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

ULTRA COMPACT series
UTC Ultra Compact audio units are small and light in weight, ideally suited to remote amplifier and similar compact equipment. The frequency response is within 1 db. from 30 to 20,000 cycles. Hum balanced coil structure plus high conductivity die cast case provides good inductive shielding. Maximum operating level is +75db. Top and bottom mounting as well as circular terminal layout are used in this series as well as the ones described above.

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Exceptional frequency stability is another reason why Collins amateur equipment sets performance standards. To develop oscillators capable of maintaining frequency stability over a long period of time, Collins constantly carries on oscillator aging tests. In these tests, groups of oscillators produced with different materials and techniques are operated over one and two year periods. The frequency drift of the high, middle and low frequencies is charted on an aging curve. The aging curve shown above charts the performance of a particular group of oscillators which showed superior long-range stability. Note the end point spread in the curve (1.955—2.955) is less than 1 kc. In other words, after continuous operation for one year, the frequency difference between the high and low ends was only 900 cycles. Oscillators with the changes indicated necessary by these tests were incorporated and are one reason why you get outstanding year-to-year frequency stability in Collins amateur equipment.

**Temperature stability**

To produce the minimum effect of temperature variation on frequency stability, each PTO on a Collins equipment is individually temperature compensated. In final testing, the PTO is placed in a temperature controlled chamber. The correct compensation is selected to bring it within the 750 cps (hot) and 1200 cps (cold) limits as shown on the curve.

**Calibration accuracy**

When the PTO dial in your Collins KWS-1, 75A-4, or KWM-1 indicates a frequency, you are closer than anyone else with a VFO. Production limits of 750 cycles, and actual figures much better (see curve), give you the best frequency calibration available, other than a crystal. Frequency deviation is also limited to 250 cycles per 50 kc of frequency change to eliminate any sudden variation within the band.

**Vibration**

An outstanding characteristic of Collins KWM-1 mobile transceiver is its amazing frequency stability despite vibration. (The oscillator in the KWM-1, though smaller and of different construction, has the frequency stability of the 75A-4 oscillator.) A vibration table oscillating at 60 cps in 2 g shocks varies the frequency less than 75 cycles. An automobile traveling over washboard roads produces considerably less than this.

The 75A-4 will take a shock of 5 g's — approximately the same as dropping it six inches onto a very solid surface — with less than 50 cycles of frequency shift.

The 75A-4 was not intended to be a frequency standard, but where else can you get the features of 1 uv sensitivity, Mechanical Filter selectivity, precise dial calibration, and rock-like stability?

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SEPTEMBER 1957
VOLUME XLI • NUMBER 9

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**Section Communications Managers of the ARRL Communications Department**

**Reports Invited.** All amateurs, especially League members, are invited to report station activities on the first of each month (or preceding month) directly to the SCM, the administrator officially elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST.* ARRL Field Organization station appointments are available in the areas shown to qualified League members. These include ORS, OBS, OPS, OJO and OBS, SCMs also desire applications for SEC, GCM, and PM where vacant places exist. 1d amateurs in the United States and Canada are invited to join the Amateur Radio Emergency Corps (ask for Form 71).

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*Official appointed to act temporarily in the absence of a regular officer.*
WE’RE RAISING THE ROOF!

We've been pretty lucky and the demand for TMC Products has been better than we hoped for—so to give us more room we’re RAISING THE ROOF and putting another floor on our main building.

We think the increased demand is due to our policy of telling the customers exactly what our equipment will and will not do.

YOU CAN DEPEND ON IT — — —
TMC MEETS IT'S PUBLISHED SPECIFICATIONS!!

The TECHNICAL MATERIEL CORPORATION
IN CANADA: Main Office: MAMARONECK, NEW YORK.
TMC Canada Ltd., Ottawa, Ontario
is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

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

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

All general correspondence should be addressed to the administrative headquarters at West Hartford, Connecticut.

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"It Seems to Us..."

SWITCH TO SAFETY

Two recent reports of death by electrocution have forcibly reminded us that amateur radio equipment must be treated with respect and caution. This is not to say that you must be afraid of your gear, nor should your family have to worry because of the nature of your hobby, but there should be an awareness of what is involved. Unfortunately, however, the old saw “familiarity breeds contempt” is all too true. Probably all of us at one time or another have been guilty of making a “temporary” hookup, in which there were a few exposed connections or terminals which carried more than a hundred volts or so. Likewise, the prevalence of 110-volt juice in every household has caused even that low voltage to be treated with far less caution than is wise.

So you think that low voltage is harmless? Well, bear in mind that it isn’t the voltage that kills you, but the current. And Ohm’s law applies to you just as much as it does to your radio equipment.

Some figures supplied through the courtesy of the National Safety Council and the Pacific Telephone and Telegraph Company tell the story very clearly. Dry skin has an average resistance of 100,000 to 600,000 ohms, while wet skin as a resistance of only 1000 ohms. Internal body resistance from hand to foot is roughly 400 to 600 ohms, while the ear-to-ear resistance is approximately 100 ohms. So, with 120 volts and a skin resistance plus internal resistance of some 1200 ohms, the result would be a current of 100 ma. That isn’t much? Look at the table below for the effects of various currents passing through the human body.

**Safe Current Values**

1 ma.: causes no sensation — not felt.
1 to 8 ma.: Sensation of shock, but not painful. The individual can release his contact at will, as muscular control is not lost.

**Unsafe Current Values**

8 to 15 ma.: Painful shock; individual can let go at will. Control is not lost.
15 to 20 ma.: Painful shock. Muscular control of adjacent muscles is lost. The individual cannot let go.
20 to 75 ma.: Painful shock. Severe muscular contractions with breathing extremely difficult.
100 to 200 ma.: Painful shock, causing ventricular fibrillation of the heart. This is “irregular twitching of the wall of the ventricle of the heart.” It is a fatal heart condition, for which there is no known remedy or resuscitation. It means DEATH!
200 ma. or over: Severe burns, severe muscular contractions, so severe that chest muscular reaction clamps the heart and stops it for the duration of shock. This reaction prevents ventricular fibrillation. Artificial respiration should be administered immediately and in most cases the victim can be revived.

Thus, current is the killing factor in electrical shock, and the voltage is important only in that it determines how much current will flow through a given body resistance. What to do? Be careful, and “Switch to Safety.”

Do you work on the rig only when all voltages are turned off? (even the 110 can kill) Does your family know where the main switch is, so that all power to the transmitter and receiver can be killed if you get into trouble? Does someone in the family know how to administer artificial respiration? (See QST for July, 1956, p. 65.) Are all racks and chassis grounded for protection against accidental shorts?

Ham radio is fun, but don’t make fun of its dangers.

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**Always Be Careful**

(A) Kill all transmitter circuits completely before touching anything behind the panel.
(B) Never wear ‘phones while working on the transmitter.
(C) Never pull test arcs from transmitter tank circuits.
(D) Don’t shoot trouble in a transmitter when tired or sleepy.
(E) When working on the transmitter, avoid bodily contact with metal racks or frames, radiators, damp floors or other grounded objects.
(F) Keep one hand in your pocket.
(G) Develop your own safety technique. Take time to be careful.

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**Death Is Permanent!**
Kentucky — The Blue Grass Amateur Radio Club will have its annual hamfest on Sunday, Sept. 22, at the Keeneland Racing Park in Lexington. Further details are available from W4PRT.

Manitoba — The Amateur Radio League of Manitoba, in cooperation with the Winnipeg Sports Car Club and the Aerial Aircraft League of Manitoba, will hold a hamfest over the Labor Day weekend. Besides the usual hamfest activities, there will be demonstrations of sports cars and model aircraft. For further details, contact A1 Jubb, VE2FT, 1115 Sherburn St., Winnipeg.

Missouri — The Southwest Missouri Amateur Radio Club will sponsor a hamfest in Springfield beginning at 9:00 on Sept. 8, at Farmer Park. Registration fee will be $1, with free benches. There will be a transmitter hunt, an s.s.b. demonstration, and a talk by the SCM.

New Jersey — The South Jersey Radio Association will hold its annual picnic on Sunday, Sept. 8, at Green Loch Park on Route 42 near Blackwood. Registration starts at 11:00, with v.h.f. transmitter hunts starting at noon. Activities for the whole family, including swimming. Pre-registration $1.00, at the gate $1.50, for singles or family. Contact Win Davis, W2LKB, Martin Ave., Medonteville, N. J. Talk-in transmitters will be on 27, 10, 9, and 6.

New York — The 13th annual Hamfest and Ladies Night of the Oneida area hams will be held on Saturday, Sept. 21, at the Masonic Temple Dining Room, 500 Main St., Oneida. Admission is $3.00 per person, $5.00 for advance registration only, and is limited to the dining hall capacity of 150 persons. Registration begins at 7 P.M., with the banquet at 7 P.M. Make all reservations prior to Sept. 21, by contacting Walter L. Babcock, W2RXW, 405 Sayles St., Oneida.

North Carolina — The annual hamfest of the Shelby Radio Club will be held on Sunday, Sept. 1, at Brackett’s Cedar Park, five miles north of Shelby on State Highway 10. Southern fried chicken, “double pumpkin” with all the trimmings, all you can eat. Swap table and auction. Entertainment and contests. Talk-in on 3805 and 29,000. For more information and dope on hotel/motel reservations, contact Malcolm E. Spangler, Box 481, 500 Suttle St., Shelby.

Ohio — 30th Annual Stag Hamfest on Sunday, Sept. 8, sponsored by the Greater Cincinnati Amateur Radio Assn. The location is two miles south of Greenhills, on Winton Road, at Hoping Grove. Registration $2.50 at the gate, which provides you with hot dogs all day long, donuts and coffee until noon, beer and pop served all day, and full picnic dinner and supper (call you can eat). Rain or shine. Games, contests, radio-controlled model plane demonstration. For further information, contact Paul R. Wolf, WM5VE, 711 Delta Ave., Cincinnati 36.

Ohio — The Findlay Radio Club will hold its annual old-fashioned hamfest on Sunday, Sept. 8, at Riverside Park. Advance registration is $3.00, $1.50 at the gate, W8PT talk-in on 3812 kc. Swap shop, contests. Concessions will be operating. Bring your family and your picnic basket. For advance registration and further information, contact Dick Ceblin, 855 Summit St., Findlay.

Quebec — On Sept. 21 the Montreal Amateur Radio Club will hold its annual hamfest in Victoria Hall, Westmount. There will be a Friday night tour of the Molson Brewery, for those who arrive early, and a banquet on Saturday night. Registration $5.00 each. For further information contact Mr. J. L. Miller, VE2TA, 535 Lonsdoun Ave., Westmount 6.

ARRL SOUTH DAKOTA STATE CONVENTION
Huron, South Dakota — September 21-22

The Huron Amateur Radio Club is sponsoring the South Dakota State Amateur Radio Convention to be held September 21 and 22 in Huron. The two-day affair will be highlighted by talks and demonstrations in the fields of transistors, single side band and v.h.f. communications. Other strictly-ham activities will include a hidden transmitter hunt, mobile-judging and talks by League officials. For the XYL and YL not interested in amateur radio, special ladies’ activities will be featured.

No matter what your interest, you’ll find the program entertaining and instructive. The pre-registration fee of $6.00 and the at-the-door registration fee of $6.50 includes tickets for a “Chuck Wagon” feed on Saturday evening and the Sunday afternoon banquet. The club will be glad to handle hotel and motel reservations. For details, write Huron Amateur Radio Club, Box 1234, Huron, South Dakota.

ARRL MIDWEST DIVISION

Kansas City, Kansas — September 21-22

The 1957 ARRL Midwest Division Convention will be held under the sponsorship of the Johnson County Amateur Radio Club at the Town House Hotel, Kansas City, September 21 and 22. Headquarters Representatives will discuss current problems. Special sessions will be held for Novices and Technicians and for those interested in DX, traffic handling, ultra-high frequencies, the earth satellite, Operation Smoke-puff, and IGY. A special display of radioteletype in action will be presented by the Midwest Amateur Radio Tele-type Society, featuring many different models. The drill team from Salina, Kansas, will conduct an initiation ceremony for the Royal Order of the Wouff Hong at Midnight Saturday, under the direction of W0JVG.

Advance registrations are $10.00 per person. Contact Jim Mc Coy, W9LOV, 3441 Booth St., Kansas City 3, Kansas. After September 7, registration will be $12.50. Make reservations for accommodations directly with the hotel.

COMING ARRL CONVENTIONS
August 30-31—Sept. 1 — ARRL National Convention, Chicago, Illinois
August 31—Sept. 1, 2 — Maritime Provinces, Charlottetown, Prince Edward Island
September 21-22 — Midwest Division, Kansas City, Kansas
September 21-22 — South Dakota State, Huron, South Dakota
October 18-19 — Ontario Province, Toronto, Ontario
November 8-11 — Far East Pacific Division, Guam

SEE YOU AT THE ARRL NATIONAL CONVENTION IN CHICAGO, LABOR DAY WEEK END
The "third method" exciter built by W1PNB was laid out for easy circuit modification during experimental work, and is therefore considerably larger than would be necessary in a "final" design. The audio circuits are along the front and the balanced modulators occupy the rear section of the chassis.

The Third Method of S.S.B.

How It Works in Theory and Practice

BY HOWARD F. WRIGHT,* W1PNB

The single side-band issue of the Proceedings of the IRE contains a thought-provoking article entitled, "A Third Method of Generating and Detecting Single Sideband Signals." The circuit is interesting in that, although the balanced modulators, filtering, and phasing are individually commonplace in s.s.b. techniques, the way they are used here is unique. It is quite unlike present practice.

Fig. 1 is the diagram of the basic "third method" generator. A common source of audio is parallel fed to two ordinary balanced modulators. The carrier signal for these first modulators — and this is novel — is centered in the speech range at 1800 cycles. The carrier voltages are in quadrature.

Each modulator is followed by an identical low-pass filter designed to pass frequencies below the first carrier at 1800 cycles and reject those above that frequency.

The output of each filter feeds another balanced modulator. The quadrature carrier voltage for these second modulators is at the desired r.f. output frequency. The r.f. outputs of these modulators are combined by series connection of the links.

The circuit will be discussed further, but first let's take a look at the claims for this method:

1) It does not require sharp-cutoff filters.
2) No wide-band phase-shift networks are needed.
3) Faulty phasing and balancing doesn't cause unwanted energy to fall outside the channel; instead, inverted in-channel energy appears.

* 55 Sigourney St., Bristol, Conn.

4) Undesired signal components are at least 30 db, down.
5) The s.s.b. signal can be generated at any desired radio frequency.
6) Operation can be bilateral; that is, the method also can be used for s.s.b. reception.
7) Quality is good.
8) The unit can be small and rugged.

Fig. 2 shows the speech spectrum to be applied to the system. These frequencies heterodyne (modulate) with the 1800-cycle first carrier in each initial modulator. Except for the quadrature phase shift, the outputs of both modulators are identical. For the present we need consider only one.

First Modulator and Low-Pass Filter

Fig. 3 shows the output spectrum of either initial modulator. Notice that the upper side band of this modulation process (sum frequency) occupies a conventional relation to the 1800-cycle carrier, \( f_c \). The lower side band (difference frequency) is folded upon itself. This occurs because there can be no “minus frequencies” and because the carrier is within the speech range. For the latter reason there are two speech frequencies — one above, and one below 1800 cycles — which mix to produce identical frequencies in the modulator output range of 0 to 1500 cycles. This is shown graphically in Fig. 4. Here, each frequency in the difference side band may represent either of two original audio frequencies. The exception is 0 cycles (d.c.), which now represents

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**Fig. 3** — Output spectrum of first balanced modulator.

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original audio of 1800 cycles. Referring to Fig. 1, notice that d.c. coupling is used between first and second modulators so that audio information at and around 1800 cycles will not be destroyed.

Referring again to Fig. 3, we are interested only in the difference side band — below 1500 cycles. The sum side band — above 2100 cycles — must be effectively removed. If it is not removed this band of frequencies will appear in the final signal as a normal, readable, unfolded, "unwanted side band."

The dashed line in Fig. 5 represents the low-pass filter requirements necessary for an arbitrary 40-dB suppression of out-of-channel unwanted side band if the speech range starts at 300 cycles.

**Second-Modulator Operation**

The output spectrum passed by the filter is applied to the second modulator. In this case (the second modulator) the carrier is at approximately the desired output frequency. Quadrature phase is also maintained between the carrier voltages applied to both second modulators.

Fig. 6 is the individual output of either second modulator. The signal at this point is a double-side-band suppressed-carrier signal. Both side bands are 1500 cycles wide. However, all 3000 cycles of original audio information is contained in each of these side bands because of the folding effect of the first modulator. Both side bands contain two components. One represents the low half of the original speech and the other, the high.

Both modulators have the same output spectrum. The phase relationship of the individual outputs, due to the quadrature carrier supply to both modulators, is such that combining the outputs of the second modulators results in one component being phased out of each side band. Thus, in Fig. 6, the signal components contained in the shaded areas will be suppressed and those in the clear areas transmitted; or, if either the audio or r.f. phase is reversed, the opposite will be true. If the components in the unshaded areas are transmitted, an s.s.b. receiver tuned to a synthetic carrier frequency of \( f_{c2} + 1800 \) will reproduce a normal audio spectrum. If the components in the shaded areas are used, the receiver would switch side bands and tune to \( f_{c2} - 1800 \) for proper demodulation.

Fig. 7 demonstrates the case and shows the presence and location of the folded-back, unwanted side band. This "unwanted" is due to imperfect phasing. It occupies the same channel as the "wanted."

**Operating Characteristics**

Fig. 8 is the complete output spectrum of the final signal. If the receiver is set at \( f_{c2} - 1800 \) or \( f_{c2} + 1800 \) (depending on the side band transmitted), proper reception of the original audio will result. Any unbalance in the second modulators resulting in leakage of the true suppressed carrier at \( f_{c2} \) will result in an audible 1800-cycle

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**Fig. 4** — Frequency components in the speech band that are spaced equally either side of 1800 cycles are converted to the same frequency in the difference side band. This occurs in the first balanced modulator.

**Fig. 5** — Audio-frequency filter characteristic for 40-db. suppression of out-of-band components.

**Fig. 6** — The signal channel contains two sets of components, corresponding to an upper side band (shaded) or lower side band (clear). One set can be eliminated by the r.f. and audio phasing. The receiver local oscillator frequency is set 1800 cycles to one side of the suppressed transmitter carrier frequency. The side to be used depends on the side band transmitted.

**Fig. 7** — An error in phasing results in an inverted side band superimposed on the desired side-band signal.

**September 1957**
tone. Notice that the out-of-channel groups marked "filter unwanted" are a function of filter performance. The shaded area indicating in-channel inverted signal is a function of phasing adjustment.

Single-frequency steady signals that tune like carriers will appear at \( f_2 - 1800 \) and \( f_2 + 1800 \) (the spot of proper receiver tuning) if the original audio frequency carrier at 1800 cycles is not perfectly nulled out in the first pair of balanced modulators.

The novel features of the "third method" aroused considerable interest among my s.s.l. friends. There was much speculation as to how the system would work and sound. Accordingly, having tried everything from n.f.m. to "super-modulation," I decided to give the "third method" a try. Because of uncertainty as to the outcome and a desire for cheap, speedy results, I didn't build a complete exciter but just a basic unit which could be connected to an existing exciter. The results are shown in the photograph. Since the parts were largely "scrounged" from interested bystanders and any part that would work, regardless of size or shape, was used, no conclusion as to the possibilities of the system in terms of bulk or complexity should be drawn from the picture.

The basic circuit was followed closely. Minor changes included changing the crystal diodes to tubes, moving the output frequency to 455 kc., and changing the phase splitter of the second oscillator to critically-coupled tuned circuits. A dual-triode audio stage is followed by a low-pass audio filter and circuitry to attenuate lows. The 1800-cycle oscillator uses a toroid-wound inductance. The transformers supplying audio are 500-ohm line-to-line, and plate-to-line transformers supply 1800-cycle carrier. The output tuned circuits were scaled down to 455 kc.

When complete, the unit was coupled into the i.f. stages of the existing 20-kc. filter rig. The resulting signal was examined and adjustments made using the highly selective station receiver, calibrated attenuator, and oscilloscope which have been used for several years to accurately measure band width and relative amplitudes of various signal components of the transmitted and incoming signals.

The "third method" experimental exciter performed as follows: Referring to Fig. S, the suppressed carrier at \( f_2 \) is nulled out by balancing the two second modulators. No difficulty was experienced in obtaining a null of at least 40 db.,
but any drift in this null results in an audible whistle of 1800 cycles in the received signal.

The carrier-like signals 1800 cycles above and below \( f_1 \) are nullled out in the first balanced modulators. Again, there was no trouble in obtaining a null. This null holds better, but the null for both signals didn’t occur at exactly the same adjustment — a difficulty that was not enough to prevent obtaining a good signal. It may have been due to some peculiarity of this particular unit.

At first, considerable readable signal in the region marked “filter unwanted” was encountered. Experimentation proved that the original simple constant \( k \) low-pass filters were inadequate for obtaining out-of-channel suppression comparable to that of conventional rigs. Adding a capacitor across the center coil of the filter, to give one \( m \)-derived section, gave vastly improved results, but a better filter designed for sharpest possible cutoff is desirable. Although it is fairly easy to get the desired selectivity at this frequency, the actual slope (in cycles) must be as good as for any conventional filter rig.

When the out-of-channel problem was licked, the phasing aspect was studied. It is extremely interesting to note the effect of differing levels of folded-back side band upon wanted signal intelligibility and distortion. With no suppression of one side band, either signal can be copied, but through fairly heavy interference from the other. Thanks to the inversion of the folded-back side band and the effects of product detection, surprisingly large amounts of unwanted signal can be tolerated without causing undue trouble. When the folded side band is suppressed 20 db, or more it seems to practically disappear as a factor in intelligibility. At 30 db, its effects on voice quality are negligible.

Conclusions

Many contacts were made using this exciter. The results were excellent. Although all desired adjustments and investigations are not complete some conclusions can be drawn from the work done.

The system is basically capable of producing excellent s.a.b. signals. Although these signals are actually double-side-band suppressed-carrier, the side-band components are so arranged that they tune like and are otherwise indistinguishable from regular single-side-band suppressed-carrier transmissions. Although the system benefits from the extremely low frequency of filter operation, and poor phasing is not ruinous, the actual attenuation vs. frequency of the two filters must be as good as in any filter rig.

The big obstacle, at the present state of design, is the complete dependence upon maintaining the null in the balanced modulators to remove the carrier and its resulting audible beat.

Although it can not be foretold what, if any, part the “third method” will play in future s.a.b. voice communication, this article is presented because this system should intrigue anyone interested in the various types of modulation.

I wish to thank those on the 78-meter band whose parts, interest, and encouragement made this an enjoyable project. The charts and graphs accompanying this article were largely prepared by Tony Sivo, W2FYT, as a result of early discussions concerning the “third method.”

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Silent Keys

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

W1AKU, Gordon S. Dayton, Winsted, Conn.
W2DDC, Hyman Yoffe, Revere, Mass.
W1N7YS, Ernest W. Simms, Bradford, R. I.
K2MFD, Leonard K. Park, Long Beach, N. Y.
W3EIL, Albert Wolfe, Pittsburgh, Pa.
W4EAK, Walter H. Hinton, Jr., Greensboro, N. C.
W4ABN, James E. Brightwell, Hendersonville, N. C.
W41AX, Harvey W. Schiffman, Greensboro, N. C.
W5AGF, Elmer J. White, Beaumont, Texas
W5EBY, Ira J. Seab, Whittier, Calif.
K6D7O, Gilbert L. Benze, Hawthorne, Calif.
W6FM7, Roland W. Davidson, Whittier, Calif.
W6LKC, Hubert Sherman, Whittier, Calif.
W7BDP, James H. Fosler, Butte, Mont.
W8CBT, John W. Adamsen, Port Austin, Mich.
W9KD1, Leonard L. Schmiring, Sac City, Iowa.
W9FMD, Arnold N. Svardt, Duluth, Minn.
WB1RFI, Everett S. Stokes, Sidney, Nebr.
W2AFU, David F. Michael, Springfield, Mo.
W1L8M, Ernie Parkin, Waukeee, N. Z.

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September 1932

... "An Intermediate-Frequency and Audio Unit for the Single-Signal Superhet" was the lead-off article 25 years ago, to be used in conjunction with the unit described the previous month.

... The "Thirty-Three Watts per Dollar" rig was also featured in this issue, with WECUII explaining how to get high output with efficiency and safety from a type 302.

... Another popular article in this issue was the symposium on "Sticks That Have Stuck," being a roundup of various types of masts and an attempt to determine which was best.

... An article about "Science Service Uraniums" reminds us that cosmic data was being investigated long before the IGY came along.

... In IARU News are reported newly-adopted rules for the issuance of WAC certificates — rules which have continued unchanged to this date. Incidentally, for the first half of 1932 a total of 60 WACs had been issued, that is somewhat under the current rate.

... And there were more reports on the use of 56 Mo. at the National Glider Meet.

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September 1957

15
V.F.O. Control for the ARRL Model 6-60-90

Space under the dash is at a premium in most low-slung cars of modern design. In fact, the installation of a completely “up front” mobile station may be nearly impossible in some cars unless one turns the front end of the vehicle into a “no-passengers-allowed” compartment. At least, that was the situation encountered in our ‘56 hard-top while attempting to dash-mount a Gonset G66B, remote-control heads for Master Mount and Radfrod antenna gear, James power supply, control panel and the ARRL Model 6-60-90.1 After looking over the pile of equipment, and the mounting space available, it was decided that the two larger units—the power supply and the transmitter—would be mounted in the trunk so as to make at least a little leg room available for the front-seat riders.

It was only natural that this decision should lead to thoughts of a remotely-tuned v.f.o. for the transmitter. Although we have no objection to a short trip to the rear whenever the transmitter is to be switched to another band, we did feel that a v.f.o. would be of little value unless it could be controlled from the driver’s seat.

The compact unit to be described is the outcome of these considerations. It is small enough to be tucked out of the way under the dash, and it requires no power other than that used by a single pilot lamp. The crystal-oscillator tube of the main transmitter is used as the v.f.o. tube and all of the connections between the v.f.o. and the transmitter are supplied by a single length of Twinax cable. A simple switching arrangement adjusts the circuit for operating any one of three frequency ranges. The first of these tunes 3370 to 3405 kc. for transmitter output at 11 meters, and the second and third ranges cover 3500 to 3720 kc. and 3720 to 4000 kc. respectively. Splitting the 3500- to 4000-kc. band in this manner provides excellent band spread for the higher-frequency bands (7 through 28 Mc.) and spreads the 75-meter spectrum out over 70 per cent of the tuning dial. An indicator circuit ganged with the band switch keeps the operator aware of the v.f.o. range in use.

The Circuit

The circuit diagram of the v.f.o. is shown in Fig. 1. Actually, the circuit is nothing more than a high-C tank that may be used to convert a standard grid-plate crystal oscillator into a Colpitts v.f.o. Since the capacitance of the remote-control cable is across the tuned circuit,

High C in a Remote Tuning Head

BY C. VERNON CHAMBERS, WIJEQ

Here is a remote v.f.o. tuning unit for the ARRL model 6-60-90 Mobile Transmitter. Although it was constructed especially for that particular rig, it may be used with almost any transmitter equipped with a grid-plate crystal oscillator. It’s a compact unit designed for under-the-dash mounting and the remote frequency control of a trunk-mounted transmitter.

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* Technical Assistant, QST.
the v.f.o. frequency will depend upon the length of the cable as well as other values. The constants shown are based on a 15-ft. control cable of RG-22/U between \( J_1 \) of the tuned tank and the v.f.o. input receptacle, \( J_1 \), of the Model 6-60-00. This length of cable should easily span the distance between the dash and the trunk of almost any make of modern car.

The circuit uses the band-pass capacitor, \( C_3 \), in parallel with \( J_1 \) for operation at the highest of the three frequency ranges. A variable padder, \( C_2 \), is switched across the tuned circuit by means of \( S_{1A} \) to lower the tuning range to 3500 through 3720 kc. This padder is replaced by a 270-\( \mu \)f fixed capacitor, \( C_1 \), when \( S_{1B} \) is switched to the 11-meter position (3370 to 3405 kc).

Feedback is controlled by \( C_4 \) and \( C_5 \), plus the cable capacitances shunting them. The capacitance between inner conductors of the fifteen-foot length of RG-22/U is several hundred \( \mu \)f, and the capacitance between each conductor and the shield (ground) is better than 300 \( \mu \)f. The manner in which these capacitances appear in the circuit is best illustrated in Fig. 2. Notice that \( C_5 \) and \( C_8 \) form a capacitive divider across the tuned tank and that the grid of the oscillator tube is tapped down on the tuned circuit as a result. When a long length of cable is used between units, the capacitance of \( C_8 \) becomes somewhat critical. If the value is too small the oscillator will not perform satisfactorily; if the capacitance is too large it shunts the tuned circuit with nearly the full capacitance of \( C_8 \), causing LC-ratio and band-spreading problems.

The indicator circuit consists of \( I_3 \), \( I_2 \) and \( S_{1A} \), the latter being ganged with the band switch, \( S_{1B} \). To balance the panel of the v.f.o., and to provide an "off" position so that \( I_1 \) and \( I_2 \) may be extinguished, only two lamps were used. The "lights out" position of \( S_{1A} \) indicates that the v.f.o. band switch is set at the 11-meter position. A green jewel is illuminated by \( I_3 \) when the circuit is switched to the 3500- to 3700-ke. range, and a red jewel indicates that the v.f.o. is tuned to 3720 ke. or above. The red light serves as a warning against tuning up the transmitter on the higher-frequency bands while the v.f.o. switch is in the high-frequency position. Voltage for the indicator lamps is obtained from any convenient spot under the dash that is connected to the ear battery. Naturally, the lamps should match the voltage of the ear's battery.

Conduction

Photographs of the v.f.o. show how the components are arranged on the U-shaped chassis. Before disassembling the multiscale dial so that the rear plate may be used as a template for marking the mounting holes on the front wall of the chassis, scribe through the large holes in the lower corners of the rear plate onto the rear side of the dial cover. The holes so marked may then be drilled — after the cover has been removed — to accommodate the pilot-lamp jewels. A similar set of holes should be drilled in the front wall of the chassis to pass light from the lamps through to the jewels.

After the dial has been mounted, slip the control shaft of \( C_3 \) into the hub of the dial and then cut to length metal spacers that will fit snugly between the mounting feet of the capacitor and the bottom of the chassis. Machine screws may then be used to fasten the capacitor firmly in place. The remainder of the parts may now be mounted as illustrated in the interior view of the unit.

To avoid confusion, it should be pointed out that the capacitance values for \( C_4 \) and \( C_5 \) of the original unit were obtained by connecting smaller capacitances in parallel, and the photograph shows combinations of two and three capacitors adjacent to \( I_1 \). The parallel combinations may be replaced by the single units indicated in Fig. 1.
The main tuning capacitor, $C_3$, mounted on metal pillars, is seen at the left in this interior view of the v.f.o. Variable padders $C_6$ and fixed capacitor $C_7$ are to the right of $L_1$. $C_6$ and $C_7$ are above and below $L_1$, respectively, and the range switch is in the upper right-hand corner. The output receptacle is mounted on the wall at the right along with the rubber grommet for the battery cable connected to $S_{1A}$.

All of the wiring except that for the hot leads to the pilot lamps is done with No. 14 tinned wire. Connections should be point-to-point with the shortest possible length. A tie-point strip to the lower right of $L_1$ (interior view) supports the junction of $C_4$, $C_5$ and the lead to $J_1$.

**Testing**

The v.f.o. unit should be connected to the transmitter via the fifteen-foot length of Twinax cable. (Incidentally, remember to remove the crystal from the rig.) An a.c. filament transformer may be used to power $I_1$ and $I_2$ if you want to check out the indicator circuit while bench testing. Warm up a receiver of known calibration. A high-resistance voltmeter connected across the 68K grid resistor of $V_2$ in the transmitter will facilitate alignment.

Only the oscillator and buffer-doubler tubes of the transmitter need be activated at this time if a high-resistance voltmeter is available for checking d.c. voltage across the buffer-doubler grid leak. In this case, the driver-multiplier tube, $V_3$, may be temporarily put out of action by either turning the excitation control to minimum or by turning the mode switch to the v.f.o set position. If a voltmeter is not available, the transmitter can be lined up by observing final grid current. However, receiver blocking will be less of a problem if $V_3$ can be disabled. $V_4$, $V_7$, and $V_8$ should be removed from their sockets to prevent excessive screen dissipation (these tubes are without plate voltage when the amplifier plate supply is turned off).

Tune the receiver to 4 Mc., turn the b.f.o. on, switch the v.f.o. to the highest range and apply power to the exciter. Adjust the bandspread capacitor of the v.f.o. tank to nearly minimum capacitance — about 98 on the Millen dial — and then adjust $L_1$ until a beat note is heard. Tune the receiver a few kc. off to either side of 4 Mc. and listen for any additional signals that may be caused by oscillator squeeging. This occurred in the original circuit, but it was quickly cured by lowering the grid-leak resistance of the oscillator tube ($V_1$) to 39K.

Next, rotate $C_5$ to nearly full capacitance — about 3 on the dial — and then return the receiver to the v.f.o. signal. The new frequency should be 3720 kc. or slightly lower. Now, switch the tank to the next lower range, tune the receiver to 3500 kc. and adjust the variable padder $C_6$ until the v.f.o. signal is heard. This should occur with $C_6$ set at approximately 90 per cent of its total capacitance. With $C_6$ rotated to nearly minimum capacitance, the oscillator signal should show up at 3720 kc. or a bit higher when the receiver blocking will be less of a problem. **(Continued on page 14-1)**

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**QST for**
Transistors in Speech Equipment

Design Notes and An All-Transistor Speech Amplifier

BY HANS J. ALBRECHT, * VK3AHH

- Low-level audio amplification is one spot where transistors ought to find considerable application in ham gear. Compactness and low power consumption are easily achieved. And the all-battery power supply offers an easy answer to the ham problem!

Although transistors have been on the market for some time, amateurs generally seem to be reluctant to make proper use of these extremely economical devices. This may be due to the lack of detailed circuit descriptions in amateur radio journals, and it is for this reason that this article has been written. The author will attempt to explain the design of transistorized amplifiers, and circuit details of a three-stage audio amplifier and a tone oscillator will be given.

By way of introduction, it must be emphasized that transistors can only be used within their limitations. At the present state of the art, transistors are suitable only for low-level operation. Thus in the case of modulation equipment for ham radio transmitters the speech amplifier is the first part that can be simplified, without loss of performance, by using transistors. In fact, the amplifier to be described has been used as the speech amplifier for a clamp-tube modulator, and performed satisfactorily in every respect.

Design Considerations

Engineering textbooks describe the design of transistor amplifiers in detail and readers interested in a more theoretical approach may consult them. Although it is not intended to refresh in this article the fundamentals of transistor circuitry, some introductory comments may not be amiss, with particular reference to the needs of the amateur. The design considerations of transistorized gear may briefly be listed as follows:

1. Care must be taken to ensure linear operation by selecting the position of the quiescent operating point.
2. The circuitry has to be designed for minimum effects of ambient temperature.
3. It is not advisable to operate transistors at potentials higher than the maximum data published.

The first point is well known from vacuum-tube technique, and characteristics published by manufacturers allow suitable operating points to be determined. Single-battery operation being preferable for convenience, the calculation of resistances for an appropriate bias network is outlined later.

The second point calls for some effective temperature compensation to be provided in the electronic circuitry. In other words, the bias of each stage has to be stabilized with respect to temperature variations. The effect of temperature upon transistor characteristics is considerable, particularly so far as the collector current at zero

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* Basic principles were discussed by Priebo, “Transistor Operating Characteristics,” QST, Feb., 1957. — Ed.
emitter current is concerned. Stabilizing circuits will be discussed below.

With reference to the third point, excessive operating voltages do not necessarily result in a complete failure of the transistor. The general performance, however, is likely to deteriorate if the transistor is exposed to such treatment. The temperature rise at the junction is a function of the dissipated power, a typical value being 0.1 degree Centigrade per milliwatt collector dissipation. The maximum junction temperature is usually given as 45 degrees Centigrade, or 113 degrees Fahrenheit. The author recalls one experiment in which the base-emitter section of a transistor was unintentionally subjected to a current far in excess of the specified limit. Subsequently, the transistor assumed a temperature of approximately 200 degrees Centigrade for a period of about three minutes. This particular transistor still performs well in a low-level oscillator, although its output is somewhat lower than before.

As is undoubtedly known to readers, there are three possible circuit connections of transistors, similar to vacuum-tube practice: common-emitter, common-base, and common-collector, resembling common-cathode, common-grid, and cathode-follower operation, respectively. Theoretical design considerations indicate that the common-base connection features lower input impedance (about 50 to 500 ohms), than the common-emitter connection (around 1000 ohms). On the other hand, the common-collector circuit provides a higher input impedance (about 60,000 ohms). So far as the corresponding optimum load impedances are concerned, typical values are 200,000 ohms, 70,000 ohms, and 2000 ohms for common-base, common-emitter, and common-collector circuits, respectively. It can be proved mathematically that, for cascade operation, the common-emitter configuration is a good compromise.

The question whether a cascode amplifier for the audio frequency range should use transformers or RC-coupling between stages is largely one of preference and availability of components. Too many transformers may cause the amplifier to become a somewhat inefficient oscillator, just as in orthodox vacuum-tube technique. Another disadvantage of interstage transformers, particularly midget transformers, may be their cost. On the other hand, straight RC-coupling results in some loss of gain, if compared with a properly matched transformer. To achieve the same gain, the mismatch between RC-coupled stages necessitates an increase in the number of stages by about 30 per cent. Also, it would seem reasonable to use additional transistors as common-collector matching stages between common-emitter amplifying stages. In practice, however, a cascode of three RC-coupled common-emitter stages provides more gain than two RC-coupled common-emitter stages with a common-collector matching stage.

Nevertheless, the common-collector configuration is a very useful connection if an input source of high impedance is to be coupled to a common-emitter transistor, as shown later in this article.

Stabilization

Fig. 1 illustrates typical bias stabilizing circuits for low-level common-emitter operation.

![Fig. 1 — Bias and stabilizing circuits for transistors.](image)

In the first circuit, Fig. 1A, stabilization is achieved by resistance feedback between collector and base, the base current being given by the ratio of collector voltage to the resistance connecting the collector and base. In some cases, an emitter resistance may be added.

In Fig. 1B the base bias is produced by a voltage divider $R_B R_A$. The emitter resistor $R_E$ is used for automatic stabilization. This circuit provides optimum stabilization at the expense of higher over-all power consumption. It is ideally suited for low-level amplification, and has been used by the author in the amplifier to be described. Some comments on the theoretical relations of these resistors seem to be worthwhile.

A "stability factor," $S$, which should have a low value, is defined by

$$S = \frac{1 + \frac{R_E}{R_B} + \frac{R_E}{R_A}}{1 - \alpha + \frac{R_E}{R_B} + \frac{R_E}{R_A}}$$

where $\alpha$ = current amplification factor. The following formulas are used for calculating $R_E$, $R_A$, and $R_B$:

$$R_B = \frac{\alpha(E - V_c - R_L I_e)}{I_e - I_m}$$

$$R_A = \frac{E(S - 1)}{I_e - S I_c}$$

$$R_E = \frac{S - 1}{(1 + \alpha S + \alpha S) (I_e - I_m) - \frac{I_e - S I_c}{\alpha(E - V_c - R_L I_e)}}$$

where $R_L$ = load resistance

$E$ = supply voltage

$V_c$ = collector voltage

$I_e$ = collector current at operating point

$I_m$ = collector current at zero emitter current.

The emitter resistor, $R_E$, has to be bypassed.
Fig. 2 — Circuit of the all-transistor speech amplifier. Capacitors are electrolytic, 25-volt or lower rating sufficient. Fixed resistors are $\frac{1}{2}$ watt.

Q1 — Philips OC-71.
Q2, Q3 — Philips OC-72.
T1 — Interstage audio, 2 or 3 to 1 ratio, larger winding so that the impedance of the RC combination is negligible for all frequencies used. Omission of this bypass capacitor or the use of too low a value would result in feed-back effects similar to those associated with the cathode-resistor bypass in tube circuits.

For completeness’ sake, two other possible stabilizing circuits should be mentioned briefly. To maintain a reasonable overall efficiency in power applications, a temperature-sensitive nonlinear device — e.g., a thermistor — is often connected into the bias network. Its characteristic enables some automatic stabilization to take place. Another possibility is the so-called tandem arrangement. This uses a resistance-stabilized transistor which supplies a constant emitter current to a second transistor. However, these circuits are not at all necessary for low-level operation, and since the amplifier under discussion is concerned with low-level audio amplification the resistance stabilization described above is quite satisfactory.

**The Audio Amplifier**

The amplifier consists of three cascaded common-emitter stages, and its circuit diagram is given in Fig. 2. The stabilizing circuits are basically identical with the one shown in Fig. 1B, with an average stability factor of $S \approx 8$ for $\alpha = 0.98$. The stabilization obtained is sufficient for the purpose of this amplifier. A lower factor — e.g., $S = 2$ — would give better stabilization at the expense of higher over-all power consumption. RC coupling is used for the input and intermediate stages and the output load is represented by the primary winding of an ordinary interstage transformer. Its secondary is connected to the modulator stage, or any other load.

The transistors utilized are Philips junction triodes OC-71 and OC-72, all operated in Class A. As is general practice with transistor amplifiers, appreciable coupling capacitance must be used to suit the generally low input impedances of transistor stages. Each stage has been carefully designed to provide optimum amplification at the general supply voltage of 4.5 volts, which is taken from a flashlight battery. At the current consumption of 3 to 5 ma, for the entire three-stage amplifier, the life of the battery should be nearly equal to the shelf life.

The last two stages of the amplifier are equipped with OC-72s. These are classified as medium-power transistors, with a permissible dissipation power of 45 milliwatts. In Australia they are commercially available in matched pairs for Class B power operation. However, their characteristics are such that they are also very suitable for single Class A operation, as used in the amplifier under discussion. Of course, OC-71s could be substituted which would result in somewhat less amplification.

Using the primary of an ordinary audio interstage transformer as the output load, the input impedance at the base of the first stage is of the order of 1000 ohms.

A volume control has also been included. As is evident from the circuit diagram, the load resistor of the second stage has been made variable for this purpose.

**Input Matching**

The relatively low input impedance of the amplifier requires a matching network of some kind. Dynamic microphones can be matched easily by a suitable transformer. In the case of crystal microphones a special matching stage appears to be the best solution.

As mentioned earlier, a transistor in the common-collector configuration is suitable for matching a high to a low impedance, in analogy to the cathode follower in tube technique. However, with a load impedance of about 1000 ohms the input impedance of this circuit is of the order of 60,000 ohms. This is still a bit too low for
adequately matching a crystal microphone, although the position is definitely improved. The remainder of the load has to be provided by a resistor, resulting in a loss.

Another solution is the use of a common-emitter stage with appreciable resistance in series with the input, in order to match a high-impedance source. The loss in the resistive element is compensated for by the amplification of this stage so that an adequate signal appears at the output of the matching stage. Fig. 3 is the complete circuit diagram of such a matching stage, as used to match a crystal microphone to the input of the three-stage amplifier.

**Tone Oscillator**

A detailed description of this part is not necessary, as circuits of transistorized tone oscillators or code-practice oscillators have been published in ham radio journals from time to time. Fig. 4 shows two popular LC feedback oscillators. In vacuum-tube practice these oscillators are known as the Colpitts (A) and Hartley (B), respectively.

For m.c.w. and test purposes, an oscillator of the type depicted in Fig. 4A has been included in the amplifier under discussion. An old Siemens r.f. iron-core coil of 1940 vintage was found to be extremely useful. A maximum number of turns was wound on the three sections of the core (total dimensions: diameter 0.88, height 0.72 inch), resulting in an inductance of approximately 25 millihenrys. The smallest capacitor that could be detected anywhere was also found in the junk-box. It is a center-tapped Bosch metalized-paper capacitor of 1 microfarad, another German dispoals components (the author is ex-DL3EC). Of course, both parts can easily be replaced by modern components. Two penlight cells make an appropriate power supply and last for a considerable period at a maximum consumption of 2 milliamperes. The frequency of oscillation is of the order of 1000 cycles per second.

An interstage transformer (about 2.5 to 1, the higher impedance side toward the oscillator) is used to couple the oscillator to the input of the amplifier (see Fig. 2). A double-pole switch at the amplifier input selects the secondary of the transformer or the microphone matching stage.

**Constructional Details**

A small chassis was used as a the container for the amplifier and its 4.5 volt battery, the oscillator being mounted on top of the chassis. The crystal-microphone matching stage was housed in a small box which also contained its supply, a 1.5-volt dry cell.

The entire setup must be well shielded, particularly if used in connection with a transmitter, in order to counteract any possible r.f. feedback. Likewise, the output cable and the cable from the matching stage must be shielded.

**Performance**

In the several months during which the equipment described in this article has been used its performance has been satisfactory in every respect. In the case of the author's ham station, the unit has been employed as a speech amplifier, its output being connected to the grid of a controlled-carrier modulator, a 12A6, which is used to modulate the p.a. (90 watts input, home-built, pair of 807s). The modulation level obtainable allows a fair amount of volume reserve. The output signals of the microphone matching stage and of the oscillator are of the same order of magnitude, permitting a convenient change-over from m.c.w. to telephony.

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**Strays**

Hams who are also amateur cinematographers may be interested in participating in an amateur film festival created by K6RWR. Amateur films will be selected for presentation on TV, with panel discussion by professionals from the film industry. For further details, write K6RWR at 210 N. Larchmont, Los Angeles.

During one school year, both WSBWL and KN8BWL were members of the Amateur Radio Club of Shaker Junior High. — WSSLR

KN8GFH tells us that because of his weight (350 lbs.) he announces his call as KN8 Extra Fat Ham.
The "Spacistor"—
A New Semiconductor Amplifier

A new principle in semiconductor amplifiers has been demonstrated successfully in an experimental device developed in the Raytheon research laboratory. The "spacistor," as it is called, is still in the research stage, but would appear to have a number of basic advantages over transistors for high-frequency applications. Its operation and characteristics are more nearly like those of conventional vacuum tubes than is the case with the transistor, although the spacistor is definitely a semiconductor-type amplifier.

Fig. 1 is a schematic of the spacistor. The usual materials such as germanium or silicon can be used for the body of the assembly, and a small pellet of indium is fused into the body to form a junction similar to that in a junction-type transistor. The collector terminal makes contact with the semiconductor body. A relatively large reverse bias, about 200 volts, is applied between the base and collector so there is a strong electric field but substantially no current in the base-collector circuit. Because of the strong field a small space-charge region forms around the junction, and electrons are introduced into this region through the "injector" contact, by means of a bias voltage applied between the base and injector. These electrons travel to the collector contact (at high speed) so current flows in the injector-collector circuit.

A fourth contact, called the "modulator," is introduced in the space-charge region, and suitably biased with respect to the base and injector. A signal voltage applied in the modulator circuit varies the electron emission from the injector, which compares with the way in which the grid controls the space charge and with it the plate current in a vacuum tube. In further analogy to the vacuum tube, the modulator or input circuit consumes negligible power, but causes an appreciable variation in the electron current, so that an amplified signal can be taken from the collector.

In spacistors that have been constructed so far, the input (modulator) and output (collector) impedances are both of the order of 30 megohms. The input impedance is high enough to be neglected in most applications, just as in the case of negative-grid vacuum tubes. The output impedance is of the order of 10 or more times that of a pentode tube, making the spacistor a truly constant-current device. Values of modulator-collector transconductance (gm) of 100 to 150 micromhos have been obtained in experimental units — small compared with a.c. type tubes but not unfavorable as compared with small filament-type receiving tubes. The interelectrode capacitance is about 0.5 µuf.

It is expected that spacistors will be capable of operating at temperatures several hundred degrees higher than are practical with transistors.

The spacistor is purely a laboratory device at the present time, and there is no indication as to how long it might take to make it a commercial item. It needn't interfere with any of your current plans for using tubes or transistors, therefore — although there's no telling how it may alter the thinking of equipment designers some years from now.

— A. G.
Greater Selectivity with the C.W. Clipper-Filter

A Two-Stage Amplifier with Variable Band Width

BY L. I. ALBERT,* W1PLM

By adding a second stage to the c.w. clipper-filter described in an earlier issue of QST, W1PLM obtains a band width of 200 to 600 cycles at 40 db. down. A simple method of varying the selectivity is included.

The modernized version of the c.w. clipper-filter described by WICUT in QST¹ is an improvement over that originally described by Grammer.² However, for c.w. work on today’s crowded bands its selectivity is still inadequate. A band width of 100 cycles at 6 db. down does not sufficiently attenuate adjacent signals if the band width at 40 db. down is one to two ke.

What is required is a band width of the order of 300 to 500 cycles at 40 db. down.

This band width is easily achieved by means of the audio filter described by WICUT; it only requires the addition of one more stage of filtering, exactly similar to the first stage, and tuned closely to the same frequency.

Inductors

Fig. 1 shows the circuit with the added filter stage. The WICUT technique of using small power-supply chokes was followed quite successfully except that the bar of “I” laminations lying across the top of the “E” laminations was not removed entirely. Instead, 2 to 5 layers of paper were put between the “I” laminations and the bar of “E” laminations and a nonmetallic clamping arrangement, such as shown in Fig. 2, was used to hold the assembly. The inductances, and hence the resonant frequencies, can now be adjusted by tightening or loosening the clamping screws. The Q of the chokes seems to be about

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Fig. 1 — Circuit of the two-stage clipper-filter. All capacitances are in μf. All 0.01 μf. capacitors may be ceramic; capacitors marked with polarity are electrolytic. Others should be tubular plastic or mica. Resistors are 1/2 watt unless otherwise specified. Switch functions are as follows: Position 1, dual filter alone; Position 2, clipper and dual filter; Position 3, clipper alone; Position 4, straight through with cathode-follower output.

CR₁ — 50-ma. selenium rectifier.
R₁ — 6.3-volt pilot lamp.
J₁ — Open-circuit phone jack.
L₁, L₂ — 5-h., 65-ma. filter choke; frame removed and choke remounted as described in the text.
S₁ — 8-p.s.t. toggle switch.
S₀ — 3-section 6-pole 1-position rotary switch, shorting type preferable. (Centralab PA-1020).
T₁, T₂ — Output transformer; 7000-10,000-ohm primary to 3.2-ohm voice coil (Thorlarsen 2855).
T₃ — Power transformer; Half-wave; 125 volts, 50 ma.: 6.3 volts, 2 amps. (Stancor PA-8121).

* 41 Cotter Road, Waban, Mass.
¹ Campbell, "Modernizing the C.W. Clipper-Filter," QST, December, 1956, p. 36.

QST for
Fig. 2 — Sketch showing the method of clamping and tuning the filter inductors. Clamping strips must be of bakelite, phenol, plastic or other suitable insulating material. Metal should not be used.

the same with the air gap increased in this manner as with the "10" laminations removed altogether. Two similar chokes should be used so that their series-resonant frequencies will be close to one another when altered as described.

Circuit

Two changes were made in the switching circuits described by W1CUT. The first position of the switch was changed from filter-clipping to dual filter alone. This seems to offer a characteristic much more useful to this writer than did the filter-clipping characteristic. The receiver output in the straight-through position is connected to the output through the cathode follower. The writer also incorporated in his unit a simple beam power-output stage to drive a speaker.

Characteristics

The selectivity curves obtained from the unit are shown in Fig. 3. The two series-tuned circuits, \( L_1C_2 \) and \( L_3C_4 \), cannot be tuned to exactly the same frequency because excessive ringing results. The two circuits may be tuned about 10 cycles apart, resulting in a very sharp characteristic as shown by Curve 1. A more easily-used characteristic is shown by Curve 2 in which the tuned circuits are tuned about 30 cycles apart. Curve 3 results with the two circuits tuned about 60 to 70 cycles apart and is almost flat-topped, but it still has fairly steep skirts. The notch frequencies, governed by \( L_1C_2 \) and \( L_3C_3 \), were set higher than those used by W1CUT, while the peak frequencies were set to about 700 cycles, an audio frequency more pleasing to the writer than 900 cycles.

It should be mentioned that the 0-dB reference is not the same for the three curves. If the peak of the sharpest curve is taken as 0 dB, the peaks of the progressively less-selective curves fall short of 0 dB, by increasing numbers of dB. In other words, the signal loudness increases with increasing selectivity until limited by ringing. It should also be noted that the response characteristic is effectively broadened by overloading signals. The receiver r.f. gain control thus should be backed off considerably when the desired signal is tuned in; the tremendous gain of the filter at the peaked frequency will allow the desired signal to be easily copied while, in most cases, all other signals will be inaudible. 3

It is immediately evident that variable selectivity is easily obtained by altering the capacitances of \( C_2 \) and \( C_4 \) by means of a two-gang multicontact switch. Capacitance is progressively added at \( C_2 \) and subtracted at \( C_4 \), thereby broadening the selectivity curve while maintaining the center frequency. Fig. 4 shows one simple method of achieving this.

Adjustment

The filter can be aligned with the help of an audio signal generator and a scope. If \( C_2 \) and \( C_4 \) are to be fixed, the procedure is to set the two tuned circuits individually to within 10 to 15 cycles of the chosen peak frequency, but on opposite sides of that frequency. This adjustment can be made by tightening or loosening the clamping screws on each choke until each

3 This is indicative of regeneration which undoubtedly contributes to the selectivity. — Ed.
Fig. 4 — One method of achieving variable filter selectivity. Greatest selectivity is obtained with $S_1$ in Position 1. All capacitances are in µf., and capacitors should be plastic tubular or mica. $C_1$, $C_2$, $C_3$, $C_4$, $L_1$, $L_2$, $T_1$, and $T_2$ refer to Fig. 1.

A circuit is tuned to the desired frequency. Altering the number of layers of paper placed between the "I" and "E" laminations of either or both chokes will allow any two similar chokes which, due to manufacturing tolerances, may be of slightly different inductances, to be tuned to the same frequency. The filter is then ready to go. If the response is too sharp, slightly greater separation of the two frequencies can be achieved by a readjustment of the clamping screws on one of the chokes.

If the switch is to be used to obtain variable selectivity, the procedure is equally simple. With the switch in Position 1, the chokes are adjusted so that the respective series-resonant frequencies are 10 to 20 cycles apart, depending on the desired sharpness in the sharpest position. Then for switch Positions 2, 3, 4, etc., one switch section successively substitutes capacitors smaller by 0.001 µf. in parallel with $C_4$, while the other section successively increases the capacitance in parallel with $C_2$ in increments of 0.001 µf. The resonant frequencies of the two circuits thus move about 10 to 15 cycles farther apart for each succeeding position until the minimum desired selectivity is reached. At about 70 cycles separation, a dip appears in the center of the flat-topped portion of the curve, and at separations beyond 100 cycles this dip in the characteristic is severe enough to limit the usefulness of loss-selective curves.

If no equipment is at hand, the circuits can be tuned by listening tests only. One's own c.w. signal can be used as a substitute for the audio signal generator. There will be no doubt when the two series-tuned circuits become resonant at close to the same frequency.

As mentioned in the original article, symmetrical output wave form depends upon proper choice of resistances in the diode circuit. The values shown were used after checking on an oscilloscope.

The operating difference between a clipper-filter using one tuned stage and one using two tuned stages is like the difference between night and day. The signals pop in and out and are best tuned by means of the beat-oscillator pitch control. Most such controls cover 2 to 3 kc, and are ideal for tuning over a narrow region around your own operating frequency.

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**Strays**

Some of the old timers around the Atlanta, Georgia, area, at a recent meeting, W1AU was elected president and W1KL secretary-treasurer of this Old Timers Club.
The Effect of Capacitance on Power-Supply Filter Bounce

A Discussion of Power-Supply Dynamic Regulation

BY DAVID T. GEISER, WIZEO

- The fact that the output voltage of a power supply decreases with an increase in load current is universally appreciated, but relatively few amateurs are aware of the rather drastic changes in output voltage that can occur when the load is rapidly varied, as in c.w. keying or in s.s.b. work. This article shows graphically how the output voltage is affected by the resonant frequency of a choke-input filter, and how the situation is improved by going to a large output capacitance. The effect of the filter constants on the surge currents that occur when the supply is turned on also is shown.

Load changes affect power-supply output voltages, regardless of the quality of design and components used. Some of the drop in output voltage with an increase in load is caused by rectifiers or resistance, and some of these factors are discussed here; but the most annoying and alarming current or voltage change—and the least well-known—is "bounce" or "resonant response." Resonant response in a power-supply filter is a simple process, and it is hoped this discussion will show how simple it is.

Why Filter a Rectifier?

A rectifier changes alternating current to "one-way" current (not direct current) by choosing paths through the rectifying circuit that only let the output current flow in one direction. The output current may be large or small; it may even be zero if there is no possible path for current to flow in that one favored direction. Half-wave, full-wave center-tap and full-wave bridge (single-phase) rectifiers without filtering all produce zero voltage many times each second. The half-wave voltage peak is more than three times the "d.c." (average) voltage, while full-wave peaks are more than one and a half times the "d.c." voltage, as shown in Fig. 1.

These unfiltered current or voltage waves from the rectifier actually (and mathematically, too, but not here) can be considered to be made up of a constant, smooth "one-way" (direct) current plus several alternating-current waves. If constant, smooth direct current or voltage is wanted, the alternating current waves must be greatly reduced. The best filter reduces the a.c. without affecting the d.c.

Alternating current waves produced by half-wave rectifiers have frequencies equal to whole
numbers (1, 2, 3, etc.) times the supply frequency: such as, 60, 120, 180 cycles per second for a 60 c.p.s. supply. The lowest frequency has the largest wave and is hardest to filter.

Perfect full-wave rectifiers produce alternating currents whose waves have frequencies even whole numbers (2, 4, 6, etc.) times the supply frequency. A full-wave or bridge rectifier powered from a 60-cycle power line will produce smaller amounts of the more easily filtered 120-, 240-, 360-cycle and higher frequency waves. (But one should not forget unbalanced tubes or transformers will produce a 60-cycle wave, in addition, in the output.)

**What's a Filter?**

A filter is a circuit that passes electrical waves...
Fig. 6 — Effect of changing L/C ratio on inrush current to rectifier tubes through choke-input filter. Top: 10-henry input choke followed by 10-mf capacitor; bottom: 10-henry input choke followed by 90-mf capacitor. The scale in these photographs is the same as in Fig. 5. The peak inrush current is considerably larger with the larger capacitance (smaller L/C ratio) and has a greater duration because of the larger LC product. Note also that the small oscillation or overshoot at the terminal end of the transient is practically eliminated with the larger capacitor.

Fig. 7 — Filter resonance effects in output voltage as a load is alternately switched on and off; choke-input filter with 10-henry choke and 10-mf capacitor. Top: load switched at rate of 5 times per second; center: switching rate 15 per second; lower: switching rate 45 per second. The large swing in output voltage in the middle photo is caused by the resonance in the filter, its natural resonant frequency being approximately the same as the switching rate.

in desired proportions. A steady one-way current does not change and can be said to have no cycles per second, so wherever “frequency” is used in the arithmetic, the number zero can be used as the frequency of the steady current.

A filter prevents or reduces passage of electrical waves either by changing the electrical energy to heat in a resistance or by providing a path that will not accept energy from waves of certain frequencies. A wave of any frequency (even zero) loses energy in passing through a resistance, so in a power-supply filter it is usually best to use parts and circuits having as little resistance as practicable. This means that circuits using chokes and capacitors are most efficient in selecting the desired direct current while reducing the accompanying a.c. waves to acceptable levels. Since more than twice as much inductance-times-capacitance (L x C) is required to filter halfwave rectifiers as full-wave rectifiers, only full-wave rectifier filtering will be discussed.

Capacitor or Choke Input?

The most commonly used filter is the capacitor-input type, Fig. 2A, sometimes also called the “brute-force” or pi (π) filter. Good quality input capacitors (the only kind that will work and last in this filter) permit extremely high pulse currents to flow through the rectifier. These currents are limited only by tube drop and power transformer impedance. It is costly to design good life into this circuit.
ing the capacitance to 90 \mu F.

No surge problem exists, of course, if the plate power transformer voltage is turned on gradually and left on. (This assumes that the energy stored in the filter much exceeds the variable demand.)

Load change does affect the output voltage of choke-input filters. Fig. 7 shows the effect on the output voltage of switching a resistive load (Fig. 3) on and off the filter output at 5, 15, and 45 times per second. There is obviously resonance at 15 times per second, in very close agreement with the resonant frequency of the 10-henry inductance and 10-\mu F. capacitor used. Fig. 8 shows an enlarged picture of the 5-times-per-second switching rate.

Increasing the capacitance to 90 \mu F. almost completely removes the overshoot. This is shown in Fig. 9 (5-times-per-second switching) and the Fig. 10 (twice-a-second switching). It is felt that the lower Q at the "predicted" 5-cycle resonance frequency is responsible. High capacitance does remove load bounce from the voltage output.

**Recommendations**

No detailed recommendations can be given — there are too many possible situations — but the following suggestions should be helpful:

Reduce surge currents by turning on rectifier plate voltage gradually and leaving it on. Do not try to find chokes of extreme inductance (at $15 to $30 per watt-second).

Use choke-input filters for medium- and high-power supplies. Use of high capacitance will minimize filter voltage bounce and produce sufficient hum filtering.

Remember that all supplies not electronically regulated will show some voltage change with load. If very stable voltage is required, an automatic voltage control system must be used.

**Acknowledgments**

Thanks are due Harold Churchill of the Signal Corps Engineering Laboratory for asking the question that initiated this investigation. Prior writers in this field shortened the labor by clear reporting and deserve credit. The permission, assistance, experience, and advice of the Sprague Electric Company team has also been essential.
Satellite Tracking

With the publication in this issue of constructional data on antenna systems, the equipment picture for satellite tracking is almost complete. Earlier *QST*'s have covered the requirements in general (July 1956), low-noise converters and preamplifiers (November and December 1956), and a method of antenna calibration (April 1957). There remains the question of recording the signals in a form that will be useful for subsequent processing. This, at first, had the appearance of being a rather sticky problem since the recorders used in the primary Minitrack system are rather expensive items. However, the NRL people have come up with a scheme that eliminates the need for a high-speed ink recorder at the tracking installation, and it now looks as though the recording difficulty can be resolved quite simply.

In essence, the method consists of using beat-tone reception of the satellite signal as in ordinary c.w. practice, and then recording the receiver's audio output with a conventional magnetic-tape recorder. Simultaneously, time ticks from WWV are recorded on the tape for precise timing of the variations in received signal strength as the signal goes through the successive nulls in the antenna pattern. The plan is that stations making such tapes will forward them to NRL where they will be played into an ink recorder of the type used in the primary Minitrack setups so that the final record will be similar to those made by the primary recording stations.

The system has been tested under conditions simulating those to be expected — i.e., a signal of the same strength as is anticipated to be available from the actual satellite — with excellent results. Final records obtained in this way compare very closely in all essential details with records made simultaneously on the same signal by a primary-type recorder. Making the tape recordings offers no technical difficulties, and any of the commercially-available tape recorders should be satisfactory.

Getting back to the antennas, the installations described by Messrs. Easton and Firor are electrically similar but differ a good deal constructionally. A principal consideration in the NRL design was mechanical ruggedness as a contributing factor to electrical stability and thus to high accuracy in taking bearings. This leads to somewhat more costly construction but should represent a good investment where wind and weather are likely to be adverse. In locations where the weather is more favorable less expensive construction may be quite adequate. Dr. Firor's antenna, incidentally, was designed originally for tracking of radio stars and the essentials of the complete receiving system for that purpose are covered in his article. Star tracking could be a fascinating activity for amateurs who have the necessary ground space and the inclination to get off the beaten track. There isn't any greater DX to be had!

**Minitrack Calibration by Moon-Bounce Signals**

The antenna system for a satellite tracking installation has to be calibrated on an actual signal if the highest possible accuracy is to be achieved. Various calibration methods have been proposed and used from time to time, ranging from airplanes and balloons carrying 108-Mc. transmitters on special flights to using radio "stars" (*QST*, April, 1957) as the calibration-signal source. Now, in a joint announcement from the Naval Research Laboratory and the U.S. Army Signal Engineering Laboratories, it is stated that signals reflected from the moon have been used successfully for Minitrack calibration.

For from being just a stunt, moon-reflected signals offer a practical way of covering a large portion of the Earth's surface, and plans are under way for making "moon-bounce" a primary source of calibration for Minitrack stations. To this end a high-power 108-Mc. transmitter is being constructed and should be undergoing testing by the time this appears in print. The NRL-SEL experiments were carried out with SEL's "Diana" transmitter, which would not be usable for calibration of a regular Minitrack installation because Diana's frequency is 151 Mc. Special receiving equipment designed for the latter frequency was used in the NRL-SEL tests, but the output and recording circuits were of the regular Minitrack type.

It is expected that when the 108-Mc. transmitter is in operation — the target date is October — its transmitting schedules will be made available to operators of Mark II Minitrack installations. If practicable, they will be published in *QST*. Whether or not you can participate in the satellite-tracking program, a good 108-Mc. converter will give you a start toward hearing signals both from the Earth's most prominent natural satellite and from the man-made "moons" to be launched during the coming year.

**Preliminary Satellites**

Plans are afoot for launching a number of "practice" satellites in advance of the first attempt to launch the regular satellite already scheduled for IGY, according to articles in the newspapers as we go to press. More on this next month.

—G. G.
For the Sun, the Radio Stars, and the Earth’s Artificial Satellite

A Radio Telescope

BY JOHN FIROR

The antenna system described here is a type suitable for tracking the Earth Satellite, provided there is sufficient spacing (500 to 1000 feet) between elements. The receiving method discussed has been developed to separate star noise from ordinary background noise and, while it could be simplified a bit for the c.w. signal to be transmitted by the satellite, is well suited for calibrating a satellite-tracking antenna as described in April QST.

Fig. 1—Reception patterns of radio interferometers. In A the two antenna elements are connected together with equal lengths of transmission line. The resulting pattern has a maximum in the plane of symmetry of the two elements. In B the two elements are connected together out of phase, resulting in minimum sensitivity in the plane of symmetry.

One of the simplest methods of detecting radio sources in the sky, whether astronomical or artificial, is by use of a radio interferometer. The system to be described in this article is similar to systems used by radio astronomers in various parts of the world during the last ten years for detecting radio stars and measuring their positions, as well as for studying the radio emission from the sun.

An antenna consisting of two elements (where each “element” may be a dipole, Yagi, or other array) separated by several wavelengths will have a pattern which is broken up into many lobes. For example, the antenna shown in Fig. 1A will have a pattern somewhat like that shown above it. The envelope of the pattern (dotted line) is determined by the elements at each end of the system, while the angular spacing of the lobes is determined by the spacing of the elements (length $d$ in Fig. 1A). The angle between the centers of two adjacent lobes is about $60 \lambda / d$ degrees, where $\lambda$ is the wavelength measured in the same units as $d$.

If we add an extra half wavelength of transmission line to one side of the antenna system, as indicated in Fig. 1B, the pattern will be similar to Fig. 1A, but the lobes will all be shifted in angle by half of their width. The envelope will be unchanged. This new pattern is also pictured in Fig. 1B. If we further arrange to put in and take out this extra half-wave length of line, we can switch between the two patterns of Fig. 1. A radio star, satellite, or other source which is at a maximum of the pattern when the half-wave-length section is out will be at a minimum when the extra piece is in. If we then switch the half-wave-length section in and out at a rate of, say, 1000 times a second, the output of the receiver will contain a 1000-cycle component caused by the presence of the radio star or source. The 1000-cycle modulation on the signal easily can be amplified and detected and used to indicate the presence and position of the radio star. The position is obtained from the phase of the 1000-cycle modulation relative to the switching cycle.

Antenna Considerations

Now the question arises as to what sort of antenna-receiver combination we can build to do all this. First we will take a look at the antenna. It is possible to detect the sun and several radio stars with an antenna consisting of just two half-wave-length dipoles at any frequency from about 15 Mc. up to well above 108 Mc., the satellite frequency. In Fig. 2 is an actual record from a pair of dipoles and a receiver such as we will describe, operated at 108 Mc. The record shows the up-and-down variations of the receiver output as the rotation of the earth carries the sources through the lobes of the source.

* Carnegie Institution of Washington, Department of Terrestrial Magnetism, Washington 15, D. C.

1 Record kindly supplied by Mr. H. W. Wells of the Carnegie Institution.
(A) A record of two radio stars and the sun made with an interferometer consisting of two half-wave dipoles and a 108-Mc. receiver. At the left the up-and-down variations are due to the strong radio star in Cygnus passing through the lobes of the antenna pattern. Near the center of the record the even stronger source in Cassiopeia has entered the antenna pattern and is adding its influence to that of the Cygnus source. At the right the sun takes over.

(B) A record of the same two radio stars as in A but with higher-gain antennas. In this case the two stars are completely separated and can be studied individually. The source pattern near the center is Cygnus A and the one to the right is Cass A. Several weaker sources can also be seen. The antenna elements in this case were four-in line dipoles in a corner reflector.

Fig. 2

antenna pattern. At the left end of the record are variations caused by the strong radio source in the constellation of Cygnus. Near the center of the record the Cygnus wiggles become confused with wiggles caused by the even stronger source in Cassiopeia. At the right the sun takes over and dominates the record. One can see from this record the disadvantage of using a single dipole for the antenna element or, in fact, using any type of element which gives a broad envelope to the antenna pattern. Several radio stars can be in the over-all antenna pattern at one time, resulting in a somewhat confused record. The second record in Fig. 2 indicates the improvement achieved by using higher-gain antennas (sharper pattern). Here the two strong radio sources are completely separated and can be studied individually.

An antenna which will provide enough gain for picking up the rather weak signals from the satellite can be made of two 8-dipole broadside arrays spaced as far apart as the available ground will permit. Fig. 3 shows the arrangement as seen from above. Each dipole is supported by two posts driven or set in the ground and backed up by a simple ground screen. The dipoles themselves are folded half-wave dipoles constructed of ordinary TV Twin-Lead.

Fig. 4 gives the details of the construction, and Fig. 5 diagrams a feeder system to get all eight dipoles connected in parallel. It is important that all the dipoles be phased correctly—that is, the leads to the north ends of all the dipoles are connected together and the leads to the south ends are all connected together.

For the long transmission line connecting the two arrays to the receiver, 450-ohm open-wire line is convenient and sufficiently low loss. If the commercial variety is used, remove most of the separators, leaving only one every four or five feet. This procedure seems to make the line less sensitive to moisture. For a nicer line, No. 14 wire stretched tight and supported only every thirty or forty feet works well. For 450 ohms, the No. 14 wire should be spaced about 1.4 inches. This type of line has been used on arrays up to 2000 feet long at 300 Mc. and has proved satisfactory except when rain is actually falling.

Fig. 3—Arrangement of possible interferometer as seen from above.

Fig. 4—Construction details of antenna.
At the center of the line two baluns must be used to put the signal into coax for entering the house, shed, shack, or what have you. The arrangement near the center is shown in Fig. 6. The arrangement as shown is slightly mismatched at the balun. If better matching is desired, the spacing of the open wire line could be gradually decreased during the last 30 or 40 feet so that it is about \( \frac{1}{2} \) inch at the balun.

The two arrays should be placed on as accurate an east-west line as can be determined with the available equipment. Furthermore, all the dipoles should be at the same level. Although interferometers not built on east-west lines or not level can be used, it is much harder to analyze the final measurements and determine the position of the satellite.

In the simplest case, when the interferometer is both level and on an east-west line, the central lobe of the antenna pattern lies on the meridian. That is, the maximum response of the pattern coincides with a line in the sky passing through the north pole, the point directly overhead, and the point directly to the south. From the output record one can measure the time at which the

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**Fig. 7**—Block diagram of a phase-switching radio interferometer.
Receiving Equipment

A block diagram of the receiver to be used with this antenna is shown in Fig. 7. Most of the items are well known and need little description. The r.f. amplifier can be any of the low-noise preamplifiers which have been written up in QST. Our preference is a 6AN4-6AX4 grounded-grid model similar to that described by Simas. But do not work too hard for that last db of noise figure. The sky contributes about 10 db of noise, so any preamp with a 4-db noise figure is good enough. The oscillator for the mixer must be crystal controlled.

The i.f. amplifier and detector are standard items and could be a good communications receiver. The gain needed is about 120 db, for r.f. plus i.f. when observing the satellite. About 10 db less will do for the radio stars. The i.f. band width should be 10 kc, for the satellite and as wide as possible for the stars. Probably one will be limited by interfering stations to a 100-ke band pass.

The narrow-band audio amplifier is just an audio stage with a voltage gain of 100 or so and a simple L-C filter to limit the band pass to the neighborhood of the switching frequency. This could be part of a communications receiver.

The switch-frequency generator is an audio oscillator with two push-pull outputs, one of which can be shifted in phase relative to the other. One of the outputs needs to be pretty husky and will be mentioned again.

Phase Switching

The phase switch, or the unit that puts in and takes out the extra half-wave length of line, is an item which will be new to most hams. However, it can be made simply, and in Fig. 8 a form of phase switch is shown which is mostly pieces of coaxial cable either $\frac{3}{4}$ or $\frac{5}{4}$ wavelengths long. The actual switching is done by two high-conduction crystal diodes. The switch is built on a sheet of copper or aluminum, and the braid at each end of each length of coax is strapped or soldered to the sheet. The photograph (Fig. 9) shows the type of construction used. To provide the rather large switching current required by the diodes (50 ma.), a circuit such as that shown in Fig. 10 will be needed to amplify the output of the audio oscillator.

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Fig. 8—Diode phase switch. RFC is self-resonant at 108 Mc.

Fig. 9—Photograph of a phase switch similar to that shown in Fig. 8, but for higher frequency. Picture shows method of clamping coax to copper sheet near connector (upper right) and near diode (center). The plastic trimmer capacitor in the photo serves the same purpose as the 100-μuf. capacitor in Fig. 8.

The operation of the switch can be understood if it is remembered that a short looks like an open when seen through a quarter-wave-length piece of transmission line. So when one of the diodes is conducting (for example, the diode at \( a \) in Fig. 8), it appears open as seen from \( b \). Hence, the signal can pass from input to output along path \( dbe \). The other diode is open and so appears as a short at \( c \). This short in turn appears as an open at the input and output and does not interfere with the signal on the other side. When the switching signal changes over, the r.f. signal changes to path \( dce \), which is a half wave length shorter.

![Fig. 10—Driver for diode phase switch. The bias on the 6AS7G triode sections is adjusted to cutoff by means of the 100K potentiometers, with no input from the switch-frequency generator. A push-pull square wave having a peak-to-peak amplitude of about 30 volts is needed for excitation of this circuit. D.c. coupling to the source is not required.](image)

![Fig. 11—Phase-sensitive detector and meter driver. Resistors are \( \frac{1}{2} \) watt. The reference signal (push-pull) should have a peak-to-peak amplitude of about 30 volts, and is taken from the switch-frequency generator. Its phase should be adjustable in order to compensate for phase shift in the receiver amplifier.](image)

The other unusual item is the phase-sensitive detector, or the device that tells us whether the source is near a maximum of the antenna pattern in Fig. 1A or of the pattern in 1B. This circuit, Fig. 11, can be seen to be a switch which turns the output of the receiver on and off in time with the phase switch. The reference signal to the phase detector, although derived from the same source as the switching signal, of the i.f. amplifier. This is the easiest way to tell when you have interference problems, an oscillating preamp, or other troubles. When the receiver is working properly, the steady swish of noise should be heard. Dig out your July, 1953, copy of QST and build yourself a simple noise generator and use it frequently to check the noise figure of your preamp and the over-all behavior of your receiver.

A Few Hints

It can be seen from the above description that building an interferometer, although not requiring any unusual techniques or parts, is still a fairly large job. Probably the hardest part will not be finding or building the components, but in securing satisfactory operation from all of the components connected together. A few comments are then perhaps in order to try to smooth the path as much as possible.

Things work much better if they have stable supplies of plate voltage and filament voltage. Get out The Radio Amateur's Handbook and build a few regulated plate supplies. Invest in a Solax or other regulating transformer for the filaments. If at all possible, keep the receiver in a room in which the temperature does not vary widely. When looking at radio stars the exact frequency does not matter, but for the satellite the receiver should be tuned to 108 Mc. within a kilocycle or so. This means that if you build the converter or mixer to go with the receiver, the oscillator must be crystal controlled. In order to be sure the receiver is tuned correctly, a 100-ke. frequency standard could be used to calibrate a stable v.f.o. at 27 Mc. The fourth harmonic of this oscillator can then be used to line up the receiver to 108 Mc.

Keep a speaker attached to the detected output.
THE COMPONENTS required for a Mark II Minitrack interferometer base line are the antennae, transmission line and the hybrid junction. Since the main cost of a satellite tracking system may be in these components and since the better stations will have at least two base lines, much work has gone into making components having the desired quality yet which are reasonably inexpensive.

The most expensive single component is the antenna. The problem is that the antenna must fulfill a large number of requirements. It must be unaffected by wind and weather. It must provide high gain yet have a broad beam in one direction so a large number of satellite transits can be recorded. To provide a gain of about 50 an eight-element broadside array has been designed. It can be extended to any larger number of dipoles as desired. Extending the length of the antennae reduces the beam width only in the direction of the extension, so the gain can be increased as desired without changing the width of the broad antenna beam.

The Antenna

Another antenna requirement is that the gain of side lobes, back lobes and at the horizon be so low that ground-reflected signals from the satellite will not interfere appreciably with the direct signal. This requirement is the most limit-

![Figure 1](image)

**Fig. 1** — Ground-reflected signal response combines with the desired response to introduce a phase error in the resultant signal as shown in this vector diagram.

ing from an antenna design point of view. It can be analyzed approximately in the following manner:

First, the system error that can be tolerated must be determined. The error in the antenna system is given by the following equation:

\[ \text{Sin of error angle} = \frac{\text{Antenna phase error}}{\text{Base line in electrical degrees}} \]

A 100-wavelength base line contains 36,000 electrical degrees. To have an error of less than 20 seconds of arc (approximately equal to 0.0001 radian) the tolerable antenna phase error is 3.6°. If this is considered to be an r.m.s. error — that is, half of the time it will be less and half the time more than 3.6° — the maximum phase error will be 3.6° \( \times \sqrt{2} \) or 5.0°. In each of the two antennae

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**Constructional Details of Antenna System for Satellite Tracking**

BY ROGER L. EASTON *

comprising the system the error can be as great as 5.0°/\( \sqrt{2} \) or 4°.

Fig. 1 shows the geometry of the problem. The error vector can have any phase with respect to the signal so that angle \( \theta \) can have any value less than the maximum angle shown.

\[ \begin{align*}
\theta &= \arcsin \left( \frac{\text{error vector}}{\text{signal vector}} \right) = \frac{\text{error voltage}}{\text{signal voltage}} \\
\text{error} &= \frac{\Delta}{57.3} = 0.07 \text{ in voltage. The power ratio is 0.005 or 23 db.}
\end{align*} \]

Since the interfering signal that is responsible for the error must be a reflected component, the reflection coefficient of the ground is important. This coefficient may be as low as 0.35 for dry soil, but is about 0.5 for ordinary soil and is 0.96 for salt water. If the value of 0.5 is taken the error signal is reduced to half. The maximum desired-response to side-lobe ratio can be as low as 17 db. under these conditions.

Two types of arrays have been investigated — collinear and broadside dipole arrays, both over ground screens. The difficulty with the collinear array above the ground screen is that the theoretical pattern perpendicular to the array axis is realized only for an infinite ground screen, because the dipoles comprising the array have no directivity in this plane. The broadside array has the advantage that the dipole elements have directivity in the plane perpendicular to the array. A true null then always appears at the ground screen, even when the ground screen is so small that ground effects are present.

The Dipole Element

The dipole element should be rigid, easily

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This article gives the construction details of the antenna system for the Mark II Minitrack, the general principles of which were discussed by Mr. Easton in his article in July, 1956, *QST*. That article should also be consulted for over-all site and installation requirements.
tuned, and simple to manufacture. After several types of matching devices had been investigated the gamma-matched dipole was selected for further study because of its inherent simplicity and rigidity.

The simplest type of gamma-matched dipole, shown in Figs. 2 and 3, is inherently unbalanced. The unbalanced dipole would be expected to have a "squint" or "lean" to its pattern in the plane of the dipole, the direction of the squint being on the same side as the feed loop. However, the measured response in the plane of the dipoles at the ground screen, although unsymmetrical, is at least 10 dB below the maximum response, so it is satisfactory from an interference standpoint.

More important than squint would be currents on the vertical support rod. Negative results were obtained on pattern measurements run to determine if radiation existed due to support-rod currents.

Construction of the dipole is quite simple. It consists of three pieces of standard galvanized pipe and a standard tee modified as shown in Fig. 2. The only machine operation needed, outside of drilling holes, is the flat on the tee where the UG-58A/U socket is mounted. This can be made conveniently in a lathe or by a mill, but can also be made with a file. The capacitor is soldered to the cable socket terminal before the external brass tube is soldered to the socket frame. Either an insulating tube or several turns of insulating tape can be placed around the capacitor to prevent its shorting to ground. If it is felt to be necessary, the entire metal tube can be filled with silicone grease. The solid block of Lucite insulation effectively centers the brass tubing. The top of the capacitor is sealed by means of the pipe cap threaded to the capacitor base and by the pipe cap at the top of the nipple. The parts for this dipole element should cost less than $7.00.

Probably the most rigid and simple means of
supporting the dipole is by embedding it in a concrete pier as shown in Fig. 2. To permit threading the coaxial cable through the vertical tubing an opening to the outside of the pier must be provided. This opening can be made in a number of ways. A greased block which can be removed when the concrete has set is one means. Another is a curved or angled tube which extends to or through the form boards. These form boards should be extended as shown in Fig. 4 to hold the wiring together and soldering, every few inches.

To eliminate the soldering problem the radiators can be placed a standard chicken-wire roll width apart so that the screening strips can be easily placed parallel to the dipoles. Such a configuration can be built conveniently by placing the dipoles an even six feet apart. The screen should be supported and stretched so the sag is less than 1/2 inch.

**Junction Box**

Before the screen is built the transmission lines to all radiators should be installed. There are several ways that the feed structure can be built. One is the common "corporate structure" in which lines to two elements are joined and matched impedancewise, then a line from a similar junction is joined to a line from the first junction and so on until all elements are fed from a single source.

A method that appears simpler is proposed for this antenna. Here the feed lines to all elements diverge from a single junction box. For this system all lines must be electrically equal but may vary in length by multiples of full wave lengths. If the total line lengths from the junction box to the antenna feed points are made an odd number of quarter wave lengths then all the antenna currents will be equal, irrespective of mutual coupling effects.

The transmission line used to join the radiators to the junction box can be RG-8/U, RG-9/U or metal-covered solid-dielectric line (e.g., Amphenol 21-600). The aluminum-covered line is preferable for this use but RG-8/U is probably adequate.

Fig. 6 shows the construction of a junction box for an eight-element array. For arrays having more elements more feed points must be provided and the impedance of the quarter-wave matching transformer must be reduced.

**Antenna Matching**

Because of their mutual coupling, all elements except the one being matched should be connected to the junction box while matching the elements, and each element should be adjusted individually. A convenient bridge for finding the best impedance match is shown in Fig. 7. Details
of making the hybrid will be given later in this article. With the hybrid bridge the antenna capacitor is adjusted until a null reading is obtained on the detector. Then the standing-wave ratio can be read using a standing-wave indicator, if available.

When all the dipoles are matched they should all be connected to the junction and the impedance looking into the junction measured. The V.S.W.R. at this point should be held to less than 1.1 to 1 if the antenna calibration is to be by surveying alone. Even if other calibrating means are available the V.S.W.R. should be kept as low as practicable. To achieve this V.S.W.R. it may be necessary to make small changes in the characteristic impedance of the matching transformer in the junction box.

**Transmission Line and Hybrid**

The transmission line joining the antennas to the hybrid junction must be independent of noticeable phase variation due to weather and must have low attenuation and negligible radiation. Since long lengths of it are required its cost should be nominal. The open-wire line shown in Fig. 8 appears to fulfill these requirements adequately.

This line is made of No. 8 wires. For extra strength, machine-straightened copper-covered steel wire was chosen. This wire costs about two cents per foot. The unstraightened wire costs about 10 per cent less but requires considerable stretching to eliminate kinks. The stretching process is troublesome and dangerous.

The selection of characteristic impedance for the line involves a compromise. A low-impedance line will give poor line pickup but will also have higher attenuation. The impedance of a high-impedance line will be less affected by motion in the wind.

With No. 8 wires a line spacing of 1.8 inches gives an impedance of 400 ohms. The pickup on this line is independent of line length and was measured as being 26 db, below that from a dipole. Since the antenna gain is perhaps 14 db, above a dipole the satellite signal picked up by the line will be negligible (-40 db.) compared with the signal.

Although balanced transmission lines having balanced line hybrids have been built for phase
Fig. 9 — J-type balun. This should be made with solid-tube-type coaxial line.

For comparison purposes, it is preferable to build the hybrid from coaxial line. The transmission line is matched to 50 ohms at both ends. A quarter-wave matching section made up of two 3/16-inch quarter-wave capped tubes slipped over the wire as shown in Fig. 8 matches the line to 200 ohms. The J-type balun shown in Fig. 9 matches the 200-ohm balanced impedance to 50 ohms unbalanced. For best weatherproofing the balun should be supported so its loop extends above the transmission line.

The steel-covered copper wire will support itself for at least 500 feet. If a 1000-foot base line is used the two lengths of line should be made equal before installation. The spacing of the wires can be kept uniform by using spacers built as shown in Fig. 10. Spacers placed every 30 feet or so appear to keep the line spacing satisfactorily uniform.

It appears advantageous to terminate the transmission lines at the center of the base line and to transform to unbalanced line before adding the signals in the hybrid. A termination pole at the center will in addition permit the use of several base lines all having the same centers.

The Hybrid

Fig. 11 shows a hybrid that has proven to be satisfactory. The ring is made of 70-ohm cable (preferably double shielded) and the antennas are connected to A and C. B then has a null output when the signals at the antennas are out of phase and D has a null output when the antenna signals are in phase. Fig. 12 shows the measured isolation between arms B and D with matched loads on A and C as a function of frequency.

Fig. 12 — Measured isolation in a hybrid junction of the type shown in Fig. 11.

Acknowledgments

A large number of personnel have helped in the design of these components. Among them are Dr. Robert J. Adams, Louis D. Breetz, M. G. Dennis, Lawrence L. Gasch, J. A. Kaiser, Paul A. Lautz, Robert M. Porter, Dr. Alan J. Simmons, and Martin J. Votaw.

Strays

W2FW found a new source of surplus radio gear — his local junk yard has all sorts of bargains.

September 1957
The monitoring oscillator installed in a Viking Adventurer. The NE-2 neon bulb and R3 are mounted on a tie-point strip to the right of the lower filler capacitor and the two capacitors in the monitor circuit are supported by the strip and the key jack. The voltage divider resistors, \( R_1 \) and \( R_2 \), are mounted in the power-supply section on existing terminals.

While there are some exceptions, most c.w. operators find it difficult to send their best code without monitoring the keying. Commonly the listening is done on one's own receiver, which when working someone on the same frequency presents no problem except proper juggling of the gain control. The crystal-controlled Novice doesn't want to limit his operations to those few frequencies for which he owns crystals, but in jumping back and forth with his receiver he runs the risk, in the crowded bands, of losing the other station. What the Novice, or anyone else, can use is a device that will permit the user to hear his sending regardless of the setting of the receiver. The keying monitor circuit shown in Fig. 1 is such a gadget.

This unit is designed to work with any cathode-keyed transmitter. If the reader doesn't know how his transmitter is keyed, a look at the diagram of his rig will bring the answer. It should be mentioned right now that the tone output of this device duplicates your fist, but is not a replica of the signal on the air.

**Operation**

The monitor is a neon bulb, audio-frequency oscillator connected to the keying circuit in the transmitter. Voltage for it is taken from the transmitter power supply through a voltage divider \( R_1 R_2 \). The headphones are permanently connected both to the oscillator and to the receiver. When the key is closed, the oscillator generates a tone that is heard in the phones. The receiver can be switched to stand-by or left on, depending on the station controls. However, if the receiver is left on and the station being worked is on or very close to the operating frequency, then the monitor tone is likely to be drowned out by the receiver output. When the key is open, the neon bulb extinguishes and the audio oscillation stops, so received signals are heard as usual. High-impedance headphones must be used.

**Construction**

The monitor can be mounted as a separate unit with interconnecting leads to the receiver and transmitter. We preferred to mount it in the transmitter because then the only external leads needed were those to the receiver headphone jack. Practically any transmitter will have adequate space for mounting the few components.

The accompanying photograph shows the installation in a Viking Adventurer. Similar techniques can be followed with other transmitters. An open circuit-jack, \( J_1 \), was mounted on the panel between the dial light and the power switch. A tie-point strip was used for mounting \( C_1 \), \( R_3 \), and the NE-2 neon bulb. A length of

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"Simplest" is an often overworked word in QST titles, but its use seems to be justified in this article. Here W1ICP shows how to add a "sidetone generator" (as they say in the ads) to any cathode-keyed transmitter, at a small outlay that is guaranteed not to break you.

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*Technical Assistant, QST."
shielded wire was used to connect from \( C_2 \) to an RCA type phono jack mounted on the back of the chassis. The phono jack \( J_2 \) is used for the connecting lead from the headphone output of the receiver. A length of shielded wire with a phono plug at one end and a standard headphone plug at the other makes up the connection between the transmitter and receiver.

The voltage needed to operate the monitor is obtained from a voltage divider, \( R_1R_2 \). The values for \( R_1 \) and \( R_2 \) for some of the transmitters in current use are given in Table 1. In cathode-keyed rigs other than those listed the values of \( R_1 \) and \( R_2 \) must be found by experiment. A simple method for doing this is to use a two-watt, one-megohm potentiometer (rated to carry two watts or more) as a voltage divider. One side of the potentiometer is connected to the B+ line and the other side to ground. The voltage for the monitor is taken from the arm (center terminal) of the potentiometer.

The adjustment of the potentiometer is simple. Turn on the rig but leave the key open. If a signal from the monitor is heard with the key open, adjust the potentiometer to the point where the monitor shuts off. Close the key and the monitor should be heard. If desired, the potentiometer can be mounted in the transmitter and used as the voltage divider. Otherwise, the resistance values each side of the potentiometer arm can be measured with an ohmmeter and one-watt resistors substituted for the potentiometer.

There are a few things we have pointed out in the past that bear repeating here. Always be careful in working around “live” circuits. When making connections or mounting components in the transmitter be sure the rig is turned off. As mentioned previously, the monitor will only work with high-impedance headphones. The receiver can be left on or switched to stand-by when transmitting, depending on how the user likes to operate.

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**Strays**

**I’ve Been Hamstrung**

Holy smokes and Goodness sake, I just received a card that made me shake. You say my subscription to QST has just run out, Oh woe is me

Rectifiers are red, and condensers are blue, QST how I would miss you
Your pages are crammed with the latest dope, Could I do without you, the answer is NOPE

I’ve got standing waves all over the place, And my VFO is starting to race
Things are in rough shape as you can see, And the only thing that helps is QST

Please find enclosed four hard earned bucks, Flying to you with the speed of ducks, I’m a busy post as you can see, But renew my subscription to QST?

— W05XU

W3PGB recently participated in an all-continent roundtable in which the roll was called and acknowledgements received in just one minute and 25 seconds. Stations in on the feat included FTAC, HZ1AB, ZS6KD, KI6ERU, XW5FL and W7D8O.

A few months ago we published a brief Stray about a W6 who worked a couple of successive call signs on successive QSOs. Since then we’ve been swamped with letters and cards reporting similar coincidences. Okay, fellows, we surrender — it isn’t as rare as we thought it was!

Mr. Ohms of the General Electric Co. is secretary of the Detroit chapter of the IRE Professional Group on Vehicular Communications.
The Viking “Valiant”

With power-input ratings of 275 watts on c.w., and s.s.b. (p.e.p. with auxiliary exciter), and 200 watts on a.m., the Viking “Valiant” fits into the gap between the “Ranger” and the “Five Hundred.” Both mechanical and electrical designs follow closely those established in other “table-top” units of the Johnson line, with modifications to suit the power level.

The “Valiant” covers all bands, 160 through 10-meters, including the 11-meter band on a separate band-switch position. The pi-network output circuit is designed to handle antenna loads of approximately 25 to 2000 ohms at frequencies above 7 Mc., and 50 to 500 ohms on the lower frequencies, with enough additional latitude to compensate for several thousand ohms of antenna series reactance. A time-sequencing system provides chirp-free break-in keying with adequate envelope shaping to minimize clicks. The a.m. modulator includes an adjustable clipper-filter, and provision for push-to-talk operation with control for an external antenna relay. Provision is also made for s.s.b. exciter input (3 to 4 watts p.e.p. across 50 ohms at the output operating frequency). An outlet at the rear of the transmitter affords access to the high- and low-voltage supplies, filament supply and modulator output for the operation of other gear, such as a v.h.f. transmitter.

R.F. Section

The tube arrangement is shown in block form in Fig. 1. A 6AU6 series-tuned v.f.o. with a broad-banded output circuit drives a 6CL6 buffer-doubler whose plate circuit is also broad-banded. This stage can be switched to serve as a grid-plate crystal oscillator. The 6CL6 drives a capacitive-bridge-neutralized 5763 buffer-multiplier having a conventional tank circuit with a separate panel tuning control. The screen of this stage is on a potentiometer so that the excitation to the final may be adjusted from the panel. The final has three 6L6s in parallel and a pi-network output circuit. This stage is also neutralized by the capacitive-bridge method. Interstage coupling is capacitive.

Bandswitching System

A single panel control performs all bandswitching functions. A three-position switch, cam-operated from the band-switch shaft at appropriate intervals, selects one of two basic v.f.o. frequency ranges — 1.75 to 2 Mc. for the 100- and 80-meter bands, or 7 to 7.42 Mc. for all higher-frequency bands. The third switch position adds a small pad that lowers the high-frequency range of the v.f.o. to cover 6.725 to 6.84 Mc. for 11-meter output. The basic frequency ranges are provided by two entirely separate temperature-compensated LC circuits with the tuning capacitors ganged. The illuminated v.f.o. dial has a calibration mark every 10 ke. on all bands.

The broad-banded output circuits of the v.f.o.
and 6CL6 are made up of combinations of fixed inductances loaded with resistance, selected by the band switch. The v.f.o. output plate circuit is on 160 for 160- and 80-meter operation and the 6CL6 operates as a straight amplifier on all bands except 10 and 11 meters where it doubles frequency.

The 5763 has a two-section tank coil tapped at appropriate intervals. It works as a straight amplifier on 160 and 40 meters, as a tripler to 21 Mc, and as a doubler on the remaining bands. All unused portions of the tank coil are shorted out.

In the pi-network output tank, the coil is in three sections with taps for the various bands. All unused portions are shorted. The variable tank capacitor is a 120-μuf-per-section splitter unit. On 160 and 80 meters, the two sections are in parallel and are padded with a series-parallel combination of four 600-volt silver-mica fixed capacitors totaling 330 μuf. On 40, one section of the variable is used in shunt with a second series-parallel combination of fixed capacitors totaling 150 μuf. On all higher frequencies the tank capacitor is one section of the splitter variable with no padding.

On the output side of the network, a 360-μuf variable is connected permanently in the circuit. A switch with a separate panel control adds fixed mica units as required.

**Crystal-V.F.O. Switch**

This switch has four positions — two for crystal operation, one for v.f.o. operation and one for setting the v.f.o. to frequency. For the first two positions, select one of two crystals (or a multiple-crystal plug-in unit) that may be plugged in through an opening in the panel. This opening is normally covered with a snap-in dummy knob to preserve shielding and panel symmetry. In either of the two crystal positions, the v.f.o. cathode circuit is opened and the v.f.o. output disconnected from the 6CL6 grid. There is an r.f. choke and feed-back capacitor permanently connected from the 6CL6 cathode to ground and the switch adds the other feed-back capacitor from grid to cathode to complete the grid-plate crystal-oscillator circuit. Crystals in the 160- or 80-meter bands may be used for 80-meter output, 80- or 40-meter crystals for output on 40, and 40-meter crystals are required for the remaining bands.

In the v.f.o. operating position, the switch establishes the v.f.o. connections, removes the 6CL6 grid feed-back capacitor and short the cathode choke and capacitor. The circuit is essentially the same when the switch is turned to the position for setting the v.f.o. to frequency,
Bottom view of the Viking "Valiant." The band switch is at the center. The shield encloses the switch section for the 6CL6 and the 5763, and the highest-frequency coils for these two stages. The micro capacitors connected to the bottom switch section are the pi-network input padders. The cam operating the v.f.o. crystal switch is immediately above the shield box.

The switch gang at the upper left is the mode switch. The pi-network output padders switch is to the right of the shield. Still farther to the right is the pi-network output variable. The high-voltage filter choke is in the lower left-hand corner, below the p.t.t. relay. The one in the low-voltage supply is at the right, below the driver transformer. The small coils at the bottom to the left are in the TVI filters in the a.c. input line and in the leads to the jack for an external antenna relay. Those to the right are in the TVI filters for the auxiliary power outlet. The small shield partition in the lower right-hand corner encloses the microphone and key jacks. Controls visible on the panel, from left to right, are for the low-voltage power switch, oscillator switch, mode switch, exciter tuning, v.f.o. tuning, band switch, final tuning, output padders, excitation control, output variable, clipping level, audio gain, and high-voltage power switch.

except that the key is shorted making it unnecessary to hold the key closed while setting frequency.

**Keying System**

The time-sequence keying system employs a 12AU7 to control blocking bias voltages to the v.f.o., 6CL6 and 5763 grids. The blocking voltage acts to turn the oscillator on an instant before amplifiers are keyed and to turn it off an instant after the key has been opened. The interval can be adjusted to the point where a breaking station can be heard between dots. The final, which is not keyed, is protected by a combination of fixed bias and a 6AQ5 triode-connected limiter which holds the plate current down to 10 ma. when the key is opened or the excitation otherwise removed.

**Audio Section**

A two-stage preamplifier using a single 12AX7 provides adequate gain for a crystal or high-impedance dynamic microphone. Provision is also made for 500-ohm line input to the cathode of the second stage. The gain control is at the grid of this stage. The microphone input jack carries connections for a push-to-talk switch which operates a relay that closes the key circuit, turning on the exciter, and also closes the primary circuit of the high-voltage transformer.

The preamplifier is followed by a clipper-filter using a 6AL5 dual diode. The clipping level — up to 20 db. — can be adjusted from the panel. The filter restricts the audio-frequency range principally to a band between 250 and 3000 cycles. The filter is followed by a third audio stage using a 6C4 which feeds the 12AU7 driver with its triodes in parallel. The driver is transformer-coupled to the 6L46 Class AB2 modulator.

**Power Supply**

The power supply is in two sections. One, using 806s and a single-section choke-input filter, supplies 620 volts for the plates of the final and
modulator tubes and, through dropping resistors, voltage for the screens of the final and modulator. The primary of the plate transformer of this supply is shunted by a connector at the rear for control of external 115-volt a.c. relays. Both are controlled either from a panel switch or the p.t.t. switch.

The other supply, which furnishes all heater power (6.3 volts), has a dual rectifier. One rectifier, using a 5V4 and capacitive-input filter, supplies 300 volts for the plates of the speech amplifier and the plates and screens (through dropping resistors) of the r.f. exciter. Screen voltage to the v.f.o. is stabilized with a 0A2 regulator tube. A tap on this supply is used to operate the push-to-talk relay.

The second rectifier (half-wave) uses a 6BY5GA with its elements in parallel and a capacitive filter. It supplies a negative bias of 265 volts for the kveing system and lower voltages for the final and modulator grids. The primary of this supply has a panel control switch which is in series with the primary of the 600-volt supply so that the latter cannot be turned on unless the low-voltage unit supplying bias is in operation.

The power unit is protected by a pair of fuses in the a.c. line plug and a separate fuse in the primary of the low-voltage supply.

**Auxiliary Power Outlet**

The auxiliary power outlet provides a means of using the "Valiant" high- and low-voltage supplies, filament supply and the modulator for operating other equipment. The voltages available are 620 volts at 350 ma., 300 volts at 75 ma., and 6.3 volts at 9 amps. The modulator power output is approximately 100 watts. Removing a jumper plug from the outlet disconnects the power supply and modulator from the r.f. section, but leaves the modulator connected to its power circuits. The panel power switches and the push-to-talk system of the "Valiant" may be used for control of power to the auxiliary equipment. The control for the external relay is also still available, of course.

**Metering**

A milliammeter calibrated in three current ranges may be switched to read combined v.f.o. and 6CL6 cathode current, 5763 cathode current, grid or cathode current to the final, and cathode current to the modulators. There is also an off position to keep the meter from taking a beating during c.w. operation.

**Mode Switch**

The mode switch has three positions. In the c.w. position, the key is activated, the 620-volt power unit supplies final screen voltage through the clumper-tube system, the screens of the modulator are grounded, and the secondary of the modulation transformer is shorted. In the a.m. position, the key is shorted, the short is removed from the modulation transformer, and the modulator screen voltage is regulated by a pair of 0C3s in series. The clumper is still in operation on a.m. to protect the 6146s during adjustment, or failure of excitation. In the s.s.b. position, the grid of the 5763 stage (this stage as well as the final is operated as a linear on s.s.b.) is disconnected from the 6CL6 output and connected to the s.s.b. input jack, the screens of the modulator are grounded, and the screen voltage to the final is regulated by the 0C3s.

**General**

The "Valiant" is supplied with a one-piece cabinet, tightly bonded to the chassis with a generous supply of screws. The seam between the panel and cabinet is sealed on the outside by the panel which overlaps the cabinet, and on the inside by tightly-wedging baffle strips. All power leads, including those to the meter, panel lamps, auxiliary power outlet, antenna-relay jack, key jack and power plug have capacitor-inductor TVI filters.

The unit measures 21½ inches wide, 17½ inches deep and 11½ inches high. It weighs 83 pounds. Input from the line is 185 watts in stand-by condition, and 500 watts under fully loaded conditions on all modes. — D. M.

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Because of the unprecedented number of entries in the 23rd ARRL International DX Competition, the June V.H.F. QSO Party and the 1957 Field Day, DX Test results cannot be presented this month. Logs are being processed by Communications Dept. personnel at a rapid rate, however, and final standings will soon appear in QST. Please bear with us.

The MARS-USAF Eastern Technical Net continues operation on 3205 kc. and 7540 kc. on Sunday afternoons starting at 1400 EDST.

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**Strays**

The list of speakers for September, and their subjects, includes the following:

Sept. 8 — Mr. Robert L. Colin, of Federal Telecommunication Laboratories, will speak on "TAGAN, Aerial Navigation."

Sept. 15 — Mr. James Douglas, of Yale University, will speak on "Venus Calling."

Sept. 22 — RADM Rawson Bennett, Chief of Naval Research, will speak on "What Research Has Done For Electronics."

Sept. 29 — Mr. Harry Wallace, of Interference Associates, will speak on "Radio Interference Reduction and Measurements."

September 1957
How's Your Soldering?

Practical Pointers on Making Good Joints

BY JOHN E. MAGNUSSON,* W9AGD

- Everybody knows how to solder — or so they think. It will pay to read this. Just in case you may have missed one or two of the fine points.

The Importance of Proper Heat

Contrary to the general impression, there is a great deal more to soldering than merely melting the solder with an adequate amount of heat and piling it neatly (or otherwise!) on the junction to be bonded. Surprisingly, there are more people soldering poorly than there are doing an adequate job of soldering. Manufacturers selling equipment in kit form will concur that the largest percentage of trouble experienced by customers is directly traceable to the inability to solder properly.

Take the example of the too-common "rosin joint" or "cold joint." When several connections have to be made to a single tie point the result will often be a cold or rosin connection unless proper precautions are observed. As heat is applied to the solder and the connection, the rosin flows around each individual conductor connected to this particular tie point in order to keep the metal clean and free from oxidation for the solder to follow. If an inadequate amount of heat is applied the rosin will not be displaced by the solder, and as the connection cools a thin coating of rosin actually insulates each connection from the other and the tie point. In a circuit where an appreciable amount of voltage is applied the

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roin film may break down and may never become evident to the builder. However, the connection might be for the grid of the first audio stage, where we are dealing with a few hundredths of a volt, and in that case we could just as well have left the connection out of the equipment for all the good it will do.

By the same token, excessive heating of a connection will have the same unhappy effects. The solder itself will oxidize when overheated. All of us have had the experience of picking up a soldering iron after a long period of heating on the stand and finding it practically useless. The gray and granular-looking appearance of the tip indicates oxidized solder. Eventually this gives way to a crusted black copper oxide which makes the iron useless until retinned.

Overheating of the connections may also have more serious consequences than a poor connection electrically. The values of composition resistors will change very appreciably with excessive heating, and the semiconductor devices employed in some circuits may be destroyed. A little common sense goes as far in soldering as it does in any other endeavor: use enough heat to make the solder flow freely but don't apply the iron any longer than is necessary to make a good joint.

**Applying the Iron and Solder**

The old saying about the craftsman and the condition of his tools certainly applies when one considers the tip of the soldering iron — called, more correctly, the “soldering copper.” This copper tip will oxidize at an alarming rate when heated unless it, too, is protected from the atmosphere with a thin coating of solder. During an evening session of soldering it is advisable to wipe the tip clean occasionally with a dry cloth and replace the excess solder just removed with a fresh supply. A heat-regulating stand also will add greatly to the life and usefulness of the instrument. With the tip of the soldering iron in top condition, and using a good grade of solder with a rosin core, one should be able to place the tip on one side of the connection to be soldered and the solder on the opposite side and actually pull the melting solder through the junction as it becomes heated to the proper temperature.

In order to provide maximum heat transfer from the tip to the connections to be soldered, it is usually desirable to melt a small amount of solder between the tip and the connection before moving the supply of solder to the other side. But don't attempt to solder by melting the solder against the tip and letting it run onto the work. This will burn up the rosin before it gets a chance to do its job of cleaning the way for the solder itself.

Once the solder is flowing smoothly through the connection there is no need to pile on an excessive amount of solder since it will add little, either electrically or mechanically, to the connection. When in doubt as to the reliability of a given connection merely reheat it, adding the minimum possible amount of solder, and see whether there is any evidence of rosin boiling up through the melted solder. Again keep in mind that prolonged heating of a connection may have the same ill effects as inadequate heating.

It is generally safe to say that the ease with which the connection takes the solder is a good indication of the reliability of the joint. Connections that seem to take twice as long and twice as much solder as normally expected should be examined closely; the possibility that the solder has flowed away from the joint to nearby connections is ever present. This form of short circuiting is quite common in the crowded areas around tube-socket terminals and the terminals of multiple tie points. Such a difficulty is usually indicative of excessive oxidation of the leads or terminals, and usually a small amount of scraping is necessary in order to achieve the proper electrical connection. Patience is a very rewarding virtue in soldering, since tracking down a poor or intermittent connection later can be as frustrating as trying to put a raw oyster in a parking meter.

**Soldering Irons**

The selection of equipment is more or less a matter of personal choice. The present-day market displays a wide variety of soldering pens, guns, and irons of all shapes and sizes, with and without thermostatic control. Experience dictates that at least two sizes are almost an absolute must. Perhaps the most generally useful soldering iron for general building, as well as repair work, is the 60-watt size. This size is small enough to get into fairly tight spots, but still has enough capacity for the heavier connections that are typical of transmitter tank circuits. A fine follow-up for occasional heavy work is the fast-acting two-speed 200-250-watt soldering gun.

A reasonable amount of care should also be used in the selection of solder. Never use reclaimed solder in the construction of electronic equipment of any kind. (If the solder is reclaimed it should be clearly marked on the end of the spool.) By the same token, avoid bargain solderers and you'll avoid bargain connections. And always use rosin flux on radio gear.

As is true in all pursuits, experience is the best teacher. The knack of being able to solder almost anything as will comes after exposure to several discouraging defeats. One cannot expect to master soldering in a few easy lessons, but one can improve upon his present ability, regardless of experience, by assuming that there is possibly a little more to learn about it.
Transmitter Hunting started on the v.h.f. bands, although in recent years it has degenerated, in many quarters, to an activity for mobiles on 10 and 15 meters. But not in Southern New Jersey. Always a hotbed for v.h.f. interest, the area served by the South Jersey Radio Association has seen 2-meter transmitter hunting (and hiding) developed to a fine art. Here is the story of a typical hunt, together with some ideas on equipment and antennas.

Saturday dawned bright and sunny; the first club-sponsored v.h.f. hunt of the season seemed assured of success. The Committee had outdone themselves in their intrigue. Plans called for a two-stage affair, beginning hare-and-hounds style and winding up with a hunt for a fixed station. As the day progressed it became apparent that Brownie and Joe, who manned the quarry, had provided us with some real teasers.

Everyone was checked in so, with putt-putt running in the trunk, Brownie’s prewar sedan rumbled out of the park entrance. A vibrator in the audio of his mobile rig ground out a tremendous roar on the local net frequency. Around us the hounds waited patiently through the specified 3-minute interval before the chase, a motley assortment of beams tracking the signal. At the starter’s wave all sped off in the same direction in hot pursuit; all except Wrong-Way Charlie, who with cut-down 10-meter loop and knowing look edged furtively out the back way. Haywire Harry, beam pole set in a tomato can on the running board, made it to the edge of the park, but was forced out when his high quad ran afoul of low branches.

Brownie and Joe, proceeding according to plan, drove at once to Joe’s almost-new black V8, parked a few blocks away. They jumped in, fired up an identical transmitter setup and returned to the park by the same route. As an extra dodge they changed from casual summer clothing to business suits, ties and sinister-looking slouch hats. Sitting at the edge of the parking lot they did their best to look like plain-clothes men from the local constabulary, investigating the strange activities in the area.

The parking spot was important, for it had been prepared previously by burying a long run of coax that extended several hundred feet across the bottom of a small lake. There it fed a quarter-wave hair-wire antenna, suspended at water level under a rustic bridge that would be watered by the returning cars. A switch for changing between the car whip and the remote antenna enabled our rabbits in snap-brim hats to give the hounds a stereophonic feeling, as they followed the shifting scent.

The wagging of antennas in the traffic jam that built up around the bridge was a sight to behold, and the hares surveyed the scene with inward gleam. When they felt that enough attention had been brought to bear on the bridge they switched to the car broadcast whip again, leaving the now-dismounted hunters with their sniffs in a disquietingly dead spot. Some of the diehards persisted, however, and eventually, the hidden wire and its coax were discovered. But the purpose of the hunt is to find the transmitter, finding the antenna is only an early stage, especially in this instance where the coax ran off into the murky depths in a long loop purposely lying in the wrong direction. Everyone was here now but Wrong-Way Charlie, who was at a filling station several miles away, dissecting his gear to find out what had become of the signal.

Uncle Phil reasoned that even well-laid plans did not include waterproofing the transmitter. The coax must come out of that pond somewhere!

BY T. E. STEWART, * W2TBD

- The incidents related here are from a film on transmitter hunting that will be presented by the South Jersey Radio Association at the National Convention in Chicago. Whether you see the show or not, we think you’ll enjoy W2TBD’s story of a typical day in SJRA’s summer hunting season.

* Sunset Trail, R.F.D. 2, Medford, N. J.
Finding a soft spot in the sand after much searching, he triumphantly dug up the cable — a few feet from the end recently cast off by the hares. They had moved unobtrusively to another spot, passing close by a bench where Eddie sat, changing batteries in his sniffer. Ed was startled to see his meter hit the pin, but he charged it off to a battery short!

From this spot the quarry maintained their outwardly unfriendly appearance until doggedly tracked down by Phil and Ed, who made several passes before building up courage to challenge the forbidding-looking pair. The field was close behind — all except Charlie, who was now beating his way back for a fresh start.

* * *

The second phase of the hunt got under way as soon as the hunters could get into position. This time a strong signal was picked up from a direction that indicated the heart of the city. Again everyone was off in the same direction — except Charlie, who had come up just in time to make a right turn and head for the suburbs.

Miscellaneous sources of r.f. power get “found” during these sessions. Chet and Augie thought that a main highway would save them time. Stopping for gas, they noted that their sensitive sniffer was showing a strong indication, while resting on the back seat. Hooking on the beam, they tracked down the source, and spent some minutes outside WCAU, 50-kw., a.m. station. A member of the hunt committee was employed there; this must be it. Disillusionment set in when they finally plugged in headphones and listened to the broadcast program.

Frankie thought the country route was attractive. With a good signal on his meter he turned into a lane alongside a field where a farmer was working with a tractor. Making a sweep around the end of the field, the farmer turned close to the car to look over its crazy occupant suspiciously and started down another row with his cultivator — and Frankie’s car, which had become firmly impaled, in tow!

Red was confused by a strong signal and wandered off into the suburbs. At one point he found it necessary to wade across a small stream. He was met on the other side by a helpful gentleman who suggested that a bath might now be in order, since he had just crossed the outlet of the village sewage-disposal plant.

Coop worked methodically downtown, and was observed in the process of examining several metal trash cans in back of a local restaurant. Possibly they were close to resonance, for he seemed to be getting good readings. Sam was also working the downtown area, and getting good signals. His car began overheating, and he stopped to lift up the hood and have a look. The voice of the hidden station operator called through his receiver, “It’s not in there!”

The fine view of the downtown hunting was afforded by the site of the hidden station, several stories up in a hotel known locally as Mildew Plaza. Brownie and Joe watched the fun as each party arrived. Latecomers found Phil resting in the lobby. He had just discovered that the wide variety of readings he had obtained in sniffing the lobby had resulted from various positions of the old-fashioned cage elevator, and not from closeness or remoteness of the quarry.

Again everyone had arrived but Charlie. His propensity for wrong turns had worked out well, however. He’d found Frankie and was helping him drag his bus out of the cultivated field.

In the systematic floor-by-floor, door-by-door
search that followed, an unexpected clue gave the hiders away. CCS operation with ICAS ratings had proved too much for the hidden station. Sensing that the familiar smell of a hot power supply was positive evidence, Eddie abandoned radio methods and started sniffing at transoms. There was no doubt about which door to open. There was nothing left then but to air out the room and call the rest of the gang together for distribution of prizes and refreshments — and for the riotous post-mortems that are an inevitable part of any day’s hunting.

Hints on Hunts

 Receivers — Most hunters use Communicators, but they quickly find that the green eye is much too insensitive to serve well as a signal-strength indicator. A common approach is to connect a microammeter from the a.v.c. line to ground. This can be done with a wire connected at the magic-eye tube and brought out through the back of the case for connection to the meter. This reduces the a.v.c. action and gives a very satisfactory indication of signal strength.

 Several fellows use converted 522 receivers, with conventional noise limiter and S meter circuits. The Handbook is helpful here.

 My receiver is a Mallory TV tuner running into an old auto receiver chassis that still has its audio and power supply intact. Three stages of 21-Mc. i.f. and a diode detector and S meter were added. There are other more-or-less conventional converter-receiver combinations.

 Hunting is a two-stage process. The general locality is reached through the use of a fairly sensitive receiver and indicator, and then the process is taken over by the “sniffer.”

 Antennas — The cubical quad with reflector is popular. The driven element usually has two turns, and is fed with 75-ohm coaxial line, through a balun. (See Fig. 1.) The reflector is a 1-turn loop, with hairpin or capacitor tuning. W2PAU uses a single-turn driven element fed through 75-ohm coax and a detuning section which is wrapped around the supporting pole. Quads seem to show less effect from the ear body than other antenna types. By means of careful tuning they give a very useful pattern for hunting purposes: a broad frontal lobe and low back response. Tuning of the reflector is critical, but is found readily by adjusting for a single rear lobe, rather than a split one. The quad shown in the sketch is for vertical polarization. For horizontal, rotate the boom 90 degrees in the vertical plane.

 Conventional parasitic arrays and all-driven arrays have been tried. The parasitic array varies so greatly with changes in its relation to the ear body that it is somewhat unreliable. All-driven systems can be made to give very high front-to-back ratio, but adjustment is fussy.

 Loops of the type used in hunting on lower frequencies are generally too insensitive for our purposes, where a single antenna is used for both initial reception and close-in tracking down.

 A quad array is big enough so that few hunters care to carry two on the chase. They use a single array, arranged for quick disconnection from the ear and reconnection to the sniffer unit. Ski racks come in handy for rigging mounts that are readily removed when the hunt is over. (Few families fancy riding around in a car that is permanently equipped with a 2-element quad!)

 Sniffers — These are small portable field-strength meters. A parallel tuned circuit with a crystal diode and meter tapped down toward the cold end as shown in Fig. 2 will do. Transistor d.c. amplifiers are helpful in extending the useful range of such devices. R.f. amplifiers help still more. The 6AJ5 is a good tube for such r.f. amplifier service. It is like a 6AK5, but it works well on very low plate voltage.

 Most sleuths like to have coaxial switching, so that the antenna can be changed from the receiver to the sniffer quickly. You soon get to recognize the approximate signal level at which the sniffer can be used, but it is helpful to be able to change back and forth at will. The meter should be arranged so that it can be “worn” but don’t forget to provide for quick disconnecting here. RCA-type phono plugs and jacks are fine — and they will prevent you from breaking your neck or wrecking some of the gear, when you dash madly out of your car in the excitement of closing in on the prey!

 Ideas from “SIRA Harmonics,”* June, 1957, Issue

 Arrange your d.f. antenna so that it can be rotated from inside the ear, and while the ear is in motion. Too much time will be wasted if you have to stop to take bearings. Also, bearings may change due to reflections; the average of a number of readings is better than a single fix. And unless you are psychic, or have a partner who is,
it's best to arrange your setup so that you can work it while driving. Most successful hunters prefer to work alone. (Who cares about dented fenders, anyway?)

Existing antennas on the car should be removed, run down, or folded flat, to avoid the possibility of their gumming up readings. Minor reflections can prevent a sharp null, often helpful in accurate tracking close in.

Super-regenerative receivers are simple, but visual indication is difficult to obtain with them. Audio output meters can be used if the signal is modulated—but this opens up another avenue for the hidden station operator to confuse the hunters.

In using a conventional v.h.f. receiver for strong signals, it is handy to be able to reduce the r.f. gain. This can be done by applying controlled bias to the r.f. amplifier stage, or by inserting a variable r.f. attenuator in the antenna feed line. For best results the control should act on the first r.f. stage, and not only on the i.f. stages, as some manufacturers say "r.f. gain controls" do.

Tuning the d.f. antenna for maximum front-to-back ratio is important. Do this under ideal conditions, if possible. This means a clear space free of reflections, with known direction to source of r.f. power having same polarization as your array.

New Life for Old Clubs

If your club customarily folds up for two months during the summer, you're missing one of the best possible bets for building up club spirit and giving everyone a pile of fun. Hunts held before regular meetings, or during week-end picnics, will make the summer season the best of the whole year for the club, instead of a time when club relations fall apart, and have to be picked up again in the fall. Happy hunting!

Strays

One of the most worth-while club projects which has come to our attention in a number of moons is the publication of a Greater Kansas City Call Book by the Heart of America Radio Club of Kansas City, Missouri. This project was sparked by Ben Walker, K6ABU, President of HARC. All amateurs residing within a radius of approximately fifty miles of Kansas City are included, being listed by call and cross-referenced by both geographical location and last name. The book is a standard 8½ x 11 page size and contains approximately one thousand hams. Wherever possible, their telephone listing is also included. This can be of tremendous advantage to travelling hams who approach the Kansas City area, for if they sight a ham installation, they will be more than welcome to stop and browse through the Call Book.

Other clubs can undertake a similar project with the entire cost covered by the advertising obtained.—W1FL-W0HYK

Field Day? No, this is the General Class tent of K3BSA at the Fourth National Jamboree of the Boy Scouts of America. Another tent nearby housed the Novice shack. From July 12 through July 18 the station worked nearly a thousand hams, many of them Scouts, on all bands from 80 through 2 meters. About 350 amateurs and at least twice that number of SWLs visited the station in Valley Forge, Pennsylvania, during the week, but the lucky ones on watch when the Norristown Times Herald photographer came by were W6YY, W9WM, K2EAV, and Idaho SWL Kent Johnson.

K3BSA also played an important part in the very beautiful ceremony held to close the Jamboree. Early in the morning of July 18 the station had a schedule with K91USA and recorded the voice of Explorer Scout Dick Chappell, who is with the polar expedition, reciting the Scout Oath. That evening, the tape was played back in the main arena, and more than 50,000 Scouts, each holding a lighted candle, joined Dick in re-dedicating themselves to the principles of the movement.

September 1957
THE EARLIEST recollections. 1924. The eavesdropping on transatlantic telephone conversations. The coming of the speech inverter. The end of the eavesdropping. The long lapse of time. The appearance of side band on ham frequencies. The articles in QST. The mild interest. Norgaard's demonstrations at hamfests. The appearance of more stations on the air. The unnatural sound of the thing. The difficulty in tuning it in. The acquiring of knowledge. The modicum of study. The fooling around. The irritations. The greater ease of tuning it in. The lousy rigs. The drifting v.f.o.'s. The drifting h.f.o.'s. The thumbs down.

The old timers taking it up. The young squirts messling around with it. The encroachment on long-used spots in the band. The holier-than-thou's. The moving down of five kc. The further encroachment. The moving down of ten kc. The actual appearance of the stuff in "sacred" parts of the band. The recognition of well-known voices. The sprinkling of excellent side-band stations. The real nice guys. The stinkers. The compatibles and the incompatibles. The neutral attitude.


The proven worth of the stuff. The deliberate interferences. The mounting disgust. The changing to another band. The return to the original band. The changing face of the band. The realization of progress. The sensation of slipping a little. The borrowed exciter. The lash-up. The crazy patterns on the scope. The timid barefoot tryout. The immediate response. The considerable thrill. The making of new acquaintances. The renewing of old friendships. The new vocabulary. The adaptation to new procedures. The desire for more power. The attempt to get it. The bow tie from the exciter. The flattened bow tie from the lash-up "linear". The continuing contacts on a.m. The ribbing from old friends. The lingering doubts. The reluctant return of the

loaned equipment. The gloating of the "I-told-you-so's."


The placing of the order. The cash on the barrel head. The early delivery. The peachy little wireless sender. The clacking antenna relay. The soundproof box. The noisy fan. The resilient mounting. The coaX fittings and jungle of cable. The reluctance to give up the half-gallon a.m. rig. The making of more new friends. The swell guys. The genuine welcome. The compliments. The absence of wisecrack.

The slipping of some diehards. The appearance of same on side band. The pulling in of necks. The two-grand jobs. The homemade jobs. The not-so-linear's. The power gluttons. The timid ones. The chronic quackers. The sameness of voices. The learning to distinguish. The careful tuning. The passing of the armchair. The better stabilities. The return to the armchair. The enjoyment of side band. The enjoyment of a.m. The satisfaction of having good rigs.

It's here to stay.

* 27 Sulgrave Road, West Hartford, Conn.
Results of Armed Forces Day 1957

Two hundred and thirty contestants have been mailed certificates of merit signed by C. E. Wilson, Secretary of Defense, in recognition of making perfect copy of the special Armed Forces Day message to radio amateurs. The message was transmitted at 25 w.p.m. by military stations on 18 May 1957. Certificate winners of the e.w. message contest are as follows:

JASBA, K2S CQ G6P FMMK KS5 RMC UCQ UUD YOP G9Z, KA2NA, K2NHAR, K4S ARF ASU C6Q U4C K2A LQG, K2OSM, K4S MDM, K4S CNEF CPC DCFY BV LDXK EKN CAR GZI OYJ LNY NRC PXZ QRB VCT WDG, K4S BLT BTH FX UK ZXK, K2BZFX, K2KFD, K4S AMC G1B BFOH, VEOJ, K4S HGW G5Q JBB LEX MEG SCH TNEF WDQ WPR YGV ZYO. H2E AAX CPS F6A C6Q G6W HCA JOA KAT M2B NKM NVB SSC TUK UAP ZMK ZRX. H2S ADE BEF BZL CUL DCG ECN E3V JHH KSQ L6G MCG VXY W1H WZC ZL, H2S EFM HOO INH KLH LTV U9H UM0 WDF WHZ ZPF, H2S F6A QDQ G6K YPC PCL PZP SPZ USA WUR ZU. W2S AAW ASH AJS AW AXV BHC C6L C6S CWX ESQ EY WHY FJY JFY FJW G6C YTV IL IFY KP KG MAI YTP MCZ NAY OYOU OES OWP TTH TQX USA USY TPC WLI WPQ WX ZPZ ZL. H27S BHI COH CBS DHD EBF EREW EYM FJX FLS FOS FOW FWR KQX LT Q6X SNR VI WYP YKX. H2S KDA DAE FER HS LEX EPH QA LN TND V4X Y4D YP6 EBE HUO HUL NQ2 NQH SST HUB W2S ANH DBR ERE LJP N5H UPE RXG TWH WET WWIN WKQ, WK5C.


Military-to-Amateur Contacts

Operating on military frequencies AIR, NSS, and WAR worked amateurs in the 80-40-20 and 15 meter bands, using c.w., a.m., s.s.b., and RTTY. The three military stations made a total of 1348 contacts.

Radio teleprinter Receiving Competition

The radioteleprinter receiving competition featured a joint message from the Chief Signal Officer, U. S. Army, Director, Naval Communications and the Director of Communications-U. S. Air Force. A total of 121 entries were received with 102 of these making a perfect copy. A letter of acknowledgment was sent to each amateur participant who submitted a copy made from the transmission of this message. RTTY winners of letters of merit are as follows:


The military departments are pleased with the increased participation of the amateurs in this contest. Next year's contest will be planned to provide for greater coverage and improved frequency assignments to lessen interference. Additionally, special attention will be given to the novice bands.

Text of Armed Forces Day Message From the Secretary of Defense

On this eighth annual observance of Armed Forces Day it is my pleasure to extend greetings to all radio amateurs throughout the world. Your participation in this phase of the Armed Forces Day Program indicates your interest in an alliance with a group of individuals which has an important role in this era of rapid technological advance. Through consistent voluntary effort you have earned noteworthy credits in research and development of electronic communications, in disaster relief and emergency situations, in the technical training of others in communications fields and in the betterment of international relations. As Secretary of Defense I commend you for your valued contributions and welcome your participation in this Armed Forces Day Program.

C. E. WILSON
Secretary of Defense

Radioteletype Message to all Amateurs

The communications services of the Armed Forces take great pride in the development of Amateur Radio Teletypewriter services. The new techniques that have been employed and the technical advances that have been achieved in the course of this development. All amateurs are urged to continue the development and operation of this media of transmission. Your efforts in pioneering in new techniques and providing a superior traffic handling facility by developing Amateur Radio Teletypewriter Nets are instrumental in carrying on the great tradition of Amateur Radio. You are extended the congratulations and best wishes of your comrades in the Armed Forces for your continued success in this field.

ALVIN L. PACHYNSKI
Major General, USAF
Director of Communications-Electronics

J. D. O'CONNELL
Major General, USAF
Chief Signal Officer

H. C. BRUTON
Rear Admiral, USN
Director of Naval Communications

Strays

W6NOB reports that Dr. Lee de Forest will be featured on the "This is Your Life" TV program Wednesday, September 11.

OUR COVER

We are beginning to receive the usual fine assortment of logs and photos resulting from Field Day activity. First reports indicate that in some areas the weather was beautiful, in others miserable. But rain or shine, all the "regulars" were on the air for this annual event, as well as many of the newcomers. Our cover this month shows the operating setup at W9ERU/9. It was a two-transmitter setup on c.w., and the boys claim 628 contacts. That's W9CB at the left, with W9ERU to the right. (You say this is a wireless station?) More details on Field Day in a later issue.

Photo by K9BJA
Looking through the file on the June V.H.F. Party makes a reporter wish that he'd saved up superlatives used in earlier reports, for the week end of June 8 and 9 provided more and bigger in just about every category by which such activities may be judged. There were far more logs than in any previous June or September Party, higher scores, more 6-meter DX, more ARRL Sections represented, more Technicians, more portable and multiple-operator entries—all of which added up to more fun, for nearly everyone. "Best contest ever!" appearing on numerous logs, just about sums it up.

For the first time in v.h.f. contest history, more than 500 contacts were made by two group stations at opposite ends of the country. With a tremendous cooperative effort, the Waltham Amateur Radio Association, operating W1MHL/1 from their accustomed haunt atop Pack Monadnock Mountain, Peterboro, N. H., made 592 contacts on 50, 144, 220, and 432 Mc. Ever expect to see a 32-element 6-meter beam? A 128-element 144-Mc. array—that tilts as well as rotates? They were only two of the features of the W1MHL/1 layout. Also used were a 64-element 432-Mc. array and a 32-element job on 220 Mc. Equipment included a kilowatt transmitter on 144, 500 watts on 50, 300 watts on 220 and 50 watts on 432, all with the best in crystal-controlled converters—the works set up for simultaneous operation on the 3 bands. Portable? Must have been, for it was all taken up to "The Pack" for that one week end! The 50-Mc. band provided 327 contacts, 144 Mc. 228, 220 Mc. 28 and 432 Mc. 9, for 30,482 points. Section multiplier: 8! How long will this record stand?

K60EE/6, of the San Bernardino Microwave Society, operating from Sierra Peak in the Los Angeles Mountains, made a score of 11,868 points with 28 sections. He worked 546 contacts, 144 Mc. 356, 220 Mc. 168 and 432 Mc. 2. He used a 16-element array.

West Virginia contacts were supplied by many club groups working from mountain sites in that hard-to-get state. Here members of the Aero Amateur Radio Club of Baltimore take time out from their operation of W3PGA/8. Left to right: W3KLA, W3JDF, W3YQD, W3WZL, WN2JLF was getting in sack time. Group made 286 contacts for 7300 points on 3 bands.

June V.H.F. Party Summary

50-Mc. DX and Widespread Portable Activity Trigger Reward Scoring

Helen Harris, W1HOY, Medfield, Mass., worked 309 stations in 28 sections on 50 Mc., for 8652 points for the country's highest competitive score by a home station. This won her the E. Mass. Section award, a Technician award, and the distinction of having broken about every 50-Mc. contest record. Rig, not in picture, runs 1 kw., and feeds a 16-element array.
Angeles Section, piled up 510 contacts on 50, 144, 220, 240, 1215, 2400, 3300 and 10,000 Mc. --- 8 bands! Their multiplier of 29 (they were not favored with so much 50-Mc. DX as the easterners) gave them 17,110 points, a West-of-the-Mississippi record that will be hard to beat.

Top single-operator score made by W1UIZ/1, Mt. Equinox, near Manchester, Vt. George made 270 contacts on 4 bands, with a multiplier of 20, for 16,000 points. His 12 sections on 220 Mc. probably set a record for that band. The country's highest home-station competitive score was made by Helen Harris, W1HOY, whose sleepless iron-man operating netted 300 contacts in 28 sections, for 8052 points. This little chore was accomplished on 50 Mc. only --- and it earned Helen the Eastern Massachusetts Section award, along with above-mentioned honors. A Technician award goes along with this, too. Other Technicians who won top honors in their sections, regardless of class of license, were W9ROS, Illinois, W3JCI/0, Wisconsin, W5KRI/5, Mississippi, W8SDK, Michigan, WDWEQ, Missouri, W1ZWL/1, Western Massachusetts, W7PRW, Washington, W6PBC, Santa Clara Valley, W5NSJ, New Mexico, W4AZC, Alabama.

With 50 Mc. open periodically through the party, that band played a larger part in the scoring than probably ever before, but there was some fine work in the 2-meters-only category, too. W2ONY, Garfield, N. J., did right well on 144 Mc. with 280 contacts in 17 sections, for 1700 points. K0EMQ, and W9YPT found it possible to work 7 sections on 144 Mc., surprising totals for Iowa stations.

Fine June weather brought out a phenomenal number of portable stations, and they stayed out through the whole party, in most instances. The expedition phase of the June and September parties is growing all the time, as groups find that, as on Field Day, just getting out to a choice location with a friendly gang and a collection of ham gear is great fun, even if you don't go for top honors. The means are more important than the end for many v.h.f. party expeditions, though multiplier awards are increasing steadily.

Expeditions to other cities, hard-to-get states and sections give the contests a big lift. Vermont and West Virginia were well taken care of in the East. The Aero Amateur Radio Club of Baltimore did yeoman service in West Virginia with W3PGA/8, making 286 contacts for 7300 points. They just nosed out the Nation Capital V.H.F. Society, making their first trip as a club group, with W3AMTP/8. The Washington gang made 243 contacts in 28 sections, for 7140. Three other groups of W3s and 4s is what we know of journeyed to the West Virginia mountains to help the cause along. Vermont, now boasting quite a few home-station regulars on 6 and 2, had W1NBN/1 on Burke Mountain, near the Canadian Border, W1UIZ/1 on Mt. Equinox, in the central part of the state, and W1PMK/1 and others on the always-populated Hogback Mountain, near the Massachusetts line.

W3JCI took the famous "Hearsemobile" 50-Mc. rock-crusher (pictures coming up in QST soon) out to Lapham Peak, Delafield, Wis., and worked an even 200 stations in 20 sections on 6. Special addition for this occasion was a 6-element long Yagi, which overpowered even the long black car underneath.

V.h.f. expeditions jammed the mountain peaks the length of the West Coast, from San Diego to Seattle, helping mightily to keep W6s and 7s happy with their otherwise rather limited possibilities in the section multiplier department. Rivalry between the San Bernardino Microwave Society and the Two Meter and Down Club of Los Angeles, W6EMM/6, was a considerable factor in promoting the use of the bands above 144 Mc. Reports from the Los Angeles and San Diego Sections, particularly, showed a sharp upswing in contest interest. W6CDT/6, San Carlos Peak, provided one of the best scores from the Bay area. Still further north, W7QTV/7 and W7PUA/7 hit new highs for Oregon and Washington activity. W7PUA/7 used 50, 144, 220, 432 and 10,000 Mc. to work 137 stations for 2972 points.

Sharp operators on 50 Mc. showed that, band openings or no, ionospheric scatter is a fine way to build up section multipliers. W4IKK, Rome, Ga., picked up 8 of his 20 sections in this way,

(Continued on page 169)
ELECTION NOTICE
To All Full Members of the American Radio Relay League Residing in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions:

An election is about to be held in each of the above-mentioned divisions to choose both a director and a vice-director for the 1958-1959 term. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the Articles of Association and By-Laws will be mailed to any member upon request.

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

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

We, the undersigned Full Members of the ARRL residing in the Division, hereby nominate as a candidate for director; and we also nominate as a candidate for vice-director, from this division for the 1958-1959 term.

(Signatures and addresses)

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

All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon EDT of the 20th day of September, 1957. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must sign in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates both for director and vice-director, but members are urged to interest themselves equally in the two offices.

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

Voting by ballots mailed to each Full Member will take place between October 1 and November 20, except that if on September 29th only one eligible candidate has been nominated, he will be declared elected.


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

For the Board of Directors:

A. L. McElroy
Secretary

July 1, 1957

TV RECEIVER RADIATION

In this department last month (page 63) we reported an FCC proposal to relax present restrictions on certain radiation from radio receivers and also published the text of the League's comment opposed to such relaxation. We are now pleased to report that the Commission's decision in this matter, Docket 12018, is wholly in our favor. In part, FCC said, "Comments from the American Radio Relay League, Inc., indicated that the Commission's proposal to relax the 100 µV limit above 15 Mc. will not afford sufficient protection from television broadcast receiver interference to amateur operations in the 14 and 21 Mc. bands. Comments have also been received from other parties recommending that the Commission not relax its existing radio receiver interference standards. It appears that the most prevalent source of power line interference is television broadcast receivers. The Commission has therefore decided not to relax its present limits with respect to this particular type of device . . . ."

N. Y. TOWER CASE

While it is impossible for the League to provide (Continued on page 168)
CORRESPONDENCE FROM MEMBERS

SORRY, SOLD!

17 Whittier St.
Dover, New Hampshire

Editor, QST:

Probably you have been advised of the "power" of the QST Ham-Ads before but W1AXW is yelling for help, sugar, relief from further inquiries. All items were sold within one week after the June QST hit, mostly via long distance telephone and telegrams. Since then I have answered over one hundred inquiries, returned checks and not answered at all several more worded "if you still have."

Being conscientious, or something, I had to answer them all and my "profit" is diminishing rapidly as well as my "high moment of inertia" being seriously disrupted.

Anyway, my sincere compliments on the results. If I have any more items to clean out, the Ham-Ad is the way.

— Homer H. Richardson, W1AXW

ORDERLY PILE-UPS

7724 — 14th Fitzpatrick
Seattle 6, Washington

Editor, QST:

When a foreign station calls CQ DX, he barely has time to sign off before at least a dozen W stations are hot after him, and generally the one with the loudest and most powerful signal gets him. Why it would not be possible for the foreign station to listen for several minutes, taking down the calls of the various stations who have answered his CQ, and then answer them in the order in which they answered them? As an example of what I mean, suppose FJIPA calls CQ DX and is answered by several DX hunters. Of this number in the confusion that reigns, he is able to take down the call letter of each. FJIPA then sends CQ DX de FJIPA Nr 1 to Nr 6 BT W6 — W6 BT W5 — BT W7 — W7 de FJIPA Nw Nr 1 W6 — KN When FJIPA is established with Nr 1 W6 —, he sends 73 de FJIPA SK Bx (Break, not back) Nw Nr 2 W5 de FJIPA KN

After he has disposed of Nr 6 he could send out another CQ DX and pick up some of those who were not included in the first go around. With this procedure each answering station who is included in the multiple address, i.e. Nr 1 to Nr 6, knows where he stands and awaits his turn. This should eliminate a lot of unnecessary calling and confusion.

This idea may be a screwy one but remember you don’t have to be crazy to be a communicator, although it helps.

— G. W., Fitzpatrick, W7XX

NEED WYOMING?

Box 670
Worland, Wyoming

Editor, QST:

Read OM Johnson’s article in July QST on how he made his WAS. Would be glad to make a sked with anyone that needs a Wyoming contact and this offer is not restricted to one with 47 states confirmed. Would like to make WAS myself but found out shortly after going on the air that almost every contact sent “if my first Wyo contact, pass QSL,” somewhere in the QSO. As a result I rarely send out a QSL of my own, but look for someone calling and I get just as much kick out of being a “First Wyo,” as I do out of getting a new state. So any of you YLs, XYLs and OMs that want to KC, just give me a shout. Have the following crystals: 5.716, 5.726, 3.741, 7.156, 7.170, 7.177, 7.191; 21.22 and 21.15.

— Bob De Vries, WNYHAL

SWAP?

Mt. Washington Observatory
Gorham, New Hampshire

Editor, QST:

I’m just wondering if any other hams would care to trade a nice high mountain for an isolated little spot in the valley. If those fellows who live in the city think they have TVI problems, listen to what we have to contend with up here. I work on top of Mt. Washington, N. H., in the winter observatory. This is the highest mountain in the northeastern U. S. and used to be a pretty good spot for ham radio, especially v.h.f. But now look what’s happened. There is a TV station about twenty feet away. Inside the TV station there are three cameras and three separate frequencies used for commercial aircraft flying up and down the east coast. Certain harmonics on all the ham bands up through 6 meters fall right on these frequencies. I’ve got so many little strips of tape pasted on my v.f.o. dial on spots where I would cause interference that the transmitter looks like an overgrown “Band-Aid.” Now there is talk of two f.m. stations possibly moving up here in a vacant building about twenty feet away. If this happens, I may as well trade the v.f.o. in for one good stable crystal.

We have problems in our own building also. In the basement about ten feet from the ham shack we have some very sensitive electronic equipment which counts high energy protons coming in through the atmosphere. On occasion, my phone signal has been rectified in one of the numerous connections in these circuits and I have run the count up sky high. There are four TV sets on the mountain which are a potential problem. Ours, incidentally, is an old Dumont about 12 years old which still has the original picture tube and is still going strong.

Even without these problems, you can’t put up a decent antenna up here. It wouldn’t stay up more than a day or two in the winter because of extremely high winds and heavy icing. Mt. Washington still holds the all-time record for the highest wind ever recorded over the surface of the earth, 231 m.p.h. on April 12, 1934. I bet Larson Rapp’s antenna would work like mad up here if you could dig a hole through solid rock to bury it, hi. I have to be satisfied with two dipole up in the attic. Nevertheless, I still think ham radio is the greatest hobby ever. I probably would not hold out from us on our regular weather skeds on 34.02 Mc, and also from the strong r.f. from the local TV station.

You wouldn’t think an old “rock pile” like this would present so many problems for ham radio.

— William A. Harris, W1HQZ

INCENTIVE, CONTINUED

1175 Laurelwood Road
Mansfield, Ohio

Editor, QST:

Let’s quit kidding ourselves about the “incentive” angle to allowing special privileges for Class A Operators. Sure, these fellows deserve credit for taking the examination, whether they memorized the answers or not. But Class A is a closed membership club now and those of us who don’t belong to this exclusive circle are not even allowed to apply for membership. Incentives are wonderful, but they should be open for anyone that can qualify, and not limited to those lucky enough to have been in ham radio before the Class A was discontinued.

— E. C. Ryan, W8LRB
TRANSMITTER KEYING WITH THE SURPLUS TG-34-A KEYER

True type TG-34-A keyer is an automatic unit for providing code practice signals from an inked recording. The output of the keyer is an audio frequency note with sufficient power to supply a number of headsets. However, if the machine is to be used for keying a transmitter during code practice transmissions, testing, etc., it is necessary to convert the audio output signals into mechanical energy that will control a keying relay. Fig. 1 is a circuit perfected by ex-WNS-WBO that will make the necessary conversion.

Fig. 1 shows the tapped secondary winding of the keyer output transformer treating (T1) coupled through a crystal diode to the base of a type 2N356 transistor. The transistor operates in a grounded-emitter circuit with the keying relay, K1, serving as the output load.

![Circuit Diagram for Keying with TG-34-A Keyer](image)

In operation, CR1 conducts during negative half cycles of audio voltage, thus providing a negative base bias for the transistor. Although CR1 rejects the positive audio voltage, it does charge C1 while conducting, C1, because of its high value of capacitance, holds the transistor base bias during positive-pulse periods of non-conduction with the result that a steady current flows in the base-emitter circuit whenever an audio signal of proper amplitude is applied to the diode. This, in turn, causes the collector current to follow the keyed input signal and properly energize the keying relay.

By using the 8-ohm speaker output taps and approximately one quarter “pot” of the bias and volume controls on the keyer, and with 10 to 12 volts applied to the transistor, perfect operation is obtained. The voltage divider, R1, across the battery is used to find the proper transistor operating voltage and its setting depends on the amplitude of the controlled signal output of the keyer. Almost any type of battery may be used as the current drain is very small. A pair of Burgess type 4F5H 7V/2 volt batteries is used with the original circuit.

The relay listed is the only one of several tried that will follow the tape and still key the transmitter regardless of speed. This relay has two springs; one is a hinge type which connects the armature to the body, and the other is a “coil type” spring. Removal of the coil spring and adjustment of the hinge type until the relay pulls in at 3 ma, is necessary. Although K1 is a d.p.s.t. affair, only one set of contacts is shown in Fig. 1.

With the exception of the batteries, all parts are mounted on a 1 X 3-inch “L” bracket attached to the keyer directly above the audio output terminals.

--- Lee Dilno, WSDAP

"STACKING" CRYSTALS FOR CONVENIENT SELECTION

Few mobile operators have a convenient storage system which permits rapid selection of crystals for the most frequently used frequencies. One method that has worked out exceptionally well in the WITNS mobile installation is shown in Section A of Fig. 2.

Crystals cut for local nets and other popular frequencies are arranged in stacks and then bound together with Scotch tape. Frequencies may be printed on paper tabs attached to the ends of the holders where they are readily visible, and the stacks may accommodate two or more crystals.

The crystal socket must ordinarily be mounted on the outside of the panel when this system is used. Make sure that the socket is at least ½-inch deep so that prongs of crystals out of the socket will not press against the panel and prevent the active crystal from seating firmly in place.

--- Chuck Newton, WITNS

Section B of Fig. 2 shows the crystal stacking...
method used here at W3ZQR. Scotch tape is used for clamping the holders together and for binding the frequency-identification tabs in place. The crystal socket may be mounted on the rear of the panel because clearance for the prongs of crystals not in use need not be provided.

If you care to, the stack may be made four high by adding a crystal to both the top and the bottom of the pile. Orientate the holders in the form of a cross so that the sets of pins are 90 degrees apart. A good grade of plastic cement may be used for bonding the holders together.

— Allen R. Breiner, W3ZQR

NOTE ON SURPLUS TYPE
BC-348 RECEIVERS

This dial calibration on BC-348 receivers can be greatly improved by adjusting the inductance of the oscillator coils. To provide this adjustment (except in J, N, & Q series) proceed as follows:

1) Make certain that the r.f. is correctly aligned at 915 ke.

2) Note whether the dial spread is greater or less than the actual frequency band covered.

3) If the dial spread is greater, the inductance is too small.

4) If the dial spread is less, the inductance is too large.

5) Remove the top and bottom covers from the oscillator compartment and drill and tap a 6-32 hole over the center of each coil which requires correction. The covers are thin and best results will be obtained if the holes are punched through with a tapering punch to give more material for threading.

6) In the holes over low inductance coils, insert a small powdered iron slug with 6-32 screw attached.

7) In the holes for the high inductance coils, insert a 1-inch 6-32 brass screw, with the head inside the coil.

8) By alternately adjusting the trimmer capacitor (near the high end of the dial) and the slug (near the low end of the dial) bring the receiver as nearly as possible into calibration. Lock the slug adjustments with a 6-32 nut and cut off any excess screw length to prevent catching on case.

If care is used, the calibration over most of the dial should be off not more than the thickness of one of the heavy calibration marks on the dial.

— Otto Woolley, W6S6G

STORAGE RACK FOR QSTS

Many amateurs sooner or later come to grips with the problem of properly storing QST. The obvious solution is the League binder, but for many of us the binder funds have a way of winding up at the parts house for that always-needed component. Stacking the magazines on a horizontal shelf in library style will work, but necessitates repackaging after a few issues are pulled for reference. This method also has the further disadvantage of bending and curling individual issues.

Vertical stacking is attractive from the standpoint of required floor space but is almost unusable unless the issues are spaced by suitable shelves, preferably at yearly intervals. The rack shown here accomplishes these needs and requires only 11 by 8 inches of floor area and 18 inches in height. It can be built in an evening at a cost of three dollars or so and will accommodate ten years of QST with room to spare. If the issues are filed as received, the December index issue will always be the top number of each shelf.

In our case the shelves were cut 95 inches long from standard 6-inch shelving. The uprights are 1 X 2-inch stock, 48 inches in length. We used two finishing nails through each upright into the shelf plus small iron angle brackets on the bottom side of the top and bottom shelves. The construction is apparent from the photograph and hams with woodworking ability can no doubt improve the design. A coat of stain matches the finish of the operating desk. From the standpoint of utility the rack leaves little to be desired.

— George S. Carson, W0JY
CONDUCTED BY EDWARD P. TILTON, * W1HDQ

BEYOND-THE-HORIZON work on 5 meters as early as 1926 — the discovery of tropospheric bending in 1934 — sporadic-E DX in 1935 — auroral propagation in 1937 — worldwide DX on 50 Mc. in 1946 — tropospheric propagation on 144 Mc. at distances beyond 1000 miles in 1950 — aurora work on 220 Mc. in 1954 — these are some of the high spots in v.h.f. history that can be seen in retrospect by leading through a QST file. They and other v.h.f. firsts came about, in many instances, because hams were willing to try things that more learned people would have said were impossible.

Practically every known form of long-distance v.h.f. propagation was first discovered in this way, often by accident. The important factor was a willingness on the part of hams to try anything! The formula still works, and no better example has ever turned up than the feat that we reported in brief last-minute fashion last month: two-way communication on 144 Mc. across more than 2500 miles of Pacific Ocean. Nobody in his right mind would have given it a chance.

John Chambers, W6NLZ, and Ralph Thomas, KH6UK, first worked on 14-Mc. c.w. on October 20, 1956. From that day on they made regular tests on 144 Mc. From early November to July 8, these averaged better than six per week — all without the slightest indication of signal either way on the higher frequency. For several months the tests had been the same: a short QSO on 14,005 and then a 5-minute test on 144,000 Mc. by KH6UK. Results were always the same — nil.

But the true ham never gives up. The tests started after the best of the fall inversions had passed, and the period did not include the king of all the meteor showers, the August Perseids. The summer inversion season and the Perseids shower held out two admittedly forlorn hopes.

The evening of July 8, the inversion layer was clearly visible over the curving coastline from W6NLZ’s escarpment location, 910 feet above sea level at Palos Verdes Estates, at the southern end of Santa Monica Bay. It was a long way to Hawaii, to be sure, but at least the West Coast end looked good. Weather information indicated that a highly stable inversion had been building up for several days. At Kahului, on the northern tip of the Island of Oahu, the afternoon of July 8 was like any other summer day in Hawaii. Nothing showed that tonight would be any different from the more than 200 others when the 144-Mc. tests had been made. Tommy had given up listening on 2 long ago. The transmitters of RCA Communications filled the band with birdsies, and he had seldom heard any 2-meter signals, anyway. But the transmitting tests still were made, and the W2AZL converter and SX-88 were ready to go, if anything happened.

The 2130 PDT sked was like all the rest: the exchange on 14,005, and the transmission on 144,000. But this time, as soon as W6NLZ got his 75A3 on frequency with the H7A converter — there was KH6UK! “Can it be? Is somebody pulling my leg? Am I getting if.f. feed-through? Am I dreaming?” All these and other thoughts raced through John’s mind — and then came a wait that seemed an eternity, while the automatic transmission from KH6UK droned on. Would the guy never stand up?

No hurry about turning the thing off, Tommy thought, and the test ran on for some seven minutes before he heard W6NLZ calling him frantically on 14,005. Then came the quick change, the breathless moments, the fumbling sending, as two old c.w. hands who ragsed easily at 40 w.p.m. fell all over themselves in a rush of buck fever that is familiar to any ham who has tottered on the brink of a really big break. But the two-way worked — and good!

Signal reports were exchanged, and a few fumbling attempts at felicitation, and then on to see what else could be done while the rare opportunity still held. Tape recordings made at KH6UK tell the story. A period of birdsies from the RCA transmitters, and then, after some delay, a rather halting c.w. sig calling. A slow (this time) “QRZ de KH6UK” is followed by a call from W6NTC. Would this be someone a few miles east of W6NLZ, ready to claim the record, now that John had done the heavy spadework? Tommy replied with mixed feelings — and then learned that W6NTC is Mrs. W6NLZ, who was called in to run the rig while John placed a telephone call to W1HDQ.

The W6NTC-KH6UK QSO was still going on as John passed along the hot news over the landline at 0150 EDT, to your very sleepy conductor. But it was the last QSO over the 25-mile circuit. Though John called several of the local 2-meter fraternity, none could be found at home with the necessary combination of gear, antenna and location to grab the plum that was waiting to be picked. KH6UK stayed on, calling CQ for three hours, but nothing more was heard but the RCAC birdsies, and no other reports have been received of reception of Tommy’s signal on the West Coast.

How did it come about? The evidence points toward tropospheric propagation. Tape recordings from both participants show the signal to be

* V.H.F. Editor, QST.
The 2540-mile 2-meter QSO across the Pacific did not "just happen." There were superb stations, big antennas and capable operators at both ends. Above, left, John and Maureen Chambers, W6NIL and W6NTC, smile happily over their DX record. Transmitter (in front of John) is modified KWS-1, that runs 1 k.w. on s.s.b. and o.w. on 144 Mc. and lower bands. Receiver just visible between the operators is a 75A3, used with a crystal-controlled 417A converter on 144 Mc. Communicator serves for local work on voice. The Chambers station comes as close to being "all-band" as any you're likely to see, there being facilities ready for all low-frequency bands, plus 50, 144, 220, 432, 1215 and higher microwave assignments. Location, Palos Verdes Estates, is 910 feet above sea level, overlooking the Pacific.

Above, right, Ralph E. Thomas, KH6UK, cuts a tape for use in his automatic keyer. At the far left of the picture is seen the 1-k.w. rig with a pair of 4-125A's in the final, that has served both W2UK and KH6UK on 144 Mc. Receiver, center, is an SX-88, with a W2AZL 417-A converter for 144 Mc. Note prized QSLs from W6NIL and W6NTC in the speaker grille. The array that turned the trick at KH6UK is made up of four Gonset "Big Berthas" spaced two wavelengths each way, mounted on an 80-foot pole. Location: Kahuku, on the northern tip of the Island of Oahu.

...essentially steady, with only the slow, typical tropospheric fade. There are no bursts; no wild excursions in signal strength that would almost certainly characterize meteoric or ionospheric reflections. The locations at each end are close to ideal, and the equipment the best obtainable. KH6UK uses the old W2UK rig with 1 kw. to a pair of 4-125A's. The antenna is 4 long Yagis in box formation, with 2-wavelength spacing each way, 80 feet above ground. W6NILZ runs 1 kw. to a modified KWS-1, feeding a 21-foot Yagi 35 feet above a location where height above ground is of substantially no importance. His view out over the Pacific and northward along the curve of Santa Monica Bay is incomparable.

But other hams have good locations and fine equipment, and not a few are good operators. W6NILZ and KH6UK have earned undying fame in the annals of amateur radio because they had all the technical wherewithal — plus a willingness to try something that gave every indication of being a lost cause before they started, and to keep on trying it, again and again, in the face of almost certain failure! The job is just started, however. The feat of July 8 showed that it can be done. It remains, now, to show how it came about, and to determine how often it might happen again. Does working across the Pacific mean that a QSO across the Atlantic is within the realm of possibility? Can equal distances be worked over land areas? We won't know until we try!

**June 30 Aurora and July Inversions Best in Years**

Right in the middle of the 6-meter DX season the 2-meter band stole the DX show. One of the most widespread auroras on record, June 30, netted contacts on both 6 and 2
over practically the entire country east of the Mississippi. No end of instances showed farther south penetration than any previous aurora. Then from July 2 to 9, and again July 15 to 17, there were tropospheric conditions over the Middle West and South that broke all records in that was department as well. Space limitations prevent detailed reporting, but here are a few high lights:

Perhaps the first auroral contact ever made from the state of Florida was W4NUU at 30-Mc. QSO with W4UFV, Johnson City, Tenn., at 1750 EST, June 30. This was followed by one with W4NW, Traveller's Rest, S. C., at 0055. The aurora was in from 1730 to 1930 at W4MUF, but it took Allen some time to realize what was afoot. The W4MUF and W4WKL at W4QI and W4GIGS, East Point, Ga., heard W4SWZ, W4HJQ, W4WKL, W4GIS, and many others. W3AAG, Woodbury, Ill., worked W5DFU, Tulsa, Okla., for the latter's first aurora contact on 144 Mc. Stations as far west as W3BYG, Lincoln, Neb., were worked W4AAG, W4XN, Greensboro, N. C., was heard all over the Middle West, and the scramble for North Carolina contacts to those that could be heard in that state had never been as much in the Middle West via aurora before.

The long tropospheric session on 144 Mc. began early in the evening of July 2-3, W3AAG, Mineral Wells, Tex., running 87 at W5KAY by 2045 EST. Many stations were on all night, and those in the Cincinnati and Dayton areas worked Missouri, Kansas and Oklahoma stations on phone. W5DFU, Tulsa, for example, worked W4JOP, Des Moines, Iowa, at 2245, followed by W4VRF, Oskaloosa, Ia., at 0000, No. 15. W3RBM WOK ZIII LF AAG, and several more Iowa and Missouri stations. At 0245 on the 3rd, Warren worked W6JPTX for No. 16. There were pronounced meteor bursts out nearly all these signals, and a comparison of these showed that signals were strongest with Warren's beam westward! Here's something to look into; has anyone found other instances like this? Tropospheric back-scatter?

At 0715 W5DFU heard a 3-minute meteor burst from W3PT, Benton Harbor, Mich., while Jack was sending to W4LTU on schedule. At 1016 on the 3rd the opening was going again. W5DFU heard a W2 on voice, and a QSO raised W4HJQ, Gladens, Ky., No. 17. This act off another 8-hour workout of such 2-meter DX as Warren never dreamed of. W4VWB, Memphis, Tenn., 18. and W3FPH, Locksburg, Pa., 19. were high spots. Working until 0330, W5DFU knocked off 3 stations in Kentucky, 2 in Indiana, 7 in Illinois, 11 in Ohio, 1 in Pennsylvania, and scores in nearer states.

W5KAY says that still another session started just before 2000 EST July 7, with stations in the Cincinnati area calling W5AJC. This went on all night again, with Jack taking time out for sleep between 0400 to 0600, W3AAG and W3OW, the latter at Ada, Okla., were worked between 0700 and 0900, when a thunderstorm finished it off at Akron. Texas calls heard included W3B VB2 RQ and W3QS. W5AJC was heard as far west as W3SWG, Hubbard, Ohio, near the Pennsylvania border.

W3RMC, Marks, Miss., lists 36 stations in 14 states as his bag for the July 3-5 opening. W8EP, Terra Alta, W. Va., was a new one, and this undoubtedly was the first QSO on 144 Mc. between these two states. As to a complete record of "firsts," we're long since lost track.

We don't have much information on the mid-July tropospheric opening, but there was another probable first made — a Minnesota-New York contact by W5FRS and W2ORI July 17. Meteor bursts were noted on this one, also.

At the start of the July 2 festivities, W3AAG could hear nothing but W5DFU working all the DX. Meteor bursts were heard from numerous stations, but no tropospheric DX of major proportions until the middle of the month. This was indicated by W5KAY above, and running far into the 8th. Leroy worked then steadily until 0300 CST, took off a couple of hours for sleep and was back at it again for several hours more before beginning to break up about 0530. The 144 Mc. signs were all good and were fantastic, far exceeding anything in W3AJC's long experience on 144 Mc. He finally called it quits around 1000, when his noise level was getting bad.

W3NSC, Houston, sent in the July 8 weather map from a local paper, showing a stationary cold front lying diagonally across the country from western Texas to the Great Lakes region. From there a warm front extended out over the Atlantic Seaboard. Even the limited data on the typical northerner weather map, shows signs of a strong high along an extended and stable front, in the classic tradition; the sort of thing we usually look for in September.

W5DFU had hardly recovered from his exertions of the previous week, when he was into another DX marathon. The same territory was in again, and in addition, Warren worked W3PT, Benton Harbor, Mich., another interstate first on 144 Mc. He also worked down the Texas Gulf Coast for the first time, as far as W3KGO, Baytown. To show the DX is not all high power spots, W5CAR and W2QKQ worked W6JPTX, Muncie, Ind., 640 miles away, with the latter using a 2-meter antenna and a TV antenna!

International 50-Mc. DX Prospects

Special 50-Mc. authorizations for 30-Mc. work in Sweden, Portugal, and the Azores and Madeira Islands have already been announced in these pages. Word from LA2AD says, "We have now obtained permission to work 50 to
84 Mc. during daytime, up to 1000 GMT, through July 1, 1958." It is not known at this writing whether the "we" means Norwegian amateurs generally, but LATY has been reported as ready to work on 6.

Word came to our PPI office recently from SP9HS, via SWL Pickering, that Russian authorities are encouraging crossband work between their amateurs on 38 Mc. and American hams on 50. Soviet stations with v.h.f. licenses have had number call signs in the past, but are reported to be getting Soviet Union type calls now, except that the prefix R will be used, in place of the usual U. Example: A Ukrainian v.h.f. station would sign RB5 instead of UB5.

At least one UB5 was heard last winter on 28 Mc., soliciting crossband contacts on 38 Mc. with American stations. Reports in the Russian journal Radio indicate that considerable DX is being worked within the Soviet Union in their 38-40-Mc. band.

European countries using the 70-Mc. band are finding it open for sporadic-E quite often, and international DX has been reported. G4KW, well known to 6-meter men as MD6KW, worked FALRH in Oman, June 16, and F8CH on June 20. The first is the current 70-Mc. DX record, and the latter is the first work on the band with France. We feel sure that Ken will be looking for 50-70 opportunities across the Atlantic, though we have had no direct word from him as yet. EI2W, near Dublin, is checking the 70-Mc. band daily, and listening on 50 Mc. If he finds evidence of sporadic-E, in the hope of catching a transatlantic opening. He will be on 28 and 70 Mc. (70.16 Mc.) through the fall, prepared for crossband work to 50 Mc. at any propitious moment.

Prospects for work with the Azores now markedly with the shipment to CSHAC of a 6146 transmitter by KB9RNQ and KQ6DX. CSSAC is at the American Air Force base, and we understand that they now may operate only on 50 Mc. and higher — which should not do the v.h.f. cause any harm! Two frequencies in the first 200 kc. will be used.

Also from KB9RNQ, via KH6RRF and K6TYW, comes a report that KG6BA, Guam, and KG6AF, Okinawa, are on 6, and that there are promises of activity on Midway and Kwajalein.

220 Grows Up

From many quarters come reports of regular 220-Mc. activity, showing that use of the band has long since passed the "How-about-a-220-check?" stage. WS9WR, Columbus, Ohio, writes that there is something doing nightly in Central Ohio around 2100, with WS9 ("SW NVI HOF RPT BPJ" and WS9XZ most active. WS9XV, visiting WS9LG, West Richfield, during the June 30th aurora, heard 220-Mc. signals from W3, 8, 9 and VE3 coming through in good shape.

VE3BQN, Toronto, has a 9006 final and a 5-over-5 array on 220. Ted keeps skeds with WS9AR, near Scranton, Pa., Wednesdays at 2015, 2215 and 0030, and Saturdays at 2015, 2215 and 0030. He and VE3A1B look for WS9LG nightly at 2215. VE3BQN would welcome Detroit area or W1 skeds on Wednesdays and Saturdays. Frequencies: VE3BQN 220.056, just above WS9LG; VE3A1B 220.103.

WS8LDZ, Dumore, Pa., worked WS9DX, WS8PD, VE3BQN, W1RFU and KD3ZAI on 220 Mc. during the aurora of June 30. He and WS8LDZ are working on plans for aurora tests on 432 Mc. as well.

W1RFU reports that W31ZD was 89 on 220 Mc. June 30. Bill also heard WS9DX, Detroit, via aurora, at 1553 EST. At 640 miles, this is the best 220-Mc. auroral DX yet reported, that we can recall.

W2LOC, Brooklyn, N. Y., long a 2-meter stalwart, now finds extensive activity regularly on 220. Signals from W3s are frequently stronger on 220 than 144, Marv says. He looks for business nightly at 2000 EST, first in the direction of W1, then elsewhere. A "cliff-dweller," he finds n.f.m. a great aid in keeping the neighborhood peace. (Continued on page 169)
FORSKEN HOMO SAPIEN
or
How to be Alone When There Are Two in the House

BY MISTER X

The identity of the author of the following treatise will be immediately recognized by rather a large group of people, for the discerning Mister X is a regular contributor to a certain West Coast radio company monthly.

"In the living room a soprano was giving out with both lungs over the hi-fi system; in the kitchen the kettle was bubbling over and from the edge of the stove door issued a thin plume of acrid smoke. Down the block and rapidly nearing was the eerie wail of a police siren. But in the den all was happy and serene.

Pushing open the door, the OM was greeted with a too familiar sight. There was no "welcome" on her face; no gladsome greeting; just a frown of concentration or irritation and a vigorous hand signal demanding QUIET!

"Yes... yes... Roger... it was a VK... running a 12 ounce Budweiser can to a pair of quart milk bottles... and a ten over twenty revolving beam..."

Quietly, the OM closed the door and tip-toed back to the kitchen to see what he could salvage, muttering: "Five'll get you ten there'll be no dinner tonight." And he envied those cops in the patrol car, eventually rolling home to a luscious hot repast.

Call it, if you wish, the electronic atomic, nuclear phase of the Battle of the Sexes. The little lady whom you once thought you couldn't live without is now firmly demonstrating to you that you CAN and that you'd better like it.

Somewhere in the dim past some misguided male initiated the first YL into the ham racket, starting a chain reaction beside which the legendary Pandora's curiosity was child's play. The rapid spread of the YL Menace threatens the very foundations of civilization. We have learned to adjust ourselves to the forces of nature, to combat in some cases even to nullify their effects. But would you dare to combat the YL? Not all your piety nor wit could nullify:

"... FB, OM. Ah read you just 100 per cent... it's a Golly-folly pushing 800 watts into a 4-
element beam... Mmmmmmm yes..... mail QTH is in most any Call Book...

You learn to sew on your own buttons because you can never find a safety-pin, she having used them to couple the anode to the diode, or the exciter to something equally irrelevant in terms of kitchen mechanics. But, cheeze up, Old Boy. The time will come when she masters the manipulation of pliers and soldering iron. And if she hasn’t yet borrowed your Sunday pants to climb the beam and make an adjustment, it’ll come, brother. It’ll come. Would she wear her own new slacks? Never!

Ask her to get up at four in the morning to accompany you on a fishing expedition and she gives you but a glance of withering scorn as she hurrows her pretty head into the pillow. But she’ll hop alertly out, bright-eyed and loquacious, to work a “Fed-8” at two a.m. and love it.

And so, dear friends, one who has unwittingly contributed in small measure to the rise and spread of the YL Menace, in a belated effort to atone for his sin, gives you this advice: Love ’em, tell ’em nothing; and leave them alone until they come to you sweetly with that honeymoon look in their eyes and murmur gently, “Jim, darlin’, that lil ole rotary beam’s stuck again, and all simply can’t fix it.” Then is the time for you to put on those Sunday pants and keep ’em on.

YL Certificates

Interest, both male and female, is keener than ever in the three major YL certificates issued by the Young Ladies Radio League. Here are the complete rules for each certificate. Count your cards—you may be eligible for an award right now.

YL Century Certificate (YLCC)

The YL Century Certificate for confirmed contacts with stations operated by 100 or more different licensed women amateur radio operators is issued by the YLRL to all amateurs, YL or OM, at no cost to the applicant upon compliance with the following rules:

1) Two-way communication must be established on the authorized amateur bands with stations—mobile or fixed—operated by 100 different licensed women amateurs. Any and all amateur bands may be used. (Note that one YL operator worked under different calls count but once.)

2) All contacts must be made from the same location. Within a given community, one location may be defined as from places no two of which are more than 25 miles apart.

3) Contacts may be made over any period of years, provided only that all contacts are from the same location as defined in Rule 2.

4) Contacts with YLs anywhere in the world are recognized provided that confirmations clearly indicate that the stations contacted were operated by duly licensed women amateur radio operators.

One of the newest YL clubs, the Camellia Capital Chirps of Sacramento, launched right into its first Field Day this year with members K6s EK6, HHD, HOI, PWH; KN6ZXY, and WS4HTS putting in 22 hours of continuous operating. Competing with four other clubs in the area, the girls stuck it out for 115 contacts on 80 and 40 on 40 meters, even tho’ the mercury reached a torrid 108°. The photo shows KN6ZXY logging for K6HOI. Site of operations was a hilltop overlooking Folsom Lake, twenty miles from Sacramento. (Photo courtesy The Sacramento Bee)

September 1957
A girl just never knows what a QSO will bring. For Eda Williams, W7EPZ, a contact with OM W8CMS one fine June day brought a gift guaranteed to make aYL feel like a Queen for a Day—one dozen red roses. W8CMS wired his floral thank-you after Eda supplied him with his 48th state (Montana) on 20 Mc, thus making Claire the first W8 to WAS on six meters. As we've said before, it pays to get on the air now and then. (Photo via W1HDQ)

5) One hundred QSL cards or other written communications from the stations worked confirming the necessary two-way contacts, accompanied by a list of claimed contacts which should include the full names of the operators alphabetically arranged and the dates and times of contacts, must be submitted by the applicant to the YLCC custodian. Sufficient postage must be sent with the confirmations to finance their return by first class mail. The YLRL will not be responsible for any loss or damage to same.

6) Endorsements: Confirmations of contracts, accompanied by alphabetical list, as per Rule 5, from stations operated by additional YLs may be submitted for credit each time 50 additional confirmations are available. Endorsements, gold and silver stickers, will be made to the original certificate as applications are approved.

7) Decisions of the YLCC custodian regarding interpretation of these rules as here stated or later amended shall be final. All inquiries regarding cards, applications, or certificates should be addressed to her.

8) The YLCC custodian currently serving the YLRL is Katherine Johnson, W4SGD, Box 166, Fuquay Springs, North Carolina.

YL Worked All States Award (YL/WAS)

The YL Worked All States award is available to all amateurs, YL or OY.

1) Two-way communications must be established on the amateur bands with a YL in each of the 48 states. Any and all amateur bands may be used. A card from the District of Columbia may be submitted in lieu of one from Maryland.

2) Contacts with all 48 states must be made from the same location. Within a given community one location may be defined as from places no two of which are more than 25 miles apart.

3) Contacts may be made over any period of years provided only that all contacts are from the same location as defined in Rule 2.

4) Forty-eight QSL cards, or other written communications from stations worked confirming the necessary two-way contacts, must be submitted by the applicant to the custodian for the YL/WAS Award. Sufficient postage must be sent with the confirmations to finance their return. The YLRL will not be responsible for any loss or damage to same.

5) The custodian for the YL/WAS Award is Grace Ryden, W6GM, 3534 North Lincoln Avenue, Chicago 14, Illinois.

YL Worked All Continents Award (YL/WAC)

The Young Ladies Radio League issues a YL Worked All Continents certificate to any licensed amateur, YL or OY, who meets the following requirements:

1) Two-way communications must be established on the amateur bands with the six continents: North America, South America, Europe, Africa, Asia, and Oceania. Any and all authorized amateur radio bands may be used. Cross band contacts are permitted; contacts may be made over any period of years.

2) Contacts with all six continents must be made with duly licensed women operators.

3) Contacts must be made from the same location. Within

(Continued on page 148)
CONDUCTED BY ROD NEWKIRK, W9BRD

How:

As indicated at the conclusion of this month's column in lines regularly devoted to long-haul happenings of yore, DX news of more than passing significance was transpiring a decade ago. The year 1947 saw an unprecedented boom in serious large-scale organizing of amateur groups and clubs primarily on the basis of DX interest. And the onset of this trend was truly a departure from tradition. In prewar DX pursuits DXers characteristically hunted the stuff in low-pressure lone-wolf fashion, hoarding rather than pooling secrets and tricks of the trade.

Statistically it can hardly be disputed that the California coast long has been the operational capital of our DX world. That prefix W6 somehow just reeks of DX implication! [And they're so doggone loud, Boss. — Jeeves] Hence it's fitting that a bunch of Sixes founded the Northern California DX Club late in '36 as the vanguard of this movement. Southern Californians quickly followed suit, and now there are prominent constituencies operating under West Gulf DX Club, Willamette Valley (Wash.) DX Club, and other long-distance labels here and abroad.

Oh, yes — another budding DX outfit enrolled its first postwar member in 1947. In fact, its first prewar member signed up twenty years ago. Right — your ARRL DX Century Club, now going stronger than ever!

We receive an occasional letter from OM Reader urging that more "How's" space be made available for the reporting of single-side-band DX doings. At such times he appears unaware that Jeeves & Co. welcome postal contributions of DX data bearing on any legitimate mode of emission, especially one so promising as carrierless phone. Space certainly is available. And we attempt no arbitrary rationings based on types of emission, a policy obviously indispensable if we purpose to represent and document our diverse DX world's bustling activities in these pages month by month in true color and perspective. So the extent of "How's" lineage dealing with s.s.b. DX activities holds in direct proportion to the amount of unsolicited sideband gist received. And that's up to Mr. Reader.

So far as side band itself goes, 'tis a big lad. Its ham history dates from 1933 and its practical postwar application began ten years ago. It can earn promotional publicity on its own merit now that technical bugaboos of complexity and expense have been wonderfully tamed and the benefits of this emission are within reach of almost every amateur. Apparently what we need at this time is a little operational pioneering.1

For a technique whose applications, it is said, could supersede less efficient contemporary modes of phone transmission there were too few winning scores posted by side banders in the 1956 ARRL Sweepstakes (check p. 51, June '57 QST); there were far too few s.s.b. users observed seriously competing in this year's ARRL DX Test; and, as friend Reader points out, there are far too few side-band DX reports being filed with this office. Why?

A missionary task is all cut out for suppressed-carrier advocates and they now have plenty of effective tools for the job. Cozy band-edge round tables are well and good, and letter writing has its merits; but most hams are from Missouri and like to be impressed by competitive results. How about it? Demonstrate that nine-db. superiority over "ancient modulation" — compete "How's" stands ready to record your results.

What:

Hey, that magical month is here! Summer's drowsy DX tempo now turns to an agile allegro; then the all-band transoceanic ionospheric chorus really swings out on a cool, crazy crescendo, entirely a capacita. You and your sender all set to face the mad music of this year's DX September song? July and August trumpeted the following toney intro. . . .

1 S.s.b. DXpeditions to rare areas serve to demonstrate the medium but this approach is promotionally feeble. Shacks, accumulating a fast logful of QSOs from Nepal with a leap-modulated Type '10 broadcast rig would prove only that hams love to work Nepal.
20 phone first, and our Four and Sixes sit the pace. Here's 
JHDKV; P909 CZ and DM (14,170 ke.) 20 
GMT. KIJEKE: KQ40O (20) 17, VP2H (200) 4, W9HJ 
SV90 (18) 2 of Rhodees, W7TP, W6TC (Timed 
Fletcher Christian's great-great-grandson),...
Mogadiscio's 15FL stirs up storms of competitive QRM on several phone DX bands. The XYL frequently pitches in to assist in providing Somalian DXCC credits to the persistent W/K VE pack. (Photo via W9WHM)

JA1EF, WH6s BYG CRY CBA, WL7s BWD CEE CEE Eighty c.w., written painfully under its blanket of QRM for W7YX for DJ2JG, DXCC, and CW QSL... DJ2JG (4), KZ5WU (30) 4, W7DUJ, ZL1CI 3RQ/4... Now let's shake the static out of our ears and scrutinize the QSL situation.

Where:

Oceania — W7/7EN advises, "Have made arrangements with ZK2AB to handle all his QSLs. I would like to thank all W/K for stamps and QSLs, especially those who have sent 2Q0A. I am not able to return your calls but remain in contact with HH3Y, HH1L, KGl4 CG KK, TP2W/K0K, YV5FR and other desirables.


10 phone silenced through the torrid months without the usual chain-breaking, pot marked, and something. We find ...

10 c.w. contended with what seemed to be the heaviest helping of thundershower activity ever, on coast to coast. But the gang persisted, coming out with several calls for QSLs of others and c.w. QSLs, WP4/AI, YF5/3T, ZL1M, KN5HY, WP4/AI, XE1, WK7U: PF8AT, JA1/6E, KN5/TD, VZ4/WL: UF7JG, CT3AI, ZS6E, 246C/M (W1WAA/M), KI1/KH: cracked the doldrums for KC1/CH: KAFP, ZA1/6L: 2D2B, UU85AB, WP4/5E, VA3/3X, WP4/3Z, YO4/A, WP2C/S and DK4/G. 100s of QSLs received from ZL, W1, ZS (all from KH67F) agree with the address and work is going. NJ4U/KU: 7Z2/6M, ZL1M, KA2/45, ZL1/TC, ZL1/DF/2.

Europe — G3AAE informs, "Between June 4th and 19th I was on vacation in Jersey, Channel Islands, and operated..."
T12HP contributes this photo-factual sequence of goings-on last March and April when the Radio Club of Costa Rica activated T9P on rare Cocos Island. Participating T12s LA and CAH collected 560 QSOs in 44 countries, including 218 phone and 156 c.w. contacts with the U.S.A. T12HP writes, 'This expedition was organized in less than a week to take advantage of a very rare trip to the island which was made by a prospecting company. We regret that it could not be prolonged and that we did not have enough time to warn all appropriate journals so that more amateurs could have taken advantage of it.' Humberto had hopes of hitting T19 again last month but the odds are always long in Cocos plans. T9CR opened fire on All Fool's Day, a cute psychological plot that fired the skeptics.

through ZL4: VK1 through VK9, excluding VK8. Log the date, QTH, band, c.w. and c.w. sent/received in that order, indicating contact and bonus points for each QSO in right-hand column adjacent. Separate band-sheets are not desired this year, keep your log in the normal chronological sequence of contacts. Attach a summary sheet bearing total claimed score, a brief station description and a signed declaration that rules have been observed. Entries postmarked no later than October 31, 1957, sent to Federal Contest Committee, WIA, Box 1334, GPO, Adelaide, S.A., Australia, will be eligible for certificates of performance which will be awarded to the highest scorer in each country and in each U.S. call area. Here's the year's best chance to salt away key credits toward such Down Under awards as WAP, WAZL, and WAVKA. Good luck...

V81BA's new Simnangang QTH is filled with d.c. mains but Dick is undaunted. 'In June loaded my TX -- a 817G-6L6-507B combo -- into a 60-watt bulb. That lamp's filament just curled up on its toes. So I stretched a long-wire on the floor and C/W, that's how I missed my first W in years, and I learned a lesson with gratifying results from the autopods. Now I'm using a cabinet, spacing up the aerial and rigging for break-in. Right now I have two crystals, both slating on commercial L.K. stations. Tough luck...

W71010 has it that VK6/WL is about to paint W6JF in expediting Solomon DXCC credits. The latter likes phone and c.w. on 14,500 and 14,060 kc., respectively...

The steady performance of ZC5RF's 90 watts and AR-88 impress K6ZI. Incidentally, he costs ZC5RF $1.50 to ship one air-mail letter to the U.S.A.

More from K6ZI's DX notebook: F08AQ, frequently found on 20 around 0300 GMT, runs 50 watts to a Window and receives with a receiver 22R. Ray, a former French Navy monos, is in charge of the port office and coastal radio on Port- Sail, (Turcoa 120 miles northwest of Tahiti)...

Lines from Y2JDL, now back at Fuentes Nambo after travels and a visit Stateside: 'I'm extremely busy these days as chief op-technician at the government radio station here. Yet in spite of many and varied duties I cannot keep away from ham radio and find myself once again pounding out the call Y2JDL chiefly on 14 Me. I can often be found on 14,020 kc. around 1000-1040 GMT but my time is limited because I must run a large diesel engine for power.' You probably know that Dave previously signed VK2DF, VK1DL and Z61AB... K20DE, ex-KC2DE, worked 107 countries from the Marshalls and now is sweating out his last few DXCC QSLs in California. ' Didn't manage WAS because Vermont and Delaware, stayed hard to get.' Papy and XYL Dusty call your attention to the Second Fair East Hamfest to be held in Guam come November... K6PRAPI and others halfheartedly seek info on one YR8A...

W2HMR says F08AC returned to the air after a...
At Pazarlik on Bulgaria’s river Maritsa the LZ1KFP gang holds forth. From left to right, front, we have operators Pavel, Jo and Luben; at rear are Lubo, Ray, Nelko, Angel, Ivan and Veino. Their club station features a homemade VFOed five-stage 150-watter, six- and seven-tube receivers, and various antennas for 10 through 80 meters. LZ1KFP’s co-op affair is typical of amateur radio in the Russian orbit where private at-home hamming is rarely encouraged. (Photo via Wm. Rico)

two-year QRT and now is living it up with a Viking I. George gives W211M3 to understand that FW2AA is off the air for lack of power source. W0E2Z’s research reveals no previous amateur work from Jarvis Isle of the Line group. Samoa is under heavy DXpeditionary attack with W6N HS UOU and K8MEX intending K8G operations around the time. W0E2Z says that W6NHS has operational eyes on VR5 and ZM17, too. The SS Monterey DXcursion of W6HS and XYL terminates on the 4th of this month after calls at Papeete, Auckland, Sydney, Suva, Pago Pago and Honolulu. Chas, hugging a handy HT-32, SX-101F and vertical skyhook along, W0E2Z credits ZL1PA with prime assistance in getting ZK2AB back on DX bands. Pacific Trust Territory notes courtesy K6UZU: “K6UZU has returned to school in the mainland. Former colleague K6UCM recently graduated from Naval Academy and will keep the Eddico on 20 phone. K6USC, K6USK, AK and AL have left these parts. K6CBG in Stateside bound after four years on Paulina, K6UZU plans to visit the U.S. after almost ten years of island-hopping in the Central and South Pacific. Upon his return he will DX in the Fijis for an a.m.” K6UZU likes e.w. work, too, but the redoures of many pile-ups spoil his fun. Carl hints that the 7.72 power limit of 100 watts may be reduced to the full gallon. Now from W4DNU: K8H8: “Those who worked VR3S on 10 phone may appreciate the fact that he was using only the power supply of his Super Pro as a transmitter h.v. supply. Lester left Christmas in July, leaving only VR3G in operation; VR3F departed some time ago. It is suspected that VR3G also will not be on Christmas Day longer.” W4DNU has worked 5C to different countries from such varied locales as Florida, Illinois, Hawaii and Japan. “I’ve gone stark raving mad just trying to complete one DXCC. Notable tallies: 1,439 skeds observed by W6RLP and K6GFLC; K6GIG on Chichilo, W6VVR in Kenya, working his dad, W6VLJ, around 14,100 kc.; and V6RAB gaining contact with VR3E0 on 14,000 kc. just after 0900 GMT. The K2QXG, sort of magnetizing the alphabet soup, raised V4Is DO and DP on the same dead-band 30-meter e.w. CQ.

South America — Peru’s RCP invites North and South American amateurs to participate in a Panamanian Contest to be held (phone and e.w.) between noon EST September 21st and midnight September 22nd. Object? Work as many North and South American stations as possible outside your own country once per band. For your first transmitted exchange send RST (or RS on phone) followed by any three digits. From then on transmit the last three digits received from the previous station worked. Phone and e.w. entries are to be considered separately, and all entries must record at least 20 QSOs and must include at least one QSO with a Peruvian station. Final score results from multiplying contacts by: the number of American republics worked (21 counting Alaska and the Canal Zone); plus the number of different bands used. Depending upon response, certification of merit will be awarded to high scores. To be eligible submit your log transcript within 30 days of the Test’s conclusion to Radio Club Peruano, Contest Commission, Casa 52B, Lima, Peru. Reminder: LABRE’s annual world-wide DX test comes off September 7th-8th (e.w.) and 14th-15th (phone) as detailed here last month. Have fun! C6EAG reports that the worst local storms in 25 years were responsible for the destruction of sailing-raft Talhiti-Nui off Juan Fernandez island in late May. A new raft is planned for return voyage from Peru to Tahiti via Koa-Tiki. C6EAG’s skippers are credited with saving the lives of all aboard. C1GO closes C6Z0 for return to England. W4HFK scheduled a summer trip through LFFY UX VPI and other south of the border. Asia — From ex-YA1AM via W4DHD: “It certainly has been an amateur’s paradise here and in closing down I wish to thank all the gang for many kindnesses. We arrive Los Angeles in mid-August and hope to make the ARRL National Convention in the city on Labor Day weekend. Then we must report for work in Washington on September 15th.” H3A1 tells K6OLC that snappy C8BBB (W5LAK) runs a mere six watts... C91M returns to England next month after an enjoyable Asiatic DX spree. The 3W3AA, whose QSLs are handled by OK1LP, uses the tricks in the book to lure W5KJ into taking QRQ. We wish them be so eager if the flood gates were down... AJD No. 8 and WDJDXC No. 1 for the U.S. A are certification. (Continued on page 144)
Radio Clubs and Emergency Equipment. Equipment-wise a 1956 survey disclosed that about 49 per cent of all affiliated clubs have club-owned emergency power units useful for Field Day or public service. In 70 per cent of the clubs individual members have gas-electric units, these averaging 2.4 per club. It is important that every active amateur license be ready to do his part and assist in using his amateur facilities and authorization in taking on communications radio responsibilities in any emergency, natural disaster or other. The average radio club can be described as having 32 members, 27 licensed, five interested but unlicensed persons, and 10 per cent of those licensed holding the Novice or Technician Class licenses. Our statistics also show 6.4 mobile-installations per club.

Looking for a possible shortage of equipment in some categories, we find plenty of home (fixed) stations and that the mobiles permitting us to ride around and push buttons and communicate are also reasonably plentiful. The unfulfilled emergency need in the equipment field seems to be for more hand-carried units of which but three per club were reported. To operate from battery supplies such as available by taking over or cannibalizing the nearest automobile for a battery (in dire emergency), we determined (from our figures) that there are available about 4.7 vibrapacks per club and 6.35 dynamotors in each club group. Multiple this by 100 active affiliated clubs and you have quite a showing of equipment. The fact that we have a successful Field Day demonstrates our know-how in making this equipment operate. The trend in U. S. A. operations has been to establish a thirty-watt class as the lowest power category in Field Days. The RSGB used to set up a weight limit for equipment categories although now the trend on the continent seems toward higher powers. But do we perhaps not need some hand-carried equipment category or ARRL Field Day credit for lightweight equipment that can be carried on one’s person . . . into zones where automobiles cannot go?

The club sampling indicated about 12 operators per club in RACES plans and about 8.9 as the number of station authorizations covered in RACES plans in a given club’s member-participation. FCC records of FCDA approved plans of course give a better idea of the number of station authorizations in the nation. At the end of last year the Federal Civil Defense Administration indicated 42 states as having approved state-level RACES plans; others are still in the making. There are now over 500 such local plans officially approved and in operation.

Save Air Mail, Enclose Stamps. Many an American amateur writes us about the problem of getting the pastebords (QSLs) from overseas stations. It may help all concerned if we consider this matter from the viewpoint of amateur operators overseas, especially from those so active as to receive a large volume of requests for QSLs. There’s no question that “the QSL is the final courtesy of the QSO.” This becomes a matter of each of us noting any way to make it easier to QSL. What little contribution to speed and convenience can we make to assist a fellow amateur on meeting the practical problems? KH6JJ (via W2SDB) in Harmonies, published by the South Jersey Radio Association, reports that keeping up with QSLs, especially when you make over 5000 contacts in one contest, seems futile. Many even expect him to answer every card by return mail.

“If the fellows would only save their air mail stamps on their outgoing letter and enclose a stamp instead, they would get quick action,” he writes. Going on with his letter, the bulletin relaying Katashi’s remarks says, “While I try not to unduly encourage QSLs, apparently a contact automatically calls for a card when it is a new one. Only one card in each thirty received is now stamped . . . Please help. Tell them to enclose stamps.” Where KH6JJ refers to stamps this can apply in US territories only of course, enclosure of return postage in other areas requires International Reply Coupons, available at U. S. post offices.

For DX, QSL Follow-ups. On the hard-to-get ones we are surprised that more amateurs interested in DX are not using the International Reply-Paid postal cards. These are available at your local U. S. post office, a double card to be sent with both halves joined. The reply half, pre-stamped and marked “Carte Postale Réponse” will be accepted in other countries for return, by surface means only, and without payment of additional postage. This of course is not as fancy as your personal imprinted card, but how can you lose at only 8¢? It necessitates no delay or load on the overworked QSL Bureaus. You know that your own address is complete and correct because you put it there. An exact blank form like the ARRL log form can be reproduced on the return part of such a double card, of course. The chances are that (from the rare ones) you are looking for reliable acceptable confirming-QSO information instead of exotic scenes or a display of color in the call letters.
Therefore you can use these IRP postal cards without any printing, after some six months or more have elapsed — and still no QSL.

As to the mailing of this follow-up or repeat card, be sure you include all data the original card carried as to the QSO that took place. Your earlier QSL may not ever have arrived, and this one will require a check-up in someone’s log before he’s going to respond to such a follow-up. And you will not want your attempt to be spurned as a spurious request! Both halves of the card we suggest should show spaces for the essential data. Your side filled out fully will assist the operator in locating the part of the log to be followed when he fills out the part to come back to you. Both station calls, the fact that a QSO is confirmed, the date and time it took place, the frequency, mode, signal report and the operator’s signature should be on any such documentary proof sent back to you. These items are all more likely to be there if you take the trouble to stress the need or indicate by space provisions for specified information on the form to be sent back to you that all this information is desired.

The regular international reply coupons can be used in any letter sent overseas to prepay for the overseas amateur an ordinary surface-mail letter reply — which you hope will contain your QSL! Such single coupons cost 13¢ each at your local U. S. post office. They are good in all countries except Korea, so far as we know. The call-book’s table of mail rates to different countries also gives an indication of how many international reply coupons are required to prepay an Air Mail reply.

Fall Season Announcements. Some of that good full operating weather should be just around the corner as this QST arrives. We also hope to be meeting many of you at the ARRL National Convention at Chicago over the Labor Day week end. Returning home from that you and I will be set for on-the-air activities to make the best of the good September operating conditions. What we do through the medium of our stations is a key to our amateur progress. Don’t forget that your SCM will welcome your monthly report of your station activities whatever frequency or group you work with. Your Section Net will give you a warm welcome. Holding down an ARRL station appointment such as the SCM can offer, if you rate it, or getting into spot activities, will increase your circle of ham friends. Accelerated communication results come from any taking part in organized amateur radio communications.

With things looking up for the best operating season ever in every amateur specialty let us try our equipment where possible in the special activities scheduled for September. (1) See the announcement elsewhere in this issue for the ARRL Frequency Measuring Test, the evening of Sept. 18. If you have a BC-221 or LM-frequency meter or receiver with 100 kc. crystal and good calibration and stability, give this a whirl and see how well you can do. (2) Don’t forget the Code Proficiency Qualifying Runs from W6OQP and W1AW ... Sept. 5 and 7, respectively. (3) The W/VE Contest is put on by the Montreal Amateur Radio Club for dates of Sept. 28-29. We think you will find it interesting to try your hand. Send them your results (not us) per the notice of this activity elsewhere in this issue. (4) Try the Virginia Free-For-All QSO Party (rules this issue) the week end of Sept. 14-15. Here’s plenty of inviting activity. Don’t pass up these opportunities! For the coming months we also invite attention to the ARRL Activities Calendar. See you on the air!

— F. E. H.

**ARRL ACTIVITIES CALENDAR**

Sept. 5: CP Qualifying Run — W6OQP  
Sept. 17: CP Qualifying Run — W1AW  
Sept. 18: Frequency Measuring Test  
Sept. 21-22: V.H.F. QSO Party  
Oct. 2: CP Qualifying Run — W6OQP  
Oct. 12-13: Simulated Emergency Test  
Oct. 16: CP Qualifying Run — W1AW  
Oct. 19-20: CD QSO Party (e.w.)  
Nov. 7: CP Qualifying Run — W6OQP  
Nov. 9-10, 16-17: Sweepstakes  
Nov. 11: CP Qualifying Run — W1AW  
Dec. 1: CP Qualifying Run — W6OQP  
Dec. 20: CP Qualifying Run — W1AW

**OTHER ACTIVITIES**

Sept. 7-8: LABRE DX Contest (e.w.), LABRE (page 71, August QST).  
Sept. 11-15: LABRE DX Contest (phone). LABRE (page 71, August QST).  
Oct. 5-6: VK/ZL DX Contest (phone), NZART and W1A (page 72, this issue).  
Oct. 12-13: VK/ZL DX Contest (e.w.), NZART and W1A (page 72, this issue).

The following lists date, name, and sponsor. Details will be presented in future issues of QST.

Nov. 1-2: RTTY Sweepstakes, RTTY Society of Southern California.  
Nov. 23-24: 21/28 Me. Telephony Contest, RSGB.
One thing that is impossible to simulate in any hypothetical emergency is the chaos and consequent loss of efficiency which would be so definite a part of any real attack. In the Operation Alert just concluded, there was a tendency on the part of participating personnel, both communications and otherwise, to use the radio as an outlet for humor, kidding, fun and jokes. It's all a big game of make-believe, and we try to hide our sheepishness at playing this kids' game by indulging in a little humor. Some of us (i.e., those who are kids) participate mainly for the enjoyment we get out of this aspect.

And why not? It is enough to simulate the situation itself without being asked to simulate the reactions that would result if the situation were real. We are communicators, not actors. Yet, in our analysis of results of simulated emergencies, especially those dealing with wholesale enemy attack, we ought to take these things into consideration. If fifty million people out of 150 million people were wiped out by the attack, this would mean that 50,000 amateurs were wiped out with them, and that our communications forces, whatever its make-up, would be reduced by one third. Many of our facilities would have gone with them, reducing our ability to communicate. Civilian mechanics left alone in the cities would be like the rest of our resources and chaos poured in, would be excited, nervous, worrying about their loved ones and about their own safety. Some would; let's face it, desert. Would you stay on duty if you were sequestered from your family and had no knowledge of their whereabouts or their welfare? Those remaining would be overworked, overworked, emotionally unstable, and would quickly reach the point of physical and mental collapse. Both the confusion and the traffic load would be multiplied at least tenfold over anything we have ever simulated. The real thing would be even more than the most realistic test we have had, and yet we try to estimate the actual situation on the basis of tests and simulated attacks.

Speaking on the average, if the real thing came along we would need at least ten times the facilities, personnel, installations, supplies and channels that we now count on. For a long time the air would be crowded with "emergency" traffic. It would all be "urgent" and, under the pressure of officials desperately needing communications, circuit discipline would be worse, not better, than it always has been -- a lot worse.

Unusually, when someone starts talking as above, he prefaced it by saying: "I don't want to frighten you, but . . ." It seems to us that it's about time we start getting frightened, or at least looking at the situation realistically instead of wishfully. We are woefully unprepared, and this is mainly because, although everybody who thinks about it at all realizes it could happen, very few really believe that there is any likelihood of its happening. To those who are convinced that it will never happen (they hope), all this preparation is a waste of time, energy, and money. If it should happen, they will simply waste their services and succeed only in adding to the confusion. Meanwhile, they exercise their right to speak.

No immediate solution is suggested. What is suggested is that we face facts, and one of the facts is that our communications facilities in RACES are still a long, long distance from being in an adequate position to handle the emergency communications load that would be dropped on us in the event of enemy attack. We can and will continue to do what we can with what we have to do with it, and we can be proud of the fact that our results are probably closer to adequacy than those of most of us, but let's not indulge in wishful thinking, fellows. Let's not kid ourselves.

W3CVF suggests that each emergency net take upon itself the responsibility of having one of its stations monitor the National Calling and Emergency Frequency at all times during any emergency. The frequency monitored would normally be the one in the band which the emergency net is using. In this way, stations with traffic for the affected area would not need to know the frequency of the emergency net serving that area; they simply tune into the traffic onto the NCEF. Such stations need not be in the emergency area, but should be capable of handling traffic to and from that area.

On April 11 a Navy plane out of Jacksonville Naval Air Station was reported missing somewhere in the Charleston-Savannah area. W5CQP, who lives next door to the missing flier's parents in New Orleans, on April 14 contacted the Charleston Navy Yard by amateur radio, which reported no information available. Later that evening W4NEK at Jacksonville was contacted, and one of the search pilots spoke directly to the missing flier's parents. Contact was maintained with W4NEK for 14 days, usually by relay since band conditions seldom permitted direct contact. Amateurs who participated in relaying included W5BCY, K1AEP, K34DP, W2GCU, W1VP, W5TCL and W2ZWL.

Alabama's Azalea Emergency Net (AEEN) was in operation on April 14 when floods threatened Mobile. NCS was W4QEE with K4EHE (EC) and K4JOV operating. Handling traffic for the Coast Guard, Red Cross and National Guard, the net was instrumental in the evacuation of 80 people ahead of the flood waters. Amateurs participating included W4ZB FBZ/m, LPF/m YAI HW/m CSA/m IAX/m NU, K4s E8R BYG, W5IAL/m, etc.

Lubbock County (Texas) EC W5BFE reports amateurs in his organization were active in nine tornado and storm alerts in the period April 20 to May 31 involving roughly 46 operating hours and 1,156 man hours of operation.

During the early May dry spells in the Northeast, many forest fires broke out, the most serious of which appear to have occurred in Western Massachusetts. Reports from W1BB, W1PSL, W1ALP, W1IBB and W1KCR will supplement the information already provided by W1ZT in August 1957 (p. 80). Members of the Winthrop Emergency net reported for duty in Manchester, under the leadership of alternate radio officers W1DLY and W1DEL. Around-the-clock operation was maintained from Winthrop to Manchester, Beverly, Topsfield and other points by twelve amateurs, both from their own stations and field points. Operations at Manchester were conducted by W1DLY, radio officer for Beverly. The following additional Winthrop amateurs participated: W1's WLP CJF JJJ 100 IRY DPN FAJ BDU MQB Y2N KNAIQ/m, W1IBB sends, through W1ALP, an Interesting report of his activities in this area.

It seems that Area 1 of Maine, C.O. sailed him and W1DLY to set up communications between Manchester and Topsfield, and they finally wound up at the old WWZ tower 80 feet high, the only point from which they could contact Topsfield. Contact with the town hall of Manchester was then established through another 2 meter link. W1IBB was on duty atop the rotoring tower for over six hours, and later went to Topsfield to help man that end of the circuit for another eight hours. The following additional amateurs were reported to have participated in fire activities from the Manchester area: W1's AR LLY NAD NDI EQQ RSX AQX ZUL YEP CSG ENS KTG JPS EZZ NAR ZAW DEX FTX NU DWW and K2UHU. W1PSL reports that on May 9 he was requested to provide communications between Area 1 Sector 10 and the fire at Plymouth, W1VBC was activated and manned by W1's PST YZG and ABJ. W1's BAB TTS and K1J provided the link to Topsfield on 10 meter phone. Plymouth's W1's NINE DXQ and CRO were mobile in the heart of the fire, keeping communications lines open with W1's NJL MIO HSN ALP.

NATIONAL RTTY CALLING AND WORKING FREQUENCIES

<table>
<thead>
<tr>
<th>Frequency (kHz)</th>
<th>Working Frequency</th>
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<tbody>
<tr>
<td>3620</td>
<td>7140</td>
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</table>
IPE and T2. W1KCR reports that he relieved W1RJC at the police station in Plymouth and worked with W1EJP until daylight to relieve W1RJC. W1LG was operating from Kingston and at times from his mobile. W1LHZ and BTL dropped in during the evening. W1KCR operated for 21 hours solid, with no sleep.

On the evening of May 14, greater Cleveland was visited by a violent windstorm with winds up to 80 m.p.h. Because of severe damage in the western part of the city was alerted. When e.d. officials arrived at their headquarters they found the amateurs already there and in operation. The following amateurs participated: W7E A.H. HUW D.C. KVQ Feczky K6NQ VOF KGZ VM SEM M6IAA.

W3EJA, EC Cuyahoga Co., Ohio.

On the evening of May 20 a tornado storm system moved across Kansas into Missouri. Funnels wreaked damage on Ottawa, Spring Hill, Martin City, Hickman Mills and Ruskin Heights, the latter two suburbs of Kansas City. Working under the general control of W8BCY, the Heart of American Radio Club station at Kansas City Red Cross, 10-meter mobiles provided communications between the stricken area and Red Cross. Telephone communications were non-existent. WMEO in southern Kansas acted as net control for the mobiles, who were working with Red Cross disaster teams. Mobiles were also dispatched to various hospitals to provide for better routing of patients. Later, Red Cross centers were set up at the disaster area with a mobile assigned to each, to provide communications between the mobiles. This is the substance of a report of this emergency in Midwest Cities.

Within less than an hour after the tornado struck Spring Hill, KB6SW/m and WB8WJC/m arrived from Kansas City, assisted by KB9HWM, K8EOR arrived a few hours later. WB8WJC/m set up as the base station at the disaster center, and acted as NCS releasing instructions to the mobiles; he was assisted by KN6HVF. The amateurs aided the Sheriff's Patrol, the Highway Patrol, local police in controlling vehicular traffic, search parties, directing clean-up crews and providing communications between officials. Thanks to K8EOR for the report on details at Spring Hill.

During the afternoon of May 21, tornadoes struck several Missouri communities, with maximum damage at Fremont and Desloge. A group of amateur mobiles was sent from St. Louis to set up relays to Desloge. First traffic from Desloge was originated at 1135, only two relays being required (although three were set up) until 0300 May 22, after which unnecessary. Traffic was handed for the Red Cross and Weather Bureau. W9DTE traveled between the three relay stations to help as needed. Relays were set up at High Ridge (W0NYT and K8EIK), Herculaneum (W4AAB), Flat River (W4TCE and K8BYL) and Desloge (K8CHR and W4WUK). K8CYS aided K8DGG at the St. Louis terminus. The station at Flat River was finally set up as a fixed portable with a 100-watt linear amplifier. Operators were released by the Red Cross at 0910 May 22, at which time two telephone lines were in service to St. Louis. W6PCB furnished some initial information from Desloge. Other amateurs participating included W1 DJV CBS DFQ WPS KOU CDA CPT GCM PCT PFG QMP HMG HMX YOR ZT1, K3A DCQ DQG, W7R DWB SH0 AIU. Thanks to Missouri SCM W9GEP for this report.

On May 21 the Gadson (Ala.) Emergency Net (AAENT) went into emergency session to assist in communications connected with a lost boy in the Lee mountain area. Information was relayed by AAENT to a local broadcast station for public announcement without direct communication. When the last child was located two hours later, the information was relayed from K4J3/0 to K4AJ/K to K4ISBR who phoned this contact direct to the h.e. station. Also assisting were W4YPC W4DEQ and K4JC. — W4YKL, SEC Ala.

When W9RUK heard a call for assistance from W2XZM/mm on June 5, he made contact and was told that the Flying Enterprise II had a sick seaman aboard with no doctor. W9RUK called a doctor friend at the Glenview (IL) Naval Station and patched him to W2XZM/mm, for consultation and diagnosis. The malady was diagnosed as penicillin allergic reaction and treatment was prescribed. The following day, when another contact was made, W2XZM reported that the seaman was much better and would soon be up and around.

On June 20, a train wreck at Guthrie, Ky., alerted a number of Tennessee and Kentucky amateurs who were able to assist by providing information concerning the wreck and handling welfare traffic on 3880 kc. for a period of about six hours. Stations participating were W4s WHW CVM GEN PFP ATQ BAM AND WQT. W4QTT served as NCS and is proud of the fact that he did this with a 20-watt s.s.b. rig.

On July 5 EC W4GTL was called upon to assist in operations connected with dragging the Hudson River 10 miles south of Albany in search of a drowning victim. Communications were needed between ships and the Yacht Club pier from which operations were being conducted. W2F0O and K2EJV immediately proceeded to the scene in their mobiles, while K2MBF stood by as a base station for Albany, K2HQL, W2FEN and K2HIM also readied their personal holiday plans. In all, 12 mobiles were involved in the operation of the ship-to-shore and pier-to-base station circuit enabled keeping track of many search boats, food and gasoline requests, messages for the cutter, undertaker and finally, the "mission accomplished" message to state police headquarters, which arrived by amateur radio several minutes before other facilities for its transmission were available. W2s DIF and LXP and K2s RDI and HVO also assisted. All equipment used was owned and operated by the ARSC members. — W4QTT, EC Rochester, N. Y.

Twenty SECs submitted reports on May activities on behalf of 547 ARSC members. This is a slight increase over last year's record. Rhode Island reported for the first time this year, putting its total sections heard from at 32. So far, 13 sections have 100% reporting records for 1957. Mid-year summary next month. Other reports covering for May: Ga., Minn., W. N. Y., N. M. Colo., E. Fla., Wis., San Joaquim Valley, NYC-LI, Santa Clara Valley, Mont., Maritime, Ont., Wash., So. Tex., Conn., Ore., Mo., Ala.

RACES News

Quite an extensive RACES-ARSC program is being planned for the National Convention in Chicago over the Labor Day week end, says page 31, August QST for details.

Note that you can be those ARSC members who are going to attend RACES and make the ARSC have a special room available, open during the entire convention, and no doubt we'll be hanging around there a lot, so be sure to drop over to say hello and to talk over your RACES problems with Jim McGregor from FCDA and yours truly. ARRL and FCDA are going to get together in person before the convention to map strategy, agree on what to discuss on, and in general get our signals straightened out: so if you're expecting to observe any last fistic fights from that quarter, you'll be disappointed. However, there should be plenty of fireworks from other sources. If present plans materialize, W9SM will be on the air en route to the convention on Thursday, August 29 and Friday morning, August 30, on 80, 40, 20 or 10 meters, phone and/or c.w., so give a listen for us. See y'all in Chicago.

RACES news is scarce this month, probably because everybody is so busy with Operation Alert. If you have not yet sent us any information on your participation, it is now too late to do so if our plans to have the write-up in October QST have materialized. But send it anyway, in case the write-up has to be cut off to the first of last year). If we get it too late, we may still be able to summarize in this column. Don't forget to send us any pictures you may have taken.
TRAFFIC TOPICS

Last year we promised to try to get the net directory out a little earlier. We still intend keeping that promise, but we need your help. The main reason we have not been able to produce it before the end of January in the past couple of years is that registrants do not send us their registration information during the summer. When you read this, if you have not yet re-registered your net (since August 1) for the fall season, how about sitting right down and doing so? Give us the following information:

(1) Name of Net. We want the official name of the net, not what you think it ought to be. If your net has no official name, how about adopting one? Remember that whatever name you adopt will appear on the list, so let's try to keep a semblance of dignity in order to impress, not simply to amuse.

(2) Net designation, if any. The set of letters which identify the net on the air or in conversation.

(3) Frequency or frequencies, in kc. If more than one frequency, be sure you line them up properly with days of operation.

(4) Days. Tell us which days, not how many. "Daily," for this listing, means every day, including both Saturday and Sunday.

(5) Call of net manager. The net manager is the amateur who organizes the net, arranges for NCS, conducts correspondence, etc. If there are different people, give us the call of the over-all boss.

(6) Net starting time(s). Net ending time(s). If your net has no specific ending time, indicate it approximately. Use "standard" (not "daylight" or "local") time, or use GMT. Be sure to indicate your time zone by EST, CST, MST, or PST.

(7) Direct coverage. This is the coverage of your net by stations who actually report in, not including the coverage of nets or stations with whom regular liaison is maintained.

(8) Purpose of net. We are not interested in registering strictly social or ragchew nets. Indicate purpose as traffic, emergency or both. If neither, leave blank.

(9) Starting date. If a new net, the date it started. If a net recessed for the summer, indicate its fall starting date. If an old, continuously-operating net, the year it was founded.

(10) Net control stations. List them by call. They go on our mailing list to receive certain bulletins.

(11) NTS? Indicate whether net is an integral part of the ARRL National Traffic System. In other words, is this net represented in its NTS regional net in accordance with the NTS plan?

(12) Liaisons. We'd like to know the names (or designations) of nets with which regular traffic interchange is conducted.

(13) Call of the amateur who submitted this information.

We are making Form CD-85 net registration cards available through the medium of September LO Bulletin and the October CD Bulletin, as usual. These cards will be sent to anyone on request. Net Managers of record are receiving reminders to re-register their nets, as are all other persons who registered nets last year. Generally speaking, it is not possible for us to go through reports, bulletins or miscellaneous correspondence to correct net registration information, so better make a special point to send us the information requested above.

First QST list will be in November QST; let's make it a big one. Supplementary lists will appear in the January, March and May issues. As soon as registrations appear to be complete, we'll compile the annual complete cross-indexed net directory. This year, we'd like to close out net registrations for the completed directory by November 1, so that the directory can start distribution by the end of that month. It's a worthy objective: whether or not it can be realized is pretty much up to you guys.

CD-85 (Rev. 9/54)

The best way to register your net is to request a copy of this net registration form from ARRL, or to put this form on a postcard. It contains all the information we need on your net.

Important Note: registration of your net in our net directory gives you no special status as over an unregistered net. The net listing is for information only.

Gone to the National Convention in Chicago over Labor Day week end? Art Swinfen, W6DO, and Jim Wilson, W6URK, are cooking up an interesting traffic program. See details in August QST, p. 52. Hope to see you there.

Miscellaneous June reports: Dragg Net held 20 sessions, handled 1015 messages, checked in 386 stations. Interstate Sideband Net handled 481 messages, had 85 stations in an average session in an average time of 1.26. The Early Bird Transcontinental Net reports a traffic total of 125 in 34 sessions. North Texas-Oklahoma Net reports 30 sessions, 954 check-ins, 291 messages. Transcontinental Phone Net reports: 1st Call Area — 1171; Second Call Area — 930; 4th, 9th and 10th call areas — 855; Total — 2985.

National Traffic System. In NTS, net managers for section nets are appointed by the SCM concerned; this takes the manner nicely out of the hands of headquarters people. At regional, area and TCC levels, however, it's a different story. The rules and regs of the Communications Department require that NTS net managers at regional and area levels be appointed by the Communications Manager. Under certain procedural requirements, this responsibility has been delegated in almost carte blanche fashion to your NTS Manager.

September 1957
We thought you might like to know just how we go about selecting appointees for these important posts.

In the first place, we get a recommendation from the outgoing manager, if he has one. If we agree (and we usually do) that this is desirable, we then write that person to ask if he is interested, and if he will accept. This letter, although addressed to the prospective manager, is usually accompanied by a letter from us with instructions to remit us to the address if he approves the appointment. After all, the SCM knows the people in his section better than we do, and on occasion this procedure has prevented us from appointing some undesired amateurs; it has also caused delays and embarrassment.

Anyway, after the SCM has indicated his approval by forwarding the letter, and the prospective manager agrees to tackle the job, we send him full particulars on exactly what is expected of him, plus whatever forms or other sources of help he needs. After he has held down the job for a while, he gets a special hand-written letter from headquarters.

In the event that no replacement for an outgoing manager is immediately available, the selection of one can be a time-consuming process. It is seldom easy to find the best combination of ability and willingness, and once in a while the former has to compromise with the latter. A regional or area net managership can be as hard as easy as the man selected himself makes it. Most managers seem to feel that it is their job to take assignments as NCS or liaison stations when no one else is available. We don't look at it quite this way. The manager is the leader, the coordinator, not the main source of all work. While it is all very well for him to set an example by taking a regular assignment himself, he is not expected to carry the full load, or even more than his fair share of it. We occasionally have an NTS manager who finds it unnecessary to take any regular assignments, who can thus devote himself entirely to seeing that the NCS and liaison stations are full and to doing the necessary paper work.

That this is a rarity is unfortunate, and is an indication that all is not as it should be.

Being an NTS net manager or TCC director can be rewarding in its own right, without paper recognition, although we do our best to provide this too. We would like to have a situation in which more traffic amateurs are not only willing but eager to take such leadership roles and to express this eagerness without undue modesty when a management is "up for grabs." We would like to see it a position to be sought after rather than to be avoided. And we would like to see their jobs made both easier and more enjoyable by their having plenty of willing operators to choose from to fill all NCS and liaison positions in operation of their nets. This is where you can help.

June reports:

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<thead>
<tr>
<th>Area</th>
<th>Functions %</th>
<th>Successful Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern</td>
<td>70</td>
<td>365</td>
</tr>
<tr>
<td>Pacific</td>
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<td>760</td>
</tr>
<tr>
<td>Total</td>
<td>70.5</td>
<td>1803</td>
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Out-of-net:

<table>
<thead>
<tr>
<th>Area</th>
<th>Functions %</th>
<th>Successful Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern</td>
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<td>265</td>
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<tr>
<td>Pacific</td>
<td>70</td>
<td>250</td>
</tr>
<tr>
<td>Total</td>
<td>69.5</td>
<td>515</td>
</tr>
</tbody>
</table>

The TCC router: Eastern Area — W35A NW JFM EMG, W82A HDW ZRC, W3MW, W4DBW, W6CKY, W6DO; Central Area — W7A CVX DO JRJ, W9E BDR SCA LCG K7Z; Pacific Area — K50W VAP PLG YHM EOT RFW RPW IPW VPC HC, K50Q QMA DTX GZ ORT, W77A GMC UJL ZBO, W8QKQ. These boys and gals are doing a terrific job.

FREQUENCY MEASURING TEST,
SEPTEMBER 18

ARRL invites all amateurs to try their hand at frequency measuring. W1AW will transmit signals for this purpose starting at 9:30 p.m. EDT (6:30 p.m. PDT), Wednesday, September 18. The signals will consist of dashes interspersed with station identification. These will follow a general message sent to help listeners to locate the signals before the measurement transmission starts. The approximate frequencies used will be 5552, 7041, and 9154 kHz. At 11:45 p.m., the 9154 kHz signal will be dropped, and the 7041 kHz signal will be changed to 7036 kHz. The approximate frequencies used will be 5557, 7015, and 11500 kHz.

Individual reports on results will be sent to all amateurs who submit their reports. When the average accuracy reported shows error of less than 7.1 parts per million, or falls between 7.14 and 357.15 parts per million, participants will become eligible for appointment by SCNs as Class I or Class II OOs respectively.

This ARRL Frequency Measuring Test will be used to aid qualification of ARRL members as Class I and Class II observers. Present observers not demonstrating the requisite average accuracy will be reclassified appropriately. They are expected to participate in the test for at least two years. For each year that a report is submitted, the following results will be considered: 300, 700, and 11500 kHz.

Any amateur may submit measurements on one or all frequencies listed above. The entry consisting of a single measurement will be eligible for the Class I listener's results. The following requirements must be met:

1. Regional Net representation based on one session per night after July 1. Others may send in two or more sessions.

2. Section net reporting: OSN (Ga.); LLN (Ill.); CPN (Cnn.); Town 75 Phone; QSK, QSK 88 & QSK (Kans.); NTX (Texas); KYN & KPN (Ky.); NJN (N.J.); NSN (N.M.); WVW (Va.); AENB, AENF & AENL (Ala.); W3MW, W3DF, W3DF and W3DF (Fla.); San Diego, CA; W3MN (Mich.).

3. TCC functions reported, not counted as net sessions.

Note the 100% reporting reflected in the tabulation, due to conscientious reporting of two non-managers who knew the net data would not otherwise be reported.

Starting next month, the "rate" column will be calculated somewhat differently. In accordance with a proposal by W2ZIC, which is a majority of regional and area net managers in the future, it will be calculated by dividing the total number of minutes the net was tested in each month by the total number of minutes the net was in session that month. It is felt that this will give more significance to this column of the tabulation.

W2ZIC reports that 2RN is now holding its first daily session (17 45 EST) on 7100 kc., to overcome local conditions; a 2RN certificate has been awarded to K2PQF. W39UE is suggested for activity on 3RN. W4KIC reports for 4RN in the minimum absence of W1LAP from the scene. W3RFC and W4RLG reported for RN5 in the absence of a RN5 manager. RN7 is being troubled by conditions. W8DSX can't see why other net managers have no success with the 2130 regional session. Tornato weather washed out eight TNE sessions during June; note their resulting low traffic total. Poor conditions and vacations are taking their toll on ECN. Nice report from PAN manager K6DX, who says that W9PLQ has received his regional net certificate and was present at the meeting.

Transcontinental Corps, W3WQ and W9KQI both reported on Form CD-135, so here are their data:

<table>
<thead>
<tr>
<th>Area</th>
<th>Functions %</th>
<th>Successful Traffic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern</td>
<td>59</td>
<td>81.6</td>
</tr>
<tr>
<td>Pacific</td>
<td>131</td>
<td>82.0</td>
</tr>
<tr>
<td>Total</td>
<td>59.5</td>
<td>1803</td>
</tr>
</tbody>
</table>

This concludes our report for September 18.

QST for
CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made on September 17 at 2130 Eastern Daylight Saving Time. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7080, 14,100, 21,010, 50,000 and 145,600 kc. The next qualifying run from WGOWP only will be transmitted on September 5 at 2100 PDST on 3490 and 7228 kc.

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

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

**Date** Subject of Practice Text from July QST

**Sept. 3:** Test Meters and How to Use Them, p. 18
**Sept. 6:** A State-Tooth Crystal Calibrator, p. 22
**Sept. 9:** Rule 14, p. 27
**Sept. 12:** Simplified CHIEF DX Predictions, p. 28
**Sept. 16:** Stand-up Lascals, p. 46
**Sept. 23:** Simplified Transmitter Control, p. 39
**Sept. 26:** Operating Achievement Awards, p. 50

**DX CENTURY CLUB AWARDS**

From June 15, to July 15, 1957 DXCC certificates and endorsements are based on postcard contacts with 160 or more countries issued by the ARRL DXCC Department to the amateurs listed below.

**NEW MEMBERS**

**W6YDJ** 300 HZQ 111 W6AQG 102
**W6WJ** 230 HZQ 108 W6WJ 109
**W6NZ** 169 HZQ 108 W6WJ 109
**W7GB** 138 HZQ 106 W6NQ 100
**W7GJ** 224 HZQ 108 W6RA 100
**W8BQ** 16 CQ 106 W6BQ 100
**W8WH** 11 CQ 104 W6WJ 106
**W6RJ** 11 CQ 104 W6WJ 106
**W8KQ** 114 HZQ 103 W6WJ 106

**Radiotelephone**

**W1AR** 195 HZQ 103 W6KQB 101
**W1PV** 128 HZQ 103 W6KQB 101
**W1WJ** 128 HZQ 103 W6KQB 101
**W1WY** 11 CQ 102 W6KQB 102
**W1WZ** 11 CQ 102 W6KQB 102
**W2GO** 114 HZQ 103 W6WJ 106
**W2NA** 195 HZQ 103 W6WJ 106

**ENDORSMENTS**

**W6Q** 320 U17CD 222 K2AQA 201
**W6V** 230 K2AQA 201
**W6W** 208 K2AQA 201
**W7A** 208 K2AQA 201
**W8A** 208 K2AQA 201
**W8B** 208 K2AQA 201
**W8C** 208 K2AQA 201
**W8Q** 208 K2AQA 201

**WIAW SUMMER SCHEDULE**

(All times given are Eastern Daylight Saving Time)
A printed local map showing how to get to WIAW from main highways or from the Hq. office will be sent to amateurs advising them the intention to visit the station.

**Operating-Visiting Hours:**
Monday through Friday: 1300-0100 (following day).
Saturday: 1000-0200 (Sunday), Sunday: 1500-0200.
Exemption: W1AW will be closed from 2230 Sept. 1 to 1300 Sept. 3 in observance of Labor Day.

Official ARRL Bulletin Schedule: Bulletins containing latest information on matters of general amateur interest are transmitted on regular schedules.

**Frequencies:**
C.w.: 1885, 3555, 7080, 14,100, 21,010, 50,000, 145,600.
Phone: 1885, 3915, 7235, 14,280, 21,330, 50,000, 145,600.

**Times:**
Sunday through Monday, 2000 by c.w., 2100 by phone.
Monday through Saturday, 2300 by phone, 2400 by c.w.

**General Operation:** Use the chart on page 88, May QST for determining times and frequencies for W1AW general contact with any amateur. Note that since the schedule is organized in EDST, the operation between 0000 and 0700 each day will fall in the evening of the previous day in western time zones.

**Code-Proficiency Program:** Practice transmissions at 15, 20, 25, 30, and 45 w.p.m. on Monday, Wednesday and Friday, and at 5, 75, 10, 15 and 20 w.p.m. on Sunday, Tuesday, Thursday and Saturday are made on the above-listed frequencies. Code practice starts at 2130 each day. Approximately 10 minutes' practice is given at each speed. On Sept. 17, Sept. 18, and Oct. 1, W1AW will transmit certificate qualifying runs and a frequency measuring test instead of the regular code practice.

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September 1957
**ATLANTIC DIVISION**

EASTERN PENNSYLVANIA—SCM. Clarence Sun-der, W3YPF—Raf.-YAZ, PAM—TEJ, EPA nets: 2550, 3010, 3195 and 3997 kc. This will be my last column. Pressure of my work has made it impossible for me to give this job as your SCM the time necessary and your new SCM, Dick Mierow, JNQ, will succeed me following this month. To all the members of the EPA organ-ization, I would like to express my sincerest thanks for the fine cooperation achieved in this section during the past 25 months. To the club secretaries and the club newspaper editors who were kind enough to put me on their mailing lists, I say “thank you.” To those of you who have had difficulty in getting correspondence from me, I want to express my apologies. I have been traveling from coast to coast and my time at home has been extremely limited. If nothing else, I think that the co-operation between the c.w. and phone nets has increased to a point where there is no more animosity and many appointees are members of both section c.w. and phone nets, making it extremely impossible for me to test their operations. If you have a 50-mc. receiver on 50 Mc. in the York Area: K3AVF and HBO. The Harrisburg Amateur Radio Club’s new operators are BQA, pres.; PKR, sec.; BPG, treas.; and ADE, treas. PNL has a new 10-meter ground plane. IM did the art work for the July issue of Philmont’s Buzzer. KN3ATY is an active member of the Wilkes Barre Post of the Ground Observer Corps with 250 hours to his credit. W3YJ is operating portable all summer at Lake Harmony. New officers of the Pocono Amateur Radio Club ILL, vice-pres.; GIV, vice-pres.; KN9KCZ, secy.; and MDC, treas. JNQ tested this reaction to passivitv during Field Day. The reaction—positive. CUL has a 7-day-per-week sked with the West Coast. She has summer skeds into 31 states daily. ZIJ has an AT-1 and is a dipole in the Cutler (Bucks) Hill Area. NNT has resigned as Section Emergency Co-ordinator. Our thanks to Doug for an MBA job over the past year. W3YJ, also, thanks all who cooperated in Section emergency and I hope to meet many of you in the future, either on the air or in person. Traffic: W3CUL 1415, TRSH 1455, W3RZB 1235, and W3AVX 1515. EPL, 21 AXA 17, DLI 4, AMIC 12, NQR 10, KN3AWW 8, 3WQ 6, PYX 4, UNQ 4, KET 2, BNR 2, EMIL 2, WP 2.

MARYLAND-DELAWARE-DISTRICT OF COLOMBIA—SCM. Louis T. Cramberger, W3TIC or—SEC: PRC, Section Nets: MDD 3560 kc. M-8 1915 EDT. MEPN 3320 kc. MWP 1830 SS 1300 EDT. New appoint-ments: DQZ, Asst. SCM for Delaware; DXA, EC Balti-more. C clipboard for the Foundation of Federated Radio Clubs was formed in Washington to be a perpetuation of the 1953 AHRl National Convention the first that has been held here. The Board of Directors includes SEC, Vice-SEC, Sect. Sec., SCM, and Chairmen. The Takoma Amateur Radio Club’s new officers are TXC, vice-pres.; SSB, vice-pres.; UYF, secy.; and YI2, treas. The Kent County Amateur Radio Club elected W3NHH, pres.; SEP, vice-pres.; P3M, secy., and ZNF, treas. The Takoma Amateur Radio Club’s new officers are TXC, vice-pres.; SSB, vice-pres.; UYF, secy.; and YI2, treas. The Areo ARC took to the West Virginia hills for the V.F.E. Contest, as did NLRARC and the National Capital V.H.F. Society. KLA advises that all those who worked PGA can now send the answer to the puzzle. ZF, guest speaker of the National V.H.F. Society on June 28 and he spoke on v.h.f. s.s.b. Jack is headed for DL-Land and is a new member of that club. Field Day indications are that the MDD clubs were out in force. The RCARA had 10 operating positions at the Gaithersburg County Fair. UTH sends 4444 on 10 meters gave a good accounting of itself. The C.R.C. operating from White Oak, worked Plymouth, Mass., on 5 meters using a Communicator and an eight-element beam. AARC, AFM, operating at the Pimlico Airfield. The furthest message (VFD) was received from JFHV2, Scotch Plains, N. J. EAW, only 17, picked first prize at the Baltimore Science Fair, earning a trip to the Fair held in San Francisco. 4EGK/S, Hayre de Grace, now is in basic training and hopes to be a station at APG upon completion. 5KVI, one of the in operators at WV, is operating on the Great Lakes for the season. WH1F, who has been traveling in EA2-, EA5-, EA6-, LA and HB0-Land, Y3V has moved the two-element 15-meter beam to the place of the three-elementer that has done so well in recent contests. KUD is building a new home in St. Mary’s County, TOM has left the Elkton Area for the West Coast, OJU now has 48 on 6 meters. K3YW regularly skeds BQJ and BWU in Pittsburgh on 6 meters, GNQ sold the DX-100 and is joining the s.s.b. gang with a 20A, KBJL, operating on 2 meters from his summer place in lower St. Mary’s County, worked AAY, YNF and UCR for his first contact with a beam (eight elements) only 10 feet off the ground and the Com- municator operating in the car. 1PO has moved into a new home in Riverside and now has a 7-meter antenna, plus a two-element 10 over a two-element 15-meter beam. KN3ANF is the new secretary of the MEFPN. JNF is mobile on 6 meters. KN3ANF received his ticket in Baltimore and is operating 60- and 40-meter c.w. until the General Class license is earned. OTD added N.D. for 41 on 6 meters. W3JMMF is moving to Buffalo, N. Y. A new Baltimore net on 6 meters; is the new one operated by W3JMR, which meets on 50.25 Mc. at 2000. W3JMR is the new net. W3JIY, who won the Comets 6-meter Linear and CAN and LIP tied for first positions at the Meade County picnic. Traffic: W3JUE 303, TN 149, WV 140, PZV 115, 105, K5WBB 98, W5EUG 85, RV 63, UCR 48, AHQ 46, FAP 43, BUD 9X. SOUTHERN NEW JERSEY—SCM. Herbert C. Brooks, K2BG—SEC: YRW, PAM: ZI. Field Day was the biggest success, many in AEC-RACES operators participating. Field Day messages were received from Hamilton Twp., Radio Assn., Dyer, Pica, JA, SIRA, and Burlington Radio Club and IQ2 in Moorestown. The Burlington Co. Radio Club also took part from the QTH of GOR. Sorry to hear that K2PFT has had extensive damage to his tower and beam. Fred is OPS and OBS, The Jersey Phone and Traffic Net held its 2nd annual picnic at “Wireless Hill.” RG has been appointed to represent New Jersey in the Region 1 C.D. Net. K3SOL, recently appointed OBP, is NC Tue., night on the J.J. Phone Net. The Maple Shade Twp. section will hold a contest, Sunday, July 23, with 2 languages, 10- and 15-meter c.w. operators, headed by KRW. The SIRA meets the 4th Thurs., in the Elton Fire Hall, Gil Cressy, Atlantic Phone Division Director, pres. The phone line conference and I hope to meet many of you in the future, either on the air or in person. Traffic: W3CUL 1545, TRSH 1505, W3AVX 1745. K3KTS makes contact with the Hickory, 1HADTS, 40-meter c.w. station. EPL, 21 AXA 17, DLI 4, AMIC 12, NQR 10, KN3AWW 8, 3WQ 6, PY 4, UNQ 4, KET 2, BNR 2, EMIL 2, WP 2.

NORTHWESTERN NEW YORK—Y32, W4RQ, Y35, W3FQ, W2MC, W2KHP. K2HKUC—SEC: UTH/PRL, RMA: RUF and ZRC. PAMs: TEP and NAL NYS C.W. meets on 3015 kc. at 1900, PSS on 3090 kc. at 1900, TAR on 3570 kc. at 1900, NYS C.D. on 3910.5 and 3933 kc. at 0900 Sun.. TCPM 2nd Cell Area on 300 kc. at 1900. BQN 2nd Cell Area on 300 kc. at 1900. HLI 2nd Cell Area on 3970 kc. at 1900. Erie County really came alive on 2 meters after forty Comets Communicators were passed around the county. At least ninety stations have crystals for the calling. The frequency is 146.410 Mc. and the 15-meter CW is almost continuously manned. The station logs were very long. K2OF has been operating in a new receiver with a better selectivity to pick out the rare DX. K2TFJ is building a 2E28A, 2 meters, also a ten-
Let's Look at Transistors

Transistors have been with us for quite a few years, but it is only recently that amateur equipment employing them has begun to appear. It would be difficult to name any other device of comparable value which has taken so long to become established in the amateur field. As a rule the amateurs pioneer with every new gadget which comes along, but Transistors have been largely left to government military applications and the hearing-aid people.

There is good reason for some of this delay because earlier Transistors would not operate on amateur R.F. frequencies. Then, too, their cost was prohibitive. Today, this situation is changing rapidly. It is now possible to purchase Transistors effective up to 30 megacycles which are moderately priced. This fall we can expect to see a number of completely transistorized units and they will be every bit as elaborate as any communications receiver now on the market.

A few amateurs have been experimenting with Transistors in fairly simple circuits for some time, but we can look for a big increase in this activity as Transistors become more generally understood. It is necessary to keep in mind that the Transistor is not a direct replacement for the vacuum tube since the vacuum tube is a high impedance, voltage amplifying device, whereas the Transistor is current operated and has a low impedance input circuit. In redesigning vacuum tube circuits to operate with Transistors the input impedance must be kept low.

Elsewhere in this issue you will find an announcement of some new Hallicrafters FPM equipment. By employing Transistors properly it has been possible to keep the size and weight to a minimum while maintaining a very high standard of performance.

Very 73,
—Cy Read, W9AA

That's official
W. J. Hallgren W9AC
for Hallicrafters
W/VE Contest
September 28-29

It's going to be Canada vs. U. S. A. again in this on-the-air festivite which comes about annually via the good graces of the Montreal Amateur Radio Club. W/K amateurs will swap contest exchanges with Canadians in all the provinces and territories, while the VE/VO contingent goes after U. S. A. bandm with no holds barred. Call CQ W or CQ VE, depending on whether you're north or south of the border. When contact results, send this information: a QSO serial number, your call, an RST report, your ARRL Section. Obtain the same data from the station worked and then move on for more contacts.

Gordy Webster, VE2BB, MARC Contest Chairman, advises that the Contest Committee is ready and eager to be deluged by logs. Activity from Prince Edward Island — that rare nugget required for WAVE — is anticipated. And what better time to meet new friends across the border and give the equipment a dry run before the SS and other fall activities. Look over the simple rules below and get set for a week end loaded with operating fun.

Rules

1) Any single-operator station located in the ARRL Sections as listed on page 6 is eligible to participate.

2) All contacts must be made during the contest period from 0:00 p.m. EST, Sept. 28 to 11:59 p.m. EST, Sept. 29, with no more than 20 hours operating time for each entry. Times on and off the air must be clearly shown in the contest log.

3) Messages containing the following information must be exchanged and be fully recorded in the contest log: (1) number of contact, (2) your call, (3) RST report, (4) ARRL Section. Example: NB 1 WIZZZZ, 570 Vermont.

4) Scoring: Count one point for each exchange sent and acknowledged, and one point for each exchange received. A station may be worked once on c.w. and once on phone in each band. VE/VO stations will multiply their total points by the number of U. S. A. ARRL Sections worked, and by the appropriate power multiplier listed below. W/K stations will multiply their total points by the number of Canadian areas (maximum of nine: VE through 18 plus VO), then by 7.22 (US U. S. A. Sections, 9 Canadian), then by the appropriate power multiplier, and then by a 2.5 proportional multiplier (based on the ratio of W/K to VE/VO logs received last year). All stations using power inputs of 30 watts or less will receive a power multiplier of 2, and stations using from 30 to 100 watts will receive one of 1.5.

5) Multioperator stations are not eligible to compete.

6) Each entry must be accompanied by the following declaration: "I hereby state that my station was operated strictly in accordance with the rules of the contest and governmental radio regulations, and I agree that the decision of the Contest Committee of the Montreal Amateur Radio Club, Inc., shall be final in all cases of dispute."

7) All entries, postmarked no later than midnight, October 3, 1957, are to be sent to Gordy Webster, VE2BB, Contest Chairman, 59 Fine Beach Blvd., Dorval, Quebec, Canada. Entries become the property of the Montreal Amateur Radio Club.

V.H.F. QSO Party
September 21-22

The month of September marks open season for v.h.f. contacts in another ARRL V.H.F. QSO Party, scheduled from 2:00 p.m. local standard time Saturday, September 21, until 11:00 p.m. local standard time Sunday, September 22. All amateurs able to work any band or bands above 50 Mc. are invited to try out new antennas and equipment and make new v.h.f. acquaintances in the contest.

Call "CQ V.I.F. QSO Party" or "CQ Contest" to raise under participants, and then exchange names of ARRL Sections (as shown on page 6). Rules 4 and 5 explain details on how to figure your score.

A certificate will be awarded to the top scorer in each ARRL Section, and special certificate recognition will also go to Novice, Technician, and multioperator stations (see rule 7).

After the contest, send a copy of your log, in the form shown on page 48 of last June QST, to ARRL, or write now for free log forms, available upon request.

Rules

1) The contest starts at 2:00 p.m. Local Standard Time, Saturday, September 21, and ends at 11:00 p.m. Local Standard Time, Sunday, September 22. 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 period.

4) Scoring: 1 point for completed two-way section exchanges on 50 or 144 Mc.; 2 points for such exchanges on 220 or 420 Mc.; 3 points for such exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of different ARRL Sections worked per band. i.e., those with which at least one point has been earned. 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: W2TBG (S.N.J.) works WIPIR (Conn.) on 50, 144 and 220 Mc. for complete exchanges. This gives W2TBG 4 points (1 + 1 + 2) and also 4 section-multiplier credits. (If W2TBG contacts other Connecticut stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.)

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

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

8) Reports must be postmarked no later than October 9, 1957, to be eligible for awards. See the sample log on page 48, last June QST for correct form, or a message to Headquarters will be printed blanks for your convenience.

FEEDBACK

In the article on the Alert Alarm in the August issue, an error appears in the circuit diagram of Fig. 1, page 19. The arm of $R_2$ should be connected to the bottom end of $R_2$ instead of to the switch. The stationary contact of $S_1$ should then be connected to the top end of $R_2$. 

84
CHOOSE YOUR POWER...

VIKING "ADVENTURER"—Compact, completely self-contained 50 watt CW transmitter. Bandswitching 80 through 10 meters—operates by crystal or external VFO. With tubes, less crystals and key.
Cat. No. 240-181-1 Kit.....$54.95 Amateur Net

VIKING "RANGER"—75 watts CW input, 65 watts phone. May be used as an RF and audio exciter. Bandswitching 160 through 10 meters. Built-in VFO or crystal control. With tubes, less crystals, key and microphone.
Cat. No. 240-161-1 Kit.....$229.50 Amateur Net
Cat. No. 240-161-2 Wired.....$229.50 Amateur Net

VIKING "VALIANT"—275 watts input CW and SSB (P.E.P. input with auxiliary SSB exciter)...200 watts phone. Bandswitching 160 through 10 meters—operates by built-in VFO or crystal control. With tubes, less crystals, key and microphone.
Cat. No. 240-104-1 Kit.....$349.50 Amateur Net
Cat. No. 240-104-2 Wired.....$349.50 Amateur Net

VIKING "FIVE HUNDRED"—600 watts CW...500 watts phone and SSB. (P.E.P. input with auxiliary SSB exciter.) Compact RF unit designed for desk-top operation—power supply/modulator unit fits most anywhere. Bandswitching 80 through 10 meters. All exciter stages ganged to VFO tuning—also may be operated by crystal control. With tubes, less crystals, key and microphone.
Cat. No. 240-500-1 Kit.....$749.50 Amateur Net
Cat. No. 240-500-2 Wired.....$949.50 Amateur Net

NEW!

250-39
250-38
250-37

T-R SWITCH—Instantaneous, high efficiency electronic antenna switching. Gain: 0 db at 30 mcs; 6 db at 3.5 mcs. Rated at 4,000 watts peak power. Will not affect transmission line SWR—provides effective impedance match to most receivers through 3 to 30 mc. range. Complete.
Cat. No. 250-39............................................$25.00 Amateur Net*

DIRECTIONAL COUPLER AND INDICATOR—Provides continuous reading of SWR and relative power in transmission line. Coupler may be permanently installed in 52 ohm coaxial line. Switch on meter lets you read either incident or reflected power—a second control permits easy adjustment and calibration of meter.
Cat. No. 250-37 Directional Coupler.............$11.75 Amateur Net
Cat. No. 250-38 Indicator..........................$25.00 Amateur Net*

*Prices subject to revision.

E. F. Johnson Company
2932 SECOND AVENUE S.W. • WAUCEA, MINNESOTA
Introducing the Viking "Thunderbolt"—the hottest linear amplifier on the market today! Here's solid communication power—over 2000 watts P.E.P.* input; 1000 watts CW; 750 watts AM linear; in a completely self-contained desk-top package. Continuous coverage 3.5 through 30 megacycles—instant bandswitching. The "Thunderbolt" may be driven by the Viking "Navigator," "Ranger," "Pacemaker," or other unit of comparable output. Drive requirements are approximately 10 watts in Class AB2 linear, 20 watts Class C continuous wave. When used with the "Pacemaker" or similar exciter, the non-inductive input circuit requires no grid tuning. Wide range pi-network will match transmission line impedances from 40 to 600 ohms. 

Two meters provide constant visual check—plate current meter also reads watts input, and a second meter reads grid current or plate voltage. Completely self-contained with all power supplies. 115 VAC-230 VAC, 50-60 cycle single phase.

Cat. No. 240-353-1 Viking "Thunderbolt" Kit with tubes . . . . Amateur Net†
Cat. No. 240-353-2 Viking "Thunderbolt" wired and tested, with tubes . . . . $525.00 Amateur Net†

TUBE COMPLEMENT: (2) 4-400A tetrode—Final Amplifier, (2) 866A—High Voltage Rectifier, (1) 6BY5—Bias Rectifier, (1) 5U4—Screen Voltage Rectifier, (1) VR90—Bias Regulator, (2) VR105 and (2) VR150—Screen Voltage Regulator.

*Prices subject to revision. November 1957 delivery anticipated.

See it in operation — You are invited to drop into Room 2346 at the Palmer House during the National ARRL Convention in Chicago (August 30, 31, September 1st) to operate this remarkable power package. Listen for W9ZSO, 9 on the air from convention headquarters.
The F.C.C. permits a maximum one kilowatt average power input for the amateur service. In SSB operation under normal conditions this results in peak envelope power inputs of 2000 watts or more depending upon individual voice characteristics. The Johnson Viking "Thunderbolt" Linear Amplifier produces these higher powers and is the only equipment available to amateurs which can reach the maximum legal limit of "Talk-Power".

Here to stay! The "Pacemaker" is an outstanding power bargain when used alone or as an exciter for the "Thunderbolt" linear amplifier. 90 watts input CW and SSB (P.E.P.) . . . 35 watts AM! Bandswitching 80, 40, 20, 15 and 10 meters.

YOUR BEST BUY—AND HERE'S WHY!
1. EXCLUSIVE—Unique circuitry uses only 1 mixer for improved spurious signal rejection greater than 50 db. Eliminates great multiplicity of sum and difference spurious products inherent in systems utilizing 2 or 3 mixers.
2. BALANCED RANGE AUDIO—Does not sacrifice low frequency response as is usually necessary in filter-type equipment.
3. BUILT-IN VFO—Highly stable, temperature compensated and voltage regulated. Complete coverage of all bands without crystal switching or re-tuning.
4. FRONT PANEL CARRIER BALANCE—Provides optimum carrier rejection.
5. NO FIXED IMPEDANCE OUTPUT CIRCUIT—Wide range pi-network output assures proper load impedance to final amplifier.
6. INDIVIDUAL CRYSTAL CONTROL—of sideband generating frequency for each band.

Cat. No. 240-301 Viking "Pacemaker" wired and tested with tubes and crystals, less key and microphone .................. Amateur Net $495.00

See your authorized Johnson distributor for easy payment terms!
More Gain than Many Reduced Size 3-Element Beams
YET SMALL ENOUGH TO BE ROTATED
BY A TV ROTOR . . .

The hy-gain 2-Element Tri-Bander
ONE FEEDLINE - THREE BANDS (10, 15 & 20M)
There Are More hy-gain Tri-Banders In Use Than All Other 3-Band Beams Combined!

2 Active Elements on Each Band!

Exclusive New Insta-Trap®- a new concept in parallel resonant trap circuits obsoletes old fashioned open-circuit traps. The only adjustable, completely weatherproof trap. Adjustable capacitor color coded for 50, 100, or 200W. Hi-Q coils wound on high impact styrofoam forms which also act as low power factor dielectrics for adjustable capacitors. No air dielectric involved. Trap assembly completely enclosed in weatherproof polyethylene cover with 2 grams of silica gel to absorb condensation.

Boom/Mast and Element Clamp®- ruggedly designed 12 Ga. galvanized steel channel for positive grip. Used throughout the entire Tri-Bander Series. Heavily plated and serrated 5/16” U-Bolts.

The “Carpet Beater” Ends®- employed on all Tri-Banders, specially designed of aluminum wire to reduce fatigue caused by vibration, increase the broad band characters of the beam, and to reduce element sag to a minimum.

Split Insulated Dipole®- fed directly with RG-8U ohm coaxial cable and coaxial line balancing choke results in low SWR on all bands. No adjustment necessary.

$69.50

All specifications furnished from experimentally derived data. These figures will maintain in most installations if antenna is relatively in the clear.

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<td>2 Element</td>
<td>152T-2</td>
<td>5.8 Aver.</td>
<td>18 Aver.</td>
<td>Less Than 1.5:1</td>
<td>68&quot;</td>
<td>72&quot;</td>
<td>1 1/8&quot; Hot Dip Galv. Steel</td>
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The standard of comparison for three band antenna systems, the hy-gain Tri-Bander is factory pre-tuned, pre-matched and pre-adjusted and may be erected in an extremely short time with no test equipment and no further adjustment necessary. Guaranteed to outperform stacked arrays, because interaction and detuning effects have been eliminated. All hardware hot dip galvanized steel for maximum weather ability. Injection molded polyethylene, styrene and cyclocel plastic used throughout. Complete assembly and installation instructions furnished.

IN STOCK AT ALL LEADING AMATEUR RADIO DISTRIBUTORS!
Send for Detailed Brochure!

hy-gain antenna products

1828 N STREET
LINCOLN, NEBRASKA

88
Top quality
ham equipment
in kit form . . .
designed especially to
meet your requirements!

Heath amateur radio gear is designed
by hams—for hams, to insure maximum
“on the air” enjoyment. Good design
and top-quality components guarantee
reliability. Heathkits are easy to build
and are easy on your budget! You save
by dealing direct, and you may use the
Heath Time Payment Plan on orders
totaling $90.00 or more. Write for com-
plete details.

HEATHKIT

DX-100

TRANSMITTER
KIT

Phone or CW—160 through 10 meters.
100 watts RF on phone—120 watts CW
—parallel 6146 final.
Built-in VFO—pi network output cir-
cuit.
Easy to build—TVI suppressed

MODEL DX-100

$189.50

$18.95 dwn., $15.92 mo.

Shpg. Wt. 107 Lbs.

The Heathkit DX-100 phone-CW transmitter offers features far beyond those normally received
at this price level. It has a built-in VFO, built-in modulator, and built-in power supplies. It is
TVI suppressed, and uses pi network interstage coupling and output coupling. Matches antenna
impedances from approximately 50 to 600 ohms. Provides a clean strong signal on either
phone or CW, with RF output in excess of 100 watts on phone, and 120 watts on CW. Com-
pletely handswitching from 160 through 10 meters. A pair of 1625 tubes are used in push-pull
for the modulator, and the final consists of a pair of 6146 tubes in parallel. VFO dial and
meter face are illuminated. High-quality components throughout! The DX-100 is very easy
to build, even for a beginner, and is a proven, trouble-free rig that will insure many hours of
enjoyment in your ham shack.

HEATH COMPANY BENTON HARBOR 9, MICHIGAN

A Subsidiary of Daystrom, Inc.
HEATHKIT DX-35
TRANSMITTER KIT

PHONE AND CW

This transmitter features a 6146 final amplifier to provide 65 watt plate power input on CW, with controlled-carrier modulation peaks up to 50 watts on phone. Modulator and power supplies are built in, and the rig covers 80, 40, 20, 15, 11 and 10 meters with a single band-change switch. Pi network output coupling provides for matching various antenna impedances. Employs 12BY7 oscillator, 12BY7 buffer and 6146 final. Speech amplifier is a 12AX7, and a 12AU7 is employed as modulator. Panel control provides switch selection of three different crystals, reached through access door at rear. Panel meter indicates final grid current or final plate current. A perfect low-power transmitter both for the novice or the more experienced amateur. A remarkable power package for the price. The price includes tubes, and all other parts necessary for construction. Comprehensive instruction manual insures successful assembly.

MODEL DX-35

$\text{56} \text{.95}
Shpg. Wt.
24 lbs.

$\text{5.70 dwn., } \text{4.78 mo.}$

- Phone or CW—80 through 10 meters.
- 65 watts CW—50 watts peak on phone—6146 final amplifier.
- Pi network output to match various antenna impedances.
- Tremendous dollar value—easy to build.

HEATHKIT DX-20
CW TRANSMITTER KIT

- Designed exclusively for CW work.
- 50 watts plate power input—80 through 10 meters.
- Pi network output circuit to match various antenna impedances.
- Attractive and functional styling—easy to build.

MODEL DX-20

$\text{35} \text{.95}$

$\text{3.60 dwn., } \text{3.02 mo.}$

Shpg. Wt. 18 Lbs.

Here is a straight-CW transmitter that is one of the most efficient rigs available today. It is ideal for the novice, and even for the advanced-class CW operator. This 50 watt transmitter employs a 6DQ6A final amplifier, a 6CL6 oscillator, a 5U4GB rectifier and features one-knob bandswitching to cover 80, 40, 20, 15, 11 and 10 meters. It is designed for crystal excitation, but may be excited by an external VFO. A pi network output circuit is employed to match antenna impedances between 50 and 1000 ohms. Employs top-quality parts throughout, including “potted” transformers, etc. If you appreciate a good signal on the CW bands, this is the transmitter for you!
HEATHKIT COMMUNICATIONS-TYPE, ALL BAND

RECEIVER KIT

This receiver covers 550 kc to 30 mc in four bands, and is ideal for the short wave listener or beginning amateur. It provides good sensitivity and selectivity, combined with fine image rejection. Amateur bands are clearly marked on the illuminated dial scale. Features transformer-type power supply—electrical band spread—antenna trimmer—separate RF and AF gain controls—noise limiter—headphone jack—and AGC. Has built-in BFO for CW reception. Shpg. Wt. 12 Lbs.

MODEL AR-3

$29.95

incl. excise tax
(less cabinet)
$3.00 dwn., $2.52 mo.

CABINET: Fabric covered cabinet with aluminum panel as shown. Part 91-15A, Shipping Wt. 5 Lbs. $.50 dwn., $.42 mo. $4.95

A HEATHKIT VFO KIT

MODEL VF-1

Covers 160, 80, 40, 20, 15, 11 and 10 meters with three basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Requires 250 VDC at 15 to 20 ma, and 6.3 VAC at 0.45A. Incorporates regulator tube for stability and illuminated frequency dial. Shpg. wt. 7 lbs. $1.95 dwn., $1.64 mo. $19.50

B HEATHKIT GRID DIP METER KIT

MODEL GD-18

Continuous coverage from 2 mc to 250 mc with prewound coils. 500 ua panel meter for indication. Use to locate parasitics, for neutralizing, determining resonant frequencies, etc. Will double as absorption-type wavemeter. Shpg. wt. 4 lbs. $2.60 dwn., $1.68 mo. $19.95

C HEATHKIT ANTENNA IMPEDANCE METER KIT

MODEL AM-1

The AM-1 covers 0 to 600 ohms for RF tests. Functions up to 150 mc. Used in conjunction with a signal source, will determine antenna resistance and resonance, match transmission lines for minimum SWR, determine input impedance, etc. Shpg. wt. 2 lbs. $1.45 dwn., $1.22 mo. $14.50

D HEATHKIT "Q" MULTIPLIER KIT

MODEL QF-1

Functions with any receiver having IF frequency between 450 and 460 kc that is not AC DC type. Operates from receiver power supply, requiring only 6.3 volts AC at 300 ma (or 12.6 vac at 150 ma), and 150 to 250 vdc at 2 ma. Simple to connect with cable and plugs supplied. Provides extra selectivity for separating signals, or will reject one signal to eliminate heterodyne. Effective Q of approximately 4000. Shpg. wt. 3 lbs. $1.00 dwn., $.84 mo. $9.95

HOW TO ORDER...

It's simple—just identify the kit you desire by its model number and send your order to the address listed below. Or, if you would rather budget your purchase, send for details of the Heath Time Payment Plan for orders totaling $90.00 or more.

HEATH COMPANY BENTON HARBOR 9, MICHIGAN

A Subsidiary of Daystrom, Inc.
"I am now using the Gotham V80 vertical antenna with only 55 watts, and I am getting fantastic reports from all over the world." VP1SD

ALL-BAND VERTICAL ANTENNAS

GOTHAM'S sensational new vertical antennas give unsurpassed multi-band performance. Each antenna can be assembled in less than two minutes, and requires no special tools or electronic equipment. In the V160, resonance in the 160, 80, 75, and 40 meter bands is secured through use of the proper portion of the loading coil. Yet, when the coil is eliminated or bypassed, the V160 will operate on 20, 15, 10 and 6 meters! The same idea applies to our V80 and V10 multi-band verticals. No guy wires needed; rugged, occupies little space, proven and tested.

Simple design and superior materials give all-band operation, and effective, omni-directional radiation. Gotham verticals are rugged, with low initial cost and no maintenance. Guaranteed Gotham quality at low Gotham prices. Perfect for the novice with five watts or the expert with a kilowatt.

QUALITY MATERIAL
Brand new mill stock aluminum alloy tubing with Aluminitie finish for protection against corrosion. Loading coils made by Barker & Williamson.

ALL-BAND OPERATION
Switch from one band to another. Operate anywhere from 6 to 160 meters. Work the DX on whatever band is open.

EASY ASSEMBLY
Less than two minutes is all you need to put your vertical together. No special tools or electronic equipment required. Full instructions given.

SIMPLE INSTALLATION
Goes almost anywhere. On the ground, on the roof, or outside your window. No trick fittings or castings needed.

AMAZING PERFORMANCE
Hundreds of reports of exceptional DX operation on both low and high power. You will work wonders with a Gotham vertical.

NO GUY WIRES
Our design eliminates unsightly guy wires. You save time, trouble, space and money by avoiding guy wires.

PROVEN DESIGN
Over a thousand Gotham verticals are on the air — working the world and proving the superiority of Gotham design.

AND THE PRICE IS RIGHT!

"I worked LU3ZS on Half Moon Island in Antarctica on Dec. 26 at 21150 Ke. I was using my Gotham V80 vertical antenna and only 35 watts." KN5GLI

Airmall Order Today — We Ship Tomorrow
GOTHAM Dept. QST
1805 PURDY AVE., MIAMI BEACH, FLA.
Enclosed find check or money-order for:
V40 vertical for 40, 20, 15, 10, 6 meters.................. $14.95 □
V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters........ $16.95 □
V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters... $18.95 □

Name..................................................
Address...........................................
City........................................Zone....State......
YOU COULD WORK WONDERS IF YOU HAD A GOTHAM BEAM!

Study these specifications—compare them—and you too will agree, along with thousands of hams, that GOTHAM beams are best!

TYPE OF BEAM. All Gotham beams are of the full-wave plumber's delight type; i.e., all metal and grounded at the center. No wood, tuning stubs, baluns, coils, or any other devices are used.

MORE DX CONTACTS

GAIN. Gotham beams give the maximum gain obtainable. Our 2-element beams give a power gain of four (equivalent to 6 db); our 3-element beams give a power gain of seven (8.1 db); and our 4-element beams give a power gain of nine (9.6 db).

THE DESIGN IS PROVEN

FRONT-TO-BACK RATIO. We guarantee a minimum F/B Ratio of 19 db for any of our 2-element beams; 29 db for any of our 3-element beams; 35 db for 4-element beams.

THOUSANDS IN DAILY USE

MATCHING. Matching of the transmission line to the beam is extremely simple and quick. No electronic equipment or measuring devices are required.

ALCOA QUALITY ALUMINUM

ASSEMBLY AND INSTALLATION. No special tools are required for assembly and installation. Entire job can be done by one man in less than an hour. Full instructions are included with each beam.

CONSISTENT PERFORMANCE

MAST. Any Gotham beam can be mounted on a simple pipe mast. Diameter of the pipe should be between ¾” and 1¾”.

YOU WILL WORK THE WORLD

STANDARD AND DELUXE BEAMS. Standard beams in the 6, 10 and 15 meter bands use ¾” and ¾” tubing elements; the deluxe models for these bands use ¾” and 1”.

In 20 meter beams, the standard has a single boom, while the deluxe uses twin booms.

TRIBANDER BEAMS

6-10-15 TRIBANDER $39.95
10-15-20 TRIBANDER $49.95

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

TECHNICAL CHARACTERISTICS

S.W.R. On Each Band 1:1
Total Number of Elements 3
Diameter of Elements ¾” & 1”
Number of Booms 2
Diameter of Booms 1”
Boom Length 12’

YOU could work KC4USA in the Antarctica with only 90 watts on 15 meters, as W4SK did.

YOU could work over 100 countries with a three element 10 meter beam, and be a top man on the frequency, like W0DEL.

YOU could work terrific skip and DX with reports of 20 over 9, with as little as 36 watts input on 20 meters, as W. E. Woods did.

YOU could work 29 states in three months on six meters, with low power, as K2LHP did.

Airmail Order Today — We Ship Tomorrow

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

Enclosed find check or money-order for:

TRIBANDER $39.95 10-15-20 $49.95

6 METER BEAMS

■ Std. 3-El Gamma match 12.95 T match 14.95
■ Deluxe 3-El Gamma match 21.95 T match 24.95
■ Std. 4-El Gamma match 16.95 T match 19.95
■ Deluxe 4-El Gamma match 25.95 T match 28.95

10 METER BEAMS

■ Std. 2-El Gamma match 11.95 T match 14.95
■ Deluxe 2-El Gamma match 18.95 T match 21.95
■ Std. 3-El Gamma match 16.95 T match 18.95
■ Deluxe 3-El Gamma match 22.95 T match 25.95
■ Std. 4-El Gamma match 21.95 T match 24.95
■ Deluxe 4-El Gamma match 27.95 T match 30.95

15 METER BEAMS

■ Std. 2-El Gamma match 19.95 T match 22.95
■ Deluxe 2-El Gamma match 29.95 T match 32.95
■ Std. 3-El Gamma match 26.95 T match 29.95
■ Deluxe 3-El Gamma match 36.95 T match 39.95

20 METER BEAMS

■ Std. 2-El Gamma match 21.95 T match 24.95
■ Deluxe 2-El Gamma match 31.95 T match 34.95
■ Std. 3-El Gamma match 34.95 T match 37.95
■ Deluxe 3-El Gamma match 46.95 T match 49.95

(Notes: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

NOW RUGGEDIZED HI-GAIN 6, 10, 15 METER BEAMS

Each has a TWIN boom, extra heavy boom mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission lines. Specify which transmission line you will use.

■ Beam #6 (6 Meters, 4-El) $38.95
■ Beam #10 (10 Meters, 4-El) $40.95
■ Beam #15 (15 Meters, 3-El) $49.95

Name .......................................................... Address ..................................................
City .................................................. Zone ... State ..................
If you have been batting 1.000 in the Quist Quiz league, here’s a real test of your ability, submitted by Mark Moynahan, W2ALJ:

You are given four unmarked resistors, one marked precision resistor, a battery of known polarity and a zero-center milliammeter. All but one of the unmarked resistors have the same value as the precision resistor. This one unmarked resistor may have a higher or lower resistance than the precision resistor, or it may have the same value. Using the equipment at hand, you are allowed two measurements to determine which one, if any, of the resistors is different than the precision resistor and, if so, whether it is higher or lower than the rest. A measurement is defined as connecting the components as you chose and noting the reading of the meter.

(If you work this out in less than an hour or so, you are invited to expand the problem to one involving 13 unmarked resistors, one precision resistor, the battery and milliammeter and three measurements.)

Last month’s problem boils down to this equivalent circuit. Solving for $R_{in}$,

$$R_{in} = 1 + 1 + \frac{(1)}{1 + R_{in}}$$

$$R_{in}^2 - 2R_{in} - 2 = 0$$

$$R_{in} = \frac{2 \pm \sqrt{4 + 8}}{2} = \frac{2 + 2\sqrt{3}}{2} = 2.732 \text{ ohms}$$

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A.R.R.L. QSL BUREAU

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. Its operation is made possible by volunteer managers in each W, K and VE call area. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4 1/2 by 9 1/2 inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left corner.

W1, K1 — D. W. Waterman, W1IFQ, 96 Flat Rock Rd., Easton, Conn.
W2, K2 — F. F. Huberman, W2JTL, Box 746, GPO Brooklyn 1, New York.
W3, K3 — Jesse Bieberman, W3KT, P.O. Box 400, Bala-Cynwyd, Pa.
W4, K4 — Thomas M. Moss, W4HGW, Box 444, Municipal Airport Branch, Atlanta, Ga.
W5, K5 — Robert Stark, W5OLG, P.O. Box 261, Grapevine, Texas.
W6, K6 — Horace R. Green, W6TI, 414 Fairmount St., Oakland, Calif.
W7, K7 — Joseph P. Vogt, W7ASG, P.O. Box 88, John Day, Oregon.
W8, K8 — Walter E. Munce, W8NGW, 2215 E. 187th St., Cleveland 10, Ohio.
W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Waukegan, Ill.
W6, K6 — Alva A. Smith, W6DDA, 233 East Main St., Caledonia, Minn.
VE1 — L. F. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
VE2 — George C. Good, VE2YA, 189 Lakeview Ave., Pointe Claire, Montreal 33, Que.
VE3 — Leslie A. Whitley, VE3QE, 32 Sylvia Crescent, Hamilton, Ont.
VE4 — Len Cuff, VE4LC, 265 Rutland St., St. James, Man.

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IS YOURS ON FILE WITH YOUR QSL MGR?

VE5 — Fred Ward, VE5OP, 890 Connaught Ave., Moose Jaw, Sask.
VE7 — H. R. Hough, VE7TH, 2215 Trent St., Victoria, B. C.
VE8 — W. L. Guary, VE8AW, Box 534, Whitehorse, Y. T.
VO — Ernest Ash, VO1A, P.O. Box 8, St. John’s, Newfoundland.
KP1 — E. W. Mayer, KP1KD, Box 1061, San Juan, P. R.
KI6 — Andy H. Fuchikami, KI6BA, 5548 Naunau Dr., Honolulu, T. H.
KL7 — KL7CP, 310-10th Ave., Anchorage, Alaska.
KZ5 — Catherine Howe, KZ5KA, Box 407, Balboa C., Z.

---

W8SLR discovered that one of the teachers in his high school was Clarence Tuska’s cousin and had helped to publish early issues of QST in her mother’s attic!
hallicrafters giant SSB contest now set for October.
More than 90 SX-101's to be given away to hams!

WESTERN UNION
TELEGRAM

AUGUST 1ST 1957
TO ALL AMATEURS
HALICRAFTERS SSB CONTEST FOR HAMS GONE WILD.
DISTRIBUTORS FROM COAST TO COAST KNOCKING
DOWN DOORS TO OFFER OPPORTUNITY TO HAM
CUSTOMERS. OVER 90--REPEAT 90--FREE SX-101'S
NOW TO BE GIVEN AWAY. (PLUS AN HT-32 AND
HT-33 TO ONE LUCKY HAM.) WATCH OCTOBER ISSUE
FOR GIANT ANNOUNCEMENT AD WITH FULL DETAILS
AND LIST OF PARTICIPATING DISTRIBUTORS!

THE HALICRAFTERS CO.

The best ideas in communications are born at

hallicrafters

company

4401 W. FIFTH AVE., CHICAGO 24, ILL.
element beam. K2PWN is building a 8209 rig for 2 meters. HQF has a 10B and is going s.s.b. K2s KDT and WN8J are building a 2 meter rig for the Field Day at WFP. The Syracuse V.H.F. Club really went all to the V.H.F., QSO Party, VE8FT/W2 is on RTTY, 75 meters, 40 bands. W2ZI, KXCN, KZDZ and QXT all qualified for Class I Observer in the May F.M.I.T. in that order. SRV3/2, 2SE/2, 2K2XN, NZ5X, ZN4A and N2MC from the Monroe V.H.F. club, the Obst by the Long Island V.H.F. Club, KX4B, K2JAJ and 8SAW, from the Rome RC provided communications for the local Loyalty Day Parade. RKC is building a new 440-Mc. rig for K2SVM. QRS is new for 2 meter and 220-Mc. and is using p.p. HK-346s, RQA got a 7A-4 and an LT-30, OWV has a Valiant kit. Quite a gang turned out for the Field Day. “The only thing Harry saw was the main speaker and ZOC was the host. The last call on a 432 Mc. and also displayed some 432-Mc. gear, to the Rochester V.H.F. group. ELX was elected chairman, CTA, vice-chairman, and K2HIT, secretary, at the same meeting. D7P is building a new rig for both 6 and 2 meters. The Rochester DX Assn. elected, QAK, chairman; MG, mast chairman; and TQR, secretary. AFF is building a 6-GHz final. REI now has 200 countries confirmed on 6-GHz. 6XW worked 2 new ones for a total of 214, K2HIT has been appointed O.E.S. RJK is back in business on 10 and 2 meters after some of the going was out of the 6-GHz band. New and old 6-meter bands. K2HIT has been appointed O.E.S. RJK is back in business on 10 and 2 meters after some of the going was out of the 6-GHz band.

RAW TEXT END
The 1957 Edison Award once more will honor an amateur who has rendered outstanding public service—will be a tribute to the assistance which all radio amateurs offer their communities and the nation when need arises.

A committee of distinguished and impartial judges will select the Edison Award winner. He will be chosen from candidates who are nominated in letters from you and others.

Since only names submitted by letter will be considered for the Award, your participation and support are essential. Start now to choose a suitable candidate! The rules at right will help you in preparing your nominating letter. Mail it to Edison Award Committee, General Electric Company, Electronic Components Div., Owensboro, Ky. 

Mary Burke, W3CUL, 1956 Edison Award winner, is honored at the banquet ceremony held February 28, 1957, at Washington’s Mayflower Hotel, with Rear Admiral H. C. Bruton, chief of naval communications, the principal speaker. Left to right: Admiral Bruton, Mrs. Burke, and L. B. Davis, general manager of the G-E electronic components division. (Official U. S. Navy photograph)

NOMINATIONS NOW OPEN FOR 1957 EDISON AWARD

WHO IS ELIGIBLE. Any man or woman holding a radio amateur's license issued by the F.C.C., Washington, D.C., who in 1957 performed a meritorious public service in behalf of an individual or group. The service must have been performed while the candidate was pursuing his hobby as an amateur within the continental limits of the U. S.

WINNER OF THE AWARD will receive the Edison trophy in a public ceremony in Washington, D.C. Expenses of his trip to that city will be paid.

$500 GIFT. Winner will be presented with a check for this amount in recognition of the public service he has rendered as a radio amateur.

WHO CAN NOMINATE. Any individual, club, or association familiar with the public service performed.

HOW TO NOMINATE. Include in a letter a full description of the service performed, as well as the candidate's name, address, and call letters. Your letter of nomination must be postmarked not later than January 3, 1958.

RULES OF THE AWARD

BASIS FOR JUDGING. All entries will be reviewed by a group of distinguished and impartial judges. Their decisions will be based on (1) the greatest benefit to an individual or group, (2) the amount of ingenuity and sacrifice displayed in performing the service. The judges will be:

E. ROLAND HARRIMAN, Chairman, The American National Red Cross.

ROSE H. HYDE, Commissioner, Federal Communications Commission.

GOODWIN L. DOSLAND, President, American Radio Relay League.

Winner of the Award will be announced on or before Thomas A. Edison's birthday, February 11, 1958.

Employees of the General Electric Company may nominate candidates for the Edison Radio Amateur Award, but are not permitted to receive the Award.
SPECIAL FILAMENT TRANSFORMERS
Included in their quality construction is Triad’s exclusive “Climatite” treatment for moisture protection and elimination of lamination noise. Write for Catalog TR-57.

SYL 110, TQG 128, VAY 119, NTA 81, HXR 74, KTX 85, BKJ 63, SWD 34, 3JF 48, EJW 48, CC 47, VNY 44, LDB 39, RTH 38, QTO 34, WUH 31, UQF 24, ENU 27, WVX 25, UXK 19, VFJ 19, PZQ 18, WBA 15, D1G 14, V1D 11, GJS 12, LMJ 12, JQ5 11, DWK 10, BDP 9, HHHW 9, KJQ 8, YXY 8, CDW 7, DSC 7, ELE 7, KNS 7, DDT 6, EKZ 6, VJZ 1, VJZ 1, GDL 4, LGD 4, SVZ 4, WLY 3, CM5 1, FJ1 1, FPF 1, FJP 1, Q1 1, WAU 1 (May) WAJP 1.

WISCONSIN—SCM, George Woolf, WB9QBB-SEC; E12Z, PAMA; NRP and APU, RAJ, EK12, K5AQA, Nets; WIN, 3933 kc, 7 p.m. CDT daily; BEN, 3930 kc, 6 p.m. CDT daily. New officers of the Oshkosh Amateur Radio Club include DQE, pres.; KEE, vice-pres.; IDTM/9, sec.-treas.; ELY, chairman of the executive board. High activity prevails as the club’s real fine bulletin, the Q8B8, indicates. The Q8B8 was launched with its mobile unit in the Armed Forces Day Parade in Milwaukee and in furnishing communications on the same day for the sports events at Williams Bay. JEB made contact with N88, AIR and WAR on Armed Forces Day. The Mancord Club has a new RAI-B-300 and holds net meetings Sun., at 11 a.m. on 3005 kc. VHA, Marion County EC, held a real emergency drill when 20 stations furnished all communications for the sports car climb of H. M., when the sound-powered phone system failed to operate. CCO is the proud Daddy of a baby daughter born while he was on duty aboard the USS B. K. K. in the Pacific. Look for Dutch as 7B in September. MYU desires word from anyone who was radio operator in the CCC back in 41. NRP is busy fixing rigs for other operators. K5GZ, now an RNC and member and has a 25-w.p.m. stickler. There is a new Novice net on 7333 kc, at 7:30 a.m. EST, FJT made WAS and sends his brother KN5UO, now in Manitoavo: K5DUZ, KN5IAX, KN5XZ, In Lake Mills: KN5IAY, In Eau Claire: KN5HBI, JFDZ is making room in the shack for new 2- and meter operators. GND has a new QSO 300 and HPC a new Valiant. JAW’s 50-watt abandons his good ship Viking sounds like a good water ground past TAZ 100 mark, on QRO working, KN5IHE is on with a Viking II and a 75A-3, K5Z is real satisfied with his new SX-101. Check with E12Z for EC appointments. Most western counties are without an EC. Traffic: June W5CXY 615, KOB 100, K5J 60, K5AEO 55, W5T 11, FJT 8, E5XK, KN5A 39, W5CJ 15, K5THT 13, W5QM 12, JF5E 10, SIZ 4.

DAKOTA DIVISION
NORTH DAKOTA—SCM, Elmer J. Gabel, W9K7Z, I met the following North Dakota boys at the 1st Paul Convention: FVU, GNS, HVA, K5CN, CMX and GRM, ILO, the Fargo Club station, reports a successful Field Day week end making 100 contacts. Operators and visitors included UTT, chief op.; NXP, WIA, NUG, K9MDT, CXJ, K9MWS and ICT, KR4TK spent three weeks at his in Michigan and returned with South Dakota with a new Johnson 500, K5CN is building a 2120 rig for 4 meters. K5CMX has a new HU-110. K5CN’s July QST was a very good one in the 1-operator column; our error. Traffic: K5CN 71, W5NPR 16.

SOUTH DAKOTA—SCM, Les Prince, W5/FLP—Ass’t SCM, Gerald F. Lee, W5KY, SCM assistants: HOIT, PKE, APL, QJR, NEO, TI, MIU and GDE: SECS: V5M and GDE: PAM, W5MR, GMR, BLX, The Tal-Med. S.D., Phone Net had 27 sessions with QH 2 (regu.), GQH 3, SCT 19, EXX 1 (fill-in); QNT 408, high 31, low 7, average 17.3; trpl 12; high 8, low 0 (114 times), average 1.5; informal 21; high 8, low 0 (twice), average 2. The S.D., 40-Meter Net had 25 sessions with FQJ (QHX operator) 5, QKZ 5, EXX 3, K5Z 2, Q5F 1, low 0 (6 times), average 216; informal 21; high 9, low 0 (6 times), average 196; informal 21; high 9, low 0 (6 times), average 16. The Signal Hill Amateur Radio Club met at the home of CTD June 3, our Field Day station was set up on Strawberry Hill. We made 40 contacts during the hour we were on. KZJ was the guest operator and her GM, Cliff, arrived late in the afternoon. We had 15 or more licensed operators plus several others. We operated long distance station over 20 watts for the power multiplier. Redfield reports good success and ascended to the 150-watt power limit raise, permitting full output of that station. The new ERTF club (Ipswich, etc.) reports being on from 3 p.m. to 7 a.m. with two transmitters on some part of a member’s frequency. The new W5JGK, OL 5, formerly of Glenham, visited Selby and other parts on June 16. K5AOG visited DVB and FL 10 in June, CAS packed up the last day of June to go to Custer and continue building his retirement home there. Error: The 2 children 1 reported as being 3K5AFW last month should have been listed as being at K5GB. Traffic: W5CST 220, SLR 24, FL 40, AIS 4, OFP 4. (Continued on page 100)
The Hammarlund HQ-110 is the most wanted amateur receiver in the world. The unprecedented demand for this receiver has resulted in a record backlog of orders. You may have to wait for your HQ-110, but you can be sure of one thing — its quality will not be sacrificed for the sake of speedy delivery.

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MINNESOTA—SCM, Robert M. Nelson, W8KLG—Asst. SCM: Robert W. Schoneman, #37990; SEC: WVO. RM1: DJL and RQJ. PAX1: JJE and LUX. Two new leadership appointments were made this month. Our new SEC is WVO, who is one of the mainstays of the Minnesota Phone Net and who took a very active part in the Emergency Net a few months ago. He replaces GJZ, who resigned because of lack of time. Our new RM1, DJL, has been a valued member of the phone section and has contributed a lot of time and effort to the phone effort. DJL is also the new manager of the Twin Cities Amateur Radio Club, one of the largest and most active clubs in the country. DJL is well known for his dedication to the ham radio hobby and his ability to manage large organizations. The ARRL has been working hard to integrate Amateur Radio into the emergency communications network in Minnesota and DJL will be a valuable asset in this effort.

The ARRL is a national organization that promotes the growth and advancement of Amateur Radio. It is the largest membership organization in the world and provides a wide range of services to its members, including emergency communications, public service, and technical assistance. The ARRL has been working to improve emergency communications in Minnesota and DJL's appointment as RM1 is a step in the right direction.

In other news, the ARRL is currently working on a new program to improve emergency communications in the state. This program will involve the creation of a new emergency communications network that will be used during times of emergency. The ARRL is also working to improve the quality of communication between amateur radio operators and other emergency communications systems.

The ARRL is a vital part of the emergency communications network in Minnesota and the appointment of DJL as RM1 is a step in the right direction. We look forward to seeing the results of this program and the improvements it will bring to emergency communications in Minnesota.
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and ITT, who did all the towers and tower-climbing. BND operated K3BSA at the National Boy Scout Jamboree July 8-10. JAW is on the air with a new rig, K5CMN will be portable from Oak Ridge for the next two months. Send reports on time. Traffic: (June) W5USM 405, K5API 278, W5UXE 177, W5PQB 88, W5QM 81, K5IT 20, JAW 14, K5XXY 8, K5RM 1, EA 4, (May) W5UXE 520, K5API 187, W5QV 120, M5IQ 81, K5IT 20, W5XXY 12, W5JWM 8, BND 6, EA 4.

MESSISSIPPI—SCM, John Adrian Houston, sr., WGEMH—The Cleveland Amateur Radio Club's Fourth Annual Picnic held June 9 was well attended, amateurs from five states being present. K5BRK is home for the summer vacation from school in Virginia and is very active on 75- and 15-meter phone and 20-meter c.w. K5DLN may be heard on work ends portable from his cabin on Lake Hiwassee, KY6C and EA on Lake Hiwassee, and recently purchased Gdale King transmitters. The Cleveland Club meets every other Fri. night in its recently-completed clubhouse. K5HPY, W5RY, and H5CQ now be heard on 75-meter phone instead of 40-meter c.w. Traffic: W5HD 85, H5M 32, K5IT 20, G9 10, K5BRK 6.

TENNESSEE—SCM, Harry C. Simpson, W5SCF—SEC: RHY, PAM: PQQ, RM: IV. Congratulations to PEP, who is the proud new owner of an NC-300, compliments of the Memphis Hamfest. It matches its Valiant very nicely. PL, with another fine total reports his XYL is in a Chattanooga hospital. Very nice bulletins were received from the Alabama Section, Kingsport and Memphis Clubs and Alabama MARS, WQ7, making like Times Square, visited NGO, UCG, BOG, BMI and GEN, in addition to attending Hamfest. In turn he was visited by GGM, QP, W5TF, K5PP, ACG, W5KE, ACW, MYD, CVM and GBN, LW monitors 50.1 AE, 10 hours daily, 2010 and 1200, and fine conditions. LX5TQ had fine cut-ins during the main openings by working three states, bringing his total to 45. EWC has two accomplishments this month—working a UV2 on 75-meter phone and teaching SEC how to remove engraved numbers from some panels. He can be contacted for details on the latter. PAM invited all the old members of EPTN to renew their activity on this fine net. K5CMN 4 was active from Oak Ridge on 40-meter s.s.b., 5412 ex K5LWD is looking for friends on 20 meters. Field Day messages were received from G5VOT, K5YV, K5FH, TRC, DYE and the Harpeth Valley ARC. TGW introduces new Humboldt ham K4LAN and ex-K5BR. K5VFO! The Humboldt station made 318 contacts during Field Day 21Y, now awaiting an "eye call", would like to hear from his friends, who may write him at 1272-A Aces Det., APO 44, N. Y. Traffic: W4PL 150, W5SCF 150, W5QV 16, W5G 16, W5G 14, W5G 35, W5G 10, W5G 12, W5G 29, W5G 5, W5G 29, W5G 35, W5G 39, W5G 8, H5 6, H5X 5, W5G 4, W5G 7, W5G 7, W5G 7, W5G 7, W5G 7.

GREAT LAKES DIVISION

KENTUCKY—SCM, Albert M. Barnes, W5KRW—SEC: JSH, PAM: WVY and SUC, RM: QCD, JUH and ITTO a better-and-better combination in Louisville, has turned in a very interesting and comprehensive report on temperature inversion and sporadic E skip on 6 meters. JUH walked away with a car presented in 1958 that completely disassembled his car. K5KIN is going back to college. Meanwhile K5K1O will operate the rig. K5KAG has a new home-built 814 rig running 190 watts on 20-meter DX. K4HCN also is building a new high-power rig. It is with mixed regret that we announce the passing of W2ET of Southgate, who was an old-time active on 10 and 15 meters and helped in Field Day contests too! New Ops: S5L. New OHS: K5KIN and K5K1O. RM QCD reports that KX5M handled 253 messages in 20 sessions with an average of 12. A new station checking in KYN is K5FFP. FL, Cumberland, QCD also delivered 25 messages from a homesick soldier in Germany with lots of relatives around Corbin. KKG made a vacation trip to the West Coast and saw lots of his WA friends. W5KRW, secretary-treasurer of the ARTS, visited Ye Old SCM and we had a marvelous rager, PAM SCD helped out in Cozumel and Lake Charles after Hurricane Audrey struck. Amateur Radio Emergency Corps (AREC) assisted Northern Ky; Auxiliary Police in handling auto packing July 4. Participants were W5KQH, B5Y, A5M, K5MO and 7Z7T. SEC JSH reports the total number of AREC members is 163 with 151 full members and 12 supporting. There are 27 official mobile units in the state, with 12 local emergency net in operation. PAM V5JZ reports KPN held 26 sessions with a total QSO of 592. Traffic was 96, 11AP before AN-vertical (June) W5ZDB 300, K5K 111, QCD 128, K5KIN 103, (Continued on page 104)
Mallory has been a respected brand name in electronics for years. Long recognition and widespread acceptance are not easily earned—they come from continuous engineering and proof of performance.

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(Continued on page 108)
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Overtone operation (five bands) 15 MC to 60 MC.
Same as FO-1, EXCEPT: please specify which band coil you desire in these five ranges:
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Printed circuit oscillator for band-edge calibrator and frequency standard use.
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checked into the 10- and 8-meter nets. Those in the 8-meter net were TFW, TXC, CTP, NRI, CW, LHI, QLS, UDL, UCX, FFA, HZY and KB8EX. Those in the 10-meter net were ARS, QPQ, BDZ, NDC, WBN, GPC, SKG, MYD, BUQ, UEM, OED, ZJQ, MAE, QXS, GQR, INW, FKB, OKI, SGO, FFQ, WLM, CUP, FVQ, LVM, BAX, QVY, JFD, TLV and AEL. The stack brought 8U’s XYL a baby boy. The South-East ARC of Cleveland had 11 pas their Neice Class examinations and receive their tickets, so the club’s code class was a big success. Those licensed are KN86 GEK, GGU, GGY, GGW, GQX, GQR, GQH, GQH, GQI, GQV, GQD, GQI, GQV, GQD, GQI and GQV. KB8PX received WAC as a Novice, TCT is mobile on 8 meters. Toledo ARC’s hands of the month are those of the TVI committee, namely, R3O, RSV, RZ2O and TQY, for their untiring work. AMW has a twelveclement beam on 2 meters. The stack brought a baby girl to RTW and his XYL. SRF300S 10 and 12 meter gold crosses for religion when he graduated from high school. STF is now mobile. CSK made BPL in June. A new appointee is ECI1 as KB8FX; YF8L, W8LPH, K8BPX, W8CCK, 310, W8YR, K8DQ, 27, WS2L, 20, GQF, Q8D, Q5F, Q5Y, WW, S8V, 8, K8PK, 8, K8XM, STR 4, LAIB 1. (May) W8ANX 9, K8BPX 8, W8SVL 4.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU, SEC; K.EC; RM; BX, PAMS; LG and NCC. Section nets: NYA on 3615 kc, at 0930 and NYSPTEN on 2935 kc, at 1800 EDST, Civil Defense Command Nets, 3963 and 3399.5 kc, Sun., at 0000 EDST, K8T on 2716 kc, Sat., at 1800 EDST. From a check of the Field Day 1957 was very successful, as evidenced by six reports received by the SCM. PHL says the new vertical for 80 meters has low radiation and a good signal. K2EHH is off the air until September. An overland operator caused trouble on Field Day for the Hanover Hill Climb. They’ll be back in June with WQL, new editor of their Zorin Beat. K3RTV is teaching RTTY to his Naval Reserve Unit. The June 15 communications drill proved to be another successful for the headquarters. Nets can move traffic when a clear channel is available. Fifty messages were handled in three hours at State Control Center, according to BGO. Their three channel RTTY system can handle upwards of 700 words per minute with two transmitters and seven receivers at the main station of the system. K2IOMC, located in a small town, is better off than the 200 people he serves. He is working on the idea of getting a TV system. K3ZJS to obtain leave to visit his critically-ill mother in Troy through K8HFO. New work, Dave. New appointment: K2TCF on 40. NYSPTEN reports 16 call-ins over a period of two months qualifies new members for net certificates. K2XTH, professor of physics at Union College, spent the summer teaching in California. Traffic: June W2DXP 178, EFD 127, K2HFO 78, W2FHC 74, K2YV 58, W2LKR 33, GCI 18.

NEW YORK CITY AND LONG ISLAND—SCM, Harry J. Duma, W2TTA, SEC; K8YR, RM; WFL, Section nets: NLI, 3630 kc, daily at 1030 EDST and Sat. at 0915 EDST, NYC-T1CN, 3060 kc, AM, through Net, from NJ to CSK; ARRC, 3098 kc, Sun., at 1400 EDST. The traffic nets are a short-handiated during the summer season, but all nets continued their fine performance. Clevelanders received a call from the students who keep the traffic moving. HPL cards go to W2RKB and KEV and K2BPB. Field Day enthusiasts enjoyed one of the most successful yet. The weekend in post war history, with excellent weather and radio conditions providing high scores. K2ECY has a new NC-300. K2OO, operated portable from camp at Peekskill. New officers of the Bronx H8 of Science BB are K2YVE, pres.; K2YMS, vice-pres.; and K2QDD, secy. TKC installed a new General Hammarlund on 20 meters to keep tabs with his Dad. 2GGA, in Florida, K26EK received power to 60 watts and reports into both the Phone and CW. Section. The Larkfield ARC is a newly-formed club in the Northport Area. CEV, Staten Island, has returned to the SCM Net after a long absence. K2GQW is HPL to get a ticket at BV1. The Thomas Jefferson HS, ESL received his DXCC-150 sticker. Joe has a wonderful color picture of the U.S.-Canadian border. What is the world doing to 10 and 12 meter equipment? IWC worked more than 300 stations in less than 10 hours of DXing. K2CLM added a D-multiplexer to his HQ-10XN. K2D9D has a DX contest for two of his DX-100. K2KTR joined the 10-meter mobile ranks. HLY and his XYL, K2KSD, welcomed their fourth addition—a fourth daughter—the boys of the Niska RC are K2BRA, pres.; M. Lavee, vice-pres.; NNY, secy., and KNZVYL, trans. K2E PFA and RFE are at ease in Port Jervis. K2NY made IVAS on 7. K2KTB and KNZVG are operating on 40 meters and is planning 8-meter fixed and mobile work. New officers of the

(Continued on page 108)
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Columbia University ARC are ANTV, pres.: KL24U, vice-pres.; K2LABA, secy.; K2VXX, treas.; ZTD, comm. mgr.; ITTV, tech. dir.; K2IYD, c.d. dir. and DISQ, trustee. KZ2BK, added an IRO-50TA1 to his station plus crystal converters for 200 and 470 kc. LPC is mobile with a G66-B and G77. ONF moved to Suffolk County. KN1YJC sports a new beam on 13 meters. OTC has a new 78A-4, BTP spooling up on 75 meters with a R&W k.s.b. rig. HAE is enjoying his newly-acquired 75A-8. MCG and LHH are radio-controlling model splinters. K2IYF plus DX-100, NC-300 and WRL tri-band beams.

NYC-LI SECTION QSO PARTY SEPT. 7-8, 1957

The New York Radio Club announces a New York City-Long Island Section QSO Party in which all amateurs are invited to participate. Details follow:
1. Times: 24-hour weekend contest starting 1800 EST, Saturday, Sept. 7, and ending 1800 EST Sunday, Sept. 8. 2. Frequencies: Use all bands, phone and c.w. The following frequencies are suggested: 3500, 3910, 7000, 7205, 11,000, 14,200, 21,000, 3550, 28,850 kc. 3. General call: Outside stations call "CQ New York-Long Island," or "CQ NLI" on c.w. Stations in the section call "CQ from New York-Long Island" on phone and "CQ de NLI" on c.w. 4. Exchange: NYC-LI stations send QSO number, RS or RST, and county. Exchange - Bronx, Brooklyn, Nassau, New York (Manhattan), Queens, Richmond (Staten Island), Suffolk. Outside stations send QSO number, RS or RST, and state, province, or country. Use log form similar to that for N8. 5. Scoring: Count 1 point per completed QSO, multiplied by the number of counties or states, provinces, or countries. Multiply this total by 1.25 if input power is under 150 watts at all times. Only one QSO per station will be counted regardless of bands used. 6. Awards: A certificate will be issued to all those working the 7 NYC-LI counties during the party. The highest scorer in each NYC-LI county will earn a certificate. Also the highest scorer in each outside state, from which more than 2 entries are received, will earn an award. Finally, first, second, and third place stations, both in and out of the section, will receive a certificate. Multioperator stations are ineligible for awards. 7. Log: Send logs to M. M. Freedman, WM2AF, President, New York Radio Club, 5 Channel Drive, Kings Point, L.I., New York. Log must be postmarked after Oct 1 will be disqualified. The decisions of the contest committee will be final. BCNU September 7 and 8!


NORTHERN NEW JERSEY - NCM, Lloyd H. Mansan, W2YQR - SEC: IN, PAM; VDE, RNI; BRC, NIKD and COG7, K2IYF-pas the Extra Class exam. The GSARA has completed its first code instruction class under the supervision of Don Marx. Fifty signed up for the course, eleven have taken the final exam with one passing. K2IRC is mobile on 8 meters. The Lakeland Amateur Radio Assn. held its second annual hamfest on Aug. 4. PWX is coming home in time New Mexico. While there he keeps in contact with K2ING, his son, who keeps the home fires burning. JCU and IMU are active in NUN after a long absence. IMU will be operating from the seaplane only en route to Bermuda. BRC vacationed in Upper New York State where the fishing is good. The FRAC en- (Continued on page 118)
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INSIST ON HY-GAIN'S ORIGINAL INSU-TRAP VERTICALS, TESTED & PROVEN IN THE WORLD'S HAM SHACKS!

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Sensational new Insu-Trap, the only tunable, weatherproof trap circuit, maintaining low SWR on the 10-40M bands. Allows for automatic bandswitching and isolates the various sections of the Auto-Toppers.

Hi-Q base loading coil for maximum efficiency on 80 and 160 meter bands. Positive connection through pressure tapping clip.

New "capacity hat" electrically lengthens the vertical and increases radiation efficiency. Included with all Toppers.

Economy Toppers offer multi-band vertical operation with manual bandswitching at the lowest possible cost, allowing the ham to save money while saving space. Proper operation on all bands is maintained by the correct tapping of a base loading coil furnished with each system. Antenna comes complete with vertical aluminum mast sections, loading coil, polyethylene base insulator, coil tapping clip, base mounting plate and universal guy rope or side mount bracket and bracket insulator, all necessary hardware and complete instructions.

<table>
<thead>
<tr>
<th>Band</th>
<th>Economy Toppers 40-V (for 40-10M)</th>
<th>Economy Toppers 40-AV (for 40-10M)</th>
<th>Auto Toppers 80-V (for 80-10M)</th>
<th>Auto Toppers 80-AV (for 80-10M)</th>
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<td>40-V</td>
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To include the 160M band, add $3.00 for the 160-V or 160-AV.

Similar in general design and appearance to the Economy Toppers with the exception of the three revolutionary Insu-Traps, the Auto-Toppers offer automatic bandswitching 40 through 10 meters, and maintain exceptionally low SWR on all bands through use of three sensational weatherproof Insu-Traps, and a base loading coil on 80 and 160 meters. All Toppers are calibrated for tone and CW on all bands. Comes complete with all parts listed for the Economy Toppers plus the three Insu-Trap sections.

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CBS 2N256 (6-volt) and 2N256 (12-volt) power transistors are useful in many other economical amplifiers...fixed or mobile. Write for CBS Power Transistor Applications, PA-16, for complete details on 15 practical circuits, including this power supply. Or pick up Bulletin PA-16 along with your 2N256 and 2N256 transistors at your CBS Tube distributor's.

2N256...$2.60 net

2N256...$3.00 net


joyed a talk given by KG2Q on RTTY. IMM was also elected vice-pres., of IRAC. KG2IF went on vacation to Cape Cod, K2TXI has a new v.l. and KG2AM is interested in establishing a 2-meter net for traffic handling. K2RXX reports RTTY installation at his home QTH, 2Z. K2GZ is working on his 21-meter net in traffic work and likes it a lot. His dad, K3TEO, has just received his General Class license. W2TV is active in the N.J.F.N. KX1 occasionally spots for 20-meter DX. KFR operated 10-meter mobile while on vacation on Cape Cod. K2RIG is a member of the N.J.F.N. Bob has a new all-band rig in the planning stage. The N.J.F.N.'s annual picnic was a huge success with 45 net members attending. VDJE line started an AREC net on 3000 k. Sun. at 1400. New Jersey Phone Net members now have call letter tape loops. K3CHI has joined the Air Force and is stationed in Texas. W2RZQ is now W2FQZ in a new Novice license and N.J.N. KG2FA graduated as E.E. from Rutgers and will do post-graduate work at M.I.T. IAT is getting back on the air with a new SI rig. FOK should be back soon. KG2QX is building a new 150-watt rig. K2QXQ is active in Fairview RACES organization. The Forty New Jersey Net Operators issued its second in a series of net bulletins. K2JYJ is the extraordinary editor-in-chief of this excellent net bulletin. KG2JEF had the rig with him at Roy Scout camp. K2KQ has a new 20-A exciter. On June 15 FNU conducted a field trip and the following shacks were visited: K2DQJ, PYL, PJK, QVT, MMG, MMJ, QXJ and AJY. A new ham in Belleville is W2NJL. GYQ is back from a trip in California. K2QUG lost his antenna during a storm. New Jersey amateurs and the entire state RACES organization did a tremendous job during "Operation Alert '67." The State Director of Civil Defense has asked that his sincere thanks and appreciation be given for the job well done as expressed through this column. State RACES control has added a new 150-ft. tower with 144-Mc antenna atop the new building.

Preliminary tests show that most of the State can be covered with ease on the 144 Mc. The new installation is one in a series of improvements that are planned for all-band operation at state control. The new tower is a ham's dream, self-supported and 150 feet straight up with the new type 4X "Station Master" antenna on 144 Mc, extending up another twenty feet above the tower apex to take 4X cameras from Stylorflex feedline and Gunset final on the station end, Traffic: (June) KG2KF 222, HHQ 188, MMJ 110, OA1 141, KG2RC 68, KG2QX 62, K2DQK 61, WADE 57, MLIW 71, RXL 59, KFR 44, K2BEQ 42, RFX 42, OA1 36, AJY 34, TNJ 27, QVT 33, PLF 19, W2TQX 17, KG2WQ 14, W2NS 14, KG2O 10, W2VinX 8, NIY 6, KG2KK 2. (May) W2MIX 12.

MIDWEST DIVISION

IOWA—SCM, Russell Marquis, WBBDR—INJMJ, National EC, was guest speaker at the Des Moines Club meeting on June 9. NWX, John Larson, AM, and SCM were present. The 160-Meter net held its annual picnic near Grand Junction. Seventy-seven hams and their families were present, NWX and SCM were officers, JAD and K6CSX received EC appointments, JAD received his 2EC appointment. The following were re-elected: LGG and QVA as RA1, UTO, NXY and QVA as OR5A and JDY as OR6S. Section Net certificates were issued to the following TFC/MJ members: KG2O, KYF, GBD, GXC, KG2WD and SLN. KG2KF is on the air with a new 100-GQX and FMX were on vacation. YDV has a new 160-inch and Triband beam. Several clubs and groups were active in the Field Day exercise. NWX visited the Sioux City Club, KG2BD had a new RME-800, SCA has a new 4100 stack complete with TV and coconut, YRA and DPT, father and son, went on a fishing trip to Minnesota. LCX missed his first RFLP in several months because of remolding the shack but promises to take back hard at it next month. EOH, mobile, originated traffic from a church conference near Kiskatich, Traffic: (June) WBBDR 1406, SCA 1149, PZO 1053, LGG 858, GCG 602, LCP 302, LCG 250, GQX 201, QVA 143, KG2O 71, WBBDR 72, LWJ 65, NXY 33, KG2QX 31, KG2QX 34, K2QVF 29, WDBDR 28, FIZ 27, UTO 20, KG2O 16, W2VVF 14, KG2QX 10, GBD 9, GQC 9, WQSLC, TFL 0, FLM I., (May) WBBDR 149, KG2QX 10, (May) KG2QX 15, (Feb.) WBBDR 27.

KANSAS—SCM, Earl N. Johnston, WBBCT—SCFEC, RTTY, HAM, QGQ, PAM, KFQ. Did you note our new PAM? Yes, FNS decided to let someone else take the helm as PAM. Rake has done an outstanding job in helping after the KPN session, but we're sure he'll be missed. We wish to welcome LEW, of Yates Center, to the roster. Bob has an outstanding summer that is heard all over the State and we feel sure it will be a good job with the KPN. All of us deeply mourn the (Continued on page 112).
GREATER SELECTIVITY
"13 tubes, and what do you get? The power and performance of a 20-tube set!"

Advanced Morrow circuitry gives the MBR-5 amazing performance in a rugged, compact unit offering more features and more value for your money.

HIGHLY SENSITIVE (½ microvolt on all bands) 100 kc. Crystal Standard built in.

EXCLUSIVE SQUELCH CIRCUIT eliminates interstation noise, but opens on the weakest signal.

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Mobile vibrator pack for MBR-5 and exciter of MB-560.
Amateur net ............... $39.50

SH-7 SPEAKER
5"x7" speaker in sturdy hammertone case. Amateur net ............... $11.50

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pasing of FTZ June 19. It was a shock felt by all of us, NIV has received its seventh Armed Forces Day c.w. certificate. From the messages received it appears that more than ten radio clubs participated in Field Day. UWN, of Waterville, has put the finishing touches on 6 Novices who have taken their exams and he is starting a new class this summer. KNEC has had a new call in Waterville, TOL, of Manhattan, likes his new Matchstick antenna that works so well, ICY (your truly) is out of the air temporarily because lightning hit the grounded tower. The juice followed the rotator cable in the shock—which was all grounded. Traffic—June (W6LJH) 958, NIV 267, W6FQ 258, FNS 153, KBE' N 127, KNSRHF 85, WH7T 91, UOL 63, ABJ 47, OMF 21, TNA 13, ICY 10, SA 10, ASY 9, W6WR 9, V8AI 7, LFC 5, VGE 4, K8AOQ 2, BVRX 1, W9LOW 1, (Almy) W7UTO 7, LOW 3.

MISSOURI—SCM, James H. Hoover, W6GEP—SHC: BUL, KM2: OUD and QXO, PAM: RV, The St. Louis RACES group has had several workouts handling communications for the C. Auxiliary Police during the flooding of the Missouri River. The June and July issue of Midwest QLIIAS, published by KXL/NIY, described amateur emergency communications following the recent devastating tornado in the Kansas City Area. K6HQQ reports that the Ozark Emergency Storm Net has been organized on 29.1 Mc. KB2DEZ has a new 6-kV, gasoline-driven generator, CPI reports that hurricane traffic boosted his traffic this month. Several reports indicated very successful hunts held in Nebraska and Missouri during June. CIA, ICW and K9RRA are operating s.s.b. in Springfield. QSL has returned after several months of work out of the State with the C. ARAH, new ARL Affiliated Clubs are the Missouri School of Mines Radio Club and the Tri-City Ham Radio Club, The 6-Meter Activity Club Net, Kansas City, now has 50.4 Mc. at 2100 each Tue. The Midwest Teenage Phone Net has moved from 76 meters and is now operating on 14 MHz, on 7232 kc. at 1500 CST. K8HQQ reports working two Puerto Rico Novices on 40 meters. UXT and MHS have qualified for Traffic Reporters Certificate. The SCM and BSC received only five messages from Field Day stations, but a much greater number were known to be operating. Triffes: June W6PFI 103, GAA 584, GLI 217, VFO 122, OLC 26, QN 78, K1K 51, IRE 35, EBE 21, K9HQQ 19, WH7T 19, W6FQ 19, V8AI 18, K9HBI 16, W6WYJ 14, BVL 11, BCL 10, CIB 10, LFC 10, EPI 9, OVY 9, KB2DEZ 4, IFL 4, HIX 3. (Almy) W6WQV 135, K9EIE 43, LQG 7, WAP 7. NEBRASKA—SCM, Charles E. McNeel, W6GXP—Field Day activity was very good in Nebraska with the following reports: Norfolk, UNI reporting 10 operators 8 miles west and 10 AHRC members. Omaha, EQC-8 reporting had 31 operators 4 miles northwest of Omaha. FNQ reported six operators and one transmitter 3 miles northwest of Omaha. UKJ reported 4 operators 5 miles south of Fairbury. ONR reported 6 operators and 2 transmitters at the air port at Hastings. VRY reported 9 operators 3 miles east of Goshen. VQG reported 16 operators at the air port in Scottsbluff. KTC-10 reported 4 operators at Point of Piedmont near Potter. New members of the 75-Meter Phone Net are K9HBI and K9DUU, making a total of 29 for June, with QNI 432 and UTC-85 as reported by SCM. SPK reports the 75-Meter Morning Net has added K9HBI and had QNI 386, traffic 87. The Western Nebraska Net is going strong as reported by SCM. QNI 372. There were about 65 amateurs in attendance at the Rocky Mountain Convention in Estes Park. K9EVE was all set as a relay station for the Powder Puff Derby which made a scheduled stop in North Platte this year. DDT keeps three net affiliations, Nebraska, TRX and C. owing to an IR message report. The Lincoln Amateur Radio Club held a picnic June 20 at Bethany Park with a good attendance. PAM MGZ reports a very nice condition on the Nebraska Phone Net but is doing an FB job keeping it going. Traffic: K9HQQ 229, WMNO 119, ZJF 78, DDT 61, ZQG 62, NTC 61, UJX 8, ERI 8, QNI 38, ERI 34, QNI 30. W6QI 16, Z6W 15, K9DEF 11, W7TTL 11, QC 8, PDH 8, Z6U 7, K9ELU 5, W6RGC 5, V6H 5, SWQ 3, V8I 2, K9HBI 1, WAMTS 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, Victor L. Crawford, WITVQ—EOL: BM: KYQ; PAM: YBH, Traffic nets: MCM, Mon.-Fri., 0430 on 3900; CTN, Mon.-Sat., 1800 on 7832, and 2200 on 3810 ke.; CTN, Sun., 0900 on 3910 ke. Sixty-four amateurs attended the Southern Division Meeting at Meriden, Bristol and Newton and Chicago Amateur Radio Clubs June 4. The program consisted of reports by New England Division Director, EOL, on the members and prizes. V8LH gave an interesting lecture on (Continued on page 112)
NOW, get your NC-300 for little or NO MONEY DOWN

it's National “old receiver round-up time”

How many times have you wished your old receiver was a bright new National NC-300? Now, make this dream come true, and save money too!

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NO CASH DOWN in most instances where old receiver covers down payment, up to 20 months to pay balance.

You may win a FREE NC-300 if your old receiver is the nation's oldest one traded for an NC-300 during the contest period. Get official entry form from your local National Company Distributor.

Final decision will rest with National Co.'s appointed board of judges. Contest period: August 1—Dec. 31, 1957

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Please send me my FREE Azimuthal map and full information on National's "Old Receiver Round-Up" plus detailed facts on the NC-300.

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City ___________________________ Zone ___ State ___
ARRL IGY-PRP. FYF worked 9 new countries in two days on 15 meters. FGF is mobile on 10 meters. YBII advises CPN not 30 times handling 175 messages and had a daily attendance of 27 stations. EERJ QN; 170 and YBII 29. DHP 27. A01 was selected as Connecticut station for Region 1 Civil Defense Amateur Radio Alliance. TVY is spreading all the time possible with his daughter and grandchildren before they leave for Maine. A0Y is a regular on the Allegheny Watch and Eastern State Nets. BDI spent part of his vacation in HAM-LAND and where his son, R2P, got married. WGD has organized an informal monthly luncheon meeting for farms working in Newington at 1200 on the third Wed. of each month at the Nutmeg House in Newington. JSQ, GYK, OLG, WGD, WKB, and ZJI attended the June meeting. KYQ reports the first session of CW handled 3 messages during June handling 171 messages. Attendance was 93.3% per session. The second session of CN handled 8 messages in 25 sessions. From FVW, Cougar says that MCN met 19 times, had a total QNI of 93 and handled 43 messages. High QNI went to R1B 16, EFW and RFI 16. Public Act 450, recently passed by the Connecticut Legislature eliminating the ten dollar extra fee for call letter license plates, becomes effective Oct. 1. TYQ vacationed in Minnesota. New Novices in Wisconsin are KNICEC and CAY. ECH needs a Nebraska QSL. W0B was OQ1 reports were resolved from AMY and DHP. OQ 6 reports from FVY and CST. New appointments received included: BNL and YNC as ORS. DHP as OQ1. Way not to take a few moments the first of each month to drop your SCM card with all the details. Traffic: W1SVO 28, CHK 385, KDI 96, AMY 89, BDI 71, DHP 59, FVY 53, UYI 51, CUH 38, RFI 37. GVK 27, EKJ 25, EBF 18, EBM 16, ECH 15, VVT 15, L7 15, PHP 7, OEO 5, W1MD 3, W1N2H1 1. MAINE—Acting SCM, Christo. RT, W1TO—The Sea Gull, Barnyard and Pine Tree Nets still are in operation. BBS and BDP have flown to England for a visit with some of the old war buddies. UXU, YU4, W1G exchange trips are coming to a close with the starting of school. Are the fellows in Northern Maine actually always away from home? Our game of AYX, is housing some small wild ducks. The Augusta Hamfest was a huge success, with DTK and PCD finding the hidden transmitter. Steams out on another time at the Dexter Hamfest. It is with the deepest regret that we place NYP, NAL and WN1K likes the Silent Keys list. CWR and parents are moving to Sunny South for the winter. PTZ and NTV still are eating all those "enormous" trout. ZEN is moving to Maine. I hope by the time this notice goes out, the section will have an SCM! All it takes is a little imagination and time. So, come on fellows. Let's keep Maine on the map! Traffic: (June): W1LEP 133, CESY 32, UDD 26, VTG 21, KRDY 14, W1VRF 3, (May) W1WTV 235, KRX 183, CESY 64, FZK 35, EPN 33, RBC 30, BB 30, UDD 27, CESY 29, FYF 10, HIT 8, JNM 6. EASTERN MASSACHUSETTS—SCM, Frank L. Baker jr., W1ALP—New appointments: TVJ as EC, Alternate to R2O. For interested SCM, SCM, TVD Andover. JSBI Waltham, SS Lincoln, as ECs. AYQ as OQ1, JSBI as ORS; UOY and SS as OPs; SS as ORS; CTR as OQ2. DA for 75 meter phone: AWA North Reading as EC and OBS. Hein on 2 meters: DA, KN1S BSM, BQI, 85BU/1. K1BSA is 6 meters with a Bingham. CTF had a serious convention but is home again. Our sympathy to WK on the death of his father. Hein on 75 meters: KRL, ZH1Q, SOL, NO, OQ, HIA, OTN, GYX now is mobile. Hams in Bellingham: BDW, DDH, HGN, IGO, IRG, ZAO, KN1S AFK, AUL, BIR, RYV. They are working on taces down there. The ARRL's F.M.T. in May: BGW, TZ2, W2, TVJ, WU bought a new place in the country and will have a real antenna farm. K1EJF is working this week and will take in the National Convention at Chicago. DIY is on 75 meters. The SO, Eastern Mass. ARA had a very fine Field Day. All of the operators in that group were out on this event. The 2-meter band opened up wide and W2s and W3s were coming in fine. NF worked EKAW and VS1GL. Gobet to N6YV, who is with them on vacation. R1J reports that the Merrimack Valley ARC was on Field Day in Chelmsford, NBV/1. The QRA held its annual auction sponsored by AG at American Legion Hall in Los Angeles and says he is feeling pretty good. HZR has gone s.s.b., with BWA and W1SO. LEO is on in Galveston. FJ1 is NCS of the HAM-LAND. K1CCH is on Thurs. and has a 10-meter ground plane, K1BHT is new in Westminster and is our Eastern Mass. Net, EFW/1, in Holl, will be on 75 meters with a trap antenna on 40 meters and a "Tapeone." KN1BYY helped YAA on Field Day, has a trap antenna, and is serving emergency service in the Boston area. The air in Franklin, helped by TZ2, BGW says a lot of the Novices are working outside on the 21-Mc band.

(Continued on page 116)
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COMMERCIAL-GRANDE ARRAYS
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HIGHEST SIGNAL-TO-NOISE, SIGNAL-TO-INTERFERENCE RATIO EVER!

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ORIGINATORS AND MANUFACTURERS OF THE WORLD’S FINEST TV AND COMMUNICATION ANTENNAS.
SMO has a 75A-3 receiver. The Braintree Radio Club held a meeting. KNAIQ is new in Winthrop. The South Shore Club held a banquet at the Wonderland Fish. KNAIC, 15 years old, is new in Brockton. It is on all bands with a DX-25 and AR-3. The Cape Cod and Islands ARC, KBIN, was Field Day in West Dennis Beach on all bands with KBSC, BCN, KBBQ, MKW, KEU, KPR, KEA, UUM, JMS, EGZ, KL HRK, KN16, BLBD, BLGD, LRE, KBBQ, WBB, East Matapoisett. There was water and VY1 Topshield were equipped with ECs. BPW has WAC, WARM and WITX awards and RFA Certificate. DPLM has a new receiver. Active on 6 meters is Karl MAO, BPMQ, BPMR, BZAR, WLA DHEI, DDFQ, EBQ, EL, ELTB, EDB, ECOM, KBBQ, LSH, LYK, LYYT, MEDG, SEA, VOX, WAOI, ZGO, WAOI, DNGO, DM1, DZG, DZK, EFL, IIA, IEO, IAQ, KGI, KBBQ, MEU, QSE, SSGG, YZC, ZOC, LXR, has new equipment in his shack. KICKAR has had the following WICAR and AE group. Those bands are in C3S, RARF, FOS and LVC, KIRF has a halo on the roof 38 feet up. The field day is on the way to work. QRA, DNY, NXS, EVA, SRA, KCO, KHR, NWK, RI, YZC. Fixed stations on at this time: CRY, EYZ, GKE, LXR, KIAIP, Traffic: (June) KDA5D 367, EJQ 46, TYT Field Day 20, 19, 14, AKN 4, KINBYV 2, WYBP 2, BPW 1, (May) WITPQ 13, BIZ 9, SMO 2, (Apr) WITPQ 27, (Mar) WIBPQ 13.

WESTERN MASSACHUSETTS—SMC, Osbourne R. McKiernan, WHRVR—SEC: RIX, RA1; BVR: PAM; MING: The WICAR Net has 3590 ke, daily at 1900 and the WAP Phone Net on 3570 ke. West, at 1900 needs your support. How about it, fellows. PAM, get your RMA, taking a well-deserved vacation from the traffic nets for ten months. DW has resumed the RMA duties for July and August. Attention: There are about 65 stations in the section that hold close to 100 official appointments. About 40 of these have not been enforced recently. To be valid, a station operator’s certificate should be endorsed each year. These checks and send them in for a signature to avoid cancellation. Field Day activity in the section was at an all-time high this year. The HALCRA had six towers in operation on Winthrop Peak, with plenty of operators and nets. Over 200 contacts were made. The Pioneer Valley Club was set up on Anniversary Hill in Hadley with 5 towers. The field day was a huge success. The Pittsfield Radio Club was very active and made many contacts. DGL, DHE, JYK and EYV was at the field day. Some contacts were also made and did an FB job with two jugs. Small groups were active in different locations and I believe this was one of the best field days ever held. SFC reports a storm-trucking drill was held by the AREC group in the Worcester Area in preparation for hurricane emergencies. LZZ has a daily fed on 18 meters with ZSS1MP and so far they have made 267 contacts in one year. LZZ has 124 countries confirmed on 18-meter phone also. ZEO reports a summer Novice class is being held at the North Adams YMCA with 18 hopefuls attending. DZY is rebuilding and will install a check-in system for the operators. HRV enjoyed some nice mobile contacts while vacationing in Eastern Massachusetts. Traffic: WHFQ 397, RR 173, EYV 27, FYV 26, DGL 22, AOM 8, HRV 4, DZY 2, ZEO 2.

NEW HAMPSHIRE—SMC, John A. Knapp, W1AJA—SEC: RXU, RMU: CHW and COC: PAM: CDX, NNX, traffic net, is on 3560 during 1900. RACES Net, NHEF, meets Sun, at 1300 on 3570 ke. GSIPX meeting time is 1900 on 3852 ke. Mon. through Fri., and on Sun. at 0000. VYJ, Nashua Mike and Key Club secretary, reports increased activity with code classes, etc., work and club auctions, NPYJ and MTB, on Mon. at 2030. WHN, Chelmsford, KN1BCS advises that KNAIPQ now has his General Class license and his call is K1APQ. WHN and All have acquired a commercial radiotelephone 2nd-class license. The Granite State Phone Net held a picnic at Belknap Reservation. Approximately 300 members, with their YXLLs, YLs and Jr. operators present. HQ closed over a short business meeting following which a general get-together and dinner added up to a most enjoyable event. Another such event is tentatively scheduled for September at which time WDBL, following return from Europe on his vacation tour, is expected to give a color-sound report of his trip. BPL ends to BAL, FUA and KN1BCS, Memorex new home: Please send your name, address and phone number to KICLD in Piermont, Traffic: JImmy WITPA 311, KN1BCS 112, WITPUQ 40, IQH 28, CDX 6, BVS 2, RN 2, KAOI W1GQ 42.

RHODE ISLAND—SMC, Mr. Jane R. Burkte, W1MXX—SEC: PAC, PAM: VNE, RMU: BBN and BTV, AUT of BHARC is in instructing potential Tech. and Gen. Class licensees. KDS has a members call. W1MM (Continued on page 118)
A Ham’s Best Friend...

The New RME 4350 Receiver

4301 Sideband Selector
4350 Receiver
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At last, your long-standing desire for better controls to complement your judgment and skill has been achieved in a receiver that sells at a sensible price. Yes, all the design features you want and need for present conditions in amateur bands, and usually found only in expensive receivers, are available to you in the RME 4350. It’s laboratory-engineered to give maximum performance for SSB, CW, phone DX, Traffic and contests.

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- Dual Conversion. Maximum performance results through the use of crystal-controlled dual conversion; images on all amateur bands are down 54 db or more.
- High Selectivity and Rejectivity. Even at high frequencies, you can precisely tune the signal you want.
- Easy, Pinpoint-Precision Tuning... Velvet-Smooth Operation with the E-Y exclusive, new two-speed tuning control. With it, you can tune to any part of the band and then micro-scan the area or the whole dial range by means of a 75 to 1 differential planetary reduction mechanism. This mechanism is an integral part of the tuning knob.
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CATALOG NO. 69BO46
Low cost, light weight, easy to install, Elements snap into position for immediate use, covers entire 2M band with excellent gain. Folded dipole, omni, impedance 300 ohms. Low SWR for 300 ohm balanced line or 12 ohm coax thru 1/2 wave balun. Stacking bars provide full wave length spacing and perfect match for balanced line or coax thru 1/2 wave balun; $3.95.

CATALOG NO. 69BO47
Highest possible gain per dollar per foot, pre-assembled and pre-cut. Middle of the band, covers entire 2M band with excellent gain and operating characteristics. Folded dipole, omni, impedance 300 ohms. Low SWR for 300 ohm balanced line or 12 ohm coax thru 1/2 wave balun. Stacking bars provide full wave length spacing and perfect match for balanced line or coax thru 1/2 wave balun; $3.95.

CATALOG NO. 69BO48
Factory pre-assembled, with elements adjustable to entire 6M band, T or gamma match for balanced or coax line feed. Add'l gain through stacking. Stacking bars provide full wave length spacing and perfect match for balanced line or coax thru 1/2 wave balun; $3.95.

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NEW 1958
CATALOG NOW AVAILABLE

SEND PLESE MUTE THE HY-GAIN BEAM CHECKED.
MY CHECK IS ENCLOSED.

2M, 5E 2M, 10E 6M, 5E

NORTHWESTERN DIVISION

IDAHO—SCM. Rev. Francis A. Peterson, W7KJ—W7KJ is making final preparations for the 1958 Field Day competition. The Benes Family. Idaho amateur car-

versary Big Springs Hamfest. Idaho amateur car-

versey Big Springs Hamfest. Idaho amateur ear- plate plates are now being sent out. Many Field Day reports are in. CDAC, H. T., The M. T., Snow B. C., and R. T. reported a large number of RFP handled lots of traffic via 2 meters on a N. H. mountain-top. TRX operated from Mt. Hohbark and Crawford. VZQ has a

Continued on page 120)
For your most exciting visit to a radio distributor, take a few hours and look over the new ELDICO line.

We were tempted to start this ad with an invitation to join the hams with outstanding signals who always seem to work them from the “top of the pile.” But truly, this new ELDICO line is so full of features that the excitement will start when you first fondle the dials on your distributor’s shelf... and it will be yours to enjoy every time you throw the switch to command your operating frequency.

Two superb transmitters offer features found nowhere else in comparable units. ELDICO’s SSB-100F basic exciter/transmitter and SSB-1000 kw. power amplifier are designed for outstanding performance on all modes of transmission — SSB, CW, and AM — with every operating provision for amateurs concentrating in any of these phases of ham radio. With the basic SSB-100F, you have an ideal medium-power rig or exciter. At any time, you can add the kw linear SSB-1000 or any other PA. Military type construction... integral 1” oscilloscopes in exciter and PA... full break-in keying... just look over the spec, then drop in on your ELDICO distributor to examine for yourself why ELDICO is the fastest-growing name in transmitters for military and amateur service. And don’t forget: this promises to be one of the hot operating seasons for all times... make it an ELDICO season!

**ELDICO SSB-1000**
- High Harmonic Attenuation: High-Q plate and grid circuits and Pin-network output circuit provide maximum harmonic-attenuation.
- Peak Envelope Power:
  - Input SSB-1000 watts
  - Output SSB-625 watts
- Frequency Range: 10 thru 80 meters.
- Tube Lineup: 5 tubes: two 856, two OA2, one GB2, one 5AU6, one 1CP1, two 4 x 250B.

**ELDICO SSB-100F**
- Type of Emission: C.W. — A.M. — SSB
- Power Ratings: DC average input SSB-100 watts; A.M. input (two tone test) — 60 watts. Peak envelope power input SSB-144 watts. Peak envelope power output SSB-100 watts.
- Keying: Grid block, full break-in.
- Harmonics and Spurious Responses: Spurious mixer products — 50 db or more down. Third order distortion products — 35 db or more down.
- TV interference suppression — 40 db or more second harmonic, 60 db or more higher harmonics.
- Unwanted Sideband and Carrier Suppression: 50 db minimum attenuation, through low frequency crystal lattice filter.
- Frequency Stability: Control Oscillator (800 to 1300 kc) — 100 cycles after two minute warm up period. Output Frequency — within 100 cycles after five minutes warm up period. Dial accuracy — 2 kc after calibration.
- Tube Lineup: 22 tubes, including two rectifiers, two voltage regulators, one oscilloscope and one 5994 power amplifier.

Write W2BFY for additional details if your distributor can’t assist you.

29-01 BORDEN AVENUE, LONG ISLAND CITY, NEW YORK
A Division of Dynamics Corporation of America
new car, new Morrow equipment and a new Viking 300. WBB and George have new Regency transistor equippers. WARNING! Watch out for "no transmitting" signs near highway construction work. You can continue in due time with dynamite caps! A mobile recently tried to blow up a mountain in Idaho that way, but fortunately no one was hurt. Some news reports assume the exciting month of the seventh of the month. Traffic: W7GMZ 23C, QVQ 52, ENT 14.

OREGON—SCM, Hubert R. McNealy, W7JDX—Your new SCM greets all of you with the hope we can work together toward an efficient band. For our section, QSB will continue as QSB. We have no RMI or PAM as yet but are looking for some. We need more QRM; any of you who are interested, please advise the SCM. His address is 11006 S.E. Madison St., Portland 16, Phone number is 4-3808. That includes Norquyes also. Your SCM hopes to be able to voice the blues during the year, so be on the lookout for him as he is a traveling man. Any clubs desirous of meetings may write the SCM and he will handle. Field Day was a success in Oregon, the weather was generally good and reports indicate lots of fun. Report from the Portland Radio Club with 23 operators, the Tumtum Valley RC with 15 operators, the Oregonian ARS with 21 operators, the McMinnville RC with 10 operators, the Oregon ARS with 4 operators, the Tillamook RC with 7 operators, the Central Oregon RC with 22 operators and the Oregon ARS with 15 operators. Also many individuals reported, such as OLA, SSH, WHE, KI, KIB and JDI. The SCM is trying to get a line on OSA for more cards, and information. The Portland Radio Club plans an installation on top of 11,000 ft., Mt. Hood for the A.H.F. Contest, OZL, IIX, YXT, ZER and VLE are arranging the trip. They expect to be on 2 and 6 meters and 435 Mc. Traffic: W7APF 701, KNU 89, JDX 11, OLU 25.

WASHINGTON—SCM, Victor S. Gish, W7FID—FAX is putting up a new SCM. He has connections from K7V, QMB, GWM, V6K, PAM and YU1 and a little letter and picture from YU1, who is looking for W7 on 20-meter CW. The SCM has a good deal of rotten band conditions. WAIK is back on the nets full blast again, USO is moving on 2 meters while on vacation through Idaho. Meanwhile, ARB still is working on a super draper shack. BXH reports the "Y1-to-be" problem looking good—otherwise things are quiet. AMC still is complaining of cheese, taking him away from hamming. JC says:"QRT, work." JVB reports the DX-35 is working FB, EYV is rebubbing mobile for use in the new car he recently drove back from Detroit, W7NEU worked 13 states, KIB and K7Y. The last was KN3AFZ, in Pennsylvania. Will be glad to take Everett traffic if the boys will QSY to the Novice band. OCA resigned its EC of Pierce County. DW4 now is acting EC. DIT got his General Class license, and DJW got his. Also DJW got his license to check onto the Montano Net Mon. and Fri. Response for Emergency Coordinators to represent each club in the section was no ed with the exception of Wallis Walla. WDQ is busy on the MARS Traffic Net, QH1 is running 7 for a while, HA, KT7FE, PUY, YAZ, K7WAT and K7PBN are the others. Traffic for June was little better than half of that for May. The WARTS Net held its annual picnic at Lake Wapena at July 13 and 14. KNTAI is a new SCM. This is the first "EXT" call we have noted. Don will be on with a DX-35 and National receiver soon. Plan-er get our reports in by the first of next month. Traffic: W7RA 2145, K7FST 3322, W7PSC 859, K7Z 641, K7WAT 650, FB 193, W7WAT 122, PRU 75.

(Continued on page 177)
After two reasonably satisfying years with [redacted], I've accumulated quite a few reasons why I'd like to join Raytheon. I've seen a lot of your equipment and it has quality all through. During the War, while in the Navy, I worked on your SG-1 Radar. I know that your company and your Field Engineers enjoy a fine reputation. It is my understanding that if I am accepted, I will be considered for assignment to one of your various High Speed Bombing Radar or Missile Programs. Several Raytheon Field Engineers I knew in the past now have very responsible positions with your company. One of my friends, who recently joined your company, mentioned that the company now has over 21,000 employees, needs many more engineers and prepares its men for advancement. He also said it was easy to talk to the people in charge and you answer person to person mail promptly. He liked your policy of moving household goods to keep men close to their families and the consideration you gave him regarding his choice of assignment and location. He also met some radio hams in your department with whom he had talked over the air. Last, but not least, he is pleased with his monthly pay check!

PLEASE DO NOT WRITE BELOW THIS LINE

Interviewer's Comments

Seems alert and intelligent. I was impressed with his electronic experience and his apparent technical competence. Pleasing personality. Recommend we hire him for assignment to the Hawk missile program and arrange for him to work in engineering or production for initial training. Note that he has an EE degree.

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Reporting to G. E. Dodge

Signature of person hiring: [signature]

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Raytheon field engineering gives you a real chance to up-grade your future—many of our executives are former field engineers. Primarily, we need men with an E.E. degree and field experience but write if you have a good radar, fire control or missile background. Attractive salaries; assistance in relocating; insurance; really interesting work. Write E. K. Doherr in confidence, without obligation.

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THE Collins
KWM-1 first mobile SSB first mobile transceiver

Use it for mobile. Use it for fixed station. No modification necessary in this 14-30 mc 175 watt PEP input transceiver. It's new, revolutionary.

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KWM-1 Transceiver $770.00
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516F-1 115 vac Power Supply 103.00
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APS 62, USO 50, WQD 46, AIB 29, JEF 24, AMC 21, BXH 20, JC 10, GVV 15, LVB 7, EYW 2.

PACIFIC DIVISION
NEVADA—SCM: Albert H. Chin, WMV—SEC: JU, The NARA held its Field Day near Virginia City on Geiger Summit. Nineteen operators were present with nine AREC members, 9MA, ex-7TA, of Sparks and a few years back and his family were guests of your SCM over the Fourth. Your SCM attended the ARCO Conference in Florida, which also was attended by CX, of Reno. Herb benches his records to the guest. CX now is operating a new HT-32. MIAH has completed a new 6-meter converter and soon will be on 6 meters to join CX and JAY to take advantage of the openings. THJ is on the air at Gabbs using a Viking II and Globe King 900A. The receiver is a TM7 GP-90. This report is short because of too much travel and not enough information. Keep it coming.

SANTA CLARA VALLEY—SCM: G. Donald Miller—Asst. SCM: Roy E. Pinkham. Details: SEC: NVO, RM: ZRE, P.A.: OFJ and WGO, K5DXY made the BPL, K5GZ made the BPL on origination for the second month. Bob is a member of the MATN, taking traffic from MARS and filing on the NTS net. The Monterey Bay Radio Club installed the following new officers in June: K5DXY, pres. UJA, vice-pres.: K6SEC, secy. ATX then installed the following officers for the coming year on June 10 at its round up in Watsonville: RHJ, pres. HIUW, vice-pres., and traffic director. HC and YLM were visitors at the June meeting of the MBRC. Harry and Don gave the gnu up-to-date information on happenings at Headquarters. QP has just received a new VHF transceiver, a Marine, with a new Valiant. KMR is heard on 144 Mc. HZK is working on going to K6L-land. K6CXT graduated from high school and soon may go into the service. K5DXY, MBRC pres., plans to get all the transmitters running as part of the club meetings. K6BBB enjoys the transmitters put on by the SARCA before each club meeting. PLG reports that at one time was and operating with the Field Day gang above Salinas. HC is cleaning weeds and grass from his yard getting ready to put up a tower this month. KIN reports several openings on 56 Mr. during the past two months. There is still need for e.w. operators to take part in RNM and NDN. The meetings meet on 3315 and 3883 kc., respectively. If interested, contact HC. Traffic: Gunns: K5DXY 335, GZ 472, W6PLG 284, JCC 158, BBY 158, FON 48, K5HGY 25, W5HYM 23, OHI 20, K6BBB 4, W6HC 4, (May) W6PON 29.

EAST BAY—SCM: Roger L. Wiscox, W6FDI—First of all I would like to apologize for not getting the column out last month. My only excuse is that of being out of town on business and participating in a rebuilding program here at the home QTH. I am hoping that I can get down to business and do a better job as SCM. My term is up this fall and some of you eager beavers should be thinking it over now. June meetings echoed with Field Day talk and from the activity reports it looked like everyone got in the act. Other meetings held in June included that of the East Bay Club with VE2AGE giving a talk on the Dew Line (Antarctic Early Warning). Tom showed colored slides illustrating his talk. The regular meeting of the SARCA was held at the Rose and Bell Restaurant. The topic of discussion was Field Day. It turned out that some of the boys had arranged to get three cabs on a siding near Newark for a Field Day spot. From what I heard over the air they seem to be having a swell time. The Oakland Radio Club, Inc., held its Field Day in the Oakland Hills in the Sempa Arena. MFZ did a fine job getting the group together. CAN, of Napa, is doing a splendid job as SEC. It seems that he isn't getting much help from the boys in the Bay Area, I know what a job is to get this help but hope we can do something about it soon. Keep up the good work, Wayne. Thanks to Major Forbes for taking the time to send in his station activity report. For the month of May K6GK handled a total of 508 and for June 298. We would like to see more of this kind of traffic work. We hope to get back into the swing of things next month.

SAN FRANCISCO—SCM: Walter A. Buckley, W6QG—Asst. SCM: Fred E. Laubender, GOPI; William T. Naka, 46GHI, SEC: K5F, ECC: HYN. The Far West Radio Club has been formed in Fortuna with RW pres.: K9RFE; vice-pres.: K9GZ, secy-treas., and K6ERC act. mgr. Club membership as of June was 22 members. Meetings are held the 1st and 3rd Fri. nights of the month in the hall above the fire and police department. Approximately 100 contacts have been made by the club station on Field Day. The Humboldt Radio Club has a new call W6FCO, and PLY is

(Continued on page 124)
NOW IN STOCK AT WORLD RADIO!

Guaranteed...
TO WITHSTAND 5000 IN. LBS. OF TORQUE!
TESTED TO 10,000 IN. LBS. WITHOUT FAILURE!

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safeguards all
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TV rotators — a com-
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High carbon machines, steel gear
and rack, heavy shoulder bolts and
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bronze bearings provide depend-
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In Stock! Send for Detailed Brochure...

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3415 W. Broadway, Council Bluffs, Iowa
moving back to W7-Land. Congolades to RJQ and RQQ on the tragic deaths of their 17-month-old grand- sons and nephew. Sorry to report a Silent Key listing for LWV. Fred Newbauer was one of the San Fran- cisco Naval Shipyard Club charter members and an old-timer member in HAMS and the San Francisco Radio Club. FEA says that WJJF is now home from the hospital and although the doctor says he will not be able to work for some months to come.

Gertie writes that Clare is showing improvement each day. But wishes for a speedy return to the air, QSM. The gang certainly misses you.

San Francisco En- din Club had its usual big turnout of fellows for Field Day as did the Band Spanner's Radio Club. GCW now has over 10,000 contacts on c.w. and has filled 12 log books in 85 years, CXD reported the fol- lowing stations were heard in 1275 Kinko 11 Contest: June 8 and 9; KHR, CWO, KQXI, KXL, KQPH, KUHE, ZBS and GGC. KBHII reported for the Au- Force 0/24 after putting in many hours to help on Field Day with the San Francisco A. P. K3K was transferred to Chiichi Jim in the Bonin Islands and will have full charge of all electronics plus the "ham shack." Congratulations to S2S on his new son. GGC's YL Mae was nurse in attendance at the birth. GCY was busy handling messages for the "Kantus Airline Pilots" which they are recently established in San Francisco, because of a company strike. QAIM reports the new dipole on 40 meters works very well. Shy and KBHII were busy bugs on the air during Field Day. Another of the San Francisco Ladies' Club members, QPD, has been very busy with her assignment as chairman of the committee of ham radio operators acting as part of the radio network on the cross-country flight from San Carles to Philadelphia of the "Powder Puff Derby." Trafle: W6QMO 180; GCV 22; JWPH 10, GGC 16; KHIH 14, BLP 12.

SACRAMENTO VALLEY—SCM, LeVaughn Shupley, K6CFF—The clubs of Sacramento County participated in local competition on Field Day with an engraved trophy being awarded to the winning club. The Radio Amateur Mobile Society took first place followed by MARC, Sacramento Aeronauts, and our new YL club, the Cigarette Capital Chicks. HIR, president of the RAMS, says it was done with antennas. They used re- linquished offices which were oriented N-W/E-W. Two feed lines and matching transformers enabled immediate switching. The RAMS will issue special commemora- tive QSL cards to all stations worked. Congratulations to fellow SCM members. The SCM received Field Day messages from most clubs. At this writing however no news of ac- tivities has been received from the 7th of May, part of our section. KNOSDXA (now K6OSDXA) won first place nation- ally in the last Novice Roundup—see July QST. Jim also is a newly-appointed OBS. Two-meter re- activity in the section is terrible—e.g., RAMS, MARHS and even WFTOL! Sacramento has about 12 stations on 40 meters. Anyone interested in 160 MC contract K6BT, KQ4H and Colleen, K6PWH, both of the CVC, contacted the Flying Enterprise on 15-meter phone. They plan to share the QSL card, I6. Don't bother for it in QST unless you have sent the information to your SCM. All reports must reach the SCM before the 4th of each month. Trafle: K6OSDXA 194, KNOYBY 39.

SAN JOAQUIN VALLEY—SCM, Ralph Sanyan, W6JQW—The Fresno Amateur Radio Club held its Field Day at Adelphi, Calif., and had 20 operators and made over 500 contacts. The Turlock Amateur Radio Club held its Field Day on Mt. Blanket and made over 700 contacts. The Stockton Radio Club held its Field Day in the Stockton Stadium and had 8 amateurs participating. The Modesto County Amateur Radio Club held its Field Day near Raymond, Calif., with 7 operators. While coming back from New York AGO wreaked his car in Tulare family and the car came out in one piece, but the car was a total wreck. NTV has a 100-ft. tower for his high-frequency anten- nas. HYZ is on all bands with nothing at his QTH. K6JTP has a new 6-meter rig with an 829 in the final. K6JRY has a 15-meter beam. NTV has a new 120-meter 40 meter s.s.b. KN5CND was in charge of the Novice's during Field Day, K6GOX has worked 37 states on 8 meters. DIY has a new SX-101. PFX has an ART-13 installed in his pickup. Summer and vacations have cut down activity but, fellows, please send in the reports. These reports are important to all of us. Hope all you had a nice vacation and came back full of vim and vigor. Remember, the Fresno Radio Club meets the 3rd Fri. of each month in the PGE Building, 10th floor. Trafle: W6ADD 39, EBL 39, K6PFM 2.

ROANOKE DIVISION

NORTH CAROLINA—SCM, B. Riley Fowler, W3RRL—SEC: ZG; PAM: DRC; June was Field Day month with the amateurs. The following clubs par-
Cleanest signal on the air! Hailcriefers new HT-32 transmitter brings a new standard of clarity with two exclusive features: (1) 5.0 mc quartz crystal filter—cuts unwanted sideband 50 db. or more; (2) new bridged-tee modulator, temperature-stabilized and compensated network provides carrier suppression in excess of 50 db. SSB, AM or CW output on 80, 40, 20, 15, 11 & 10 meter bands. High-stability gear-driven V.F.O. 144 watts peak input. Ideal CW keying and break-in operation.

Amateur Nu..................$675.00


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HALLICRAFTERS

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</table>

Write For Complete Literature

On The Tellex Line

Arrow’s Export Dept. Ships To
All Parts of the World.
ALL PRICES F.O.B. N.Y.C.

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525 Jericho Turnpike, Mineola, N. Y. • Pioner 6-8686

125
Just a word about my new 500B Globe King. That is the nicest piece of equipment I ever owned. I work 10-15-20-40 and 75 meters with it. The TV set is 10 feet from it with absolutely no TVI on any band or any channel. I have several 50 watt rigs in another room but they just aren’t the same. I really like it as I have not had a minute’s trouble with it. This is my third Globe and I like it. I have had since you built them and they were all good, but this one tops them all. That speech suppression is “out of this world.”

Glen F. Gressly, WØFK
705 Hiway St.
Savannah, Missouri

![WRL Globe King 500B](image)

**WRL Globe King 500B**

$40.00 per mo.

Wired & Tested: Just $72.50 Down

Bandswitching, 10-150M Transmiter for 540W on fone & CW, $40W on SSB (P.E.F.), with any external exciter of 10-15W.

Outperforming any rig in its price & wattage range, the King is housed in a handsome 31x221/4x13/4” cabinet, specially designed for TVI-suppression. Relay controlled: includes a built-in antenna relay; built-in VFO, separate power supply for modulator section, allowing better overall modulation. Commercial type compression circuit keeps modulation at high level. Features grid-block keying for signal clarity. Pi-filter matches most antennas, 52-560 ohms. Provisions for crystal operation. New 4-400A Amplifier tube used for increased safety factor.

**And the World-Famous**

Globe Chief 90 ...................................... $67.50 5.47 per mo.
Globe Champ 300 .................................. $449.00 25.14 per mo.
Globe Scout 650 .................................. $129.95 5.91 per mo.

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**WORLD RADIO LABORATORIES**

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COUNCIL BLUFFS, IOWA

Please send me your free catalog □ and info on: □ Globe Chief, □ Globe Scout, □ Globe Champ, □ Globe King.

Name: ________________________________

Address: ______________________________

City & State: ____________________________

(Continued on page 123)
ELMAR ELECTRONICS

for complete large-quantity stocks...

TUBES. TRANSISTORS. DIODES

Elmar, outstanding among the West's foremost electronic distributors... supplies large quantities of RCA tubes, transistors and diodes to a widely diversified market—amateur, industrial, research, government, radio and TV broadcasting, technician, service dealer and others.

To meet such varied requirements fully, Elmar stocks are complete, constantly adjusted, fully maintained. Units, always several deep on the store service shelves, are each backed up by heavy reserve stock.

At Elmar, RCA stock is treated in this manner.

It ranges from the largest transmitting tube to the smallest transistor.

It will meet your requirements.
Amateurs everywhere are invited to participate in a QSO Party, the purpose of which is to assist Virginia stations in earning the VA/JF award (rules on page 72). The party will begin at 6:00 p.m. EST, September 14, and continue until midnight EST, September 18. Outstate stations will attempt to contact as many Virginia amateurs as possible using any band or mode. Each QSO between a Virginia station and a QSO station may be counted once regardless of band or mode. (2) Out-of-state QSOs are counted only if the Virginia station is seeking a Virginia or an out-of-state contact. Each contact must include a two-way exchange of QSO Number, BRT or RS report, and state or country. Examples: "NBR W4AMM CON" or "NBR WAYDH VA." Virginia stations will send "Virginia," even though the fact be self-evident. (3) Score one point for each complete two-way exchange. No credit will be allowed for incomplete contacts. (4) Suggested calling spots: 3050 and 3935 (the Virginia net frequencies), 7050, and points from 25 to 50 kHz inside each of the various bands and phone sub-bands. (5) Logs should reach the Virginia SCM, John Carl Morgan, W4DR, c/o Radio Station W4GR, Box 699, Fredericksburg, Va., no later than October 15, 1987.

ROYAL MOUNTAIN DIVISION

COLORADO—SCM, B. Eugene Sponsaro, WDML—SEC: NIT, PAM: KDQ, PAM: HFC, OBS: KBDU, OO: OTR, OBS: KJCLJ. Another successful Rocky Mountain Division Convention was enjoyed by over 3000 in attendance at the sold-out convention of INJL. Congratulations to the Denver boys on a well-done job. The Colorado Springs group went out in force to handle the communications for the July 4 Pikes Peak Hill Climb, doing a swell job as usual. Those participating were TON, CVG, VBP, KC5CB, JAI, and a number of others. Anyone wishing to improve his e.w. technique is invited to check into the Fishnet which meets at 6:00 p.m. Feb. and Thurs., 7:15 p.m., KBDTR is the central location for the Denver Area operating on 50 Mc., W9KCPFP, K0XX, KJR, W9F, RWD, TH, W8K, KJCLJ, DUZ, and JIA. The Boulder Amateur Radio Club has re-

(Continued on page 180)
We trade higher!

Howdydoony...

I'm Jack S., the new Vice-President in charge of equipment Trade-Ins. I haven't always been known as Jack S. . . . You see, the guy who made this name plate for my desk said Vice-Presidents HAVE to have a middle initial. I said he could use the initial from my last name... then when he got to the last name I'd already used it and... Like the sign fellow said, though, it's pretty darn effective!

I got this position because the old Vice-Pres. was "surprised" while making those famous "Surprise Trade-Ins"! They caught him making a profit! In the Trade-In Dept! The Boss said this was unthinkable and what they needed was a real moron for the job. A few well-placed pulses through the electronic brain pointed to me as the best choice. I'm sure you've heard of the Ozarks and the famous superlative qualifications they offer.

500,000,000... just write me a letter telling me just what sort of stuff you want to trade in... and if you've been "surprised" by an Ashe deal in the past... you'll flip your antenna at a Jack S. offer!

Jack S.

IT'S EASY TO DO BUSINESS WITH WALTER ASHE!

1. Just tell us what factory-built gear (made since 1945) you have to trade, and what new gear you wish to purchase. You'll get our top dollar quote by return mail.
2. When the deal is made, you ship your equipment to us by prepaid express or, if express is not available, by prepaid truck. We check it at once and, in most cases, your new gear is on its way to you within 24 hours after we receive your trade-in.
3. We will ship your new gear to you via express in most instances. Where express is not available, or not practical, we will ship by truck.

HALLICRAFTERS HT-32 TRANSMITTER, Net......$675.00
HALLICRAFTERS HT-33 LINEAR AMPLIFIER, Net $775.00
HALLICRAFTERS SX-101 RECEIVER, Net $395.00

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All prices f. o. b. St. Louis. Phone Chestnut 1-1125

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OUR 35TH YEAR

Walter Ashe Radio Company
1125 Pine Street, St. Louis, Mo.

[Check boxes for trade-in service]

Rush "Surprise" Trade-In Offer on my...

[Provide name and model of new equipment desired]

[Provide phone number]

[Provide address]

[Provide city, state, and zip code]

129
Utah—Acting SCM, John H. Sampson, jr., WTCX—SEC: GPN, PA1; DTV. Amateurs are invited to participate in the Ogden City-Wells Bay Emergency Net each Thurs. at 2000 MST on 29.310 Mc. Both the Ogden Amateur Radio Club and the v.h.f. section had new locations this Fall. WTCX has received a MARS Code Proficiency certificate for 20 w.m. QDIJ spent July in W9-Land. CWG is planning 2-meter mobile operation. LRP is claiming the power supply on his Morrow mobile rig to a 600-cycle, fan-blast-driven alternator along with a pull-pull engine for portable operation. Haan is repairing the car engine. During Field Day CWG was elected to work ZL2MU on 10 meters with his low-power mobile rig. Also CWG worked an Arizona station early morning while an atomic test was in progress at the ASC Nevada Test Site. He reports the blast had no effect on communications. KXZ is now on 20 w.m. He expects to hear CWG on 2 meters. QOC has been in the hospital but is on his feet now. Traffe: WTCX 2.

New Mexico—SCM, Ray Biersch, W50Z—SEC: KDAA, PA1; DTV. Thanks for the vote which helped elect me your new SCM. Your interest and cooperation will help put the New Mexico section on the map. Now that we are part of the Rocky Mountain Division, let’s dust off the cobwebs and really get going. IC, Claude Maer, Rocky Mountain Division Director, flew to Albuquerque June 12 to personally welcome us to our new division. Some 75 or more hams were present. CIN, POF, and KNSJU spent Field Day at the Four Corners (the only point in the U.S.A. common to Four State Corners). The Santa Fe Radio Club (KYES/5) had nine operators out on Field Day. Four AECQ members were present. WAZ has just put up a 16-meter vertical and is now working all bands 10 to 30 meters. DAA still is working hard for a better net for all New Mexico Elec. The Echo Charley Net and meets Sun. at 1730 MST on 26.2 kc.

Wyoming—SCM, James A. Masterson, WPTSO—The Pony Express Net meets Sun. at 0330 on 3920 kc. with PSO and MWS alternating as NCS. The YO C.W. Net meets on Mon., Wed., and Fri. at 1820 on 2010 kc. with BHH, DXW, and NWM alternating as NCS. DTG recently was appointed EC for Washakie County. FIX and HIA participated in the Newport Puff Band Day. Time, 1515 w.m. The Net relaying flight information across Wyoming from Salt Lake City, Utah, to North Platte, Nebr. The Sheridan gang hauled out Wyoming QSOs on Field Day, operating the club station, GUX77, in the Big Horn Mountains. Operators included U2B, JMM, TQT, TUL, N2J, JEC, E2G, and PW. NWM reports their heavy summer QRN slowed activity on the YO Net. Now that fall is approaching it is hoped there will be more check-ins on the Pony Express Net. In addition to the stations reported last month MNW, YWW, KFPW6, HRR, and KUB attended the Rocky Mountain Division Convention in Estes Park, Colo. Traffe: WYWW 6, MWM 4, GU 1.

Southeastern Division

Alabama—SCM, Joe A. Shannon, W4M—I-SEC: TRL, RM: KlX: PAM: KAOZ. The coming of summer has brought increased operating activity. Come to the following: KAJPD, the XYL of WTHW, KN4PHU, the XYL of K4CJD, ROB passed the General Class exam. AWA’s General Class Exam. K4AJG got Extra Class, and 1st-Class phone commercial licenses. HIN moved from Kentucky and now is in Jasper. KAGKE has General Class license. I would appreciate a card from all newcomers with their calls. K4BBF has low-power linear for s.s.b., s.w.b., and DKB and UTU are working the A.T. RIG and RLG have 33 states on 6 meters while K4HPP reports 32. Six-meter activity is increasing in the section and Alabama is well represented at all the conventions. K4EOD, net manager for AENT (Teenage Net) states that all teenagers interested meet with them on 2005 kc. daily at 1530. TOI still is having a lot of trouble with rigs. K4KJD is copying much better with a new HQ-100. HON and HJK made a deal and HJK got the fixed station and HON wound up with...
BARGAIN BUYS FROM HARVEY

CENTRAL ELECTRONICS 10A—Perfect...$ 90.00
COLLINS 32V-3—Excellent .................. 550.00
COLLINS 32V-2—Excellent .................. 450.00
MORROW FTR—Complete—Display Model ... 89.50
MORROW 5BR—Display Model .............. 52.50
BARKER & WILLIAMSON 515B—Display .... 224.00
BARKER & WILLIAMSON 515B—Display .... 212.00
SONAR MB26—10-Meter Xmt.—New ........ 39.50
SONAR CFC VFO—New ...................... 24.50
SONAR SRT—120M-Xmt.—100 Watt—New ... 120.00
SONAR SR-9—2-Meter Rcvr.—New ........ 39.50
SONAR SR-9—10-Meter Rcvr.—New ........ 39.50
ELDICO SSB—500½-KW Linear—Factory W. & T.—New ..................... 350.00
RME 4300 with Speaker—New ................ 159.50
HARVEY WELLS R9A—Rcvr.—Display ..... 129.50
HARVEY WELLS CMA-50—New .............. 14.50
HARVEY WELLS—Remote Control for TBS-50—New ....................... 14.50
JOHNSON VIKING II—Kit-Sealed Carton—New ..................... 219.50
JOHNSON VIKING II—Factory Wired—New .......... 269.50
HALLICRAFTERS S76—Rcvr.—Perfect ........ 150.00

Every Month Watch This Box
For HARVEY HAM SPECIALS!

IN STOCK — FOR YOUR HAM NEEDS

BELL CM-1—Mobile Carbon Mike. High Output—Rugged ..................... $ 9.95
CESCO-CM52 Reflectometer ..$29.95
M. C. JONES 261 and 262 .......$37.00
UNIVERSAL KW-4M Ratiometer .... $45.00

COMMUNI-Q-BOOSTER

Here’s a brand new device that utilizes the Q multiplier principle to increase the gain and selectivity of the GONSET Communicator. Designed to operate with the 6-mc if of the Communicator, the booster reduces interference between stations and improves the reception of weak signals. As a result, there’s a quieter and more stable receiver. The rf capacitors in the booster are special ceramic units that are factory set for maximum Q. Inductors are of the miniductor type for high gain. Available for 6 or 12-volt, SPECIFY WHICH $25.95

HARVEY is known the world over, wherever Hams operate, as a reliable source for Ham Equipment. All orders shipped same day received.

We’re Generous on Trade-Ins
If You Want to Talk SWAPS and DEALS
write... or call
W2DIO

NOTE: Prices Net, F.O.B., N.Y.C.
Subject to change without notice.

131
BUY IT FROM
for the top
performing
Amateur
kilowatt...
Collins
KWS-1

移动。WOG 已经不用移动。没有移动了。K4GOW 期待着成为一个好收
手并像那些设计和推测的人那样。你能帮助我吗？Traille：(John) K2BTO
92, AOG 77, EGQ 77, WAKLX 54, K4KZQ 37, ANB 21, W4RKY 39, CNU 18, MI 18, TOH 18, YRO 17,
K2WV 15, W4CEF 15, K4KJD 15, K2HJ 12, ZSH 12, KAJHM 12, W4HON 11, WOG 10, D5G 9,
BFX 9, TKL 6, K4KZQ 2, W4CV 1, (May) W4CTU
23, KB4SF 23, KB4FF 21, HJM 13, DUC 2, W4GW 21,
NIQ 1.

Session nets: FPTN, 2045 kc. 1500 Tues. FSN
and M.F.R. will resume operation Oct. Let's all support
our section nets. Their net managers will be glad
to have you. The BARC assisted in handling trafic
for the 8th All Women's International Air Race.
The Orlando Amateur Radio Club of Melbourne recently
was organized with over 16 active members. A new phone
Floridora YL's Net will be held each Sat.
at 1400
EST at 7200 kc. K4CHC is the chairman of the
Gainesville TVI Committee. The Manatee County AREC
Net meets on 20,500 kc. every other Wed. EDH is the
local RO for c.d. The Knights of the Kilocycle on
3910 kc. is maintaining an over-forty average, and
meets every Sun. at 0700. Everyone is welcomed.
AEP is the new Master Oscillator. The Bahamas Phone
Net meets every Sun. at 0500 EST at 7210 kc. Some of
the boys at Grand Bimini Island are interested in
16 meters. A couple of v.h.i. stations are known to exist
there and they are looking for contacts. K4PPF has
his new 500G, K4LQT has a new Globe Champion and
DX-88, ARU is a new AREC member in Collier County.
WXD is making concrete boxes for the beach. Did you
know that Jacksonville has a new tower and others around Tampa regularly on 6 meters? TAS
received a special award from the Manatee County Red
Cross. KAMQ is now a new station on 20 meters.
DX-35, NAQ has a new GPR receiver. K4DH has
been a new Ranger. K4KRO now has 82 counties to his
credit. K4LTD is now one of South Florida's
KIANJ 50, BNE 30, WIIFM/4/31, K4GZQ 19, W4QQ 15,
BWR 14, QCP 13, K4YB 8, AHW 5, DRO 2,
M2Z 1, (May) K4KDN 12, GOH 42, W4PY 27,
K4DRO 22, OBY 21, W4VO 10, KNGJ 12, BJ1 4.

Es,
BB, BYE Okaloosa, HIZ was busy getting ready
for the c.d. exercise. FIQ is enjoying 6-meter mobile
operation, HBK raised the beam 10 more feet, GMS
is planning a wider-band beam for better DX. SPP
keeps 10 meters hot. OXY is planning a Yagi in place of
the ground plane. K4KIF wants a kw, on 6 meters.
UUP has despatched 2 for 6 meters. ODO is adding
an antenna to the 5000. EQB is building a tower. K4
worked all bands from 6 through 80 meters during
Field Day. FHQ is awaiting delivery of a Johnson KW
kit. K4RL has a new 3000 to install. DX, K4AI's son-in-law is K4PM. New calls in the
area are K4FPR, K4PSB and K4PJC. D80/DEF still
bores out the newcomers. K4G4H still doesn't know
what the QST the following hams will be at Fla. State in Tallahassee: GMS, K4AGM, HBK, Z2F and BGQ, WAC
still is after a crank-up mast, OK meets the Hurricane
Net, PQW is heard on 75 meters. K4EHI has finally
broken through with an FB signal on 6 meters from
Milcon. K4TIV keeps tights hot on 6 meters from
Ferry Pass. OKB and PJP are getting the Sunfish
Field Ham Club going again. AXP is rebuilding power
supplies. K4YQ is QRL TV repair work. K4KU is
building a super-tuner 6-meter converter. KEECM is
getting a DX-35 for the home 6-meter transmitter.
K4E has a new radio room nearly ready. VR still plans to
put 7 M. K4ADY is in the armed services. UYS is
renewing his ticket. K4DDG did a fine job on Field
Day. RDG is the new president of the Pensacola
Amateur Radio Club. GRO is operating mobile. MUX
sticks to 7 M. ZPN keeps skeds with his son. OW2 is
doing an FB job with low power. K4KT is looking
for the big opening on 6 meters. K4AGM now has 22
stations on 6 meters. JPD is putting up trap antennas.
K4KK is looking for the big opening on 6 meters. K4LTG operator 15 meters late at night. UGY stays
loal to 10 meters. KHVP operates 6 meters fixed end
mobile. PJW is building a house on a slab. ZUN is letting
us gather on the rig. RKH is heard on 75 meters. Ex-
FWY has returned to Pensac after 16 years and is
(Continued on page 184)
go mobile with Master Mobile

NEW!...SILVER-PLATED ROLLER WITH
POSITIVE ACTION, STAY-PUT CONTACT
ANTENNA COILS

MASTER DELUXE ALL-BANDER
No. 750
HY "Q" construction
with wider spacing of
turns for high frequency
bands. Use as center or
base loaded antenna
with 60" whip.
- Covers 10 thru 75 and
all intermediate fre-
quencies.
- Silverplated single turn
contact, positive spring.
- Eccentric cam contact,
easy selection of turn.
- Automatic lock prevents
damage to coil.
Amateur Net: $14.95

No. 333
MASTER MIGHTY MIDGET
...engineered to provide the highest "Q"
consistent with good design. Compact,
externally rugged, yet lightweight, its
operation assures precision tuning with the
new adjustable silver-plated roller that
stays put! Perfect for 40-20-15-10
meters. "Get 5 Bands Plus on 1 Coil."
$9.95

W6EFFX—Says!
"I would not be without a Master
Matcher on my mobile rig...I can
QSY on any band at the same time
peak my antenna to the operating
frequency for maximum output. It
makes a mobile like a home station!"
W. B.

BODY MOUNT
No. 321
less spring
$7.95

BODY MOUNT
Heavy duty Stainless Steel
Coax. Conn.
$15.95

Other
Mounts
$8.75 up

THE NEW DIAGONAL
SWIVEL BALL-JOINT
LOCKS IN
ALL POSITIONS

MASTER Mobile Mounts, Inc.
1306 BOND STREET - LOS ANGELES 36, CALIFORNIA

GROUND PLANE ANTENNA
Outperforms any type mobile
vertical dipole, "Drooping" type.
Gives a low angle of radi-
ation for
general com-
communication. Ideal
for CD, de-
Fense nets, Amat-
A Multi-
Broad Band.
Matches 50
ohm coax
cable. Ad-
justable
radials. For
medium or
low-powered
trans.
Model 300

NEW NOISE-FREE
E-Z-OFF
ANTENNA CONNECTOR
Connect or remove your load-
ing coils, whips or mounts in a
jiffy. No wrenches, pliers or
screwdrivers needed. High-
grade stainless steel through-
out.
- Precision made
- Maximum efficiency
- Positive lock—will not
corrode
AMATEUR NET $2.95

133
LAKE SHORE announces the new and improved Phasemaster II-A

CONDENSED SPECS

- SWITCHABLE EYE FOR TUNE UP OR DISTORTION CHECKING
- IMPROVED 9-M STABILITY
- NEW STEEL CHASSIS
- TALK-ON FREQUENCY OR ZERO BEAT
- VOLTAGE REGULATION
- MANY OTHER FEATURES

See us and our complete line at the 9th ARRL Convention

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MANITOWOC, WISCONSIN
MANUFACTURERS OF PRECISION ELECTRONIC EQUIPMENT

Commandant of Corry Field. K4PEN is planning a fixed antenna for mobile operations, if so is another newcomer to the area. The final word must come from the state No. 42. H8G does an F8 job on 78 meters. How about some dope from Panama City, Tallahassee and Mariana?

GEORGIA—SCM, William F. Kennedy, W4CFD—SEC; K4AUM, R.A.M.; X4K, A.M.; K4CH, M.M.; PIM, GCEN. meets on 3995 kec at 1800 EST Tue., and Thurs. and at 0800 EST Sun., ATLCW on 7100 kec at 2100 EST Wed., GSN on 3995 kec Mon. through Fri. at 1600 EST with PIM as NC; the 75-kec Mobil Phone net on 3995 kec each Sun. at 1300 EST with UWH as NC; the Atlanta Ten-meter Phone net 30.0 kec each Sun. at 2200 EST with V-HH as NC. It sure is nice to get reports from 22 clubs in Georgia that participated in Field Day. The Georgia Amateur Radio Club of Dalton elected K4CCJ, pres.; K4CIR, vice-pres.; H.O., act. mgr.; K4PFP, secy-treas.; K4KMH, pub. direc. It was a pleasure meeting with the Dalton Club recently. K4NQY is a new Novice in Cedar Bluff. We were very happy to present the new charter of Recognition to the Atlanta Radio Club on June 28. ETD transmitted 47 bulletins in 14 days on s.a.d.c. e. and a.m. on four frequencies. K4COG has a new mobile incoming car. P.O. (G.W.P., AAA, AAM, IPI) has a new QTH and new antennas. W4VWP has a new C.E. 800LL is on the air now and is putting up new antennas for all bands. ZD has a new 15-meter antenna and is getting good reports. Had a wonderful visit with BQT, K4NN, ETD, LVE and others in Valdosta recently. QSM is increasing each month with many new members, CB is EC for Wilson, C.G. in Tallahassee, CB is EC for Telfair County. W4PO is EC for Fulton and Decatur Counties Traffic: K4LVE 195, K4VIP 135, K4MLQ 81, K4HVD 29, K4CCL 45, W4BYX 17, K4BAL 15, DFY 10, W4DI 10, K4GNO 0, CPO 5, CFN 4, HOU 4, W4VYX 5.

WEST INDIES—SCM, William Werner, KP4D—SEC; AAA, HZ resigned as SEC and has been replaced by KP4AAA. If you have not yet received your ARRL registration form, contact AAA, DJ or your local EC. The CQI of the P.R. Amateur Emergency Network is now originating from the new police headquarters building in Hato Rey with the call KP4DC using a Viking kW and NC-300 receiver. The present staff of operators includes DC, DJ, K4Y, AAA, AAM, AIA and ACQ. If you would like to join our staff visit us Wed, at 7 p.m. New net time is now 7 p.m. instead of 8 p.m. AAI, K4PTC Radio Club president, has been appointed EC for the San Juan district. ABN is Asst. EC for v.h.f. activities. The recently-formed Maragosa Amateur Radio Club announces acertificate for persons giving 10 years of service to the ARRL, in recognition of service to the ARRL during the last 10 years. W4CGH, F-15-A, Maragosa Terrace, Maragosa, P.R. The UPR AFROTU Amateur Radio Club and the Colegio San Jose Radio Club will co-operate to hold "Worked Ten Puerto Rican Novice Contest" to be held Sept. 8, 15, 22 and 29, using the 15-meter band between noon and midnight of these dates. Send lists of stations worked to Dept. of Air Force, Office of ROTC Det. 755, UPR, Rio Piedras, P.R. The UPR Radio Club, as part of AFROTU, has been assigned the call K4PFAE, AED advises that KP4NY, the Colegio San Jose Radio Club station, has 10 and 15-meter beams led by the General Loring 300 Keefer, is using an AT-1 and simple modulator from a mountain-top location called "Guayama" to report into the 800-kec Net. KVBY is MARS AH6Y in St. Thomas, v.e. W2GRM, ex-DL4OR, is now located at Fort Brooke and will be on s.a.b. using a KW-5100 and an s.a.b. generator driving a pair of 4-tubes. KVBY is on 20 meters with a TBS-50 and diapole. KVBY is Ascendant District Attorney for St. Thomas. KVBA has a new 70A-4. KP4AB is a new station at Humacao. AJN, at Isabella, is operator at MARS KP1PAC at Ramsey AFB. KP4AB and KV4RD participated in an 11-meter contest on June 9. KP4BR transferred to Arima at Denver, W6GIO/KP4 and W4LEW/KP4, at Airborne Island. A.R. is V.T.H. at Colegio Rafael Echeverria Amateur Radio Club, is trying to get standing waves off the coax leader from the Tri-hander beam. RF stays in the DX-100 transmitter. KD is currently 50 ke, after putting back up the coax-fed antenna. AAA has a 220 p.p.-pitch to turn his two-element 20-meter beam. WD has a new prop-pitch rotor to

(Continued on page 138)
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SOUTHWESTERN DIVISION

LOUISIANA—SCM, Albert F. Hill, Jr., W9JQ —SEC: LIP, RMR, RGG and GIP. PAM, RMR, and ORS, Field Day turnout looked bigger and better than ever before. Congrats to GTH and K6MCA, who made HPL this month. K8ETK and K6GGS are new Emergency Coordinators. DX is going great guns, RW received a card from FW4AA. K6JCS is working South Americans. K6YJ has 15- and 20-meter beams up. K5COP worked CTAHL. NJU put up a new three-element 20-meter beam. K6QKD now is Chief NCS of ALN3. K6YX is QSL with glider soaring and glider meet. K6MON made GTHM. Congrats. Bud, MEP is putting a 420-Mc. repeater on the air. K6HYC is expecting her 4th harmonic. Congrats. Mano, OLZ is organizing c.d. in Hawthorne. New officers of Rio Hondo Radio Club are W5FY, W5RHI, (first VL pres.); K9RIF, vice-pres.; K9RTG, secy.; UKC, tress. Public Service awards were received by INI, USY and JQB. CSIN is busy with QSL mailing. RGG is using SCN running in fine shape. K6UF has a new KWS-1 and a 78A-4. QK is opening a hum parts house in Hemet. Support your local SCN, 3600 kHz. 1930 P1111 daily. Traffic: (June) W9EGY 055, K6MCA 570, K6HON 269, W2J2 232, COP 117, GOK 135, W6BTHG 133, INI 103, VSH 84, K5QOD 64, W5ORS 37, K6FII 31, EA 25, EUZ 22, W8UK 18, K6PLW 16, DDO 10, GTG 10, W3USY 8, OLZ 7, MEP 8, K6HOV 4, ICS 4, W8YSK 4, BEQ 2. (May) K6YJL 78.

ARIZONA—SCM, Cameron A. Allen, W7ON—SEC: YWVF, PAM Arizona Emergency Net: ASL, PAM Grand Canyon Net: LJUJ. Both nets were quite active all through June. FKK is active both on c.w. and WTTK and keeps plenty of traffic moving. We heard one or two groups out on Field Day but received reports from only four. MAL and gang were on ML, Union, UCA and the Mesa gang were lost in the woods but they kept things humming anyhow. The Arizona Amateur Radio Club of Phoenix was on Mingus Mt. YBE has been moved to a hospital in Los Angeles. Listen for 3685 kc. for the latest bulletin on him. Traffic: W7FKK 224, YWVF 22, OIF 8, CAP 6.

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vacationed in Washington and Oregon. Don’t forget the Annual Upper Ten Picnic to be held at Glenn County Park, Cardif, Sept. 15. New members of the SOC, W37BO, WA2ING, WA4KBO, W4KAG, KK5JUD, K6AIW and W8STN. New officers of the Rehe Communicators include K6LKY as president and K6BUC as vice-president. CAA and WNN improved their ability in the recent F.A.T.I. by qualifying as Class I Official Observers. K6BTO, OWY and W8STW continue to lead on OWY, the K6W rig. OWY worked Santa Barbara on 144 Mc, with a 4-t. bank of wire as an antenna. He is building an SBRA transmitter for 404 Mc. LWT has a new 15 KC. rig for the higher frequencies. KN4VUL now has a new six antenna on a 40-t. tower for 144 Mc, EOT, who is K6C, EC and ORN, continues to lead the section in traffic-handling for single operators, and was awarded the BPL Medally recently. Congrats to JVA, who was third highest in the country in QST, for the Spring CD Party. With school starting soon and most vacations now over, your SCM hopes more clubs and individuals in this territory can find time to send news in each month for this column. Traffic: W5EOT 359.

SANTA BARBARA—SCM, Mrs. Dorothy E. Wilson, WOREF—Ass’t. SCM: Bill Farrell, W4IW, SEC: K6QVR. K6QVR has a Technician Class ticket and is working to join his OM, K6SIF, and his twin, K6JSJ, with a General Class license. K6QGZ and W4D vaccinated together in the High Sierra, both mobile. The Pass Robles RC shuttered its previous Field Day records with 855 contacts, 47 states, 8 countries and 67 ARRL sections. YBO and 85OB were top sections. Other top stations were ALQ, BRY, FYW, TOP, K6THH, LI7 and KN5HT. CAIR received a Fresno State College scholarship, award. K6RIS is on 40 meters from Yel- lowstone National Park where his band is playing. WYN and family are QSTing to Kwajalein, CQ’R is using 863 on G4 in Class B line. K6VIN and KN5C are new for the month. NTS: The Peanut Whistle Net, 3850 kc. 0930; the Tri-Counties Net, 3620 kc. 1200; the Channel Cities Net, 2 meters. 1200. Traffic: WOREF 39, QW 44, PWK 3, JP 1.

WEST GULF DIVISION

NORTHERN TEXAS—SCM: Ray A. Theiller, W7TFF—Asst. SCM: J. Bruce Craig, W5OD, SEC: BNG, PAMA: AEX and IWQ, RM: AHC, SFW made WAB on 6 meters. ETHL is the proud owner of a new Vannan. AEX and the NT-G continues to allow an increase in traffic handled. GPO is now on s.s.b. with a new HT-32. The gang at Waco hosted our SRC at a visit which was very much enjoyed. K6KREY is now on the Novice boards from Sherman. HUJ received a very interesting booklet on Moscow from USA9J. The Highway Department is processing and mailing application blanks to all amateurs who have previously had call for plates. October 1 is again the deadline for getting your form back to them for 1952 licenses. Act now and avoid the last minute rush! Remember, regulations require that you have a working rig installed in your car in order to enjoy the privilege of owning call for plates. It looks very much as if the usual “summer slump” has us in its grip. There was a very good decrease in activity reports each month. Hope everyone enjoys a safe, restful vacation and when the temperature in the oil’ shack drops back below the 100 degree mark that we will be low on the air again. Please remember to drop us a card or QTC come the end of the month, letting us know what’s new from your QTH. Remember, official opening openings exist in all categories, but would you be interested in? Let me know. QST: (June) K5WAB 1780, FFB 392, W5AHC 257, K5BKH 217, W5DTS/S 120, TFY 69, K5WAT 56, HTHL 4. (May) W5DTS/S 154.

OKLAHOMA—Acting SCM, Richard L. Hawkins, W5ZPA, SEC—Asst. SCM: James R. Schneider, WA5BBD, LXX, PAMS: K8 and MFX, RM: JXAL. As your SCM until a successor to G8H can be elected I wish to reiterate the excellent reports that Earing received for the various jobs. New officers of the Barlett Club are EKA, pres.; K5AV, vice-pres.; K5BSS, secy.-treas. The section was well represented during Field Day but thunderstorms marred the day, VAX is going s.s.b. K5CAY installed a new 805, Tri-Band transceiver. SCM logged visits to Army reserves and SWAT and WAX. BLW and SCY had a successful V.L.F. Party atop Mount Scott. K5DLP is hospitalized with a heart attack. Best wishes for a quick recovery. The Storm Warning Net had a busy month with several twisters over the State, DR2 moved to Yukon. K513M is back from military duty, with his K5K unit. New Novices: KN5KRI and KWI. K5BSS and K5SV hope to do some mobile while vacationing in...
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CANADIAN DIVISION
MARITIME—SCM, D. E. Weeks, VELWB—Astd. SCM: Aaron Solomon, 1OC, SEC: IFLE 50-Mc activity is on the increase with ZM, ZG and ACL on the air from Prince Edward Island and ADH operating from Sable Island. RR has been transferred to Washington. D. C., Bill Sullivan ex-SOE, is now ITV. 3AIU has been operating out of Ottawa, and lines from the Gics OPC and KWG are heard on QSOs. Requests for QSLs should be addressed to 3AIU, Barrie, Ont. Nearly all Maritime clubs were active during Field Day. May 11-12, with the sudden passage of XL UT attended the hamfest at North Bay, Ont. HJMA also attended at a recent ex. c. conference at Amherst. Ont. ADH and GAV accepted appointments as Emergency Coordinators. Astd. SCM OC recently visited the Toronto and Ontario Radio Clubs. Mr. H. H. Brannen has been promoted to the position of Director of the Government of Canada, Department of Transport, on the retirement of Mr. George Harris. Congratulations to Mr. Brannen and many happy days to Air Harris. Traffic: VE6FI 42, ME 16, UT 16, AED 8, DB 7, OSI 5.

ONTARIO—SCM. Richard W. Roberts, VE6NG—From reports, this year's Field Day was one of the best yet. CEF is back on after a lengthy absence. AVS visited A2Z in Cochrane. ZR has been active since BI9 and is now in St. Thomas. He is ex. ex. EFO. The St. Thomas Club was active in the c. (provincial) Operation Alert. BXX has a flying ticket. DXT's XYL, Barbara, is to soon see some DXt. DXT is on 20 meters with his new WJK antenna. BUR visited ARRL Headquarters. DH won his WAS and has a new QTH in Ottawa. The Kingston ARC and the Club received much publicity on their Field Day efforts. NE, aboard the aircraft Carrier Bonaventure on her maiden voyage to Canada, was active on 28 meters. 3AHU/Gaza comes in fine on 20 meters also and was heard working the following: ATU, AML, ARS, ASQ, KT and VE1OC and PG. Traffic from our boys in Gaza to their folks here at home is heavy. We welcome a new club, the Kapuskasing Amateur Radio Assn., which operated ham gear at the local Hobby Show May 4 and 5. DXM is DXing on 20-meter e. c. DJXQ is doing an FB job as editor of the Metro Club's paper, the Modulator. The Peterboro Club supplied the equipment for the motorcycle races held there recently. 6II still is in the Toronto Area. NF visited DVM and ARF/K3 at Mazinaw Lake. Your SCM made it to the North Bay Hamfest this year. Hurricane Audrey stepped in and WX was stormy. BBH won the Capt. Morgan Trophy for his swimming ability and costume. The Collins receiver was won by DU, of London. Emergency communications were set up by the SCM and the ECI in the Lake Simcoe Area following a tornado that did millions of dollars of damage early in July. Traffic was passed from three mobiles at Keswick to Toronto Civil Defense Headquarters. EC DX was in control on the lake while NG coordinated the operation from Toronto at the c. d. radio room. The following were active: NG, DSM, BBQ, BIT, AST, AVS, NP, GJ, AIA, DZA, AFR, DQX, DXT, DUN, AIB and 1Z. This was the first joint effort of the AREC and the Metro C.D. of Toronto in a disaster where emergency communications were required. Some of those seen at

(Continued on page 149)
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North Bay were DEX, GH, BBH, BBE, our Canadian Director, 2CA, AMB, DEW, ADA, ACK, DUF, DPO, KM, DSM, HUT, TAI, BUR, AQD, AWC, RD, RH, RG, 1H, AAB, DPA, TX and EAW. Ontario operators are anxious of the VE2 license plates (Quebec). We still have hopes, write your M.P.J.F., please. Traffic: June 3 EYRUR 139, DPO 88, NO 48, NG 65, AUBU 44, TAI 24, DWN 12, DH 9, AES 8, APL 5, CE 1. (May) VE3AYS 14.

MANITOBA—Acting SCM. James Elliott, VEALF—Our good friend JA is expected to leave for VO-Land soon. HB has a GO9 on 29 meters. RR is now back to work, and spends weekends at Lake St. John. KLJ moved to a new QTH July 1 where there will be more room for antennas. NN has been heard with his mobile once since he moved from Saskatoon. We would like to hear you more often. Larry, MN was a visitor at the last ARRL meeting. Met brought his jr. operator back to the hospital. We hope he gets well soon. EA is doing an FM job on 80 and 20 meters. WR is leaving for a visit this summer to the U.K. GB, 1P and 2P returned unganged from the West Coast. Thanks from the Northern Saskatchewan Hamlets. Thanks for a lovely time.

The Winnipeg gang has been working overtime preparing for the hamfest, to be held Labor Day weekend. Traffic: VE3AY 10, QD 10, CE 6, JY 6, LF 5, AN 4, AG 2, KN 2, HB 1.

ARRL Model 6-60-90

(Continued from page 18)

show up at 3720 kc. or a bit higher when the receiver is retuned.

Switch the band switch to the 11-meter position and the receiver to either 3.37 or 26.96 Mc. The v.f.o. signal should now be heard when C3 is adjusted to approximately 25 per cent of maximum capacitance — about 75 on the dial. Tune the receiver to either 3.405 or 27.24 Mc. and rotate C3 toward minimum capacitance until the signal appears. With the original tank this occurs with about 5 per cent of the capacitance of C3 in use.

The v.f.o. should now be tuned to 3750 kc. and L1 in the transmitter adjusted for maximum deflection on the v.v.m. If the latter is not used, tune L1 for maximum final-amplifier grid current. In this case, L1 must be activated with the excitation control at maximum, and the transmitter switched to 3.5 Mc. — without plate voltage to the final.

Readings that may be expected with the v.v.m. and the grid meter are approximately 150 volts and 3.5 ma., respectively. The voltage will fall to 100 volts or so and the current will drop a bit when the v.f.o. is tuned to either 3.5 or 4 Mc. Voltage and current will fall off a good deal more when the v.f.o. is switched to the 11-meter range, but this can be compensated for later on by proper adjustment of L4 and L9.

Alignment of the r.f. exciter at 7 through 28 Mc. may now be checked. If the stages have been previously peaked at the centers of the bands with crystals in use, it should not be necessary to readjust any of the transmitter coils. Of course, it will do no harm to retouch the slug tuning for each stage with the v.f.o. set for harmonics that fall at 7.15 Mc., 14.175 Mc. and so on.

Using an inter-unit cable appreciably less than fifteen feet in length will reduce the capacitance across the tuned circuit, thereby raising the operating frequency of the v.f.o. tank.

(Continued on page 144)
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This reduction in circuit capacitance can be compensated by reducing the value of C4, since it is in series with the cable capacitance across the circuit. However, it should be kept in mind that the circuit will not oscillate if the capacitance of C4 is made too low without also altering the values at C4 and C5. If, for any reason, a very short length of cable is used, it will be advisable to decrease C5 to approximately 220 μf, and then increase the capacitances of C4 and C5 until the proper frequency ranges are obtained along with the desired band spread. If the fifteen-foot span is considerably longer than needed for a particular installation, don’t be afraid to coil up the spare cable as this will have no adverse effect on the tuning ranges.

New parts for the v.f.o. unit — including the Minibox and the dial — will cost approximately $13.50. Fifteen feet of RG-22/U and a pair of PL-284 plugs run another $5.00 or so.

How’s DX?
(Continued from page 74)

Rumors collected by W7CSW’s 200 watts and ground-plane — VU2JG olds on K50EA’s shoulders for a QSO producing XE QSO around 14,015 ke. — K0LZI finds W8TE’s USNM rules do not prevent him from QSYing around 0700 GMT on 20. — QZPL and W1WPO have XWSA’s routine as 1280-1300 GMT on 14, 21 or 29 Mc, dependent on conditions. This one is expected to remain active into 1958.

Africa — Gana Strip is neither a burlesque row nor a separate entity on the ARRL DXCC Countries List, from that refugee-ridden area V8EHAU writes: “I operate fixed- portable from RAF Camp on the 26-meter phone band only 0000-0600 GMT. QSTestation, activation due to an input of 600 watts, 100-per-cent modulated, and we have two aerial arrays at the moment. Main one is a terminated rhombic with 300-ft legs nined on Ontario. The other is a Lazy-H array, top elements fifty feet high, beamed at Edmonton, Alberta. Receivers are Collins and we have no trouble making contact back home when the skip is in.”

VE3AHU is primarily interested in keeping fellow Canadians of the U.N. Expeditiory Force, Middle East, in touch with VE—land. — V22RZ prefers to wait away from it all. “Been here for the last 14 years. The country was pretty wild when I first arrived from Johannesbrug but now it is getting too civilized and I think I will be leaving within a year.”

Bob tells WHCP he hopes to be better prepared for next year’s ARRL DX Contest. “I worked a terrific number of Yank stations from here and I really enjoy it because they are such good guys.”

Field work this spring ZSOTTW, a very familiar call to W7CSW, DX bands, undertook a tour which took him to France, England and the States. On our side he especially enjoyed transposing QSOs with W9MN, F2QIO, W8BFS, W8NEP, W8NO, W9CHX, W9CY; W8RM and K9BFS. “The U.S.A. and the friendships of your people were almost overwhelming!”

Freewar ex-S5BYD credits E72UH with getting him back into the same. — K0LZI notes that S52TP, regularly audible around 14,020 kc, at 0300-0600 GMT, needs only 80. Dak to complete W8. At 0000 S42TP usually unlimbers a 14,310 kc, s.s.s., rig to keep the voice throng happy. — W5DZZA stakes Comoros possibility 14,480 GMT near 14,000 kc; ARRL DX Expeditionary rumbles include such areas as Ascension Island (W8HDX & Co.), Iboi (B9UDF and friends), and Bechuanaland (GZ5JO).”

Continental Europe — The Continental DXpeditionary picture looks bright this fall with H6AA, OK1MB (OK1KSE) and others directing attention to Albania: WA6AA and W1ADW concentrating on San Marcello, and other adventurers beginning to spill more Andorra. Monaco, Luxembourg, Svalbard, Alba, Liechtenstein and Corsica QSOs down on the W1/VE gang. — E9GAM, via W2EYLP, plans for a 20-meter New Mexico contact to finish up WAS, Y03FT, another WAS-sacker, pizzazz for 3 Mc, Mon 3 Dec. Nev. and R. L around 14,005 kc, and 0300-0600 GMT, according to W1AWE’s W1WFR. — W5CTP’s p.s. 8070a, unjustifiably accused, are making TVI headlines in the British press. The Sheffield Amateur Radio Club handled the ball up to the parliamentary level in clearing Charlie. — G512DBX’s 3000-QSO and 3125 points took top honors for Scotland and second high among U.K. participants in last

(Continued on page 148)
Limited quantity of this Collins first soon available for immediate delivery. First come, first served. Look at the features of this new 14-30 mc 175 watt PEP input transceiver. Use "as is" for mobile or fixed station — no modification necessary. Frequency stability comparable to Collins KWS-1 and 75A-4. Self adjusting automatic load control. Mechanical Filter sideband generation. Complete TVI filtering. Pi-L output network. 6½” H x 14” W x 10” D. Look at the price, too — a tremendous value for a Collins SSB station.

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autumn's BFO 21 and 28 mc., phone contest. Of world-wide scope, the 1957 edition of this affair is scheduled for late November. W9QVY recently fired up in Kassel as W9QVY to roll up 72 countries and 32 states on 14, 21, and 28 mc. in just two months. Conversely, W9HWW writes, "Just returned to Wisconsin from Germany where I was an exchange student for the past year running DL on 20 mc. Got a very good year of DX and it was a wonderful experience for a 16-year-old. Got DXCC in only seven months running 30 watts!" W4HRJ has it that SWBBW will stay put on Rhodes for another year or more.

-Crossfire comments on our July "onset" program. "Only other evening I saw a film in London in which Ge are asked to look out for an illicit station, no frequency given. I tuned the illicit is using a packaged kit RX/EX and the hero is shown retrieving the stolen instrument which is supposed to be a receiver. He is honest; he can't read, though he behaves like a dog with two tails. He rings his mates and tells him has found the station required, making, 'He's sending too fast for an amateur!' (about 5 w.p.m. mixed). The episode closes on a note of authenticity, however, as the XYL threatens to throw his set out the window and him with it." Ted's ZL plans fell through but now he is shooting for an assignment down VPS way.

-CVE2RJ returned from DXCC work in Scandinavia, where he picked up the hospitality of RM5A BCF CHG CO OF RQ TK W1 and friends most pleasantly. W3LMA learns that Swalland's RA2E/1 expects to remain at the Hopan Island weather station till next July, working 3.5, 7 and 14 mc. with a 20-watt c.w. rig. Odd's odd duty period causes a rotating ham schedule which shifts from 1000-1500 to 2100-0600 GMT and back again. SEP5/LA2/P also is reported available up Spratley way. From SW9CA, I am 45 and active since 1927. I work GRP using four watts to a long-wire and an old-type HRO. I contacted 78 countries and 40 states in the last year with this layout. My PZK association now is an independent one and we hope to re-enter IARU soon ....... The LZ1/KPZ staff tells SWL Bill Rice that Bulgarian interest in LZ1 is KBA KBA KDP KPZ KSP WKVD and LZ2KST.

Hereabouts — Need Prince Edward Island for your WAVE drudgery? W9NJL/V1/VE will be coolin' there on 17, 21 and 28 mc. through 10 meters, c.w. a.m., a.m.d., between September 29th and October 2nd. Pete intends to hit the bands particularly hard during the W/V/E Test, September 29th. **ON1KT reports a huge 21 mc. signal from VN1FV who uses gear left behind by Stateside-bound VN1DR.** After a long layoff, WPPZ is back in action with a DX-100 driving a 750-watt 30/40FT into a handbook cube quad. He reports a fast rise to 140 countries thanks to a bunch of new ones which were unattainable until eight years ago ...... VE3B/WY, with DXCC and WAS in Toronto, reminds the new blood that he also holds provo WAS and DXCC as GW4B/WY. An interesting item from TP2B/WU (W2FDQ) dealing with Uncle Sam's boys: TPs WBM WBQ and VB3 sign off, the latter heading for a KG1 assignment. TP2SWU still seeks Mont., Nv., Dak., Utah and Wyoming for you darn-well-know-it ...... W9WMA, informed by the media that he's not long for this world of tears, awaits override G9L from OQ7, OQ5DA, UC2KAB, VB9Y, VPs 2IC 3HAB BLR and VQ2HJ ...... WD7JU defies excessive taxing on wide-open bands. "One day I started up at the top of 20, tuned clear through to the bottom and counted six stations holding their keys down or making other tests. To them, some rotten ears!" ..... KT8PJ, the taker, adds "Big news here at the moment is that my youngest son, Bob, has a Novice ticket, K4PUP. Hoping to add the 12-year-old grandson to the list soon. No we haven't a two-tand-two-some combo: KPI4 BD BJ and K4PUPJ." Ey reports that KPI4 JE ZV and ZV have gone north, and that he himself calls about for Utah and Washington to close out his phone WAS effort. During this year's ARL Field Day KDIY had the 75 mc. bug, including ARRL Pacific Division Director W4DC, enthusiasts macking up transpecific DX from Mt. Hamilton. **Caribbean notes via WZIE/Dominique's VP2DZ, with p.p. 81.4 and 81.4 modulating, acts as NCS for the southern leg of the 3815-ke. Antilles Weather Net. Many of the local lay gentry keep tabs on ill winds by eavesdropping on this group. Grenada Radio Club proxy VP5GW assigns stations to regular tours of weather net duty. ** Potomac Valley Radio Club, W1SM secretary, is plotting a foray to desugging DX men CT2BO, EASBF, VP5/YM, ZL9NQ, ZP8AY and 4X4BX. PVRC hopes to arrange such presentations annually. K2RSZ contemplates an early DXpedition to rare Sierra County, a notorious stopover along the road to WACC. ** Our RKL brethren and sisters lured and frolicked at the old magazine table on All-star ARL Hamfest in July, this hall held at Anchorage under AARC auspices. ** W3's EQS HTI and NLQ will spin off F8P call during the middle two weeks of this month. VE3T will play QSL until 110 through 10 meters, using c.w. a.m. and a.m.d. W2HTI will parry QSL'S, thrusta. ** W4WYR wonders how to obtain IRIAT'S QSL for a W4ZQ contest entry. Good data on the present whereabouts of former Anandamans: VP2PB and VQ1LQ. Ten Years Ago in "How's DX?" — Arrival of Sep.

(Continued on page 148)
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Yl News and Views
(Continued from page 69)

a given community, one location may be defined as from two places no two of which are more than 25 miles apart.

4) Six QSL cards, or other written confirmation showing proof of contact, must be submitted with application. Sufficient postage must be affixed to the confirmations to finance their return. The YLRL will not be responsible for any loss or damage to same.

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From QST staffer Ed Collins comes the following items:

"Miss Barbara Markley of Richmond, Indiana, an employee of the U. S. State Department, while on route from Karachi to Singapore aboard the Flying Enterprise II, skipped by the famous Kurt Carlson, W2ZXM, was inoculated by the Captain with the amateur radio bug and came down with it heavily. Miss Markley was up to 10 words per minute and a good grounding in theory by the time Singapore was reached, and when the ship arrived at San Francisco on May 27, she was able to go before the FCC examiner in that port. She is now awaiting her novice and general ticket. It is well known that Skipper Carlson is one of the most active missionaries for ham radio that the hobby has."

Oooga! W6KJZ says we were a bit generous in crediting her with six BPL medallions as per the July '57 column. Lydia claims ownership of just one medallion at present, but on the strength of her traffic-handling talents, we predict it won't be long before it's a legitimate six for her.

Strays

The Milwaukee Radio Amateur's Club is celebrating its 40th year of continuous activity. It is one of the oldest clubs affiliated with ARRL, having received its charter in 1919.

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Collins KWM-1 SSB TRANSCEIVER

These are some of the features that make the Collins 175 watt PEP input 14-30 mc Transceiver a revolutionary development in Amateur communication.

- Transceiver design saves both space and cost, 6 1/4" H x 14" W x 10" D.
- Use for mobile or fixed station without modification.
- Frequency stability comparable to the KWS-1 and 75A-4.
- Break-in CW using VOX circuits, side tone monitoring for CW.
- Self adjusting automatic load control.
- RF inverse feedback for better linearity.
- Mechanical Filter for sideband generation and receiver selectivity.
- Complete TVI filtering.
- Pi-L output network.

WE FEATURE
A COMPLETE LINE OF COLLINS EQUIPMENT
AND ACCESSORIES.
24 MONTHS TO PAY.
TRADE-IN ALLOWANCES.

RADIO SUPPLY COMPANY
Wholesale Electronics
enabling him to make 56 contacts for 1120 points, a respectable score for a section where local activity is low. W4RMU, Oceana way, Fla., W4ZXI, Greensboro, N. C., W8LPD, Cincinnati, Ohio, K2ITP, Riverton, N. J., your conductor, and a few others made this hard-way method pay off. It brought the W1HDQ section total to 29 on 50 Mc., and we estimate that the use of c.w. on both 50 and 144 Mc. raised our 10,880-point (noncompeting) score by at least 20 per cent.

The summary to follow includes 443 acceptable logs, from 61 ARRL Sections, both all-time highs for June and September V.H.F. Parties.

SCORES

In the following tabulation, scores are listed by ARRL Divisions and Sections. Unless otherwise noted, the top scorer in each section receives a certificate award. Columns indicate the final score, the number of contacts, the section multiplier, and the bands used. A represents 50 Mc., B, 144 Mc.; C, 220 Mc.; D, 1295 Mc. or higher. Multiple-operator stations are shown at the end of each section tabulation.

**ATLANTIC DIVISION**

E. Pennsylvania

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**WESTERN NEW YORK**

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<td>W2QHY</td>
<td>940</td>
<td>94</td>
<td>10</td>
<td>50 Mc., 144 Mc.</td>
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<td>W2YUV</td>
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<td>5</td>
<td>50 Mc., 144 Mc., 220 Mc.</td>
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<tr>
<td>W8Qblk</td>
<td>785</td>
<td>15</td>
<td>5</td>
<td>1295 Mc.</td>
</tr>
<tr>
<td>W2MIDC</td>
<td>726</td>
<td>12</td>
<td>5</td>
<td>1295 Mc.</td>
</tr>
<tr>
<td>W2PST</td>
<td>294</td>
<td>4</td>
<td>6</td>
<td>50 Mc., 144 Mc., 220 Mc.</td>
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<tr>
<td>W2TRO</td>
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<td>4</td>
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**CAWALL-2/4** (W2B ALL JTF, K2S CEF HHT)

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SEE PAGE 109 NOVEMBER QST
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FREE 1957 CATALOG covering the full precision
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Specifically Designed For
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These units require no tuning, no switches . . . weatherproof for outdoor mounting; small enough for mounting in transmitter. These baluns are indispensable when connecting coaxial cable to a balanced line as in feeding dipoles, folded dipoles, trap antennas, beams, etc.

BALUNS NOW IN PRODUCTION

TB-2J 75 ohms unbalanced to 300 ohms balanced
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T-1J 75 ohms unbalanced to 50 ohms balanced

Price $9.95

Also in Production—RF TRANSFORMER

Specifications: Overall length 4½", height 2", width 2¼", weight 1-lb.

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1432 N. CARLISLE STREET • PHILADELPHIA 21, P.A.

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AN ELECTRONIC
T-R SWITCH
THAT REALLY WORKS!

FEATHERWEIGHT • MIDGET-SIZE • UPS EFFICIENCY

Don't confuse this great, new electronic Transmitter-Receiver Switch with anything similar you've ever known! Here is a truly effective, efficient and practical replacement for that time-worn coax relay. The Lymnar TRS-1 Switch is designed for any amateur transmitter, home-made or commercial. Wonderfully tiny, it hides away inside most transmitters (1½ x 1½ x 2¼, weighs approx. 4-oz.), does not add any TVI and makes most receivers perform better. Under test, receiver sensitivity increased up to 15db when used with transmitters of 150-watts or less - . . . uses negligible power for operation and takes 6.3 volts filament and 150 volts @ 13 mils for plate of type 6AK5 tube, ordinarily supplied by transmitter. This switch is a must for every Ham rig!

PRICE $11.95

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"Pioneer designers and manufacturers of all type towers."

the Collins KWM-1

SSB Mobile Transceiver

FIRST Mobile SSB Transceiver — 175 watts PEP input, 14-30 mc. Excellent frequency stability. Use as mobile or fixed station without modification. Break-in CW using VOX circuits, side tone for monitoring CW. Ten 100 kc, bands available anywhere in the 14-30 mc range. 6¼” H x 14” W x 10” D. Not price .................$770.00

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NEW! HEAVY DUTY FIVE BAND ANTENNA COILS
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Available for immediate delivery.

HC-F Coils Postpaid..........................................................$19.95
Complete antenna with 88 ft. of KW twinlead, heavy duty insulators and wire.

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Be prepared with a reliable, easy starting, portable power plant. Only unit available fully shielded and filtered especially for radio use. (each checked by oscilloscope). Ideal for standby, civil defense, camps, trailers, etc. Powerful, easy starting, 4 cycle engine with wet iron cylinders. Built-in voltmeter. 6 or 12 v. battery charging and starting available, specify which one when ordering. Money back guarantee!

700 Watts (A-101) Ship wt. 77 lbs. ........................................$143.50
1000/1200 Watts (A1012) Wt. 90 lbs. ..................................$195.50

Up to 3500 Watts available from stock. Special voltages, etc. available. Write for information.

GENERAL ELECTRONIC SERVICE
P.O. Box 9 Rockwell 3-2425 Burlington, Wis.

KN2VAB reports that he is just 10 years old, and he wonders if he is the youngest ham in the Northern New Jersey Section. If there are any challengers, please write to him.

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"Strays"

GIVE YOUR SIGNAL a "SHOT IN THE ARM" WITH A CUBEY-10-15 MTR DUAL BAND CUBICAL QUAD

FREE BROCHURE FROM ONLY

CUBEX COMPANY
3322 TONIA . A.LTADENA, CAL.

"Strays"

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**1¼, 2, 6 or 10 METERS with Tecraft**

**Tecraft Transmitters** For 220, 144, 50, or 10-11-15 Mc. Hi-Level Plate Modulation • Hi-Impedance Mike Provisions for Metering All Stages • Tuned Antenna Output System to 52-72 Ohm Line • RF Output-Indicator • Power Requirement 6.3 V AC @ 4 amps & 250 v DC @ 250 ma. • Tubes: 6AU6 osc.; 5763 Buf/Dblr; 6360 Buf/Nullt; 6360 final amp.; 12AX7 speech amp. & driver; 2-6AQ5 modulators • Power Input to Final, 20 Watts.

**Complete with tubes, crystal and plugs** $59.95

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**Collins EQUIPMENT**

**KWS-1**

1 kilowatt Transmitter w/Power Supply $2,095.00

75A-8 SSB Receiver $695.00

**KWM-1 SSB**

Mobile/Fixed Station Transceiver $770.00

and a complete stock of all Collins accessories.

Liberal trade-in allowance. Convenient Time Payment Plan.

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Happenings of the Month

(Continued from page 68)
direct legal counsel for any and every amateur who may be involved in some local difficulty, ARRL does concern itself with certain specific cases where the decision of a court may in general affect the rights of all amateurs. In accordance with this policy, the League has litigated through the highest courts of the states of New Jersey and Pennsylvania the question of whether an amateur antenna tower was an accessory use of residential property; both courts ruled that it is.1 Another state, Minnesota, had earlier reached a similar decision in favor of the amateur tower.

Despite these precedents, in recent years a number of other amateur planning problems have encountered difficulty with local zoning ordinances, building inspectors and zoning boards. This problem appearing particularly acute on Long Island, approximately two years ago the League selected a suitable case for presentation to the courts. While the case was in process of preparation, independently another amateur tower problem on the Island was brought to a head suddenly and moved into local courts. Upon a request for League assistance, to avoid having two separate cases on the same subject under litigation simultaneously, the League took over the second one, that of Ozie Frenndt, W2IFC.

During these past two years, the case has moved through the courts of the state of New York and earlier this year reached the Court of Appeals, highest in the state. We are obliged to report that the decision was in favor of the zoning board. The Court split, five members concurring in the majority opinion, and two members filing a dissenting opinion which expressed the view that the decision should have been in favor of the amateur.

As a result, we now have conflicting law on the subject of whether an amateur tower constitutes an accessory use of residential property. The highest courts of Minnesota, New Jersey and Pennsylvania have found in favor of the amateur; New York has now decided otherwise.

Further procedural steps are now under study by the League and its General Council.

LORAN

In this department of QST for July, 1956, we reported the withdrawal from amateur use, in certain locations near the Gulf, of operating privileges in the 1800–2000 kc. portion of the spectrum. This restriction was required during a

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1 QST, June, 1951, p. 39; October, 1951, p. 13.

(Continued on page 160)
QST BINDERS

As QSTs get older, they become more valuable. Are your 1957 copies scattered sloppily about the shack? If so, it's time to store them neatly as the year-end approaches — and the best way to accomplish this is to file them in QST Binders.

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period of reorganization of the Loran navigation system by the Coast Guard, and was expected to maintain for approximately one year.

While that phase of the program is now accomplished, the greatly increased use of radio navigation facilities, particularly on the part of another Government agency, has required a considerable expansion of the Loran system — a task again to be handled by the Coast Guard. The result is that the Coast Guard cannot at this time, as it had expected, return the amateur sharing arrangement to its earlier pattern. It is not possible to predict how long the required engineering and other studies will last, nor whether any additional modifications will need to be made in the amateur sharing arrangement.

This situation, while not a happy one from our standpoint, is wholly within the provisions of the regulations, which stipulate that the Loran system has priority, that amateur use is not a bar to the expansion of Loran, and that the amateur sharing arrangement is subject to cancellation or revision at any time, without hearing.

VE MOBILE IN U.S.A.

Previous items in QST concerning Canadians wishing to obtain authorization for mobile operation in W-land have included an FCC address which has now been changed. Requests for application forms for such authorization should now be addressed simply to The Secretary, Federal Communications Commission, Washington 25, D.C.

(Continued from page 68)

420-Mc. Record Moves to Europe

We haven’t had a change in our v.h.f. DX records box for more than a year, but now we have two. The KH6UI - W6NLZ record is a jump beyond our fondest expectations in the 2-meter department, and we have a new one for 420 Mc., also. Thanks to our good friend G6CL, of RSOB, we have news of some 420-Mc. work that definitely costs us the record on that band.

This probably should have happened before, for there was a report about two years back of a 420-Mc. QSO across the Mediterranean. We never received complete details on this one, though it appeared to be well beyond the 410-mile record we’ve carried since June 12, 1954. G6CL tells us that on June 19, at 2232 GMT, G6HAZ, near Birmingham, worked DL2YHA, 16 miles east of Hannover, Germany, on 420 Mc., c.w. Distance appears to be almost exactly 500 miles. We list this tentatively until more details can be obtained from the principals.

With the kind of tropospheric conditions reported for early July on 144 Mc., extension of the 220- and 420-Mc. records in this country would appear to have been waiting merely for some stations in the right spots to have a go at it. With 59 signals over paths of nearly 1000 miles on 444.

(Continued on page 168)

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It is logical to assume that 220 and 420 might have done as well, or perhaps better. Let's try!

A new amateur frontier was opened recently when W0MRY and K6YF worked two-way on 30,500 Mc., the highest frequency yet used for amateur two-way communication, outside of that done with light beams. More details on this one coming up.

**50-Mc. WAS for W8CMS and W0MVG**

The aura of June 30 posed a difficult choice for W8CMS, Salins, Kan. Jim was hearing stations all over the country, but he elected to work 144 Mc., including W12XI, Greensboro, N.C., a very rare opportunity, indeed. But there were Oklahoma stations on 8, and as so often is the case with much Middle-Western states, it was only that adjacent one that W8CMS had needed for many months. The closure of 8 for the best period of the aura netted 50-Mc. WAS Award No. 26, though it was a rough job, with nearly everyone attempting to use voice, Jim became the first Kansas 50-Mc. operator to make WAS on it. (W81B, now a Kansas resident, was in Missouri when he knocked off No. 1 back in 1948.)

Award No. 25, and the distinction of being the first 80-Mc. WAS, goes to W8CMS, Newton Falls, Ohio, Eda Williams. WTEPZ, Billings, Mont., played the lead in this drama, becoming the first YL on 6 to provide the final state in a quest for 50-Mc. WAS. We understand that she received a dozen American Beauties along with her QSL, as Claire’s expression of gratitude.

W8CMS was given special honors, a case of champagne, and a K5AOG-style WAS certificate at the Northeast Ohio V.I.L.P. Picnic, held recently at Akron. Some 500 participants were on hand to do honor to Claire, long a leader in Ohio 6-meter circles.

Note to 50-Mc. WAS aspirants: Be sure to send a covering note with your cards for a 50-Mc. WAS award. Two regular WAS certificaters have now been issued to applicants who earned 50-Mc. awards, because they sent cards only. Remember—there are thousands of the other kind, and cards for them arrive in nearly every mail.

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

Anyone interested in a 50-Mc. transcontinental relay? W7RGS, Milwaukee, Ore., writes that provision will be made to start a relay from Oregon during the September V.I.L.P. Party, the week end of the 21st. Four portable stations will provide a network from the Oregon coast to Idaho. From there it is hoped to work W7ACD at Shelley, Idaho, but from there on some additional cooperation is needed. Floyd says that they will give it another whirl in June, if there is interest to warrant the effort. Transcontinental communication is easy on 6 at times, but a relay across the country under dead-band conditions is quite another matter. Volunteers?

One of the mountaineering expeditions to participate in this effort will climb 11,750-foot Mt. Hood. Members of the Portland Amateur Radio Club with equipment for both 2 and 6 will make the climb. W7VLE, Forest Service Ranger in the Mt. Hood area, is helping with planning. W7OZL, PARC president, has had forestry service experience and knows the problems well. Others in the party include W7HFX and W7ZIF.

Another September expedition is planned by the Phoenix V.I.L.P., Radio Club, The objective is the San Francisco Peaks, north of Flagstaff, Ariz. Call will be W7VMF/7. Operation is planned for 50, 144 and 420 Mc., from about 1200 MST, Aug. 31 to the same time Sept. 2. The Penwicks of W7VM are mountain-topping this summer. Using a 700-watt 144-Mc. rig formerly W9KL’s, they made their first trip to Mesa Verde National Park, near Grand Junction, Colo. This netted contacts on 144 Mc., with W7VM in Phoenix and W9FAG, Albuquerque, N. Mex., both in the

(Continued on page 184)
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"first Colorado" category. Meteor rings and one call identification, but no QSO, resulted from evening skeds with W9KLK. On the Colorado expedition were W7A RUC W0MK VMO and V10Q. Antenna Plans will be given on expedition work on 144 Mc. Include two Goutet "Big Bertha."

Speaking of states on 144 Mc., having worked W4AIB, Aller, S. C., July 13, W3NY now has all of them east of the Mississippi, which might be "first east" as far as we are able to determine. It wasn’t so many years ago that a well-known W told your conductor, "We’ve tried 2 meters here again and again, and it simply doesn’t work!" One of these days somebody is going to be 24 $ on 144 — and if that can happen, how long will it be before a Grand Slam is made on 2. W9KLK and W8KAY lead the pack with 34 each! Perhaps it’s not too early to be thinking about an appropriate trophy.

Notice how large 6 and 2 are beginning to loom in the Field Day picture? W1FYZ says that his club, the Bristol County Radio Association, made 134 contacts on 50 Mc., while two rigs working all other bands managed only a combined total of 170 more. Many hohot contest clubs now rely on v.h.f. setups for 200 contacts or more. Not a few of these groups would have excelled at the idea of including 6 and 2 in a serious contest lineup a few years ago.

Largest 6-meter array? Could it be the fixed two-tower structure of W3HMK, 4教授, W3JHF and W4GYS. Two 100-foot towers support a 24-element collinear array facing northwest-southwest. This project was taken on especially for IGY purposes, and the antenna was several months in the building. Rig was fitted with 50-Mc. skeds with W1HDQ on 50 Mc., and will welcome other skeds along the line of the big beam. His scatter signal at W1HDQ is good enough for more-or-less routine c.w. QSO’s when the band is dead, and when there is sporadic E about the sig is like nothing we’ve ever heard on 6. More about this project at the National Convention, and shortly in QST.

V.H.F. enthusiasts within driving range of Syracuse should circle Oct. 12 on their calendars. That’s when the big v.h.f. Roundup will be held. If you already circled Oct. 5, the date we gave in a previous mention, please move the circle along a week. Don’t know how that’s got in there! More details next month. Your conductor will be there, too.

Want meteor-scatter skeds with Rhode Island on 144 Mc? W1KCS has been a good bet in the past, and now W1AJR is willing to give it a whirl. He has up to 500 watts on c.w., and has been very well in aurora work.

Not all v.h.f. newcomers are youngsters, by any means. K8ACC, Richland, Mich., who has worked 41 states on 6 since March 27, writes: "I’m 61, and believe me, the Technician ticket is a godsend to fellows who, like myself, start a bit late in life to master the code at 13 w.p.m. He’s working on it still, but enjoying life on 6 meanwhile. Hint from one of the younger 6-meter enthusiasts to those who yearn for large section or multi-continent contests: "Skeds on 50 Mc. with W4KKK and WARMU in the June V.H.F. Party paid off in additional multipliers. Both QSO’s were completed in under 7 minutes, which was less than expected. Seems that this method of fattening section multipliers should be exploited by more v.h.f. men. A good antenna, high receiver selectivity and the willingness to use a key are all that’s needed. We have highly in the works, but all our scatter contacts have been made with 50 watt!" — K2TEP, Riverton, N. J. To which we add, "Amen!" Scatter work on 6 gave W1HDQ 5 sections in the June Party. We had skeds with W4KKK and WARMU, also, but worked them both before sked time.

The Oklahoma Central 6-Meter Net, club style, was organized July 12, with 32 members. They plan to have this net (that frequency, again?) each Sunday at 2030 CST. A certificate of honorary membership is available to anyone who works and QSOs 6 of the members. Send your list of... (Continued on page 169)
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<td>30db</td>
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<td>10 meter-4 element, 11/4&quot; dia. tapered to 1&quot;</td>
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<td>30db</td>
<td>20 lbs.</td>
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2-Meter Standings

<table>
<thead>
<tr>
<th>U. S. States Area Miles</th>
<th>U. S. States Area Miles</th>
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<tbody>
<tr>
<td>WB7BZY, 7 1175</td>
<td>WB6LJZ, 8 2540</td>
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<tr>
<td>W4FZJ, 11 1190</td>
<td>W4FZJ, 5 5300</td>
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<tr>
<td>W4FZJ, 20 1175</td>
<td>W4FZJ, 3 3500</td>
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<tr>
<td>W4FZJ, 20 1175</td>
<td>W4FZJ, 2 2100</td>
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<tr>
<td>W4FZJ, 15 650</td>
<td>W4FZJ, 2 2100</td>
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<td>W4FZJ, 15 650</td>
<td>W4FZJ, 2 2100</td>
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</tbody>
</table>
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HY-GAIN "TRI-BANDERS"—Here are the beams preferred by Hams everywhere! Adjustable, weather-proof trap circuit. Rated at full KW. Excellent match to single 52-ohm coaxial line on 10, 15, and 20 meters — less than 1.65 to 1 SWR. Really rugged construction.

MODEL 152-T1 — 1 ELEMENT — Single, 3-band dipole. Rotate or leave in fixed position. 28 ft. in length. Weight: 10 lbs. — $39.95 Amateur Net

MODEL 152-T2 — 2 ELEMENTS — 5.8 db gain — only 6 ft. long. With separate 10 meter reflector. Weight: 36 lbs. — $69.50 Amateur Net

MODEL 152-T3 — 3 ELEMENTS — Most gain per dollar! 18 ft. boom — 29 ft. element. With separate 10 meter reflector. Weight: 58 lbs. — $99.75 Amateur Net

MODEL AD-1 — Additional 10 meter director element for increased power on the 152-T3 — $14.95 Amateur Net

MODEL 152-T5 — 5 ELEMENTS — 12 db gain! Deluxe array. 36 ft. boom. Weight: 96 lbs. — $395.00 Amateur Net

HY-GAIN STANDARD SINGLE-BAND BEAMS — Here's a group of well-designed, really rugged beams at real economy prices. Pre-tuned for best performance and excellent impedance match.

<table>
<thead>
<tr>
<th>Model</th>
<th>Bond</th>
<th>Elements</th>
<th>Gain</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>25</td>
<td>2</td>
<td>5</td>
<td>10.5 db</td>
<td>$7.95</td>
</tr>
<tr>
<td>210</td>
<td>2</td>
<td>10</td>
<td>12.0 db</td>
<td>9.95</td>
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<tr>
<td>65</td>
<td>6</td>
<td>5</td>
<td>10.5 db</td>
<td>14.95</td>
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<tr>
<td>103</td>
<td>10</td>
<td>3</td>
<td>8.5 db</td>
<td>19.95</td>
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<tr>
<td>153</td>
<td>15</td>
<td>3</td>
<td>8.5 db</td>
<td>29.95</td>
</tr>
<tr>
<td>203</td>
<td>20</td>
<td>3</td>
<td>8.5 db</td>
<td>49.95</td>
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</tbody>
</table>


MODEL 40-AV — 40 through 10 meters — $27.95 Amateur Net

MODEL 80-AV — 80 through 10 meters — $29.95 Amateur Net

MODEL 160-AV — 160 through 10 meters — $32.95

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Boom/Mast and Element Clamp: ruggedly designed 12 Ga. galvanized steel channel for positive grip. Used throughout the entire Tri-Bander Series. Heavily plated and serrated 5/16" U-Bolts.

Split Insulated Dipole: fed directly with RG-58U ohm coaxial cable and coaxial line balancing choke results in low SWR on all bands. No adjustment necessary.

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$99.75

All specifications furnished from experimentally derived data. These figures will maintain in most installations if antenna is relatively in the clear.

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>3 Element</td>
<td>152T-3</td>
<td>8 Aver.</td>
<td>25 Aver.</td>
<td>Less Than 1:2:1</td>
<td>1 Kw</td>
<td>59°</td>
<td>216&quot;</td>
<td>1/2&quot; Hot Dip Galv. Steel</td>
<td>1/4&quot;)</td>
<td>.058</td>
<td>.049</td>
<td>.035</td>
</tr>
</tbody>
</table>

* Additional Director Element for Increased Gain and F/B Ratio on 10M, Net $14.95.

The standard of comparison for three band antenna systems, the hy-gain Tri-Bander is factory pre-tuned, pre-matched and pre-adjusted and may be erected in an extremely short time with no test equipment and no further adjustment necessary. Guaranteed to outperform stacked arrays, because interaction and detuning effects have been eliminated. All hardware hot dip galvanized steel for maximum weather ability. Injection molded polyethylene, styroson and cyclocene plastic used throughout. Complete assembly and installation instructions furnished.

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Central 100V
Central 600L
Lakeshore Phasemaster
Lakeshore P-400 GG Amplifier

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