not insulated from the shelf.

The binding posts are similarly insulated.



the effectiveness of the electronic filter, no doubt because the  $RC$  product in the base circuit should have been kept constant. Unfortunately, getting some additional hundreds of microfarads at a 25-volt rating would have run into undesirable bulk. A value of 2000 ohms for  $R_1$  was finally settled upon as a suitable compromise.

Incidentally, the transistor is not a d.c. regulator *per se*. The circuit does resemble the series-type regulator, but there is no stable fixed voltage to serve as a reference. Nevertheless, there is a species of d.c. regulation — enough so that the output voltage is held considerably more constant than the d.c. input voltage (between points A and B) with changes in load current. With a fixed setting of  $R_1$  in the middle range, the voltage drop is of the order of 20 per cent, from zero output current to a load of around 300 ma. At light loads (up to perhaps 50 ma.) such as would be representative of most transistor circuits, the drop is under 5 per cent — hardly noticeable. The d.c. could easily be regulated by using a Zener diode as a reference, but at the expense of the voltage-adjustment feature.

### Ratings

The supply wasn't intended to be a replace-

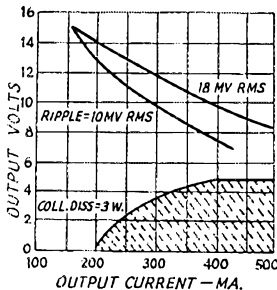


Fig. 2—Rating chart—permissible output current vs. output voltage. Power-supply ripple voltage will be less than the values given by the two top curves for all points below the curves. The shaded area should be avoided because in this region the transistor temperature will be over the rating unless an adequate heat sink is provided.

ment for a storage battery, but all of the components used do have rather ample ratings, as compared with what might be taken continuously from flashlight cells. Theoretically, the d.c. output current should be limited to no more than 350 ma. or so, to keep within the ratings of the 1.2-amp. filament transformer. However, the transformer doesn't get particularly hot at this load. The actual limitations on output power are tolerable ripple voltage and transistor heating.

The ripple-voltage limitation applies at the higher d.c. output voltages, as shown by the two upper curves in Fig. 2. A figure of 10 millivolts r.m.s. was chosen as a tolerable ripple, more or less arbitrarily. It represents just detectable hum in a pair of headphones connected across the supply output terminals (with low ambient noise and a headset having reasonably good low-frequency response). This is probably a rather severe test; we haven't yet heard a trace of hum in actual use of the supply on transistor equipment. The 18-mv. curve can be taken as an "absolute" maximum, because at higher current the hum increases rapidly; the electronic filter begins to lose control above this level.

Transistor heating is the limiting factor at low output voltages. Here the collector-to-emitter voltage is highest, leading to maximum collector dissipation. The 2N301 is rated for a flange temperature of 80 degrees C. A series of tests showed that, with the type of mounting and enclosure used here, a collector dissipation of 3 watts was just under this temperature rating. It takes a few hours for the transistor temperature to stabilize at this figure, and larger currents than are shown by the curve of Fig. 2 can be taken for short periods if the transistor is allowed to cool off subsequently. Ordinarily, however, the shaded region should be avoided. The transistor limitation could be removed by using a regular heat sink for the 2N301, but this would increase the bulk by a considerable margin.

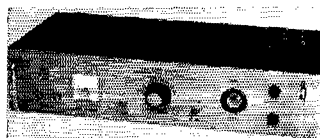
### Uses

In most transistor circuits the steady current

(Continued on page 148)

# • Recent Equipment —

## Alltronics Model K RTTY Converter

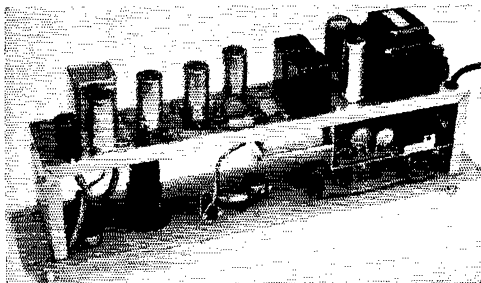


UP to now there have been few well-engineered RTTY converters available either commercially or in war surplus for radio amateurs interested in teletype. Home-brewed terminal units (TU) or converters have been the order of the day. Some good designs have evolved<sup>1</sup> and met the test of amateur practice. The features required for optimum performance in amateur RTTY operating have now been combined in a unit that is simple to handle and dependable in performance. This unit, the Alltronics Model K Telewriter converter, operates on the audio impulses received from the output of any reasonably-stable communications receiver. These signals are converted to provide timed d.c. impulses for printing RTTY signals. The block diagram in Fig. 1 indicates the different elements that make up a complete receiving and transmitting system and, except for the teletypewriter-printer, the terminal unit is probably the essential component that non-RTTY amateurs may require to adapt their existing stations for RTTY operation.

The Alltronics converter can be rack-mounted or not, as the user prefers: it has the advantage of compactness (our composite designs have too often been unduly bulky). It contrives an excellent balance and clean-cut appearance without this in any respect being allowed to handicap its essentials of convenience in placement of operational controls.

There's an effective use of a dual magic-eye tube for quick easy-tuning-in of f.s.k. signals. (Our personal choice is for cross lines on an oscilloscope. However, Alltronics approach is practical and saves the user considerable space as well as permitting the dollar's worth to go farther in

<sup>1</sup> R. G. Bernstein, "An Inexpensive Radioteletype Converter," *QST*, January, 1953, p. 44.



This view of the converter shows how most of the components are mounted on a "U"-shaped chassis, which is in turn attached to the 19-inch rack panel. Cover plates have been removed for this photograph.

equipment.) There are two front-panel closed-circuit jacks connected in series so that a printer and re-perf can be operated at the same time in the series loop. If desired, a single printer can be used. There's the expected ON-OFF switch, a SEND-RECEIVE switch, and a REVERSE switch that permits a quick turnover on any signals on which mark and space are found to be reversed, or if a signal is tuned in "upside down."

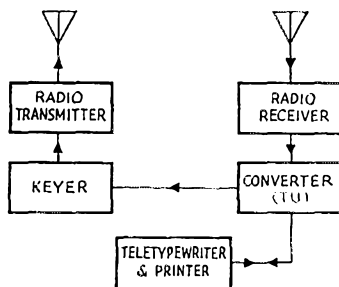


Fig. 1—Block diagram showing a typical RTTY setup.

### Operation

The block diagram of the Model K converter is shown in Fig. 2. Incoming signals first pass through a two-stage limiter,  $V_1$ , which adjusts the amplitude variations to a desired standard, permitting weaker signals to have their equal chance to be copied. A linear discriminator amplifier,  $V_2$ , and a rectifier circuit permit operation with normal 850-cycle shift or reduced (narrow) shifts. Low-pass filtering is used here to reduce noise and take out interfering beat notes higher than the dot rate. A symmetrical clipper and d.c. amplifier,  $V_3$ , slices out a section of the filtered pulses, removing any remaining distortion and beat frequencies riding on top of the pulses. A rotary control located at the center of the converter's panel, labeled DISTORTION, and normally in the 12 o'clock position, allows for increase in the weight of either mark or space to reduce errors caused by distortion of signals due to propagation anomalies.

The printing loop is operated from a final keying-tube stage,  $V_4$ , which connects directly to the printer magnets. This is a recommended way to give electronic keying, which means freedom from the radio noise sometimes generated in relay-keyed loop circuits.

### Adjustments

A meter on the front panel of the converter measures loop current. This can be adjusted



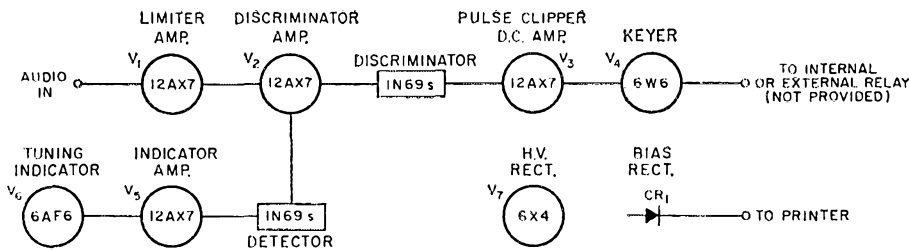


Fig. 2—Block diagram of the Model K converter.

"right-on-the-nose" for 30 or 60 ma. or other desired values. Adjusting the slider on an accessible internal resistor lets the user respect the printer manufacturer's exact specifications for his machine, or change equipment from series to paralleled magnet connections. The internal 120-volt d.c. supply for the printer and keyer tube is independent of the plate supply for the rest of the converter circuit. This lets you put the printer loop at ground potential.

A separate adjustable resistor and metering jack lets you adjust the loop supply to give correct bias current for an internal or external polar relay (which is not furnished) for f.s.k. or a.f.s.k. uses.

Front panel controls allow the dual tuning-eye indicator,  $V_6$ , to be set. Adjustment is made so that the mark eye just closes when a 2125-c.p.s. mark signal is tuned correctly, and so that the space eye closes when a 2975-c.p.s. signal is tuned in.

Other provisions in the converter include an

octal socket in which a polar relay (optional) may be plugged. This is used for frequency shifting a v.f.o. for transmission. The keyboard in series with the printer loop activates this relay when the converter is switched to SEND. An output plug is provided on the back of the Model K, so that the converter can in this same way operate an external polar relay for transmission, additional loop circuits, etc. — F. E. H.

### Alltronics Model K RTTY Converter

Height: 4 inches.

Width: 19 inches.

Depth: 8 inches.

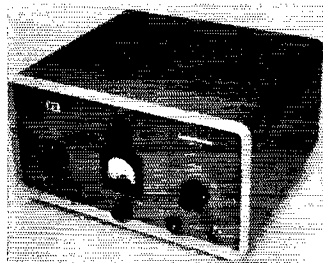
Weight: 7 pounds.

Power requirements: 117 volts, 60 cycles, 50 watts maximum.

Price class: \$190.

Manufacturer: Alltronics-Howard Co., Box 19, Boston 1, Mass.

## The Loudenboomer Linear Amplifier



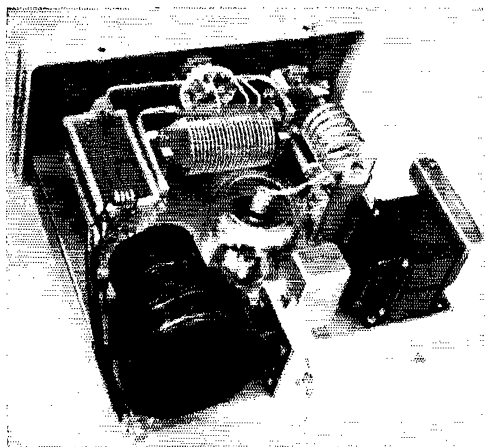
So far as we know, the Radio Industries Loudenboomer, Mark II, is the first commercial rig to use the new Eimac 3-400Z high- $\mu$  zero-bias triode.<sup>1</sup> Probably the most convenient feature of the tube, and thus of the amplifier, is that no bias or screen voltage is necessary. This greatly simplifies the power-supply problem, as only a single high-voltage power supply, delivering about 2500 to 3000 volts at 350 ma., is necessary to operate the amplifier at the full legal input.

Designed for table-top operation, your external power supply (a matching power supply is available from Radio Industries), is placed on the floor or in any other convenient spot away from the amplifier. Since all of the operating controls for

the power supply are on the amplifier unit, the power supply need not be touched by the operator when turning the unit on and off or when going from send to receive.

About 40 watts of drive are required for full input to the amplifier and, since the tube is connected in grounded grid, a large percentage of drive power appears as useful r.f. output. Drive is applied to the 3-400Z filament through a broadband transformer designed for an input impedance of approximately 50 ohms on all bands from 80 to 10 meters. A pi-network plate tank, using an adjustable output loading capacitor, allows for working the amplifier into a variety of load impedances, but the amplifier is nominally designed for operation into a 50-ohm nonreactive load. In order to maintain low minimum capaci-

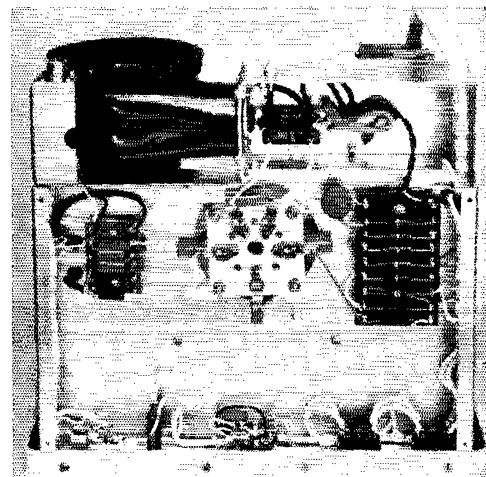
<sup>1</sup> Barber and Sutherland, "High-Power Zero-Bias Grounded-Grid Linear," *QST*, September 1961, p. 11.



A neat layout of components is evident from this view of the Loudenboomer grounded-grid linear amplifier. A glass chimney surrounds the 3-400Z tube. The subchassis to the right of the blower contains the filament isolation circuit. The phono jack on this chassis is for introducing the drive to the amplifier. Notice the safety interlock switch assembly attached to the filament transformer. Amplifier output is taken from the 50-239 connector which is to the bottom left of the blower. Power for the amplifier is fed through the multiconductor cable running in at the lower right of the photograph.

tance, the Loudenboomer uses a 100- $\mu$ fd. tank tuning capacitor for the bands 40 through 10 meters. On 80 meters an additional 100- $\mu$ fd. fixed ceramic capacitor is switched in parallel with the main tuning capacitor by a lever-operated rotary switch located just below the main TUNING control on the front panel.

In addition to the TUNING and LOADING controls, there is a five-position BAND SWITCH, two



Bottom view of the Loudenboomer with its cabinet removed. The blower supplies air, which feeds into the shielded compartment at the upper right, then into the main chassis and out through the hole around the tube base. The resistor board to the right of the tube socket contains components associated with the voltage divider for the plate voltage meter.

15-amp. toggle switches (PLATE and FIL) for remote control of the power supply (the FIL switch also controls the blower, and heater voltage for the tube in the amplifier), and a four-position meter switch. Grid current, plate current, relative r.f. output voltage, and d.c. plate voltage are measured. A 1N34A diode is connected through a voltage divider to the amplifier tank circuit for measuring the relative r.f. output voltage.

A cable is part of the amplifier package for connection to the remote power supply. High voltage for the amplifier goes through a separate lead to a safety terminal at the rear of the amplifier chassis.

Safety has not been overlooked in the Loudenboomer. A safety interlock switch is operated by the hinged lid on the amplifier cabinet and opens the 117-volt primary circuit when triggered. However, the metering circuit requires that the negative power-supply lead be above amplifier chassis ground by about one quarter of an ohm. For this reason it is, of course, necessary for the power supply also to have its negative output lead above ground since, in the interest of good safety, the power supply and amplifier chassis should both be connected to the "shack" ground.

The instruction manual furnished with the amplifier contains the usual installation, operating and circuit information. — E. L. C.

### Radio Industries Loudenboomer Linear Amplifier

Height: 7 $\frac{1}{8}$  inches.

Width: 11 $\frac{1}{8}$  inches.

Depth: 12 $\frac{1}{8}$  inches.

Weight: 25 pounds.

Power requirements: 117 volts a.c., 2500 to 3000 v.d.c., 350 ma.

Price class: \$280 (power supply, \$160).

Manufacturer: Radio Industries, Inc.,  
1307 Central Ave., Kansas City, Kansas.

## Strays

All for Want of a Penny

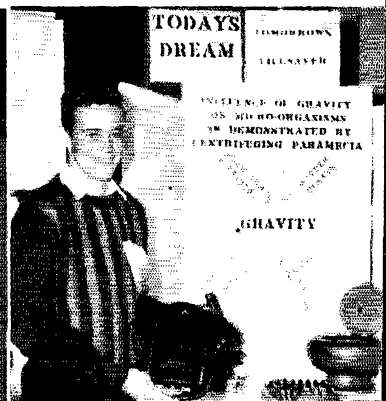
An applicant for an amateur examination by mail forged the signature of a licensed amateur as certifying to his qualifications. However, since the would-be ham failed to put sufficient postage (a difference of one cent) on the envelope, it was not delivered to the FCC but was forwarded to the licensed amateur whose return address appeared on the envelope. The amateur immediately reported the attempted deception to the Los Angeles field office. The case is under study by FCC.

— . . . . —  
WA2SLY and WA2RAT are brothers, and sons of WA2QAO.

— . . . . —  
Congratulations to KH6IJ, recently appointed assistant professor of physics at the University of Hawaii.



In the photo above left, in the usual order, are W9PRN, Illinois SCM; W9GPI, Central Division Director; K9CJH, Twin City ARC president; and KØIAX /9, QST author. KØIAX is seen receiving a cover plaque award from W9GPI, his article in the January issue of QST having been selected by the League's directors for the award. . . . Above center is W2IXU listening to astronaut John Glenn. W2IXU reports that plenty of hams, using both surplus gear and modified ham gear, were in on the project to pick up Glenn's voice and feed it to NBC. . . . Above right we see WØCXX, president of Collins Radio, receiving the Navy's highest civilian award, the Distinguished Public Service Award, from Vice-Admiral Pirie. The citation pays tribute to WØCXX for his contributions of time and genius in all phases of naval communications and electronic navigation and says, in part: "Every Navy ship, aircraft and shore station has equipment made possible by his personal inventive genius."



Above, left, W8RLT gives a demonstration of ham TV at the Wolverine ARS. K8PIJ and K8ARQ look on. . . . In the center, W1JMA, FCC engineer in charge of the Boston office, receives a plaque from W1JLN (r.) in appreciation for the many years of service he has rendered radio amateurs. . . . Right, KØFYD looks pretty happy after winning science fair honors. He received an all-expense trip to the World Fair in Seattle, and was there during early May.

The Johnson twins, WA6QMX and WA6QMY, were almost completely paralyzed by rheumatoid arthritis years ago while in the 5th grade. Alert mentally, they have only the smallest use of their right hands. Their KWM-2 is rigged up so that it can be turned on and off and tuned anywhere in a particular band by means of a stepping relay, and they can also rotate the beam. The boys handle phone traffic all day long and so, despite a great physical handicap, perform a substantial public service. Their ham radio tutor was Father Joseph Prince, WA6JOF, standing at the left. At the right is ARRL Southwestern Division Director Ray Meyers, W6MLZ, who is working closely with the twins to organize a net to be known as the "Handicappers." This net will be composed of handicapped hams who spend most of their time at their ham rigs and who will monitor the national calling and emergency frequencies, rendering whatever public service they are called upon to do. W6MLZ will serve as corresponding secretary of the "Handicappers," and the San Diego Council of Radio Clubs will furnish engraved certificates for net members. As a starter, look for the Handicappers around 14,300 kc., sideband. And if you want further information, or if you know of someone who should be recruited for this net, write to Ray Meyers, W6MLZ, Box R, San Gabriel, Calif.





# Hints and Kinks

## For the Experimenter



### B.C. RADIO ANTENNA CONNECTOR SUBSTITUTE

WHEN I tried to connect my new mobile converter to my automobile b.c. receiver, I found that I needed a Motorola type antenna plug to fit the car broadcast receiver antenna input jack. Quite by accident, I found that the common phono plug can be used as a substitute for the Motorola type antenna plug. Since most junk boxes contain a supply of the phono plugs, it is not only less expensive but more convenient to use the phono plugs, since they also fit the connectors of most converters. The phono plugs fit the Motorola flange jack when they are inserted fully into the outer shell of the jack.

— Edward E. Thomas, WAZKQO

### STORING RESISTORS

TO keep track of my many hundreds of junk-box resistors I use pint pickle jars with the lids fastened to the under side of a shelf. I then separate the resistors by the first color code ring; that is, I put all of the resistors that start with a brown ring in the first jar and so on through the color code. With this system, any value from 1 to 10 megohms is in the first jar, 2 to 20 megohms in the second, etc. — W. E. Leverkus, W5KFY

### SOLDERING GUN HINT

IF the tips of Weller soldering guns are inverted, there will be better illumination of the work by the built-in lamps.

— Kenneth G. Kopp, W5TKI/4

### PAPER THERMOMETERS

HEAT-SENSITIVE paper which changes appearance sharply from white to black at predetermined temperatures can be conveniently used to measure the temperature of transistors, diodes, and vacuum tubes. "Thermopaper" is available in 36 different temperatures, ranging from 100 to 400 degrees F. The change from white to black occurs within a fraction of a second with a rated accuracy of plus or minus 1 percent of the stated temperature. The paper thermometers are supplied in glass vials in ready-to-use  $\frac{1}{4} \times 2$ -inch strips. Each vial contains 100 strips of a single temperature. Thermopaper can probably be obtained from large welding-supply houses or other large industrial suppliers.

— Robert L. Martin, K1CJX

### PLASTIC CLOTHESLINE TEST

AN engineer friend of mine was kind enough to make some tests for me on plastic clothesline, the kind used by many amateurs for antenna guys. The line tested was plastic-covered and filled with a rayon cord, and measured about  $\frac{5}{8}$  of an inch in diameter. All the tests were made with 12-inch lengths taken from the same piece of line. Here are the results of the test:

Length at Failure (in.)	Load at Failure (lbs.)
14 $\frac{3}{4}$	240
14 $\frac{7}{8}$	275
14 $\frac{3}{4}$	250

— Walter Myers, W3MKT

### KEYING MODIFICATION FOR THE 200V

THE 200V transmitter develops an undesirable transient when switching between transmit and standby, and sometimes has key clicks when operating on c.w. This seems to be because of the high value of blocking bias applied to a number of low-level stages. The circuit shown in Fig.

1 shows some additions to the original circuit that will eliminate the trouble. All of the starred components in Fig. 1 are added components. In the case of the two capacitors, the 2- $\mu$ f. units should be either mylar or paper types, not electrolytics.

— O. M. Carter, W9ADN

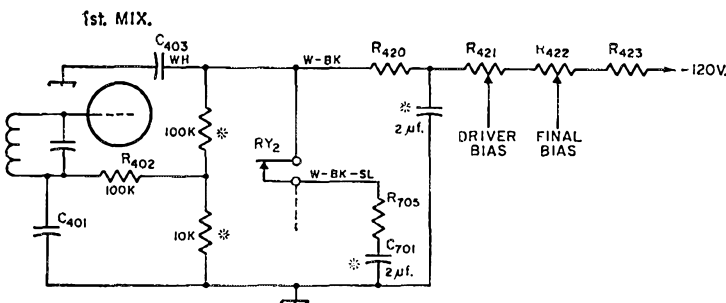


Fig. 1—Components marked with a star, when added to the 200V transmitter circuit, will reduce keying transients.

## 6BY6 PRODUCT DETECTOR FOR THE HBR-16

THE designer of the popular HBR-16 receiver, W6TC, has an enthusiastic word to say for the 6BY6 as a substitute for the 6BE6 product detector, V<sub>9</sub>. The 6BY6 is capable of handling larger

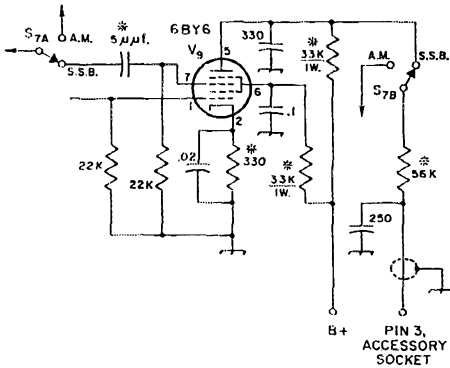


Fig. 2—6BY6 product detector for the HBR-16.

signal voltages without folding up, and Ted writes that there isn't any distortion on s.s.b. signals even when their strength is such as to pin the S meter to where it doesn't drop back during normal no-modulation intervals.

The base connections are the same as those of the 6BE6, so no rewiring is necessary. A couple of values should be changed; these are shown starred

## INEXPENSIVE TRANSISTOR POWER SUPPLY

THE power supply shown in Fig. 3 is capable of 20 to 25 watts output at about 170 volts. The circuit is built around an inexpensive filament transformer, T<sub>1</sub>. The unit was constructed on a homemade 2½ × 2 × 8-inch chassis designed to fit under the car dash. The transistors specified are "heavy" enough so that elaborate heat sinking is not necessary. Ordinary mounting with mica insulators to the aluminum chassis provides enough cooling. The r.f. chokes, L<sub>1</sub>, L<sub>2</sub>, along with the two 100-µf. capacitors, prevent hash from getting back into the car's electrical system and fouling up the mobile receiver. Switch S<sub>1</sub>

in Fig. 2. Other values should remain the same as given on page 21 of the June, 1961, issue of QST. The tube substitution has been tried by a number of builders of the receiver, and all are highly pleased with the improved performance.

## NUT HOLDER

DOUBLE-FACED tape (sometimes called toupee tape), the same as that used by printers to mount their plates, can be cut into narrow strips, applied to an index finger and used to hold a nut in a tight spot when starting it on a machine screw.

—Pete Kolupaev, W9AVT

## EMERGENCY TRANSISTOR CHECK

AN ohmmeter can be used to give a quick positive indication as to whether or not a transistor is operative. Connect the emitter lead of the transistor to the plus lead of the ohmmeter (for p-n-p types) and the collector lead to the negative ohmmeter lead. The ohmmeter should then read a moderately low value of resistance. Now touch the transistor base lead to the collector lead; the resistance shown on the ohmmeter should drop to a lower value if the transistor is good. As an additional check, touch the base lead to the emitter lead; the resistance shown on the ohmmeter should now read a higher value.

Any transistor which gives the above indications on the ohmmeter will amplify. The exact values of resistance shown on the ohmmeter will vary, of course, depending on the type of transistor being tested.

—George L. Harvey, W4UI

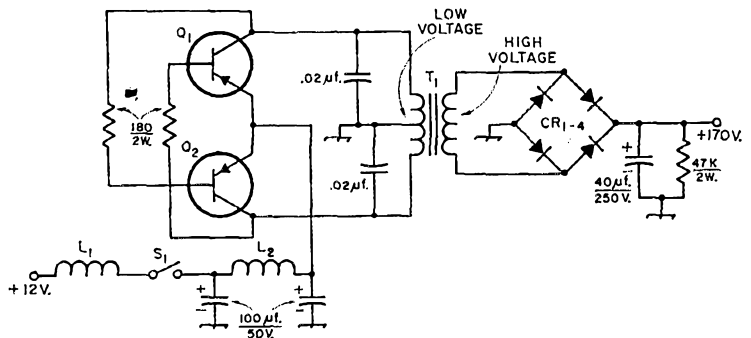
is the remote on-off switch. Heavy wire should be used between the switch, power source and power supply. Though I can't claim "years of continuous service," I can say that the supply has worked in my car for over two months, and has withstood bench tests at 20 volts input and full load. Although the supply was designed for 12-volt systems, it will run satisfactorily on 6 volts but, of course, the output voltage is halved. One note of caution: Don't run the supply without some kind of a load. Without loading, spikes quickly build up across the transistors and can destroy them.

—D. E. Haselwood, K9IBZ

Fig. 3 — CR<sub>1-4</sub> — 400 volts p.i.v., 750-ma. silicon diodes (1N3194).

L<sub>1</sub>, L<sub>2</sub>—14 µh., 0.12-ohm r.f. choke (Miller 4624).

Q<sub>1</sub>, Q<sub>2</sub>—2N441 transistors.  
T<sub>1</sub>—12.6-volt, 2-amp. filament transformer (Stancor P-8130).



# V.H.F. QSO Party Announcement

June 9-10

**H**ERE'S your chance for real v.h.f. fun in the June V.H.F. QSO Party, scheduled for June 9 and 10. This gala operation, open to all amateurs who can work any band or bands 50 Mc. or above, gets under way at 2 P.M. (1400) your local standard (not daylight) time Saturday, and continues until 10 P.M. (2200) local standard time Sunday.

To raise other participants just call "CQ VHF QSO Party" or "CQ Contest." The only exchange required during contact is ARRL Section (see page 6, this *QST*). Score one point for completed exchanges made on either 50 or 144 Mc.; two points for exchanges on 220 or 420 Mc.; and three points for exchanges on higher v.h.f. bands. To derive final score, the sum of these points is multiplied by the number of different ARRL Sections worked per band. You may work the same stations on different bands to increase both your contact points and multiplier.

A certificate will be awarded to the top scorer in each ARRL section, as well as a certificate to the highest scoring Novice, and multiple-operator station in each section from which at least three entries in that special category are submitted.

Please follow the log and summary form as shown in the example. You can get these logs free by writing to the ARRL Communications Dept., 38 La Salle Rd., West Hartford 7, Conn. Reports should include your call and ARRL

section, as well as times, calls, and sections of stations worked. Your entry must be postmarked by July 2, 1962, for *QST* listing.

## Rules

- 1) The contest starts at 2:00 P.M. Local Standard Time, Saturday, June 9, and ends at 10:00 P.M. Local Standard Time, Sunday, June 10. All claimed contacts must fall within this period and must be on authorized amateur frequencies above 50 Mc., using permitted modes of operation.
- 2) Name-of-section exchanges must be acknowledged by both operators before either may claim contact point(s). A one-way exchange, confirmed, does not count; there is no fractional breakdown of the 1-, 2-, or 3-point units.
- 3) Fixed-, portable- or mobile-station operation *under one call*, from one location only, is permitted. A transmitter used to contact one or more stations may not be used subsequently under more than one other call during the contest.
- 4) Scoring: 1 point for completed two-way section exchanges on 50 or 144 Mc.; 2 points for such exchanges on 220 or 420 Mc.; 3 points for such exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of *different* ARRL sections worked per band; i.e., those with which at least one point has been earned. Reworking sections on additional bands for extra section credits is permitted. Cross-band work does not count. Contacts with aircraft mobile stations cannot be counted for section multipliers.
- 5) A contact *per band* may be counted for each station worked. Example: W2BLV (S.N.J.) works K1CRQ (Conn.) on 50, 144 and 220 Mc. for complete exchanges. This gives W2BLV 4 points (1 + 1 + 2) and also 3 section-multiplier credits. (If W2BLV contacts other Connecticut stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.)
- 6) Each section multiplier requires completed exchange with at least one station. The same section can provide another multiplier point only when contacted on a new v.h.f. band.

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

8) Reports must be postmarked no later than July 2, 1962, to be eligible for awards. Follow the sample log for correct form, or a message to Headquarters will bring printed blanks for your convenience. QST

Sample log and summary form giving an example of how to score. Count one point for contacts on 50 and 144 Mc., two points for 220 and 420 Mc. contacts, and three points for higher v.h.f. bands. Multiplier is sections per band. You can obtain these log forms free by writing to ARRL Communications Dept., 38 LaSalle Rd., West Hartford, Conn. Logs must be postmarked by July 2.

SUMMARY OF CONTACTS, V.H.F. QSO PARTY									
STATION...W1AW		ARRL SECTION...CONN							
Freq. Band (Mc.)	6/9 EDST Date Time	Station Worked	Section	Record of new Sections for each band				Other 12/8	Contact Points
				50	144	220	420		
50	1501	W1MEH	CONN	1					1
	1505	WA2BAH/2	ENY	2					1
	1515	W1MHL/1	NH	3					1
	1520	W1YDS	CONN						1
144	1600	W2GKR	N.N.J.		1				1
	1605	W1MHL/1	NH		2				1
420	1800	W1YDS	CONN				1		2
1215	1900	W1HDQ	CONN					1	3

(Enter below on last sheet used)

Band	Contacts	Points	Mult.
50 Mc.	4	4	3
144 Mc.	2	2	2
220 Mc.			
420 Mc.	1	2	1
Other	1	3	1
TOTALS	8	11	7

CLAIMED SCORE: 11 (points) x 7 (mult.) = 77 FINAL SCORE

I hereby state that I have abided by the rules specified for this contest and that, to the best of my knowledge, the points and score as set forth in the above summary are correct and true.

Signature: \_\_\_\_\_ Call: \_\_\_\_\_ Address: \_\_\_\_\_

## FCC Proposes Kw. on 420 Mc.

### Fee Comments Delayed

#### FEE COMMENTS DELAYED

At the request of the League, FCC extended the time for filing comment in Docket 14507 from April 16 to May 16, and for reply comment from May 16 to June 16. The delay was requested to allow more time for amateurs to express their views, and to permit a summary of the comments to Hq. (a pile a foot deep as we write this, and almost unanimously in opposition) to be incorporated in the League's filing. The full text will, therefore, be published in the July issue.

#### SHF BAND CHANGE

FCC has just amended the amateur rules to bring them into line with the Geneva Radio Convention of 1959. For the most part, the changes are minor ones concerned with words: *kc.* becomes *kc/s*, *radiopositioning* becomes *radiolocation*, etc. There are two substantive changes however: the microwave band at 3500-3700 megacycles returns to its old stand, 3300-3500 Mc., and the open territory at the top of the spectrum for use by amateurs and experimental services now begins at 40,000 Mc. instead of 30,000 Mc. A number of other amendments are purely for editorial reasons.

#### THIRD PARTY WITH EL SALVADOR

The government of El Salvador has entered into an agreement with the U. S. allowing amateurs of the two countries to exchange certain communications on behalf of third parties. Conditions of the agreement, similar to those previously signed with Bolivia, Canada, Chile, Costa Rica, Cuba, Ecuador, Haiti, Honduras, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru and Venezuela, appear below:

1. No compensation may be directly or indirectly paid on such messages or communications.
2. Such communications shall be limited to conversations or messages of a technical or personal nature for which, by reason of their unimportance, recourse to the public telecommunications service is not justified. To the extent that in the event of disaster, the public telecommunications service is not readily available for expeditious handling of communications relating directly to safety of life or property, such communications may be handled by amateur stations of the respective countries.
3. This arrangement shall apply to El Salvador and all its insular territories, and to the United States and its territories and possessions, including Puerto Rico and the Virgin Islands and to the Panama Canal Zone. It shall also be applicable to the case of amateur stations licensed by the United States authorities to United States citizens in other areas of the world in which the United States exercises licensing authority.
4. This arrangement shall be subject to termination by either government on sixty days' notice to the other government, by further arrangement between

the two governments dealing with the same subject, or by the enactment of legislation in either country inconsistent therewith.

#### REALLY OLD TIMERS — A REMINDER

The Golden Anniversary Banquet, to be held in New York City on October 13, 1962, will honor those early amateur radio operators who were licensed in 1912 and are licensed today. A token of the esteem in which these pioneers are held by their fellow amateurs will be presented or mailed to all the eligible hams whether or not they are able to attend the banquet. ARRL Hq. is compiling the list of amateurs to be so recognized. Acceptable proof is a photocopy of the 1912 amateur station or amateur operator license, or a listing in the 1913 edition of the government call book. If you need to rely on a listing in the call book, please tell us your city and state in 1912, and 1912 call letters, and of course your complete present address and call. For further details, see page 64, April *QST*.

#### NO TRAFFIC WITH CONGO

There seems to be some confusion over the status of the Republic of the Congo (9Q5) as concerns third-party traffic. Apparently, on an occasion or two in the past, several U. S. hams have handled important traffic with 9Q5US, and because of a critical communications problem between the two countries there was apparently no disposition on the part of authorities to issue citations. This situation no longer exists, however; there is no third-party agreement with the



Michigan gets its first official Amateur Radio Week, June 24 through June 30, 1962 starting, instead of ending, with Field Day. The Council of Amateur Radio Clubs of Southeast Michigan, which was instrumental in securing the proclamation, is planning to use the event for a widespread public-relations effort. Council delegates, W8NBF, K8NTD, K8DST, K8DPM, W8SS and W8OHI cluster around Governor John Swainson as he signs the proclamation.

Congo at present, and therefore no communications service may be provided to third parties by U. S. amateurs. To quote a recent letter from FCC:

The Commission is not aware of the existence of any arrangement between the United States and the Republic of Congo which provides for the handling of international third party traffic by amateur stations of those countries. Therefore, we have advised our Monitoring Division to cite any United States amateur station licensee observed transmitting international third party traffic to the Republic of the Congo.

### PACIFIC NUCLEAR TESTS

The FCC has been informed that there may be some effect on long range radio communications on frequencies between 3 and 30 Mc., as a result of ionization brought about by the nuclear tests near Johnston Island in the Pacific. The ionization is expected to affect long-range communications crossing a wide area around the test site. The Commission would appreciate receiving reports of effects observed by commercial and amateur operators, which may be sent to the Field Engineering and Monitoring Bureau, Federal Communications Commission, Washington 25, D. C.

### FCC PROPOSES KW. ON 420

In accordance with a petition filed by the League, FCC now proposes to remove power restrictions on the 420-Mc. band, except for parts of the country where full-power amateur operations could be expected to cause interference to certain U. S. government installations. In the areas listed, the 50-watt input limit would



For the tenth consecutive year, the Governor of Ohio has proclaimed Amateur Radio Week in Ohio for the June week which ends with Field Day. The week of June 17 through 23 is it this year; W8RRJ, Columbus ARA president and K8NCY, chairman of the Ohio Council of Amateur Radio Clubs, watch while Governor Mike DiSalle makes it official.

continue in force: those portions of Texas and New Mexico bounded by latitudes 31°53' and 33°24' North, and longitudes 105°40' and 106°40' West; the entire state of Florida; those portions of Georgia, Alabama and Mississippi which are within 200 miles of either Patrick AFB or Eglin AFB; the entire state of Arizona; the parts of California and Nevada which are either south of latitude 37°30' North or are within 200 miles of Point Mugu, California. The proposed amendment, however, contemplates the possibility of authorization for higher power, even in the restricted areas, to individual amateurs on a case-by-case basis.

Any interested parties may file comments in support of or in opposition to the proposal on or before June 15, 1962. The text of Docket 14610 (except for amendments to Part 2 of the Rules, which duplicate the amendments to Part 12) appears below in full:

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington 25, D. C.**

In the Matter of  
Amendment of Parts 2 and 12 of  
the Commission's Rules and Regu-  
lations to Remove the Power Re-  
strictions in the Band 420-450 Mc/s  
in the Amateur Radio Service. } DOCKET NO. 14610  
RM-304

#### NOTICE OF PROPOSED RULE MAKING

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

2. The American Radio Relay League (hereinafter referred to as ARRL) has filed a petition requesting the Commission to amend Section 12.111(k) of its Rules in order to remove or modify the power restrictions in the 420-450 Mc/s amateur band. Although not stated in the petition the proposed amendment would also require a change in Section 12.131 and in Footnote US7 to the Table of Frequency Allocations contained in Part 2 of the Rules and Regulations. Section 12.111(k) is now §12.111(b)(11).

3. Footnote US7 to Part 2 and the above-mentioned Section of Part 12 restricts the power of amateur stations to 50 watts DC plate power input to the final stage of the transmitter in the amateur band 420-450 Mc/s. This power limitation originated with the temporary post-war use by radio altimeters in the band 420-460 Mc/s as specified in Footnote US6 contained in Part 2. In 1955 the amateur power limitation of 50 watts peak to the antenna was modified to read 50 watts DC plate input power to the final stage. In 1958 Section 12.111(k) was amended to include the following additional restriction:

"In the band 420-450 Mc/s the amateur radio service shall not cause harmful interference to the Government radiopositioning service."

4. Footnote US6 to Part 2 and Section 9.312(1) of Part 9 of the Commission's Rules provides that radio altimeters will not be permitted to use the band 420-460 Mc/s after February 15, 1963.

5. Petitioner states that the 420-450 Mc/s amateur band is unique and most important to amateur radio because it is the "jumping off" place from VHF to UHF. It is the lowest frequency amateur band where coaxial and cavity tank circuits normally replace the familiar coils and capacitors. Petitioner further contends that removal of the present power limitation will greatly stimulate amateur experimentation and undoubtedly will develop most important propagation data. The ARRL believes that the power limitation now may be removed from the entire 420-450 Mc/s band without causing interference to any other present or possible future users of the band.

6. The Commission, in negotiation with appropriate Government agencies, has reached an agreement whereby the amateur radio service will be authorized to use the maximum input power permitted in this service except in



certain areas which are defined in the proposed amendments to Part 2 Footnotes and Section 12.111(b)(14) which are set forth in the attached Appendix.

7. Public comment is invited on the proposed amendments to Parts 2 and 12 of the Commission's Rules as set forth in the Appendix hereto, issued pursuant to the authority contained in Section 303(e), (f) and (r) of the Communications Act of 1934, as amended.

8. All interested persons are invited to file, on or before June 15, 1962, comments supporting or opposing the proposals set out in this Notice and in the Appendix hereto, or submitting any modifications or counterproposals the parties may wish to submit. Comments in reply thereto may be submitted by June 25, 1962. The Commission will consider all comments filed hereunder prior to taking final action in this matter provided that, notwithstanding the provisions of Section 1.213 of the Rules, the Commission will not be limited solely to the comments filed in this proceeding.

9. In accordance with the provisions of Section 1.54 of the Commission's Rules and Regulations, the original and 14 copies of all statements, briefs, or comments filed shall be furnished the Commission.

#### FEDERAL COMMUNICATIONS COMMISSION

REN F. WAPLE  
*Acting Secretary*

Released: April 27, 1962

#### APPENDIX

Section 12.111(b)(14) is amended to read as follows:

§12.111 Frequencies and types of emission for use of amateur stations.

(b)

(14) Within the following areas, the DC plate power input to the final stage of the transmitter shall not exceed 50 watts, unless expressly authorized by the Commission after mutual agreement, on a case-by-case basis, between the Federal Communications Commission Engineer in Charge at the applicable District Office and the Military Area Frequency Coordinator at the applicable military base:

- (i) Those portions of Texas and New Mexico bounded on the south by latitude 31° 53' North, on the east by longitude 105° 40' West, on the north by latitude 33° 21' North, and on the west by longitude 106° 40' West;
- (ii) The entire State of Florida, including the Key West area and the areas enclosed within a 200 mile radius of Patrick Air Force Base, Florida, and within a 200 mile radius of Eglin Air Force Base, Florida;
- (iii) The entire State of Arizona;
- (iv) Those portions of California and Nevada south of latitude 37° 30' North, and the areas enclosed within a 200 mile radius of the U. S. Naval Missile Center, Point Mugu, California.

Section 12.131 is amended to read as follows:

§12.131 Maximum authorized power.

Except for power restrictions as set forth in § 12.111, each amateur transmitter may be operated with a power input not exceeding 1 kilowatt to the plate circuit of the final amplifier stage of an amplifier-oscillator transmitter or to the plate circuit of an oscillator transmitter. An amateur transmitter operating with a power input exceeding 900 watts to the plate circuit shall provide means for accurately measuring the plate power input to the vacuum tube or tubes supplying power to the antenna.

#### Minutes of Executive Committee Meeting

No. 285  
March 28, 1962

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met in Hartford, Connecticut, at 1:58 P.M., March 28, 1962. Present: President Goodwin L. Dosland, in the Chair; Vice President W. M. Groves; Directors John G. Doyle, Robert W. Denniston, Morton B. Kaln, Ray E. Meyers; General Manager John Huntoon; Communications Manager F. E. Handy; and Treasurer David H. Houghton. Also present were Directors Milton E. Chaffee, R. O. Best and R. Rex Roberts of the Finance Committee; Directors P. L. Anderson, jr., and Charles G. Compton of the Housing Committee; General

Counsel Robert M. Booth, jr.; and Assistant Secretary Perry Williams.

By invitation, M. C. Towns, jr., K6LFH, Chairman of the Project Oscar Association, joined the meeting and reported in detail on the flight of Oscar I as well as plans for Oscar II and future flights. On motion of Mr. Meyers unanimously VOTED to authorize reimbursement of \$208.93 expended by the Association for postage and miscellaneous expense. The Committee expressed its appreciation to Mr. Towns, who then departed from the meeting.

The Committee discussed at length the Commission's proposal to establish a schedule of license fees. Directors present indicated an overwhelming feeling by amateurs in their divisions against the proposal, and an analysis of heavy correspondence to Headquarters similarly disclosed viewpoints strongly against adoption of the proposal. On motion of Mr. Denniston, unanimously VOTED that the League file comment in Docket 14507 in opposition to the proposed fees for amateur license applications.

The Committee, jointly with the Finance and Housing Committees, then examined and discussed at length plans for the new headquarters building. Messrs. Arthur Cook and Fred Clark of the firm of Jeter & Cook, architects, were present for this portion of the meeting to describe details of the building construction and to answer questions. On motion of Mr. Kaln, on behalf of the Housing Committee, unanimously VOTED that the Executive Committee approves the plans for the new building and sets May 10 as the date for opening bids.

The Committee, jointly with the Finance and Housing Committees, then examined response to the March QST editorial inquiry concerning a proposed Building Fund and found enthusiastic membership support in more than 500 comments so far received. On motion of Mr. Meyers, the following resolution was unanimously ADOPTED:

BE IT RESOLVED, that to defray the major portion of the cost of the new Headquarters facilities, the League institutes a Building Fund with a goal of \$250,000 and appoints the Chairman of the Housing Committee as Chairman of the Building Fund drive, and

BE IT FURTHER RESOLVED, that the General Manager and the Treasurer, acting jointly, are directed to set up and administer separate accounts for the Building Fund, under the supervision of the Chairman of the Finance Committee.

The Chair appointed Directors Kaln, Doyle and Meyers to serve as a Special Gifts Committee.

On motion of Mr. Doyle, unanimously VOTED that the Chairman of the Housing Committee, the General Manager and the Treasurer, acting jointly, are directed to undertake preliminary negotiations for the sale of the present headquarters property at the best possible figure, and report to the Board of Directors.

On motion of Mr. Doyle, unanimously VOTED that the League casts its vote in favor of IARU Proposal 102 concerning the admission of the Association Radio-Amateurs

This jovial group seems to be bearing up well under the strain of preparing for the 1962 ARRL National Convention in Portland, Oregon. Seated, l. to r., are W7RFV, program; K7BHL, executive chairman; W7SEZ, council chairman; and K7EIS, promotion. Standing, l. to r., W7ADU, entertainment; K8BQE, finance; and W7AXJ, registration. Set aside the dates of September 1-3 for the National Convention in the Memorial Coliseum in Portland, Ore.



Libanais (Lebanon) to membership in the Union.

On motion of Mr. Denniston, unanimously VOTED that the Committee ratifies its mail actions in approving the holding of a West Virginia State Convention at Jackson's Mills, July 7-8, 1962; a Rocky Mountain Division Convention at Denver, Colorado, July 21-22, 1962; a West Gulf Division Convention at Corpus Christi, Texas, August 3-5, 1962; in lieu of that earlier approved for Tyler, Texas; and an Ontario Province Convention in Toronto, October 19-20, 1962.

On motion of Mr. Doyle, unanimously VOTED to approve the holding of a Southeastern Division Convention in Miami, Florida, January 19-20, 1963.

On motion of Mr. Handy, unanimously VOTED that the Committee ratifies its mail actions in approving the affiliation of radio clubs as follows:

- Central High School Radio and Electronics Club . . . . . Binghamton, N. Y.
  - Central Vermont Amateur Radio Club . . . . . Montpelier, Vt.
  - The Cloromont County Amateur Radio Club . . . . . Batavia, Ohio
  - El Dorado County Amateur Radio Club . . . . . El Dorado, Calif.
  - Laurel Radio Club . . . . . Laurel, Mont.
  - Michigan 6 Meter Club . . . . . Detroit, Mich.
  - Middlesex Amateur Radio Club/Waltham, Mass.
  - Mid Island Six Meter Amateur Radio Club . . . . . Levittown, N. Y.
  - Order of Boiled Owls, Columbus Ohio Chapter . . . . . Columbus, Ohio
  - The Order of Boiled Owls of New Mexico . . . . . Albuquerque, N. Mex.
  - Palmetto VHF Club . . . . . Greenville, S. C.
  - Tri-State DX Club . . . . . Memphis, Tenn.
- On motion of Mr. Doyle, affiliation was unanimously GRANTED to the following societies:
- Amateur Radio Club of Hot Springs . . . . . Hot Springs, S. Dak.
  - Amateur Radio Emergency Corps of Jefferson Ct. . . . . Steubenville, Ohio
  - Anaheim Amateur Radio Association . . . . . Anaheim, Calif.
  - Arlington State Amateur Radio Club . . . . . Arlington, Texas
  - ARROWS, Amateur Radio Rag-chewers of Whitewater . . . . . Whitewater, Wis.
  - Big Orange Amateur Radio Club . . . . . Orange, Va.

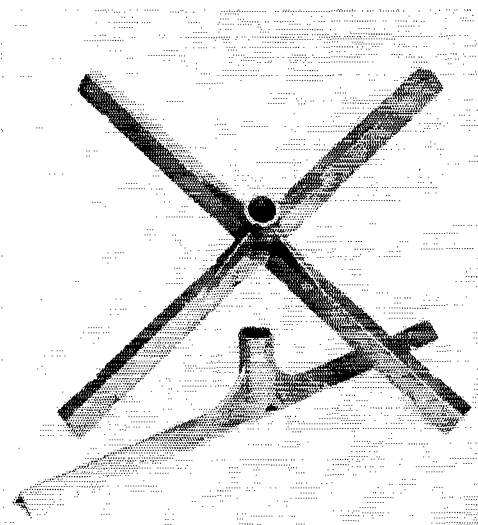
- The Cavern City Amateur Radio Club . . . . . Carlsbad, N. Mex.
- The Communicators . . . . . St. Louis, Mo.
- The DeSoto Amateur Radio Club . . . . . Rainsville, Ala
- The Earl C. Batchelder Radio Club . . . . . N. Attleboro, Mass.
- Fargo High School Radio Club, Fargo, N. Dak.
- Fishers High School Amateur Radio Club . . . . . Fishers, Ind.
- Forest City Amateur Radio Club . . . . . Rockford, Ill.
- Gulfstream Amateur Radio Club N. Palm Beach, Fla.
- Lakehead Amateur Radio Club, Ft. William, Ont. Canada.
- Marion Amateur Radio Club . . . . . Marion, Ohio
- Monmouth County V.H.F. Club . . . . . Belmar, N. J.
- Moultrie Amateur Radio Club . . . . . Sullivan, Ill.
- Nemasket Amateur Radio Club Middleboro, Mass.
- North Dakota State University Amateur Radio Soc. . . . . Fargo, N. Dak.
- Northern Panhandle Amateur Radio Club . . . . . Wheeling, W. Va.
- North Mo. Amateur Radio Club, Inc. . . . . Princeton, Mo.
- North Shore Radio Amateur Club, Inc. . . . . Milwaukee, Wis.
- The Perfect Copy Rag Chewer's Club/Net of Chicago . . . . . Chicago, Ill.
- Permian Basin Amateur Radio Club . . . . . Odessa, Texas
- St. Mary's H. S. Amateur Radio Club . . . . . Manhasset, N. Y.
- South Community YMCA Radio Club . . . . . Pittsburgh, Pa.
- Steel City Amateur Radio Club, Inc. . . . . Pueblo, Colo.
- Submarine Base Medical Research Laboratory ARC . . . . . New London, Conn.
- Washburn County Radio Club, Spooner, Wis.
- Woodward High School Radio Club . . . . . Cincinnati, Ohio.

General Counsel Booth reported to the Committee on developments in the matter of Senate Bill 2361 providing for reciprocal licensing.

There being no further business, the meeting adjourned at 5:45 P.M.

JOHN HUNTOON  
Secretary

## • New Apparatus



## Cubical-Quad Components

THE aluminum-alloy end and center spiders shown in the photograph are manufactured by Skylane Products, 406 Bon Air, Temple Terrace, Florida. Both have 1 1/4-inch i.d. center holes for attaching to the supporting mast or horizontal boom. A set screw is provided in each. The arms on both castings measure about 25 1/2 inches from tip to tip and are notched so that "U" bolts can be attached for holding the quad spreaders. Skylane can also furnish special Fiberglas spreaders which measure 12 1/2 feet long and which taper from 1 1/2 inches in diameter to 3/8 inch. These spreaders are reinforced at the 4-foot, 6 1/2-foot and 10 1/2-foot points and have projecting screws at these spots for tie points. A 25-foot spreader for 40-meter quads is also available.

Complete quad kits, which include a bamboo spreader model and the above-mentioned Fiberglas models are also available.

— E. L. C.

# Building Fund Progress

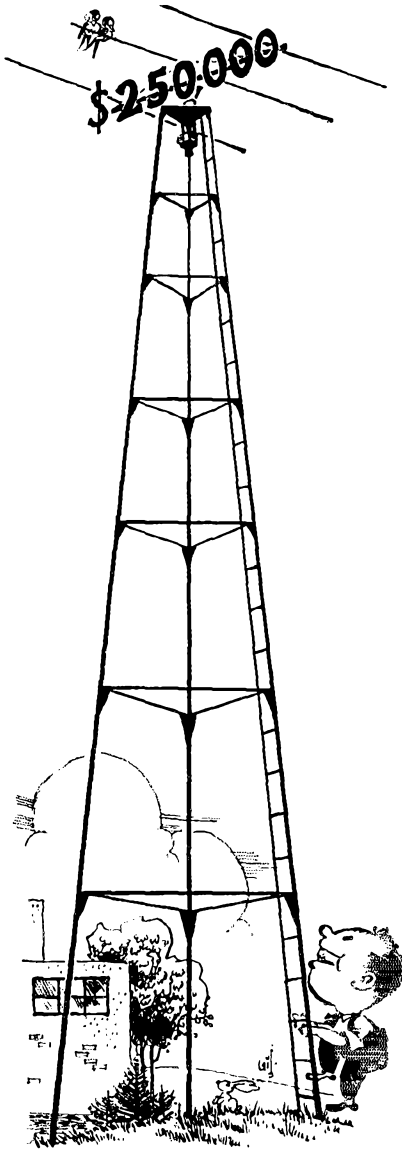
**T**HE incoming mail room at 38 LaSalle Road these past few days (early May) is taking on a golden hue — the yellow Building Fund subscription forms are arriving by the armload and getting the drive off to an excellent start. At press time several hundred individual contributions had been tabulated, with the total amount involved some \$10,000. Our July issue will better tell the story of the initial response to the fund drive, because as we write this the May issue containing the announcement has been in distribution only a couple of weeks. But, as you can see, the base of the tower is firmly planted and the climb to the top is under way.

A formal acknowledgement certificate, suitable for framing if desired, is being prepared and will be sent to each donor. We trust contributing members will bear with us until this part of the program can be accomplished and certificates mailed, as we may run behind due to the quantity involved.

Building plans and specifications are now in the hands of a number of contractors, with the deadline for submitting bids May 10. Assuming receipt of a satisfactory bid, the contract will be awarded and we hope to announce the result in July *QST*, possibly along with a picture showing the first spadeful of dirt being turned. Subsequent issues will report the progress of construction as well as that of the Building Fund Drive.

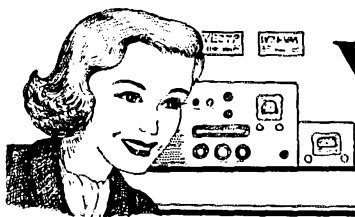
If by chance you missed the subscription form in May *QST*, you'll find it at page 64A of that issue. Support your League's "blueprint for progress" toward amateur radio's continuing growth!

**QST**



At a joint meeting of the Executive, Finance and Housing Committees, League officials examine detailed plans for the new Hq. office facilities before granting the final stamp of approval. Seated, left: Morton B. Kahn, W2KR, Chairman, Housing Committee. Standing, left: Arthur Cook, of Jeter & Cook, architects. Standing, rear: P. L. Anderson, jr., W4MWH, Charles G. Compton, W08BUO, Housing Committee members; Treasurer David H. Houghton; First Vice-President W. M. Groves, W5NW; R. O. Best, W5QKF, Finance Committee. Seated right: R. Rex Roberts, W7CPY, Finance Committee; John G. Doyle, W9GPI, Executive Committee; Milton E. Chaffee, W1EFW, Chairman, Finance Committee. Looking on from behind the camera were President Goodwin L. Dosland, W0TSN, Robert W. Denniston, W0NWX, and Ray E. Meyers, W6MLZ, Executive Committee; Vice-President F. E. Handy, W1BDI; John Huntoon, W1LVQ, General Manager; and Robert M. Booth, jr., W3PS, General Counsel.



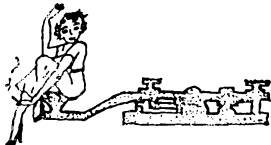


# YL NEWS AND VIEWS

CONDUCTED BY ELEANOR WILSON,\* W1QON

Louise Ramsey Moreau, W3WRE, of Johnstown, Pennsylvania, one of our BPL YLs (and 100% traffic), enjoys delving into the history of wireless and telegraphy. The first licensed woman operator to become a member of the DeForest Pioneers and a historian of the Antique Wireless Association, Louise has a unique collection of telegraph keys, and she has become an authority in her "second hobby."

At the New York State ARRL Convention last year, Louise could safely claim that she was the only YL who operated rotary spark in 1961 with the smiling approval of the FCC "which is an advantage of playing around with this antique stuff and therefore being a Girl Guide in these displays and demonstrations. I don't know if we'll have a working spark rig at the Dayton Hamvention or not, but if we do, then I'll renew my claim for 1962. You understand that all this is done with special permission from the FCC and the AWA members only demonstrate the equipment at specified times — that's when one really reaps advantages from being classed as a grey-bearded historian!"



W3WRE claims nothing unusual, "just the female love of collecting antiques. In my case, they are old telegraph instruments instead of milk glass or Spode Blue Castle. They are intensely interesting, however, and so far as I know, this collection is the only one of its kind in this country. To be sure, there are dozens of collectors, but mine is restricted to two fields — wire telegraph instruments and vacuum tubes. I love tubes. Yes, I have an Audion — it's my prize, naturally. It's quite interesting really — that plus running down the stories behind these old items. I don't just collect; I'm curious about the how and why of it all. Would you have space for some items on the very earliest YLs in the telegraph end of the game? We gals wrote history very far back, and right here in Johnstown we have the famous 'HM,' the Western Union operator who sent out details on the famous 1889 flood, until the waters swept her away. You know, wireless historians point with great male pride to Jack Phillips of the Titanic, etc. I claim

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

I can match their wireless stories with equal ones of the telegraph."

For stories as interesting as W3WRE relates, we'll make space and here's one you'll like. In future issues, we'll have more from Louise.

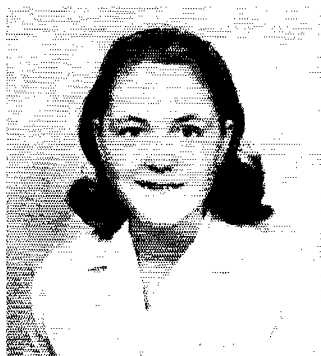
## YL Brasspounders

The legends and rumors that have built up so much history have not left the YL end untouched. For a long time it has been the popular, but unauthenticated, belief that Sarah Bagley was the first woman operator. She may have touched a key now and then for F. C. J. Smith, but there is no record of her actual employment as an operator. The first lady operator was appointed office manager as well as operator in the Westchester, Pa., office of the Atlantic and Ohio Telegraph Company in 1851. Her name was Miss Emma Hunter, and she did such an efficient job that the company presented her with a gift of \$150 at the end of her first year. The second was Miss Ellen Laughton in the Dover, N. H., office. Appointed in 1852, at only 14 years of age, she did so well that four years later she was made manager of the Portsmouth, N. H., office.

Following these two pioneers into what had been a purely masculine profession, we have records of many women, both as operators and as managers. They are actually the very earliest traffic women and probably would have put most of us to shame with their ability and monthly traffic totals.

The ability of these "lady operators" was so well known, and appreciated that there was always a special event for them alone in the Morse Telegraph Tournaments. Usually this was a ladies' 5-minute sending class. On April 10, 1890, at the Hardman Fast Sending Tournament in New York City, Miss K. B. Stephensen won the Ladies Sending with a record of 43.5 w.p.m. Also in New York, eight years later, Miss J. McManus took top YL sending honors with a flashing 47.8 w.p.m. She had only two errors in that five-minute period. It may be noted that she was not too far behind the top man of the Men's Five-Minute Sending. It was won at 50.6 w.p.m.

It should be remembered that the semi-automatic key or "bug" was not on the market yet, and that these records were made with a hand key. There is no record of a women's receiving event. However, considering their sending ability, they would have probably done an equally fine job. Small wonder these "lady operators" were nicknamed "Queens of the Wire".



Left: When OM K9RHN of Notre Dame sent along this photo of Joanne Wareham, K9ZRV, he exclaimed "Long live ham radio!" We see what Jim means. Joanne is a freshman at Connecticut College for Women in New London, Conn. A c.w. contact introduced K9RHN and K9ZRV to each other several months ago, and they've been maintaining weekly skeds ever since.

Center: General class licensee Alanna Koralko, WA2VFT, of Brooklyn, N.Y., now 11 years old, became interested in ham radio at the age of nine. The daughter of W2MCD, Alanna works 80 meters c.w. and 2 meters, when seventh grade studies permit.

Right: At the age of 13, Alicia Ryden, K8RBB, is the youngest YL to become a member of DXCC! Alicia received her Novice license in Sept., 1959, and her general class license in March, 1960, when she "started working for countries earnestly." In an accelerated program at school, K8RBB's studies come before fond hamming on 15 and 20 c.w., but, nevertheless, Alicia has acquired many certificates in addition to DXCC. Of the four hams in K8RBB's family (mother Mary, K8ONV, dad Ken, K8OHG, and sister Sally, K8ONW), three are DXCC!

### 16th POWDER PUFF DERBY

The 1962 All Woman Transcontinental Air Race (popularly known as the Powder Puff Derby) will start at Oakland, California July 7 and will end July 11 at Wilmington, Delaware. Carolyn Currens, W3GTC, (P.O. Box 523, Norristown, Pa.) will again serve as chairman of the amateur radio net.

The following is a list of the stop-over cities along the flight route, along with the amateur radio chairman of each stop. Amateurs wishing to assist in traffic relay for the exciting operation, please contact W3GTC or chairman in your area. Oakland, Calif. — Gertrude Cassidy, W6FEA, with Oakland ARC

Fallon, Nevada — Captain Charles Walker, W6WUG, Fallon Amateur Radio Society

Elko, Nevada — Milo Taber, W7QYK

Salt Lake City, Utah — W. J. C. Fahey, K7FCN

Rock Springs, Wyoming — Rochester Stephenson, K7ELH

Scottsbluff, Nebraska — Howard H. Poppert, W0VQR  
Tri City ARC

Grand Island, Neb. — R. E. Wiles, W9DLL, Grand Island ARS

Des Moines, Iowa — Rev. Wintthrop Mager, W6MJH

Peoria, Ill. — (to be announced)

Dayton, Ohio — Clem E. Wolford, W8ENH

Pittsburgh, Pa. — (to be announced)

Wilmington, Delaware — Edgar Baylis, K3EMT

### National Convention

Portland, Oregon, Aug. 31—Sept. 3, 1962. The YL-XYL activities will be conducted by the Portland Roses YL club. Publicity Chairman of the club, Beverly Welker, W7HPT, has submitted the following schedule of YL convention activities, with the notation that there may be some minor changes made later.

Sat. Sept. 1 — 2:00-4:00 P.M. Tour of Lloyd Center, the fabulous shopping center with "everything", fashion show

Mrs. Alice Ginsburg, K4TGB, accepts a large framed replica of a QSL card in behalf of herself and husband Martin, K4TGA, from Major Andrew V. Mincey (W4YJW) USMC, of Amphibious Group Two. The card, with 100 signatures, was presented in behalf of the officers and men of Amphibious Group Two who gave the Ginsburgs "a vote of thanks" for their untiring devotion toward boosting their morale during a recent deployment to the Mediterranean.

and tea, 6:00-8:00 P.M. Dinner and forum for licensed YLs only, with gifts and prizes.

Sun. Sept. 2 — 8:00-10:00 A.M. Women's breakfast for all YLs and XYLs, with guest speaker, prizes, and gifts. 12:30-2:30 P.M. Women's lunch for all YLs and XYLs. Talk on scenic sights of Portland to be followed by bus tour of Rose Test Gardens, Oregon Museum of Science and Industry Zoo, plus other points of interest. 6:00-7:00 P.M. Women's dinner for all YLs and XYLs. The art of Japanese flower arranging will be discussed.

Mon. Sept. 3 — 8:00-10:00 A.M. Women's breakfast for all YLs and XYLs. Gifts, prizes and SWOOP initiation.

These events are in addition, of course, to the general convention program with its various meetings, lectures, get-togethers, etc. of interest to all hams. The committee suggests tying in the convention with a visit to nearby Seattle and the 1962 World's Fair in that city — two outstanding events for the cost of one trip — well, almost!

Among the gals, anyway, "eyelash" QSO sounds nicer than "eyeball" QSO, referring to a face-to-face QSO — do you agree? We don't know who to credit for the recent switch to "eyelash", but it's a pleasing change.

### Clubs and Nets

*Puget Sound YL Coffee Net* — A new group of Washington state YLs organized Feb. 19. Meetings are on six meters weekday afternoons and informally Tues., Sat., and Sun. evenings. Membership includes K7JXX, KAK, KIUU, KUW, NKZ, NQR, OSN, QMG and W7HTD. A certificate is awarded to OMs for working 7 regular members for ½ hour each; OM DX stations need work only 3 stations. For further information, please contact Laurie Hansen, W7HTD, Rt 2, Woodinville, Wash.



*New Jersey YL Club* — A new YL club in New Jersey. Sorry we don't have details yet, but contact Lillian Klarfeld, 148 Leslie St., Newark, N. J.

*IMPS (Indiana Michigan Petticoat Sisters)* — K9YIC, Any, has designed the two certificates for the IMPS. The Member's Certificate is issued to any YL within "hearing" distance of Goshen, Indiana, who wishes to become an IMP. The Achievement Award is issued to any amateur who contacts 5 IMPS within a 100-mile radius or 3 IMPS beyond a 100-mile radius of Goshen, Ind. (not during net time).

*Rhode Island YL Club* — The club is conducting a new net Tuesday at 7:00 p.m. EST on 50.4 Mc.

*WRONE* — Some 60 licensed YLs attended the YL meeting at the ARRL New England Division Convention at Swampscott, Mass., on April 8. V.p. of WRONE K1EKO, Edie, conducted the meeting in the absence of pres. K1ADY. Recognition was given to W1ZJS, Dee, for the excellence of *Miss WRONE's Chatter*, of which she is editor.

*Los Angeles YLRC* — Lads 'N' Lassies certificate custodian Irma Weber, K6KCI, advises a revision in rules for the certificate. Work 10 members of LAYLRC since Jan. 1, 1952. Copy of log showing name, call letters, date, time, band and type of emission may be sent in lieu of QSLs. Special recognition will be shown on the certificate if all contacts are c.w. It is not necessary for all contacts to have been made from one QTH. Only one certificate shall be awarded to an individual. Contacts made during a net

will count. Send log copy to K6KCI, 762 Juanita Ave., Santa Barbara, Calif.

### Coming Events

*ARRL Southwestern Division Convention* — June 1-3 at Disneyland, Anaheim, Calif. Address inquiries to S.W. Division Convention, P.O. Box 1685, Newport Beach, Calif.

*Field Day* — June 23 and 24. YLs and YL clubs who participate are invited to submit summaries of their FD doings (pictures too, please) to this column for a special YL FD report.

*16th Annual AWTAR* — July 7-11. More info on page 67. *ARRL National Convention* — Aug. 31-Sept. 3 at Portland Oregon. See item on page 67.

### YLs at SSB Dinner

YLs who operate single sideband were well-represented at the annual Sideband Dinner in New York City on March 27. We are grateful to Madeline Greenberg, W2EEO, for the several fine pictures of YLs that Madeline snapped as she table-hopped among the 860 who attended the "tremendously successful" dinner. Thanks too for the FB photos of KP4CL and her OM and of K5SPD/1 and K2MGE. Dorothy Strauber, K2MGE, is co-editor (with her OM K2HEA) of *The Sidebander*, publication of the SSB Amateur Radio Association.

### YLs at Sideband Dinner



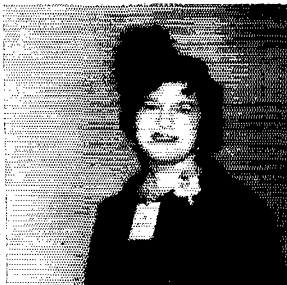
K2UTP



W2OWL



K6MHU



W2EEO



WA2DLK



WA2BEI



K2CFF



K2DPN



W2SUR



K5SPD/1 and K2MGE



KP4CK and KP4CL



CONDUCTED BY ROD NEWKIRK,\* W9BRD

**Whither?**

Be there W/Ks with souls so dead  
Who never to themselves have said,  
"I'd rather be DX, instead!"?

Perhaps. Anyway, a recent Sunday edition of the Chicago *Tribune* found Jeeves, totally limp with spring fever, prostrate in his hammock enjoying an overdue southern breeze. His alarming languor at this time of year is punctuated only by pangs of the wanderlust, a malady known to be propagated in epidemic proportions by *anopheles DXodus*, the DX bug. And then this advertisement in the paper caught his eye:

**RADIO OPERATORS  
to work for  
U. S. GOVERNMENT**

Single with recent military experience in sending and receiving C.W.  
Minimum code speed, 15 w.p.m.  
U. S. citizenship  
High school education  
Excellent health  
Willing to work shifts and to serve abroad  
Starting salary, \$4830 plus allowances  
A representative will conduct interviews at . . .

Jeeves put down the paper, pushed his specs up on his forehead and gazed off into the distance. "To serve abroad . . ." He conjured up coral atolls, snowy peaks, rolling desert, cities in DXotic climes. Now the fit was on him for fair. Mumbling a few applicable almost-forgotten lines from Marquis's *Spring Ode*, he popped out of the hammock like a kid again and raced for the shack. There he thumps away on his J-38, brushing up his c.w. just in case they ever get down to the bottom of the barrel.

\* \* \*

That help-wanted ad, from a mercenary angle, puts a new high value on our good old ham-type code. As prime requisite for the position mentioned, it breaks down to \$320 per year per w.p.m. — no FCC licenses, typing, etc., specified. What's *your* certified speed in ARRL's Code Proficiency Program? Only 15-per? Darned good start, OM. You're in high-priced company already, and Uncle Sam obviously is concerned with your progress. He may need *you*.

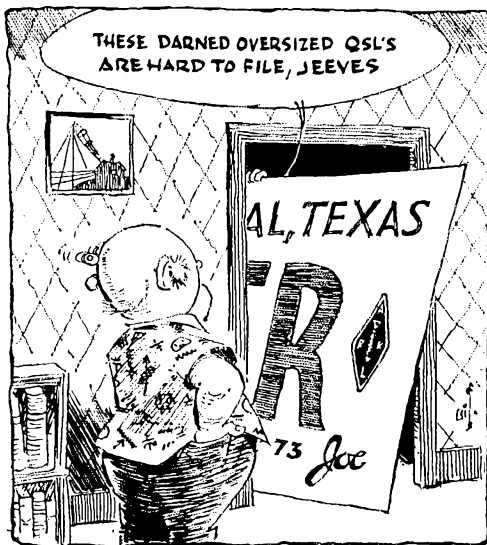
**What:**

*Bon voyage* to successful applicants for those jobs — and, if the opportunity arises, PSE QSL. . . . There's scarcely a more exciting means for a newcomer to gain proficiency in the c.w. art than operation on our leading Novice DX band, 21,100-21,250 kc. In palmer propagation days a few determined freshmen even managed to join the ARRL DX Century Club via this route. Now a new and eager Novice generation gallops along in their DX footsteps. . . .

\*7862-B West Lawrence Ave., Chicago 31, Ill.

**15** Novice news comes this month from KN7s PFU PIG WN4s CMW DAA, WV2s UDT VFU (10/8 countries worked/confirmed), YCI ZQU ZSA and WV6SBO (70/62!) who will decorate their shack bulletins with the wall paper of CEXXB, CQs 2ER 8HB, CTs ID NT, CT2AI, CX1AC, DJs 31W 4AL 5DA 50J, DL4s SQ XE, DM3YED, DU7SV, Es 2FQ 2MA 2SA 3DT 8VN 8ZY, two dozen Gs, GMs 3PQK 4TF, HB9s AAB VL, HC5CN, HKs 1AA4 3LB 34X 6JH, HMIAP, forty-five JAs in all call areas save the 9th and 10th, JTKAA, K5DYR/VO2, KA2s LMI NY YA, six KH6s, KL7DXC, KP4BDU, KRs 6DO 6JG 6LD 6MA 8AB 8AK, KW6DG, KZ5s EM KGN, LA5 51H 8IF/mm, LU5 5DDF 8BFH, OEs 1VT 6RP, OK2KGZ PA0VER, PJ2CR, PYs 1NEZ 2JOB, PZIs RH CJ, nine SMs, SP8SR, UA6s GF KJA, UB5KAB, six mainland VKs, VK9GP, VQ2W, VSs 1FE 4RM 4RS 6EN, WA6QFJ/KG6, WH6s EON ELY, WL7EAN, WP4s BAL BBN BDM, XE1VB, YU3IE, some YVs, Z8EJY, ZL3GN, 60IMT and 9M2FQ. . . . WA6MCU, stationed in Spain, hears solid sigs from KN1s SED VJH, WV2s TYK VTP ZZN, KN3OEU, WN4s BAB CGA EMY FOD, WN8s ALX CGZ CHU CTM, WN9AHX and WN0AEH. Over in Korea, K2GMF tuned in KN7s RAIT and RQU without much trouble.

**15** c.w. among the five-year ticketeers inspires Ws 1HGT 1OPB 4KXV 4MLE 5EHY (130/104), 6RCV 7DJU 7LZF 7POU, Ks 1JFF 1PJT 2GMF 2MMS 4OGV 5ALU 5HW 5WSE 6BHM 6MQC 6STI 8GJD 8NMC 8OKM 8RDE 9TZK 0BHM 0JPL 0RNK 0VSH, WAs 2FIT 2FQG (127/113), 2KSD 2LDC 2MHH 2RTS 2YFB 6HRS 6ORS, VE3PV, 11ER and ZS2U to document the 21-Mc. appearances of CEs 1AD 1BD 3AG 4GAT, 3RY, CP5s EO EZ, CR7Z, CTs 1ID (25 kc. above the lower band limit), 2AI (30), DM2s ACO AMM, EL4A, EP2BX, ET2US (20) 18-19, FAs 30A 8R1 15, F08AN, GD3FXN, HAs 5KDF (63) 21, 8UD 17, 9OS, HCLAGI, HKs 1QQ 23, 7ZT, HM5 1AP 4AQ, HP1IE 21-23, HZ1AB (25), forty JAs, KA2JM 3, KM6s CE CG, KR6s AR LJ 1, LY 0, KW6s CS DG 0, DM 19, LZ1s KDP KSA KPZ, OE1WT, OX3DL, P42s AA AD, SL5ZL, SPs 2AEO (50) 17, 8CK 8HU (35) 15, ST2AR (50) 19, SV0WG (36) 14-16, TI2s CAH LA, TP3MB, TN8s AG (80) 20, AU 10, TT8AL, UAs 2KAA 16-17, 0GF 22-23, 0KKB 21, UB5s CG FG KKA, UG2s BS LE 16, UJ8KA 10, UL7FA (60), UP2NV 14, UQ2AN, VPs 2LD 6RG 7NQ 20, 9EP, VOs 2JN (70) 20, 4DW (65) 19, 4KPB, 51B (80) 19, 51G 8BC, VRs 1B 2DK, VSs 1FE 4RS (80) 23-0, 6EM, W4WQQ/VP 0, WP4BBN, YN1AA 21, a helping of YVs, ZB1s CR 11, NZE, ZEs 1AE 2JS 3JJ 8J, ZK1s ZR BN BS, ZPs 5CF 5LS 9AY, 3V8CA, 4X4s KK MR, 5As 1TW (20) 19, 3BC, 5N2s AMS (70) 20, RSB (60) 20, 5U7AC (70) 20, 60IMT 18, 6W8DD (50) 22, 9G1DT 19, 9K2AM and 9Q5AAA (40) 20.





EP2BK's meteoric DX career, recently terminated, featured astounding 160-meter DX results earlier this year. An old-style Lazy H skywire, good for more than 100 countries on its design frequency, 21 Mc., produced world-wide 1.8-Mc. QSOs as a top-loaded semivertical radiator. (Photo via K5WSE)

**15 phone** is D. Exceptionally productive for W1BPNI (125/110), Ks 1PJT 2YFE 5ALU 5JBW 5WSE 6MIQG 8NMIQ 8OKAI 9LJR 9TZK 8RNRK, Was 2FIT 2FQG 2LDC 2MIHH 2RTS 6ORS and VE3PV, the asterisks representing single-sidebanders: CEs 1AGI 2AW 2HJ 2HX 3RC 3TR 3UW, CN8s 1K\* JF\* (428) 13, CO2 2AB 2CT 3NR 3BK 8RA (240) 13, CR6s CA\* JL, CT2AI, CXs 2CO\* 3RU, DM2BGO, EA8BA\* 15, EL6E\* 16, EP2s AF BB\* (432), BE, FG7XL (250) 13-23, FS7RT\*, HA8UD, HGs 1AGI 2CR, HHs RB (280) 21, Y\* (300) 20, HKs 4EF 5OW 7YB\* 0, HM1AE (250) 1, HO9SC\* 0, HPIAP, HR1s AL CH (250) 0, LB, HZIAB (414) 14, JAs ICYV 1VX\* 0, 5ACW, K6SZE/VO2, KC6GJ, KR6s 1BX\* 4AN\* 4A0 61J, KR6s DI\* OC, KZ5RH, LX1DC, MP4BDC, OAs 4GR 8B, OEs 1CS 1RZ\* 1WG (260) 14, 3NH (250) 16, PJ2s DW\* MC\*, SL6BF of Sweden, SPs 7HF 7HX 8JA, SV0WT\*, TGs 5WH 9RB, TIGCAL, TN8AA, UB5s FG E4\*, VE3-BQL/SU, VP, 2AF (250) 20, 3HAG (235) 13, 4LD 4LG 4TP 5AK 5BB 5LR 6AB 7NC 8GN, VOs 4RF\* 5AU 5IG\* 19, VR2BC, XEs 1CT 2AX 2SO, YNs 6HH 9CFL 9LOT, YVs 1EE\* 1EM\* 17, 2AB 2CJ 3CT, YU3IE, ZB1NZE, ZL 1JWC 6HK, ZE1JW, ZLIADH, ZPs 5AM (223) 13, 5CG (225) 13, 5IT\* 6BB\* 18, ZSs 3LW 7S\* 19, 4X4s CW\* 17, DK\* PQ 16, 5As 1TB\* 18, 2TC (300) 12, 5TW, 5N2s EBL\* 18, JKO (210) 21, 5T5AB (330) 21, 9GIAB and 9U5JH.

**20 phone**, now commencing to bear the summer brunt of voice DX work, enables Ws 2WMIQ 9YMZ, Ks 1JFF 1PJT 2GMF 5ALU 5JBW 6BHM 6MIQG 8GJD 8RDE 9LJR 9UHH, WA2s FIT LDC and VE3PV to bend the ears of CE2AK 3, CN8s HY\* JF (330) 23, CR9AH (303) 14, CT1HE\*, CX2s AX CO (342) 23, DL2AB (122) 22, FLs 20\* 2R\*, Ks 1AGI (318), 2RH, HHs 2V 4, 5DAI\*, HB8DC\*, HK3NQ\*, HP1s AP\* CN (332) 8, HR3JW\* (180) 18, HZIAB (346) 13, KC4UJ 3, K6BGC\* (210) 5, KOs 1BO (312) 18, 4AO 5, 4BC\*, KR6s BZ (271), MH (270) 13, OH, KV4AA, KZ5MQ\*, LU9ZF 3-4, LX1DE (298) 13, MP4BBW (340) 16, OEs 1RZ (122) 19, 8MI (316) 13, OX3s KC (280) 22, KM\*, PJs 2AA 2AF 3AD\*, PZ1AX (330) 2, SM5ZS/CZ6 (313) 21, SU1KH\*, TEs KH MSP\*, TF2-WPF\* (182) 9, UAs 1KBW 3CR/UA1 (302), 3FG 4CE 41B 6MK (315) 18, 0VQ OKAR (302) 13, UQ2AN (349) 13, UR2AT (278) 14, VEsAII\*, VPs 2DU\* 2GA 2GAC (273) 13, 3HAG\* 5BP (116) 18, 7CD (128) 1-23, 9WB, VO1CJ 20-21, VSs 6AE (280) 13, 9APH (126) 21, XEs AE HHT\* 0, XW8As, XZ2SY 16, YNs 1ST\* 9MQ\*, YS1KR\*, YV3BG, 4X4DK (129) 22, 5U7AH (126) 21, 6W8CU\* (132) 3, 9G1CN 1, 9M2AZ (271) and 9O5US (348) 23, wherein the asterisks stand for outnumbered a.m. performers.

**20 c.w.** puts on its usual lively springtime show for Ws 1OEB 2WMIQ 4ALLE, 6JQB 6RCV 7DJU 7LZF 7POU (89/73), Ks 1BVI/2 JFF (101/95), 1PJT 2GMF 2JUA 2MMS 2UYG 3CNN 5ALU 5JBW 6BHM 6MIQG (156/121), 6STI 6TFZ (56/48), 8GJD (115/95), 8RDE (103/72), 9GSD 9LJR 9UHH (175/150), 9AXU 9BHM 9JPL 9RNR 9VSH (91/73), WAs 2HLH 2KSD (137/100), 2LDC 2OVR 2RTS 2UXZ 6CYT 6HRS (102/73), 6ORS, VEs 3PV 7BBB, 11ER and ZS2U, displaying action by East Pakistan's AP5CP 14, BV2A, BY1PK (60) 5, CE8AA (11) 2, 9AF 0, CN8YK, CP3s CD 23, CN, CO8RAI, CRs 4AH 23, 6AI 21, 6CW 22, 6DG 22, 7IZ 20, CT2AI 21, DL9VZ/SV of Rhodes, a slew of DMs, DUs 1OR 23, 7SV (20), EA9AP, ELs 3NA (51) 23, 4A (30) 21, 4YL (10) 20, EP2BK (15) 4-16, ET2US 22, FA3WV (2) 20, FB8XN (42) 22, FK8s AB (53) 5, AE (52) 7, AT (8), FO8s AC (50) 6, AN (65) 16, FP8AP, HA5KFR (7), HGs 1AGI (42) 1, 5CN 5, HH2s GR LD (89) 1, HK6AI (12) 23-0, HM1AP (39), HP1s IE LM (28) 22, HRs 1MM 3, 3MW, HZIAB, IT1TAI (5) 23, a few dozen JAs, JT1KAA (60) 4, KA2s AK CN MA (60) 4, KCs 4USV 6BD 21, KGs 1AA (6) 17, 1BA (22) 0, 1BO (82) 17, 4AG, KM6CF (43), KP6AM, KR6s AR BX (26), GP LJ LY O, QW (36) 16, KV4s AA (81)

19-22, AQ (12) 12, KW6DG 2, KN6CG, LAILI/p (55) 21 of JAL, LX2XG, some LZs, MP4TAM (20) 17, OA4KF, those new ON5s AF (20) 17, AG, OX3s BZ (57) 2, DL (43) 18, FD (65), KW (45) 23, PJs 2AE (40) 23, 2ME (50) 23, 3AK, PZ1BH 22, ST2AR (75) 21, SUIAI (27), SVs 1AO 23, 8WT (12) 23 of Crete, 8WU (10), TFs 2WV (25) 21, 3AB, 3AP, TEs CAH DL PZ, TN8AG 21, TN8AL-5-22, UA2s KAE (83) 13, KAT (30) 22, UA9s DN FW JH (15) 3, KDA (13) 12, KDD (20), KEC KOG (90) 2, KVD (40) 2, MC OI OK US VB WI YE YV, UA0s AW (13) 3, BI EW FF ER FS GF (48), 1 IK (25) 3, JB (42) 16, KCC (40) 2, KCN (32) 7, KDA (9) 1, KFC (67) 7, KFG (80) 2, KJA (70) 3, KKB (57) 17, LH (60) 6, LL LR (68) 4, fourteen UB5s, UG2s AR (55) 19, CS CU 21, KAB LE, UD6BE (40) 4, UF6KPA (70), UH8BI, UI8s AZ (60) 3, KAA, UJ8KAA (80) 15-16, UL7s FM KAA 14, UM8s FZ KAB 5, UO5s AA (55) 20, BAI (1) 17, SAI 16, UPOL-10, UP2s KNP NV, UQ2s AE/mm (60), AS (75) 20, CC (50) 19, KAR (79), UR2s BU BV, UVs 3AR 9AB 9CC, VEs 8AH 8BC 8DU 8NR, VPs 2MV (10) 22, 4AA 4CC (30) 22, 6GC 6PJ 22, 6RG 23, 6YI 8GB 8GQ 8GV 19-22, 9EP (20) 20, 9EU 3, VOs 1DR (40) 22, 2FC 22, 2W (28) 21, 4DW 4GT 19, 4IQ (40) 23, VRs 1B (70) 4, 2AB (61) 6, 2DK (45) 6, 2EA 4CV (60) 7, 6AC 2, VSs 1JY (80) 14-15, 1FF (51) 15, 1KF (55) 16, 6EC (63) 15, 6EN 0, 9AC (72) 22, 9AFM (25), 9OC (85) 15, VU2KY (50) 16, XEs IH 1KD (69) 3, IOX 1, 2OK, YN1AA, YO8RL, sundry YVs, ZB1HC, ZC4s IP SS (50) 2, ZD7SE 21, ZEs 2JS 4JS, ZK1s AR (37) 17, BS 5, ZP5CF 2, ZS3EW 23, 4X4s DJ MI NX, 5AITW, 5N2s JKO LKZ (60) 18, RSB 21, 5T5AD 22, 5U7AC 20, 6W8s BQ (25) 21, DE (10) 22, DF (70) 23, 9G1s CY 21, DT 22, DU 22, GN (50) 20, 9K2AM, 9M2CP (50) 16 and 9O5AAA (DL7AH).

**40 c.w.**, where the stay-up-lates take in some late-late DX shows, supplies Ws 1HGT 2WMIQ 4ALLE 6JQB 6RCV 7DJU 7LZF 7POU, Ks 1BVI 2MMS 3CNN 4MYO 6STI 9GSD 9BHM 9GVA 6JPL, WAs 2HLH 2FIS 2KSD 2LDC 4FJM 6CYT 6HRS, VE7BBB and 11ER with good shots at CEs 1AD 1AGI 1GI 0ZE, CO8RAI, CT1AG (2) 4, CX2BT, EAs 8CP (38) 9AP (9) 7, FA8RJ 4, FB8XN, GC2s 1M2 (2) 4, FZC, GD6UV (25) 7, HA8s AT FF KBP (7), HGIAGI, HIs 7JFR (22) 2, SPP, HK7XI, HMs 1AP 4AQ HPHE, HR2AF, IS1SZU (27), ITIAGA, JAs 1ACA 1ANZ 1BTF 1BWA 1CO 1DDR 1DOY 1DWS 1EUV 1FWQ 1GAE 1GCB 1GIV 1JG 1HPI 1HTY 1IAM 1IAY 1ISA 1ISB 1ISH 1ITX 1VX 2AP 2BHW 2BL 2BP 3GV 2UJ 3AF 3ASF 3BQH 3CKI 3CYG 5ADR (11), 5MD 5MZ 6AHY/mm 6BSU 7ARQ 7AMK 7ANZ 7AWA 8ADQ 8QA 9RR 8SU (where JA4-9S), KA2YA, KG1AA, KJ6CA, KM6CC, KR6s AR BN LJ LY, KW6s CG DF, KX6s AF CG, KZ5MQ, LAs 1LI/p (1), 7Y, LZs 1FO (23) 5, 2KSK, OEs 1RZ 4EM 7GX, OX3DL, PJEAE, PY8NT, SPs 1ADN 18, 6FZ, SV0WZ (35) 5, TEs CAH PZ, UA0s 1K KDA KFG KIB KKB KKD LU, UB5KST, UF6KAE (9) 3, VKs 1ED 9RO, VPs 2LD (20) 1, ACC (21), 4E1 6RG 8GP (5), 9BO 9EP, VR2DK, VSs 1DK 4RM, XEs 1LB 2J8 2KH 2LA 2RCC, plenty of YU-YVs, ZK1s AR BV, many ZBs ZLs and VKs, 4X4DH (28) 0 and 9M2FK . . . . . Korea-based K2GMF hears snappy signals from Novice WVs SKL SOP and TFY around 7180 kc. . . . . K5JBW and WA2JIS encounter HR3H (s.s.b.), KP4ASK and XE1NA on 7-Mc. phone.

**80 c.w.** sounds like a multiplexed hi-fi rendition of a forest fire, shooting gallery and bowling alley at this time of year but Ws 1HGT 4ALLE 5EHY 7DJU 7POU, K6JPL, WAs 2LDC 4FJM and 6HRS nevertheless drag forth EA4CR (6), Els 6D (11) 4, 9J, FBZF, GD6UV, G13OQR (22) 7, CW3J, HB9VY, HGIAGI, HK1QQ, HPIE, JA2APZ, KH6AHQ, KP4CC, KR6AR, LA6U, ON4GL (16) 6, OK3KFE, OX3DL, PA8LOU (9) 4, TPCAH (18) 8, UA8KA, VR2DK (4) 6, W8VEH/VP, YN1AA, YV5AGD and ZK1AR (9) 6 . . . . . VE3PV pulled CT1YE's sideband through satisfactorily around 3783 kc. 0700-0800 GMT.



**10 phone** fools a lot of critics by providing WIBPM Ks 1PJT 2YFE 5ALU 5BW 8OKM 9JLH 0RNX WA2s PQI LDC and VE7BBB with signals from CE3s FG, (500), PY, CRs GCA (400) 18, ZEA (550) 19, CX2BW (400) 20, FG7XX, FS7RT (s.s.b.), HC2CB, HB8DGG (400) 22, HP1BA, HR1s AF BG (310), KG4s AO BC, KP4s AWF BEW, KV4CF (600 s.s.b.) 18, KZ5LV (515), L8ALF/um (s.s.b.), oodles of LU1Pys, P4s 2AE 3AD (400), PZ1AX on sideband, VK2s ASA 1TU, VP: 2G1AQ (600) 14, 2LA (600) 21, 6TR (200) 19, 6WP 9FE, VQ: 41R (s.s.b.), 2AT (s.s.b. 700) 15, 4RF, XE2SO (400), YS1LA's sideband, ZVs 2JA 8TZ (200) 15, a pile of SZs, ZL2UD, a flock of YVs and 5N2JKO (400) 15.

**10 c.w.** is DXier than it may sound on cursory inspection. Ws 11GT 4MLE 6RCV 7LZF, Ks 2GMF 2MMS 2YFE 2YXC 0BHML, WA2s KSD and LDC take the bush for CE3RY, HC1AGI, HP1IE, KV4AQ, LU8BHF, PY1ADA (20) 19, TIC2AH (5) 17, UF6ACW (120) YN1AA (1) 16, YV5s AGD ANT (160) 19, ZE8JY 1L, ZP9AY 21 and ZS2NG. Here's a hand where the more CQ-1X the merrier, longer and louder.

**160 c.w.'s** 1961-'62 winter season dust is settling slowly. WI1GT, Ks 5ALU 68TI and the 160-Meter DX Bulletin (No. 5) of WIBB describe, among other angles, the late-February triumph of EP2BK in working VE1ZZ. Ws 2IU and 1BB got the EP2 in that order in March. W8VEH/VP9 worked EP2BK, and G6BQ hooked HC1AGI in other outstanding two-ways. Static subsides in the southern hemisphere just as it increases up our way, so don't neglect 1.8-Mc. transequatorial possibilities this summer!

**Where:**

**Asia** — "JT1s AA and YL return home to Czechoslovakia around the end of May. Then Ludvik will operate as OK1KW, Mla as OK1KX. I will be their QSL manager." This from W3LE who insists on the usual self-addressed stamped envelopes from W/K applicants. . . . W 7E3IU requests s.a.s.e., too, concerning his QSL efforts in behalf of 9M2GV. . . . "I'm taking over QSL chores for VU2BK," writes Steve Ewing, address in the roster to follow. "Ken will fulfill all contacts and correct s.w.l. reports. We request s.a.s.e. from Statesiders, International Reply Coupons from others, for Statet replies." Steve still manages 11GH QSL activities and has a few additional arrangements in the works. . . . S.w.l. Gordon Yazer, address to follow, notifies: "UA9KOG has asked me to be his QSL agent for North America, BV DU SV and TA regions. The customary s.a.s.e. and IRCs, of course. . . . Florida DX Club's *D.V. Report* hints that W3KVQ may help in the confirmation of 9K2AM QSOs recently made on c.w. by visitor W3RYX. . . . PA0WVP now has TA2AR's logs for the period September 26 through October 2, 1961. Line forms on the right.

**Africa** — "I have 5A3BC's logs dating from March 16, 1962," declares K2PFC. "Cards for QSOs concerned will be shipped from here. S.a.s.e. for direct reply, others via bureau." WA2PQG's problem: "I continue to handle ZS1AB/ZS3AB QSLs in response to s.a.s.e. but Barney's cards are six-by-four and won't fit small envelopes. So tell the gang that mint 4-cent stamps will be sufficient, or s.a.s.e. of business size or larger." Hayes knows just how it is. Ted. . . . WIBPM apprises, "I'm now QSL manager for ZS3LW." W/K contacts, s.a.s.e. a must. . . . W60KU has word from ex-F8AC that he closed that station November 18, 1958, audible evidence to the contrary notwithstanding. . . . W8KX finds 5T5AD running low on QSL stock with a new supply on order from France. Alban's modified FF8AD cards will do the job temporarily, and he's a conscientious QSLer. . . . W1VG hears from W3ZZE: "Held the call 5A3TR from January 31, 1961, to January 30, 1962, and had hoped to clear up all QSLs last September but things got out of hand. Most have been sent

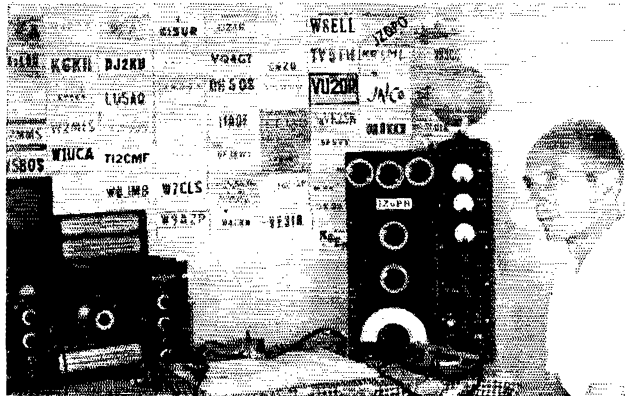
out now. Anyone who still needs my card should drop a line to W3ZZE. . . . In the VERON (Holland) DXpress we see that 7G1A is skeptical of any other 7G1's validity at this time, also that Guinea and Togo may try the 3X and 5A prefix blocks respectively. . . . From our Liberian look-out, EL4A: "I'm flying full time again, setting around this region regularly. I'll be glad to accept any EL-bound QSL for relay. EL4A QSLs are sent out in batches every three months via bureaus, next shipment in June. How about more universal and accurate use of Greenwich Mean Time, and dates expressed only in clear day/month/year sequence?" And let's spell out the month, men, because "6/1/62" means January 6, 1962, in much of the world.

**Oceania** — W5WV communicates: "I've just completed a mailing of 108 VK8FZ QSLs via bureaus to complete confirmation of all Fred's QSOs for which I have log data. These last are the residue of contacts for which no W/K cards were received, or no s.a.s.e. filed. Fred visited the States this spring and tells me there's a backlog of QSLs waiting to be attended to in Australia. He will get on that chore as soon as he gets back home. I still receive a dribble of QSLs for VK8FZ; these will be taken care of as soon as Fred supplies pertinent log details. It has been a pleasure to help most of the fellows who worked VK8FZ on Macquarie although there were numerous problems of GMT conversion." Bill notes the usual pitfalls when daylight saving time and date change are concerned. W4MLE learns that W4KWC no longer is affiliated with F08AC QSL matters. You might try the direct QTH in the listing to follow, suggested by W4CKB of FDXC.

**South America** — W9VZL of Wisconsin University's Geophysical & Polar Research Center throws clarifying light on recent QSL confusion involving CE9s AF AS AW and AY. "During the 1961-'62 austral summer I had the opportunity of operating those stations. [For their QSOs] I will QSL only to stations I worked myself; i.e., those whom I told to 'QSL via W9VZL. I cannot confirm other QSOs for I do not have the necessary logbooks. QSL cards for this Chilean Antarctic activity will be in my hands shortly. Those wishing confirmations should include self-addressed stamped envelopes with their cards sent to my Milwaukee address." HC4CD welcomes the QSL managerial co-operation of friend KAZP. W/Ks only.

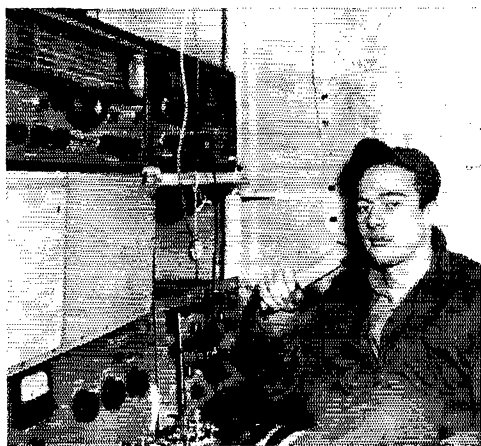
**Hereabouts** — All hail our "QSLers of the Month"! They be CT2AI, DL1FF, FT2US, F2MO, GD3AH, GW3DIX, HB9ZE, HK1JF, HM1AP, HP1IE, HR3MW, KL7BBW, KR6s AR QW, LP2XG, MP4s BBW BDC, SM5BFE, SP7LA, SV0WZ, TF2WV, UB5JE, UR2AR, VE3BQL/SU, VKs 3AZM 9MV, VP7s BP NQ, VR2DK, VS4RS, XF2JS, ZL2GH, ZK1BS, 3V8CA, 5A3BC, 5N2JKO, 5T5AD, 5U7AH and 6W8DD, plus QSL aides Ws 2CTN 2HMJ 3AYD 4MCM 40PM 7ZAS, Ks 8MTI and 8BLT. The book-keeping diligence of these colleagues arouses the admiration of nominators Ws 1BPM 4NJF, Ks 1BVI 6MQG 6TZX 8NMIG 8SQK 9UHH 0GVA 0VSH, Ws 2PIT 20VR 4V4J 6HRS 6ORS, WV2YC1, VE1ARC and listener S. Novick. Good show, QSLs! . . . K9TZK and W2UDT announce their availability as QSL agents for deserving overseas DX operators. . . . HB8DC (ex-VE2XM) writes W8KX: "Been in and out of the ham game since 1938 and had often wondered just how wonderful it would be to be a rare DX station and have people all over the world begging me for cards. Well, I found out that they beg, all right, but the returns are not too good, especially on phone. Of the first 1600 QSOs from HB8DC, 1200 said they would QSL and requested ours; only about 700 actually sent cards. Thus only about 40 per cent of our QSOs result in QSLs. We have an 80-per-cent return from Canada, 75-per from the U.S.A., and 45-per from the rest of the world, 60-per-cent returns all told." HB8DC closed down in March, advising: "Until we are resettled I have made arrangements with HB8JSM to hold our QSLs for us. Cards received up to March 15, 1961, have been acknowledged. All received after

JZ0PH collected 89 countries and 37 United States with this Biak layout before closing down for return to Holland. Joop now can be reached for QSL purposes via VERON's bureau. (Photo via W2MES)



that date will be held by HI8JSM until we have a permanent address for forwarding." Doug expects to resume his ham career in Canada around October after a European vacation . . . . . K1MEM declares that all FP8BR QSL applicants resulting from 1843 QSOs in '61 have been sent cards after a printshop delay. Those still in need are urged to re-apply . . . . . W3LMM informs "VP2MV's cards are being printed, and he expects to answer all received, direct in response to s.a.s.e. or IRCs, otherwise via bureaus." . . . . . From K1AA: "Re VP2AB c.w. operation in the ARRL DX Test, February 17th, all who sent me QSLs with s.a.s.e. or IRCs have been answered direct. QSLs for other W/K contacts were sent to ARRL Bureau Managers on March 12th." Got the proper supply of s.a.s.e. on file with your call area QSL chief? . . . . . ARRL Director VE3CJ writes W1BDI: "Since coming home [from VP5BP] I have QSL'd every contact made outside contest hours, plus all of W0NWX's c.w. contacts, partly through the bureaus and partly direct. I've also sent cards for contest contacts for which I received cards, and will continue to do so." . . . . . W3BVN testifies that the most recent legitimate FP8AF appearance occurred in July, 1950 — none since. . . . . If you're one of QST's s.w.l. readers you may have DX QSLs waiting for you in the SWL/QSL Bureau of Lefroy Waite, 39 Hannum St., Bullston Spa, N.Y. . . . . We hope you can boost your confirmed total with a few of these individual recommendations:

**BY1PK**, Box 427, Peking, China  
**CE9S AF AS AW AY** (see text preceding)  
**CE0ZG** (via CE1AD)  
**CN2BK** (via W2CTN)  
**CO6XZ**, Box 6996, Havana, Cuba  
**CO8JK**, Dr. F. Magran, P.O. Box 857, Santiago, Cuba  
**CR6CA** (via K4ICA)  
**CR7DY**, J. de Assincao, Alto Molocue, Quelimane, Mozambique  
**CT1DJ**, A. Rebelo, Quinta Alagao, Lote 22, Carcavelos, Portugal  
**DL2AB**, D. Bowden, 205th Sig. Sqdn., BFPO 24, London, England  
**ex-DL4ME**, E. Bort, K6YTF/4, Hq. & Hq. Co., 7th Spec. Forces Gp. (ABN), 1st Spec. Forces, Ft. Bragg, N.C.  
**DL5KM** (via W0UUW)  
**DL9VZ/SV0** (via DARC or direct)  
**ex-EP2BK**, R. Snyder, Box 502, Springfield, Mo.  
**FK8AT** (via W2CTN)  
**FK8AZ**, L. Chaumont, Box 40, Noumea, New Caledonia  
**FO8AC**, G. Vincent, Av. du Regent Paraitu, Papeete, Tahiti  
**ex-FU8AE** (to FK8AZ)  
**GD6UW** (via R8GB)  
**GW2DUR** (via K9RDP)  
**HC4CD** (W/Ks via K4ZZP)  
**ex-HC5HA** (to 5N2HA via 5N2JKO)  
**H1L2KJ** (via W2NIX)  
**H17JFR**, Central Romana 497, Laromana, D.R.  
**ex-H18DGC** (via HI8JSM)  
**HO9SC** (via W9SZY)  
**HR2FG** (via W2CTN)  
**HR3MW**, M. Whitaker, Aptdo. 14, La Ceiba, Atlantida, Honduras  
**JA7AD**, S. Kamio, 82 Anyojishita, Sendai-city, Japan  
**JT1s AA YL** (via W3LE)  
**K3GAD/KJ6** (to K3GAD)  
**K5SOI/KH6**, G. Graves, USS *Conserver* (ARS-39), FPO, San Francisco, Calif.  
**K8YUW/KJ6**, G. Murphy, Johnston AFB, Johnston Island  
**K9QJG/KL7** (via K9YRQ)  
**KC4AAE** (via K9KYJ)  
**KH6EEM/KB6**, H. Adams, Box 38, APO 06-50,000, Canton via Honolulu, Hawaii  
**KJ6CA** (via KH6DOX)  
**KN7OWH/WP4**, D. Barnes, Box 25, Castner, P. R.  
**KP6AM** (via KH6AAJ)  
**ex-KR6BF** (to EP2BB)  
**KR6BH** (via K5MDX)  
**KR6LY** (via K5PSO)  
**KV4CM** (to W6GEK)  
**KZ5LC** (via W2CTN)  
**KZ5LW**, Box 382, Fort Gulick, C.Z.  
**LZ1HA**, Box 205, Sofia, Bulgaria  
**MSVZ** (to IISVZ)  
**ex-MP4TAC**, A. Dicker, 10 Avenue Rd., Gosport, Haunts, England  
**OK1s KW KX** (via W3LE)  
**OX3BZ** (via W2CTN)  
**SL6BH** (to SM6CKU)  
**TN8AF** (via RRF)  
**TN8AM** (via W2CTN)  
**TT8AL** (via TT8AC)  
**UA3CR/UA1** (via VE7ZM)  
**UA9KOG**, c/o G. Yazer, 312 George St., Sydney, N. S., Canada (see text preceding)  
**UP2CG**, G. Misunas, P.O. Box 16, Vilnius, Lithuanian S.S.R., U.S.S.R.  
**VE8AM**, Box 130, Yellowknife, N.W.T., Canada  
**VE8MZ** (via K6RDP)  
**VK8NK**, R. Knight, D.C.A., Box 31, Alice Springs, N.T., Australia



**KC4USS**, here manned by RM/2c K0GVB aboard the Navy's USS *Burton Island*, worked plenty of 20-meter DX on phone and c.w. from the south magnetic pole. After months of battling antarctic elements and radio blackouts, the ship goes back to Bremerton for refurbishing and K0GVB returns to more clement land-based Iowa DXing.

**VK9LA** (via VK6RU)  
**VP2LD**, S. de Lima, c/o Aeradio Ltd., Castries, St. Lucia, W.I. (or via W2CTN)  
**VP2MV**, D. Goddard, Cable & Wireless, Montserrat, W.I  
**VP2SH**, R. Nelson, Dept. of Agriculture, St. Vincent, W.I  
**VP4EI** (via R8GB)  
**VP5AI** (via K4UFE)  
**VP5CW**, C. Hewett, 903 E. 7th St., Panama City, Fla.  
**ex-VP6DG** (to VP2MV)  
**ex-VP8CZ** (to G3LWS)  
**VQ1DR** (via W2TSD or WA2RAU)  
**VQ1YW** (via VQ1CJ)  
**VQ1YL** (via W2TSD)  
**VQ8APB** (to VQ8AP)  
**ex-VR1B** (to VK3IB)  
**VR2AB**, P.O. Box 184, Suva, Fiji Islands  
**VR2BZ/VR1** (via VR2AS)  
**V56AE** (via W6DIX)  
**VU2BK**, c/o S. Ewing, Sleepy Hollow Rd., Atkinson, N.H.  
**VU2LNZ** (via W2ODZ)  
**VU2US/AC5** (via ARSI)  
**XE2JS**, F. Ramos, P.O. Box 39, Guayamas, Sonora, Mexico  
**YV1CE**, P.O. Box 1019, Maracaibo, Venezuela  
**YV2AB**, J. Fernandez, P.O. Box 299, San Cristobal, Venezuela  
**YV2CD**, J. de Guevara, Box 32, Barinas, Venezuela  
**YV2CJ**, A. Urbina, P.O. Box 32, Barinas, Venezuela  
**YV4AV**, P.O. Box 510, Valencia, Venezuela  
**ZC6UNJ** (via W2CTN)  
**ZD3P** (via W7VEU)  
**ZS3LW** (via W1BPM)  
**3A2BW** (via W4ECU)  
**5A3BC** (via K2PFC; see text preceding)  
**9G1DP** (via K4TWF)  
**9K2AM** (see text preceding)

Your benefactors for the rerunning glossary are WA1DGL 1HA 1KE 1TS 1UED 1WOP 2MES 3LAIM 4MLE 7LZF 8KX, Ks 1BVI 1JFF 2LSX 2MMS 2UYG 2YFE 3MNI 6MGG 6TZX 7JYE 8GJD 8RDE 9UJR 9TZK 9UHH 9BHM 9GVA 9GVB 9JPL 9VSH, WAs 2FQG 2H1H 2HX 2JMI 6HRS 6ORS, VEs 3PV 7BBB, plus the following worthy groups and clubs: DARC *DX-MB* (DLs 3RK 9PF), Far East Auxiliary Radio League (Military) *News* (KA2LL), Florida DX Club *DX Reporter* (W4CKB), Japan DX Radio Club *Bulletin* (JA1DM), Kanawa Radio Club *Splatter* (W8PQQ), North Eastern DX Association *DX Bulletin* (W2DGW), Northern California DX Club *DXer* (K6CQM), Okinawa Amateur Radio Club *Keystone Carrier* (KR6LD), Polar Bears Radio Club *DXer* (SL3ZO), VERON'S *DXpress* (PA6s FX LOU VDV), Western Washington DX Association *DX Northcutt* (W7JPC) and West Gulf DX Club *DX Bulletin* (K5ADQ). None of those postal suggestions is necessarily official, complete or accurate — help yourself.

#### Whence:

Asia — Last year's c.w.-only 2nd All-Asian DX Contest, results courtesy sponsoring society JARL (Japan), saw Ws 7YGN 6LDD 5PSB 9IOP, K6EVR, Ws 7HKT 6WX 4KXV

K6s JT DDO and IEC pace U.S.A. entrants in that order. The Canadian contingent was led by VE7EH, WB4IH/VE3, VE8 2NV 3BW 2AFC 2WA 6HG and 5KY. Other W/K team leaders: WS 1KQF 2JAE 3WAX, K8MTI and W0BFD. Continental U high-scorers are W7YGN, KW6DG, CX2CO, Z84MG, U4A3C and 4X1N1. Top homefront tallies were turned in by JAs 3AF 2JW 1BK 7AD 7KY 1A1S 1DS1 1ANG 6AK 1C1D and 8YF in that order. Mark of the last week end in August for the 1962 edition of a radiotelephone DX activity that seems to be gaining popularity year by year. . . . Ex-ZD2K1K/nc-5N2K1K receives ZG6UNJ in the Israel-Jordan buffer area and writes W2CTN: "I use a 150-watt Collins rig on 14-Mc. a.m. and c.w., with an SP-400 and other receivers. Antennas are no great problem as there are lots of masts I can use, but I'd like to get a beam atop Government House here for the three higher-frequency bands. I'm also interested in obtaining a small s.s.b. rig for possible use in Jordan and Syria. I hope to be here a year — plenty of time for operating."

VE7BBB finds former BV1US staffer Leo signing KZ5LW near Cristobal. . . . K5CDA/mm, cruising in the Red Sea, reports big signs from both ends of an E22AF-VK6RI 21-Mc. QSO. . . . From K2UYG: "ZCIC's MP4 tour was postponed but he still plans on the trip before he returns many ZC4s off the air, at least temporarily. . . . VU2CQ, weary of 14-Mc. sideband QRM, moved up to 21,240 and 28,440 kc. where he still works the U.S.A. and encounters less interference. Mickey, aided by W4IMP and DJ4WN, has a new crystal-filter 100-watt sideband outfit cooking. . . . HL9KT (K2LSX) found rough phone going in this year's ARRL DX Contest. "First time I've been in a DX test over here. What a mess was caused by Statesiders calling blind! We received s.s.b. transmission privileges but our maximum permitted input power was cut to 100 watts at the same time. . . . VU2s BK ED PS RSTN and US were ringleaders of that a.m./c.w. VU2US/AC5 eruption in April. Three rigs running 8, 35 and 100 watts; five receivers including a Super Pro, HRO, BC-312 and BC-348; and three antennas, a cube quad and two verticals, comprised their noisy arsenal. . . . W8DAW reminds us to remind you that FCC-licensed amateur risk citation by working or attempting to work Cambodia, Indonesia, Thailand and Vietnam, whose governments have notified the International Telecommunications Union that international communication by their amateurs is prohibited. VE/VOs additionally are forbidden to contact Jordan, Laos and Roumania — see p. 50, last month's QST. . . . K0VRG writes from Vietnam where hamming possibilities seem remote; K4FXT, due to depart Istanbul this month, finds a similar situation in Turkey; and W4GOAQ indicates to K7TZX that Yank amateur work in Korea is limited to operation at existing H19 installations. . . . Nuclear physicist JA1EC, a familiar 21-Mc. bandmark, tells W9ALYB of enjoying Oscar-tracking sport. . . . FDXC, FEARL, JDXRC, OARC, VERON and WGDXC volunteer Asia observations; AC4AX says prospects of early Tibetan transmissions are cloudy. . . . MP4Ts AC and AO are widely worked on 15 meters, a.m. and sideband, respectively. . . . BY1PK continues to limit QSOs to the soviet bloc as a rule. . . . J1KAA, 14,050-14,070 kc., 0200-0130 GMT, holds a frantic following. . . . KR6IM gives specs on an RC-type Okinawan certification, and K49MF can supply scoop on a diploma awarded for five K49 QSOs.

**Africa** — A particularly nutty development in Nigeria is reported by K3MNI. Seems that 5N2RSB worked W2NUT and W5NUT back to back, and both sent him QSLs on which are pictured squirrels eating — well, *not* bananas. . . . W8KX provides insight on 5T5AD goings-on: Alban, usually active around 2000-2200 GMT on 20 c.w., often comes up with fifty to a hundred QSOs per sitting. He doesn't mind brief contest-type contacts because his English is quite limited. When not busy parrying pile-

ups, 5T5AD functions as a Mauritania Posts & Telegraphs official. . . . Orbiting W4BFD concluded a lively 3A2BW tune-up for his Indian Ocean objectives, then suited for Seychelles in mid-April. Gus and VQ9HB will aim at the Aldabras, Agadea, Comoros, Tromelin and other juicy DX-peditionary targets. His c.w. spots will be 35 and 65 kc. above the low band edges, except for crowded 40 meters where 7001 kc. is specified. On sideband watch 3765, 3995, 14,125, 21,235, 21,435, 28,235 and 28,635 kc. W4PC1, who supplies this info, warns callers to steer clear of these frequencies. . . . SU1M, 14,034 kc. at 0330 GMT, tells W2GGG he's gunning for more W/K QSOs with his new 100-watter. . . . EL43 encountered improved conditions in the c.w. ARRL DX Test sessions, managing 407 QSOs with a hurry-up quad. Ken awaits arrival of a 2-B receiver and Vallant to feed his new 555-ft. Vee. The 20,0JQ-QSO EL4A vertical finally succumbed to Liberia's vigorous breezes. Ken reports lower frequencies now going sour as the tropical QRN barrage builds up, 20 and 15 peaking for summer action, but 10 meters practically lifeless. Watch for EL4A in his usual 7007-14,014 and 21,024-ke. slots around 0800 GMT and FB8XX regularly holding forth for a summer holiday in Sweden. . . . FDXC, WEDXA, WGDXC and VERON add Africa commentary: ST2AR is game to try TL TR8 and TY2 DX including if properly inspired and equipped. . . . E49AZ's 7087-ke. s.s.b. is a challenge at 0700 GMT. . . . Z861F intersperses ZS-7-8-9 considerations with construction of a 7-Mc. quad to foil foible 14-Mc. conditions. . . . Four VQs (CJ DR WW and YL) active one time. . . . Zambar was never like this!

**Oceania** — W1A (Australia) forwards the outcome of last year's VK/ZL DX Contest. We find W5WZQ and K5MDX grabbing top U. S. A. scoring honors on s.s.b. and phone, respectively. Statesiders WS 1JYH 2JAE 3DBX 1BJ 5WZQ, Ks 6EVR 7KGP, Ws 8JIN 9IHN and 0BMM submitted leading c.w. scores in their call areas, while VE8 7B1N and 9BWV can owe two Canadian Continental code leaders are W5WZQ, V5BZ, DL6GN, JA2W, W6GLI and FABRJ. Radiotelephone highs were posted by K5MDX, W8JIN, K6VXX and V5KC in the U. S. A. in that order; with K5MDX, HL3X, SM3EP, JA6CV and KW6DG voice winners by continent. On the local scene, c.w. call area kings are VKs 1JE 2GW 3DQ 4SS 5NO 6PM 7SM 8CP, ZLs 1A1 2GS and 4GA; on phone VKs 1PM 7WC 3BA 4SN 5MS 7WA 8AV 9NV, ZLs 1KG and 3VI. W1A Contest Committeeman F. E. Nicholls declares, "It is a pity that all claps who enter contests do not send in logs. . . . Conditions were pretty bad here, but it seems that the contest was enjoyed. . . . Contest king K1GJ tours the Far East in official capacity this summer. . . . part of a training project I hope to set up well-equipped ham stations in East and West Pakistan with facilities for RTTY, s.s.b. and c.w." We'll be Katashi makes it back to Hawaii in time for the '62 WRL Sweepstakes. . . . V49FZ tells W5WW that VK6JR will probably be active on Macaerie this year, but mainly for the purpose of working back home. Rapidly deteriorating propagation conditions foiled VK6FZ's bid for WAS and DXCC. Even WAC eluded Fed — no Africans. . . . Sailor W5SOI/K1H anticipates permission to operate an amateur station aboard Navy's USS *Conan*, U. S. A. preferred. . . . K4RC, VERON and WGDXC append Oceania notes; Starbuck, Maniluki and Samoa are mentioned as future DX-peditionary targets for VP2VB/mm-P08AN whose favorite haunts appear to be 14,065 and 14,195 kc. . . . VK9LA, with 20 watts of 14,015-ke. c.w. on Coros-Koding, sometimes appears between 1400 and 1530 GMT, Saturdays. . . . Lots of curious and spurious CR10 domes this spring. . . . K6LL's W4YQS departed in April, leaving his Iwo Jima KWS-1 to gather cobwebs until another fortunate ham happens along.

**Europe** — The summer DXcurssionary season is already under full steam on the Continent. DL9PF, assisted by

CT3AF, who specializes in 15-meter phone DX, sent this interesting shackshot to friend W3ICQ.



DL5HI (K9PDH), expects to participate with a July 9th-29th multiband stand on Corsica as DL9PF/FC. No Turkey tour this summer for Walter. . . . OK2QR checked his WERC (Worked Frankford Radio Club) credentials with W3LEZ and also has 96 QSLs toward his Keystone sheepskin. Ruda reminds us of the availability of Czechoslovakia's 868, 100-OK and ZMT certifications, details presumably obtainable from Central Radio Club, Post Box 69, Praha 1. . . . K9JJR remarks on the 14-Mc. sideband rag chews dished out by voluble UA1KBW, and we hear that UA1LO may be the call of Russian spaceman Gagarin. . . . SMS 5CTY 6AAM 6BUB 6CKU 6CRZ and 7CUY make up the staff of SL6BH, Swedish Air Force Training School, Halmstad, and the boys are eager to add 14- and 21-Mc. single-sideband action to their current 3.5- and 7-Mc. c.w. program. . . . "Took me nine years to qualify for RSGB's beautiful Empire DX Certificate," recounts W9NN. Quite a project—fifty Commonwealth countries on 40 meters, plus another fifty on 20. . . . YERON observes that ZB2AD is on a sideband spree and that DL9VZ/SV0 surprised the s.s.b. set from Rhodes in April.



HL9KT, with K2LSX shown here at the s.s.b. position, joins HL9s KH and KS in 14- and 21-Mc. single-sideband DX developments. A brand new antenna installation on 90-foot sticks soon will be boosting the 75-country HL9KT DX score. K2LSX is scheduled for return to New Jersey in August.

Hereabouts—VP2MV (ex-VP6DG) of Montserrat supplies a Caribbean toughie to many a 200-country man. W3TMM remarks, "Dean arrived here in late January and got going with a little 'junkbox' 6L6 10-watter on 7 Mc. a few days later. Now he's on the low end of 14 Mc., 2300-0200 GMT, while awaiting arrival of his 75-watt Barbados transmitter. He has encouraged VP2MC's return to the air on 40 phone. VP2MV likes a good old-fashioned rag chew when the wolf pack gives him the opportunity." . . . Departing HI8DGC (VE3BLJ) discourses to W8KX: ". . . I bought HI8BE's Viking and Windom antenna when he left in 1959. Both were still in use, aided by a triband cubical quad, when I closed down in March. No c.w. here until I started it up again. Got a key last year and did a bit of it but I have a brass arm which is good only for about half an hour. Recently borrowed a bug which really put HI8DGC back in business. In nearly all cases I found hams to be gentlemen, waiting their chance in the pile-ups, but there is a small nasty percentage who insist on ill-timed calling. These went on my black list and did not get worked that particular evening." . . . HC1CD commends K4ZPP & Co. for encouragement and technical assistance that helps him enjoy 10, 15 and 20. "There are many problems at this location in securing radio parts. Thanks to Herb I now enjoy many Stateside QSOs." . . . Ex-DL4MG recently passed the 250-country mark as W5WV, adding 89 countries since the fall of 1960. "There's a new DL4MG now, and I hope he finds that call as productive as it was for me—143 confirmed." . . . W4GHS, situated in one of those frustrating no-visible-antenna residential areas, collected 102 countries with a sneaky lash-up of No. 28 magnet wire. . . . K0GVB, signing KC4US aboard USS *Burton Island*, found ARRL DXCC Rule No. 8 a bitter pill when cemented to the antarctic continent by a 15-foot thickness of ice. Rules is rules, Gary. . . . Twelve WACs, four WASs and four DXCC sheepskins adorn the shack at W6FB, all earned under nine different calls in different locations since 1926. . . . K8OEM finds K1NWD/mm enjoying 21-Mc. phone fun aboard *USS Parle* in the Caribbean, and K9JJR understands that HO9SC is a Ninelander aboard a ship of Panamanian registry down that way. . . . ARRL SCM W6JQB rests up on 20- and 40-meter

DX channels after a furious winter social season and stereo kick. . . . K5ALU, still going strong after 10,000 QSOs in two years, is a good bet for Arkansas-hunters on 10 through 160 meters, voice or code. . . . USAF and RCAF personnel at Goose Bay have formed separate radio clubs, modifying the availability of GBARC's Worked All Goose certification. Better check with VO2NA. . . . W0DVK enjoys the company of OX3BZ in Greenland communications work. . . . Highlights of VE3CJ's springtime VP5BP stint: a get-together with fellow ARRL Director W0NWX who stopped by on return from his own VP2VI DXcursion. . . . Absence of a beam was one disappointment but, "My long-wires worked well with the added 15-lb. gain of my call." Nylon embroidery cord and bronze trolling line successfully endured the Grand Caymans winds after other more orthodox materials failed. . . . Four or five Europeans calling at once made 75 phone seem just like 20. . . . Extraordinary 160-meter propagation was enjoyed although Caribbean lower-frequency QRN is terrific. . . . S.s.b. proved its superiority, and a.m. was used only locally and on 160. . . . Ninety-nine per cent of the gang dispensed good manners but there were those who apparently have forgotten that amateur radio is a hobby, abandoning the Golden Rule. . . . More impressions from W1RAN re his late-winter FP8BX outburst: Nine hundred miles of near-blizzard motoring from New London, Conn., to North Sydney, N. S. . . . FP8AP, St. Pierre's lone ham resident, met the twin-engined Piper with a glad hand. . . . W2KIR started the ball rolling with a QSO ten minutes after Gus and Ned stretched a 7-Mc. doublet between two chimneys. . . . Poor conditions the first night but things perked up next day. A 3.5-Mc. sky-hook was added, then a 206-footer for 1.8 Mc. Ned's DX-60 made 2380 contacts in twelve days, plus a tantalizing heard report from FP2BK on 1826 kc. . . . Rough sport at times, but if W1RAN had to do it all over again, he'd do it all over again. We haven't heard the last of FP8BX. . . . Some of K1AA's DXperiences as c.w. manipulator at VP2AB during the '62 ARRL Test: QSOs-per-hour averages were 49.3, 40.5, 46.6 and 50.8 on 3.5, 7, 14 and 21 Mc, respectively. . . . U. S. Sixes constituted 11.2 per cent of all QSOs, Sevens only 0.46 per cent. . . . In some 14-Mc. pile-ups signal strength lost its meaning; selection of frequency and shrewd timing became all-important in raising VP2AB. . . . Even in kilowatt-superbeam alley on 20 fellows in the 100-300-watts and simple-antenna category seemed to be doing well. . . . NEDXA's big DX guns are Ws 1GKK 2HMJ 1BHH 1JYH and 2AYJ in that order. Wis PZ OOS JYH BHH and WDD head the phone ladder. . . . DX lustress K5ADQ relieves W5ABY's Houston gang on the WGDXC DX Bulletin wasthead. . . . FDXC reports ex-W8ZY, now K1CT, menacing the peninsular pack with his trusty 250-TH.

Ten Years Ago in "How's DX?"—Old-timer reliables on our DX bands are applauded in the opening discussion for June, 1962. . . . Hey! Fifteen meters is a strange new heading that shows up in your QST DX pages for the first time. Limited DX results so far, but many a Yank is reporting his first 21-Mc. QSO. . . . On 20 phone we hear of AG2AC, HC8MI, HI6EC, JA0IJ of Iwo, KT1s BB CH LU, KW6BC, LX1s DC DU, MI3s DW RH RR US, OE13GK, TA3AA, W6HQT/KW6, ZC6AD, ZD1s BB BF and Marion's ZS2ML. . . . Twenty c.w. is the lair of AG2AG, EK1AD, FD8AB, FU8AA, KI6AKV/KJ6, KT1s OC UX, MI3SL, OE13s HD ILL SC RB, OQ5s PE PF, ZD1B1 and 9SLAX. . . . Forty is fine for CT2BO, EA9BB, FF8AC, HE9LAA, KX6AH and ZK2AB. . . . Good ones on 80: FA8BC, KI6QY/KC6, OQ5RA and ZS3K. . . . The lads on 75 manage to pull ZS6s LW and KD through the rising QRN level. . . . Our 28-Mc. reports dwindle down to KS4AR and ZD9AA on voice, VR2CG and ZK2AA on code. . . . W2QHH keeps 160 topical by working South America, VPHZ. . . . Jeeves is frightened by his first multiband beam, while pictures of GI6YM, VP6CS and Kashmir's 4U4J complete the conspectus.

QST

### IMPORTANT NOTICE Changes of Address

Important postal changes in handling second-class mail matter are now in effect. Please advise us *direct* of any change of address. Four weeks notice is required to effect change of address. When notifying, please give old as well as new address. Your promptness will help you, the postal service and us. Thanks.



CONDUCTED BY SAM HARRIS,\* W1FZJ

**M**ARCH winds and April showers,  
The final test for beams and towers.

And even if they did survive the winter colds and the spring winds it's still time to take them down and clean the connections, re-do the phasing lines, rematch the stubs, re-grease the rotators, tighten up the guy wires, and get ready for the June contest. Anybody knows that taking a six-meter beam down at the end of April is certain to make the six-meter band open up, so Helen missed the first good sporadic-E opening on the band while our beam was lying on the ground being refurbished for the coming season.

You can't improve your last year's performance if you don't improve your equipment and there's no time to improve your equipment like the present time. The coming contest bids fair to be a wild one, with contacts being made as high as 23 kMc., and it wouldn't surprise me any to find at least one contact using lasers. W1BU will be operating 1296 moonbounce during the entire period of the contest in hopes of making the first moonbounce contest contact. Cooperating on the other end will be W6HB and company, W6NLZ and company, W2CXY and company, and, with any luck, KH6UK and no company. So whether you're hoping for a moonbounce contact or running a Gonset on a hilltop, or sitting at home with your homebrew 100-watter, the contest in June is designed to provide fun for everyone. The prime objective of the contest is to promote activity on all the v.h.f. bands and u.h.f. bands. The rules are written so that the more bands you operate, the more multipliers you can get.

If, for instance, you worked all bands available you could amass a multiplier of ten sections without working farther than across the street. I don't believe that anyone has ever turned in a score with multipliers on every available amateur frequency in the u.h.f., but it is a situation devoutly to be desired. As with any contest, the object is to try and amass the largest score. However, this really is secondary to the objective of promoting activity on lesser-used amateur frequencies. Hence, the contact points for the higher frequencies are fattened up considerably to offer a reward for making efforts on the higher bands.

Complete rules for operating the contest, which starts June 9 at 2:00 P.M. your local standard time, and ends June 10 at 10:00 P.M. your local standard time, appear on page 60 of this issue. If

\* P.O. Box 334, Medfield, Mass.

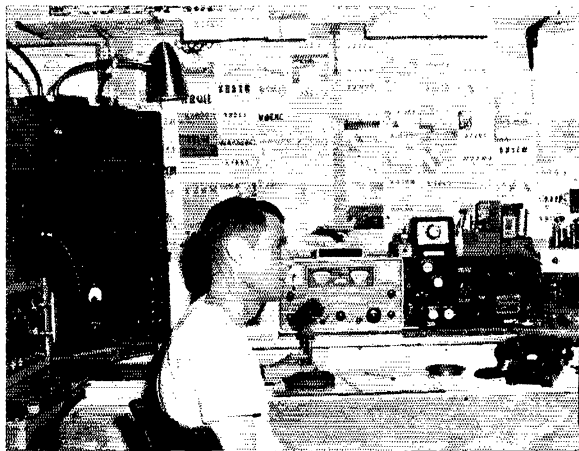
Neat and natty! Operating position at QTH of W5DKP.

you operate the contest you will inevitably run into some operators who are not familiar with the method of scoring the contest or who have not learned that there was in fact a contest going on. Be sure to make note of the calls of these stations and after you have briefed them on the contest (thereby losing three or four contacts), drop them a card pointing out the advantages of belonging to the ARRL, because obviously they must not or they would have the contest information available. As a matter of fact, if you would send me a list of these nonparticipants, I would consider it a great favor—as I have a little message which I would very much like to send them once I've discovered them. Just remember, a v.h.f. man who in times like these is not supporting the League is not doing his duty.

I think it would be pretty nice if the v.h.f. fraternity held up its end of this project. To mis-quote a current great American "This is not the time to ask what the League can do for you, this is the time to ask what can you do for the League."

### 50 Mc. and Up

Away up thar in Lethridge, Alberta, Canada, VE6DB sez that activity has been slow and DX dead since the first of the year, but he has great expectations of things happening once the weather breaks. One short aurora was heard during February and weak signals are heard from south of the border occasionally, so the boys are expecting to be working the 6's and 7's again fairly soon. VE6ABS is a new station in Alberta now working on 50 Mc. Tom, K8MMMI, in Novelty, Ohio, writes that in late December he worked K4PGL/VP9 in Bermuda. A number of the boys worked him but to date no one has received a QSL and they are beginning to wonder—is he or is he not? And from Vic Frank, W7QDJ, we've received the word that VP7NP is off 50 Mc. as of April 10, after three months of c.w. operation with no QSOs. Too bad, he would have been a nice contact. A most interesting letter received from Doc, W1UWQ, which we thought we'd like to share with you: "Thought you'd like to know that about a week ago (March 15) I received an SWL card from a listener in Maderia, stating, he had heard my six-meter signal a good 20 db. over 9 with some QSB and that he heard me in QSO for about half an hour. He asked for a QSL card. I feel it is authentic as he



### Transpacific Moonbounce!

Starting on May 1, and continuing for three days, W1FZJ heard KH6UK on 1296-Mc. moonbounce. As of May 8, schedules were continuing in the hope that KH6UK would soon be hearing W1FZJ (W1BU). Sam can hear his own echo, so figures it is just a matter of time before KH6UK digs him out of the mud. The signal from KH6UK is pretty weak, but Sam says that plenty of 80-meter DX has been worked with signals that aren't as good!

addressed me as 'Doc' and he would have no way of knowing the 'Doc', as I am not listed in the call book as 'Dr.'. He also said that the time he heard me was about 10:00 A.M. and that is about the only time I have had to turn on the rig recently. As you know I run a G50 with a 5-element wide spaced beam and have an excellent location for this city (about 200 feet above sea level)." Sounds like the 50-Mc. band has lots more life left than many thought possible, and when Doc receives further word from his SWL, he'll pass it along.

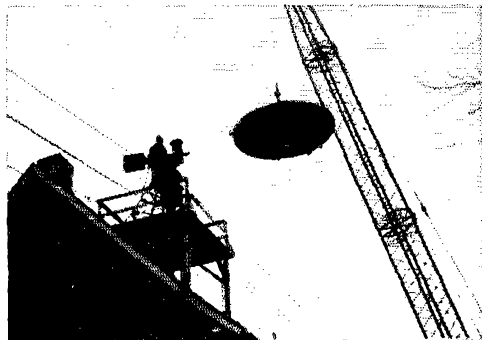
K9TFJ is working on a rig for 50-Mc. d.s.b. Although disgusted at the moment because of problems with frequency shifting, Jim is sticking with it and trying something else. His next project will be s.s.b. for 50 Mc. Another sidebander new to six meters is W8BAN who sez "an airc having a ball with s.s.b. on 50 Mc. Am looking forward to some openings to see how activity on s.s.b. has picked up across the country." According to the many reports received such activity is picking up by leaps and bounds on the v.h.f. bands. A few of the active ones in the Jackson area are W8STX, W8NDQ, W8BDX, W8ARL and W8BAN. K0BCW is working K7HKD in Cheyenne regularly from Westminster, Colorado, and hopes to soon have skeds going in Nebraska and Kansas. Sidebanders in the Denver area include W0IC, W0UJA, K0JSD, K0BTO, and K0BCW. W4ZGV is active in the Colorado Springs area and K7HKD in Cheyenne. All on s.s.b. W0CCA, K0SJM, K0CGP, and K0TSD all have rigs on RTTY on 50 Mc.

On March 28 K3DSM in Merion Station, Pennsylvania saw a test pattern of W3Z --- on the high end of 440 Mc. Gene sez it was a very poor picture and he was able to make out only a part of it, but it was the first received and builds up that old enthusiasm once again. He has purchased an RCA TV camera and has converted a Blender Tongue \$25 u.h.f. converter to cover the  $\frac{3}{4}$  meter band, and has ordered a 13-element beam. Sounds like Gene is really enthusiastic in spite of the fact that he is away at school the greater part of the time. He also mentions that 50 Mc. is loaded with locals although no skip nor good ground wave has been observed at his QTH.

On March 7, 8 and 9, Jack Raceosta, K8YAV, of Detroit, Michigan, had his own private Field Day. On the 7th Jack worked W4BJZ, K8OXO, K8ONA, K8JDV, K8YVS,

Up she goes! The German method of putting that dish in place, atop the mount, atop the roof.

Location—QTH of DL3FM.



and K8TEZ, all from the northern part of Ohio. On the 8th he worked K8OCJ, K8TEZ, K8VWHZ, K8QIO, K8RNE, K8VCK, K8YVA, K8NYZ, W4AHU, K8SRA, W8AUT, W8CKA, W8ABF and W8BU, again all Ohio contacts. On the 9th there was K8YYK and W8KBV, both Ohio. Seems like Jack must have that pipeline into the Ohio area. Received a Mash from Lynn, WA2DAC, who worked K1CXX in Auburn, Maine, on ground wave, six meters, c.w. with his new 811A linear. While the distance may not seem exceptional (168 miles) for six-meter ground wave, the path is over the mountains in Vermont and New Hampshire with peaks of from five to six thousand feet and including Mt. Washington. Gives Lynn a new state and a new ground-wave record for the Plattsburgh location. He wants skeds particularly with the Albany and Central New York State areas.

From Birmingham, Alabama, W4CIN comments that the 50-Mc. band is very active in the local range (50-60 miles) and the extended ground wave range (100-300 miles), and that contacts are good between 6:00 and 8:00 A.M., and between 8:00 and 11:00 P.M. Guerney also would like to make skeds on 144 or 432 Mc. on Wednesdays or Sundays between 9:00 and 10:00 P.M. with anyone interested in a.m. or s.s.b. work on these bands. Bill, K1KAV, tells us that although he did hear some short skip to 4 land on March 8 he was unable to establish contact. Out in Ames, Iowa, Jim, W0PFP comments that conditions have been generally poor, showing some improvement during the last part of March. Conditions at 1315Z each day showed considerable improvement over the month of February. Jim's sked with W9HGE is still being carried on daily, with contact made 28 out of 30 tries in March. A large increase in activity in the Ames area with K0CLY, K0DYZ, K0DUG, K0HPQ, W0IIL, K0KPG, W0LSF, W0UGR, K0YLO, W0ZAQ, W0ZBL, K0PIJ and K0BGF all being active. In South Dakota, Bob Eide, W0ENC is working with 50-Mc. scatter. On skeds with W6YX, Bob has copied several call sequences from W6YX and skeds with W7ZQX in Seattle, started on March 17th, had results (calls copied) as soon as the next day. Good news from Gus, K6SIX; although he missed the opening himself he is the only one who has reported the opening of March 18 when the band started showing its true colors by opening to Texas and then swinging around and opening to Hawaii and Japan. We don't know who the California stations were who worked the opening, nor do we know calls of the DX stations that were coming through. Maybe they'll be coming into the east coast again some day and then we'll have the dope first hand (if we don't miss the opening).

An opening was reported on March 4 by Norm, WA2TQT,

And thar' she is, all set to go on 1296-Mc. moonbounce work.



who sez that six meters was open to Florida, South Carolina and Alabama with many and good signals coming through. Conditions normal other than that for the month of March in the New York City area. K3LNU has come to the conclusion that 40 watts is *not enough*, and right there you have the basis of a good argument. Those who say it is enough cannot be convinced otherwise and those who say it is not enough cannot be convinced otherwise either. What's that saying about an immovable force? Anyway, he says that in order to work 90 miles conditions have to be average for him, and for contacts of 130 miles conditions have to

## 2-METER STANDINGS

WIREZ...	32	8	1300	W5EDZ...	8	5	
W1AZK...	28	8	1205	W5YYO...	7	4	1330
W1KCS...	24	7	1150	W5UNH...	6	3	1200
W1RFU...	24	7	1120				
W1AJR...	23	7	1130	W6WSQ...	15	5	1390
W1MNN...	22	8	1200	W6NLZ...	12	5	2540
W1HDQ...	22	6	1020	W6DNG...	0	5	1040
W1WZY...	20	7	1180	W6AJF...	6	3	800
K1CRQ...	19	6	800	W6ZLL...	5	3	1400
W1AFO...	18	6	920	KRHMS...	4	3	850
K1AFR...	17	5	450	K6GTG...	4	3	800
				W6MMU...	3	2	950
W2NLY...	37	8	1300				
W2CKY...	37	8	1360	K7HKD...	13	5	1130
W2ORI...	37	8	1320	W7JRG...	12	4	1040
W2BLV...	36	8	1020	W7LHL...	5	3	1050
K2GOL...	35	8	1365	W7JIM...	2	8	670
W2AZL...	29	8	1050	W7JIP...	4	2	900
K2IEJ...	27	8	1060	W7JU...	4	2	235
K2CEH...	25	8	1200				
K2LMG...	25	8	1160	W8KAY...	38	8	1245
W2AMJ...	25	6	960	W8WT...	35	9	1260
W2ALR...	24	8	1100	W8SDJ...	35	8	1220
W2KXG...	23	8	1200	W8LFX...	35	8	980
W2SMX...	23	7	1090	W8SFG...	34	8	1040
K2HOD...	23	7	950	W8LOF...	33	8	1060
W2DWJ...	23	6	860	W8RMH...	32	6	910
W2PAJ...	23	6	730	W8RCH...	32	8	1180
W2LWJ...	21	6	700	W8RAX...	32	8	960
K2KIR...	21	5	900	W8NOH...	31	8	1090
W2ESX...	21	6	750	W8SVL...	30	8	1080
W2UTH...	20	7	880	W8RHW...	30	8	860
W2WZR...	19	7	1040	K8AXU...	29	8	1050
W2GZY...	19	8	720	W8RCH...	28	8	850
K2RLG...	17	6	980	W8WRN...	28	8	680
K2JVT...	16	6	550	W8DX...	26	8	720
K2DDK...	13	5	465	W8ILC...	25	8	800
W2AJFA...	10	4	340	W8JWV...	25	8	940
W2ZPGY...	8	4	266	W8WVM...	25	8	900
				W8GFM...	23	8	540
W3RUE...	33	8	1100	W8LCT...	22	7	680
W3GKP...	31	7	1180	W8BLN...	21	7	610
W38GA...	31	8	1070	W8GTR...	17	7	550
W3TDF...	30	8	1125	W8NRM...	17	7	550
W3KCA...	28	8	1110				
W3EPA...	28	8	1070	W9KLR...	41	9	1160
W3LNA...	21	7	720	W9WOK...	40	9	1170
W3LST...	21	6	800	W9GAB...	34	9	1075
W3NKM...	20	7	730	W9AAG...	33	8	1050
W3LZD...	20	7	650	K9AAJ...	31	8	1070
K3HDW...	12	6	1015	W9EAL...	31	8	850
				W9ZIH...	30	8	830
W4HJQ...	38	8	1150	W9BPB...	28	8	820
W4HHK...	37	9	1280	W9LVC...	27	8	950
W4LTU...	34	8	1160	W9OJI...	27	8	910
W42XJ...	34	8	950	W9ZHL...	25	8	790
W4MKJ...	33	8	1149	W9EIV...	25	7	1030
W4AO...	30	8	1120	K9AQF...	24	7	900
W4VLA...	26	8	1000	W9LLE...	22	7	825
K4EUB...	26	7	1130	W9KPS...	22	7	690
W4EQM...	25	8	1040	K9SGD...	21	7	1100
W4ATB...	25	8	900	W9GUX...	21	7	800
W4WNE...	24	8	850	W9ALU...	18	7	800
W4JJC...	23	6	725				
W4VVE...	23	6	724	W0BFB...	37	9	1350
W4RMU...	21	7	1080	W0HHD...	31	8	1030
W4TLY...	20	7	1000	W0SMJ...	29	9	1075
W4IKZ...	20	6	720	W0LFE...	28	7	1050
W4OLK...	20	6	720	W0RPH...	27	9	1300
W4LNG...	19	7	1080	W0BIC...	22	7	1360
W4RFR...	19	9	820	W0MOX...	22	6	1150
K4YUX...	18	8	830	W0INI...	21	6	830
W4CPZ...	18	6	650	W0TGC...	21	7	870
K4VWH...	18	6	590	W0ERY...	20	8	925
W4MDA...	17	6	757	W0ENC...	20	6	1100
				W0AZT...	18	7	1100
W5RCI...	37	9	1215	W0JAS...	18	6	1130
W5AJG...	32	9	1360	K0AQJ...	16	6	1120
W5FYJ...	30	9	1275	W0IFS...	16	6	1100
W5JWL...	29	7	1150				
W5DFU...	28	9	1300	VE3DIR...	30	8	1330
W5PZ...	27	8	1300	VE3AIB...	28	8	1340
W5LPG...	25	7	1000	VE3BQN...	19	7	790
W5KTD...	23	8	1200	VE3AQG...	18	8	1300
W5MLL...	16	5	700	VE3DFR...	17	8	1340
W580J...	12	5	1390	VE3HAW...	17	7	1350
W5HEZ...	12	5	1250	VE3BPF...	14	6	715
W5SWV...	12	4	745	VE2ABF...	10	4	580
W5CVW...	11	5	1180	VE77J...	2	1	365
W5NDE...	11	5	820				
W5KFU...	11	4	1300	KH6UK...	2	2	2540
W5VY...	10	3	1200				

The figures after each call refer to states, call areas and mileage of best DX.



Speaking of moonbounce—K1GNY, Leigh Mac Quarrie, with his transistorized 1296-Mc. transceiver.

be good. When ground wave is excellent he can work 180 miles with difficulty. Another Pennsylvania station heard from this month is Dave, K3GAU, who sez that as far as he knows there was no band opening and no aurora during March. Groundwave has been good, though, for the past several weeks from his QTH in Bloomsburg with Dave hearing 2's from New York and New Jersey and hearing Carl, W3ASD in Delaware several times. Six meters came to the rescue once again when Bertha, WA4BMC was able to get information via six meters for VE6ADL who was trying to get same concerning a shipwrecked friend of his between Miami and the Bahamas. Original contact was on 15 meters, but VE6ADL was unable to get his info on that band, so of course Bertha came to his rescue.

### Clubs and Nets

The newly organized "Future Scientists Club" of Stockton, California, will be operating a pre-Field Day trial run on May 19 and 20 on Mt. Diablo. The group will be on both six and two meters and hope to be using the call of W6HIP which has been applied for as the club call. If this call is not received they will be using W6YGZ.

The "Royal Order of Hoot Owls" is preparing for their 8th annual family picnic to be held on June 16 and 17 at the Seattle World's Fair. Attendance this year is expected to be over 1800 because of large numbers attending the event in the past and the added attraction this year of being held at the fair.

In the Fort Walton Beach, Florida, area, the two-meter emergency net has been getting a workout with the recent tornadoes in Crestview and Milton. The mobile units have been acting as messenger boys for the Red Cross and the fixed units taking care of a great part of the communications in the area.

The Boy Scouts of America Emergency Service Two-Meter Net in New York City meets every Wednesday evening at 1900 EST on 146.30 Mc. and is looking for members.

### 144 Mc. and Up

K4LLI, Delray Beach, Florida, reports a good month on 144 Mc. Among other good openings the 14th of March provided communication into Texas with signals running 5-9 both ways. Tom reports schedules at 6:00 A.M. EST each morning with W4ODF and W4PNS. They're looking for more early morning schedules in their area. Aurora reared its lovely head on the 9th of March providing contacts from W0HAJ, Kansas City, Kansas, into W0HWC,

Nebraska, K0KPE Missouri, W0KNF Missouri, W0DDX Spring, W0QDH Kansas, W8PT, Benton Harbor, Michigan, reports the aurora opened at his QTH on March 5 with a short opening after 10:00 p.m. into the 2nd, 3rd, 8th, 9th and VE3 areas. No signals from east of the mountains nor west of the Mississippi into Michigan. KIINL, San-

ford, Maine, says that two meters is showing some signs of Spring. Good ground wave conditions from Maine on 8, 9 and 10th of March and again on the 29th gave openings from Don's QTH out to the 200-250 mile range.

**Schedules** — W8PT is maintaining his 220-Mc. schedules on Mondays at 9:00 p.m. EST with W8GOB, W8CVQ, K8AIFX, W8EYD, W9REM and W9SKN. Jack reports that continuing the schedule is improving activity on 220 Mc. noticeably. K2QCV is set up for meteor scatter work on two meters and is anxious to obtain schedules with states over the 800-mile range from his location in Bayside, New York. K4KLD and W4TLC are maintaining their Sunday morning schedules at 0800 EST on 220 Mc. Signals over the 100-mile path with 20 watts input are marginal but are always at least observable. Charley is looking for more takers to participate in this schedule; W4TLC is on 220.20 and K4KLD is on 220.075. Charley maintains schedules also with W4RMU on Mondays, Wednesdays and Fridays at 2200 EST, no results as yet. K8IFL is holding schedules with W8IDN in Berrien, Michigan (110-mile path) at 6:15 a.m. and 8:15 p.m. EST. Anyone interested in joining this 144-Mc. schedule should contact K8IFL, Ironwood, Michigan. W4FJ, in Richmond, Virginia, is maintaining nightly schedules with W2ESX at 2330 EST on 144.009. K4FLR, in Gainesville, Georgia, having just completed his 220-Mc. station and made his first contact with K4KLD on the 15th of March, is looking for schedules in the Gainesville, Georgia area. He is proposing a schedule with W4VIW in Greenville, South Carolina, on 220 and would like anyone else in the path on either end to join in. W4PLK is operating a mobile circuit in the Fort Walton-Pensacola route. Activity is concentrated between 145 and 145.3; He is looking for anyone else along this route in Florida to join in on the mobile net. Contact W4PLK, Shalimar, Florida. W9PRN has been holding a schedule with K9DGC over a 235-mile path on 144 Mc. They have had only partial success, having considerable noise level at the K9DGC end of the schedule. Particulars on this schedule can be obtained from W9PRN, Springfield, Illinois. K3MLL, Philadelphia, would like schedules on a continuous basis with anyone over the 100-mile mark from Philadelphia, either north or south, between the hours of 6:30 a.m. to 7:10 a.m. daily. Anyone interested in the breakfast net, please contact Don, K3MLL, Philadelphia, Pennsylvania.

**3300 Mc. and Up** — K1LPL of Providence, R. I., has just completed his 3300-Mc. beer can transceiver and is looking forward to obtaining schedules with someone in his area on the 3300-Mc. band. K7ASX, in Seattle, Washington, has also set up his 3300-Mc. transceivers for polarizing and is looking for schedules. I don't know if these last two stations should get together or possibly will require a relay in between. KITGB, of Belmont, Massachusetts, is putting the finishing touches on a 10,000-Mc. transmitter receiver setup and, having two complete setups, is interested in obtaining cooperation from someone located the proper distance away (the proper distance being defined by KITGB after inspection of the location) to cooperate on a 10,000-Mc. venture.

## 220- and 420-Mc. STANDINGS

### 220 Mc.

W1AJR	11	4	480
W1AZK	9	3	412
W1HDQ	11	5	450
K1JXJ	10	2	400
W1OOP	12	4	480
W1RFU	15	6	480
W1UHE	11	4	385

W2AOC	13	5	450
K2ANQ	8	3	230
W2BAH	4	2	167
K2CBA	13	6	650
K2DIG	4	3	140
W2DWJ	15	6	740
W2DZA	12	5	410
K2ITP	11	5	265
K2ITQ	11	5	265
K2JWV	12	6	344
K2KIB	12	4	300
W2LRJ	10	4	250
W2LWI	12	4	400
W2NTY	12	5	300
K2PZ	11	4	400
K2QJQ	13	5	540
W2SEU	4	2	150
K2UUR	4	3	105

W3AHQ	4	2	180
W3FEY	10	5	350
W3JYL	8	4	295
W3JZL	4	3	250
W3KKN	10	4	255
W3LCC	9	5	300
W3LZD	15	5	425
W3RUE	9	5	450
W3UJG	13	5	400
W3ZRF	5	4	112

K4TFU	8	4	400
W4TLC	4	1	165
W4UYB	7	5	320
W5AJG	3	2	1050
W5RCI	8	5	700

K6GTG	2	1	240
W6MMU	2	2	225
W6NLZ	2	2	2540

K7ICW	1	1	250
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KNAXU	10	5	1050
W8LJG	9	5	475
W8LPL	6	4	480
W8NRM	5	1	390
W8PT	10	5	600
W8SVL	6	4	520
W9AAG	9	4	660
W9EQC	11	5	740

W9JCS	6	2	340
W9JEP	9	4	540
W9OVL	6	3	475
W9UFD	4	4	605
W9ZIH	5	5	500
K0DQU	5	3	425
K0ITE	6	3	515
KH6UK	1	1	2540
VE3AB	7	4	450

### 420 Mc.

W1AJR	10	4	410
W1HDQ	8	3	210
W1MFT	8	3	170
W1OOP	11	3	390
W1RFU	7	4	410
W1UHE	6	4	430
W2AOD	6	4	290
W2BLV	12	5	360
K2CBA	5	3	225
W2DYZ	6	3	200
W2DWJ	10	4	190
W2DZA	5	3	130
K2KIB	4	2	100
W2NTY	3	2	100
W2OTA	10	4	300
K2UUR	7	3	175

K3CLK	9	4	250
K3EOP	6	3	250
W3FEY	7	3	290
W3LCC	2	2	96
W3RUE	2	2	4
W3UJG	6	6	6

W4HHK	6	4	550
W4VVE	7	4	430

W5HTZ	5	3	440
W5RCI	10	3	600

W6GTG	1	1	180
W7LHL	2	1	180

W8HCC	3	2	355
W8HRC	3	2	250
W8JLO	4	2	275
W8NRM	3	2	390
W8PT	6	3	310
W8RQI	4	2	270
W8TYT	9	5	580
W8UST	3	2	255

W9AAG	5	3	375
K9AAJ	4	3	425
W9CAB	9	4	608
W9OJL	6	3	330

The figures after each call refer to states, call areas and mileage of best DX.

## Strays

K1HCH and K1DMW, stationed in Germany and members of the Bad Aibling Sport Parachute Club, plan to operate parachute-to-parachute on their next jump. Each will carry a small 10-meter transceiver, and they will attempt to work each other even while they are busy maneuvering their duties in order to hit the ground target.

FLASH! K2SJO reports that Governor Rockefeller has vetoed the New York call letter license plate bill. Saying that the legislation is unnecessary, the governor at the same time issued an executive order directing the motor vehicle commissioner to set up procedures whereby the call letter license plates would be issued beginning in

the fall. This word was received just at press time, and so we'll plan to have more info for you next month.

The 5th annual Boy Scout Jamboree-on-the-Air will be held between 0000 GMT, October 20, and 2400 GMT, October 21. Use any band, any mode, and call "CQ Jamboree" to contact other Scouters. VE3WSB will be on the air from World Scout Bureau Headquarters in Ottawa. Look for VE3WSB around 3760 and 3820, 7250, 14,200, 21,200, and 28,500 kc. Afterwards, send a report on your Jamboree activities to Boy Scouts World Bureau, 77 Metcalfe St., Ottawa, Canada, and receive a certificate.



# "DX-of-the-Month Club"

BY JOHN G. TROSTER\*, W6ISQ

TING-a-ling-a-ling.

"Two in the morning! Who could be calling? Hello. Yes, operator, I'll accept the charges."

"Good morning, Number 79. DX-of-the-Month Club calling.

"Oh yes, Master, good morning."

"Please, old boy . . . that's Master DXer, if you don't mind. We've arranged a very nice one this morning for all paid-up members. I notice, however, that you are delinquent in your payments. But if you promise to remit in the morning, I'll let you in on this one."

"Oh I promise, Master . . . ahhh, DXer."

"Good, Number 79. Frequency is 14,349 kc. Time 1200 GMT. Be there, on time, in order, on frequency and get your dues in the mail tomorrow or you will be dropped from the Club."

"Please, Master DXer, who do you have lined up for us this morning?"

"We have a nice station in the Central Hawaiian Group. Probably you've never worked this island before."

"But, Master, I've worked KH6 before."

"Please, old boy, if you don't mind, it's Master DXer. Now listen Number 79, in this club you work them as I set them up. You've probably never worked this particular island before, you hear. And we're going to put the pressure on ARRL to recognize this island as a new country. Besides, you can use this island for your Worked All Islands Award. So be grateful for what I do for you. Now, be on time — and pay up."

"Yes, Master . . . ahhh, DXer."

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"QST all DX-of-the-Month Clubbers. Our choice for the month is KH6ZZ/KH5. Here is a rare new island. Now you all have your numbers. Speak up quickly, in order, don't waste time. KH6ZZ/KH5 has the order in which you will appear and will check you off as you come in. He will acknowledge all check-ins, and all paid up members will receive the usual beautiful scroll complete with Club insignia. Those of you sending an additional \$5 will receive a recording of your call as it was received by this rare DX station. And those of you sending an extra \$10 will receive my special tape offering of 'Great Moments in DX'. And now, are you ready KH6ZZ/KH5?"

"This is KH6ZZ/KH5. All ready, Master."

"Please, OB, that's Master DXer. All right, tape recorder on and listen to the countdown — 5 — 4 — 3 — 2 — 1 — Call."

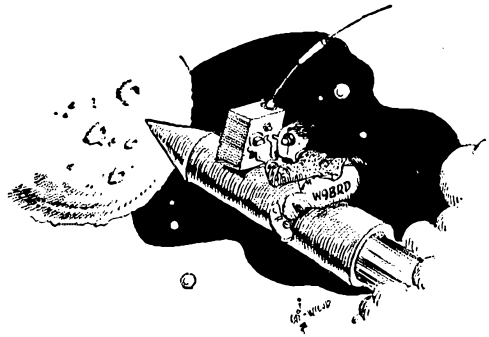
"This is W9BIK, Farmer City, Illinois. Number 1."

"This is W2TW, New Jersey, Number 2."

"This is Number 3, W6OA. California. Nice to meet you, Old Man."

"Faster, faster, no time for all that chit-chat. Call and number only. Speed it up."

\*45 Laurel Street, Atherton, California



"Boy, am I excited. Almost to my number. Wonder if he can hear me. There's Number 76 — 77 — 78 —"

"Oh boy, oh boy, here I am — W6ISQ, Number 79. Gosh, that was exciting. Just think my little two-watter going out across the world — across oceans, over mountains . . . even into the great beyond, and on and on . . . and it's still going . . ."

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"This is the Master DXer speaking. That's the last one, KH6ZZ/KH5. Now please verify."

"Heard all but Numbers 17, 47, 79, and 207."

"KH6ZZ/KH5. This is the Master . . . ahhhh, DXer. I'm sure those stations transmitted. We can't disappoint paid-up members. You will assume 100% reception. Some of our stations were only running 2 or 3 watts. Kw.'s can't bag all the DX. We help one another in this Association — it's only fair. Besides, those QRP stations are all paid up, you know. Most of them anyway — eh, 79?"

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"Now, members, next month we have a really exciting DX station for you. W9BRD/mm, if we can complete arrangements."

"This is Number 79. What's so good about W9BRD/mm?"

"Number 79, if you would pay your dues, I'd send you the Bulletin and you would know what's so good. That 'mm' is Moon Mobile."

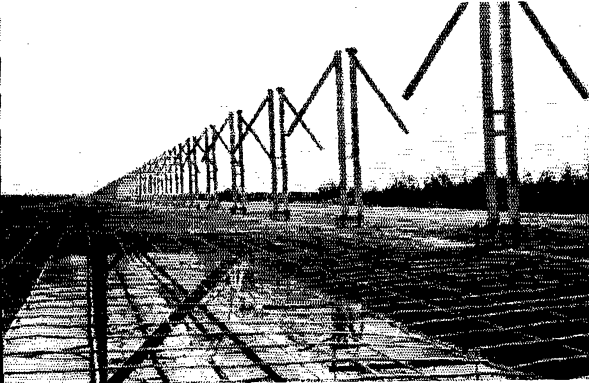
"I'll pay, I'll pay, Master."

"Now this may be a little difficult. First of all, we're not sure we can get BRD to take the ride. Secondly, he may take only one pass at the moon, so there won't be much time. Therefore, we are going to tape record all transmissions in advance and will play them to BRD at high speed. We can run through the entire Club roster in only a few seconds that way. If, I mean *when*, BRD gets back, he can acknowledge that he heard a nice crisp 'beep' from our Club. I will send instructions for this event to all paid-up members of the DX-of-the-Month Club. Got that, 79?"

"Yes, Master."

"Please, Old Boy — Master DXer."

QST



# Navy Space Surveillance Antenna

**T**HAT they sure grow them big in Texas can be attested to by this antenna located near Wichita Falls, Texas — it's over one mile long! The antenna is part of the U. S. Navy space surveillance system that detects hostile satellites which might be silently crossing our territory.

The detection network consists of two main sections, one in the eastern part of the United States and the other in the western part, both located along a great circle path close to the 34th parallel. Each section is made up of two 108-Mc. receivers separated by 500 miles, with a 50-kw. 108-Mc. transmitter located equidistant between the receivers. A super-high-power transmitter (and the antenna in the photograph) is located midway between the east and west sections to fill the "hole in the middle."

All of the transmitters feed antennas that favor the east-west direction with a very narrow fan-shaped beam. The receiving antennas have simi-

<sup>1</sup> Easton, "Radio Tracking of the Earth Satellite," *QST*, July, 1956.

lar patterns so that when a satellite crosses the east-west line the transmitted signals are reflected from the satellite and picked up by the receivers. The position of the satellite is determined by measuring the angle of reception of the reflected signals, using interferometer methods similar to those used for Minitrack.<sup>1</sup>

The transmitters operate 24 hours a day, and the information on reflected signals is sent by land line to a center where computers convert the data into orbit information.

The antenna in the photograph, which is located at Lake Kickapoo, Texas, consists of 9 end-to-end bays, each bay containing 72 dipoles. Nine 62.5-kw. transmitters feed the antenna system (which has a gain of 3400) for a total effective radiated power of almost 2 billion watts! The drooping dipoles (called "Breetz" dipoles for the man who developed them) are to help shape the antenna pattern. The dipoles are backed up by a wire-grid screen which serves as an artificial ground.

— E. L. C.

## FEEDBACK

Whoops! Re the "Gift Handbooks" letter on page 75 of the February issue, the correct signature should have been as follows:

— Pete Smith, K9VRV/4,  
1940 Richmond Road,  
Petersburgh, Va.

Anyway, our advertisers are on the ball. The Hallcrafters ad on page 83 of March had the correct address.

— . . . . —

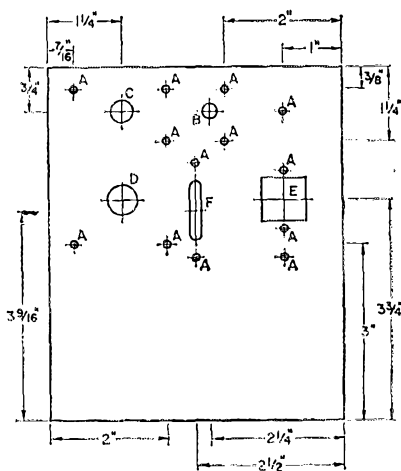
We slipped a decimal point in giving the value for  $C_1$  in Fig. 1, page 45, April *QST* (Norgaard, "Eyeball and Eardrum Doppler Tracking"). It takes 0.22  $\mu\text{f.}$ , not 0.022, to resonate with 118 mh. at 1000 cycles.

— . . . . —

The base connections for the 6CJ5s in George Hanchett's modulator (February, 1962, *QST*, page 35) were those originally used when the tube was in the developmental stage. Production tubes use the following pin connections:

- |                    |                 |
|--------------------|-----------------|
| Pin 1 — Grid No. 2 | Pin 5 — Heater  |
| 2 — Grid No. 1     | 6 — Grid No. 1  |
| 3 — Cathode        | 7 — Grid No. 2  |
| 4 — Heater         | Top Cap — Plate |

Pins 8 and 9 are used for internal connections and the socket prongs should not be used as tie points.



- |                     |                     |                                       |
|---------------------|---------------------|---------------------------------------|
| A — No. 28 Drill    | C — $\frac{3}{8}$ " | E — $\frac{3}{4}$ " x $\frac{3}{4}$ " |
| B — $\frac{1}{4}$ " | D — $\frac{1}{2}$ " | F — 1" x $\frac{3}{8}$ "              |

There was an error in the location of holes for the 420-Mc. transceiver last month (page 14). The correct version is shown above.

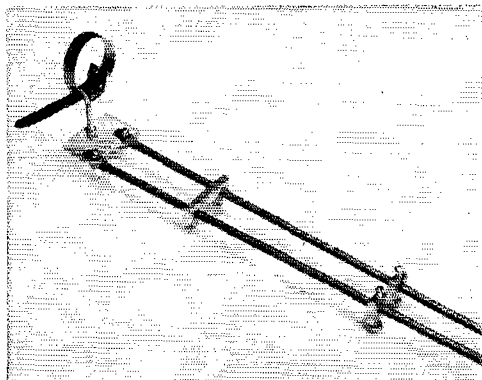
# • New Apparatus

## The Cushcraft Universal Matching Stub

ONE of the most useful devices for feeding a v.h.f. antenna is the corrective-stub matching system outlined in the v.h.f. antenna chapters of the *Handbook* and *Antenna Book*. Because it includes provision for either balanced line or coax, to feed a load of any impedance, the stub can be used in many matching situations encountered in v.h.f. antenna work. It is especially helpful when the impedance of the load is unknown, which is often the case. Its principal disadvantage lies in the fact that it may be a little involved to make up one that is mechanically rugged and electrically effective. This problem is now solved by the availability of a new Cushcraft item described herewith.

Basically, the Cushcraft matching stub is a section of transmission line 40 inches long, made of  $\frac{1}{4}$ -inch aluminum rods spaced  $1\frac{1}{4}$  inches center to center. The load to be matched can be any antenna or phase line designed for balanced feed, operating on any frequency from 144 Mc. up through the 420-Mc. band. This load is connected to the open end of the stub. Toward the other end is an adjustable short, and partway up the stub from the shorting bar are two sliding contacts for attachment of the feed line. Polystyrene blocks support the stub at each end, and these in turn are fitted with standoff mounts having stainless-steel clamping straps of the type frequently used in TV work. These clamps allow the stub to be mounted parallel to the boom of the array, or to the vertical support between stacked bays.

To use the stub, you merely adjust the position of the shorting bar and the point of connection of the transmission line for zero reflected power. Though two adjustments are involved, the



Part of the Cushcraft Universal Matching Stub, showing the clamp for mounting. The antenna or other balanced load, such as the feed point of a phased array, is connected to the open end, not shown here. The stub is long enough for use from 144 to 450 Mc. Either a balanced line or a coaxial balun may be connected to the movable taps.

procedure is simple, and you don't have to know anything about the impedance of the load. The shorting bar tunes the whole system, and the position of the balun or balanced-line connectors takes care of the match. It could hardly be simpler, but some form of s.w.r. indication is a must, as it is in any matching adjustment where coax is used. The bottom end of the stub, or the shorting bar, can be grounded if desired. If less than the full length of the stub as supplied is needed, the remainder below the shorting bar can be cut off, once the proper adjustment has been made and the permanent location for the shorting bar determined.

— E. P. T.

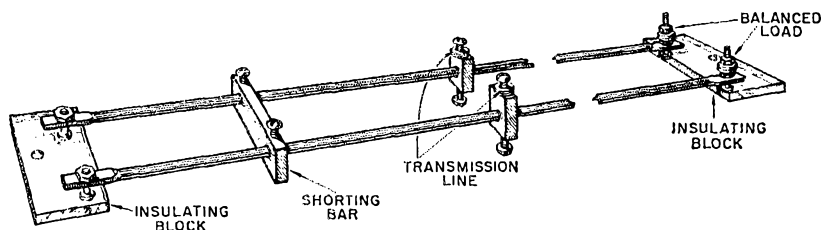


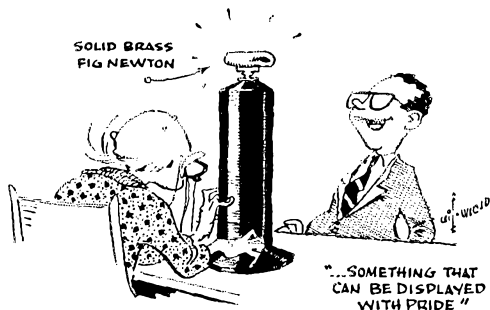
Fig. 1—Sketch of the matching stub, with mounting clamps omitted for clarity. The shorting bar and taps for connecting the transmission line are equipped with set screws for making permanent settings. Points to be used for connections are equipped with double washers.

### Strays

Just as we were putting the finishing touches on this issue, W8OLJ phoned to say that the SS *Hope* sailed for Peru on May 8. With a full complement of Hallcrafters gear, and signing W9AC, the ham station on board the *Hope* will be on 7005 and 14005 kc., c.w. and RTTY, and

on 7295, 14,345, and (perhaps) 21,445 kc., s.s.b. Much of the personal traffic from the ship will be via the modern RTTY gear furnished by the Teletype Corporation. Phone traffic will be limited to special occasions, although there will be plenty of normal s.s.b. activity.

# The Brass Fig Newton



BY R. M. CASE,\* K4YNO

UNTIL his death a few years ago, I was the private secretary to the fabulously wealthy cookie magnate, John Barefoot Tiptoe. For nearly twenty years I lived on Copperrock, Mr. Tiptoe's vast estate. During this time I had the opportunity to learn quite a bit about his private life. Very few people knew that he was an amateur radio operator. Even fewer knew of his campaign to bring the enjoyment of this hobby within the reach of all.

I distinctly remember one morning about two weeks before his death when I was summoned to the ham shack. I had been there several times before, but the vastness of this immense building never ceased to amaze me. I found Mr. Tiptoe in the twenty-meter room, listening to an extremely strong signal booming in over the usual QRM. We both listened until the station signed, then we looked around his frequency to see if any one had answered him. No one had. Mr. Tiptoe turned to me and said, "Mark, there is a fellow I really feel sorry for. With his reputation he will be doing well if he comes up with anything more than an s.w.l. card for the whole morning."

Naturally I agreed with him for I knew well the talk that went on about this guy at the local ham club.

"Mark," Mr. Tiptoe went on, "I am getting to be an old man, and I wouldn't want to think that I am heading for the last hamfest without having set up some lasting way of helping hams like that one we were just listening to achieve some status with the rest of the boys."

"Just what did you have in mind, sir?"

"I was thinking along the lines of creating a new series of awards. Something new and different, not just the usual run-of-the-mill certificates that the average ham papers his walls with, but a trophy, something that can be displayed with pride. I am going to call it the Brass Fig Newton."

With that he produced from a drawer in his desk a beautiful trophy, a full three feet tall. It consisted of a polished ebony pedestal with a solid brass replica of a fig newton — in all its grandeur — placed upon it with a scattering of brass crumbs around the base. It was a truly breathtaking sight!

"What do you think of it, Mark?"

"Why it's just fantastic, sir. The requirements

for winning it must be very stiff."

"Quite the contrary, my boy. We want this to be an award that will be given to only a deserving few. Nevertheless, the qualifications will not be so stiff that anyone who puts his mind to it cannot become a winner."

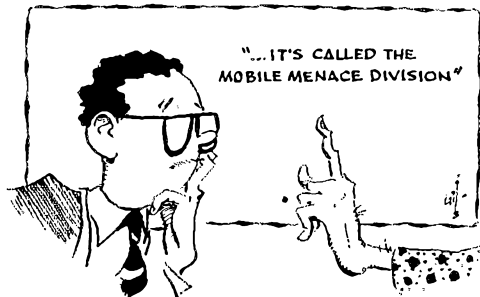
"That sounds rather complicated to me, sir."

"It's really quite simple, Mark. In order to be eligible for the award one must be nominated by a sufficient number of other hams or by the Federal Communications Commission. I have thought of several divisions that we could offer the award in to begin with, and probably after it gets going there will be many more areas which we will find we have overlooked.

"To begin with, the easiest area to win in would be the 'Worked All Neighbors' Televisions' division. To merit the Brass Fig Newton, the applicant must submit copies of at least six letters from the FCC pertaining to television interference, no less than two letters of recommendation from the TVI committee of his local community, and four from his neighbors. Hams applying for this award must do all operating from the same address, and mobile operation will not qualify."

"That sounds quite reasonable up to the last part. Aren't we being rather prejudiced against the mobile operators?"

"No, Mark. I have another area for them alone, called the Mobile Menace division. This is a competitive area and requires a little skill to win. However the extra requirements are justified, as we will give an additional trophy to the winner. It will be a miniature reproduction of the Brass Fig Newton, with a suction cup on the base for mounting it on the dashboard.



\*105 N.W. 120 St., Miami 50, Florida

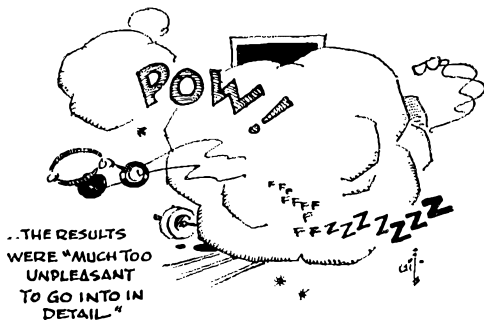
"In order to qualify for the competition, one must submit the usual letters of recommendation from the State Highway Patrol of any state in the United States. The more letters an applicant submits, the better his chances are of winning. Documentary evidence of accidents caused — such as photographs, court records, and revoked drivers' licenses — will also enhance his chances."

"That sounds like a very good idea, sir. Perhaps it would serve a dual purpose and get more hams interested in mobile operation."

"I thought you would say that, Mark. How about another division entitled the 'I Love Me' division. This should be a natural for the fellow who is always diverting the conversation of the local rag-chews around to what his latest achievements in the world of DX are, and how much new and wonderful equipment *he* has. Also eligible for this award are the net control stations of the various social nets around the country who hold up the net 'til all hours of the night by carrying on a long drawn-out QSO with one or two of their good friends. Hams will not apply for this award. They must be nominated for it by a petition of at least fifteen others who think they are worthy of it. You can see that will be a much coveted trophy."

"It certainly will be, sir. This does indeed sound like a fine program. Are there any more divisions which you wish to establish now?"

"I think these will suffice to get it under way, Mark. There will inevitably be others interested, and I have no intention of trying to monopolize it. Once we get it rolling I plan on turning it over to some responsible organization along with sufficient funds to sustain it for quite a while. I want you to promise me that you will carry on this project in case anything happens to me."



I gave Mr. Tiptoe my solemn word that I would do my level best to see that this great project was carried on in the true Tiptoe tradition.

As fate would have it, an unforeseen accident claimed the life of my employer within the next two weeks. As he was going from the twenty-meter room of the ham shack to the fifteen-meter room, his earphones — which he had forgotten to remove — pulled him from his inter-room conveyance chair. Unfortunately, he landed on the third rail, with results much too unpleasant to go into in detail.

The really disheartening part of this story is the fact that the wealthiest man in the world had died leaving his estate, and all he owned, to his debtors . . . Even after the estate had been divided, there were many debts left unpaid. This seemed to be the final blow to the Brass Fig Newton. However, as a last resort, I am issuing a plea on the behalf of those amateurs who would like to see this project put into effect. Will some organization take up the ball and carry it from the point where we fumbled it? QST

## Strays

On January 21 the following equipment was stolen from the Newark (N. J.) Civil Defense Center. If you have any information regarding this gear, please contact Newark Police Chief A. J. Rauscher.

- 1 Hallicrafters Littlefone Model 22 IDS serial No. 4246.
- 4 Gonset IV Communicators, serial Nos. A1070, A1079, A1200, and A1017.
- 2 Polycomm P62B transceivers, serial Nos. 91B64 and 91B65.
- 1 Jordan Radector Survey Meter Model AG-B, serial No. 95.
- 1 El-tronics Survey Meter Model SID-1, serial No. 159.

On March 27 a Viking Navigator transmitter, serial No. 85,803, was stolen from W7GDV. A further identification of this rig is that the phonotype output jack had been replaced with an SO-239 coaxial fitting. Any info on this equipment should be sent to L. E. Randle, W7GDV, 1720-A Laurel Canyon Blvd., Los Angeles 46, Calif.

In early March the club rooms of the Canadair Amateur Radio Club (VE2EEE) were broken into and a Collins 75A-2, serial 1340, was stolen. If

you have any info on this receiver, please forward it to the club at P. O. Box 6087, Montreal, Quebec, Canada.

- - - - -

In March the following equipment was stolen from W6HJT.

- 4 Collins 32S-1 transmitters, serials 11932, 10443, 10345 (one number unknown).
- 4 Collins 75S-3 receivers, serials 10118, 10221, 10648, 10354.
- 4 Collins 516E-2 power supplies, serials 12273, 10338 (two numbers unknown).
- 4 Collins 312B-4 speaker consoles, serials 53269, 52905, 52532, 52027.
- 3 Collins 30L-1 linear amplifiers, serials 10326, 10927, 11302.

Contact the San Diego County Sheriff, or W6HJT, Cameron G. Pierce, 1190 Oak Grove Ave., San Marino, Calif.

- - - - -

A Hammarlund HQ-145X receiver was recently stolen from W9YB, the Purdue Amateur Radio Club. Serial number unknown. This receiver was the personal property of K9RLU, and had been on loan to the club. Contact the Purdue ARC, Box 518, W. Lafayette, Ind.



# Correspondence From Members -

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

## LEAD PIPE CINCH

¶ I have just made an important discovery and, since I am a ham of long standing I feel you should break the news to the quivering world.

For several years now the people delving into Radio Astronomy have been unable to explain the large amount of radio emission from some galaxies. Like man, I got it figured: these galaxies are older than some and, with the untold number of planets involved, it's a lead pipe cinch that, at all times, two or more are having simultaneous DX contests.

Go ahead and take the credit — you will go down in history with Pasteur, Marconi or Mathis. — *Don M. Wherry, W6EUM, Camarillo, Calif.*

?

¶ WN4AQV's remarks on "Novice Accent" April QST: Must be a lot of old converted railroad operators like myself. A period in Morse comes out ? in International — darn hard habit to break! — *R. E. Johnson, K0GQO, Florence, Kansas.*

¶ I have just finished re-reading "Your Novice Accent" which I received when I first joined the League as a novice.

It says something about the novice being "isolated" from the rest of the ham fraternity. I disagree with this. Any novice can move his dial a few kcs. and listen to proper practices. Maybe this will loosen the corrosion that has set in! — *Kenny Ribet, WA200L, Belle Harbor, New York.*

## SURE CURE

¶ . . . The cure for Mr. "No-lid" is as simple as turning off the receiver. Take away his attention and he's lost. A dog barks and a small child throws a tantrum for attention. Ignore them and they'll get over it quickly. Nothing will upset our friend in better fashion than to think he's not getting out. He may be right in the middle of your QSO, but grit your teeth and let him deliver his time honored speech to himself. Nothing ruins his day more than to think you can't hear him. With enough help from all of us, Mr. "No-lid" is destined to oblivion. — *Dave Angel, K8BDZ/ K1RYT, Marietta, Ohio.*

## AWARD ARITHMETIC

¶ I read with considerable interest a letter from John Velamo, OH2YV regarding the "Certificate Industry" (April, QST).

May we assume from this that John is going out of the certificate-selling business; that he is now offering to sell his certificate without a list of other certificates or that his attempt to sell a book of certificate rules failed?

For some years John has been the Award Hunters Club and sold a 5 X 7 Certificate attesting membership in said organization to all and sundry upon receipt of \$1.00 US or equivalent and a list of 25 awards held by the applicant, certified by another amateur. In addition for another dollar per year you could receive his "News Letter" . . .

I point out the above only so that his wail re competition in the Awards Field can be placed in the proper perspective. . . . After all, it is still up to the individual amateur to determine how he will spend his time and buck. I know of no instance of an arm being twisted to "sell" an award. My W3RPG DXCC means just as much to me as it would if it were the only certificate issued. The fact that I have over 50 other "awards" does not cheapen it. . . . — *William T. Clark, K8VNR, exW3RPG, exW4IZM, exW5RXC, Columbus, Ohio.*

## 599 RATING

¶ Your RST 599 hr in Central Valley, Calif. Due to your FB signal received here I was able to pass my Novice examination and received call letters WV6SER. Just recently I passed my Conditional examination and now have call letters WA6SER.

I rate you a 599 because of your code practice schedules and fine books you have that helped me pass my examinations, especially the *Handbook* and the *License Manual*.

Thanks again and will be listening to your WIAW schedules. — *Walter J. Wysock, WAGSER, Central Valley, Shasta County, Calif.*

¶ A few days ago, I took to work my copy of *How To Become A Radio Amateur*. A friend of mine at work became interested in the book and asked if he could take the book home and read it over the weekend. Monday he told me that it was the most interesting book he had read in a long time, complete but down to earth. Thanks for publishing such a fine detailed book on amateur radio; keep up the good work at Hq. — *Melvin Ray, W0HYE, Minneapolis, Minnesota.*

## PHILANTHROPY

¶ Received a letter from Oscar Kalmar, HA5DH of Budapest, Hungary. We have corresponded off and on for the past several years. I am certain you remember Oscar as he helped to clutter 14 Mc. quite a bit during the evenings before the sunspot cycle hit us. It may be news to you, as it is to me, that Oscar has been off the air since some time during 1960. He tells me that his ticket was withdrawn (underscored) but did not say why. Knowing Oscar's "open" style of writing it is possible that he may have opened up too much for the authorities.

He wrote in this letter, "I would be very happy if you knew for me somebody to take out a subscription for the QST" and I could compensate for it by sending stamp series recently appeared." It is possible that currency is not permitted to leave Hungary and his only method of paying is by means of postage stamps.

. . . Do we have a philatelist among us who would be willing to fork over six bucks for the equal in the latest issue of Hungarian postal paper? — *Harry R. Schulte, W3LQ, 3009 Clinton Street, N.E., Washington 18, D. C.*

[Editor's Note: This is just one example which illustrates problems facing fellow amateurs overseas.]

## POWER SUCKER

¶ Congratulations to W8YLU on his article "Clear Channel Operation" which appeared in April QST! I was so enthused over this new principle that I immediately adapted my rig according to OM Quitter's instructions and I was really having a ball. That is, until last night, when another station came on my frequency and sucked me right off the air. Evidently he had also adapted to the "signal sucker". So, I doubt if this method has a very bright future on the ham bands, since, as OM Quitter noted, it won't be long before everyone's signal will be sucked off the bands. — *Tony H. Harpole, K4VOL, Clinton, Kentucky.*

¶ I was one of the fellows he worked. During the QSO, I noticed that my receiver was sliding toward the back of the operating desk. After yanking it back to its normal position several times, I happened to look out of the window and saw something that utterly amazed me.

My antenna was tugging and straining fiercely to the west, then suddenly crashed to the ground. Not only was he sucking in all the power, but also the whole darned antenna system! — *Anthony L. Steckel, W3WMX, Lancaster, Pa.*

¶ I thought that your April Fool article, "License Fee — or Tax?" was just too ridiculous to be funny. When such a relatively trouble-causing service as the Citizens' Band would be taxed on almost the same level as the self-policing and monitoring Amateur Radio Service it is obvious that some screws are loose somewhere.

On the other hand, I enjoyed very much the article, "Clear Channel Service." I hope to have my system in operation as soon as I can get my superaudible oscillator superaudibly oscillating. It will be very helpful considering my QRO 75 watts. — *Ped Levy, K8WNY, Manchester, Ohio.*

☞ I feel that Mr. Quitter has developed an excellent method for removing QRM. I have been using a similar system for several years, and find that it works very well. I might caution those not familiar with this system to be extremely careful to keep the resistance precisely zero, to avoid broadbanding. A few weeks ago, I had too much negative resistance at the superaudible oscillator, and wiped out the entire twenty-meter band for several hours. — *Richard R. Smolenski, K8GJD, Grand Rapids, Michigan.*

☞ With regard to the article on clear channel operation by Mr. Quitter, I would like to point out that he has missed a very good bet. The tunnel diode exhibits a negative resistance characteristic which is independent of frequency (up to a point), unlike the power source which he appears to be describing in his article. Consequently a properly biased tunnel diode attached and matched to his antenna would operate in the manner he describes for all frequencies at which the antenna had the proper resistance.

Further consideration of the principle employed leads to an examination of Maxwell's equations for the case considered, which prove that the clearing action of the device takes place only at the antenna itself. The effect will fall off roughly as  $1/d$  for any distance  $d$  away from the antenna, and consequently the antenna must be infinite in length, area, and volume to totally clear the band. Given such an antenna, I rather suspect that one could even dispense with the tunnel diode. — *Lewis T. Fitch, W4VRY, Clemson, S. C.*

☞ The article you printed in the April *QST* entitled "Clear Channel Operation" by W8LLU really had me fooled at first. I realized its purpose after recalling "More Sock for Cents" last April. — *Dick Stutsman, K5PME, Carlsbad, New Mexico.*

☞ . . . the Lick-Wilmerding High School Radio Club has made an extensive study of the "Power Sucker" antenna of the type described in the article. We made our own "Power Sucker" antenna on which our experiments were conducted.

We discovered that the most critical part of the antenna is the crossover network between the Superaudible Oscillator (SAO) and the Transmitter Power Amplifier (TPA). The size of the angle (in degrees) and the length of the feed line from the SAO and TPA to the antenna is directly related to the power gain of the antenna.

Through our experimentation we derived a formula which may be applied to calculate the power gain of a "Power Sucker" antenna for any size angle of crossover and length of feed lines. The simple formula is as follows:

$$\text{Power Gain} = \frac{\sin^{-1} \int \frac{\pi/2}{\text{LOG}_{10} 2} \sqrt{1-a^2 \tan^2 \theta b^2} (\text{LOG}_{10} 2)}{\frac{\sin 90^\circ}{\cos 90^\circ}}$$

where  $a$  = length of feed line from SAO to antenna  
 $b$  = length of feed line from TPA to antenna  
 $\theta$  = size of angle of crossover

— *Bernard A. Rosen, K6JS, Sec.-Treas. Lick-Wilmerding Radio Club, San Francisco, Calif.*

☞ . . . I am wondering if a power-sucker tuned to the ham-bands might act as a TVI filter when connected to a TV set? — *Mike Copeland, W4BMRB, Buena Park, Calif.*

☞ . . . Prof. H. E. Dunnit has a small pig farm in Iowa and has been running a full gallon and blowing big holes in the ham bands himself. Lately since the introduction to the Power Sucker into the field, every time that he fires up to blow holes in the bands, he gets clobbered by some Sucker Upper. To overcome this, he turned his great talent and years of experience to outwitting the Suckers.

His theory was to put such a concentrated beam on the air that it would overload the Suckers and render them inoperative. Having a round steel grain bin, he added another stage to his big rig and fed it into the bin. After checking his work, he was ready to try it on some Sucker. Having been taken out by this Sucker before, he knew about where the boy operated, so loaded up and waited. It happened!

Now, what the Prof. wants to know is what did the guy do with that 1200 bushels of corn? — *C. O. Bush, K6VYP, Forest City, Mo.*

### HELP THE MAILMAN

☞ I have one pet peeve which I think should be brought to the attention of those careless chaps who fall into the

category. It concerns the addressing of QSLs. It appears that many small town hams have never heard of that architectural monstrosity called an apartment house. The one that I reside at, for instance, has about 85 families. Yet, I am constantly receiving cards addressed merely to ARS WA2FQG and the street address. As strange as it sounds, my mailman knows me by my last name and not by my call letters. One bright fellow sent me a card and addressed it to "Ted" and the street address. In order to get the address, the callbook must be used. The last time I looked, my last name was listed along with my address. Why isn't it used?

Let us all try to ease the lot of the hard-working mailman by using full names on cards. In that way, he will not be in doubt as to whom the card goes to. In cases where there are more than one ham in a building, doing this will be greatly appreciated by all. — *Ted M. Marks, WA2PQG, Brooklyn, New York.*

### TRY TO CROSSTOWN

☞ I, as an amateur and ARRL member, am coming to you for any help you might be able to give our group in a problem which our membership cannot seem to see. With the change in the sunspot activity our amateur bands are changing so that now the 40-meter, 80-meter and even the 160-meter bands are the DX bands. The amateurs have become so used to using these frequencies for short distance communications that they are still trying to battle the QRM across town. You can tune across the 10-meter band almost any time of day or night and receive nothing. The CB group have proven on the 11-meter band that this frequency is excellent for short range communications. Is there anything we can do to jar the amateurs into realizing that they don't all have to jam themselves into the already overcrowded low bands? — *Clair Parker, K8HGA, Midland, Mich.*

### CQ K

☞ I have forfeited a good QSO many times because I tuned in just a little too late to make certain that the OM was calling CQ. Signing procedure doesn't help much (some use K; others AR; others AR K, etc.). Suddenly the idea struck me that if we signed our CQs with CQ K there would be no doubt in the matter! This seems like a trivial thing, but they mount up, you know! I think it would improve operating practice. — *M. H. Schatzlein, W9DUF, Knightsstown, Ind.*

☞ How many times have you tuned across a c.w. band, stopped and listened to a fine signal signing call letters two or three times, followed by a K? Perhaps you wondered if the station had called CQ or was already in QSO. You may have waited to hear if there was an answer and heard nothing. Perhaps you called the station anyway, or not being sure, you may have moved on. How about adding an extra CQ just before the final call sign of a sequence?

The League suggests a 3x3 CQ call. Why not add a single 1x1 at the close? — *C. H. Norwood, K1AMP, Braintree, Mass.*

### . . . STILL AROUND

☞ I wish to state that recent reports of my death have been grossly exaggerated. It was with considerable dismay that I read my name among the Silent Keys, especially since I've always been a phone man. (The XYL, W3FJG, regards the notice as an omen that this hobby will be the death of me yet.)

Unfortunately many of my friends saw the list too, and the resulting confusion can be easily imagined. Some, whom I have not seen for a while, were about to send flowers. Also the FCC engineer in charge of this area feels that it would be wise to notify the Commission of the error in order to prevent my call from being reissued. Worst of all, the League apparently feels I've no use for the remainder of my *QST* subscription, since I have not received my copy of the April issue. If a friend had not been concerned about the welfare of the "widow", I might still not know I had died.

At a time when the League is plugging hard for new members, it hardly seems practical to do away with those of us who still have a few good years left. Here's hoping I can be returned to active membership; I'll try to be on the air enough to prove I'm still around. — *Charles E. Clarke, W3BSW, Luthersville, Maryland. Editor's Note: Our humble apologies. Mr. Clarke is still a lively Full Member — and one with an excellent sense of humor.*

# I.A.R.U. News



## QSL BUREAUS OF THE WORLD

For delivery of your QSLs to foreign amateurs, simply mail cards direct to the bureau of the proper country as listed below. Cards for territories and possessions not listed separately can be mailed to the bureau in the parent country; e.g., cards for French Camerouns (FES) go to REF in France; cards for VP8s go to RSGB in England. W, K, VE and VO stations only may send foreign cards for which no bureau is listed to ARRL.

For service on incoming foreign cards, see list of domestic bureaus in most QST's under "ARRL QSL Bureau." **Bold face listings indicate corrections or additions.**

*Algeria:* G. Deville, FA9RW, Box 21, Maison-Carree, Alger  
*Angola:* L.A.R.A., P.O. Box 484, Luanda  
*Argentina:* R.C.A. Carlos Calvo 1424, Buenos Aires  
*Australia:* W.I.A., Box 2611 W. G.P.O., Melbourne  
*Austria:* Oe. V.S.V. Vienna I/9, Box 999  
*Azores:* Via Portugal  
*Bahamas:* Via ARRL  
*Barbados:* Arthur St.C. Farmer, Storms Gift, Brandons, Deacons Road, St. Michael  
*Belgium:* U.B.A., Postbox 634, Brussels  
*Bermuda:* R.S.B. P.O. Box 275, Hamilton  
*Bolivia:* R.C.B., Casilla 2111, La Paz  
*Brazil:* L.A.B.R.E., Caixa Postal 2353, Rio de Janeiro  
*British Guiana:* D. E. Yong, VP3YG, Box 325, Georgetown  
*British Honduras:* L. H. Alpuche, VP1HA. P.O. Box 1, El Cayo  
*Bulgaria:* Box 830, Sofia  
*Burma:* B.A.R.T.S., P.O. Box 800, Rangoon (Union of Burma)  
*Canton Island:* Charles Singletary, KB6BH, % FAA, USPO 06-50,000, Canton Island, Phoenix Group, South Pacific  
*Ceylon:* P.O. Box 907, Colombo  
*Chile:* Radio Club de Chile, Casilla 761, Santiago  
*China:* M. T. Young, P.O. Box 16, Taichung, Formosa  
*Columbia:* L.C.R.A., P.O. Box 584, Bogota  
*Congo:* U.C.A.R. QSL Bureau, P.O. Box 3748, Elisabethville  
*Cook Island:* Bill Scarborough, % Radio Station Rarotonga  
*Costa Rica:* Radio Club of Costa Rica, Box 2112, San Jose  
*Cuba:* F.A.R.A.C. QSL Bureau, P.O. Box 6996, Habana  
*Cyprus:* Mrs. E. Barrett, P.O. Box 219, Limassol  
*Czechoslovakia:* C.A.V., Box 69, Prague I  
*Denmark:* E.D.R. QSL Bureau, Ingstrup  
*Dominica:* VP2DA, Box 64 Roseau, Dominica, Windward Islands  
*Dominican Republic:* RCD, P.O. Box 157, Ciudad Trujillo  
*East Africa:* (VQ1, VQ3, VQ4, VQ5): P.O. Box 30077, Nairobi, Kenya Colony  
*Ecuador:* Guayaquil Radio Club, P.O. Box 5757, Guayaquil  
*Ethiopia:* Telecommunications Amateur Radio Club, P.O. Box 1047, Addis Ababa  
*Fiji:* S. H. Mayne, VR2AS Victoria Parade, Suva  
*Finland:* SRAL, Box 306, Helsinki  
*Formosa:* Hq MAAG, APO 63, San Francisco, California  
*France:* R.E.F. BP 26, Versailles (S & O)  
*France:* (F7 only): F7 QSL Bureau, MARS, Headquarters U. S. European Command, APO 128, New York, N. Y.  
*Germany* (DL2 calls only): G. E. Verrill, G3IEC, 10 Seahorse St., Gosport, Hants, England  
*Germany* (DL4 & DL5 calls only): DL4 & DL5 QSL Bureau, % DL4AVJ Base MARS Station, APO 130, New York, N. Y.  
*Germany* (other than above): D.A.R.C., Box 99, Munich 27  
*Gibraltar:* E. D. Wills, ZB21, 9 Naval Hospital Road

*Ghana:* 9G1CW, Hans Suess, P.O. Box 1945, Kumasi  
*Great Britain* (and British Empire): A. Milne, 29 Keechill Gardens, Hayes, Bromley, Kent.  
*Greece:* George Zarahs, P.O. Box 564, Athens  
*Greece* (Unlisted SVFs only): MARS, 7206 Support Group, APO 223, New York, N. Y.  
*Greenland* (OXs only): Via Denmark  
*Greenland* (KG1s only) KG1AA-KG1EZ and KG1IIA-KG1LZ) Via MARS Director, 4683rd Air Defense Wing, APO 23, New York, N. Y.; KG1FA-KG1HZ: Via MARS Director, 468th AB Group, APO 121, New York, N. Y.  
*Grenada:* VP2GE, St. Georges  
*Guam:* M.A.R.C., Box 445, Agana, Guam, Marianas Islands  
*Guantanamo Bay:* Guantanamo Amateur Radio Club, Box 55, NAS, Navy 115, F.P.O., New York, N. Y.  
*Guatemala:* C.R.A.G., P.O. Box 115, Guatemala City  
*Haiti:* Radio Club d'Haiti, Box 943, Port-au-Prince  
*Honduras:* O. A. Trochez, P.O. Box 244, Tegucigalpa, D. C.  
*Hong Kong:* Hong Kong Amateur Radio Transmitting Society, P.O. Box 541, Hong Kong  
*Hungary:* H.S.R.L., Postbox 185, Budapest 4  
*Iceland:* Islenzkir Radio Amatorer, Box 1058, Reykjavik  
*India:* P.O. Box 534, New Delhi 1  
*Iran:* Amateur Radio Society of Iran, MAAG, APO 205, New York, N. Y.  
*Ireland:* I.R.T.S. QSL Bureau, 24 Wicklow St., Dublin 2  
*Israel:* I.A.R.C., P.O. Box 4099, Tel-Aviv  
*Italy:* A.R.I. Viale Vittorio Veneto 12, Milano, Italy  
*Jamaica:* Ruel Samuels, VP5RS, 34 Port Royal St., Kingston  
*Japan* (JA): J.A.R.L., Box 377, Tokyo  
*Japan* (KA): F.E.A.R.L. (m), APO 925, % Postmaster, San Francisco, Calif.  
*Kenya:* R.S.E.A. QSL Bureau, P.O. Box 30077, Nairobi  
*Korea:* Korea Amateur Radio League, Central Box 162, Seoul, Korea  
*Kuwait:* William N. Burgess, 9K2AZ, % Kuwait Oil Co., 14 — 5th St. North, Kuwait, Persian Gulf  
*Lebanon:* R.A.L., Ahmadi, B.P. 3245, Beirut  
*Liberia:* Ken Bale, EL4A, Le-Tourneau of Liberia, Roberts Field  
*Libya:* 5A QSL Service, Box 372, Tripoli  
*Liechtenstein:* via Switzerland  
*Luxembourg:* R. Schott, 35 rue Batty Weber, Esch/Alz. Luxembourg  
*Macao:* Via Hong Kong  
*Madagascar:* P.O. Box 587, Tannarive  
*Madeira Island:* P.O. Box 257, Funchal  
*Malaya:* QSL Manager, Box 777, Kuala Lumpur  
*Malta:* R. F. Galea, ZB1E, "Casa Galea," Railway Road, Birkirkara  
*Mauritius:* Paul Caboche, VQ8AD, Box 467, Port Louis  
*Mexico:* L.M.R.E., P.O. Box 907, Mexico 1, D.F.  
*Midway Island:* KM6BI, AIRBARSRON Two Detachment, Midway Navy 3080, F.P.O. San Francisco, Calif.  
*Monaco:* 3A2CN, Anderhalt Pierre, 49 rue Grimaldi  
*Montserrat:* VP2MY, Plymouth  
*Morocco:* A.A.E.M., P.O. Box 2060, Casablanca  
*Mozambique:* Liga dos Radio-Emissores de Mocambique, P.O. Box 812, Lourenco Marques  
*Netherlands:* V.E.R.O.N., Postbox 400, Rotterdam  
*Netherlands Antilles* (Aruba): Verona, Postbox 392, San Nicolas, Aruba  
*Netherlands Antilles* (Curacao): Verona, Postbox 383, Willemstad, Curacao, NW 1  
*New Guinea:* Rabaul Amateur Radio Club, P.O. Box 170, Rabaul, Territory of New Guinea  
*New Zealand:* N.Z.A.R.T., P.O. Box 489, Wellington C1  
*Nicaragua:* Club de Radio Experimentadores de Nicaragua, Apartado Postal 925, Managua  
*Nigeria:* Dr. M. Dransfield, 5N2JKO, Regional Research Station, Samaru, Zaria, Northern Nigeria  
*Northern Rhodesia:* N.R.A.R.S., P.O. Box 332, Kitwe  
(Continued on page 166)





# Operating News



F. E. HANDY, WIBDI, Communications Mgr.  
GEORGE HART, WINJM, Natl. Emerg. Coordinator  
JOHN F. LINDHOLM, WIDGL, Ass't. Comm. Mgr., C.W.

ROBERT L. WHITE, WIWFO, DXCC Awards  
LILLIAN M. SALTER, WIZJE, Administrative Aide  
ELLEN WHITE, WIYYM, Ass't. Comm. Mgr., Phone

**Contest Operating.** V.h.f. operators at one time had to be coaxed to get into anything that savored of a contest. Not so these recent years. The V.H.F. Sweepstakes is right up there with all the other major activities. The June V.H.F. QSO Party, our next challenge, is high opportunity to be on the air to make new contacts, work some new states and have a whale of a good time operating. Each such contest is a chance to put your station on the map. There are new results even if you get in only a little while. Beyond this it's a test between you and other operators in your ARRL section to see which man can win the section award. The January activity is mostly from home stations but on June 9-10 it's a chance to operate from the hilltops in a month that is often good for v.h.f. DX. Working as many bands as you can helps both in the number of contacts you make and in your multiplier (sections). See page 60 for full details on the V.H.F. QSO Party, June 9-10.

**The Greatest of Them All Comes June 23-24 — The ARRL Field Day.** Some may dissent, if they have never operated Field Day before, but from the standpoint of sheer number of operators enjoying the big annual field exercise, this tops every other form of operating activity in amateur radio. Testing emergency equipment is always the prime objective. Field Day runs under flexible rules embracing club groups, a single operator, or a pair of operators. Club en-

tries are classified by number of transmitters to fit big clubs and little ones. The rules for this year's Field Day are on page 28. We hope every amateur will meet the challenge to better his operating ability and set up operation in the field. Small portables and hand-carried equipment, battery powered, is fine gear to have in the station during the whole year, as well as on FD. Remember too, that there's a class for mobile entries. We encourage clubs in addition to their club score to have their members report individual mobile contacts for an aggregate mobile score to show mobile capability within your club.

Perhaps Field Day is primarily a club exercise, but every amateur who goes it alone, or as part of a club operating team, who can make even one emergency-powered contact, has carried out the spirit and meaning of Field Day.

**Versatility in Operating.** Over the years changes in equipment and technique have done much to further the desirable goal of being versatile in our operating. We band switch to take advantage of conditions. With a little care to provide simple but effective antennas, we can efficiently pass a message on the section net on 3.5-Mc. c.w. and a few minutes later be working DX on 14 or 21 Mc. A switch to h.f. voice and we can polish off the evening with a satisfying local rag chew, or a switch to v.h.f. and we are in an AREC or RACES drill.

The more we take part in all kinds of amateur work the more fully we reap the pleasures and benefits. Hamming is a field of diversified activities. Let us investigate the up-to-now untried possibilities. If one confines himself to building and experimenting and never rag chews, he is probably missing general contacts and friendships that could mean so much. Likewise if one chews the rag all the time, he is missing something valuable too. The skilled amateur also is familiar with message forms and procedures. Be equipped and skilled to use both voice and c.w. operation. Such skills add to one's prestige as a true communicator. Avoid the "formula" contacts.

Another thought — the public service record of the amateur, participation in emergency work in natural disasters and traffic handling services, reflect great credit on amateur radio. We all share in the pride. Register in the AREC or report regularly into your section net to share in the responsibility. Strive toward versatility in your daily amateur operation.

— F. E. H.



Director Carl Smith, WØBWJ, annually presents a PICON Award to the outstanding amateur in each section of his (Rocky Mountain) division, selected from among nominees made by each SCM. The New Mexico winner for 1961 was Carl Franz, W5ZHN, New Mexico SCM, shown here (right) being presented the plaque by Assistant Director K5CXN (left). Carl created and implemented the New Mexico AREC plan, which has attracted some national attention.



# With the AREC

In an obscure corner of the Emergency Communications Manual there appears this admonition: *Select the mode to suit the need.* Probably, to be realistic, this should be prefaced with the phrase: "Within the limitations of availabilities . . ." and to "mode" we should add "band," so that the statement will then read: "Within the limitations of availabilities, select the mode and band to suit the need." Or, to put it in simpler terms, "Use what you've got, but use it right."

We wonder, sometimes, if all of our ECs follow this philosophy faithfully. We wonder this because in emergency after emergency most of the big noise is made on 75-meter phone, the most crowded band we have and not by any means the best suited for the average emergency purpose. The band probably least used is 80-meter c.w., one of the least crowded and for many purposes the best. In one recent emergency there was considerable activity on 20-meter phone, and much publicity was generated therefrom — and yet, how can effective emergency communication be carried out on this band under normal circumstances?

We realize that it is not always possible to consider the need first, then deliberately set about acquiring the equipment and operators to accomplish it — although this is the logical way to go about organizing. All too often, in our amateur radio emergency work, the disaster finds amateurs on the scene partially or totally unprepared, and hundreds of amateurs suddenly finding themselves in a position magnanimously to offer their "help," although they have taken no part in preparation. The loud-talkers reap the publicity (both good and bad) while the real emergency work is quietly being accomplished in pre-organized v.h.f. or s.a.b. nets. Sometimes, listening during emergency operations, we wonder how the amateurs ever achieved such a position of respect in emergency communications and consider how much more we could offer if we concentrated on rendering an *effective public service* and forgot other considerations until we could conscientiously feel that such a service was being rendered.

We hope the above paragraph won't offend some who have rendered effective aid on 75 meters. It can be and often has been done — and if AREC members use 75-meter phone and nothing else there is little else you can do until equipment can be acquired for better bands. The hen lays its egg in a nest already full, and newer amateurs will flock to the band where they will have lots of company. We want lots of company in emergency work, too, but not *casual* company (this is just so much QRM). Our purpose is better accomplished on an empty band than on a crowded one.

If we followed strictly the principle of selecting the band to suit the need, we would inevitably put 75 meters at the bottom of the list for *any* purpose, short, medium or long distance. For short distances, the v.h.f.'s (2 and 6 meters) are ideal, preferably toward the high-frequency ends of the bands. For the next few years, 10 and even 15 meters will be local rather than DX bands, so here's a chance to organize some AREC nets utilizing the DX stations with such capabilities who do not use the v.h.f.'s. For medium distances, beam antennas can take the place of general coverage radiators to do the job in most cases; perhaps in the west, where "medium" distances are measured in hundreds of miles rather than in multiples of ten, 80-meter c.w. can best do the job.

There is not too great an application for long-distance communication in the average emergency, but where it becomes necessary it is best accomplished on 40-meter or 80-meter c.w. Twenty meters has little or no emergency potential, even during the high part of the sunspot cycle.

If there is no c.w. ability in your AREC group (can such things be?), 75 meters would be the best band for medium distance if you could get through the QRM. In such a contingency, s.a.b. is far superior to a.m. For high-speed point-to-point, how about RTTY?

A great deal more can be said on this and allied subjects. We already have gone on at too-great length. In commercial fields it is usually possible to acquire equipment, capability

and frequency space to accomplish the desired objective in the most efficient manner. We amateurs aren't in the business, so we have to make the best of what we have. This is restriction enough. Let's not restrict ourselves further through consideration for things other than the job to be done. — *WINJ.M.*

During a flood disaster in Idaho, Feb. 12-16, telephone communication facilities at the Red Cross chapter in Pocatello proved inadequate to carry the load, so EC W7GCO was called upon for assistance. Within the hour, three mobiles were in operation, one acting as control station and the other two on patrol. Later, K7CVB was set up at Red Cross headquarters and K7IMB at the National Guard armory, manned 24 hours per day by volunteer amateurs. Before the flooding condition was over, 22 amateurs had been in action, including ten mobiles on patrol on the dikes, reporting to the armory station any needs of the workers on the dikes such as sand, bags, food, and also reporting conditions in the various critical areas along the Portneuf River. Two other stations in Pocatello assisted in handling welfare messages. The following additional stations are known to have been active: K78 ALA GQE GSC CXP EQQ HEV MLJ MLK NEY GCE, W78 BDL GGV YBA UA UKH HDB VPS BNJ CDA GCO. — *W7GCO, EC Bannock County, Idaho.*

In all, some 32 amateurs in the Tidewater Area provided assistance, sixteen of them mobile. C.D. headquarters stations K1SDS (Richmond), W5AIY4 (Virginia Beach), W4VMA (Hampton) and W4WLQ (Elizabeth City, N. C.) also joined the net, and W4MFK operating on emergency power at Manteo on the outer banks provided the only communication to that area. Many amateurs in other states remained on standby to provide assistance as they were able and needed. K4MSB set up six-meter gear at c.d. headquarters for tie-in with Norfolk Area V.H.F. Net. Portable stations were provided by K4TJSJ and W4MRN to assist at evacuation centers. The combined mobile and fixed station net, with relays being handled to W4QDY, remained in operation until 0200 Mar. 8, when radio was released to standby status, subject to immediate recall. A very nice job by both AREC and RACES groups working together in the Norfolk area.

On Mar. 5, after the Baltimore Area Emergency Net had completed its regular drill at 2100, it was reactivated for an emergency brought about by heavy snow conditions. The net relayed much needed information for the Department of Transit, state police, county police, Gas & Electric Co. and the State Road Commission concerning road conditions, fallen power lines, traffic tie-ups, drifting conditions and weather reports. Four stations went mobile in the blinding snow to get information on road conditions from areas the road commission could not reach by truck. Four different stations served as NCS during the fracas. An excellent turnout of amateurs resulted purely from the habit of the local AREC gang in monitoring the agreed-upon emergency frequency. Those taking part: K38 MDL NAS LJB RGD OGA LEN PZB EVE QAK EVI QOK KPZ, W38 HYY BOM TAL TRU USW HZG NAE. — *K3KPZ, EC Baltimore Area, Md.*

On the evening of Feb. 3, 1962, two very anxious mothers, neighbors of K1AUN of Middletown, R. I., asked for help in locating their respective sons, aged nine and eleven, who had previously threatened to "leave home." K1AUN was activated on the mobile frequency. WITXL coordinated activities between mobiles and fixed stations. Three hours after the alert, the boys, tired and hungry, returned home of their own accord, having discovered that distant pastures were not as green as they thought. Other amateurs participating in the search activity, all on six meters, included K18 AUN KBD TPK NII JED OZY SKY and NJT.

Members of the Naval Air Station Amateur Radio Club in Pensacola provided communication in early January for a woman whose husband, stationed at Guantanamo Bay, Cuba, had had a heart attack. Word of the need got to K4FOG, secretary of the club, and she, with the assistance of K4EYI and club station W4NBM, succeeded in contacting KG4AN at Guantanamo. Several schedules were kept between Pensacola and Guantanamo for continued reports on the man's condition. — *K4SIWQ, EC Pensacola, Fla.*

Virginia SCM W4QDY reports extensive operation by RACES and AREC members in the Norfolk area, as reported by W4BGP. The presence of an emergency condition first became apparent on the morning of March 7, when an amateur mobile remarked about the high water on his way to work along West Ocean View. (He never did make it to work.) W4DHz, Norfolk radio officer, activated the Norfolk CD Radio Net and K4UKT was dispatched to the evacuation center at Ocean View School. W4BGP assumed net control for Norfolk C.D. Other mobile units were dispatched to other designated evacuation centers, W4OUJ/mobile at Bayview, W4OCQ/mobile at Stuart, K4UKT at Ocean View. Telephone lines were disrupted and the amateur net was the only continuous communication for Red Cross and c.d. Relief at the latter locations was provided by K4IGW and K4IQX. When commercial power failed in the East Ocean View area, W4BGP was there with his trailer-mounted generator to restore service within 15 minutes. W4DHz reported into the net from c.d. headquarters, and Red Cross and c.d. reports of evacuation procedures flowed directly to headquarters officials. Because of antenna damage at c.d. headquarters, W4BGP retained control until 1900, with relief from W4RCG. At this time, operation on 75 meters was abandoned because of the high QRM level and shifted to 29.6 Mc. The Virginia Phone Net continued on meters under the direction of W4YVG.

A wintry gale whipped up the Atlantic Seaboard in early March, causing high tides and extensive flooding and wind damage. We have reports of amateur participation from North Carolina, Virginia and New Jersey. Operation was performed under both AREC and RACES banners.

SCM W4RRH gives us the details in North Carolina. Communication was knocked out early in the storm and c.d. headquarters was activated at Raleigh with W4s PNM UQA F'DV and K4DWU doing the operating. Contact was established throughout North Carolina and adjoining states with K4s KLJ GFG CPX, W4s PCN LCV SHJ TJA TLA, W4AFHV, W8OWD/4, K9HSG/4. Over 300 official messages were handled at c.d. headquarters, plus a great many personal welfare messages. The Tar Heel Emergency Net was also in session beginning at 1900 EST on March 7 and ending at 2200 EST March 13. Many amateurs left their homes and businesses to help in the emergency. EC W4MFK, from Chapel Hill, moved into Mateo the morning of March 8 and then went out to Avon, operating continuously, except for a few naps, until 2200 March 11, handling over 200 messages. W4LCV operated continuously for 144 hours, handling an estimated 1000 messages. K4SMA also operated some 72 continuous hours. W4TJA and W4TLA moved a rig to Kitty Hawk and worked from there for 72 hours. K9HFG/4 operated portable at Edenton and W8UWD at Manteo. K4VVK was also in portable operation. K4QJQ controlled the net for a solid 28 hours; others spending long hours as NCS were K4s WLV FGF ODX, W4s ZKE YMI EYZ. Among the outstanding assisting stations were K4s NGR VUS, W4s BJH SHJ PON POI WLQ FOR LFX QC and W8BHK. Many of these participated in both the RACES and Tar Heel Nets. — W4LRH, SCM North Carolina.

— . . . . —

On March 7, WA2OZQ, on his way to work in Atlantic City, found that the road was blocked by high water caused by high tides. He was in contact with K2HAJ in Pleasantville and K2ZYZ in Northfield. Returning home, he set up his two-meter rig and started monitoring the c.d. frequency of 146.9 Mc. It wasn't long before he heard the expected — a plea from WA2KWF for mobiles. WA2OZQ and WA2QOG, who was also listening, set out. WA2s KWF OZQ and QOG rendezvoused at the bridge leading to Ocean City, talked their way through the police blockade and drove into the flooded area. WA2QOG set up at the armory. WA2KWF at c.d. headquarters and WA2OZQ at the high school, where plans were being made to take care of refugees, of which over 100 were already on hand. WA2OZQ's first message relayed a need for blankets, and then K2YYB set up a portable unit inside the high school so that running back and forth to the car would be unnecessary. Because the indoor antenna would not reach c.d. headquarters, WA2OZQ relayed from his car outside the building. Traffic consisted of requests for medical and food supplies, and information on water contamination and utilities. One notable message was about a body floating down 16th street in Ocean City, which turned out to be that of a person drowned in Beach Haven, 70 miles distant. By 2000, condi-

tions at the high school seemed to be under control, but nobody could leave, so WA2OZQ stayed until 0230, when he, WA2KWF and WA2QOG secured for the evening and drove through two feet of water to reach the bridge back to Somers Point.

During the operation, WA2DOU and K2CIR monitored the frequency and often stepped in to relay when the going was tough. WA2AVD went more than 24 hours without sleeping in order to keep communications open. Mobile units from out of town helped, too. WA2TIL, WA2KRX and W2LY were active, the latter bringing down a mobile trailer unit for use in the Wildwood area. In closing his report, WA2OZQ, EC for Atlantic County, N. J., states that all who took part were AREC members, coordinating their efforts with c.d. in Ocean City, which supervised all operations, and that "the dedication, cooperation and willingness to serve at personal sacrifice were in keeping with the best traditions of the Amateur Service."

— . . . . —

February SEC reports were received from *thirty* sections, an increase of one section over the same month last year. AREC members represented totalled 14,132, an increase of about 2,000 over last year and the highest number of AREC members represented in SEC reports *any* month in *any* year. We now have five sections reporting an AREC membership of over a thousand; NYC-LI, Mich., Ind., Ohio and E. Fla., in that order. South Texas hasn't far to go with 913, and E. Pa. is close by with 895. Other sections heard from in Feb.: Tenn., Okla., W. Fla., Alta., S.N.J., E. Mass., Minn., Maine, Sac. Valley, N.C., Iowa, Ariz., N. Texas, Wash., Colo., Utah, W. Mass., Nevada, W. Pa., S. Dak., Ore., Ala., Los A.

### RACES News

Latest word from the Office of Civil Defense indicates that things are still pretty much upside down, but RACES is still in business, with Leo Haijzman, W8KA, still at the operational helm. Some 1580 RACES plans are now on file at OCD, as of April 1.



In July of 1960, we attended a private OCD conference at Battle Creek to discuss the national civil defense RACES frequency plan with officials of OCDM and USCDARA. This was reported in this column in Sept. 1960 QST. Later, as a result of this conference, we received an advanced draft of the new frequency plan, reported in this column in May 1961 QST.

We now have a finalized version which we understand is available from the Communications Operations Division, Office of Civil Defense, Battle Creek, Mich.

One thing about this plan (Appendix I, Annex 15 — Communications, National Plan for Civil Defense Mobilization) (or just ask for NP-15-1) which we would like to call to the attention of all RACES radio officers is the section entitled "Modification Requirements," in which it is stated that after Jan. 1, 1963, RACES plans which do not conform to the particulars set forth therein will be cancelled, and approval of subsequent plans received at OCD will not be given unless they comply. Meanwhile, presently-approved plans may be used, but if modification is necessary be ore Jan. 1, 1963, the entire plan must be brought into compliance with NP-15-1.

In other words, OCD expects the new national frequency plan for RACES to go into full effect on that date. Most states have already submitted modified plans, and it is expected that others will soon fall in line. At local levels, RACES plans should be re-examined to be sure they follow the national frequency plan prior to Jan. 1.

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What about OPAL-62? According to our latest word, there are no plans to have one this year — not on a national basis, anyway. However, Texas Division of Defense and Disaster Relief is sponsoring a contest on FD week end, similar to the FD itself, in which all RACES members are invited to participate. Sorry, we don't have room for the details, but a note to Frank Cox, K5TRY, Communications Officer, Texas Division of Defense and Disaster Relief, Austin, will bring you all the dope.

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The Charleston (S.C.) RACES Net was activated on Mar. 3 during severe weather conditions which knocked out

normal power and communications in neighboring Dorchester County. Damage was particularly severe in the Summerville area with icing conditions knocking down power and telephone lines. Charleston County e.d. units were taken to Summerville by W4ZRII and communication established with Charleston on 2 meters. Message traffic handled by W4OPL, mostly on emergency power, and K4ZAW, enabled e.d. officials to communicate with key officials in Charleston and Columbia. As a result, emergency power equipment and disaster facilities were obtained quickly for the affected areas. National Guard aid was also

obtained through network facilities. State e.d. headquarters at Columbia was manned by W4CE and W4HMG. Traffic picked up on two meters was relayed to Columbia by K4ZAW on 3993 kc. Units of W4ZRII were located at fire departments, police departments, Red Cross, Salvation Army, hospitals, the newspaper and radio and TV stations. For the first day and part of the second the only communication to Summerville was through the RACES network, which was maintained until normal channels were restored. Courtesy by casual amateurs on 3993 kc. and vicinity was excellent. — K4ZAW.



# DX CENTURY CLUB AWARDS



## Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in case of ties are determined by date of receipt. All totals shown represent submissions received as of the end of the last day of the month of March, 1962.

PY2CK.....308/320	W3JNN.....305/317	W9YFV.....303/315	W6EBG.....302/315	W8KML.....300/311
W2HUO.....307/319	W3GHD.....305/317	W8BFC.....303/314	W7GLX.....301/312	W5ASG.....300/312
W4DOH.....307/319	W9RBI.....305/318	LU6DJ.....302/314	W7PHO.....301/311	W8JBI.....300/310
W6CUG.....307/320	W8DMD.....304/315	CE3AC.....302/314	W8KIA.....301/313	W7GBW.....300/312
W2AGW.....306/318	W8BF.....304/315	W2HMJ.....302/313	W8MMK.....301/312	CX2CO.....300/312
W8BRA.....306/318	W5ADZ.....304/315	W6AM.....302/315	W9HJZ.....301/312	W2LPE.....299/311
KV4AA.....306/318	W8UAS.....304/315	W6OVZ.....302/312	4X4DK.....301/312	W9LNM.....299/312
W8JIN.....306/319	W3KT.....304/316	W2BXA.....302/314	W9NDA.....300/313	W1RHH.....299/311
W1GKK.....306/319	W7GUV.....304/316		W1NE.....300/312	W4TMM.....299/311

## Radiotelephone

PY2CK.....308/320	W9RBI.....302/313	V04ERR.....301/313	CX2CO.....299/311	W8KML.....297/308
W8GZ.....305/316	W7PHO.....301/310	W4DOH.....300/310	4X4DK.....299/309	W6YK.....297/308
W8BF.....303/314	W8PQQ.....301/311		W3JNN.....298/309	W6AM.....292/304

From March 1, to April 1, 1962 DXCC Certificates and Endorsements based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

## New Members

S9PKJ.....168	G3JRR.....109	DJ4VU.....105	OA4JH.....103	W6FB.....101	K5WSE.....100
W9OZJ.....154	W6VPV.....108	GW3IEQ.....105	UT5CC.....103	GHFP.....101	W6BJL.....100
W2GGE.....150	KR6GF.....108	K0TYO.....104	VQ2EV.....103	HA5FO.....101	W6CRV.....100
K2BUL.....140	C9JJR.....107	EP2BB.....104	OK1BV.....102	H89AF.....101	K8PYD.....100
DL4HP.....120	G3NPZ.....107	K5BBA.....103	W2JVV.....101	OK1BE.....101	K8RBB.....100
W8EW.....115	F2MIS.....106	W5PUN.....103	W2FRM.....101	SM6AOQ.....101	K8YOE.....100
W0LFB.....113	W2TSD.....105	W6IVZ.....103	W48NU.....101	TA4EAD.....101	K8LUX.....100
UA8AD.....110	K6MGM.....105	VE4SX.....103	W5JVV.....101	WA2KSD.....100	K8WKE.....100
W5AEW.....109	W9MGX.....105	H89ZT.....103	WA6BUX.....101	W3BKE.....100	VE3OI.....100
W7DQM.....109	W9HGP.....105			K5AAD.....100	UA9OI.....100

## Radiotelephone

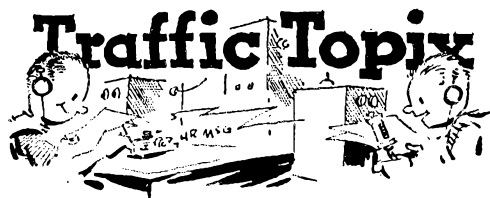
DL1KB.....153	SM5BFJ.....106	K4WHD.....104	UB5LV.....103	UF6FB.....102	W9MDF.....101
PY7EC.....113	EP3RO.....105	11WZ.....104	W8RKR/4.....102	W5DVV.....101	YV8HE.....101
K9WUR.....111	K4GLA.....104	SP9KJ.....104	W4RLS.....102	K5JLX.....101	YV5ED.....100

## Endorsements

W2LV.....302	KP4YT.....260	W2BHM.....221	W5CK.....190	K8KTZ.....160	W8GFH.....130
W4GXB.....300	W7TJ.....257	K8KAE.....230	W82MW.....190	W4DEP.....152	W8LUZ.....130
W6TS.....300	K4LPW.....256	VE5JV.....210	K8OHG.....185	W8KSR.....152	SM7AUG.....127
W3CGS.....294	K9AGB.....251	K4G88.....209	K4AJ.....184	DL4BS.....152	W9HUV.....125
VE3DIF.....294	WILZE.....250	W8NUT.....208	SM3AZI.....183	W1FJJ.....151	W9VMZ.....125
W5UJ.....292	K4ICK.....250	K8ONV.....207	W8PHN.....182	OH7OU.....151	SV0WZ.....122
W3DVPW.....291	W6LN.....250	G2FEO.....201	DL6PC.....182	ZL1ARY.....151	W8RNF/5.....121
W8HAN.....290	VE3JZ.....250	C2FYT.....201	W1RMY.....181	ZS5RS.....143	W8EDQ.....121
W8SYK.....290	VE3DKY.....247	G2IO.....201	W8IQS.....180	K6ZIF.....141	W0CAW.....121
W9SFR.....284	W1ORV.....241	G5VU.....201	G3JLV.....180	K9OKD.....141	K8VSL.....120
K2LWR.....281	K4RPK.....241	K2YNY.....200	K0ESH.....172	VE2DK.....141	R0MAS.....120
W2HO.....274	W0BMQ.....241	W2ZY.....200	W1GDY.....170	WA2AEL.....140	W3AFM.....117
W3LMM.....274	W4CKB.....240	K4TWF.....200	W6CBE.....170	W7CNL.....140	R7AC.....114
K2PC.....271	W9ROM.....240	W6LGH.....200	W6ERS.....170	W7IYW.....140	K6JPL.....113
W4GLK.....271	W9U7S.....240	W7BTH.....200	K8QJH.....167	W9YYG.....139	ZL1CH.....112
W2RDD.....270	H89ET.....240	F9MS.....198	K0IKL.....164	W7PS.....136	W1GF.....111
K5BGB.....270	P2IAX.....233	SP4JF.....194	SV0VL.....163	UQ2AS.....133	W1BH.....110
W6ULS.....270	W2QKJ.....230	SM5BFJ.....192	Z67JV.....162	SP6AT.....132	W4ZBGW.....110
W9K6F.....270	W6MVL.....230	K4TEA.....191	W4LZW.....161	VQ2LE.....132	K8AMI.....110
W8JRI.....263	K8HQJ.....230	W2QQ.....190	LA5ID.....161	K4GXE.....131	K8KHD.....110
K8HJL.....262	W1KQF.....227	K4EX.....190	K5UXP.....160	K4SCT.....130	W9NVJ.....110
W1BGA.....260	K2MGR.....222	W4MS.....190	W7STC.....160	K6JBP.....130	

## Radiotelephone

VE3KF.....282	W1ORV.....220	G3RD.....200	VE1PQ.....180	W4UWC.....162	VE3CTO.....132
W6OBH.....270	K1IXG.....212	HK3LX.....200	SM3AZI.....179	LA5ID.....155	W1BO.....130
W8JFJ.....270	W4ZIS.....211	W3AYD.....194	W4DWN.....174	G25JT.....151	W0R6J.....130
W1LLE.....252	W2TTP.....211	W3V8U.....191	W4LZW.....174	K1JMY.....150	W3DVF.....130
W8ZET.....250	W1BIIH.....210	W9JAV.....190	W4LZT.....174	W4BBL.....150	VE5KJ.....129
K2CJN.....236	W2QKJ.....203	W0BMQ.....190	K4CYF.....171	K1JIDW.....145	W7BPS.....127
W8SYK.....233	W9SFR.....202	K4AJ.....184	G3NUY.....171	W8SMQ.....141	W9VMZ.....125
P2IAX.....223	W1YDO.....201	W0TJC.....181	SP7HX.....170	G3NRZ.....140	W8TMM.....120
H89ET.....226	K5JEA.....201	W0TJ.....181	W2YTH.....169	VE5JV.....135	W4DFO.....117
F8PI.....223	W2YBO.....200	W9ZSZ.....180	K4LPW.....168		W45MC.....110
W3CGS.....222					



At the end of 1961, the identity of the "big ten" in traffic handling circles showed a number of new calls. Of course it almost goes without saying that W3CUL far outdistanced everybody else, as she will always do as long as she maintains that killing pace. Mae gathered 646 BPL points during the year (four points for each BPL total, plus one point for each full hundred in the BPL traffic count). In second place, with 288 points, was another XYL, W1LGG. Follows the remainder of the first 25 in the 1961 BPL race (points in parentheses): K6BPI (249), K4AKP (211), W0JOZ (192), W7BA (183), VE2AZI/W1 (179), K4SJJ (165), K2UAT (165), W3IVS (164), K8ONK (156), W3EML (146), W6GYH (145), W8UPH (145), W9DYG (144), W8DAE (143), W8BDR (143), W8SCA (143), W7DZX (141), W0LXCX (133), W3VR (128), K9OZM (117), W0OHJ (114), W6WPF (113), W4PL (112). Call area leaders, not already mentioned in the "top 25" are W1SMU (111), and W5ZHN, (58).

In the post-war standings, we find W3CUL on top, of course, with 6109 points, and W7BA has finally moved ahead of W4PL to take second place with 2243 and 2234 points respectively. The rest of the post-war "top 25": W8BDR (2096), W8SCA (2058), W2KEB (1873), W6GYH (1282), W9NZZ (1280), W0LGG (1228), W3WVQ (1184), W9D0 (1121), W6CPI (1099), W9JUI (982), W7PGY (922), W7CZY (885), W0LXCX (882), K2UTV (860), W6CE (815), W7TQD (809), W8UPH (804), W8PZO (710), W9TT (644), W2RUF (631), K6BPI (536), W4PJU (522).

Notice anything? Yep, no fifth district stations in either list.

The March issue of *Watchwords*, the bulletin of the Traffic Hounds Morning Watch (M-S, 3540/7080 kc., 1200/1230 GMT) contained such down-to-earth observations on net operation that we asked W4IA permission to plagiarize or paraphrase. Having received carte blanche to do either, we decided to do the latter, thus:

Without the application of common sense on the part of NCS and net members, any attempt to limit net discipline to the bare essentials can result in chaos. No one is infallible, but the NCS is in charge, and we must let him run the net! It may seem to us at times that he is not doing it right, that we could do much better. There is a tendency for stations to break in and give the NCS advice or, even worse, attempt to negate the NCS's instructions. Apart from the obviously poor manners involved, this causes QRM and throws things into a tailspin. For example, after an NCS has directed a certain routing, in comes a breaker advising that he has such and such a schedule which will give faster service, etc. As a result, both the NCS and the station interpreting the NCS's instructions are frustrated and confused.

We are all guilty of occasional overzealousness; no one's good intentions are questioned. The routing selected by the NCS may not be the fastest or most direct, but he usually has good reason for it. Normally, he knows the routing capability of each station in the net; if he needs information, he will ask for it. In his routing decisions, he must face such factors as (1) who can hear whom, (2) who has to leave the net early, (3) who can take which traffic, (4) how can traffic best be distributed so that all have a chance to handle some. Evaluating these factors, the NCS develops a traffic pattern and like it or not, we must follow it. We all must stay out of the NCS's business. If we have any information for the NCS about our capabilities, etc., we should impart it when we report in; thereafter, we should follow his lead.

The above may seem to negate the friendly, informal, fraternal spirit of amateur radio. Not at all! You will continue to find a spirit of good fellowship on the net. Pleasantries that do not disrupt net operation may continue. During lulls in activity, the NCS is not going to shoot you if you make a brief side comment. But, the routing of traffic and the control of net operations are the NCS's job and his alone while the net is in directed session. Let's permit him to do it.

*March net reports.* Listing in this column is available to any net not a part of NTS which has greater than section (usually state) coverage. Submit the information in the tabulation below.

Net	Sessions	Check-ins	Traffic
7290	44	1685	744
Fourth Region Day	13	246	276
20 Mtr. I.S.S.B.	22	601	1215
Interstate S.S.B.	31	1228	336
Northeast Area Barnyard	—	918	12
All Service	4	44	35
Northeast Area Teenage	12	45	13
Eastern Area Slow	31	147	32
East Coast Traffic	31	114	352
Early Transcon	30	—	336
Mike Farad E & T	52	528	662

*National Traffic System.* The annual statistical comparison of NTS region nets for 1961 shows that the *Ninth Region Net* (9RN) takes first spot, just nosing out by a hair a net which never placed higher than third before and was seventh in 1960; we refer to the *Third Region Net* (3RN), which has had a terrific upsurge of activity during the past year. TEN was third, with 2RN and RN6 tied for fourth. The following table shows how region nets "placed" in each of the five categories used to arrive at the final standing, and will serve to show the principal weaknesses in each net:

Net	Sessions	Tfc	Rate	Average	Rep.	Final Standing
9RN	3	2	1	1	10	1
3RN	2	5	6	4	1	2
TEN	1	1	2	5	11	3
2RN	5	7	3	9	2	4
RN6	10	3	5	2	6	4
1RN	9	3	4	3	9	6
4RN	6	7	7	8	3	7
RN5	4	6	7	7	7	7
TWN	11	10	9	6	4	9
8RN	8	10	12	11	5	10
RN7	7	9	10	10	12	11
ECN	12	12	11	12	8	12

The tendency is for the five categories to balance each other out so that a net has to be good all-around in order to place at or near the top. Note, for example, that 9RN and TEN each placed on top in two different categories, but each fell down in representation — in which category 3RN excelled to the extent of successfully competing with both of these midwestern regions.

This is the fourth time 9RN has placed highest statistically since we started keeping these records in 1951. Prior to 1956, a different net was statistical champ each year, then 9RN won it three years in a row; after a lapse of two years, 9RN is on top again. Congrats to W9ZYK and his gang. Starting in 1951, here's how the championship has gone: 4RN-RN6-TEN-1RN-RN5-9RN-9RN-9RN-RN6-2RN-9RN.

## A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are per GMT)

June 7: CP Qualifying Run — W6OWP  
 June 9-10: V.H.F. QSO Party  
 June 16: CP Qualifying Run — W1AW  
 June 23-24: Field Day  
 July 6: CP Qualifying Run — W6OWP  
 July 14-16: CD Party (c.w.)  
 July 17: CP Qualifying Run — W1AW  
 July 21-23: CD Party (phone).  
 Aug. 2: CP Qualifying Run — W6OWP  
 Aug. 22: CP Qualifying Run — W1AW  
 Sept. 2: CP Qualifying Run — W6OWP  
 Sept. 13: Frequency Measuring Test  
 Sept. 15-16: V.H.F. QSO Party  
 Sept. 20: CP Qualifying Run — W1AW  
 Nov. 10-12, 17-19: Sweepstakes Contest

March reports.

Net	Ses- sions	Traffic	Rate	Average	Representa- tion (%)
1RN	62	472	.317	7.6	70.0
2RN	62	499	.475	8.0	95.1
3RN	31	423	.388	13.6	100.0 <sup>1</sup>
4RN	61	594	.329	9.7	91.2
RN5	62	544	.299	8.7	70.0
RN7	60	330	.200	5.5	60.4
8RN	90	451	.211	5.0	73.2
9RN	58	570	.426	9.8	62.2
TEN	86	749	.410	8.7	71.2
ECN	22	61	.145	2.8	85.0 <sup>1</sup>
TWN	31	376	.456	12.1	84.5 <sup>1</sup>
EAN	30	1403	.867	47.6	100.0
CAN	31	979	.677	31.5	100.0
PAN	31	964	.572	31.1	100.0
Sections <sup>2</sup>	1140	6062		5.3	
TCC Eastern	126 <sup>3</sup>	485			
TCC Central	93 <sup>3</sup>	637			
TCC Pacific	122 <sup>3</sup>	652			
Summary	1857	16251	FAN	7.8	3RN/ CAN/PAN
Record	2007	26611	1,025	13.9	100.0

<sup>1</sup> Region net representation based on one session per day. Others are based on two or more sessions per day.

<sup>2</sup> Section nets reporting: MDDS & MDD (Md.-Del.-D.C.); WIN, WSSN, WSB & BEN (Wis.); BUN (Utah); ILN (Ill.); NJN (N.J.); Wolverine SSB (Mich.); NEB (Nebr.); GSN (Ga.); VN & VSN (Va.); SCN (S.C.); GEM (Idaho); AENP Eve, AENT, AENM, AEND, AENO & AENB (Ala.); SCN (Calif.); OQN (Ont.-Que.); NCN (Calif.); BN (Ohio); CCW (Colo.); GBN (Ont.); ALN, MSN, MSPN Noon (Minn.); QKKS (Kans.); TN (Tenn.); CPN (Conn.); SCVSN (Calif.); WSN (Wash.); RISP (R.I.); GSPN (N.H.); SGN (Me.).

<sup>3</sup> TCC functions reported, not counted as net sessions.

We hope that March will be the last of the poor-condition months until next fall. Of course we'll have QRN to contend with this summer, but that's nothing new. Come October, 1962 — watch out! Better get that 160-meter rig working.

W2EZZ notes a dropping-off on the part of New York City-Long Island in 2RN representation. W3UE says that 3RN resumed its second session beginning April 1. W4SHJ has issued 4RN certificates to KP4BDS, WA4FJM and K4TPZ. RN5 certificates have been issued to K5JTD and W4ZWD. RN7 is improving, sez W7DZX, thanks to W7APS for getting Alaska represented and K7EWZ for taking care of Montana. Well-deserved 8RN certificates have been issued to W8CXM and W8LXJ; other data show 8RN is not the same net that placed third in 1961. Much correspondence from TWN Manager W0FEO indicates all goes well in this very active net. CAN certificates have been issued to W9NQW, K9UOV, W0ISJ and W0BYV. K7NHV has been awarded a PAN certificate for outstanding service. PAN Manager WA6ROF will emcee the traffic seminar at the Southwestern Division Convention at Disneyland, June 1-3; hope all you west coast traffickers will make it.

Transcontinental Corps. W7DZX, who is still doing double duty as RN7 Manager and TCC Director Pacific, says he has no complaints, that the TCC boys and gals just do their jobs and report results routinely, and that all goes as well as can be expected. From WISMU and K4AKP — silence, except for the report data. We saw Frank at the N. E. Division Convention in April, and had a very nice visit.

March reports:

Area	Functions	% Suc- cessful	Traffic	Out-of-Net Traffic
Eastern	126	80.6	1312	485
Central	87	93.6	1320	637
Pacific	122	91.9	1318	652
Summary	335	89.6	3950	1774

The TCC roster: Eastern Area (WISMU, Dir.) — W1s AW EMG NJM OBR SMU, W2MTA, W42s APY OPG, K2UFT, W3s EML FAF WRE, K3s IMP RXQ, W4s DLA FOR, W8s CHT ELW UPH. Central Area (K4AKP, Acting Dir.) — K4AKP, W9s JOZ DYG CXY ZYK, K9UGY, W0s DUA SCA, K0IVQ. Pacific Area (W7DZX, Dir.) — W5ZHN, W0s EOT FNE HC, K0s ZYZ LKD DXX GID, WA6ROF, W7s DZX GMC ZB, A7s NHV NWP, W0s WHE/7 WME KQD, K0s EDK DTK EDH.

**BRASS POUNDERS LEAGUE**

Winners of RPL Certificate for March Traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	193	1163	992	140	2488
K6BPT	86	1068	898	108	2098
W3CUL/4	67	696	661	14	1438
W0LGG	309	540	496	38	1383
K0ONK	42	582	553	13	1137
K4SHJ	212	523	411	10	1156
K4AKP	31	548	446	101	1126
K2UAT	207	418	337	14	996
K4AMP	136	423	395	19	973
W3GWH	21	479	404	54	948
W8DAE	38	477	342	69	926
W7BA	7	456	400	54	917
W9MIM	3	423	391	1	818
W8SCA	22	380	379	0	781
W3GWH	182	272	251	12	717
W0ZWL	2	501	0	214	717
WA4BMC	162	291	247	12	712
W7DZX	9	376	298	29	710
K6BPT	8	339	219	120	686
W1PEX	27	316	285	26	654
W3YER	50	297	255	8	610
WA2OPG	31	302	282	31	628
WITXL	30	290	284	8	610
W3VR	33	287	265	12	597
W6UUB	1	294	288	8	589
WA2GPT	268	209	53	51	581
W6ZG	12	278	285	3	578
K2UBG	16	277	249	10	552
W1SMU	7	288	257	5	537
K0LTX	157	189	140	49	535
W4FOR	191	171	132	32	526
W8TPH	8	259	205	34	526
K7NHV	71	221	215	14	521
W9DYF	54	247	180	33	514
W0GGP	27	477	4	0	508
W0FEO	62	285	120	40	507

**More-Than-One-Operator Stations**

Call	Orig.	Recd.	Rel.	Del.	Total
W6YDK	972	361	31	327	1691
KR6GF	171	485	413	52	1101

Late Report:

W4DYG (Feb.)	2477	7	0	7	2491
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**RPL for 100 or more originations-plus-deliveries**

WA2TQT	202	K7BKH	125	K0HGT	109
K4FSS	184	W9SAA	119	W42CCF	109
K4EMQ	150	W9SAW	117	W9NZZ	103
K4ENW	137	W9TT	114	K8JJC	100
K1GGG	131	K9YIC	112	K8ONQ	100
W3YDF	129	W2GKZ	110	Late Report:	
W2EW	126	W3RV	109	K9CIL (Feb.)	109
W4PNM	125				

**More-Than-One-Operator Stations**

W4DFU	268	W1AW	109	W9YC	103
W9YT	139	W4NTR	109	K8YMO	102

RPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: W2OE, K4ILB, K4KSN.

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

**RESULTS, FEBRUARY F.M.T.**

The February 16, 1962 FMT, open to all amateurs, brought entries from 241 participants who made a total of 665 measurements. Of these, 104 ARRL Official Observers submitted 341, and 137 Non-00s made 324 readings. All taking part have received individual reports of their readings. The standings accredited to the more precise in each group appear below; all listed show ability of the highest order in Frequency Measurement. September QST will announce details on the next ARRL FMT.

Observers	Parts Million	Non- Observers	Parts Million
W8CUJ	0	W3GKP	0
W8YCP	.1	W8GQ	.1
W4JUI	.1	W9TZN	.3
W8GBF	.2	K0BBO	.4
W4VRD	.4	K8VLI	.6
W4KR	1.2	W4CYO	1.1
W6GQA	1.4	W6KT	2.0
W5NKH	2.1	WA6KFY	2.9
W6CBX	3.5	DL4YR	3.0
W5FMO	4.1	W5OOF	3.3
K1HZM	6.2	W3AIZ	4.4
K8DDG	7.6	W4SHL	4.8
K5CSR	8.5	W7SAK	5.0
W3HC	8.8	W5GJQ	6.0
W2JAE	8.9	K6AYK	7.2

## CLUB COUNCILS AND FEDERATIONS

British Columbia Amateur Radio Association, David Gilmore, VE7YG, Secy., 1150 Comox St., Vancouver 5, B.C., Canada

Central California Radio Council, Jeri Bey, W6QMO, Secy., 371 Athens St., San Francisco, Calif.

Federation of Eastern Massachusetts Amateur Radio Associations, Eugene Hastings, W1VRK, Secy.-Treas., 28 Forest Ave., Swampscott, Mass.

Indiana Radio Club Council, Inc., Adah Elliott, W9RTH, Secy., 721 Centennial St., Seymour, Ind.

Michigan Council of Clubs, Wendell R. Mellberg, W8QPO, Secy., 1885 N. Westwood Drive, Saginaw, Mich.

The Ohio Council of Amateur Radio Clubs, Ernest E. D'Angelo, K8DJM, Secy., 3134 Ontario St., Columbus 21.

San Diego Council of Amateur Radio Organizations, Inc., Ralph E. McAndrew, W6ZBE, Secy., 3139 Natchez Ave., San Diego 17, Calif.

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

Information on which our Honor Roll is based comes from study of the Club Annual Reports. The League's Board requires 51% (or above) League Membership of any club for initial and continuing affiliation. The HONOR ROLL is for those affiliates that come up with 100% ARRL Membership; we think that special recognition is deserved. Besides the QST mention we shall shortly send the 100%ers certificate to each club here mentioned.

As questionnaire forms are returned from additional affiliates indicating 100% ARRL membership, these clubs will be in line for an additional listing later this year. Clubs reporting favorable for ARRL membership drives being conducted currently can also be included in this further Honor Roll if they qualify.

Abington Amateur Radio Club, Clark's Summit, Pa.  
Aeronautical Center Amateur Radio Club, Inc., Oklahoma City, Okla.

Amateur Radio Technical Society of St. Louis, Mo.  
Amateur VHF Institute of New York, Maspeth, L.I., N.Y.

Athens Amateur Radio Club, Athens, Ga.  
Bandhoppers Radio Club, Inc., Ferguson, Mo.

The Casper V.H.F. Society, Casper, Wyo.  
Central Kansas Radio Club, Inc., Salina, Kans.

Chicago Radio Trallie Assn., Inc., Chicago, Ill.  
The Cleveland Twist Drill Amateur Radio Society, Cleveland, Ohio

Coffee Dunkers of Detroit, Mich.  
Decatur Amateur Radio Club, Decatur, Ala.

Enid Amateur Radio Club, Enid, Okla.  
Experimental Amateur Radio Society, Rockford, Ill.

Fountain City Radio Club, Knoxville, Tenn.  
Harlo Radio Club, Harlowton, Mont.

IRC Amateur Radio Club, Philadelphia, Pa.  
Keystone Amateur Radio Club, Springtown, Pa.

The Loudon County Amateur Radio Club, Lenoir City, Tenn.  
Maui Amateur Radio Club, Kahului, Maui, Hawaii

Mecklenburg Amateur Radio Society, Inc., Charlotte, N.C.  
Meridian Amateur Radio Club, Inc., Meridian, Miss.

Mike & Key Club, Inc., Greenville, S.C.  
Milliwat Mobiliers Amateur Radio Club, English, Ind.

Norfolk County Radio Association, Norwood, Mass.  
O.B.P. #1 Radio Club, Rock Hill, Mo.

Orlando Amateur Radio Club, Inc., Orlando, Fla.  
Port Jervis Civil Defense Radio Club, Port Jervis, N. Y.

Prairie Amateur Radio Club, Inc., Galesburg, Ill.  
Radio Press Association, Peterson, N.J.

Radios, Lancaster, N.Y.  
Rhododendron Swamp VHF Society, Medfield, Mass.

Rock Hill Amateur Radio Club, Inc., Rock Hill, S.C.  
St. Louis Amateur Radio Club, Inc., Valley Park, Mo.

Skagit Amateur Radio Club, Renton, Wash.  
South Lyme Beer, Chowder & Propagation Society, South Lyme, Conn.

Southern California VHF Radio Club, Norwalk, Calif.  
Southwest Missouri Amateur Radio Club, Springfield, Mo.

Sunrise Radio Club, Inc., Elmont, L.I., N.Y.  
The Thirteen Amateur Radio Club, North Burnaby, B.C., Canada

Vanderburgh Amateur Radio Emergency Service, Princeton, Ind.

Wichita Amateur Radio Club, Wichita, Kans.  
Windblowers V.H.F. Society, Inc., Wyckoff, N.J.

## ELECTION NOTICE

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

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

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

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

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

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

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

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

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

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager

Section	Closing Date	SCM	Present Term Ends
Maritime	June 11, 1962	D. E. Weeks	Feb. 15, 1962
Quebec	June 11, 1962	C. W. Skarstedt	June 10, 1962
Western Pennsylvania	June 11, 1962	Anthony J. Mroczka	Aug. 7, 1962
Western New York	June 11, 1962	Charles T. Hansen	Aug. 10, 1962
Northern Texas	June 11, 1962	L. L. Harbin	Aug. 10, 1962
Vermont	June 11, 1962	Miss Harriet Proctor	Aug. 10, 1962
Santa Barbara	June 11, 1962	Robert A. Henke	Aug. 10, 1962
North Dakota	June 11, 1962	Harold A. Wengel	Aug. 19, 1962
Wyoming	June 11, 1962	Lial D. Branson	Aug. 22, 1962
Montana	June 11, 1962	Ray Woods	Sept. 1, 1962
Canal Zone	July 16, 1962	Thomas B. DeMeis	Oct. 1, 1962
Nevada	Aug. 15, 1962	Charles A. Rhines	Oct. 10, 1962
Santa Clara Valley	Aug. 15, 1962	W. Conley Smith	Oct. 15, 1962
New Hampshire	Aug. 15, 1962	Ellis F. Miller	Oct. 26, 1962
Kansas	Aug. 15, 1962	Raymond E. Baker	Oct. 29, 1962

## 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.

North Carolina N. J. Boruch, W1CH Apr. 11, 1962  
Louisiana Thomas J. Morgavi, W5FMO May 31, 1962

In the Georgia Section of the Southeastern Division, Mr. James A. Giglio, W4LG, and Mr. H. M. Rosser, W4PMJ, were nominated. Mr. Giglio received 242 votes and Mr. Rosser received 191 votes. Mr. Giglio's term of office began Mar. 26, 1962.

In the Tennessee Section of the Delta Division, Mr. David C. Goggio, W4GGG, and Mr. Donald V. Goodin, K40UK, were nominated. Mr. Goggio received 286 votes and Mr. Goodin received 267 votes. Mr. Goggio's term of office began Apr. 15, 1962.

## NATIONAL CALLING AND EMERGENCY FREQUENCIES (KC.)

3550	3875	7100	7250
14,050	14,225	21,050	21,400
28,100	29,640	50,500	145,250

During periods of communications emergency these channels will be monitored for emergency traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be vacated immediately to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: *c.w.* — 3535, 7050, 14,060; *phone* — 3765, 14,160, 23,250 kc.

### SUGGESTED RTTY OPERATING FREQUENCIES

3620, 7040, 14,090, 21,090 kc.

### GMT CONVERSION

To convert to local times subtract the following hours:

ADST -3, AST -4, EDST -4, EST -5, CDST -5, CST -6, MDST -6, MST -7, PDST -7, PST -8, Honolulu -10, Central Alaska -10.

## 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 June 16 at 0130 GMT. Identical tests will be sent simultaneously by automatic transmitters on 3555, 7080, 14,100, 21,075, 28,080, 50,700, and 145,800 kc. The next qualifying run from W6OWP only will be transmitted June 7 at 0400 Greenwich Mean Time on 3590 and 7129 kc. **CAUTION:** Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0130 GMT June 16 becomes 2130 EDST June 15.

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 35 w.p.m., you may try later for endorsement stickers.

W1AW conducts code practice daily at 0130 GMT on all frequencies listed above with speeds of 15, 20, 25, 30, and 35 w.p.m. on Tuesday, Thursday, and Saturday, and at 5, 7½, 10, and 13 w.p.m. on other days. Approximately 10 minutes' practice is given at each speed. To check your copy, the texts used on several transmissions are listed below. The order of words in each line of QST text is sometimes reversed. To improve your fist, try to send in step with W1AW.

Date Subject of Practice Text from April QST

- June 2: *Five Transistors . . .*, p. 16
- June 6: *Listening for Satellite Tracking . . .*, p. 15
- June 12: *Simulated Emergency Test*, p. 21
- June 15: *How To Avoid Radiation . . .*, p. 26
- June 20: *Field Day Power Distribution*, p. 29
- June 23: *Amateur Participation in Echo A-12*, p. 32
- June 29: *Multiband Mobile Antenna Loading Coil*, p. 42

## W1AW SCHEDULES

(June 1962)

### Operating-Visiting Hours

Monday through Friday: 1 P.M.—1 A.M. EDST.  
Saturday: 7 P.M.—2:30 A.M. EDST.  
Sunday: 3 P.M.—10:30 P.M. EDST.

The ARRL Maxim Memorial Station welcomes visitors. The station address is 225 Main St., Newington, Conn., about 4 miles south of West Hartford. A map showing local street detail will be sent on request.

### Operating Frequencies

C.w.: 1820, 3555, 7080, 14,100, 21,075, 28,080, 50,700, 145,800 kc.  
Voice: 1820, 3945, 7255, 14,280 (s.s.b.), 21,330, 29,000, 50,700, 145,800 kc.

Frequencies may vary slightly from round figures given; they are to assist in finding the W1AW signal, not for exact calibrating purposes. Amateurs are respectfully requested to refrain from transmitting on the above frequencies during W1AW bulletins and code practice.

### Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in Greenwich Mean Time.

C.w.: Monday through Saturday, 0000; Tuesday through Sunday, 0400.

Voice: Monday through Saturday, 0100; Tuesday through Sunday, 0330.

**Caution.** Note that in the U. S. and Canada, because times are GMT, bulletin hours actually fall on the evening of the previous day.

## W1AW CONTACT SCHEDULE

Would you like to work W1AW? W1AW welcomes calls from any amateur station in accordance with the following schedule:

Time (GMT)	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0000-0030 <sup>1</sup>	.....	14,280	3555 <sup>3</sup>	14,100	14,100	7080 <sup>3</sup>	14,100
0030-0100	.....	14,280	3555	14,100	14,100	7080	.....
0100-0130 <sup>1</sup>	.....	145.8 Mc.	21,330	145.8 Mc.	50.7 Mc.	21,330	.....
0230-0300	.....	.....	.....	1820	.....	1820	.....
0300-0330	.....	.....	.....	3555	.....	3945	.....
0330-0400 <sup>1</sup>	.....	.....	.....	3945	7255	7255	3945
0400-0500 <sup>1</sup>	.....	.....	.....	3555 <sup>3</sup>	3945	7080 <sup>3</sup>	.....
1700-1800 <sup>2</sup>	.....	21/28 Mc.	21/28 Mc.	21/28 Mc.	21/28 Mc.	21/28 Mc.	.....
1900-2000	.....	7080	14,100	7255	14,100	7080	.....
2000-2100	.....	14,280	7080	14,100	14,280	14,100	.....
2200-2300	.....	14,280	14,280	14,280	14,100	7255	.....
2300-2330	.....	7255	.....	21,075 <sup>3</sup>	.....	14,280	.....
2330-2400	.....	14,100	.....	3555	.....	14,280	.....

<sup>1</sup> Starting time is approximate. General-contact period on stated frequency begins immediately following transmission of Official Bulletin, on c.w. at 0000 and 0400, on phone at 0100 and 0330.

<sup>2</sup> Operation will be on 21,075, 21,330, 28,080 or 29,000, depending on band and other conditions.

<sup>3</sup> W1AW will listen for Novice Class licensees on the Novice portion of this band before looking for other contacts.



• 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, Allen R. Breinert, W3ZRQ—SEC: DUL, RM: EML, PAM: K3BHU, V.H.F. PAM: SAO New appointees are GRS as OO and K3ARR as OES. The first activity card from K3LKB shows he is using an Apache and operates all bands 80 through 6 meters. The skiing expedition of JNQ left him with a broken ankle, 14 stitches and a 3-inch scar. New Gear Dept.: JXX, NNL and KLT have 10-meter ground plans. RV gets 1:1 s.w.r. on the new Hy-Tower antenna. JLW received WTPA, WWCNY and Empire V Awards. K3RFH got card No. 100 for DXCC. KN3SKZ is a new Novice. After 3 boys, NOH added a YL jr. operator. EML was made grandpoo the fifth time around, all boys. Officers of the Lancaster Transmitting Society are JPS, pres.; MZI, vice-pres.; OY, secy.; RZE, treas. HTZ got 10 new countries in the DX Test. K3MVO is NCS on 3RN once a week. Our ladies man, UIU, says it's rough to work 100 girls in the YL-OM Contest. K3IMP has a new outlet via K3AIR for MARS traffic. AHZ computed his rig trouble to a bad modulation transformer. HNK has overhauled the tri-band beam for the summer months. K3DSM and EWC both lost antennas in the recent snow storm. BNR is now portable 7 in Sundance, Wyo. VR has given up trap antennas and gone back to the old-fashioned dipole. ELI had a rough time in the recent Frequency Measurement Test because of local QRM, but added a few new states in the CD Party. The University of Pennsylvania station is ABT, operated by K3JTE. Temple University station is K3KJI, operated by K2EJV. AXA had his receiver to the specialist for a shot in the arm. All high level section appointment holders held a meeting at your SCM's QTH. A supplement net to take care of the A.M. portion of the Sunday morning RACES drill on 3987 kc. was discussed. An AREC phone, emergency and traffic net at the same time on 3850 kc. is the possible solution. Your comments or solutions will be appreciated. See E.Pa. section picnic notice in hamfest calendar elsewhere in this issue. Traffic: W3CUL 2498, K3A1P 973, W3EML 948, UR 597, UIU 207, K3ONW 187, W3RV 147, K3JSX 146, RXQ 137, W3JKX 124, K3MVO 91, BHU 85, HTZ 62, MQE 56, W3FAF 51, ZRQ 46, AXA 44, K3KJI 42, W3HNK 41, K3LNV 39, W3ABT 32, JTI 25, K3LEQ 25, DCB 18, W3GJA 16, K3RFH 15, W3BUR 12, MFW 12, K3JHF 11, W3LC 11, K3CAH 10, W3OY 10, BFF 9, K3KTC 9, NBU 9, W3BNU 7, K3ALD 5, JLW 5, ANU 4, LNU 4, W3ID 3, K3MNT 3, JJJ 2, MDG 2, W3ADE 1, K3DSM 1, W3DUI 1, ELI 1, K3ETS 1.

**MARYLAND-DELAWARE-DISTRICT OF COLUMBIA**—SCM, Andrew H. Abraham, W3JZY—Asst. SCM Delaware: M. F. Nelson, 3GKE, SEC: CVE. The MDD Traffic Net meets on 3850 kc. at 0015Z daily. MDDS (slow) Net meets on 3850 kc. daily at 0130Z. MDPN meets on 3820 kc. M-W-F at 2300Z and on Sat. and Sun. at 1800Z. Del. Emg. Net meets on 3905 kc. at 2330Z Sat. K3AMC reports good attendance on the Del. Emg. Net. BKE lost all of his antennas in the snow storm. K3BBR will transmit OBs on 3590 kc. at 0000Z. This is the 3rd Regional Net frequency meeting at 0045Z daily; also the UTL Net. Bill will have to QRT by the time the nets start. BRS comes on the air with a new Johnson Invader 2000 s.s.b. retaining the old rig as a standby. John says there are 5 Generals in Tanytown now. BUD says the Southern Maryland Net operates on 29.560 kc. CDQ was in the YL/OM Contest. CFA says that the First State Amateur Radio Club OMs entertained the XYLs at a Dinner Mar. 28. ECP had receiver and transmitter trouble. K3NNC operated PZA during the Red Cross Roundup. EEB took a 12-day trip to KV4, VP4, VP6, VP2 and FM8-Lands, returned and got into the Delaware QSO Party, working 195 stations. K3GKF/3 worked portable at the Kent County Fire

House during the QSO Party. EOY/DAG are displaying auto tags #EE-73-88. Ted is giving up radio and TV service and going back into Government work as Eng. Asst. Electronics. K9EOP/3 is new in the area and is interested in QRP operations. HENX/3 operates on 20-meter s.s.b. K3GKF now has 50 awards and certificates on 7 Mc. and has QSYed to 3.5 Mc. HDL/4 is now living in Fairfax County, Va., and is on the air with an HT-32 and a pair of 4-400As a.m. and s.s.b. and wants to contact all his old friends. HQE lost one of his 70-ft. towers and 40-meter beam in the snow storm. K3IRF is going to Radar School in Fort Bliss, Tex. K3IYE had a good time in the Delaware QSO Party. K3JYZ has been away for four weeks and TN took over. Andy will have a net bulletin out soon. K3KHA and GQF operated 1/3 in Sussex County, Del. K3LFD has a new 50-ft. mast up. K3LJG is going into the hospital for a back operation. K3IDL, K3KPZ and HZG operated in the Baltimore AREC Net in the snow storm for the State Roads. One station in Jacksonville, Md., was the only outlet on c.w. and used emergency power. K3NZV went all out in the contests. OHI has more time for ham radio now. KN3RNO, KN3RSN, K3RRT and K3SLV are new amateurs in Delaware. KNSFT is a new ham in Glen Burnie handling traffic. YYC is moving traffic. YZI lost his 40-meter beam. ZAQ sent out 84 OO notices in March. ZNW reports the MDDS (slow) Net is back on 3850 kc. KN3SSG is a new ham in S.E. Washington. The RCARA's officers are RE, pres.: LUL, sr. vice-pres.; K3LFN, jr. vice-pres.; K3CFD, secy.; GSH, treas. Traffic: W3TN 126, K3LFD 107, W3ZNV 72, UF 59, WBJ 50, YYC 48, HQE 46, K3NCM 43, MOP 39, W3GQF 31, ECP 28, K3EVL 28, JYZ 27, LGJ 26, W3EOV/DAG 22, CFA 15, HDL/4 11, K3AVA 10, W3FEB 10, OHI 10, KN3SFT 7, W3BUU 6, K3NEB 6, W3YZI 5, JFR 4, K3LJB 4, MDL 4, W3CXX 3, K3ACH 2, AXW 2.

**SOUTHERN NEW JERSEY**—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY, PAM: W2ZI, RMs: W2-HDW, WA2VAT, W2JQU, Fort Dix, is now OO and OPS, Delaware Valley Radio Assn. officers are W2VE, pres.; K2TQI, vice-pres.; W3MTV, secy.; W2WOA, treas. N.J. Phone Net totals for March: 31 sessions, QNI 575, traffic 166. NJN, 31 sessions, QNI 580, traffic 208. WA2GQZ is NJN manager. K2RXB, Margate, has a new linear. WA2KWB, Yardville, received 1st place award and 3rd in the state in the recent N.J. QSO Party. WA2ARJ is the new Radio Officer of Cumberland County. W2YVB and W2YVD are new calls in the Millville-Bridgeton Area. WA2ARA has been confined to the hospital. W2BEI, Ardubon, received WAS. WA2KRX, Collingswood, submitted a fine report on assistance given in various Jersey shore areas during and after the storm. The following worked in conjunction with K2BR at the Atlantic City Race Track: W2BTO, WA2THL, K3MPG, W2LY, W3GGP, W2KFC, WA2EMB and WA2KRX. A full report of emergency operations has been given by SFC K2ARY and WA2OZQ, Atlantic County EC. W2WOA, DARA treasurer, has been in the hospital. W2ERW, Julie of Moorestown, scored 55,450 points in the recent VE/W Contest. SJRA's Mon. night 6-meter net is increasing in size and interest. W2JQU/KL7DIR, Fort Dix, was SJRA's speaker at the March meeting. Gloucester County AREC members W2KE, K2AQL, K2GHZ, W2GQK, W2AIMD and K2JRU furnished and manned mobile units to aid evacuation operations in Cape May County. The Gloucester Co. ARC will hold its Annual Hamfest Aug. 12 at Algonquin Club, near Mullica Hill. Southern Counties ARC News is loaded with activities and plans. WA2QOG and K2-HBA are organizing AREC nets among SCARA members and in the shore area. Traffic: WA2VAT 200, W2ERG 164, K2RXB 137, W2ZI 45, K2SOX 44, WA2HSP 41, W2JQU 30, K2CPR 15, WA2KWB 9, WA2ARJ 6, W2IU 4, WA2LBL 4.

**WESTERN NEW YORK**—SCM, Charles T. Hansen, K2HUK—SEC: W2LXE, RMs: W2RUF, W2EZB, W2-FEB, PAM: W2PVI, NYS C.W. meets on 3670 kc. at 1900, ESS on 3590 kc. at 1800, NYSPTEN on 3925 kc. at 1800, NYS C.D. on 3610.5 and 3993 kc. at 0900 Sun. and 7102.5 kc. at 1930 Wed., TCPN 2nd call area on 3970 kc. at 1900, IPN on 3980 kc. at 1600, 2RN on 3690 kc. at 0045 GMT and 2345 GMT. BPL was made by WA2OPG. Appointments: K2ZRC as OPS, WA2OPG as ORS. The RARA directory and Clinton Co. call book were received during March. K2HUK spoke at a recent LOSARCS meeting regarding club benefits of ARRL affiliation. Is

your club affiliated? WIICP, of Hq., spoke at the Ithaca Mike and Key Club meeting in April. WA2ROV passed the General Class exam. WA2GCH is converting his 1962 Falcon bus into a mobile RACES unit. The Central H.S. Radio and Electronics Club in Binghamton has affiliated with ARRL. K2KTD demonstrated the 7-watt s.s.b. rig at the North Chautauqua ARC meeting held in the club rooms of a lighthouse. The Chautauqua Lake ARA has three deputy sheriffs as members. WA2DAC has a new 81A linear for 6 meters. K2RYH is ill and has to stay off the air. The Elmira ARC named K2UOV as Ham-of-the-Year. K2DNN, W2GOR, WA2HFL, WA2MJO and W2PYE gave an emergency communication demonstration to a local Boy Scout troop. K2JJK reports that the Penn-York Hamfest Assn. Dinner was a big success with 105 in attendance. WA2EIP gets results with his code class; 72 of his pupils reported to the FCC for their code test and only 10 failed. Forty-five made General and by now they should be making the Rochester airwaves crackle. WA2BCW gave a talk on slow-scan TV to the CARA. RAGS will provide communication for the Thousand Islands Marathon Race. The ARATS has blossomed out with a fine club, paper edited by W2RGJ. WA2MQX has 25-w.p.m. CP. The LARA had a talk on ham TV. It's not too late for a last-minute scramble to organize your club's Field Day effort. Join the fun and participate. This is the highlight of the ham year. Traffic: WA2OPG 628, W2MIA/2 313, W2E2B 243, W2RUF 169, K2RTQ 128, W2FEB 90, K2QDT 71, WA2KZQ 50, K2OFV 35, W2PVI 34, WA2-IXY 33, W2RKU 32, WA2HEC 26, WA2TDE 26, W2-RQF 24, WA2LKW 22, K2PBU 20, K2AFE 17, K2DNN 17, W2ANE 14, W2SSB 14, WA2GLA 11, WA2WEE 10, W2QOK 9, K2PNA 8, WA2FVI 7, WA2MJJN 7, K2SEP 6, K2HOH 5, W2RUT 3, K2QOQ 2.

**WESTERN PENNSYLVANIA**—SCM, Anthony J. Mroczka, W3UHN—SEC: WRE. Asst. SEC: KUN, RMs: KUN and NUG. The WPA Traffic Net meets Mon. through Fri. at 2100 GMT on 3585 kc. The Keystone Slow Speed Net (KSSN) meets 2330 GMT on 3585 kc. Mon. through Fri. SMV is running ten watts to an old UX-245. APR is on 15- and 20-meter s.s.b. New officers of the Conemaugh Valley ARC are WRC, pres.; JLM, vice-pres.; BJQ, secy.; K3DKF, treas.; TIF, LSE and K3EDV, trustees. MIE is a Silent Key. K3DCI is instructing Boy Scouts in radio. Coke Center RC reports: Code and theory classes are held Mon. evenings; new Novices are KN3s PLZ and PMA; K3-PLQ lost his beam in a storm. The Indiana County ARC plans to furnish communications for the local soap box derby and stock car races. K3JTH has a Poly-combin 6-2. Bedford County RC reports via *Shorts*: K3NQT has a new tri-band beam; KN3SAK passed the General Class exam; TZN is working DX lately; a new Novice is KN3SIU. K3JHG is busy chasing fire-calls. The Juniata Valley ARC's *The Static Blast* reports: K3PLX now is a General; K3MEW has his Tech.; SBX is the club's new pres.; The Millin County C.D. Net operates Mon. evenings on 6 meters. K3HTJ received his N.H. QSO Party certificate. The Mercer County Radio Assn. is going all out for Field Day. ZZO is working s.s.b. on 6 meters. K3PJX has an HK-1B keyer. The Etna RC reports via *Oscillator*: APN moved to a new QTH; FML has a new Shawnee; K3HSE and MJC finished second in the North Hills Sports Car Club Rally. The Cumberland Valley ARC reports through *Valley QRM*: JZY is on 2 meters; HSU has a new Finco beam; the club station, K3GFV, is building a 2-meter rig. IZH is on 6 meters. IGV (OO) spoke at the ATA of WPA April meeting on how to measure frequencies 4 parts/million. YDF is handling traffic at the Penna. State Rifle Championship. K3s NHD and OLG are using home-built keyers. The editor of the Somerset County ARC *Roof Garden* wishes to exchange publications with other clubs. Contact K3BGL. K3QCW is on 6 meters from Cresson. CDP and K3J CZ are getting on 2 meters. ZPZ is back home from the service. The Westinghouse Research ARC has the call K3UAE. The Nittany ARC reports via the *Beacon*: SYV and K3-MMB have a 420-Mc. link between their trailers; JTS has a new tower; K3PIF passed the General Class exam; NARC is leasing one acre of ground at the top of Pine Grove Mt. The Western Penna. Mobileers are issuing a "Worked All Postal Zones" (in Pittsburgh) certificate. The Brasspounders Amateur Radio Fraternity released issue No. 2 of *Unclutter*. The GPVHF Society reports there will be no Hamorama this year. The Friendly Amateur Radio Society will operate Field Day from Forest County using the call LMM/3. Traffic: (Mar.) W3WRE 638, NEM 198, YDF 184, KUN 178, K3DKE 80, W3IYI 57, SMV 46, K3GQA 40, W3UHN 38, LSS 30, K3EDO 29, W3YA 25, JHG 11, K3HHD 10, W3-KNQ 10, K3BWI 1, HTJ 1. (Feb.) K3HID 2.

## CENTRAL DIVISION

**ILLINOIS**—SCM, Edmond A. Metzger, W9PRN—

Asst. SCM; Grave V. Ryden, W9GME. RM: W9USR, PAAL: W9RYU. EC of Cook County: W9HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CDT. The League's Executive Committee approved the application of the Moultrie Amateur Radio Klub, the Perfect Copy Rag Chewers Club/Net of Chicago and the Forest City Amateur Radio Club for ARRL affiliation. K9EIV is working DX on 6 meters. K9JFA is taking part in organizing the Lockport-Homer Township Civil Defense communications set-up. W9AQP has homebrewed a transmitter for 432 Mc. W9VOK was named Outstanding Citizen of the Year in Ottawa by the Junior Chamber of Commerce. The Montgomery County AREC Hamscramble held recently in Hillsboro was very successful. The Starved Rock Radio Club's Annual Hamfest will be held Sun., June 3, at the same place as in previous years. New calls heard in the Bureau County Area are K9HLC, WA9AZB, WA9BVX, WA9APN, WN9DXS and WA9BOT. K9LKA is building a new linear around two 4-1000A tubes. W9UCY is working on the missile system in the vicinity of Boise, Idaho. W9USR (RM) is doing an article on traffic-handling. K9HAE, K9SFX, K9SDA, K9YQS, W9BLZ and K9EID are on 6-meter s.s.b. and K9EID also is sidebanding on 2 meters. New officers of the St. Clair County Amateur Radio Club are K9ZHN, K9ZFR, W9PAM and K9LON. W9BJY recently returned from a stay in the Far East and operated from KH6FAH, K6GFAE and K42YA. W9FJY has moved his QTH from 9-land to Colorado Springs. Officers of the Forest City Amateur Radio Club (formerly Klix, Chiro and Splatter Society of Rockford) are K9RUK, W9BQC, K9VJB and KN9IAR. The club station call is W9FGY. K9LKA recently received the QST cover award in Rockford, and in Campaign K9LAX/9 also was awarded the same distinction, with W9GPI and W9PRN being present. New appointees are K9RVG as OFS and K9ZQF as OO. The North Central Phone Net handled 180 messages during the month and the ILN reports a traffic count of 197 for the same period. A late report for the ILN's February traffic shows a total of 275. The Quad County is hosting the breakfast Club's Annual Outing to be held July 23 and 29 at Terry Park, Palmyra, Ill. The facilities will be open from Friday night until Monday morning. K9-GDG is operating 1296 Mc. The Calumet Area Emergency Net handled a traffic total of 111. The Rockford 2-Meter Emergency Net meets Thurs. at 2030 CDT on 145.4 Mc. The Lane Tech radio station, W9WKR, again is on the air. The RAMS (Chicago) meetings are now scheduled for the last Fri. evening of the month with the meetings being held at Shibonna Park. W9OAK, W9CVD and W9UKZ are the new directors of the club. W9PNV finally is back on 2 meters after a few years' absence. Recipient of the RPL award for March is W9-PAW and a late award for February goes to K9CILL. Traffic: (Mar.) K9TIGY 277, W9FAW 245, W9ISR 226, K9BTE 222, W9AKV 205, K9UOV 180, K9OCU 168, K9-KZB 100, K9OFT 37, K9CILL 66, K9OAD 60, K9ITG 28, K9LXG 10, W9PRN 6, K9QAE 6, W9SKR 6, W9RQC 4, W9RKT 2, K9RHU 1, W9ZPB 1. (Feb.) W9ISR 498, W9IDA 316, K9UOV 285, K9CILL 151, W9IMN 133, W9-JXV 73, W9EET 32, K9CRT 28, K9RAS 20, W9YYG 10.

**INDIANA**—SCM, Donald L. Holt, W9FWH—Asst. SCM: Clifford M. Singer, W9SWD. SEC: W9SNQ. PAMs: W9MM, K9KTL, K9GLL, RMs: W9VAY, W9TT, K9WET. Net scheds: IFN, 0800 daily and 1800 M-F on 3910 kc. ISN (s.s.b.), 1930 daily on 3920 kc. QIN, daily at 1900 and RFN, 0700 Sun. on 3656 kc. QIN (training), 1800 M-W-F on 3745 kc. New officers of the Tri State College ARC are W8MNP/9, pres.; K8KXJ/9, vice-pres.; K8JPC/9, secy.; W8AVD/9, stn. mgr. A great loss came to Indiana when W9AYW became a Silent Key Mar. 30. Kent had held many ARRL appointments, was active NCS for the IFN and had received the Hoosier Courtesy Award and Outstanding Amateur Award. New appointments: W9BZI as OO III/IV, K9MRL as EC of Pike County. K9QAN as EC of Wayne County. W9-ABU is a new Tech. in Anderson. W9AQT is a Tech. in Carmel. QIN Honor Roll: K9SGZ, K9VEJ, W9TT, K9ZLA, K9WET, W9ZYK, W9QLW, W9VAY, K9WVJ, K9OET. New officers of the Cuneand ARA in Valparaiso are W9HIV, pres.; W9VAY, vice-pres.; W9-PQQ, secy.; K9PZS, treas. *Amateur radio exists as a hobby because of the service it renders.* Those making RPL: W9ML, W9JOZ, W9TT, W9VIC, W9NZZ. March net reports: IFN 193, Hoosier V.H.F. 298, ISB (s.s.b.) 594, RFN 80, QIN 258, QIN (training) 21. W9SKY reports 9RN traffic as 370. Indiana is represented 100 per cent. Traffic: (Mar.) W9MM 818, W9JOZ 376, W9ZTK 384, K9OFT 332, W9TT 268, K9YIC 192, W9NZZ 157, K9SGZ 155, K9ZLA 154, W9IQU 147, W9VAY 144, K9-WET 88, W9RE/9 78, W9FH 66, K9RWQ 64, W9RTQ 58, W9RTH 57, W9FJR 51, K9ZUP 48, K9KTL 45, K9-HYV 44, W9JCS 43, W9QLW 42, W9QYQ 39, K9JST 35, W9DZC 34, K9DZW 32, W9DOK 30, K9YJW 30, W9SPT

(Continued on page 106)

# DUAL LOOP AVC

**A**VC AUTOMATIC VOLUME CONTROL — We should all be aware, of course, that AVC is utilized in most radio receivers, some with AVC disabling switches for CW reception. (This is generally accepted as necessary for copying CW).

**T**HE AVC circuit regulates the gain of the R.F. and I.F. amplifier tubes to provide a constant level of output signal over a wide range of input levels.

**U**SUALLY the AVC control voltage is developed by a rectifier system connected into the last I.F. stage of the receiver. This system has limitations, however, as strong signals within the receiver's selectivity curve can develop AVC voltages and reduce the receiver gain to a point where weak signals cannot be copied.

**D**UAL loop AVC is used in the Hallicrafters SX-115 to minimize this situation. It is accomplished by taking the first AVC loop signal out at a point of medium selectivity, amplifying and rectifying it and using it to control the gain of only the R.F. stage. This allows the R.F. stage to operate at maximum sensitivity as all the AVC control voltage for the I.F. of the receiver is developed by the second loop. When the signals increase to a level over a few microvolts, the first loop takes over and holds the overall gain at a nearly constant level through the entire receiver. This dual loop system gives the advantage of improved signal to noise on weak signals plus greatly improved intermodulation characteristics and the ability to handle input signals up to 2 volts without overload.

**D**UAL Loop AVC is only one of the many extra features found in the Hallicrafters Model SX-115.

— R. W. DROBISH, W9QVA

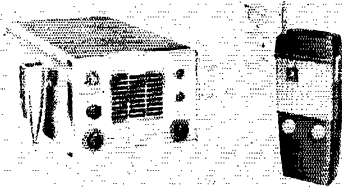
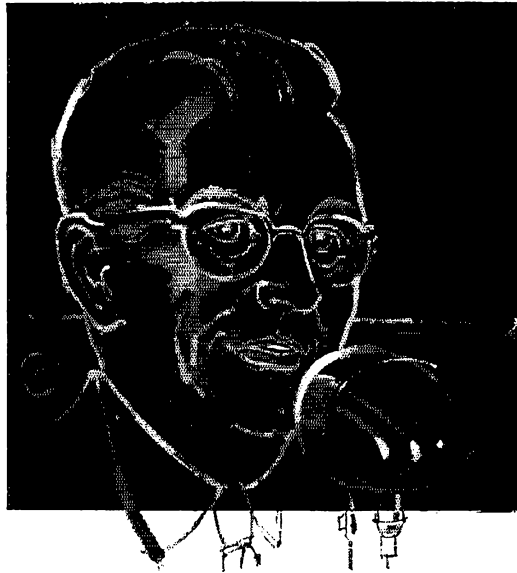
*Levin's Marshall K9EBE*

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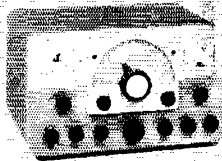


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Cat. No. 242-201; -202; -203  
Amateur Net . . . . . From **\$129.75**

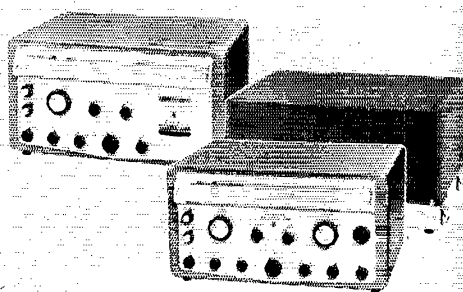
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penlight cells) Amateur Net . . . **\$129.50**



**RANGER II**—Now!—A new version of the popular 75 watt CW or 65 watt AM "Ranger"! Also serves as an RF/audio exciter for high power equipment. Self-contained—instant bandswitching 160 thru 6! Built-in VFO or crystal control—high gain audio-timed sequence keying—TVI suppressed! Pi-network antenna load matching from 50 to 500 ohms. With tubes, less crystals.

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**INVADER 2000**—Here are all of the fine features of the "Invader", plus the added power and flexibility of an integral linear amplifier and remote controlled power supply. Rated a solid 2000 watts P.E.P. (twice average DC) input on SSB; 1000 watts CW; and 800 watts AM (250 to 300 watts output—upper sideband and carrier). Wide range output circuit (40 to 600 ohms adjustable). Final amplifier provides exceptionally uniform "Q". Exclusive "push-pull" cooling system. Heavy-duty multi-section power supply. Wired and tested, with power supply, tubes and crystals.

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**HIGH POWER CONVERSION**—Take the features and performance of your "Invader". . . add the power and flexibility of this unique Viking "Hi-Power Conversion" system—and you're "on the air" with the "Invader 2000". Completely wired and tested, includes everything you need—no soldering necessary—complete the entire conversion in one evening.

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# New! "Valiant II"

● Built-in provisions for use with SSB adapter... increased communications power... VFO designed for outstanding stability so vital to SSB operation!

Newly restyled—and offering many new operating and performance features, the "Valiant II" gives you outstanding flexibility and performance in a compact desk-top rig! Completely bandswitching 160 through 10 meters—delivers a full 275 watts input CW or SSB (with auxiliary SSB exciter or the new Viking SSB Adapter) and 200 watts AM! Low level audio clipping prevents overmodulation and increases modulation level and intelligibility for increased communications power. Differentially temperature compensated VFO operates in the 1.75 to 2 mc. and 7.0 to 7.45 mc. ranges—provides the extreme stability necessary for peak SSB operation. High efficiency pi-network tank circuit will match loads from 50 to 600 ohms and tunes out large amounts of reactance—final tank coil is silver-plated. Other features: complete TVI suppression; timed sequence (grid block) keying; high gain push-to-talk audio system for use with high impedance crystal or dynamic microphones; built-in low pass audio filter; self-contained power supply; and single control mode switching.

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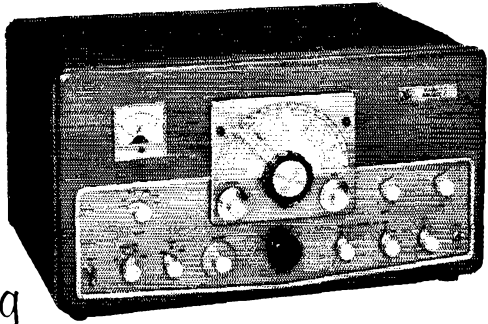
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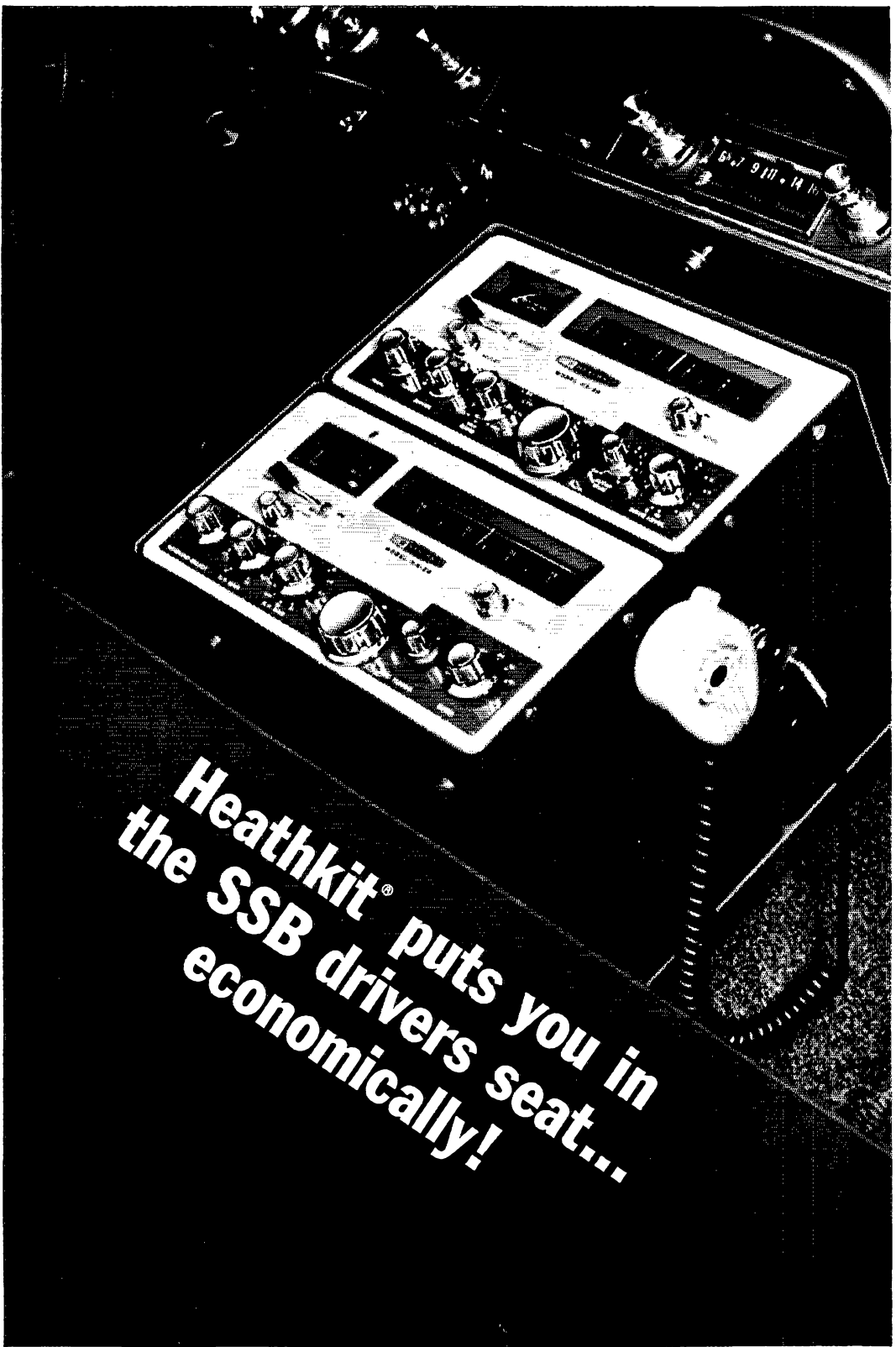
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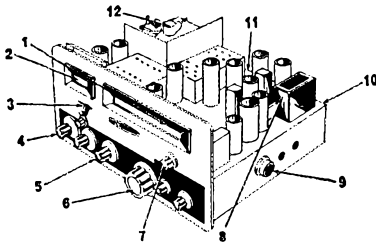
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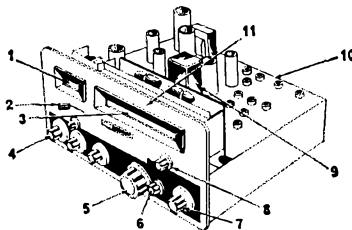
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**\$395<sup>00</sup>**  
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All the features you want and need for top mobile performance. Handsomely styled with die-cast panel, chrome-plated knobs. Units require only 1 cubic foot of space for easy installation in auto. Rack mounting allows easy removal for fixed or portable use. Operates with Heathkit HP-10 or HP-20 power supplies. Here's quality, economy and versatility that can't be beat anywhere!



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## 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 reports from every continent except Europe (589)! I have also worked enough stations for my WAC, WAS, WAJAD and ADXC awards, and I am in the process of working for several other awards. And all this with 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 talking about.

Wishing you the best for 1959, I am

Sincerely yours,  
Thomas G. Gabbert, K6INI (Ex-T12TG)

## OR IS K4ZRA THE NEW CHAMP?

Read his letter, and see his diagram of a typical installation and what it achieved:

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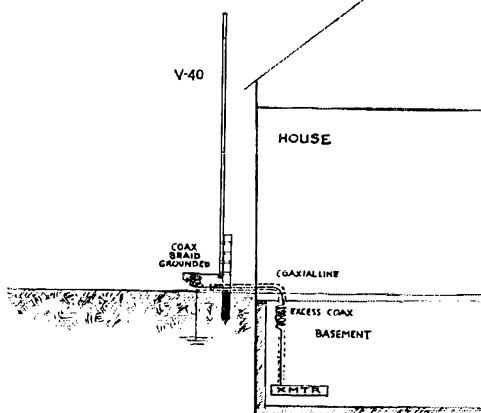
GOTHAM  
Miami Beach, Florida  
Gentlemen:

During the time I used this antenna, I worked well over 100 DX stations in 44 different countries, earned a WAS certificate, and worked the necessary stations for WAVE, receiving very fine signal reports from all. My rig ran from 75 to 100 watts plate input and the receiver was an old military ARR-7 (Hallcrafters reboxed SX-28.)

The above mentioned contacts were made with the vertical mounted several inches off the ground, without radials, with only a simple ground connection to the coaxial shield.

Daniel F. Onley, K4ZRA

## K4ZRA's INSTALLATION THAT WORKED WONDERS WITH A GOTHAM V-40 VERTICAL



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## OLD-TIMER K4KXR (ex-W2JAY) SAYS:

"The all-band operator is best equipped to serve his community in emergencies. A Gotham antenna is the key to many life-long friendships. To get QSLs by the thousand, and make your call letters known all over the world, use a Gotham antenna."



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## THE GOTHAM V-80 IS THE BEST ALL-BAND ANTENNA

- If K6INI can do it, so can you.
- Absolutely no guying needed.
- Radials not required.
- Only a few square inches of space needed.
- Four metal mounting straps furnished.
- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Many thousands in use the world over.
- Simple assembly, quick installation.
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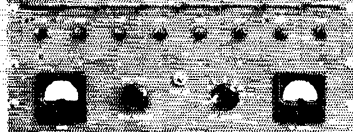
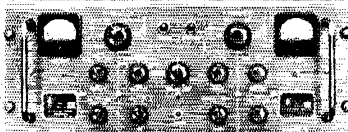
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28, K9FFV 22, W9VMW 21, K9GLL 20, K9ZLB 20, W9-EJW 18, K9ILK 18, W9SNQ 17, K9WVJ 17, K9RGS 16, K9VHF 14, K9FFV 12, KN9FOG 11, W9OG 9, W9YYX 8, W9BDP 7, W9DKR 7, K9MWC 7, K9QVZ 7, K9CTF 6, K9CRS 6, W9IMU 6, K9YXX 6, W9SWD 5, W9ZNC 5, K9TFJ 4, K9ARW 3, W9AQW 2, K9GEL 2, (Feb.) W9SVL 66, W9SFU 23, K9ATY 7, K9CMIH 6, W9YDP 4.

**WISCONSIN**—SCM, Kenneth A. Ebner, K9GSC—SEC: W9BCC. PAMs: W9NRP, W9NGT, W9SAA, RMs: W9VHP, W9VIK. New appointment: K9YKL as OES. Renewed appointments: K9SQV, W9IQW, K9JVP, W9-RKP, K9HDL, K9ELT, K9PQT, W9NRP, W9VHP, W9CBE, K9UJJ, W9AJU, K9QDA, K9QKG, W9DYG says he has been visited by 23 out-of-town traffic men in the past 4 years. The MRAC will have the north and south side against each other Field Day, W9KQB's DX is at 109 worked and 94 confirmed. W9VSO's new antenna system paid off with 99 per cent of all DX heard worked. W9IHN is building a ground plane for 40 meters. W9EKZ has his new 2-meter rig on the air. New in Neenah-Menasha is WN9DWP. ARRL affiliation has been granted to ARROW's of Whitewater, the north Shore Radio Amateur Club and the Washburn County Radio Club. The WNA Picnic will be held July 8 at Hartford. W9GFL says that second harmonics on 7.4 Mc. get so bad they QRM each other. W9VHP says this is his first month that all NCS reports were in by the end of the month. BPL for March went to W9DYG, W9SAA and W9YT. Traffic cleared on nets: W9BN 477, BEN 273, WIN 146, W9SSN 37, W9NGT is rebuilding his rig. K9UJJ is working DX on 40. Traffic: (Mar.) W9-DYG 514, W9SAA 294, W9NQW 163, W9YT 160, W9VHP 98, K9UUT 70, W9CBE 59, K9WGN 48, K9GSC 44, W9-NGT 44, W9VTK 33, W9RZ 28, K9HJS 24, W9DHL 20, W9NRP 19, K9GDF 16, K9ELT 14, K9RFC 14, K9ZMU 14, K9DOL 13, W9IHN 12, K9QKG 12, W9LFP 11, W9-MWQ 11, K9OCA 11, W9WJH 10, K9HDL 9, W9HPC 8, W9IQW 8, W9KQB 5, K9QKU 5, W9MOX 4, K9ESN 3, W9EKZ 2, K9ZCB 2, (Feb.) K9WGN 29, K9HJS 14, K9HDL 12, (Jan.) K9HJS 5.

### DAKOTA DIVISION

**NORTH DAKOTA**—SCM, Harold A. Wengel, W0HVA—SEC: W0CAQ, PAM: K0TYY, RM: K0-QWY. K0IQV is now operating on the Transcontinental Corps. K0YWD reports interest in a 6-meter net in Minot. The Goose River Net report for March: 4 sessions, 110 check-ins, 2 formal messages, 2 informal. The North Dakota C.W. Net report: 12 sessions, 85 check-ins, 8 maximum check-ins, 5 messages handled. The North Dakota 75-Meter Phone Net report: 26 sessions, 669 check-ins, 48 formal, 54 informal messages, 15 relays. The Fargo High School Radio Club and the NDSU Amateur Radio Society are now ARRL affiliated. The NDSU ARS elected W0GBQ, pres.; K0MHC, vice-pres.; K0QWY, secy-treas.; K0PEO, public relations; K0JJP, QSL Mgr.; W0RRN, faculty advisor. Traffic: (March) K0IQV 240, K0QWY 43, K0ITP 39, K0GGI 26, W0YCL 16, K0TPK 9, W0CAQ 8, K0RSA 6, K0TYY 6, K0TNI 5, W0AQR 4, K0AYJ 4, K0-KBV 3, (Feb.) K0RSA 8.

**SOUTH DAKOTA**—SCM, J. W. Sikorski, W0RRN—SEC: W0SCT, K0NHPY is now stationed on Okinawa. K0HQD has a Viking II and an RAIE-4350. W0NEO crashed while in a helicopter, was seriously injured, and is making a slow recovery. K0BSW has completed his mobile station. K0ZMA reports Harding County AREC held a successful drill with six stations participating. W0SMV built an electronic keyer. W0RRN has an HA-4 keyer. A new call is K0ZAP. W0ZWL closed the South Dakota Weather Net Apr. 14. K0BGD and K0-LIX passed the General Class exam. K0ZTV is now an ORS. K0UDZ has a 6-meter beam on a 55-ft. tower. K0DEL was re-elected president of Radio Researchers, Inc. Also re-elected were Robert Mundt, vice-pres.; K0-BRC, secy-treas. The Amateur Radio Club of Hot Springs is now affiliated with ARRL. Traffic: W0ZWL 717, W0SCT 202, K0BMQ 124, W0DVB 83, K0AIE 58, W0OFP 30, K0ZMA 29, K0VY 28, K0ELQ 27, W0-NNX 26, W0CTZ 21, K0CNL 21, K0TXW 19, K0-DHA 14, K0WJT 14, K0YJF 12, W0AOY 10, W0CMI 10, K0TNI 8, K0JGM 6, W0VQC 6, W0FJZ 4, K0-HPS 4, K0YNS 4, W0DIJ 3, K0TWT 3, K0ZTV 3, K0WEN 2, W0YVF 2, K0ZBJ 2, K0TAM 1.

**MINNESOTA**—SCM, Mrs. Lydia S. Johnson, W0RZJ—Asst. SCM: Charles Marsh, W0ALW, PAMs: W0-GCR, K0EPT, RMs: W0KLG, K0AKM. These hams assisted the Red Cross in St. Paul with flood work: K0s MVE, PML, IYV, GFL and W0THY. The following did likewise in Rochester: K0s CPW, SBB, JRN, UKU, AKM, A0Z, EWA, AID, JXB, PSI, W0KVU, K0GPI. MSPN secretary reports that the St. John's Radio Club, established in 1919, is building a kw. double s.s.b. transmitter and is using a Drake 2-B receiver.

(Continued on page 108)



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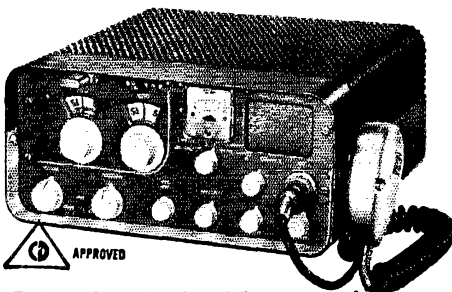
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KN0JFB, age 13, is on the air with an HT-40 and an S-167. WOJBT applied for AREC. The Worthington ARC elected W0MZR, pres. and trustee; W0WVP, vice-pres.; K0JZD, secy.-treas. OES KOVLD, with KOYMJ, is gathering TV equipment for amateur TV on 420 Mc. ORS KOVTG now belongs to the "Tops C.W. Club of Wales" which has a world-wide membership of approximately 700. W0URQ built an s.s.b. exciter using a 6146 in the final and a 500-watt linear with a pair of 811-As to go with his home-brew double super-het receiver. KOMGT and W0KLG are building the "Transmatch" from Nov. QST. Ten MSN members are using electronic keyers. MIJN NCS WA0ADX is the first WA0 to be heard on MSPN (phone). KN0JFJ and WNOAKW are new net members of the MIJN. K2HQE, who has the most fantastic mobile gear (\$15,000 worth) in his Cadillac, spent an evening at your SCM's shack. K0DHI applied for Class IV OO and K0RCF applied for OBS. Director W0BUO attended a meeting in New York and stopped in at West Hartford ARRL Headquarters. K0WWW has a DX-20 and an SX-111 receiver with a 250-ft. long-wire antenna. New on RTTY are W0BHA and KOAQA. EC K0CNI has a new HQ-110C receiver. WNOAWY passed the General Class exam. K0CRP has ordered a new TBW-5. OO W0KLG listed 36 violations, and W0WMA one. New OPSs are W0GCR, K0s LWK, VPJ, ZKK. K0ZKK has organized a radio club in Park Rapids. She uses a Drake 2A receiver. EC K0CPW spoke on amateur radio at the Zumbro Valley Citizens Band Radio Club. Traffic: W0EJZ 213, W0YC 170, K0OTH 142, W0LST 104, K0WPK 104, K0RCF 101, W0KLG 99, W0HEN 93, K0ZKK 79, K0QBI 49, W0UMX 44, W0WMA 44, W0GCR 37, K0AKM 32, W0ATO 32, K0SBB 23, K0YJB 19, W0MXC 19, W0OEZ 15, K0ZRD 15, W0THY 14, W0CKT 13, WA0ABU 12, K0UBA 12, K0VPJ 12, W0BUO 10, K0LWK 5, K0VTG 5, K0SNG 4, WA0ADX 3, K0WYV 3, KN0JFV 1.

## DELTA DIVISION

ARKANSAS—SCM, Odia L. Musgrove, K5CIR—SEC: K5IPS, PAM: W5DYL, RM: K5TYW. Well, summer time is almost here and with it comes the tornado season. We should all check our emergency power supply and power plants and make sure they are in good working condition. Six-meter activity really is picking up and should be good for the next two or three months with some DX possible. We have some 42 counties in Arkansas which do not have an EC. Anyone interested in the appointment should get in touch with K5IPS. K5CIR's 60-ft tower was struck twice by lightning during an electrical storm but no damage was done as the coax feed line was disconnected. Traffic: K5TYW 27, K5IPS 20, K5UEK 12, K5YFP 12, K5YCM 10, K5ABE 2, K5CIR 2, K5CVW 2, W5TJH 2, K5YMU 2.

LOUISIANA—SCM, Thomas J. Morgavi, W5FMO—Plans are moving along nicely for the Delta Division Convention to be held at the Jung Hotel, New Orleans, Labor Day week end. We lost a good traffic man when W4LDM/5 moved back to Florida. OPS endorsements: K5CDC, W5UJK, K5YUJ, K5KTY, K5DGI. The Tulane University Club station, W5YU, was issued an ORS appointment. W5UQR had his OES certificate endorsed. W5EA had a modulation transformer in the DX-100B go out. K5UYL and the Lafayette ARC are working on Field Day plans. K5BXX should have his beam up by now. W5NDV and his ART-13 are regulars on 75-meter phone, 80-meter c.w. and on MARS. K5VJT reports that the Lafayette Club is sponsoring two certificates, a W.A.L.L. (worked all Lafayette, La.) and a W.A.L.P. (worked all Louisiana parishes). W5CEZ, Route Manager for Louisiana, checks into some six or seven nets daily. K5QXV is busy handling traffic with his HT-37 and Drake 2B receiver. W5HNS has been active on the 7290-ke. net. The Westside Club is as regular as a clock with its 10-meter emergency net. K5CHC has a 6&2-meter final using 2 4X150As running about 300 watts. Recent applicants for AREC include W5AWC, K5OVR and K5WQ/5 K5OVR, an OPS appointee, is active on several nets including 4th Army MARS. K5LZA is busy at school. Traffic: W5CEZ 272, K5QXV 97, W5MXQ 81, W5HNS 19, W5NDV 16, W5EA 2.

MISSISSIPPI—SCM, Floyd C. Tretson, W5MUG—The Biloxi Club announces its Annual Hamfest will be held June 30 and July 1. The Biloxi Club reports a 100 per cent increase in membership. K5MDX reports a score of 259,530 points in the recent DX Contest. W5CKY reports a score of 285,000 points. The Jones County Club is considering sponsoring an Explorer post. K5GAD is on with a screen modulated DX-20. K5LWS is on from New Albany with a Viking Invader and SX-111. K5DGL has been out for spring toothball practice but is now back at the key. W5AALR is on from Canton with an IX-11 and an HQ-128X. K5YPV has been having theater interference. W5JHS and his XYL report that they are regaining their health. New appointments: K5WSY as

(Continued on page 110)

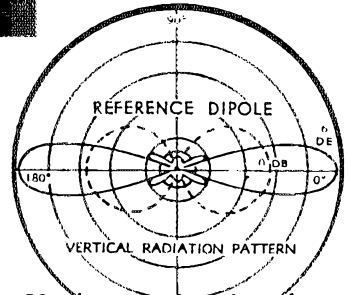
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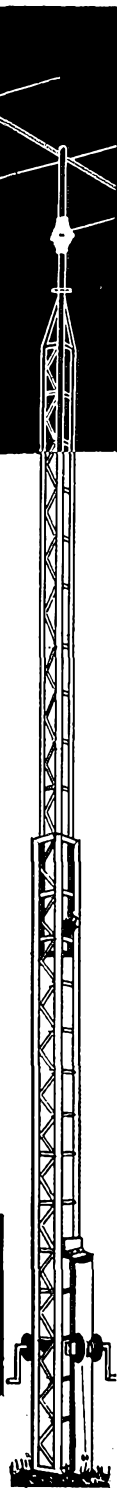
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OPS and K5RRG as OHS and ORS. K5GSY was a recent visitor to the hospital. The Jackson Hamfest will be held July 29 at Legion Lake. Traffic: K5WSY 174. K5YPV 72. K5GAD 33. K5GDL 5.

**TENNESSEE**—SCM, R. W. Ingraham, W4UIO—SEC: K4OUK, PAAM: W4PQP, RM: K4AKP. Loudon Co. reports that the new call W4PSZ is that of the YL of K4WRV and K4WRW; and that new members include K4BYJ, K4LQO, K4SSO, W4RZF, K4VOX, W448FZ, WN4CGN and K4TYZ. New officers of the Jackson Club are W4WTP, W4UN and WN4BCT. W4UVU is putting up a tower to support 80-, 40-, 20-, 6-, and 2-meter antennas in addition to satellite beams on 108, 136 and 145 Mc. W4RRV has a new trihandler beam. WN4GAN is a new call in Oak Ridge. K4PUZ is back home in Oak Ridge. K4LTA and family enjoyed a trip to Florida. Renewed appointment: K4PUZ as OO. Reports were received from OOs: W4ZBQ, K4RIN, W4TDZ, W4TZG; OESs K4KYL, W4TDZ; OHSs W4VJ, W4SGI, W4OQG; nets W4PQP, K4AKP, W4UO; clubs Chattanooga, Oak Ridge, Loudon County, Jackson. In this, my last report, I should like to thank those who have worked with me and faithfully made their reports. Traffic: (Mar.) K4AKP 1126, W4PL 428, W4FX 359, W4OGG 176, W4OQG 134, W4PQP 121, K4WUG 60, W4UO 36, W4VJ 36, W4LLJ 24, W4TZG 19, W4TYV 11, W4VNU 11, W4VTS 10, W4SGI 6, K4KYL 2, W4TDZ 2, K4VOP 2. (Feb.) W4PQP 105, W4VTS 10.

**GREAT LAKES DIVISION**

**KENTUCKY**—SCM, Elmer G. Leachman, W4RFW—SEC: W4BAZ, PAAM: W4ZDB, RM: W4CDA, V.H.F. PAAM: K4LOA. *Big news! Other Clippings* will be published again, by the Blue Grass Amateur Radio Club, Lexington. Send your subscriptions to K4KJQ, 103 Devine Avenue, Lexington, Ky. New appointments: W4ISF as OES and OPS. He is on with a DX-100, a homebrew 813, an HQ-129X and an assortment of low-power gear. Antennas include a four-element beam and a sixteen-element colinear. K4HSB is on with a new Invalder, is remodeling the shack and getting up new antennas. K4KWQ is on 80 meters with portable/emergency phone and c.w. Give Pontaine your 9RN traffic. K4LOA is trying for the state net on 6 meters and works west to Henderson. Try going east via Lexington and Ashland. Hank on 50.3 Mc. W4JUI has a heavy school schedule but keeps up OO work. W4ADH is very active on 6 meters—49.94 (MARS) and 51.17 Mc. using a transistorized modulator and power supplies for mobile. Route Manager W4CDA asks NCSs to contact him for special maps of Kentucky. The Blue Grass Amateur Radio Club again will sponsor the State Convention with the tentative date Oct. 13. An organization meeting of the Kentucky Council of Radio Clubs will be held during the convention. An *East-Kentucky Amateur Radio Society* (EARS) has been formed to run the 3rd Annual Breaks hamfest, June 10. W4JPY is founder. K4TPX pres., K4NVO secy. and VP. from each county. Traffic: K4KWQ 101, K4CSF 70, W4BAZ 66, W4CDA 65, W4KKG 28, K4OZG 28, K4TQZ 23, W4SZL 14, K4VSI 13, K4KJP 10, K4LOA 10, W4TYV 8, K4KSC 8, K4ITSB 5, K4ZQR 4, W4ADH 2, W4RPN 1.

**MICHIGAN**—SCM, Ralph P. Thetreau, W8FX—SEC: W8LOX. RMs: W8EGL, W8OQQ, W8FWQ, K8KMQ. PAMs: W8CQU, W8JTC, V.H.F. PAM: W8PT. Appointments: K8AEM as EC; W8BEZ and W8WQH as ORS; K8CKD and W8HK as OPS. The Oakland Co. ARS meets the 1st Tue. of each month at Amvets Hall, 570 Oakland, Pontiac. The Catalpa ARC is sponsoring a successful OT night at Greenfield Village with speakers W4CF, W8CJT, W8CRM, W2QY and W2ICE scheduled. W8YGI finally cleaned out 25 years of junk. W8WQV works England on 160! K8GSW also gets EC. W8JX finished up a new "Valiant." W8BAN is on 8-meter s.s.b. Ask W8PT what he thinks of the Gem converters. W8CRM gave a nice talk at the Ford ARL meeting. New officers: Huron Valley ARA—K8OKC, pres.; K8UEP, vice-pres.; W8TEZ, secy.; K8NJW, treas.; K8JDM, trustee. Kent RC—K8IWI, pres.; K8JUG, vice-pres.; K8TXH, secy.; W8RUU, treas. The V.H.F. Mobile Assn.—K8QFK, pres.; K8OCU, vice-pres.; K8JGF, secy.; W8AOY, treas.; W8MIP, act. Wayne State U. RC—K8JOF, pres.; W8GKII, vice-pres.; K8ZZA, secy.; K8LOS, treas. New XYLs in the MCR are K8TGP and W8ACKA. W8IV has a new Heath HX-10. K8TDJ clix on the Wolverine Net, on c.w. K8RTM worked the USS *Randolph* while Glenn was being "shot." More 50-Mc. s.s.b.; W8PCZ and K8RTM. K8JUG is "back to life" with a mobile. W8PCY moved to Warren, Mich. W8FSZ sold his p.p. 35 TG final. It wasn't quite old enough for our museum! W8OCK got the Ziegenbein Award for '61. W8RXY and his XYL took 1st prize—roller skating. New mobiles and transceivers: K8PUW, W8IIE and W8FOL. W8ZHB puts out OEs on 3663-ke. c.w. starting at 0015Z. W8III finally reports after 15 years. K8GJD has 115 countries, and brother K8RDE has 103. W8WVL replaced the transformer so is back on. W8EMD is now s.s.b. on 50 and 144 Mc. Ex-

(Continued on page 112)





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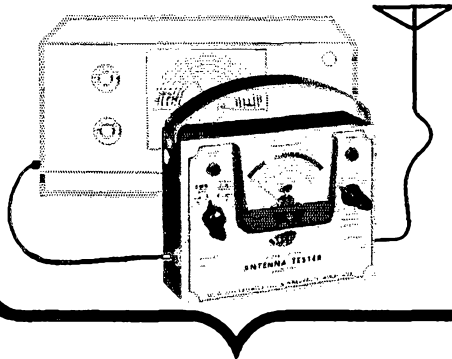
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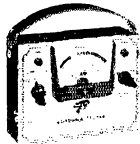
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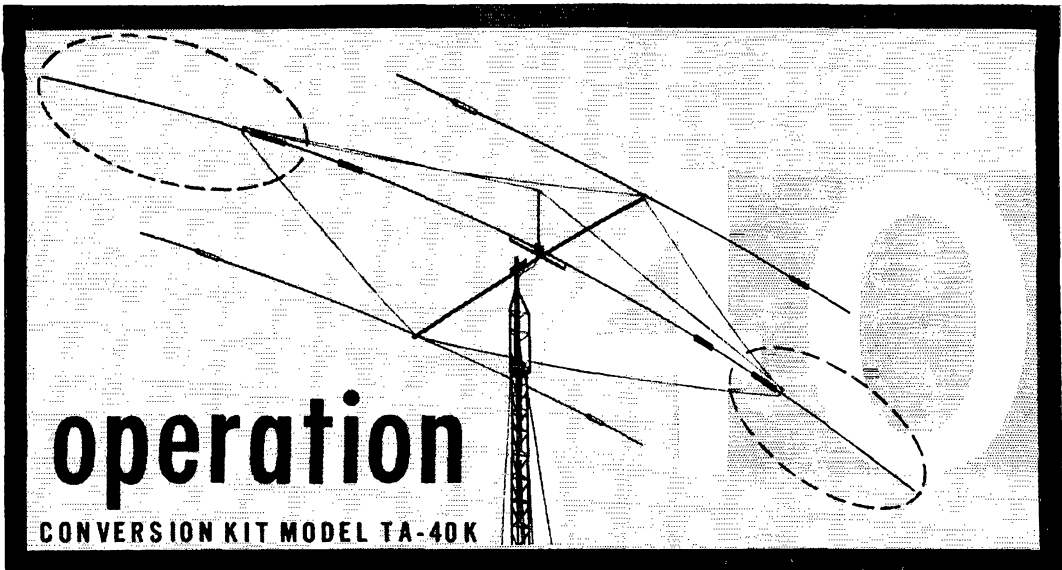
W8I2S (KL7AOL) is coming back to Michigan. K9PBA went to the hospital for an operation. W88BUH is now a Silent Key. HPLers: K8KAIQ and K8JJC. W8TBP burned up the final plate transformer. K8VRF put up a new beam. Traffic: (Mar.) K8KAIQ 282, K8HLR 210, K8JJC 225, W80CQ 142, W8JTC 136, VE3CYG/W8 126, K8TDJ 115, W8XJ 91, W8WQH 90, W8ZIB 87, K8QLL 78, K8ZZW 71, W8IKT 69, W8FX 61, W8FWQ 60, W8EL 58, K8PYW 42, W8AID 31, K8EPZ 24, W8ULI 23, K8WQV 22, W8DSE 21, K8RQO 20, W8SVP 20, W8BEZ 17, K8SHQ 14, K8QCJ 12, K8TJH 12, W8HK 10, K8JED 10, W8AII 9, W8EGI 8, K8GJD 8, W8WV 7, W8TBP 5, K8VRF 3, K8LOS 2. (Feb.) W8ACW 36.

**OHIO**—SCM, Wilson E. Weckel, W8AL—Asst. SCM; J. C. Erickson, W8DAE. SEC: W8HNP. RMs: W8BZX, W8DAE, W8VTP, K8ONQ. Greater Cincinnati ARA's *The Mike and Key* informs us that W8ERG gave an informative talk on "Converters: Past, Present and Future", and that K8QYG is now K8WST. The Fort Hamilton ARA's *Bulletin* announces the start of code and theory classes for the attainment of Novice Class license coordinated with the local YAMCA. Canton ARC's *Peal-line* cover page pictures: K8KTM and relates that K8YVZ, K8ZMN and W88CGL are new Technicians; K8TKG, General Class, has a new HT-37; K8ANA received a certificate for placing second in the N.J. QSO Party. Seneca RC head W8LL talk on antenna construction. Dayton ARA's *B-F Carrier* states that W8FYR told of Helpful Hints on Matching and Tuning Antennas; K8YCP spoke on "TVI—Its Causes and Cures"; W8KKH became a Silent Key; W80VG was in the hospital. Xavier U. ROTC RC's officers are K8NAWZ, pres.; K8NYMJ, secy-treas.; Paul Baekeroot, corr. secy. The club has a new GSB-100, Warrior and Drake 2B. Toledo's *Han Shack* (ghost) names W8BCQ as its Ham-of-the-Month; W8RZQ is in the hospital; W8TIL and W8VSB have a new baby girl; the stork brought a baby girl to K8SEX; W88BPE is a new ham and Toledo RC's officers are K8GOF, pres.; W8NXX, vice-pres.; W8WHA, rec. secy.; W8ITT, corr. secy.; W8GJS, treas. Inter-City RC's *IRC News Bulletin* says Mr. Lytle spoke on servicing receivers and transmitters; the club has 51 enrolled in its theory class with W8JYY and W8LRR as instructors; K8UGA is on 6 meters. The writer hopes that W8WE is obeying the doctor's orders and will be back with us in BN in a limited way. Parma RC's *IRC Bulletin* advises that W8ALF spoke on microminimization; K8NUE received the Century Award; the Greater Cleveland V.H.F. Club's officers are K8SFP, pres.; K8KNJ vice-pres.; K8SAIQ, secy.; K8CDA, treas.; K8HRU received her CP-35-w.p.m. award. Thank you, Southeast ARC, for sending me your *Ham Fax* and we note that Mr. Kshelitz, of Bush Instruments, spoke on semiconductors. The *W8LT Log of the ARC of the Ohio C.* states that W8IAF spoke on the physics of capacitors, K8DDG on the performance of oscilloscopes and K8BYT on tunnel diodes. From the *Smoke Signals from the Indiana Hills RC*, note that K8SIP has a new Lafayette HE-50; W8AEB has a new 80-meter dipole up; K8ZGW is on 6 meters. OH-KY-IN V.H.F. Radio Society's *Q-Fiber* informed us that K8IBQ received his General Class license; W8UPB, our Great Lakes Director, spoke to the club; W8NUN is now W88NU. Springfield ARC's *Q-Fiber* says that Charlie Friend, an engineer in the Navigation and Guidance Lab at Wright-Patterson AFB, spoke on the d.c.-banders or v.h.f.ers (namely crystal oscillators); K8s AEW, DEO and VOP lost their antennae in the ice storm; K8DUA/8 left for a 15-month stay in Europe. Tusco RC's *Beam reports* that W8NBK is in the hospital; K8RNM is new act. mgr. Several copies of the *Ohio Phone Net News* were received. The net operates on 3860 kc, at 1830 EST. WA8s HEC, BTH and CDV are new hams, K8s DOV, HGT, JLG and LYJ. Akron U. students, work out solutions to their math problems on 53.5 Mc. The Buckeye Ragchewer Net, with 52 members on 51.6 Mc., issues two certificates, one for working ten of its members and the other for 100 contacts by hams outside Ohio with Ohio amateurs on 6 meters. For these contact K8IGT, W8CYS is a new GRS. March HPLers are W8DAE, W8UPB and K8ONQ. The Ohio Council of Amateur Radio Clubs' officers are K8NCY, chairman; W8OHU, vice-chairman; K8DMJ, secy.; W8AL, treas. Traffic: (Mar.) W8DAE 926, W8UPIH 526, W8CHT 332, W8BZX 308, W8AJN 268, K8SQK 219, K8ONQ 184, W8BGP 133, K8BDZ 83, K8WBJ 57, K8VWN 35, W8LZF 34, W8AL 32, K8BNL 32, W8CXM 19, K8RTU 17, K8BPE 12, W8IBX 12, K8KSN 12, K8KNS II, W8RY 8, K8WDC 7, W8BEV 6, W8WYS 6, W8OUU 5, W8RJD 5, K8DDB 2, K8TER 2, K8BXT 1. (Feb.) K8VSN 34, K8OZG 5, K8JSQ 4, K8LBU 2, K8MAZ 2, K8PBZ 1.

## HUDSON DIVISION

**EASTERN NEW YORK**—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RMs: W2PHX and K2QJL. PAM: W2JIG. Section nets: NYS on 3670 kc. nightly at

(Continued on page 114)



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0000 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT; MHT (Novice) on 3716 kc. Sat. at 1800 GMT; Inter-club on 28,690 Mc. Mon. at 0130 GMT. Appointment: WV2RWU as OES. New officers of the Ulster County Club are WA2TIF, pres.; K2YRY, vice-pres.; WA2MLF, treas.; WA2VJV, rec. secy.; WA2OJD, corr. secy.; K2VYN and K2TGK, directors. Its members had a tour of the Kingston Telephone Exchange. W2DQW is looking for stations to handle traffic on 2 meters around Dutchess County. Officers of the RPI Radio Club (W2SZ) are K2KYE, pres.; Bill Lehrman, treas.; K1KMI, secy.; K2DAC, equip. supv. The club's new shack is finished and all rigs have been installed. Open house was held Apr. 15. W2APF entertained the Albany Club with movies of his safarries across four continents on Mar. 24. An Albany crystal bank is operating under Chairman WA2LLX. WIDX, of ARRL, spoke to the Schenectady Club on "Receivers." Down in New Rochelle W2TUK, Vice-Director of the Hudson Division, who discussed S.S.B., was guest. WA2QEQ is back on 2 meters, as is WA2AUC, who also is considering 3500 Mc. Our congrats to K2SJO and others who worked hard on the license plate bill in the Legislature. The new State Civil Defense Control Center is nearing completion in Albany. All clubs report active Field Day plans. Don't forget that message to the SCM for extra points. Traffic: W2THE 176, W2DQW 96, W2EFU 86, W2PKY 54, K2TXP 49, WA2MID 44, K2SJM 37, W2URP 29, WA2LOJ 14, WV2VYS 13, K2MPIK 6.

**NEW YORK CITY and LONG ISLAND—SCM.** George V. Cooke, jr., W2OBU—SEC; W2ADO, RM; W2WFL, PAM; W2UGF, V.H.F. PAM; W2EW, Section nets: NLI, 3630 kc. at 0015 GMT nightly; NYCLIPN, 3908 kc. at 2230 GMT nightly; V.H.F., Traffic Net, Tue.-Wed.-Thurs. 145.8 Mc. at 0100 GMT and Fri. through Mon. 146.25 Mc. at 0000 GMT. Mike Parod Net, 7238 kc. at 1700 GMT; All Service Net at 1800 GMT Sun. on 7270 kc. BPL certificates were earned for good traffic-handling during March by K2UAT, K2UBG, W2EW, W2GKZ, WA2GPT and WA2TQT. WA2GPT has been made asst. mgr. of the Mike Parod Net. E&T, 1700 GMT session. W2GKZ received a BPL medallion and also worked 100 new countries in the recent DX Contest. K2HCU and K2UAT are putting lots of effort in the revival of the NYCLIPN; K2YMU is asst. mgr. and urges stations to report in and help put the phone net back in business; Mon. through Sat. at 2230 GMT on 3908 kc. WA2NCE finally worked WAS and made W-DEL. WV2RVU bought 33 feet of mike cable to extend the mike to the roof for operation on hot nights. WV2VKK earned All Manhattan and V.H.F. Century Awards. K2VGR received the Empire Award and announces the following winners of the NYC-LI QSO Party: WA2RMP (Suffolk), W2NUM (Nassau), K2UAR (Queens), W2DUN (Kings), WA2OKO (Richmond), K1LPL (R.I.), the highest score outside of NYCL. with the farthest log being received from New Mexico. W2WFL is the new RM for the section, replacing K2UPT, who did a fine job until work and schooling got to be too much. K2AAS has taken over as manager of the All-Service Net. W2EC now is snugly located in a new QTH in Setauket with room for an antenna farm. The Queens County AREC is putting on a big membership drive. All Queens amateurs are urged to sign up. Contact W2IAG for full data. K2ASP has a new SX-101A, Nuvistor converter and master control panel for 2 meters. The Bronx Heterodyne Net, nightly at 2030 on 146.502 Mc. with WV2YDG, has just gotten started in upper N.Y.C. W2OME is running a complete S/Line to a TA33JR on a new 54-ft. tower. WA2IMH bought an RME-6900 and is racking up a fast DX score with it. WA2KER joined the CAP. WA2KSD received a justly-earned DXCC certificate and has been accepted at R.P.I. for next year. New officers of the Bellerose ARS are K2IVE, pres.; WA2MPP, vice-pres.; WA2KYF, secy.-treas. WA2GJT has a new Gonset 11-B for 6-meter mobile. The Laurel Hill ARC elected W2MGN, pres.; K2RIX, vice-pres.; WA2GIO, treas.; WA2QAT, trustee. A new licensee in Brooklyn is WV2WOF, the son of WA2SYB. W4-JQG/2 has settled in his new QTH in Dix Hills, Huntington. W2TUK was visited by his brother-in-law, W7-ZHE, whom he had never met before. WA2MPM procured a Gonset 3357 V.F.O. and can be heard on 2 and 6 meters using n.f.m., which is showing considerable increase in this area. K2PQY can help you with n.f.m. problems if you want to try this mode. K2MJO added a kw. linear and is working DX with an attic antenna, no less. K2ITW has a new Drake 2B. Your SCM will be at W2YKQ in Brookville with the Lake Success RC for Field Day and your messages can be handled directly on any band during the outing. Correction: 'Twas WA2-OHN (not M) elected treasurer of the Rockaway Amateur Club and mentioned in this column last month. Our apologies. Traffic: (Mar.) K2UAT 996 WA2-GPT 581, K2UBG 552, W2EW 401, WA2TQT 307, W2GKZ 200, WA2NCE 199, K2FO 182, K2KYS 151, WV2RVU 132, WA2RMP 112, WA2QAT 95, WV2VKK 86, (Continued on page 116)

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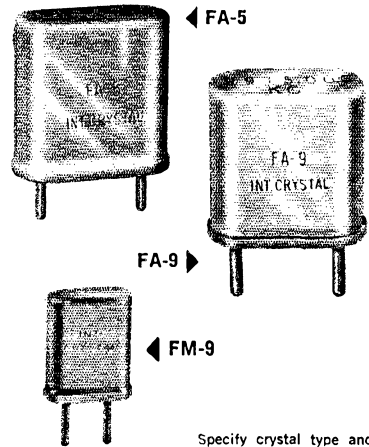
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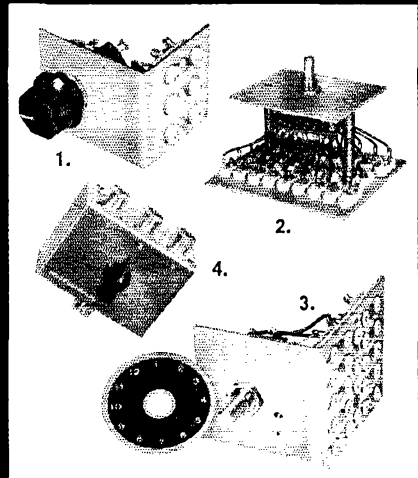
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Overtone (3rd)	<ul style="list-style-type: none"> <li>10 - 14.99 mc</li> <li>15 - 29.99 mc</li> <li>30 - 59.99 mc</li> </ul>	<ul style="list-style-type: none"> <li>Not Available</li> <li>30 - 39.99 mc</li> <li>40 - 59.99 mc</li> </ul>
Overtone (5th)	<ul style="list-style-type: none"> <li>60 - 75.99 mc</li> <li>75 - 99.99 mc</li> <li>Not available</li> </ul>	<ul style="list-style-type: none"> <li>60 - 89.99 mc</li> <li>90 - 100 mc</li> <li>101 - 109.99 mc</li> </ul>
Overtone (7th)	<ul style="list-style-type: none"> <li>100 - 137 mc</li> </ul>	<ul style="list-style-type: none"> <li>110 - 137 mc</li> </ul>

\* Allow three to four day processing.



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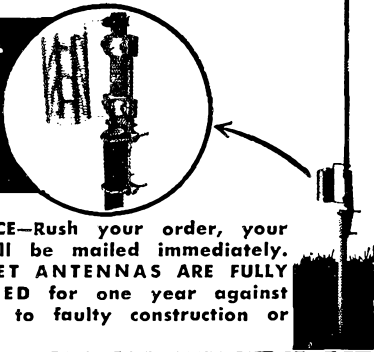
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**FAST SERVICE—Rush your order, your antenna will be mailed immediately. ALL HORNET ANTENNAS ARE FULLY GUARANTEED for one year against failure due to faulty construction or material.**

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**NORTHERN NEW JERSEY—SCM,** Daniel H. Earlev, WA2APY—SEC: K2ZFI. RM: WA2GQZ. PAM: K2SLG. V.H.F. PAM: K2VNL. The section nets are NJN daily at 0000Z on 3695 kc.; the NJPN Mon. through Fri. 2300Z, Sun. 2400Z on 3900 kc.; the NJ 6&2 Thurs. and Sun. at 0400Z on 51.15 Mc.; Wed. and Sun. at 0300Z on 147.75 Mc. Sessions, attendance and traffic: NJN, 31-580-206; NJPN, 31-575-166; NJ 6&2, 21-138-27. New ORSS are K2BHQ, WA2JTZ, WA2KRC, WA2TWL, WA2QYC, K2SBS, W2TFM, WA2OQV. The Union County ARA extends a welcome to new members. The UCARA meets the 2nd and 4th Fri. at 8 p.m. in the Roselle Civil Defense Building, 408 Chestnut St., Roselle. K2UKQ still is very busy getting YL news. Her address is in the call book. WA2ONH has big troubles. The WAS Award was received by WA2MYB. W2NKD did a little traveling through the New England states. Guess K2AGJ finally got the shack finished and now it's DXing time. After 41 years of hamming W2ABL joined the Old Timers Club. School plays and tennis keep WA2KRC QRL. K2JTU received the WNII and WANE Awards. W2CWV made DNCC and says he worked 49 YLs in the recent contest. K2SBS, trustee of the Parsippany H.S. Radio Club, says the club has applied for a license. WA2RIN wants the absorption formula for a TV antenna 20 feet away—on 6 meters? K2BHQ's exciter does well on NJN but he still wants a final. According to WA2SRK the North East Teenagers Net meets at 2325Z on 3545 kc. WA2CCF attended the IRE Show. K2UCY received official commendation for his handling of c.d. traffic from the Office of Civil Defense. K2PZY reports a lot of activity in the AREC in Ocean County in the recent storm. The Union County ARA has changed its call from W2GIZ to W2HFP in memory of Bill Gerlach. The SCM wishes to thank all for their congrats. W2ZI, PAM for S.N.J., extends his welcome to all who would like to handle traffic in the NJPN. It may seem funny mentioning the S.N.J. PAM here but it so happens that the NJPN and the NJN are combined nets that take in the entire state of New Jersey. This may be slightly confusing to the PAMs and RMs and SCMs but it has been this way for quite a while and functions very well. The new SEC, K2ZFI, is thinking of an outing up at Lake Hopatcong. This is for the ECs to get together. Don't you wish you were an EC? Traffic: K2UCY 283, K2VNL 174, WA2CCF 150, WA2APY 140, WA2HO 102, WA2JTZ 31, WA2SRK 64, WA2EBR 56, K2BHQ 51, K2SBS 35, WA2QYC 34, W2TFM 33, W2CWV 32, W2QNL 31, K2SLG 25, W2EWZ 24, K2JTU 20, WA2KRC 17, W2CFB 13, W2ABL 11, K2EQF 8, WA2JSB 8, K2AGJ 6, K2MFX 6, WA2JZH 6, W2NKD 5, W2OXL 5, W2NIY 3.

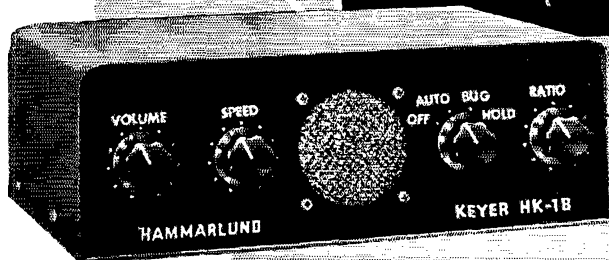
### MIDWEST DIVISION

**IOWA—SCM,** Dennis Burke, W0NTB—SEC: KO-EXN—PAM: W0PZO. RM: W0DUA. The Iowa 160-Meter Picnic will be held at Newton June 10. I have had many club reports this month; I thank all you secretaries. This office regrets that it failed to mention that W0CZ was awarded 17 BPL certificates for his fine work prior to June, 1961, and that he has many more besides these. W0SCA reports his 130th consecutive BPL. W0BDR was in his 8th year of consecutive BPLs before retiring from the game. W0LCX was a repeater for many years; likewise Bertha, W0LGG, has been outstanding in traffic since becoming interested. See page 66 Mar. QST. The Iowa section has much to be proud of. 75-Meter Net report: QNI 1410, QTC 124, 27 sessions. 75-Meter S.S.B. report: QNI 897, QTC 18, 25 sessions. 160-Meter Net report: QNI 1195, QTC 22, 31 sessions. Traffic: (Mar.) W0LGG 1383, W0SCA 781, W0CZ 175, W0NTB 99, W0PZO 82, W0TEY 44, W0LJW 38, W0VWF 24, W0CQ 19, KOHBD 18, KOQ-YN 17, W0PJP 16, W0UTX 16, W0BLH 13, K0KQ 11, W0REM 11, K0EXN 10, W0YDV 9, K0OPK 8, W0UHO 7, K0AFG 6, K0AFI 6, K0QKD 6, W0FMZ 5, W0PTL 5, K0UAB 5, K0VSV 5, W0EEG 4, W0-QVZ 4. (Feb.) W0DUA 355.

**KANSAS—SCM,** Raymond E. Baker, W0FNS—SEC: K0BXF. Asst. SEC: K0EMB. RM: W0QGG. PAM: K0EFL. V.H.F. PAM: W0HAJ. Nets: KPN 3920 kc. Mon., Wed., Fri. at 1245Z Sun. at 1400Z. NCSs K0QKS, K0GH, W0IFR, W0FHU, W0ORB, 17 sessions, QNI 436, high 56, low 13, average 25.6; QTC 71, high 13, low 0, average 4.2 QKS, 3610 kc. daily at 0030Z. NCSs K0YTA, W0SAF, W0TOL, W0-YBV, W0QGG, W0FNS, K0SBN, 3920 kc. Sun. at 1350Z, 4 sessions; QTC 8, high 2, low 2, average 2; NCSs K0IZW, SHB, FNS; QNI 41, high 12, low 9.

(Continued on page 118)

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Hard to believe—but true . . . and backed up by the most distinguished name in Amateur radio—HAMMARLUND.

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ator combines every desirable feature of electronic sending with distinctive dot/dash control to give messages your own distinctive "touch". Ideal for expert or novice alike, it provides a full range of speeds to match individual proficiency.

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**VERSATILE** Automatic, semi-automatic (bug) or straight key operation.

*Volume adjustable* sidetone signal for monitoring or code practice.

**Speed Range** with variable dot/dash ratio. (Approx. 8-50 WPM)

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**SIMPLE** Transistorized circuitry for extended service.

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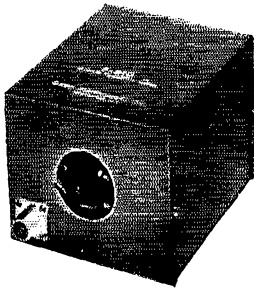
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### MODEL BP-144

A narrow band-pass filter with 6 mc pass band and 146 mc center frequency. Less than 1 DB insertion loss. At least 35 DB attenuation of harmonics out of pass band. Handles up to 185 watts plate input.

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The above filters are available in single band packaging for each band. Specifications are the same as F810.

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average 10.1. W01AJ now has a new 4X150A final on 2 meters and advises there is lots of activity in the Kansas City Area at present. K0RWC now has a handie-talkie on 2 and 6 meters. Dot. K0GIC, advises there is no skip on 6 meters in Kansas. K0YQE now has a 65-ft. self-supporting tower up, a 40-meter beam, a 75-meter inverted "V" and a 100-meter long-wire Ranger and an SX-101; also he has been appointed Official Phone Station. The new club bulletin of the Lawrence Amateur Radio Club is called *Static*. Emma. W0JUV, really has done something in the Lawrence Club. I wish to thank each and every one of you for the cards received while I was in the company hospital. Traffic: (Mar.) W0OHJ 507. K0HGI 178. W0SAF 146. W0BYV 133. W0TOL 115. W0ABJ 81. W0FNS 65. K0YTA 47. K0HVJ 32. K0EFL 31. W0QGG 28. W0IFR 22. K0OKS 13. K0GII 10. K0LIF 10. W0TWJ 10. W0ORB 9. W0TSR 8. W0ALA 7. K0JID 5. K0ZHO 4. W0PDI 3. W0VQB 3. K0LPE 1. (Feb.) K0IRL 47. W0TWJ 7. W0LOW 2.

**MISSOURI**—SCM, C. O. Gosh, W0BUL—SEC: K0LTP, Asst. SEC: K0LTJ, RMs: W0OOD, K0ONK, PAMs: W0BVL, K0WNZ, W0LFE (v.h.f.). Net reports (Mar.): Mo. S.S.B. (3063 kc. 2100 GMT, Tu-Th) 9 sessions; QNI: 145; QTC: 39; NCSs: W0PXE 5, W0MM 4, MSN (3715 kc., 2200 GMT, M-F; 1400 GMT S) 21 sessions; QNI: 47; QTC: 22; NCSs: K0ONK 16, K0VPH and K0FPC 4 each, HBN (7280 kc., 1805 GMT, M-F) 21 sessions; QNI: 729; QTC: 390; NCSs: K0WYT 8, K0WNZ 4, K0HGI 3, W0ANT 2, K0TJV, K0TPY, K0UHF, K0LTJ, 1 each, PON (Mo.) (3810 kc., 2100 GMT, M-F) 22 sessions; QNI: 309; QTC: 96; NCSs: W0HVJ 11, K0PIQ 5, K0BWE 3, W0TXC 3, W0HVW 1, M1EN (3885 kc., 2400 GMT, MWF) 13 sessions; QNI: 441; QTC: 36; NCSs: K0IHA 4, K0ONK 4, K0VPH 5, M0N (3580 kc., 0100 GMT Tu-S) 27 sessions; QNI: 230; QTC: 217; NCSs: W0OD 13, W0KIK 7, K0VPH 4, W0RTW 3, SAIN (3580 kc., 2200 GMT, Su) 4 sessions; QNI: 17; QTC: 11; NCSs: K0FPC 4, W0OD 1. Appointments: W0EOJ as OPS: W0TPK and K0YNB as ORS. Endorsements: K0LTP as SEC: K0LTJ as Asst. SEC: K0VPH as OPS: W0GCL as ORS. K0ONK as OO (III/IV). This is your column! How ever, news items must be sent to me. I'm no mind reader. Officers of Green Co. ARC (Springfield) are K0JPI, pres.; W0SJT, vice-pres.; W0AH, secy-treas.; K0HUU, act.; K0JPI, bulletin. Northwest St. Louis ARC officers are W0WFQ, pres.; K0JPL, vice-pres.; W0MNW, secy.; K0CRJ, treas. The "Highway 66" RC, was organized at a dinner meeting. Two new ARRL affiliated clubs are the Communicators ARC (St. Louis) and the North Missouri ARC, Inc. (Princeton). W0RPA is a new ham in the Bureau of Mines, Rolla. W0TPK has a 35-w.p.m. code certificate. Jennings RC reports a station on 50 Mc. K0RAX converted his Ranger for 50-Mc. operation. Traffic: (Mar.) K0ONK 1210. K0LTI 537. W0MM 133. K0VPH 128. W0OOD 113. W0TPK 94. K0FPC 93. K0RPH 82. W0ZLN 82. W0BUL 54. W0KIK 52. W0MKJ 34. K0IPD 33. W0RTW 31. K0VMZ 31. W0BVL 29. K0GOB 18. K0WNZ 15. K0VNB 12. W0EPI 10. W0PXE 10. K0KCG 7. W5EZY 5. W0GBJ 4. W0OVV 3. K0IHY 2. (Jan.) K0FPC 27.

**NEBRASKA**—SCM, Charles E. McNeel, W0ENP—SEC: K0TSU. The Nebraska Morning Phone Net, K0DGW NC, reports QNI 666, QTC 91. The Western Nebraska Net, W0NIK NC, reports QNI 712, QTC 559, 100 per cent reporting W0VYX, W0DVB, W0GGP, W0LDO, W0NIK, W0OFP, K0BMQ, K0FRU, K0AIE. The Nebraska Section C.W. Net, W0OKO reporting, had QNI 220, QTC 78 for Mar. and QNI 230, QTC 89 for Feb. The Nebraska Emergency Phone Net, W0HXH reporting, had QNI 704, QTC 32, new members W0LEK, W0PQP, K0VTD. Amateurs in Nebraska were on hand and provided a great public service during the mid-March blizzard that crippled communications and travel for several days in the northeastern section. W0JFJ acted as NC for the 3-day duration and the net handled over 1000 messages. The Flood Control Net for Northeastern Nebraska was very ably handled this year with several mobile stations in the flood area and the emergency net was very nicely handled by K0LDO as NC. With deep regrets we report the passing of K0YGG Mar. 21 at McCook. Traffic: (Mar.) W0GGP 508, K0GAT 73, W0OKO 70, W0NIK 54, W0ZJF 54, W0NYU 47, W0DDT 43, K0UWK 42, K0RRL 41, K0RPL 32, K0FRU 30, W0LLO 30, W0RIB 29, K0DGW 28, W0EGQ 27, W0UWK 27, W0AIB 26, W0OCU 25, K0CN 20, K0FBD 20, K0KYN 20, W0VZJ 16, W0FNH 14, K0IAL 14, W0YFR 14, W0LJF 13, K0MSS 12, W0BOQ 11, W0LMI 11, K0YDS 9, K0ELC 8, K0SBV 7, W0CIV 6, K0FUJ 6, W0VEA 6, K0YZP 5, K0ZEQ 5, W0HOP 4, K0BRQ 3, W0KDW 3, W0LJO 3, W0HXH 2, W0WPK 2. (Feb.) W0OKO 44, K0YDS 21.

(Continued on page 120)





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**N**obody knows when *Mobilitis* will strike—but when it does, watch out! You can't sleep. You can't eat. The day seems to have about 76 hours in it. You feel blah all over. Recognize those symptoms? Bet a Confederate buck you do! Why, man, them's the warning signals for you to pack your mobile gear in the old jalopy, hoist in a hamper of vittles, stash away a few cans of beer, grab the YL—and go, go, go, GO!

**W**hazzat? You don't have a real sharp piece of mobile gear? The pleasure is mine. Mr. Ham, meet the G-76 All Band Transceiver. Gonset G-76 Transceiver, meet Mr. Ham.

**T**his new, power packed, 100 watt AM transmitter and sensitive dual-conversion receiver, all integrated into one eye-filling honey of a case—is the best thing that ever happened to a car since Henry Ford!

**Y**ou blanket the spectrum operating on 80, 40, 20, 15, 10, and, with a slight modification, the lively 6 meter band! I tell you, when Gonset put all these goodies together in a cabinet that mounts under the dash, or on your yacht or dinghy, or in your Piper Cub—they went all out. And so will you when you see it! Drop me a line today. I'm no medical man but I've got the best cure in the world for *Mobilitis*!

A Gonset G-76 6 Band 100 Watt AM Transceiver!

Sincerely,

*Ward J. Hinkle* W2JFK

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**CONNECTICUT**—SCM, Henry B. Sprague, jr., W1-CHR—SEC; EOR, RM; KYQ, H.F. PAM; YBH, V.H.F. PAM; PHP. The virus quered QV's chances in the second half of the DX Contest. NTE has temporarily forsaken traffic to chase DX and build an 800-watt linear. OJR is now an OTC member. WKW has an s.s.b. rig going. IKB is nearing 200 countries worked. WX is on 3.5-Mc. c.w. with QRP BC-474. KUO's travelling makes his CN presence infrequent. ETF got his RTTY gear on the air again. ZGO is rebuilding his v.h.f. s.s.b. gear. IJV plans to be married in Sept. KIBXC is back on 6 meters. KN1RWI has little luck trying to QNI MHT. KIQPN got his 20-w.p.m. certificate and has been operating mobile with KILWM. KIHTV now has 162 countries. K1TVI passed the General Class exam. KN1VIA and VJL are new New Haven Area Novices. ADW is enjoying a new (to him) 32V-3. BDI struggled to replace his 2-meter rotator atop a pipe plus tower plus house without braising himself, the house or the beam. The Sub Base Medical Research Lab. Club is now ARRL affiliated. K1CTG reports that U-Conn's LXV handles traffic for students and provides operators for the state's c.d. The Waterbury ARC's station, L&S, is active using a DX-100. Officers are EQV, pres.; K1KTM, vice-pres.; K1OVT, secy.; GTE, treas. PHT is on 40-meter c.w. at his new QTH in Cheshire. HJG lost a clamp on his 2-meter halo and towed it behind his car for two miles! KIQUAL, while in the hospital, tried a 6-meter Gonset but it came through the hospital's p.a. system so he switched to 2 meters. SXR has 3 transmitters abuilding. NJM conducted the N.E. Division meeting for SECs and SCMs called by EFW at the Swampscott Convention to review AREC and related matters. Contact your local EC, SEC or SCM if interested in emergency work. OBR enjoys s.s.b. along with his heavy c.w. traffic commitments. Traffic: (Mar.) K1GGG 329, PQS 365, W1AW 218, KYQ 187, K1FJ 173, W1YBH 150, RZG 147, K1JAD 142, WINJM 126, BDI 113, ORR 113, K1PPE 91, W1LXY 89, K1-JVZ 69, AQE 66, PUG 52, DKG 50, W1FXS 48, RFJ 47, KIMBA 35, K1MUT/1 21, KIHTV 15, W1CUH 12, BNB 10, QV 8, KIQPN 5, W1ETF 1. (Feb.) KIQPN 30, W1KUO 6.

**MAINE**—SCM, Albert C. Hodson, W1BCB—Results of the Maine QSO Party are in and they reflect little success with only eleven out-of-state reports received. K1SKH/5, with 2400 points, and EHX, with 1260 points, were leaders but no logs completing contacts with all 16 counties were received. Of the Maine stations reporting, GHV reported 34 contacts on 80- and 20-meter c.w. Newcomers in Arrostook County are K1SUU, K1SUT and K1VOR. Communications Officer for the county is ACW, in Presque Isle. Radio Officer is BBE, assisted by W1S EPN and TCF and K1S LFG, BPH and CYJ. JPN is at school in Mass. K1AKC is now 8DPTU and is looking for Maine contacts. The Westbrook ARC has a club station on 2 meters with the call K1UHB. K1ADY is a grandma. JIS is wondering if he is the oldest active ham in New England at age 85. He would like to hear from others around his age. The Sixth Annual Augusta Hamfest, sponsored by the Augusta Radio Club, will be held Sun., June 17. Get those mobiles ready. At the ARRL New England Division Convention in Swampscott your SEC, GRG, showed the best EC reporting activity for New England and deserves your support by your enrollment in AREC. Traffic: K1GUP 90, W1GRG 30, ISO 29, K1GSR 24, W1YYW 16, K1OAZ 5, CVJ 4.

**EASTERN MASSACHUSETTS**—SCM, Frank Baker, jr., W1ALP—SEC: AOG. New appointments: AAU Dedham, NSZ Groton as ECs; KBN and K1JIU as OBSs; RHN as OO; K1TGB and K1VBN as OESs. AFV and MP are Silent Keys. UXN moved to Florida. MMY and WOX are on 10 meters K1JIU has applied for OBS appointment. EFW presented the King Philip ARS in Sudbury with its charter of affiliation with ARRL. EAE and ALP were present. The Nauset ARC of Middleboro, K1IAD secy.; the Earl C. Batchelder RC of No. Attleboro, K1TKW secy. and the Middlesex ARC of Newton, K1OGA secy. are now ARRL affiliates. The Old Colony Radio Club elected OJL pres.; K1M00, vice-pres.; K1LLK, secy.; K1OVA, treas.; K1LUI, property officer. The Hingham ARC's officers are KP, pres.; K1MTH, vice-pres.; ZNG, secy.-treas.; CRA, instructor; MD, trustee of VPR. Lexington High School ARC's officers are K1QBV, pres.; K1YSU, vice-pres.; K1MJS, secy.; K1OSH, act. mgr. K1JMQ is the club call and K1SQU is trustee. K1S RNL, RNE, JVM and KCG are now Generals. The Framingham Club had a talk on Radio Control of Aircraft Models by Harvey Thomasan. Our sympathy to DIXQ on the death of his mother. The Milton Club had Les Cushman speak on antennas. The QRA had a C.D. Communications Night with K1GFR.

(Continued on page 122)

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Includes complete set of coils  
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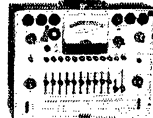


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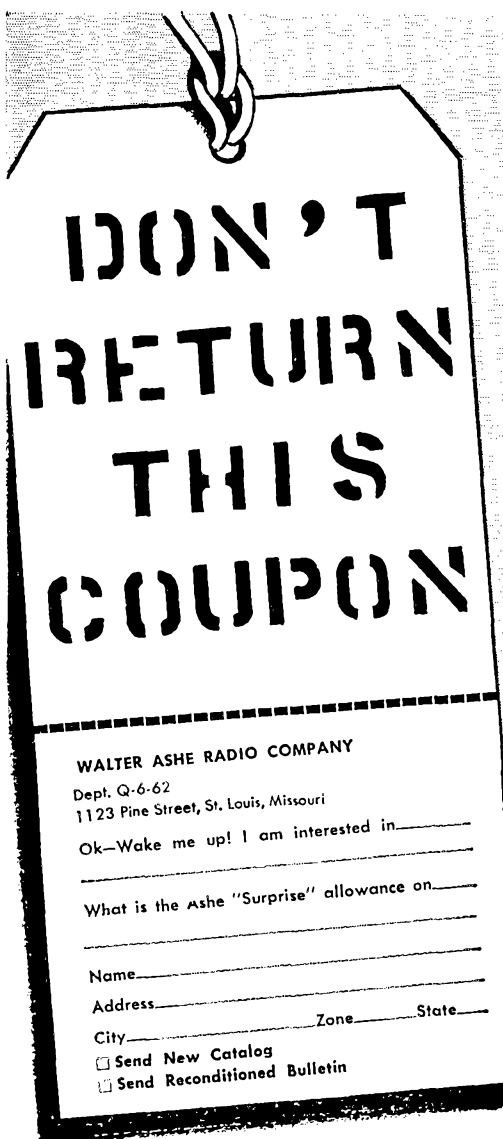
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KIIZM and BL as speakers. The T-9 Club met at the QTHs of Larry Stone and Al Barton. PKV is home from the hospital. SZ is back in Wayland. EFY is C.D. Director for Groton. K1UCT is very active in traffic nets. NF enjoyed his 15 years as an OO. CPB works K4BQ, ex-ICPD, on 20-meter s.s.b. almost every day. On 2 meters: KN1s VLW, VFZ, VFD, VXB, VDJ, UMZ, VWM, K1s SUB, CKO, DSS, QLP, TCA, QBD, BJE, JBY. The EM2MIN held 22 sessions, with 263 stations, 161 pieces of traffic. K1QNG and QNZ are new NCSs. FON is back on 2 meters. K1QNM has a net certificate. K1TGB is building two transmitters and receivers. K8KDJ/1 is on 6 meters in Watertown. QMU is building a v.f.o. for 6 meters. LAZ is on 6 meters in Brookline. PIW went to Florida. CGU is converting a 454 receiver for use with a new converter. K1JFA is building mobile for 6 meters. RM is on s.s.b. early mornings. JOW is working on the reduction of man-made noise. VYS is back from the West Indies. LNU is rebuilding power supplies. The Middlesex ARC held an auction and K1MIA gave a lecture on Modulating Transmitters. K1MPE has an HT-40, an SX-140, a Sixer and a 6-meter beam. K1NVT has an S85 receiver and a Globe Chief transmitter. AYG is home again and worked BIY on 40 meter c.w. from mobile each day. The EM75N had 383 stations and 155 traffic. HIL has a new HA-10 kw. linear and is getting an HX-10 for s.s.b. ACR made the 70PS c.w. club. BA is C.D. Director for Boston Edison. FQA is back from Florida. H1U has a new QTH. K1GKA is converting an ARC-4 for 2 meters. K1GYM is on 20-meter s.s.b. K1TSD is on our EMCWN. K1LJK has been ill. The Tewksbury Memorial HSRC has the call K1UFB. K1OLN is trustee. K1N1UF and Mrs. Rand, ex-PBM's XYL, were married by K1OXK. Appointments endorsed: OFK as PAM for 2 meters. K1KKS as OES. NF as OO. IPZ Shirley. SPL Sector 1-C. HRY Wellesley. BCN Sector 2-C. as EC. BCN and SPL as OESs. SMO and FJJ as ORSs. HIL as OPS. Sorry to have to report the death of ex-1KBS-W4VLI. BGW made RTTY WAC. BERTA and DUF4. CMW got a 35-w.p.m. certificate. K1ATQ is in Keesler AFB. Miss. RB worked EP2BK in Iran on 160 meters. The Framingham Club, GLA, operated at Shoppers World during Amateur Radio Week. K1KMY doing some building. Traffic: (Mar.) W1PEX 654. FMG 250. OFK 239. EAE 72. ZSS 63. D1FS 61. K1MYN 51. W1DOM 36. K1QNG 37. C1M 29. GYM 29. GOG 28. GKA 25. TSD 25. W1AOG 21. VYS 20. HGN 18. K1QNZ 18. W1SIV 18. A1Q 13. GFK 11. K1BGE 9. LFA 6. GTX 2. (Feb.) W1EAE 102. FJJ 54. K1QJ 7. W1VYS 7. K1LFA 6. OLN 4. LJK 3. (Jan.) W1EAE 97.

**WESTERN MASSACHUSETTS**—SCM, Percy C. Noble, W1BVR—SEC: BYH/K1APR. RM: K1IJV. A demonstration of operating and c.w. net procedure put on by AZW, BKG and K1LBB was well received by the members of the Pittsfield Radio Club. K1PGV is using a homemade 6-meter rig to demonstrate a.m. modulation on scope display for the local and U. of Mass. High School Science Fair. W1DX, of ARRL Hq., was speaker at the April meeting of the BCARA. Attendance on WMN is improving and 132 messages were handled during March. Two new members who are fast becoming good traffic men are K1PES and W2GLN/L. WEF is working on a new c.w. exciter using Nuvistor and transistor and is attending U. Conn. grad school part time. Two very fine bulletins have been received from the Nipmuc Emergency Radio Corps of Upton, which plans to operate Field Day on 2, 6, 10, 15 and 20 meters (with standby equipment for 40 and 75 if needed). Calls of some of the members are K1OCG, K1PRG, K1TYW, RYE, K1KQK, K1YKD and K1SLG, corr. secy. K1CZZ is home from the hospital and doing nicely. AZW had a 40-minute QSO with a former guest speaker of the BCARA, KH6IJ, who is now Asst. Professor of Physics at the University of Hawaii. K1GTT has been appointed Asst. EC under EC BKG. At the March meeting of the BCARA, D1Y entertained with his wonderful slides of our western National Parks. WMN again had 100 per cent attendance on IRN, thanks to the continuing efforts mainly of K1IJV and K1LBB along with those of your SCM. BVR sold his year-old DX-60 and has built another. Traffic: K1IJV 131, LBB 123, W1BVR 104, AMI 37, MNG 34, K1PES 23, W1D1V 22, OSK 5.

**NEW HAMPSHIRE**—SCM, Ellis F. Miller, W1HIQ—SEC: K1GQK. PAM: K1JDN. RM: K1ITS. KSPN meets Mon. through Fri. at 2100 and Sun. at 1430 on 3842 kc. CNEN meets Mon. through Sat. at 1145 on 3842 kc. NHN (c.w.) meets Mon. through Sat. at 2330 on 3685 kc. Endorsements: CTW as OES. The Manchester Radio Club held its Annual Banquet Mar. 10 with 109 in attendance. Following a bountiful dinner, Capt. Williamson, USAF, gave a line talk on SAC's role in the National Defense. YHI, MAS and K1GIG were in there pitching for AREC memberships. Please, any new applicants for AREC in Hillsborough County, contact any of the above. A Swedish meatball supper and auction was held Mar. 17 under

(Continued on page 124)

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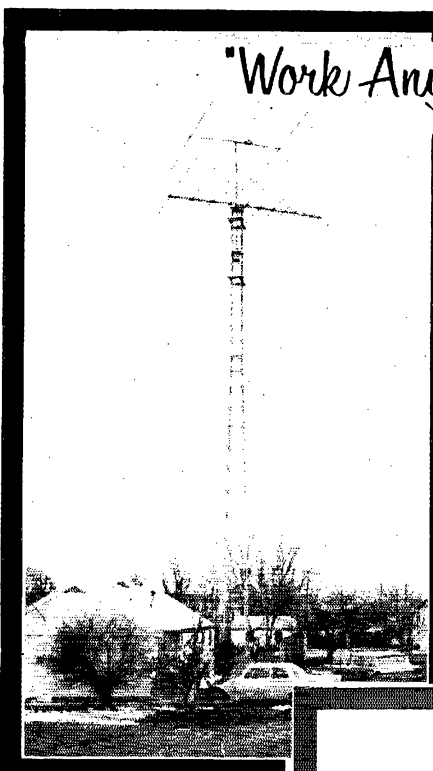
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"Both the Log Periodic and the Hy-Seven are real performers. When you can work anything you can hear and you are the first or second one called on the DX pileups. Local tests on the LP indicate up to 45 to 50 dB front to back ratio.

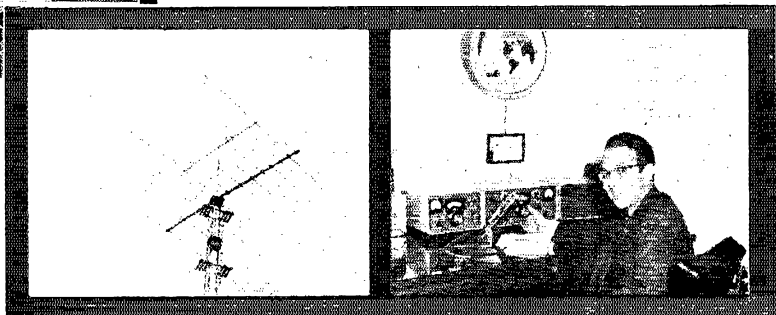
"Mechanically, the beams have withstood all the winds and sleet and snow that ole man winter has provided. Gusts up to sixty miles per hour have had no effect on the installation.

"In all, I am very well pleased with the antenna . . ."

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- LP 1330      \$570.00
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- 402-B        \$ 99.75



**13-30 MC LOG PERIODIC**

The Hy-Gain Co-Planar Dipole Type Log Periodic system was originally developed for the U. S. Air Force Global Communications Network and is now available for commercial or amateur use. This system operates without hiatus over its entire frequency range. VSWR is less than 1.5:1. Average front-to-back ratio 20 db. Forward Gain averages 8.7 db over isotropic source. Power handling capabilities — 2.5 KW AM, 5 KW P.E.P. Mechanical construction meets milspecs. Technical information available. \*Model LP-1330.

Model RBX-5 commercial rotating system delivers 5,000 in. lbs. rotating torque and 20,000 in. lbs. braking torque. Turns at 1 rpm. Selsyn controlled indicator.

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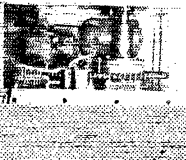


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## COLLINS KWM-2 FROM ART BROWN



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| KWM-2 less power supply   | \$1150.00 |
| The KWM-2A is an extended frequency version permitting the use of 14 additional bands, each 200 kcs. wide, outside the U. S. amateur frequencies within the range 3.5 to 30.0 mcs.  |           |
| KWM-2A less power supply  | \$1250.00 |
| The fact that the KWM-2 is a part of a carefully integrated amateur communication system should not be overlooked. Each of the purposefully conceived accessories is readily available and contributes substantially to utility of the KWM-2. |           |
| 516-F 115 volt AC power supply  | \$115.00  |
| 440F-1 Extension cable for 516F-2 or PM-2.  | \$17.00   |
| MP-1 14 volt DC power supply for mobile applications.   | \$198.00  |
| 516E-2 28 volt DC power supply for mobile applications.   | \$400.00  |
| PM-2 Lightweight (15 pounds) 115 volt AC power supply for portable applications.  | \$150.00  |
| CC-2 Carrying case accommodates KWM-2 and PM-2 permitting inclusion of portable station with other luggage.   | \$85.00   |
| CC-3 Carrying case for 312B-4 or 312B-5 and MP-1 plus spares.   | \$107.00  |
| 399B-5 Novice adapter for CW operation meeting requirements of Crystal Control less crystals.   | \$46.00   |
| 312B-4 Speaker console, incorporating directional wattmeter and station controls.   | \$195.00  |
| 312B-5 VFO and control console, permits individual control of transmitter and receiver frequency as well as other station control functions.  | \$350.00  |
| 399C-1 VFO and speaker without station controls.  | \$164.00  |
| 351D-2 Mobile mount for quick and easy mounting and demounting of KWM-2 in mobile installations.  | \$120.00  |
| 351E-4 Mount for table top location in vehicular use.   | \$24.00   |
| 351R-1 Relay rack mount   | \$32.00   |
| 136B-2 Noise blander for electronic reduction of ignition noise in mobile installations.  | \$124.00  |
| MM-2 Comfortable combination earphone/microphone for "no hands" voice communications.   | \$39.00   |
| MM-3 Mobile boom microphone   | \$27.00   |
| TD-1 Portable antenna   | \$152.00  |
| DL-1 Dummy load   | \$58.00   |

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the combined auspices of the Concord Brasspounders, the Contoocook Valley RC and the Turkey River RC with 43 attending. CNX auctioneered. FOG won an electronic keyer. AJJ has succumbed to wedded bliss and is busy outfitting a new 8-room home. Our congrats to Knappy and Teach. Traffic: WITA 50, PPU 22, IIQ 8, SWX 8, KIGQH 7, JDN 6, W1YH 6, AIJ 5, KIPDA 5, EEN 4, CIG 2, MID 2, W1PYM 2, KNITGZ 2..

**RHODE ISLAND**—SCM, John E. Johnson, K1AAV—SEC: PAZ, RM: SAMU, PAM: TXL, RISPND reports 31 sessions, 567 QNI, 94 traffic. Endorsement: WED as OBS. K1LPL is the first R.I. Certificate Hunters Club member. K1GRC has a new 99er for mobile work. K1KDI is building a new oscilloscope. K1PAM has passed the General Class exam. K1NKR will be mobile on his bicycle. The WIAQ Club of Rumford announced the committee for its Annual Ham and Bean Supper. HXU and KN1THE are co-chairmen with K1CZB. The following KIs were named to the Field Day Committee: CZD, CZB, QIE and LDK. The new WRI certificate chairman is K1LDK. WRI certificate No. 17 was issued to K5UYF and No. 18 was issued to 2NIY, K1VYC and K1VLM are two new Techs, who have joined the 6-meter band hams. Sun., Apr. 8, was a very quiet day on the ham bands here in Rhode Island as most of the hams attended the New England Division Convention at Swampscott. A good time was had by all and everyone is awaiting the next one. Traffic: WITXL 610, SMU 537, K1LYQ 73, PZY 42, JOD 30, DZX 23, GRC 20, LPL 20, LSA 10, WIWED 9, K1GRA 8, PNI 6, W1PXi 5, K1KDI 2.

**VERMONT**—SCM, Miss Harriet Proctor, W1E1B—SEC: K1DQB, RM: KRV, PAM: ERG. Newly organized clubs are in Franklin and Orleans Counties. UCL is Franklin County Amateur Radio Club, Inc. pres. with K1RAM, treas. and K1MIV, clerk. The club has 27 members and the important project is getting a club house and setting up a station. A transmitter has been donated. The Sacred Heart High School of Newport has its own amateur club with seven licensees and has applied for a club station with K1KFI as trustee. We'd like to hear from all clubs about ED and about their public service activities during the summer. VMC has been in Washington, Vt., since June and should now be on RTTY. Vermont was well represented at the N.E. ARRL Convention. K1PQN appeared in print in *V.H.F. Amateur* magazine. Traffic: K1IJJ 19, W1FPS 16.

### NORTHWESTERN DIVISION

**ALASKA**—SCM, John P. Trent, K17DG—BZO reports the following for the SCM: The Anchorage RC had guest speakers from the telephone company and the International Assn. of Car Racers and on Mar. 24, (Whitehorse to Anchorage) some 24 KIs operated successfully for 24 to 36 hours! Thanks to all who helped. The club has a new Bunny Trophy. DQL and DQT have their name on it twice! The amateurs of Anchorage are on channel 2 with a Sat. P.M. program to let people know what amateur radio can do for the community. Please help your new SCM (who now takes office) with club news and news of the state. We need OO, EC, SEC and other offices filled.

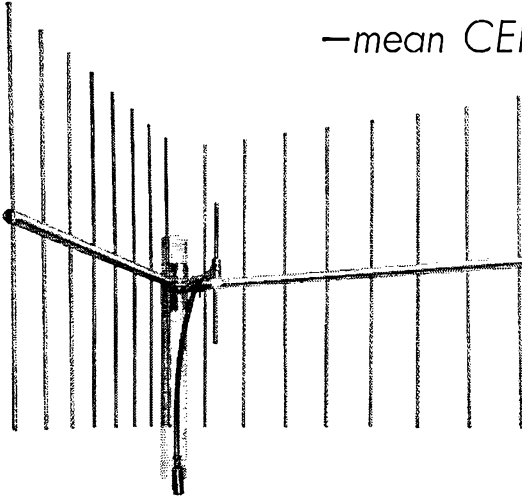
**IDAHO**—SCM, Mrs. Helen M. Maillet, W7GGV—Our sympathy to the family of ITT, who became a Silent Key. The FARM Net elected JFA manager and K7KRO, net control, assisted by K7OAB and K7ENQ. WMO is alternate NCS for the Gem Net. The Eastern Idaho C.D. Net meets at 1415Z on 3991 kc. Wed. Bingham County AREC has code practice daily at 1330Z. K7HLR sends code for Novice practice daily except Tue. at 0230Z on 3700 kc. The Argonne Club held its first meeting at K7KBY's QTH. K7QIE was appointed OBS. K7NSEO is a new ham in Idaho Falls and K7QDT got his Conditional Class ticket. GDA and ORB, 40 miles apart, keep regular 2-meter skeds. K7DMZ is setting up for RTTY operation. UA showed movies of the Eastern Idaho flood to the Pocatello Club. Visitors to the SCM's ham shack were K7COM and K7HLR. The FARM Net reports 20 sessions, 430 checkins, 37 pieces of traffic handled. Traffic: K7KBY 94, HLR 54, W7WMO 19, GGV 18, VQC 18, EEQ 16, FL 9, SLY 5.

**MONTANA**—SCM, Ray Woods, W7SFK—SEC: BOZ, PAM: YHS; RM: K7AEZ. The MPN meets on 3910 kc. at 1800 hours. M-W-F; the MSN meets at 1830 hours on 3530 kc. T-T-S; TSN meets Mon. through Fri. on 7230 kc. at 1200 hours. K7MYQ and MYP put on a radio demonstration for the Sidney Jr. High School. K7GYE, a new EC, is heard with his DX-100 from Forsyth. We'll miss FTV, who is headed for Los Angeles. YHS and his XYL are on a vacation trip. The Havre gang is real busy. Club officers are K7MEG, pres.; K7SCJ, vice-pres.; K7BQN, secy.; IDK, activities and editor. Havre will hold its hamfest June 10, 1962. K7RME reports 2-meter activity around Helena. S.s.h.ers in Helena are

(Continued on page 126)

# C-P COMMUNICATION ANTENNA SYSTEMS

—mean CERTIFIED PERFORMANCE!



## Electrical Specifications:

Nominal input impedance .....	50 ohms
Forward gain .....	10 db
Front-to-back ratio .....	20 db
Maximum power input .....	250 watts
Internal feedline .....	RG-8A/U
Flexible terminal extension .....	18" of RG-8A/U
Termination .....	Type N male with Neoprene housing
VSWR .....	1.5:1
Bandwidth .....	±3%
Lightning protection .....	Direct ground

## Mechanical Specifications:

Reflector (size per side) .....	2' x 2'
Reflector material .....	High strength aluminum alloy
Radiating element material .....	High strength aluminum alloy
Radiating element diameter .....	3/4"
Rated wind velocity .....	100 MPH
Lateral thrust at rated wind .....	16 lbs.
Torsional moment on mounting pipe .....	16 ft. lbs.
Weight .....	8 lbs.

Stainless steel hardware supplied to mount antenna on 2" IPS pipe.

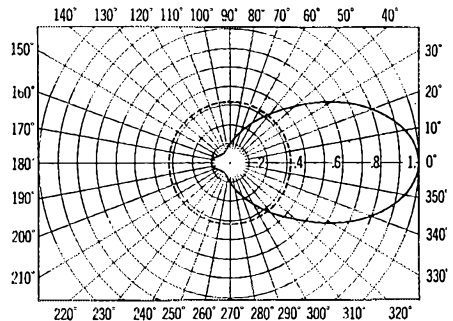
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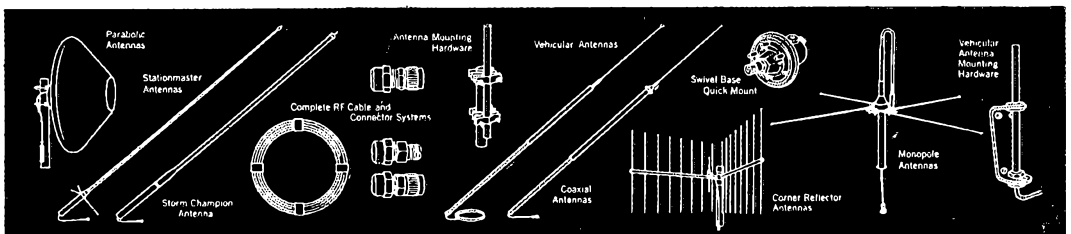
Horizontal field strength pattern of Corner Reflector 10X-Gain Antenna Cat. No. 161-509. A dipole pattern is shown for reference.

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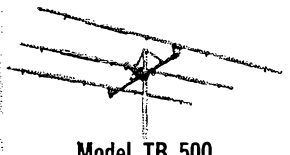
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**SATISFACTION GUARANTEED**

UWY, CBY, JZW, BIX and KME. Missoula is doing an FB job in erecting signs for the out-of-state hams that pass through at Fair time. The boys in Anaconda are going for 8 and 2 meters. They have 18 members listed. The Glacier Park Hamfest to be held July 21 and 22 at Apgar is pretty well shaped. DWR reports a lot of v.h.f. activity in the Flathead Valley. RZY and CHA are on with a five-element beam on 21 Mc. Traffic: K7NHV 321, EWZ 216, BKH 193, W7TVX 49, K7OGF 21, GHK 18.

**OREGON**—SCM, Everett H. France, W7AJN—SEC: WKP, RM; MTW, PAM; NJS. New appointment: K7JTY as EC for Klamath County; MAO as ORS. Endorsements: K7CNZ and RNJ as ECs; NJS, K7CLL and ZB as OPSs; HRG as OO; K7EZF as OES; OBS, RVN, Multnomah County EC, has appointed two Asst. ECs: K7OWF for the 75-Meter Phone Net and ZFH for the C.W. Net. The Oregon State Net (OSN) reports: Session-23; attendance 220; traffic 59; BRAT awards to AJN, BVIL, MTW, ZFH, K7IWD and MAO for 100 per cent QNL. The 6-Meter AREC Net had 5 sessions with a total attendance of 105. K7CJB, OBS, has been keeping regular three night per schedules on the AREC Phone Net. K7KZF, LaGrande EC, reports the starting of a 2-meter net with base stations HTL, LVM, K7KRP, K7OAA, also on mobile HTL, K7KZF, K7KRP, K7IWD. OO sends in a report of 29 signals heard with various type discrepancies in the ham bands. K7RWO is a new ham in Gold Hill. K7PMB has a new Hammarlund 100 receiver. ADR is on 2 meters now and has contacted K7IRR and K7ISI, both of Seattle Wash. Traffic: (Mar.) W7ZFH 130, ZB 122, K7IWD 35, W7IVN 35, BVH 25, BDU 22, DEM 19, K7CNZ 17, W7AJN 14, MAO 10, K7CJB 3, DK 2. (Feb.) W7BDU 32, ZB 30, K7EPH 18, W7MTW 10.

**WASHINGTON**—SCM, Robert B. Thurston, W7PGY — SEC: HMQ, RM; AIB, PAM; LFA. The Puget Sound Council of Amateur Radio Clubs held its first Annual Banquet at the Waller Grange Hall near Tacoma with 250 attending. JJK was the top prize winner. The Radio Club of Tacoma held its banquet with 44 attending. PEO, of Seattle, gave a talk on the Russian hams at the Tacoma meeting. Mary, K17BJD, is visiting the different clubs in the Puget Sound Area. She will be the Alaskan operator at Century-21 World's Fair in Seattle. IKG has a new NC-300. K7CWO is getting married July 1 and is going in the USAF in Aug. A new radio club has been formed in the Marcus Whitman Junior High School in Seattle. A new active Novice in the Seattle Area is KN7QFV. K7QOM is using a tri-band quad for his contacts. K7KSE and KSF mobile to Idaho on vacation. OEB is active on 10 meters. OIH, NNE, NNF, and YFO are chasing DX on 20 meters. New Conditionals in the Richland Area are K7s NIH, OOA, PVF, RRM, PVG, QFY, PJJ, PVJ, PWQ. The Skagit Club spent the week end at Sol-Duc Hot Springs. LFA returned from a trip to Texas and New Mexico. K7JRE made his 1000th QSO Mar. 28. Attention visitors to the World's Fair: When mobiling through the state the frequencies of 3970 and 3882 kc. are monitored in case you need assistance. The Spokane Amateur Radio Club is converting a van truck into a mobile communication truck. K7GBW is operating RTTY on 80 and 20 meters. The NSN had 229 QNTs and 76 QTCs for 27 sessions. K7OEX is QRL building a new push-to-talk junction box. GYH is heard on several nets. GVC works 10- and 75-meter phone and 80-meter c.w. NXY has an HRO-60. ZAW has Heath twins installed in his car. KN7BPA passed the Conditional Class exam. IDI has the honor of being the first ham to operate from the space needle at the Seattle World's Fair. The Kitsap County AREC has been reactivated with a good turnout for drills. AMC is QRL with prizes for hamfest in Bremerton. CW and NPK are active again after years of silence. JC renewed his ORS certificate. ACU is a Silent Key. He was a member of the Quarter Century Wireless Assn. ZAS is now Class I OO. A new OES in the Seattle Area is EMX. The SEC, HMQ, was asked to provide communications for ground searching parties for the lost Navy plane Mar. 23. Communication was established at 0230 PST and continued for 57 hours with 118 pieces of traffic handled. K7DTS/7 set up the Toledo operations and OCA/7 the AlChord Field operations. A total of 52 amateurs participated. Traffic: W7BA 917, DZN 710, PGY 317, GYF 136, GIP 90, APS 78, K7JHA 38, W7AMC 31, OEB 30, HSO 25, BTB 18, AIB 13, IEU 6, VPW 6, K7CWO 5, W7JEY 2, W7RGL 1.

**PACIFIC DIVISION**

**NEVADA**—SCM, Charles A. Rhines, W7VIU—The State Centennial Commission has been approached regarding a Nevada Centennial Certificate for next year and plans for such an award are now being completed. K7KBN has a new Hornet three-element beam but is now having transmitter troubles. K7ICW and his XYI, SNP are moving to a new QTH. MAH visited the Reno

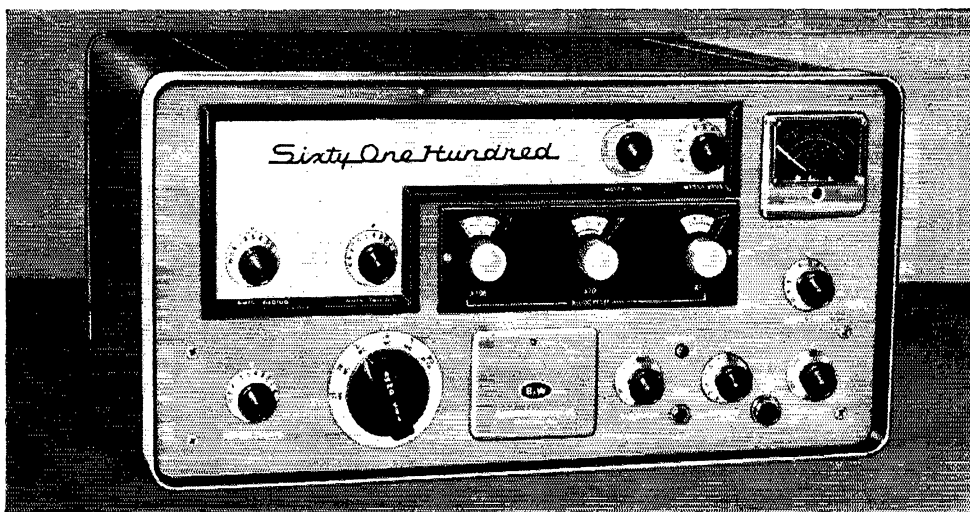
(Continued on page 128)



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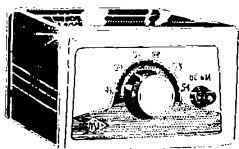
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gang on the way back east on business. MWF has moved to a new QTH. YKC acquired a 75A-3. KHU still is grabbing good DX. QYK is holding radio classes twice weekly at his home. Look for a new crop of hams in Ilko soon. KN7s RBM, PSK and QPK have dropped the "N." New Nevada hams include K7s QEU, QPX and NOM. K7HYP, at Las Vegas High School, has a new crank-up tower and beam. Appointee—SEC: JU. ECs: PC, HJ, YKC. OO: KHU. OBS: K7KBN. ORS: VIU. Traffic: W7KHU 234, K7KBN 57, W7PBV 2.

**SANTA CLARA VALLEY**—SCM, W. Conley Smith, K6DYX—Asst. SCM, Edward T. Turner, W6NVO. SEC: W6ZRJ. PAMS: WA6EIC, W6ZLO. RM: K6KCB, K6HCP. OES. gave a very interesting talk on u.h.f. scatter propagation at the SCCARA March meeting. WA6HVN, trustee, is making the club station, W6UW, available on Sat. and Sun. nights for members and friends. WA6RWY and Bob Ashford, Navy pilots, have been operating aeronautical mobile on their proficiency flights out of Monterey. On a recent Sun. morning 75 meters was jaunted while they flew to Sacramento and back and as they circled the peninsula before landing all the XYLs were out in their various yards waving blankets! It's a boy for Dor and Caroline Gmelin, W6ZRJ, Robert Paul was born Mar. 29, W6FON was temporarily laid low by a case of shingles. WA6HRS has been operating portable from Alpine County week ends to the delight of those needing that county for WACC. K6MTX has replaced his 20-meter beam and overhauled the 2-meter rig. W6MMG put a 12AT7 mixer in his RME-99, W6AUC still keeps regular traffic skeds with Hawaii, Alaska, Virginia and Oregon. WA6OLQ's traffic file for March was accidentally destroyed by the cleaning lady. The SCARS C.D. Net used the California Vehicle Code for question/answer communication drills. K6QJF has organized an emergency net for Carmel Valley. New appointee: K6TEH. OBS on 2 meters. Traffic: (Mar.) K6DYX 128, WA6EIC 112, W6AIT 106, W6AUC 97, WA6NAV 88, W6DEF 80, W6FON 61, K6GZ 38, W6OH 36, W6ZLO 20, K6ZCR 12, K6VQK 8, W6YBV 7, K6MTX 6, K6TEH 6, K6EQE 4, W6UVP 2, (Feb.) W6YHM 32, WA6HVN 31, W6UW 7.

**EAST BAY**—SCM, B. W. Southwell, W6QJW—SEC: WA6MIE, ECs: W6WAH, K6OSO, WA6MHJ, K6EDN, K6HJT, W6LDV. This month I wish to start out this column with a short soap-box oration. First, I wish to thank you one and all for electing me as your SCM. I shall continue to give you good service in all matters pertaining to ARRL in the section. Second, as our previous SEC, WA6HYU, has left the section, WA6MIE, John A. Howell, 1293 Walden Road, Walnut Creek, Calif., has been appointed to this office, effective Apr. 1, 1962. Please give him the same cooperation in AREC matters that you have other SECs in the past. Thank you. K6VXX has resigned as EC for Napa, and SEC reports several areas in need of ECs. If interested, contact WA6MIE. WA6FKN finished his WAC and is hot on the trail of ORC WACC Award. K6GK is leaving for a trip around the world. W6EY is back from 9 months tour of the U.S. and Canada. K6ZYZ reports traffic skeds on 80 meters are improving. K7NOK/6 is a new check-in to the NCN from Napa. WA6JH, K6PJV, WA6GJW and WA6LIG are members of the East Contra Costa Amateur Radio Club. It is with regret that I note the passing of W6JOH. The ORC needs a new chief operator for the club station, W6OT. Contact W6ELW. W6RSSR is awaiting his General Class ticket. Hwyward High School station K6BD is on the air every morning on 3956 kc., the ragchew net. W3WAU/6 has a set of Morrow twins and is getting out FB with them. WA6MXX is attending Oakland City College. WA6BBJ was bitten by the DX bug. W6QDQ has his code speed up to 35 w.p.m. and will try for General Class soon. W6ICR is collecting parts for a linear. W6VPG is HARC representative to the CCRC. The MDARC visited the Federal Air Traffic Control Center. WA6DKG is MDARC historian. K6TFC has a new triband beam and tower. WA6QFT has a new Valiant. The NCN held its spring brunch Apr. 1 in Palo Alto. The ORC had one of its largest attended meetings Mar. 2. W6MNK received a life membership in the ORC. Th ORC meets the 1st Fri. of the month at Oakland Red Cross Building, 906 Fallon Street, Oakland. Traffic: K6GK 132, K6ZYZ 127, WA6FKN 3.

**SAN FRANCISCO**—SCM, Wilbur E. Bachman, W6BIP —Don Norgaard, ex-W2KUJ, now W6VMH, spoke on "Theory and Practice of S.S.B. for the Amateur" as guest speaker at the San Francisco Radio Club meeting. Condolences to W6JXK on the death of his XYL. W6CTH is sporting a new Gonset G-76. Those who took part in the recent DX Contest were W6WB, W6HVN, W6ATO, W6ERS, WA6DJI and K6OHJ. Vern reported fine openings to Europe both on 14 and 21 Mc. W6WYF reports that the Red Cross station at 1550 Sutter Street is open Thurs. nights from 7 to 10 p.m. Hams are welcome to participate and learn a lot from MARS operation. The other Red Cross station, W6MLK, located on Van

(Continued on page 130)



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Nes Ave. and Sutter, is open to hams on their regular meeting night at 8 P.M. the 4th Fri. of each month. W6JWF is custodian of Red Cross on Sutter, which is Airforce MARS, and W6MLK has W6GGC as custodian. This is an Army MARS station. K6ANP has had his new XYL in St. Lukes twice for surgery in the four short months of married life. Brighter skies in the future. Len. We know all the gang join in this wish. K6XXI thinks that the summer Sporadic E season soon will make openings to 1500 miles possible on 50 Mc. Several Bay Area v.h.f. men are working on 432-Mc. TV. An effort is being made in Marin County to get the Red Cross Mobile Net (3885 kc.) to also operate on 1995 kc. and become a part of the RACES program. This would provide for welfare traffic in a disaster as well as an operation in case of national emergency and all hams are taken off the air. The Citizen Banders are having great success on 11 meters so why not get your club into a project of building transistor handle-talkies for 10 meters. This band needs occupancy now that the sunspot cycle is approaching its lowest activity level. The HAMS had Jim Wren as guest speaker at its recent meeting. K6IZY's subject was Toroid Filters and each fellow attending received some of these filters and was allowed to test them on receipt of same. The 6-meter gang had two outings recently, one to Pan-American Airport where the group toured the installations and then had luncheon at the Hilton Hotel. Three weeks later the gang met at the Precido and enjoyed a fine luncheon meeting at the Mess Hall. On Apr. 1 the NCN members and their friends had a brunch at Riecky's in Palo Alto. The net meets at 0300 GMT on 3635 kc. daily. RN6 is now on 3580 kc. WA6FJY has put up a 30-ft. homebrew tower with a Thunderbird beam. W6KUF is selling his mobile gear aiming for the Swan s.s.b. 40-meter rig. K6CVV, Red Cross liaison in Marin, is making plans for the simulated disaster alert. Over 70 turned out for the Marin Amateur Radio Club meeting in March. W6KZF is editing the Marin Club paper. W6DIX has left for a trip to Colorado. New officers of the Marin Club are W6JHZ, pres.; W6JEU, vice-pres.; WA6FJY, treas.; WA6AUD, secy. The BAYLARC Club had a line fun-fest at the Hotel Whitecomb for the YL Annual Get-together with 56 attending the YL luncheon while the OMs toured the U.C. Radiation Lab. Traffic: W6QMO 178, K6SAA 122, W6GQY 49, W6GGC 20.

**SAN JOAQUIN VALLEY—SCM.** Ralph Saroyan, W6JPU—The Kern County Radio Club is setting up a workable system for RACES and is on 50.25 Mc. every Sat. at 2000 PST. Among those checking are K6ZGD, K6CKL, W6MJH and K6QOO. The nets and times in the Bakersfield Area are 80 meters, 3800 kc., 0800 Sun.; 40 meters, 7280 kc., 1930 Tue.; 20 meters, 14,250 kc., 2000 Thurs.; 10 meters, 29,000 kc. 2030 Thurs.; 0 meters, 50.25 Mc, 2000 Sat.; 2 meters, 145.8 Mc. Tue. 2000. All times are PST. WA6OYP is mobile on 3995 kc. W6SFP has an 80-ft. tower. K6OBX is on 3995 kc. K6IXA moved to Modesto. K6IMN is on RTTY with a HC-810. The Madera Radio Club is sponsoring the SJVN Picnic which is to be held at Bass Lake, Recreation Point, Aug. 12, 1962. The SJVN had 561 check-ins, 58 contacts, traffic 5. QST 9. Bulletins 14. The SJVN meets on 3915 kc. every night at 6:30. WA6NBK has 1VI on 6 meters. W6BAN is on the Citizens Band, probably Channel 8. WA6URY has an HT-37 and an HT-41. W6BJI finally made DXCC. The Fresno gang has started up a local net on 28.6 Mc. and meets every Monday at 8 P.M. W6OUX has v.l.o. problems. W6PPO put up a new quad antenna. K6SFF has an HT-37. K6BFX is building a linear using 811 tubes. WA6LLA has a G-63. K6OZI is on 40 and 20 meters trying for WAC. WA6LUX has his Technician Class license and is building a 6- and 2-meter rig. Traffic: W6EFP 19, W6ADB 17.

### ROANOKE DIVISION

**NORTH CAROLINA—SCM.** B. Riley Fowler, W4RRH —SEC: W4YMI, PAM: W4DRC, V.H.F. PAM: W4ACY, RM: K4CPX. Fellows, this will be the last report I will file as SCM for some time. For the most part it has been most enjoyable. This month I have had some time to study the traffic situation. The situation is in fair shape but could be improved. Let's take the Ash Wednesday storm in the Outer Banks. Those who worked at this program point out some defects. RACES did not have the equipment or personnel to handle the situation. The Tar Heel Net used its frequency and did a fair job as far as it went, and it was appreciated. fellows. We tend to waste too much time standing by for "emergency traffic" and pass over some important "welfare traffic" and just plain courtesy to fellow amateurs desiring information. Perhaps it will improve as time goes on. The C.W. Net did not operate as the NCN as it gave its frequency over to RACES, which is commendable. A separate article is being sent to ARRL for QST listing amateurs who took part in the activity. As I have pointed out time and time again, the amateur is letting CAP and the new Citizen Band take over more and more of  
(Continued on page 132)

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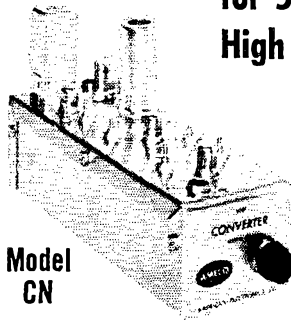
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(Specify IF output in order)

Specs: Noise figure 2.5 db at 50 MC.; 3.0 db at 144 MC.; 4.0 db at 220 MC. Gain 45 db average. Image and spurious rejection—better than —70 db. IF rejection—better than 100 db. Power required—100 to 150 V at 30 ma, 6.3 V at .84 A. See PS-1 power supply.



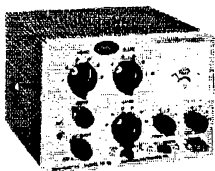
CB-6

6 &amp; 2 meter converters using tubes. Low noise, high gain. IF easily changed. Specify IF.

CB-6K—6 meter  
KIT \$19.95  
CB-6W—  
WIRED \$27.50  
CB-2K—2 meter  
KIT \$23.95  
CB-2W—  
WIRED \$33.95

PS-1

Matching Power Supply that plugs directly into all Ameco converters.

Model PS-1K—  
KIT \$10.50  
Model PS-1W—  
WIRED \$11.50**COMPACT 6 thru 80 TRANSMITTER**

The TX-86 can handle 90 watts input on CW and 90 watts peak input on phone on all bands. It uses a 12BY7 osc., a 6BQ5 buffer and a 6146 final modulated by a 12AX7 and a 6AQ5 (using a new low distortion modulation circuit).

- Phone and CW
- Pi-Net Output Circuit
- TVI Suppressed
- Straight thru on all bands
- Mobile or Fixed
- Extremely compact (5"x7"x7")
- Push to talk Mike jack

Model TX-86K, complete KIT  
\$ 89.95Model TX-86W, WIRED & TESTED  
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Model PS-3, Power Supply, Wired..\$44.95

Model W612A, Mobile 12V  
Power Supply, Wired ..... 54.95**EASY TO UNDERSTAND AMECO BOOKS**

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**NOVICE CW TRANSMITTER**

for 40 &amp; 80 meters. Includes heavy duty power supply &amp; Pi-net output cct. Crystal Controlled. 15 watts. Uses 6V6 &amp; 6X5. Keying is clean &amp; chirpfree.

Model AC-1 Kit (less tubes)  
\$17<sup>65</sup>

set of tubes \$2.30

**CODE PRACTICE MATERIAL**

Ameco has the most complete line of code records, code practice oscillators and keys. Code courses range from start to 18 W.P.M. and are on 33, 45, or 78 r.p.m. records. Model CPS oscillator has a 4" speaker and can be converted to a CW monitor.

Code courses on records .....	from \$ 4.95
Model CPS-Code oscillator, Kit .....	13.75
Model CPS-Code oscillator, Wired .....	14.95
Telegraph Keys .....	from 1.00

Write for complete details on code courses and other ham gear.

Ameco equipment is available at all leading ham distributors.

Dept. Q-6

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Affiliated with American Electronics Co. and Ameco Publishing Corp. MINEOLA, L.I., N.Y.

**BARRY**  
**ELECTRONICS CORP.**

**JUNE SPECIALS!**

30 Watt Mobile Xmtr. W/6 V. Pwr Supply \$9.95.  
In stock: Mosley Beams and Verticals. Write.  
12 Volt Coaxial Relay. Takes standard 831SP connectors. (R/E) \$5.95.

12 VOLTS DYNAMOTOR. Output: 425 VDC @ 375 Ma. (R/E) \$6.95.

CAPACITOR SPECIALS: 1 Mfd @ 1000 VDCw/bracket @ \$5; 12 Mfd (4 each 3 Mfd) @ 600 WVDC w/bracket @ \$1.00; C.D. .001 Mfd @ 2500 VDC (test 5 KV) Mica @ .30c.

PILOT LIGHT ASSEMBLY: 1" diameter. Amber Bulbseye. By Dialco. Special \$5.4.

6 W. G.E. 110 VOLTS LAMPS for above @ .30c.  
RHODES ONE HOUR TIMER: TYPE C6. Complete less dial face and knob. 70¢.

MINIATURE MOUNTING RACK. Brand new. On four small shock mounts. Rack measures 6 1/2" x 4 1/2". Order Mount FT-141. 60¢.

METER SPECIALS: 1 1/2" Sq. 0-1 Ma. Herm. sld. \$2.95; Simpson 3" Rd. 0-150 Ma. RF @ \$4.95; Weston 2 1/2" Sq. 0-1 Ma. Herm. sld. (Cal./Yards). \$2.50; Burlington DC Ammeter. 2 1/2" Sq. 0-5 Ma. and 0-50 Amps. (FS: 1 Ma) \$2.50.

GLOBE SCOUT 680A XMTR. 6 Bands (6 thru 80). \$79.95.

HALLICRAFTERS: SX-140 Receiver. \$85.00; SX-99 @ \$65.00.

NATIONAL RECEIVER NC-98 @ \$49.95.  
TMC VFO VOX (2 to 64 Mcs) \$550.00.

TECHNICAL MATERIEL CORP. MODEL DCU Dual-Diversity Mixer. \$99.95.

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STANCOR FILAMENT TRANSFORMER: Pri: 115 VAC @ 60 CPS Sec: 10 V.C.T. @ 12 Amps. (7500 V. insul). Orig. box. Stancor #P-5062. \$9.95.

SALE — Brand new factory fresh Coax Cable: RG-59A/U \$5.00 per hundred ft.

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RG-11/U \$8.00 per hundred.  
4CX300A TUBE \$47.00.

SK-710 SOCKET for 4CX300A tube @ \$14.00.  
REDMOND 160 C.F.M. BLOWER. 115 VAC @ 60 CPS. New. W/6 foot cord and "Snapit" switch. \$12.95.

RCA 4X150A TUBES. New JAN stock. \$12.50.

RCA COMPACT 125 WATT MOD. XFMR. 3 lbs. \$4.95.

7000 VGT/1 AMP. RCA PLATE XFMR (3500-0-3500 V. @ 1 Amp) Tapped pri: 208 to 240 V. plus or minus 11 V. Unused. 166 lbs. \$65.00.

GENERAL ELECTRIC FULL-WAVE BRIDGE GERMANIUM RECTIFIER: In: 117 VAC. Out: 115 VDC @ 10 Amps. 7 3/4" W x 4" D. Wt: 3 1/2 lbs. \$19.00.

ELECTRONIC REGULATED POWER SUPPLY. In: 115 — 60 CPS. Out: 250-300 VDC @ 100-125 Ma. High Voltage intermittent 1600 V. Supply. Excellent for SSB screen supply & power supply for a monitoring scope. R.E. \$15.00.

BUY YOUR RME6900 Receiver from Us... we offer excellent trade-ins.

Hammarlund Electronic Keyer HK-1B. Fully transistorized. \$39.95 postpaid/48 States.

50 feet 8 conductor rubber color-coded Cable. Hilarity. \$2.50.

COME IN SATURDAYS FROM 10 AM to 2 PM. Free Coffee. Free Gifts!

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**512 BROADWAY, NEW YORK 12, N. Y.**  
**WALKER 5-7000 AREA CODE: 212**

- Enclosed is money order or check and my order. Prices FOR N.Y.C. Shipments over 20 lbs. will be shipped collect for shipping charges. Less than 20 lbs. include sufficient postage. Any overage will be refunded.
- Send copy of summer "Green Sheet" Catalog.
- Send information on.....
- I have available for trade-in the following.....

Name..... Title.....  
Company.....  
Address.....  
City..... State.....

its public service. Traffic: W4PNM 286, K4CPX 210, W4AFJM 137, K4ZFO 80, W4LXS 52, W4DBU 42, K4QFV 27, K4MPE 23.

**SOUTH CAROLINA**—SCM, Dr. J. O. Dunlap, W4-GQV—SEC: K4PJE, RM: W4PED, PAM: K4KCO. A Worked South Carolina Counties Award is now available from the Greer ARC. The award is available in three classes for working 25, 35 and 46 counties. See SCARAB and QST for details on this commendable project by the club. WN4BUO plans to become active on 2 meters now that his twelve-element array is complete. K4LND has been appointed ORS and along with W4ADGH has been awarded his net certificate on the C.W. Net. W4TLC is busy lining up schedules on 220 Mc. July 1 is the absolute deadline for filing application for 1963 special auto tags with call letters. Consult K4-PJE, W4HDR, W4HMG or W4GQV for details. The C.W. Net held its semi-annual meeting Sun., Apr. 29, in Columbia. The Rock Hill ARC has completed classes leading to the Novice Class license and has held examinations for the group. The Greenville Hamfest, sponsored by the Blue Ridge Radio Society, was held May 8. Traffic: K4LND 42, W4AKC 38, W4ADGH 24, K4WJR 21, K4PJW 11, K4OCU 5, W4YPD 5, K4YFK 4.

**VIRGINIA**—SCM, Robert L. Follmar, W4QDY—Asst. SCM: H. J. Hopkins, W4SHJ. SEC: W4VMA, RM: W4LK, K4MXF, W4SHJ, W4QDY, PAM: W4BGP, K4JQO, K4PQV, W4FOR reports that traffic is fun. W4DLA says that his aggregate total for the first year was 2394 messages but no BPL! A nice traffic total is reported by W4NTR/K4PYV. W4RHA is adding outlets to his traffic work and the Viking II is back on the air. K4YNW is a consistent traffic man and reporter. K4RNH has been accepted to M.I.T. Our gal in Richmond, K4TFL, has been much more active lately. K4YZT is running 500 watts to a pair of 4-125s. K4TZF is sporting a new beam. K4TSJ received CWC, VN and VSN certificates. The Va. Sideband Net shows a nice increase in traffic handled. The following reported antenna damage during the recent storms: W4TE, antenna tower; W4PRO, beams and doublets; W4WBC also reports damage. K4QIX still is travelling. W4KFC missed a QSO with EP2BK on 160 meters and the loss of his longwire in a storm also. Dependable W4BZE reports 30 years with this call. W4UJ is back from 7 days in VPT-Land. K4IKF, over Roanoke way, is helping several to acquire their tickets. W4JXD is doing the same up in Alexandria. W4ZM says he could be more active if he didn't have to work for a living. W40WV and W4BGP report their OBS activity along with traffic. K4ORQ was in California on business. K4QIY is within 5 quarters of a BSEE degree. K4UVT received WAS, CWC and 87 confirmed out of 140 worked for DXCC. W4NVX reports from his new QTH in Annandale. The Roanoke Club is busy getting ready for the big convention. The Lynchburg Club puts out an FB paper. The Alexandria Club is active with its club QSL award. Nice reports were received from OES: K4EUS, W4FJ, K4IME, K4RTG and W4GVQ. Traffic: (Mar.) W4FOR 526, W4DLA 419, W4NTR 284, K4PSS 264, K4MYF 174, W4SHJ 168, W4LK 112, W4RH 95, K4YNW 77, W4IA 54, K4AL 49, W4LRN 42, K4RNH 39, W4QDY 37, K4TFL 37, K4IAN 33, K4YZT 32, W4BGP 30, K4TZF 29, K4TSJ 27, K4JQO 24, W4TE 24, K4QIX 18, K4ITY 15, W4KFC 15, K4KNP 13, W4PRO 13, W4KX 12, W4BZE 6, K4IJP 6, K4DAL 5, W4UJ 5, K4IKF 4, K4LTK 4, W40WV 4, W4ZM 4, K4ORQ 1, (Feb.) W4HMQ/4 29, K4IKF 5, W4LRN 4, W4NVX 4, (Jan.) W4ZM 32, K4IKF 7.

**WEST VIRGINIA**—SCM, Donald B. Morris, W8JM—SEC: W8SSA, PAM: K8CFT, RM: K8HID. K8LO reports 100 stations checked into 18 sessions of WVN with 44 messages. K8CFT, PAM for the WVA Phone Net, reports increased activity. K8TSB called the Kanawha County Emergency Net during March with 39 stations active. New stations are K8QBF, W8CCX, W8CMK, W8CMQ and W8CMS. K8TQB has a new 400-watt home-built rig on 75 meters. W8BK and K8AHG are active on 10 meters. WN8AYB will attend WVV this summer. Logan County ARC has reorganized and was active during the recent floods. W8JUE is active on WVN from Eastern Panhandle. W8FGL has been inactive recently because of illness. The Opqueon Radio Society of Martinsburg is holding Novice classes at K8UXP's home. K8YBR and K8WIP are new Generals. W8PZT has a new pole for antennas and is back on 80-meter c.w. W4TZZ/8 will be operating from Fairmont for an indefinite time. The West Virginia State Convention will be held July 7 and 8 at Jackson Mills, West Va. Plan to attend and take in the ARRL Wouff Hong Ceremony Sat. night. Traffic: K8LO 34, K8CSG/3 23, W8JUE 23, W8HZA 19, K8TSB 6, K8CNB 3, K8JSX 3, K8MYU 2.

**ROCKY MOUNTAIN DIVISION**  
**COLORADO**—SCM, Donald S. Middleton, W0NIT—  
(Continued on page 134)

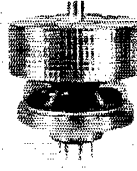
# PATTERN FOR PERFORMANCE

Here is a straightforward approach to the problem of preventing electrons from returning to the screen region of a transmitting tube. When channeled into beams like those below, electrons reach the anode, where they do their useful work. Penta's exclusive, patented vane-type suppressor grid does the trick.

The characteristics of Penta tubes employing this electrode geometry approach those of the theoretically perfect beam tube. Plate current is practically independent of plate voltage. Kinks and wiggles are absent. Plate voltage can swing well below screen voltage without appreciable loss of current.

The result is outstanding linearity, efficiency, stability. Penta's PL-172, for example, delivers 1000 watts of Class AB<sub>1</sub> useful output at only 2000 plate volts... more than 1500 watts at maximum Class AB<sub>1</sub> ratings. Introduced in 1955, Penta tubes with vane-type suppressor grids are in important equipment the world over, and their use in high-quality linear amplifiers is growing daily.

You, too, can enjoy the advantages of this years-ahead design by specifying the PL-177A, PL-175A or PL-172 for 100-watt to 1.5-kilowatt power output applications. Detailed, factual data sheets are available for the asking. Ask also for your copy of "Transmitting Tubes for Linear Amplifier Service," which explains how and why this exclusive Penta design provides outstanding performance.



PL-172 1000W beam pentode. High-output Class AB<sub>1</sub> linear amplifier.

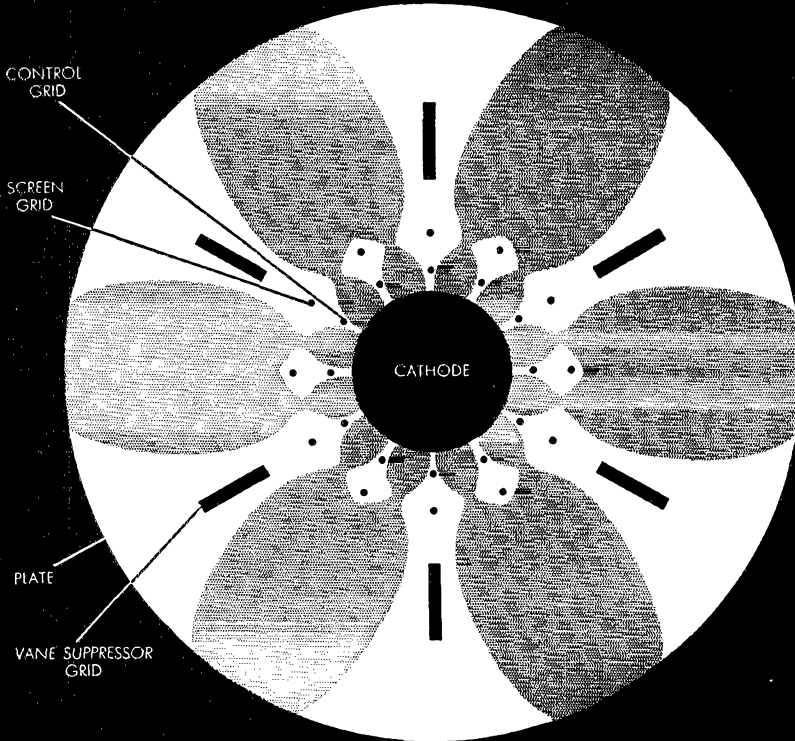


PL-175A 400W beam pentode. Popular Class AB<sub>1</sub> linear amplifier.



PL-177A 75W beam pentode. To 175mc. Highly efficient at plate voltages as low as 600v.

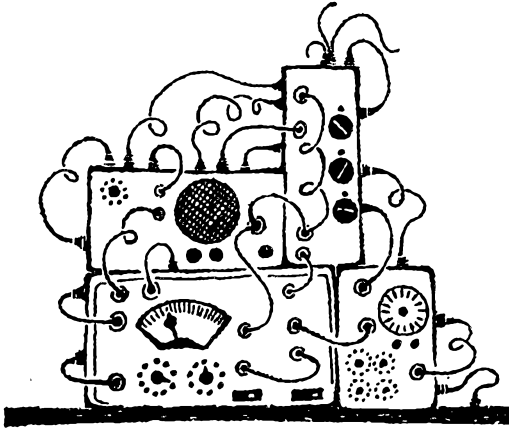
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Santa Barbara, California





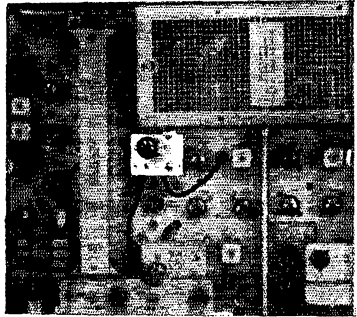
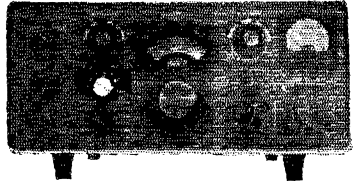


# WATERS UNNETTLES RIGS

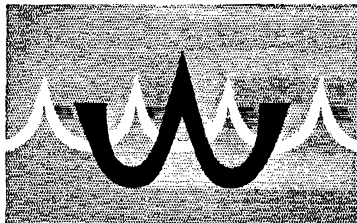
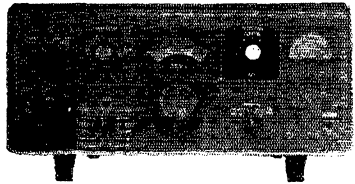
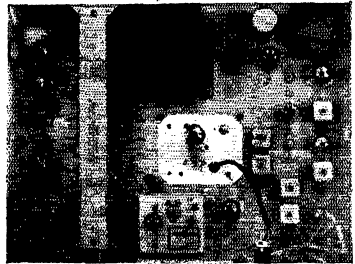


If your receiver has a nervous cough, unnettle it with a Waters Q-Multiplier/Notch Filter. Enjoy a clear signal, the signal you were meant to hear, with the Waters Q-Multiplier/Notch Filter . . . available in 2 models, the 337-S1 and the 337-M2. These filters are designed to eliminate heterodynes and other undesirable signals in the i-f pass-band of the Collins 75S-1 receivers and KWM-2 transceivers. Tunable over a 5KC range, 2.5 KC on either side of the 455 KC center frequency, they require very little power from the Collins equipment: .3a. @ 6.3v. and 1.4 ma @ 140 V. (275 V. in the KWM-2). The notch depth is greater than 40 db. Either Filter comes completely assembled with easy to follow instructions for installation and connection.

Amateur Net: \$33.95  
Available at leading distributors



Q-MULTIPLIER/NOTCH FILTERS



WATERS MANUFACTURING, INC.  
WAYLAND, MASSACHUSETTS



Emblem  
Decals



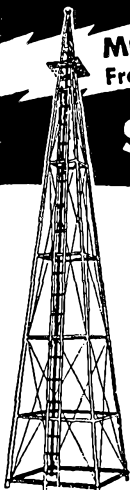
Attractive black and gold ARRL emblem decals are available to League members from Headquarters. They measure approximately 4 by 2 inches, will adhere to almost any surface, metal, glass, wood, plastic, and come complete with directions for applying. Use them to dress up your car, station equipment and shack. They're supplied at 10 cents each — no stamps, please — to cover costs.

### AMERICAN RADIO RELAY LEAGUE

West Hartford 7, Connecticut

**MORE SIGNALS PER DOLLAR**  
From Money Invested in an Antenna

Self Supporting  
**STEEL TOWERS**  
For Rotary Beams, FM, TV



Width of Base Equal to 1/5 Height

Vesto Towers are available in a wide range of sizes to meet requirements of amateurs and commercial users alike. Note the low prices for these quality lifetime towers: 22' \$ 159, 28' \$ 194, 33' \$ 229, 39' \$ 275, 44' \$ 313, 50' \$ 362, 55' \$ 408, 61' \$ 463, 77' \$ 724, 100' \$ 1132.

Towers are shipped to your home knocked down. FOB Kansas City, Mo. 4th class freight. Prices subject to change, so order now! Send check or money order... or write for free information.

### ATTRACTIVE — NO GUY WIRES!

- 4-Post Construction for Greater Strength!
- Galvanized Steel — Will Last a Lifetime
- SAFE — Ladder to Top Platform
- COMPLETE — Ready to Assemble
- Withstands Heaviest Winds

SMALL DOWN PMT.—EASY TERMS

WRITE TODAY FOR COMPLETE FREE INFORMATION AND PHOTOGRAPHS

**VESTO CO., Inc.**  
20th and Clay  
North Kansas City, Mo.

RACES frequency). The Bessemer Amateur Radio Club is preparing for a big Field Day this year at the summer home of K4HNO and W4AWZ. AEND, the Novice net, meets on 3725 kc. daily except Sun. at 1600 CST. W4WGI has been elected NAI for the AENR on 50.55 Mc. 1915 CST Tue. and Thurs. Traffic: (Alar.) K4WOP 92, K4PFM 83, K4YUD 75, K4FQG 52, K4UDK 47, K4WHV 45, K4FZO 40, K4AOZ 39, W4ABDW 33, K4VWSH 32, K4PBY 31, K4PHH 29, K4GNS 28, W4OXU 28, K4HJM 27, K4DJR 21, K4KJD 21, K4LNA 20, W4ABX 17, K4ZYU 14, K4BRZ 13, W4PVG 12, W4AVM 11, W4VWG 11, K4RTO 10, W4WHW 10, K4RIL 9, K4SUF 9, K4TDJ 9, W4DS 8, W4DGH 7, K4WYD 7, W4CIU 6, K4JDA 6, K4AIR 6, W4VGI 6, K4FTC 5, W4TOI 5, K4DSO 4, K4KDE 4, K4YTT 4, W4AALY 3, W4AZK 3, K4ZTT 3, K4WSK 2, K4ZNI 2, K4AAU 1, W4ABTA 1, W4DFE 1, K4UMD 1, (Feb.) K4PQG 25, K4BRZ 10, K4WSK 4, K4JET 2.

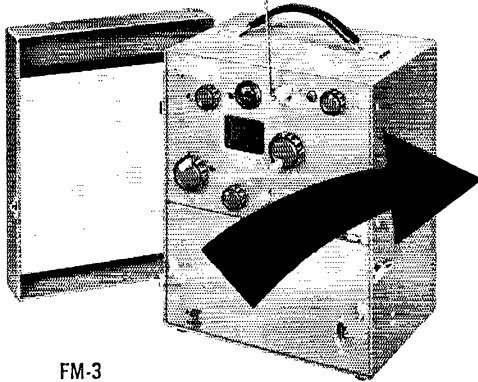
**EASTERN FLORIDA**—SCM, Albert L. Hamel, K4SJH—SEC: W4IYT, RM: K4KDN, RM RTTY: W4EHU, PAM: 40 W4SDR, 75 K4LCF, V.H.F. W4RMU, S.S.B. W4CNZ, Mae, W3CUL, on vacation in Sarasota, gave some fine lessons on how to handle traffic with 1438 in about two weeks. During the Milton tornado disaster QEN did its usual excellent job with W4SRK working c.w. portable Milton. Some OOs really are active while others are not. W4RMU is running a gallon s.s.b. on both 6 and 2 meters with 500 watts c.w. on 230 Mc. Hi to K4JLO, old traficker from VN/4RN. The W4DFU gang means business with several positions including RTTY for traffic. K4KDN has gone to Invader 2000 now — gee. If W4EXM doesn't get down to Florida pretty soon he'd better check with the SCM up D.C. way, where he now is on 20-meter s.s.b. Why are some operators skittering away from OPS/ORs appointments which they have been qualified for months and been invited to apply for. You are doing the job—why not take credit for it. Traffic: (Alar.) W3CUL/4 1438, K4SJH 1156, W4BNC 712, K4AHU 439, W4DFU 358, K4COO 338, K4LCF 322, K4BY 311, W4WHK 263, W4TRS 222, W4TUB 192, K4KDN 190, K4ENW 167, W4EHW 157, W4LDM 133, W4DVR 102, K4YSN 100, W4AKB 98, K4ILB 89, K4AX 82, W4NBYP 77, W4FPC 74, W4NAME 69, W4WTO 69, K4DAX 68, W4VLH 65, W4FNF 57, W4MIN 57, W4CNZ 56, W4VGE 55, W4HTH 54, K4AKQ 51, K4JLO 48, K4DBT 46, W4YPX 42, W4VXC 41, K4NYD 39, W4CWD 35, W4ZAK 34, K6SXX/4 32, W4TRU 31, W4AZZ 25, W1AGM/4 27, K4YOQ 26, W4YD 25, W4BKC 25, W4ACOR 25, W4HRC 23, W4IMC 23, K4QXU 23, K4JZU 21, W4IYT 20, K4MTP 20, K8KLY/4 20, W4HGW 19, W4DSH 18, W4LMT 18, W4WPD 18, W4BBZ 17, K4RDX 17, W4HFR 14, W4LSA 13, K4JWM 12, K4TGB 12, W4EAT 10, W4QVJ 10, K4ZIF 9, W4ABGL 8, W4DDW 8, K4OSQ 8, W4BWR 7, K4CMK 7, W4KIS 5, K4LNL 5, K4VGD 5, W4AII 2, K4JZX 2, W4OHA 2, W4RMU 2, W4YOG 1, (Feb.) W4DUG 2491, K4AHU 146, W4ADMV 114, K4FMA 73, W4OVE 72, K4FQP 53, W4WPD 48, W4IYT 44, K4YOQ 43, W4WTO 29, W4BBZ 16, K4JWM 16, W4HFR 12, W4DVR 11, W4IUB 11, K4JZX 10, K4MXH 9, K4OSQ 8, K4RHL 8, K4LLI 7, K4VGD 7, W4QVJ 6, W4AII 5, K4JZU 5, W4BWR 4, W4HLE 2, W4OHA 1, (Jan.) W4WPD 17.

**WESTERN FLORIDA**—SCM, Frank M. Butler jr., W4RKH—SEC: W4MLE, PAM: W4WEB, RM: K4UBR. About 150 operators worked for 30 hours and handled over 500 messages during the Milton tornado. K4HOX did an outstanding job in Milton. Perry: W4KQP hears lots of DX on his new receiver. Gulf Breeze: K4ZMV is back on the air with a Valiant. Tallahassee: W4AZR is mobile on 10 meters. WN4DNY has advanced to Conditional Class. Panama City: W4AFLJ is the new NCS for WFPN Sun. K4WNA won first place in the Science Fair. W4IJQ is now Asst. EC. The PCARC is working on 2-meter halos and Big Wheel antennas for c.d. WA9BRL/4 is a new Technician. W4EJF was elected PCARC secretary. Ft. Walton: W4ZWD received an RN5 certificate for c.w. traffic activity. A state-wide roster of 2-meter stations has been prepared. W4MTD was elected EARS president. W4ZGS, W4CSS and W4PLK are hunting DX on 2 meters. Pensacola: The V.H.F. Club prepared a roster of v.h.f. hams in the area. Amateur radio was featured at the ARS Hobby Fair. P.A.R.C. meetings are now held in a room over K4DDD's TV shop. The new club call is W4UC. K4SWQ has been transferred. Traffic: (Mar.) K4VND 155, W4BVE 141, K4BDF 48, W4MLE 48, W4CMG 47, K4ZMV 32, W4WEB 28, W4AFLJ 18, W4GAA 15, (Feb.) K4CNY 234, W4MLE 136, (Jan.) K4CNY 239.

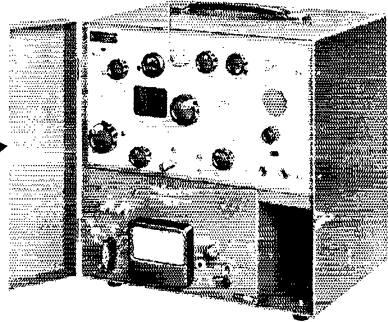
**GEORGIA**—SCM, James A. Giglio, W4LG—SEC: W4TJS, PAM: W4LXE, RM: W4DDY. The GCEN meets on 3995 kc. at 1830 EST Tue. and Thurs., 0800 on Sun.; GSN meets Mon. through Sun. on 3995 kc. at 1900 EST and 2300 EST; the Georgia Cracker Mobile Net each Sun. on 3995 kc. at 1330 EST with W4LG as NC; the

(Continued on page 138)

# YOUR GERTSCH FM-3 FREQUENCY METER CONVERTED TO MEET FCC REQUIREMENTS



FM-3  
Frequency Meter



FM-3A 2-Way Communication  
Frequency Meter

**— factory conversion provides direct reading  
of all allocated channels in the 150-170 mc band**

All Gertsch Model FM-3 frequency meters can now be factory-converted to measure and generate *all* assigned channels in both 150-170 mc, and 450-510 mc bands ... with  $\pm .0003\%$  (3 ppm) accuracy. Instrument features a single 1-mc crystal which is easily standardized against WWV.

Converted units can also be operated as standard FM-3 instruments through 20 to 1,000 mc, at .001% accuracy.

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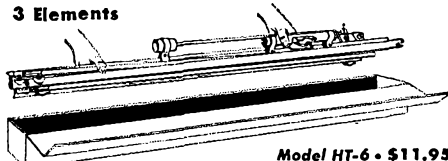
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GPYL Net each Thurs. on 7260 kc. at 0900 EST with K4KIH as NC; the GPYL Roundtable each Wed. at 1630 EST with K4RHU as net manager; the Atlanta Ten-Meter Phone Net on 29.6 Mc. at 2200 EST each Sun. with W4BGE as net manager; Ga. S.S.B. Net Mon. through Sun. on 3975 kc. at 2200 EST with K4RZL as net manager; the North Georgia Graveyard Net every Thurs. and Fri. at 2200 EST on 50.250 Mc. with K4UQM as net manager; the Fourth Region Day Net daily on 7125 kc. with W4PIM as net manager. The Atlanta Radio Club Hamfest will be held June 2 and 3 at Fabulous Lenox Square. All hams are invited. K4WVY has a new homebrew rig working FB on 40 and 80 meters. K4UJS reports good DX with a "Lazy H" antenna on 15 meters. Congratulations to the Confederate Signal Corps and the Atlanta Radio Club on their excellent club publications. *The Bugle* and *The Atlanta Ham*. The Greater Atlanta V.H.F. Society conducts transmitter hunts every Monday night. Traffic: K4MCL 314. W4DDY 186. W4PIM 130. K4WVY 70. K4NGI 56. W4LME 42. K4ZYI 42. K4UJS 38. K4QPL 29. K4BYD 25. K4BAI 24. K4YRO 18. W4BZ 4. K4RHU 4.

**WEST INDIES**—SCM, William Werner, KP4DJ—C.D. Radio Officer; MC, QSL Mgr.; YT, WT renewed as OPS. BAU is a new OPS at Ramey AFB, CK is OBS for 50 Mc. CH is OBS for 7 and 3.8 Mc. Officers of Radio Club, Dominican are H8HFC, pres.; H8WPC, vice-pres. API reports from Cornell that he operates W2CXM on 14-Mc. s.s.b. daily from 2200 to 2230 GMT. CCH is Acting NCS of the C.D. Net on 3810 kc. at 2130 GMT Mon., Wed., Fri. RA's XYL is on 6 meters with a Clegg 950. RA has added a Collins 30S1 kw. to improve reliability of skeeds with his son-in-law in Virginia. KP4AAX has been appointed P.R. coordinator for Ocean satellite project. AYP is now General Class. BDU is on 40-meter c.w. from Rio Piedras. AFL reports to the C.D. Net on 7205 kc. at 1700 GMT. RA and AET are members of the Ramey AFB Radio Club. BEA has ordered a Hammarlund electronic keyer. ASK continues audio and antenna experiments. CH worked 725 stations in the C.W. DX Contest. WYTQM/KP4, MARS operator at Fort Allen, is on 40-meter phone. DJ hears W2IU, W3GQF and others on 1801 kc. using a BC-342 receiver. DJ has another 40-meter dipole running N/S; the other runs E/W. YT is practicing on a Presentation Model Vibroplex while waiting for new DX to appear. WD received his 75S-3 receiver. CK, CL, SV, AAN, AMG and their XYLs attended the S.S.B. Dinner in New York. BCL installed weather rulers at Gaudeloupe. His ground planes are thermoplastic insulated wires lying on the roof. QV is on 10-15-20 meters with a homebrew vertical and 40 watts. APR is on s.s.b. with a 600L and a Drake 2B and has a Ranger for standby use. The PRARC members sent a protest to the FCC re Docket 14507. AXB returned from Dew-Line and is on 14-Mc. s.s.b. with a 10A/linear tri-bander and a Drake 2A. OAR has ordered the Hallicrafters HT-40 and SX-140 combination. CR6CA is the first CR6 to be awarded a WPR25 Award certificate by the PRARC. Traffic: KP4WT 89, AFL 3.

**CANAL ZONE**—SCM, Thomas B. DeMeis, KZ5TD—The CZARA Dinner at the Canal Zone Police Lodge was a terrific success with 63 attending. BC worked over 400 during the recent DX Contest. TG has a new Drake 2A receiver. TF reported HIF was in the hospital. TF/HIF recently put up a TB-1000 antenna. BE expects to have an HT-37 on the air soon. Under the new provisions of FCC for Conditional Class licenses, several of the gang down here have been taking these tests. LE recently passed the test and is now assigned his stateside call of WA4GAH. SW is in Philadelphia attending school. New station GW, with a Johnson Navigator and Super-Pro receiver, is at Balboa. RW, also newly-licensed, is making arrangements to get on the air. TJ and WW now are strictly c.w. but with the XYL making the strong pitch for some voice operation. HPIIE reported a good score in the DX Contest. Army MARS station AA is back on the air with S-Line equipment at one position and a BC-610 at the other. Capt. Halladay is replacing Lt. Cokell as MARS Director. KR, operating on 10 meters with a six-watt rig, reports good results. Traffic: KZ5SS 150, JW 121, AD 60, OB 34, OA 30, CD 16.

### SOUTHWESTERN DIVISION

**LOS ANGELES**—SCM, Albert F. Hill, jr., W6JQB—SEC: K6YCX, RMS: W6BHG, W6ROF, P.A.M.s: W6ORS, K6PZAI. The following stations earned BPL for the month: W6GYH and K6EPT. Congrats, fellows! K6RIR has moved to a new QTH in Woodland Hills. W6ROF is QRL with traffic meetings at the Southwestern Division Convention. K6JNP is working on the 29 Palms Motorecycle Run. W6WNR got into his new QTH in time for the 2nd session of the C.W. DX Test! New officers of the Salvation Army Disaster Net are K6MIDD, pres.; K6JQB, vice-pres.; W6DBB, secy. W6VOZ is trying to replace DX cards that were lost during the shack move

(Continued on page 140)

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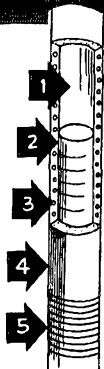
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to the garage! W6SRE sure gets around the state and now has a mobile in the new Chrysler. No word has been received from W6HUK for a long time. What's cooking, Graham? The XYL of W46KVA has been quite ill. We all wish her a speedy recovery. The Associated Radio Amateurs of Long Beach had a nice trip to the Goldstone Tracking Station near Barstow. W46HUC reports 10 meters is opening very well of late. W46DGJ is the new Corona Area EC. The San Fernando Valley Radio Club's Annual Hamfest will be held June 17, 1962, at the new location of Northridge Park in Northridge. It is hoped that all will be at the Southwestern Division ARRL Convention at Disneyland June 1, 2 and 3. Support your section nets. On c.w. the Southern California Net (SCN) meeting at 0300 GMT daily on 3600 kc.; on phone, the Southern California Six Net (SoCal 6) meeting daily at 0230 GMT on 50.4 Mc. Traffic: (Mar.) W6GYH 717, K6EPT 686, W6WPF 470, K6OZJ 370, K6MDD 340, W6QAE 253, W6ROF 205, K6IWW 176, K6YVN 113, W6BHG 63, K6SIX 57, W46CKR 38, W46KAW 36, W46GRG 29, K6HOV 28, W46QMC 28, W46JDB 25, W6EBK 16, W46KVS 13, W6USY 10, W46DWP 7, K6JNP 4, W46KVA 4, W6SRE 4, W6VOZ 4, W6ORS 2. (Feb.) K6IWW 94, W46JDB 50, W46CKR 41, W6FAH 34, W6EBK 15, W46SLF 4, W6NKR 2.

ARIZONA—SCM, Kenneth P. Cole, W7QZH—Asst. SCM/SEC: George Mezev, K7NIY, PAM: OIF, RM: LND. The Copper State Net meets at 1930 MST Mon. through Fri.; the Grand Canyon Net Sun. at 0800 on 3880 kc.; the Tucson AREC Net Wed. at 1900 on 3880 kc.; the Cochise County AREC Net Sat. Sun. at 1400 MST on 7260 kc. A c.w. net, the Arizona Interstate Net, meets Mon. through Fri. at 1900 MST on 3555 kc. Arizona needs a c.w. net. The phone bands are crowded. Band conditions are not too good. Get out your keys and bugs and check in. The Brunswick Wholesale Drug Company, Tucson, was the point of distribution for Sabine Vaccine in Pima County. Distribution of the vaccine was handled by Tucson amateurs. Those participating were DRU, HWX, IWJ, LZL, SQX, UCX, ZFC, K7CET, CRO, GVP, IBX, QCX, QCAW, UEA, W9DCO/7, K9KQR/7, KN7QAU and KN7-SEC. New members of the Scottsdale ARC are K7-NCY, K8PPW/7, KN7SCB and Ed and Sophie Luptak. Your SCM wishes to express his gratitude and appreciation to the amateurs of Arizona for the privilege of allowing him to represent the ARRL for another two years. Traffic: (Mar.) W7AMM 20, K7RUR 7. (Feb.) W7AMM 13, K7RUR 4.

SAN DIEGO—SCM, Don Stansifer, W6LRU—W6UUS made BPL for the first time. Both W6WNN and W46KOU are on 6 meters with s.s.b. K6EGR, in Orange County, sent in a traffic report of 95, all on 144 Mc. Chief operator at W6YDK is K8GTB. The 100th meeting of the Newport Amateur Radio Society was held in late March, and a special banquet was held in April with Director Ray Meyers, W6MLZ, as special guest speaker. W46SBO added 30 countries his first month as a General. Many locals added UA3CR, Franz Josef Land, on s.s.b. recently. W6RCD spent Easter in New York on business. K6BPI now puts Official Bulletins out on RTTY. W46BUX graduated from Pt. Loma High School with top honors. Besides being a straight "A" student, Ralph earned letters in track, and completed his DXCC during his senior year. New members of the San Diego DX Club include K6E, QJW and SDR. W60ME, long-time c.w. DXer, is now heard on s.s.b. with S/Line equipment. All clubs are reporting Field Day planning, with the San Diego Council promoting activity between local clubs, and much competition in Orange County already evident. Our newest ARRL affiliated club is the Anaheim Amateur Radio Association in Orange County. Your SCM will be handling his duties via remote control until September from his cabin in Mono County. All mail will be forwarded and answered, and keep an ear out for me on c.w. all bands signing W46VUT from that rare area for the WACC award. Have fun on Field Day. Traffic: K6BPI 2098, W6YDK 1691, W6UUS 589, W6EOT 380, K6LKD 166, K6KGR 95, W46CDD 77, W46DF 42, W46BDW 37, K6TFT 15, K6IME 7, K6GJM 2, K6RCK 2.

## WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: K5AEX. PAM: W5AYX, RM: W5LR. Once more I had the pleasure of attending a hamfest in the West Texas Area, this time at Midland, Tex. Mar. 17. If you have never had the opportunity of attending one of these gatherings you have been missing something. There were 300 registered for this one. The Midland ARC is to be complimented for its efforts in putting on a fine hamfest. W5NW, our 1st Vice-pres. and W5QKF, West Gulf Division Director, were present and gave very interesting talks on the League and the future of the ama-

(Continued on page 142)



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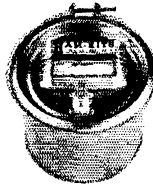
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teur. W5NFO reports that West Texas hams have been able to get their antennas back up after the 85-m.p.h. winds in March blew them down. W5OIE is doing a fine job as net control for the N.W. Tex. Emergency Net. K3WND is instructing a group in theory for General Class exams. WN5AHC, WN5AHD, WN5AHE and WN5AHG hope to become General Class as a result of his efforts. K5LSN has been in the hospital because of a heart attack. K5LBG has a new NC-190. New officers of the Ft. Worth KC Club are K5DOP, pres.; JOU, vice-pres.; K5IOO, secy-treas. Congratulations to the Arlington State ARC and Permian Basin ARC on becoming affiliated with ARRL. Traffic: K5LBG/5 239, W5LR 173, W5GY 102, W5BKH 111, K5JQT/5 98, W5GNF 46, K5HTM 48, K5PXV 19, W5EJW 15.

**OKLAHOMA**—SCM, Adrian V. Rea, W5DRZ—Congratulations to the Enid Amateur Radio Club, which is fast becoming one of the better clubs of the nation. K5WZF has 25-w.p.m. Code Proficiency certificate. K5CWR is looking for his. K5RFS has a new beam. K5MJJ, K4KQ and RLM are getting emergency equipment ready for spring storms. New officers of the Electron Benders Club are K5ZCJ, pres.; K5EYT, vice-pres.; W5GZD, secy-treas.; K5OOV, trustee; K5WVA, historian; Marion Strickland, corr. secy. The new club call is W5OK. W5HTF is back on the air with a good signal. K5FKV is building a new home. John Hamilton, of the Weather Bureau, was the guest of the Duncan and Ft. Sill Clubs at special meetings. Another club bulletin, *The Northfork Exciter*, has made its appearance. It is edited by K5IZP. Two meters is taking Oklahoma; the latest list of 2-meter stations includes W5KAL, W5JKO, W5FRB, W5TKE, K5JCH, K5DUU and W5LZ, an old-timer on 2 meters. Another new Official Bulletin Station is K5REH. W5FRH is a new amateur at Antlers. K5HPZ is new at Hugo. Thanks to W5VLW, W5IZP, W5FKV and W5CWR for news from individuals; also to the club secretaries and correspondents for bulletins and news. Traffic: W5DRZ 76, K5AUX 72, W5JMQ 72, K5SWW 33, K5ZCJ 33, K5OCK 32, W5FWW 30, K5DLP 27, W5FKL 26, K5JGZ 26, W5CCK 20, W5JCY 16, W5PNG 16, K5JOA 15, K5ZEP 14, K5RWL 12, K5CWR 10, K5LZF 10, W5ICQ 7, K5OOV 7, K5VNJ 7, K5BNQ 6, W5EHC 6, W5UYQ 5, K5FSU 4, W5WAF 4, K5HQE 3, W5VLW 3.

**CANADIAN DIVISION**

**MARITIME**—SCM, D. E. Weeks, VE1WB—Asst. SCMs: A.E.W. Street, VE1EK, and H. C. Hillyard, VOICZ. Congratulations to AHR and his XYL on the arrival of a new jr. operator. New calls include AIL and AJG. ES has a DX-100 transmitter. Ed also is a member of the Old Timers' Club. The NBARA announces, in addition to the WNBC Award (Worked N.B. Counties), a WANB (Worked All N.B.) Award. Details are available from AFA and MZ. The first WNBC Award went to AGE with 35 others qualifying to date. The Annapolis Valley ARC announces the establishment of a new award open to VE1 stations participating in the Annual ARRL Field Day. Details are available from AGL, P.O. Box 199, RCAF Station, Greenwood, N.S. TM and AAR have joined the ranks of s.s.b. operators. This report concludes the writer's assignment in the SCM post. I would like to thank the many who have so faithfully and kindly assisted during the past six years of office. Please continue with your support to the incoming SCM. He certainly would appreciate it. Traffic: VE1ADH 26, OM 7, AEB 2.

**ONTARIO**—SCM, Richard W. Roberts, VE3NG—The St. Thomas ARC has five members ready to try their exams. The North Bay Club ran a station for the local Exhibition of Arts & Crafts. The Scarboro ARC held its Annual Dinner in Toronto and from all reports it was a sellout. The London ARC is opening a 2-meter net for its area. The Scarboro ARC, last year's winner of FD, was presented with the Trophy at its Annual Dinner by Canadian Director Noel Eaton. DH is on vacation in G-Land. ARF and DVM are in Arizona while DYO is in VE6-Land. KJ has returned from the Arctic. Ray has returned from Florida. My Section Emergency Coordinator wants every EC to report each month. A radio message, Form 5 or postcard will suffice. Certificates for endorsement by the SCM or SEC should be made at the annual date . . . send them. Carleton Varsity at Ottawa is a member of the Eastern Canadian University Net, 3770 kc, at 1915 Tue. and Thurs. BCR, WX, CDX, HC, 2V, 2RL, 3ATI were all at the S.S.B. Dinner in New York City. We regret the passing of CEG, of Kingston. BBW is on 2 meters. The Newmarket ARC is in with EMO. The Fort William boys, under the Lakehead ARC, are now affiliated. AGQ has RTTY. DKW and ATI are working for their WAS. BV has received his RCC. BLD is on 2 meters. CUA is taking a course in the USA. ECN and family are off to Israel for two years. EAO

(Continued on page 144)





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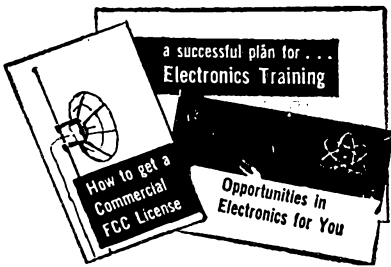
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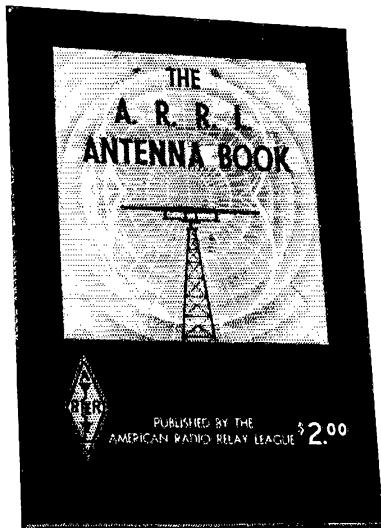
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QT-6

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has a quad, VE3DJE is now 3RS. The 807 Club, under 3DQG, will have its 5-year anniversary in June. Of 216 members, 174 have visited DQG. The Windsor ARC is out to win the ED trophy. DKE is s.s.b. The Quinte ARC has a 2-meter net Mon. at 9:30 p.m. on 144.5 Mc. Traffic: VE3CYR 183, DPO 159, NG 129, FAS 124, CFR 109, BAQ 65, AML 44, BZB 43, DRF 33, RN 30, NO 24, DZA 23, ELQ 23, DH 18, GI 16, AMT 12, DXG 9, BUR 7, FES 6, OT 2, VD 2.

**QUEBEC**—SCM, C. W. Skarstedt, VE2DR—AUU, Montreal and Isle Jesus EC, reports interest encouraging with 53 AREC members, of which 18 are active mobiles and 12 portable stations. WA is a new ORS. Someone finally gave PT a crystal for 3790 kc. YA went south and met VP6FO and PV in Barbados, and VP2AB and AP in Antigua. BIF also was a guest at VP2AB. While in England BK contacted locals by s.s.b. AUH was reelected St. Maurice Valley Club president. AGI is ready for emergency work with mobile. UQ was nominated Canadian coordinator for Oscar projects. The South Shore gang gave a farewell party for BFE, going Dew Line, and WSPQG/VE2, moving back to the States. YU, WV and NV were very successful in the DX Tests. HB9F was a Montreal visitor. XO moved back to Montreal. AJD is the proud papa of a baby girl. ATL, our new Asst. SCM, sets a good example by enrolling 4 new members in the ARRL drive. He reports: RAQI announce que son piquenique aura lieu dans le Royaume du Saguenay les 27, 28 et 29 juillet prochain. AGR, PY and AN ont visité APL a St. Jerome. WT travaille a CFTM-TV. AOI, PX and PS ont de nouvelles QSL. Avis aux intéressés! Stations Françaises en s.s.b.: BCT, ARS, FO, ADL, ASW, VR, AUA. IC diffuse des bulletins d'intérêt général le samedi à 1100 HNE sur 3750 kc. C'est avec le plus grand regret que nous apprenons la mort de JAM et de AUI. BCZ s'est joint aux missionnaires laïcs du Pérou, il sera actif de ce pays très bientôt. AXU mobile contacted a submerged sub at a 55-ft. level off Cape Hatteras. Traffic: VE2DR 98, AGM 76, AUU 46, EC 36, CP 35, AJD 22, BG 20, SD 12, APR 8, BDV 7.

**ALBERTA**—SCM, Harry Harrold, VE6TG—SEC: FS, PAM; PV, ECs: IU, SS, FK, RM; AEN, OO; HM, OBS; HM, ORS; WG, OPS; CA, OES; DB, HO; PV reports that the Alberta Phone Net now is on summer sked, 3770 kc. at 2130 hours MST Mon., Wed., Fri. FK reports the emergency group is coming alone line with two assistants PL and SA, with drills every Tue. at 1930 hours MST on 3740 kc. This group will be known as the CHEN. AEN reports the C.W. Net is improving. OES report very little activity these days. HM is busy notifying the bad boys. In a bulletin from the Canadian Director re D.O.T. we learn we can now have 3rd-party communications with Venezuela and Costa Rica. Our SEC reports the Central and Calgary emergency groups increasing membership and very shortly we will have two of the smartest emergency groups in Alberta. The EC for Lethbridge should appoint an assistant since he is so busy and has no time for emergency work. ABS and AFJ are going to try for Advance Class tickets. FS will be singing in the music festival. Traffic: VE6HM 235, TG 17, AEN 12, FK 9, CA 8, NF 5, SS 5, FS 4, PZ 4, TT 3, AAX 2, SU 1.

**BRITISH COLUMBIA**—SCM, H. E. Savage, VE7FB—Thanks to our faithfuls, BBB, DH and AAF for their usual good reports. Sorry to hear that AAF lost all his radio gear and car in a fire. The Vancouver ARC visited the CBC TV studios with 44 members attending. JD has his beam up and is working DX. ALU is in Vancouver as a P.G.E. engineer and is not on the air. DH reports not much DX activity. TF built an FB keyer-monitor-muter. There will be more f.s.k. signals on from Vancouver. BBB made 8000 points in the C.W. YL/OM Contest. BFN is proud of his Drake 2B. QK is back and to stay. Officers of the Royal City ARC are AAA, pres.; DZ, vice-pres.; NE, secy. The Royal City is planning a big hidden transmitter hunt for September. JAM is on the air and will check the AREC Net 3755 kc. at 0200Z each night to answer questions for the coming Boy Scout Jamboree on the air. AC is now an apple farmer in Winfield. BGE reports traffic down as he spent ten days in the hospital. DC is spending some time in the hospital. AKE is now at Port McNeil. We never hear the Alberni gang any more. ACW still is active. OM still is running low power. HE has the new Collins KWM-2. Traffic: VE7BFK 36, BGE 32, AMW 20, DBP 17, AGJ 15, BBB 7, AAF 6, AC 6, AOY 4.

**MANITOBA**—SCM, M. S. Watson, VE4JY—VW has been appointed coordinator for Field Day by the WARA. All Manitoba amateurs will regret the resignation of LC as QSL Mgr. after many years of faithful service. Len intends to settle in Victoria, B.C., in the near future. New calls issued include CZ and HV, of Winnipeg, and NJ, of Beausejour. Preparations are well

(Continued on page 148)

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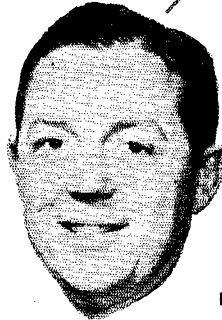
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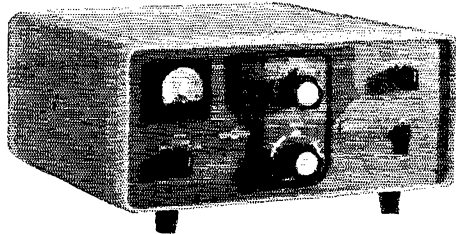
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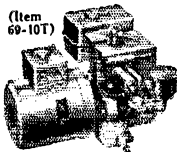
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146

in hand by the Dauphin Club for the Manitoba Hamfest to be held there Sept. 1-2. The Brandon Club held a bang-up banquet Apr. 21. The ARRLM was treated to a fine tour of T.C.A. equipment and new planes at the International Airport, courtesy of CX. At a last meeting some travel films were shown, courtesy of BOAC. MAL is back on the air at Elmo with an FB signal. Birdies? Heard from MN Apr. 1 and understand his 813s make good heaters for the chicken coop. ARRL circulation in Manitoba is now 188 and all Canada is 3539. The *News Letter* from Noel B. Eaton, Canadian Division Director, is widely appreciated. The Manitoba Travel and Convention Assn., at the instigation of the Dauphin Club, is about to print scenic QSL cards available for distribution. Traffic: VEJY 28, QD 10, EF 7, KN 6, MN 6, PA 4, AK 2, IW 2, EG 1, MK 1.

**SASKATCHEWAN**—SCM, Jack Robinson, VE5BL—Officers elected for the Regina Club for the next year are JS, pres.; QA, vice-pres.; JI, secy.; NZ, treas. GG, GI and HP has been heard mobile. TP has a Heath 6-meter rig and QA is building a 6-meter rig. PM has a new vertical on 20 meters with FB results. VJ is on sideband, LO is on his annual bee trip to W-Land, EO is active on c.w. This is the last reminder by this column for the Hamfest at Saskatoon, June 30, July 1 and 2. B.C.N.U. there. Traffic: VE5HP 153, LM 66, HQ 16, GC 12, JU 6, RE 4.

## Field Day Rules

(Continued from page 29)

pendence-of-mains" multiplier (multiplied by the "battery power" multiplier, if applicable.) Where different multipliers apply during the Field Day period, points are multiplied by the multiplier in effect at the time the points were earned.

**11. Club Aggregate-Mobile Scores:** Entries under Class C may be combined to form a "Club Aggregate-Mobile Score." The club name must be noted on the individual reports, and the club secretary must submit a claimed aggregate score. Credits to the extent supported by the reports submitted to ARRL will be allowed. Only bona fide members of the club, residing in the club territory, may contribute to the aggregate-mobile club listing.

**12. Reporting:** Mail reports or entries on or before July 23. Reports must show starting and ending time of F'D operating period, bands used, dates and contact times, calls of stations worked, signal reports sent and received, and ARRL sections or locations of stations worked. Reports must also show power inputs and sources of power, number of transmitters in simultaneous operation, location of station, number of persons participating, class of entry, and score computations.

QST

## A Transistor Transceiver

(Continued from page 42)

will re-open the squelch.

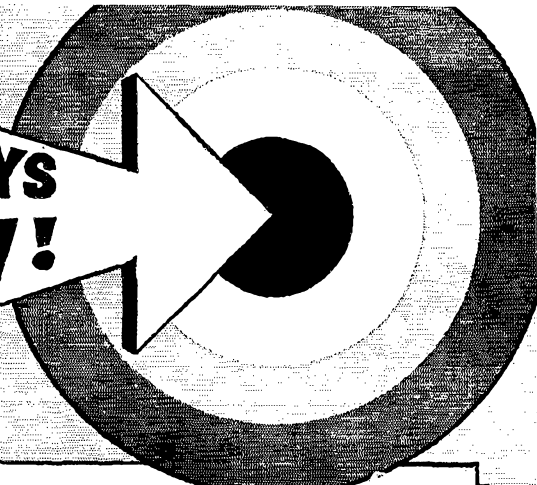
In aligning the transmitter, check the oscillator operation with a receiver, then check the tuning range of the tanks with a g.d.o., being sure that the 17.5 volts is applied. Using two No. 48 bulbs in series as a load, align all tanks and the loading capacitor for maximum bulb brilliance. Modulation can be checked by listening to the transmitter second harmonic in an f.m. broadcast tuner.

The handy-talky has been in use for months, and has proved itself quite well. Range, using its vertical antenna, is about five miles to a fixed station, although at times this can be exceeded when a good ground plane, such as a car body, is available. Two such units can communicate for about two miles over fairly open terrain. The high-power version can reach stations 10 to 15 miles away.

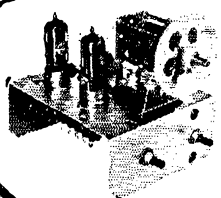
Perhaps you now have visions of transistorized equipment running through your head. Forget about bulky, fragile, power-hungry tubes and give it a try!

QST

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Mod. 4/103 for 144-148 mc bands. Combines VFO primary freq. of 18 mc with xtal fundamental freq. of 12 mc. Supplied with Mod. 1647 dial ass'y.

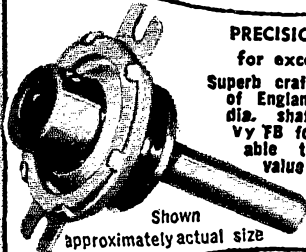
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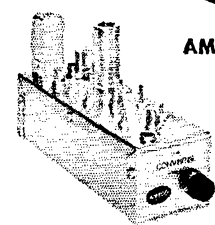
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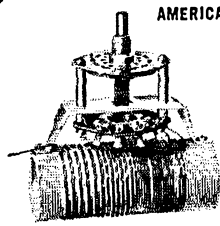
Specify desired IF output for converter model selected.

Kit: CN-50K, CN-144K, or CN-220K, each \$34.95

Wired & Tested: CN-50W, CN-144W or CN-220W, each \$49.95

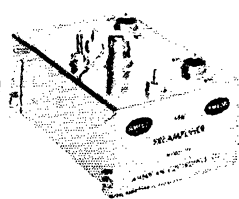
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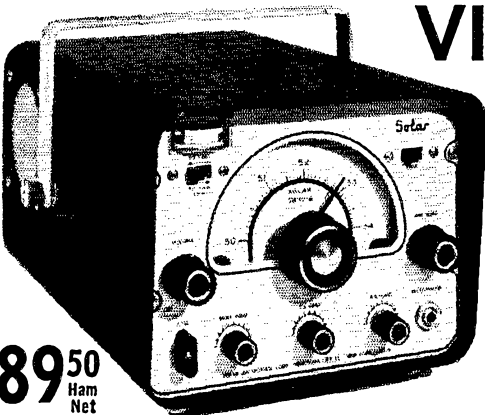
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## A Transistor Power Supply

(Continued from page 53)

is quite low, and this supply has far more output than is needed. However, the extra capacity is handy. For example, a practical transistor circuit may call for two or more voltages, ordinarily obtained from taps between cells of the battery. With a single voltage source a voltage divider has to be used, and it should have as low resistance as possible. With this supply you can usually afford to put a fairly heavy current through a low-resistance divider, and still have plenty left over for the transistors.

The adjustable output voltage is useful not only for "sneaking up" on normal operating conditions when first trying a new circuit, but also for determining the limits of voltage at which a piece of equipment will operate.

The gadget can even be used for tube circuits — for example, as a d.c. supply for the heaters in the early stages of a high-gain audio amplifier. It will easily handle two 12.6-volt, 150-ma. heaters or one 6.3-volt, 450-ma. heater. It is thus useful for helping to localize hum troubles in testing amplifiers or oscillators.

Finally, unlike flashlight cells, it's always fully charged and ready to go, just as long as there's an a.c. outlet within reach of the plug!

QST

## No-Holes Installation

(Continued from page 51)

such undecorative appendages of mobile hamming don't help much in this respect. It's nice to shed the cumbersome mobile array now and then, just to experience a brief respite from the "Hey — look at the car with television!" that rings in every v.h.f. mobile enthusiast's ears. Chances are you won't leave the car unadorned, however. Once you've experienced the noise reduction and relative freedom from flutter that horizontal antennas provide on 6 or 2, you're not likely to be satisfied with vertical whips for long!

QST

## V.H.F. SS

(Continued from page 48)

W1VNH 9430-205-13-ABCD	K1ODW 96- 4- 2-A
W1QWJ 6048-144-11-ABD	W1IC 72- 3- 2-A
	W1URI 44- 2- 1-A
	K1SZJ/1 (2 opns.) 216- 9- 2-B
K1BEL 4332-114- 9-A	
K1JQT 4212-117- 8-A	
W1WLE 3570- 85-11-B	
K1RLG 3168- 99- 6-A	
K1KQK 3026- 89- 7-A	
W1RVW 2055- 69- 5-ABD	
K1JNS 1952- 61- 6-A	
K1RVE 1920- 60- 6-A	
W1NMQ 1870- 55- 7-A	
K1PIL 1690- 65- 3-B	
K1BSW 1504- 47- 0-AB	
W1JWV 1410- 47- 5-B	
W1ALL 1326- 51- 3-B	
K1CYG 1200- 40- 5-B	
W1OY 1128- 47- 2-B	
W1STR 1008- 36- 4-B	
K1PLA 924- 33- 4-A	
K1OYT 858- 33- 3-B	
K1UWL 840- 30- 4-A	
K1SZJ 768- 32- 2-AB	
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W1ESA 672- 28- 2-B	
W1HBF 630- 21- 5-A	
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	5800-145-10-AB
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	K1GYT 1300- 50- 3-AB
	W1MHL/1 (W1s DDF)

(Continued on page 150)

# YOUR BEST ANTENNA VALUES—AT HARVEY

## HI-PERFORMANCE

*Hy-gain*

## MULTIBAND DOUBLETS

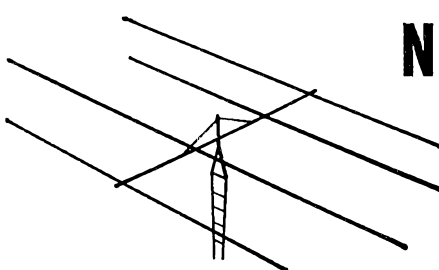


(KIT FORM)

Hy-Gain Multiband Doublets are guaranteed to equal or exceed the performance of any full-size doublet system and are adjustable for either phone or CW operation. These high-efficiency doublets are designed for one feed line, offering a low SWR of 2:1 or less at resonance on all bands. Four top models to choose from, all of 7-strand No. 23 copper clad steel. Models 5BDT, 4BDT, 2BDP offer a fanned dipole arrangement; Model 3BDT is a one section of wire using four trap circuits. Fanning distance between all doublets vary from 4 feet to 35 feet. Trap doublets accept power up to 500 watts AM 1 KW PEP. Model 2BDP will accept 1 KW AM, 2 KW PEP. All models are characterized by easy, flexible installation.

Model 2BDP — 15, 40 & 80 meters.....\$19.95  
 Model 3BDT — 10, 15 & 20 meters.....\$17.50

Model 4BDT — 10-40 meters.....\$24.50  
 Model 5BDT — 10-80 meters.....\$34.95



**NEW** *Hy-gain*  
**DUO-BANDER**  
 FOR 20 AND 40 METERS

This is the most important new antenna system of the year, designed especially for the popular 20 and 40 meter amateur bands. New design advancement eliminates use of inductance and capacity traps; exclusive "Beta Match" permits maximum gain and low standing wave ratio into a single 52 ohm coaxial feed line. Weight of new DUO-BANDER is 54 lbs.; boom length, 24 ft.; longest element length, 40 ft. Power capability is 5KW PEP, 3 KW AM. This is a real Harvey value!

Model DB-24 .....\$169.50

PROMPT DEPENDABLE SERVICE TO ANY PART OF THE WORLD



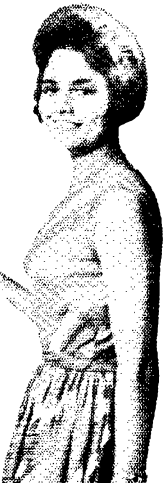
**HARVEY**

ESTABLISHED 1927

**RADIO CO., INC.**

103 West 43rd Street, New York 36, N. Y./Judson 2-1500

# NEW EZ-IN QSL CARD PACKET



FRAMES  
20 CARDS  
IN CLEAR  
PLASTIC

POCKETS OF  
"DOUBLE"  
PACKET  
OPEN AT  
FRONT CENTER  
FOR EASY INSER-  
TION OR  
REMOVAL

1 PACKET  
35¢

3 PACKETS  
\$1.00

POSTPAID and GUARANTEED BY:

**TENN. PAPER & BOX CO.**

P. O. BOX 198

GALLATIN, TENNESSEE



**Croth**

## TURN COUNT DIAL

Registers fractions to 99.9 Turns  
FOR roller inductances, INDUC-  
TUNERS, fine tuning gear re-  
ducers, vacuum and other multiturn  
variable condensers. One hole mounting. Handy  
logging space. Case: 2" x 4". Shaft: 1/4" x 3/8". TC  
2 has 2 1/2" dial - 1 1/2" knob. TC 3 has 3" dial -  
2 1/2" knob. Black bakelite.  
TC 2 \$5.50 - TC 3 \$5.75 - Spinner Handle 75c extra  
Add 12c for Parcel Post

**R. W. GROTH MFG. CO.**

10009 Franklin Ave. Franklin Pk., Illinois

## FACTORY AUTHORIZED SERVICE

ON RECEIVERS AND TRANSMITTERS

REPAIRS, modernization, calibration and alignment by  
competent engineers using factory standard instruments.  
Collins, Globe, Hallicrafters, Hammarlund, Harvey-Wells,  
National Co. Service representative for Hickok and RCA  
Test Equipment. Factory parts. All work guaranteed. Our  
twenty-sixth year.

**DOUGLAS INSTRUMENT LABORATORY**

176 Norfolk Avenue Boston 19, Mass.

**Kreco**

## CO-AXIAL ANTENNAS

All Aluminum

LIGHT • STRONG • EFFICIENT

2 METERS	MODEL CO-2A	15.00 net
6 METERS	MODEL CO-6A	24.00 net
10 METERS	MODEL CO-10A	30.00 net
27 MC	MODEL CO-CBA	33.00 net

These models are ordered cut to exact frequency

30 to 50 MC	MODEL CO-30A	30.00 net
50 to 100 MC	MODEL CO-30A	24.00 net
108 to 470 MC	MODEL CO-150A	15.00 net
3/4" Aluminum Pipe	per foot	1.00 net
RG-8/U with 2 PL 259's attached, per foot		.20 net

ASK YOUR DISTRIBUTOR OR WRITE

**HERB KRECKMAN CO. • CRESCO, PA.**

GEF KSD  
25,732-461-18-AB  
K1BZB (5 oprs.)  
3485-103- 7-AB

### NORTHWESTERN DIVISION

*Oregon*  
W7HBB 672- 29- 2-A  
K7AAD 416- 16- 3-AB  
K7EAU 330- 15- 1-A

*Washington*  
K7DTH 3480-116- 5-AB  
W7ZSL 1656- 69- 2-AB  
W7ZQN 1512- 63- 2-AB  
K7PAL 1320- 55- 2-A  
W7ANT 1276- 58- 1-A  
K7LQI 946- 43- 1-A  
K7QLC 780- 33- 2-A  
K7QOG 385- 18- 1-A  
K7JZP 216- 9- 2-A  
K7JZF/7 44- 2- 1-A

### PACIFIC DIVISION

*Santa Clara Valley*  
WA6BYA  
6300-210- 5-AB  
W6RDN 2250- 75- 5-AB  
WA6NLJ 832- 32- 3-A  
W6PBN 504- 31- 2-B  
WA6NDZ 300- 15- 3-A  
W6VMY/6 (4 oprs.)  
8040-201-10-AB  
K6SLQ (7 oprs.)  
7380-246- 5-AB

*East Bay*  
K6KQD 1950- 75- 3-AB  
WA6LGE 1442- 52- 4-A  
WV6TIN 364- 13- 4-B  
WA6MAV 360- 12- 5-B

*San Francisco*  
K6GEY/6  
2790- 93- 5-B  
WV6UAP 196- 7- 4-B  
*Sacramento Valley*  
WA6OPG 1890- 63- 5-B  
WA6GMN 1200- 40- 5-B  
W6PIV 1110- 37- 5-B

*San Joaquin Valley*  
W6KUY 2580- 86- 5-AB  
W6LZA 1725- 38-13-AB  
W6OVR 1560- 52- 5-AB  
K6AYL 812- 29- 3-B  
K6SDZ/6 (K6SDZ,  
W6LNG)  
2916- 81- 8-B

### ROANOKE DIVISION

*North Carolina*  
W4AGY 2664-111- 2-AB  
K4AHS 2256- 94- 2-AB  
K4REO 1966- 84- 2-AB  
W4AAET 2076- 76- 3-AB

W4WDH 1950- 75- 3-B  
W4BUZ 1752- 73- 2-B  
WA4CCK 1704- 71- 2-B  
K4YYJ 1890- 65- 3-AB  
K4CPL 1680- 70- 2-B  
K4SNF 1392- 58- 2-AB  
W4ULX 1368- 57- 2-AB  
W4YSB 1248- 51- 2-AB  
W4HEH 1200- 50- 2-B  
WN4DKU 1128- 47- 2-B

W4OAB 1080- 45- 2-AB  
K4PXU 1078- 49- 1-B  
W4AJT 1012- 46- 1-B  
K4QFY 948- 40- 2-B  
W4VHH 868- 31- 4-AB  
K4HEE 816- 34- 2-AB  
W4RPC 660- 30- 1-B  
W4DFQ 638- 29- 1-B  
W4LNK 638- 29- 1-B  
K4JCU 528- 24- 1-B  
W4GNF 528- 24- 1-B  
WN4CUD 528- 24- 1-B  
W4MLC 506- 23- 1-B  
K4SHU 440- 20- 1-B  
WN4CTC 374- 17- 1-B  
W4HRC 198- 9- 1-B

*South Carolina*  
K4JOY 481- 19- 3-A  
W4VIV 456- 19- 2-AB  
W4VRV 416- 16- 3-A  
W4TLC 264- 11- 2-AB

*Virginia*  
K4VWH 9320-233-10-AB  
W4LTU 5632-128-12-B  
K4UKQ 4578-133- 6-AB  
K4LHB 3332-120- 4-AB

W4WOU 2805- 94- 5-A  
W4KJH 2296- 82- 4-AB  
W4OTX 1624- 58- 4-AB  
W4GOC 1612- 62- 3-A  
K4WTV 1560- 00- 3-AB  
W4BHD 1508- 68- 2-A  
W4GVQ 1152- 48- 2-A  
W4ONN 960- 40- 2-A  
W4PAY 720- 30- 2-AB  
K4EFS 578- 17- 7-B  
K4RAY (5 oprs.)  
8928-250- 8-

K4AJE (K4s AJE, BXCZ)  
3842-114- 7-AB  
K4BNI (K4s BNG, BNI)  
1586- 61- 3-B

*West Virginia*  
K8RPP 1708- 61- 4-B  
K8YOH 1215- 41- 5-A  
K8WHN 897- 35- 3-A  
K8BLR 650- 25- 3-A

### ROCKY MOUNTAIN DIVISION

*Colorado*  
K0TSD 1320- 55- 2-AB  
K0ISC 984- 42- 2-A  
W0DKA 720- 30- 2-AB  
K0MNG 528- 22- 2-AB  
WN8BAO 418- 19- 1-B  
W0BPT 286- 13- 1-B  
W0BVZ 176- 1- 1-B  
W0PFF/0 (4 oprs.)  
1056- 44- 2-AB

*Wyoming*  
W7UFB 156- 7- 2-A  
W7YTR 120- 7- 2-A  
K7GLL 110- 5- 1-A  
W7PSO 110- 5- 1-A  
W7VDZ 88- 4- 1-A

### SOUTHEASTERN DIVISION

*Alabama*  
K4SFH 1350- 45- 5-AB

*Eastern Florida*  
K4YSN 1782- 81- 1-A  
K4LVZ 1716- 78- 1-AB  
W4HFD 1672- 76- 1-AB  
W4CUI 858- 39- 1-A  
K4QQE 814- 37- 1-AB

*Western Florida*  
K4KIF 512- 16- 6-AB  
W4ZGS 432- 18- 2-AB  
*Georgia*  
K48JF 752- 22- 3-B  
K4BQK/4 (K4s BQK,  
P2S/TQU)  
1540- 82- 4-AB

### SOUTHWESTERN DIVISION

*Los Angeles*  
WA6DJB 7232-226- 6-A  
K6JQR/6 6840-228- 5-AB  
WA6MFI 4260-142- 5-A  
WA6NMT 3542-131- 4-AB  
K6JZK 330-105- 3-A  
K6GYF 2132- 82- 3-  
HCDE

WA6KVS/6 1540- 55- 4-A  
K6PGJ 1027- 40- 3-A  
WV6SLF 912- 38- 2-B  
W6NSW 744- 38- 2-A  
WA6QFC 286- 11- 3-A  
K6TGH 284- 12- 1-AB  
W4AKS 260- 10- 3-A  
WA6COB 216- 9- 2-B  
K6QV 143- 7- 1-A  
K6OZA 120- 5- 2-A  
12,796-457- 4-AB

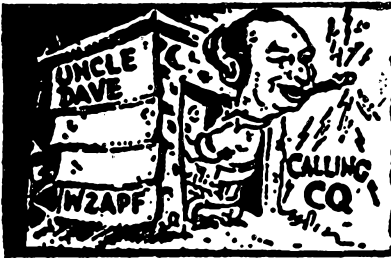
W6JCA 120- 5- 2-B  
WA6AFA 110- 5- 1-A  
WA6BS 688- 1- 1-A  
WA6BSY 06- 3- 1-A  
WA6PH 66- 3- 1-A  
K6UMM/6 (3 oprs.)  
K6BPC/6 (6 oprs.)  
9736-351- 4-AB  
WA6CA (K6GPH,  
WA6GAG)  
7290-243- 5-AB  
W6UFJ (4 oprs.)  
5992-214- 4-AB  
1176- 49- 2-A

K6ZVK 4810-185- 3-AB  
WA6CDV (K6ITG,  
WA6CDV)  
2678-103- 3-AB  
K6OPI/6 (4 oprs.)  
1176- 49- 2-A

*San Diego*  
K6DBZ/6 (4 oprs.)  
13,356-477- 4-  
ABCE

(Continued on page 152)





# FORT ORANGE

## Radio Distributing Co. INC.

904 BROADWAY ALBANY 4 N. Y. U. S. A.  
AMATEUR HEADQUARTERS

Cable Address "Uncledave"

CALL ALBANY HE 6-8411

NITES GR 7-5891

If you're not going to be a June bride or groom why not spend that money on your favorite hobby and be really thrilled with any number of special bargains listed below

### NATIONAL RECEIVERS

NC300	\$250.00
NC98	98.00
NC173	125.00
HRO50T	195.00
HRO60	325.00
NC188	100.00
NC57	55.00
NC98	79.50

### TECHNICAL MATERIEL CORP. RECEIVERS

GPR90 w/spk. Excelnt. Cond... \$350.00

### HALLICRAFTERS XMTRS. AND RECEIVERS

SX62A Rec.	\$269.50
HT32A SSB Xmtr.	495.00
HT31 Linear	195.00
HT32 SSB Xmtr.	395.00
HT33 Linear	450.00
SX100 Rec.	219.00
S108 Receiver	104.50
SX110 Receiver	129.50
SX111 Receiver	229.50
HT20 AM Xmtr.	175.00
HT30 SSB Xmtr.	195.00

### GONSET XMTRS.—REC.—CONV.

Series III 2 or 6M Comm.	\$175.00
GSB100 SSB Xmtr.	375.00

### ELMAC XMTRS. AND RECEIVERS

AF67 Mobile Xmtr. .... \$95.00

### COLLINS XMTRS. AND RECEIVERS

KWM-1 Xceiver	\$600.00
32V2 Xmtr.	250.00
KWS-1	1095.00

### JOHNSON XMTRS. AND ACC.

Mobile Xmtr.	\$ 69.50
Thunderbolt Linear	450.00
Viking 1-w/VFO 122 Xmtr.	175.00
Valiant Xmtr.	350.00
Viking 1—Xmtr.	125.00
Ranger Xmtr.	195.00
Pacemaker SSB Xmtr.	250.00
Viking II Xmtr., CDC Model	175.00

### "WRL"—GLOBE XMTRS.

DSB100 DSB Xmtr.	\$ 74.50
LA-1 Linear Amp.	85.00
VOX10 Voice Relay	22.50

### HEATH XMTRS. AND ACC.

SB10 SSB Adapters	\$ 75.00
MT-1 Mobile Xmtr.	99.50
VF-1 VFO	15.00
TX-1 AM Xmtr.	275.00

### BARKER AND WILLIAMSON XMTRS., ETC.

5100 AM Trans.	\$250.00
515B	150.00

### CENTRAL ELECTRONICS XMTRS., ETC.

"Q" Multiplier	\$ 24.95
"A" Slicer	44.95
20A Exciter, Like New	175.00
20A Exciter	150.00

### EICO XMTRS. AND ETC.

720 (Transmitter)	\$ 74.95
730 (Modulator)	39.95

### HAMMARLUND RECEIVERS

HQ160	\$295.00
HQ110	195.00
HQ150	175.00
HQ100	145.00

**USED, EXTRA SPECIAL**  
Checked but no warranty  
Sonar CD-2.....\$99.50  
Sonar CD-6.....99.50  
100 Watt VHF 2 or 6 Meter Trans.

### MISCELLANEOUS USED

HE35 Lafayette (6 meter transceiver w/Xtal & Mic.)	\$ 44.95
Mon-Key (Electronic Key)	18.00
SSB100A Eldico w/PWR Supply (as is)	149.50
VFO44 Knight	34.95

### WRL—GLOBE XMTRS.

VOX-10 Voice OP Relay	\$19.50
QT-10 Anti-Trip Unit	5.95
PA-1 Power Reducer	7.95

### VANTRON

300A Linear Amp. .... \$75.00

### MOBILCON

H302—Mobile Power Supplies (350V—125MA) ..... \$29.50

### TECRAFT

C3/26 (CB) Conv. Cit. Band	\$27.50
P1 (P.S.) Conv. Pwr. Sup.	12.50

### BEAMS—NEW AND USED (AS INDICATED)

Mosley V-27GP (CB) new..... \$29.95

We have more beams and verticals at very special prices—write us about your needs and we will quote.

Mosley VPA1520 (New)	\$109.50
Mosley VPA1020 (New)	99.50
Telrex 3EL 20 mtr. (Used)	49.50
Telrex 3EL 10 mtr. (Used)	39.50
Mosley V144GP (2 mtr.) used	17.50
Mosley VPA20-2 (New)	39.50
5A-6M Taco (New)	9.95
BA6M (Baluns-for-above)	3.95
Mosley TA33 (New)	84.95
Mosley V3 (New)	19.95
Mosley V3 Jr. (New)	15.95
Mosley TA32 (New)	59.95
Mosley TA32 Jr.	42.95
Mosley A320	66.95
Mosley S153	42.50
Cushcraft AGP15	11.95
Cushcraft AGP10	10.95
Cushcraft ATGP3	24.95
Cushcraft A28A	21.95
Hy-Lite 3E10F	49.50
Gonset 3220	94.50
Hy-Gain 203G	49.95
Hy-Gain 113G	39.95

### EXTRA SPECIALS

New Items—Overstock and Discounted

### SPECIAL

COLLINS RECEIVER FILTER 35U1 (New)	\$ 10.00
HAMMARLUND XTAL CALIB. OR BFO UNIT WITHOUT XTAL	5.00
COPPERWELD WIRE (Nos. 12-14-16)	per 100 ft. 2.85
GLASLINE—Standard per 100 ft.	3.08
per 600 ft.	17.84
Heavy Duty	per 100 ft. 5.89
per 600 ft.	34.75

### TUBES—NEW—GUARANTEED

All individually boxed except where noted in bulk.

	Reg.	Each	Dozen
6H6	\$3.50	\$1.05	\$11.50
6SJ7	3.75	1.15	12.65
6J7	4.55	1.25	13.75
45 (Bulk pack)	2.05	.65	7.15
2A6 (Bulk pack)	3.65	1.10	12.10
6A8G	5.80	1.75	19.25
6AE6G	2.05	.65	7.15
658GT (Bulk pack)	2.75	.85	9.35
6C4 (Bulk pack)	1.50	.45	4.95
6J6 (Bulk pack)	2.35	.75	8.25

1962 Calendar and Schedule Pad Free with purchase of 5 Receiving Type Tubes.

Write Uncledave  
WZAPP  
with your needs  
and problems.

TRADE-INS ACCEPTED AND  
FOREIGN TRADE SOLICITED  
BANK FINANCING

TIME PAYMENTS

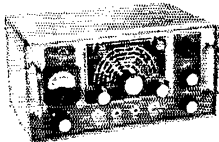
18 Months to pay. Life Insurance at no extra cost

UNCLE DAVE'S  
RADIO SHACK

A SUBSIDIARY OF  
FORT ORANGE RADIO  
DISTRIBUTING CO.

# MULTI-ELMAC FIXED OR MOBILE

THIS EQUIPMENT COMBINATION OPERATES FROM A.C. OR D.C. SOURCE



**AF-68 TRANS-CITER**  
6 thru 80 meters—VFO  
all bands—65 watts AM,  
and CW.

## PMR-8 RECEIVER

6 thru 80 meters plus  
broadcast band.



**M-1070 POWER SUPPLY**  
Operates from 6 or 12  
volts D.C. and 115 volts  
A.C.

(M-1071—Power Supply in kit form.)

Manufactured by

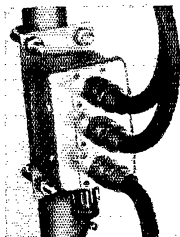
**MULTI-PRODUCTS COMPANY**  
21470 COOLIDGE HWY., OAK PARK 37, MICH.

## CUSTOM CERAMICS

FOR THE AMATEUR

Beautiful custom stamped, hand painted, permanently fired ceramic "Call Bars" or "Handle Bars" (limit six letters). **LAPEL PIN \$1.50, ALLIGATOR TIE CLASP \$2.00, CUFF LINKS \$1.50.** Matched set **TIE CLASP AND CUFF LINKS \$3.00.** **DESK TOP CALL BAR**, one inch raised letters with ceramic base **\$4.95.** On jewelry items add 10% Federal Excise Tax, Ohio residents add 3% State Sales Tax. All Prices Post Paid.

**DONNA'S CERAMICS** P. O. Box #111  
SYLVANIA, OHIO



## "All-Weather" COAXIAL RELAY

MODEL NO. (UHF Connectors)	POWER	ONLY
CU 420	115w A.C.	19.95
CU 421*	115w A.C.	19.95
CU 421*	6w A.C.	19.95
CU 521*	6w D.C.	19.95
CU 621*	12w D.C.	19.95
CU 821*	24w A.C.	21.20
CU 921*	220w A.C.	27.20

\*1P2T Aux. Contacts.

- Eliminate expensive coaxial cable
  - Mounts anywhere, outdoors or indoors
  - Mating power connector supplied
  - 1P2T construction—operates 0 to 225 mc.
  - Full 1000 watt capability
  - Extremely low insertion loss—less than 0.1 db.
  - Attractive gold anodized aluminum construction
  - Weatherproof—gasket sealing
  - High quality TR switch
  - Money back guarantee.
- Write to Hoi, W8YPT for catalog sheet. Dealer and distributor inquiries invited.

## BAY-ROY ELECTRONICS, INC.

P. O. Box 7503 Cleveland 30, Ohio

WA6SLD (WA6S LLD  
T1R) 4500-192- 2-AB  
W6NLO/6 (7 oprs.)  
2508-105- 2-AB

### WEST GULF DIVISION

Northern Texas

K5ARU 2552-116- 1-A  
W5FMV 2442-111- 1-A  
K5RWR 2024- 82- 1-A  
K5MTR 1694- 77- 1-A  
K5EHM 1562- 71- 1-A  
W5EPZ 1254- 57- 1-A  
K5BFL 1232- 56- 1-A  
K5VUP 1100- 50- 1-AB  
K5HPI 594- 27- 1-A  
K5FVT 506- 23- 1-A  
WA5AEB 374- 17- 1-A  
K5KVE 308- 14- 1-A  
K5OBO 308- 14- 1-A  
K5IKK 198- 9- 1-AB  
K5KWB 176- 8- 1-A  
K5VUM 154- 7- 1-A  
K5TXX 132- 6- 1-A  
W5HPT 55- 5- 1-B  
K5TKR (K5s TKR ZBM)  
3520-160- 1-AB  
W5BJB (K5s AFJ ZIM,  
W5BJB)  
2970-135- 1-A  
W5GQU (W5s GQU  
(GQY) 2332-107- 1-A  
WA5AAQ (WA5s AAQ  
AAR ADY)  
1980- 90- 1-A

Oklahoma

W5TKT 2244-102- 1-AB  
W5VCJ 1716- 78- 1-AB

K5CLS 671- 31- 1-AB  
W5LOW 649- 30- 1-AB  
K5LRE 528- 24- 1-A  
K5DFM 418- 19- 1-A  
W5FMX 330- 15- 1-AB  
K5CMV 154- 7- 1-AB  
K5RRQ 154- 7- 1-A  
K5OHU 132- 6- 1-AB

### CANADIAN DIVISION

Quebec

VE3BM/2  
1157- 45- 3-B  
VE2AXO 702- 27- 3-B  
VE2BPP 336- 14- 2-B

Ontario

VE3DUU  
2472-103- 2-AB  
VE3BGB 2352- 98- 2-AB  
VE3AIB 2064- 86- 2-AB  
VE3DIT/3  
1440- 61- 2-B  
VE3ESE 1440- 60- 2-B  
VE3CIL 1392- 58- 2-B  
VE3EZI 1128- 47- 2-B  
VE3TV 936- 39- 2-AB  
VE3DLS 804- 37- 1-B  
VE3AAH 696- 29- 2-B  
VE3ETO 546- 21- 3-AB  
VE3CEM 418- 19- 1-B  
VE3CWN 408- 17- 2-B  
VE3AL 374- 17- 1-B  
VE3DNR/3  
22- 1-1-B

British Columbia

VE3BZ/7  
132- 6- 2-A

<sup>1</sup> K3EGE, opr. <sup>2</sup> Novice Award Winner. <sup>3</sup> K9JNA, opr.  
<sup>4</sup> K9GDF, opr. <sup>5</sup> WA2GWY, opr. <sup>6</sup> Hq. staff, not eligible for  
award. <sup>7</sup> W2BWU, opr. <sup>8</sup> W4ACY, opr. <sup>9</sup> K4LBB, opr.  
<sup>10</sup> W0IFC, opr.

ARRL thanks the following amateurs for submitting check  
logs: W2IBQ, W3GCO/3.

## Hamfest Calendar

(Continued from page 10)

**Mississippi**—The Biloxi Amateur Radio Club will hold its 5th annual hamfest on June 30 and July 1 at the Community House, Biloxi. There will be club-station activities and a dance Saturday night, and individual and mobile contests, dinner, etc., on Sunday. For further info, contact the Biloxi ARC, 2307 Miller St., Biloxi.

**Ohio**—The 3rd annual Lancaster hamfest will be held at the County Fairgrounds in Lancaster from 1000 to 1700 on Saturday and Sunday, June 16-17. Technical lectures, equipment displays, and an outstanding family program. Registration \$1.00. For further info, contact Robert Skidmore, K8NCY, % the Lancaster and Fairfield County Amateur Radio Club, P.O. Box 3, Lancaster, Ohio.

**Ohio**—The 7th annual picnic of the Northeast Ohio V.H.F. Group will be held on Sunday, June 17, at Sunset Park on Route 619, near the intersection of Route 44, northwest of Alliance, Ohio. Activities begin at noon. Games, awards, hidden transmitter hunt on 1290 Mc. (bring along headphones, plug and jack—the hamfest committee will supply the rest), swap shop, mobile talk-in on 6 meters. Bring your family and your lunch. Refreshments available on the grounds. Registration \$2.00 per family. For further info, contact Ormal Garlock, K8BYR, 450 Westmorland St., Akron 14, Ohio.

**Pennsylvania**—The Penn-York Hamfest Association will hold its 4th annual hamfest in the Ingersoll-Rand Recreation Hall, Athens, Pa., on Saturday, June 16. Program will include speakers, contests, awards, and dinner. Special program for the ladies during the afternoon. Reservations at \$4.00 per person (\$8.00 at the door) includes everything. Plenty of free parking, with police protection. For more information, contact Penn-York Hamfest Association, % CARA, P.O. Box 301, Corning, N. Y.

**Pennsylvania**—The annual ARRL Eastern Pennsylvania Section picnic will be held on Sunday, June 17, at Pavilions 7, 8, and 9, Hershey Park, Hershey, Pa. (Note—more space reserved than previous years.) Registrations begins at 0900. Program includes speakers, swap and auction, award presentations and eloquent oratory by WINJM, ARRL'S National Emergency Coordinator. Bring your own picnic lunch. Registration is \$1.00 per amateur call, and may be made in advance with George Powell, K3CAH, Church and Pikeland Ave., Spring City, Pa.

**Tennessee**—The Memphis hamfest will be held on Sunday, June 24, at the Overton Park pavilion, on East Parkway North. Registration begins at 1000 and activities will wind up about 1600. Mobile talk-in on 50.5 Mc. and  
(Continued on page 164)



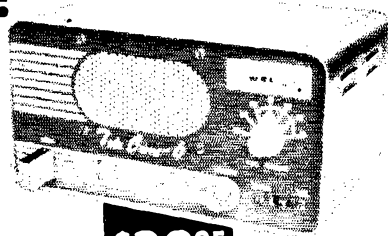
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#### TC6-A 6 METER TRANSCEIVER

Smallest unit anywhere with these features: 5 watts input, uses regular 8 mc crystals, push to talk relay, plate modulation, 52 ohm coax output. Full superheterodyne receiver tunes all of 6 meters (49-54mc) with 8:1 vernier. STABILITY EXCEEDS .01% AFTER WARM-UP. R.F. stage, noise limiter, 20kc selectivity, built in speaker. Requires 285VDC @ 115MA and either 12V or 6V filament power as available from our Model TCA and TCD12 supplies.

Kit \$39.95

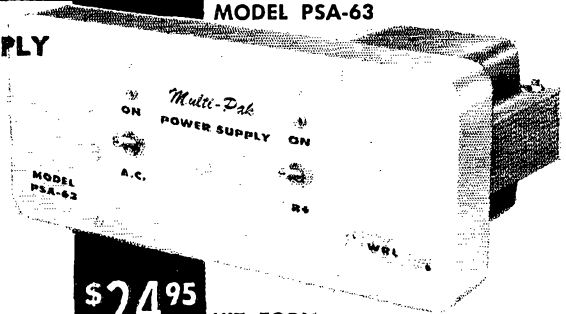
115VAC Power Supply Model TCA, Complete \$15.95 Kit  
12VDC Power Supply Model TCD12, Complete \$24.95 Kit

### \$39<sup>95</sup>

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MODEL PSA-63

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Available kit or wired. Custom made for Gonset G76, Swan, Heath MT-1, Eimac AF67-AF68, Wired for Swan only, \$49.95.

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KIT FORM

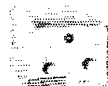
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For any Xmtr. of input power 100W SSB/CW, 75w fone or less. Matches most Xmtrs. to high impedance antennas. Unbalanced input and output. Steel cabinet. Completely self-contained. 5x4x4". Easy instruction manual.



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6-Meter Beam .....	\$12.95	Colinear 6M Vertical .....	\$29.95

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● **Model B-24**  
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Net — \$34.95

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(no radials)  
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4-band — 5'3" high  
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### Exclusive Features of Model B-4010 40 plus 10 meters

- New end loading for maximum radiation efficiency\*. No center loading employed.
- Element length only 20'; boom 10'.
- About 22 lbs. in weight.
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- SWR . . . 1.5:1.
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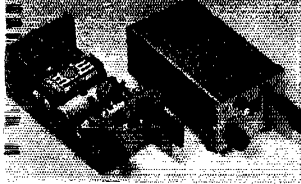
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Peak Triband performance on 10-15 & 20 M with Skyline Quads . . . HIGH Gain, EXCELLENT F/B, SWR 1:1 at resonance, pre-cut, pre-tuned, rugged Fiberglass or bamboo, turn with TV rotor & light wgt.

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3950 kc. No admission charge. Bring your own lunch, or buy your lunch at one of the two near-by restaurants. Soft drinks, ice cream, and coffee available right at the hamfest site. For further info, contact Clayton Elam, K1FZJ, 1-47 Merrycrest Drive, Memphis.

**Oregon** — Port Orford is having a big July 4th celebration, and among the activities scheduled is a mobile hunt for hams. Other events will include a motorcycle hill climb, horse show, scottish dancers, square dance, art show, and fireworks. Mobile talk-in on 3850 kc. For further info contact Mary Lou Knottingham, K7QC'N, Box 197, Port Orford, Oregon.

**Saskatchewan** — A hamfest on Saskatoon on June 30 and July 1 and 2. Listen for VE5QSO, transmitting bulletins about the hamfest. No other info available.

**Washington** — The 8th annual family picnic of the Royal Order of Hoot Owls (a 6-meter amateur radio society) will be held June 16 and 17 at the Seattle World's Fair. For further info, contact Lee Singleterry, W7YJE, 191-4 Ballinger Rd., Seattle, Wash.

**Wisconsin** — The Wisconsin Nets Association will hold its annual hamfest and family picnic (formerly the BEN family picnic) on Sunday, July 8, at East Park, Hartford, Wisconsin (about 30 miles northwest of Milwaukee). Refreshments, contests, awards. Registration begins at 0900 Airstrip for those flying in, with transportation to and from the field. For further details contact Mrs. Ralph (Sara) Potter, W9VIK, 610 Wisconsin Ave., North Fond du Lac, Wisconsin.

## Strays

For several years we have heard the rumors about the toxic effect of Teflon, and a Stray that we published about this a number of years ago brought in a great deal of correspondence. Now we have a little pamphlet sent to us through the courtesy of W2YFG, which is entitled *The Anatomy of a Rumor*. Written by Dr. John Zapp, Director of the Haskell Laboratory for Toxicology and Industrial Medicine, it states that there is *no* evidence that the fumes from Teflon have ever caused anything but a temporary discomfort which passes away within a matter of hours. There is *no* evidence, says Dr. Zapp, that Teflon fumes have ever caused the death of a human.

## Receiver Design

(Continued from page 21)

transistor stage gain by lowering the emitter to collector voltage, will provide better cross-modulation performance than the conventional "reverse" a.g.c., which controls gain by varying the base bias to reduce collector current in a manner similar to the bias control used with remote-cutoff pentodes.

Even better results can be obtained with a.g.c. systems where the controlled element is separate from the transistor stage. An example of this would be some form of a bridge or "T" network using a voltage variable capacitor, controlled by a.g.c. voltage.

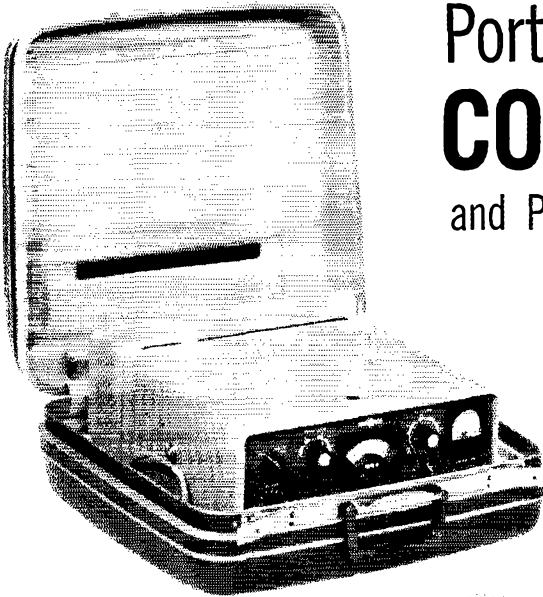
### Conclusion

As our technology expands, new tools for accomplishing our radio communication jobs are evolved. They are not always a direct advance in

(Continued on page 156)

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SPECIALIZING IN THE BEST AT EASY TERMS  
HIGH TRADES AND LOW DOWN PAYMENTS  
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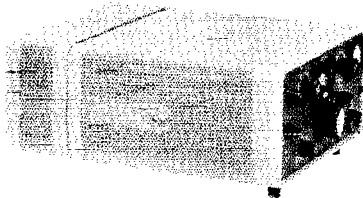
Collins PM-2 Portable Power Supply with built-in auxiliary speaker connects directly to the KWM-2 to give you a rig that operates on either 115 or 220 volt ac. Formed plastic-lined Samsonite suitcase provides shock-resistant protection for the KWM-2, the PM-2 and accessories. Your complete portable station weighs less than 45 pounds.

## Portability Plus Power... **COLLINS KWM-2** and PM-2 Portable Power Supply!

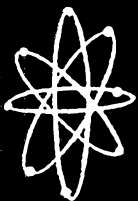
Your ham shack goes where you go with the KWM-2 Transceiver and the Portable Power Supply. In your den at home, for the mobile unit in your car, or for use aboard a boat or plane, the KWM-2 means a complete, superior SSB station.

Collins KWM-2 Transceiver covers all amateur bands from 3.4 to 29.7 mc with 1 kc accuracy. 175 watts P.E.P. input on SSB; 160 watts on CW. Weighs only 18 pounds.

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**\$1150.00**



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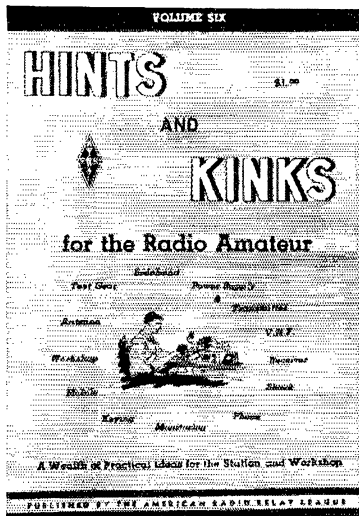
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the state of the art, but must be considered carefully in the light of existing requirements.

In the case of the broad-band circuits discussed in this article, we have a definite step backward in cross-modulation and blocking capability. Modifying circumstances such as the need for light weight, portability, low power drain, low cost, or mechanical simplification may be worth the sacrifice in performance that accompanies the use of these design techniques. **QST**

## IARU News

(Continued from page 86)

- Norway: N.R.R.L., P.O. Box 898, Oslo  
 Okinawa: O.A.R.C., P.O. Box 739, APO 331, Postmaster, San Francisco, Calif.  
 Pakistan: Box 4074, Karachi  
 Panama, Republic of: L.P.R.A., P.O. Box 1622, Panama  
 Paraguay: R.C.P., P.O. Box 512, Asuncion  
 Papua: VK9 QSL Officer, P.O. Box 204, Port Moresby  
 Peru: R.C.P., Box 538, Lima  
 Philippine Islands: P.A.R.A. QSL Bureau, 67 Espana Extension St., Quezon City  
 Poland: PZK QSL Bureau, P.O. Box 320, Warsaw 10  
 Portugal: Rua de D. Pedro V., 7-4º, Lisbon  
 Roumania: Central Radioclub, P.O. Box 95, Bucharest  
 Salvador: YS10, Apartado 329, San Salvador  
 Singapore: QSL Manager, P.O. Box 777  
 South Africa: S.A.R.L., P.O. Box 3037, Cape Town  
 Southern Rhodesia: R.S.S.R., Box 2377, Salisbury  
 Spain: U.R.E., P.O. Box 220, Madrid  
 St. Vincent: VP2SA, Kingstown  
 Sweden: Sveriges Sandare Amatörer, Enskede 7  
 Switzerland: U.S.K.A., Buron/LU  
 Syria: P.O. Box 35, Damascus  
 Trinidad: John A. Hoford, VP4TT, Box 551, Port-of-Spain  
 Tunisia: S. S. Wagoner, Jr., 3V8CA, U. S. Embassy, Tunis  
 Uganda: P.O. Box 1803, Kampala  
 Uruguay: R.C.U., P.O. Box 37, Montevideo  
 U.S.S.R.: Central Radio Club, Postbox N-88, Moscow  
 Venezuela: R.C.V., P.O. Box 2285, Caracas  
 Virgin Islands: Richard Spenceley, KV4AA, Box 403, Charlotte Amalie, St. Thomas  
 Wake Island: T. D. Musson, P.O. Box 127  
 Yugoslavia: S.R.J., P.O. Box 48, Belgrade

## Strays

### What Am I?

I've broken barriers of language, religion, customs, and government greater than any other method known to man.

What am I?

I span continents, oceans, mountains, rivers, and valleys at the speed of light.

What am I?

I have within my ranks more than 200,000 people in the United States alone, and more than 18,000 in other countries.

What am I?

I have saved lives, made lasting friendships, brought scattered families together, cheered lonely soldiers, and brought the world's people close together.

What am I?

I am cherished and respected in the hearts of everyone involved with me.

What am I?

I am amateur radio.

— K5CGH

# 6 & 2 M DUOBANDER

4 ELEMENTS 6M — 18 ELEMENTS 2M

## Single Feed Line

A ruggedly constructed, 52 ohm 'fed VHF Duobander, developing 8.0 db forward gain on 6M and 15.0 db on 2M. Front to back ratio averages 15-20 db and SWR is 1.5:1 or less, both bands.

Boom is 1 1/4" OD aluminum; elements 7/16" OD, factory preassembled. Net wt.: 8.5 lbs. Boom length: 10 ft. Longest element: 10 ft.

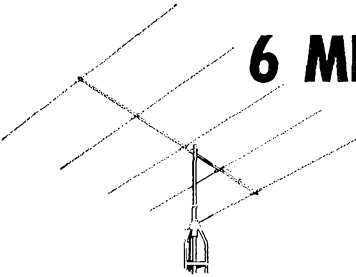
Model DB62  
**\$32.95**

EVERYTHING IN

# VHF

FROM HY-GAIN

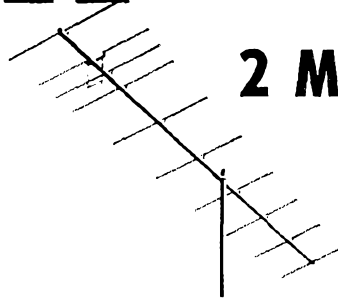
## 6 METERS



8 Elements. The Hy-Gain Model 68B develops the tremendous forward gain of 10.1 db with 25 db F/B ratio. Weighing only 9 lbs., this 6M beam may be rotated by any TV rotator. Boom 18 ft., longest element 9 ft. 8 in. Beta match and factory pretuned. **\$32.95**

5 Elements. The Hy-Gain Model 65B weighs only 6 lbs.; is extremely easy to install and rotate. Develops 9 db forward gain and 25 db F/B ratio. Boom 9 ft., longest element 9 ft. 8 in. All factory preassembled. Directions for stacking included. **\$18.95**

## 2 METERS



5 Elements. This 2 meter Hi-Bander, Model 25, is extremely light weight — 2 3/4 lbs. Completely factory pretuned, the beam may be fed either coax or parallel. Boom length: 5 ft. 4 in., longest element: 41 3/4". **\$8.95**

10 Elements. The world's most popular 2 meter beam, the Model 210 offers 13.4 db gain with excellent F/B ratio and no compromise. Weighing only 4 1/4 lbs., it may be easily rotated. Beta matching. Boom is 12 ft. long. Longest element, 41 3/4". **\$14.95**

11 Element, 1 1/4 M Beam, Model 111, 4 lbs. 14.2 db gain .....	<b>\$13.95</b>
13 Element, 3/4 M Beam, Model 313, 2 lbs. 16.1 db gain .....	<b>\$12.95</b>
Dual Stacking Kit for two VHF Beams adds 3 db gain .....	<b>\$ 4.95</b>
Quad Stacking Kit for four VHF Beams adds 6 db gain .....	<b>\$15.95</b>
Stacking Frame for mounting four stacked beams .....	<b>\$59.50</b>

## 6 METER

# HALOS

## 2 METER

One inch diameter aluminum tubing. Beta matched and pretuned for perfect match to 52 ohm coax. Cyclocac base takes 1" mast. Model HH-6B, **\$12.95**. 5 ft. telescoping mast, Model HMB, **\$4.95**.

Less than 1 lb., the Model HH-2B is 14" in dia. with heavy wall, 1 1/2" dia. aluminum tubing. Beta matched and factory pretuned. Up to 15 db gain over vertical whip, **\$5.95**. Stacking kit for two HH-2B's, **\$4.95**.

### HALO DUOBANDERS

Unique combination of both halos for 6 & 2M operation with double feedline and low SWR. Simplified assembly. Models HH-2B and HH-6B .....

**\$18.95**

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Mounting Structure Does Not Affect  
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\$74.25 Net  
3 ELEMENTS  
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3X Power of  
TG-2-R

\$18.00 Net  
Half Wave  
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Maximum  
Possible Gain

Although independent use of the TG-5-5 and TG-2-R give amazing performance, their combined use as "Team-Mates" produce the ultimate in gain and efficiency. The engineered compatible characteristics of pure vertical polarization and matched feed points, with the elimination of horizontal polarization, make the "Team-Mates" leaders in the field of communication.

Gain Figures, Radiation Patterns and Catalogs Listing All Models are Available

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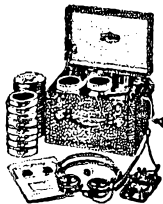
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## Strays

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## 25 Years Ago

this month

June 1937

... The editor pleaded for realistic RST reports, while the Communications Manager announced the Fifth Annual ARRL Field Day. VK5GR reported on the 1936 VK-ZL DX contest — highest-scoring W was W5EHL.

... On the technical side, W3ECP (he's still around!) described a complete portable station powered with dry batteries. Two watts to a crystal-controlled transmitter, and a one-tube receiver. W4CVQ also had a battery-operated rig, running 15 watts, with modulator and two-tube receiver. Technical Editor Jim Lamb had some more high-selectivity circuits for receivers, while W3AWH (Arley Beers) had a whole bunch of tips for the fellow who wanted to build his own receiver. W8UD described a 3-stage rig covering 160 through 10 meters, W1HRX (Jim Millen) described a 500-watt 14- and 28-Mc. amplifier, and W3DQ had a 28-Mc. mobile installation. W9DNP described his 100-foot lattice tower, and W5BZR had a rotary beam for 28 Mc.

... The minutes of the annual meeting of the Board of Directors were carried, and among them was recorded the decision to proceed with the construction of W1AW.

QST

## Silent Keys

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

W1AFV, Charles E. Jennings, Dorchester, Mass.  
K1DGV, George C. Milford, Chesterfield, N. H.  
K1MAY, John A. Stoops, Danbury, Conn.  
W2AMX, Raymond O. Bixby, Schenectady, N. Y.  
WA2GKN, Richard G. Favreau, Plattsburgh, N. Y.  
K2JFR, William H. Mills, Uster Park, N. Y.  
WA2JUT, Herbert G. Hildebrandt, Baldwin, N. Y.  
W2NJV, Bernard J. Murphy, Ozone Park, N. Y.  
K3BDR, Frank F. Glabatz, Feasterville, Pa.  
K3PDN, Gladys R. Dolas, Pottstown, Pa.  
K4BII, John P. Briggs, Charlottesville, Va.  
K4IPR, Chester J. Corrigan, Miami, Fla.  
W4JDY, John H. Zimmerman, Winter Haven, Fla.  
W4VJ, Charles D. Hervey, Eau Gallie, Fla.  
W5QBR, William R. Wallis, Austin, Tex.  
K5SPV, Paul W. Allich, Los Alamos, N. Mex.  
W5YNZ, Neil S. Thompson, Peecos, Tex.  
W6FW, Jesse V. Wise, Thornton, Calif.  
W6JOH, Robert L. Weber, Oakland, Calif.  
W7CMQ, Floyd A. Larkin, Eatonville, Wash.  
K7KEW, Henry H. McCauley, Bellevue, Wash.  
K7MKL, Robert E. Ogle, Las Vegas, Nev.  
W7NNK, William R. Strother, Portland, Ore.  
W8AKW, Rollo L. Tedford, Cincinnati, Ohio  
W9AYW, Loren K. Zoll, Bluffton, Ind.  
W9BTR, Bevan E. Dearinger, Rushville, Ind.  
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W8NXX, Robert A. Scalia, St. Louis, Mo.  
W0OWD, Owen H. Griffiths, St. Louis, Mo.  
K8YGG, John H. Klehn, McCook, Neb.  
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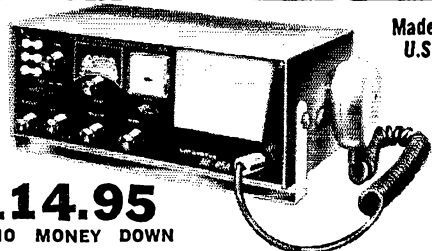
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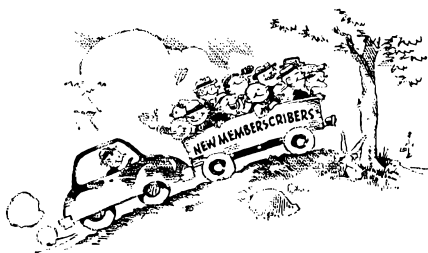
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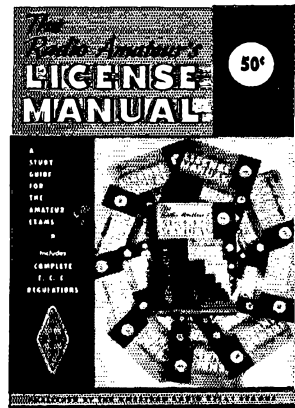
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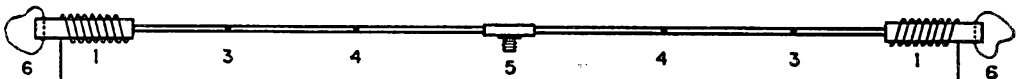
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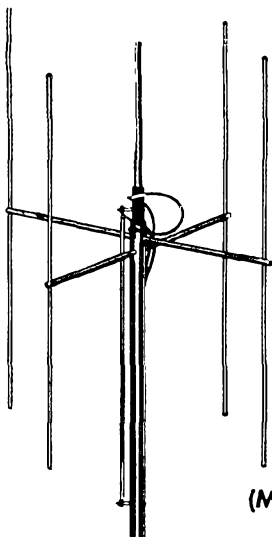
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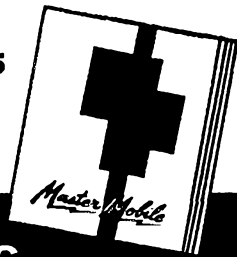
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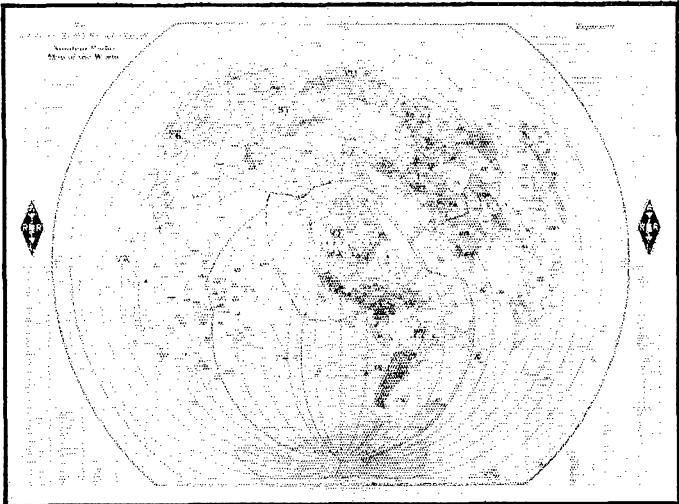
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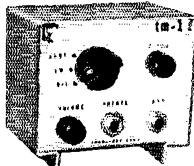
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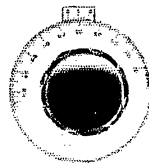
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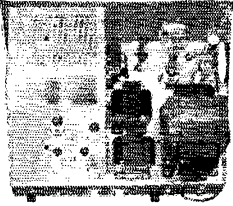
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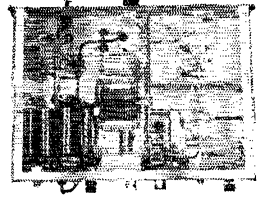
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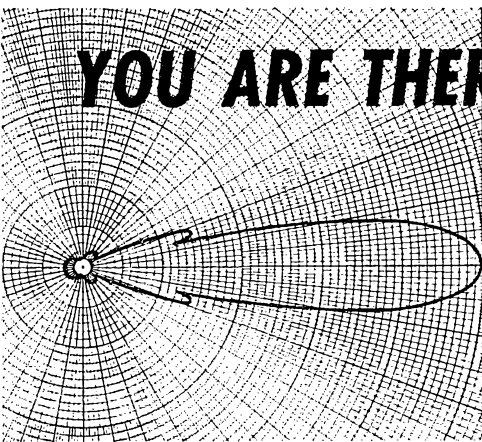
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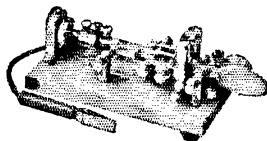
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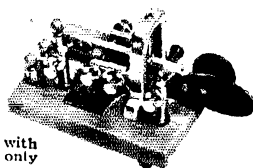
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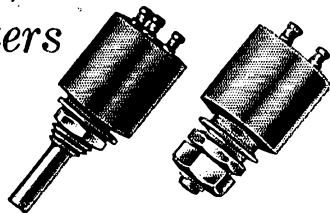
**VHF AMATEUR** Our May issue contains 48 packed pages for example: Complete conversion of the APX-6 for 1215 mc, nuvistor converter for 144 mc, 2 meter transceiver (super-region revr, 3 watt signal), DX column, 2 meter column, SSB column, plus other regulars. Our April issue featured capacitor testing, 432 & up news, etc. Ask to start with our April or May edition. Send 35¢ for sample. Subscriptions: \$2.50 per year, \$4.00 for two years, \$5.50 for three years. Published monthly by Bob Brown, K2ZSQ. The VHF AMATEUR, Dept. 6A, 67 Russell Ave., Rahway, N. J.

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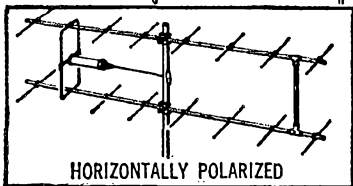
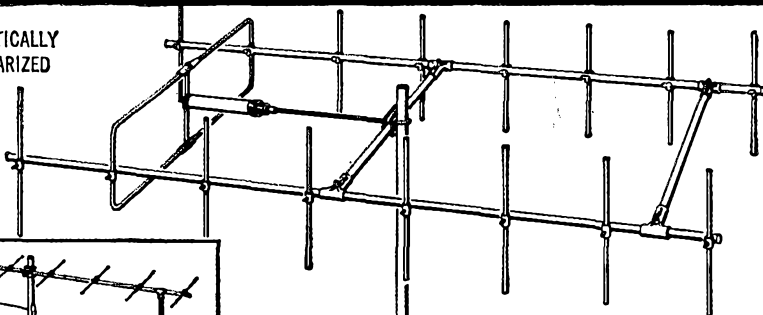
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Also available: A complete line of commercial antennas.

## GAIN INC.

Write Attention DEPARTMENT T-6

1209 West 74th Street • Chicago 36, Illinois • Phone 874-2610

### TELEWRITER FREQUENCY SHIFT CONVERTER



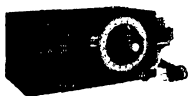
**NEW  
MODEL "K"**  
**\$189.00**  
CABINET \$14.50

Audio INPUT. Connected to receiver speaker terminals. OUTPUT jacks on front panel for teletype magnet and keyboard. Keyer tube keys magnet directly. Loop and bias supplies built-in with provision for mounting polar relay within converter chassis, or using external polar relay for keying transmitter. Automatic HOLD on Mark in absence of signal. Copies any shift 100-1000 cycles. Toroid inductors tuned to 2125 and 2975 cycles. Dual eye indicator. For further information and reconditioned teletype list write: On display at Harvey Radio Co. 103 West 43rd St. N.Y.C.  
**ALLTRONICS-HOWARD CO. BOX 19 BOSTON 1, MASS. (RICHMOND 2-0048)**

## LAMPKIN METERS + 2nd Commercial License = YOUR OWN PROFITABLE BUSINESS!

You already have earned one FCC license—your ham ticket. With a little extra study, you can get a 2nd class radiotelephone license. This one can lead to lots of money . . . in a business that's a natural for a ham.

THERE IS AN URGENT NEED FOR TECHNICIANS WITH 2ND-CLASS COMMERCIAL LICENSE—TO MAINTAIN TWO-WAY COMMERCIAL RADIO. FREQUENCY ADJUSTMENTS ON THESE OUTFITS CAN BE MADE ONLY BY PROPERLY LICENSED AND EQUIPPED TECHNICIANS. TO LEARN MORE . . .



**LAMPKIN 105-B  
FREQUENCY METER**  
RANGE 0.1 TO 175 MC AND UP.  
PRICE \$260.00 NET.



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Send for **FREE BOOKLET**—

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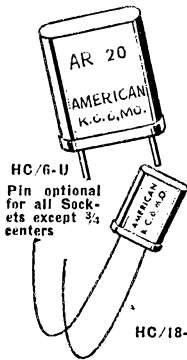


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MFG Division, Bradenton, Fla.  
At no obligation to me, please send me free booklet "HOW TO MAKE MONEY IN MOBILE-RADIO MAINTENANCE"—and data on Lampkin meters.

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CITY \_\_\_\_\_ STATE \_\_\_\_\_

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## UNCONDITIONALLY GUARANTEED FAST SERVICE

American specializes in two-way communications. Frequency correlation data for G.E., Motorola, R.C.A., Collins, Globe, Johnson, Lear, Narco, Hallicrafters, Link, Gonset, Heath, Bendix, Aero-tron, U.S. Gov't. and many other companies. *Include postage with order.*

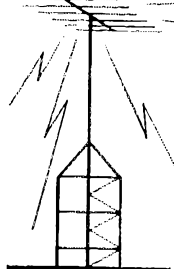
HC/18-U Subminiature

FREQUENCY RANGE	CALIBRATION TOLERANCE	PRICE
3000 KC to 9999 KC	.002%	\$3.50
15 MC to 30 MC TM	.0025%	\$3.50
30 MC to 50 MC	.0025%	\$4.00
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Write for quantity discounts —

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**FLASH!**  
ALL ORDERS  
SHIPPED ON  
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Complete stocks of nationally advertised products always available at **SMALLEY'S** — ham headquarters for Western Canada. Ten licensed hams on our staff to serve you.

- TRADE-INS ACCEPTED
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- SEND FOR SPECIAL FREE HAM BULLETIN

Pioneer ham suppliers since 1920. Specialists in **HI-FI, TELEVISION** and **INDUSTRIAL ELECTRONIC EQUIPMENT.**

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## AVON ELECTRONICS CO.

A new service in New England to expertly service all types of ham gear to factory specifications. Reasonable rates—Work guaranteed. Your inquiries invited.

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ALBANY TURNPIKE (ROUTE 44) AVON, CONN.

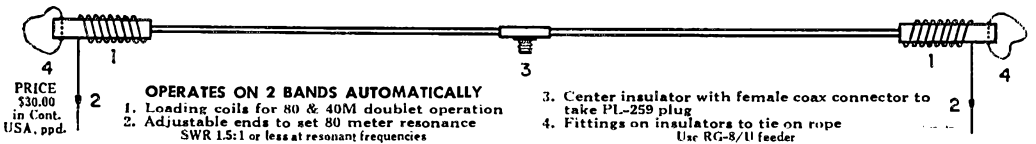
TELEPHONE - HARTFORD 658 - 6447

JOSEPH D. OGLE, WILSS, MANAGER

## LRL-70 ANTENNA

70' LONG, 80 & 40 M

Power rating 2 Kw. P.E.P. or over



PRICE  
\$30.00  
in Cont.  
USA, ppd.

**OPERATES ON 2 BANDS AUTOMATICALLY**  
1. Loading coils for 80 & 40M doublet operation  
2. Adjustable ends to set 80 meter resonance  
SWR 1.5:1 or less at resonant frequencies

- Center insulator with female coax connector to take PL-259 plug
- Fittings on insulators to tie on rope

Use RG-8/U feeder

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Box 44

Owensboro, Kentucky

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— 20A00ORBI (form only): 1/4" dia. x 13 1/16" long. Coils wound on this form have an inductance range of .079 uh to 1.25 mh.

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\* Resinite is a phenolic impregnated tubing which combines the mechanical and dielectric advantages of phenolics with the high dielectric strength, moisture resistance, and non-corrosive properties of cellulose acetate. Resinite can be certified to MIL P 798 Type PBG.

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# HAM-ADS

(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. Since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham Ads is the 20th of the second month preceding publication date.

(6) A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial, and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (3), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

*Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.*

**HAMFEST!** Starved Rock Radio Club, June 3rd. For details write SRRCT/WMKGS, G. E. Keith, Secretary, 3RD No. 1, Box 171, Olesby, Ill.

**WANTED:** Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W67RH, 1010 Monte Dr., Santa Barbara, Calif.

**MOTOROLA** used FM communications equipment bought and sold. W5BCO, Ralph Hicks, Box 6097, Tulsa, Okla.

**"BREAKFAST Club Hamfest,"** July 28-29 at Terry Park near Palmyra, Ill.

**TRAVEL** Abroad costs less, and is lots more fun when arranged by The International Ham-Hop Club, Non-profit, non-political. Members in 50 countries. W6THN/1, Gunther, 165 Lloyd, Providence 6, R.I.

**VE1FO/1** will QSL all Field Day contacts, Halifax Amateur Radio Club, P.O. Box 663, Halifax, N.S., Canada.

**WANTED:** All types military aircraft ground radios, teletype and test equipment, GRC, PRC, etc. Have all types amateur gear for trading, purchases or cash. Phil Rickson, K2HJC, Morrisville, N.Y.

**WANTED:** Manual and schematic for Scott Marine Radio, model SLRM, serial 223, W. N. Zahn, 1301 Shakespeare Ave., Bronx 52, N.Y.C.

**QST Magazines:** 1940 to 1962, \$50. W8SWF, Dearborn, Michigan.

**FOR Sale:** Viking Valiant xmt. \$325.00; SX-99 rcvr. with Heathkit Q Multiplier, \$90.00, 3-element 15-meter beam, \$15. Complete rig—\$410. All in like-new condition. K4IQI, 9540 Byron Avenue, Miami Beach 54, Fla.

**WANTED:** Complete transmitting-receiving station. Must be new or in perfect condition, also mobile rig. Paying cash and pick up your location. Send complete information in your first letter. Calleja, Box 2807, Mexico City.

**WE Buy** all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., 199 Front St., Hempstead, N.Y.

**RECEIVERS:** Repaired and aligned by competent engineers using factory standard instruments. Factory service at reasonable prices or Collins, Hallicrafters, Hammarlund, Gonset, National, Harvey-Wells. Our 26th year, 90 day guarantee. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

**TRIGGER:** Cash paid for ham equipment, 7361 W. North Ave., River Forest, Ill. PR 1-8616, Chicago #TU 9-6429.

**TOROTOS:** Uncased 8R Mhy, like new, Dollar each. Five/\$4.00 P.P. DaPaul, 309 So. Ashton, Millbrae, Calif.

**SOUTHERN California:** Transmitters and receivers repaired, aligned, bandwidth, frequency, harmonics measured, Used ham gear bought, sold, traded, Robinson Electronics, 922 W. Chapman, Orange, Calif. Tel. Kelllog 8-0500.

**WANTED:** Two or more 304TL tubes. Callanan, W9AU, P.O. Box 155, Barrington, Ill.

**ATTENTION Mobilizers!** Leeco-Neville 6 volt 100 amp. system, \$50; 12 volt 50 amp system, \$50; 12 volt 60 amp system, \$60; 12 volt 100 amp syst. \$100. Guaranteed no ex-police car units. Herbert A. Zimmernann, Jr., 42 PAT 1907 Concy Island Ave., Brooklyn 30, N.Y., tel. DF-Weay 6-7388.

**SELL:** AF-67, \$110; PS-2V, \$30; both \$130. Instruction books, original cartons. W8PJH.

**QSL'S? SWL'S? World's finest and largest variety samples 25¢ (retunded). Sakkers, W8DED, Holland, Mich.**

**C. FRITZ QSL's** guarantee greater returns! Samples, 25¢ deductible. Box 1684, Scottsdale, Arizona (formerly Joliet, Ill.).

**QSL'S** Three and four colors on lustre coat stock, 100 \$3.85 or 200 for \$6.90 combination mixture—fast service—satisfaction guaranteed or order our sample catalog showing over one hundred designs, \$1.00 (refundable). Constantine Press, Bladensburg, Maryland.

**QSL-SWL-WPE.** Finest. Since 1946. Largest assortment. Priced right. Send 10¢ for samples to: Glenn Print, 1103 Pine Heights Ave., Baltimore 29, Md.

**QSL'S "Brownie,"** W3CJ1, 3110 Lehigh, Allentown, Penna. Samples, 10¢; with catalog, 25¢.

**QSL-SWL'S.** Samples 10¢. Maigo Press, Box 375 M.O., Toledo, I., Ohio.

**DELUXE QSL'S.** Petty, W2HAZ, Box 27, Trenton, N. J. Samples, 10¢

**QSL Cards.** Call letter D-cals, Samples 10¢, or send 25¢ for extra large selection and free "Danger, High Voltage!" card. Dick, W8VXK, Rte. 3, Gladwin, Michigan.

**QSL-SWL'S,** 100 2-color glossy, \$3.00; QSO file cards, \$1.00 per 100. Samples, 10¢. Rusprint, Box 7507, Kansas City 16, Mo.

**QSL'S:** samples 25¢ (refundable). Schuch, W6CMN, Wildcat Press, 6707 Beck Ave., North Hollywood, Calif.

**QSL'S, SWL'S, WPE.** Samples 5¢. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

**QSL'S, SWL'S, XYL-OMS** (sample assortment approximately 93¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fantabulous, DX-attracting, prototypal, snazzy, unparagoned cards (Wow!), Rogers, K8AAB, 961 Arcade St., St. Paul 6, Minn.

**DON'T Buy QSL-SWL'S** until you see my free samples. Bolles, W5OWC, Box 9445, Austin, Texas.

**SPACE AGE 3-D QSL cards.** Don't miss out! Free sample brochure, 3-D QSL. Dept. QJU, 5 Wood End Road, Springfield Mass.

**SUPERIOR QSL'S,** samples 10¢. Ham Specialties, Box 823 Bellaire, Texas

**ATTRACTIVE QSL'S:** Large variety of styles, cartoons, Multi-colored same price, Personal ham stationery, Samples 25¢ (deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn 13, N.Y.

**QSL'S,** 3-color glossy, 100—\$4.50. Rutgers Varityping Service, 7 Fairfield Rd., Somerset, N.J.

**PICTURE QSL'S.** Cards of your shack, home, etc., Made from your photograph, 1000, \$13.00. Raum's, 4154 Fifth St., Philadelphia 40, Penna.

**QSL'S,** 300 for \$4.35, Samples 10¢. W9SKR, "Goarre" Vesely, Rte. #1, 100 Wilson Road, Inletside, Ill.

**QSL-SWL'S.** Samples free. W4BKT Press, 123 No. Main, McKenzie, Tenn.

**QSL'S.** Samples free. Phillips, W4HRG, 1708 Bridge St., The Dalles, Oregon.

**QSL'S.** Samples dime. Rubber stamps: name, call and address \$1.35. Harry Sims, 3227 Missouri Ave., St. Louis 18, Mo.

**QSL'S,** \$2.50 and up. Samples 10¢. RBL Print M.R. 12, Phillipsburg, N.J.

**QSL'S.** Free Samples. W7IIZ Press, Box 183, Springfield, Oregon.

**QSL'S, SWL'S** that are different, colored, embossed card stock, and "Kromekote". Samples 10¢. Home Print, 2416 Elmo, Hamilton, Ohio.

**RUBBER Stamps,** \$1.00. Call and Address, Clint's Radio, W2UDO, 32 Cumberland Ave., Verona, N. J.

**HUNDRED QSL'S:** 80¢. Samples, dime. Meininger, Jesup, Iowa.

**CERTIFIED QSL-SWL'S,** unique designs, speedy service. Catalog 25¢ (refundable) Certified Printing, Box 1023, Whittier, Calif.

**QSL'S, Kromekote 2 & 3 colors,** attractive, distinctive, different. Free ball point pen with order. Samples 10¢. K2VOB Press, 62 Midland Blvd., Maplewood, N.J.

**1 1/2" Call QSL'S (2 sides printed),** 100, \$2.75; sample free. Garipey, 2624 Kroemer, Ft. Wayne, Ind.

**QSL Specialists,** Distinctive. Samples 15¢. DRJ Studios, 2114 N. Laverne Ave., Chicago 39, Ill.

**QUALITY QSL'S,** New designs monthly. Samples 10¢. Giant, 25¢. Savory, 172 Roosevelt Rd., Weymouth, Mass.

**100 QSL'S,** \$1.00 (2 color, \$1.50). Lewatski, 1367 Perkiomcn, Reading, Penna.

**QSL'S.** Samples, dime. Printer, Corwith, Iowa.

**RUBBER Stamps** for hams, sample impressions, Hamm, W9-DNY, 542 North 93, Milwaukee, Wis.

**QSL'S—\$2.00** per 100 postpaid U.S. only. Glossy, red and green. All orders mailed within 10 days. Free sample. Hobby Print Shop, P.O. Box 155, Umattila, Fla.

**QSL'S 2 color glossy,** 100, \$2.50 samples dime. Ramsbottom Print Shop, Box 237F, Kirksville, Mo.

**QSL'S SWL'S 3-colors,** 100 \$2.00. Samples dime. Bob Garra, Lehighton, Penna.

**QSL'S.** Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

**MAKE Your own QSL'S** with quality rubber stamps. Sample impressions (stamp appreciated). Vanguard Industries, Box 1386, St. Thomas, V.I.

**QSL'S.** Real rassers. Dime. Filmerafters, Box 304, Martins Ferry, Ohio.

**QSL'S,** 2 color glossy, 100, \$2.50. Samples dime. Ramsbottom Print Shop, Box 237F, Kirksville, Mo.

**ATTRACTIVE QSLs:** Large selection of styles, cartoons, multi-colored, same price! Personal ham stationery. Samples 25¢ (deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn 13, N.Y.

**CANADIANS! QSLs** in fluorescent colors, by silk screen process. Free samples. Martin, 314 Delatre St., Woodstock, Ont. P., Canada.

**CANADIAN Used, surplus and new gear.** (Grant catalog, 25¢. Low prices, thousands of items. ETCO, Box 741, Montreal, P.Q., Canada.

**CANADIANS:** Johnson Valiant, factory-wired, late model. Has input for SSB, in mint cond. Used v. little. V6EQIU, 14708-84th Ave., Edmonton, Alta., Cana.

**CANADIANS!** Selling Mosley V-4-6 vertical, wid 75 meter loading coil. Trade? J. E. Tomecek, VE5JT, Box 69, Glenside, Sask. P., Canada.

**CANADIANS:** For sale—Collins 75A4, perfect, \$550; 32V3 in exc. cond., \$300. Going KWM-2, VE4BJ, Box 160, Binscarth, Manitoba, Can.

**WANTED:** Military or Industrial laboratory test equipment. Electrocraft, Box 399, Mt. Kisco, N.Y.

**WANT 1925 and earlier ham and broadcast gear** for personal collection. W4AA, Wayne Nelson, Concord, N.C.

**MICHIGAN Hams!** Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase W8RP, Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel. NOrmandy 8-8262.

**\$1.00 Frames 60 QSL cards** in clear plastic! See picture on page 150 this issue. John Thomas, K4NMT, Box 198, Gallatin, Tennessee.

**HAM TV Equipment** bought, sold, traded. Al Denson, W1BYX, Rockville, Conn.

**KWSI, \$900, W2ADD**

**LOWEST Prices.** Factory fresh sealed cartons. Central Electronics, CDR, Dow-Key, Drake, Electro-Voice, Gonset, Gotham, Hallcrafters, Hy-Gain, E. F. Johnson, Mosley, P & H Electronics, Telrex. Self-addressed stamped envelope for lowest quotation of your needs. Gonset G-33 brand new factory sealed cartons, \$75.00; brand new PL-172 and socket, \$125.00. Used, perfect Ranger, \$150.00; Valiant, \$275.00; SX-110, \$125.00; SX-100, \$180.00; DX-40, \$50.00; Sonar-120, \$50.00; Adventurer, \$35.00; Two brand new Eimac 4CX300A's, both \$55; Mosley A-320B, \$40. H D H Sales Co., P. O. Box 73, Rowayton, Conn. PROCEEDINGS OF THE I.R.E., 1914 through 1933. Some volumes complete. Will sell any copy or copies. Excellent price on entire lot. Mrs. Miriam Knapp, W1ZIM, 191 Beechwood Rd., West Hartford 7, Conn. Tel. Jackson, 3-7560.

**CASH For your gear!** We buy, trade and sell. We stock Hammarlund, Hallcrafters, National, Johnson, RME, Hy-Gain, Mosley and many other lines of ham gear. Ask for used equipment list. H & E Electronic Supply Inc., 506-510 Kishwaukee St., Rockford, Ill.

**WANTED:** For personal collection: QSTs January through August, 1916; ARRL Handbooks: Editions 1 and 5, W1CUT, Box 1, West Hartford 7, Conn.

**CHICAGO LAND Amateurs!** Factory authorized service for Hallcrafters, Hammarlund, Johnson, Gonset. Service all amateur equipment to factory standards. Heights Electronics, Inc., 1145 Halstead St., Chicago Heights, Ill. Tel. Skyline 5-4056.

**SSB Transceiver** from the BC-453, 40 or 80 meters. \$53 page step by step instructions, \$3.00 ppd. WRA, 10517 Haverly St., El Monte, Calif.

**TRADE:** New matched pair walkie-talkies BC-611 75 meters for older good receiver. Astatic model 10-D dynamic mike, tailored for SSB. \$15.00 F.o.b. W.K.Y.G. Mirror Lake, N.H.

**GOODIES:** Engraved Shack Plaques—Badges—Desk Plates. Printed Call Card Mailing Envelopes, etc. Illustrated list, 10¢ refundable. K1VRO, Shirley Decker, 36 Hampden Street, Westfield, Mass.

**1047L tubes** wanted. Also other transmitting and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARC, GRC, URR-51 and MN. Air Ground Electronics Co., 64 Grand Place, Kearny, N.J.

**BEFORE You buy receiving tubes or electronic components,** send now for your giant free Zalytron current catalog featuring nationally known Zalytron first quality TV radio tubes, Ham, Hi-Fi Stereo Equipment, Kits, Parts. Special Purpose Tubes, antennas, etc. All priced to Save you plenty. Why pay more? Zalytron Tube Corp., 220-Q W. 42nd St., N.Y.C.

**COLLINS 75S-2, \$375; URA-8A converter, \$225; 51J2, 51J3, 5134 reconditioned.** Collins receivers 500 kc.—30-30.5 mc. Teletype and KleinSchmidt equipment taken in trade for new amateur equipment. Write Tom, W1AFN, Alltronics-Howard Co., Box 19, Boston 1, Mass. Tel. Richmond 2-0048.

**WANTED:** KWM-2 Transceivers and any old issues of QST from inception through 1925. Al T. O'Neil, Camp Lakeview, Lake City, Minn.

**FOR Sale:** Gonset G-76 transceiver with A.C. power supply; booklet included. Less than 50 hours use. Exclnt condition \$450.00 W3CWP, M. Conroy, 1117 E. Price St., Phila. 38, Penna.

**FOR Sale:** Complete instructions including 28-p. booklet and 26" x 36" schematic for converting the ART-13 transmitter to AM and SSB. \$2.50. Satisfaction guaranteed. Sam Appleton, K5MK1, 501 N. Maxwell St., Tulsa, Texas.

**SELL:** Heath DX-40, \$50; VFO-1 VFO, \$15; Hallcrafters SX-100, \$185. Will be willing to ship. K2CBY, Miles Anderson, Sag Harbor, N.Y.

**TOROID Bonus:** Free .033 (space) and .068 (mark) 200 V. mylars during June, July; August 1962 with order of five toroids. 88 mhy., uncased, like new, with mounting hardware; information sheet, \$1.00 each. 3/\$4.00 postpaid. KCM, Box 88, Milwaukee 13, Wisconsin.

**SELL:** Like new Globe-King 500B, \$450; SX-71 revr, \$125; RME Presetector (new), RFE Coupler, facilities, \$31.00; Johnson TR switch, \$20; Bud TVI filter LF601, \$12; Two UTC CVM1 modulation transformers, \$10 each. Stancor A3808 modulation transformer, \$10. George Edward Magera, W4YLT, 123B Dogwood Drive, Mullins, S.C.

**SELL:** B&W-5100 and 51SB. Best offer. John Gillen, 912 South 57th, Philadelphia 43, Penna.

**VIKING II, VFO,** in superb condition. Best offer. W1ARD.

**FOR SALE:** KWSI, new PTO, new Collins knob, \$900; 75A4, 3 & 6 kc. filters, new Collins knob, \$495; 51J, 3 & 6 kc. filters, new Collins knob, in Collins tabletop cabinet, \$600; CE gated compression amplifier GC-1, \$35; 10-M beam, Telrex 6-4 Super-Mini, \$30; 20-M beam, Telrex 2-cl. Mini-beam, \$20; Tribander, Mosley A-33, \$40; 51A, built-in, \$10; 5-in. Millen "scope (complete with amplifier), beam rotator control and indicator, all AC power supplies for units built-in. Conrad alarm control and panel in unit, \$250. For pick-up only. All the above in most exclnt condx. K2BO, call office: FL 9-2090 and leave msg. S. P. Sultin, 149-43 35th, Flushing 54, L. I., N.Y.

**AMATEUR Paradise Vacation,** Livingstone Lodge and log cabins, Mascoma Lake, Enfield, N. H. Couples, families, \$31.00; swim, fish, boats, sports, Dartmouth golf, tennis, 33rd year Light housekeeping, \$20. PPPV, children half. Literature, Al Livingstone, W2OPN 12-01 Ellis, Fair Lawn, N. J.

**FOR Sale:** Master Mobile 666 ant., dble chain-bumper mount, Gonset Super Six converter and 3001 noise limiter, DX-60. KØHWE, 1533 D Ave. Northeast, Cedar Rapids, Iowa.

**COLLINS 30S-1,** like new, \$750. Dick Mitchell, Rte. 1, Box 59, Winnebago, Ill.

**FOR Sale:** Mobile installation consisting of Viking mobile transmitter with VFO, 600V 300 Ma., 6V/12V DC pwr. supply, Morrow xtal controlled FTR 1F strip and Mod. 5BRF converter with power supply, Master Mobile Mounts rotary coil 12VDC, all for \$175.00. Will ship collect. E. Johnson, W4RGL, 161 Diane Circle, Melbourne, Fla. Sry, no trades! SELL: HT-37, \$340.00, K2EHR.

**FOR Sale:** 65-watt transmitter, phnc/c.w., 80-40M, built-in pwr. supply, \$35.00. Jack Hall, 307 Sneed Hall, Lubbock, Texas.

**COLLINS gear** in good condx: 75A3 with 3 kc. filter and spkr, \$325.00; 3J3, \$275. Cash only. W4RQK, 437 Janmar, Falls Church, Va.

**DX 100** in excellent condition, little used, \$125.00. George Buck, W7BSD, 119 West 6th St., Port Angeles, Wash.

**\$350:** Radio Station WA6DJF, NC300 revr calibrator, converters, spkr, DX100 transmitter, electronic key, low-pass filter, coaxial relay, electronic switch, microphone, VSWR bridge, all-band vertical antenna, etc. R. W. McNair, 2907 West 141st Place, Apt. #5, Gardena, Calif. Tel. FA 1-5811.

**SELLING to make room** for harmonics, 72" enclosed Bud rack with the following: AF-67 (modified for 6), oversize power supply for Eimac (will handle 200 watts), 40 meter ARC-5, modulation monitor, two 6" spkr. CWV control unit with full break-in, and power supplies for auxiliary equipment. Will deliver to best Dallas-Fort Worth area over \$200. W3CXJ, Area Code 214, FL 2-7680.

**SHURE:** 55S, Heath AR2, trade or sale. Wanted: BC224, BC348, R-320/AR88, DX-40. In good condx. W4ZJM.

**SELL:** Pair GW-30 walkie-talkie, GR-II FM receiver. Best offer. W4BRI, Danville, Ky.

**WANTED:** P&H model 600-A, K5SGP, 1427 Louisiana Ave., New Orleans 15, La.

**WANTED:** AC power supply for unmodified ART-13. R. Wm. Lindberg, Box 1832, Vandenberg AFB, Calif.

**COLLINS 75S-1, \$480; 32S-1 with AC, \$520; 399C-1, \$120; 51E-1, \$180. K8YEI.**

**SALE:** KWM-1, AC power supply, speaker, SWR wattmeter, console, Perfect, \$550.00. E. Brooks, K2PML, 65 Madison Ave., Ertlon, N. J.

**WANTED:** Tapes For TG-34A Keyer, Thomas Condon, 321 More Island St., Staten Island, N. Y., C., N.Y.

**APACHE,** excellent, \$199. W2DID, 451 Smith St., Central Islip, N. Y. Tel. CE 4-8544.

**CE20A exciter,** factory wired, QT1 and VFO, \$150.00. Drake 1A revr, \$160.00. Both in like new condx. 1 KW pwr. supply, rack panel, metered, \$50. K2RAG, C. Bednarck, 118-07 228 St., Cambria Heights, N. Y. AC 212-FJ 1-0597.

**SINGLE Sideband Station** in two packages. Pack No. 1 is HT-32B, 100 hours, with D-104 PTT stand at \$560; package No. 2 is Drake 2-B, 2-QS, Waters hybrid coupler, Dow-Key cards DK60-2C, less than 20 hours, at \$300. All mint condition with homebrew connecting harness. Also have Viking Navigator at \$110. Frank Smith, K2RSP/1, Box 451, Hanover, N. H.

**WANTED:** 32S1 and KWM2 with pwr. supplies; also 312B console. Please state full details and cost in first letter. Col. E. W. Sears, K6QOI, EX-DL4D1, 4725 Bridle Trail, Santa Rosa, Calif.

**WORLD'S Largest crystal catalog** 100,000 available crystal frequencies 32 pages. Send 25¢ coin stamps to cover costs. Quaker Electronics, Mt. Top, Penna.

**SELL Pro, wired Apache,** Leon Reckinger, 31-22 84 St., Jackson Heights 10, L. I., N. Y. Tel. J 7-3772.

**IMMEDIATELY** late numbered, SX-101A. For fast sale—\$299. Also factory W & E, 720 \$80. All books, manuals and cards for above. "Ric", WA2SSQ, Bo 1-7614, N. Y. C.

**OLD Timers:** Need 1/2 KW resonance spark transformer preferably Thordarson Type R, "Everyday Engineering Mag.", Nov. 1917. Also Electrical Experimenters 1916-1920. T. L. Mayes, W9AX, RR #2, Shelbyville, Ind.

**COLLINS Receiver:** 75A-4 serial #2319 with speaker, 3 Kc and 6 Kc mechanical filters. In gud condx, \$550.00. K2POI, 559 Grant Blvd., Syracuse, N. Y.

**FOR Sale:** DX-100 with extra, \$100; HQ-140X with spkr, \$150; D-104 mike and many extras; free delivery New York-New Haven vicinity. Steve Lewis, 9 Rivercrest Road, New York 71, N. Y.

ATTENTION Ham Clubs! Field Day gear for sale. Four 50 ft. plywood masts complete with bases, guys, anchors, tackle \$100. AC generator gas driven 600 watt, \$50. Mizecane antennas brown in if you come and get 'em. W9ERU, Box 350, RR 4, Rockford, Ill.

TRANSMITTER for sale. Globe Scout 680-A. factory wired, like new. 6 through 80 meters. plate modulated, with speech booster and Heath VFO. \$80. 50 watts phone 65 watts c.w. Mannie Teitch, 628 East 8th St., Brooklyn 18, N. Y. Tel. Ulster 4-0083.

SALE: SX101A Hallicrafters amateur band receiver, absolutely new condx, \$300. WA2KNP, R. M. Taylor, RD No. 1, Washinton, N. J. Tel Oxford N. J. 453-2371.

CRYSTALS. 2-20 meters. Clearance sale. Your last chance to buy crystals at real surplus prices. 6 for \$1.00. Postpaid. Send for list of available frequencies. W6IMC, 210 Aiden Rd. Hayward, Calif.

HALLICRAFTERS HA-4 keyer won in national contest. Never used! \$45.00 or your best offer. W8KC, 2392 Eardley, Cleveland 18, Ohio.

COLLINS 75A2, exc. condx, Spkr. manual, \$270. R. Bergen, 2301 Forrest Rd., Winter Park, Fla.

VIKING II w/VFO gud opt'd condx, mike-key-tal-ant, included. U pick up. Firm \$160. Even swap for 20A w/VFO. Prop pitch motor, TA-33 Jr, AR-22 rotor, S-20R revr. G-I disc recorder. Assorted misc. parts. Write/call W2DCC, PL5, 1743.

51Z receiver. Collins for sale. Best offer. S. Harris, 758 Princeton Rd., Franklin Square, N. Y.

SUMMER Tube Specials for Radio Clubs only. Send for free wholesale listing. Lou-Ironics, Inc., 131 Lawrence St., Brooklyn 1, N. Y.

FOR Sale: Collins 75S1, Serial 480, exc. condx. \$350. G. Rankin, Jr., W4BK, 920 Curry Dr., Macon, Ga.

WANTED to buy: KWM-2 with AC and DC supplies, in excellent condx. Please give price and serial number with your first letter. K2DJQ, 1713 Ave. A, Olean, N. Y.

SALE: Tri-ex H-471—71 ft. crank-up tower, new condx. \$195.00. W3CKM, A. Young, 40 Holly Road, Severna Park, Md.

FOR Sale or trade for ham equipment: 40 coil-operated hospital radios with built-in bed lamp and pillow speakers, 6-tube chassis with RF stage. Complete with mounting bracket. Originally cost \$75 each. Best offer accepted. Roy Lund, W0VSK, 149 2nd Ave. S.E., Valley City, N. Dak.

WANTED: Central Electronics 200V or 100V. Make reasonable offer. T. McLean, 117 Andover Cr., Oak Ridge, Tenn.

HFATHKIT Mohican, 2 months old, \$105.00, John Norton, WA2SOZ, 11 Audley Circle, Bethpage, L. I., N. Y.

WANTED: Collins Filter F-455-E-31 or CBY. Ahumada, 521 Fifth St., Coon, N. Y. C.

HEATH Mohican GC-1A, \$98 plus shipping. With or without bandspread modification. A-C Supply, \$9. K8WXO, 636 Hollywood, Monroe, Mich.

WANTED: Commercial or surplus Airborne, Ground Transmitters. Receivers. Test sets. 18S, 17L, 51R, 618S, BC611, BC1000, GRC, PRC, ARN14, RT77GRR, Bendix, Collins, others. Rico, Box 156, Annandale, Va.

SELL: C-E 600L linear, \$275; HT-37, \$325; SX-100 with product det., \$195.00, or all three items for \$725. Also 6M SSB xmtr conv., 200W P.E.P. for use with HT-37 and Navistar conv. for SX-100. Both for \$125.00. W2GQK, Florence Ave., Pitman, N. J. Tel. LU 9-8111.

COLLINS KW-1 Excellent condx. Serial No. 17, original owner. Make offer. W6NX, P.O. Box 527, San Jose, Calif.

TECRAFT 2M transmitter and converter. \$65.00. W9NYS.

FOR Sale: Gonset Super Six converter and Dodge '48 car revr., 6 volts, 10-meter whip, all for \$25; extension phone set, \$5; Polaroid Land 95B and Kodak Pony 35 m/m cameras, both new worth \$35 each, both \$60. Deal or swap. M. Schiff, W2ENP, 12 Burbank St., Yonkers, N. Y. DE 7-2909 evenings.

MOBILE G76, exclnt, \$299. DC or AC Sp. \$75. W6PM, tel. KE 8-0510, 922 West Chapman, Orange, Calif.

GLOBE Champion Mod. 350; used only one hour. \$350 watts c.w., 275 watts a.m. Robert Orwin, W4YGS, 706 Columbia, Somerset, Ky.

SACRIFICE: Good SX-99, \$75. Scratched but otherwise in excellent condx 6-meter Communicator III, \$129; 5-element Cush-Craft beam, \$9; exclnt Matchbox (Johnson) with Monimatch, meter \$32. Millen 50-watt extr, \$15. Unused Alliance T-12 rotor, cable, \$15. All unmodified. SX-99, Communicator, Matchbox shipped free. W1LFO, 322 Beach Road, Hampton, N. H.

SELL: Viking Adventurer, perfect condx. Worked 75 countries with it. \$30. W2TDO, 138-54 228 St., Laurelton, Queens, L. I. N. Y.

HRO-60 with A, B, C, D, AC coils and XCU crystal calibrator. Brand new condition. \$285. W2HO, W. Volkammer, Mountain Road, Monroe, N. C.

RF Amplifier with power supply. Linear grounded grid using two 4-1000A tubes. Covers 3-24 Mc. pi-network output using vacuum variable capacitors. High voltage is variable from 0-6000 volts. Entire unit mounted in two 6 ft. enclosed relay racks. \$650.00. Ronald White, 945 Contra Costa Dr., El Cerrito, Calif.

SELLING: Heathkit DX-60, less than one year old, \$50.00; Collins 75A3, receiver, v. gud condx. \$350.00; Vibroplex Bug, \$10. Leo G. Severa, 2205 Meadowbrook Dr., S.E., Cedar Rapids, Iowa.

VIKING I, v. gud condx. Push-to-talk with Dow-Key relay. Best offer over \$100. Need one money for college. Denis Scotton, Brown's Road, Storrs, Conn.

32S1, like new condx, with neat homebrew AC supply and manual, \$500. Hal Greenlee, Field Projects Branch, NASA, Box 186, Port Canaveral, Fla.

FOR Sale: RCA WO-33A oscilloscope. Brand new condx, never used! \$90. M. Conroy, 1117 E. Price St., Philly 38, Penna.

COMPLETE Station: SX-101-A; Apache, SB-10; Turner 250 dynamic mike (pt. II); Dow-Key coax relay; Bandmaster '72; Heath SWR meter; R-46B spkr. All power and other functions integrated for AM or SSB at neat station control within spkr cabinet. Hy-Gain "Tri-Bander" included. Free delivery and installation within 250 miles. \$800. K0WFX, St. Joseph, Mo., 501 North 25th St.

EXCELLENT Hammarlund HO-140-XA receiver for sale. With KC-100 calibrator, speaker and manual. Only \$149.00. Will pack carefully and ship prepaid anywhere in Mainland U.S.A. Larry Guenther, W9AC3, 315 Dempster, Evanston, Ill. Tel. UN 9-4421.

FOR Sale: Gonset Super 12, Johnson Viking Mobile tx, Elmec M-1070 power supply, Gonset noise clipper, Johnson mobile VFO Heath SWR bridge, Dow-Key coax relay, Astatic 331 mike, Trap ant., 10-80, carbon mike, 6-meter converter (c2), homebrew 6 meter tx, Hy-Gain trap 4bdc, Master mobile ant., 1080, crystal calibrator 100 kc, Johnson whipload 6 coil, Master Mobile spring, 108" whip. All for \$250.00. Ralph J. Carjto, K2DJR, 43-17 54th St., Woodside 77, L. I., N. Y. Tel. TW 9-5229.

GSB-100 and G-63 for sale, both for \$435.00. Frank Wheeler, W6MMH, 314 Earl Way, Hanford, Calif.

CENTRAL Electronics 10-A with converted BC-458 VFO. best offer takes all. Wanted: Communicator II or III. Cash or trade. Richard Kleppe, 406 Wineshiek, Decorah, Iowa.

BOB Henry says: Our Motto: Pay cash and save money. Used equipment guaranteed: 32V-2, \$199; 32V-3, \$299; 75A-2, \$299; 75A-3, \$349; HT-37, \$389; Viking Invader, \$469; Drake 2B, \$219; New HT-37's, old price \$450 and new 75S-3's old price \$620 while they last. Many other items. Write or phone for cash prices on demonstrators. Terms: Cash and no trades. Bob Henry Wholesale Radio, Butler, Mo. ORchard 9-3127.

WANTED: Motorola 16V receiver for mobile. Michael Mazzoni, 3745 North 50th St., Milwaukee 16, Wis.

HT-37, \$350; SX-111, \$180; Johnson lo-pass filter, \$8; Gonset Monitone, \$15; Bud Gimix, \$5; Hy-Gain 14AV with new roof mount kit, \$15; Telrex 2M-3 beam, \$4; Penwood Numechron 24 hr. clock, \$8; 6 40M tubes, \$3.50; new 813, \$10; TS-13 handset, \$3.00; Bell 2300, 20W hi-fi amp, \$35. F. S. Eggert, 11833 Wisconsin, Detroit 4, Mich.

SELL BC344 receiver 150 Kc to 1500 Kc, \$50 F.o.b.; 3E29 tubes, \$3 each. B&W chassis-mounted pair baluns, \$4. W2TB, 39-20 220th St., Bayside 61, L. I., N. Y.

75A-4 exclnt condx, no scratches. 3.1 and 6 Kc. AM filters, \$495. W8RMH, 1910 Long Point, Pontiac, Mich.

KWM1, 301.1, Tri-Band Mosley beam on E-Z Way tower; also 3 bedroom 2 1/2 bath home in Hollywood, Florida Lake section. Circular Driv. Drapes, rugs included. Central heat and air conditioning. Great beautiful furnished Move four months in and turn on the rig. Price \$49,500. 3 blocks from the ocean. K4QJO, George Schiffer, 1030 Polk St., Hollywood, Florida.

CLOSEOUT W2SSH Estate: Triplett modulation monitor, \$15; Dumont Electron Switch and square wave generator, \$25; Telrex R-100 rotor with Selsyn remote indicator and heavy stand, \$60; Gelo 250 ohm dynamic mike, \$12; Millen antenna bridge, \$20; Two RCA 4-125A tubes, n.w. \$10 each. Mrs. R. L. Cassell, Woodland Terrace, Bound Brook, N. J.

"ALTERNATOR" 100 amp Leeco-Neville 12V. Used by little, \$38.00. HT-37, almost brand new, orig. carton, instructions, etc. \$359.00. K2ZDJ, 53 Overlook Road, New Rochelle, N. Y.

BACK Issues of OST from estate of W1MRP. Most in gud condx. Some of the years 1930 thru 1958. Many in exc. condx. Just what is needed to fill out your own files. Many now almost unobtainable. Mrs. W. Vorkahl, Jr., 116 Cross Highway, Westport, Conn.

SELL: Globe Chief, \$25 V.F.I., \$12.50; UM-1 plate modulator, \$25; Package \$50; G4ZU 10 1/5 mtr. Minibeam, \$20. After 9 countries AM/CW, going SSB, W2TOD, c/o David Kemp, 65 Bradford St., New Providence, N. J.

HALLICRAFTERS R-44/ARR-5 receiver: 28-150 Mc. in 3 bands. Functions: Selectivity broad, fine, standby; AM, FM, CW; AVC, ANL, BFO, RF gain, AF gain, S-meter adjust, bandwitch. Takes 5F-70 ohm coax cables. Power requirements: 270V at 135 Ma; 6V at 5A. Just professionally aligned. With schematic and 2 extra sets of acorn tubes, \$125 or will trade for Hammarlund communications type receiver. WA6SSK, 337 Longfellow Ave., Hermosa Beach, Calif.

WANTED: Counselor in small co-ed camp for Ham Radio and electronics program. Have closed-circuit TV. High School senior or older. Salary \$150.00—\$400. Must like kids. Killoolett, Hancock, Vt.

DID You hold a radio license forty or more years ago? If so, you are eligible to membership in the Old Old Timers Club. Initiation fee covers life-time dues, lapel pin and bi-monthly issues of the "Spark Gap Times" for the rest of your life. For information, write Sec.-Treas. Earl C. Williams, W2EG, 507 Wayside Rd., Neptune, N. J.

VIKING I, wired for SSB. With SB10 and additional power supply Heath HG-10 VFO 80 thru 2, \$150. F.o.b. K2RNN, 322 Farwood Road, Haddonfield, N.J.

WILL Trade Winchester Model 12, 20 ga. new condition with case for a good Heath SB Adaptor to use with DX-100. Don Cameron, Jr., K7PMY, Box 314, Gardiner, Mont.

I KW SSB c.w. AM KWS-1 Ser. 1267, \$995 (excellent). Robert Cava, 113 Wood St., Salinas, Calif.

SELL: Ranger and Morrow mobile transmitter and receiver. Clean, factory-wired, no modifications. Dash mount, whips 10, 15, 20, 40. J. McCaffrey, 266 Monticello Ave., Jersey City, N. J.

SELL: Western Electric Mercury wetted relays No. D168479, \$3.50 each; 20 K, \$10 for \$2.50; 50 ohm tubes 9 for \$2.00. Treadwell, K4DKJ, 3289 Hallwood Circle, Macon, Georgia.

BARGAIN: Like-new Gonset G-76 transceiver with Minneapolis-Honeywell transistor power supply, including instruction book, \$325.00. W4Q1, L. Holland, Siler City, N.C.

FOR Sale: DX-35, \$25; BC-348M, \$50. Both with manuals. In nice cond. Replaced here with higher power last Christmas. Prefer not to ship. Donald Farrell, WA2WEE, 207 Seneca St., Chittenango, N.Y.

MOBILE: Elmac AF-68 w/rack, Gonset Super 12 Heath HP-10 transistorized supply, all relays, cables. All purchased new in November 1961. No scratches. \$250. W4DLH, 1066, 17th Ave., N.W., Hickory, N.C.

TRADE Four 829Bs or eight 6146s, new, unboxed for one RR-4D32, R. C. Baughman, W0YMN.

FOR Sale: Johnson Viking KW amplifier with matching desk, in like-new condition. Will crate and ship anywhere. Jim Reed, W4ZAY, 2022 Wilkinson Blvd., Gastonia, N.C.

SX-101A, used 20 hours, like new cond., \$250. W2FRM, 4 Nassau Rd., Poughkeepsie, N.Y. Tel. GL 4-5238.

SELL/Trade: 2 homebrew 10-watt mobile transmitters for 75 and 10 meters, mike, xtal, Vibropack, \$35.00 each; 75 meter mobile converter \$10; new 1961 Plymouth car radio, \$30. Vibropacks: 12V-300 v./90 Ma., \$9.00; 12V-380V/180 Ma., \$15; 2 new Elmac 304T1s, \$30; 11 pound-spool #22 Niyclad copper wire, \$9; 30-watt plate modulator, \$18. Novice Electronic T-R switch, \$9; 100-watt plate preamplifier, \$10; 40-meter mobile converter, \$10. Supplies: 750V/200 Ma., \$12; 1000V/200 Ma., \$15. Everything is in mint, top-notch cond. W8OKU, 2748 Meade, Detroit 12, Mich.

HEATHKIT, New, unbuild mobile station, Comanche, Cheyenne, all accessories, power supply, etc. Sacrifice, \$250. Cash. W2ZUNE, Michael Myster, 295 Grand Ave., Lindenhurst, N.Y.

SELL: Ranger, SB-10, Triband ground plane, W2EUV, Leon Steinberger, 55 Lenox Rd., Brooklyn, N.Y. Tel. BU 2-4737.

SWAP Nikon F camera with accessories for KWM2, Victor Weiss, 56 Windsor Lane, Levittown, N.J.

COLLINS Filter F455-108, \$25.00. Shirley Futch, W3MRV, 220 Traylor St., Exeter, Penna.

EXCELLENT LM frequency meter, \$50. Write to W6CZP, 850 Groff, Pomona, Calif.

IMMACULATE DX100-B, used 4 hours. Write K9CMA.

SELL Apache, \$195; Mohawk, \$200; HO170, \$250. W2PBR, Phone 201, PO 8-2891-64 Nickerbocker Rd., Closter, N.J.

KWM-1, exclnt cond, never mobile. Best offer takes it. K4OXZ, Pritchard, 230 Beverly St., Titusville, Fla.

FOR Sale: RME 4300 receiver, RME 4100 SSB adapter, both \$140. Deluxe Phasemaster, Jr., SSB exciter with 438VFO, both \$70. Lyco Transmaster 600, \$40. Ailyn M. Freese, 246 So. 6th St., Reading, Penna.

HT-37 Hallcrafters SSB and AM transmitter, New Cond., \$350.00; also SX-101 Mark III with R-48 deluxe spkr, \$215.00; includes all hook-up wire, ant. relay, mike, stand and all manuals. Inspection invited. Reason for selling: Extra travel very seldom used because of business hours. K0IND, Grinnell, Iowa.

KWS-1, with station control control, also 75A-4. Both used very little. In mint condition by factory authorized repair service. If you want a real clean, new condition station, write W8BPB, 5210 Three Mile Drive, Detroit 24, Michigan, for photo or demonstration. Detroit area parties, phone TU 4-3800 days for appointment.

MUST Sell for best offer (suggested prices shown): HT-32 xmt, a few scratches, but otherwise perfect, \$295.00; HT-33A, only a few hours use; will accept package deal for both, 4-1000A tubes used, \$45.00; new (never out of carton) 880; both for \$120. 250THs, 2 used and 1 new, \$35.00; power transformer 2250 V, at 625 Ma., \$35, for \$70 will also include filament xtrmr 10V at 12 amp., kw modulation xtrmr and 300 watt audio xtrmr, all in gud shape. Collins NBFM adapter, \$15. Write: Walter M.D., W9WNV, 2718 W. Foster Ave., Apt. J-2, Chicago 25, Ill.

SELL: Globe Chief trans. Model 90A, Like new, \$40. Charles K., 18 Elm Road, Pompton Plains, N.J.

BUY: Sell! Swap equipment with other hams! "WEquipment Exchange Bulletin" lists many offers! Sample Bulletin free! Write: Brand, Sycamore, Ill.

4-1000A, used, \$15. Also fit xtrmr for 4-400A 5V, 13A, 175V, pri., \$3.50. Kleig, 5 Stratford Pl., Babylon, L.I., N.Y.

RTTY 15 printer, synch. motor, keyboard and W2PAT converter, \$150; B&W 370 SSB slicer (20Kc filter) like new, \$45.00, 4/1000A with Elmac air socket \$75; Jennings vacuum variable 10/400 mmfd, 10k v., \$35; fixed vacuum 50 mmfd, 20k v., 3 for \$10.00, WE 416B new, 2 at \$5; Elmo #8-S RMM camera, electric eye, reflex viewer, F-1.8 zoom lens, pistol grip plus Willensak #715 750 watt projector, both recently purchased. Both for \$165.00. Will consider trades on movie equipment. Al Waring, W2CFT, Box 483, Lake Ronkonkoma, L.I., N.Y. SE 2-3308.

MY Fifty-foot fold-over tour built for less than fifty dollars. Send three dollars for specifications, drawings, instructions and photographic satisfaction guaranteed or money refunded. Jim Brigan, WA1EN, Norcross, Ga.

SSB-AM-CW station: Hallcrafters HT-37 and SX-111, won at hamfest, brand new. Best offer over \$350. Richard Stec, 287 High, Medford, Mass. K1JUR.

FOR Sale: FW Johnson Valiant, perfect in appearance and operation, \$125; DX-100, port. cond. with many extras inc., \$155. Both almost new and on the air. Van Vermont, WA2CQO, 83 Blackheath Rd., Lido Beach, L.I., N.Y. Phone GE 2-0707.

COMPLETE Station: Ranger, SX101/III, D-104 w/stand, Heath SWR, Dow-Key, interconnecting cables, AR22 rotor, Homebrew coupler, \$420 takes all. Also separately, try, no shipping! Deliver within 50 miles NYC. Russell Black, WA2NWG, 212-BO-3-2811.

SELL: DX-20, S-120, both exclnt cond. KITFA, 727 Pine St., Forestville, Conn.

75A-4, \$450; KWS-1, \$850; 100V, \$495, W8WGA, phone: Area code 513-27-7-0409.

HAMMARLUND HO-100 receiver with clock. Never used! Swap for guns. Leo Soulek, 418 Riverview, Springfield, Oregon, 20A, OT-1, 458 VFO, break-in CW, latest factory modifications. \$190; 200V GG linear, silicon pwr supply, \$30; late Drake 1-A vibrator, \$195; 100-watt exc. xtd. K9HMN, 5525 Indianola, Indianapolis, Ind. Tel. CL 5-9401.

FOR Sale: TR-2 rotor, indicator \$15; Panadapter, SP44, \$25; Heath TV-FM align, gen. TS-4A, \$25; 2- 813 flt. xmfrms 10VCT at 10A., \$5; MicroMatch SWR ind. \$15; Century self-service tube checker SS-1, new, never used, \$90; Gonset converter 135-162 Mcs., audio amp. pwr. supp. home or mobile use, \$35; Carter dyn. 6v/470VDC, 260 Ma. with starting relay, \$9.00; Gothard dyn. 12v/400VDC, 75 Ma., \$5. B&W indicator sets HDVL, I-VL and JELS, variable xmt. conds. Johnson, National and Caldwell, W2UGM, Dick Marsino, 66 Columbus, Closter, N.J., PO 8-1884.

SELL Central Electronics 200V mint cond., \$700; Drake 2B with Drake O multiplier, spkr. used only 3 months, \$240. Complete mobile rig, gud cond., Gonset Super 12 with Super-Scency, 455 transmitter, PE-103, complete, \$110. H. L. Scepsey, Birmont, N.H.

SELL: Gonset G-63, in exc. cond., Best offer. Donald LeWand, WA2WAS, 20 W. 42nd St., Bayonne, N.J.

QUICK Sale: HT-37, HO-180 with matching spkr, both units unmarked and in perf. cond., HO-180 just returned from factory with latest modifications. First certified check for \$675 gets them shipped express charges collect. George Grimes, 1710 Laurel St., Jackson, Miss.

QSTs wanted: 1915 to 1921. Sell QSTs 1923 up, W2DYU, 36 New Lawn Ave., Kearny, N.J.

CLOCKS, Battery operated 1/2 V., complete with dial and hands, alarm, automatic on and sleep switch, ideal for use with your current ready for panel mounting. Movement case 2" x 2 1/2" x 1 1/2" dials 2 1/2" x 2 1/2" or 4 3/8". Guaranteed. Limited supply available postpaid, \$3.85. H & E Clock Repair, Inc., 145-19 Jamaica Ave., Jamaica 35, L.I., N.Y.

WANTED: AC coils HRO-50. Sell: Leece-Neville mobile generator rig complete, KN5MUE, 410 W. Lee, Kingsville, Texas.

COLLINS Receiver 75A-4 serial #4921, in exc. cond., \$500. Kenneth H. Enstrom, W5CUM, 833 Oak Forest Dri., Dallas 72, Texas.

SELL: (College debts) Heath Comanche, Cheyenne, mobile and utility power supply, mounting rack, speaker, all co-ax connections, home from college June 8th. I will ship. \$220. K8TJD, 638 Walker, Grand Rapids, Mich.

SELL: Hammarlund HX-500 transmitter, \$585; Drake 2-B receiver with 2-AO O-multiplier, 2-AC calibrator, \$285; Gonset CW transmitter, custom ACP/S spkr, stal calibrator mounting bracket, \$385. Transistor mobile P/S 12VDC, 500VDC, 250 Ma., 12VDC-600VDC, 200 Ma., \$25.00 each. Want: KWM-2, Williams, W2WZT, 64 Prospect Ave., Hackensack, N.J.

FOR Sale: Ampex stereo system consisting of 960 recorder and matching 2010 speakers/amplifiers. New in original cartons with manual \$585.00. New surplus G-E Prynals 4 mid, at 3000VDCW, \$5.50 ea. H. C. Martin, 613 Pearl St., Bluefield, W.Va.

APACHE, \$220; SB-10, \$65; HO-140-V, \$165; TA-33 rotor, \$70; Deluxe Vibropack, Bug, \$15; new S-38E, \$30; 2Mtr. Test. conv. \$22; BC-681, \$12; BC-453, \$8. W.F.-1, Lawyer, W2LBE, 45 Sturzig Rd., Bronxville, N.Y. WO 1-2340 after 5PM.

COLLINS 32V3, Excellent. Used 11 hours since factory overhaul. \$300. F.o.b. Cleveland, Ohio. Thomas Clements, 2020 California St., Mountain View, Calif. Phone YO 7-4794.

SELL Complete 6 meter mobile; Gonset converter, Superceiv home brew 2F26 xmttr. Dynamotor with plugs and cables, \$75; Wilcox CW3 revr with book, \$25; RME VHF 152A 2-6-10 converter, \$3. Richard Vogley, W2IPB, 554 Seventh Ave., New York, Park N.Y.

EXCELLENT LM-15 with supply, \$90; 10A exciter, \$65; A Slicer, with adapter, \$30; M-1 transistor supply, \$35. Want: audio oscillator. All letters answered. WOCHV, 2020 North 58th, Lincoln, Nebr.

FOR Sale: Hallcrafters HT-33A linear amplifier, like new, with manual. A. Martinka, 3723 Magnolia Ave., Chicago 13, Ill.

COLLINS 32S1, No. 2162 and 516-F2, No. 2802, \$495. Consider c.w. rig or Pacemaker in trade. C. Malinowski, So. Deerfield, Mass.

MUST Sell: HT-37 transmitter, HO-170 receiver, almost new; D-104 stand, mike, coax relay, balun; entire sundry equipment including tubes 19'er, 10 mtrs., bug spkr, low-pass filter. Bud 100Kc osc., total retail value \$1044. Will sacrifice. Best offer over \$600. W2DRD, F. Greenbaum, 2125 Cruger Ave., Bronx, N.Y.

WANT To buy, sell or swap used hi-fi equipment or LP records? Opportunities galore in The Newsletter, published by High Fidelity Magazine! Send check or m.o. for \$2.00 for 30-word one-time listing (including name and address) and full year's subscription. Subscription alone, \$1. No dealers. High Fidelity, Dept. CE, Great Barrington, Mass.

FACTORY-Wired Central Electronics 20-A, VFO, OT-1, perf. cond., \$185 prepaid, Eico 232 VTVM, \$25. Herb. K7CWO, 527 So. Vancouver, Kennewick, Wash.

FOR Sale: Johnson Valiant, factory-wired and Hammarlund HO-160 at \$200 each. Both units are clean, with no scratches and cannot be told from new. Frazier, P.O. Box 933, Mount Dora, Fla.

SELL: NC-300, calibrator, 6M converter, spkr, \$200; Ranger, 3125, Both for \$300. K3JFK, 402 Crest Rd., Wilmington, Del.

WANTED: Ham gear. Will trade Chore-Master garden tractor, electric welder, Lionel train set, Delta 24 in. scroll saw. Write for details to Jim Lund, WA5BMM, Box 26, Deming, N.Mex. SB-10 Apache PTT, both exc. cond., First \$295 takes. Shipping collect. KIMCI, 13 Alfred Road, Saxtonville, Mass.

GLOBE LA-1, 400 watt linear, \$50; Gonset Super Six (wired for 12) converter, \$15. Shipped collect. W5FJR, 823 West Grant, Baton Rouge, La.

C-E Sideband Slicer with O multiplier and AP-1. Like new cond., \$50 prepaid. W8LJW, 106 South Sandow, Midland, Michigan.

WANT HT-37 and TA-33 Jr. Sell or trade cameras—Rolliflex Tessar F3.5, \$100; Super Kodak 4x5 Ekfarr F4.5, \$195; Retina 2 Schneider Xenar F2, \$75; Kodak Ektar F4.5 F3.5, \$150; Irgus C4, \$2, \$70. Stan Dickhaut, W8TXI, 344 Ohio St., Huron, Ohio.

WANTED: R-100 with stal cal., S-meter and matching speaker. Jack Kulish, Stamford, Montana.

SELL: AR88, #140. W6KEV, 3088 Greenoak Court, San Mateo, Calif.

APACHE TX1, \$215; Elmac AF67, Super Six converter and PS, \$135.00; SX101-3 receiver and spkr, \$225; GSB-100 transmitter, \$275; Millen grid din M90651, \$35; B&W No. 370 receiving adapter, \$75. Eldico 1/2 kw c.w. xmtr, complete, \$75. All in exc. condx. W2CE, Freepost 9-0415, L.I., N.Y.

APACHE #210 SB-10, both \$275, in exc. condx. Ship F.o.b. or deliver within 75 miles Detroit, Toledo, Cleveland, K8JC, Box 182, Allen Park, Mich.

SELL: KWM-1, noise blander, mobile supply and mount, \$735. W8KXG.

FOR Sale: AN/PRC-10 in sud condx, complete with antennas, handset, two new batteries, 10 Vt. power supply, dozens of spare tubes and coils, manual. Best offer. W3NJZ, 910 Douglas Dr., Murrysville, Penna.

SELL: Hallcrafters HT-40 transmitter, factory-wired, perfect condx, \$75. Bob Merritt, K3OWX, 415 Georgia Court, Towson 4, Md.

ELMAC Receiver PMR-6, Gonset Commander, Transcon transistor power, TNS, antenna relay packaged to fit VW glove compartment, \$150.00. W2KWB, 30 Drohan St., Huntington, L.I., N.Y.

COLLINS 75S-3, brand new. Best offer. K5YSY, 3607 Morningstar, Dallas 34, Texas. Tel. GH-7-3831.

WANTED: Oscillator and mixer coils, Hallcrafters #19R, Part #51-170 and #51-169. Ottunger, 814-62 St., Brooklyn, N. Y.

SNR Exciter (Converted BC-458 per W2EVL) 20/75 meters. Built by EE, 200 watts, exciter \$50. Elmac PMR-7 revr with matching PSR-612 pwr. supply, manual, \$120. Elmac AF-67, manual, \$95. Both like new. PE-101C (12V, dynamotor w/ filter, relays, etc. for either xmtr.) \$15. All f.o.b. WAWAH, Box 443, Plymouth, Fla.

LONGYAGIS for 50 thru 432. Send for free catalog. Wegner Brothers, Dept. O, Bridgeport, Michigan.

FOR Sale: Gonset IIB 6 meter Communicator, clean, w/mike, \$125; Hammarlund 100 Kc xtal calibrator, \$7.00; 1161 revr to 2 meters, \$30; McMurdo Silver 2-meter 1/4 meter xmtr, \$20; Heath AT-1 xmtr, \$18; Sam Jaffe, 158-14 65th Ave., Flushing, L.I., N.Y. Tel. F1ushing 1-0231.

70-E-R PTO, \$35; 1500VDC 1/2 A supply, 5A Variac, H.F., 61.68 to 600.0, \$15; mechanical full Auto bug, \$8; 6C21s, \$10 ea.; BC221T, \$45; B&W TR, \$10; B&W lo-pass, \$8; 1/2 kw Sola constant voltage xmtr, \$12; J. Gillson, W3GAU, 109 Mullin Rd., Wilmington 3, Del.

EXCELLENT Deal: 75A4 with 3 filters; KWS-1 with two extra 4X250Bs. All latest mods, except Hi-Volt connector, SC-101 station control complete with five relays and all selens. All equipment looks and operates like new. First cashier's check for \$175 buys whole station. Will ship transportation charges collect in original power supply crate and cartons. Have moved to apartment, W5RIK, 4304B McKinney Avenue, Dallas 5, Texas. Tel. LAKESIDE 6-2409.

EXCELLENT CE-100V: late model #E-620, all modifications. Perfect in every respect, \$75. Also HRO60T, with seven coils and calibrator, \$295, W8YBZ, 1716 Sierra Road, Charleston 4, W. Va., Tel. DI 4-3233.

WANTED: Full size 5-element wide spaced (46 ft. boom) Telrex 20 meter beam, Telrex Model #20M546, or equivalent. K0AQV, 4601 Cedar Ave., Minneapolis, Minn. Tel. PA 9-0912.

WANTED: Best receiver that \$75 will buy. K9TKB, Evansville, Ind.

SELL: BC-221AK, internal modulation, charts, perfect, ready to go, \$69; Eico No. 147, \$18 and Eico No. 710 GDM, \$24. Both kits professionally wired, in perfect condx, scratchless, new. Goebel Davis, K5UNI, Trieras, N.A.M.

FOR Sale: 500 watt linear, SX-71, 10-A, VFO, mike, and coax. Sell to best offer over \$400. Joe Welsh, RR No. 2, Glenwood, Mo. Tel. GI 7-3167.

HAM BUERGERS, Used equipment, money-back guarantee. Globe Linear, \$85; Mohawk RX1, and speaker, \$275; DX20, \$70; \$79.95; B&W 51SB, \$175; Johnson Thunderbolt perfect, \$499.50; Pacemaker, \$340; \$106; \$39.95; Phasemaster II with VFO, \$289; RME, 4300, \$134.95; AF67, \$124.95; Gonset GSB100, \$299.95; Gonset Super 12, \$54.95; Gonset 6 Meter Linear, \$124.95; Gonset 2 Meter Linear, \$124.95; Gonset Super Six Converter, \$39.95; Trades. Write for free list. Ham Burgers, Glenside Ave. & Rices Mill Rd., Wyncote, Penna. Tel. CA 4-1740.

QSTS 1937-1950, \$15.00, SX-28, \$75. Will sell or swap for mobile gear. Bob Decker, K2ORA.

SELECTED Reconditioned equipment: Central 20A w/OT-1; HC458 VFO, Central 20A-OT-1, BC458 VFO, \$189.95; Elmac A-54, \$49.95; G66B, \$110; PMR-7, \$110; Gonset Communicator II, \$210; G66B, G77A, 6M linear, Hallcrafters SX101-1, HT30, \$249.00; HT32, \$439.95; Heath Cheyenne, \$99; DX-100, \$179.95; HP-10 (new), \$45; Johnson Ranger, \$169.95; Viking II, \$169.95; Valiant (spotless), \$325.00. Write for list. Radio Distributing Co., Inc., South Bend, Ind.

GONSET G-76 transceiver B-model Serial S-18218; AC and DC pwr. supp., \$500, K5GGA, 524 Highflair, Dallas 32, Texas.

"HORSE-TRADER", Ed Moory, Will Buy Your Used Equipment: We Need: 32S-1's, KWM-2's, 200-V's, 75A-4's, 100-V's, HT-37's, and 20-A's. Will Pay Top Dollar for Above Equipment either Trade or Outright. Bargains Used Equipment: Swan Transceiver, \$239.00; HT-37, \$175.00; Drake 2-A, \$195.00; 75A-4, \$489.00; Collins KWS-1 with Matching Supply, \$895.00; 30L-1, \$395.00; 75S-3, \$499.00; 75S-1, \$349.00; Gonset GSB-101 Linear, \$189.00; SX-101-A, \$275.00; Mosley CM-1 Receiver-Demonstrator, \$109.00; Viking Invader, \$429.00; Demonstrator 2-B, \$229.00; Valiant Like New, \$279.00; Heath SB-10 Wired, \$65.00; TH-4, \$65.00; Ham-M Rotor, \$69.00; HT-33-B, \$675.00; Terms: Cash or No Trades; Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas, Phone Whitney 6-2820.

STORM Warning Stations. Send \$2.00 for our book on making 12 Weather Instruments. Saco Press, Box 2513, South Bend, Ind.

COLLINS 75A4 (3 filters), KWS-1, clock, Micro-Match, antenna indicator, All perf. condx, \$1500. W. L. Hinkle, 304 Country Club Dr., Escondido, Calif. Will deliver San Diego/Los Angeles Area.

TV Xmtr 420-450 Mc. 50 watts. Surplus conversion information supplied. Less tubes and power supply, \$24.95. Kencol Electronics, 2816 E. Norwich, Fresno, Calif.

SELL: Gonset 2-meter Communicator II, 12v/110V, xtals, antennas, mike, in A-1 condx, complete, \$135.00. W3JOM, Qtrs. 268, USMA, West Point, N.Y.

ASTATIC Crystal mike, desk stand, \$4; RCA 45-rpm record-changer, \$4; portable mill, \$10; Proce 6.15 audio generator, \$25. V. R. Hein, #18 Grouse, Rockford, Ill.

SELL: Gonset II 12V-2 M, in exc. condx, \$150.00, NC-125 revr, \$100 or your best offer. K6JAV, P.O. Box 275, Alamo, Calif.

FOR Sale: Telrex, 20M 56-149 antenna, complete with balun, \$75.00 f.o.b. Princeton, N.J. W2YFB.

CHANGE Xtal frequency, etc. safe method; everything needed. Ammonium bi-fluoride, containers, holders, instructions. Guaranteed, \$1.00, Deluxe kit, \$2.00. Ham Kits, Box 175, Cranford, N.J.

SELL: Collegel 10H, \$80; Globe Scout deluxe, \$105; Heath VF-1, \$12; AF-68 transmitter, Pierson KE-93, 13-tube mobile power supply, 1 Kc. passband and 3 shaper, AC/DC supplies, \$400. Originally \$625.00. K9OET, 3216 Crescent, Ft. Wayne, Ind.

CASH For Vantron Q-probe; CO all issues 1945, W41D, 461-3rd Ave., Sea Park, Eau Gallie, Fla.

XMTR 750 watts AM; 1000 CW 210 VAC. Technical Radio T350, \$550, or reasonable offer, Morrow Twins (Falcon Receiver) \$250 of Trade 2B, K6GUW.

SELLING new Hallcrafters SX120 receiver, \$62; Chuck Harmon, WA6NPP, Hq Co 501 Int'l., 101 Airborne Div., Ft. Campbell, Ky.

HT-42B, exceptionally perfect condx. Barely used. With all xtals, \$550 cash. Going mobile! W3FBT.

ATTENTION ALL Hams, VHFers, Novices: Michigan's Original Ham Headquarters Summer Sale will save you money on all prices low and available trade-ins. Special prices without trades. Tell us what you want for your Ham Shack or write for the latest list of Trade-ins or come and visit Michigan's Water Wonderland. All expressways lead to Detroit. We are located Downtown at 2040 Grand River, Detroit 26, M. N. Dutton Co., complete Ham Electronic and Hi-Fi Headquarters.

NEAR New SX-101A and HT-32. Perfect condition. Used 3 hr. excess inventory. \$459.95. Special prices. WE 4-4344, 7-9 PM Mon.-Fri. 20522 Pacific Coast Highway, Malibu, Calif.

MUST Sell, taking XYL: Globe Champion 350, \$395; NC-109 w/spkr and cal., \$140; Monitone, \$15; Vibroplex Original, \$15; TA-33, \$70; AR-22, \$25; Surplus tower 20 ft. crank-up, \$50. E-V 611 mike, \$15; all in FB condx or all for \$700. WAZKCK, 219 Lakeview Ave., Syracuse, N.Y.

CUP-CORE Inductances, excellent for sharp or band-pass 50 to 100 Kc. I.F. or B.F.O. Very high Q. Unused, case, add postage and solder terminals, Type 1, 2.9 Mh., Type 2, 7.3 Mh. Dollar each, postpaid U.S. Circuit suggestions included. H. Woods, 2346 Clover Lane, Northfield, Ill.

COMMERCIAL Power units, high voltage Thordarson xfmr Pri. 240V sec. 3500 tap taps 2350, one amp. DC, size 16" x 12" x 9". Very hvy, \$50; UTC filter choke 20 h. 1 amp. in series SH 2 amps parallel, UTC swining choke 8-40" H one amp, \$15 ea. All new condx. Power control cabinet 10" H x 21" W x 15" D. Two doors. Complete regulation AC input 0-240V and high voltage output. Footproof protective system. Time delay over-underload, filament, high voltage relays, meters, pilots, switches. Also have other transformers, transists, chokes. Will not ship. Srs. Dick Zucker, K2CR, Upper Saddle River, N. J., L.A. 7-2208.

CRYSTALS Airmailed: SSB, MARKS, Net, CD, Marine, Novice, etc. Custom fitted. FT-243, 01% 10 Mc. Kilocycle, 3500, \$800 \$1.49, (10 or more same frequency, FT-243, 99¢) 1707 to 20,000 \$1.95, 20,001 to 30,000 \$2.25. Overtones above 10 megacycles. Fundamentals 10 to 13.5 megacycles \$2.95. Add 50¢ each for 005% Add 65¢ each for HC-6/u hermetics. QST Projects—FT-243 crystals, "SSB Baggage", vgr mixer, \$9.95, seven matched filters (FT-241-A) \$9.95, DCS-500, "IMP", "Phasing" (Nov. 1959), \$9.95. Be specific, write regarding other project crystals, singles and sets. Airmailing 10¢ per crystal, surface 5¢. Crystals since 1933. C. W. Crystals, Box 2065-O, El Monte, California.

SELL: Mosley TA-33 Senior beam. New in June, 1960, \$50.00 plus shipping. K9JEL, 1001 Hillcrest, West Lafayette, Ind.

FOR Sale: R-44/ARR revr w/ac pwr. supply, 28 to 142 Mc. New in spring of 1961. \$120 or best offer, RTTY equip. or parts considered for trade. SSB Frank T. Laughner, 204 4th Comm Sqdn, Box 621, Ft. Myer, Va.

HT-32A, excelnt condx, \$475. Will deliver free within 150-mile radius. W5NR1, 4507 Woodlawn, Wichita Falls, Texas. Tel. 692-2480.

6 and 2 meter kilowatt for sale; Johnson 6N2 Thunderbolt, factory-wired, factory new condition, \$399. J. W. Gregory, K4OCK, 3000 S.W. 103 Court, Miami 55, Fla.

GONSET G66B receiver, 3-way power supply, G77A transmitter. Used very little. Excellent condition. Will ship prepaid. Make bona fide offer. Cameron Magnon, 510 Franklin St., Tampa, Fla.

TOWER 3-section crank-up Tri-Ex T354HD with extra heavy guys and turnbuckles. \$125.00 cash and carry. K1HDW.

HEATH Monowalk, very hot, \$229. Bill Oringdoff, 109 Main, Elk City, Okla.

RANGER, Factory-wired, push-to-talk and FSK added, \$165.00 or will trade for teletype tape gear. W0RQY, 4000 28th St., Topeka, Kans.

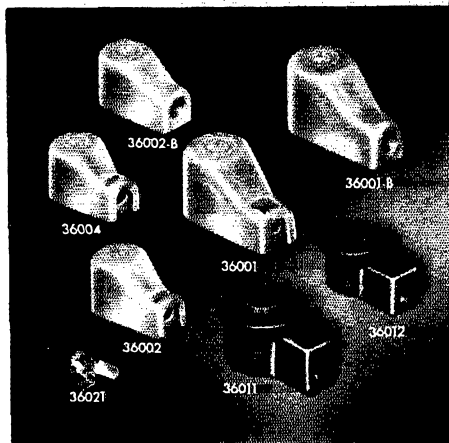
SALE: Gelofo G222 xmtr 75W AM SP600JX, TR switch, crank-up tower, 60 ft. 10-m beam, 908 W. Mission, Bellevue, Neb.

QSTS. Bound volumes: 1934, 1937, 1939, 1940, 1944. Will sell all or any. Heath Ignition Analyzer Model IA-1, 4-400A. Low prices. L. A. Morrow, W1VG, 99 Bentwood Road, West Hartford 7, Conn. Phone 521-0416.

# Designed for



# Application



## PLATE AND GRID CAPS

Illustrated are the stock military and standard ceramic Milten plate and grid caps and the snap lock caps for mobile and industrial applications requiring tighter than normal grip. Standard plate caps have phosphor bronze clips; military plate caps have beryllium copper clips.

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"WES" FLEURDELYS, WØBIG/K1UAR, takes a break from riding herd on a new microwave project to check out his temporary QTH set-up.

## FIELD ENGINEERING WITH A FUTURE

*Stretching Microwaves Coast-to-Coast*

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As Program Manager for Raytheon's MLD-4B — an ultra-sophisticated cross-country microwave communications program — Wes and his group are now completing the first installation in California. Additional stations will follow in seven mid-western states, Pennsylvania, New York and Maryland.

The outstanding growth and reward opportunities offered by MLD-4B are typical of many fast-expanding programs at Raytheon's Electronic

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Requirements include an E.E. degree or its equivalent in practical experience in guided missiles, fire control, radar, sonar or communications equipment.

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ELECTRONIC SERVICES DIVISION

BURLINGTON, MASSACHUSETTS

**RAYTHEON**

# VHF MEN-LOOK!

COMPLETE DELUXE 185-WATT 6 AND 2 METER TRANSMITTER

## ALLIED SUPER-BONUS PACKAGE

SAVE \$91<sup>83</sup>



### CLEGG "ZEUS" TRANSMITTER

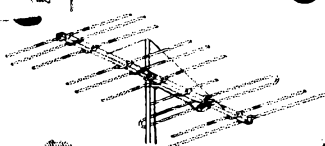
Regular Price \$675<sup>00</sup>

FOR JUST \$1<sup>00</sup> MORE  
you get all these extras  
worth \$91<sup>83</sup>!

#### 185 WATTS OF SOLID "TALK POWER"

Get the most in carrier output and highest level of modulation power. Have 185 solid watts on both AM and CW, with automatic modulation control that will actually let you "out-talk" many kilowatt rigs! Put a ZEUS on 6 and 2 and watch the QSO's roll in!

**SPECIFICATIONS:** 2-unit construction—handsome 15 x 9 x 9" tabletop unit (illustrated) contains all RF stages, audio pre-amp and VFO; remote unit 17 x 11 x 13" (not illustrated) contains all power supplies, audio driver stages and Class B modulator system • Automatic feedback control of low level speech clipping permits 120% positive modulation peaks for maximum splatter-free talk power • Visual monitoring of modulation • Frequency response flat  $\pm 2$  db between 400 and 3400 cps and down at least 18 db at 150 and 4500 cps • Hum and noise levels down to at least 40 db below 70% modulation • Up to 18 db speech clipping, adjusted with calibrated panel control • VFO maintains frequency stability of 1 part in 10<sup>6</sup> per degree F. per hour after 15-minute warmup • Zero back-lash flywheel dial • Maximum TVI suppression • 6 meter output fed through pi network • 2 meter output coupled to high efficiency tank • Units supplied complete with 10-ft. interconnecting power cable. Complete shpg. wt. 111 lbs.



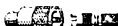
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Two PL-259  
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Ship me:

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- Complete Deluxe Station, plus all extras shown above, \$676.00, No. 20 SU 341-4BA
  - Send No Money Down on Allied's Credit Fund Plan
  - \$.....enclosed (check) (money order)

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City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

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Allied's Credit Fund Plan gives you up to 50% more buying power; up to 24 months to pay. Write for application.

#### KING-SIZE TRADES:

For that top trade-in deal, write Don Koby, W9VHI,  $\frac{1}{2}$  Tech Service Dept.

order from **ALLIED RADIO**

# NATIONAL® ONE YEAR GUARANTEE

## National Radio Company 1 Year Warranty

In addition to the normal 90 day warranty covering parts and labor necessary to repair defective equipment, all defective component parts (except vacuum tubes) of any National Radio Company equipment are guaranteed against failure for a period of one year from date of purchase. Any such part which discloses defect will be repaired or replaced if such part is delivered to National Radio Co., its authorized service agency, or the dealer from whom the equipment incorporating same was purchased. For a statement of the terms of the guarantee purchasers are directed to the Warranty Certificate packed with each receiver.

Now from National® . . . the Industry's only **ONE YEAR GUARANTEE!** Now your new National Radio Company receiver is backed by an iron-clad guarantee against component failure for one full year from date of purchase. This amazing guarantee is by far the longest available in the industry. In fact—the vast majority of other manufacturers dare offer you only one-fourth as much protection.

This one-year guarantee applies to all National Radio Company receivers . . . regardless of price. You can buy with the complete assurance that National stands squarely behind your purchase . . . that the receiver you select offers long-term reliability, as well as more superior features and performance.

### Why is this extended guarantee possible?

1. National has manufactured fine communications equipment for almost half a century. Our experience is unequalled. Over 75% of our highly skilled test and assembly people have been with us for more than 25 years—an astonishing record in the relatively young electronics industry. They know their business . . . take pride in their fine workmanship—workmanship so outstanding that many National receivers purchased thirty years ago are still in daily use.

2. National manufactures most of the components used in its equipment . . . the same components specified by other important electronic manufacturers and government agencies. Therefore, National has maximum control of component part quality from design to manufacture to end application. If a special part is needed, National simply makes it, rather than compromise design to fit less satisfactory parts already available on the market.

3. Every National receiver goes through an intense series of rigid quality control tests before it leaves the factory. National tests every receiver as it comes off the assembly line . . . not just random samples.

The purchase of a new receiver is an important investment. To insure this investment look for the National Seal of Quality. It is your assurance of advanced design, exceptional performance, and guaranteed reliability.

To help you make a wise choice National is preparing a new Receiver Guide. Write now to reserve your copy.

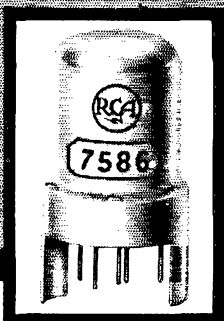


National Radio Co., Inc.  
37 Washington Street  
Melrose, Massachusetts

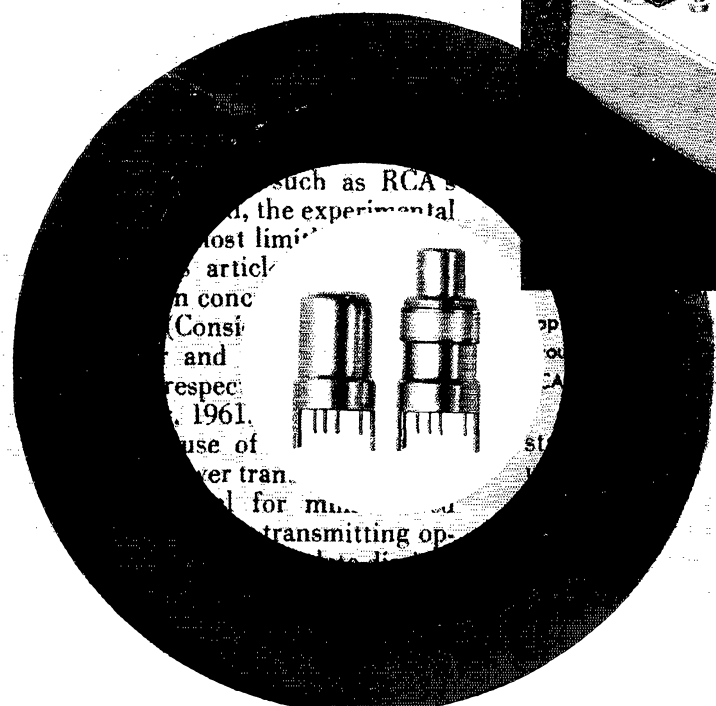
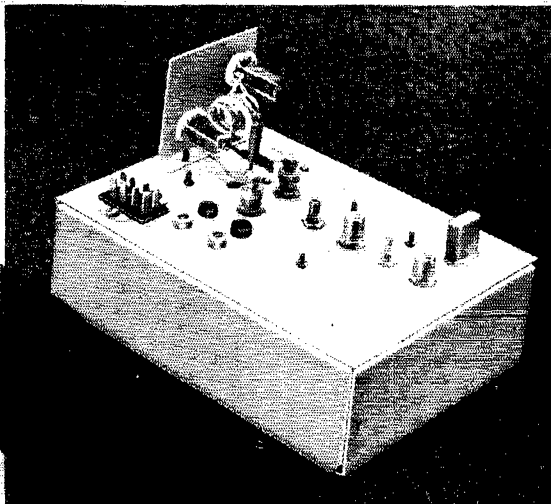
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# HAM TIPS



## 7½-WATT ALL-NUVISTOR 2-METER TRANSMITTER



### A "HOW-TO-BUILD-IT" ARTICLE ON A NUVISTOR RIG

The unquestioned superiority of RCA nuvistor tubes in VHF receivers is a well-known fact. Not so well known, however, are the advantages of the tiny nuvistor in VHF transmitter applications.

The article in the Spring 1962 issue of Ham Tips shows how to build a sturdy, compact nuvistor transmitter for "2". This stable three-stage rig (crystal oscillator → tripler → p-p final) uses two type 7586 and two type 7587 nuvistors. It can be

powered from a receiver-type power supply—takes 7½ watts plate input at 240 volts!

#### Announcement to Amateurs

For complete story, get a copy of this issue of Ham Tips today—from your RCA Industrial Tube Distributor, or write Section F-37-M, RCA, Commercial Engineering, Harrison, N. J. This issue also gives details on a new subscription plan.

RCA ELECTRON TUBE DIVISION



The Most Trusted Name in Electronics

## Board Meeting Highlights

**H**ERBERT HOOVER, JR., was unanimously elected President of the American Radio Relay League by the Board of Directors at its 1962 meeting on May 11 in Hartford, Connecticut. A prominent national figure, Mr. Hoover served as Undersecretary of State from 1954 to 1957. He is well known to amateurs as K6ZH/W6ZH after nearly fifty years of ham activity. The July issue of *QST* will carry a more complete story on our new President for the information of members.

Retiring President Goodwin L. Dosland, W0TSN, was nominated for re-election but regretfully announced his decision not to accept because of continuing heavy demands of his law practice. The Board expressed sincere appreciation for his distinguished and dedicated service to the League and amateur radio, and conferred the title of President Emeritus.

Other League officers were re-elected, and Directors Denniston, Doyle, Eaton and Kahn were named to the Executive Committee.

Directors approved the Housing Committee report and accepted the lowest bid for construction of a new Headquarters, subject to concurrence of the architect. The new building should be ready for occupancy in about one year.

The Board voted to strongly oppose any proposal for fees for amateur license applications; supported the FCC proposal to remove power restrictions from the amateur 420-Mc. band; rescinded its 1961 request for U. S. amateurs to avoid using 14,335-14,350 kc.; appointed a special committee to study the usage of 14 Mc.; and referred to its Planning Committee the question of Technician use of 28 Mc.

The Board expressed its gratitude to Senator Barry Goldwater and Representative Elford A. Cederberg, and their staffs, for their efforts to obtain reciprocal licensing privileges for amateurs. Thanks were also given to the Project Oscar Association for its achievements in amateur space communication; to the Field Engineering & Monitoring Bureau and the Public Safety & Amateur Division of the Federal Communications Commission for assistance and cooperation rendered the amateur service; and for the continuing efforts of League field officials in over-all amateur interests.

Approval was granted for the holding of an ARRL National Convention in Cleveland, Ohio, October 4-6, 1963, as well as for the publication of a 10-year index of *QST* and a new v.h.f. handbook. General Manager Huntoon was designated to represent the League at the June dedication of 4U1FTU, the new amateur club station at the headquarters of the International Telecommunications Union in Geneva, Switzerland. The Executive Committee will consider the desirability of appointing a General Counsel in Canada.

The Board reviewed the progress of the League, studied and discussed reports of the officers and its several committees, and made numerous policy decisions to guide League and amateur affairs during the coming year. Informal sessions in the three days previous to the official meeting included extensive discussions of various amateur matters, requiring less time for the formal meeting.

Minutes of the meeting will appear in July *QST*.

## Members Are Saying . . .

Your idea for a drive to raise money for the new building by going directly to the membership is not only good sense but I think that members would get a great deal of benefit and pride in helping to further the growth of ARRL. — *K7BJB*.

My first contact with *QST* was just prior to World War I when my cousin transferred his subscription to me when he was called into the Navy. Each month I look forward to receiving *QST* today as I have in the past years. I certainly would be pleased to help as best I can. — *W2DMU*.

Now is the time to do it — higher construction costs in the future. — *K8SFC*.

I personally would be glad to help — especially when it's for such a worthwhile and beneficial cause. In short, the idea is great. — *K4ZML*.

I would feel proud to know that I have paid for that nail or brick. — *V7FB*.

The plan will cause every contributing member to take even more interest in his League and its operation. — *W0SPM*.

Just name the place and time; I'm ready. — *KG6AIY*.

You have my full cooperation in building a new headquarters. Congrats on such an excellent idea. — *K3PMP*.

I would like to express my desire to contribute toward a building fund, and my earnest support toward a project which will express the ARRL's strong faith in a productive and prosperous future for amateur radio. — *K5VVV*.

I have never been in New England but this will be an incentive to see *WIAW* when you have it in "new" operation. — *W8BKB*.

Hams have always cooperated among themselves and with the general public. The very existence and importance of the League is merely evidence of this fact. Were it not for this cooperation and sense of brotherhood, such activities as *RACES* and *Project Oscar* would not be successful but merely ideas and dreams of what might have been. — *K0YOM*.

If everyone would do his and her part, it would all add up and not be a burden on any one person. — *W1ZWL*.

I am strongly opposed to depleting other funds for a building, or mortgages or bonds to put off paying into the future sometime. Let's pay for it now! — *W9TZN*.

I feel a great responsibility to do something more for ARRL than just paying my yearly dues. — *W8CXM*.

I can think of no other way of doing it that will allow us all to participate. FBI — *W4BZE*.

It is the most sensible suggestion which I have heard out of Hartford in a very long time. I am appointing myself a committee of one to sell this idea to the local fraternity. — *W6BE*.

Please keep our 40-year investments intact. — *W4LPH*.

The Magic Valley Radio Amateurs are entirely in favor of setting up a building fund for the purpose of constructing new League headquarters. — *W7GCX*.

I'm not "heeled" but can scrape up a few bucks. If we don't quite make it, you can hit ARRL reserve for the small balance. — *W4NO*.

I am pleased to hear that our organization is planning for improved location, building etc. I've wondered why we didn't do this before. — *W5W5M*.

I do not favor depletion of present reserves. I think this is not only unwise, but unnecessary. Issuance of bonds might be a quicker way to raise the amount needed but that would hardly be a better way since those bonds would have to be paid off and with interest. Be assured of our continued interest and support. — *K8COW*.

I think a stronger ARRL is essential if amateur radio is to survive in the coming years. — *K3RIJ*.

With two boys in college I am financially limited but will make a small contribution and will support the fund drive. — *W1WMK*.

Build the building! I'll help out. — *K8FCX*.

You can count on each of us. — *K0KSM*, *K0EZZ*.

To what avail is any organization without the support of its members. I look forward to the success of the project and the participation of all members, including myself. — *W4ZSRO*.

While I can't find a big amount I'm sure ready to do my bit towards support of your building fund. — *V8BY*.

The more closely united in purpose the membership becomes, the better; not to mention the sense of pride we would all have in accomplishment by joint effort. — *W3UER*.