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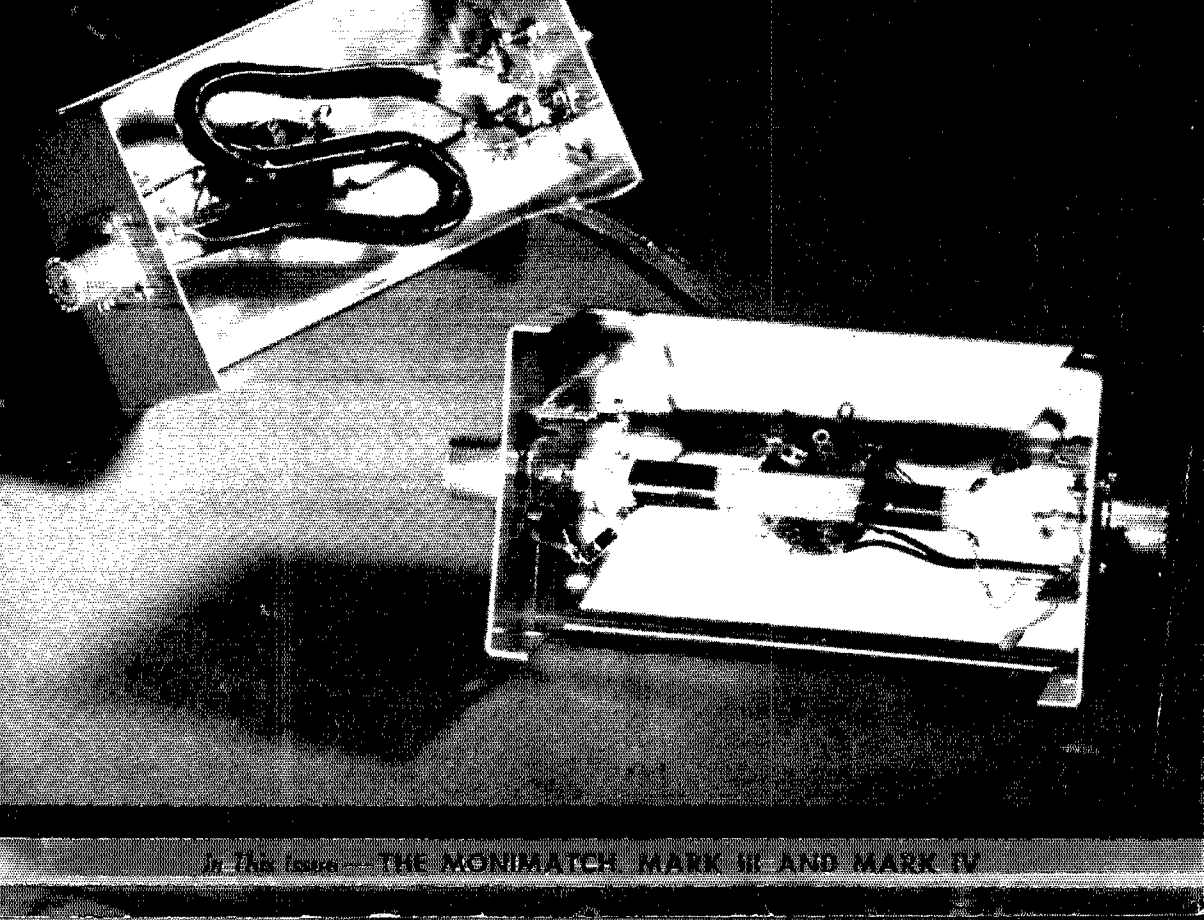

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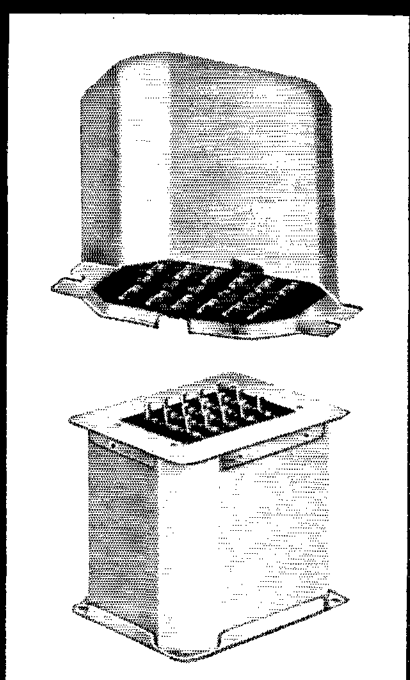

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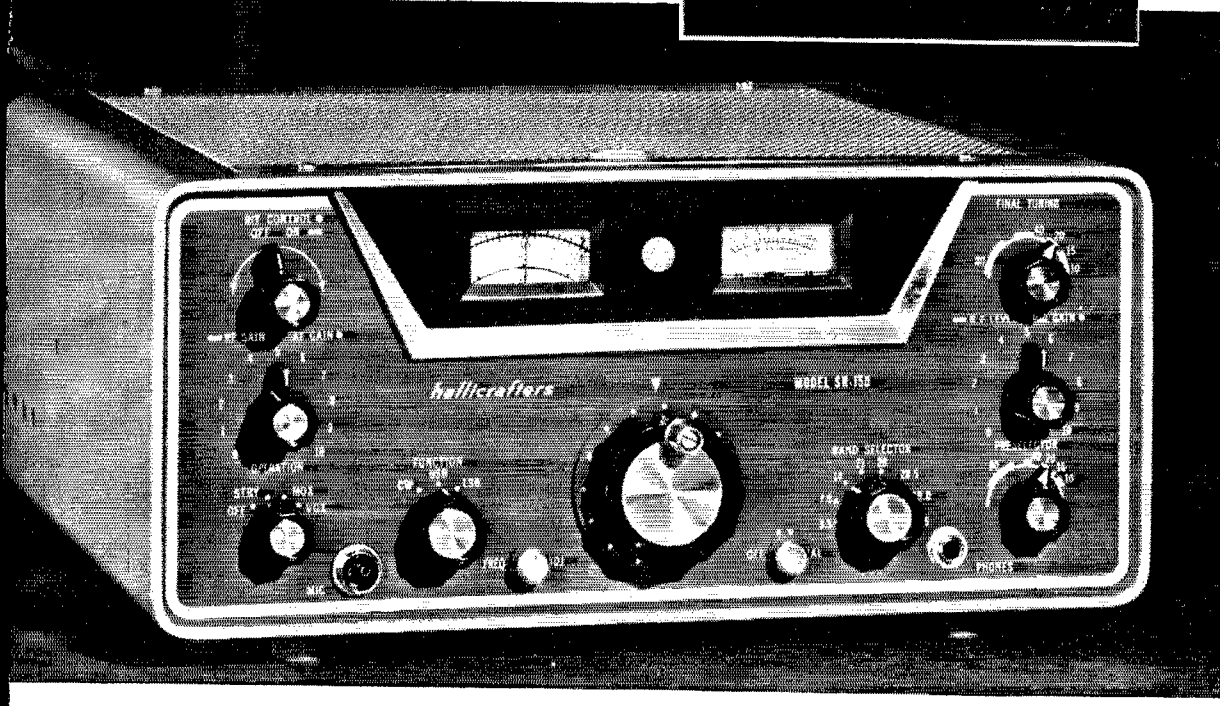

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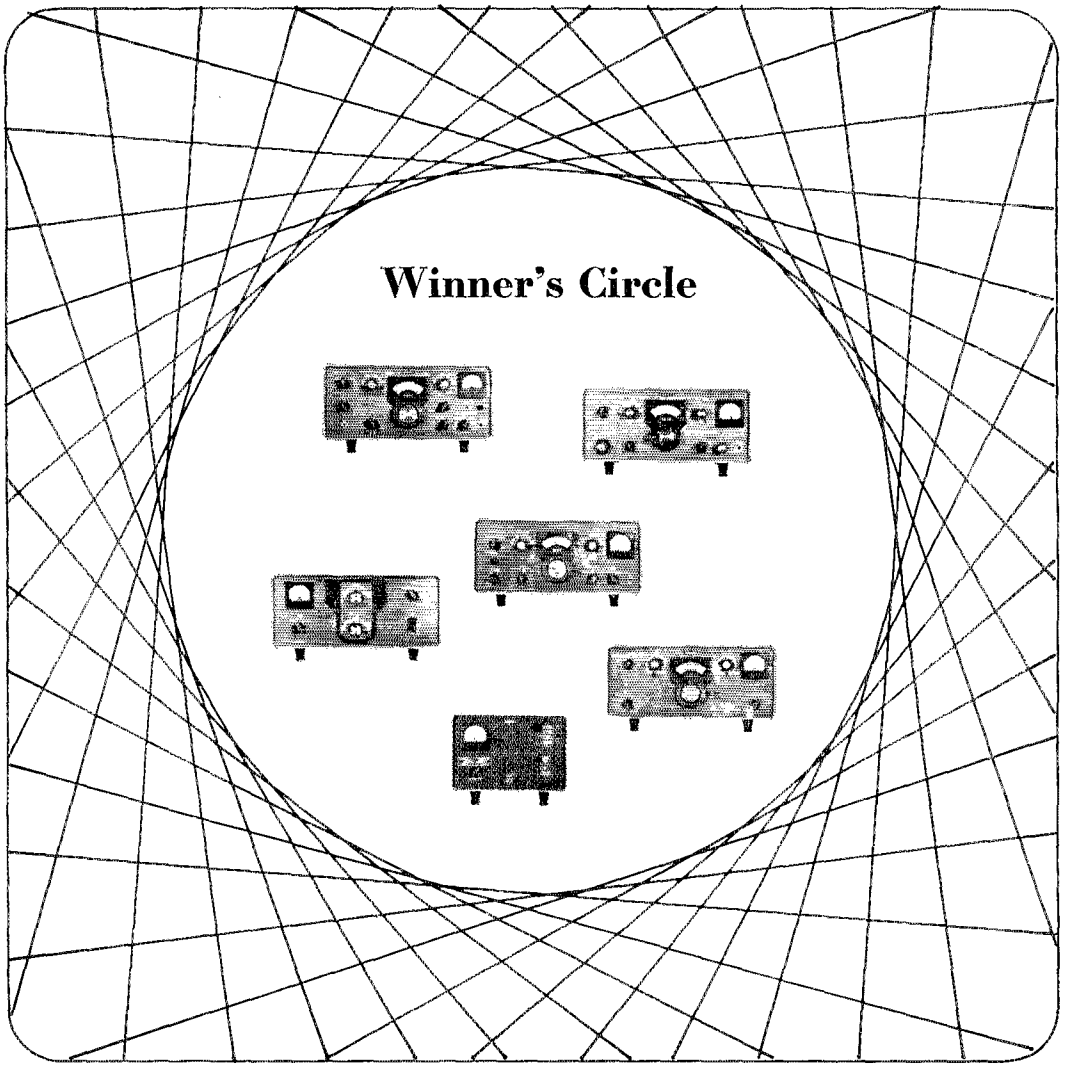

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QST

SEPTEMBER 1964

VOLUME XLVIII • NUMBER 9

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—CONTENTS—

Happy Anniversary A.R.R.L.!

1964 marks the 50th anniversary of the founding of the American Radio Relay League. Eitel-McCullough, Inc. (30 years young in 1964) salutes the A.R.R.L. on the occasion of attaining the half-century mark in noteworthy achievements and leadership in amateur radio.

The vision and direction provided by the American Radio Relay League has strengthened and fostered the spirit of amateur radio at home and abroad. Continued mature leadership in the best interest of the Radio Amateur Service by the A.R.R.L. will insure that this unique avocation will prosper and grow during the coming years. All radio amateurs of good will salute the American Radio Relay League and join us at Eimac in wishing "Happy Anniversary A.R.R.L.!"

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W6YSX
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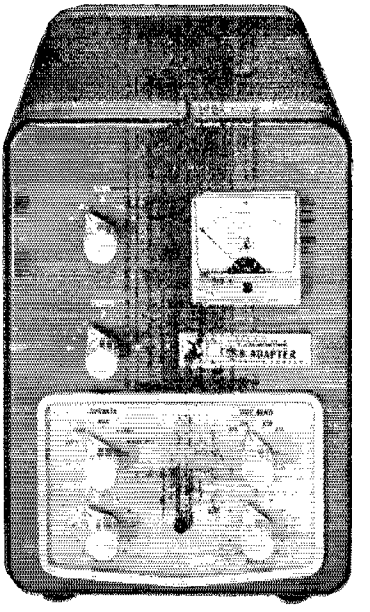

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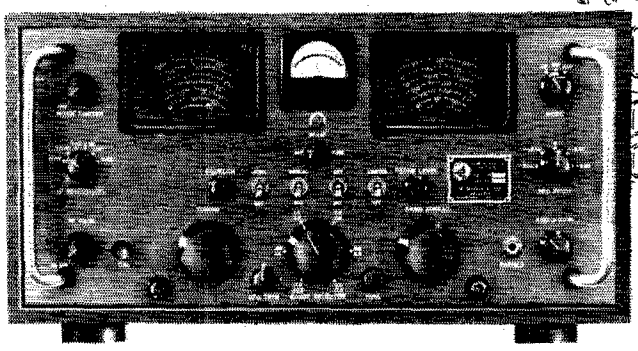

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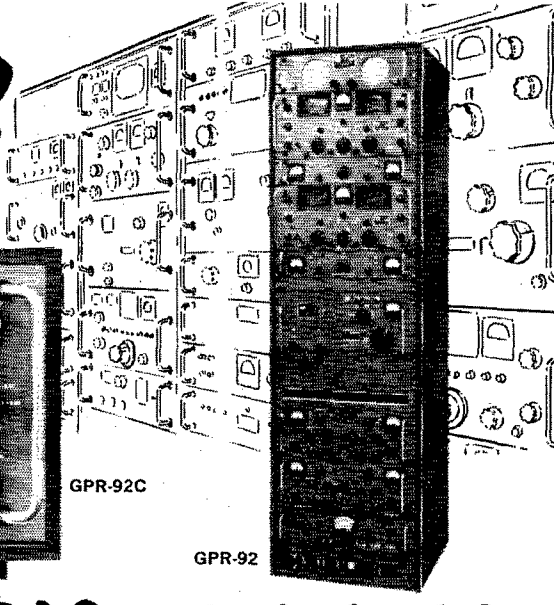

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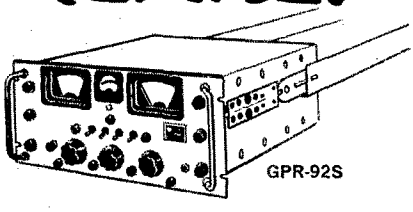

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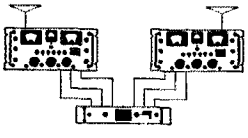

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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors.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

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

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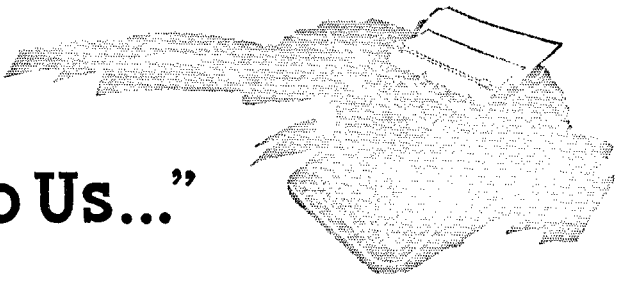


"It Seems to Us..."

PUBLIC SERVICE

A COURSE of continuing performance in the "public interest, convenience or necessity" was charted by the ARRL Board of Directors this year when it designated *public service* as the number one objective of the League's program. But simply putting public service at the head of a printed list does not automatically assure its achievement. A full measure of success will come only with substantial support and participation by the majority of amateurs.

Furnishing vitally-needed communication in time of emergency has long been a strong point of the amateur. Because of our sheer numbers and our widespread geographical distribution, no matter where disaster may strike there are always one or more hams ready to assist government and relief agencies in bringing order out of chaos.

Yet as has long been known — and once again demonstrated during the Alaskan earthquake — the most effective amateur performance is by those skilled in message-handling through experience in organized networks — whether of the National Traffic System, AREC, RACES, or even the "independent" nets. Suddenly cast into an emergency situation, an amateur inexperienced in efficient procedures for message handling may well end up providing more confusion than assistance.

Of our 250,000 hams, less than 40,000 are presently enrolled in AREC, NTS and RACES. Even many of these are merely "signees," often unprepared to do the kind of job that needs to be done, unable or disinclined to drill regularly or to take leadership assignments. Thus we come face to face with our biggest problem — *apathy*. K8AOE, president of the East Shore VHF Club of Cleveland, well states the case:

"What a sad state of affairs it is indeed when, after going to all the effort of passing an exam and collecting the equipment to put our stations on the air, we cannot find enough energy to join other amateurs in providing the services which would keep the cause of amateur radio in the public eye. Instead we have more interest in our personal and often selfish satisfaction, such as DX hunting, or rag chewing, or any of the other diversified branches of ham radio."

Look down our nose though we may at Citizens Banders, the fact is that many in this young and eager new group, despite organization which is only sporadic and localized, can teach us a lesson in ardent drive to do a community service. Amateur radio, both through ARPSC and RACES, is far more capable of rendering an effective, respected and responsible public service than is CB. But again, capability is not accomplishment; a let-George-do-it attitude by too many amateurs can cause us serious difficulty — especially when it comes to justifying retention of our frequency privileges. Will CB, through their sheer drive and our apathy, usurp the traditional role of amateurs in emergency communications?

Amateur radio has grown to many diversified fields of interest, which in itself is good. But these tangential excursions should never obscure the fundamental requirement on all of us to spend a portion of our time in public service activities. Join an AREC, NTS or RACES group. More important, take an active and *regular* part in their operations. A few hours a week by every active amateur will not only provide operating pleasure, but the very real satisfaction of performing a useful function in strengthening public service accomplishments of the amateur radio service.

BARRY

Perhaps the highest public honor ever bestowed upon an individual amateur radio operator occurred in July when Senator Barry Goldwater, K7UGA/K3UIG, was named the choice of his party as its presidential nominee.

Although equipped with comparatively-new calls, the Senator is no neophyte in amateur radio. As a youngster in the 1920s he held the call 6BPI, Phoenix, Arizona, with a 5-watt c.w. rig. Later, he went high power — 20 watts — his best DX Hawaii. His current renewed interest is by no means passive. Human interest stories datelined San Francisco reported the Senator's preferred method of relaxation during even the most critical portions of the political convention — a portable ham rig in his hotel room!

Partisan politics as such has no place in amateur radio communications, and even though deep in the heart of every amateur may lie the dream of some day seeing an amateur

beam at 1600 Pennsylvania Avenue,[1] hams should not take sides on the air, nor will *QST* in print. For more than a half century, amateur tradition is to avoid on-the-air discussions of political campaigns and controversies. We had the pleasure, a few months ago, of reading the mail while K3UIG talked to a high school radio club; we particularly admire the superb ethics followed by the Senator, while still speaking his mind, of avoiding partisan answers to loaded questions.

There will be a lot of public mention of amateur radio, it seems certain, while the Senator follows the campaign trail. If amateurs maintain strict neutrality on the air in accordance with tradition, no matter how actively they may be working for the Senator elsewhere, the publicity should be all good, and of great benefit to the amateur service.

QST

[1] *QST*, November 1952, p.50.

COMING A.R.R.L. CONVENTIONS

September 5–6 — Maritime Province, Charlottetown, P. E. I.
September 11–13 — Southwestern Division, Palm Springs, Calif.
September 25–27 — Pacific Division, Sacramento, Calif.
October 2–3 — Ontario Province, London
October 17 — Michigan State, Grand Rapids
October 31 and November 1 — Oklahoma State, Lake Texoma
January 23–24, 1965 — Florida State, Miami

PACIFIC DIVISION CONVENTION

Sacramento, California — September 25–27

The 1964 Pacific Division ARRL Convention will be held September 25–27 at the Hotel El Dorado, just outside of Sacramento; its theme will be "The Golden Anniversary of Organized Amateur Radio." Every effort is being made to insure that the first ARRL convention to be held in this city in over thirty years is one of the best ever.

Opening event will be the Pacific Division Golf Tournament, beginning at 1:00 P.M. Friday at the Haggin Oaks Municipal Golf Course. Convention registration will begin at 4:00 on Friday followed by an informal MARS dinner, with MARS officials of the three services as guests.

Saturday activities will include special group breakfasts; hidden transmitter hunts for mobiles on 2, 6, and 75 meters; ARRL forum; technical talks; mobile judging and field strength trials. Ladies' activities will include a luncheon and fashion show, as well as a conducted tour of the Governor's Mansion and/or the State Capitol Building, followed by a SWOOP party. The Saturday night banquet will be highlighted by the presentation of the first Hiram Percy Maxim Medal to John Reinartz, K6BJ; trophies for winners of competitive events will also be presented. At midnight, an initiation ceremony for the Royal Order of the Wouff Hong will be conducted for ARRL members.

Technical speakers will include Don Stoner, W6TNS; Bill Orr, W6SAI; Jo Jennings, W6EI; Chuck Towns, K6LFH; and Doc Gmelin, W6ZRJ. The League Forum on Saturday will feature ARRL President Herbert Hoover, Jr., W6ZH; General Manager Huntoon, W1LVQ; and Director Engwicht, W6HC.

Banquet reservations are $8.50; ladies' luncheon $3.00. Pre-registration deadline is September 14. The Hotel El Dorado is located on Highway 40 at Canterbury Road, just north of Sacramento. For further information and reservations, write to the 1964 Pacific Division ARRL Convention Committee, P.O. Box 214155, Sacramento, California 95821.

ONTARIO PROVINCE CONVENTION

London, Ontario — October 2-3

The Ontario Province ARRL Convention will be held Friday and Saturday, October 2–3, at the Holiday Inn in London. Registration will begin Friday at 6:00 P.M. An informal get-together is planned at 7:30, including a buffet and some entertainment. Saturday arrivals may register after 9:00 A.M.; various talks and demonstrations will begin at 10:00.

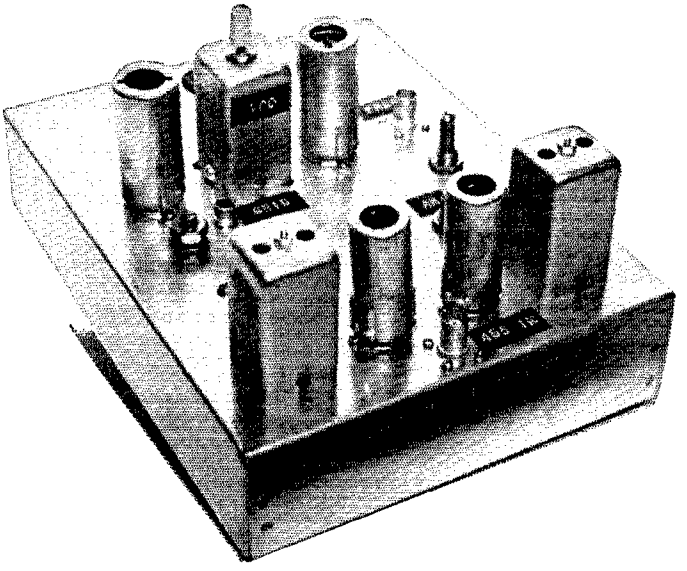
Speakers will include Fritz Franke of Hallicrafters; Rowland Beardow, VE3AML, of the Ontario Radio Society; and Dick Baldwin, W1IKE, ARRL Assistant General Manager. A representative of the Department of Transport will be present to answer questions on Canadian regulations. Demonstrations of v.h.f. and u.h.f. antennas, closed circuit TV and the newest in amateur equipment are also scheduled.

An s.s.b. and DX luncheon will be held Saturday noon and a 75-meter station will be in operation throughout the day. Cocktails will be served at 6:30, followed by the main banquet at 7:30; entertainment will be provided after the meal.

Convention registration is $2.00; banquet, $4.00. For complete details and reservations, write to the London Amateur Radio Club, P.O. Box 82, London.

Strays

Fifty years of organized amateur radio culminates in the issuance of a commemorative postage stamp honoring hams. See page 26 for details on how to get your "first-day cover" as a memento.



The phase-lock receiving adapter is built on a 7 × 9 × 2-inch chassis. The discriminator amplifiers are in the foreground in this view.

An I.F. Tracking Filter for Weak-Signal Reception

BY RALPH W. BURHANS,* W8FKC

A TECHNIQUE known as "phase-lock correlation detection" has come to be the common receiving method at a large number of installations where r.f. transmission loss is large or transmitter power is low. These methods are almost universally used at government satellite and space-vehicle tracking installations for Doppler measurements. Correlation-detection techniques can provide automatic frequency tracking, with a high degree of precision, along with superior weak-signal reception capabilities.

Methods of improving the basic input signal-to-noise ratio (s.n.r.) of receiver systems, such as the use of parametric amplifiers, have been used by amateur u.h.f. experimenters. To improve the *output* s.n.r., the amateur has usually employed audio filters following selective multiple-conversion i.f. strips. Active-filter or correlation-detection techniques can provide a big improvement in the basic receiver output s.n.r. by reducing the effective output bandwidth to levels not obtainable with any sort of passive-filter device. These methods have not been used by amateurs because

* Research Dept., The Standard Oil Company (Ohio), 4440 Warrensville Center Rd., Cleveland 28, Ohio.

Phase-lock detection methods, although capable of effecting a drastic improvement in signal-to-noise ratio, have had little use so far in amateur work. The reason is that the advantages are not realizable in ordinary amateur-type communication. However, for some specialized types — moonbounce is one example — a very much worthwhile increase in effective sensitivity can be secured. The system described here, developed by the Sohio Moonbeam group for receiving weak satellite signals and making Doppler measurements, represents a considerable simplification in circuitry. By making use of manual signal acquisition and phase-error integration, complexity and cost are much reduced.

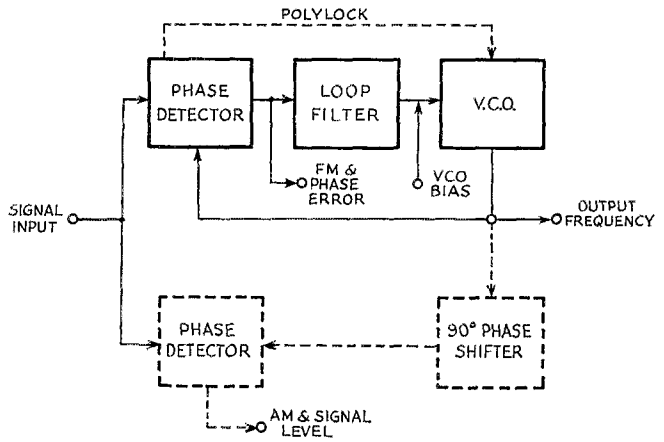


Fig. 1—Block diagram of the phase-lock adapter system.

at first glance they appear to be excessively complex and beyond the capabilities of the individual experimenter. A possible exception is the amateur Microlock system pioneered by W6VZA,[1] but this was a group effort of a large number of operators. A primary purpose of this article is to present one simplified version of a tracking filter or phase-lock adapter that is within the capabilities of the serious amateur experimenter.

The circuit to be described reduces the effective detector bandwidth, the ultimate bandwidth reduction being a function of (1) the stability of the poorest local oscillator that precedes the detector in the receiver, and (2) the information bandwidth or frequency "tracking" rate desired at the output. Detector bandwidths much smaller than 10 c.p.s. can be achieved, with sensitivities better than 0.01 μv. The adapter unit also provides a.m. and f.m. detection for telemetry reception. In its present form it is intended for weak-signal reception from satellites or space probes, but might be adapted for narrow-band c.w. reception, as in moonbounce experiments. This particular model is not intended for s.s.b. reception or for general use in crowded communications channels.

Correlation Detection

A correlation detector is a linear product detector similar to those used in s.s.b. detection, except that the beat oscillator is locked to the incoming signal through a feedback control system.[2] The locked beat oscillator provides a relatively noise-free internal estimate of the phase and frequency of the incoming carrier. The degree of s.n.r. improvement is a function of the filtering provided in the feedback control system together with the inherent integration provided by the controlled beat oscillator. With proper circuit design, this locally-generated estimate of the signal frequency and phase does not vary in amplitude, so amplitude information can be obtained by comparing the beat-oscillator amplitude with the incoming-signal amplitude. Similarly, rapid frequency or phase modulation can be detected by comparing the instantaneous reference oscillator signal with the incoming signal. Slow frequency variations, such as those caused by Doppler shifts, can be detected by making the feedback-loop time constants small compared with the Doppler shift, but large compared with any frequency or phase modulation on the carrier. The Doppler shift of a satellite can thus be followed by recording the slow variation in frequency of the controlled reference oscillator. This variation is relatively independent of any modulation on the incoming carrier.

There are many ways of using phase-lock methods in receiving systems. The Microlock system generates the controlled signal in the form of the first-local-oscillator signal at the receiver input. Some systems generate i.f. estimates of the signal at frequencies like 5, 10 or 30 Mc. Still another method is to generate an audio estimate with a controlled audio oscillator, utilizing all the existing receiver including the internal b.f.o. The term "phase-locked receiver" is usually applied to receivers which have a single crystal-controlled reference, with the input local oscillator as the primary controlled oscillator. The term "tracking filter" is usually applied to methods which adapt an existing receiving system to phase-lock methods by depending on the receiver conversion oscillators for the basic reference.

Circuit Design

This adapter unit operates at the widely-used intermediate frequency of 455 kc. Higher or lower i.f.s could be employed. In principle, an automatic frequency- and phase-control circuit is achieved with a phase detector, low-pass filter, reactance modulator, and an oscillator. These are combined as in Fig. 1. The output of the voltage-controlled oscillator (v.c.o.) feeds one side of the phase detector while the input signal feeds the other side, and the resulting error-

[1] Richter, "Microlock," *QST*, Dec., 1957.

[2] Jaffe and Rechtin, "Design and Performance of Phase-Lock Circuits Capable of Near-Optimum Performance Over a Wide Range of Input Signal and Noise Levels," *IRE Transactions*, Vol. IT, No. 1, Mar., 1955. (Also in *Progress Report No. 20-243*, Jet Propulsion Laboratory, Pasadena, Calif.)

product signal feeds the v.c.o. after low-pass filtering. In practice it is usually not quite so simple, since the damping of the low-pass filter or the pull-in *vs.* hold-in range leaves something to be desired. This difficulty has been surmounted to some extent by the use of an active-filter design first described by Jensen and McGeogh of NRL.[3] They utilized simple circuits but added an additional feedback loop called "polylock." This simple addition of one small capacitor from the top of the phase-detector transformer secondary to the grid of the oscillator tube serves a variety of useful functions.

The polylock loop generates a small pull-in voltage, characteristic of a frequency discriminator when the oscillator is not locked. The polylock loop is self-canceling, and the additional voltage drops to zero as the primary feedback loop starts to lock. The polylock permits control of damping of the primary loop filter. The original Jensen-McGeogh active-filter circuit utilized a simple reactance tube and electron-coupled oscillator circuit. All control and output was at the grid of the oscillator circuit. Some noise modulation of the output frequency was apparent in the weak-signal condition. This can be overcome by reducing the polylock capacitance to some extent. However, effective output-frequency noise-bandwidth reduction is achieved by the use of a tuned-grid, untuned-plate oscillator circuit as shown in Fig. 2 (V_{2B}). The output is somewhat isolated from the control input since the 1000-ohm cathode resistor provides a reasonably low output impedance. Many of the advantages of the polylock loop are still retained, particularly in loop-filter damping characteristics. However, for the weakest signal detectable, the pull-in range is still largely a function of the loop-filter time constant and the reactance sensitivity of the v.c.o. circuit. The value of the polylock loop coupling capacitance is difficult to determine except by experimental trial. Usually the smallest possible capacitance is required — of the order of 0.1 to 0.5 pf. The circuit of Fig. 2 will hardly work at all without this capacitor, but becomes a highly effective circuit with as little as 0.1 pf. for the polylock-loop coupling. The capacitor can be a simple twisted-wire gimmick or a cut-down mica compression trimmer capacitor. Sometimes

[3] Jensen and McGeogh, "An Active Filter," *NRL Report No. 4680*, Nov. 10, 1955, U. S. Naval Research Laboratory, Washington, D. C. (Also available as U. S. Dept. of Commerce, *PB No. 111787*.)

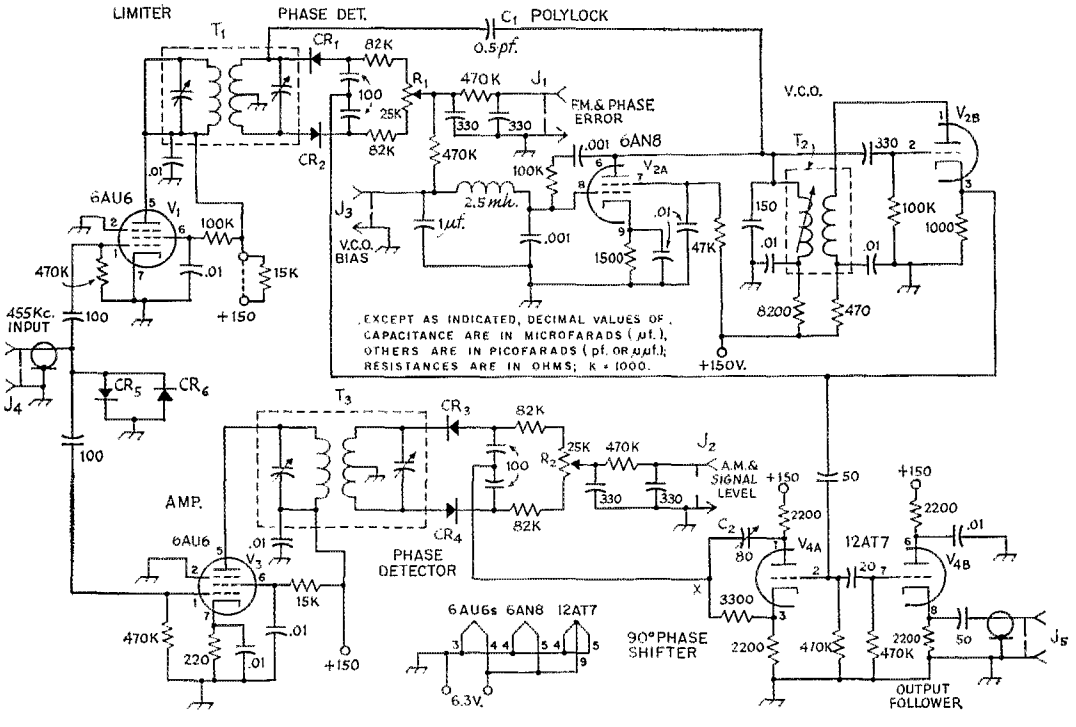
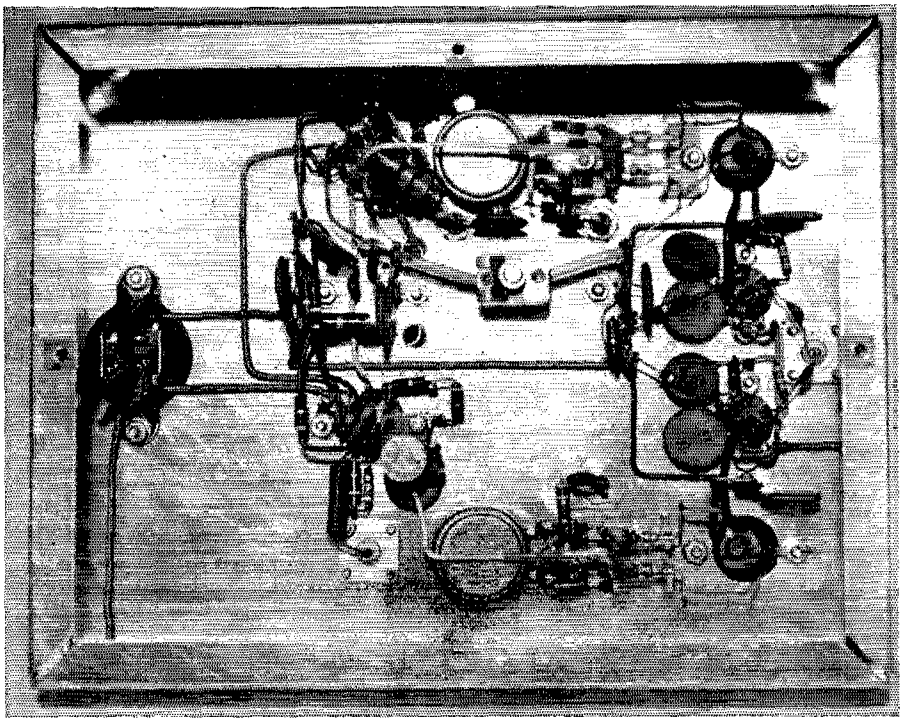


Fig. 2—Circuit diagram of the phase-lock adapter unit. Fixed capacitors are ceramic; resistors are ½ watt, unless otherwise indicated. B supply is regulated 150 volts. Note: CR_5 and CR_6 require a d.c. return, which may be supplied by the secondary of the i.f. transformer feeding J_4.

C_1—Cut-down 3-30-pf. mica trimmer (see text).
C_2—80 pf.; 8-50-pf. ceramic variable (Erie 557-H or similar) in parallel with 50-pf. fixed ceramic.
CR_1–CR_4, inc.—1N695 or equivalent high back-resistance diodes, matched.
CR_5, CR_6—1N34A or similar.
J_1, J_2, J_3—Phono jack.
J_4, J_5—Coaxial connector, chassis-mounting (BNC).
R_1, R_2—25,000-ohm control, linear taper.
T_1, T_3—Full-wave 455-kc. transformer (Miller 913-D with discriminator capacitor removed).
T_2—B.f.o. transformer, 455 kc. (Miller X-320-C).



The two discriminators are in the right-hand half of the chassis, using practically identical layouts. The polylock capacitor, a cut-down mica trimmer, is just above the chassis center. The v.c.o. circuit and output connector are at the left.

the stray capacitance in the circuit layout is sufficient.

The v.c.o. uses the triode section of a 6AN8 as the oscillator, feeding the primary phase detector, CR_1CR_2, directly from the 1000-ohm cathode resistor through suitable blocking capacitors. The pentode section, V_{2A}, is a reactance modulator (inductive).

A 12AT7 *RC* phase shifter, V_{4A}, feeds the a.m. and signal-level phase detector, CR_3CR_4, by supplying a voltage 90 degrees out of phase with the signal supplied to the primary phase detector. V_{4B} is used as a cathode follower for output-frequency isolation.

The input amplifiers, V_1 and V_3, are nearly identical. It is necessary to operate the 6AU6 feeding the primary phase detector as a limiter. Good limiting action is important for preventing amplitude fluctuations of the input signal from affecting the primary phase-detector output. CR_5 and CR_6 contribute further to the limiting, and function somewhat as the Bishop noise limiter. The clipping level is about 0.1 volt peak, which causes the a.m. and signal-level detector to saturate at a low level, but this is no particular disadvantage if accurate level indications are not needed. For these, the 6AU6 driving the a.m. and signal-level phase detector should not be preceded by any limiting.

Receiver Requirements

A high signal-plus-noise level is required for operating the adapter unit. Many communications receivers provide a 455-kc. output terminal which is at a relatively-low voltage level, and if such an output is used additional 455-kc. amplification will be needed. The circuits for this are straightforward. Additional i.f. stages should not be required if the i.f. output is taken directly from the last i.f. transformer.

With all tracking filters, the stability of the system is determined by the local oscillators in the preceding receiving equipment. With this system it is desirable to use a highly-stable receiver, generally of the type employed in s.s.b. work, with narrow tuning range or wide bandspread. For the v.h.f. region and higher, crystal-controlled converters of high stability are a primary requirement. Parametric amplifiers are desirable to improve the input s.n.r. since the correlation-detection process is a *detector* bandwidth-reduction and tracking scheme, and does not improve the basic receiver input s.n.r.

Adjustment

The adapter of Fig. 2 can be tuned up with the aid of a suitable signal source, vacuum-tube voltmeter, and oscilloscope. T_1 and T_3 can be tuned by temporarily removing V_2 from its socket and peaking the transformers for maximum signal on a v.t.v.m. plugged into the a.m. and f.m. output terminals, J_2 and J_1, in turn. For this purpose it is desirable to turn the balance potentiometers, R_1 and R_2, on the phase-detector outputs all the way to one side so as to provide an unbalanced voltage for indication. Once the

transformers are peaked, the balance potentiometers should be adjusted for approximately *zero volts with a signal applied at the input to the* adapter. The 6AN8 can then be plugged in and the slug in T_2 adjusted for lock-in with a signal applied at the input. Lock-in is observed with a v.t.v.m. at J_1; as lock is approached, the v.t.v.m. will swing rapidly positive, then through zero to negative, as the center frequency of the v.c.o. is varied with the slug in T_2.

The a.m. phase shift adjustment can be made with a v.t.v.m. at J_2. The phase-shift capacitor, C_2, should be adjusted for maximum v.t.v.m. voltage when the f.m. phase-error v.t.v.m. is indicating lock and zero volts. A further check on the 90-degree phase shift can be made with the aid of an oscilloscope having low-capacitance probes and identical horizontal and vertical amplifiers. C_2 should be adjusted for a good Lissajous oval when comparing the signals at the output of the phase shifter (point X) and the cathode of V_{2B}. The r.f. output at the cathode of V_{2B} should be 8 to 10 volts peak-to-peak, while the output at the phase shifter should be 5 to 6 volts peak-to-peak.

Output and Auxiliary Circuits

To use the adapter unit it is desirable to employ simple v.t.v.m. circuits as permanent signal-level and phase-error meters connected to J_2 and J_1, respectively. Fig. 3 illustrates this circuitry, together with a communications audio system for monitoring or for feeding the signals to a tape recorder. The signal-level (a.m.) v.t.v.m. should have a full-scale range of 4 to 5 volts or so. The phase-error (f.m.) v.t.v m. should have a range of ±6 volts with zero center. These ranges can be obtained with the 1-megohm input potentiometers and the 4.7-megohm series resistors.

Fig. 4 is the circuit of a frequency comparator which provides analog or pseudo Doppler indications for quick-look operation in satellite tracking. This circuit consists of a crystal-controlled product detector and frequency meter covering the approximate range of 0-10 kc. The frequency-meter portion is a transistor univibrator which puts out a square wave with a duration proportional to the cross-coupling time constant. This square wave is differentiated by the diode coupling capacitor, C_3, and added in a stepwise manner by the counting rate diodes. The load resistance of the meter and driving source resistance determine the maximum voltage which will be developed across the output indicator at a given repetition rate. The highest linear repetition rate indication will be limited by the time constants of this output circuitry. The linearity will drop off when the differentiated pulse width is a large fraction of a single cycle of the counted frequency. A linear range of 250 c.p.s. to 8000 c.p.s. has been achieved with the circuit values chosen. R_9 is adjusted to give 2.5 μa. for 250-c.p.s. input and 80 μa. for 8000-c.p.s. input, using a 100-μa. meter. R_8 sets the amplitude level of the input

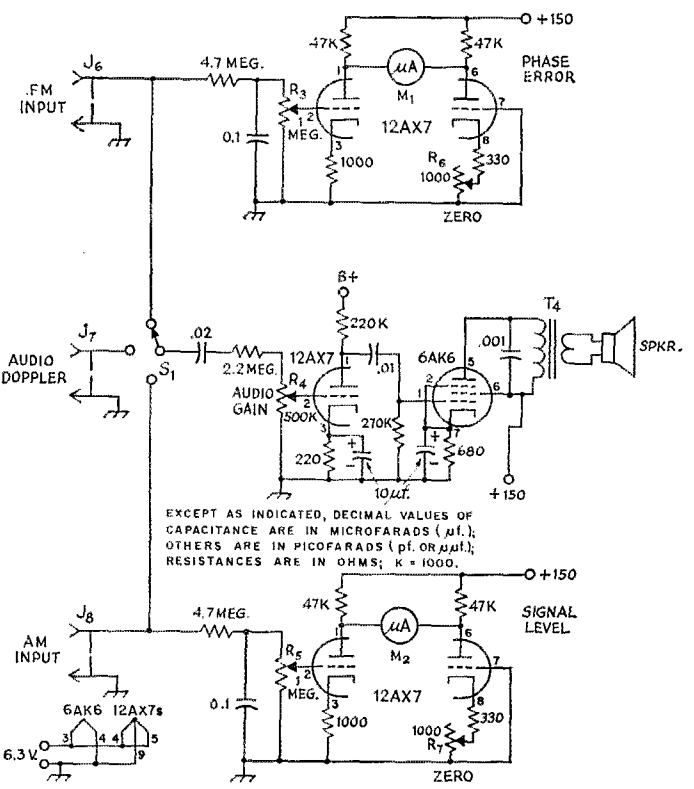


Fig. 3—Vacuum-tube voltmeter and audio-output circuits. Capacitors with polarity indicated are electrolytic; 0.1-μf. capacitors are paper; others are ceramic. Fixed resistors are ½ watt. B supply is regulated 150 volts.

J_6, J_7, J_8—Phono connector.
M_1, M_2—0-200 microammeter.
R_3, R_5—1-megohm control, linear taper.
R_4—0.5-megohm control, audio taper.
R_6, R_7—1000-ohm control, linear taper.
S_1—Rotary, 1 pole, 3 positions.
T_4—Audio output, 7000 to 4 ohms.

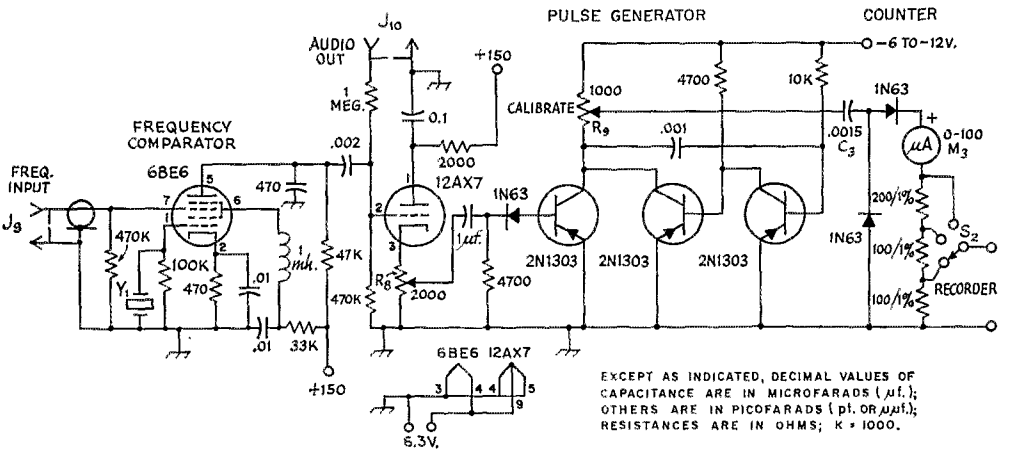


Fig. 4—Frequency comparator and audio-frequency meter for analog Doppler measurements. Output ranges are 4, 2 and 1 millivolts per kilocycle. Frequency range approximately 0-10 kc. Except as indicated, capacitances are in μf.; fixed resistors are ½ watt.

C_3—Mica.
J_9—Coaxial connector, chassis-mounting (BNC).
J_{10}—Phono connector.
M_3—0-100 microammeter.
R_8—2000-ohm control, linear taper.
R_9—1000-ohm control, linear taper.
S_2—Rotary, 1 pole, 3 positions.
Y_1—Approx. 455 kc. (see text).

audio frequency. Output for driving a potentiometric 0-10-mv. recorder can be obtained across the resistors in series with the indicating meter. The output recorder selector switch permits selection of recorder ranges of 1, 2 or 4 mv. per 1000 c.p.s. (The new Heathkit potentiometric recorder could be adapted to record this output signal.)

In using the frequency comparator it may be desirable to choose a crystal on the high or low side rather than one centered on the intermediate frequency, to prevent reversal of the analog Doppler recording. The choice of crystal will further depend on the conversion system used in the receiver preceding the adapter unit. The output i.f. may decrease with an increase in input signal frequency or just the reverse, depending on the receiver local-oscillator frequencies.

A v.c.o. bias source is desirable for manual integration of the phase error. This is done by applying an adjustable d.c. voltage through J_3, Fig. 2, using the circuit of Fig. 5. This circuit also provides for plug-in or switched filtering capacitances on the primary loop RC filter. With this voltage through the 470K summing resistor, the center frequency of the v.c.o. can be varied about ±3 kc. This is useful for fine passband tuning, and is essential for phase-error integration during lock on weak signals that are keyed and shifting in frequency.

Acquiring and Tracking Signals

When the adapter and output indicating circuits are all connected to the appropriate receiver some additional fine adjustments are usually required. For weak-signal acquisition, the r.f. gain of the receiver is turned up so that peak noise pulses cause the signal-level and phase-error indicators to move about 0.1 volt. The meters can be re-zeroed by small adjustments of R_1 and R_2. The v.c.o. center frequency usually will shift somewhat with the additional noise voltage, so the slug in T_2 should be readjusted for zero phase error with no signal, just noise. There will be some interaction between the v.c.o. tuning slug and R_1; consequently, it is best to go back and forth between these two adjustments until the phase-error meter is wavering about zero volts with the noise level.

The v.c.o. bias source is then connected to the v.c.o. input terminal and the appropriate filter capacitance plugged in. A convenient filter capacitance is about 2 μf. This will limit the tuning rate of the receiver to something of the order of 500 c.p.s. for acquiring lock on a signal of the order of 0.05 μv. For weaker signals, more capacitance can be used but the tuning rate of the main receiver must be correspondingly reduced. For very fine tuning with the main receiver fixed, the v.c.o. bias potentiometer, R_{10}, can be slowly rocked back and forth to cover about a ±1-kc. range. When once a signal is acquired, the phase-error meter will immediately settle down to a more steady reading. If the frequency of the signal is changing at a rate which the loop filter permits, the phase error will slowly shift off zero to one side or the other.

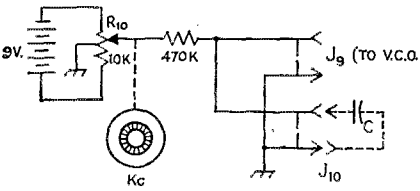


Fig. 5—Frequency-controlling bias source for v.c.o.

C—External capacitance for changing filter time constant; must be low-leakage type (see text).
J_9, J_{10}—Phono connector.
R_{10}—10,000-ohm control, center-tapped.

For Doppler-shift recordings on satellites, the operator can adjust the v.c.o. bias so as to maintain the phase error at approximately zero volts. As long as the signal is locked, this does not affect the output frequency, but it does provide the input to the v.c.o. with an error voltage (from the v.c.o. bias source) which is a best estimate of where the signal will be acquired in locking on keyed c.w. signals from satellites. For acquiring most signals it is usually preferable to have the v.c.o. bias potentiometer offset or centered at zero-volts output and use the main receiver tuning. On strong signals (1 μv. or more) a very positive indication of lock is apparent by wide swings of the phase-error and signal-level meters. For weak signals, very slow tuning of the main receiver or v.c.o. bias is necessary to detect lock on the phase-error meter.

A stable 0.1-μv. c.w. signal will produce a 2-volt indication on the signal-level meter and the s.n.r. at the output frequency will be so high that no detectable change in the analog frequency-comparator output can be observed. In terms of the frequency output, the s.n.r. improvement can be of the order of 40 db., at the expense of the information bandwidth of the signal. Thus on a very weak signal, such as one below 0.01 μv., we can tell that the signal is there, but only slow c.w. or very slow frequency-shift keying could be used for information transmission. In any case, the present phase-lock adapter system is superior to most square-law receivers for detecting weak signals. Of course, the signal source must be stable enough to permit the use of these very narrow-band techniques, and we must know where to search for the desired signal.

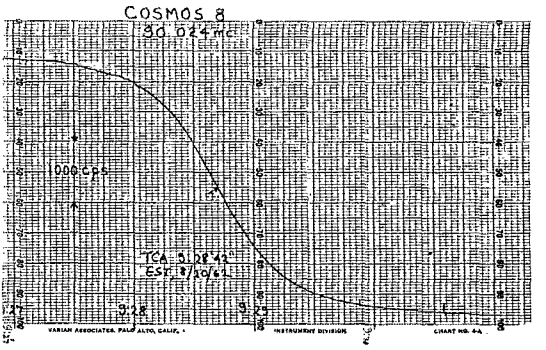


Fig. 6—Typical Doppler recording made using the system described.

An alternate way of operating the system is to offset the v.c.o. bias control (±4.5 volts) and retune the v.c.o. slug for zero phase error. This provides a wider tuning range (at least 6 kc.) for tracking a satellite signal from one edge of the i.f. passband to the other. The signal is tuned in at the correct edge of the input i.f. passband and can be followed sometimes as much as 10 kc. from the initial acquisition point. For this use, the frequency-comparator crystal should be on the starting edge of the input i.f. passband so that the audio-frequency output is always increasing.

A typical recording made with the aid of a strip chart recorder connected to the analog

(Continued on page 166)

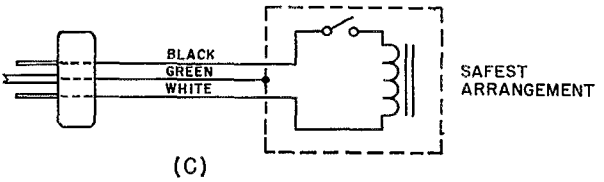
Correction to "Electrical Safety"

In Fig. 3C on page 53 of the August issue of *QST*, in the article on power wiring by W9NLT, we unfortunately got the ground wires reversed in the sample transformer primary circuit. The one labeled "white" should go to the transformer and the one labeled "green" should go to the shield. The accompanying drawing shows the correct circuit. Mark the drawing in August *QST* to show the right wiring; you may want to refer to it later and may possibly forget that it was wrong if it isn't noted *now*.

Incidentally, the wire colors refer primarily to the permanently-installed wiring and not necessarily to the colors used in an appliance cord.

If your house has 3-conductor outlets, it doesn't pay to take it for granted that the "green" connection actually is grounded. Depending on the fixture and how it was installed, the ostensible ground connection may or may not be a good one. Some fixtures depend on a scraping contact when the plate is assembled to the box, and the con act sometimes has to cut through paint. Test the setup by connecting a 300-watt lamp between the grounding contact in the receptacle and the other two contacts in turn. This will also show whether the "white" and "black" connectors are properly wired in the outlet (Fig. 2 of the same article). There have been cases where the supposedly grounded contact (white) has been hot, while the supposedly hot contact actually was connected to the earthed side of the line. Also, in building equipment for the 3-wire system, place the switch and fuse only in the hot wire; don't use double-pole switches to break both sides. Our thanks to Art Walters, W6DKH, for these suggestions.

Finally, don't think of the third wire in the power cord as a substitute for the external ground connection that ought to be made to every metal-cased piece of radio equipment. Run a separate lead to the water piping, and make a practice of seeing that this ground connection is made *before* the power plug is inserted into the wall socket.



(C)

Simple Crystal-Controlled F.S.K.

Better Stability for RTTY Transmitters

BY KENNETH N. SAPP,* W4AWY

MOST RTTY stations are using v.f.o., and it has been noted that a large number of them who operate in nets have difficulty getting on the net frequency within tolerance, and staying on after they get there. While there was no difficulty getting on frequency at this station, there was difficulty staying on because of v.f.o. drift, especially when starting up cold. For this reason, it was decided to switch to crystal control. Various arrangements were tried, and the one finally decided on is shown in Fig. 1. It is now in use at this station, and has proven quite satisfactory. With the exception of a polar relay (not shown), which most RTTY stations already have, only six small parts are needed for the f.s.k. unit.

Assembly

The oscillator circuit shown is a conventional Colpitts, with the f.s.k. network connected between crystal and ground. However, the system should work with any oscillator circuit in which the crystal is normally grounded. The network takes very little space and, if you have the oscillator already built, the network can probably be added to the existing circuitry. If there is sufficient room in the oscillator compartment for the few small parts required, an outboard unit which plugs into the regular crystal socket can be used. In either case all parts should be mounted as close as possible to the oscillator and crystal sockets to keep the r.f. path short. A long r.f. path will reduce the possible shift and lower the natural frequency of the crystal. Length of keying leads is not critical. One advantage in having the shifter built permanently into the oscillator circuit is that it can be used to adjust the crystal frequency either up or down to exact net frequency for phone or c.w. work, as well as for f.s.k. It should be pointed out, however, that most of the shift in frequency possible with this circuit is toward a lower frequency, so a crystal on the net frequency or slightly higher should be used.

* P.O. Box 3034, St. Andrews Branch, Charleston, S. C.

Diodes

The diodes may be the tube type, such as the 6AL5, or may be crystal diodes. I have found the crystal diodes to work better, and of all those tried here the Ohmite 1N34A worked best. However, the peak inverse voltage rating of crystal diodes is low compared to that of the 6AL5, so it is recommended that the oscillator screen voltage

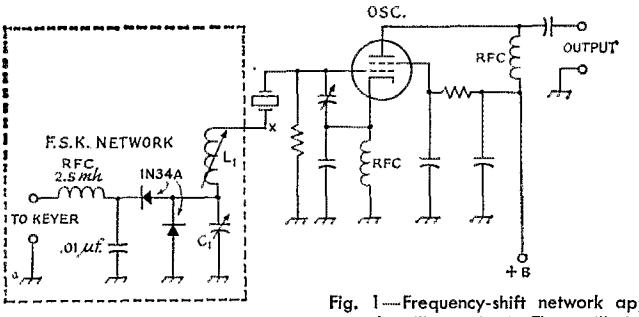


Fig. 1—Frequency-shift network applied to a typical crystal-oscillator circuit. The oscillation circuit is normally grounded at the point marked X. This connection is broken for insertion of the f.s.k. network. Values for C_1 and L_1 are discussed in the text.

be not over 100. The 0.01-μf. bypass capacitor should be mica or ceramic. For the variable, C_1, a simple mica padder of 150 to 200 pf. maximum works fine.

The Coil

The value of the inductance will depend on the frequency, the crystal, the holder and the amount of frequency reduction required. In general, a frequency of 3 Mc. to 4 Mc. will require about 25 μh., and 5 Mc. to 6 Mc. about 15 μh. If the f.s.k. is to be used with only one crystal, and always with the same amount of shift, the inductance could have a fixed value arrived at by first winding a coil of more inductance than the estimated requirement, and then removing turns until the right value is found. A more flexible arrangement is to use a slug-tuned coil. I suggest getting a coil form (probably one in your junk box) and winding it yourself. It takes very little wire. For 3 Mc. I used a ⅜-inch

form and wound about 50 turns at the top end of the form in a space the length of the iron slug. For 5 Mc. I used a ¼-inch form and wound about 30 turns. If you do not have wire small enough to wind the required number of turns in one layer, make two layers. I used No. 26 wire because I had nothing smaller on hand. If you plan to operate on several frequencies, perhaps widely separated, the inductance can be extended by including a rotary switch with several positions, and a small inductance of about 5 μh. connected between each switch point. (A coil of 24 turns, ½ inch in diameter and ½ inch long, has an inductance of 5 μh. No. 26 wire will fit nicely in this space, with room to spare.) The entire series string would be connected in series with the variable inductance and the switch rotor used to short out any portion not needed for the particular frequency in use at the time. If this arrangement is used, the variable inductance should be small enough to work with the highest frequency used, perhaps a 5- to 10-μh. coil.

Adjustment

Too much inductance or too little series capacitance can cause the crystal to stop oscillating. Adjustment should be started with maximum capacitance and minimum inductance. For an 850-cycle shift, with the keying circuit closed to put the oscillator on "space" frequency, adjust the inductance so that the frequency is 425 cycles below the net frequency. Then open the keying circuit and adjust the variable capacitor until the frequency is 425 cycles above the net frequency. There is a slight interaction between the two controls, so go over them again until both frequencies are right. If you are using narrow shift, the inductance and capacitance should, of course, be adjusted to the particular shift in use.

Basically, the circuit is series-tuned, with the *LC* combination so arranged that normally the frequency is high, or "mark." On "space," the capacitor is effectively shorted out by the diodes, and the frequency is reduced by the inductance in the circuit. It is possible to key the circuit directly without the diodes, the bypass capacitor, or the r.f. choke, but it would be unstable because of the r.f. in the circuit. The keying circuit is isolated from the r.f. circuit by these four components.

The unit can be keyed directly from the keyboard by proper polarization of the diodes, but the shift will be upside down, since the keying circuit must be open on "mark." To get the shift circuit must be open for the higher frequency normally used for "mark." To get the shift right, it will be necessary to use a relay. Since the relay coil must be in the teletype circuit, the best thing to use is a polar relay, properly adjusted both mechanically and electrically, so there will be no bias on the f.s.k. signal. As shown in Fig. 1, the diodes are polarized for a positive voltage on the ungrounded keying lead. When there is no voltage in the keying circuit, polarization is immaterial as long as the two diodes are polarized the same.

QST

Strays

1963 VE/W Contest

Word from Canadian Vice Director VE2BK explains the lateness of the results of the past years' contest. Both the Websters have been undergoing prolonged illness and will forward the contest results as soon as is possible. Please be patient and stand by.

—•••—

Dr. Benjamin Toy, W1WXJ, 44 Cummings Road, Brookline, Mass. 02146, notes in a recent AMA *News* a list of doctor-hams that is far from complete. W6BRW, K1GHT, K2SVD and others are interested in completing a directory of those in the profession on the air, and to that end notices are being placed in several medical journals. W1NXJ would appreciate help in compiling a complete list of doctor- or dentist-hams.

—•••—

WA2RZZ and K2HTX, while testing a rig together worked K1UTH.

On Field Day, WA2RZZ and K2HTX happened to meet in the 2-meter tent, just as the operator worked K1UTH.

WA2RZZ and K2HTX drew duty at K2US the same time; K1UTH signed in as a guest operator.

Can anyone figure the odds?

—•••—

A fascinating tale of espionage and counter espionage during World War II, together with a description of shortwave broadcaster WRUL's wartime services, can be found in the book *ROOM 3603*, by H. Montgomery Hyde. — *VE3GG*

—•••—

Don't forget to order a "first-day cover" with the amateur radio commemorative stamp — see page 26.

Gus Browning, W4BPD, has been visiting all sorts of clubs following his return from a two-year DXpedition which everyone must have heard of by now. Here is a club group where 100% of the members turned out to hear his talk! Left to right, standing, K6TRK, W4BPD, W6HYG; kneeling, W6UJ, W6GRR, WA6FPB. All except Gus are members of the Kern County Club.

Up-To-Date Version of A Popular Matching Indicator

The Monimatch----

About eight years ago *QST* carried the description of the Monimatch,[1] a simple device that could be used for checking the match between a coax feed line and an antenna, or to find the correct adjustment of a transmatch. A short time later Monimatch Mark II,[2] a more compact and reliable unit than the original, made its appearance. Since then several commercial versions have appeared, all using the basic design features of the Mark II. The Mark III and Mark IV Monimatches appearing in this article are much simpler to build than the earlier versions.

In addition, they are more sensitive, particularly the Mark IV. One of the problems with the earlier units was their lack of sensitivity on the lower bands, particularly 80 meters. With 50 watts output, the maximum current obtainable was 250 microamperes, meaning that an expensive microammeter was required for an indicating device with low-power transmitters. The Mark IV eliminates this problem: as shown in Table I, 7 watts will give full-scale deflection on a 0–1 milliammeter. This should be especially useful for matching purposes for low-power mobile operators on 160 and 80 meters.

Before talking about construction details, let's have a refresher course on what the Monimatch is and what it will do.

What It Is

The Monimatch is a reflectometer, and a reflectometer is simply a device that, when connected into a transmission line, will respond to r.f. energy traveling only in one direction along the line. When two reflectometers are connected back-to-back at the same point on the line, they can be used to measure both the forward and reflected voltages at that point on the line. When both voltages are known, the standing-wave ratio can be determined.

At this point one thing should be made quite clear: the Monimatch is, and always has been, a standing-wave *indicator*. It is *not* a precise measuring instrument. Because of several factors that can get into the act, such as nonlinearity of diodes, differences in coupling between the two reflectometers to the line, or less than perfect directivity, there is no simple method of coming up with an instrument that will give exact s.w.r. readings. Even the expensive commercial bridges have a certain amount of inaccuracy when checking s.w.r. However, the Monimatch is an excellent *matching* indicator and the accuracy is very good when a matched condition is approached.

What the Monimatch Will Do

A newcomer to amateur radio, starting out with a Monimatch or similar device, would wonder how anyone ever got on the air without one. Let us reassure you — hams did manage to get their antennas or transmatches adjusted in the old days. However, the Monimatch simplifies the job and makes it very easy to get an antenna system adjusted.

In our opinion the best multiband antenna system is a dipole, center-fed with open-wire feeders. This system requires using a transmatch between the transmitter and the feeder. The Monimatch can be inserted in coaxial line between the transmitter and transmatch to show you when the transmatch is correctly adjusted. Also, many beam antennas have adjustable matching devices, and the Monimatch will serve as an indicator to show you when the matching section is properly adjusted.

Another important function of the Monimatch is its use as an output indicator. One of the problems a beginner has is finding out if power is actually going to his antenna. The Monimatch accomplishes this because it gives a comparative indication of the r.f. power in the coax line and thus the power going to the antenna.

Construction Information

In the Mark II version of the Monimatch special channel-type construction was used and polystyrene spacers had to be made to maintain the correct spacing between the pickup leads and

Table I

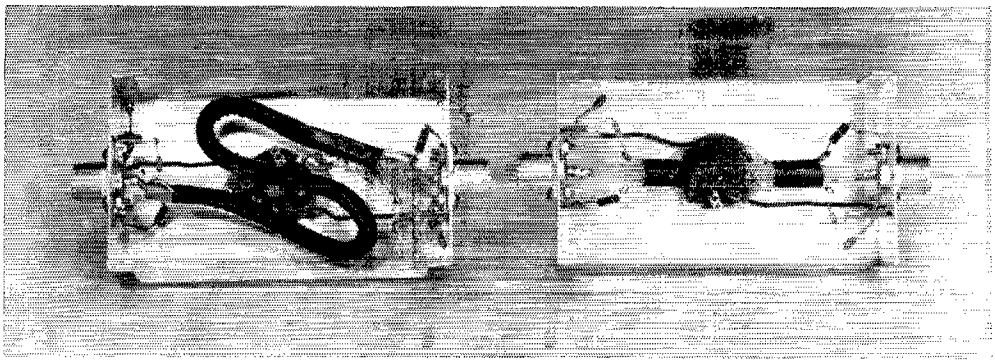
R.f. power required for full-scale deflection of 0–1 milliammeter

Band	*Mark III*	*Mark IV*
1.8.	100 watts	35 watts
3.5	40 "	7 "
7.0	9 "	2 "
14.0	3 "	Less than 1 watt
21.0	1 watt	" " " "
28.0	Less than 1 watt	" " " "

* Technical Assistant, *QST*.

[1] McCoy, "The Monimatch," *QST*, Oct. 1956.

[2] McCoy, "Monimatch, Mark II," *QST*, Feb. 1958.



At the left is the Mark IV. In this unit the pickup leads L_1 and L_2 are taped almost the entire length of the inner coax conductor insulation. The unit at the right is the Mark III. As can be seen, the construction is quite simple.

Mark III and Mark IV

BY LEWIS G. McCOY,* W1ICP

the inner conductor of the feed line. The Mark III and IV models are much simpler, and no channel work or spacers are required.

For the Mark III, a piece of RG-8/U coaxial line, 4½ inches long, is required. Either the regular solid-dielectric or polyfoam type can be used. First, remove the outer insulation material and then slide off the shield braid. All we need is the inner conductor and the insulation material around the conductor. The new outer conductor of the coax will be the inside of the metal Minibox that holds the unit. The Minibox size for both units is 2⅛ × 3 × 5¼ inches.

Next, cut two pieces of No. 14 solid wire, 3⅜ inches long. The two pieces of wire, L_1 and L_2, are then, taped to the insulating material that is around the inner conductor, as shown in the photograph. Position the two wires so that they are on opposite sides of the inner conductor. The assembly is then ready to be installed between the two coax chassis fittings in the Minibox.

There are only a couple of precautions to follow in making the unit. First, be sure that the pickup wires lie snug along the insulating material, and make sure the wire doesn't have kinks in it. When soldering the 1N34 diode leads, be sure to use a pair of pliers to hold the lead being soldered, in order to conduct any heat from the iron away from the body of the diode. Excessive heat will quickly ruin a germanium diode.

The length of the diode leads between the body of the diode and the pickup wire should be about ½ inch. Also, the cathode (the bar in the circuit diagram) of the diode is the end with the black color code bar on it. The opposite end, with no color bar, is attached to the pickup lead.

The terminating resistors, R_1 and R_2, must be carbon or composition type, *not* wire-wound. The leads on these resistors should be no more than ½ inch long. As with the diodes, it is a good idea to hold the resistor lead with a pair of pliers while soldering, to conduct the heat away from the body of the resistor.

The Mark IV is made in a similar manner except that the pickup wires are taped along the insulating material for almost their entire length. This is necessary to maintain the pickup lead spacing and alignment when the assembly is bent to fit inside the Minibox.

The coax piece for the Mark IV is 11½ inches long. No. 14 solid wire is used for the leads, which should be 10¾ inches long. The assembly is bent as shown in the photograph and fitted into the Minibox. Spacing of the assembly from the sides of the box is not critical.

As you'll note from the photograph, the indicating unit is remote from the Monimatches. Rather than build an indicating unit for each Monimatch we equipped the units with jacks, with a mating plug and cable for the indicator. Many hams have more than one antenna installation and would want a Monimatch in each line rather than moving a single unit from line to line. Three leads are needed — "forward" and "reflected" leads and a ground lead. However, even though there are only three leads, we used octal sockets and an octal plug simply because they are cheap and easier to obtain than three- or four-terminal sockets and plugs. Shielded wire was used for the leads between the indicator and the Monimatch units. The leads can be whatever length is required for your installation.

Using the Units

Using a Monimatch is a fairly simple procedure. Switch the indicator to read forward voltage and then feed enough power through the unit to obtain a full-scale deflection on M_1. Then

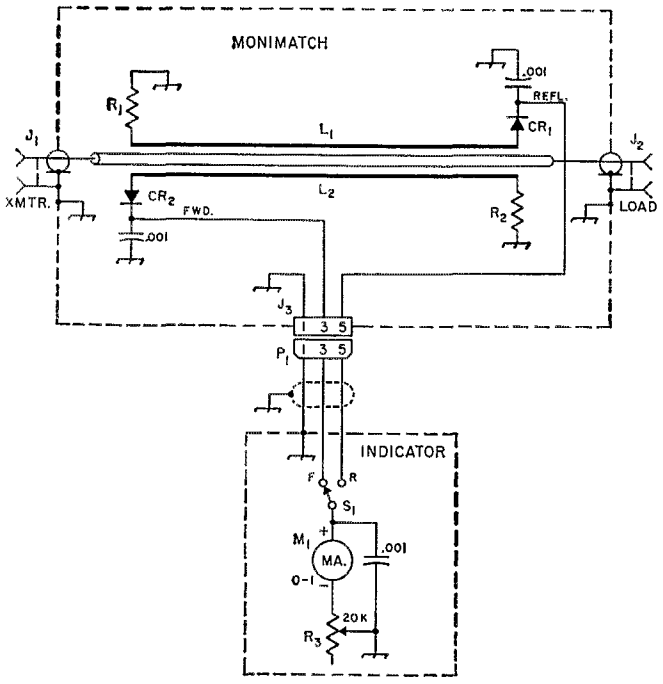


Fig. 1—Circuit diagram of the Monimatch and indicating unit. All capacitors are 0.001-μf disk ceramic; fixed resistors are ½-watt composition or carbon, not wire-wound. Dotted lines indicate Miniboxes.

CR_1, CR_2—1N34A germanium diodes.
J_1, J_2—Chassis-mounting coax receptacle, type SO-239.
J_3—Octal socket.
M_1—0–1 milliammeter.
P_1—Octal plug.
L_1, L_2—See text.
S_1—Single-pole double-throw toggle.
R_1, R_2—Mark III:
For 50-ohm line—470 ohms, ½-watt carbon or composition.
For 75-ohm line—430 ohms, ½-watt carbon or composition.
Mark IV:
For 50-ohm line—270 ohms, ½-watt carbon or composition.
For 75-ohm line—220 ohms, ½-watt carbon or composition.
R_3—20,000-ohm ½-watt control.

switch the meter to read reflected voltage and you will obtain an indication of the match. As we stated earlier, the Monimatch will not give an *exact* measurement of s.w.r. but it will be close enough for all practical purposes. To determine the s.w.r. you merely add the forward and reflected readings together and then divide that amount by the difference between the forward and reflected readings. That is,

$$S.W.R. = \frac{F + R}{F - R}$$

For example, assume that your indicating meter has a 0–10 scale in equal divisions and that the reflected reading is 3. Then

$$S.W.R. = \frac{10 + 3}{10 - 3} = \frac{13}{7} \text{ or } 1.8 \text{ to } 1.$$

To use the Monimatch as an output indicator, simply tune the amplifier stage in the transmitter for maximum meter reading in the forward direction, using a setting of R_3 in the indicator unit that puts the needle at about half scale. The meter does not read actual power or voltage, but does give useful relative indications so long as R_3 is left alone while tuning. That is, the *change* in the reading as you adjust the amplifier is the important thing, not the exact reading itself.

One point here: many tetrode or pentode amplifiers will show more power output at some point other than at the exact dip of the plate meter. The question arises whether to tune up by the dip or by the indicated power output. Always use the power-output indicator — while staying within the plate input rating of the amplifier, of course. Optimum operation of the amplifier is usually with maximum output rather than with some particular value of plate current.[3]

Occasionally we receive queries from amateurs using s.w.r. bridges, stating that they have a condition where there is a greater reflected reading than a forward one. This is, of course, impossible, because you cannot have more power returning from a load than goes to it from the transmitter. One cause of such a condition can be the presence of spurious signals (such as harmonics) or parasitic oscillations in the transmitter's output. These get into the indicating circuit and throw all measurements completely out of line. If you have such a condition, better do some checking around the amplifier stage in your rig for parasitics! QST

[3] This applies to tuning for c.w. output. With screen-modulated a.m. phone, the appropriate procedure for the particular transmitter should be followed. — *Editor.*

A Power-Saving Conversion V.F.O.

With less than one-third watt maximum power drain, this circuit offers the power economy needed for portable operation along with top-notch performance. As there is almost no heating, drift is negligible. Output is sufficient for driving a Class AB_1 amplifier with an untuned grid circuit.

AMATEURS in general are certainly not unaware of the desirable features of transistors in applications where low power drain is a No. 1 consideration, as in portable equipment. The v.f.o. shown here was built by Don McKinley, VE3AU/VE3FID, as part of a program of watt conservation at a summer cottage where batteries are the sole source of power for radio equipment. Saving an amp here and a milliamp there became essential — and ruled out the power-consuming cathodes of vacuum tubes.

The circuit was developed, through considerable experimentation, over a period of more than a year. The pictures reflect this state of flux to some extent, so the dope here isn't offered in the thought that the construction should be duplicated exactly. Rather, it is hoped that those having a similar problem will find some ideas to help them get started.

The Circuit

This is a complete conversion-type v.f.o. having five transistor r.f. stages: variable oscillator, buffer amplifier, crystal oscillator, mixer, and output amplifier. The total drain is only 300 milliwatts, key down. Output is available in the four amateur bands from 1.75 to 14 Mc.

The variable oscillator circuit is the series-tuned Colpitts with a nominal tuning range of 5 to 5.5 Mc. The actual range used by VE3AU is 325 kc., covering the c.w. sections of the bands along with the overlapping Canadian phone segments. The range can be extended or curtailed by changing L_1 or C_1, or both.

A separate crystal is used for each of the bands in the fixed oscillator, Q_5. All crystals are fundamental types. This oscillator has tuned output circuits on 19.5 and 12.5 Mc. (for the 14- and 7-Mc. bands, respectively) but uses an untuned choke/resistor combination for the two lower frequencies.

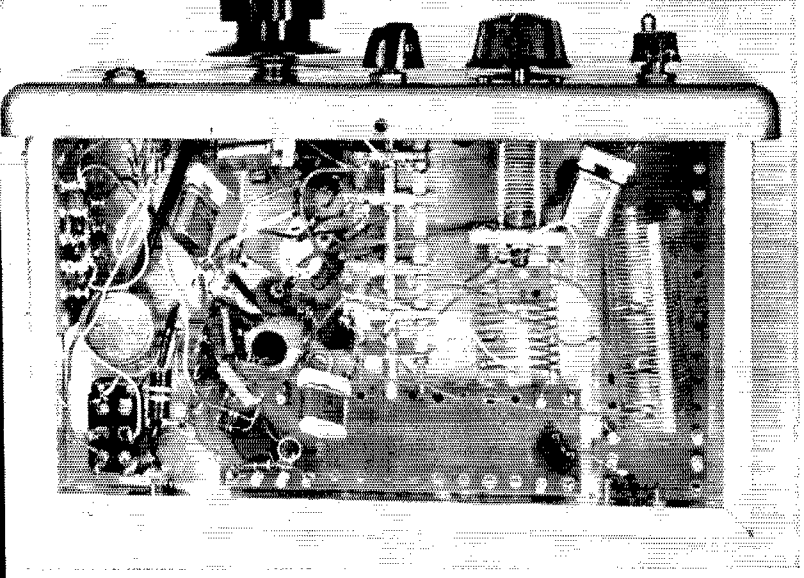
Outputs from both oscillators are fed to the base of the mixer, Q_3. The mixer collector circuit has a parallel-tuned tank with an extra 270-pf. capacitor switched in for 1.75 Mc. The tank inductance consists of L_4 and L_3 in series to make up the required inductance for 3.5-Mc. Unneeded turns are shorted out for the higher frequencies. The collector is tapped down on the coil for optimum mixer loading.

The output stage, Q_4, is an emitter follower which acts as a step-down transformer into coax line. When biased for 5 ma. collector current, the stage delivers 2 volts peak-to-peak into a 100-ohm load at the end of a few feet of RG-58/U.

Keying

The keying system incorporated in this circuit is designed to go along with blocked-grid keying of a subsequent amplifier or amplifiers. With S_2 in the "operate" position, power for the v.f.o., buffer, mixer and output stage has to go through Q_6. When the key is open, CR_1 ties the base and emitter of Q_6 firmly together, biasing the transistor to cutoff, so Q_6 is an open circuit and the r.f. section is inoperative (with the exception of the crystal oscillator, Q_5, which runs continuously). On closing the key, power is connected to Q_6 and its bias is shifted to cause the transistor to conduct. Thus Q_6 is a fast-acting switch actuated by the key.

The conversion v.f.o. is housed in a cabinet approximately 11 × 6 × 7 inches (Hammond 1403-D), offering sufficiant panel area for a tuning dial and other controls, plus ample internal volume to house three 6-volt lantern batteries.



Underchassis view shows the components not part of the v.f.o. assembly. As this is an experimental unit, there are some parts showing that are not included in the circuit diagram. The layout is the result of trying various ideas, and can be varied as necessary to suit the builder or to fit into chassis of other dimensions (this one is 10 × 6 × 2 inches).

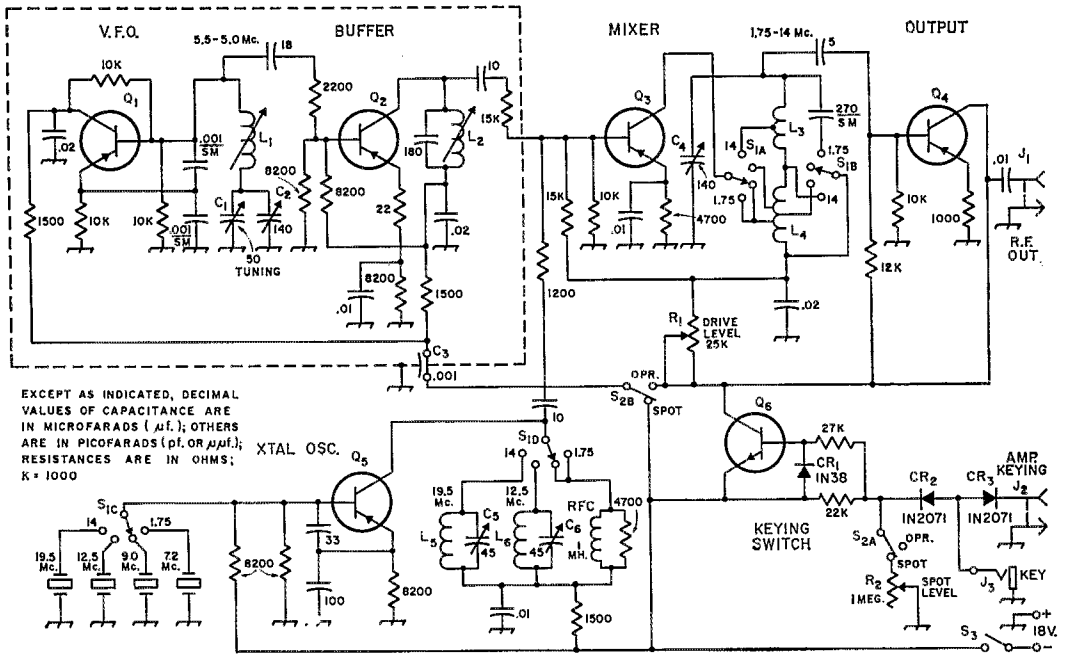
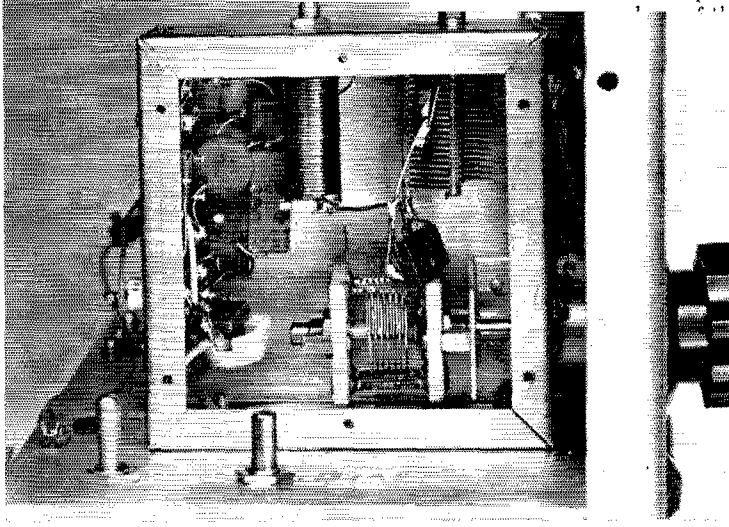


Fig. 1—Circuit of the conversion v.f.o. using transistors. Except as listed below, capacitors are ceramic or silver mica (SM); resistors are ½ watt.

C_1—50-pf. variable.
C_2, C_4—140-pf. variable, air padder type.
C_3—0.001-μf. feedthrough (Centralab MFT-1000 or equivalent).
C_5, C_6—7-45-pf. ceramic trimmer (Centralab 822 or equivalent).
J_1, J_2—Phono jacks.
J_3—Open-circuit phone jack.
L_1—App. 7 μh.; 35 turns No. 20 enam. on ½-inch diameter slug-tuned form (Miller 43A000 CBI or equivalent).
L_2—App. 5 μh.; shielded; (Miller 9051, 3-7 μh.).
L_3—9 turns No. 18, 1-inch dia., 8 turns per inch (B & W Miniductor 3014), tapped 5 turns from C_4 end.
L_4—45 turns No. 20, 1-inch dia., 16 turns per inch (B & W Miniductor 3015 with 3 turns removed); tapped 4, 14 and 27 turns from L_3 end. Taps at 4 and 27 turns go to S_{1A}; tap at 14 turns goes to S_{1B}.
L_5—App. 2 μh. (miniature r.f. choke).
L_6—App. 5 μh. (miniature r.f. choke).
Q_1–Q_5, inclusive—2N1143, 2N384, or any p-n-p transistor having an alpha cut-off above 100 Mc.
Q_6—2N35, 2N1302, or any similar n-p-n transistor.
R_1—25,000-ohm control, linear taper.
R_2—1-megohm control, linear taper.
S_1—Ceramic rotary; 4 sections, 1 pole per section, 4 positions.
S_2—D.p.d.t. toggle.
S_3—S.p.s.t. toggle.



The variable oscillator and buffer are in a 4 × 4 × 2-inch chassis mounted on one edge. It is shown here with the shield plate removed. Chassis area behind the v.f.o. chassis, not visible in this picture, is used for the battery power supply.

Closing the key also keys the transmitter through CR_3 and J_2, the latter jack being connected to the normal transmitter keying terminals. The transmitter's blocking bias appears across J_2 with the key open, but is held off from having any effect on Q_6 by CR_2. Similarly, CR_3 isolates the v.f.o. circuits and supply from the amplifier keying circuit. Thus the time constants in the main transmitter's keying circuit can be adjusted for the desired shaping without affecting the rapid switching function of Q_6.

The keying system offers the essential switching of full differential keying, although in Fig. 1 no provision has been made for holding Q_6 closed while the amplifier output dies out after opening the key. This could be done by incorporating a suitable time constant in the Q_6 emitter-base circuit.

The circuit could be modified a bit by connecting all stages except the variable oscillator, Q_1, to the −18-volt lead, letting Q_6 switch just the variable oscillator on and off. It is also possible to let the two oscillators run continuously, with Q_6 switching just the buffer, mixer, and output stages. This has worked satisfactorily on 1.75 and 3.5 Mc. at VE3AU, but a weak continuous signal could be heard on the higher bands, even with no voltage on Q_3, because some mixing occurs in its emitter-base diode. Such stray leakage might not be bothersome in other installations.

Notes

R_1 and R_2 are continuously-variable controls for adjusting the output (drive level) and for setting a desired level in the receiver when S_2 is in the "spot" position. Experience has shown that these are seldom used, and little or no inconvenience would result from omitting them.

All the circuits include bias stabilization for minimizing temperature and voltage changes. The r.f. stages are rather loosely coupled, as it was found that the best way to avoid spurious signals in the output was to keep the r.f. level low. The 15,000-ohm resistor between Q_2 and Q_3 was the final step in reducing one somewhat bothersome birdie to a level more than 60 db. below the wanted signal.

Power for the circuit is obtained from three 6-volt lantern batteries (such as the Burgess 4FP1) which normally sit on the chassis in a space not occupied by circuit components. The key-down current is 16 ma. A rectifier-type 18-volt regulated supply could be used where a.c. power is available. As battery operation was intended, no special attention was paid to the voltage stability of the oscillator, but measurements showed a frequency change of approximately 32 cycles per 1 per cent change in supply voltage.

Temperature effects, given a steady ambient temperature, are quite low: while no exhaustive investigation has been made, a drift run showed a maximum deviation of less than 25 cycles from the initial cold-start frequency over a 40-minute period, with deviations of only a cycle or two from the mean after about 20 minutes.

The unit is used for driving a 2E24 Class AB_1 amplifier which is the first stage in the transmitter in VE3AU's portable setup. The voltage across a 100-ohm resistor in the amplifier grid circuit is sufficient for this, and the advantage of such a grid "circuit" is that the 2E24 has no reason to be unstable. — *G. G.* QST

Strays

The makers of the reed switch used by VE3AU in his keyed antenna relay (July *QST*, page 29), Hamlin, Inc., are no longer able to take direct orders. However, they advise that the switch can be purchased from Allied Radio, Chicago; the Allied stock number is 33B976. The price is $3.00 each.

The switch can also be obtained from the makers of the solenoid, the Coto-Coil Company, Inc., 65 Pavilion Avenue, Providence 5, Rhode Island. The complete assembly — coil, reed switch and silicone treatment — is available at $4.50 postpaid. Order No. SP-12/DRG-DTH. The coil only is type SP-12 and can be obtained for $1.50 plus 20¢ postage.

COMMEMORATIVE STAMP FOR AMATEURS

Official First-Day Covers Available

As briefly stated in August *QST*, the Post Office Department will later this year issue a commemorative stamp honoring amateur radio operators. In making its announcement, the Department said:

> In recognition of the public service contributions of a quarter million licensed amateur radio operators, a stamp for "hams" will be issued. This is the 50th anniversary year of the founding of the American Radio Relay League.
>
> The important work done by the radio hams ranges from civil defense and aid in disasters to routine favors for countless thousands of Americans, Mr. Gronouski said. Many a soldier overseas has been able to talk with his family back home because two hams provided a hookup. When telephonic communications were disrupted during the recent earthquake in Alaska, it was the hams who made contact with worried friends and relatives.

There is considerable interest among stamp collectors in "first-day covers," which are envelopes carrying the commemorative stamp and mailed (postmarked) from the original city of issuance on the first day the stamp is released. In accordance with custom, the League is preparing an official first-day envelope, a steel-graved reproduction of the May 1964 *QST* cover, plus the ARRL diamond and some additional art work. There are three envelopes to a set, each with the design printed in a different color. Prices, which include addressing, stamping and mailing from the first-day city are:

Single envelope — 25 cents
Set of 3 envelopes — 70 cents
Pair (two stamps on same envelope) — 30 cents
Block (four stamps on same envelope) — 40 cents
Plate block (four stamps on same envelope with identifying number of printing plates) — 75 cents

The single-stamped envelope is an ideal opportunity both to obtain a personal memento of the occasion and for some excellent public relations. Order at least one to keep in your log or with other station records. Order additional envelopes for neighbors, relatives, friends — the envelope will carry an inserted card briefly describing amateur radio and its accomplishments. Remit 25 cents for each single envelope desired, or 70 cents for each set of three. Include complete names and addresses of those to whom you wish envelopes mailed, being very careful that such material is thoroughly legible. For extra accuracy, you can furnish small gummed labels with the name and address already prepared by you, as many stamp collectors do. Please do not include other League matters, such as membership renewals or technical queries, in any correspondence about the commemorative stamp.

At the time of issuance, at this writing not known but probably some time in November, amateurs will want to purchase a quantity of stamps at their local post offices for use in correspondence, etc. However, official first-day covers are available *only* from the League, and *only* by ordering in advance. Send in your order today!

Increasing Power in the V.H.F. Station

Thanks to its almost universal use in sideband work, the linear amplifier is enjoying new popularity in all kinds of hamming, and especially in the v.h.f. field. Though it has some attractive aspects, the linear is not necessarily the best approach to high power for the v.h.f. enthusiast. If you're thinking of ways to increase your sphere of influence on 6 or 2, this information may help you to select the one best suited to your needs.

BY EDWARD P. TILTON,* WIHDQ

WHEN a fellow breaks into the v.h.f. game, his first transmitter is usually a low-powered job; probably no more than 10 to 25 watts input. Very likely it has its own power supply and modulator, with the whole works in one neat handy package. This is fine — for a while. He makes many interesting contacts and has a lot of fun. Then one day the band opens up and our newcomer jumps in with his peanut whistle and tries to do battle with the high-power boys who suddenly appear out of nowhere at the first sign of DX. He may have some success, but with activity on 6 and 2 being what it is these days, the chances are good that he'll be clobbered fairly often.

Comes then the urge for a "big signal" — one that will at least let others on the band know that they've been in a contest. At this stage our hero looks around for another box, preferably complete in itself, that he can connect to his present setup and thereby move up from the few-watts to the few-hundred-watts category. He finds that such a box is called a *linear amplifier*, and forthwith wants to buy or build one.

The next discovery may slow him down a bit: there are not many v.h.f. linears on the market, and those that are available cost quite a bit of money. Maybe there's something to this business of building one's own ham gear, he decides, so off goes a letter to ARRL — "Please send me plans for an amplifier for my Sixer." Or 99er, Communicator, homebuilt 6360 rig, or whatever. Something cheap, simple, easy to adjust and sure-fire in operation. It will help if it uses an 829B or some other surplus tube; the budget is still suffering from the first venture into the world above 50 Mc.

Unfortunately for the v.h.f. hopeful, increasing power on 50 or 144 Mc. is not quite that simple. Despite all that has been written and said along these lines over the years, it is quite obvious that many v.h.f. newcomers do not understand all the angles, so at the risk of being repetitious to those who do, here are some basic facts to be considered before plunging into the high-power pool.

How, and How Much?

Let's make it clear that, as nice as high power is at times, you don't need it as a steady diet. This fact has been getting attention of late in connection with QRM problems on lower bands, and it applies equally to the v.h.f. scene. Regulations require use of only such power as may be needed to maintain good communication. Running a kilowatt all the time on 6 or 2 violates the spirit and letter of the law just as much as does use of a rock-crusher to work locally on 20 or 75. Go to high power if you wish, but be sure to make provision for operating at moderate power levels, too. There are many ways to do this, some of which were covered recently in *QST*.[1]

There are several routes to higher v.h.f. power. All have merit, and only you can tell which best suits your requirements, and then only after weighing many factors. There is the inherently low efficiency of the linear amplifier. Even if you run a kilowatt input, the most you can get out of an a.m. linear amplifier is about 350 watts. Other methods may yield as much as 750 watts, but getting the biggest legal phone signal with a.m. involves additional audio as well as r.f. amplifiers. When you figure up the cost, weight and bulk of a 500-watt modulator, you may well conclude that something less will have to do.

As seen from Fig. 1, modes other than amplitude-modulated voice may enter the picture. The low-powered starting rig is shown at A. As supplied commercially, this nearly always includes a modulator and power supply. Hopefully, it will also include provision for c.w., though some manufacturers have not seen fit to provide this very inexpensive but useful feature. By adding a linear amplifier, as shown at B, we have a high-powered c.w. and medium-powered a.m. phone transmitter. It is worth remembering that c.w. is the least expensive and simplest communications system technically, yet it is the most effective mode of all for weak-signal DX work.

Single-sideband is making v.h.f. converts rapidly. The usual s.s.b. exciter has provisions for c.w. and a.m. as well. It thus is a logical driver for a linear amplifier on three modes, as in C,

* V.h.f. Editor, *QST*.

1 "Notes on Reducing Power," Campbell, Feb. 1964 *QST*, p. 20.

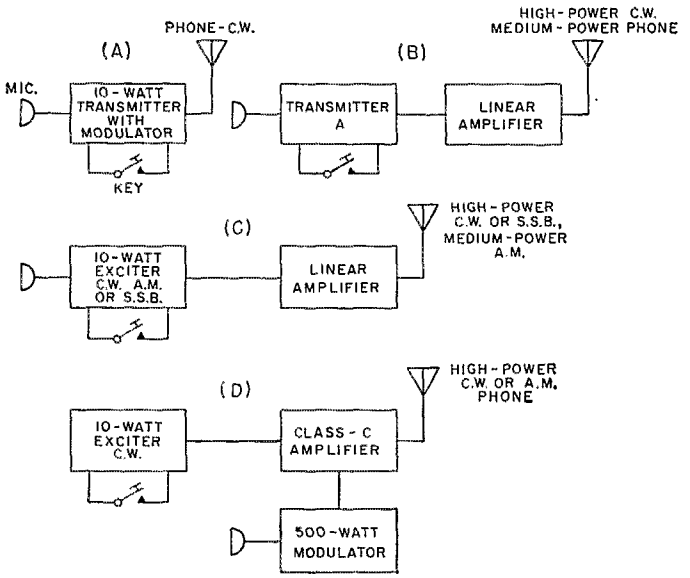


Fig. 1 — Some ways to increase power in a v.h.f. station. Transmitter A is a typical commercial packaged unit, complete with modulator and power supply. Adding a linear amplifier, B, can give up to 300-watts output on a.m. phone, or 750-watts output on c.w. The sideband exciter, C, usually also makes provision for c.w. and a.m., so it combines well with a linear amplifier for high power on s.s.b. or c.w., and medium power on a.m. phone. A small r.f. unit, D, is used to drive a Class-C amplifier for high-efficiency c.w. Addition of a modulator is required for high-efficiency a.m. phone.

giving high power on c.w. and s.s.b., and medium power on a.m. phone.

If the exciter is a general-purpose r.f. unit, as most *QST* and *Handbook* items are, since this is an economical approach for the home constructor, the following amplifier usually runs Class C. The example shown in 4D yields high efficiency and the maximum power output that can be generated legally, if one wants it. A modulator is needed for voice operation. It should have a rated power output equal to half the final stage power input.

An approach you may not have thought of, frequency modulation, offers a very simple route to high power, and it has one overpowering advantage for the city dweller: it practically eliminates TVI problems associated with all other voice modes.

At W1HDQ we've found it useful to combine all these. Years ago we decided that 200 watts of audio was all we'd ever have, though we've had kilowatt capability on c.w. for a long time. Going to the 500 watts of audio needed to modulate a kilowatt input would have involved too much investment, taken up too much space, and added too much back-breaking weight to look attractive as a means of getting another 3 or 4 db. of signal. A few weeks ago the failure of our 25-year-old modulation transformer forced us into a decision that we should have made long ago. The heavy iron modulator is retired at last. The amplifiers for 6 and 2 recently described[2] are now used most of the time as linears, on sideband and a.m. An easily-made adjustment of operating conditions gives us a high-efficiency c.w. kilowatt. We've been renewing our long-standing acquaintance with f.m., particularly on 220 and 432 Mc. The old speech amplifier is now coupled into the screen circuit of our VXO[3] for this purpose. Only a tiny variation of the crystal oscillator screen voltage gives all the deviation needed for 144 Mc. and higher bands. Nothing could be much simpler (see Fig. 2).

Making the Linear Pay Off

It is no small wonder that the linear amplifier appears attractive to the neophyte looking for his first step up the v.h.f. power ladder. At first glance it seems almost too good to be true. A Class AB_1 linear, the type most often used, requires *no driving power at all.* Class AB_1 is operation without the amplifier drawing grid current at any time. With the amplifier consuming no power from the driver stage, only a mere handful of exciter is needed. You could use a one-watt transistor rig, and have output to spare.

This applies whether the amplifier runs 100 watts input or 1000, so it can be seen that the linear is most attractive in the high-power bracket. The inevitable price to be paid is low efficiency. Thus there is hardly any point in building a linear for less than about 200 to 300 watts input: you won't get enough step-up in power to make the project worthwhile. And since any amplifier is a fairly expensive undertaking, it may be well to build it for kilowatt capability, even if you don't expect to push it that far right away. We run our February *QST* linears at about 300 watts input most of the time. At this level they deliver about 100 watts to the antenna — no mean signal on a v.h.f. band. There is plenty in reserve when we need it, and the final tubes hardly know they're working.

As its name implies, a linear amplifier is one which reproduces the wave form of its driver stage exactly, but at higher power level. This neat trick requires considerable attention to details. Everything has to be *right*, or the signal

[2] "Kilowatt Amplifiers for 50 and 144 Mc.," Tilton, Feb. 1964, *QST*, p. 11.

[3] "A Stable But Variable Frequency Control System for the V.H.F. Bands," Tilton, July 1963, *QST*, p. 11.

sounds terrible, and it may give other occupants of the band a bad time with spurious products. Grid bias, drive level and antenna loading are all critical. Regular use of an oscilloscope is a must. Meters alone are not enough, if you want to be sure that your signal is above reproach. Running a linear properly is quite some cut above operation of a Sixer, technically, but it *does* have advantages, and it can result in a very fine-sounding signal.

Obviously the driver stage is important in the linear picture. If we are going to amplify it in exactly its original form, the signal had better be good to start with. A distorted splattering signal fed to a linear results in more of the same; lots more! The exciter should be stable and its output stage as perfectly modulated as we can make it. Since the driver operates at very low level, this is not hard to do. If an exciter is being built especially to drive a linear, it might be well to go with a neutralized-triode output stage, with no more than about 5 watts input. A Class-A modulator employing inverse feedback and some form of output limiting would be good. Peak limiting is important, to keep the average modulation percentage high and prevent overmodulation.

The 6360 transmitters described in August 1961[4] *QST* are used as drivers occasionally at W1HDQ. The modulation characteristics of these rigs and their companion modulator have been satisfactory enough all this time, but when we examined their envelope patterns on a scope we found that the modulation did not reach 100 per cent in the negative direction. This was caused by insufficient modulation of the screen, apparently, and was corrected by bypassing the screen-dropping resistor for audio, as shown in Fig. 3. With the values given, modulation in a negative direction is limited to about 90 per cent, while it goes over 100 per cent in the positive direction. This cheap-and-easy level control pays off in high average modulation percentage without sideband splatter that would result from excessive modulation on negative peaks. The higher-than-usual screen resistor reduces the maximum output from the 6360 from 10 watts to about 6, but leaves far more than is needed for a near-kilowatt linear of the AB_1 variety.

Most v.h.f. transmitters will have a lot more output than is needed, so the drive applied to the amplifier must be reduced in some way. Detuning the driver output circuit or the amplifier grid circuit will not do, as it may leave the driver without a proper load, and impair its modulation quality. A simple solution at W1HDQ was to connect a 50-ohm dummy load parallel with the driver output. A coaxial T fitting is connected to the driver output receptacle. The dummy load is connected to one side of the T, and the amplifier grid input to the other. The amplifier grid circuit still must be detuned slightly to avoid overdriving, but not enough to impair the driver modulation.

Driver output has also been reduced by taking the 6360 plate and screen voltage from a tap on a bleeder on the power supply. Running the tap voltage down to 100 lowered the 6360 input to 2.5 watts, and still more than enough drive was available to induce some "flat-topping" on the monitor scope.

Some Tips on Linear Adjustment

The Heath Monitor Scope, Model HO-10,[5] is ideal for use with a v.h.f. linear, as it may be left connected to the transmission line for continuous monitoring. Some modification may be necessary for effective use of this scope on 144 Mc., though it works nicely on 50 Mc. and lower bands as is. Two coaxial receptacles of the SO-239 type are mounted on the back of the scope, with their inner terminals joined by a wire about 1½ inches long. The transmitter is connected to one receptacle and the antenna coax to the other. The unshielded wire inside the scope causes an appreciable impedance bump in a 144-Mc. line. This may be corrected by connecting a coaxial T fitting to one of the terminals, and using its two arms to make the above connections from transmitter to antenna line. Internal scope connections and functions remain intact, and the impedance bump is held to manageable proportions.

The scope, milliammeters in the grid, screen and plate circuits of the amplifier, and a power-indicating device in the coaxial line are useful in setting up the linear for maximum effectiveness. The power meter will tell you if you are getting all you should from the amplifier. If you're getting too much, the scope will tell you

[4] "Two-Band Station for the V.H.F. Beginner," Part II, Aug. 1961, *QST;* similar circuit and r.f. layout in 1963 and 1964 ARRL *Handbook*.

[5] "The Heathkit Monitor Scope," Recent Equipment, Dec. 1963, *QST*, p. 58.

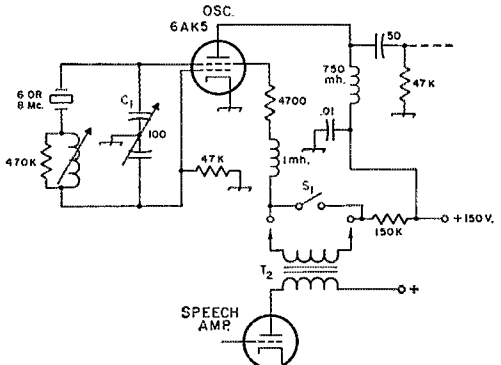


Fig. 2—Method of connection of a speech amplifier to modulate the screen voltage of a crystal oscillator for f.m. The circuit shown is the VXO described in July 1963, *QST*, but any pentode crystal oscillator may be used. The transformer T_2 is the driver transformer in the author's modulator, but it can be replaced by a carbon microphone transformer. Only the transformer, microphone and a battery would be needed in this case, as only a very small audio voltage is needed for narrowband f.m. The switch S_1 is closed for modes other than f.m.

The meters are necessary to assure operation at both safe and optimum conditions.

The tube manufacturers' data sheets give typical operating conditions for various classes of service, usually including a.m. linear. These are the best guides available, and you'll do well to follow them closely, especially when just learning your way around with a linear. They do not tell the whole story, however. They are merely "typical"; there may be other combinations that will work well, if you know how to read the indications your meters and scope provide. Conversely, it may be possible to radiate a less-than-admirable signal, when meter indications alone seem to be in order. You'll need that scope!

In using our 6- and 2-meter linears, we find that the plate voltage can be almost anything, provided that the amplifier is adjusted carefully whenever the plate voltage is changed. We've used all the way from 800 to 2000 volts on 4CX250Rs and Bs, and on a 4CX300A, on 50 through 432 Mc. Screen voltage should be what the sheet calls for; in our case 250 volts for Class C and 350 volts for Class AB_1. Bias should be variable and adjusted so that the tube or tubes will draw the recommended no-drive plate current. In this instance it's about 100 ma. per tube. We like to start with bias on the high side (no-drive plate current low) to be on the safe side until we get set up correctly.

With the amplifier running in this fashion, feed in enough drive to make the plate current rise and output start to appear. Tune the final plate circuit and adjust the loading control for maximum output, as indicated by the height of the scope pattern or by the power-indicating meter in the transmission line. Disregard the final plate current, so long as it is at a safe value. (Do not tune for dip; tune for maximum output.) Run up the drive now to the point where grid current just starts to show, and then back it off slightly. Readjust the plate and loading controls for maximum output. Be sure that you're putting every watt you can into the transmission line for this amount of grid drive. Maximum loading is a must for linear operation.

Now the scope comes into the act. Try modulating the driver, while watching the scope pattern. It should look just like the patterns shown in all modern editions of the *Handbook* for a properly-modulated carrier. Some typical examples are shown in Fig. 4. These are envelope patterns, which are most readily obtained with the Monitor Scope. Unmodulated carrier is shown at A. The Heath scope has a built-in tone oscillator. Using this or a steady whistle into the microphone should produce a pattern like the one at B, when the modulation level is 100 per cent. The peaks and valleys are sharp, and the valleys (negative peaks) just reach the zero line. Positive peaks are just twice the total height of the unmodulated envelope. Pattern C shows effects of excessive grid drive or too-light loading, or both. Note the flat-topping, and the lower height of the positive peaks. Extended positive-peak modulation with negative-peak limiting is shown at D. This allows a high average modulation percentage (positive peaks in excess of 100 per cent) without causing splatter. It is characteristic of the results with the 6360 driver modified as shown in Fig. 3.

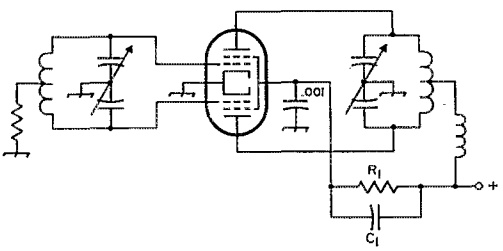


Fig. 3—Modifications made in the 6360 plate-screen circuit to obtain better modulation on negative peaks. Values of R_1 and C_1 can be adjusted for desired characteristics. Use of 50,000 ohms for R_1 (2 100K 1-watt resistors in parallel) and 0.03 μf. for C_1 (3 0.01-μf. disk ceramics in parallel) gave the modulation envelope of Fig. 4D.

The indication to strive for is the highest clean and undistorted positive peaks you can get, without flattening the troughs of the negative peaks at the zero line. If you don't have some form of negative-peak limiting, watch out for excessive modulation in that direction. That's where the splatter comes from first if audio and r.f. operation is clean otherwise. In watching your voice modulation beware of the bright flashes at the zero line of the modulation pattern that indicate over-modulation on negative voice peaks.

Practice the adjustment routine with a dummy load connected to the transmitter, and you'll soon get the hang of it. Deliberately over-drive the amplifier and see how quickly you can detect the results (pattern 4C) on the scope pattern. Observe the meter action, too. You'll see that you can't draw *any* grid current without spoiling the picture. You'll also see that when the scope picture is right the plate current stands still on all modulation peaks. The screen current will probably be just a bit negative. Output will absolutely not exceed 35 per cent of the input. If it does, you've got some meter inaccuracies, or you're cheating on the interpretation of the scope pattern. The scope is the final authority; you *have* to believe it.

Now, once over lightly again. Loading is all-important. Keep it at the maximum output you can get for a given value of grid drive. Recheck it for every frequency change or change in plate voltage. Grid current will *always* be zero. Grid drive can be lower than optimum as regards output, but never more than optimum. (You can read grid *voltage* for a reference on amount of grid drive, if you like.) The scope will tell you very clearly the minute you go too high. So will the sound of the signal, but this may be hard to determine, if your receiver overloads on your own signal. Most receivers will. Final plate current will rise with increasing grid drive, but it must stand still during modulation. If it kicks on modulation peaks, you've got distortion, and very likely splatter.

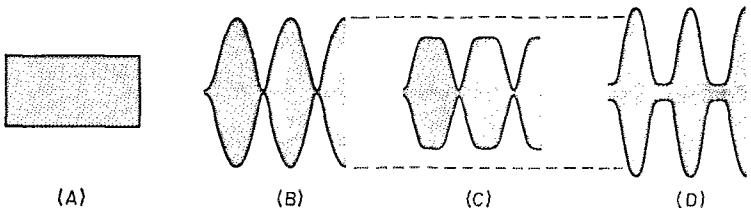


Fig. 4—Typical oscilloscope envelope patterns. Unmodulated carrier is shown at A. The single-tone pattern for 100 per cent modulation is shown at B. Peaks should rise to twice the envelope-pattern height, and valleys should just reach the center line. The effects of excessive drive or too-light loading, or both, on a linear amplifier are shown at C. Note the flat-topping and small increase in amplitude over the unmodulated envelope. Negative-peak limiting is shown at D. Valleys flatten off just before reaching the zero line, and positive peaks may extend above 100 per cent, affording high average modulation percentage without splatter.

All adjustments react on one another to some extent, and each time you change any operating condition you have to go through the routine completely again. This sounds as if you'd spend the rest of your life tuning the rig, but once you get the hang of it you can make the necessary corrections in seconds.

Using Other Modes

Now let's try f.m., c.w. or sideband. Since a.m. linear is the most critical of all, it is in order to switch to any other mode without making any adjustments, if you want to switch instantly. A good linear is more versatile than this, however. It's possible to do a lot better than the a.m. conditions on sideband, and still stay in the AB_1 mode. Efficiency on c.w. will shoot up markedly with just a slight increase in grid drive, with no other changes. Same for f.m., which is identical to c.w., as far as the tubes in the final are concerned. If you want the ultimate in c.w. or f.m. output, switch to 250 volts on the screen, and run up the grid drive some more. Drive level is very uncritical, so about all you have to watch for is to keep the final input below the kilowatt level, and avoid swinging the plate current on f.m. Readjustment of plate tuning and loading will be needed for top efficiency. Plate-modulated voice service is quite similar to the c.w. conditions, except that the maximum plate voltage permissible is lower with most tubes. Grid drive requirements are usually slightly higher for good plate modulation conditions than for c.w. or f.m., and the bias should be juggled for best modulation characteristics. Scope indications should be like Fig. 4B or 4D.

It can be seen from all this that increasing power on 6 or 2 is something of a project, especially if the linear amplifier approach is used. To do the job right requires some careful planning first, and following through with an appreciable investment in meters and test equipment. It's a step up technically and financially, as well as in power level. When you take the step you will have moved out of the turn-it-on-and-talk stage.

More power to you! QST

About Those February QST Linears

THE following information is presented to answer numerous inquiries about the 50- and 144-Mc. amplifiers (Feb. *QST*, p. 11), and to pass along helpful suggestions made regarding them.

Using other tube types. The 4CX250Rs were used because they are the latest member of this tube family. Other types of similar design should do equally well for most purposes. Tubing having the 4X prefix are glass insulated. They work as well, but may be less able to stand heavy overloads than the newer 4CX versions, which are ceramic. Of the latter, the 4CX250B is practically identical to the R version for amateur purposes. The 4CX350A is physically identical, but designed exclusively for linear-amplifier service. The 4CX300A is excellent for v.h.f. applications, but requires a special socket that would prevent interchangeability with other types.

The interchangeability aspect also ruled out other types such as the 8122, a recent addition to the family of external-anode tetrodes which also requires a socket that does not permit substitution of the 4X150A. This last type is the one most v.h.f. men use, since it is available new at moderate prices, and is on many surplus lists at bargain prices.

In using the 4X150A and others a slight difference in output capacitance is encountered. This should not be enough to require a change in tank circuit dimensions, but a simple check may be made before final assembly of the 144-Mc. pipe-and-fittings plate line. Slip the castings and pipe together without soldering, and check the tuning range with a grid-dip meter. This should be done with the sockets, tubes and tuning capacitors mounted in the chassis, and with the disk capacitor assembled. No plate or heater voltage need be applied. Have the coupling loop in place, and loaded with a 50-ohm resistor.

(*Continued on page 162*)

Tilted Verticals

Effect of Tilting on Directional Patterns

BY DALE W. COVINGTON,* K4GSX/3

THE recent use of "tilted verticals" by G3BDQ,[1] W4LKB, K4LYW, and others raises the question of what changes occur in the far-field radiation when a ¼ wave or ½ wave antenna slopes away from the normal direction. The following note specifically considers the angular variation of the E field in two planes — the vertical plane defined by the tilted antenna and its image, and the horizontal plane parallel to ground.

The patterns were derived by using an analogous V-antenna approach. Fig. 1 illustrates the geometry of the antenna system. The antenna AO is tilted at an angle θ with respect to a perfectly conducting ground. The net radiation was approximated by summing the fields from AO and its image antenna OB inclined at the same angle θ and driven by a current of opposite phase to that in AO. No change in current distribution was assumed in going from a base-fed to a center-fed antenna. Therefore using sinusoidal driving currents, E-field expressions were evaluated as a function of the angle of elevation Δ. For the present case an additional term associated with the antenna phase center enters the expressions when the antenna is not truly vertical. Thus the resulting radiation patterns plot the absolute magnitude of the relative radiation field vs Δ.

Graphical results of the vertical field computations are given in Fig. 2. In these patterns the dotted line is the angular multiplying factor of the field of a ¼-wavelength antenna while the solid line corresponds to a ½-wavelength antenna. Four angles of θ were considered; namely, 90, 75, 60, and 45 degrees. Note that only half of the pattern is shown since the field is symmetric about the normal in the vertical plane.

Radiation in the horizontal plane was found to be essentially omnidirectional regardless of the tilt. There was a slight increase in radiation along the GOF direction. The table below gives the maximum per cent departure of the radiation from a circular pattern drawn through the average of the extremum values.

	Per cent Deviation			
Tilt Angle →	90	75	60	45
AO = ¼ wave	0	0.1	0.9	1.8
AO = ½ wave	0	0.8	2.6	5.9

The vertical radiation patterns clearly indicate that there is an increase of high-angle radiation as the antenna shifts away from the normal. The ¼-wave antenna in this respect is less susceptible to tilting than the ½-wave. Calculations for longer antennas reveal even more drastic increases in high-angle radiation, although the ⅝-wave antenna maintains a large percentage of radiation below 30 degrees until θ decreases below 60 degrees. For low-frequency use, tilting a vertical could permit utilization of some of the net gain of the ½-wave vertical over the ¼-wave while still achieving good local coverage and a considerable reduction in tower-support height. At the higher frequencies θ less than 70

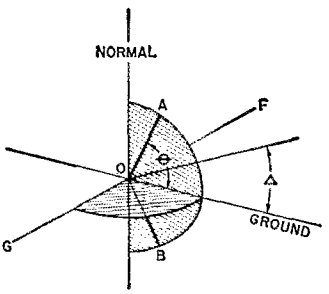


Fig. 1 — Antenna coordinate system.

Antenna analysis in the literature is confined almost entirely to certain standard configurations — in the case of the dipole, to vertical and horizontal conductors. Here are some theoretical patterns for antennas tilted off vertical, a type of installation that is not uncommon in practice. They are based on the usual assumption of a perfectly-conducting ground.

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[1] Heys, "A Grounded Semi-Vertical Aerial for the L. F. Bands." *RSGB Bulletin*, Feb. 1964.

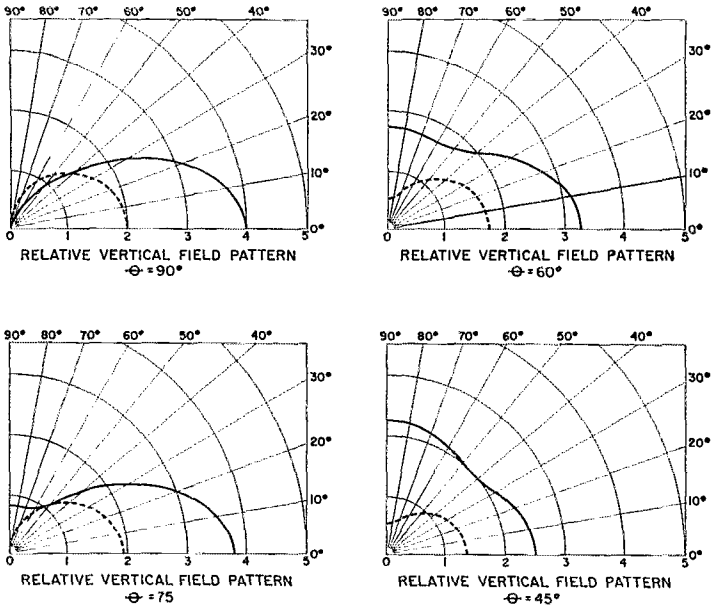
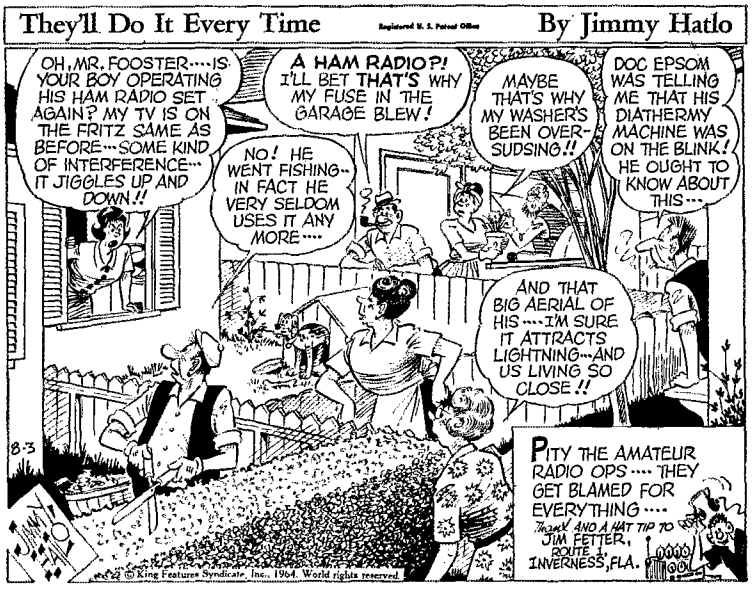


Fig. 2—Vertical field patterns for antennas having no tilt (90 degrees) and tilts of 75, 60, and 45 degrees from the horizontal. Dashed pattern, ¼-wavelength antenna; solid pattern, ½-wavelength antenna.

degrees or so would affect DX capabilities. For example, at an angle of 10 degrees the field of a ½-wave vertical is 3.7 db. greater than the field of a ½ wave at 45 degrees fed by the same drive current.

Comparisons between the fields of the various antenna configurations for a constant input power must of course involve the inverse square root of the sum of the radiation resistance and any loss resistance. The radiation resistance calculation is rather sticky, involving the antenna length, θ, and a number of mathematical approximations of questionable accuracy. In general however, the expected decrease of radiation resistance as θ decreases would tend to cancel the corresponding reduction of the angular multiplying factor. Thus for the same *power* input, the net change in field strength would be somewhat more gradual than the patterns indicate. QST



A tip of the ARRL hat to famed cartoonist, Jimmy Hatlo for so effectively illustrating wild neighborhood rumors which often plague amateurs. (© King Features Syndicate, Inc.)

Organizing Your Local Emergency Corps

In April, May, June and August **QST**, *we have discussed some of the basic principles and described some amateur radio organizations for public service. Starting with this issue, we hope to deal with the mechanics of performing public service in the name of amateur radio. In other words, now that we have laid the groundwork, let's get down to some practical procedures.*

THE Amateur Radio Emergency Corps is the basic unit of organization for amateur radio public service at local level. Local level is where we all are, regardless of whatever other levels some of us may have to deal with, so it is most important that all organization start here.

Sad to say, many of our most important areas are either poorly organized or not organized at all in either the AREC (see May *QST*) or RACES (see August *QST*). At this writing, we have in the neighborhood of 1400 appointed ARRL emergency coordinators, and an estimated 34,000 AREC members at this important local level. This is a beginning, and that's about *all* it is. It is also a mere statistic which does not take into account some of the imponderables such as how active they are, their distribution and their efficiency — things you cannot set down in quantitative terms. We need *more* ECs, more *good* ones, and more AREC members with vigor and enthusiasm to back them up.

So, Let's Go . . .

How about it? Do we get going?

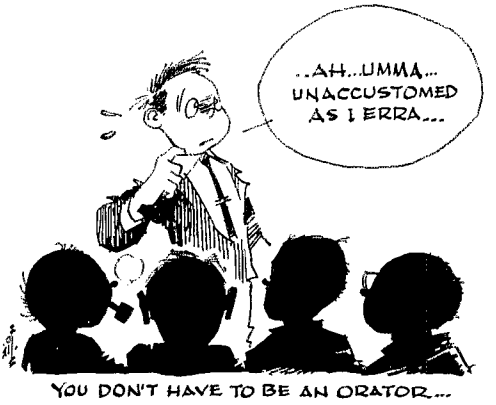
We plan, in this article, to give you a step by step procedure on how to go about organizing AREC locally, presuming it is not already organized. In any case, it will give you some idea how you should be set up.

Of course, circumstances vary cases. However we tell you it should be done, there are going to be a lot of "ifs." We can't possibly cover all of them, so we won't try to cover *any* of them, and we'll even avoid using the word "if" — if we can, that is.

Okay? Now, let's take a look.

Most average-size communities have an amateur radio club, some of them several. Club interests vary, but we have yet to see one without at least a small segment interested in public service work. The local club is the ideal starting point for organization. Once the subject of public service is brought up at a meeting there are few members who are going to say they are against it. The result will probably be that a committee will be set up to study the matter and recommend procedures for implementation.

Let's get something straight right at the outset. We have already said that the club is the ideal vehicle to get things started, but this doesn't mean the club runs the AREC organization. Public service is the job of *every* amateur, regardless of whether he belongs to your club or to ARRL or to your church. Make this a basic guiding rule — all amateurs are invited to participate.



YOU DON'T HAVE TO BE AN ORATOR...

Let's Call a Meeting

Along those lines, one of the committee's first and biggest jobs is to get a late copy of the call book and go through it to get the call, name and address of every amateur in whatever area is concerned — let's say your town. Set up a mass meeting of local amateurs, and send out cards notifying every amateur in town about it and what it is for. Depending on the size of your town or the area being covered, you may be able to use the high school or a junior high or grammar school auditorium, a church, a lodge hall or, in some cases, even a private home. Our experience has been that you can plan on about 25% of the amateurs notified to attend, with perhaps a few more notifying you that they are interested but cannot attend that particular night — and by the way, it's a good idea to suggest this on the card.

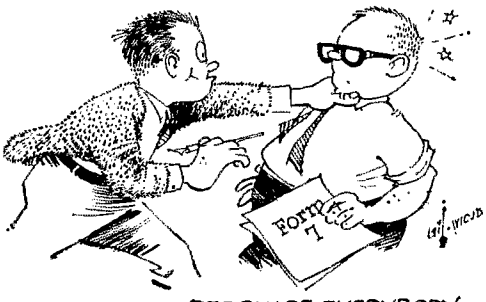
All right, you have the group before you, palpitatingly eager to hear your words of wisdom. What do you tell them?

"Ladies and gentlemen," you begin, "my name is Joe Doaks, W9XYZ. I have been appointed by the Podunk Amateur Radio Club as chairman of a committee to organize here in Podunk a unit of the Amateur Radio Emergency

*National Emergency Coordinator, ARRL.

The Nuts and Bolts of Rallying Local Amateurs to Public Service

BY GEORGE HART,* W1NJM



PERSUADE EVERYBODY TO JOIN UP

Corps, a division of the Amateur Radio Public Service Corps. This meeting is the first step in the process."

Then you go on to explain just what the AREC is and how it works and why it is needed, as per the article in May *QST*. You don't have to be an orator. Just talk to them informally, as you would in casual conversation. The less formal and the more chatty and down to earth the approach, the better. Worry less about the form of presentation and more about telling them exactly what gives.

Once you have introduced the subject, the first item on the agenda should be the selection of an emergency coordinator. This is something that should be given some thought, but on the other hand it is usually better to get it done while you have them all together for the first time. A large turnout at the first meeting is not always an indication of widespread interest: a lot of them are just curious and may have no intention of active participation. Some may be just plain hecklers. Getting them to have a part in the actual selection of the EC just might strike the sparks that ignite their interest.

What to do! Decisions, decisions! Again, it depends on your assessment of the local situation. In most cases, we would say, get it done at the first meeting if possible. The selection of EC can be by vote, by acclamation or, if (oops!) you can get away with it, simply by saying that the club has decided to recommend Dick Roe, K9XYZ. Whatever you do, don't let them stew about it for a few weeks, so that the pot can simmer down and cool off.

Selecting an EC, of course, doesn't automatically *make* him the EC. The SCM (Section Communications Manager, elected every two years by ARRL full members of the section) has to do that, and many SCMs act on such matters only on recommendation of their SECs (Section Emergency Coordinator, who is also appointed by the SCM). The EC selected at the meeting should be endorsed by the club and recommended to the SEC for appointment as ARRL emergency coordinator of the town.

Chances are you will find section officials delighted to have such a recommendation of an amateur selected by all the other amateurs in the area for this job.

Who Can Be EC?

While any licensed amateur can sign up in the AREC, the EC is an ARRL official in the leadership category and works closely with other ARRL officials, elected and appointed, and with the headquarters staff. His duties encompass all amateur bands and all amateurs within his area of jurisdiction. He must therefore be an amateur of conditional class or higher and he must be an ARRL member.

The above is the answer to the question, "Who *may* be EC?" Who *can* be EC depends a lot on the individual, the crew of amateurs he has to deal with, and the local situation he faces. We have talked before about the qualities of leadership, and about other characteristics which make certain amateurs outstanding but not necessarily good leaders. It is very difficult to balance the factors of popularity and ability to come up with the best combination of both — for the man with the popularity may not have the necessary ability, and the man with the ability may not be popular. *Both* qualities are needed in an EC, but that of ability is by far the more important, and by far the most often neglected — because an EC with ability will be able to delegate to qualified assistants those functions which require volubility, aggressiveness and extroversion, whereas an EC having only the latter qualities will not have enough depth of perception to delegate.

In the end, you will recommend the candidate who is available. Only when there is a field to choose from can you afford the luxury of applying axioms of leadership to the choice.

Signing Them Up

Before that first meeting breaks up, trot out those AREC registration blanks that you got from headquarters and have everybody fill one out. The new prospective EC can use them to good effect in getting his new AREC organization under way. Don't let anybody get away; once they are in there, barricade the doors until the meeting is over and they have all registered. At least, then, you will have their names and ad-

dresses on paper and can keep heckling them to be active — even those who only came out of curiosity.

Making the Rounds

While the appointment is being processed through section organizational channels, the prospective EC ought to start making the rounds of contacts. Preliminarily, this may be just by way of introduction, because the EC can only talk about plans and not about accomplishments. It will also assist him in getting some idea of the requirements of to-be-served groups, agencies, organizations and commercial concerns about town. To name a few: civil defense, Red Cross, Salvation Army, police and fire departments, newspapers, TV and radio stations, utilities companies, any large industrial concerns in town and officials of lodges and other civic groups. The more people you know, the wider your circle of contacts, the more will know about you and what you and your AREC group are trying to do. Try to get to talk to the head man personally. Be courteous, respectful, brief and concise, but at the same time forceful and vigorous. Don't be apologetic, but don't be "pushy" or arrogant. Sometimes you may find it difficult to get to see the head man. In this case, always settle for a lesser light, but not without first doing your darndest to talk with the boss himself. When you are finally granted an audience with someone, say something like this: "Mr. Zilch, my name is Dick Roe. I'm a licensed amateur radio operator. The amateurs of this town are getting together to form a unit of the Amateur Radio Emergency Corps, a division of a national organization called the Amateur Radio Public Service Corps. My title is emergency coordinator. Here's one of our decals, which you will soon start seeing on cars around town.

"Mr. Zilch, we are going all out to set up facilities to provide emergency radio communications in the event of any emergency. My main purpose in coming here is just to meet you and let you know what we are up to, so you will remember us. Also, if you wish, we can discuss any of your possible emergency communications needs. It need cost you nothing. We are doing it for the community and for amateur radio, and our own satisfaction."

Making the rounds and maintaining official contact is an important part of the EC's job. He is, in effect, a salesman, but with one essential difference — what he is selling won't cost his "customer" any money, and that makes the selling job a whole lot easier. Oh, he'll get the brush-off often enough, but persistence pays off.

The Planning Committee

Eventually, the EC appointment is made official, the SCM sends the certificate, headquarters sends an initial set of supplies and Dick fills in the requisition form for more of needed items. What sort of items? Oh, AREC registration forms and membership cards (the recruiting campaign is continuous), reporting forms, decals, assistant EC certificates, emergency and operating manuals and many others, all listed on the Form 29 requisition.

Don't forget, the EC still has all these AREC registration forms he collected at the mass meeting. Now is the time to look them over, divide them into interest groups, band groups and any other groupings that seem appropriate and start conjuring up some kind of a tentative plan of action. By the time the supplies arrive, or maybe even before (headquarters is *so* slow, sometimes!), the EC will have decided how many assistants he needs, and for what.

In a large AREC (say a hundred members or more) the EC will probably want to designate a v.h.f. assistant, a 75-meter assistant, a mobile assistant, Red Cross and c.d. assistants (the latter might well be or become the RACES radio officer), a public relations assistant and perhaps a general assistant to help him keep track of things. The EC usually doesn't do all the work; it's too big and too important a job.

The EC and his assistants form the local AREC Planning Committee. This committee now meets, considers the contacts the EC has made, divides up the AREC group among them according to their interests as expressed on their Forms 7, starts work on a comprehensive AREC community plan (see page 33, May *QST*) and in general "gets the show on the road."

After that, things start happening. The assistant-EC-v.h.f. gets nets started on 6 and 2 meters, using novice and technician operators liberally. Nets are started on other bands as feasible, usually ten and 75 meters. These local nets are set up mainly as "intercom" nets to handle intra-area (county, city, burg, hamlet or whatever) communications. The assistant-EC-civil-defense camps at the doorstep of the c.d. director to get RACES started. The assistant-EC-public-relations writes to newspapers and other publications, informing them of the formation of the AREC, division of ARPSC, arranges for radio and TV interviews, and in general noises it around that the amateurs locally are on the ball. The EC himself makes the rounds again, letting officials of all to-be-served agencies (those who showed an

interest the first time, and a few important ones who were cool) know what is being done for them.

The Planning Committee meets from time to time to review progress, to discuss problems, to amend the plan and to formulate new plans. In the best-organized and led AREC group, all will not be peaches and cream. There will be personality problems, equipment problems, problems caused by obstreperous officials. Some of the assistant ECs themselves will be problems. Constant attention is required to keep things on an even keel, to devote primary action to the objective of an effective emergency communications organization and not to be side-tracked by individuals or cliques. The EC has to be a big man — big in experience, know-how, persuasiveness, diplomacy and the ability to pick capable people to whom to delegate functions.

Equipment and Funds

The AREC community plan might well call for unit installations at the Red Cross, at c.d. headquarters, at police and fire stations and hospitals and broadcast stations and newspapers and many other points. Where does the equipment come from? Who pays for it? Who maintains it and pays for the maintenance?

In most AREC groups the agencies served, if they are served well, are ready to give with the equipment, facilities and sometimes funds with which to purchase what is needed. However, the AREC group that depends on such equipment and facilities, or that demands it, is in for some trouble — because when some agency gives you something, they are going to want to have something to say about how it is used, by whom and under what circumstances. It is wisest to plan to do the best job that can be done with whatever equipment and facilities you can muster from your own group. Served agencies will usually "take the hint" in the event the services your group offers fall below their requirements. Just one precaution: don't let any single agency monopolize the services of your AREC!

Activity

An AREC group that exists on paper only, no matter how well organized, is not going to be worth a hoot in an emergency. It must be active on the air during normal times. There are plenty of activities in which the group can participate, and your EC and his Planning Committee of assistants will be (we hope) calling on you to take part in tests and drills and exercises simulating emergency conditions or performing some routine civic function for practice purposes. Some of them can be a lot of fun and leave the participant with a very real sense of satisfaction. When your EC calls you out, inconvenience yourself, if necessary, to take part.

Form 7 Anyone?

AREC registration, Form 7, is sent out with various ARRL membership mailings, and in general these forms are scattered all over the place. You will see them at conventions, hamfests, club meetings and in your mailbox. We'll be glad to send you one or a supply of them if you have use for them — that is, for AREC registration, not for doilies to put your coffee cup on. (They are no good for scratch paper, because they are printed on both sides.) No need to wait for the matter to come up at your club meeting — although you can always *bring* it up, you know! Your Form 7 can go to your section emergency coordinator or your SCM, direct. When enough of them are received, an EC will be appointed and he'll inherit *all* the forms.

The point is this: don't sit on your duff squawking about not getting any action. The best way to get some is to *take* some! QST

OPERATOR OF THE MONTH

Have you thought back over the past month and picked out your nomination for "operator of the month?" Details appeared on page 35, August *QST*. Let's hear from *you*.

During July the following additional amateurs were nominated in recognition of their extra skills and courtesies:

W1EEE
W1EVN
K1WJD
WB2FGR
W2ZRC
K4CC
K6VVA
K7USZ
K8KMQ
WA9CCP
ZL1CA

September 1939

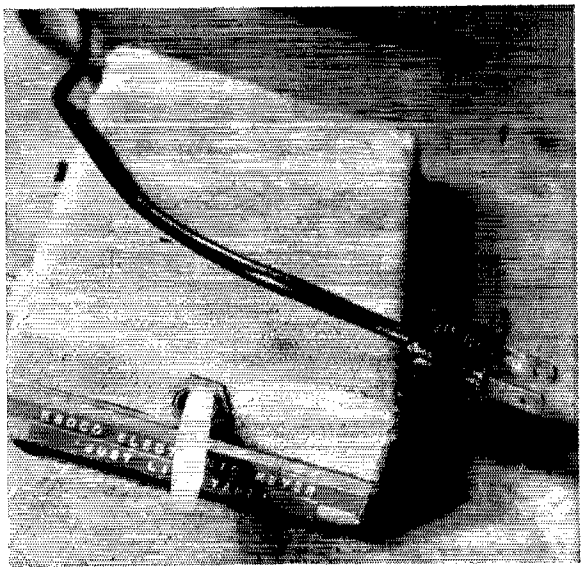
W9AQS cited several "case histories" of amateur interference with broadcast reception.

. . . W6AM reported on the role amateur radio played in the Treasure Island to Honolulu yacht race. The *Contender* came in first, and all news reports and dispatches from the ship during the race were handled by amateur radio.

. . . A u.h.f. Field Day and relay were announced and scheduled to take place September 9 and 10.

. . . W1COO reported on the story behind a 92-mile record on 255 Mc. from Mount Washington.

. . . Technical articles included W1EAO's hetrofil, an aid to selectivity; data on an e.c.o. with assured crystal performance by W6CUH; W9ANZ's portable-emergency utility transmitter; and some new ideas in transmitter design and construction by W1LJI. QST



This unusual electronic key uses a neon-bulb relaxation oscillator as the timing element. The unit is simple and inexpensive to build.

The complete Neon-Bulb Keyer. The operating control is a standard lever-type switch.

The Neon-Bulb Keyer

BY HARRY J. GENSLER, JR.,* K8OCO

TODAY there are many devices available to do the simple job of grounding the key jack of a transmitter at selected intervals. Each of these devices involves more or less complexity, time, space and money and, in return, provides ease, speed, precision and enjoyment in varying degrees to the c.w. operator. It is the purpose of this article to describe a keyer which has a good and practical balance of these factors.

The Neon-Bulb Keyer is simple in circuitry and easy to build. It uses a tube and a relay, but is as compact as most transistor keyers. Voltage regulation, a side-tone monitor, and a keying lever are built in. The dash-dot-space relationship is constant over the speed range, and characters are self-completing. Parts for the keyer should not run over $20.

* 15335 St. Marys, Detroit, Michigan 48227

The Pulse Oscillator

Neon bulbs have interesting properties that make them useful in many applications, such as the relaxation or saw-tooth oscillator shown in Fig. 1A. After voltage has been applied to the circuit, the capacitor voltage will rise to a value approaching the source voltage (E_1 in Fig. 2). If the capacitor voltage is greater than E_2, the voltage required to ionize the neon tube (approximately 90 volts for an NE-2), the bulb will fire at the instant the switch is closed (T_1). The capacitor will be discharged immediately through the low resistance of the neon bulb to a voltage E_3 that will no longer maintain ionization (approximately 70 volts for an NE-2). The neon bulb will extinguish, opening the discharge circuit. The capacitor voltage will rise again to the ionizing voltage at T_3, and the process will be

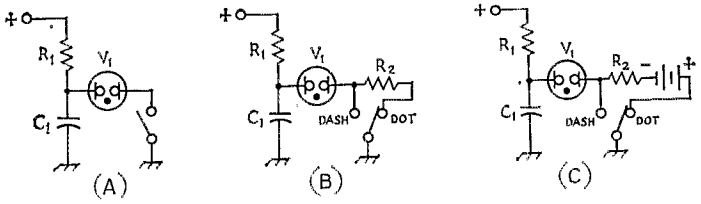


Fig. 1—Sawtooth oscillator circuits discussed in the text. A shows the basic circuit for dashes, B the basic circuit for shortening the pulses to produce dots, and C the dot circuit with corrective biasing voltage. Component labels are for text-reference purposes.

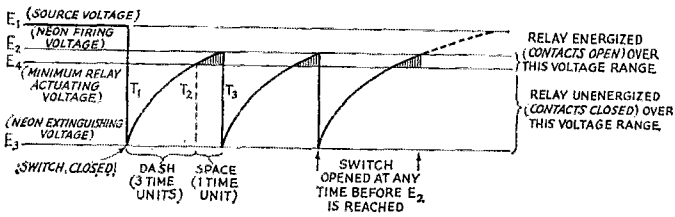


Fig. 2—Three characteristic dash pulses produced by the circuit of Fig. 1A. The shaded areas indicate time over which the keying relay is energized to open the keyed circuit for spaces.

repeated as long as the switch is held closed. The number of pulses occurring in any given length of time can be controlled by a change in R_1 or C_1.

Dash Formation

In the Neon-Bulb Keyer, the variations in capacitor voltage are applied to the grid of a d.c. amplifier with a back-contact relay in its plate circuit This is done in such a manner that the relay will be energized to *open* the external keyed circuit only at capacitor voltages prevailing over the last quarter of the charging cycle (T_2 to T_3), when the capacitor voltage exceeds E_4. Over the first three quarters of the cycle (T_1 to T_2), when the capacitor voltage is less than E_4, the relay will not operate and the external circuit will be closed. The adjustment to obtain this proportion is made by proper setting of a voltage divider at the grid of the relay-control tube.

Thus the external circuit is closed for three units of time and open one unit of time for each cycle, forming a dash and following space in correct proportion. Speed can be controlled by varying the charging resistance R_1. The switch (key lever) can be opened at any time after T_1 and the dash and its space will be completed automatically, since the neon bulb has already opened the discharge circuit and will not close it again until the capacitor voltage has risen to the neon-firing voltage E_2, when the dash and its space will have been completed. For the same reason, the key lever can be opened and closed again prior to T_3 without curtailing the space.

Making Dots

The formation of dots is a little more complicated. Referring to Fig. 3, it can be seen that by increasing the capacitor voltage at which the neon bulb extinguishes (from E_3 to E_3'), the neon bulb will extinguish and the capacitor will start recharging at a higher point on the charging curve than in the case of the dash (shown in dotted lines). Thus the time required to reach the neon-bulb firing voltage is shortened so as to produce shorter periods of relay-off (contacts-closed) time. This shift in voltage can be accomplished by switching

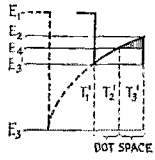
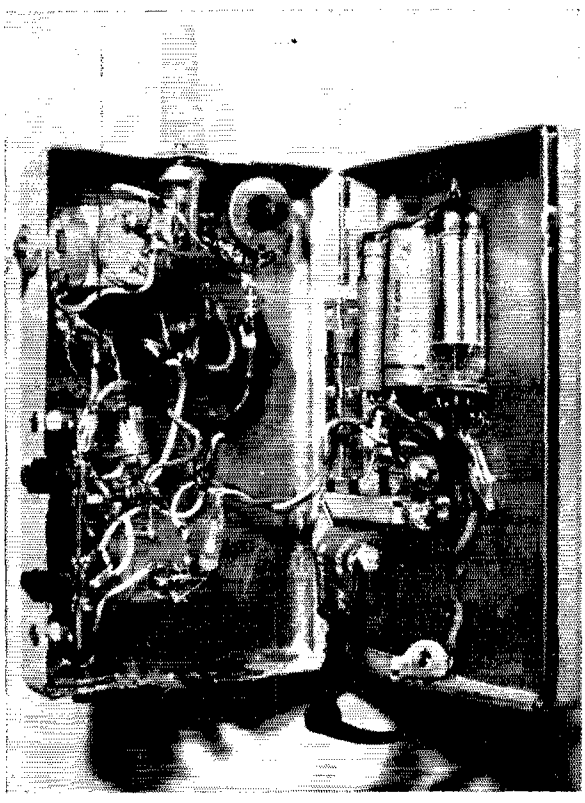


Fig. 3—This graph shows the desired dot pulse superimposed on the dash pulse for comparison. Because of the series resistance (Fig. 1B), the neon bulb extinguishes at E_3', rather than at E_3 as in the case of the dash. The charge characteristic then retraces only the last portion of the dash curve (shown in dotted lines).



Interior view of K8OCO's electronic key. Power-supply components are mounted in the lid of the hinged box, to the right.

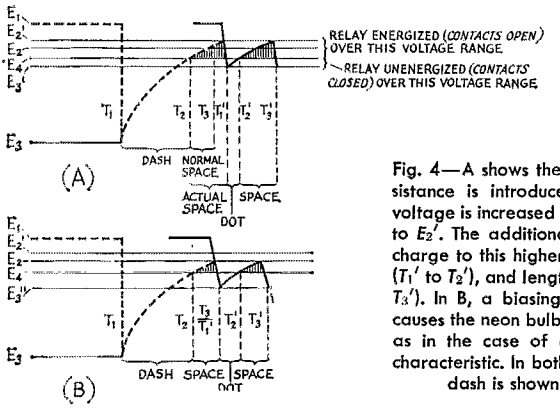


Fig. 4—A shows the actual dot characteristic when a resistance is introduced to shorten the pulse. The firing voltage is increased from the normal E_2 (with no resistance) to E_2'. The additional time required for the capacitor to charge to this higher voltage results in shortening the dot (T_1' to T_2'), and lengthening the space (T_2 to T_1', and T_2' to T_3'). In B, a biasing voltage has been introduced which causes the neon bulb to fire at the same capacitor voltage as in the case of dashes, resulting in the desired dot characteristic. In both A and B, the curve for a preceding dash is shown in dotted lines for comparison.

a resistor in series with the neon bulb when the lever is thrown to the dot position, as shown in Fig. 1B. By adjustment of the resistance, an extinguishing point may be selected that will result in a dot and the following space in proper proportion to the dash length.

Unfortunately, the insertion of the resistance increases the neon-bulb firing voltage slightly (to E_2' in Fig. 4 — approximately 0.8 volt for an NE-2). However, the time required for the capacitor to acquire this additional charge (T_3 to T_1') is sufficient to cause a significant lengthening of the space and clipping of the dot as indicated in Fig. 4A. To offset this, a small voltage is connected in series with the resistance, as shown in Fig. 1C. This voltage is adjusted to compensate exactly for the increase in firing voltage so that the neon bulb will fire at the same *capacitor* voltage (the voltage actuating the relay-control tube) as it does in the dash condition. A combination of resistance and voltage can be found that will produce the correct proportioning of the dot and its space in relation to the dash (1:1:3), as indicated in Fig. 4B. Addition of the resistance also introduces a small time factor in the discharge characteristic; the voltage does not fall in a perfectly vertical line as in the case of the dash. This delay is also compensated for by adjustment of the resistance and voltage.

The Keyer Circuit

The complete circuit of the keyer is shown in Fig. 5. V_1 is the sawtooth oscillator. C_1 (C_2 may be switched in parallel for slower speeds) is the capacitor, and the charging resistance is made up of R_1 and R_2. V_2 is the controlled triode with

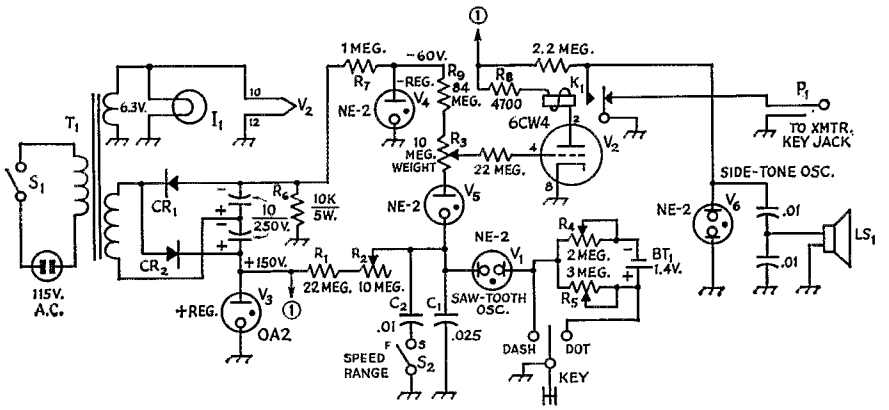


Fig. 5—Circuit of the Neon-Bulb Keyer. Capacitances are in μf., resistances are in ohms if not specified. Except where polarity indicates electrolytic, capacitors should be high-quality paper types with a rating of 200 volts or more. Unless specified, fixed resistors are ½-watt composition. Component labels not found below are for text-reference purposes.

BT_1—1.4-volt mercury cell.
CR_1, CR_2—Silicon or selenium diode, 400 p.i.v., 50 ma. or more.
I_1—6-volt dial lamp; see text for placement.
K_1—S.p.d.t. high-speed sensitive relay, 5 ma. or less, 5000 to 10,000 ohms (Lafayette F-322).
LS_1—High-impedance crystal headphone.
P_1—Key plug.
R_2, R_3, R_4, R_5—Linear control.
R_8—For limiting plate dissipation of 6CW4; resistance should be 10,000 ohms minus coil resistance of K_1. Value of 4700 ohms is suitable for relay specified.
R_9—Made up of two 22-megohm and two 20-megohm resistors in series.
S_1, S_2—S.p.s.t. miniature toggle.
T_1—Power transformer: 125 volts, 15 ma., 6.3 volts, 0.6 amp. (Stancor PS-8415).
V_1, V_5—Selected; see text.

the back-contact relay K_1 in its plate circuit. R_4, R_5 and the battery BT_1 are in the dot-forming circuit, the combination providing adjustment of both resistance and compensating voltage.

V_3, with its dropping resistor R_6, provides a regulated positive 155 volts for the charging circuit, for V_6, and for the plate of V_2. Neon-bulb V_4, with its dropping resistor R_7, provides a regulated negative reference voltage for the grid of V_2. V_5, another neon bulb, is part of the voltage divider supplying the signal voltage to the grid of V_2.

V_6, still another neon bulb, is in a side-tone oscillator feeding a crystal headphone which serves as a miniature loudspeaker (LS_1). It is keyed along with the transmitter by K_1.

I_1 is an important item in the circuit. It is placed close to V_1, since it was found that the firing voltage of V_1 is much more constant in the presence of light because of the photoelectric effect.[1]

CR_1 and CR_2 are in a voltage-doubling power source for the keyer.

Construction

The unit shown in the photographs was built into an old hinged jewelry box measuring 6 by 4 by 1½ inches. Power-supply components are mounted in the lid of the box. The key lever is simply an s.p.d.t. lever-type switch, with a center off position and spring return (Switchcraft Lev-R type 3033, or similar) with its cylindrical knob replaced by a Lucite paddle. The contact leaves were bent slightly to reduce the "throw" of the lever.

Placement of components is not critical aside from that of the lamp I_1, which should be mounted close to V_1 as mentioned earlier. The speed control is brought out from one side of the box; other controls are internal.

[1] In correspondence, the author calls attention to the NE-76 (5AE) as a possible improvement over the NE-2 at V1. Although this bulb is more expensive (approximately $1.00), it is pre-aged, and has closer tolerances in breakdown voltage and an additive which may make the use of I_1 unnecessary. However, the author has not as yet had the opportunity to make an actual evaluation.—*Editor*

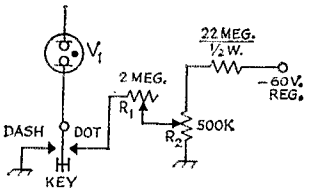


Fig. 6—Optional dot circuit to eliminate biasing battery R_1 and R_2 are linear controls.

If a remote keying lever is used, a 220-pf. capacitor should be connected from the dash-contact side of V_1 to ground to swamp out variations in cable capacitance that may upset the dot adjustment.

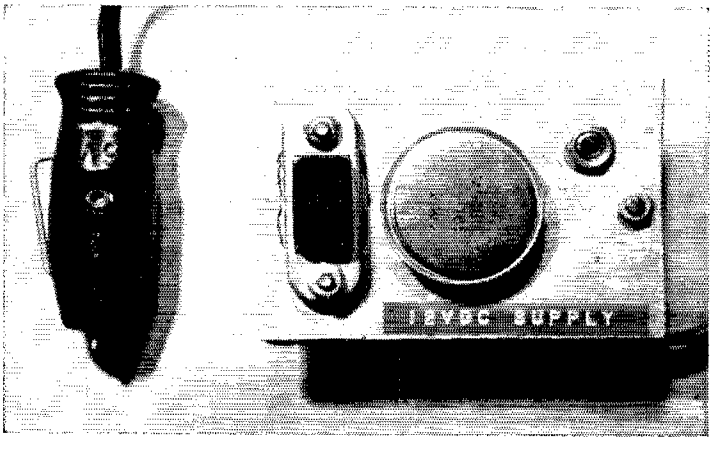
It is recommended that the high-speed but inexpensive relay listed under Fig. 5 be used. A slow-acting relay can ruin the performance of the keyer at higher speeds.

Adjustment

Place an ohmmeter across the output jack. With the lever in the dash position, adjust R_3 for a ¾-scale deflection on the ohmmeter. If this is not found possible, try a different combination of NE-2 bulbs at V_1 and V_5. At a dime each, it will not cost much to have several available to try.

With the lever in the dot position, R_2 adjusted for slow speed (high resistance at R_2), set R_5 at about 2.3 megohms, and adjust R_4 for a ½-scale deflection on the ohmmeter. Now count the dots for a period of 5 seconds, and then the dashes for the same period of time. The ratio of the numbers should be 2 to 1. If it is not, adjust R_5 a bit at a time while keeping R_4 adjusted for ½-scale deflection on the ohmmeter. Continue this adjustment until you can count twice as many dots in a given period as dashes for the same period.

Once the proper ratio is attained, it should hold across the entire speed range. To make a check at higher speeds, connect an oscilloscope with a low sweep frequency across the headphone loudspeaker, and adjust the speed (or the sweep) to obtain a pattern illustrating one dash. Then ad-



The miniature a.c.-d.c. inverter for portable use. The connector at the left fits the cigarette-lighter socket.

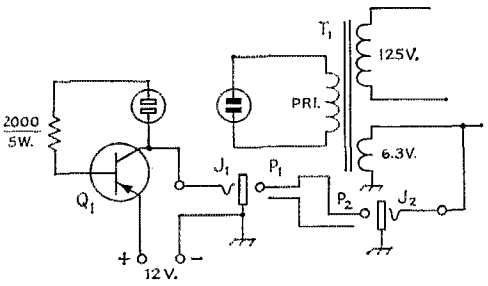


Fig. 7—Circuit of the 12-volt inverter for mobile or portable use. Resistance is in ohms. T_1 is the power transformer in the keyer unit. Its power plug goes into the outlet of the inverter. Output from the inverter is fed to the filament winding of T_1 through J_1, P_1, P_2 and J_2, which are headphone plugs and jacks. Q_1 is a 10-watt p-n-p transistor, such as the GE-4.

just R_4 and R_5 until the scope shows two dots and the ohmmeter reads half scale simultaneously.

C_1 and C_2 in Fig. 5 provide a choice of two speed ranges, C_1 alone covering the range of about 20 to 33 w.p.m. The addition of C_2 in parallel brings the range down to about 13 to 22 w.p.m. Smaller capacitances will provide higher speeds, and larger capacitances will produce slower speeds. A 0.1-μf. capacitor will bring the speed down to about 5 to 7 w.p.m. At the high end of the range, the speed is limited only by the maximum at which the relay will work reliably. The key has been tested at speeds close to 100 w.p.m. with a 0.0068-μf. capacitor. A switch (or switch position) from the arm of R_2 to ground will provide "hold" for v.f.o. setting.

Modifications

The 6CW4 was used because of its small size, but a less expensive 6AU6 also works well with the screen voltage obtained from the plus 150-volt regulator. Some other types tried were not satisfactory, so the 6AU6 is the only substitute recommended.

An optional dot circuit that has worked well in a breadboard setup is shown in Fig. 6. This modification eliminates the battery if one finds the latter objectionable.

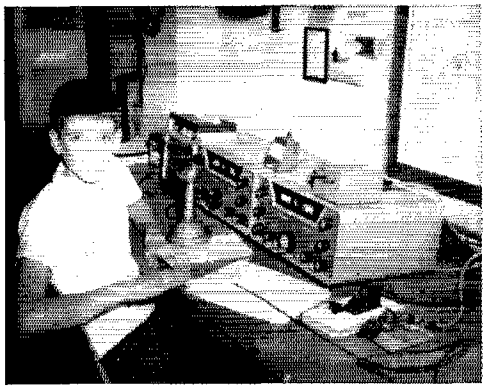
Mobile Power-Supply Adapter

Fig. 7 shows the circuit of a simple power inverter that was made to power the keyer from a 12-volt battery for mobile or Field Day use. The primary winding of the power transformer in the keyer is used as the feedback winding in a transistor oscillator circuit which feeds the filament winding of the same transformer. This arrangement produces somewhat less voltage from the 125-volt secondary, but it is still sufficient to operate the voltage regulators. The primary winding must be polarized correctly, by trial, to obtain oscillation.

The keyer has been in use now for several months and has performed with complete satisfaction under varying conditions, including a mobile trip to Florida where it was subjected to high temperature and humidity. At the home station, it has compared most favorably with one of the better commercial keyers. QST

Strays

Segments of a tape of reminiscences by Mike Caveney, VE3GG, are to be used on the program, "DXing Worldwide" heard Saturdays 1900 GMT on 11.95, 15.33 and 15.38 Mc. from WRUL beamed to Europe and the Caribbean primarily for short-wave listeners.



This is 12-year-old WA9IIH, who has a General Class license and a First Class Commercial Radiotelephone license. All through self-study, not formal classes. He must have had an incentive!

A want-ad in the Oklahoma *Times* read:

HAMS — Brand new 3 EL-Ten meter **bean** Still boxed $30. VI 2-1104

The ad might have been talking about smoked meat and a vegetable 393.7 inches long, since the whole business was under the heading, "Good Things to Eat"! — *K5SAM*

—•••—

WA8AGV wants to compile a list of hams who work in professional baseball. Groundskeepers, players, coaches, managers, front office personnel, etc., write WA8AGV, 5990 Glenwood, Boardman, Ohio.

QST ARTICLE CONTEST

As a feature of the ARRL's 50th Anniversary Year, readers are invited to become writers, and submit entries for the monthly Article Contest.

The author of the article selected by *QST*'s staff as the best each month for the remainder of 1964 will receive a $25 U. S. Savings Bond. This month's winning entry is by WA9FMQ, page 49.

Complete rules and some subject ideas appeared on page 49 of *QST* for February.

1964 VE/W Contest Announcement

September 26–27

THE Montreal Amateur Radio Club again invites all W and VE stations to participate in the 1964 VE/W Contest to be held from 2300 GMT Saturday, September 26, to 0459 GMT, September 28.

A "CQ VE" by a U.S. station alerts the VEs, while VEs try to raise Ws with a "CQ W." Exchange contact serial number, RS(T) report, and ARRL section. Yukon-N.W.T. (VE8) counts as a separate multiplier. *Example:* W4SVJ called VE7EH, who sends "W4SVJ de VE7EH NR 5 579 BC K," and W4SVJ replies with "VE7EH de W4SVJ R HR NR 7 589 GA K."

Follow the log sample shown below. Please don't write to ARRL or MARC for log forms, as they are not available. The over-all contest winner earns a handsome trophy, with certificates going to the top scorer in each ARRL section. The MARC wishes to emphasize that, "This is *not* an endurance contest. It is strictly a one-man operation, no tapes, automatic calling devices, etc. The contest was sponsored initially to foster friendly relations between American and Canadian hams and we'd like to keep it that way. Secondly, Ws are asked *not* to send self-addressed stamped envelopes for return of logs. U.S. postage cannot be sent through the Canadian Post Office as outgoing mail. You fellows in Vermont, Canal Zone, Wyoming, Idaho, Kentucky and Sac. Valley, let's get *with it* — turn in your W/VE logs."

Check the rules which follow very carefully. To be eligible your log must be in the hands of the MARC Contest Committee by November 13. Mail logs to Mrs. G. H. Webster, 1550 Erin Place, Dorval, Quebec, Canada.

Rules

1) Any *single-operator* station in the 73 ARRL Sections may participate. Yukon-N.W.T. (VE8) also counts as a separate multiplier. An amateur may enter as mobile, portable, or fixed, but in only *one* category. Multiple-operator stations are not eligible to compete.

2) All contacts must be made during the period from 2300 GMT Sept. 26 to 0459 GMT Sept. 28, with a total operating time of no more than 20 hours for each entry. Times on and off the air must be clearly shown in the log.

3) Canadians will work only amateurs in the U.S. and Possessions, and vice versa. VE/VO to-VE/VO and U.S.-to-U.S. contacts do not count. A station may be worked once on phone and once on c.w. on each frequency-band.

4) The exchange consists of a QSO number, RS or RST report, and ARRL Section. Example of W4SVJ's message to VE2NI: "VE2NI de W4SVJ NR1 579 Ga."

5) *Scoring*: Count two points for a complete exchange of information; incomplete contacts do not count (no fractional breakdown of the two points per QSO). For final score, VE/VO stations will multiply their total contact points by the number of ARRL sections worked in the U.S. and Possessions, and then by the appropriate power multiplier listed below. For final score, W/K amateurs will multiply their total contact points by the number of Canadian areas (max. of 10; VE1-VE8 plus VO and VE9), then by 6.6 (ratio of U.S.-to-Canadian Sections), then by the appropriate power multiplier, and then by a 2.5 provisional multiplier (based on the ratio of U.S.-to-Canadian log entries received in previous contests). All stations using power inputs of 30 watts or less receive a power multiplier of 2, those using from 31 through 100 watts receive a power multiplier of 1.5, and those using over 100 watts receive a power multiplier of 1.

6) Each entry must be accompanied by the following signed declaration: "I hereby state that my station was operated strictly in accordance with the rules of the contest and governmental 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) To be deemed valid, all entries must follow the form shown in the sample log and must be received no later than midnight, November 13, 1964. They should be sent to Mrs. G. H. Webster, 1550 Erin Place, Dorval, Quebec, Canada. QST

LOG, 1964, VE/W CONTEST

W4SVJ — *Call*..... C.W. — *C.W., Phone, or Both*..... Ga. — *ARRL Section*.....

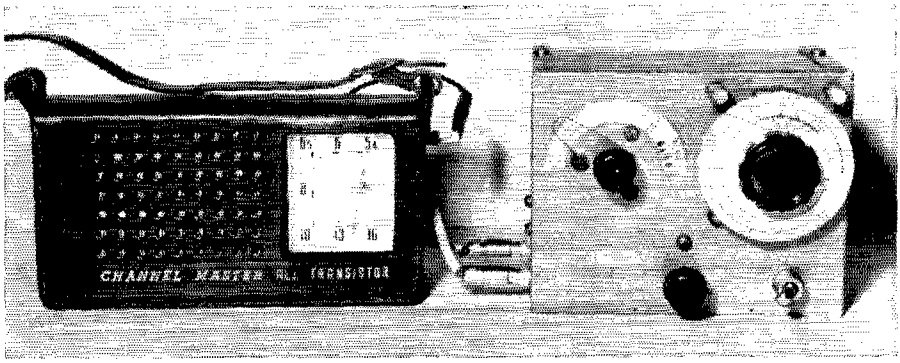
Date/Time On or Off Air (GMT)	*Time of QSO*	*NR Sent*	*My Stn.*	*RST Sent*	*My Sect.*	*Freq. Band*	*Emission*	*Power Input*	*NR Revd.*	*His Stn.*	*RST Revd.*	*His Sect.*	*New Sects. Wkd.*	*QSO Pts.*
Sept. 26														
On 2300	2300	1	W4SVJ	579	Ga.	3555	A1	75	1	VE2NI	599	QUE	1	2
"	2301	2	"	569	"	"	"	"	2	VE3BFF	579	ONT	2	2
"	2302	3	"	579	"	"	"	"	1	VE2OC	579	QUE	–	2
"	2313	4	"	559	"	7010	"	"	3	VE1EK	579	MAR	3	2
Off 2315														

Total Operating time: 15 min. Bands used: 3.5 & 7 Mc. 3 sects., 8 pts.

Claimed score: 4 QSOs × 2 (points per contact) × 3 (different sections worked) × 6.6 (section-balancing multiplier for all W/K stations) × 1.5 (power multiplier for 75 watts input × 2.5 (provisional multiplier for all W/K stations based on ratio of U. S.-to-Canadian logs previously entered) = 594.

I hereby state that my station was operated strictly in accordance with the rules of the contest and governmental 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.

Signature..... Call.....



The converter is built in a 4 × 5 × 6-inch Minibox. The r.f. tuning control (C_1) is to the left, and the oscillator control to the right. Below are the r.f. gain control (with on/off switch attached) and the toggle switch for the b.f.o. The transistor broadcast receiver is used as a fixed-tuned i.f. amplifier and audio system for the converter.

Five-Band Transistor Converter— No Band Switches

80, 40 and 20 Plus Three S.W.L. Bands

BY WILLIAM L. NORTH,* W4GEB

This converter, when used in conjunction with a transistor broadcast receiver as a fixed-tuned i.f., provides reception in several high-frequency bands. The combination makes a simple and inexpensive portable arrangement for general listening in these bands as well as the standard broadcast band.

IN SPITE of the title of this article, there is nothing really new or unusual about the transistor converter shown in the photographs. A good friend of mine[1] asked me if I would design an 80-meter converter, for phone reception only, that would work into a small transistor broadcast receiver for general portable or mobile use. A look at some of the ideas in the ARRL *Handbook*, a little arithmetic, and a couple of breadboard experiments showed that it should be possible to cover several other segments of the spectrum, in addition to the 80-meter band, without the need for coil switching or additional components. These bonus segments include the amateur 40- and 20-meter bands in addition to three short-wave broadcast bands. Since it required only a few additional parts, a b.f.o. for s.s.b. and c.w. reception was thrown in for good measure.

Fig. 1 is the circuit of the converter. The diodes CR_1 and CR_2 will be dismissed first by saying that they are there to protect the first transistor from damage by strong r.f. fields, and are not needed unless the converter is to be used in the presence of an operating transmitter.

Otherwise, the arrangement is quite conventional. Q_1 is an r.f. amplifier which feeds the mixer Q_2. These two stages cover the range of 3.5 to 15.5 Mc. by means of large variable capacitors of the broadcast-replacement type. Q_4 is the conversion oscillator. This circuit tunes over the range of 5100 to 5700 kc., producing a difference frequency of 1600 kc. in the output of the mixer when the r.f. input circuits are tuned to the 3.5- or 7-Mc. bands. The other bands are covered by making use of harmonics of the conversion oscillator, and the sum frequencies, as well as the difference frequencies, appearing in the output of the mixer, as described in the *Handbook*,[2] and listed in the accompanying chart. With any of these combinations, the mixer output frequency

* 712 Hallwood Ave., Falls Church, Virginia.

[1] George E. Sterling, W1AE.

[2] 1962, 1963 and 1964 editions; page 125.

is at 1600 kc., so any broadcast receiver may be used as a fixed-tuned i.f. amplifier and audio system by tuning it to 1600 kc.

It should be pointed out that reception in any one of the bands listed to the exclusion of the others is dependent entirely on the selectivity of the two tuned circuits preceding the mixer. Therefore it is important that these circuits have high Q and be carefully tuned. The tracking of the two circuits should be adjusted as accurately as possible. The selectivity is improved in this instance by adjusting the r.f. amplifier so that it is slightly regenerative.

Q_3 is the b.f.o., which may be turned on or off by S_1.

Construction

Construction of the unit was facilitated by the use of "tempered" Masonite for the main chassis and making the r.f./mixer, oscillator and b.f.o. sections into subassemblies mounted on perforated insulating board. If this construction is followed, "flea clips" may be used as terminals and tie points, and nearly all of the complicated wiring and assembly can be accomplished before the individual assemblies are placed in the cabinet.

The various tuned circuits should be adjusted to approximate frequency before the components are permanently installed. Typical coil dimensions are shown under Fig. 1 as a guide, but the best procedure is to wind the coils experimentally. In each circuit, the slug of the coil should be set halfway in. Then more than the suggested number of turns should be wound on the form. After connecting the coil across its associated capacitor or capacitors, the tuning range (by capacitance variation only) should be checked with a grid-dip oscillator. Turns should be added or subtracted from the coil, if necessary,

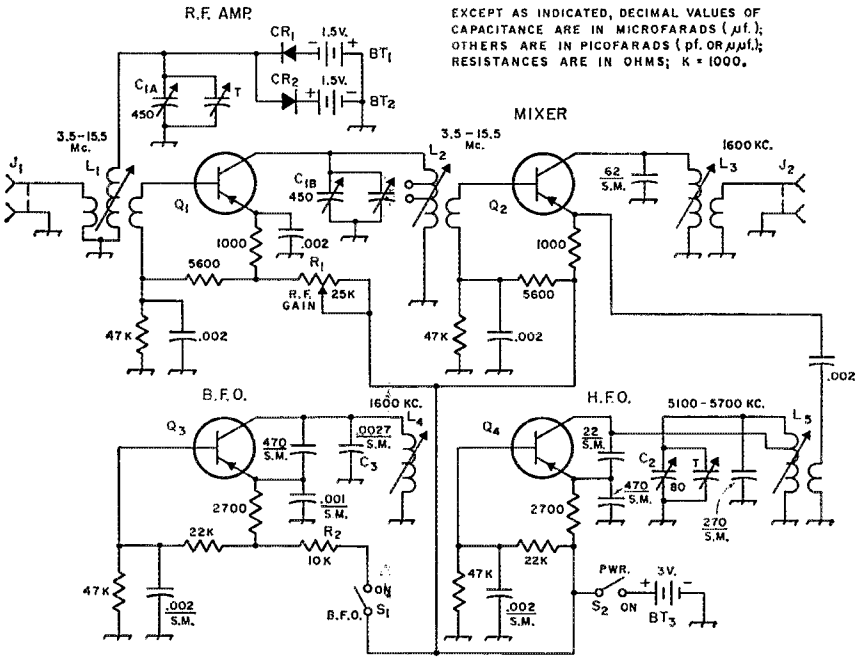


Fig. 1—Circuit of W4GEB's transistor converter. With the exception of C_3, fixed capacitors of decimal value are disk ceramic; others, including C_3, are silver mica. Resistors are ½-watt carbon.

BT_1, BT_2—1½-volt hearing-aid battery.
BT_3—3 volts, same as BT_1, two cells in series.
C_1—Dual-section broadcast-replacement-type variable (with trimmers indicated by T), maximum capacitance per section 356 to 450 pf.
C_2—Same as C_1, but having sections with maximum capacitances of 80 and 125 pf., 125-pf. section not used. This is a superheterodyne replacement.
C_3—Silver mica.
CR_1, CR_2—1N52, 1N34, or similar.
J_1, J_2—Phono connector.
L_1, L_4—20 turns No. 26 single cotton-enamel close-wound on 9/16-inch iron-slug form.
L_2—Same as L_1, tapped at ½ and ⅔ of the coil from ground.
L_3—Replacement transistor broadcast-receiver oscillator coil, slug-tuned, approx. 150 μh. (Lafayette MS-265).
L_5—Same as L_1, but 12 turns, tapped at 9th turn from ground end.

Note: With the exception of L_3, original coils were wound on surplus forms. Approximately twice the number of turns will be required for ⅜-inch ceramic forms, with L_5 tapped at approximately 18 turns from ground end. See text for adjustment with either type of form. All coupling coils have two turns wound at the ground ends of the associated coil.

Q_1—Q_4, incl.—2N1177 or 2N1180.
R_1—Linear control.
R_2—See text.
S_1—S.p.s.t. toggle switch.
S_2—S.p.s.t. attached to R_1.

Table I

Band (kc.)	*Oscillator (kc.)*
3500–4100	5100–5700 (fundamental of osc.)
6700–7300	5100–5700 (fundamental of osc.)
8600–9800	10,200–11,400 (2nd harmonic of osc.)
11,800–13,000	10,200–11,400 (2nd harmonic of osc.)
13,700–15,500	15,300–17,100 (3rd harmonic of osc.)

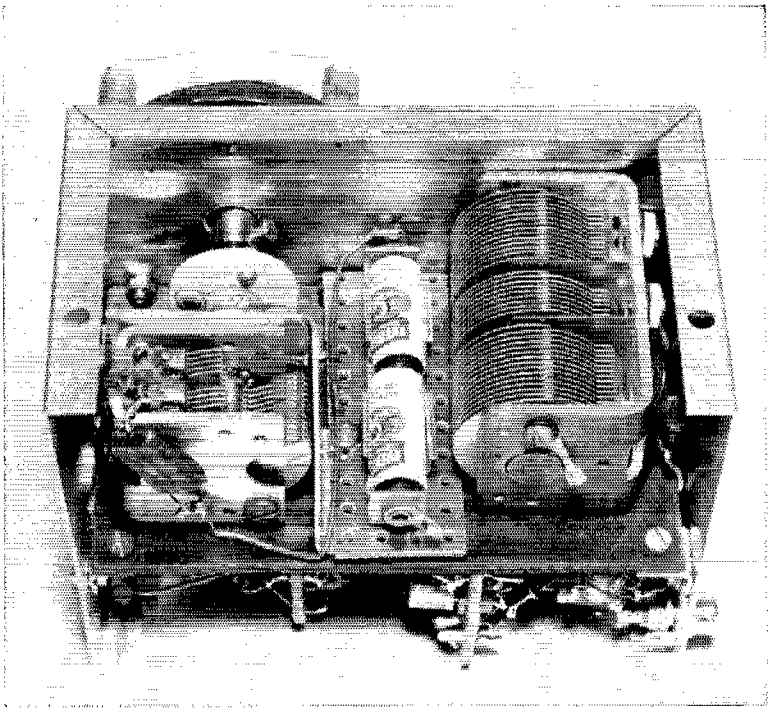
For reception in each band, C_1 is adjusted for the frequencies in the first column.

until the proper range is obtained. The coil slugs will then provide plenty of leeway for final adjustment after the components are installed. L_1 and L_2 should be adjusted so that the circuits resonate at 3.5 Mc. with C_1 at maximum capacitance and the trimmers of C_{1A} and C_{1B} at minimum capacitance. Then, the frequency with C_1 at minimum capacitance should be about 17 Mc. L_3, with 62 pf. connected across it, should be adjusted for resonance at 1600 kc. L_4, with the fixed capacitors connected across it as shown in Fig. 1, should be adjusted for about the same frequency. With the several capacitors connected across it as shown, L_5 should be adjusted so that C_2 covers the range of 5100 to 5700 kc. After these adjustments have been completed, the coils can be given a coat of cement to hold the windings firm. The coupling coils can then be wound, but the coupling coil to the base of Q_1, and the one on L_5, should not be cemented until after the coupling has been set experimentally.

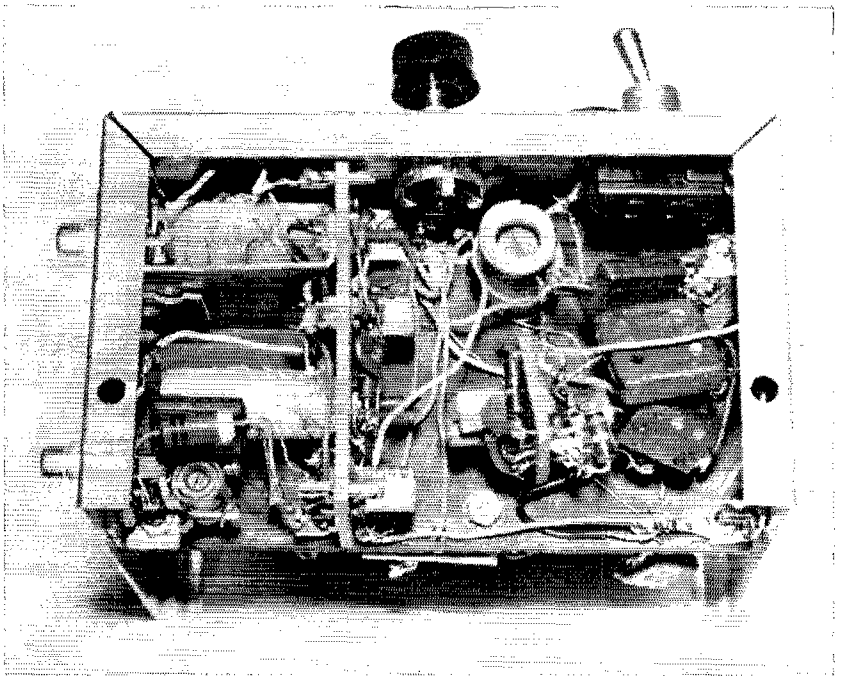
Holes should be drilled in the cabinet to provide access to the capacitor trimmers and coil slugs, since some final adjustment may be necessary after the unit is completely assembled. In general, placement of components is not critical, and arrangements differing from the one shown in the photos should work equally well. However, since the r.f. stage is not neutralized, it tends to be regenerative, and the stage will oscillate if certain precautions are not taken. L_1 and L_2 should be shielded from one another. Q_1 should be mounted on the same side of the shield as L_2, and L_1, Q_1 and L_2 should be mounted in a straight line with very short leads. The transistors are mounted in miniature "5-in-line" tube sockets.

Final Adjustment

Insert Q_4 in its socket and check for oscillation. This can be done by listening on a receiver covering 5100 to 5700 kc. When oscillating properly, Q_4 will draw from 0.25 to 0.5 ma. This can be checked by temporarily inserting a meter in the battery lead (before the other transistors are installed). Oscillation is indicated if there is a slight change in current when a finger is touched to the stator plates of C_2. Make sure that the oscillator covers the desired tuning range, adjusting the slug of L_5 and the trimmer of C_2 as necessary.



Top view of the converter showing C_2 to the left, C_1 to the right, and batteries at the center. The center section of C_1 and rear section of C_2 are not used. The h.f. oscillator transistor Q_4 is in the upper left-hand corner of the chassis, hidden by C_2.



Bottom view of the converter. The r.f. and mixer coils are to the left, separated by a small aluminum shield. The 1600-kc. output coil is in the lower left-hand corner. The h.f. oscillator coil section is to the right, below the gain control. The b.f.o. is the subassembly in the approximate center of the chassis. L_4 is hidden under the mica capacitors to the right of the small board.

Plug Q_2 into its socket. If Q_4 stops oscillating (it will probably change frequency, so don't be misled by this), loosen the coupling to L_5 by sliding the coupling coil away from the main coil. If after doing this Q_4 still does not oscillate, it may be necessary to move the collector tap to the top of L_5, or reduce the coupling coil to one turn. One or the other should do the trick.

Couple the output of the converter to the broadcast receiver by running a twisted pair, or shielded wire, from J_2 to a one- or two-turn link coupled to the receiver antenna coil. In the case of a transistor receiver, the latter will probably be a loopstick. Some receivers have a small jack for connecting an external antenna. If this happens to be the case, simply couple to this jack through a 20- or 30-pf. capacitor. (Direct coupling without the series capacitor may detune the receiver antenna circuit.)

With all transistors plugged in, connect an amplitude-modulated signal generator to the input jack of the converter. Set the generator to 3.5 Mc. and align the antenna and mixer circuits by adjustment of the slugs of L_1 and L_2 while C_1 is set at maximum capacitance, and the oscillator is tuned to 5100 kc. (C_2 near maximum). Next, adjust C_2 until the oscillator is on 5333 kc. (This places the third harmonic at 16 Mc.) Now, with C_1 at minimum capacitance, adjust the trimmers on C_{1A} and C_{1B} for maximum output from the broadcast receiver with the signal generator operating at 14.4 Mc.

B.f.o. injection is by stray coupling; L_4 should be adjusted to place the b.f.o. on 1600 kc. R_2 was inserted to reduce the b.f.o. injection; it may not be needed in all cases.

If the r.f. amplifier oscillates, this will be indicated by strong spurious signals in various portions of the tuning range. In the original unit, the remedy was to reduce the coupling to the base of Q_1 by moving the base link away from L_1. Once the proper coupling has been found, the link can be cemented in place. However, if the converter battery voltage is raised later to a higher level, there is a good chance that the link may have to be decoupled still further. In extreme cases, it may be necessary to tap the collector of Q_1 down on L_2, using the taps suggested. Otherwise, these taps will not be used.

Before putting the signal generator away (or returning it to its owner) the dial can be calibrated. Calibration should be approximately as shown in Fig. 2.

If a local broadcast station happens to be operating on 1600 kc., it may give you some trouble because of direct pickup by the broadcast receiver. If this is the case, retuning the receiver to 1610 kc. should remove the difficulty. If the receiver has been previously calibrated at 1600 kc., this shift will throw the calibration off by 10 kc. If you consider this error worth worrying about, the dial can be calibrated at 1610 instead of 1600 kc. If you use the converter and receiver while traveling about, you may run into localities

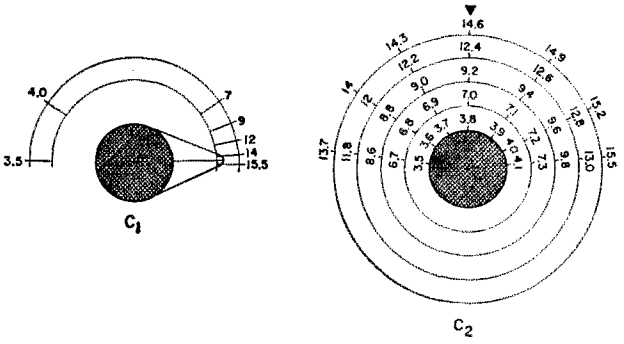


Fig. 2—Sketch showing approximate dial calibration for r.f./mixer on the left, conversion oscillator on the right.

where one or the other of these two frequencies is in local use. Shifting to the opposite frequency should avoid trouble, since both channels will not be in simultaneous use in any given location. Since the r.f. gain control is connected to only one r.f. stage, it is not as effective as one might wish. However, in the case of extremely strong signals, further attenuation may be obtained by detuning with C_1.

In the words of W1AE, for whom this converter was built, "It is hotter than a firecracker on a 4-foot antenna, and makes a wonderful little unit to take on trips." One final word — don't use too large an antenna, and be sure to have C_1 tuned properly to the desired signal frequency.

QST

• New Apparatus

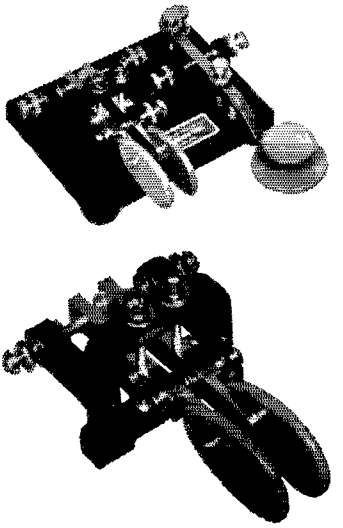
Brown Transmitting Keys

THE accompanying photographs show two of the keys made by Brown Bros. Machine Co., 5370 Southwest Ave., St. Louis 39, Mo. There are five models in the complete line, some one of which should satisfy the taste of any c.w. operator.

In the top photograph is the model CTL, which is a combination unit consisting of a twin-lever actuator for use with electronic keyers and a heavy-duty straight key. They are mounted on a heavy base (about 2½ pounds) that measures 3½ by 4½ inches. A binding post is provided at one corner of the base, adjacent to the hand key, so that the straight key can be connected independently of the twin-lever key. Leads from the twin-lever key terminate at a recessed three-terminal screw-type terminal strip. The straight key has ¼-inch silver contacts and both keys are fully adjustable. Arms, levers, and hardware have bright chrome finish, while the frame and base are black wrinkle enamel. Paddles on the twin-lever key and the Navy-type knob on the straight key are red plastic.

The bottom photograph is of the model UTL. This is a twin-lever key less the base, and is designed for mounting in the user's own equipment. There are tapped holes in the legs and front of the frame for mounting the unit to a base or panel. The key is the same as described above and has the independent dot and dash levers, with ¼-inch silver-plated contacts on the levers. These face 3/16-inch silver contacts on the chrome-plated brass contact screws. Spring tension is adjustable, as are the pivots.

Not shown in the photograph are the models BTL, ST, and CSA. The BTL is the twin-lever key just described mounted on the same type 3½ × 4½-inch base. Connections to the key are made to a recessed-screw terminal-strip at the back of the base.



The model ST is the straight key mounted on the 3½ × 4½-inch base. This base, by the way, is equipped with three rubber feet. These feet, along with the heavy weight of the base, give all the Brown keys extremely good stability. It is practically impossible to move or slide the keys during normal hand sending.

Model CSA, not illustrated, is a combination semi-automatic and heavy-duty straight key mounted on a 3½ × 4½-inch base. The semiautomatic key has the usual adjustments for getting the desired "feel," and has a sliding weight for speed adjustments. The straight key is the same one described above.

— *E. L. C.*

• QST Article Contest Winner

You and Emergency Power

BY GARY GARRIOTT,* WA9FMQ

". . . and, gentlemen, this is why the amateur radio operator is one of the most valuable citizens in any community. If a disaster should strike and impair communications, the amateur is prepared to step in and provide emergency facilities to the outside world. Many lives have been saved as a result of amateurs providing communications, working hand in hand with Red Cross and Civil Defense. I hope that this talk has shown to you how valuable the radio ham is, and what an asset he can be in an emergency. Thank you."

John Q. Ham stepped down from the speaker's platform amid enthusiastic applause from the group assembled at Centerville's town meeting.

"You should pat yourself on the back for that performance, old boy," he thought as he grinned approval at himself. "Now the ARRL can't complain that you didn't try to project the ham's image to the public."

John, owner of station W9XYZ, went home happily that night thinking he had fulfilled his obligation to his fellow hams. When invited to give a talk on ham radio at the meeting, he had picked "emergency power" as his topic because it was relatively easy to work up and had widespread public appeal. Did John himself own emergency-powered gear? Naw, don't be foolish! Emergency drills were fun to participate in, but the real McCoy never happened.

But it did happen. Scarcely 24 hours after John had proudly given his speech at the town meeting, a tornado hit Centerville in its full fury. In less than an hour, almost the entire village had been demolished. John had weathered the blast in the shelter of his basement, and when he heard no more wind banging things around, he cautiously stepped outside to see what the twister had done to the sky wires that sent the signals of W9XYZ on their way. To his utter amazement, the long wire was the only antenna that came down. The 40- and 80-meter dipoles were still up, and the tribander, bent though it was, had withstood the wind bravely.

While he was still wondering about his good luck, a group of dazed villagers saw him simultaneously and rushed over to him. All telephone and power lines were down, and the villagers regained a spark of hope when they remembered John's speech about providing a link to the outside world. Would he get on the air and find a doctor for little Patty who was gravely ill following a skull fracture from falling debris? And what about 70-year-old Mrs. Peterson who had broken her leg in the disaster and needed immediate hospital attention? Local Red Cross volunteers needed medicine, food, blankets, and a thousand other things.

John looked bleakly into the faces of the people who had lost in an hour much of what they had spent a lifetime working for, and wondered how he was going to tell them that he was as helpless as they were.

"John, wake up!" came a shrill female voice. "It's time for supper." John slowly shook his head and muttered, "Boy, what a nightmare. That Scottish stuff does wonders." But he had learned his lesson. He hurried to the telephone and —— "Say, Sam, you know that surplus generator you have? Well. . . . ."

This, my friends, is a very fictional story about a not-so-fictional possibility. It is indeed encouraging to see an ever increasing number of amateurs supporting such worthwhile emergency programs as AREC and RACES, but how helpful would *you* be to these groups in a disaster without emergency power? If a gasoline-powered generator is out of your financial means, you can still invest in battery-operated rigs, d.c. dynamotors, vibrator supplies, and other similar equipment.

The day may come when you will be asked to serve in the absence of commercial power. Whether or not you'll be able to meet the challenge is up to you. Can the neighbors depend on you, OB? QST

* Box 2, Rte. 2, Hortonville, Wis.

This simple idea enables urban dwellers and others with restricted antenna space to make use of the lower-frequency bands. Although the principle is not new, it may not be familiar to many present-day amateurs. A simple network providing a 50-ohm transmitter load is included.

Working 15- and 20-Meter Antennas on 40 and 80

Using Feed Lines as Radiators

BY DAVID TALLEY,* W2PF

ONE of the League's recommendations for reducing congestion in the rather limited amateur frequency allocations is to make a choice of bands below 30 Mc. appropriate to the distance to be covered. There is no point in using bands open to DX for intranational contacts, at hours when lower frequencies will serve equally well or better.

But in attempting to follow this sensible suggestion, there may be problems for those who reside in apartment houses and other urban locations where space for a conventional 40- or 80-meter antenna is difficult if not impossible to find. However, many city dwellers are equipped with 15- or 20-meter antennas of one type or another, most of which may be adapted to 40- and 80-meter operation quite easily by resorting to the old trick of tying the conductors of the feed line together at the transmitter end. The feed line then becomes part of the radiating antenna. This simple solution is adaptable to almost any dipole, folded or otherwise, or even to the driven element of a 15- or 20-meter beam if the element is not grounded to a metal tower.

* 40 East Ninth St., New York 3, N. Y.

Although shorter lengths will work at reduced efficiency, it is desirable that the total length of one half the dipole (or driven element), plus the length of the feed line be at least ¼ wavelength for the lowest frequency to be used (approximately 33 feet for 40 meters, or 66 feet for 80 meters). The antenna in my own case is a 20-meter dipole fed with 22 feet of RG-8A/U coaxial line, making the total length approximately 16 + 22 = 38 feet. Even with this short length, highly satisfactory results have been obtained in working at 3999 kc.

Feeding the Modified Antenna

Most transmitters these days, both home-brew and manufactured, are designed to work into a limited range of load impedances. In some, the operating range is restricted to the narrow limits of 50 to 75 ohms. Only by sheer chance will an antenna of the random-length type described have a feedpoint impedance such that it can be fed directly from the transmitter pi network on one band or the other. Even in such rare cases, it is highly unlikely that it will be possible to feed the antenna on *both* 40 and 80. In most instances a matching device of some sort will be required.

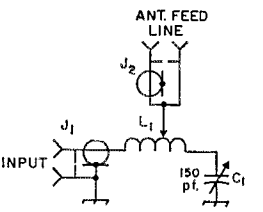


Fig. 1—Circuit of the simple matching circuit for random-length antennas.
C_1—150-pf. variable (see text for voltage ratings).
J_1, J_2—Chassis-mounting coaxial receptacle (J_2 must be well insulated from ground).
L_1—Approx. 70 μh.—50 turns No. 16, 1-inch diam., 4 inches long (or B & W type 3853 variable inductor or type 3907-1 coil, 100 turns, 2-inch diam., 10 turns per inch).

Fig. 1 shows the circuit of a simple matching network that has worked well at W2PF. It consists of a simple series-fed tuned circuit, with the antenna tapped on the coil at a point that results in minimum s.w.r. on the coax line from the transmitter to the network.

Since the antenna feed line is radiating in this application, the network should be placed as closely as possible to the point where the line enters the station. The network should be grounded to a water pipe or other earth ground. Also, since the portion of the line at the station end may be at high r.f. potential, the line should be kept well spaced from house wiring and other metal conductors.

Construction

The components used in the network should have ratings roughly corresponding to those of

the tank components in the output stage of the transmitter. The coils suggested under Fig. 1 have been used successfully with a 1-kw. transmitter. A receiving-type capacitor will usually be adequate for powers up to 100 watts. Higher power will require a transmitting capacitor with greater plate spacing.

The components may be housed in an aluminum box of dimensions suitable for the components used. The output terminal of the network is a *shorted* coax receptacle of a type to match the plug on the end of the feed line. This receptacle is mounted on an insulating panel which, in turn, is mounted over a hole cut in the shielding box. This arrangement makes it convenient to shift the feed-line plug from the box to the transmitter for normal higher-frequency operation.

Adjustment

An s.w.r. indicator should be placed in the coax line between the network and the transmitter. An output indicator, such as an r.f. ammeter or r.f. voltmeter, should also be provided. C_1 should be set at maximum capacitance, and the transmitter adjusted for the minimum output that will give a satisfactory reading on the s.w.r. indicator. Then the tap on L_1 should be adjusted for minimum s.w.r. This adjustment will be critical. Then adjust C_1 for a further reduction in s.w.r. With a proper combination of the coil tap and the setting of C_1, it should be possible to obtain an s.w.r. of close to 1:1. This adjustment should hold over a range of 150 kc. or more. The transmitter may now be adjusted for full output as indicated by the output meter. QST

Strays

OPERATION ELECTION

On May 30, radio amateurs in 75 of North Carolina's 100 counties participated in one of the largest public service operations ever mounted in the State. The object of "Operation Election," the result of over three months' planning, was to furnish the citizens of the state the fastest possible coverage of the recent gubernatorial election.

As the polls closed at 6:30 on that Saturday evening, amateurs descended on the 75 county boards of election. There, as precincts reported, the operators kept a running tally. At each significant change in the count, a message was filed via one of five different nets to the Election Central Computer in Raleigh. Tabulated by the computer, data went to Election Central itself in the studios of WRAL-TV, there to be broadcast over a state-wide television network comprising stations in Wilmington, Washington, Raleigh, High Point and Charlotte, giving state-wide coverage.

The amateurs in each county were left to their own initiative in effecting liaison with their assigned state net. In most cases telephones, v.h.f. links, and even runners were used to get to a local fixed station capable of net operation. Some groups set up larger transmitters at the site and worked into the nets directly. State-wide nets in operation included the Coastal Carolina Emergency Net, North Carolina CW Net, North Carolina SSB Net, Tarheel Emergency Net and a v.h.f. net set up especially for the occasion.

The five nets handled approximately 450 election reports. Early in the evening, Election Central and the TV network led non-network stations by as much as two-to-one in the total votes tabulated, and at one time by as many as 500 precincts.

A letter from Sam Beard, Director of Public Affairs, WRAL-TV, says "This was the fastest election coverage ever provided to North Carolina and it isn't being flowery to say that the amateurs made it possible." — *W1AW/M*

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"A Complete Two-Band Station for the V.H.F. Beginner" — a reprint of articles that appeared in July, August, September, and October, 1961 *QST* — is still available for 50¢ (no stamps) from ARRL, 225 Main St., Newington Connecticut 06111.

Here's an idea that you might try at one of your next club meetings. Have some of the old-timers bring in some of their ancient gear, so that newcomers to the game can see what changes time hath wrought, and so they can better appreciate some of the wonderful work that was done with gear that is fairly crude by present-day standards. This scheme was tried at the May meeting of the Jayhawk Amateur Radio Club in Kansas City, Kansas. Shown above (*l.* to r.) are WØKM, WØCU, WØITX, WØDMZ and WØLB. (*Kanas City Star photo*)

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* W1NJM

IN order to make a point, we are going to tell a little story on ourselves that most of you probably never knew about, to wit: Some months ago, when we were introducing precedences and message-handling instructions (HX) and gosh-knows-what-all, we showed the preamble of a message as beginning with the number, precedance, HX and station of origin, in that order. Later, in another example, we reversed the order of the station of origin and the HX, because we thought it was better not to have two new prosigns together. Some eagle-eyed amateur pointed out the discrepancy, so we made a pronouncement somewhere in these pages to the effect that number-precedence-station-HX would be the official order.

A few days later our new Form 3 was delivered by the printer — about 50,000 copies of it — and it started being bound into all new log books. Guess what? That's *right*, the message example showed the precedence and HX following each other! Horrors on horrors, and pass the cyanide, brother! What to do, another about-face, or reprint 50,000 Forms 3? Or maybe it would be easier just to walk in front of an oncoming truck.

In the end, we decided to do nothing. Nothing at all. Just ignore the whole thing, and wait for developments.

The point is this: nothing happened. The one eagle-eye who noticed the first discrepancy asked what-the-heck-goes-on, but no one else seemed to notice it at all, and nothing was said. This seems to prove one of two things: either no one reads this column (or *Traffic Topix* and *With the AREC* before it), or those who do couldn't care less *which* way we arranged our cockeyed message preamble.

Or, it could mean one other thing: that most of the fraternity is willing to go along with it no matter which way we arrange it. After all, what difference does it make?

If the latter be true, we're not sure it's good. In fact, we wouldn't like it. But we don't think it is, because the unofficial "public service" branch of the CD is beset, we think, by more than its share of hecklers. Either we are not doing what we should be doing, or what we *are* doing is wrong. They disagree with us, argue with us, cause us all kinds of trouble, get in our hair and under our feet and waste our time. They write us long letters that make us think before we can answer them. They require us to justify ourselves instead of just being arbitrary and peremptory, which would be a lot easier. We wish they would shut up and go away.

But without the hecklers and the gimlet-eyed critics who break into fiendish cackling when they catch us doing something wrong, we wonder just how much progress would be made.

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We don't like changes for the sake of changes, but one thing about message preambles we never did like has been this business of requiring the location of the station of origin on that part of the message preamble calling for "place of origin" when the message doesn't originate there. It has been standard practice, in such cases, to use the names of *both* places in the preamble, connected by a "via." This could result in an inordinately long place of origin, such as "Truth or Consequences, New Mex. via Twenty-nine Palms, Calif." And how necessary is it? The "place of origin" should be where the message originated, not *necessarily* the location of the station of origin.

So, henceforth, the "via" in the place of origin in message preambles is no longer required. If your station is in Boise and you get a message by mail or other non-amateur-radio means from Pocatello to be originated, your place of origin is "Pocatello, Idaho," and just leave Boise out of it.

Just one thing: senders of service messages, beware! Use your callbook in addressing the message. The place or origin on the message may not be the station of origin's location.

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The Wichita Falls Tornado

On April 3 at 1435 local time, Wichita Falls, Texas, was struck by a tornado that ripped its way through the northwestern part of the city. This was just a week after the earthquake hit Alaska, and in the wake of all the excitement of the latter, the tornado was almost forgotten, except by residents of Wichita Falls and those in the immediate area.

Here is the type of damage done in Wichita Falls by the tornado. This particular shot is of the Sunset Terrace area, the hardest hit.

QST for

* National Emergency Coordinator.

But this was no minor emergency. Luckily, the twister lifted just before reaching the control tower at Sheppard Air Force Base. Most people were at work or shopping and the local schools had not yet closed for the week end. The residential areas near the air base were the hardest hit with seven deaths, 70 injured and $1.5 million in damages.

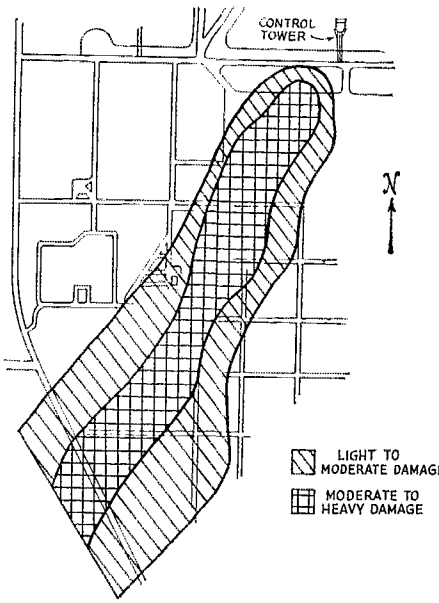
When the possibility of a severe storm became publicly known, hams in the area kept themselves alerted for any possible need for communications. When the tornado finally formed and started its four-mile dance through town, local amateur groups quickly activated. Thanks to W5AVA, we have reports on what most of the amateurs did, and the following is a condensation of same.

W5IFI proceeded to the base station of the Red Cross and maintained communication from Wichita General Hospital to the air base hospital, using mostly volunteer ten-meter mobiles. "No one was contacted," he tells us. "All volunteered immediately." K5ILX helped at the Red Cross station. K5OUK drove into town from his home in Byers, 23 miles away, and was dispatched to the disaster area by NCS W5US. K5UTR upon hearing of the emergency immediately checked into the emergency net and was dispatched to the disaster area where he and K5DFP searched for injured people. K5DFP was sent to Red Cross headquarters to get the base station on the air. He, K5UTR and W5MQW were instrumental in getting word to an army reserve unit to activate. WA5DLR went to the air base hospital to help maintain contact with the Red Cross and the General Hospital. WA5CMB set up emergency generators at the disaster site. K5RCB handled traffic between field stations and the downtown Red Cross office for three days. W5MQW and WN5GKF mobiled into the center of the disaster area and passed the first message to K5ABG while the funnel was still visible. They provided aid for the Red Cross and many others during 57 hours of continuous operation. K5ABG activated the ten-meter emergency net from a high vantage point and remained on until the base station, activated by W5IFI, came on. He then went to the storm area and handled traffic to the city for the next 48 hours.

WA5CMC picked up a Red Cross generator and took it to the disaster scene, then remained for two days to assist. K5JNA at Sheppard handled health and welfare traffic to town in the absence of any telephone connections: WA5EIY/mobile was the contact. WA5CDJ helped furnish communications for the Red Cross from the scene of the disaster, then spent two days from his home station handling emergency and health and welfare traffic into and out of Wichita Falls. WA5DFR came home from school to handle 45 messages for the Red Cross, c.d. and individuals via the Oklahoma Storm Warning Net. W5DYY operated on 80 meters handling traffic from the Red Cross in St. Louis and regular disaster traffic from Austin.

The mayor of Wichita Falls was visiting in Midland when the disaster struck. His first connection with officials in Wichita Falls was via K5ZJF in Midland, who contacted K5FUF/mobile and K5ABG/mobile at the disaster scene. K5ROX helped operate K5FUF. The mayor talked direct to the city manager after K5ABG located the latter and brought him to the mobile unit.

Oklahoma SEC K5DLP called the Oklahoma Storm Warning Net into operation at 1530 local time. This net passed priority Red Cross and c.d. messages during the first part of the emergency and then approximately 150 welfare messages after emergency traffic was cleared. The net was also



Showing the path over which the tornado vented its rage through the city and Sheppard Air Force Base. How do you suppose the boys in the control tower (upper right) felt?

able to obtain power units, medical personnel and winch trucks for the disaster area.

Other stations participaating, not mentioned above, were *W5s* AVA AC ACK BWC DQT GKT HBH IGV IKM KIL KNN MQR NTW PML US VW, *K5s* ABB AXG BAJ BKO BNR BYF CGS DFR EIJ FHM FHN FLD HBH HXR JKN KAZ MOF MRC UUS VGE WIA, *WA5s* BEQ BUV CPX DGM FJG JJH, W4PSG/5, W8NLT, KØOLD.

Although most communications went smoothly, nearly every amateur who participated had some critical comment to make as to how the performance could have been improved. The operators seemed to know what to do and where to go and it was evident that they had been trained in emergency operation. A problem did develop, however, as to who was in charge. Several amateurs were denied access to the disaster scene because they weren't considered "official." The security of Sheppard AFB had to be maintained and this prevented access to certain parts of the base. Here are a few of the more noteworthy comments:

"A certain frequency should be set aside for disaster . . . only and stations not working the disaster should be required to clear (it) and keep it clear. — *W4TOV/5*. "S.s.b. seemed to be best mode; c.w. at approximately 15 w.p.m. excellent." — *K5DLP, SEC Okla*. "I think better liaison between amateurs should be established." — *WA5DFR*. *WA5BMS* feels that a closer liaison between city officials and amateurs should be maintained. "I want to praise the ten-meter net and K5ZFJ for the way they handled the emergency." — *K5FUF*. "Communications above local level need to be organized." — *K5OUK*. "The city, county and state authorities should be told our purpose and how we propose to help." — *K5UTR*. *WA5DLR* says everyone should be on net frequency, the NCS should identify every five minutes and above all, stay cool. *WA5CMB* opines that there should be a planned and approved program with fixed and alternative meeting places. "Definite assignments so that everyone knows what to do." — *K5RCB*. "We need

better identification to get into the disaster area." — *WA5CDJ.*

Another chapter of public service for the radio amateur. Nice going, gang!

Diary of the AREC

We have received an additional report on the explosion in Attleboro, Mass. on Jan. 12 (see p. 87, Apr. 1964 *QST*). The following amateurs also participated: *W1s* LJY WCE, *K1s* KAZ RLD RAO HQE NSX UZA UXS VOB KKY TPH LSA PMI MQD.

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Since the report on the Alaskan earthquake (p. 46, July 1964 *QST*), we have received several additional reports on amateur operation.

K7UHG received a special commendation from the Air Force for his operation in the emergency. *K6ITL* spent 48 sleepless hours in contact with Alaskan health authorities in Juneau, to handle and expedite all requests from the official health and welfare agencies to their counterparts in California and Washington, D. C. *WA5AUT* handled all messages from the Plainview, Texas, Red Cross to Alaska. *KL7PL* and *KL7ANQ* manned a 2-meter link between Fairbanks and Anchorage. *W3IVS* was instrumental in providing a communications link between FCC offices in Anchorage and Washington, D.C.

Other stations reported to have been active during the emergency were: *KL7s* BTA CPA ENF, K1YYJ/KL7 W3MHT/KL7, K1OIC, *WA5s* BEQ DGM FZY JJH, WN5IGZ, W6QDO, *W7s* AMC ANT BJG BTB CWU EGY FHZ HMA MCW NUD TXN VI, *K7s* GQH HPF KWV MXM OZN QFW SNH SST TSP QFW UJQ UOE VRB VSL ZQB, W0BSK, *KH6s* ACC EZ.

Corrections: WB2ALF was erroneously listed as WA2-ALF, W7DLR as W7LDR, and WB6FQO did the leg work for W7AY in the gas gangrene incident.

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On May 13, an F-105B, on take-off from Nellis AFB apparently lost power due to a flameout. His wing mate dropped low with him trying to talk him out of trouble and the pilot did his best to miss the new development and hit a field beyond. However, he couldn't quite make the grade and plowed into a home, killing a woman and two children. Within five or ten minutes after the disaster, W7PBV, Nevada SCM, went into action and set up a circuit on 7205 kc. in which K7YYX and W7RBV maintained a continuous running account with W6MLZ in order to keep the news services informed of conditions at the disaster area. — *W6MLZ, Director Southwestern Division.*

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On June 14, the regular session of the Maine Sea Gull Net was interrupted by emergency traffic. A man was critically injured in an auto accident, and attempts were being made to reach a friend who was fishing on a remote lake in the wilds of Maine. K1RQF first brought this information to the attention of the net. The sheriff's office was contacted for assistance in locating the man. Two hours later, he was finally located and brought to the hospital where his friend has been taken. Other stations in the net and assisting in the emergency were: *K1s* ZIL ROF ZVN MDK DYG, *W1s* OUD TTY, K4BSS/1. — *K1DYG, SEC Maine.*

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The Sangamon Valley Radio Club, Springfield, Ill., provided communications for the polio immunization of some 91,000 persons in "Operation Sugar Drop" on March 8. One station was set up at each of the feeding points and hourly reports were given to W9KQX who in turn reported to W9YJF at the hospital. Communications went so smoothly and efficiently that on May 3 the same group provided similar communications but this time on a county-wide basis. Favorable publicity resulted and two letters of commendation were received from the Medical Society. — *W9FFP.*

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The National Intercollegiate Flying Association Meet was held at Gallatin Field near Belgrade, Mont., on May 14-16. Amateurs assisted by supplying communications for the 75-mile cross-country navigation course which was flown on the 15th. Activities began at 0500 MST. K7RGI, assisted by K7NIP, installed and operated the base station at the Control Tower at Gallatin Field, K7NKS/mobile, assisted by K7WOC, operated from Check Point Two near Three Forks, Mont., and W7TQC/mobile relayed traffic for 18 of the contestants. Traffic handled was originated by the various judges at the check points and consisted of such things as aircraft identification numbers, azimuth of approach at check point, exact time of arrival at the check point and other messages relating to traffic control and safety of the pilots. The last plane completed the course and the net was secured at 1300 MST. — *K7RGI.*

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A mass polio immunization program entitled "SOS" (Sabin Oral Sunday) was held in Monroe County, Mich., on May 17. The AREC under EC W8NDM provided communications from the 19 immunization sites to the county health department and the two county hospitals. Mobile, fixed and portable equipment was used along with land-line circuits for hourly reports from all feeding stations plus the handling of calls for supplies, personnel, etc. — *W8NDM, EC Monroe County, Mich.*

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The Boy Scouts of Milwaukee County, Wis., held a camporee on May 15-17. Communication was provided by members of the Milwaukee County AREC under K9KJT. As the scouters arrived at the registration area Friday evening, they were checked in and started on a one-and-a-half-mile hike through the woods to their camp site. The Handie-Talkie and mobiles along the trail were used to keep checking on the movement of the scout patrols. At the end of the trail the patrols were checked again by a mobile stationed at the camp site. Saturday morning the communications team was used to assist judges in relaying scores to judging award chairmen at the headquarters tent. Sunday noon, as the scouts returned on the trail, they were kept track of by the mobiles while the Handie-Talkie was used to bring up the rear with the last of the patrols. The boy scout official in charge of camping communications expressed his thanks to the group as the last patrol left the wooded trail. — *K9-KJT, EC Milwaukee County, Wis.*

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On May 16, members of the Milwaukee County, Wis., AREC provided communications for the Armed Forces Day parade. Communications were provided for parade officials and the Red Cross. Seven mobiles, one portable and one Handie-Talkie were posted with the parade starter and marshal, along the parade route and with the mobile first aid units of the Red Cross. Explorer scouts were used as runners. Cooperation by the police was excellent since the operation was incorporated into the written police plans. — *K9CMX.*

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On May 23, forty-two hospitals in nine counties of Western Pa. participated in operation WESTPA, an emergency disaster drill. Communication was provided by AREC and groups from several counties. This was a large-scale exercise in which h.f. and v.h.f. were used and in three counties teletype links were set up. It was presupposed that an atomic attack was launched against this country and attempts were made to simulate problems, predominantly among hospitals and volunteer workers in the Western Pa. area. Hospitals were linked together on 75-meter s.s.b. and local communications throughout were conducted on 10, 6 or 2 meters. Since this was not only a communications exercise but a full-scale disaster operation, doctors, nurses, police and fire officials also participated and several "accidents" were staged with real-life "victims" and painted injuries. All in all, the exercise was deemed a huge success and special commendations were given to *W3s* SHT LAT IFK and SVJ for their help in organizing the operation. — *W3MUL.*

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Members of the Story County, Iowa, AREC participated in two communications activities during May. On May 24 they provided communications for the annual Outdoor Sports Show. This was their first test of 6-meter Walkie-Talkies and it proved very successful. They were requested to assist in maintaining a telephone link into the city of Ames and other communications within the local park before, during and after the show.

On May 31, the same group assisted in the rededication of the local airport and the annual Airplane Contest. The operation was twofold in nature; basic communications between the main contest site and the airport into the free flight area (several miles away) and into Ames. — *KØYLO, EC Story County, Iowa.*

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The dates of this year's Simulated Emergency Test are

October 3–4. All AREC officials, please take note and mark your calendars. We hope to have the bulletin with detailed instructions in your hands in mid-September. Meanwhile, plan to make your connections with the National Traffic System!

SEC reports for May total 39, representing 17,992 AREC members. This is the same number of reports as received last month and last May, but shows a drop of almost 500 members from last year. Those sections reporting were: Del., Hawaii, E. Bay, L.A., E. Pa., Nebr., W. Va., E. Mass., Colo., Minn., Wash., N.C., B.C., Nev., Ind., Ala., Alta., Ohio, Maine, Okla., Va., Ark., N.Y.C.-L.I., S. Dak., N.N.J., Tenn., Kans., Mich., Ont., W. Pa., Utah, E. Fla., Ariz., Mo., S. Tex., S.C.V., Ga., Iowa, N. Mex.

National Traffic System

From time to time we receive proposals for the handling of specialized types of traffic. Can't the amateurs nationwide, someone asks, set up a system for handling this traffic? Our answer is always the same — the amateurs *are* set up for handling it, under the National Traffic System, which is organized to handle all traffic of whatever origin and for whatever purpose (within legal limits, of course). Until a couple of years ago, we handled traffic just as it came from the originating station, without any special consideration for one "kind" of traffic over another. Now and then someone would pop into a net with a frantic "pitch" of one kind or another as to the special importance of the traffic he was peddling. Sometimes he would make his point, sometimes not, depending on the circumstances.

It ought to be quite apparent to those making proposals for special handling that NTS cannot undertake to adopt procedures and schedules to handle traffic for one particular agency or one special purpose. The system has to be set up to handle *all* traffic, systematically, so that, *in general*, traffic moves with a maximum of efficiency and dispatch. Now if you have a special message of some kind that has to receive extra-urgent treatment, it is possible that you may do better to get on the most crowded band there is and make a plea for assistance. Could be someone at the place of destination will take pity on you and handle the message.

But if you put it on NTS, it will receive the same treatment as all other messages flowing through the system, unless it qualifies and actually bears a high precedence rating. In the isolated case, where Joe Doaks has to get word from Minneapolis to Seattle and back in a big hurry on a personal matter, the best bet is Ma Bell or Western Union. If a communications emergency exists, an individual effort on the part of some amateur *might* do the job. But ordinarily, don't expect NTS to disrupt all its normal operation to handle some personal or individual matter. The system aims to handle all traffic in stride during normal times. In times of emergency it *still* strives for systematic operation, handling traffic in accordance with the precedence system devised.

June Reports:

Net	*Sessions*	*Traffic*	*Rate*	*Average*	*Representation (%)*
1RN	58	376	.184	6.5	82.0
2RN	60	541	.634	9.0	99.7
3RN	60	483	.312	8.1	93.9
4RN	44	528	.346	12.0	64.7
RN5	60	889	.351	14.8	94.3
RN6	60	790	.650	13.0	89.6
RN7	30	469	.436	15.8	88.5[1]
8RN	52	289	.235	5.5	70.5
9RN	30	408	.571	13.6	91.6[1]
TEN	49	501	.493	10.2	58.4
ECN	29	102	.178	3.5	73.6[1]
TWN	29	255	.432	8.8	76.6[1]
EAN	30	1250	.858	41.6	98.8
CAN	30	1097	.769	36.5	100
PAN	30	1003	.766	33.4	98.9
Sections[2]	1223	6048			
TCC Eastern	95[3]	475			
TCC Central	77[3]	645			
TCC Pacific	89[3]	668			
Totals	1874	16,817	EAN	8.9	CAN
Record	1865	19,944	.991	15.9	100

[1] Region Net representation based on one session or less per day. Others are based on two or more sessions per day.

[2] Section nets reporting (44); AENB AEND AENH AENJ AENM AENO AENP(eve) AENP(noon) AENT AENZ (Ala.); OZK (Ark.); BUN (Utah); Buckeye (Ohio); ETPN TSSN TN TPN (Tenn.); Susq. Valley Tfc EPA PTTN (Pa.); MDD MDDS (Md.-Del.-D.C.); VTN (Vt.); QIN (Ill.); OQN (Ont.-Que.); GBN (Ont.); Ore. State; WSBN WIN (Wis.); WFPN (Fla.); So. Cal. 6 SCN (Calif.); NCN (early) NCN (late) NCCW NCSN (N.C.); QMN (Mich.); MSPN(noon) MSPN(eve) MSN MJN (Minn.); NTTN (Texas); VSSN VSBN (Va.).

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

We broke the session record this month. Summer conditions seem to be hurting net operations. Cheer up, guys and gals, only two more months to September.

2RN is suffering from the usual summer QRN but seems to be doing quite well in spite of it. K3MVO has issued 3RN certificates to the following: *W3s* EEB EML KUN LOS NFB NEM NNL PQ QCW RV, *K3s* FHR GJD HNP JYZ KTH LLV MQE NZB OMP PIE PYS QDD QUG UFV YQJ. WA4EUL is taking over 4RN until W4SIIJ returns from vacation. WB6BBO sez vacations, baseball, moving and visiting are taking the nicely planned schedule and twisting it into a pile of junk, but RN6 is still operating smoothly. RN7 is improving and Alaska was represented 100%, reports K7JHA. K8KMQ is taking over 8RN while W8CHT is re-building his station. W9QLW reports 9RN is holding its own with summer condx; Ill. representation is down but should improve. W9DYG sez CAN NCS so regular that he has had to QNG only three times this year; special mention to W9JOZ for QNB almost every night. WB6JUH reports conditions are starting to play havoc with PAN but they are going to try to stick it out on 80.

Transcontinental Corps. W3EML sez that with summer vacations, alternate stations are taking over the skeds with little or no confusion. TCC certificates were issued to *W1s* EMG NJM *W2s* GVH MTA, *WA2s* BLV KQG, W3EML, *K3s* GJD FHR MVO, *W4s* DLA DVT, K4POA, WA4EUL, *W8s* CHT ELW and K8NJW. W4ZJY reports the number of failures increased slightly due to bad condx. W7DZX sez QRN on 80 has caused most of the boys to change their skeds to 40; all in all, not too bad, tho.

June reports:

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern	137	69.6	1367	475
Central	100	77.0	1087	645
Pacific	120	74.1	1338	668
Summary	357	75.4	3802	1788

The TCC roster: Eastern Area (W3EML, Director) — *W1s* AW EMG NJM, *K1s* WJD WKK, *W2s* JVH MTA, *WA2s* BLV VLK, *W3s* EML NEM, *K3s* FHR FKJ GJD MVO, *W4s* DLA DVT, K4POA, WA4EUL, *W8s* CHT ELW, *K8s* NJW TIG. Central Area (W4ZJY, Director) — W4ZJY, *W5s* PPE QMJ, *W9s* AKV CXY DYG VAY ZYK, K9DHN, WA9AUM, *WØs* BDR SCA, KØFPC.

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Net Reports:

Net	*Sessions*	*Check-ins*	*Traffic*
20 Meter SSB	22	764	2329
Northeast Area Barnyard	26	719	3
Hit and Bounce	30	370	436
7290	44	1207	499
Interstate SSB	20	672	136
North American SSB	26	504	565

QST

Strays

TV-bent Technicians contact WA4MPD. He wants to start a net.

—•••—

Jim Jacobs, K1GHT, did his bit for international relations recently, arranging for hospital treatment for the small son of Israel's Ambassador to Ecuador Menuchin Karni, at Boston Children's Hospital. Jacobs has been credited with several other errands of mercy via ham radio, too. Last year, he relayed to relatives the news of the death of two Ecuadorian visitors whose daughter had been undergoing treatment at Children's Hospital, also. — *W1CTR*

MARS Army operators who manned the WAR network included WA5HKG, KH6-EGS, WA2KGN, K3CCI, W4PTI, K3IMG, K4GFM, W4DIN (Chief Engineer, third from left front row), K4KNV Deputy Chief, fourth from left), and Major Henry C. Becker (Chief, MARS Army, fifth from left).

Armed Forces Day – 1964

Communications Test Results

THE performance of participating amateur radio operators was rated "excellent" by Armed Services communication experts during the communications tests conducted in conjunction with Armed Forces Day, May 16, 1964.

An unprecedented 7586 radio contacts with the amateur radio operator fraternity were made during the twelve hours and forty-five minutes of crossband operations which were scheduled for that one day.

Four military radio stations, WAR (Army), NSS (Navy), and AIR (Air Force), located in the Washington, D.C. area, and NPG (Navy San Francisco), were authorized to conduct the tests and operated on fixed frequencies adjacent to the amateur bands throughout the test period. The general consensus of opinion within the military communicators' group actively involved was that the amateurs demonstrated a gratifying level of operating skill, technical know-how, and an obvious emergency-military communications potential.

A commemorative QSL card has been forwarded to each contact who could be identified in the Summer 1964 edition of the *Callbook*. Any amateur who has not yet received a QSL card confirming his contact should address a request for clarification to the Armed Forces Day Contest, Room 5B963, the Pentagon, Washington 25, D.C. This request must include the amateur's call sign, the station worked, time of contact, and the frequency utilized by the military station.

A Certificate of Merit has been issued to amateurs who submitted a perfect copy of either or both of the Secretary of Defense messages which were transmitted during the communications test. There were 742 perfect entries for the 25 w.p.m. c.w. broadcast and 620 perfect copies submitted of the 60 w.p.m. radio teletypewriter message. Grading has been completed and entries not considered perfect have been returned to the sender together with a letter of explanation of the errors detected. As always, some perfect entries were submitted without identification of the sender. Here again, an amateur who has not yet received a reply to his entry should write to the Armed Forces Day Contest at the address listed above. It is quite possible that the entry may be among those as yet unidentified.

The complete text of the radiotelegraph message is printed below followed by the call signs of those who received a Certificate of Merit for submitting a perfect contest entry.

ON THIS 15TH ANNUAL OBSERVANCE OF ARMED FORCES DAY THE MILITARY AFFILIATE RADIO SYSTEM PAREN MARS PAREN FACILITIES OF THE ARMY CMM NAVY AND AIR FORCE AGAIN AFFORD ME THE OPPORTUNITY TO EXTEND GREETINGS TO ALL AMATEUR RADIO OPERATORS THROUGHOUT THE WORLD PD THE VALUABLE AND VARIED SERVICES WHICH AMATEURS HAVE PERFORMED BOTH IN WAR AND IN PEACE IN THE COMMUNICATIONS AND ELECTRONICS FIELD ARE WELL KNOWN AND APPRECIATED IN THE DEPARTMENT OF DEFENSE PD MODERN TECHNOLOGY CMM WHICH HAS SHRUNK OUR WORLD AND PUSHED US INTO THE SPACE AGE HAS FORCED MANY REVISIONS IN OUR CONCEPTS OF NATIONAL DEFENSE PD I AM CONFIDENT THAT FORWARD LOOKING PROGRAMS OF THE RADIO AMATEUR SERVICES WILL CONTINUE TO HELP US IMPROVE OUR KNOWLEDGE AND OUR CAPABILITY IN AN ESSENTIAL PART OF OUR DEFENSE EFFORT PD IN THIS YEAR OF THE 50TH ANNIVERSARY OF THE FOUNDING OF THE AMERICAN RADIO RELAY LEAGUE I COMMEND ITS OFFICERS AND MEMBERS FOR THEIR MANY CONTRIBUTIONS TO THE COMMUNICATIONS ART AND TRUST THAT THE QUALITY OF THEIR LEADERSHIP IN AMATEUR RADIO AFFAIRS SO ABLY DEMONSTRATED IN THE PAST WILL PROSPER AND INCREASE IN THE FUTURE SGD ROBERT S MCNAMARA CMM SECRETARY OF DEFENSE

C.W. Certificate Winners:

K1AAA, W1AIJ, W1AQR, W1AXK, W1BB, W1BDI, W1BGW, W1BMW, W1CBT, W1CMW, K1CUE, W1ECH, W1ELL, K1EWL, K1FPB, W1FV, K1GGG, W1GPY, W1GZQ, K1HCH, K1IEH, W1IHN, W1IIB, W1IKE, W1LZL, W1MCG, K1MEG, W1MFJ, W1MD,

W1MIP, K1NOW, W1OLS, W1OMN, K1PLP, K1QZV, K1RHN, W1RXP, W1SAD, K1SDX, W1SGU, W1SRM, W1TAP, K1TAX, W1WPR, K1YQZ, W1ZAD, K1ZVN, W1ZYO, WB2AVK, WA2BGI, W2BVE, W2BXW, WA2CKL, W2CLQ, K2EQP, WB2FMK, W2FPM, WA2FPT, WB2FVD, WB2GJG, K2GKO, W2GKZ, W2GQN, W2HGY, WB2HTL, WB2ILY, WA2IMT, WA2INO, W2JCA, K2JUA, WA2KIP, W2KLD, W2LRW, W2LYH, W2MTA, WA2MYS, W2MZB, W2NVB, W2OBU, W2OCO, W2OE, W2OXL, WA2OWQ, W2PKY, WA2PVB, K2QDG, W2QND, WA2QPW, WA2RGQ, W2RN, K2RQT, WA2RSE, W2RUK, W2RUT, WA2RXO, K2SEN, W2SIL, K2SOX, WA2SRK, W2TU, W2TUK, K2UGZ, WA2UPC, K2UTV, WA2VSQ, WA2VYS, W2WBY, W2WHM, WA2WKK, WA2WUB, K2YQK, W2ZMK, WA2ZQH, W2ZUK, W2ZVV, W3ADE, W3AEA, W3AEL, W3AVQ, W3AX, W3AXA, W3BFF, W3BHK, W3CA, W3DZL, W3ECP, W3EKL, W3ELI, W3EML, W3EOV, K3FKG, K3GIH, K3GOH, W3GOT, W3GUS, W3HDL/4, K3HTZ, W3IDO, K3ILC, W3IVC, W3JFP, W3JHR, W3JRV, W3JSA, W3KDF, W3KIP, K3LYW, W3MCG, K3MKZ, K3MNT, K3MTT, W3MWV, W3NGL, W3NHX, K3NJW, W3NQA, K3NZB, W3OPO, W3ORS, W3OY, W3RDF, W3RKF, K3STI, W3SXL, K3TUV, K3TZD, K3UFV, K3UPR, W3UQX, K3USH, W3WHK, W3WXB, W3WZC, W3ZLP, W4AAD, W4ABY, K4AS, K4BAI, W4BNU, K4BP, W4BWZ, W4CCC, W4CH, WA4CTD, W4CXY, W4DAP, W4DDQ, WA4-DLF, K4DMU, W4DVT, W4EFV, WA4EGI, K4EHV, K4EOF, W4EOP, WA4FJM, W4FPW, W4FRO, WA4-GLC, W4GLL, K4GMR, W4GNU, W4HOS, W4IJK, W4IMC, W4JJT, W4JJU, K4JKK, WA4JWV, W4JXD, K4JXG, WA4JYB, W4KH, W4KIS, WA4KJB/MM, W4KJL, WA4KPP, W4KR, W4KVO, W4LYV, W4MHW, K4MTL, W4MWL, WA4NDM/1, W4NPG, W4NTE, W4NZP, W4OI, K4OLG, WA4OMI, K4OMX, WA4OMZ, W4OSC, WA4OSR, W4PQP, W4PTR, K4PVP, W4RHZ, W4RKQ, W4RQB, W4SLJ, WA4SSB, WN4SSU, W4TGB/MM, W4UNA, W4UUI, W4VHX, W4VUE, W4VYB, K4WII, W4WHF, K4YOQ, W4YPI, W4ZM, K4ZSX, W5ACK, K5ADQ, W5AIR, W5AJG, W5ARK, W5BBV, W5BCF, WA5BNK, W5CAC, W5CCF, W5CME, WA5CTW, W5CYE, W5DWB, W5EJV, WA5EQQ, WA5GDF, W5GJH, W5GKV/MM, W5GOG, WN5GVB, WA5GWR, W5HFN, WN5HIA, W5HKE, W5IDZ, WN5IIN, W5IGY, W5IGZ, WA5JDR, WA5JFB, W5JGK, K5JGZ, K5JVF, W5KQC, W5NW, W5NXZ, K5MBB, W5MFX, K5OCX, W5QMJ, WA5QVZ, W5RCF, W5RIH, K5THK, W5USA, K5VQU, K5YAA, K5YKS, K5YTA, W5ZU, W6AAQ, W6AEE, W6AM, W6AWP, W6AXV, K6BAY, W6BHG, K6BPI, W6BVY, W6BYS, K6CB, W6CBX, W6CFE, W6CHL, W6CKU, W6CLB, K6CME, W6CWR, K6DV, W6DVD, K6DX, K6DYX, K6EA, W6ELT, K6EPT, WB6EUJ, W6EXQ, W6EY, W6FB, W6FCX, W6FHI, K6FL, W6FLW, W6FYN, W6FYW, W6GGC, K6GK, W6GNO, WB6GRU, W6GUQ, W6GYH, K6GZ, W6HSA, WA6IQA, W6ISQ, W6JNX, W6JUS, W6JXK, W6KF, WB6KFI, WA6KFN, K6LKD, K6MHW, W6MMG, W6MSR, W6NBX, W6NG, W6NRK, W6OFK, K6OGE, W6OJW, W6OSU, W6PCP, W6PLS, W6QLU, K6QXP, W6RDK, W6RT, WA6ROU, W6RXT, W6SAW, WB6SCF, K6SHZ, K6SKT, K6SWL, W6SWR, W6TZK, WA6USU, WA6UWV, W6VPV, W6WAW, W6WLI, W6WPF, W6WWQ, W6WXO, W6WXX, K6YKG, W6ZLF, W6ZPX, W7BJY, K7BPR, W7CWN, W7CZY, W7DIE, W7EKK, W7ESN, K7EWZ, W7EXT, K7FDB, W7FIX, W7GAQ/6, W7GVG, K7GXO, W7HNA, W7HWD, W7IVL, W7JMH, W7KEG, W7KQV, W7KX, K7KYG, W7LFA, W7LPM, W7MAE, W7MCU, W7NUN, W7NWA, W7OCX, K7PBZ, W7PPC, W7QLL, K7QWP, K7SPH, W7SRN, W7TIQ, K7VJU/6, W7VM, W7YKG, W7ZT, K7ZVA, WA8AFQ, W8BTW, W8CJN, K8COU, W8CYN, W8DAE, W8DD, WA8DDI, K8DIU, W8DJD, W8DQL, W8DSX, WA8DYN, W8DYY, K8EQN, WA8FBQ, W8FFK, WA8FIC, W8FLA, W8GMX, W8GTL, W8HCR, K8HKU, W8HZA, W8IJV, W8JBQ, W8JGI, K8KIR, WA8KKD, WN8KLK, WN8KPO, WN8KYF, W8LEX, K8LOU, K8LXJ, K8MFO, W8MHP, W8NEM, W8OMY, W8PHM, W8QLJ, W8QQK, W8QWE, K8RFU, W8RLR, W8SQU, K8SUX, W8TLW, K8TWW, W8TZO, W8VMP, K8VOR, W8VPC, K8VWN, W8VZ, W8WVL, W8WXO, W8ZCW, W8ZJY, K9AHH, K9AIR, W9ANB, W9ARM, K9ARW, W9BMJ, K9BRL, W9BRY, W9BVE, W9CHD, W9CQH, W9CXY, K9DCV, W9DGA, WA9DHI, W9DNY, K9DUI, K9DXB, W9EGR, K9EIV, W9EOK, W9ERW, WA9FDU/6, W9FKH, WA9FMQ, W9GCX, W9GMR, W9GQY, K9GSK, K9GTZ, WA9HDP, W9HOA, W9HUF, W9HUZ, W9HVP, W9IDO, K9IEI, W9IFS, K9ISP, K9IZD, W9JAM, K9JSM, K9JVV, W9JYO, W9KCR, WA9KJJ, W9KVJ, K9PEN, K9QMJ, W9RAR, W9TCV, W9TGB, W9TVN, W9UIN, W9VHD, K9VPL, W9VUD, W9WNB, K9YMU, W9YNK, W9YPO, W9ZEN, WAØABO, WØAGI, WØAGJ, WØAH, WØAJL, WØAWM, KØBAT, WØBES, WØBHA, WAØBPE, WAØBPR, WØCCM, WAØCCP, KØCDG, KØCST, WØDFP, WØECE, KØEHO, WØFDJ, WØFEO, KØIDV, WØIQC, WØJMB, WØJHS, WØJHY, WØLGG, WØLOE, WØLQK, WØOKH, KØPHD, WØPYX, WØQQG, KØRAL, WØRGS, WØRSZ, WØRZU, KØSQB, WØUSL, KØWMD, KØWWI, KØYTA, WØZWK/6, 11GO, KH6AO, KH6AX, KH6BGW, KH6EVU, WH6EUI, KH6EWA, KH6FX, KH6UK, KL7DG, KL7DQD, KL7ETO, KP4HQ, VE1AJT, VE3EYN, VE6VV, VK3KF.

The call signs of those who submitted perfect copies of the radioteleprinter message are as follows: (Space does not permit repeating the text, which was similar, nor the names of non-amateurs successfully participating in the tests—*Editor.*)

RTTY Certificate Winners:

K1AAA, W1AXK, W1BGW, W1EFF, W1FGL, K1GGG, W1GPY, K1HCH, K1IEH, W1IRH, W1KAY, W1KOT,

(Continued on page 158)

(Left) In a corner of the AIR operating room is W5LDM operating the 40-meter setup while (l. to r.) W3TMM, W4PFM, W4NWE and W4IYR (Chief, Air Force MARS) watch. (Right) W3GD and W4ABY operate two of the several c.w. positions at NSS while other participants look on. The voice installations are in the background.

Hints and Kinks For the Experimenter

BLACK-MAGIC INTERFERENCE REDUCER

I WAS having a great deal of trouble using my mobile station because of a tremendous amount of ignition noise from my car. After trying several cures, I accidentally found that the noise was almost completely eliminated by connecting a lead from the bumper to the chrome ring that surrounds the driver's side tail light. There is, of course, nothing mysterious about this scheme. It is mentioned here to point out how one must try almost everything when it comes to eliminating mobile interference. Grounding pieces of metal that could be acting as antennas is only one method. Other things that can be tried during a noise-reduction session are: grounding the exhaust pipe at both ends and even at several spots along its length; grounding the engine hood to the body at several spots; and grounding the engine block to the body at several spots. Conventional methods of noise suppression using suppressor resistors and coaxial feedthrough capacitors should also be used, along with bonding and grounding operations.

— *J. G. Michaud, K2UBE*

SOAP-BOX HANDLES

WHEN my mother came home from the market the other day, I noticed that there were nice metal handles on the extra large size of Dash washing detergent. I removed the handles from the box and attached them to some portable radio equipment of mine. The handles aren't bad looking and they make it much easier to carry the rig!

— *Jon D. Nagy, WB2GFY*

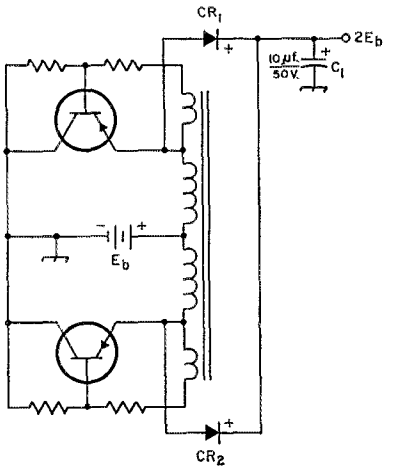


Fig. 1—This circuit will provide 24 volts d.c. when used in a 12-volt system.

TIN-LEAD SOLDER FOR ALUMINUM

A NOTE to the editor in the December, 1963 issue of the *Journal of the Radio Society of Great Britain* from G3PIT, and a rebuttal from a skeptical reader in the March, 1964 issue of the same publication, have provoked a group of us into some investigation into the soldering of aluminum with conventional solder.

G3PIT contends that ordinary solder will adhere to aluminum if a light oil is used on the aluminum surface first, in order to remove the thin layer of aluminum oxide that forms from the reaction of aluminum and air. He states that this procedure is excellent for soldering feedthrough capacitors to a chassis wall, or for any "occasional joint." His critic, however, takes great issue to the use of tin-lead solders on aluminum.

We did some experimenting and have found that steel wire will hold to aluminum fairly well under a "blob" of solder applied in the manner offered by G3PIT. And, surprisingly enough, a 50-50 alloy of tin and lead works better than a 60-40 alloy. This procedure was used successfully to bond aluminum boxes to aluminum chassis for electrically-tight compartments. For those who want to try this method, it is suggested that a very hot iron be used and that the aluminum surface under the oil be scraped with a knife just before soldering.

— *J. Sparky Summers, W5MVP*

BONUS 24-VOLT POWER SUPPLY

THERE are still plenty of 24-28-volt relays available on the surplus market. However, there is a problem when it comes to using these relays in the 12-volt mobile station. I found that a simple addition to the 12-volt transistor power supply will give 24 volts d.c. without any additional transformer windings. Fig. 1 shows the primary circuit of a typical transistor power-supply transformer with the added parts, CR_1, CR_2, and C_1, which gives twice the battery voltage, E_b.

The rectifiers are chosen with sufficient current ratings to handle whatever load is desired. Of course, the total load on all outputs of the supply shouldn't be allowed to exceed the rated power of the transformer.

An additional feature is that the circuit gives some spike-limiting protection for the power-supply transistors because of the clipping action of the diodes and capacitor.

— *Ben Vester, W3TLN*

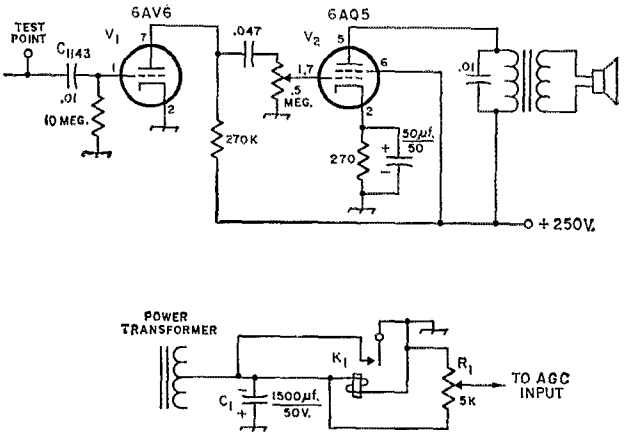


Fig. 2—Modifications to the ARN-21 i.f. strip. The lower diagram shows a source of negative 16 volts to power a relay. Capacitances are in μf., resistances in ohms.

BETTER SELECTIVITY WITH THE APX-6

SELECTIVITY and over-all performance of the APX-6 on 1215 Mc. can be greatly improved by substituting the i.f. strip of an ARN-21 for the original APX-6 i.f. system. The ARN-21 i.f. strip has been available on surplus for as little as $1.00, less tubes. Its frequency is 63 Mc., somewhat higher than the APX-6 strip, but this has no bearing on its use in the latter receiver.

The tube lineup is a 2C51/5670 cascode amplifier, followed by four 6AK5 amplifiers, a 6AK5 discriminator, and a 6AK5 video amplifier. All i.f. stages are controlled by an a.g.c. voltage of minus 1.7 to 6 volts. The amplifier tuning is adjustable, and the response can be sharpened considerably by tuning for maximum gain instead of for broad response. The value of the swamping resistors across the secondaries of the i.f. transformers can also be increased. My i.f. is about 450 kc. wide.

In converting the strip, the video amplifier components are removed and a 6AV6, V_1, is substituted as an audio preamplifier, as shown in Fig. 2. A 6AQ5 output amplifier, V_2, is added to complete the job. A test point on the discriminator output makes a handy place to connect a v.t.v.m. or high-resistance voltmeter, for use as a tuning meter.

This is an f.m. detection system, so reception of stable a.m. signals is not particularly good. Something akin to the slope detection, normally used on a.m. receivers for reception of f.m. signals, must be used if a.m. is copied. This works well enough except on very strong signals. On these, the bias must be increased to minus 15 volts. In converting my APX-6, a d.c. relay, K_1, was inserted in the negative lead of the power supply, so that the relay operates in the receive position. A convenient minus 16 volts was available across the relay, so a 1500-μf. 50-volt capacitor, C_1, was placed across it as a filter. A 5000-ohm control, R_1, provides bias adjustment for the i.f. strip.

Radar interference in the 1200-Mc. region is very bad in the Los Angeles area. Using the APX-6 i.f. strip it was often impossible to hear anything but radar. The improved selectivity of the ARN-21 greatly reduces this interference to the point where it is no longer necessary to hunt for a clear spot in which to operate. The radar signals are not nearly so troublesome, and TACAN signals are very sharp.

— Bruce W. Peterson, W6JWL

FAST ETCH FOR COPPER-CLAD BOARDS

WHEN etching copper-clad boards for "printed circuits" the etching process can be accelerated by using the following mixture as an etching solution. One part of concentrated sulphuric acid, one part nitric acid (70 per cent concentration), and one part water. The complete process of etching takes about two minutes with 0.0015-inch copper! Of course, extreme caution should be taken when handling the above chemical components and, remember, the gases released from the etching process are dangerous, too.

— Jim Carlson, WB6EED

DRIP HOLE FOR VERTICALS

OWNERS of the 14AVS trap vertical antenna will find, as I did, that even though the 20-meter decoupling stub is closed at the top, rain and condensation water will gather in the stub. Drilling a small drain hole at the bottom end of the stub takes care of this problem nicely.

— Ralph Cabanillas, Jr., K6GIL

IMPROVING THE K6AXN 1296-MC.

CONSIDERABLY more output on 1280 Mc. may be obtained in the K6AXN 1296-Mc. converter (March, 1961, *QST* and the ARRL *Handbook*) by back-biasing the multiplier diode. I obtained the small negative bias voltage by inserting a variable resistor in series with one of the doubler stages. The diode capacitance changes considerably with voltage, so adjustment must be done a little at a time, increasing the bias and adjusting the tuning capacitor until optimum output is obtained.

— Bruce W. Peterson, W6JWL

June V.h.f. Party Results — — *Conditions Poor,*

but Intercontinental Moonbounce DX Provides Highlights

THOUGH most comments accompanying entries in the ARRL June V.h.f. Party indicate that the week end of June 13–14 was the low spot of the month, there was no lack of contacts or logs. Nearly 500 entries were received, including many from areas where 50-Mc. DX used to be a prerequisite for any participation at all. And despite subnormal conditions generally, there never was a contest in which such DX was worked on 144 and 432 Mc., thanks to the moonbounce schedules on these bands kept by KP4BPZ, Arecibo, Puerto Rico, details of which have already been reported.

The number one score in every category (contacts, multiplier and points), was turned in by K2LNS, Northern New Jersey Section winner, with 509-46-24,334, on 50 through 420 Mc. K3IPM won the Eastern Pa. award (this is news?) with 392-36-15,012, also a 4-band effort. Stan nosed out W3SDZ, Milton, Pa., who used 4 bands to make 13,064 points with only 270 contacts, thanks to a multiplier of 46.

With the 50-Mc. band not open extensively for sporadic-E DX, there were not many outstanding one-band scores. W9ECV/2, Setauket, L.I., picked up a few sections via skip, and his 262-23-6026 effort was the top one-band job in the country. WA2LRO, New York City, made 275 contacts on 6, but missed a few sections in running up the only other 50-Mc. score over 5000 points. It is interesting that the New York City-Long Island Section, a Channel 2 area, had its four top entries on the 50-Mc. band. Section awards were won by only 13 50-Mc. stations, and several of these were in low-competition sections. All was not lost in the 50-Mc. DX picture: VE8BY, our old reliable in Yellowknife, N.W.T., managed to work VE4YW in Manitoba, and W8KNC/KL7, near Fairbanks, Alaska, just to keep his hand in.

There was little good propagation on 144 Mc. either, so 2-meter scores were generally below recent averages. W1HKL and K1PKQ/1, both of Connecticut, were 1–2 in the 2-meters-only category, with 208-16-3328 and 171-16-2736, respectively. Even in the small-section East, 16 ARRL sections are not worked every day on 144 Mc. One entry with a 1-1-1 score rates some special attention: WB6JZY's 144-Mc. QSO with KP4BPZ via the moon. This call was given incorrectly in earlier reports of the moonbounce doings as WB6GZY. Our apologies, OM!

These June and September parties are becoming more and more the occasions for group efforts. There are v.h.f. enthusiasts who may be somewhat frustrated in their efforts from their home locations, but a couple of times each year they can go all-out, in a site of their own choosing. "Working portable" used to be a matter of taking a battery rig to some high spot, but the portable ventures in our v.h.f. parties often bear little resemblance to this. Instead, they are more likely to be combined efforts of a dozen or more staunch v.h.f. men, who pool their resources and skills to provide the best possible equipment and facilities. Often these mountain "portables" thus include high-powered transmitters, capable of operating on sideband and c.w., as well as a.m., several of the best communications receivers available, low-noise converters of advanced design for all bands from 50 to at least 1300 Mc., and antennas of a size seldom seen in the sky above an average ham residence.

The talent manning these installations is usually second to none in contest and v.h.f. know-how, and each year the participants learn from the previous year's mistakes or successes. The best spots are ferreted out, and the means for using them to the fullest advantage are explored fully. These ventures don't "just happen." Often they are planned a year or more ahead, and some groups do little else in ham radio but work toward these two big week ends per year.

It is no small wonder, then, that some truly fabulous accomplishments are being recorded every June and September, in every section of the country. The numbers below are really significant only when you look back over past accomplishments in the various areas concerned. There being no satisfactory way to place a "figure of merit" on such work on a country-wide basis, one should from time to time glance back through the reports of v.h.f. parties over the years past. Only then will the reader realize the true significance of the

Something new in operating tents: K1PLX/1, Pack Monadnock, N.H., used half of a 30-foot echo ballon, until wind tore it to shreds.

job being done today. Meanwhile, those who stay home reap the benefits, along with those who take to the hills, as topnotch mountain stations always provide extra contacts and multipliers for the stay-at-homes.

Remembering the inherent imbalance between east and west, north and south, in the matters of ARRL section size, population concentrations and geography, we cite a few outstanding efforts, emphasizing again that a New England number one did not necessarily outperform a California number six. Once again, the top score among portables was turned in by the King Philip Amateur Radio Society, K1OOR/1, operating from the highest spot in Massachusetts, Mt. Greylock. With 16 operators on 50 through 10,000 Mc., K1OOR/1 made 960 contacts. With a multiplier of 73, this brought in 76,869 points. The 6220 Club, W2PEZ/2, New Milford, N.J., made 925 contacts on 50 through 1230 Mc., for 47,677, with a staff of 13. Waltham Amateur Radio Association's W1MHL/1, on Mt. Monadnock, N.H., slipped to third spot with a mere 692-59-43,601 this time.

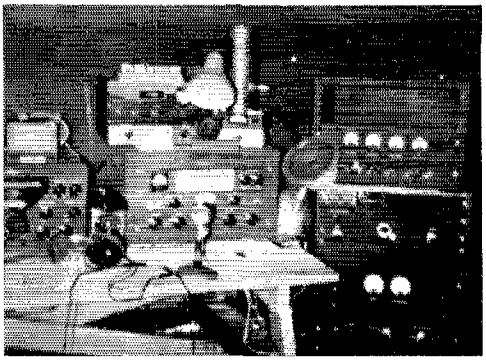
The Southern California V.h.f. Club, K6BPC-/6, turned in a fine 754-27-21,384 effort from Frazier Peak, in the Santa Barbara Section, to lead all western entries. W6PUZ/6 in the San Diego Section hit 661-22-16,258. Both were 8-man jobs. All things considered, the California entries look the best we've ever seen, and we could go on for pages recounting the efforts of numerous clubs and other groups. For years the W6s sought some magic spot from which it would be possible to work all California Sections — even on 144 Mc. K6TJL/6, San Benito Peak, in the Santa Clara Valley Section, turned the trick this time on 432, in addition to posting a 200-36-8244 score.

W4FWH/4 found 432 productive for the first time. With W4VHH helping, atop Brasstown Bald Mountain, 90 miles north of Atlanta, contacts were made on 432 with 6 sections, none of them close by. The prize was K4NTO in Florida, 475 miles distant.

Some prodigious mountain-climbing on foot went into a few portable ventures. The only way up Mt. LeConte, one of the highest points in the Great Smokies is under your own foot-power, 5½ miles. W4ZZ has a lodge near the summit, but gear for the W4SKH/4 was packed up the hard way, and in torrential rain! A 2-mile hike, with all gear and a generator, was involved in operation by W1ETO/1 on Bear Mountain, highest point in Connecticut. The writer knows this spot well, and can make it with little more than a transistor portable and a sandwich! — *E.P.T.*

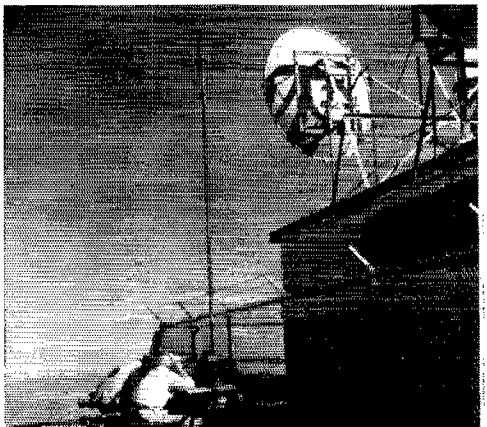
Soapbox

K4LPW, after the Mt. LeConte hike: "I slumped into a chair, but my feet were still walking!" . . . *K3OBU/3:* "Never heard so many Maryland stations. I operated portable there because the section has seemed scarce in the past, but everyone else had the same idea." . . . *K8ZES*, Galion, Ohio: "Good contest, though only a 5-minute opening on 6. Groundwave was good on 2 in one direction or another all weekend, and it was even better on 6 at

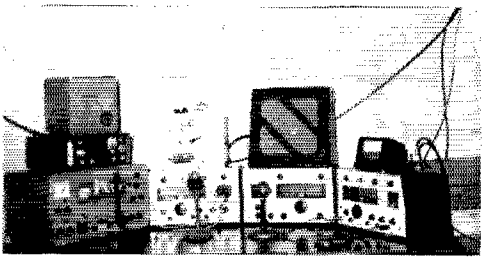


Part of the 144-Mc. setup of K1OOR/1, highest-scoring station in the June V.h.f. Party, atop Mt. Greylock, in the northwest corner of Massachusetts.

Vic Michael, W3SDZ, Milton, Pa., smiles happily over his 270–46–13,064 score in the June V.h.f. Party, made on four bands.



50-Mc. operating position of K6TJL/6, San Benito Peak, Santa Clara Valley Section. This station had the distinction of working all 8 California sections on 432 Mc. They also heard the 432-Mc. moonbounce signals of KP4BPZ. Dish adjacent to the 50-Mc. antenna is not part of the K6TJL setup.



Well-equipped station of K2LNS, Northern New Jersey Section winner, and top single-operator entry in the June V.h.f. Party.

times, which is unusual." . . . *K8SSK*, Columbus: "No E_s, but approaching cold front brought good tropo." . . . *K2SWI:* "Heard KP4BPZ on 432 moonbounce." . . . *W2PEZ/2:* "Enjoyable contest, except for short break to get rid of copperhead snakes!" . . . *W4TVH/3:* "Finally had to get some sleep Sunday afternoon — then the band opened, and my wife couldn't get me awake in time!" . . . *W3AJD/3:* "Some minor interruptions. We took time off Saturday afternoon to hunt for lost children. (They were found 2 hours after dark, unharmed.) Next day state troopers carrying shotguns showed up, looking for three armed men who had shot two state policemen on the Pennsylvania Turnpike nearby. The station was dismantled quickly on police advice. (The last of the three men was captured late in the afternoon.) Hope for quieter conditions in September!" . . . *W3SDZ* — "Use of c.w. helped out with many sections that would have been impossible on phone." . . . *KØCER:* "Next time please try to arrange for an opening that *includes* South Dakota!" . . . *K2YNT/2:* "Our first real contest try. Greatest moment was when our APX-6 sang out with the tone of W2PEZ/2!" . . . *K1YLU/1*, Mt. Wachuset, Mass.: "Never saw such bad weather as during Saturday night. We lost some contacts made during the worst of it, when fog and rain made ink on our logs run, and I couldn't read them in copying this report — but we did have fun!" . . . *K7MFA/7*, near Boise, Idaho: "Spent 8 hours Sunday at 6000-foot elevation, and only station worked was W7GBZ/7 at a similar elevation 25 miles away. No skip, except some c.w. briefly around 8:30 A.M." . . . *K7JZP/7*, Seattle: "Aside from hearing very little skip, and snoozing through our Sunday-morning scatter skeds, it was a lot of fun." . . . *WGSDM/6:* "Not much of a score, but the 432 activity was something to hear. Many high-power stations in the San Joaquin Valley, which is isolated from the Bay Area and Los Angeles activity centers." . . . *W4TLC*, Taylors, S.C.: "Very nice contest. 432 seems to be coming up all the time." . . . *K4WYS:* "Here's a log to make the big boys look good!" . . . *WØEVZ*, Denver: Set new record for restringing S-76 dial cord Sunday morning: 25 minutes!" . . . *WØEVE*, Boulder: "Local activity low, but 220 and 432 are picking up." . . . *KØBPC/6:* "50 Mc. was open 9 days running prior to the contest, and then again on Monday!" . . . *K5BXG:* "Everyone had to dig this time. 5 of my sections were worked on c.w., and without them my score really would have been lousy!"

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, 420 Mc.; and E, 1215 Mc. or higher. Multiple-operator stations are shown at the end of each section tabulation. An asterisk denotes a Novice Award Winner.

ATLANTIC DIVISION

Eastern Pennsylvania

K3IPM 15,012-392-36-ABCD
W3SDZ 13,064-270-46-ABCD
K3JGU 3821-213-17-AB
W3ETB 3564-162-22-AB
K3LNU 2115-141-15-A
K3ZTJ/3 840- 70-12-A
KN3ZSG 423- 47- 9-B
K3WJQ 150- 30- 5-AB
W3WJC 105- 15- 7-B
W3CCX/3 W2EIF, W3CL, K3LOM) 37,700-699-50-ABCD
K3TYE/3 (K3s QMQ TYD TYE) 8586-312-27-ABC
W3AD/3 (11 oprs.) 8400-280-30-AB
W3ARW (4 oprs.) 8160-177-40-ABCD
K3UNZ/3 (8 oprs.) 7248-302-24-AB
W3OI/3 (5 oprs.) 6800-264-25-ABD
K3YFZ (4 oprs.) 5947-313-19-AB
K3PPR/3 (8 oprs.) 4620-210-22-AB
K3YGH (W3s GFN JUZ) 3920-135-28-ABC
K3MTT/3 (6 oprs.) 3838-202-19-AB
W3HZU/3 (6 oprs.) 1824-114-16-AB
K3USY/3 (6 oprs.) 900- 90-10-A
W3CCH (K3s BUM DTD TEJ) 506- 46-11-AB
WA3ADR/3 (K3s OHU YEQ, KN3YQN) 66- 22- 3-AB

Maryland-D. C.

W3NG 2422-173-14-AB
K3UVH 2160-144-15-A
K3OBU/3 1740- 87-20-AB
K3MFM 1276-116-11-AB
K3NXU 860- 86-10-AB
K3WLK 840- 84-10-AB
K3WSQ/3 810- 81-10-AB
K3VRS 640- 80- 8-A
K3YGG 525- 75- 7-A
W3HB 252- 42- 6-B
KN3FPE 136- 34- 4-B
K3FYP 132- 33- 4-A
K3OKC/3 100- 25- 4-B
K3ERM/3 (8 oprs.) 9492-339-28-AB
K3PZD/3 (5 oprs.) 4016-251-16-A
K3ZRM/3 (4 oprs.) 2752-172-16-A
W4TYH/3 (multi-opr.) 2601-153-17-A
K3YSI (K3s YSI YYP) 900-100- 9-A

Delaware

K3UCX 5404-193-28-AB
K3AZH 3120-115-26-ABD
K3FED 1001- 77-13-A
W3HC 224- 32- 7-B

Southern New Jersey

WB2CUD/2 11,356-334-34-AB
WA2EMB 5950-160-34-ABD
WA2VBN 2142-119-18-AB
WB2ENJ/2 1000-100-10-A
WA2KLZ 612- 51-12-B
W2HXF 165- 15-11-B
K2JKA (K2JKA, WA2KGD) 2226-159-14-A

Western New York

WA2VAI 2660-131-20-ABC
K2ERQ 2576-161-16-AB
K2YCO 2016-168-12-AB
WA2KVN 744- 93- 8-AB
WA2KND 576- 72- 8-AB
WA2THS 540- 90- 6-AB
W2EFO 432- 72- 6-A
WA2QFJ 230- 46- 5-A
WA2YRH 230- 46- 5-AB
K2BBJ 17- 17- 1-B
WA2WEB/2 (14 oprs.) 25,578-576-42-ABC
K2LOK/2 (7 oprs.) 19,020-634-30-AB
W2MAU/2 (10 oprs.) 11,124-286-36-ABCDE
K2ODL/2 (6 oprs.) 10,004-234-41-ABC
WA2JOQ (14 oprs.) 9423-340-27-ABC
K2LFB (8 oprs.) 6386-193-31-ABCD
W2KIJ/2 2465-145-17-AB
WB2CCA/2 (6 oprs.) 1920-124-15-ABCD
W2ZKF (W2s WZR ZKF, WA2G8X) 1312- 77-16-BD
W1KBI/2 (W1s KBI TLZ) 936- 78-12-B

Western Pennsylvania

K3OJH/3 2282-163-14-A
K3TTM 714-102- 7-A
W3IJM 130- 26- 5-A
KN3ZGI 18- 6- 3-B
K3IWK/3 (5 oprs.) 8004-348-23-AB
K3HKK/3 (8 oprs.) 7308-260-28-ABD
K3PLX/3 (K3s GZS PLX) 2660-140-19-AB
W3ZRQ/3 (K3MPN, W3ZRQ) 1695-113-15-A
K3EAV/3 (K3s EAV SWZ SZX) 1650-110-15-AB
K3ZFP (K3s ZFP ZHH) 1320-110-12-AB
W3VI (8 oprs.) 957- 87-11-A
K3USC (K3s USC ZOP) 424- 53- 8-AB
K3FOW (4 oprs.) 364- 52- 7-AB

CENTRAL DIVISION

Illinois

K9DWR 1350-134-10-ABC
K9VCZ 680- 85- 8-AB
K9AAJ 533- 40-13-ABD
WA9FIH 500-100- 5-A
K9HMB 442- 24-17-ABCD
WA9JQE 212- 53- 4-B
W9RSV 205- 41- 5-A
WA9ETE 180- 36- 5-AB
WA9EEG 171- 57- 3-A
WA9BSF 153- 51- 3-A
WA9EMN 145- 29- 5-AB
WA9HEU 57- 19- 3-AB
K9DTB 36- 9- 4-ABC
WA9EKJ 11- 11- 1-A
K9YZG 9- 9- 1-A
K9DNW 8- 8- 1-A
K9VIS (K9VIS, W9WOK, WA9AHU) 3900-325-12-AB
WA9CDN (WA4AXL, K9WTS, WA9CDN) 616- 77- 8-AB
K9YHB (K9AYR, WA9EJD) 580-116- 5-A
WA9HJZ (WA9s G8M HJZ) 240- 60- 4-A
K9YNF (2 oprs.) 66- 22- 3-A

Indiana

K9WZB 896-112- 8-AB
K9JTZ 245- 49- 5-A
W9MHP 160- 16- 8-ABCD
WA9CYG 81- 27- 3-A
K9VPE (K9s QCB VPE) 3852-205-18-ABCDE

Wisconsin

WA9CBO 775-155- 5-A
K9YGR 645-129- 5-A
WA9BPG 505-101- 5-A
W9DHQ 200- 40- 5-B
WA9FPH 165- 55- 3-A
WA9AVZ 72- 24- 3-B
W9TQ 52- 13- 4-B
WN9JFM 36- 12- 3-B
WN9JKN 5- 5- 1-B
W9HHX (WA1BWF, WA9's BFH GZU) 525-105- 5-AB

DAKOTA DIVISION

South Dakota

KØCER 243- 27- 9-A
KØUDZ 203- 29- 7-AB

Minnesota

WØIRO/Ø 176- 44- 4-A

DELTA DIVISION

Mississippi

K5TYP (K7HSD, WAØDRP)
100- 25- 4-AB

Tennessee

WA4CGA
1023- 93-11-AB
WA4DCZ/4 60- 20- 3-A
W4SKH/4 (18 oprs.)
7619-397-19-ABE
K4LQO (4 oprs.)
1665-185- 9-A
W4ZOD (4 oprs.)
1258- 72-17-ABD

GREAT LAKES DIVISION

Kentucky

WA4AAJ 1824-114-16-AB
WA4ERT 416- 52- 8-A
K4QPJ (K4QPJ, WA4QVQ)
792- 88- 9-AB

Michigan

W8CVQ 649- 59-11-AB
K8VEX 414- 69- 6-A
W8VRH 232- 58- 4-B
WN8KOS 152- 38- 4-B
WN8LGS 108- 36- 3-B
WN8MIL 27- 9- 3-B
K8TIW (7 oprs.)
1800-150-12-AB
W8SH (3 oprs.)
1275- 85-15-AB

Ohio

K8ZES 4313-227-19-AB
K8SSK 2090-209-10-AB
WA8HVY
1112-139- 8-A
W8KKF 992-124- 8-AB
K8PLD 848-106- 8-B
W8JRN 776- 97- 8-AB
K8VGL 558- 62- 9-A
WN8MFE*
534- 89- 6-B
WA8CJP 448- 64- 7-AB
K8PMW 222- 37- 6-AB
WA8DOM 30- 15- 2-B
K8YWF 10- 10- 1-B
WN8JSL 5- 5- 1-B
WN8JSK 3- 3- 1-B
W8CCI (7 oprs.)
7660-380-20-ABC
K8CJY (6 oprs.)
2884-201-14-ABD
W8ID (7 oprs.)
1441-131-11-AB
K8ZSZ/8 (7 oprs.)
1062-118- 9-AB

HUDSON DIVISION

Eastern New York

K2CBA[2]
8979-199-41-ABCDE
K2GXJ/2
5190-164-30-ABC
WB2FXB
1000-100-10-B
WN2IOR 488- 61- 8-B
K2GSF 300- 30-10-B
W2IP 248- 31- 8-B
WB2HZY 130- 26- 5-A
W2HF 120- 12- 5-C
WB2FKJ/2 (15 oprs.)
31,320-481-58-ABCDE
K2CQS (14 oprs.)
28,428-583-46-ABCD
K2ARO/2 (7 oprs.)
15,561-385-39-ABC
W2MFF/2 (9 oprs.)
1806- 80-21-ABC

N. Y. C.-L. I.

W9ECV/2
6026-262-23-A
WA2LRO 5225-275-19-A
WA2WVW
1650-150-11-A
WB2GMF
1430-110-13-A
WA2OOL 1250-125-10-B
WA2YXK
1111-101-11-AB
WA2DRK
1001- 77-13-B
W2KXG 816-102- 8-B
W2DHN/2[4]
720- 60-12-AB
WN2LUU 644- 92- 7-B
W2LJF 360- 40- 9-B
WB2CNC 287- 41- 7-AB
W2ZSD 248- 31- 8-AB
WA2OUM 204- 34- 6-B
W2DBQ 135- 27- 5-B
W2RPZ 126- 42- 3-B
K2OZH 102- 17- 6-B
WA2YII 88- 22- 4-B
WN2JJT 51- 17- 3-B
K2SWI (9 oprs.)
27,183-497-51-ABCDE
WB2NXN (5 oprs.)
14,911-481-31-AB
W2ZOA/2 (WA2YZB, WB2GGX)
480- 60- 8-AB
WB2DIN (WB2s ART DIN)
476- 68- 7-AB
W2UW/2 (multi-opr.)
324- 54- 6-B
WA2NLX (WA2NLX, WB2GAG)
22- 11- 2-A

Northern New Jersey

K2LNS 24,334-509-46-ABCD
WB2GCD
2865-184-15-BC
WA2WIL 1650-150-11-B
WA2VEB 1536- 96-16-AB
WB2KDK
1526-109-14-B
WA2BDP 1484-106-14-AB
WA2IJI 1080-108-10-B
WN2LEB*
1017-113- 9-B
WA2OOD 1000-100-10-B
WB2CCX 891- 81-11-A
WA2ZKT 850- 85-10-AB
WN2KDD 828- 92- 9-B
WN2LOO 588- 84- 7-B
WA2IDH 312- 52- 6-A
K2DMI 150- 30- 5-B
WN2KQD 132- 44- 3-B
WA2HJN 112- 28- 4-A
WA2ZRT 66- 22- 3-A
W2MQF 48- 16- 3-B
WA2LOW 28- 28- 1-B
W2PEZ/2 (13 oprs.)
47,677-925-49-ABCDE
W2LST (7 oprs.)
36,110-739-46-ABCD
K2YNT/2 (8 oprs.)
29,541-653-43-ABCE
WA2SAB/2 (6 oprs.)
20,088-526-36-ABCDE
K2BJP/2 (15 oprs.)
18,901-420-41-ABCDE
WA2VLR (6 oprs.)
17,056-529-32-ABE
W2ZDR/2 (W2s FPM NLN NUL) 5900-209-25-ABC
K2DEL (8 oprs.)
2992-187-16-AB
WA2TWG/2 (4 oprs.)
2064-129-16-AB
WB2JJK/2 (WA2HRR, WB2s JJK JIO)
828- 92- 9-AB
WN2KNO (WB2IYO, WN2s KNO LOC)
476- 68- 7-B

MIDWEST DIVISION

Iowa

WAØCVA 448- 64- 7-A

Kansas

KØGIC 259- 37- 7-AB
WAØDZI 40- 20- 2-A
KØPFV (KØs MMI PFV)
90- 45- 2-A

Missouri

WØEKM 707-101- 7-A
WAØFLL 355- 71- 5-A
KØCWP (KØs BYR CWP)
525- 75- 7-AB

Nebraska

W9EET/Ø 60- 15- 4-AB

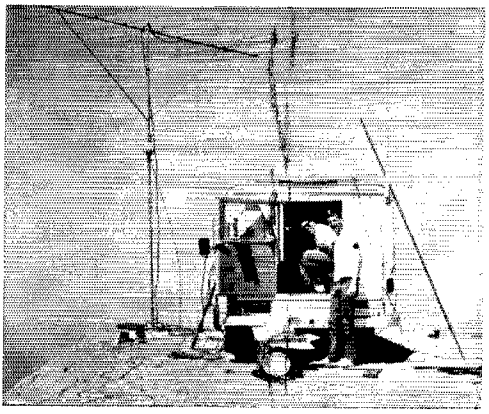
NEW ENGLAND DIVISION

Connecticut

W1MEH 3675-175-21-AB
W1HKL 3328-208-16-B
W1WHL 3200-160-20-AB
K1PKQ/1
2736-171-16-B
W1WFB/1
1495-115-13-B
K1QGC 1272-106-12-B
W1HDQ[4] 1100- 43-20-ABD
W1NZY 928- 58-16-AB
K1RTS 440- 55- 8-B
WN1ALR 432- 54- 8-B
WN1ANB 378- 63- 6-B
W1USF 42- 7- 3-C
K1ZTF 18- 9- 2-AB
K1BEN (6 oprs.)
7992-296-27-AB
W1ETO/1 (8 oprs.)
4104-171-24-AB
K1VMI (K1s ERA PLR YMI) 1085-203-19-ABC
K1DII/1 (K1s DII RSK YPP) 2520-140-18-AB
W1VON/1 (4 oprs.)
2130-106-20-AB
K1PFD (K1s PFD PQA)
16- 8- 2-B

Maine

K1MTJ 200- 40- 5-AB
K1OYB 66- 22- 3-AB
K1NAY/1 (K1s NAY ZDF)
4620-231-20-AB
K1NTC/1 (K1s JDY NTC WPE) 1980- 99-20-AB



Mt. Tecate, on the Mexican Border, was used by W6NLO-/6. Operators at the 50-Mc. position here are WB6EAX and WA6UHB.

Eastern Massachusetts

W1QXX 9905-273-35-ABC
W1VAH 576- 64- 9-A
K1DRB 240- 22-10-ABD
K1ZGH/1 216- 27- 8-A
W1BDF 150- 25- 6-B
K1YYE 96- 24- 4-B
K1FJM 87- 29- 3-B
K1WYS 84- 21- 4-A
K1ZGH 77- 11- 7-A
W1CTR/1 26- 13- 2-AB
W1QIB (8 oprs.)
6214-238-26-ABC

Western Massachusetts

K1JIX
10,836-221-42-ABCDE
K1VCK 2800-200-14-A
K1ULZ 630- 63-10-AB
W1DXS 539-49-11-A
W1HDQ/1 352- 44- 8-A
W1UCB 160- 20- 8-AB
K1OOR/1 (16 oprs.)
76,869-960-73-ABCDE
K1YLU/1 (6 oprs.)
8242-317-26-AB

New Hampshire

W1FZ/1 4060-133-28-ABCD
W1IQD 200- 25- 8-A
W1MHL/1 (13 oprs.)
43,601-692-59-ABCDE
K1PLX/1 (4 oprs.)
6164-268-23-AB
W1ALE (W1s ALE YQH)
2808-102-26-ABCD
W1BHU/1 (K1LKK, W1BHU) 32- 4- 4-ABE
W2MSN/1 (K1LKK, W1DDN, W2MSN)
28- 4- 4-ABDE

Rhode Island

W1QLT[5] 120- 15- 8-A

Vermont

W1EXZ 120- 15- 8-AB
W1QQ 6- 6- 1-B
W1IPJ/1 (11 oprs.)
11,340-239-42-ABCD
K1QIZ/1 (K1s QIZ UZK)
915- 61-15-AB
K1DJH (5 oprs.)
754- 58-13-AB
K1CQX/1 (K1CQX, W1JVL) 104- 8- 8-ABCD

NORTHWESTERN DIVISION

Alaska

W8KNC/KL7
8- 4- 2-A

Idaho

K7MFA/7 1- 1- 1-A

Montana

W7TYN/7 8- 8- 1-B

Oregon

K7GWE/7 903-127- 7-ABCD
W7TYR 528- 81- 6-ABCD
W7DIS 244- 61- 4-AB
K7AAD 160- 17- 8-ABCD
K7EAU 56- 28- 2-A
W7UDM/7 (4 oprs.)
636-103- 6-ABCD
W7ICS/7 (K7s ELM UWW, W7ICS) 240- 60- 4-AB

Washington

K7BBO 996-166- 6-A
K7QQP/7 535-107- 5-A
K7ZQD 78- 39- 2-A
K7YHQ 30- 30- 1-A
K7UMJ/7 17- 17- 1-A
K7DTH (K7s DTH OFT)
1833-141-13-AB
K7JZP/7 (K7s CAZ HEF JZP) 1705-153-11-ABCD
W7EK/7 (6 oprs.)
192- 64- 3-A

PACIFIC DIVISION

Hawaii

K6QKL/KH6
2- 2- 1-A

Nevada

K7ICW 429 -32-13-ABC
WA9IMR/7 (4 oprs.)
261- 29- 9-A
WA6GER/7 (K6OLP, WA6GER)
240- 40- 6-A

Santa Clara Valley

K6SDZ 2336-146-16-AB
WA6QQH
1584-124-12-ABD
WA6VPL 20- 10- 2-B
WB6JZY 1- 1- 1-B
W6UW/6 (11 oprs.)
11,264-323-32-ABCD
K6TJL/6 (7 oprs.)
8244-200-36-ABCDE
K6SLQ/6 (10 oprs.)
6831-278-23-ABCD
W6QWN/6 (W6QWN, WA6s MLY RMO)
1358- 97-14-AB

East Bay

K6KLY 1032- 80-12-ABD

San Francisco

WA6RRH
1110-111-10-AB
W6AJF 882- 47-14-ABCD
WA6YYM/6
810-135- 6-B
K6VXI 396- 44- 9-AB
K8JHE/6 108- 18- 6-AB
WB6GUG/6 (6 oprs.)
3388-308-11-AB

Sacramento Valley

WA6PAB 450- 45-10-AB
K6ONP 210- 21-10-AB
WA6DDO 185- 37- 5-B
W6HBU/6 (6 oprs.)
1482-114-13-AB

San Joaquin Valley

W6FZA 1152- 36-24-ABD
WB6EDF 147- 21- 7-AB
W6SDM/6 (K6DAH, W6s ELT SDM)
1826- 71-22-ABCD

ROANOKE DIVISION

North Carolina

WA4BVW/4
1920-118-16-ABC
K4MHS 372- 28-12-ABCD
W4HJZ 329- 47- 7-AB
WA4REX 292- 73- 4-B
WA4SQB 204- 68- 3-AB

(Continued on page 162)

September V.H.F. QSO Party

"CQ CONTEST" on the v.h.f. bands the week end of September 12–13 will mark another popular ARRL V.H.F. QSO Party. This contest which gets under way at 2 P.M. (1400) your local standard (*not* daylight) time Saturday, September 12, and runs through 10 P.M. Sunday, September 13, is open to all amateurs in the 73 ARRL sections who can work 50 Mc. or above. For purposes of the contest Yukon-N.W.T. (VE8) will count as a separate multiplier. Contacts count only when the contest is in progress at both ends of the QSO.

Just exchange ARRL section (see page 6, this *QST*) and count one point for completed exchanges on either 50 or 144 Mc.; two points for contacts on 220 or 420 Mc.; and three points for contacts on higher bands. The sum of these points multiplied by the number of different ARRL Sections worked per band gives you your final score. Therefore, it pays to contact the same stations on different bands to increase both contact points and multiplier. **Portables are urged to sign properly to avoid possible disqualifications.**

All foreign contacts count for QSO points, but *only once* for section multiplier per band, even if in different countries. See rule 4b.

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

Send to ARRL Communications Dept., 225 Main Street, Newington 11, Conn., for free log forms as shown on page 38 of June, 1964, *QST*. Either follow that log format, or send for the log forms. Reports should include your call and ARRL section, as well as times (GMT), calls, and sections of stations worked. To report the results in December *QST* (so you'll know how you did before the V.H.F. SS starts), we must have the logs in before the deadline. Logs must be postmarked by October 5. Good luck!

Rules

1) The contest starts at 2:00 P.M. local Standard Time, Saturday, Sept. 12, and ends at 10:00 P.M. Local Standard Time, Sunday, Sept. 13. All claimed contacts must fall within this period and must be on authorized amateur frequencies above 50 Mc., using permitted modes of operation. Contacts between stations in different time zones can be counted only when the contest period is in progress in both of the time zones concerned.

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 station used to contact one or more stations may not subsequently be used under any other call during the contest (with the exception of family stations, where more than 1 call is assigned to one location by FCC/DOT).

4a) 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 bands. The sum of these points will be multiplied by the numbers 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.

4b) Foreign entries: all contacts with foreign countries (such as Mexico and the Bahamas) count for score. All foreign countries are grouped together as one, and a section multiplier of *no more than one* (per band) may be claimed for contacts with all foreign stations contacted. Foreign stations may only work stations in ARRL sections for contest credit. Foreign stations will give their country name in the exchange.

5) A contact *per band* may be counted for each station worked. Example: W1FZJ (E. Mass.) works W1HDQ (Conn.) on 50,144 and 220 Mc. for complete exchanges. This gives W1FZJ 4 points (1 + 1 + 2) and also 3 section-multiplier credits. (If W1FZJ contacts other Connecticut stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.)

Contacts made by retransmitting either or both stations do not count for contest purposes.

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

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

8) Reports must be postmarked no later than Oct. 5, 1964, to be eligible for awards. Follow the sample log for correct form, or a message to Headquarters will bring printed blanks for your convenience. QST

Strays

Members of the Old Pueblo ARC of Tucson, Arizona, continue to collect community kudos. Featured in news splashes last year were K7OBS and several others. Old Pueblo members have been very active in such public service activities as the Eyebank Network, c.d., and message handling for crippled and asthmatic children.

—···—

The *Los Angeles Times* recently told of the pooch who couldn't wear a collar: if he scratched while wearing a collar, he changed channels on the family's remote-controlled television. — *W6PXU*

—···—

WB2BME and WB2DKF are forming a French students' net on six meters. Inquiries to WB2BME are welcomed.

—···—

W4ZDB tells us of a chess match between the Ashland, Ky., and Cincinnati chess clubs. The match was held on 80 c.w. with W8QHW at the Cincy end. Cincinnati won it, 3½ to 1½.

100% QSO

BY JOHN G. TROSTER,* W6ISQ

"QRZ W6ISQ — break."
"W6ISQ, W4JIK — break."
"W4JIK, W6ISQ. 5 by 9 — break."
"W6ISQ, W4JIK. Same — break."
"W4JIK, W6ISQ. Near San Fran — break."
"St. Pete here — break."
"Name Jack — break."
"Okay here — break."
"For identification purposes, this is W6ISQ in contact with W4JIK — break."
"For identification purposes, this is W4JIK in contact with W6ISQ — break."
"Kw. here — break."
"100 watts here."
"Three elements — break."
"Dipole — break."
"You're down to S5. Break."
"Why? Break."
"Ahhhh — err — QSB — break."
"Oh — break."
"Great contact — break."
"Good QSO — break."
"See ya 'round — break."
"See ya — break."
"Seven three — break."
"Yeah — seven three — break."
"W6ISQ signing clear with W4JIK after 100% QSO — break."
"W4JIK signing clear with W6ISQ after 100% QSO — break."
"QRZ W6ISQ — break."
"W6ISQ, W3TMZ — break."
"W3TMZ, W6ISQ. 5 by 6 — break."
"W6ISQ, W3TMZ. 5 by 8 — break."
"Near San Fran — break."
"Near D.C. — break."
"Handle Jack — break."
"Handle Jack — break."
"No-no-no — handle *here* Jack — break."
"Handle also Jack — break."
"Ohhhh . . . haw . . . break."
"Yeah . . . haw . . . break."
"For identification purposes this is W6ISQ in contact with W3TMZ."
"For identification purposes this is W3TMZ in contact with W6ISQ."
"Kw. here — break."
"Same here — break."
"Three elements here — break."

45 Laurel Ave., Atherton, Calif.

"*Five* elements here — break."
"Guess you're 5 by 8 now — break."
"That's better — receiver trouble? Break."
"Yeah — break."
"Rough — break."
"Clear here — break-break."
"I'm an OO here, OM — one 'break's' enough. Rain here. Break."
"For identification purposes, this is W6ISQ in contact with W3TMZ — break."
"For identification purposes, this is W3TMZ in contact with W6ISQ — break."
"Great contact — break."
"Real great — break."
"Seven three — break."
"Seventy threes — break."
"Whaaaattt??? Break."
"Oooops, sorry OM — forgot. Seven three — break."
"W6ISQ signing clear with W3TMZ after 100% QSO — break."

"W3TMZ signing clear with W6ISQ after 100% QSO — break."
"QRZ W6ISQ — break."
"W6ISQ, W4HKJ — break."
"W4HKJ, W6ISQ. 5 by 7 — break."
"W6ISQ, W4HKJ. 5 by 7 — break."
"Near San Fran — break."
". . . break . . . rain . . . snow . . . great . . . 1D . . . see ya . . . seven three . . . And this is W6IQ — after 100% QSO . . . QRZ? . . ." QST

MORE BANDS!

U.S.A. and Canada on November 15th Open 10 and 5-Meter Bands and Four Microwave Bands; 2½ Shifted; International DX Restored

JUST as this issue of QST is ready for the bindery, and with barely time enough for us to slip in this extra sheet, the Federal Communications Commission for the United States and the Department of Transport for Canada on November 9th have simultaneously announced important actions restoring amateur radio on frequencies above 28 Mc. The actions are effective at 3 A.M., E.S.T., on November 15th.

The FCC action is covered by its Order 130 and replaces the temporary authorization of last August under which we operated until Nov. 15th. While it is expected that by early December FCC will be able to set up the machinery to issue new station licenses (and begin the renewal and modification of old ones), such facilities are not yet available. The only action possible at the moment is therefore to continue a temporary authorization to those of us already licensed. Station licenses that were valid at any time between Dec. 7, 1941, and Sept. 15, 1942, are validated for another six months — until 3 A.M., E.S.T., May 15th. (During that time there will be FCC instructions on how to apply for renewals.) Such stations are then authorized to operate on a newly-stated group of frequency bands. The action applies to all areas under FCC jurisdiction except the central, southern and western Pacific areas. Unfortunately, at the time of releasing the order military clearance had not been completed for Hawaii and the U.S. island possessions in the Pacific, and they are excluded. (The prohibition is but temporary and it is possible that it will be lift- even before Nov. 15th. K6 amateurs should keep themselves informed by l- to W1AW's broadcasts. Here are our new frequency bands after Nov

TEN METERS

The postwar band 28–29.7 Mc. is opened in its e- to 29.5 is available for a.m. 'phone (A-3), wh- 29.7 Mc. The 'phone figures are reported- and do not represent ARRL sugge- should observe them carefull-

We open- a.m. '-

ARRL—Postwar Readjustment

IN 1918 the dawn of peace had shed its first uncertain rays on an amateur radio which was nearly defunct. The League had been closed up since the enlistment of its Secretary some fifteen months earlier. It had no funds; its "official organ" was privately published by the Secretary, and it owed much more than it owned.

In contrast, when peace arrived after World War II, ARRL was a stronger institution than at the start of the war — because of the intense loyalty of members and advertisers alike, and the success of its publications as training manuals. Truth to tell, much of the groundwork for re-establishment of amateur radio was already done by V-J Day: four days afterward, the military released most of the 2½-meter band to FCC and it, in turn, to amateurs. Licenses which had expired since 1941 were reactivated by a series of extensions, and amateur radio was back in business.

Postwar allocations planning — both for domestic usage and looking toward an eventual international radio conference — had begun in 1943. By 1945, the Interdepartment Radio Advisory Committee (the agency which regulates government use of radio) and FCC had agreed on an allocations table: the amateur service was constantly represented by ARRL during the planning stages. The new Loran service spelled doom for the old 160-meter band (though sharing arrangements were later worked out by the League with the Coast Guard); a new 21-Mc. band was proposed; ten meters was clipped 300 kc. at the top edge to provide a "diathermy" band at 27 Mc. (also later temporarily shared by amateurs); v.h.f. bands were shifted to accommodate TV, f.m. broadcasting and aviation requirements; and a number of microwave bands for amateurs newly appeared in the table.

As the military shrank to peacetime dimensions, it gradually — and always with ARRL prodding — released bands for amateur use. W1AW in November 1945 commenced transmissions on 80-, 40- and 20-meter spot frequencies with bulletins of regulatory developments. The ten-, five- and new two-meter bands and the microwave frequencies above 2300 Mc. were released early in November; the 2½-meter band was withdrawn. In January 1946 the 420–430-Mc. (later expanded to 420–450) and 1215–1295-Mc. segments were made available. In February the new six-meter band was opened and the historic 5-meter band became TV Channel 2. In March amateurs were assigned shared use of the "diathermy" band and temporary use of 235-240 Mc. while arrangements were being made for the withdrawal of an aviation device from 220-225 Mc. The 80-meter band was returned earlier than scheduled after monitoring and subsequent pressure by ARRL; 3625-4000 kc. was cleared for April 1, the remainder by May 1. The top halves of the 40- and 20-meter bands were opened to amateurs in June of 1946, and the job completed in November with the release of the

remaining halves. All these measures were joint Canadian-U.S. moves, coordinated with other allies as well.

The original basis of U.S. amateur call areas had been the nine radio inspection districts of the Commerce Department. These districts had long since lost their meaning: in addition, some were very much heavier-loaded than others. Accordingly, ARRL drew up and furnished to FCC a plan for redistricting which would not split any states. The plan — under which we still operate — was adopted by FCC and went into effect with new calls issued after October 15, 1945. W3s in New Jersey, W6 Arizonans, W8s in Pennsylvania and New York, and W9s west of Illinois and Wisconsin continued to operate under their prewar calls until they applied for modification or renewal. Counterpart calls were given to these amateurs wherever possible, and later, for a time, to other amateurs who moved from one district to another. In 1946 the FCC decided to permit former holders of two-letter calls to apply for any unassigned two-letter calls as long as there were some available in the appropriate call area. Distinctive two-letter prefixes appeared in the possessions, and for the first time civilians were permitted to ham in the Canal Zone.

In Canada, too, the prewar calls were outgrown. VE4 lost Saskatchewan and Alberta, henceforth to cover only Manitoba. VE5, which prewar had included British Columbia, Yukon and the Northwest Territories, was assigned to Saskatchewan. Alberta became VE6-land and British Columbians got VE7 calls.

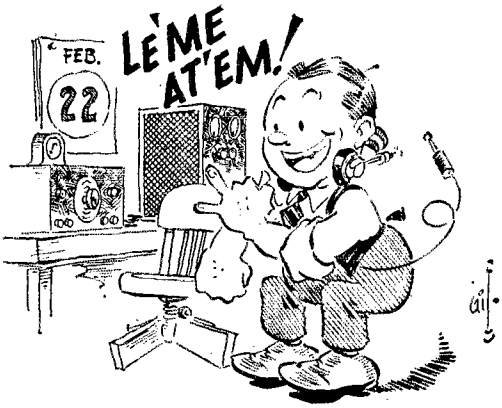
The new zero calls seemed overly long to some, who signed with the long-dash zero. FCC said this would not be permitted, and then did relent for a three-month test period, after which the long dash was permanently barred in call signs. Five-year license terms were adopted when licensing resumed in October 1945. Wartime measures, such as proving citizenship and registering transmitter equipment, were abandoned soon after the war ended. Amateurs no longer had to show possession of station equipment before being granted a station license and call sign, effective in July 1946. The requirement that the code test be written in longhand was changed at League request on behalf of the thousands who had learned to copy in block printing for Uncle Sam. Geographical names used to help identify an amateur call on phone were barred in 1946, but again permitted, at League request, since August of 1946.

The informal working relationship between ARRL and FCC was permanently altered with the adoption by Congress of the Administrative Procedure Act in 1946. Theretofore, an ARRL proposal for amateur rules change would be checked out with the FCC engineering and legal departments and, if no objections arose, the change would be promptly made. The new act required much more formal relationships between FCC (and all other alphabet agencies created by Congress) and those under their regulatory jurisdiction, including public notice of any proposed change and ample time for anyone interested in the matter to file comment. The first question to be stacked up behind the necessarily-slower procedures was the division of bands by mode, the first round of a battle — primarily between phone and c.w. groups — to be fought later. In the interest of unity for the forthcoming Atlantic City radio conference, the ARRL Board of Directors withdrew its request for increased phone privileges, as well as a proposal for a no-code license for frequencies above 200 Mc., thus postponing the ruckus which will be reviewed in these pages next month.

In 1947, W3DF was appointed Chief Engineer of FCC, and later that year was named a Commissioner; George Sterling thus became the only amateur to hold that office. A special department was newly established in FCC to handle expanding amateur regulatory matters.

There was a considerable and growing problem with TVI, both due to harmonics and to poorly-built sets. The problem was not restricted to the amateur, either; in June of 1948 the Commission held a general meeting of communications people to discuss harmonics. The League ran a story by Phil Rand, W1DBM, in May of 1948, and later cooperated in tests of i.f. and harmonic problems conducted by W1DBM with TV equipment borrowed from RCA, GE and Hallicrafters. In September that year FCC started using a form letter to complainants which was eminently fair to the amateur. A bulletin of the RCA Service Company to its affiliates further pointed out that amateurs were not the major cause of TVI.

By late in 1948, the Office of Civil Defense Planning had developed the basic concept of a national scheme building up from municipal level. Amateurs figured in these plans, at all levels, as an important alternate communications system. Meanwhile, cooperation between the amateurs and Red Cross was strengthened by a



This cartoon, used to illustrate announcement of the first postwar contest, the Band Warming Party, succinctly states the amateurs' view toward the all-too-deliberate process of postwar reopening.

Midway through the Atlantic City allocations conference ARRL gave a dinner for all licensed amateurs registered with the conference. Sixteen countries were represented by the thirty-three amateurs present.

plan for handling Red Cross traffic developed jointly by the agency and ARRL, announced in January 1949.

In March of 1949, after years of behind-the-scenes maneuvering, needling, prodding and so forth by ARRL's "traveling salesmen" in Washington and Ottawa, an arrangement was devised for amateurs in the U.S. and Canada to use parts of the 1.8-2.0 Mc. band, divided roughly east and west, sharing with the Loran service.

International

An international administrative radio conference had met at Cairo in 1938, and had made a date for 1942 at Rome. For obvious reasons, this meeting was never held. In the meantime, aviation, both commercial and military, had grown to many times its prewar size. Radar, Loran, distance-measuring equipment, radio altimeters, radiosonde, and other "black boxes" had been invented, had proved themselves, and were now in need of permanent frequency space. For a decade before the war, commercial television had been "just around the corner"; technology developed during wartime helped the TV industry finally to turn it. A wonderful world of music had become practical, as commercial v.h.f.-f.m. broadcasting also burst upon the scene. The alignment of nations was altered by events, and postwar, the jockeying for a better world position continued among nations, though perhaps with a different lineup; all of this would have to be reported to the citizens of the world, and international broadcasting must therefore be continued and spread. Radio — nay, electronics, for radio was now too restrictive a term — would not be the same again.

Thus, the great relief felt by amateurs in once again getting on the air was tempered — in the minds of serious hams, at least — with concern that the tremendous pressures brought by wartime developments against a non-elastic spectrum might be dangerous to preservation of amateur radio.

It is the Department of State which officially represents the U.S. at international conferences. In 1946 it was also the Department of State which was operating the nation's propaganda broadcasting transmitters. The combination almost raised a serious threat to the carefully-prepared plans of FCC and IRAC; there was a move inside State to expand the U.S. recommendations for the international broadcasting service. The reaction from other government and private users of radio was immediate, sharp — and successful: the move died in the making. There was also a brief flurry of activity connected with TV and f.m. broadcasting, both of which services were not altogether happy with their planned allocations, but the decision which moved amateurs from 56-60 Mc. to 50-54 Mc., placing TV next above, and f.m. starting at 88 Mc. was reaffirmed.

Meanwhile, the U.S. position pretty much firm, the U.S. undertook to explain its viewpoints to other nations — at the Third Inter-American Radio Conference held at Rio de Janeiro, September 3 through 27, 1945; at an Anglo-American communications conference in Bermuda in November; and at Moscow from September 30 to October 21, 1946 among telecommunications representatives of China, France, the U.S.S.R., the United Kingdom and the U.S. W1BUD was present at all three of these meetings, at Rio and Moscow representing the amateur service through ARRL, and at Bermuda representing the Coast Guard.

There was some disagreement about the venue and the opening date of the world conferences, but finally Atlantic City, New Jersey, was chosen as the site and the Administrative Radio Conference got under way in May 1947.

Before the conference ended, 20 weeks and 10,000 pages of mimeograph paper later, delegates knew they'd been in a fight! As one example, the camel of international broadcasting, having gotten its head in the amateur 7-Mc. tent at Cairo, tried to get shoulders and hump in there, too. The Cairo Convention had assigned the band to amateurs, worldwide, but then permitted sharing of 7.2–7.3 Mc. by international broadcasting outside the Western Hemisphere. At Atlantic City, the American republics, under the energetic guidance of Canada and the U.S., attempted to preserve the band as exclusively amateur. Other nations, chiefly in Europe and Asia, were equally determined that the international broadcasting service should have at least 150 kc. of the segment on an exclusive basis. Finally, the conflict was resolved on a political rather than engineering basis: the whole band remained exclusively amateur in the Americas, but in the rest of the world the ham segment was only 7.0–7.1, with 7.1–7.15 shared, the rest being allocated only to broadcasting.

The 80-meter band was properly handled on a regional basis, with the Americas again being more generous to amateurs. Here the band stayed

Sidelights, 1945-1948

A sprightly column, called "The Crystal Ball" made its first appearance in *QST* for September, 1945; short letters from members described the gear amateurs expected or hoped to see in their postwar shacks. . . . At League request, FCC adopted a policy of issuing advisory notices to amateurs heard with correctable violations of technical rules; previously, FCC had only a formal citation to be issued for violation, regardless of how minor or how serious a violation was. . . . The terms "Radio Engineer" and "District Engineer-in-Charge" replaced the terms "Radio Inspector" and "District Inspector-In-Charge" for FCC's field personnel. . . . At the Moscow five-power conference, the U.S. was permitted to bring only five industry people, one of whom was ARRL's Budlong. . . . The first mainland K calls were issued in the fall of 1946, to military recreation stations connected with the Naval Reserve. . . . The League and the Netherlands society, VERON, jointly sponsored a program under which U.S. and Canadian hams could "adopt" a PAØ amateur and send him components with which to rebuild his amateur station. . . . When a B-29 made a record-setting distance run from Honolulu to Cairo non-stop in October 1946, radio amateurs provided the backup communications. W3QR was communication officer aboard the *Parusan Dreamboat*. . . . First transoceanic work on six meters occurred when W1HDQ worked two Gs crossband on ten, in November 1946. . . . The Society of American Radio Amateurs was formed in November 1946, to organize the opposition to any expansion of phone bands. . . . "Incentive Licensing" was adopted in Canada effective April 1, 1947. Under the rules still in effect no phone is permitted below 30 Mc. for the first six months, after which operators may use the phone portions of the 10- and 11- meter bands. After a year, amateurs may try for the Advanced Amateur certificate, requiring a theory and regulations exam and a 15 w.p.m. code test, to acquire phone privileges on the bands below 25 Mc. . . . A special meeting of the Board was held on March 14, 1947, to cope with pre-Atlantic City jitters, and to assure directors and members that proper preparation for the conference had been accomplished. . . . The Board of Directors in May 1947 appropriated $25,000 and granted "Committee of One" powers to ARRL President Bailey to be used as necessary in the defense of amateur radio. The action came just days before the opening of the Atlantic City Conference. . . . Rules for amateur remote control were spelled out in a December 1947, FCC action. . . . Single sideband articles in *QST* were attracting attention; early in 1948 Secretary Warner predicted that "s.s.s.c." as it was called then would come along rapidly in the amateur field and that it would eventually have a material effect upon our allocations problems. . . . It was suggested in February that year that any phone allocations on the new 15-meter band might be restricted to s.s.s.c. . . . The Canadian phone bands were expanded to read 3.75-4.0 and 14.15-14.35 Mc. effective with the renewal of licenses on April 1, 1948. . . . In May the formation of the National Amateur Radio Council, Inc., was announced, to oppose an ARRL request for a Class A code speed requirement of 16 w.p.m. and for the continuation of 40 meters as a c.w.-only band. . . . ARRL's Budlong was one member of a three-man government committee which drafted a proposed new Inter-American communications agreement in advance of the Fourth Inter-American Radio Conference. . . . The familiar U.S. form of amateur license paper, with all information on both the station and operator licenses typed on one side, was put into use in July, 1948. . . . The Canadian and U.S. amateur rules were changed to permit mobile operation on all bands. . . . A. L. Budlong was appointed Acting Secretary after the death of K. B. Warner (see text). . . .

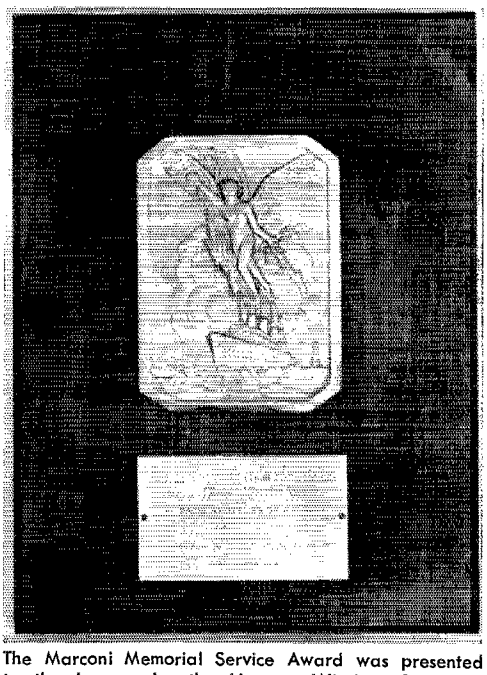
at 3.5–4.0 Mc. shared with the fixed and mobile services, precisely as it had since the high frequency pie was first cut up in 1927. In Europe and Africa (or more properly, ITU Region 1) the band emerged as 3.5–3.8, shared with fixed and mobile and in the remainder of the world (ITU Region III) 3.5-3.9 Mc. Further details in the western hemisphere were left for a later regional conference.

The 20-meter band, with heavy fixed and broadcasting pressures against it at various times, emerged with 50 kc. chopped off the top end (14.0–14.35 instead of 14.0–14.4 Mc. as it had been under the Cairo table), but still carrying the label "exclusively amateur." The ten meter band suffered only minor surgery, with 300 kc. out of 2,000 disappearing; the final result was 28.0–29.7 Mc., exclusively amateur.

On the credit side of the ledger was an entirely new entry — 21.0–21.45 Mc., exclusively amateur, worldwide, harmonically related to our 7-Mc. band, and having great potential for DX much of the time. Amateurs had never been legally entitled to this band prior to the Atlantic City conference.

Although the 1.8–2.0 and 26.96–27.23 Mc. bands could not be regarded as amateur, the conference approved sharing arrangements for 160 meters and in Region II for 11 meters. A few additional countries adopted one or the other by footnote.

Through all of this, the amateur service was most active. ARRL Secretary Warner, General



The Marconi Memorial Service Award was presented to the League by the Veteran Wireless Operators Association on February 16, 1946. The plaque was awarded "to the radio amateurs of America in recognition of their outstanding contributuons to the successful prosecution of World War II."

The ARRL booth at the Fifth National ARRL Convention, Milwaukee, September 4–6, 1948, with members of the Milwaukee Radio Amateurs Club on duty. From the left: W9DOS, W9NAV, W9DWI, W9PYM.

Counsel Segal, Assistant Secretary Budlong and Technical Director Grammer were members of the U.S. delegation. The International Amateur Radio Union observer group included W2KH, VE2BE, YV5AP, CX1CC, G6LJ, C1KT and LA1GA. All told, 41 amateurs from 20 countries were in attendance at the conference.

On October 2, 1947, the conference was over. In this business, however, one rarely gets a breather it seems — in November. Secretary Warner told the directors that planning for the Fourth Inter-American Radio Conference had gotten under way!

Organizational Matters

The high level of business which the League had reached during the war was exceeded in the two years following. It was necessary during this time to occupy the whole building at LaSalle Road, including the basement. The staff was raised from 45 at V-J Day to 60 employees 14 months later. A new lease was signed for LaSalle Road in 1945, covering the years 1947–1952. In 1947 the Board raised the dues from the rate of $2.50 set in 1926 to $3.00 in the U.S. and from $3.00 to $3.50 in Canada. Yet only a year later it was necessary to raise the dues again, to $4 and $4.50 respectively, so great had been the post-war inflationary pressures. Similarly, the *Handbook*, all its previous life a $1 book, was raised in 1947 to $1.25, and the 1948 edition sold for $2.00.

The Board considered, in 1946, a move to cut the number of League divisions in the U.S. from 14 to 10, the new ones to coincide with FCC call areas. However, the plan was defeated, mostly on the grounds that the directors would lose much contact with the members in the larger divisions. As a partial answer to unbalanced divisions — particularly the Central — a new Great Lakes Division was created in 1946, to comprise Michigan, Ohio, and Kentucky.

Charles Blalack, W6GG, who had been vice-president of the League since 1940, joined Silent Keys on December 7, 1945. The 1946 Board, after spirited politicking, elected J. Lincoln McCargar, W6EY, as vice president on the third ballot.

Kenneth B. Warner, W1EH, the first career employee of the League — secretary, general manager since 1919 and much of that time editor of *QST* as well — died suddenly early in the morning of September 2, 1948 of a coronary thrombosis. What his career had meant to the League was eloquently summarized in these words from the November 1948 issue of *QST*:

"For if it was Maxim who conceived our League, it was Warner who breathed into it life and energy and vitality, whose balanced judgment and clear vision ensured its growth and success." Warner's death came without warning. The day before he had put in a full day at the office, and had finished the speech he was to have delivered at the ARRL National Convention, September 4–6 in Milwaukee. The speech "The ARRL — Your Organization" was read to the assembly instead by Vice President McCargar. An era had come to a close.

Post-War Amateur Operating

Post-war on-the-air amateur activity paralleled the return of frequencies. First came the Aug. 21 sharing of 112 to 115.5 Mc. with the WERS. Thereafter each new band-opening order attracted a large initial occupancy. The League's Emergency Corps, also the appointments for and services to Official Bulletin Stations (OBS) were activated without delay. An ARRL *Band Warming Party*, in February 1946, was the first official spot activity. In this the ten-meter band was "a squirming mass of signals from one end to the other." Here was operating at fever pitch! Eleven meters was in use by March, but no part of 3.5, 7 or 14 Mc. became available until the order to permit 3625-4000 kc. operation starting April 1. Domestic traffic handling then resumed on a more normal scale and provision for emergency communications requiring h.f.'s could now go forward. The fraternal side was further emphasized in September by an ARRL *Get Acquainted Party*. The LSPH's (Licensed Since Pearl Harbor) were invited to get on the air and work the Pre-War Actives. Besides the customary exchanges of name and signal report, the ages and date-of-license gave data of interest: RCC was another objective. The point leader, WØEHR/3, had 47 15-minute (or longer) contacts and a 68,000 pt. total.

Expedition work: DXpeditions had not yet been reduced to mere statistics of the numbers of contacts. Amateurs then active may well recall the first post-war expedition — a B-29 "*Dreamboat*" flight, Hawaii to Cairo, W3QR operator, in Oct. '46. Then MacMillan's *Bowdoin* once more in June '46 left Boothbay Harbor, Maine for one of those voyages to the Arctic. KLPO, with W1KKS

W1AW returns to the air! Communications Manager, W1BDI, is here pictured at the ARRL Headquarters Station on October 31, when the first post-war transmissions of information "to all radio amateurs" was made.

as operator, was given FCC clearance to work two-way to handle its communications through amateurs. In April 1947, Expedition *Kon-Tiki*, LI2B, attempted to reach Tuomotu from Peru by ocean currents and a 45-foot balsa raft. W6EVM, W6AOA and others established 20-meter contacts and handled vital communications even though the raft equipment was a 10-watter with 2E30 tubes.

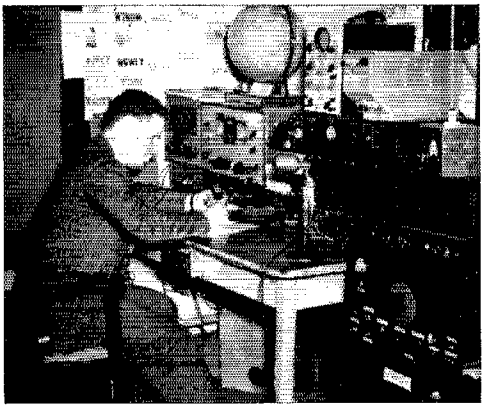
With the v.h.f.s assuming ever more importance, a new post, that of Official Experimental Station, was announced and met immediate acceptance. The Code Proficiency Program of certifications was resumed. This enjoyed great success in the latter nine months of '46. There were that year all the usual expected CD activities except the DX competition. The first 2,000 post-war RCC (Rag Chewer's Club) matchings were made. To examine band occupancy as soon as things became stabilized an Operating Interest survey card was inserted in January '47 *QST*. Ten-phone topped all bands for voice interest. Forty c.w. had about 20% of all operating interest with 80 and 20 rated at about 11% and 14%. The three major voice bands were 10, 75, and 20 meters, 25% 11% and 9% of all interest recorded. V.h.f. activity on 6 meters (1%) was about half its pre-war stature, (in view of the adjustment to a new frequency region) while 2-meter work rose to ten times the '41 occupancy representing 5% of total interest. A *VHF Marathon* was an 8-month feature for v.h.f. workers in 1946. Most-States VHF Contests also were held in '46 and '47. As well as points for mileage, the "marathons" encouraged (by band multipliers) versatile use of the different v.h.f. bands. The 11-month Marathon in '47 was the last; a new type *VHF Relay and QSO Party* held in May was successful and a more practical activity to administer with the tremendous increases now recorded in v.h.f. operating.

In '47 propagation conditions were at the top of the 11-year sun spot cycle. The high m.u.f. allowed transoceanic communication on all bands, even including 50 Mc. ARRL section nets and post-war trunk lines now got rolling on 80 meters in dependable fashion. Awards in all categories were in great demand, and contest activities reached new highs. The first ARRL Member Party in six years was held with 66 sections represented and the Field Day the biggest (up to then) in League history. Appointment lists swelled; still all SCMs together had but 673 Emergency Coordinators. Northern and Southern Minnesota Sections were put back together again to form one *good* ARRL section. Some 88 nets and seven trunk lines were functioning by the end of the year — a far cry, however, from our net registrations and NTS activity today!

In 1948 *QST* started an "on the air with single sideband" column; the mode was making progress. The list of ECs was now 1,000 strong. The results of the "First VHF Sweepstakes" appeared in July *QST*. It was a lively contest for the v.h.f. supremacy of each ARRL section; sixteen clubs competed for the gavel award.

Two other developments set the pattern for post-war operating progress. One was evolutionary, the planned interconnection of state level nets to form a true National Traffic System. Also for the growing numbers of clubs a new Training Aids Program was inaugurated by the League. Starting with seven 16-mm. sound movies covering radio principles, and nine film strips, available only to affiliated clubs, the library of aids was expanded as rapidly as possible. Quiz-type items were added in '48 and by this time hundreds of clubs were making loan-bookings. A National Emergency Coordinator was added to the League staff, and in '48 a National Emergency Net was implemented. Close ties were maintained with the American National Red Cross in line with a co-operative understanding worked out before the war between the two organizations. ARRL published a *DX Operating Code* as an operating aid, after coordination with a large number of DXCC award holders and receipt of favorable comments on the draft from foreign societies. There were close to 500 *active* club affiliates by early '48, a number that was to triple and increase steadily over the following years.

Commander Brad Martin, USNR, XU1YV/W3QV, shown in his mobile communications van in Tangku, China, from where he made over 200 contacts on 28 Mc. from February 6 to April 6, 1946.



Oscar Sandoz, VE1QZ, Halifax, Nova Scotia, who (with VE1QY at Yarmouth) provided the first VE1 contacts on 50 Mc.

It was also in '48 that amateur radio teletype started to attract more amateur interest. Users in the New York area formed an a.f.s.k. net on 147.96 Mc. Interest was catching on in some other developments. Seventy-two clubs reported n.f.m. users; only twenty three reported having s.s.b. voice equipment demonstrations or use within their memberships at the time. The s.s.b. operation was however, destined to outdistance other operations in popularity. F.s.k.-RTTY nets also were shortly to come into being.

A Simulated Emergency Test, second such since the war, was conducted in October '48. Three thousand messages were delivered to ARRL and the ARC. Much favorable publicity resulted for the amateur. The FD, SS and DX contests remained ARRL's "top three" events in operating. A fifth ARRL Governors'-President Relay was held in January '49. Messages were delivered from thirty-nine governors and four territorial governors. In all, forty-one states were heard from. There were many general amateur activities in this period: state QSO parties, amateur radio use in reporting the course of boating events, regattas and motorcycle races, also use for monitoring parades, exchanging results of inter-city matches and college competitions.

The post-war development of a new national traffic plan seems, in retrospect, the greatest "operating pattern" improvement of the area. Announced in September '49 *QST*, the National Traffic System (NTS), utilizing the fact that about every ARRL section had traffic nets, established a firmly functioning, systematic means to interconnect these to provide for traffic flow daily between all points in the nation. The NTS was not designed to replace specialized systems. However, it helped at once to take care of the fast-increasing post-war traffic. Twelve newly set up NTS regional nets with the four area nets were first active in the '49–'50 operating season. By the following year it was apparent that here was a system providing for participation at will by any amateur. It gave more universal coverage for routing traffic than ever before. However, regional or independent systems serving special purposes did not have to be abandoned. These too could tie in where thought advantageous for traffic exchange — with 100% integration of all systems a long term goal. The NTS with its known pattern for routing represented tremendous improvement from those earlier days of "hitchhiking" of traffic through a multiplicity of individual-station schedules. Four or five trunk lines of those reactivated after WW II were gradually supplanted by the NTS provisions.

There were still "firsts" in operational work. One was reported in March '49 *QST*, when for the first time two-way RTTY was employed for a *transcontinental* traffic exchange. W6PSW and W1AW used 11-meter a.f.s.k. for this. *QST* that year also recorded the first amateur *transocean* RTTY QSOs. This historical work involved operating by W6ITH, W7JCU and JA3RO. In January '49 a Ten-Meter WAS Party livened up this band. This success was followed by another in December '50 and helped many of the 10-meter gang progress to "all states" status. Working with British amateurs again, a series of 160-meter transatlantic tests was announced in late '50 for early the following year with staggered time periods for W/VE and overseas calling.

The major spot activities and all ARRL awards gained in popularity with each passing year. By 1950 the award issuances for DXCC and WAS ran 479 and 513 a year. By the end of 1950 the leading c.w. and phone contender had a total of 236 countries c.w. and phone and 195 phone only. There were about 1087 amateurs with "over 100" countries, three hundred with phone certifications, all in post-war DXCC. About 12,000 different amateurs held Code Proficiency Certificates, and in all 2,000 amateurs . . . had been issued the Worked All States Award since WW II.

Emergency Communications

THE ashes of war were still smouldering when Communications Manager Handy announced the reactivation of the ARRL Emergency Corps and the creation of a new appointee post, that of Section Emergency Coordinator. The latter was to be appointed by the SCM and serve as his right-hand man in all emergency matters. Not a great deal of progress was possible during the remainder of 1945, when amateurs were sharing the 2½-meter band with WERS and there was some tendency on the part of WERS licensees to "hang on" to their prerogatives.

But WERS was terminated by FCC late in the year, and amateur operation took over. At first it was just rag-chewing and getting re-acquainted, but once the "feel" of unrestricted operating was restored, the amateurs started looking around for something useful to do. ARRL supplied this

in a series of articles by the Communications Department regarding AEC programs and progress; W2OHE, EC for Brooklyn, N.Y., reported the first AEC drill on two meters. The York, Pa., AREC conducted a comprehensive simulated emergency test under EC W3AQN in March of 1946. The first post-war report of amateur emergency work appeared in August 1946 *QST*, an Alaskan earthquake (sound familiar?) which occurred on April 1, 1946, reported by K7FFG (yes, *K7* was Alaska then). No mention is made of the band used, but some low-frequency bands where then available.

Simulated Emergency Test was scheduled for October of 1946, the first of these annual tests designed to give the ARRL's Emergency Corps an annual "dry run." The "SET" has since become a fixture, like the Field Day.

Meanwhile, amateurs started participating in more emergencies. In late May it was a Susquehanna River flood, under Regional EC W3UA; this activity was conducted on 75-meter phone. In mid-September a Belgian plane crashed in Newfoundland and VO2RM handled traffic on 75. In October a Florida hurricane brought amateurs into action by the score, and in November amateur radio was responsible for the rescue of 300 motorists stranded by a blinding snowstorm on a New Mexico highway. In mid-November a snow and ice storm in Idaho and Washington brought amateurs into action. Other 1946 highlights were operation in connection with an Atlanta hotel fire and a dramatic rescue of a party stranded on an ice floe in Quebec. Accounts of these and other operations were scattered through the "Operating News" section of *QST*, and continued in 1947, '48 and part of '49 before they started being collected under a single column.

The big emergency in 1947 was the Texas City explosions which occurred in April of that year. *QST* sent an assistant editor, W1CEG, to the scene of this and a nearby tornado emergency at Woodward, Okla., resulting in a feature article in the July, 1947, issue of *QST*. The Texas City explosion is still often cited as a classic example of a man-made catastrophe which could occur in nearly any industrialized area.

The other big emergency in 1947 was a Gulf Coast hurricane which struck hardest at Louisiana and Mississippi in September. ARRL's new National Emergency Coordinator visited the scene before the wind stopped blowing and prepared a report for December *QST*.

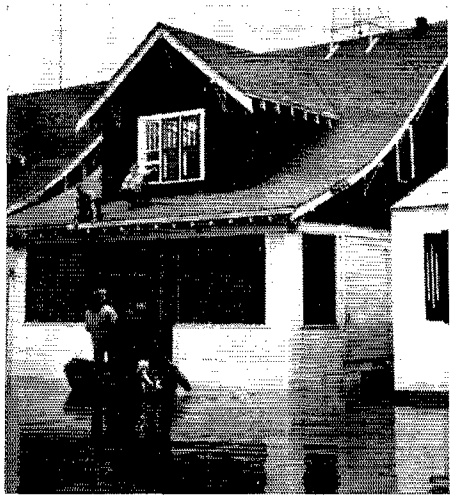
There were 28 other emergencies reported in issues of *QST* that year, and at its annual meeting in May the ARRL Board of Directors recognized the increasing importance of emergency work by authorizing "expansion of the personnel of the Communications Department . . . for on-the-scene assistance wherever disasters may take place," and "expanded training . . . of the personnel of existing . . . establishments." Pursuant to this mandate, a National Emergency Coordinator was added to the staff late in 1947 in the person of Albert E. Hayes, W3LVY, and immediately went to work. Close working relationships were formed with the Red Cross and Western Union, some of the trunk lines were called upon to serve in emergencies, and amateurs in areas of imminent disaster were alerted and instructed by the NEC.

One of the biggest news stories in 1947 was the Texas City explosion. Amateurs covered themselves with glory in their achievements during and following this man-made catastrophe.

During 1948, strong efforts were made to weed deadwood out of the AEC, make new EC appointments, and establish emergency procedures. An article detailing collaboration between ARRL and Western Union appeared in the June issue. The first Simulated Emergency Test report appeared in the February issue, indicating participation by 54 AEC groups. A National Emergency Net was formed with a definite roster of stations to appear on certain designated frequencies whenever an emergency occurred anywhere, and the first box listing the "National Emergency Frequencies" appeared in November *QST*. The first net directory also appeared in this issue, listing 94 nets, about a tenth of them exclusively for emergency purposes. In June the first "With the AEC" column appeared in "Operating News." In August, QRRR replaced the traditional QRR as the amateur distress call.

Outstanding emergencies in 1948 included the famous Vanport (Wash.) dike break, a Louisiana

A broken dike on the Columbia River flooded Vanport, Wash., enabled a well-prepared ARRL Emergency Corps under EC W7DIS to render effective assistance. Here is W7AEF, transmitting by walkie-talkie from the dike.



When the Red River of the North went on a rampage in May of 1950, Winnipeg was almost completely submerged. VE4ML and VE4RM (on roof) stayed behind, when other residents were evacuated, to maintain communications.

tornado and violent midwest blizzards in January and November. These were in addition to the run-of-the-mill emergencies which were written up from time to time in "Operating News."

Much less happened among emergency lines in 1949. The report of the 1948 SET, appearing in March '49 *QST*, showed 93 AEC groups in action. For the first time a complete list of section emergency coordinators was published (in the Feb. issue), showing all but 15 sections having such appointees to centralize emergency operating activities within their sections. The only emergency of note was the earthquake in Ecuador, which involved Ecuadorian and Canal Zone amateurs — although of course the AEC was kept busy with smaller emergencies which regularly were reported under "With the AEC."

In the late summer of 1949 the NEC post became vacant, and later in the year it was assumed by W1NJM, already a ten-year staff member, as an additional duty.

The flood of the Red River in the north and the consequent inundation of the city of Winnipeg was the only big emergency story of 1950, although the usual assortment of smaller and localized emergencies were reported in *QST*'s "With the AEC" column, now reduced to six-point to accommodate more text. Of greater significance, this was the year of the re-emergence of civil defense as a part of the amateur emergency communications picture, a situation which was summarized excellently by an editorial in December 1950 *QST*. But let's start with this subject next month.

Technical Progress

GETTING back on the air after the war was a scrambling, piecemeal operation. Many hams had sold their receivers to the Signal Corps at the start of the war, so receivers had to be resurrected or hurriedly built from pre-war junk-box parts. The bands were returned one by one, starting with 28 Mc. on Nov. 15, 1945, and followed by part of 80 meters in April, 1946. Working overtime to sort out the services, in late 1945 the FCC announced the new f.m. band at 88 to 108 Mc., TV Channels 1 through 6, a relocated 56-Mc. band at 50 to 54 Mc., and a number of microwave assignments for amateurs. The effect of the TV assignments on amateur radio were not appreciated at the time.

On the h.f. bands available during 1946, there was little if any technical progress. Commercial and homemade gear followed the general lines of pre-war design. Commercial receivers used metal tubes and 455-kc. i.f. amplifiers with a single-crystal filter for selectivity. Homemade receivers either followed old designs or were conversions of war-surplus receivers. ("Conversion" meant adapting a 400-cycle or 28-volt unit to 60-cycle 115-volt operation.) Homemade transmitters were built on metal or wood in the familiar open style, although there were attempts to house them in suitable cabinets. The big commercial push on f.m. (and, later, TV) made 300-ohm Twinlead readily available, and it was used for amateur purposes until some of its shortcomings became apparent. War-surplus coaxial line (some of it pretty bad) was also on the market, and many an amateur changed over to using it for its neatness and convenience. With no means for measuring s.w.r., no one worried much about it until the line failed. The flexible coaxial line made feeding a rotatable beam much easier, and the war-surplus "selsyn" indicators were utilized as direction indicators. Surplus "prop-pitch" (propeller pitch drive) motors were the standard 10- and 20-meter beam rotators. The combination of old equipment, old techniques and old habits resulted in signals so bad that the *QST* editorial for November made a plea for cleaning them up. Hurry to get back on the air, widespread use of poorly-engineered VFOs and lack of pride were blamed for the situation. Harmonic radiation from amateur transmitters falling outside of amateur bands and interfering with other services was getting to be a serious problem and the cause for many FCC tickets.

On the credit side of the ledger, some of the hams who consider everything below 30 Mc. the "d.c. bands" were busy opening up the new microwave bands. Work on 2400 Mc. was reported in July of 1946, and the August *QST* told of working on 24,000 Mc. While it is true that the "amateur" work often meant moving lab or commercial gear to a rooftop after hours and working similar gear at a distance, the accounts of the work introduced many readers to the war-developed reflex klystrons and wave-guide techniques.

The editorial in the August, 1946, *QST* speculated on "transceiver" operation in the r.f. bands, pointing out the convenience and the saving in spectrum usage.

The first truly exciting technical development came early in 1947, when M. C. Jones described the "Micromatch," an absolutely magical instrument for *instantaneously* measuring the s.w.r. on a transmission line! Previously s.w.r. measurement involved the tedious sampling of the voltage (or current) along the line for at least a quarter wavelength, a quite impractical procedure at most commonly-used amateur frequencies. Although followed by several other devices that could measure the s.w.r. but at low power levels, the Micromatch had the big advantage that it could be left in the line all of the time. In October another bit of magic showed up in the form of the "Twinlamp," an amazingly-simple device for indicating reflected and forward power on 300-ohm Twinlead.

Narrow-band f.m. on 75 and 20 meters was proposed as an alternative to a.m., and with special permission W2GDG and W1AW carried out tests in the 75-meter band. As a result of these tests, which showed that n.f.m. didn't increase the QRM and did alleviate BCI, the regulations were changed to permit its use. N.f.m. was always under a terrific handicap because the usual receiver was not engineered to receive it advantageously, and all too few amateurs acquired adapters that demonstrated the advantage of n.f.m.

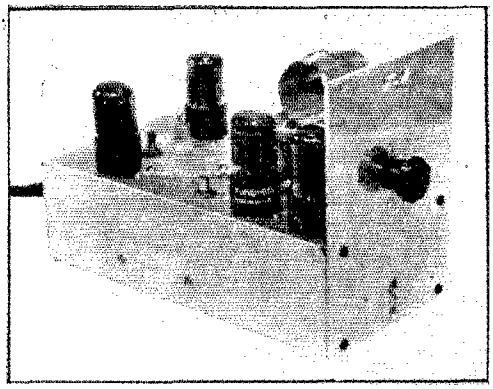
But in the bright days of new developments, the skies were getting very dark in two areas. Around New York and Chicago the ogre of TVI was chasing amateurs off the air by the hundreds. These were the days of relatively low-powered TV transmitters, and high-gain antennas at heights of 80 to 150 feet were installed at taverns and some homes to get a snowy picture from 50 to 100 miles away. It was bad enough to live near the transmitter; pity the poor ham who lived in the "fringe" areas of the day. During 1947 a few plagued amateurs refused to be chased off the air and did their best to solve the problems, and the major contributions were probably made by Mack Seybold, W2RYI, and George Grammer, W1DF, followed by Phil Rand, W1DBM, in 1948. This triumvirate throughly sifted through the possible cause and prevention techniques to clarify the problem and to offer workable solutions. It should be borne in mind that at the end of 1947, however, TVI affected only the areas mentioned. To the average amateur around the country, TVI might be another abbreviation for a government agency, for all that it affected him.

In 1947 the 6-meter men of the day were arguing for vertical or horizontal polarization, depending upon their location in the U.S. The New Englanders favored vertical and the rest of the country went for horizontal.

On the receiving front, a *QST* article in September introduced the war-developed "noise figure" concept of rating the sensitivity of a receiver, in contrast to the traditional "sensitivity" figures that were in reality overall-gain measurements and not really what an amateur has in mind when he speaks of "sensitivity." J. J. McLaughlin described in October his "selectable-sideband" reception method. It had appeared in the June, 1941, *QST* and had been of considerable help to the FCC and OSS during their wartime monitoring work. And in December Phil Rand described his "Q5-er," a low-frequency selective i.f. amplifier to follow the 455-kc. i.f. of the average receiver. Used with a war-surplus BC-312 as the "front end," it boasted a selectivity of 1½ kc. at −6 db. and 7½ kc. at −60. The following month a "Technical Topic" in *QST* told how the surplus BC-453 could be used as a "Lazy Man's Q5-er" to give a −6 db. bandwidth of 2 kc. and a −60 db. width of 6½ kc. These selectivities were considerably better than anything available from the contemporary commercial "communications receivers."

But while the January, 1948, *QST* included such practical articles as the use of the BC-453, the editorial staff went off its rocker with three articles plus an editorial, plus a cover on, of all things, single-sideband radiotelephony! This much space devoted to a single apparently-incomprehensible subject was unheard of, and some of the readers were not reluctant to point it

Bill Hoisington, W2BAV/1, described in February, 1948, his experiments with directional 75-meter antennas. The caption accompanying this picture read: "To make a movable parasitic element, one of the (70-foot) 'whip' antennas was mounted on a buggy and wheeled into place. The buggy was obtained locally."



The one-band phasing exciter described by Bill Rust, W2UNJ, started many an early sideband experimenter on his way. Receiving tubes were used throughout.

out. The splash was brought about by the appearance on 14 Mc. in October, 1947, of W6YX (Stanford University) with a 400-watt single-sideband signal. Art Nichols, WØTQK, was so enthralled by the possibilities that he literally threw together a sideband rig in one week, starting from scratch (and a filter borrowed from the telephone company). The QSOs between the two stations were copied by *QST* staff members and prompted the articles in the January issue.

In late 1933 *R9* magazine had carried a series of three articles by Robert Moore, W6DEI, describing his filter-type single-sideband transmitter, and a few amateurs made transmitters and contacts. However, s.s.b. was unknown to the great majority of amateurs. In the 30s receivers were not stable enough to hold s.s.b. signals directly, there wasn't as much 'phone interest, or as much QRM. The phasing method

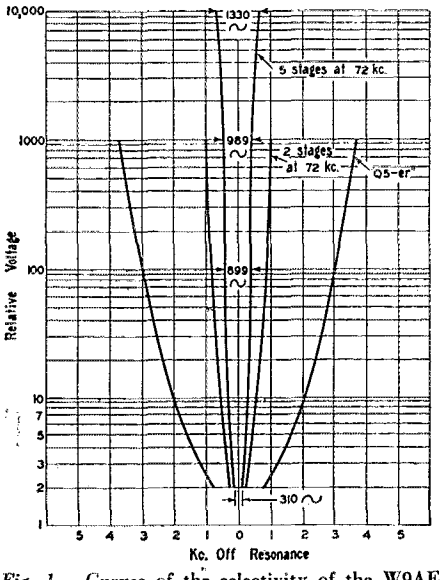


Fig. 1 — Curves of the selectivity of the W9AEH receiver when using 2 and 5 stages of 72-kc. i.f. amplification, compared with a typical Q5-er selectivity characteristic.

of s.s.b. generation was known in theory, but no one knew how to obtain the essential 90-degree audio phase shift. In the December, 1946, *Electronics*, R. B. Dome disclosed a method for obtaining the long sought-for audio phase shift, and this triggered the Stanford work, headed by O. G. Villard Jr., W6QYT.

K. B. Warner's editorial in the January issue started out: "Several articles in this issue of our magazine point the way toward the most significant development that has ever occurred in amateur radiotelephony: carrierless single-sideband emission. After years of fearing that our receivers weren't stable enough to permit the use of s.s.s.c. — as we're calling it — the adventitious appearance on the air of an experimental station with this method of emission has shown that it isn't so difficult after all and that its merits are waiting for all of us. And so immense are these advantages that we are convinced that a speedy revolution in our equipment and our operating practices is imminent and certain." Not all of the amateurs of the day agreed with this analysis, however, as some of them may recall.

But for those who did agree, or were just curious about something relatively new, 1948 was an exciting year. Don Norgaard, W2KUJ, was another "father" of the phasing method of generating and receiving s.s.b. signals, and his series of *QST* articles and his "SSB Jr" (which appeared in *G.E. Ham News*) did much for those interested in the new technique. In an effort to encourage others, an s.s.b. column was started in *QST* (July), devoted to recording the birth and gear of new stations and the listing of such records as might be set. Before the year was out, about 20 or 25 amateurs had built filter or phasing rigs and were active on 75, 20 and 10 meters. During the next two years the number increased to about 150, and a close comraderie had developed among these "pioneers," through their common new interest. A practically universal observation was, "Getting on the air with s.s.b. was my biggest thrill since my first QSO . . . years ago." These were not all engineers or physicists; many were typical amateurs inspired by what they read and heard. It was amateur radio at its best.

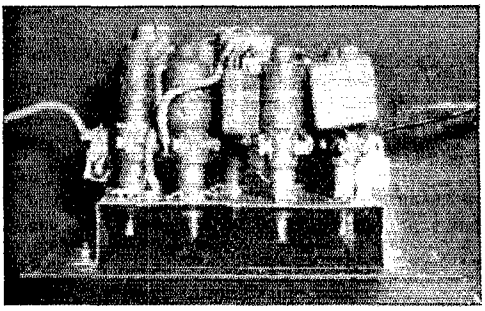
A.m. (or "ancient modulation" as the sidebanders called it, in defense of their own "Donald Duck" transmissions) got a big boost when the mobile regulations were revised in the middle of 1948 to include operation on all amateur bands. This brought renewed interest in loaded antennas (for 3.9-Mc. operation), and the surplus PE-103 generator. Low-powered mobile installations used vibrator power supplies. Controlled-carrier a.m. made another try in April, 1950, by changing its name to "constant modulation" and met with the same general lack of acceptance that it always had.

Although during this period Yagi antenna dimensions were investigated by a number of amateurs (all in search of the correct magical combination), and more and more the constructional direction was toward the all-metal "plumb-

er's delight," the big subject of conversation was the "Cubical Quad" antenna (*QST*, November, 1948). Designed at HCJB in Ecuador to solve a corona problem at the high altitude, it was simple to construct and did show gain somewhat out of proportion for its size.

On the receiver front, panoramic reception had been described in March, 1946, but despite its obvious value and some commercial push it never received the acceptance it merited. Many of the early sidebanders used it to spot a new s.s.b. signal showing up in the band More interest was displayed in receiver "skirt" selectivity, and the August, 1948, description by T. A. Githens, W9AEH, of his "Super-Selective C.W. Receiver" continued the trend of the earlier Q5-er. During 1950 i.f. amplifiers with variable selectivity (to accommodate 'phone or c.w. signals) were described, as well as the two-crystal filter, which had been known and used in England for a number of years. Commercial receivers still offered single-crystal filters and sometimes an audio-frequency rejection-notch filter.

For the man who "talked with his hands," differential keying was offered in March, 1948, as one answer to the c.w.-break-in-with-no-chirps problem. Another solution to the same problem was the "silent VFO" (continuously-running oscillator) described by Dick Smith, W1FTX, in February, 1950. The Clapp oscillator (series-tuned Colpitts) circuit came in for attention during 1948 and was soon accepted as a better way to obtain stability. And in September, 1948, John Paddon of the *QST* staff described the first of many versions of the "Monitone," a c.w.



Dave Mann, W3MBY, designed a sideband filter for a 10-kc. suppressed carrier signal, using TV linearity coils. This is the filter. Two heterodyning operations put the signal in the 3.9-Mc. band.

adjunct that was intended to promote better sending without punctured ear drums. Band-switching exciters with built-in VFOs were beginning to show up among the constructional articles. Previous exciters were based on crystal control, and the VFO was nearly always a separate unit.

At the end of 1950 the most important technical fact was TVI. Although more and more was being learned about its prevention and cure, the one most encouraging factor was the FCC's policy of not taking the easy way out and siding with the viewer in all TVI cases. Instead, an amateur who went to work and cleaned up his rig knew he wouldn't be put off the air by the FCC. What his neighbors might do to him, however, was a different story! They were not easy times for many amateurs.

S.S.B. and TVI

DURING the next five years of 1946 through 1950 most of the advertisers in *QST* were firms that came back strong after World War II, although several new companies appeared. Two new subjects, distantly related to each other, began to attain prominence — one good, one bad, and both extremely important. They were single-sideband suppressed-carrier transmission and interference by amateurs to television reception. Now we can look back with pride and say that the good guy — we now familiarly call him s.s.b. — has triumphed and the bad guy, TVI, has been beaten, but for quite a while the a.m. enemies of s.s.b. fought grimly while cries for help arose from hams creating TVI.

The Bell Telephone Labs/W.E. ad in August of 1948, although describing commercial equipment, was strong support for s.s.b. In November both G.E. and Millen advertised Single Sideband Selectors for amateur use.

On the other hand, the first ad to call attention to the dangers of TVI and to offer a partial solution was National's in the July 1948 issue of *QST*.

Single sideband equipment was slow in coming on the market. During 1949 the only ads were National's in June on a filter "for maximum sideband attenuation," Canoga's in September and Millen's in December, each on a phase shift network. In April 1950 National gave pointers on tuning in S.S.S.C., as s.s.b. was called. In June Collins said that the 75A-1 was the "SSSC Receiver of the Year".

In 1949 the TVI situation was rapidly becoming critical. National and Radio Transceiver Labs discussed cures in April. National offered an i.f. kit for TV receivers in June. Collins offered the 35-1 low pass filter in August, Drake both low pass and high pass filters in September. In December Collins gave tips on eliminating TVI and Harrison offered a TVI Chaser Package. Eldico TVI filters were announced in Harvey's January 1950 ad. Mallory told how to build wave traps for TV receivers in March, Collins mentioned a shielded cabinet for the 32V-2 in May, Barker & Williamson brought out a low pass filter in the same month. Eimac's campaign on the use of tetrodes to cut down TVI ran for the last half of 1950.

Advertising on TV receivers started a little ahead of advertisers' advice on how to combat TVI. In June 1948 Hallicrafters announced the

T-54; Newark and Harvey showed Tech Master in the fall; the Hallicrafters projection model receiver was in the October Newark ad; advertisements on Television Assembly and Philmore appeared. The first National TV receiver was introduced in October.

The next year, 1949, saw additional TV receiver ads by Hallicrafters and National with Hallicrafters' dual focus, a plan of switching between a circular and rectangular picture, explained in April. TV antennas and feed-lines were advertised by CML, Federal Tel and Radio, Arrow, Newark. National brought out a 16" TV receiver in April 1950.

Let's leave these subjects now and take a look at other advertising pages in *QST*:

Several new receivers were introduced during the five years. In January of 1946 National announced the HRO-5TA. February saw Hammarlund's Super Pro 400 and the Hallicrafters S-40. The RME-84 was first advertised in March, the Cardwell 54 in July, the Pierson KP-81 in August. The first Waterproof Electric (now Gonset) ad came out in September. Collins showed the 75-A in October. The SX-42 which had been introduced by Hallicrafters in October had forty pages devoted to it in the December issue! New models in 1947 included the SP-44 Panoramic and SX-43 by Hallicrafters and the NC-173, HRO-7, NC-57 and NC-183 by National. The years of 1948, 1949 and 1950 saw the introduction of National's NC-33, NC-108, HFS, HRO-50, NC-125 and of the Hallicrafters S-53, S-77. The Collins 51J-1 came out in November of 1949 and the 75A-2 in July 1950.

The Collins 30K and 32V-1 transmitters were advertised in 1946 with the 30K-1 following the next year, the 32V-2 in 1950. In 1946 the 310A appeared; other models in the 310 series came out in 1947 and 1949. The KW-1 was introduced in October of 1950.

Hammarlund's Four 20 and Four 11 appeared in May 1947; the Hallicrafters HT-17 and HT-18 in July.

In October of 1949 E.F. Johnson announced the Viking I transmitter kit. As we have seen, the kit idea was not new, but the Viking I with its punched chassis and good wiring instructions was immediately popular. It may be said to have paved the way for a succession of good amateur kits, still coming to us from several companies.

Hunter's first ad was in October of 1948, the same month that saw the HT-19 from Hallicrafters. B&W started advertising complete transmitters in 1949 and Millen announced an r.f. amplifier, a transmitter and a v.f.o. in that year.

Globe, a name well known but presently inactive, first appeared in June of the same year. Meck and Supreme, 1946; Kaar, Electro Mechanical, Decimeter, 1947; El Tronics and Telvar, 1948: all of these are no longer with us.

Vacuum tube manufacturers were busy with new designs, both transmitting and receiving. Amperex, Eimac, H&K, Hytron, Lewis, RCA, G.E./Kenrad, Raytheon, Sylvania, Taylor, United, were steady advertisers.

Two keys, new in 1948, were especially interesting. The Mon-Key, in January, was the first electronic keyer to be advertised in *QST*. Six months later, in June, the Melehan Valiant appeared. It made both dots and dashes mechanically.

Other new developments were National's Select-O-Ject in December 1949, Centralab's printed circuits for hams in August of 1950, Eldico's electronic key in September 1950. RCA announced the new Ham Tips in June of that year.

Evidence of increased mobile operation was shown by Harrison's offer in June 1949 of a mobile trophy and in 1950 by the ads of Mallory, Master Mobile, Premax, Ward, National, Subraco.

Wire recorders were sold for use in amateur stations, with both Webster and Air King featuring that kind. However, Amplifier Corp. advertised a tape recorder in September 1948 and Knight offered both types in the Allied ad for June 1949.

Schools and code teachers remained active with American Radio Institute, Cleveland Institute, CREI, Commercial, Mass Radio, Milwaukee School, Port Arthur, YMCA Trade & Tech; Candler, Gardiner, Instructograph, Teleplex.

The Gatti-Hallicrafters expedition, a forerunner of DXpeditions of today, was announced in May 1947. National talked about Kon Tiki in September.

1946–1950

Can you match the calls with the faces?

WØCXX W9LIP WØGFQ W2RID W9DAX W2AVA WØARA

Contests were sponsored by Sun and Sylvania in 1946 and by Telex in 1947.

Antenna, rotator and tower advertising, commonplace today, was coming to the fore with manufacturers like Amphenol, Andrew, Brach, Electronic Indicator, Hy Lite, Johnson, Kytoon, UHF Resonator, Workshop Associates; Alliance, Gordon, Munger; Sky Lane, Trylon, Vesto, Western Coil, Wind Turbine.

Manufacturers, some of them new, advertising during 1946-1950 included: Astatic, E-V, Shure, Turner, Burlington, Marion, Simpson, Triplett, Mallory, with emphasis on the three Inductuners announced in 1948, 1949 and 1950, Ohmite, Bliley, Clark, Crystal Research, General Electronics, James Knights, Petersen, Scientific, Valpey, Chicago, Kenyon, Peerless, Thordarson, UTC, General Radio, Condenser Products, Sangamo, Sprague, Advance Relay, Ward Leonard, Par-Metal, Gates, Gross, Lettine, Meissner, Motorola, Silver, Wilcox, Cardwell, M.C. Jones, Clippard, Browning, Chicago Industrial, Eico, Lambda, Measurements, Precision, Waterman, Jensen, Vibroplex, Insuline, Belden, Cornish Wire.

Most of the distributors advertising in *QST* during those years are still with us, although the day of deserting ham radio for television by many radio stores was not far off.

The east was represented by such firms as Arrow, Electronic Marketers, Harrison, Harvey, Hudson, Leeds, Peerless, Terminal in the New York City area; De Mambro and Radio Shack in Boston; Hatry & Young, Sceli in Hartford; Almo, Herbach & Rademan, Radio Electric Service in Philadelphia; Sun in Washington; Wholesale in Baltimore.

The west, north and south did not furnish many companies, although Brill in Oakland, Radio Products Sales in Los Angeles, Lew Bonn in Minneapolis, Radio Parts in Norfolk and Universal in Louisville were advertising. The central United States showed activity with Allied, Concord and Newark in Chicago; Mytronic and Steinberg's in Cincinnati; Srepco in Dayton; Cameradio in Pittsburgh; Ashe in St. Louis; B-A in Kansas City; and Henry in Butler; Van Sickle in Indianapolis; Wholesale in Council Bluffs. The circulation of *QST* at the end of 1950 was 63,400. Advertising rates were the same as at the end of 1945 — the cost of one page was $325.

QST

Election Notice

Court Upholds FCC Fees

RTTY Identification Simplified

ELECTION NOTICE

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

An election is about to be held in each of the above-mentioned divisions to choose both a director and vice-director for the 1965–1966 terms. 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 21. Nominating petitions are hereby solicited. Ten or more Full Members of the League residing in any one of the above-named divisions may join in nominating any eligible Full Member residing in that division as a candidate for director therefrom, or as a candidate for vice-director therefrom. No person may simultaneously be a candidate for both offices; if petitions are received naming the same candidate for both offices, his nomination will be deemed for director only and his nomination for vice-director will be void. Inasmuch as all the powers of the director are transferred to the vice-director in the event of the director's resignation or death or inability to perform his duties, it is of as great importance to name a candidate for vice-director as it is for director. The following form of nomination is suggested:

Executive Committee
The American Radio Relay League
Newington, Conn. 06111

We, the undersigned Full Members of the ARRL residing in the.....Division, hereby nominate.....of..... as a candidate for director; and we also nominate..... .....of.....as a candidate for vice-director; from this division for the 1965-1966 term.
(*Name Call City Date*)

The signers must be Full Members in good standing. The nominee must be a Full Member and the holder of at least a General Class amateur license or a Canadian Advanced Amateur Certificate, 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.

(Left) California Governor Edmund G. "Pat" Brown helps the Pacific Division Convention Committee to plan tours of the State Capitol and Governor's Mansion for the week end of September 25–27. From left, standing around the Governor: Convention Publicity Chairman K6SEA, Camellia Capitol Chirps vice president WB6AOJ and president K6GUQ, handling the women's program. (Right) Under the dome of the State Capitol in Sacramento, California, hides this handsome ham station, in the office of the Hon. James Holmes, W6REK, State Assemblyman of Santa Barbara. K6GUQ is at the controls.

All such petitions must be filed at the headquarters office of the League in Newington, Conn., by *noon* EDST of the 21st day of September, 1964. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates both for director and for vice-director but members are urged to interest themselves equally in the two offices.

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

Voting by ballots mailed to each Full Member will take place between October 1 and November 20, except that if on September 21 only one eligible candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are: *Central*: Philip E. Haller, W9HPG (Vice-directorship vacant). *Hudson*: Morton B. Kahn, W2KR, and Harry J. Dannals, W2TUK. *New England*: Milton E. Chaffee, W1EFW, and Bigelow Green, W1EAE. *Northwestern*: R. Rex Roberts, W7CPY, and Robert B. Thurston, W7PGY. *Roanoke*: P. Lanier Anderson, Jr., W4MWH, and Joseph F. Abernethy, W4AKC. *Rocky Mountain*: Carl L. Smith, WØBWJ, and John H. Sampson, Jr., W7OCX. *Southwestern*: Raymond E. Meyers, W6MLZ, and Virgil Talbott, W6GTE. *West Gulf*: Roemer O. Best, W5QKF and Ray K. Bryan, W5UYQ.

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

For the Board of Directors:

July 1, 1964

JOHN HUNTOON
Secretary

PLENIPOTENTIARY CONFERENCE

The International Telecommunications Union will convene a plenipotentiary conference at Montreaux, Switzerland, on September 14, 1965, observing the hundredth anniversary of the founding of the Union, originally as the International Telegraph Union.

The conference is a high-level diplomatic affair, dealing with such matters as the basic organization of the Union, budgets, election of a replacement for Gerald Gross, HB9IA/W3GG, who is retiring as Secretary-General, and so forth, and it will not normally deal with allocations or other administrative matters. A special committee has been formed to organize suitable events to commemorate the Union's anniversary.

There is still no date set for an Administrative Radio Conference, at which allocations would be discussed. A recent postponement, from 1965 to 1966, for a special aeronautical conference lends further support to the view that the next conference directly affecting amateur bands will not occur until late in this decade.

Forty-eight carsful of U.S. amateurs crossed the border into Mexico for a hamfest at Enseñada, Baja, California. One of the features of the affair was a 30-minute DX contest won by K6ICS/XEØICS. K6ICS accepts the trophy, a bronze statue of Inca chief Chapultepec, from a representative of the Tecate Brewery, award sponsor, as XE2NR, secretary of the Enseñada Radio Club, looks on.

The League is already at work on several separate projects in preparation for the frequency conference when it does occur. For instance, Assistant General Manager Richard L. Baldwin, W1IKE, has just returned from Europe where he spent considerable time in background studies at Geneva, and additionally in meeting with officers of amateur societies in Europe to discuss future plans.

RTTY IDENTIFICATION SIMPLIFIED

The Federal Communications Commission has amended its rules, effective August 10, 1964, to simplify the dual identification requirement. In the past, when a mode other than telegraphy using the International Morse Code or telephony was in use, such as RTTY, facsimile or TV, the transmitting station had to identify the station being called and his own station both in the mode being used and in either c.w. or phone as well, as appropriate to the mode and band being used. A request by the League some years ago for complete elimination of the dual identification requirement was flatly refused by the Commission, when it denied RM-277 on February 26, 1962. Accordingly, in August of that year the League filed a petition, RM-358, asking that the rules be changed to require c.w. or voice identification only of the station transmitting, so as to permit automatic transmission of the identifier. FCC issued its Notice of Proposed Rulemaking, Docket 15267 in January 1964, incorporating as well a petition filed by Edwin B. Bruening, W8DTY, RM-435, whose basic request was to substitute preregistation for dual identification.

Pertinent portions of the Report and Order appear below. It should be read carefully by those intending to use automatic means of identifying

on c.w., since informal ground rules are set forth in the order.

2. All comments received, including those of the original petitioners, the American Radio Relay League and Mr. Edwin B. Bruening, supported the proposal. Qualified support was received from a few licensees who felt that greater relaxation of the teleprinter station identification requirements should be accomplished. In this regard, the Commission notes, as was expressed in its Notice of Proposed Rule Making, that any further relaxation of these requirements at this time would be detrimental to its monitoring and enforcement activities.

3. In addition to comments as to the proposed rule change, the Commission solicited comments and suggestions as to methods of superimposing telegraphic identification of the transmitting station upon the carrier without interrupting the teleprinter transmission. One suggestion in this respect was submitted by Mr. Merrill L. Swan (W6AEE), President of the RTTY Inc., as follows:

"Using an audio frequency shift generator, and a keyed audio generator, feeding a SSB type of transmitter, I have demonstrated the compatibility of this method. The audio tones employed were: Mark, 2125 cycles, space, 2975 cycles and c.w., 2550 cycles. A sharp cut-off 'low-pass filter' was used beween the a.f.s.k. c.w. generator and the . . . transmitter, utilizing l.s.b. mode. The transmitted signal was examined, using a panadaptor and a . . . receiver, to search for spurious signals — none were found."

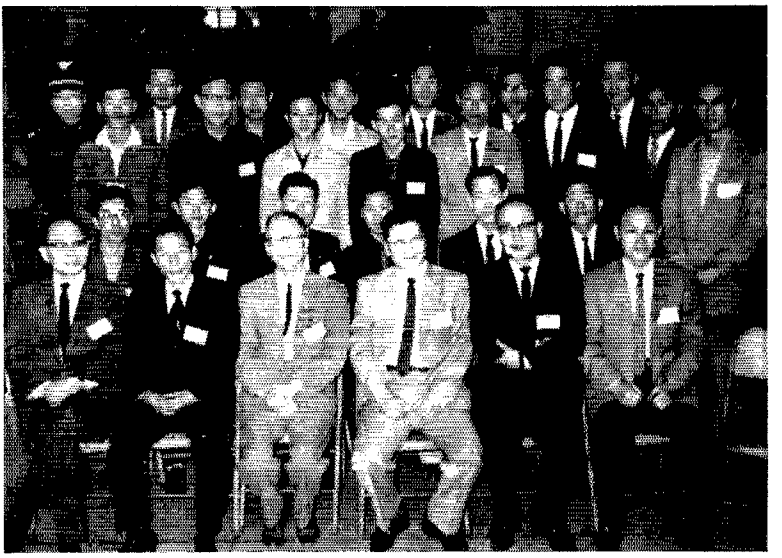
Mr. Swan's method appears to have limited application but apparently can be accomplished without change of the Rules. However, amateur licensees contemplating the use of audio tones via single side band suppressed carrier transmitters for the generation of A1 and/or F1 emissions, are cautioned that any radiation of the carrier or suppressed side band frequencies at an intensity sufficient to cause interference in receiving equipment of good engineering design constitutes spurious radiation in violation of Section 97.73.

The Commission will continue to consider these suggestions and our monitoring stations would be pleased to cooperate by observing tests of methods under development.

4. As indicated, there is no apparent objection to the proposed rule amendment. Therefore, for the reasons set forth herein and in its Notice, the Commission concludes that the proposed rule-making should be adopted. In adopting this rule-making one important factor requires comment. This rule change will enable licensees to employ automatic devices for telegraphic station identification by International Morse code. However, the transmission of the amateur call sign automatically at more than twenty or twenty-five words per minute and/or with a frequency shift of less than about 100 cycles would make identification difficult, especially when monitoring from a mobile unit. Licensees are advised, therefore, that for telegraphic identification they will be expected to observe reasonable standards for code speed and keying methods. In the event that there are abuses in this area, the Commission will be obliged to set forth standards in the Rules. . . .

COURT UPHOLDS FCC FEES

The United States Court of Appeals for the Seventh Circuit in Chicago upheld the legality of the fees charged to applicants for licenses by the Federal Communications Commission. The July 10 decision answered a suit brought by avia-



The Korean Amateur Radio League, which was founded in April of 1955 with 50 unlicensed members, reports a membership of over 400 with 60 amateur transmitting stations and 100 licensees. Pictured are some of the officers and members at the 9th General Convention held in Seoul on April 25. *From left to right, front row,* Inspector Yoo, Inspector Kim, Advisor Cho, President Lee, Vice Presidents Kim and Park, HM4AQ; *second row,* HM1AL, 1AB, 1AP, 8CD, 2AO, 1BA; *third row,* HM2CE, 1BI, 8CB, 1BO, 2DD, 1AH, 1AF; *back row,* HM1BK, 1AI, 2BN, 1CF, 1BX, 1BE, 1AJ, Secretary.

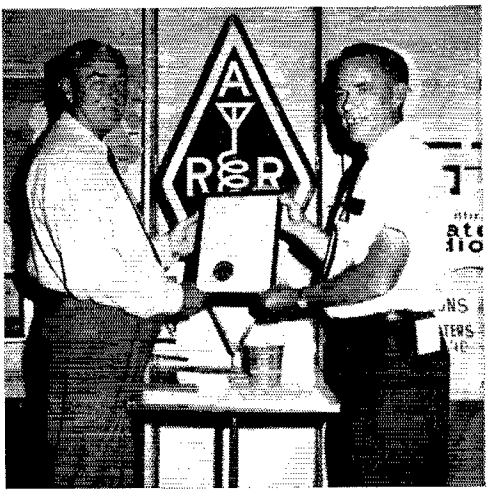
tion interests, in which the League was an intervening party. With respect to our arguments that amateurs are exempt, the Court stated:

> Finally we do not agree with intervenor American Radio Relay League that the imposition of fees upon amateur radio service is not within the authority of §140 because many amateurs are engaged in "the official business of the Government" because some public service is rendered, and because an amateur radio license has no "value to the recipient." The Commission took the commendable public service into consideration in setting the nominal fee ($2.00 for modification, $4.00 for initial licenses and renewals, and $20.00 for special call signs) and exempting novices and those amateurs who participate voluntarily in emergency communications networks. It also considered the possibility that a greater fee might discourage the use of radio by amateurs, and set the fee at a minimum so as not to interfere with the purpose of the Communications Act (generally encourage the larger and more effective use of radio in the public interest) to encourage and enlarge the use of radio by amateurs in the public interest. And we see no requirement in §140 that "value to the recipient" need be pecuniary value. That is but one of the factors that the Commission had to take into account, and as we have indicated before, the Commission may in its discretion determine what weight should be placed on each of the factors.

It is too early to ascertain whether the aeronautical interests which initiated the petition will take further action.

STILL MORE AMATEUR RADIO WEEKS

The Hon. Edward T. Breathitt, governor of Kentucky, proclaimed the week of June 21–28, 1964, as Amateur Radio Week. The proclamation mentioned amateur participation in the March floods and other Kentucky communications emergencies; voluntary training of amateurs in scientific investigation and in military communications; the added recognition brought to the state by the amateur "Bluegrass Awards" program; Kentucky hams' participation in Field Day; the Kentucky Council of Amateur Radio Clubs and the ARRL.



Herbert Hoover, Jr., W6ZH, president of ARRL, and Carl Smith, WØBWJ, attending the 1964 Rocky Mountain Division ARRL Convention at Estes Park, Colorado, display the proclamation signed by Colorado's governor, John Love, for Amateur Radio Week, July 10–17, 1964.

Florida Amateur Radio Operators Week was proclaimed for the week June 24–30, 1964, by Governor Farris Bryant. To the points of praise picked out by Kentucky, Florida added the maintenance of international good will, messages handled for service men and scientific exploring parties; rehabilitation of the blind and other handicapped people; and medical assistance to people in remote places. QST

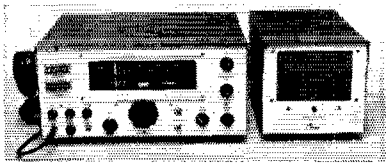
Strays

The Associated Radio Amateurs of Long Beach each year participate in the Long Beach Hobby Show. At the 1964 event, the photographer caught WA6JJG, co-chairman of the show committee; W6PIF, president; and WA6MPM, treasurer, seated at the booth, while WA6YYN, co-chairman; W6BRT, vice-president; K6TLR and WA6SCC stand behind them.

• Recent Equipment —

The Clegg Venus

50-Mc. S.S.B. Transceiver



With the transceiver becoming so popular in s.s.b. work on lower bands it can be assumed that this approach to sideband will enjoy increased acceptance among v.h.f. operators as well. This newest member of the Clegg Greekdeity v.h.f. family should accelerate the trend, at least as far as the 50-Mc. band is concerned.

The Venus is probably the first production sideband unit for v.h.f. service that goes all the way on the transceiver line. It is a sideband rig first of all; though it can be used on a.m. phone and it is fine for c.w., it was designed for and will find its principal acceptance in sideband communication. It is a true transceiver. Unless one is willing to do some considerable and careful dial spinning he will spend his time working stations on or very close to his own frequency, and nowhere else. This complete break with time-honored v.h.f. operating procedure may keep the Venus from being the top goddess in the v.h.f. market for a while, but it may also very well mark the beginning of a v.h.f. revolution.

Because it is a one-band design using many new techniques and circuit features, the Venus is compact, light in weight, and easy to use — but it will take some wordage to describe exactly what happens inside the boxes. The interior photographs appear deceptively simple, but a look at the block diagram, Fig. 1, will show that there is quite a bit to explain. The Venus instruction book takes the easy way and shows the transmitting and receiving functions separately, making little attempt to indicate portions of the lineup that do double duty. We have attempted to show the signal paths and stage functions in a single diagram, but we will describe the send and receive operations separately.

The Receiving Lineup

The receiver has a single grounded-grid r.f. stage, a 6CW4, V_1. It is worth emphasizing that this is all the r.f. amplification there is, yet the Venus does the 50-Mc. receiving job as well as it can be done. Double-tuned input and output circuits provide considerable selectivity and rejection of unwanted signals from outside the amateur band. Because the tuning range is restricted to the first 500 kc. of the band, the rejection obtainable outside the band is high, there being no need for extreme broad-banding of any circuits.

Next there is a 6EH7 mixer, V_2. Crystal-controlled injection on 36 Mc. is supplied by an 18-Mc. oscillator-doubler, V_{21A-B}, giving an intermediate frequency in the 14-Mc. range. The oscillator-doubler is also used in transmitting. A second 6EH7 mixer, V_3, has tunable injection from the variable local oscillator, and cathode follower, V_{18A-B}, a 6DJ8 dual triode. This oscillator range is 5 to 5.5 Mc., resulting in a fixed second i.f. of 9 Mc. The 9-Mc. signal then passes through the crystal filter, FL_1, which is the principal factor in the receiver's excellent selectivity.

Now comes the amplification, after the selectivity, which is as it should be if overloading problems are to be minimized. A 9-Mc. amplifier, a 12BA6, V_4, feeds a 12BE6 mixer, V_5. Injection 8550 kc. from one half of a 12AU6, V_{19B}, results in 450-kc. output from V_5. This is amplified by a 12BA6, V_6, and passed on to an a.m. detec-

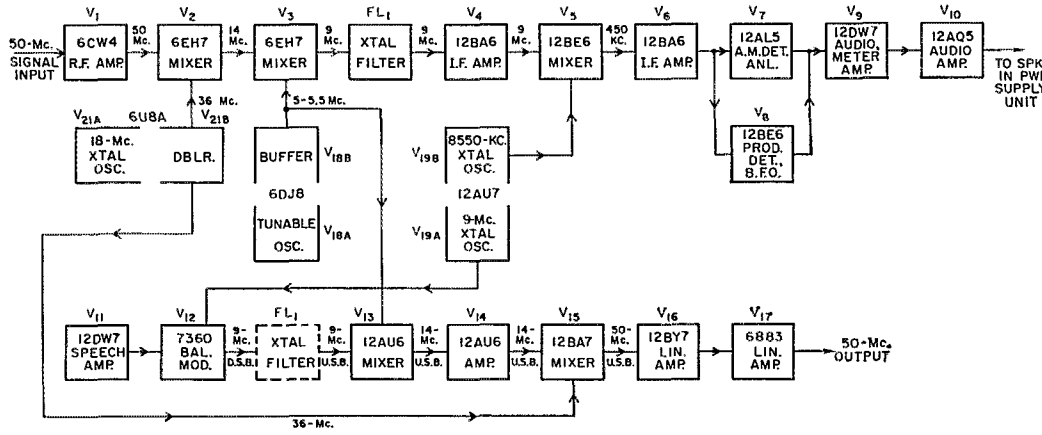


Fig. 1 — Block diagram of the Clegg Venus 50-Mc. Transceiver.

tor, V_7, or to a 12BE6 product detector, V_8, for c.w. or s.s.b. Also part of V_8 is a crystal-controlled b.f.o. on 448.5 kc. Audio amplification is handled by a 12DW7 triode, V_9, and a 12AQ5, V_{10}. V_7 and V_8 are multifunction tubes, also serving as automatic noise limiter and meter amplifier, respectively.

Transmitting Functions

Sideband with its heterodyning processes is a natural for the transceiver approach, since several stages can do the same job for both transmitting and receiving. The frequency control and selectivity circuits comprise some of the more critical elements in either transmitting or receiving, and fortunately these are among the items that can be made to perform a dual role in a transceiver. The economy of the transceiver approach becomes apparent when we trace the signal paths in the lower portion of Fig. 1.

Energy from the microphone is amplified by a 12DW7 dual triode, V_{11}, and fed to a 7360 balanced modulator, V_{13}. Also driving the 7360 is a 9-Mc. crystal oscillator, V_{19A}. Output from the 7360 is 9-Mc. double sideband, with carrier suppressed. This becomes upper-sideband s.s.b. after passing through the crystal-lattice filter, FL_1. No sideband switching is provided, and none is needed, since 50-Mc. sideband communication is concentrated at the low edge of the American phone assignment and upper sideband is thus the logical choice.

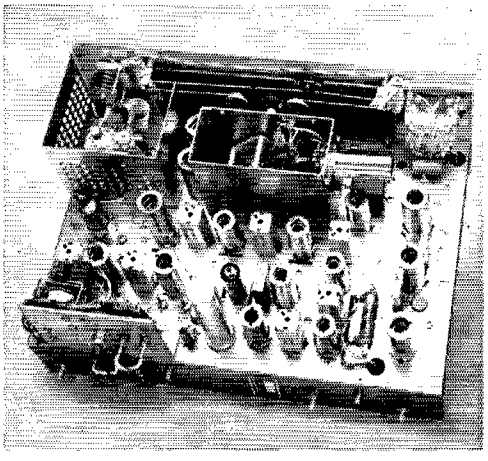
The filter is the first dual-function item, remaining in the transmitting and receiving circuits permanently. The tunable oscillator, V_{18A-B}, enters the picture again at this point. Its output on 5 to 5.5 Mc. beats with the 9-Mc. sideband signal in a 12AU6 mixer, V_{13}, producing 14-Mc. s.s.b. energy that is amplified by another 12AU6, V_{14}. Here the 6U8 oscillator doubler, V_{21A-B}, comes into play again, its 36-Mc. energy adding to the 14-Mc. signal in a 12BA7 mixer, V_{15}, to produce the 50-Mc. signal that is eventually transmitted. Linear amplifiers V_{16} and V_{17}, a 12BY7 and a 6883, bring the signal up to the 85-watt p.e.p. input that the final stage runs.

Operation

In the interest of clarity in description of the basic stage functions we have used round numbers to indicate the frequencies involved. Actually there is some latitude possible in setting the frequencies of both transmitter and receiver. Normally the transmitting frequency is left fixed, and the receiver can be varied plus or minus 1.5 kc. from the transmitting frequency by a front-panel control. This is handy in net operation and round-table QSOs, where there is often a small variation in the frequency of the participating stations. Being able to adjust the receiver slightly without affecting the transmitting frequency prevents such a group operation from gradually walking across the band, as can happen if there is no independent frequency control for the receivers.

The transmitting frequency can be shifted by a similar amount if it appears desirable. Separate transmitter and receiver offset controls shift the frequency of the variable oscillator, V_{18A}, by the desired amounts. The transmitter control is on the back of the r.f. unit, while the receiver offset is on the front panel. It is calibrated in 0.5-kc. intervals.

The main tuning control for both transmitter and receiver is a dual smooth-running vernier affair, reading directly in frequency. When properly calibrated, it is accurate to within less than 2 kc., and may be reset to well under 1 kc. Front panel controls in the upper row on the left side are for speech gain, carrier level, and receiver r.f. gain. Below the carrier level knob is another for carrier balance. Microphone and key jacks are mounted either side of the balance control.

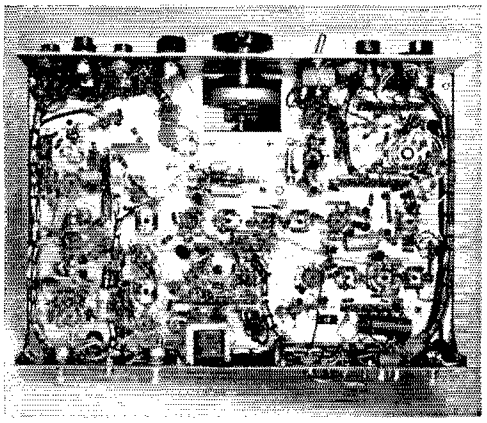


Interior of the Venus Transceiver. The rectangular section in the upper center is the v.f.o. assembly, with its cover removed. The transmitter output stage is at the upper left.

Toggle switches at the right of the main tuning knob are for fast-slow a.v.c. and receiver mode switching. Knobs at the lower right are the noise limiter and receiver audio gain controls. At the upper right are the final amplifier plate loading and tuning controls.

The tuning range is 49.975 to 50.475 Mc., though other ranges may be obtained on order. Very little readjustment of the transmitter is needed in covering this small segment of the band, and none at all in the receiver. In transmitting, once the loading has been set up for a 50-ohm load, only a slight retouching of the final plate tuning control is needed, and this only when the change in frequency is a major portion of the tuning range. Two meters are provided. One reads final amplifier cathode current and the other relative output. The latter doubles as an S-meter in receiving.

The Venus is supplied with a push-to-talk microphone, and all voice operating is done by this means. Shaped grid-block keying is provided, with a key jack on the rear wall. The transmitter is set up for c.w. operation by insert-



Bottom of the Clegg Venus. Despite complex circuitry, the layout has been kept open, with all parts accessible. A factor in this is inclusion of the power supply components in the speaker enclosure, a separate unit.

ing the key and turning the speech gain control to its off position. The switch on this control is used as the send-receive switch in c.w. work. The carrier level control may be used to set the power output at any convenient level for tuning or antenna adjustment purposes.

For a.m. service the carrier level is set so that the amplifier cathode current is approximately 60 ma., and the speech gain so that both meters show only very slight upward movement on voice peaks. Reception of a.m. involves merely placing the mode switch in the proper position. It should be noted that the Venus is designed for sideband and c.w. service. The receiver selectivity (2.7 kc. at 6 db. and less than 6 kc. at 50 db.) is such that the deficiencies of many a.m. signals currently heard on 50 Mc. show up very markedly. A stable well-modulated a.m. signal is quite readable, even at low signal levels, but the wobbly v.f.o. and the fuzzy modulation that so often characterize 50-Mc. a.m. operation fare very poorly indeed.

Venus 50-Mc. S.S.B. Transceiver

	R. F. Unit	Power Supply & Speaker
Height:	8 inches	8 inches
Width:	15 inches	7½ inches
Depth:	11 inches	11 inches
Weight:	18 pounds	21 pounds
Price Class:	$195	$110

Manufacturer: Squires-Sanders, Inc., Watchung, New Jersey.

Options

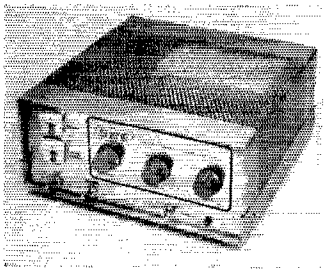
The power supply, which also contains the speaker, is normally supplied for a.c. operation, but a 12-volt version is available. The a.c. supply is an all-solid-state chokeless design which is compact and relatively light in weight. Being separate from the r.f. unit, it can be placed away from the operating position to conserve table space, if desired.

The Venus was designed with many contingencies in mind. It is a complete 50-Mc. station in its own right, with enough power to perform well, but it may be used effectively in conjunction with other gear. Provision is included for operation with a high-powered linear amplifier. The 14-Mc. output from the first mixer in the receiver, F_2, may be taken off and fed to a communications receiver, thus using the receiving front end as a converter and providing wider tuning range than the Venus tuning system affords. This also frees the operator for transmitting and receiving in widely separated frequencies, where this is desirable.

Though the prospect is not discussed in the instruction book, it takes no great amount of imagination to visualize the Venus as a frequency-control system for any and all higher bands, both transmitting and receiving. Some fairly simple transverter equipment for each additional band is all that would be required.

—*E. P. T.*

SBE Linear Amplifier SB1-LA



THIS is truly the age of miniaturization. SBE has managed to pack neatly an s.s.b. kilowatt linear amplifier, including power supply, into a ½-cubic foot package. Although the amplifier is designed to go with the SB-33[1] transceiver, it is compatible with other exciters that can furnish about 65 watts of drive. Since the SB-33 covers the 80-, 40-, 20-, and 15-meter bands, the SB1-LA also operates in the amateur bands between 3.8 and 21.5 Mc. The amplifier is rated at 1000 watts p.e.p. input on s.s.b. (750 watts on 15 meters), 400 watts on c.w., f.m., and f.s.k., and 300 watts on a.m.

[1] Recent Equipment, *QST*, Apr. 1964.

One secret that could account for the small size of the amplifier is the use of several relatively small tubes instead of one large kilowatt tube. SBE incorporates six 6JE6 TV sweep tubes in a grounded cathode circuit. With all of these high-perveance tubes in the circuit, it doesn't take a

super-high voltage to power the amplifier, and it's quite impressive when the plate meter swings up to 1.5 amperes!

Since the amplifier is operated Class AB_1, no power is required for driving the grids, so a bank of swamping resistors is connected across the input to the amplifier. The input impedance is about 75 ohms resistive. Fixed operating bias is fed in shunt to the 6JE6 grids from a voltage-doubler power supply. This bias can be adjusted, if necessary, by a potentiometer located at the rear of the cabinet.

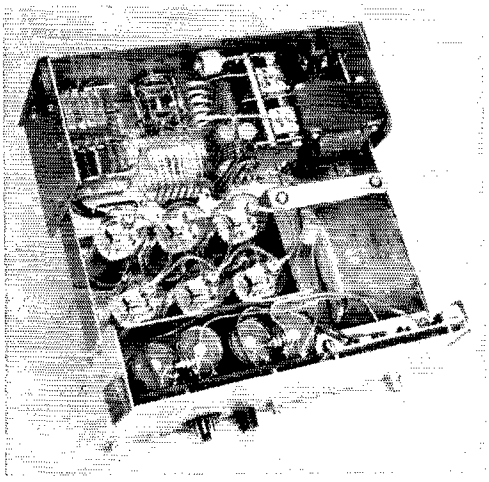
A pi-network output circuit is used in the amplifier plate and, because of the unusually low plate load impedance of the six parallel-connected 6JE6's, the pi-network input capacitor (TUNE) is rather large in value while the inductance required is small. In fact, the coil on 80 meters has only 7 turns. The BANDSWITCH automatically selects the proper inductance tap and, on 80 and 40 meters, switches in fixed capacitors across the LOAD capacitor. Additional capacitance is also connected in shunt with the TUNE capacitor on 80 meters. The amplifier output circuit is designed to work into a 50-ohm load that does not exceed an s.w.r. of 2 to 1.

If you inspect the SB1-LA amplifier closely and look over its circuit diagram, you'll find no obvious parasitic or neutralization precautions except for 27-ohm resistors in each of the 6JE6 grid leads. Undoubtedly, SBE has found the secret to stable amplifier operation because it *is* stable and there were no indications of parasitics in the unit inspected here at the ARRL lab. Perhaps it is a combination of the grid loading, plate lead dressing and effective screen grid bypassing.

The power-supply section should be of special interest to those who normally think of having the power supply located beneath the operating table in a table-top amplifier. As mentioned earlier, the SB1-LA power supply is included in the cabinet with the amplifier. A single transformer with three secondary windings supplies the high voltage and bias for the amplifier. Two of the windings are for a pair of semiconductor voltage doublers connected in series. This allows the use of relatively low-voltage (and small-size) electrolytic capacitors in the filter. Output from the high-voltage supply is about 800 volts with a nominal load of 1.2 amperes. The third transformer winding provides bias voltage which is also rectified by semiconductor diodes. Screen voltage is taken from one half of the voltage doublers.

Two miniature meters are mounted on the front panel of the amplifier. One indicates the PLATE AMPERES (actually measures plate and screen current) on a 0 to 1.5 ampere scale. The other meter is an OUTPUT indicator, 0 to 5 scale, and measures the relative r.f. volts at the output of the amplifier.

Some thought has been given, in the design of the SB1-LA, to antenna switching and use of the amplifier with its companion driver. Panel toggle switches and internal relays allow for "barefoot" or amplifier-in operation. The three toggle



All of the components for the kilowatt linear, including the power supply, are neatly packed into the SB1-LA cabinet. Here, with the cabinet top removed, most of the major amplifier and power supply components are visible. The six 6JE6 amplifier tubes are just to the left of the plate transformer. Filter capacitors and semiconductor diodes (diodes not visible here) are placed along the rear wall of the cabinet at the bottom of the photograph. At the upper right hand corner is the filament transformer and to its left are the r.f. amplifier tank circuit components. Rear-apron connectors and controls are, from left to right: Antenna connector (SO-239), driver connector (phono plug), power plug, bias adjust potentiometer, and ground stud.

switches are FIL (on-off), POWER (hi-low), and TUNE-OPERATE. The POWER switch gives the straight-through or amplifier action, while the TUNE-OPERATE switch lowers the screen voltage on the amplifiers so that the operator can roughly tune the amplifier tank to resonance before turning on the full power. During standby, the amplifier tubes are biased off completely to prevent tube noise.

Mobile operation is possible with the SB1-LA and the manufacturer can supply a matching inverter (model SB3-DCP DC/AC) to power it from the car's power supply. The instruction manual furnished with the amplifier has recommendations and suggestions for going mobile.

The SB1-LA has the same general color scheme as the SB-33 — gray cabinet with a satin chrome panel and light blue knobs and trim. — *E. L. C.*

SBE Linear Amplifier SB1-LA

Height: 5¾ inches
Width: 12 inches
Depth: 12⅛ inches
Weight: 40 pounds
Power Requirements: 117 v.a.c., 50-60 cycles, 1400 watts peak.
Price Class: $280
Manufacturer: Sideband Engineers, 317 Roebling Rd., South San Francisco, California.

Hamfest Calendar

Illinois — The Egyptian RC will hold its annual hamboree on Sunday, Sept. 27, at its club house on the levee at the Chain of Rocks Canal near Granite City. Games and contests for the entire family. Ample space to park and swap. Club located 200 yards south of U.S. 66 and 40 bypass, ¾ mile west of U.S. 67 Alternate, and 2 miles east of Chain of Rocks Bridge. Mobiles monitored on 29640 by club station W9AIU. For more info contact Egyptian Radio Club, Inc., Box 1300, R.R. 1, Granite City, Ill.

Illinois — The Peoria Area ARC hamfest will be held Sept. 20, at Exposition Gardens on the northwest edge of Peoria, 2 miles north of junction 150 and N. University Ave., and 2 miles west of junction 88 and Northmore Road at the State Police Headquarters. Watch for Hamfest signs along these routes. All-weather site, lunches available. Free swap section, parking, contests, and cartoons for the kiddies. Free coffee and donuts from 9:00 to 9:30 A.M., CDT. Registration is $1.00 in advance, $1.50 at the gate. For registration write Ferrel Lytle, W9DHE, 419 Stonegate Rd., Peoria.

Kentucky — The Henderson ARC will hold its first annual hamfest Sept. 27, at Park Field just north of Atkinson Park, Henderson. Plenty of parking space and shade, and food will be available on the grounds. Registration begins at 9:00 A.M. For more info contact Owen L. Kanipe, WA4KZI, Box 252, Henderson, Ky.

Manitoba — The Manitoba Association of Amateur Radio Clubs is sponsoring the Mid-Continent Hamfest, which will be held Sept. 5 and 6, at the Riviera Park on Highway 75. Program includes swap and shop, demonstrations, games for the children, entertainment for the XYLs, a dance Saturday night and a banquet on Sunday. For registration information and hotel accomodations write Russ Down, VE4DE, Box 475, Winnipeg, Manitoba, Canada.

Maryland — The Foundation for Amateur Radio will hold its annual hamfest at Howard County Fairgrounds, Routes 40 and 97 in Maryland, on Sept. 27. For more info contact Clarence Carvell, K3EIW, 2820 Curtis Drive, SE, Washington 31, D.C.

Michigan — The CMARC picnic will be held Sept. 13 at W. Washington Park, Lansing. No other info at hand.

Minnesota — The Duluth picnic will be held August 30 at Chambers Grove. No other details available.

New Jersey — The South Jersey Radio Association will sponsor its annual hamfest Sept. 13 at Molia Farms, Malaga, N.J. Rain date is Oct. 4. The program includes 2-and 6-meter hunt, swap shop, pony rides, games and swimming. Talk-in by K2AA on 2 and 6 meters. Bring your lunch basket. Advance registration for non-club members is $2.00, deadline Sept. 6; general admission at the gate $3.00. For registration and information, contact Joe Duffin, W2ORA, 247/257 King's Highway, West Haddonfield, N.J.

New Jersey — The East Coast V.H.F. Society will hold its 6th annual hamfest and old-style picnic on Saturday, Aug. 29, at Saddle Brook Park, Saddle Brook, N.J., beginning at 10:00 A.M. Games, contests and displays are planned for the whole family. Talk-ins on 2, 6, and 10 meters; directional signs will be posted on all nearby routes. Registration and parking free; food and soft drinks available at nominal prices. Contact John J. Johnson, W2YIA, 51 Birch Road, Dumont, N.J., for more info.

New Jersey — The Southern Counties Amateur Radio Association, Inc. is holding a hamfest on Sunday, Sept. 20, at Lake Lenape Park, Mays Landing, N.J. There will be free rides for the children, free use of picnic and camping areas and beach. The program includes a swap shop, equipment displays, hidden transmitter hunts, and QSL contest. A traffic control station will monitor the 6- and 2-meter bands, and transmit on 50.550 Mc. and 147 Mc., starting at registration time — 9:00 A.M. Registration is $2.00, children under 12 admitted free. For more info and registration, write Charles Bengal, W2TUR, 815 Seaside Ave., Absecon, N.J.

New York — The Staten Island ARA will sponsor their 3rd annual dance on Oct. 2, 8:30 P.M., at the Labetti Post, 390 Hyland Boulevard, Staten Island. Tickets are $2.50 and will be available at the dance. Contact Paul Wiegert, K2JFE for more info.

Ohio — The Findlay, Ohio, hamfest will be held at Riverside Park, September 13. Program includes a bazaar for the ladies, playgrounds for children. Bring your picnic baskets or buy snacks at the park. Talk-in on 75, 6 and 2 meters. Tickets are $1.00 in advance, or $1.50 at the gate. Tickets are available from any ham in the Findlay area, or write Dennis Quick, K8LEU, 834 Summit St., Findlay or Clark E. Foltz, W8UN, 122 W. Hobart St., Findlay.

Ohio — The 27th annual STAG hamfest, sponsored by the Greater Cincinnati Amateur Radio Association will be held Sunday, Sept. 27, at Stricker's Grove on Compton Road, Mt. Healthy, Cincinnati. For more info, write Michele J. Marzigliano, K8YNT, 4440 Poole Rd., Cincinnati 39.

Ohio — The Warren Amateur Radio Association will hold its 7th annual hamfest August 30, at the Newton Falls Community Center. Contact Don Lovett, 3629 Northwood Dr. SE, Warren, Ohio, for more info.

Ontario — The Seaway Valley ARC of Cornwall is holding its annual hamfest at St. Andrew's West, 10 miles north of Cornwall, Aug. 30. For more info write M. B. Rowbotham, 1308 Montreal Road, Cornwall, Ont., Canada.

Pennsylvania — The Metropolitan Erie V.H.F. Society will hold a hamfest Sunday, Sept. 20, at the Brookside Fire Hall, near Erie. Program includes dinner, auction, QLF contest, transmitter hunt. For more info contact Hank Schneider, W3KPJ, 1806 Water Street, Wesleyville, Pa. 16510.

Pennsylvania — The annual hamfest of South Central Pennsylvania Radio Clubs will be held Sept. 6, at the Adams County Fair Grounds, 2 miles north of Abbottstown, Pa., on Route 194. Contact Millard H. Klunk, W3FDA, 118 East Hanover St., Hanover, Pa.

Pennsylvania — The Uniontown Amateur Radio Club's 15th annual Gabfest will be held Saturday, Sept. 19, at the club grounds, on Old Pittsburgh Road, 2 miles north of Uniontown. Refreshments will be available. This is a stag affair. Registration is $2.00. Contact Joseph M. Sofranko, 438 Braddock Ave., Uniontown, Pa. 15401, for more info.

Texas — The Central Texas ARC will sponsor the 10th annual hamfest at Waco, Sept. 6. For more info contact R. L. Edrington, Central Texas ARC, P.O. Box 1032, Waco, Tex.

Washington — The Walla Walla Valley Radio Amateur Club will hold its 18th annual all-family picnic and hamfest Sept. 19 and 20, at Jefferson Park in Walla Walla. Saturday's activities begin at 6:00 P.M. and include disaster films of ham activity, W7DP museum, and free refreshments. Sunday's program includes swap shop, games, displays and a potluck lunch at 12:30 (coffee, pop and dessert furnished). Registration, 10:00 A.M. to noon, is free. The annual meeting of the MINOWS will be held Sunday. Talk-ins on 29.6 and 3970. For more info contact Pat Stewart, W7GVC, 1410 Ruth Ave., Walla Walla.

Strays

This is the display booth set up at the Southwestern Division ARRL Convention by the San Diego DX Club, keepers of the W6/K6 QSL Bureau. Those cards on the walls, some *very rare indeed*, are all undeliverable because the addressees have no envelopes on files with the Bureau. Is *yours* on file at *your* bureau?

—...—

K2QHZ drives a tractor-trailer twice weekly between Boston and Baltimore, and operates two meters to while away traveling time. He recently told W1AW's W1WPR that he gets about 100,000 miles from a five-element beam (he mounts them on the cab) before the vibration and weather wear it out.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

We were going to discuss the amazing icicle antennas of K4CQA this month, but military classification may be involved. We'd better save it. Like we've been saving this DXpostulation of an erstwhile youthful and ambitious New York countries hunter:

Dear Jeeves —

I was a teen-aged DX man. I emphasize *was*. Slowly and painfully, with 150 homebrew watts that worked when they wanted to, a lackadaisical trap antenna and a so-so receiver, I built myself up to 71 countries.

In pursuit of these I had little trouble at first, for I was willing to settle for the common types. Later, around the 60 mark, I ran out of easy countries and had to start competing for the harder ones. So I saved my pennies one summer and got a tribander. Due to various circumstances beyond my control I had to settle for a mere 26 feet in height. Still, it *was* a beam, and I thought I was all set.

I had, of course, already worked a few good ones (HE9 four times, in fact) but I had missed some garden-variety countries, too. I planned on neatly finishing DXCC before going away to college in the fall. The sad truth, however, gradually became apparent.

I had to listen more and more, but I had expected this and it didn't bother me. What began to get me was the fact that each country became such an epic frustrating struggle. Much more often than not, I met with demoralizing, crushing defeat.

I didn't mind calling and calling for hours knowing that others had hung on even longer. What really bugged me were the in-between types of countries I needed that weren't pile-up prizes, whose QSOs I patiently read the mail on only to have them suddenly QRT or QRJ. The times I sat up from midnight till dawn and worked nothing new with the bands wide open — the panicky claustrophobia as you realize you're just a blank face in the crowd, a weak squeal in a roaring mob — the fat W9s who casually barged in with kilowatts and superbeams to snatch away countries I almost had in the bag — the nagging failure to hear them come back as mounting QRM or QSB finally swallowed them up.

Contests? Never had any luck in a DX contest. I sat on the fringes to pick off simple stragglers while *buddies with S-38s and DX-20s knocked off* the Aland islands, and another friend worked his 75th country on QRP phone. I've *had* it. I'm through. My beam I'll sell. My new Extra Class license I'll cover up the hole in the roof with. 73,

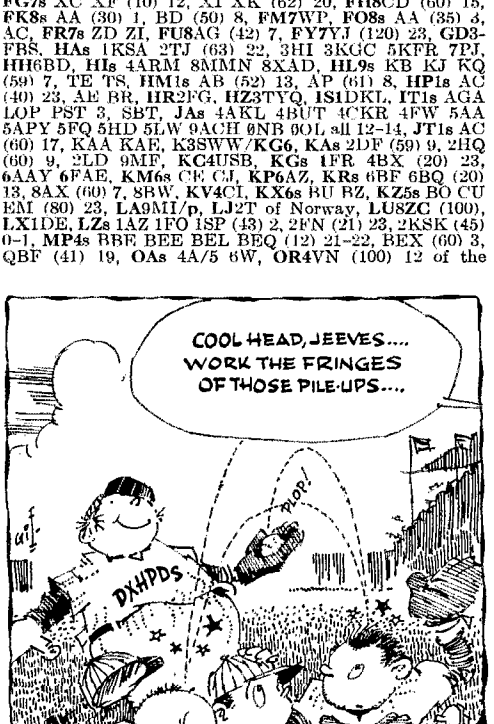
— Garry, K2---

Yes, we were slyly hanging onto this stylish lament, trusting to add a clever punch-line here to the effect that this lad had reconsidered and had just hit triple-DXCC. But we underplayed our hand. It's been *years* now. Garry, OB, where are you? And how's DX?

What:

Whew — the home stretch of summer at last. What a sizzler it's been out our way! Weatherwise, we mean. DXwise — well, not exactly torrid, yet not exactly horrid. In fact, not bad at all, judging generally by word from the "How's" herd. Some scattered opinion: "Conditions must be improving, or is it my new beam?" — *W2BTQ/KH6*. . . . "Erratic is the word for 15 and 20." — *WA4TLB* . . . "Been hearing plenty, but working it is another story," — *W3HNK* . . . . "That springtime 'DXplosion" hit during summer doldrums here!" — *WA9ICQ*. . . . "How s DX? Pretty darned good out here with nice late openings on 20." — *K7QXG*. . . . "Whoops — TVI caught up with me on 15!" — *WA2WIJ*. . . . "Twenty is spotty, occasional good openings." — *W7VRO*. . . . "Not much doing; busy with station maintenance and construction." — *K7VMO*. . . . "*Loved* my first three weeks on 15. The DX bug has got me!" — *WN4RIJ*. . . . "That 15 keeps surprising me." — *WA6TMY*. . . . "VKs and ZLs come through nicely on 21 Mc. but where are all the Pacific islands?" — *WA6TGH* — . . . . "Why wasn't I interested in DX back in '59?" — *K4MYO*. . . . "Forty and 80 have picked up somewhat despite summer QRN." — *W7DJU*. . . . "This season is a letdown after last year's 7- and 3.5-Mc. DX doings." — *K3JVF*. . . . Well, it's 20's turn for an activities spotcheck this month, so let's get on with the job. Those numbers in parentheses represent kilocycles above the lower band-limit, and the unenclosed digits stand for GMT in whole hours. Like this. . . .

20 c.w., is well covered by reports from **Ws** 1ECH 2BTQ/KH6 3HNK 4GTS 7DJU 7VRO 8EQA 8YGR 9HAO, **Ks** 3SLP 3TJE 3UXY 4MYO 5CDA/mm 7QXG 9HXY ØAID ØGVA, **WAs** 2KSD 2WIJ 4JJY 4TLB 5AER 5CIY 5GZX 6SLU 6TGH 9AVT 9FMQ 9ICQ, **WBs** 2AYU 2FLA 2FVD 6IFC and HER on the subject of **AC3**SQ (60) 9–10, **AP5s** HQ (72) 15, HR, **BY1**PK (60) 20–21, **CN8s** FW GC, **CO2s** AL BB I, CB JB, **CPs** 3CD 5EZ, **CRs** 6AI 6FY 6GO 6JA 6JL 8AD 8AE 9AH (50) 14, **DMs** 2AGH 2BKK 2CEL 3PZO, **DUs** 1GF (20) 12, 1OR 7SV, **EI9J**, **ELs** 2AD 8X, **EP2s** EL RC (7) 18, **ET3s** JF JH (60) 15, F9s FC/**FC** UC/**FC**, **FB8s** WW (53) 6, XX, YY, **FG7s** XC XF (10) 12, XI XK (62) 20, **FH8**CD (60) 15, **FK8s** AA (30) 1, BD (50) 8, **FM7**WP, **FO8s** AA (35) 3, AC, **FR7s** ZD ZI, **FU8**AG (42) 7, **FY7**YJ (120) 23, **GD3**-FBS, **HAs** 1KSA 2TJ (63) 22, 3HI 3KGC 5KFR 7PJ, **HH6**BD, **HIs** 4ARM 8MMN 8XAD, **HL9s** KB KJ KQ (59) 7, TE TS, **HM1s** AB (52) 13, AP (61) 8, **HP1s** AC (40) 23, AE BR, **HR2**FG, **HZ3**TYQ, **IS1**DKL, **IT1s** AGA LOP PST 3, SBT, **JAs** 4AKL 4BUT 4CKR 4FW 5AA 5APY 5FQ 5HD 5LW 9ACH ØNB ØOL all 12–14, **JT1s** AC (60) 17, KAA KAE, K3SWW/**KG6**, **KAs** 2DF (59) 9, 2HQ (60) 9, 2LD 9MF, **KC4**USB, **KGs** 1FR 4BX (20) 23, **6**AAY **6**FAE, **KM6s** CE CJ, **KP6**AZ, **KRs** 6BF 6BQ (20) 13, 8AX (60) 7, 8BW, **KV4**CI, **KX6s** BU BZ, **KZ5s** BO CU EM (80) 23, **LA9MI/p**, **LJ2**T of Norway, **LU8ZC** (100), **LX1**DE, **LZs** 1AZ 1FO 1SP (43) 2, 2FN (21) 23, 2KSK (45) 0–1, **MP4s** BBE BEE BEL BEQ (12) 21–22, BEX (60) 3, QBF (41) 19, **OAs** 4A/5 6W, **OR4**VN (100) 12 of the



Dutch-Belgian antarctic bunch, **OX3s** XU 2, UD, **OY7S**, **PJs** 2AA 2ME 3AN, **PZ1s** BH BW, **SL7AC** of Sweden, **SU1IM**, **SV0s** WAA (20) 22, WGG WPP 23, one **TA2BK** (37) 15, **TFs** 2WIU 3AB (30) 1, **TI2s** AB CFM PZ, **TN8s** AF AL, **TT8s** AK AM 17, **TU2AU** (50) 20, **UAs 1**KED (30) 0-1 of Franz Josef Land, **2AK 2**KAR **2**KAT **9**AC (18) 1, **9**AG **9**FI **9**GC **9**JH (5) 1, **9**JS **9**KAH **9**KEO **9**KOG **9**KTE (35) 2-3, **9**MR **9**OI **9**WJ **9**WR 3, **9**WS (15) 0-1, **ØB**I **Ø**EQ **Ø**GF **Ø**FG (63) 9, **Ø**FJ **Ø**FK (60) 7, **Ø**IE (59) 8, **Ø**IK (17) 7, **Ø**KCA **Ø**KIF **Ø**KIG **Ø**KJA **Ø**KSS **Ø**KZB **Ø**LJ **Ø**MF **Ø**MM (60) 9, **Ø**PK, **UB5s** AU (2) 32, IB JE KST LU TQ ZV, **UC2s** AR TA WP (40) 22, **UD6s** AM (5) 2, BD (17) 21, BN (65) 19, BZ (20) 2, KAK KGF (90) 19-20, **UF6s** BT KPA (75) 0, KPE (94) 20, **UG6**DL (52) 0, **UH8s** AD (70) 2, KAA, **UI8s** AI (12) 3, AH CT (93) 2, CV (85) 2, KAD KBA KHA (62) 1, LB (40) 3, **UJ8s** AC (62) 3, AH **UL7s** CH (80) 2-3, CG (53) 2, KAT KBB KCR (5) 22, KDT (60) 1-2, LK (50) 2, PB (2) 1, PH (45) 1-2, PJ (46) 2, **UM8s** AB FZ (46) 3, KAA (37) 2, **UN1**BK (60) 3, **UO5s** PK (40) 22, SM (70) 22, **UP2s** BF (25) 1, KCF (80) 16, KMU NM PT, **UQ2s** AN GA HT KAR (1) 0, KCT (15) 2, **UT5s** AZ BX (70) 20, HF NV, **UWs** 3DC 3EH **9**CE (15) 1-2, 9OU (35) 1, 9UX (53) 1, **Ø**AW **Ø**IP **Ø**IR (20) 2, **VE8s** CD DL 7, RN RX, **VK9s** GC (30) 5, RB (40) 3, SB 12, **VPs 2**AV **2**KT **2**KJ 12, **6**BW (50) 14, **7NQ 8**HJ 9BO 9BP 9DL 9EU (30) 14, **9**FC **9**FD **9**FJ, **VQs 1**GDW (78) 11, **2**BC (60) 17, **2**GJ (60) 19, **2**JN **8**AM (70) 16, 8BT, **VRs** IL (100) 3-4, **2**DK 5-8, **2**EJ **4**AO (28), **VSs 1**CW 1JV (65) 13, 1JW (60) 10, 1JY (63) 12-13, 1LD 1LV (3) 14, **5**LX (60) 14, **6**EY (65) 16, **6**FF **6**FJ **9**MG (50) 16, 9OC (32) 11, **VU2s** CYZ LEZ (21) 1, ND TP, **XE1s** AZ (50) 7, NL 13, OE (10) 0, PJ, that **YI3**D (65), **YK1**AD (60) 0, YN1SL, **YOs** 3RF 5KAT 6AW (60) 17, 7DL 7DO 8CF (70) 22, 8GL, **YS1**O (75) 23-0, **ZBs** 1CR 2F, **ZC5s** AJ 16, DS (50) 18, **ZD3**A (5) 19, **ZEs** 1AE 1AS 2KV (60) 18, **ZK1**AR (85) 3-4, **ZP5s** LS (35) 0, OG, **ZS3**EW, **4U1**ITU (30) 20, **4W1**D (5) 22, **4X1s** GA, JU MJ NX (25) 16-17, RH, **5As** 1TW 2TJ (55) 23, 3TX (5) 23, 5TR, **5B4s** CL CZ (13) 23, IP, **5H3**HZ, **5R8**AD (1) 4, **5T5**AD, **5X5**IG, **5Z4**IV, **6O6**BW, **7G1**IX (60) 20, **7X2**DU (5) 23, **7Z1**AA (6) 15, **9G1s** DY EY FC FE (75) 21, FK (80) 21, **9K2s** AD (75) 17, AN (80) 21, **9L1s** KW LH NH TL (29) 20, **9M2s** LO YY, **9Q5s** AB PS (70) 28, **9U5s** BB and JH.

20 phone, where DX stations have developed a habit of working inside the W/K phone subband on s.s.b., is harrassed somewhat by local short-skip QRM when pile-ups occur. **Ws** 3HNK 7VRO 8KML 8YGR, **Ks** 7QXK 7ZLO 9IIXY **Ø**AID, **WAs** 2KSD 2WIJ 5AER 5EID 6SLU, **WB2**AYU, listener C. Maher and the clubs press list a load of **AP2s** AD AR* M1* 15, **BV1**USA 15, **CNs** 2CS 8AW 8BB*, **COs** 2VU 6XZ* 8RA*, **CPs** 1BH (150) 18, 1BJ 1BK (125) 20-21, 5AD 5EA (145) 2, 5EC 5ED 5ER* (184) 20, 8AB (104) 2, **CRs 6**AL* **6**BF **6**RX **6**DB* **6**OR* **7**GF (270) 15, 9AH (125) 14, **9**AI, **CTs 1**EE* (190) 0, 1GD **1**GE* **1**IP 1KK* **1**LX 1MI **2**GR*, **CXs** 1LC 2CO 2DT* 4AW 8BM, **DUs** 1NBW 6TY*, **EAs** 3JE* 16, **6**AI* **8**DH* 8DM* **9**AX* 9AZ, **ELs** 1G 1P 2AF 2I 3D 5D*, **EP2s** AO AU (115) 2, BQ BY* DJ RC RV, **ET3s** FW HP JF RR, F9s RY/**FC** (120) 13-14, UC/**FC** (100) 22, **FG7s** XL* XS XT* XT/**FS7** XV 21, **FM7**WQ (110) 20, **FO8s** AQ (253) 3, BJ (250) 3, **FY7s** YE* YF (117) 23, **GC2**AAO (245) 22, GB3RCS of England, **HAs** 1KSA* 5BU, **HCs** 1DM 1FG* 1FX* 19, 1GJ (103) 9, 2JL 23, 5NV 5NW 8FN (125) 3, **HIs** 3JR* 4RM (215) 13, 4XAB* 8JSM*, **HKs** 4EB 5SL*, **HL9s** KD KH (290) 12, KP 13, KR (111) 16, TS, **HMs** 1AX 14, 5BF, **HP1**MN, **HRs** 1SO 2CH 22, 2SY 2, 9EB 23, **HS1X** (270) 14 and taboo for FCC-licensed amateurs, **HZ2**AMS 15, **IS1s** BCO CWN (251) 0, VAZ (255) 23, **IT1s** BXX (253) 23, DAM* GRV* **JAs** 4HT 5HL (267),12 5HT (260) 14, 6AY 6NP (105) 12, 8HK (103) 12, **JT1**CA (300) 14, **KAs** 5MC (246) 12, 6MP, **KC4s** USK USV USX, **KB6s** CB EPN (272) 10, **KGs** 4AA 4BQ 4DX 6AJI (324) 8, 6AJV **6**AKR (270) 7, **6**AOJ 6NAA 6SB, **KJ6s** BZ (322) 0, CC (332) 14, CL, **KM6s** BI (325) 16, CE CJ*, **KR6s** BF* CF DF DI GM MB 14, MH (250) 17, SP* 12, USA, **KS6**BA (267) 6, KV4s AA BP* BZ, **KW6s** CV DS ES 10, **KX6s** CH BD BQ (260) 5, DC, **KZ5s** AX KY MQ PD 22, SM YL, **LA9**FL/**p, LJ2T***, **LUs** 2XL/**9K3** (253) 2, **8ZC*** (100), **LXs** 1BB* 1CO 1DC* 22, 1DB* 1KA* 1LF* 23, 2DX, **M1B***, **MP4s** BBA* BBL BBO BBW BCC BDP QBF* TAV TBA, **OD5s** AX (100) 17, LX (110) 15, **OX3s** JV XU, **OYs** 7ML 8KR (115) 14-15, **PJs** 2AA (122) 0, 2CE 2CZ* 3AH* 3AJ* 0, 3AO 3CF 22, **PZ1s** AG AX 16, BR BW (110) 23, CE, **SP0**FR (253) 23, **SVs** 1AP* 23, **Ø**WB **Ø**WBB **Ø**WF **Ø**WPP (120) 19, **TF2**WIL (260) 12, **TG9**RJ, **TIs** 3AA 3MY 5RV, **TU2s** AE AF AJ* AS AW, **UAs 2**AW 3CE 3, 3C**R** (115) 3, 3JT 4IF (106) 3, 9AP* 9DT (108) 3, 9FB **9**KTE*, 9KTK*, 9TE (100) 3, **Ø**EK*, **Ø**KIE (260) 20, **Ø**KIF (113) 3, **Ø**KWA **Ø**LA **Ø**RG **Ø**SH **Ø**SK, **UB5**UW 21, **UC2**CU (260) 21, **UD6**BR, **UF6BB***, **UG6**AW, **UH8s** AY BO (110) 4, **UI8s** AE AG AU CT (270) 18, **UL7s** FA (103) 0, FE 4, KDW* NW*, **UM8s** FZ KAA (128) 4-5, **UN1**AZ*, **UO5s** LP PK OP (109) 4, WS, **UP2s** KAF (252) 1, KCB* KCK*, **UQ2s** AN CS (120) 19, **UR2-**KAW (250) 12-13, **UT5s** IK* RP*, **UW9s** AF (110) 2, CC (108) 4, **VEs** 6AMX/**SU** 21, 8MC 8MD 8MI, 8MO 22, 8RX 2, 8YT*, **VK9s** DR NT (110) 12, XI, **VPs 2**AB 2KJ (113) 12, 2VJ 3, 3CJ 1, 3HAG (128) 0, **5LP 6**AW (150) 22, 6KL (150) 22, **6**WR 23, 7DN 22, **7NU* 9**BY (105) 12, 9DC 9DL* 9DW 9FE 2, 9FH (135) 21, 9FK, **VQs 1**GDW **2**AB **2**JC* 9HJB/-**MP4**, **VS9**ARC, **VRs 2**BC (270) 3, 2DI (271) 4, 2EQ* 4, 4EE (251) 13, 4EG*, **VSs 1**FS 1LP 1LX 16, 1MC 1MF 4XK (185) 11, 4MM, **5**LX (250) 9, **5**MH (111) 15, **5**TR (295) 9, 6AZ 14, 6EK (310) 9-11, 9AAA 9ABM 9ADD 9AJR* 9MB (260) 15-16, 9MD 9MG (112) 3, 9MH (200) 14, 9PDR, **VU2s** MR NR 16, TP*, W**Ø**PI/**KM6**, WA6s FRB/-**KG6** FRV/**KG6***, **XEs** 2HHG (150) 0, 3L 3PI, (200) 0, 3PY 15, 3ZM, **YAs** 1AN (260) 17, 1BW (250) 16-17, 4A (300) 15, **YK1s** AA* (270) 14, AL (260) 18, YN1LH (130) 13, **YSs** 2SA (110) 22, 3PL*, **YU3**FZ* 22, **ZBs** 1A 1BX* 2AE*, **ZC5s** AJ AM, **ZD6**PBD 17, **ZEs** 1AC 1JE 2KL*, **ZPs** 3CJ* 5CF (200) 22, 5DD (110) 13, 5CG, **ZSs 2**MI (253) 12 of Marion isle, 3HX, **3A2CP*** (320) 15, **4U1s** ITU SU (230) 17, **4S7s** PG* YL*, **4W1**D (108) 20, **4X4s** AS BL (246) 20, HO* IW* IS* LC QA* SY*, **5As** ITG (278) 20, 1TT* 15, 1TK* 1TO* 1TW (253) 22, 2TJ* 3TV* 5TI* 5TW*, **5B4s** AK* CZ (248) 23, HK* TK, **5H3s** JJ* JL* JR, **5N2s** CKH GEL* 0, JEB JWC, **5R8s** AI (120) 15, AK*, **5T5**AB, **5X5s** AU* IU, **5Z4s** AA* AQ* ERR (335) 20, CT JR JU KU RF (140) 14, **6O6**BW 15, **6W8s** AE CA, **6Y5s** GH MC MJ (120) 12, RA* UC (120) 22, US, **7Q**DI of Malawi, **7Xs** 2BB 2SQ* 2VX (260) 18, 2WW* 3CT 3RT 3VW (119) 20, **7Zs** 1AA (260) 18, 3AA (111) 14, **9G1s** BY DR DY EC* GY 21, **9K2s** AM AN*, **9L1s** HX 17, JR (120) 18-19, RO WN*, **9M2s** CR DQ FR LO (107) 15, **9N1s** BG* 15-16, MM (280) 15, **9Q5s** GU HF* PA* SP TH*, **9U5s** JH* BB*, **9X5s** GG (259) 20, LR* MH and RZ*, those asterisks designating non-s.s.b. signals.

* * *

Next month the "How's" Bandwagon rolls along to other bands with the help of (15 c.w.) W2BTQ/KH6, **WAs** 5CIY 6TGH 6TMY, **WN4**RIJ; (15 phone) K7VMO, **WAs** 2WIJ 4JJY 5CIY 5EID 5GZX 6TGH 6TMY; (40 c.w.) **Ws** 1ECH 7DJU, **Ks** 4MYO 5JVF, **WA2s** FUL KSD, KN3ZOL; (80

VP8HF (G3RFH) visited remote Candlemas island in the South Sandwich group with an official survey party last March to produce 771 c.w. and 382 s.s.b. QSOs with 51 countries. Some 750 W/Ks, among whom the need for this rare country was practically unanimous, succeeded in catching VP8HF while Ken battled snowstorms, volcanic smoke and ash, power failures, collapsing antennas and atrocious propagation conditions.

c.w.) W7DJU, K5JVF and any other DX hitchhikers we pick up along the route. Even 10 and 160 may display DX scenery worth a tour. Hop aboard!

Where:

ASIA — Mr. M. T. Young of Taichung, Formosa, listed in the *Callbook* as proprietor of the BY-China QSL bureau, writes ARRL Assistant Secretary W1ECH that he can no longer provide this service. He suggests that BY-bound cards go via BV1US, QSLs for BYs direct . . . . VS1JY shipped a batch of Singapore postage to W2SAW but the mailing seems to have gone astray. Yat thinks another W/K may have received the stamps by mistake; if so, he'd appreciate their relay to Sax . . . . VS1LP tells W1YYM of ARRL that Singapore stations may be signing something like 9M4 ere long . . . . VERON's *DXpress* says operator Roley of VS9MB can be reached c/o 14A Romanway, Farnham, Surrey, England . . . . The *DXer* of DXCPR states that K7GCM has received duplicates of lost VS1MB log transcripts, that VS6DS of HARTS is bouncing QSLs for unauthentic VS6CO 14-Mc. c.w. QSOs, and that SM5CCE is awaiting YI1WS logs for confirmation purposes . . . . W2GHK's crew began attending to HZ2AM's 8Z4 and 8Z5 QSLs in late June after delays at the printer . . . . WGDXC understands that G2BVN still holds a few unclaimed G5KW/YI and G5KW/-JY QSLs. Self-addressed stamped envelopes, or s.a.e. plus International Reply Coupons, will get you yours.

AFRICA — VQ8AM, who may sign VQ8AMR on Rodriguez next month, makes it clear that he employs no QSL managers. "I think it is the duty of every operator to handle his own QSLs." This is a respected conservative school of thought, but we favor amending the motion to the sense that it's the duty of every operator to see that his QSLs are handled properly, third-part assistance acceptable . . . . W4ZRZ affirms his arrangement to manage QSL exchange for all ZD3A single-sideband QSOs . . . . W1ECH has it that cards for EL1–2 stations can be sent via G. Marcus Kelley, c/o Liberian Govt. Radio Stn., Monrovia. Other legit ELs can be reached through Robert Flemister, P.O. Box 465, Monrovia.

OCEANIA — "I still have plenty of QSLs left and will have my logs with me," writes departing KX6AJ (W6GRZ). "I believe I have QSLd almost 100 per cent but anyone who figures I still owe him a card can write me at the address in the listings to follow." Ross's records indicate 3000 KX6AJ QSLs already circulating . . . . DARC's *DX-MB* thinks ST2AR may soon sign a 6U2 call, and that Zanzibar may become 5H1 . . . . VERON's *DXpress* says W9FSR has KC6PE logs for the period October 28, 1959, to June 5, 1960 . . . . "I will QSL 100 per cent," assures K3SWW/KG6 of Guam.

EUROPE — W4VPD desires to clarify his connection with San Marino QSL matters. "I am QSL manager for 9A1TAI, no other 9A1s. S.a.s.e. and GMT are required." Enos has been receiving cards for other San Marino stations as well as for IT1s TAI and ZGY, but these should be sent direct or via other routes. W4VPD reports some 1300 9A1TAI confirmations already processed . . . . "I am U.S.A. QSL manager for SVØWPP, declares W5EGR, requesting the customary s.a.s.e. courtesy . . . . SL3ZO still has a flock of U.S.S.R. callbooks for sale, as well as prepaid envelopes and mint postage from LZ OK YO U and other curtain regions . . . . ISWL's *Monitor* understands that SP9s FR and GR can help QSP QSLs to unlisted SPØ stations . . . . Spurious use of the ZA prefix continues hot and heavy. Space limitations preclude running all those patently phony Albanian QTHs that keep rolling in each month. If anybody has something solid on Albanian activity we'll gladly pass the word along.

HEREABOUTS — Ws 1ECH 4GTS 81BX, K7s QXG VMO, WAs 4JJY 8KCO 9AVT 9ICQ, WN4RIJ, KA7DR and VE7BBB nominate this month's "QSLers of the Month": CO8RA, CP8AB, CR9AH, DL1CR, FS7AA, HB9AAF, HR3DW, IS1DKL, JA1CFD, K6BIA, KA2KS, KZ5KY, MP4BEQ, VKs 3AWT 5GM 5LX, VP7BG and W6ICM/KM6, plus QSL aides W2CTN and WA8CHU. You'll note one ordinary old K6 in that bunch. QSLing is a two-way street, you see, and KA7DR liked the fast work of K6BIA. Any particularly prompt QSLers you think should be recognized here? Pass the prose along, then . . . . Help! W3HNK still seeks a pasteboard push toward FY7YJ, OH5TK/Ø, 6W8BL; W4RLS desires ditto re Papuan VK9AT; K9VQK wants the word on ET3USA, GC2FMV, OH5VD/Ø all worked last year; WA2FUL and others are curious about the 3B1 prefix; and VE4OX longs to latch onto KL7DIE/VE8 of '60 vintage. "It surely pays to advertise," agrees W4GTS. "Please thank the many warmhearted 'How's' readers who wrote to advise me of PZ1BH's QSL manager. I started to answer them personally but soon realized that my postage bill would be higher than my monthly budget for DX QSLs." Phil still hunts an effective 6W8AC address . . . . "I'm now QSL manager for KP4BPH," notifies WA9AVT. "Ralph sends me his logs on the 30th of each month. S.a.s.e., *please*." . . . . What's your QSL bugaboo? LZ (seven worked) and UP2 (eight logged) won't come through with a single card for WA6TGY. A confirmation from each of these countries and UJ8AC would make Joe's results unanimous . . . . "VP5TK (K5VYV) is home after a year on Grand Turk with the Navy," announces K5LQL. "I have given him all QSLs that were being held here for him. After he is settled in Port Arthur he will have time to whittle the stack down. Meanwhile, second- and third-request cards are unnecessary." . . . . VP5GT, also on Grand Turk, tells K5JVF not to QSL but to just watch the ARRL Bureau . . . . K7QXG attributes much QSL-returns complaining to lack of s.a.s.e. or equivalent, insufficient use of IRCS, and the mysterious whims of DX operators. Jeeves holds that careless operating is a chief factor, particularly callsign confusion caused by silly phonetics and punk fists. South Americans are reluctant QSLers as a group, finds K7QXG . . . . PY1CK writes that all PY1BCR/Trindade QSL inquiries hereafter must go to PY1BCR himself. Flavio has returned those 1962 logs . . . . W7VRO and WA2OYG offer their services as QSL managers for DX stations in bona-fide need . . . . XE1NNN vows thorough QSL response from Cuernavaca . . . . Now let's peruse the post for possible QSL tips in the QTH line, keeping in mind that the following suggestions are necessarily neither accurate, complete or "official" . . . .

"RST 229" is an apt caption suggested by W1BB for this photo showing Antioch DX Society members (l. to r.) ham-to-be Bob, WA6s LJH JCD IJG and K6PJY in contact with KR6TZ on 160 c.w. from atop Mt. Butte, California, on a chilly morning last January. Neat U.S.-Okinawa first!

CO2JB, J. Brana, Box 6996, Havana, Cuba
CO8RA, Box 831, Santiago de Cuba, Cuba
CR6CA, Box 2121, Luanda, Angola
DM2AWG, R. Helm, M. Bollmann Str., Halberstadt, D.D.R.
DM3NC, F. Kampa, Buchholz/Kreis Robel, D.D.R.
DM4II, H. Hofmann, Tambach-Dietharz/Thu., Hohe Warte 14, D.D.R.
EL1II, E. Trachsel, Box 32, Harbel, Liberia
EL0B/mm (via HB9AAE)
G3RFH/mm (to G3RFH)
GC2FMV (via RSGB)
GC3IFB (to G3IFB)
HC2JL, Box 597, Guayaquil, Ecuador
HK4ALE, A. Rodriguez, P.O. Box 4124, Medellin, Colombia
IIRB/IS1 Hammarlund DXpedition, P.O. Box 7388, GPO, New York, N. Y. 10001.
IITAI (to IT1TAI)
IS1GWN (to IIGWN)
IT1TAI, D. S. Marino, P.O. Box 300, Palermo, Sicily
JT1s AH KAE, Box 639, Ulan Bator, Mongolian Peoples Republic
K3SWW/KG6, C. Bluhm, 126L E. Sunset Blvd., Navy 943, FPO, San Francisco, Calif.
K6MRR/KP4, R. Hartley, Navy 116, Box 36-R4, FPO, New York, N.Y.
K6OZL/KP4, J. Hill, Navy 116, Box 36-R4, FPO, New York, N.Y.
K7AEY/mm, D. Tulp, RM3, USS *Kretchmer*, DER-329, FPO, New York, N.Y.
KA2IJ (to KH6IJ)
KA2LD (via W2CTN)
KP4BFF, Sabana Seca ARC, U.S. NavRadSta (R), Bldg. ?, Sabana Seca, P.R.
KP4BPH (via WA9AVT)
KP4CKX, G. Cummings, Navy 116, Box HC/o, FPO, New York, N.Y.
ex-**KX6AJ**, H. Ross-Clunis, jr., W6GRZ/4, 122 James

River Dr., Newport News, Va.
KZ5DK, Box 747, Curundu, C.Z.
LU5ED, D. Sampson, P.O. Box 1242, Buenos Aires, Argentina
LZ1SP, Box 319, Sofia, Bulgaria
OK7CSD/mm (via CRC)
ON4QY/mm (to K6ICS)
OZ3UD (via EDR)
PX1BE (to PA0BEA)
PY1BGR/Trindade (see preceding text)
PY5XQ (via LABRE)
PZ1BH (via WA6SBO)
PZ1CK, A. Tsai a Woen, Box 566, Paramaribo, Surinam
SM6CNS, T. O. Karlsson, Sidenvagen 15, Alingsaas, Sweden
SP0KJ (to SP9KJ)
SV1BK, 10 Diacou St., Athens 457, Greece
SV0WPP (via W5EGR, W/Ks only)
ex-TF2WIE (to K6MRR/KP4)
TN8AP, J. Fees, B.P., 310, Brazzaville, C.R.
TU2AS, Fr. Cloutier, Box 71, Daloa, I.C.R.
VK9RB (via RSGB)
VK9WP (via VK3RJ)
VQ8AMR (to VQ8AM)
VP2MV (via W2CTN)
ex-VP5TK, T. Knight, K5VYV, c/o KPAC/TV, 2900 17th St., Port Arthur, Texas
VP7DD (to W5DZF)
VRs 1B/a 3H (to VR1B or via VK2EG)
VR4EG, E. Gibbins, P.O. Box 84, Guadalcanal, Solomons
VS4CS, 248th Gurkha Sig. Sqdn., BFPO 628, c/o GPO, Kuching, Sarawak
VS4KRS, ACT, Telecoms Hq., Kuching, Sarawak
XE1NNN, R. Wheaton, Aptdo. Postal 588, Cuernavaca, Mor., Mexico
XT2D, B.P. 798, Ouagadougou, Upper Volta
YA1AN (via DL3AR)
YN1SL, P.O. Box 753, Managua, Nicaragua
ZC5DS (via VS1MF)
ZD3A (see preceding text)
7X2VX, W. Porter, c/o U.S. Embassy, Alger, Algeria
9A1TAI (via W4VPD; see preceding text)
9G1KS (to VE4KS)
9M2LO (via MARTS)
9Q5TI (to 9Q5TH)
9U5BB (via ON5KY)

Source of the forerunning glossary lies in the research of **Ws** 1ECH 1WPO 1YYM 4GTS 4VPD 8IBX, **Ks** 3SLP 3UXY 4MYO 5JVF 5LQL 6OZL/KP4 7QXG 7VMO 8BFI, **WAs** 2KSD 5ESW, **VE7BBB**, **VP8HF**, **PY1CK**, DARC's *DX-MB* (DLs 3RK 9PF), DX Club of Puerto Rico *DXer* (KP4RK), Far East Auxiliary Radio League *News* (KA2-CM), Florila DX Club *DX Report* (W4HKJ), International Short Wave League *Monitor* (12 Gladwell Rd., London N.8, England), Japan DX Radio Club *Bulletin* (JA1-DM), Long Island DX Association *DX Bulletin* (W2FGD), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N.Y.), North Eastern DX Association *DX Bulletin* (W1BPW, K1NOL), Puerto Rico Amateur Radio Club *Ground Wave* (KP4DV), VERON's *DXpress* (PA0s FX LOU VDV WWP), and West Gulf DX Club *DX Bulletin* (W5IGJ). Keep it coming, colleagues!

Whence:

EUROPE — SSA (Sweden) welcomes world-wide participation in its 1964 Scandinavian Activity Contest scheduled for (c.w.) the period 1500 on the 19th of this month to 1800 the 20th, and (phone) on the 26th–27th, same times, on 3.5 through 28 Mc. Non-Scandinavians will score up as many LA LA/p OH OHØ OX OY OZ and SM/SL stations as possible, swapping the usual RS- or RST001, RST002, etc., serials. Scores are calculated at one point per completed QSO, this total multiplied for final score by the number of Scandinavian band-prefixes collected (40 the possible maximum). Your log transcript listing date, GMT, station worked, serials sent-received, band, and notation of each new multiplier claimed, should be submitted with a summary sheet to SSA Contest Manager SM7ID, Karl O. Friden, Box 2005, Kristianstad 2, Sweden, postmarked no later than October 15, 1964. Good chance to close in on such certifications as OHA, OZCCA, WALA, WASM, etc. See you on the north Atlantic path! . . . . . Four GC QSLs resulting from contacts after 1946 can qualify non-European amateurs for the WAGC Award. Consult Mrs. Jill Banks, Secy., QAU Club, 23 Marett Ct., Marett Rd., Jersey, C.I. via Great Britain, for application details . . . . . There's a Columbus Contest coming up on the 9th–11th of next month, sponsored by Genoa's Institute of International Communication. The W/K/VE objective will be the working of I1 IS1 IT1 IM1 and HV1 stations. More info next *QST*. . . . . K6ICS spent a month in Europe as ON4QY/m . . . . . "SVØWPP (W5MAE) will be active in Athens for the next four years or more," advises W5EGR. "He's most often on 20 c.w. but also tries 14- and 21-Mc. single-sideband." . . . . . WA9ICQ says the June European field day really pepped up DX bands, especially those G and HB9 portables . . . . . Continental comment culled from the clubs press: Twelve ops manning LX3s AA AB AX and AZ, and a gang signing OH2s BH BQ BS and QV in the Alands, hopped up DX doings in late July. . . . 3A2s BY, 14,250-kc. s.m. at 2030 GMT, and CP, 14,295-kc. s.s.b. at 1400–1500, attract Monaco seekers. . . . UA1KED keeps F.J.L. operative on 20 c.w., 0000–0400 GMT. . . . Rockall island off the British Isles remains under close DXpeditionary scrutiny from several quarters. . . . W4HKJ skeds rarish SMCXE, Saturdays or Sundays on 14,003 kc. at 2230 GMT. . . . HAMU produced a flock of 14-Mc. s.s.b. contacts from HV1CN this summer.

OCEANIA — Next month NZART (New Zealand) invites amateurs throughout the world to frolic in its 1964 VK/ZL/Oceania DX Contest to be held (phone) from 1000 GMT the 3rd to 1000 the 4th, and (c.w.) the 10th–11th, same times. Exchanging the usual RS- or RST001, RST002, etc., serials, non-Oceania participants earn a point for each non-VK/ZL Oceanian worked per band, 2 points for each VK/ZL captured, and for final score multiply this total by the number of VK/ZL band-call areas accumulated. (Oceania contestants outside VK/ZL work both sides of the fence at 1 point per non-Oceanian and 2 points per VK/ZL, same multipliers.) Your log could clearly indicate date, GMT, callsign of station contacted, band, serial sent, serial received, and each new VK/ZL call area as worked per band (separate sheets for each band). Include a summary sheet showing your callsign, name, address, equipment description, and designate multi- or monoband entry classification. Then whisk the works off to NZART, Box 489, Wellington, N.Z., postmarked on or before January 16, 1965, to be eligible for possible certificates of outstanding test performance. ZL2GX, NZART contest and awards manager, writes. "Scores may be low because of erratic conditions, but sincere appeal is made for as many logs as possible." Have a go, gang! . . . . . W1YYM's QSO with VR1B/a recalled Ellen's contact with Chas. as VK1AC, Macquarie, ten years previous . . . . . Remember "DXCC^2"? ZL1AV comes through with the first in a long time, claiming QSLs from DXCC members in 116 countries. Dave's is No. 45, the very first from Oceania . . . . . K3SWW/KG6 gets on 14,030–14,070-kc. c.w. daily between 0600 and 1100 GMT . . . . . "I operated exclusively on c.w. from Kwajalein," records W6GRZ, pulling the big switch as KX6AJ. "Much of the time I was the only c.w. station in KX6 land. It was a ball while it lasted!" . . . . . More Pacificisms via club newshawks: Heard isle may be heard in November if the DXpeditionary ball bounces right, with Macquarie a December long shot. . . . VK4TE, latest Willis entry after VK4JQ's departure, is QRL with commercial duties. . . . VK9WP expects to give his Panda sender a two-year workout on Nauru.

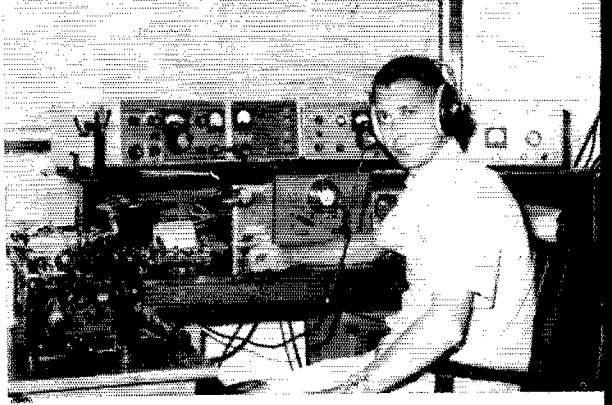
ASIA — "I was surprised and pleased to chat with OT KH6IJ at the key of KA2HQ this summer," pens W2BTQ/KH6. "Nose has been teaching for the USAF in Japan and will be back in Hawaii by September. I move to Japan myself this month for assignment at Army Logistical Center, Tokorozawa, near Tokyo, then back to the U.S.A. in a couple of years." KH6IJ also was reported active as KA2IJ . . . . . W7DJU's friend ex-9G1DZ hurried off to Saigon after settling his family down near Seattle . . . . . Don't forget that ARSI (India) has its first VU/4S7 DX Contest upcoming on the 10th–11th and 17th–18th of next month. Details next "How's" . . . . . Further Oriental orientation via aforementioned DX organizations: HS1P (W4LCY) is back in Florida after a Thailand DX tour frustrated by the ITU/FCC Ban List. . . . HL9TE/Ø was

YN1LH needs just a few more countries for membership in ARRL's DX Century Club. Armando's sideband sticks close to 14,120 kc. between 1900 and 2100 GMT.

an attractive call used by K2UVU on Korean field day in July. . . . MP4s BBW and TAV keep sidebanders happy down Persian Gulf way while MP4s DAA MAH TBA and TBE employ c.w. and straight a.m. . . . G5KW keeps his transceiver with him in Arabia which could mean something new for somebody. . . . VU2GV says most Indian amateurs run 40 to 70 watts to 807s or 1625s, radiating mostly with dipoles and an occasional quad. . . . 9M2DQ has temporary antenna limitations and power noises hampering DX doings at his new north Malaya QTH just 15 miles from Thailand. . . . We note that rare Asian items are boring local stuff to the JA gang but they really go wild for our own run-of-the-mill Caribbean cousins. . . . KA2s CJ CM and LD try to cook up something to reduce the rarity of KA3-4-6 regions. . . . KAs 2CM (K9QPL), 2DF (WA9LHE), 2JW (WA5CUY), 2RG (WA2POX) and 7DB (W7QCN) hold new or renewed FEARL memberships. . . . Club station VS9OSC, RAF Salalah, lately has hit 10 through 40 meters for some 900 QSOs with 70 countries. A DX-100U, 680 receiver, 21-Mc. rotary and 14-Mc. dipole do the job. . . . BY9s SD and SM haunt 7050 kc. around 2000 GMT. . . . EP2RC (K1KOM) expects to keep his ubiqituous 25-watter on tap till June of '65. Dick's best sideband times to the U.S. are 1600-2000 and 0300-0400 GMT. . . . Cyprus Amateur Radio Society's 29,008-kc. beacon station, 5B4WR, transmits continuously and identifies with f.s.k. in 10-meter transequatorial propagation tests with South African amateurs.

AFRICA — VQ8AM gives ample advance warning: "I plan to go on a DXpedition to one of the rarest DX spots in the world, Rodriguez island, in November as VQ8AMR." Anyone care to give France a hand? . . . . . You'll rate a royal QSL when you work CN8MH, the king of Morocco. Yank CN8AW is vice-president of newly formed Amateur Radio Club of Sidi Yahia, at the site of Sixth Fleet's NavComSta. Other officers are K3RRG, pres.; WØTSX, secy.-treas.; and WA2QYC, director. ARCSY has a threefold purpose: "To stimulate interest in amateur radio, to guide eligible personnel toward membership, and to keep abreast of advances in radio techniques. CN8AW, also president of neighboring Kenitra Radio Club, provides amateur liaison between U.S. military licensees and the Morocco administration. ARCSY and KRC are affiliated with the official Morocco radio society, ARAEM, and guest CN8s are required to adhere to that country's communications regulations . . . . . You have only until October 24 to collect contacts toward Northern Rhodesia Amateur Radio Society's WANR certification. After that date the territory becomes known as Zambia. QSOs with six VQ2s in at least three towns since 1946 are the minimum basis for qualification. Write NRARS, P.O. Box 332, Kitwe, Northern Rhodesia, for full info . . . . . W4RLS skeds ZD3A's new s.s.b. on 20 meters Sundays at 1900 GMT . . . . . VE7BBB says 9G1KS (VE4KS) is hunting Canadian QSOs around 14,120 kc. . . . . Africa dispatches via the clubs and groups: TU2AU expects a move to Somalia come November, then a try for XT2 and 5U7 status. . . . FH8CD of the Comoros still stacks the pack on 20 c.w. or s.s.b., sometimes 15 meters, around 1700 GMT. . . . Malawi, nee Nyasaland, probably will keep the ZD6 prefix for a spell before switching to something like 7Q. . . . Early Mali maneuvers are threatened by 7G1IX (/TZ) on 14,050 kc . . . . TL8AC, 21,200-kc. a.m., held the C.A.R. fort while TL8SW vacationed Stateside.

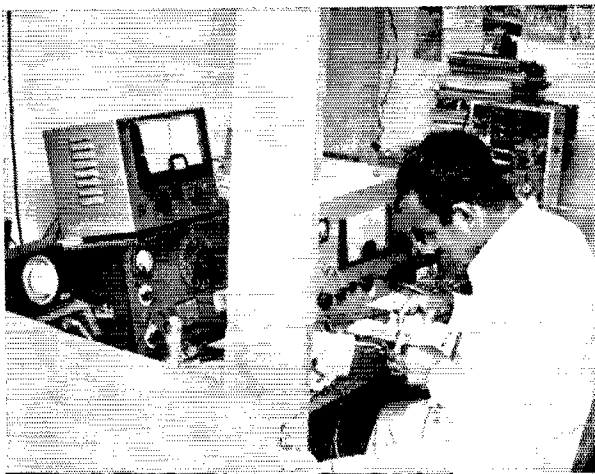
SOUTH AMERICA — "I plan to be on Trindade isle again in October, s.s.b. only," forewarns PY1CK. Flavio may use his 1958 call, PYØNA . . . . . G3RFH reminisces: "I thoroughly enjoyed my 16 days on Candlemas island as VP8FH. Our campsite was situated at the foot of a 3000-ft. mountain rising up sheer 100 feet behind our camp, regrettably preventing VK/ZL QSOs." Ken's biggest operating peeve was the caller who obviously was not hearing him and who had to be ignored after two or three acknowledgments. "On the whole, operating manners were not too bad. Occasionally one sat and tapped one's fingers while some comedian gave a weather report, his QTH, name, equipment rundown, etc., with the band about to fade out. It is considerably more difficult to sort out an s.s.b. pile-up than a stack of c.w., as was discovered much to the pain of the writer's ears. This was indeed an experience never to be forgotten. To all those who 'made it', thanks for your cooperation and patience; to those who didn't, better luck next time and the hope for better conditions." Wonder if Ken will find it hard to become just another G3 again



9G1FK expects much 20-meter activity during his State Department assignment in Accra. Jack signs WA4OOB back home. (Photo via W1ECH)

. . . . . LCRA (Colombia) sponsored a DX competition on July 18-12 but announcement reached us 'way too late for treatment here. Perhaps you were able to get in on some of the fun working HKs, anyway . . . . . W4VON writes, "DX men often wonder if there are still any unconquered countries in the Western hemisphere where hams have never operated. Recently I had occasion to read a fine article by P. L. Sachs of the Woods Hole Oceanographic Institute, Woods Hole, Mass., titled "A Visit to St. Peter and St. Paul's Rocks" (June 1963 issue of *Oceanus*). Pictures appeared in the next (December) issue, and landing descriptions are given in some detail. The rocks are in the middle of the Atlantic ocean, 500 miles from South America and a thousand miles from Africa. This article was reprinted by UNESCO in 20 languages. Of special interest is the fact that one of the rocks is flat, and helicopter landings have been made. Brazil, owner of the place, built a lighthouse there in 1931 which succumbed to a storm a few months later. Its steel frame remains. Anyone for a DXpedition?"

HEREABOUTS — The umpteenth annual W9-DXCC Dinner and Get-together will commence at 2:00 P.M. Saturday, the 19th of this month, in the Tally-ho Room of Chicago's Sheraton Hotel. De luxe DXpeditioners W9s JJF WNV and others promise a lively program. The $6.50 includes turkey with all the trimmings — check immediately with W9SFR for more details and your reservation . . . . . Equipment insufficiencies have silenced VP2SY. K2MRB wonders if any of the gang desire to join him in helping Washington return to the air . . . . . K3SLP says OX3UD will rest up as OZ3UD until return to Greenland next March . . . . . WN4RIJ credits KZ5KY with many a patient 21-Mc. Novice QSO . . . . . K7VMO finds W5DZF signing VP7DD while working on the Atlantic Missile Range. Many of Scotty's colleagues are qualifying for VP7 calls at the 100-watt maximum . . . . . VE3WSB, the Boy Scouts World Bureau, Ottawa, is tuning up for the October 17-18 world-wide Jamboree-on-the-Air, 15 through 80 meters . . . . . Local tidbits courtesy club newshawks: FG7XT may make it to St. Bartholomew isle this month. . . . W4BPD ought to be DX gossip fodder again at any time. . . . XE1AE's Socorro sojourn may come off next month or next, depending on the length of the stormy season. . . . KP4s BNL DV SV and K6OZL/KP4 are new DXCPR members. . . . Yank sidebanders who sneak out of their voice subbands to attract the attention of overseas DX are cautioned by DXCPR observers to properly shut off their mikes and plug in their keys when so doing. QST



VS1JY's quad puts a potent 25-watt signal into the U.S.A. on 14 Mc. Yat's c.w. savvy comes from fifteen years as a navy brasspounder. (Photo via W2SSC)

CONDUCTED BY JEAN PEACOR,* K1IJV

E = IR

ENJOYMENT = Interest and Resourcefulness! This application of the Ohm's Law equation wouldn't aid in the completion of an electrical circuit, but it does apply to many activities being offered to amateur radio operators. One glance at the first few pages of *QST* each month, where the many hamfests and conventions are listed, is an example of this.

The many people who read about and attend these conventions are certainly interested. They look foward, year after year, to meeting on-the-air friends, renewing old acquaintances and making new ones. The workers behind the scenes must have a basic interest in wanting to provide an informative and memorable time for all.

In order to complete the picture, more than interest is required. The faculty of getting up appropriate ideas that will appeal, the proper use of facilities and the searching out of interesting speakers all tax committee resourcefulness to the hilt. When both of these ingredients are properly brought together, there is enjoyment for all.

When it comes to YL participation in convention activities, as the number of licensed YLs has increased, so have plans for YL programs. This was demonstrated this year at the New England Division Convention held at Swampscott, Mass. One of the high points of interest was the crowning of Louise French, K1LAS, of Henniker, N.H., as Tower Net Queen. The Tower Net was formed for the purpose of relaying weather information and traffic for Cape Cod, the islands and the Texas Tower off shore and operates on 75 meters. Net members chose the Swampscott Convention to show their appreciation to a YL who has very adeptly served as one of their net control stations.

Several other licensed YLs demonstrated other talents by serving as models for a hair styling show which proved to be another convention highlight. Volunteering their time for shampoos, rollers and hair drying, along with their descriptions of the changes that had taken place, proved added enjoyment for all.

In addition to these activities, the more formal side of YL activities was represented at a WRONE (Women Radio Operators of N. E.) meeting. Following a YL Forum, conducted by Ginny Powell, K1LCI, President, informative talks were also given by Fran, K1MGP, who spoke about v.h.f. and by Leona, W1YPH, whose subject was DX and certificates. Such active YL participation at this convention shows the resourcefulness and interest of many which greatly added to the enjoyment of all YLs.

Australian YLs

The general public of Australia recently learned more about the different aspects of amateur radio through news coverage in the Sydney *Morning Herald* of the first actual YL meeting of licensed YL amateur operators in their country. Four YLs from the Sydney area who often enjoy 40-meter s.s.b. ragchews, and who also operate s.s.b. on 20 meters most afternoons, recently met together in person. When it is noted that there are reportedly only 26 YL operators in the country, more than half of whom live in New South Wales and Victoria, it can be seen that this would represent a well-attended meeting by most any standard.

Muriel, VH2AIA, has been very active for the past eight years. Mona, VK2AXS; Merle, VK2MR and Hebe, VK2AOK, have been operating since January of 1964. When Hebe's eldest son recently received his amateur license, it gave their family what is believed to be the distinction of being the only one in Australia having three call signs — her OM being VK2AZG.

Already another meeting has been planned at the Wireless Institute and all interested YLs and XYLs are invited to attend. With so few YLs in any

Shown attending the first YL meeting held in Australia are: (l. to r.) Muriel, VK2AIA; Mona, VK2AXS; Hebe, VK2AOK; Merle, VK2MR.

* YL Editor, *QST*. Please send all news notes to K1IJV'S home address: 139 Cooley St., Springfield, Mass.

Adding a touch of glamour to the N. E. Div. Conv. were the following YLs who volunteered as models for a hair-styling show: (l. to r.) W1LUT, Ruth Brown; K1GCU, Barbara Wilson; XYL of W1ECH, Elaine Foskett; K1NST, Doris Bithell; K1WXF, Norma Gilbert; K3WJG, Laura Marsh; K1UOR, Doris Young; and K1IIF, Ruth Barber.

given area, meetings will be held quarterly at present. This sounds like the start of another fine YL group. To quote Hebe, who sent along news of these YLs, "This is what is going on 'down under'."

Howdy Days

For all YLs — YLRL's sixth annual Howdy Days Contest starts off YL fall activities. This is a fine chance to meet non-YLRL members, encourage them to join YLRL (be sure your name is on their application for "silver credit") and to help push YLRL over the 1000 mark as part of the 25th anniversary year.

Starts: Tuesday, September 22, 1964, 1700 GMT

Ends: Thursday, September 24, 1964, 1700 GMT

Rules: Score will be based on licensed YL contacts only. All bands and modes of emission may be used. Only one contact with each station will be counted. Contacts on nets do not count.

Scoring: Score 2 points for each YLRL member and 1 point for a non-YLRL member. No multipliers. Logs not required. Submit a list stating date, time, call, name, QTH and whether YLRL member or not.

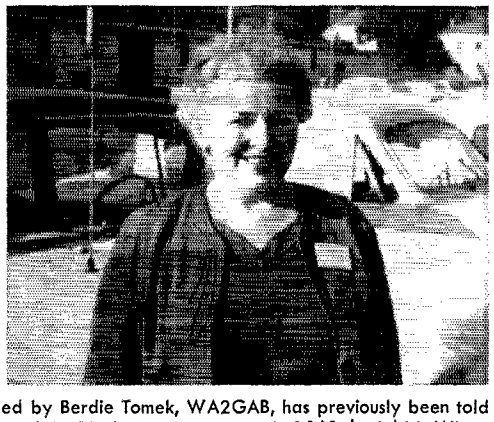
Awards: Top scoring YLRL member will receive a choice of a pin, charm, or YLRL stationery. Top scoring non-YLRL member receives 1 year paid membership in YLRL.

Score sheets must be received by October 15, 1964. Submit them to Martha A. Edwards, W6QYL, 44303 North Date Ave., Lancaster, Calif.

Louise French, K1LAS, Tower Net Queen. Frank Horn, W1EUE, officiated in the presentation of an overdress of fish net, slug tuned coil earrings, necklace of gold diodes and resistors, a corsage and a banner—all fit for a queen!

Coming Events

For All YLs — the 25th YLRL Anniversary Party — c.w. portion, October 21–22; phone portion, November 4–5. Complete rules next month. QST



(left) The fine work with the Brooklyn V.A. Hospital performed by Berdie Tomek, WA2GAB, has previously been told (Sept. 1963). Berdie is also another smiling YL whose call graced the BPL listings many times in 1963. (right) Iris White, VE1AYL, of Glens Falls, New Brunswick, recently marked her 26th year as an amateur radio operator. Her operating begins at 7 A.M. each day with the weather net on 3750 kc. Iris often monitors this frequency and will gladly assist in relaying any messages for her area.

The World Above 50 Mc.

CONDUCTED BY SAM HARRIS,* W1FZJ

More on KP4BPZ

BECAUSE information on the moonbounce work of KP4BPZ was just beginning to come in at copy deadline for August *QST*, the details reported were necessarily sketchy. To bring the story into better focus we offer a brief summary of additional reports, plus a correction or two.

First, a correction: the call reported as WB6GZY should have been WB6JZY, Mountainview, Calif. His report was in the form of a log submitted in the June V.h.f. Party, so the moonbounce contact was not picked up until the contest summary was being written.

Reception reports have come in from many quarters. Most of these are for 144 Mc., but W4HHK, Collierville, Tenn., is added to the list of those who heard the 432-Mc. signal of KP4BPZ. Paul has an 18-foot parabolic reflector mounted 35 feet above ground, feeding a 6299 preamplifier and crystal-mixer converter. He heard KP4BPZ almost continuously on 432, at times with signals strong enough to have been readable on s.s.b. His power output, 35 watts, apparently was not enough to make contact.

A fine tape recording of KP4BPZ was submitted by K5KDN, Houston, Texas. Part of this was made using a 20-foot dish on a polar mount, with an 8058 preamplifier in a horn at the focal point. Energy is fed from the preamp through 100 feet of RG8/U coax to a Tapetone 432 converter. This equipment was the work of an associate of K5KDN and W5SDA, C. G. Johnson, who is not a licensed amateur. The balance of the 432-Mc. tape is the signal as received on a 13-element Yagi on a polar mount at W5SDA. This antenna feeds a parametric amplifier and a homebuilt 432-Mc. converter. The signal on the dish is markedly better, despite the advantage of the paramp in the latter arrangement. Also cooperating in this venture was Peter Carey, ex-ZE5JJ, now on the staff of Rice University.

W3LUL has given us background information on the setup used by the various W3 calls worked by KP4BPZ on 144 Mc. The antenna was a 60-foot parabola at the Applied Physics Laboratory of John Hopkins University, at Silver Spring, Md. Transmitter power output was 300 watts. The receiver had a 4-db. noise figure. Everything was fine up to here, but the big antenna had left-circular polarization, which was the wrong sense for working with KP4BPZ! As a result, they just barely made it, with signals rather below those of several stations using much smaller arrays. Carl tells us that W3GKP also heard the KP4BPZ signal at his home.

W9EHX, McLean, Ill., heard KP4BPZ at intervals on 144 Mc. using a 5-element Quad Yagi having a gain of 10 to 11 db. He had aiming trouble as a result of only brief glimpses of the moon. He found the signal T9, readily identifiable though weak, and close to 144.001 Mc.

K5IQL, Dexter, N. Mex., says that the signal appeared to be about 3 kc. higher during the latter part of the period. Frank lost it for about a half hour in the middle, and got the best reception in the last 25 minutes. He uses two 8-over-8 J Beams movable in both elevation and azimuth He has nearly two more S-units of noise with the beam near the horizon and that with it straight up. Aiming low for KP4BPZ, he found the signal readability broken up by noise.

K6HMS, Costa Mesa, Calif., heard KP4BPZ for about 20 minutes, beginning about one hour after the scheduled starting time. Skip has 2 11-element Yagis, horizontal polarization, with RG-17 line feeding a 416B preamplifier.

We have tape recordings from K2LMG, K5KDN, K5IQL, W4FJ, OH1NL, HB9RG and K6HMS. As users of tape will appreciate, the task of listening to all these and sorting out parts for copying is a time-consuming task. So please bear with us; the tapes are much appreciated, and they will be returned as soon as we can get the job done.

Massachusetts to Hawaii on 432 Mc.

The DX record for the 420-Mc. band was extended to about 5000 miles July 31, when W1BU, Medfield, Mass., worked W2UK/KH6 via the moon. Signals were weak, peaking about 10 db. above the receiver threshold in a 100-cycle filter, with much rapid fading in evidence. Both stations have 28-foot reflectors, with plane-polarized dipoles. Transmitter power output is 700 watts at W1BU; slightly less at W2UK/KH6.

W1BU is able to receive his own echoes on 432 regularly when the moon is in range, with signal strengths up to 20 db. above the receiver noise. Tests are being conducted with HB9RG, as yet without success.

States Worked Boxes

Several months have passed since the "States Worked" boxes have appeared. The prime reason has been an effort to correct and up-date the listings. Unfortunately we cannot always get the latest information on station standings and all the proof reading we can do still will not eliminate all errors. It will be greatly appreciated if all errors noticed (whether information or some one else's) are reported by post card as soon as possible.

50 Mc.

In this month's column we'll do as we promised (last month) — start with reports from 5 land and

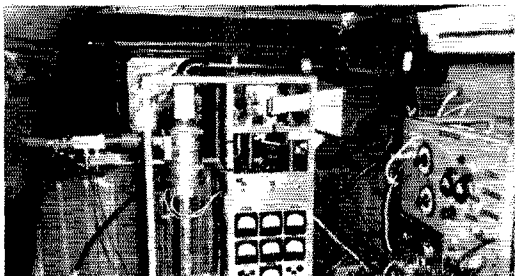
* P. O. Box 334, Medfield, Mass.

continue from that point. We also mentioned last month that at this time of the year it is practically impossible to include all reports received concerning Sporadic *E* conditions on 50 Mc.

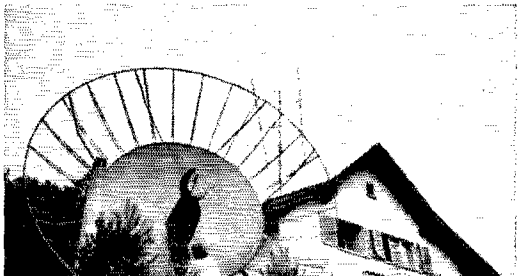
Bill Graham, VE4GI, reports that although the season got off to a poor start in VE4 land the band was good during the month of June. The first week of June the band was open to 5 land all the time, to Ø land on the 6th, all areas except 6 and Ø on the 7th, VE8BY via aurora on the 10th, Arizona on the 11th. Several days passed with nothing doing then on the 18th very short skip was observed into Montana, Wyoming, Ø and VE8BY. Other locals in Winnipeg report hearing VP's on the 20th and 21st when Bill was out of town, but he continues his report with Montana, Idaho, Washington and Arkansas on the 21st and 22nd, and W4's on the 23rd. Bill also reports that he (VE4GI) and VE4JX are both on six and two-meter s.s.b.

K5YBB in Little Rock sez: "Would like to report unusual band opening to you. On May 31 at 0825 A.M. I heard CO2DL from Havana, Cuba calling CQ DX on 50.2 Mc., asking for an answer on 15 meters. I tuned my transmitter to 21.3 and answered his call. His signals on 50.2 held to Q5-S9 for the entire QSO which lasted for half an hour. His power input was 75 watts, while mine was 180 watts." Dick also mentions that among things heard and worked during the first part of June were VP7, KP4, XE and VE2 and 3 lands. In Dallas, WA5IKU reports working VE4TV, VE4MA, XE1PY and XE1OE during May. Perry also worked CO2DL on May 30 and says all stations were worked with 65 watts input to a Ranger II. Reports from California were received from WB6BOW, W6IEY, WA6VAT, W6YKS and K3JHF/6. In condensing these reports we find that 26 states were heard in California plus VE6 and XE. W6IEY leads the field with openings heard on 12 days during June and 2 days (so far) during July. WA6VAT sez that with a borrowed SR-34 transceiver he made his first seven 50-Mc. contacts in Seattle, Washington, and Portland, Oregon. Bob's now convinced that he must get a permanent rig for six-meters. We're with you Bob! At Las Vegas, Nevada, K7ICW worked VE4MA on May 17 for his second VE4 contact, and on May 18 worked VE5MG for his first VE5. Al reports openings on 15 days during June, the best of these on June 6 and 30. The 6th was noted for contacts in Missouri, Delaware, Maryland, Virginia, West Virginia and Ohio. With the help of W5SFW (who cleared the frequency) contact was made with VP7DD on June 30, making another good day in A1's log on 50 Mc. K7ZOK (also of Las Vegas) sez: "Twenty-four states worked this season from this new QTH. Everybody needs Nevada!" Hal caught seven of the openings during the month of June and worked fourteen of those twenty-four states at that time. He also heard VE6's with strong signals on the 11th. At Gladstone, Oregon, K7GWE made hay during May when he worked Arizona and Florida to bring his total states-worked on 50 Mc. up to 40. W8CVQ, W8MBH and K8VEX all report from Michigan that the band has been good in that area. Walt, W8CVQ, sez the June 17 was particularly good when the band opened early in the morning and continued well into the night. "Openings chiefly to 4's and 5's with some Ø's. 7's came in on June 21" sez Walt. W8MBH sez that June 19 was a good day in Detroit with Havana, Minnesota, Wyoming, Idaho and Colorado all heard during the day on 50 Mc. WA8CJO in Ohio tells us that the band has been very good at his location. Bob also sez that on June 14 a number of the local hams helped W8BTW and W8LGY put up their tower. Half an hour later a twister came along and took the tower down again. K8TUT sez that the band was open in all directions during June. June 6 was a good date for WA8AMK, who worked K7VTM in Cheyenne, Wyoming, bringing his total on 50 Mc. up to 42. Louis also worked 5's and Ø's and heard VE4's plus VP7's on the same day. K8WVZ sez the most noticeable good skip during the month was on the evening of the 20th when he heard 3 KP4 stations within 20 kc. of each other.

Just one report from Indiana — from Bill, WA9JVL. Openings were observed at Evansville on fifteen different days during June when stations were heard in 1, 2, 3, 4, 5, 7 and 8 lands plus VE2, VE3, VP7, CO2 and XE. Bill also tells us that Shirley, K9STV recently worked Utah for state #48 and is now looking for Alaska and Hawaii. Good luck, Shirley! Five reports received from Illinois. WA9EJA at Clinton, Illinois caught eleven openings during the month of June and worked/heard twelve states plus VP7. Phil now has 23 states confirmed on six meters. WA9EVF sez that six has been open for all call areas except 7 and that he heard K9??? working a PE4 (?). It (June) was really a good month for WA9FIH. He heard or worked 38 states during 19 days of openings plus CO2, KP4's, VE1, VE4 and VE6. Looks like you really stayed with it, Jim. K9FNB sez: "June was another good DX month." On the 5th Dick worked VE4CS, VE4KB, VE4MA and VE4RV. He was later told that VE4PU was copying him with his mobile rig with good signals. On the 6th he worked into Maine for a new state



Interior view of 432 Mc. Moonbounce rig used at HB9RG in contact with KP4BPZ.



HB9RG and XYL making adjustments to feed on dish for 432 Mc. Moonbounce tests.

2-Meter Standings

W1REZ	32	8	1300	W5VY	10	3	1200
W1AZK	28	8	1205	W5BEP	9	3	1000
W1KCS	24	7	1150	W5EDZ	8	5	1375
W1AJR	24	7	1130	W5YYO	7	4	1330
W1MMN	22	8	1200	W5UNH	6	3	1200
W1JSM	22	7	1330				
W1HDQ	22	6	1020	W6W8Q	15	5	1390
W1IZY	20	7	1080	W6NLZ	12	5	2540
W1MEH	20	6	1000	W6DNG	9	5	1040
W1AFO	19	6	920	K6HMS	7	3	1010
K1CRQ	19	6	800	W6AJF	6	3	800
K1AFR	17	6	675	W6ZL	5	3	1400
				K6GTG	4	2	800
W2NLY	37	8	1390	W6MMU	3	2	950
W2CXY	37	8	1360				
W2ORI	37	8	1320	K7HKD	20	7	1330
W2BLV	36	8	1020	W7LHL	10	4	1170
K2LMG	32	8	1200	W7CJM	5	2	670
K2GGI	35	8	1365	W7J1P	4	2	900
W2AZL	29	8	1050	W7JU	4	2	235
K2IEJ	27	8	1060				
K2CHH	27	8	1200	W8PT	40	9	1260
W2AMJ	25	6	960	W8KAY	39	9	1210
W2ALR	24	8	1100	W8SDJ	37	8	1220
W2RXG	28	8	1200	W8IFX	35	8	980
W2SMX	23	7	1090	K8AXU	34	9	1275
W2LWI	23	7	1050	W8SFG	34	8	1040
K2HOD	23	7	950	W8MVE	33	9	1155
W2DWJ	23	6	860	W9LOF	32	8	1060
W2PAU	23	6	753	W8GGH	32	8	1180
W2ESX	21	6	750	W8BAX	32	8	960
K2KIB	21	5	700	W8RMH	32	6	910
W2UTH	20	7	880	W8NOH	31	8	1090
W2WZR	19	7	1040	W8EHW	31	8	860
W2RGV	19	8	720	W8SVI	30	8	1080
WA2EMA	19	6	1010	W8EHW	30	8	860
W7PUA/2	18	7	1150	W8LPD	29	8	850
WA2PZE	18	6	750	K1CRQ/8	28	8	690
W2RLG	17	6	980	W8WRN	28	8	680
WA2YXS	17	6	720	W8DX	26	8	720
K2OFI	16	6	1010	W8ILC	25	8	800
WB2CCO	16	6	780	W8JWV	25	8	940
K2JWT	16	6	550	W8WNM	25	8	900
				W8GFN	23	8	540
W3RUE	33	8	1100	W8LGY	22	7	680
W3SGA	31	8	1070	W8BLN	21	7	610
W3TDF	30	8	1125	W8GTR	17	7	550
W3GKP	30	7	1180	W8NRM	17	7	550
W3KCA	28	8	1110				
W3BYF	28	8	1070	W9KLR	41	9	1160
W3FPH	22	8	1100	W9WOK	40	9	1170
W3LST	22	6	800	K9UIF	39	9	1150
W3LNA	21	7	720	W9AAG	35	9	1050
W3NKM	20	7	730	W9GAB	34	9	1075
W3LZD	20	6	650	K9AAJ	34	8	1070
K3HDW	12	6	1015	W9REM	31	8	850
K3CFA	12	6	550	K9SGD	30	8	1100
				W9ZIH	30	8	830
W4HJQ	39	8	1150	W9PBP	28	8	820
W4HHK	37	9	1280	W9LVC	27	8	950
W4LTU	34	8	1160	W9OJI	27	9	910
W4ZXI	34	8	954	W9IFA	26	6	1000
W4WNH	34	9	1050	W9ZHL	25	8	700
W4MKJ	34	8	1149	W9BPV	25	7	1030
W4AO	30	8	1120	W9CUX	24	7	1000
W4IXC	27	8	1225	K9AQF	24	7	900
W4LVA	26	8	1000	W9WDD	23	7	900
K4EUS	26	7	1130	W9LF	22	7	825
W4EQM	25	8	1040	W9KPS	22	7	690
W4AIB	25	8	900	W9ALU	18	7	800
W4RFR	24	9	820				
K4QIF	23	8	1000	W0BFB	41	9	1350
W4TLV	23	7	1000	W0LFR	32	9	1040
W4JC	23	6	725	W0HD	31	8	1030
W4RMU	21	7	1080	W0SMJ	29	9	1075
W4OLK	20	6	720	W0QDH	27	9	1300
W4LNG	19	7	1080	W0ENC	25	6	1225
K4YYU	19	6	720	W0DQY	24	7	1000
K4MHS	19	5	800	W0RUF	23	7	900
W4MNT	19	8	1170	W0MOX	23	6	1150
K4YUX	18	8	830	W0IC	22	7	1360
K4VWH	18	6	590	WA0DZH	21	7	1170
W4MDA	17	6	775	W0TGC	21	7	870
				K0ITF	21	6	940
W5RCI	39	9	1280	W0INI	21	6	830
W5AUG	33	9	1360	W0RYG	20	8	925
W5FYZ	33	9	1275	W0JAS	19	7	1130
W5JWL	29	7	1150	W0AZT	18	7	1100
W5DFU	29	9	1300	K0AQJ	16	6	1120
W5PZ	28	8	1300	W0LFS	16	6	1100
W5LPG	25	7	1090				
W5KFD	23	8	1200	VE1CL	8	5	800
W5SWV	20	5	960	VE3DIR	37	9	1300
W5UKQ	18	8	1150	VE3AIB	29	8	1340
W5ML	16	6	700	VE3BPR	24	7	950
K5TQP	15	6	1170	VE3BQN	23	7	1180
W5KFU	15	5	1360	VE3AQG	18	8	1300
W5UGO	13	4	635	VE3DER	17	8	1340
W5FSC	12	5	1390	VE3HW	17	7	1350
W5HEZ	12	5	1250	VE6HO	1	1	915
W5CVW	11	5	1180	VE7FJ	2	1	365
W5NDE	11	5	620	KH6UK	2	2	2540
W5WAX	11	5	735				

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

and on the 17th caught Connecticut for another new one. WA9FVD sez: "Skip worked almost every day during June." Wisconsin has come through with some juicy reports: K9DGY caught twenty-one

220- and 420-Mc. Standings

220 Mc.

W1AJR	12	4	480
W1AZK	9	3	412
W1BU	14	5	600
W1HDQ	12	5	450
K1JIX	11	4	615
W1OOP	12	4	400
W1RFU	15	5	480
W2AOC	15	5	530
K2AXQ	9	3	240
WA2BAH	4	2	167
K2CBA	16	7	660
K2DIC	4	2	140
W2DWJ	15	5	740
W2DZA	12	5	410
K2DZM	12	5	400
K2ITP	10	5	265
K2ITQ	11	5	265
K2JWT	6	3	244
K2KIB	12	4	300
W2LRJ	10	4	250
W2LWL	12	4	400
W2NTY	12	5	300
K2PPZ	11	4	400
K2QJQ	13	5	540
W2SEU	11	5	450
K2UUR	8	3	210
W3AHQ	4	3	180
W3FEY	11	5	350
K3IUV	8	3	310
W3JYL	8	4	295
W3JZL	4	3	250
W3KKN	10	4	255
W3LCC	10	5	300
W3LZD	15	5	425
W3RUE	10	5	480
W3UJG	13	5	400
W3ZRF	5	4	112
K4TFU	8	4	400
W4TLC	5	1	315
W4UYB	7	5	320
W5AJG	3	2	1050
W5RCI	8	5	700
K6GTG	2	1	240
W6MMU	2	2	225
W6NLZ	3	2	2540
K7ICW	2	2	250
W7AGO	2	1	160
K8AXU	11	5	1050
W8IJG	9	5	475
W8LPD	6	4	480
W8NRM	8	4	390
W8PT	10	5	660
W8SVI	6	4	520
W9JCS	6	2	340
W9JEP	9	4	540
W9OVL	6	3	475
W9UED	4	4	605
W9ZIH	10	5	500
KØDGU	5	3	425
KØITF	6	3	515
KH6UK	1	1	2540

420 Mc.

W1AJR	12	1	410
W1BU	11	3	390
W1HDQ	9	3	210
K1JIX	8	2	230
W1MFT	8	3	170
W1OOP	11	3	390
W1QWJ	10	3	230
W1UHE	10	4	430
W2AOD	6	4	290
W2BLV	12	5	360
K2CBA	8	4	220
WA2DTZ	6	3	200
W2DWJ	10	4	196
W2DZA	5	3	130
K2DZM	10	4	390
WA2EUS	7		
K2GGA	4	4	383
WA2HQE	8	4	280
K2KIB	4	2	100
W2NTY	3	2	100
W2OTA	10	4	300
K2UUR	9	3	280
W2VCG	9	4	280
W2YPM	6	3	300
K3CLK	9	4	
K3EOF	6	3	250
W3FEY	8	4	296
K3IUV	7	3	310
W3LCC	3	2	
W3RUE	7	4	410
W3MMV	5	3	240
W3UJG	4	2	350
W4HHK	9	4	550
W4RFR	5	2	665
W4TLV	4	2	500
W5AJG	6	2	665
W5HTZ	5	3	440
W5RCI	12	3	660
W5SWV	7	3	525
W6FZA	1	1	280
K6GTG	1	1	180
W7LHL	2	1	180
K8AXU	5	3	660
W8HCC	3	2	355
W8HRG	3	2	250
W8JLQ	6	3	275
W8NRM	3	2	390
W8PT	8	5	400
W8RQI	6	3	270
W8TYY	9	5	580
W8UST	3		25
K9AAJ	9	5	425
K9UIF	8	5	390
W9AAG	8	4	525
W9GAB	9	4	608
W9OJI	6	3	330
K9ITF	3	2	158

VE3AIB 7 3 450
VE3BPR 3 3 300

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

days of openings and also heard/worked VE1, VE6, KP4 and VP7. And K9HBT in Roberts sez: "E skip showed up at this QTH on 13 days during June with all call areas in at one time or another. VP7CX and VP7CC were worked on the 22nd." At Janesville K9DBR observed "some type of opening noted every day of the month of June. All states except Nevada, Oregon and North and South Dakota copied at this location." K9FPM notes that on May 30 while working skip he decided to try c.w. Ron sez, "It's the first time I've ever seen c.w. used to the *extent where interference was common.* Worked stations in Pennsylvania, New York and Massachusetts." WAØBRU at Des Moines, Iowa worked ten states during June and heard another ten (not worked) plus 5 VE districts and XE1 land. At Newton, Iowa WØDRE sez his most notable contacts during the month were on June 6 (4's in North and South Carolina, Tennessee, Alabama, West Virginia, Montana and Maine). June 7 and 23 were also good days at Newton. On the 23rd WØDRE worked K5HWL in Oklahoma, the second time in three years that Oklahoma has been heard and

worked. KØGIC and WAØDZI sent reports of skip heard in Kansas. KØGIC caught openings on five days and worked 18 states during these openings. WAØDZI sez "the band was generally good after 6:30 in the evening." He worked/heard 23 states during the *E* openings plus VE3. He also reports hearing stations calling KP4, KH6 (?) and KL7(?). Bob McArthur sez that during the evening of June 10 excellent ground wave conditions existed northward into Iowa and WØYYM at McClelland was the first Iowa contact for many of the Kansas City six-meter gang. WØYYM now has 47 states confirmed and is looking for Minnesota. KØFKJ in South Dakota sez that the band has been open every day during June and the poorest openings were during the v.h.f. contest. During the aurora of June 9 and 10 a number of s.s.b. and n.b.f.m. stations in Illinois and Ohio had good signals into Dell Rapids, but no contacts. At Sioux Falls KØCER comments that the band runs hot and cold (coldest during the v.h.f. contest). However Bill notes that such calls as CO2, T12, KP4, VP7 and XE have been heard plus most of the U.S.

And now to 1 land and K1VPJ. Bruce noted openings on 50 Mc. on seven different days during June with skip into 4, 9 and Ø lands. He sez that on the 27th skip shifted from 4 to Ø land in about six minutes. New Jersey reports through K2LNS, K2RPZ, WB2JCP and WA2ZOW that six meters "was good" during the month of June. K2LNS mentions five openings and 18 states worked during the month with VP7CX and VP7DD in the Bahamas plus XE1OE for the real DX worked. K2RPZ sez that June 19 was the big day for him when he worked VP7CX for his first QSO with a station outside of the U.S. (Confirmed too!) On the same day he also worked stations in Florida, Tennessee and Georgia. WB2JCP sez that band openings occurred throughout the day, sometimes in the early mornings but for the most part around 5 P.M. The evening of the 22nd was a special one for Ken when he copied all call areas except 7 land and worked a KP4. WA2ZOW sez: "On June 20 I heard WAØEPZ and W4NCV on my 3 transistor converter ahead of my Lafayette HE-10 receiver, using a 130' long wire for antenna." July information received from WA2PMW continues the "opening" story. Lou managed to catch five days of openings during the first part of the month. These included stations in 13 states plus VP7DD either worked or heard. WA2PVW in the Bronx sez that "On June 30 I worked K9CZI with a Heath sixer running low power to a dipole antenna. K9CZI was surprised at Al's rig and sez he uses it 'to check out noise leaks as the power company was unable to find them.' Thought it might make good reading for the members." WB2GNC comes through from Canandaigua, New York with the news of nine days of openings and 12 states worked plus VE3BSQ/-VE3BPR for his first Canadian contact on June 28. Same day he worked VE4YW and VE4MA plus WA5DPC/VO2. A good day noted by WB2MLK was the 14th of June when the band was open to 4, 5, and Ø lands for three hours during the morning. Don sez most other DX was in the early evening hours. Don requests that all stations running 100 watts or less on 6 or 2 (in his area we presume) contact him for information on 6n2 Amateur Radio Council, an organization devoted to supporting service to the low power v.h.f. amateurs. WA2DRP had 17 days of openings during June, five days when ground wave was good and an auroral session noted on the 19th. Among many other things heard were VP7, CO2 and VE1's. WB2HZY sez openings on six becoming more and more frequent; WA2WAO sez: "normal summer on six, 1's, 4's, 5's, 8's, 9's and VP7's." WA2TQT observes that ground wave conditions throughout June were excellent with occasional openings. At Rockville, Maryland, K3UVA sez: "Six meters has been jumping during June and July!" Mike had his special days to remember too. On the 20th he heard K7RWT in Oregon and on the 27th he worked into Colorado and California. At present writing total at K3UVA is 38 states on six in one year. K3LLR, also in Maryland, sez it would be much easier to report the days when six meters was not open. "Never before heard so many stations from all over the place at one time. Even heard the West Indies and Guadeloupe on June 20." According to K3QMK six-meter skip does help him to tolerate the various heat waves. Chuck is using an HE-45A receiver and running 50 watts. In two seasons he has worked 23 states, the Dominican Republic, and Canada. Heard but not worked were Mexico, Cuba, Puerto Rico and the Bahamas. K3HNP and W3ZRR both note almost constant Sporadic *E* during June with VP7's, FG8, CO2's KP4's and VE1's appearing quite frequently.

The Alabama boys agree that (in the words of W4UAR) "Activity on six meters has been quite wonderful during June." W4UAR, and K4IQU, W4YRM and K4SFH all say that the band has been open to all call areas except 6 and 7 lands. In the July column we seem to have misplaced WA4JCS and said he was located at Miami, Florida. Our error! WA4JCS, Walt Fiscus is located at Oxford, North Carolina.

144 Mc. and Up

VE4GI at Winnipeg, Manitoba, writes that although groundwave on 144 Mc. is getting stronger each day there still have been no openings to his area. Bill also reports that: "VE4JX and VE4GI are on two meter s.s.b.; VE4JX runs 800 watts s.s.b., c.w., RTTY on two; that WØPHD, WØHZM, WØHAN, VE4JX and VE4GI all congregate on two meters at 0300Z every Tuesday night; and that WØPHD runs 600 watts of s.s.b. on two meters with a 32 element beam up 80'." K6QKL/KH6 sez KH6EEM, KH6DEM, KH6DBY and KH6EJY are all active on two-meter s.s.b. Local frequency is 147.00 and most activity is between 0400 and 0800 GMT.

WB2BRZ reports a band opening on the night of June 29 on two meters. Ben sez he doesn't usually hear much because of his equipment but that night he heard 8 states all to the northeast of him (except Pennsylvania). WN2KLD notes that band conditions were generally good during June and that on the 22nd he worked K1IED/4 in Virginia. K3OBU in Delaware is looking for M/S skeds with anyone who would like to get that state on 144 Mc. Joe wonders if there are any stations active in Vermont on 144 Mc. He also reports that the evening of June 9, 10 was a very good one on 144 Mc. with strong signals from New Hampshire to southern Virginia. However sez he: "Best band opening heard here in many months was on June 29. The band was loaded with activity and very strong DX signals. Worked Connecticut, New York and heard a number of 4's and Rhode Island." In Pennsylvania K3CFA observed two-meter openings on June 5, 6, 29 and 30. It was also open during the contest and Joel worked into Virginia for state number 13 on 144 Mc. W3ZRR also sent word of the opening on the 29th from northeast to southwest. In North Caro-

(Continued on page 156)

Correspondence From Members-

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

73 OM

¶ One of our fellow hams has made good by becoming the Republican candidate for President. A new "first" for the ham fraternity!

How about the gang sending the gent a QSL card with a big "73" to wish him luck? His calls are K3UIG, The Westchester, 4000 Cathedral Avenue, Washington, D.C., or K7UGA, 6250 N. Hogahn, Phoenix, Ariz. My card is in the mail.

His QTH after next January may or may not be 1600 Pennsylvania Avenue, but at least we can furnish him wall-paper for his shack wherever it might be. — *W.12BGU*

THE WILL TO PROGRESS

¶ I have been upping my code speed for the Extra Class license even before the incentive licensing was proposed. I was doing it simply for the prestige. I do think the Extra and Advanced hams should get some extra consideration for the effort they have put out. —*K4DNU/4*

¶ Contrary to many statements that have been made, you do not have to be an engineer to obtain the higher grades of licenses. I am not an engineer and my formal education is more abbreviated than I care to admit. I studied for a year and traveled 1700 miles to take the old Class "A" examination and passed it. We didn't have multiple choice questions either, you had to write them all out in full.

So tell the boys (girls too) to dig in and learn basic electricity and magnetism and Ohm's Law thoroughly. That, together with the math they have been taught in the grade and high schools for years, plus some study of the *Handbook* will give them all they need to pass the exams. They will find that this will benefit them in other ways than ham radio; they will be able to understand what goes on in the electrical system of their car, their home appliances etc., to say nothing of the feeling of real accomplishment after having that Advanced or Extra Class license in the shack.—*W7DXQ*

¶ Although I was uncertain when I first realized I must be stirred out of my complacency, I soon saw the value and need for an incentive program. I was entirely convinced after reading the article by Herbert Hoover, Jr., in the January *QST*.

I brushed up on my code speed and theory, and went over to fail the Amateur Extra Class examination. After three more months of this, I have qualified. So I know it can be done, by almost anyone who puts his mind to it, and there's a lot of satisfaction in knowing it is accomplished.—*K2OTK*

¶ As of March 4, 1964, please change my status in your records from General Class amateur license to Amateur Extra Class. Your incentive licensing proposal gave me the incentive to get it.—*K4FM.1*

¶ I know that I have a great deal of work to do before I could earn an Amateur Extra Class license, but I do not shirk the challenge, I welcome it. In my area, the general, although quiet, attitude of the amateurs agrees with me in this controversial area.—*K8CUP*

¶ Although the holder of a Conditional Class license, I am strongly in favor of the incentive license proposal and would like to support you in your fight for it. I realize that it would be a hard struggle to get the Advanced Class license. I would, however, be able to do it with the help of experienced amateurs. The Sangamon Valley Radio Club helped me gain the status of an amateur and I am deeply indebted to them for this. I believe that they, and other radio clubs, could arise to the occasion and start Advanced class study classes. The main reason that I am for this incentive license proposal is because I do not know enough about my equipment and, in studying for this license, I would gain the knowledge along the way. So with my renewal to the ARRL and *QST*, I cast my vote for the life of the radio hobby.—*W.19GUM*

¶ Congratulations on your stand on incentive licensing. As you probably know, this system is in use in Canada today to a greater extent than the ARRL is advocating for the U.S.A. To operate radio telephone below 28 Mc. in Canada requires one year of c.w. operation plus an advanced test in both theory and c.w. While the present American-Canadian systems are not really comparable (we do not have a Novice class) the point is this: incentive licensing is a reality in Canada and I have seldom heard any complaints from those actually operating under this system; in fact the contrary is true. I personally feel that this system is achieving a very worthwhile end.

While American regulations are not the concern of a Canadian, the overall standards of amateur radio are and this is controlled to a large extent by the massive W/K population. As you have said, it is the duty of the American amateurs to see that this standard is maintained, or preferably raised. — *VE4EP*

¶ I was reading an article by W5EGS in the July issue and I am ashamed to admit that I am falling in the same category as he was. As a result, I am starting to "clean up and clean out" my shack.

I am also falling behind in the electronic field — but certainly am now going to make a redoubled, concerted effort to remedy this situation. You see, I left Sandia Corporation in April of 1961, to start out on my own. I seemed to never be quite able to get started, but perhaps this reminder is the incentive I need.

If anyone in the *QST* world of readers has the same trouble, perhaps we could "get together." — *WØEIJ*

¶ . . . Like most of us, there had been no inclination to advance beyond the General Class, despite the fact that the First Class Radiotelephone license helps grace the walls here. But a few days ago, finding myself glancing up at that license, a thought

(Continued on page 156)

Operating News

F. E. HANDY, W1BDI, Communications Mgr.
GEORGE HART, W1NJM, Natl. Emerg. Coordinator
ROBERT L. WHITE, W1WPO, DXCC Awards
LILLIAN M. SALTER, W1ZJE, Administrative Aide
ELLEN WHITE, W1YYM, Ass't. Comm. Mgr.

Certificate Issuances January' 64 through June '64

It gives us pleasure again to report the calls of those code-certified in connection with the ARRL Code Proficiency Program. There are now some 45,000 different persons who have demonstrated their interest and been certified as a result of the program. While most of our certifications have been in the 10, 15 and 20 w.p.m. speed ranges, *very special credit* is due to all those who go on to achieve the full 30 and 35 w.p.m. rating. The practice transmitted by W1AW tapes starts at 5 w.p.m. but the lowest speed at which certifications are made is ten words per minute. Our runs go up to 35 w.p.m. in 5-word increments. Endorsement stickers are available for *each speed increase* from an initial certified speed. May we especially commend all those who have won certificates and endorsements in the following list.

ARRL Certified at 30 w.p.m.

WN1AEV*	W2SJR*	WA4HQW*	W8CLD*	WA9CKQ*
W1AFM*	K2UAT*	W4KDK*	WA8CLP*	WA9DKV*
K1ZND*	W2UMO*	WA4LTB	K8DBW*	W9FVD*
WB2AIJ	WA2UPC	WA4MSS	K8EHD*	K9UGP*
WB2ALF*	WA2VSQ*	K4VFY*	WA8FAE*	W9UJN
W2BC	WA2WBA/4*	W5EJV*	WA8FIC*	K9UTQ*
WB2CPU*	WA2WLN*	K5SAM*	WA8GYT	K9VHY*
WB2ECR	WA2YHA*	WB6CAA*	K8HVT*	W9CUC*
WB2EUH*	W3AEA*	W6DGM*	K8IKB*	KØRPH*
WB2EZG*	K3NLG*	W6JUS*	W8QWE*	W9USL
WA2HIU*	K3OMP*	WA6WTX*	K8RDE*	WØVFE*
WB2ILY*	K3QOO*	WA6ZME*	K8RXD*	VE1ACD/W1*
WA2LJM*	K3UFV*	W7NGW*	K8VFR*	VE2AGQ*
Wa2PJL*	K3USH*	W7PAY	W9AKV*	VE2BMS
WA2QMC*	K3WWP*	K7SRI*	K9ATB	VE2BPX
W2ROM*	WA4BAD*	K7VJU	K9AZY*	VE3CYG*
W2SIL*	K4FRM*	WA8CAL*	K9BGM*	VE3EYN*

Richard C. Carlson, Imperial Beach, Calif. Donald Marshall, Missoula, Mont.

* Endorsement sticker.

ARRL Certified at 35 w.p.m.

W1AFM*	WA2LOZ*	W3JSA	WA5GNV	WN7AFQ
W1ELL*	WA2PUM*	K3OMY	K5III*	W7HBO
K1EWL*	WA2QJU*	K3ZMH*	W5JA/W5ALY*	K8MFO*
W1MGX	W2QKM	WA4BAW*	K5KAA	K8ZOA*
W1ZLX*	WA2RSE/-	K4BYN*	W5KQD	W9FRS*
WB2BDK	VO1*	K4CSY*	W5LZL*	K9KHI
WB2CSS	WA2RUE*	K4EOF*	WB6FKE	K9UTQ*
WA2FQW/2	K2SIL*	K4FMA*	WB6KNN	KØFPC*
W2GIP	W2SKX*	WA4JYB*	K6OCU	K9GFA*
WB2JHX*	WA2VLK*	W4LUV*	W6RQZ*	KØIFO*
WA2KQG*	WA2WLN*	W4ZBW	WA6ZID*	VE2BMS*
	K3HEZ			VE7BDJ

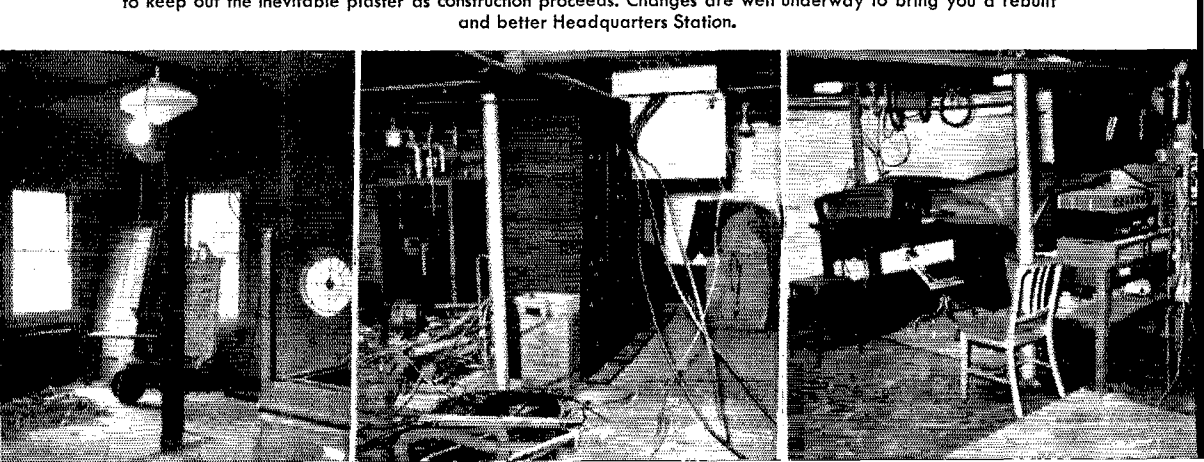
*Endorsement sticker.

Test Pests. "Can't we do something to clean up these bands. This interminable testing in the c.w. portion is a disgrace. Almost every QSO is QRM'd by test pests. Perhaps these operators do not know that this is illegal. I timed one WA5 who held the key down for 21 minutes. Testing unduly voice or c.w., is the most violated section of our regulations. Keep hammering away in *QST* that this is illegal."—W8BIE

Try Ten! Several amateurs have reported ten meter work; more reports will be welcomed. The reason more use is not made of ten seems to be that not enough amateurs make use of the frequency *at the same time.* We can catch some *exceptional* DX and with little relation to whether low power or high is used, if we'll keep watching for the good times. May we recommend it to one and all.

When not useful for good DX 'tis *always* good for local use, inviting too with little QRM. To be around for openings some recommend trying it daily, say one to four P.M. and especially on weekends. —*F. E. H.*

Some evidence of the "disarray" at W1AW as the Maxim Memorial Station undergoes extensive reconstruction. On the left, a view of a corner of the upper operating room. The Maxim Memorial plaque rests against one of the windows of the visitor's lobby which displayed the famous Maxim spark transmitter. The center picture shows a July view of the old W1AW rigs (temporarily housed in the basement) and at the right is another below-decks view of the makeshift arrangements keeping W1AW going on code-practice, bulletins, qualifying runs, FMTs, etc. The nightly cover-up is necessary to keep out the inevitable plaster as construction proceeds. Changes are well underway to bring you a rebuilt and better Headquarters Station.



FREQUENCY MEASURING TEST

SEPTEMBER 10

ARRL invites every amateur to try his hand at frequency measuring when W1AW transmits signals for this purpose starting at 0130 GMT, Sept. 10. *CAUTION:* Note that since the date is given in Greenwich Mean Time the early run of the frequency measuring test actually falls on the evening previous to the date given. *Example:* In converting, 0130 GMT, Sept. 10 becomes 2130 EDST Sept. 9. 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 3505, 7043 and 14,048 kc. About 4½ minutes will be allowed for measuring each frequency, with long dashes for measurement starting about 0136. It is suggested that frequencies be measured *in the order listed.* Transmission will be found within 5 or 10 kc. of the suggested frequencies.

At 0430 GMT, September 10 W1AW will transmit a second series of signals for the Frequency Measuring Test. Approximate frequencies will be 3512, 7022 and 14,080 kc.

Individual reports on results will be sent to all amateurs who take part and submit entries. When the average accuracy reported shows error of less than 71.43 parts per million, or falls between 71.43 and 357.15 parts per million, participants will become eligible for appointment by SCMs 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 until they demonstrate the above-stated minimum required accuracy. Class I and Class II OOs must participate in at least two FMTs each year to hold appointments. SCMs (see listing page 6) invite applications for Class III and IV observer posts, good receiving equipment being the main requirement. All observers must make use of cooperative notices, reporting activity monthly through SCMs, to warrant continued holding of appointment.

Any amateur may submit measurements on one or all frequencies listed above. No entry consisting of a single measurement will be eligible for *QST* listing of top results. Listing will be based on overall *average* accuracy, as compared with readings made by a professional lab.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for June Traffic:

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W3CUL	157	1989	1711	267	4124
K6BPI	81	1904	1985	83	4053
W0LGG	118	957	863	65	2003
K0ONK	115	718	691	38	1562
W7BA	11	657	610	45	1323
WA9CCP	6	658	633	12	1309
W0BDR	88	531	518	5	1142
W6WPF	8	427	403	24	862
W6RSY	35	398	289	109	831
W3VR	31	396	374	7	808
WB6BBO	62	382	341	6	791
WA2RUE	49	348	316	28	741
K6IWV	17	359	339	20	735
W1PEX	36	344	330	18	728
K9IVG	11	380	326	3	720
K5GDH	17	342	319	23	701
K9KZB	16	334	331	3	684
W6GYH	150	256	251	2	659
W3EML	41	329	221	5	596
K9HJS	5	284	249	28	566
WA6WTK	3	267	233	41	544
W0OHJ	11	257	240	17	525
WA4HRG	32	252	233	4	521
WB6JUH	25	244	214	29	512
W7JHA	4	256	221	31	512
K1WKK	24	245	232	6	507
K6MDD	2	252	200	52	506
W7WST/6	11	246	243	5	505
W5DTA	19	235	188	59	501

More-Than-One-Operator Stations

Call	*Orig.*	*Recd.*	*Rel.*	*Del.*	*Total*
W6IAB	1260	1427	965	462	4114
W6YDK	2987	278	248	30	3543
Late Reports:					
KH6USA (May)	0	2182	0	33	2215
W6YDK (May)	957	472	28	500	1957

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

K9JXW 252	W2EW 129	K9DHN 102
WA6TAW 213	WA8PIC 113	Late Reports:
W7APS 210	K7EWZ 111	K5GDH (May) 146
WB6GZY 178	K4VFY 109	WA4IMC (May) 113
WA4BAC 175	W8DAE 106	W7GUH (May) 113
K6GZ 168	K9IMR 104	W9JDF (Apr.) 103
WA2TQT 136	KØAEM 104	

More-Than-One-Operator Station

W5QEG 121

BPL medallions (see Aug. 1954 *QST*, p. 64) have been awarded to the following amateurs since last month's listing: W2GVH, WA0CIE.

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

A.R.R.L. ACTIVITIES CALENDAR

(Dates shown are in GMT)

Sept. 4: CP Qualifying Run — W6OWP
Sept. 10: Frequency Measuring Test
Sept. 12–13: V.H.F. QSO Party
Sept. 16: CP Qualifying Run — W1AW
Oct. 1: CP Qualifying Run — W6OWP
Oct. 3–4: Simulated Emergency Test
Oct. 10–12: CD Party (c.w.)
Oct. 15: CP Qualifying Run — W1AW
Oct. 17–19: CD Party (phone)
Nov. 6: CP Qualifying Run — W6OWP
Nov. 20: CP Qualifying Run — W1AW
Nov. 15: Sweepstakes Contest (phone)
Nov. 22: Sweepstakes Contest (c.w.)

OTHER ACTIVITIES

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

Sept. 14; W1EIA High Speed Code Test, C. W. A. (p. 103, this issue).

Sept. 19–21: Seventh Pennsylvania QSO Party, Nittany ARC (p. 110, this issue).

Sept 19–20, 26–27: Scandinavian Activity Contest, SSA (p. 92, this issue).

Sept. 26–27: W/VE Contest, Montreal ARC (p. 43, this issue).

Oct. 3–5: Ninth Delaware QSO Party, Delaware ARC (next month).

Oct. 3–4, 10–11: VK/ZL Oceania DX Contest, NZART and WIA (p. 92 this month).

Oct. 10–11, 17–18: VU2/4S7 Contest, Amateur Radio Society of India (next month).

Oct. 17–1:— Fourth World-Wide RTTY Sweepstakes (next month).

HIGH SPEED CODE TEST

Some 45 copies were received of the speed test put on by W1EIA, club station of the Connecticut Wireless Assn., and honorary members K6DYX and W6EOT last March 16. A total of 32 qualified for CWA achievement certificates, as follows (speeds in parentheses): K1EWL (40), W1IKE (40), W1MGX (45), K1MJN (40), K1RTV (40), W1ZLX (50), K2HVT (50), W2LYH (55), WA2OQV (50), WA2RUE (40), K2SBS (40), W3ELZ (50), K3OMY (40), W4CQI (40), W4DLA (55), WA4FVD (40), K4TUA (60), W6CLB (45), W6EAR (55), W6GNO (50), W6OAZ (55), W6OZ (55), WA6RGD (40), K6VYJ (60), K7BPR (40), W8AUD (40), WA8DYN (40), WA8ENO (40), W8LEX (45), W8ZCW (40), K9ARW (50), K9KSG (50).

The dearth of 5's and 0's in the above list is caused, we think, by the fact that coverage is on the west coast and east coast but there has been nothing in the midwest. Our appeal for volunteers brought three good midwestern stations, one of which we are putting to work in September; the others will probably get their chance next March. He is Ken Isbell W5QMJ of Enid, Oklahoma. W5WMJ packs a wallop which, we hope, will cover the midwest like a blanket.

Here is the dope on the September High Speed Code Test. *Date:* September 14 (Sept. 13 by local time). *Time:* Start listening at 0100 GMT, find the station you receive and copy best; very important instructions start at 0130 GMT. *Stations and frequencies:* These are tentative, depending on successful fruition of present plans. W1EIA will transmit simultaneously on 3637 and 7120 kc.; W5QMJ will be on 3660 kc.; K6DYX will be on 3690 kc.; W6EOT will transmit simultaneously on 3640 and 7005 kc. *Speeds:* This time we are starting with high speed first, so the sequence will be 60, 55, 50, 45 and 40 w.p.m. There will be a five-minute transmission at each speed. Copy will be the same from all four stations. *Requirement for certificate:* One minute of consecutively solid copy will qualify you at any speed. *Please copy instructions at 0130 GMT, Sept. 14,* for detailed rules and procedures.

W1AW SCHEDULES

(September, 1964)

Operating Hours

Daily: 2230 to 0430 GMT.

While the reconstruction program is in progress, there is *no* provision made for visiting of the station. Visitors to the ARRL headquarters building, located on the same premises, are of course welcomed during regular office hours from 8:15 A.M. to 4:30 P.M. EDST Monday through Friday. The station will be closed September 7, Labor Day.

Operating Frequencies

C.w.: 3555 7080 14,100
Voice: 3945 7255 14,280

Frequencies may vary slightly from round figures given; they are to assist in finding the W1AW signal, not for exact calibrating purposes.

Official Bulletins

Bulletins containing latest information on matters of general amateur interest are transmitted on the above frequencies according to the following schedule in GMT:

C.W.: Mon. through Sat., 0000; Tues. through Sun. 0400.
Voice: Mon. through Sat. 0100; Tues. through Sun., 0330.

Caution: Note that in the U.S. and Canada bulletin hours usually fall on the evening of the previous day by local time.

NET REGISTRATION INFO

The September 1 deadline is drawing near — is your net registered? The year-end net directory will include your net, *if* you register in time and follow the instructions given on page 103 of August 1964 *QST*.

SUGGESTED
OPERATING FREQUENCIES
RTTY 3620, 7040, 14,090, 21,090 kc.
WIDE-BAND F.M. 52.525 146.94 Mc.

GMT CONVERSION

To convert to local times subtract the following hours:
ADST —3, AST —4, EDST —4, EST —5, CDST —5, CST —6, MDST —6, MST —7, PDST —7, PST —8, Hawaiian —10, Central Alaska —10.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made Sept. 16 at 0130 GMT. Identical tests will be sent simultaneously by transmitters on 3555, 7080 and 14,100 kc. The next qualifying run from W6OWP only will be transmitted Sept. 4 at 0400 Greenwich Mean Time on 3590 and 7129 kc. *CAUTION!* Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0130 GMT Sept. 16 becomes 2130 ESDT Sept. 15.

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

Daily tape-sent code practice transmissions are available on an expanded basis this season. These start at 2330 and 0130 GMT and are sent simultaneously on all c.w.-listed W1AW frequencies, with about 10 minutes practice given at each speed: 5, 7½, 10 and 13 w.p.m. on Sun. Mon. Wed. Fri. (GMT date) from 0130–0220; 15, 20, 25, 30, 35 w.p.m. on Tues. Thurs. Sat. (days in GMT) from 0130–0220; 10, 13 and 15 w.p.m. daily from 2330–2440 GMT.

To make the practice more beneficial the order of words in each line of the text is sometimes sent reversed. The 0130–0220 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending *in step with W1AW* and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0130–0220 GMT practice on those dates:

Date Subject of Practice Text from July *QST*

Sept. 2: *It Seems to Us. . . .*, p. 9
Sept. 3: *Speech Clipping for Single Sideband*, p. 11
Sept. 11: *Power-Less*, p. 21
Sept. 15: *A High-Precision Permeability-Tuned V.F.O.*, p. 22
Sept. 24: *Maturity* p. 65

Date Subject of Practice Text rom *Understanding Amateur Radio*, First Edition

Sept. 28: *Parallel Resonance*, p. 23
Sept. 30: *Impedance*, p. 23

W1AW NOTE

The ARRL Headquarters Station, W1AW, is still undergoing extensive reconstruction. Operation during this period (2230 to 0430 GMT daily) will be conducted from temporary positions in the basement of the building on a curtailed schedule on 80 40 and 20 meters only. Full W1AW services will be continued for the transmission of voice and c.w. bulletins, as well as both periods of tape-sent code practice, as noted elsewhere on this page. During most of this period, with the building in disarray as construction progresses, it will not be feasible to invite visitors.

We hope you will bear with us in these slight but necessary inconveniences with the expectation of renewed and extended complete schedules when the changes are completed, from a rebuilt and better W1AW.

DX CENTURY CLUB AWARDS

Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given, including deleted countries. Positions in cases of ties are determined by date of receipt. All totals shown represent submissions credited through June 30, 1964.

W1FH....311/337	W8DMD...310/332	W1JYH....308/331	W8HGW...306/331	W4GXB....304/325
CX2CO....311/332	W7PHO....310/328	W6YY....308/328	W0QDF....306/323	W2AYJ....304/323
W9RBI....311/336	W8MPW...310/328	W2BOK....308/325	G8KS....306/324	W2TVR....304/322
W6CUQ....311/336	W8BF....309/330	W7BGW....308/332	W7ENW....306/330	G3YF....304/326
W8BRA....311/334	W2LPE....309/330	W4TM....308/330	W2UVE....306/324	W5AFX....304/329
W8JIN....311/336	W9YFV....309/333	W2ZX....308/327	W5CKY....306/325	W2HMJ....303/323
W4GD....311/332	W1ME....309/332	W0AIW....308/331	W2WZ....305/328	W5ASG....303/327
G4CP....311/335	W1BIH....309/333	W6EBG....308/333	W8DAW....305/328	W4VPD....303/320
G3AAM....311/335	G2PL....309/332	W8LKH....308/328	W0SYK....305/323	W2SAW....303/320
W2AGW....311/335	W9LNM....309/332	W4AIT....308/331	W7IZW....305/322	W2LAX....303/320
W4DQH....311/335	W0QVZ....309/330	W4ML....308/328	W2OKM....305/323	W5UX....303/318
W8UAS....311/332	G3FKM....309/326	K2DCA....308/325	K6ENX....305/322	W8PUD....303/320
W8PQO....311/328	W3JNN....309/333	VE7ZM....308/332	W2FXN....305/319	W9KOK....303/327
W2TQC....311/330	DJ1BZ....309/327	LU6DJX....308/332	W4LYV....305/325	W8IRN....303/321
4X4DK....311/329	W4QCW....309/326	W1CLX....307/330	K4LMN....305/319	K6EVR....303/320
W7GUV....311/334	W9HUZ....309/329	W6GPB....307/328	W3ECR....305/322	DJ2BW....302/319
W3GHD....311/335	W8EWS....309/333	HB9J....307/331	K2GFO....304/325	K4RID....302/316
KV4AA....310/334	W2LV....309/328	W6AM....307/332	W5ADZ....304/326	W0PGI....302/317
W1GKK....310/335	W5MMK....309/330	W5ABY....307/324	W6GYV....304/322	W4PLL....302/317
PY2CK....310/333	K3UPG....309/333	W2ZGB....307/323	W4MR....304/324	PA0FX....302/322
W9NDA....310/334	W8JBI....309/328	W0BFB....307/325	W9AMU....304/321	W3WGH....302/317
W2JT....310/329	DL3LL....309/325	OE1ER....307/329	W2GUM....304/326	W8NGO....302/319
W8KIA....310/334	W0DU....309/331	K2BZT....307/324	W7AC....304/328	W4OM....302/324
W3LMA....310/332	CE3AG....309/333	W0ELA....307/330	W4OPM....304/319	5Z4AQ....302/321
W2BXA....310/334	W3KT....309/333	W2SUC....307/324	W0NTA....304/324	I1AMU....302/320
W2DEC....310/326	W8KML....308/329	W3JTG....307/330	W1HZ....304/322	W5OLG....302/323
		W5KC....307/330		

Radiotelephone

CX2CO....311/332	W7PHO....310/328	W8KML....308/329	W6YY....307/327	W0AIW....304/325
W9RBI....311/334	4X4DK....310/328	W2ZX....308/327	W3JNN....307/328	W8HGW....302/324
PY2CK....310/333	W8BF....309/330	5Z4ERR....308/330	W2JT....306/320	W4OGW....302/315
W3RIS....310/335	W1FH....309/320	W4DQH....308/330	W2BXA....305/327	W6AM....301/325
W8GZ....310/333	W8PQQ....308/325	PY4TK....307/324	W9JJF....304/321	I1AMU....301/320

New Members

From June 1, through June 30, 1964, DXCC Certificates and Endorsements based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

SM5BAU...213	DJ8RR....118	K9LBL....111	W4SOT....105	YV5BKA...102	W6QRH....100
G2RO....203	UA4KPA...117	JA6PY....110	W9QQN....105	WA2UWA...101	W7UXP/KH6
HB9PL....191	SP5ALG...116	DJ4VV....108	YV0AA....105	W9RVN....101	100
G8PB....180	SP5AEF...115	W0GDX....107	K9MQL....104	UA4QA....101	WA8GUN...100
UH8DA....158	DL0LB....114	G2HCZ....107	W4FHI....103	UA9HA....101	K8WVF....100
OH5UQ....154	G3RFE....113	SM1CXE...107	UP2KNP...103	UB5ES....101	W9FRS....100
W4DVT....123	UW3DR....112	YO2BB....107	W7YFO....102	W1EOA....100	K9HUY....100
G3IJX....120	5Z4IQ....112	WA2EFN...105	OK2BCI...102	WA4CZM...100	K9YBC....100
			U18LB....102	K4NVI....100	KØKLH....100

Radiotelephone

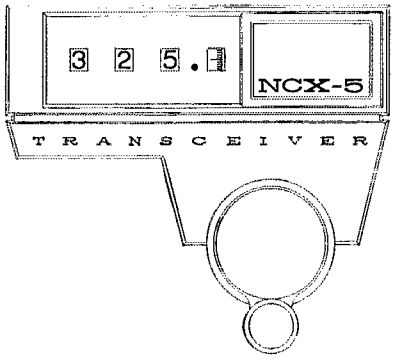
5Z4AQ....219	ZL3NS....124	OA1W....110	W4TUC....106	W2JSX....102	K9DQO....101
WA6FPB...179	K1RTB....120	WA2JBV...109	K8ZPK....105	WA4JOS...101	VE2ANK...100

Endorsements

W4OM....323	W9JUV....290	KP4RK....260	W5AI....200	YV5BOA...165	W7MX....140
VK3KB....323	W2ZKQ....282	VE6TP....255	W8LUZ....200	W9OW....163	VE7KX....140
W5OLG....322	W2WMG...281	K8WOT....252	UA2AO....200	W1ECH....160	KH6ACC...140
G3FXB....318	W4IF....281	WA2DIG...250	G4FN....197	W2YCW....160	KP4BJD...140
W5IGJ....316	W9TKV....281	W6ISQ....250	KØUKN....193	W4OMW....160	PY2BGL...140
K4AIM....315	W4HUE....280	OK1KTI...249	DJ5IM....193	WA5CBL...160	VE8DX....137
W2FZV....314	DL7EN....276	SP9RF....249	K6TWU....192	W9IWX....160	W4KN....132
WØVBQ....312	W3AFM....273	W4DLG....248	KØZEC....192	W4FRO....159	K5RUO....132
W2SSC....311	W4RBZ....272	W8ETU....241	VR2DK....192	W4IEN....155	K7ADL....131
K5BGB....310	W2WU....270	W9AZP....241	K9JJR....191	VE2BCT...154	KP4BJU...131
W5PSB....310	K4EDF....270	W2UFT....240	WA6FTM...190	WA2KSD...152	K3NLC....130
W6CAE....310	JA2JW....269	ZS6ATA...240	W4HRS....190	WB2CKS...152	LA1H....130
W3KVQ....306	W7BA....267	DL1QT....237	OH2FS....190	W4OBL....152	YV5AZR...129
K4RPK....306	G2FFO....265	W2QDY....230	DL3AR....188	W1HOZ....151	K8ZIP....124
W4LRN....303	DJ2KS....264	G2FYT....230	I1CWN....186	W1BPY....150	W9AFZ....123
W8JSU....302	HB9UL....264	G2GM....230	WA2OMR...185	K8EHD....150	W3ZAQ....122
W1AZY....301	ZP5LS....264	OH2LA....226	W2ZTV....183	OK3IR....150	W2RIR....120
W4DQS....301	W2AZS....263	W4HKJ....222	K1RTB....181	W2ANX....149	W3STA....120
W4ZRZ....301	W3GRS....263	W2ZY....220	W2LJF....181	W5QIX....147	W9AOW....120
K4RJN....300	I1UA....263	UA3HI....219	W6UMI....180	W9YMG....147	K9CZV....120
W9HB....300	W8KMD...262	IT1ZGY...215	VE1EK....180	SM7CAB...145	K9JJS....120
WØIJW....300	W2MJ....261	VK2NS....214	W1MIX....174	K2ZCD....144	VE6ABP...120
KØRAL....300	W5VSQ....261	W8FAW....204	W6OMR....174	I1ZCN....143	W9TQA....112
DJ3KR....296	WA6TGF...261	K6EXO....202	K8RDE....172	WA2BRI...141	LA8PF....112
W5FFW....295	W8CUT....260	K1UGO....201	OH2XF....172	K2LAF....141	G3JFF....111
PZ1AX....293	W8QNW....260	W1YYM....200	TN8AF....171	WØWRO....141	W2ERZ....110
W6SQP....290	WØOAQ....260	WA2IEK...200	K1LWI....170	WA2RUB...140	WA2IZV...110
		WA4CXR...200	HK3RQ....170	W4UF....140	K2MRB....110

Radiotelephone

VE7ZM....320	W4PAA....270	K2CNX....231	WØQLX....199	WA2LDV...161	F2FO....134
ON4DM....318	K6EVR....270	I1CQD....229	W8QNW....196	PA0SNG...160	ZL1AAS...133
K4AIM....311	I1UA....262	K1JMV....225	KØUKN....193	K9JJR....156	W7PRY....131
W8DMD....311	W9UZC....260	W4RBZ....225	ZS6BBP....191	DJ2KS....156	W4PLL....130
W9YSX....310	YV5AXQ...255	W4DLG....223	UA2AO....190	OA4PD....156	OA4KY....130
W1BAN....300	W2BOK....251	W4PJG....220	I1CWN....184	I1BXK....150	W3GRS....128
G3FXB....296	DL3RK....250	W9HP....220	WA2HOK...181	F8WE....143	KP4AWH...122
PZ1AX....293	YV5AKP...246	W2WMG...213	EA4GZ....181	YV5BIG...143	W9DNE....120
W3WGH....288	KØRAL....243	W4HUE....207	W7QPK....180	W2FXA....140	K9JJS....120
W4OM....282	W4ZRZ....240	F2MO....201	W2ZTV....163	K6HZP....140	W3NM....112
W7ADS....271	G3HDA....232	EA1GH....200	JA2JW....163	W8FAW....135	K1LWI....110
					K3RFH....110



WE'RE QUITE PROUD of the new NCX-5 SSB transceiver . . . We've achieved our design goal of bringing you the finest transceiver you can buy at half the price of comparable equipment.

FREQUENCY STABILITY and dial calibration, for example, has been an index of equipment performance for a number of years, and the accuracy of read-out in the National NCX-5 has previously been available in only the most expensive military gear.

THE NCX-5 incorporates a specially designed VFO capacitor and direct reading digital counter assembly which allows the operating frequency to be read *directly* to one kilocycle on each amateur band. A fourth counter provides additional readout in *100 cycle* increments!

THE VFO used in the NCX-5 is an outgrowth of our design work on the new HRO-500 solid state frequency synthesized receiver. The NCX-5 transistorized VFO has *no* warm-up drift as such — a significant advance over tube-type oscillators which by their nature drift rapidly when first turned on (while the tube electrode structures expand). The NCX-5 VFO exhibits a drift characteristic *from turn-on* which is equal to those of the best tube-type VFO's *after* electrode stabilization! Because the NCX-5 VFO is double voltage regulated — first by a VR tube and then by a Zener diode — variations in input voltage to the transceiver (such as in mobile operation) have practically no effect on frequency. For example, it is possible to tune a beat note while mobile with the engine of the car turned off, and then start the engine without a detectable change in frequency while the starter is grinding or after the engine has started and run at high speed!

NATIONAL'S NCX-5 also incorporates a *Transceive Vernier* control which allows the operator to tune the receiver section of the transceiver 5 Kc. each side of the transmit frequency — an important feature for AM, CW, or net operation.

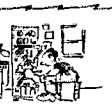
WHAT ELSE does the NCX-5 have? You name it . . . the finest filter ever manufactured for amateur use, with a 1.7:1 shape factor for maximum possible sideband suppression and adjacent channel selectivity . . . selectable upper or lower sideband operation with no retuning . . . *two* R.F. stages in the receiver . . . ALC control for maximum talk power without flat-topping . . . break-in grid block keying with adjustable delay . . . a separate optional VFO console with unique features for the CW man or novice operator . . . and, of course, front-panel choice of built-in VOX or PTT operation, full compatible AM facilities including a separate AM detector . . . S-meter . . . There really hasn't been anything left out to make the NCX-5 the ultimate transceiver, and the only unit suitable for total fixed station operation (as well as mobile) without compromise.

WE'RE ENTHUSIASTIC. You will be, too, as soon as you get your hands on one.

MIKE FERBER, W1GKX

National Radio Company, Inc.

Station Activities



• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: W3EML, K3MVO, K3YVG. PAMs: K3CAH, W3SAO, W3SGI. The EPA C.W. Net had a QNI of 292 with QTC of 266. PTTN had QNI-119 with QTC of 29. The Cen-Penn 6 Net had QTC of 68. K3PBU has been appointed EC for Susquehanna County. The traffic totals of K3OMP are down because of vacation and rig repairs. W3AZR is using a 1200-ft. long wire antenna. Bucks County ARC had an expedition to W. Va. for the V.H.F. QSO Party and your SCM, with K3MPN, operated from W. Pa. Clinton County 2265 feet elevation. The XYL of W3ELI, SEC, is being indoctrinated with the "hamus virus." K3YVG complains of trouble with QSS. The station of K3SFP is inactive during the summer months because he is slaving at W3AZR's print shop. WA2QVL walked off with the NCX-3 top prize at the Penn-York Hamfest. Milton ARC is installing an 80-ft. tower at the club site. W3NOH added a Warrior final to the shack, and W3KEK added to his gear a Heath Ham-Scan panndapter. WA3AYO is a new operator in the Lititz area and WN3ALF, with his T-60, has been added to the Bangor vicinity. W3BNR, now portable seven, has hung his hat at Opheim, Mont. New club officers of the North Penn ARC are W3EMH, pres.; W3STA, vice-pres.; W3URS, treas.; K3TMJ, secy. Mt. Airy V.H.F. Radio Club officers are K3GAS, pres.: W2EIF, vice-pres.; W3SAO, secy.; W3MVF, treas. K3YQJ operated Field Day from W2-Land. After the modulator broke down, K3MYS found the old reliable c.w. made hum 241 QSOs on Field Day. K3TEJ is now mobile on 6 meters. For better results, K3HTZ resorted to the old S-20R rather than the NC-303. Regarding those Field Day messages, we received 6 via W3ZRQ/3 and 19 via the U.S. mails. Ever stop to think what would happen to those messages during the real thing? What say, next year let's try ham radio for QSP. The EPA. C.W. Net and the PTTN Training Net meets nightly on 3610 kc. at 1830 and 1800 EST, respectively. Communications for the Tamaqua Soap Box Derby were handled by K3IAC, K3SRQ, K3UFB, K3KNL, K3UTJ, K3NYX, WA3AFB and W3ZRQ. Traffic: W3CUL 4124, W3VR 808, W3EML 596, K3MVO 261, K3YQJ 145, K3BHU 106, K3OMP 64, W3JKX 46, W3AZR 42, K3HNP 39, K3MQE 38, W3ELI 36, K3RZE 34, W3AXA 32, W3ZRQ 32, K3RUA 31, W3RV 25, W3BFF 21, K3SFP 19, K3YVG 19, W3BKF 16, K3HHY 13, W3LXN 10, W3VAP 10, K3HTZ 5, K3LSV 5, K3TEJ 5, K3NZD 4, K3MNT 2, K3RFH 2, W3ID 1, K3MTF 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Andrew H. Abraham, W3JZY—SEC: W3CVE. RMs: W3QCW, W3JYZ, W3ZNW, W3MCG. PAM: W3RKK. The MDD Net meets daily on 3649 kc. at 0000Z. The MDDS meets daily on 28.1 Mc. at 0130Z. The MEPN meets M-W-F at 2200Z and Sat. and Sun. at 1700Z on 3820 kc. The Foundation for Amateur Radio will hold its big hamfest at the Howard County Fair Grounds, 15 miles west of Baltimore on U.S. Route #40 Sept. 27. W3AHQ keeps busy by copying the Bulletins from W1AW and putting them out on the v.h.f. bands. W3ATQ finds time to QNI the MDD Net. W3CDQ attended the YL-XYL-25th Anniversary of the YLRL at Columbus, Ohio. W3ECP had a grand time with the grandchildren while in Georgia. Van also attended the Atlanta Hamfest. W3EOV is taking advantage of the Army MARS training courses. W3HQE is feeling fine now that he is home from the hospital. W3IVC has passed the General class exam. Red also is working on the v.h.f. bands. K3KAL, from Smithsburg, has enlisted in the U.S. Navy. K3KMO/3 has been busy taking care of the new baby, but finds time to QNI into the MDD Net. K3LLR made 28 MDD Net sessions out of 30. W3MSR finds little time for hamming. K3OAE is going to summer school. Art has his Extra Class ticket. W3OHI has air-conditioning in his shack. W3PQ again affirms his strong support of ARRL policies. W3QCW has drawn up an emergency plan for the MDD Net and is working with other traffic nets on frequency use for this winter. K3QDD has his keyer working. K3QZZ is home from school. K3RUQ operated on Field Day from a fire tower in Delaware. K3TUJ has a new 6- and 2-meter beam up and also a vertical for the low bands. K3UFV is top man in traffic. K3URZ is taking up typing. W3ZNW is doing a fine job managing the MDDS Net on 28.1 Mc. It is time to register all nets in the Md.-D.C. area so that they will appear in the Net Directory. Send the name, frequency, time in GMT and days of operation of all nets to ARRL. The Baltimore area AREC group set up an amateur station in the Towson Plaza Shopping Center in observance of Amateur Radio Week. The Alexandria, Va., Radio Club set up operations for Field Day in the Washington, D.C., area. The WMAL TV station sent a crew out to the Field Day site and televized the stations in operation for the WMAL-TV news program that same evening, June 27, 1964, giving details on why Field Day is held by the ham operators. Traffic: (June) K3UFV 131, K3QDD 129, W3PQ 126, K3RUQ 96, W3QCW 63, W3AHQ 52, W3IVC 43, W3EOV 25, W3ATQ 24, K3JYZ 22, K3TJE 21, K3URZ 19, W3ECP 16, K3LLR 10, K3QZZ 4. (May) K3KMO/3 8.

DELAWARE—SCM, M. F. Nelson, K3GKF—PAM: K3LEC. RM: W3EEB. DEPN meets Sat. on 3905 kc. at 1830 local time. DSMN meets Tue. on 50.4 Mc. at 2100 local time. Renewals: K3AZH as EC (Newcastle County); K3GKF as OBS. The Kent County ARC is conducting classes in traffic-handling. K3AZH and K3OBU furnished communications for the Newark Memorial Day Parade. W3EEB's XYL broke her leg and delayed their KL7 trip. Ced claims she did it intentionally. W3FJF's XYL also has been in the hospital. K3OCE has a new Shawnee transmitter in action on 6 meters. The new ORSs, K3YHR and K3YZF, are doing a good job handling traffic. Field Day was enjoyed by all. Clubs and groups were in action from all three counties. Traffic: W3EEB 137, K3YZF 24, K3YHR 12, W3CFA 3, K3AZH 2.

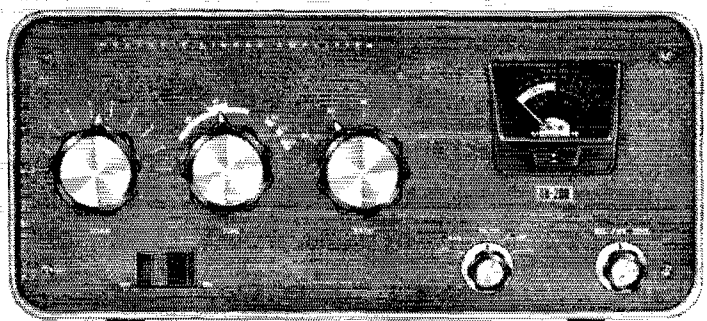
SOUTHERN NEW JERSEY—SCM, Herbert C. Brooks, K2BG—SEC: K2ARY. PAM: W2ZI. RMs: WA2BLV and WA2VAT. W2BZJ, Pennington ORS, is back handling traffic after being QRT for a long time. WB2GUK, Atlantic City, is one of NJN's representatives to 2RN. WA2GSO, W2MMD, W2ZI, W2BZJ and WB2FJF are among the vacationers. Jersey Phone & Tfc. Net totals for June: 30 sessions, QNI 591, traffic 165. Field Day reports were received from K2HJY/2, Medford Wireless Assn.; K2AA/2, South Jersey Radio Assn.; WA2NGI/2, Gloucester County ARC.; WA2-ENJ/2, Mercer County; K2BR/2, Southern Counties ARA; WA2QZQ, Rancocas Valley Amateur Radio Assn. The SJRA's Hamfest will be held at Molia Farms, Malaga, Sept. 13. The state of N.J. is planning to supply amateurs in the state with pictorial QSLs for their use in the near future. WA2MES is editor of the gossip column in SJRA's *Harmonics*. The following assisted SJRA's FD chairman: W2HBE, W2LBX and W2OSD on 6 and 2; WA2GSO on 10; WA2EMB on 15 meters; W2FYS on 20 meters; WA2ABF on 40; K2BG on 80. K2JKA, Woodbury, editor of Gloucester County ARC *Crosstalk* and EC for Gloucester, has a potent signal on 6 meters. WA2WLN, Linwood an active traffic-handler, is building a 6-meter rig. The Burlington County Radio Club meets the 2nd Mon. in Moorestown; W2WUP is pres. No reports were received this month from Salem, Cumberland or Cape May Counties. Monthly reports are always appreciated. The section also includes Burlington, Camden, Gloucester, Mercer and Atlantic. The closing date for reports is the 5th of each month. Traffic: (June) W2RG 98, WA2KIP 64, WB2FJF 46, WB2GUK 45, W2MMD 34, W2ZI 30, K2GIO 17, WA2WLN 10, W2BFI 8, W2BZJ 6, WA2KAP 4. (May) WA2BLV 311, WA2KAP 2.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2ICZ. RMs: W2RUF, W2EZB, W2-FEB. PAM: W2PVI. NYS C.W. meets on 3670 kc. at 1900, ESS on 3590 kc. at 1800, NYSPTEN on 3925 kc. at 1800, NYS C.D. on 3510.5 kc. and 3993 kc. s.s.b. at 0900 Sun. and 3510.5 kc. at 1930 Wed., TCPN 2nd call area on 3970 kc. at 1900, 1PN on 3980 kc. at 1600, 2RN on 3690 kc. at 0045 and 2345 GMT. W2RUF reports that NYSCN now has 36 counties represented in the W.N.Y. section. This is a new net which eventually will be 100%

(*Continued on page 110*)

#3 IN THE HEATHKIT® SSB SERIES

SB-200 LINEAR AMPLIFIER AT ONLY $200.00



• 1200 watts PEP SSB—1000 watts CW • 80 through 10 meter band coverage • Built-in SWR meter—antenna relay solid-state power supply • Automatic Load Control (ALC) • Shielded, fan-cooled amplifier compartment • Pre-tuned cathode input circuit • Circuit breaker protection—no fuses • 120/240 volt operation

Handsomely styled to match the Heathkit SB-300 Receiver and SB-400 Transmitter, the new SB-200 is a completely self-contained desk-top KW Linear that provides globe-circling SSB power at tremendous savings!

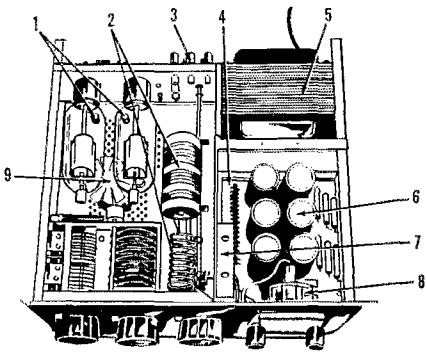
Many Advanced-Design Features! Incorporated in the SB-200 is a pre-tuned cathode input circuit for maximum efficiency and low distortion . . . ALC output for automatic exciter control . . . a rugged, well-rated solid-state power supply, protected by circuit-breakers (No fuses to replace or worry about) . . . two heavy duty 572B/T-160-L final amplifiers, fan-cooled for maximum life . . . complete shielding for maximum TVI protection and stability . . . plus a built-in SWR meter and antenna relay for full operating convenience. Antenna is automatically transferred to the exciter when the Linear is switched "off".

Quality Built Throughout! A heavy-gauge one-piece aluminum chassis, partitioned for extra strength and isolation of circuits . . . use of high quality well-rated components . . . and clean circuit layout all contribute to assure extra years of dependable, trouble-free performance.

Complete Operating Versatility! Compact and lightweight the SB-200 is an ideal companion for the SB-400 Transmitter, the soon to be released SB-100 Transceiver and nearly all other popular SSB & CW exciters in use today! Power supply operates on either 120 or 240 volt power sources for use anywhere. When you go "high power" choose the SB-200 for extra value, performance and dependability!

Kit SB-200, 38 lbs., $20 dn., $17 mo. $200.00

SB-200 SPECIFICATIONS—Band coverage: 80, 40, 20, 15 & 10 meters. **Maximum power input:** 1200 watts P.E.P. SSB, 1000 watts CW. **Driving power required:** 70 to 100 watts, depending upon frequency. **Duty cycle:** SSB, continous voice modulation; CW, 50% (key down time not to exceed 5 min.). **Third order distortion:** 30 db or better at 1000 watts P.E.P. **Output impedance:** 50 to 75 ohm unbalanced; variable pi-output circuit. SWR not to exceed 2:1. **Input impedance:** 52 ohm unbalanced; broad-band pretuned input circuit requires no tuning. **Meter functions:** 0-100 ma grid current, 0-1000 ma plate current, 0-1000 relative power, 1:1 to 3:1 SWR, 1500 to 3000 volts high voltage. **Front panel controls:** Load; Tune; Band; Relative Power Sensitivity; Meter switch, Grid-Plate-Rel, Power-SWR-HV; and Power Switch, on/off. **Tube complement:** Two 572-B/T-160L (in parallel). **Power requirements:** 120 volts AC (@ 16 amperes (max.), 240 volts AC (@ 8 amperes (max.) **Cabinet size:** 14⅞" W x 6⅝" H x 13⅜" D. **Net weight:** 35 lbs.



1. Two heavy-duty 572B/T-160-L tubes in parallel **2.** Separate pi-network output coils for 80-20 meters & 15-10 meters. **3.** Pretuned cathode input circuits **4.** Long-life silicon high-voltage rectifiers **5.** Conservatively rated 120/240 volt power transformer **6.** High capacity (125 mfd ea.) voltage-doubler filter capacitors **7.** Two manual-reset circuit breakers for power supply protection **8.** Switched panel meter measures SWR, Rel. Pwr., plate current, grid current, & hi-voltage **9.** Fan-cooled final amplifier compartment for long tube life.

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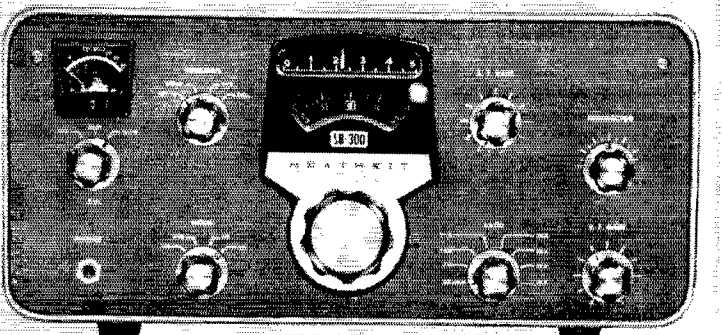
HEATHKIT®
SB-300
SSB-RECEIVER
$265.00



• Everything you could ask for in a deluxe receiver and more! • Complete coverage of 80 through 10 meter amateur bands with all crystals furnished, plus provision for VHF converters • Crystal-controlled front-end for maximum stability on all bands • 1 kc dial calibrations—100 kc per dial revolution provides bandspread equal to 10 feet per megacycle—tuning knob to dial ratio approximately 4 to 1 • Provision for transceive operation with matching SB-400 Transmitter • Pre-built Linear Master Oscillator (LMO), wiring harness and two heavy-duty circuit boards for fast, easy assembly • Professional styling and features at 60% savings

Good news travels fast! . . . especially on the amateur airwaves! Since its introduction, the Heathkit SB-300 has set the amateur world on its ear as one of the finest values in the industry! Deluxe styling and features now bring you a new dimension in quality, performance and dependability never before thought possible in kit form! . . . and by doing the easy assembly yourself you'll save 60% the cost of comparable units!

Experienced amateurs will quickly recognize the high standards to which this receiver was designed. Its many superb features include a crystal-controlled front-end for optimum stability on all bands, a pre-built Linear Master Oscillator (LMO) for linear tuning with 1 kc dial calibrations, a built-in crystal calibrator, hermetically-sealed 2.1 kc crystal band-pass filter, smooth non-backlash vernier dial mechanism . . . and many, many more! Order yours today!

Kit SB-300, less speaker
22 lbs., $27 dn., $22 mo. $265.00
SBA-300-1 Optional AM crystal filter
(3.75 kc) 1 lb. $19.95
SBA-300-2 Optional CW crystal filter
(400 cps) 1 lb. $19.95
Export model available for 115/230 volts AC, 50-60 cps; write for prices.

SB-300 SPECIFICATIONS—Frequency range (megacycles): 3.5 to 4.0, 7.0 to 7.5, 14.0 to 14.5, 21.0 to 21.5, 28.0 to 28.5, 28.5 to 29.0, 29.0 to 29.5, 29.5 to 30. **Intermediate frequency:** 3.395 megacycles. **Frequency stability:** Less than 100 cps per hour after 20 min. warmup under normal ambient conditions. Less than 100 cps for ±10% line voltage variation. **Visual dial accuracy:** Within 200 cps on all bands. **Electrical dial accuracy:** Within 400 cps on all bands after calibration at nearest 100 kc point. **Backlash:** No more than 50 cps. **Sensitivity:** Less than 1 microvolt for 15 db signal plus noise-to-noise ratio for SSB operation. **Modes of operation:** Switch selected; LSB, USB, CW, AM. **Selectivity:** SSB: 2.1 kc at 6 db down, 5.0 kc at 60 db down (crystal filter supplied). AM: 3.75 kc at 6 db down, 10 kc at 60 db down (crystal filter available as accessory). CW: 400 cps at 6 db down, 2.5 kc at 60 db down (crystal filter available as accessory). **Spurious response:** image and IF rejection better than 50 db. Internal spurious signals below equivalent antenna input of 1 microvolt. **Audio response:** SSB: 350 to 2450 cps nominal at 6 db. AM: 200 to 3500 cps nominal at 6 db. CW: 800 to 1200 cps nominal at 6 db. **Audio output impedance:** Unbalanced nominal 8 ohm speaker and high impedance headphone. **Audio output power:** 1 watt with less than 8% distortion. **Antenna input impedance:** 50 ohms nominal. **Muting:** Open external ground at Mute socket. **Crystal calibrator:** 100 kc crystal. **Front panel controls:** Main tuning dial; function switch; mode switch; AGC switch; band switch; AF gain control; RF gain control; preselector; phone jack. **Rear apron connections:** Accessory power plug; HF antenna; VHF #1 antenna; VHF #2 antenna; mute; spare; anti-trip; 500 ohm; 8 ohm speaker; line cord socket; heterodyne oscillator output; LMO output; BFO output; VHF converter switch. **Tube complement:** (1) 6BZ6 RF amplifier; (1) 6AU6 Heterodyne mixer; (1) 6AB4 Heterodyne oscillator; (1) 6AU6 LM osc.; (1) 6AU6 LMO mixer; (2) 6BA6 IF amplifier; (1) 6AU6 Crystal calibrator; (1) 6HF8 1st audio, audio output; (1) 6AS11 Product Detector, BFO, BFO Amplifier. **Power supply:** Transformer operated with silicon diode rectifiers. **Power requirements:** 120 volts AC, 50/60 cps, 50 watts. **Dimensions:** 14⅞" W x 6¾" H x 13¾" D. **Net weight:** 17 lbs.

FREE CATALOG
See the wide array of Heathkit Amateur Radio Equipment available at tremendous do-it-yourself savings! Everything you need in "mobile" or "fixed" station gear with full descriptions and specifications . . . Send for Free copy!

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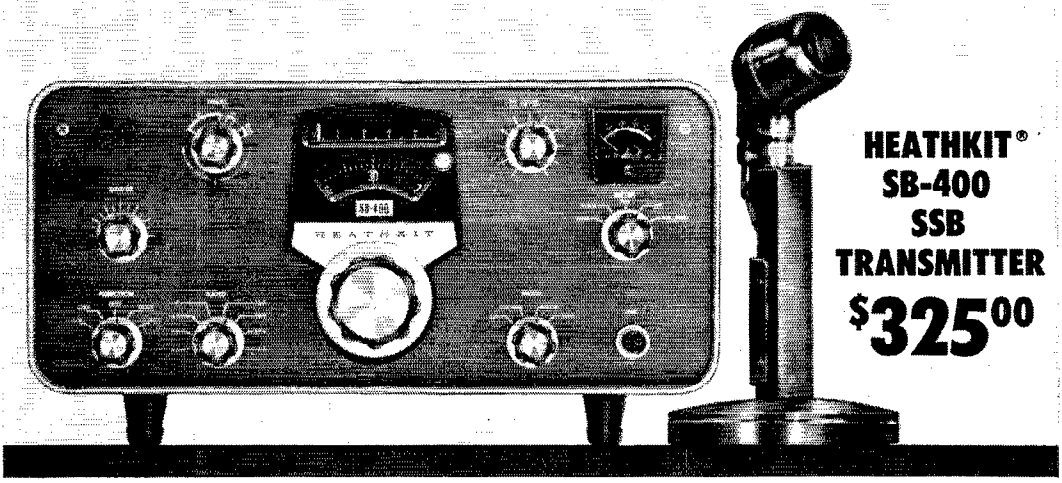

HEATHKIT® SB-400 SSB TRANSMITTER $325.00

• Built-in power supply • Complete transceive capability with SB-300 Receiver • Linear master oscillator frequency control • Built-in antenna change-over relay • All crystals supplied for complete 80-10 meter coverage • Automatic level control for higher talk power, minimum distortion • 180 watts PEP SSB, 170 watts CW • Crystal filter type SSB generation • Operates SSB (upper or lower sideband) & CW • VOX & PTT control in SSB operation, VOX operated CW break-in using CW sidetone • CW "shift" transceive operation to eliminate transceiver chasing • Crystal controlled heterodyne oscillators • 1 kc dial calibration—100 kc per dial revolution • Dial bandspread equal to 10 feet per megacycle • 500 kc coverage per bandswitch position • Switched 120 V AC for external amplifier antenna relay • Sturdy, lightweight, heavy-gauge aluminum construction throughout • Neat, modern "low-boy" styling

Here it is . . . the new Heathkit SB-400 Transmitter . . . second in the exciting new Heathkit series of Deluxe SSB Amateur gear! Following the same high standards set by the Heathkit SB-300 Receiver, the new SB-400 Transmitter now offers a matching counterpart that permits complete transceive operation with a host of advanced engineering design features for unmatched performance, versatility and operating convenience!

Unique mechanical design . . . prebuilt Linear Master Oscillator (LMO) . . . built-in heavy-duty power supply . . . sturdy chassis construction . . . beautiful modern styling . . . and power-packed performance are just a few of the many features that make the SB-400 your best buy in an SSB Transmitter! Order yours today for "Deluxe" communications at tremendous do-it-yourself savings!

Kit SB-400. . 33 lbs. . . Write for credit details. $325.00 Export model available for 115/230 volts AC, 50-60 cps; write for prices.

SB-400 SPECIFICATIONS—Emission: SSB (upper or lower sideband) and CW. **Power input:** 170 watts CW, 180 watts P.E.P. SSB. **Power output:** 100 watts (80-15 meters), 80 watts (10 meters). **Output impedance:** 50 to 75 ohm—less than 2:1 SWR. **Frequency range:** (mc) 3.5-4.0; 7.0-7.5; 14.0-14.5; 21.0-21.5; 28.0-28.5; 28.5-29.0; 29.0-29.5; 29.5-30.0. **Frequency stability:** Less than 100 cps per hr. after 20 min. warmup under normal ambient conditions. Less than 100 cps for ± 10% line voltage variation. **Carrier suppression:** 55 db below peak output. **Unwanted sideband suppression:** 55 db @ 1 kc. **Intermodulation distortion:** 30 db below peak output (two-tone test). **Keying characteristics:** Break-in CW provided by operating VOX from a keyed tone (Grid block keying). **CW sidetone:** 1000 cps. **ALC characteristics:** 10 db or greater @ 0.2 ma final grid current. **Noise level:** 40 db below rated carrier. **Visual dial accuracy:** Within 200 cps (all bands). **Electrical dial accuracy:** Within 400 cps on all bands after calibration at nearest 100 kc point. **Backlash:** Less than 50 cps. **Oscillator feed-through/mixer products:** 55 db below rated output (except 3910 kc crossover which is 45 db). **Harmonic radiation:** 35 db below rated output. **Audio input:** High impedance microphone or phone patch. **Audio frequency response:** 350 to 2450 cps ±3 db. **Power requirements:** 80 watts STBY, 260 watts key down @ 120 V AC line. **Dimensions:** 14⅛" W x 6⅝" H x 13⅜" D.

WATCH FOR THE NEW SB-100 ALL-BAND SSB TRANSCEIVER SOON TO BE RELEASED!

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☐ Enclosed is $265.00 plus postage. Please send SB-300 Receiver.

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Prices and specifications subject to change without notice. AM-147R

(*Continued from page 106*)

RACES with v.h.f. liaison with local RACES and AREC. The net meets Sun. at 1000 on 3510 kc. and Mon. at 2000 on 3670 kc. Your SCM attended the Penn-York hamfest and was much impressed by the fine program and 6-meter activity in that area. Chemung County had an AREC display of homebrew gear built by K2SPY (30-watt 6146 6-meter transmitter), WA2URX (6-meter six-element beam), WA2HFL (2-meter beam and inverter) and K2DNN (6-meter Halo). Field Day seemed better than ever and our area was blessed with fine weather. Many thanks to those groups who made the effort. I know everyone learned something and had a good time. WB2IPX reports that the Southern Cayuga Co. ARC (SCCARC) has received the club call WB2NOD. Two new hams, a mother and daughter, are WB2NYO and WB2NYP. WA2DAC worked K2US on 6 meters with 49 mils to a 3139 transistor. The rig is c.w. with about a 2-mile range. WB2DMU is interested in c.w. skeds on 6 and 2. W2EMW received his H22 certificate. K2LXC is coming back to Buffalo after 4 years in the Air Force. W2PZI hosted NFDXA to hot dogs and liquid refreshments. The ARATS holds monthly 2-meter transmitter hunts. Everyone is welcome. W2KDE won the Utica ARC Annual Mobile Award. The NCARC had W3YA as a guest speaker. The club meets in the Dunkirk Coast Guard Lighthouse. The GRAM has formed a v.h.f. group with WN2JCZ and WB2JDL as co-chairmen. The RAGS elected K2-KTK, pres.; K2KRN, 1st vice-pres.; K2KJZ, 2nd vice-pres.; WB2CTP, secy.; WA2DAD, treas. Exercise "Blade" received much more space in various club bulletins this year than previous RACES exercises. I detect a much more responsible attitude by serious amateurs to their respective communities. WA2SMP was appointed OPS. W2PZI was endorsed as OO Class I, WA2GLA as OPS and K2SSX as ORS. Traffic: W2GVH 316, WA2KQG 276, W2RUF 232, W2OE 188, W2HYM 94, W2FEB 86, WB2GAL 71, WB2DPR 50, K2KTK 38, WB2HSK 31, WA2RLV 30, WB2KNJ 29, WB2DMU 28, K2SIL 27, WA2GCH 25, W2RQF 24, W2FCG 22, K2IMI 22, W9PTZ/2 19, W2PVI 17, K2JBX 16, K2OFV 16, WB2JCE 6, K2DNN 6, W2RUT 6, K2RYH 6, WA2-DAC 5, WA2GLA 5, K2BWK 3, W2EMW 1.

SEVENTH PENNSYLVANIA QSO Party

September 19-21, 1964

The Littany Amateur Radio Club announces the Seventh Pennsylvania QSO Party, in which all radio amateurs of the world are invited to participate.

Rules: (1) *Time*: The contest begins at 2300 GMT Saturday, Sep. 19, and ends at 0400 GMT Monday, Sep. 21. (2) Suggested congregating frequencies are 3575, 3875, 7075, 7275, 14075, 14275, 21075 and 21325 kc. in addition to ten meters. This party is being conducted for the purpose of aiding stations obtain their *Keystone Award* and endorsements, and to work counties for WAPC. Each Pennsylvania station will be worked once on each band during the party. (4) *General call*: "CQ PA." Pennsylvania stations sign "DE PA." (5) *Exchange*: Penna. stations send QSO number, RS(T), and county; outside stations send QSO number, RS(T), and state, VE province, or country. (6) *Awards*: Every station qualifying for the Pennsylvania Counties Award during the contest will receive it without charge. Appropriate certificates will be awarded to high scorers. (7) *Entry*: A copy of the log, showing QSO number, station, date, time, band, mode, and station worked should be submitted to the Littany ARC, Box 60, State College, Pa. 16801, postmarked not later than October 18, 1964.

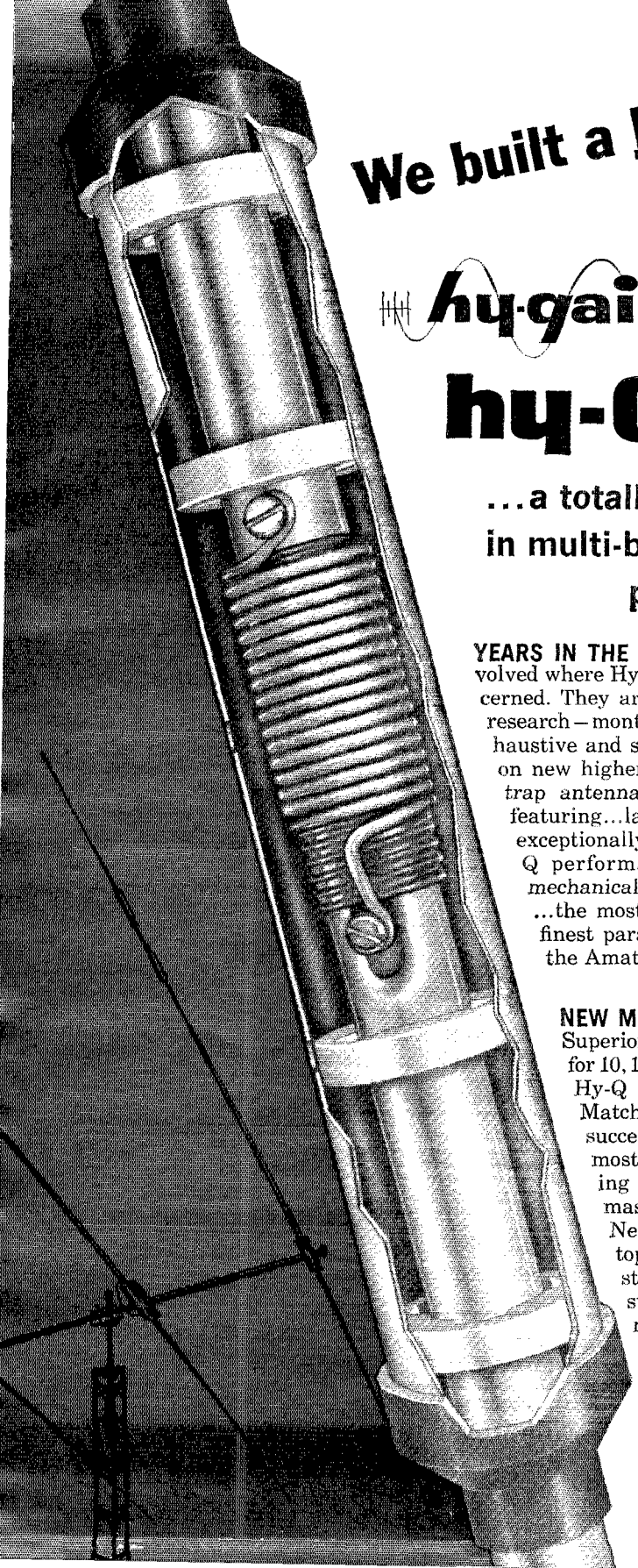
WESTERN PENNSYLVANIA—SCM, Anthony J. Mroczka, W3UHN—SEC: W3LIV. RMs: W3KUN, K3-OOU and W3NUG. PAM: W3TOC. The WPA Traffic Net meets Mon. through Fri. at 2400 GMT on 3585 kc. After nine consecutive years of skeds with W7PJJ, W3KNQ had as house guests, W7PJJ and his XYL, W7SEU. K3SMB is erecting a new tower. K3VPI is testing the ASP-249 on 6 and 2. New officers of the ATA are K3OTY, pres.; K3SMB, vice-pres.; K3PAM, secy.; W3UL, treas.; K3RAD, W3RSB, W3IWF, directors. W3SAY reports that the Centre County AREC provided communications for the Alpha Fire Co. Parade in State College on the Fourth. The AKARA (W3RVC) is planning a slow-speed c.w. net on 50.1 Mc. Newly-elected officers of the Connellsville ARC (K3AML) are W3HSY, pres.; KN3FCQ, vice-pres.; W3UTT, treas.; KN3FLW, secy. Beaver County AREC has completed an antenna installation for New Brighton Boro. At the recent meeting of the Nittany ARC (K3HKK) W3YA presented to K3CFA the chrome-plated cover of the April *QST* for having the best technical article for the month. The Coke Center RC reports: a new General is K3FBJ; W3QCP has 47 worked for WAS on 10; a new Novice is WN3AWC. W3LWW *Newsletter* reports: K3CEW graduated from Penn. State; K3MUB and K3RKR are joining the Air Force. The Two Rivers ARC meets the last Fri. of each month at the Naval Training Center. The Radio Assn. of Erie *Newsletter* reports: The c.d. control center now has a Viking 2000 and a Drake 2B; W4BHN revisited the club recently; W3KPM now is on the retired list; W3MED now is mobile. New officers of the Horseshoe Radio Club are W3LIV, pres.; K3IML, vice-pres.; K3SIQ, secy.-treas.; K3ELL, act. mgr. Congrats to K3PYS, who now has 146 consecutive QNIs on WPA, surpassing W3MFB's record of 120. Traffic: K3PYS 113, K3PIE 86, W3KUN 59, W3JHG 57, W3UHN 35, W3LOS 30, K3SMB 15, W3IYI 14, K3OCU 7, K3COT 5, W3OEO 4.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—Asst. SCM: Grace V. Ryden, W9GME. SEC: W9RYU. RM: W9USR. PAM: W9VWJ. Cook County EC: W9-HPG. Section net: ILN, 3515 kc. Mon. through Sat. at 1900 CDT. W9WYB, K9RAS, K9QLC, W9NPC, W9GFF/K9MWE, W9JUV/K9OSO and W9IMN participated in the latest ARRL Frequency Measuring Test. K9CIL reports that the Quad County Amateur Radio Club's hamfest was well attended and many eyeball QSOs were renewed. Now that the final results have been received, it is evident by the scores that this year's Field Day will set a record. W9PRN has been appointed trustee of W9DUA, the Sangamon Valley Amateur Radio Club, Inc., which is located in the Chapter House of the Sangamon County Red Cross in Springfield. W9PNB, an old-timer, of Elmhurst, has joined the ranks of the Silent Keys. Our sympathy to his family and many friends. W9MAK has received his BSEE degree from Illinois Institute of Technology and soon will enter Northwestern graduate school. K9KHZ and his family were struck by lightning while on a camping expedition, and his XYL was severely burned and hospitalized. WA9KBJ and WA9FVD have gone 432 video. WA9HSZ, WA9FVD, WA9AWY, K9EYT, WA9BIH, K9AJN, K9-FBL, WA9HQK, K9TOV and WA9FUY participated in the Noridge C.D. Net demonstration to the public. WA9CCQ received his WAS certificate. WA9CHG is back on 6 meters. WA9AIH and WA9AII have added an H.B. linear with 4 811s with FB results. From all of the OES reports received the month of June produced some fine DX results. K9UCD is the proud father of a new harmonic. The Hamfesters Picnic (Chicago) was well attended and a good time seemed to be had by all. WA9IML and WA9LIO are new OES appointees. The Ninth Regional Net had a traffic count of 408. K9BTE reports that the North Central Phone Net passed 291 messages during the month of June in 26 sessions. Recipients of the BPL award are WA9CCP and K9KZB. Traffic: (June) WA9CCP 1309, K9KZB 684, W9HAS 201, W9AKV 152, K9CYZ 137, W9JXV 132, W9MAK 103, K9KWV 72, K9BTE 71, W9JDF 66, WA9-AJF 64, W9IDA 49, WA9FVD 45, W9PRN 20, W9LNQ 4, WA9FIH 2, W9QQG 2, K9RAS 1. (Apr.) W9JDF 103.

INDIANA—SCM, Ernest L. Nichols, W9YYX—Asst. SCM: Donald Holt, W9FWH. SEC: K9WET. RFD 1, Walton, Ind. (Note new address.) PAMs: K9CRS, K9-GLL, K9IVG. RMs: K9DHN, W9TT, W9DGA. Net skeds in GMT: IFN, 1330 daily and 2300 M-F on 3910 kc. ISN, 0030 daily on 3920 kc. QIN, daily at 0000 and RFN, at 1200 Sun. on 3656 kc. New appointments: W9DIP as EC of Clinton Co. and WA9JVL as OBS and OES. BPL awards: K9IVG and K9DHN. QIN honor roll: K9HYV, K9VHY, K9DHN, WA9IZR, K8-QKY, K9MAF. New Greenwood ARC officers are K9-EMV, pres.; K9JQT, vice-pres.; WA9HLW, secy.; K9GEE, act. mgr.; K9FOF, chief op. After seeing W9-JOZ's kw. break-in system, W9QLW splurged on coax and t.r. switches, monitor scope and a 40-ft. tower. WA9AUM is now CAN representative on Wed. and K9DHN on Sun. The Clinton Co. V.H.F. Club (100% ARRL members) held a fine hamfest at Mulberry, Ind. K9IVG, of Michigan City, Ind., was named as the Indiana Outstanding Amateur Radio Operator by the Indi-

(*Continued on page 115*)



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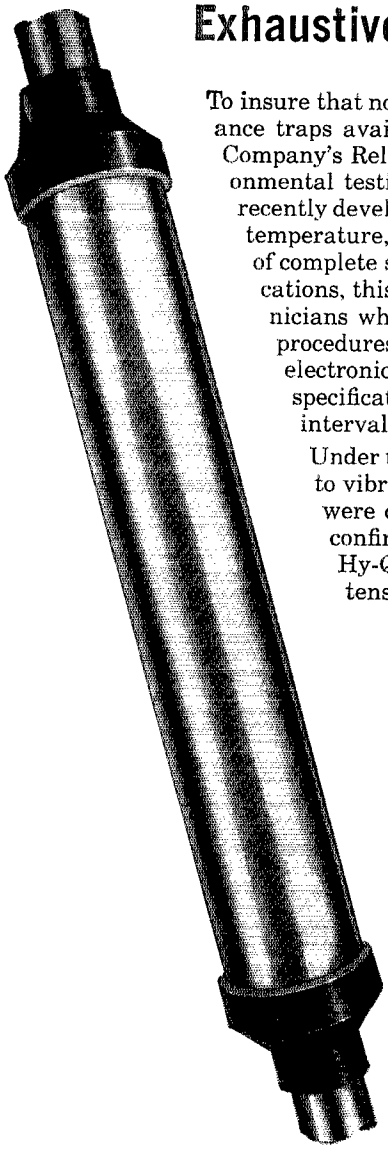
YEARS IN THE MAKING There's no guesswork involved where Hy-Gain's all new Hy-Q Traps are concerned. They are the product of countless hours of research—months of field testing—weeks of exhaustive and severe environmental torture. Now, on new higher performance Hy-Gain multi-band trap antennas...separate traps for each band, featuring...large diameter coils that develop an exceptionally favorable L/C ratio and very high Q performance—air dielectric capacitor—mechanically superior solid aluminum housings ...the most advanced and unquestionably the finest parallel resonant traps ever offered to the Amateur.

NEW MULTI-BAND TRAP ANTENNAS New, Superior Performance Thunderbird Beams for 10, 15 and 20 meters...incorporating new Hy-Q Traps—new advanced design Beta Match. New, Improved Trap Verticals—successor to Hy-Gain's 14AVS, the world's most popular Ham antenna...now featuring new Hy-Q Traps—new double-grip mast bracket—new 18 ft. overall height. New, Improved Multi-Band Doublets—top performance Hy-Q Traps—super-strength aluminum clad single strand steel wire elements—famous Hy-Gain molded high impact cycolac plastic center and end insulators.

...THERE'S MORE—TURN THE PAGE

Exhaustive Environmental Testing...



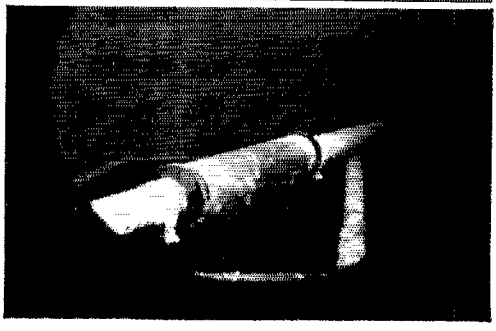
To insure that no stone was left unturned in producing the finest total performance traps available, Hy-Gain Hy-Q Traps were submitted to Hallicrafters Company's Reliability Evaluation Laboratory for vigorous, impartial environmental testing. The Hallicrafters Laboratory is equipped with the most recently developed testing equipment available for making vibration, shock, temperature, altitude and humidity tests. Designed for precision testing of complete systems or components used in missile, aircraft, or other applications, this laboratory is staffed by highly qualified engineers and technicians who have years of experience in evaluation testing. Inspection procedures, facilities, and personnel meet the highest standards of the electronic industry and every requirement of all armed forces Mil specifications. All instrumentation is checked and calibrated at regular intervals to maintain absolute control over accuracy at all times.

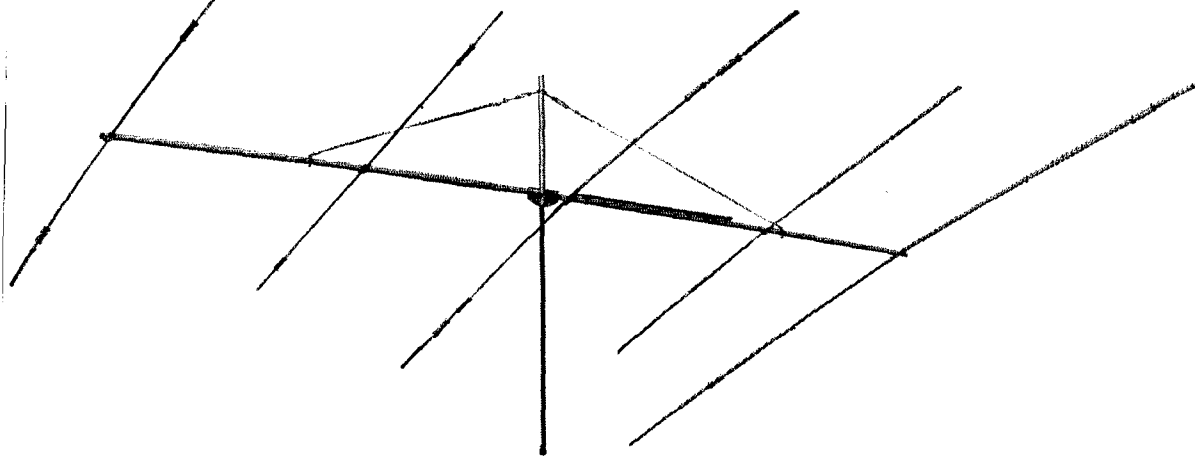
Under these exacting conditions, Hy-Gain Hy-Q Traps were subjected to vibration, altitude, humidity, freezing, and salt spray tests which were conducted to and at Military Specifications. The test results confirmed Hy-Gain's faith in the mechanical reliability of new Hy-Q Traps. Complete test results are on file in Hy-Gain's extensive engineering library.

A view of the Astro-Space Chamber in the Hallicrafters Reliability Evaluation Laboratory. Here, altitude can be raised from site level to 60 miles in less than 5 minutes.

A Hy-Gain Hy-Q Trap being given a vibration test in the Hallicrafters Laboratory. Frequency was 2600 cycles; maximum acceleration, 10 G's.

A porthole view of a Hy-Gain Hy-Q Trap in one of the Hallicrafters temperature chambers at 70 degrees F.





NEW THUNDERBIRD TRIBANDERS ...for 10, 15 and 20 Meters

- New Hy-Q Traps
- Advanced Design Beta Match
- Taper Swaged Seamless Aluminum Elements

Famous Hy-Gain Thunderbird Tribanders have been improved...to give you even greater total performance. Each new Thunderbird is equipped with separate new Hy-Q Traps for each band—to give you peak performance on each band whether working phone or CW. New advanced design Beta Match insures optimum transfer of all available energy—allows precision broadband matching and a high degree of electrical and mechanical reliability...comes to you completely factory pre-tuned. Mechanically, new Hy-Gain Thunderbirds are rugged...large diameter, heavy gauge aluminum boom...taper swaged seamless aluminum elements...heavy gauge, machine formed boom to mast and element to boom brackets...non-corrosive full circumference compression clamps at tubing joints. They're available in four models...

ALL NEW 5-ELEMENT THUNDERBIRD DX MODEL TH5DX

Superb DX performance. Features wide spaced elements on a 24 ft. boom. New Hy-Q Traps provide true full-sized performance. Feeds with 52 ohm coax—Beta Matched for optimum gain—maximum F/B ratio without compromise. SWR less than 1.5:1 on all bands. Longest element, 32 ft.—weight, 47 lbs. Model TH5DX, **$139.95** Net.

NEW, IMPROVED 3-ELEMENT THUNDERBIRD MODEL TH3Mk2

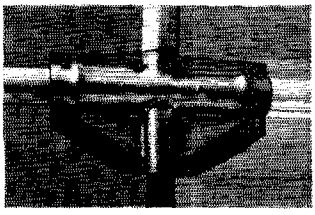
Outstanding performance on 10, 15 and 20 meters. Separate and matched new Hy-Q Traps for each band. Feeds with 52 ohm coax—Beta Matched for optimum gain—maximum F/B ratio without compromise. SWR less than 2:1 on all bands. Boom length, 14 ft. Longest element, 26 ft. Weight, 36 lbs. Rotates with heavy duty TV rotator. Model TH3Mk2, **$99.75** Net.

NEW, IMPROVED 2-ELEMENT THUNDERBIRD MODEL TH2Mk2

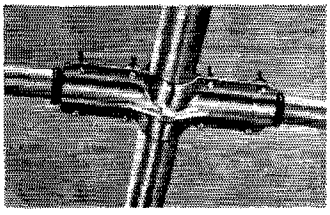
Compact...installs almost anywhere... delivers excellent performance. Features new Hy-Q Traps. Feeds with 52 ohm coax—Beta Matched for maximum gain. Rugged lightweight construction compatible to rotating with standard TV rotator. Boom length, 6 ft. Longest element, 26 ft. Weight, 21 lbs. Model TH2Mk2, **$69.95** Net.

IMPROVED 3-ELEMENT THUNDERBIRD JUNIOR MODEL TH3JR

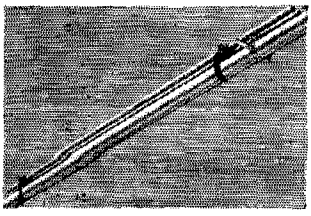
A compact 3-element beam that delivers outstanding performance. Up to 25db f/b ratio. SWR less than 2:1 at resonance. Hy-Q Traps—Beta Match—seamless heavy gauge aluminum construction. Rotates with standard TV rotator. 12 ft. boom. Longest element, 27'6". Turning radius, 15'11". Model TH3JR, **$69.95** Net.



Boom to Mast Bracket



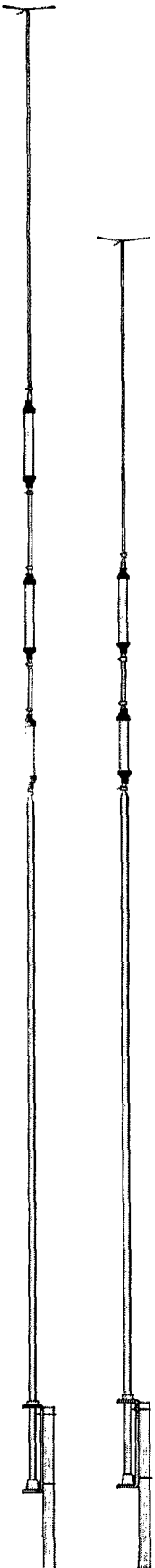
Driven Element to Boom Bracket



Beta Match

NEW HY-GAIN MULTI-BAND TRAP VERTICALS

•New Hy-Q Traps •New 12" Double-Grip Mast Bracket
•Taper Swaged Seamless Aluminum Construction



HY-GAIN'S MODEL 14AVS, the world's most popular Ham antenna, has a new, improved successor...the Model 14AVQ. Three separate new Hy-Q Traps...completely factory pre-tuned...provide peaked performance on 10 through 40 meters. Outstanding low angle radiation pattern for DX. New 12" double-grip mast bracket insures maximum rigidity whether roof-top or ground mounted. New total performance construction... heavy gauge taper swaged seamless aluminum radiator—full circumference compression clamps at tubing joints non-conducive to corrosion or wear. Unsurpassed for portability ...outstanding for permanent installations. Overall height, 18 ft. Weight, 10 lbs. Adapts to 80 meter operation using Hy-Gain's Model LC80 loading coil. Model 14AVQ, **$29.95** Net.

Loading Coil for 80 Meter operation—Model LC80.....$ **7.95** Net
Roof Mounting Kit—Model 14RMK.....$**11.95** Net
Decoupling Stub adds 6 Meter operation—Model 6MK.....$ **4.95** Net

For 10, 15 and 20 Meters...Hy-Gain's New Model 12AVQ. Companion to the new Model 14AVQ, the Model 12AVQ, for 10-20 meters, incorporates new Hy-Q Traps—a new 12" double-grip mast bracket—taper swaged seamless aluminum construction. It delivers outstanding low angle radiation. SWR is 2:1 or less on all bands. Overall height is 13'6". Weight, 9 lbs. Model 12AVQ, **$21.95** Net.

Roof Mounting Kit—Model 12RMK.....$**11.95** Net
Decoupling Stub adds 6 Meter operation—Model 6MK.....$ **4.95** Net

NEW HY-GAIN DOUBLETS...TAKE MAXIMUM LEGAL POWER

Model 5BDQ for 10 thru 80 Meters

Model 4DBQ for 10 thru 40 Meters

Model 3BDQ for 10 thru 20 Meters

Model 2BDQ for 40 and 80 Meters

Model 248BDQ for 20, 40 & 80 Meters

- New Hy-Q Traps
- Super-Strength Aluminum Clad Steel Wire
- Install Horizontally or as Inverted V
- Weatherproof Center and End Insulators

Installed horizontally or as an Inverted V, new Hy-Gain Doublets with Hy-Q Traps deliver true half wavelength performance on all bands. Completely factory pre-tuned ...SWR less than 1.5:1 on every band. Super-strength aluminum clad single strand steel wire defies deterioration from salt water and smoke ...will not stretch...withstands hurricane-like winds. Easily installed with famous Hy-Gain molded high impact cycolac plastic center and end insulators.

Model 5BDQ 10 thru 80 M.....**$34.95** Net
Model 4BDQ 10 thru 40 M.....**$24.50** Net
Model 3BDQ 10 thru 20 M.....**$17.50** Net
Model 2BDQ 40 and 80 M.....**$19.95** Net
Model 248BDQ 20, 40 & 80 M.....**$22.50** Net
Model 2TQ Matched Trap Kit for building 40 & 80 Meter Doublet.....**$12.95** Net
Model 2BDP Trapless Fan Doublet for 15, 40 & 80 Meters.....**$19.95** Net

AVAILABLE NOW FROM YOUR FAVORITE HY-GAIN DISTRIBUTOR

NEW Hy-Gain Full Line H.F. Antenna Catalog—Beams, Verticals, Doublets, Mobile Toppers, Base Station and Mobile Accessories. 16 pages picturing and completely describing the finest antenna line available. It's FREE. Write for your copy today...

HY-GAIN ANTENNA PRODUCTS CORPORATION
8418 N.E. Highway 6—Lincoln, Nebraska

(*Continued from page 110*)

ana Radio Club Council at the annual picnic at Brown County State Park. Roberta, OPS and PAM of the Ind. Phone Net, received a plaque from K9BSL, chairman of the IRCC. The many Field Day reports were appreciated. *Amateur radio exists because of the service it renders.* June net traffic: ISN 251, IFN eve. 120, IFN morn. 86, QIN 147, RFN 28, Hoosier V.H.F. 78, 9RN 408 with Indiana represented 100%. Traffic: K9IVG 720, K9DHN 424, WA9AUM 349, W9VAY 344, W9MM 308, W9JOZ 265, W9QLW 139, W9ZYK 127, W9TT 92, K9RWQ 84, WA9BWY 82, WA9IZR 62, W9YYX 59, K9HYV 57, K9BSL 50, W9BUQ 46, WA9ECX 43, W9DGA 42, W9-RTH 33, W9CC 28, K9CRS 28, W9QYQ 26, WA9CJR 25, K9KTL 22, K9MAF 22, W9BZI 20, K9SWL 20, WA9-CYG 19, W9FWH 16, K9WWJ 15, K9VHY 14, W9SNQ 12, W9DZC 9, K9ILK 8, K9UXX 7, K9UEO 5, W9AQW 3, WA9ELY 2, K9MAN 2, K9DHQ 1, W9FJI 1, K9FPA 1, W9GGW 1, W9JSV 1, WN9KFQ 1, K9PNP 1, K9SUH 1, W9TKU 1, K9UHQ 1, W9URQ 1, W9ZZR 1.

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: W9RCC. RM: W9IQW. PAMs: W9NRP, K9IMR and W9NGT. Nets: WIN on 3535 kc. daily at 0045Z, BEN on 3950 kc. daily at 2300Z, WSBN on 3985 kc. daily at 2215Z, SWRN on 50.4 Mc. Mon.-Sat. at 0200Z. New appointees: K9GSC as OO and WA9DOT as EC for Ozaukee County. Renewed appointments: W9FBC as OES; W9ONI, W9HDV, W9LQC and W9VHA as ECs; W9RKP and W9IQW as OOs; W9APB, W9IQW and W9NLJ as ORSs; W9NRP as OPS and PAM. The Milwaukee AREC assisted with communications for the ON Wisconsin Sports Car Rally. W9DYG had a visit from W9QLW. A new club has been formed in Beloit, with WA9EZT, pres.; WA9JTX, secy. Wisconsin had only 90% representation on 9RN for June. June BPL certificates went to K9IMR, K9JXW and K9HJS. Net certificates went to W9NRP and W9QJW for WSBN. W9HGE worked KP4BPZ on 432 Mc, Moonbounce. New officers of the ARROWS are W9SFI, pres.; K9BLZ vice-pres.; K9IMM, secy.-treas. WA9EDZ has a new NCX-3. K9HJS has a Swan 240. FMT results: W9KCR 18.1, K9GSC 21.3, W9GFL 27.8 p.p.m. error. Net reports: WIN cleared 50 of 73 offered in 9:10 by 184 check-ins; BEN cleared 69 of 110 offered in 23:51 by 723 check-ins; WSBN cleared 432 of 532 offered in 20:29 by 1118 check-ins. W9VSO led the OOs with 5 notices sent in June. Traffic: (June) K9HJS 566, K9IMR 362, W9CXY 266, K9JXW 253, W9DYG 251, K9WTE 122, W9AOW 68, WA9EDZ 57, W9NRP 55, W9CBE 52, K9GSC 42, W9IQW 32, WA9AQT 26, K9GDF 26, K9CJP 22, K9DGY 22, W9QJW 10, K9DBR 9, W9FNT 8, W9OTL 6. (May) WA9FXJ 63, K9HJS 12. (Apr.) WA9FZJ 70, K9HJS 10. (Mar.) K9HJS 72.

DAKOTA DIVISION

NORTH DAKOTA—SCM, Harold A. Wengel, WØHVA—SEC: WØCAQ. PAM: KØTYY. The Forx Amateur Radio Club reports the following newly-elected officers; KØHXL, pres.; WØHUM, vice-pres.; WØGFE, secy.-treas.; WØEUQ, act. mgr. WAØAAD and WØGFE were visitors at the New York World's Fair. WØDM is on a trip to California. The North Dakota 75-Meter Fone Net has a partial report of 14 sessions with 156 check-ins, max. 17, min. 2, and handled nine formal messages and 19 informals with four relays. The Goose River Net reports four sessions on the four Sundays in June with 64 check-ins. This net meets on 1990 kc. at 1500 GMT. Traffic: KØITP 79.

SOUTH DAKOTA—SCM, J. W. Sikorski, WØRRN—SEC: WØSCT. RM: KØGSY. At least six groups operated on FD in this section: Sioux Falls, Mitchell, Brookings, Black Hills, Prairie Dog ARC and one non-affiliated group. KØCER is back on 50 Mc. with a Clegg Venus and three-element Hy-Gain. WAØAYP has a new converter for his HQ-110. WAØDEM has accepted appointments as OBS and Asst. SCM. KØJHO has received his discharge from the Army and was married in Texas. WAØCWW is scooting around Sioux Falls on a new motorbike. KØGJX is working for KSOO-TV. WØCUC reports his first 50-Mc. contact from VE5-Land was VP7CX. Traffic: (June) KØGSY 120, KØYNR 88, WØSCT 85, WAØAOY 67, WØDVB 28, KØTXW 25, WAØBWF 16, WAØARZ 15, KØZBJ 12, KØCXL 7, WØZWL 5, KØBMQ 4, WAØFUZ 4, KØZTV 4, KØKOY 3, WØOJY 3, KØYJF 3, KØAIE 2, WAØCXK 2, WØFJZ 2, WØBLK 1, WØBXO 1, WØDUN 1, WØZSJ 1. (May) WAØFUZ 7. (Apr.) WAØFUZ 16.

MINNESOTA—SCM, Mrs. Helen Meidrich, WØOPX—Asst. SCM: Emerson Meidrich. WØRIQ. SEC: WAØ-BZG. RMs: WAØEPX, KØMGT. PAMs: KØFLT, KØVPJ. MSSB PAM: WØHEN. Congratulations to new appointees: WØFLK as RTTY OBS, WAØBZG as SEC, KØFLT as evening net PAM, KØMGT as RM MSN. Many thanks and good wishes to retiring PAM WØYHR and SEC KØKKQ, both of whom did an FB job. WØKJZ was hostess at the Annual MSN Party. Among those attending were Director WØBUO; Asst. Director WØMXC and XYL; SCM WØOPX; former SCMs WØRA, WØKJZ, WØKLG; Asst. SCM WØRIQ; ORSs KØJFJ, WØGRW, WØTHY, KØOTH, WAØFCJ, KØMGT; ex-RM KØZRD; KØZRC and KØRSJ. The Duluth Arrowhead RC's new officers are WAØAHU, pres.; WAØBJY secy.-treas.; WØKNR, program chairman. WØHYE had the pleasure of an FB visit from VK3QV. The two also visited the shacks of KØGQG WØJHS and WØAWK. Warm friendships were formed when OPS WAØEDN toured the Arrowhead area with visiting DJ1HPM. They were able to include many hams from a hundred-mile radius of Duluth. KØJFB had the recent pleasure of a visit from Rev. Carl Zimmer, VK9YT. The Duluth Picnic is scheduled for Aug. 30 at Chambers Grove. ORS KØJFJ is enjoying the new S/Line 75S-3 and 32S-3. V.H.F. OBS WAØCQG operated K2US while visiting the World's Fair. He also has new Communicator II and III. FD messages to the SCM were received from KØQIK/Ø, KØUKL/Ø, WAØ-ARA/Ø, WAØDIL/Ø, WØREA/Ø, WAØASV/Ø, WØ-EQJ/Ø, WAØBZG/Ø, WAØDKA/Ø and KØFSJ/Ø. Many thanks to those who submitted written reports of FD activities. OBS WØFLK works 6- 20- and 80-meter c.w. KØPIZ is an NCS on the South Texas Emergency Net. Traffic: (June) KØIJU 78, KØUXQ 74, WØKFF 71, WAØIAW 70, WAØDSH 65, WØRIQ 54, WØOPX 53, KØVPJ 53, WØKYG 49, WAØFCJ 44, WØHEN 44, WAØEPX 43, KØJFJ 42, WØATO 41, KØFLT 41, WØKJZ 41, WAØDGW 40, KØERQ 39, KØZIW 37, KØZRD 32, WAØAAM 30, WAØBZG 28, WAØFIE 22, WØRA 21, WAØBYO 18, KØJYJ 18, WØUMX 16, KØLWK 14, WØLIG 13, KØMGT 13, KØMIA 13, WAØCEI, 12, WAØEDN 12, KØICG 11, KØPIZ 11, WAØEZQ 6, KØZKK 6, WAØDXV 5, WAØFIK 5, KØSRK 5. (May) WØUMX 24.

DELTA DIVISION

ARKANSAS—SCM, Curtis R. Williams, W5DTR—SEC: WA5INE. PAMs: K5IPS, WA5GPO. RM: K5-TYW. Endorsed appointments: WA5BHW as EC, Benton County; WA5CAG as OPS and EC Baxter and Marion Counties. If you are not an AREC member, register your skill and equipment with your EC. June net reports:

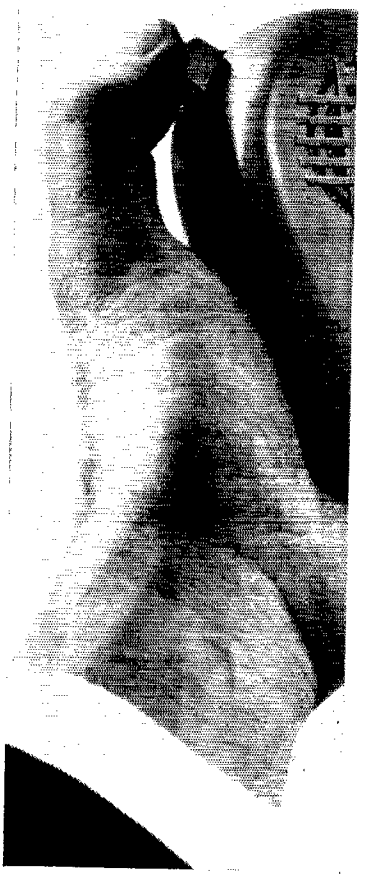
Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	Ave. *QNI*
OZK	3790	0100Z	Daily	30	168	327	10.9
QAN	3695	0400Z	Daily	30	76	167	5.2
AEPN	3885	1200Z	Mon.-Sat.	26	60	1047	40.3
ASSBN	3815	0030Z	Daily	29	61	228	7.9

I had a nice visit with the Southeast Ark. ARC June 16. Top stations on OZK in June were K5ABE 28, W5-JWL 27, WA5EKA 27, WA5AVO 26, WA5CBL 25, W5-DTR 24, K5TCK 22, WA5HNN 22, WA5INE 20. Top stations on QAN were WA5HNN 21, WA5EKA 20, W5-JWL 18, WA5AVO 16, W5DTR 15, K5TCK 15, WA5CBL 15, WA5BBS 13. FD reports were received from K5-EDH, WA5GRO, WA5IWD, W5YM, K5ALU, K5TCK and WA5HNN. Traffic: (June) WA5AVO 295, W9PHR/5 271, W5JWL 223, WA5EKA 170, W5DTR 132, WA5HNN 124, WA5BQI 49, K5TYW 44, WA5BBS 29, WA5CBL 23, WA5GPO 21, K5IPS 18, K5ALU 10, K5ABE 7, K5GKN 7, K5UEK 6, W5NIJ 4, K5EDH 3, WA5FGT 2. (May) K7RWI/5 49, WA5BQI 20, WA5FGT 16.

LOUISIANA—SCM, Thomas J. Morgavi, W5FMO—On June 6 and 7 during the Contraband Days celebration at Lake Charles, boat races were coordinated and the results were relayed by WA5EBE, WA5DBY and K5DGD to radio station KPLC for broadcast to the public. On June 12 the Amateur Radio Club of S.W. Louisiana's station W5QEG, operating portable at the Boy Scout Camp at Edgewood, La., relayed emergency traffic to WA5DBY and WA5EBE in Lake Charles when a light plane crashed at the camp resulting in the death of the pilot. W5FNL and K5HAH stood by on the frequency. Information was relayed to KPLC for news broadcast after the Sheriff's Department was notified. W5CEZ's traffic count took a beating because of other activities taking priority. The Springhill ARC was on Field Day, which included a family picnic. Those operating were W5ADE, K5ELM, K5ELJ, K5QNK, K5-WOD, K5BCU, W5SQO, WA5FRU, plus visitors K5-TNS, K5SGB and WA5CHZ. W5IQH made a good traffic count. Jefferson ARC now has a 12.5-kw. emergency plant, thanks to Army MARS. W5JFB lost his 2-meter power supply when fuses failed to blow. WA5-JAY is working in South Bend, Ind., for the summer.

(*Continued on page 118*)

push



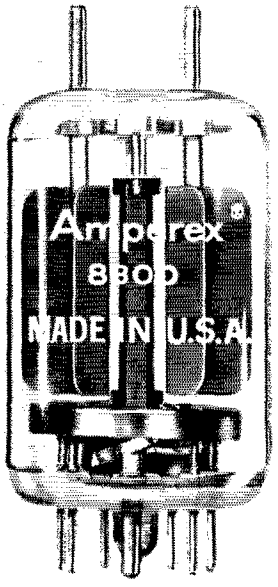
wait
100
milliseconds

talk

Harp cathode in new Amperex SSB twin tetrode permits full talk-power in 100 milliseconds!

Now the AMPEREX harp cathode—fastest-heating cathode ever produced—has been incorporated in a twin tetrode specially designed to provide excellent linearity in parallel for PEP outputs up to 158 watts ICAS, with third order IM distortion better than 30 db down!

With the AMPEREX Type 8300 RF linear amplifier tube—instant-heating version of the 8117—fast warm-up, excellent linearity and high efficiency are provided for mobile and portable SSB systems in the VHF range up to 175 mc. When operated under intermittent conditions, the 8300 has a plate dissipation rating of 34 watts per anode. Either forced air or heat sink cooling may be used when operating the 8300 at or near the maximum ratings.



TYPICAL OPERATION—AB$_1$ LINEAR RF AMPLIFIER, BOTH IN PARALLEL

Frequency	30	30 Mc.
D. C. Plate Voltage	1000	800 volts
D. C. Grid #2 Voltage	250	250 volts
D. C. Grid #1 Voltage	−34	−34 volts
Zero Signal D. C. Plate Current	50	50 ma
Effective RF Load Resistance	3100	2300 ohms
Average D. C. Plate Current*	131	130 ma
Peak RF Grid Voltage	34	34 volts
Average Plate Power Output*	70.5	56 watts
Peak Envelope Plate Power Output*	141	112 watts
3rd Order IM Distortion	30	30 db

*Conditions under two-tone modulation.

Also available: Indirectly-heated-cathode Types 8116 and 8117 with 26.5 V and 6.3 V heaters, respectively.

For detailed data on Type 8300 and other SSB tubes, write: Amperex Electronic Corporation, 230 Duffy Avenue, Hicksville, Long Island, New York.
In Canada: Philips Electron Devices Ltd., 116 Vanderhoof Ave., Toronto 17, Ont.

Ask Amperex

W5PM, your new SCM, is vacationing in New York State. He visited ARRL Headquarters during the trip and renewed old acquaintances. I want to thank all who hold or have held ARRL CD appointments for their cooperation during the ten years I have been your SCM. Please address your activities reports to W5PM. Check the expiration date on your appointments and mail them in for endorsement. Traffic: W5CEZ 192, W5QEG 150, WA5BLO 96, W5IQH 88, WA5FNB 52, WA5FNE 40, W5MXQ 17, WA5JAY 2.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. Congratulations to WA5JWD on the FB signal, 75 through 10 meters, from Isola. W5JDF requests that all ECs and AREC members notify him of present activities and plans. School and a night job keep WA5CAC busy. W5OSA really is having fun mobile and has a good signal. K5RUO will be active as an OO again in the fall. K5RIX has recovered and is doing a fine job. We hope W8VDA/5 will check in with us from Ohio. Mighty good reports of Field Day activities from Jackson, Starkville, Oxford, Hattiesburg and others were received. WA5CSK has been having good luck on 10 meters lately and says the band has been wide open. W5ZAR is doing a good job with his mobile. Looks like 3925 kc. always has a good crowd on. Ex-Meridianite W5DNV/4 has a fine signal from Atlanta. W5CVY/4 was down from Memphis for Field Day. W5JDF will notify when his Novice Training Manual for proper net procedures and traffic handling is available. Traffic: W8VDA/5 203, W5JDF 202, W5WZ 51, W5EMM 16, K5RUO 15, WA5JWD 12, WA5CSK 7, K5RIX 4.

TENNESEE—SCM, William A. Scott, W4UVP—SEC: W4RRV. PAMs: K4WWQ, W4RMJ, WA4AIS. RM: W4MXF.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*QNI*	*QTC-Ave.*
TN	3635	1900C	M-Sat.	26	103	190	7.3
TSSN	3980	1830C	M-Sat.	26	85	774	3.3
ETPN	3980	0640E	M-Fri.	22	35	416	1.6
TPN	3980	0645C 0800C	M-Sat. Sun.	30	138	738	4.6

Congrats to WA4HRG on his second BPL. K4VAH was the subject of a favorable newspaper story on medical emergency traffic from Nicaragua. W4AZD was given press mention on missionary traffic. WA4UCI is the club call at ETSU with a station on the air. K4VIR is confined to W. Tenn. TB Hospital. Hope the recovery is rapid, Bill. W4HHK heard KP4BPZ on 432 Mc. Moonbounce for 156 minutes but Paul's 35 watts were not sufficient for a QSO; result a 500-watt amplifier under construction. This promises results. WA4HRG will enroll at T.P.I. in the fall, where TCC Director W4ZJY is currently enrolled. All clubs reported higher scores in FD. Traffic: WA4HRG 521, W4ZJY 393, W4PQP 182, W4FX 100, W4MXF 73, WA4IBZ 61, K4WWQ 61, W4UVP 40, W4PFP 33, W4RMJ 33, W4WBK 31, W4TYV 26, W4TZJ 26, W4CVG 15, WA4GLS 14, W4LLJ 13, K4NRZ 13, W4VNU 10, W4JVM 9, K4LPW 9, K4UMW 8, W4VTS 8, K4LTA 7, W4VJW 7, K4HRY 6, W4YAU 6, K4EWI 5, WA4EWW 4, WA4PSV 3, K4JXG 2, WA4RPP 2, K4QWV 1, K4ZYL 1.

GREAT LAKES DIVISION

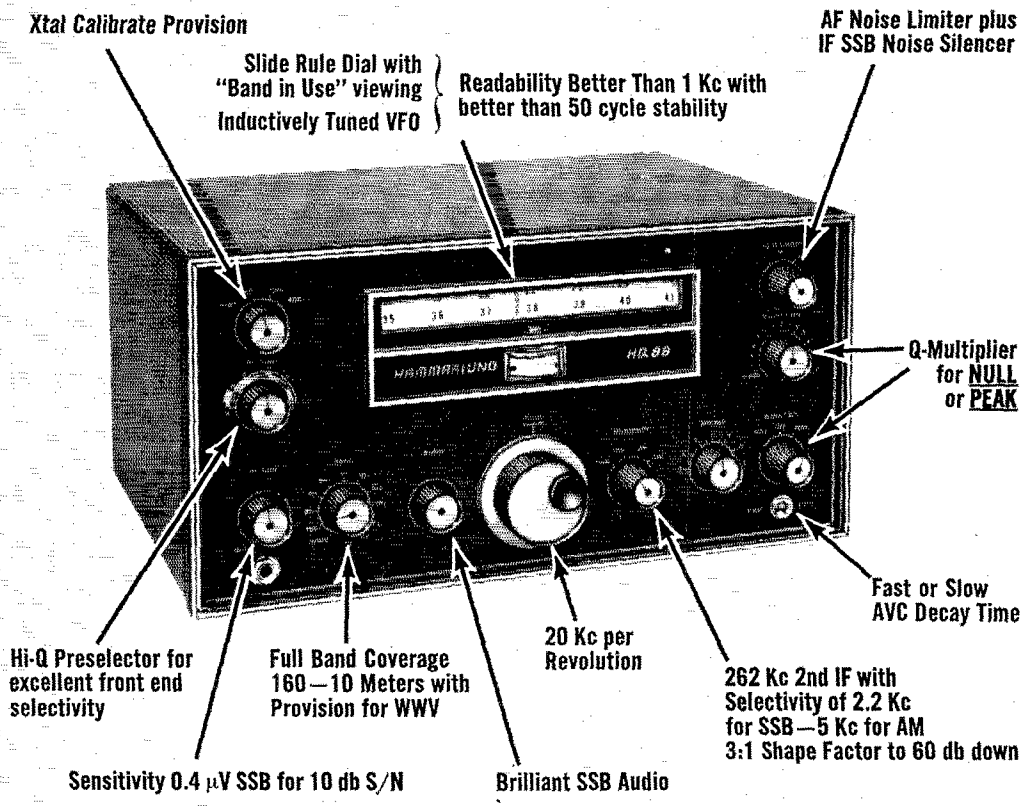
KENTUCKY—SCM, Mrs. Patricia C. Schafer, K4QIO—SEC: K4URX. PAMs: W4BEJ, W4SZB. V.H.F. PAM: K4KJQ. RM: WA4LCH. Appointments: K4ZCB as EC, WA4AYH as ORS. June net reports:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
EMKPN	3960	0630E	M-F	22	353	58
MKPN	3960	0830E	Daily	31	551	61
KYN	3600	0900 & 1900E	Daily	57	452	232
KPN	3960	1930E	M-F	42	549	37

Kentucky's Governor Breathitt proclaimed June 21-28 as Amateur Radio Week in Kentucky in recognition of the many public and community services of some 2300 licensed amateurs in the state. This proclamation was made because of the efforts of the Ky. Council of Amateur Radio Clubs and its individual members. The Breaks Interstate Park was a beautiful setting for the hamfest held June 14 which had a good attendance, as did Mammoth Cave. W4QCD has moved to a new QTH, same town. Crystals are needed for 7.050 Mc. for the Novices. If you are inclined to be generous, send them to me and I'll pass them along. Ky. was represented 96.6% on 9RN with K4DZM followed by WA4LCH as high QNIs. Traffic: (June) WA4LCH 235, W4BAZ 134, WA4AGH 95, K4DZM 81, WA4BSC 75, K4DMU 32, W4EON 27, K4HOE 26, WA4MEX 17, W4CDA 16, W4SZB 16, K4QIO 15, K4VDO 15, W4BTA 14, WN4RVP 14, WA4ELK 9, WA4HLW 9, W4JRA 7, K4SWL 7, W4KJP 6, K4LOA 6, WA4ENH 5, W4BEW 4, W4YYI 4, W4PLN 3. (May) W4CSE 15.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU. RMs: W8EGI, K8QLL, W8FWQ, K8KMQ. PAMs: W8CQU, K8LQA, K8JED. V.H.F. PAM:

(Continued on page 120)



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Thermal drift on the "88" is rated at no more than 50 cycles after warmup. See and test this high stability receiver at your nearest Hammarlund Distributor *Today!*

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W8PT. Appointments: K8GOU as SEC, K8JED as PAM B/R Net, W8ZHB as EC, W8DSE as ORS, K8GJD as OPS, WA8DZP as OBS, K8TLO as OES. The health of our former SEC, W8LOX, is now rapidly improving but he felt it would be best to have someone else take over and K8GOU will make a good SEC. He works for AT. & T. and is mostly on s.s.b. K8JED has been handling traffic on the B/R Net and is a good choice for PAM of that net. New Officers of the Michigan 6-Meter Club: K8TCL, pres.; K8JGF, vice-pres.; W8AIZ, secy.; K8OMZ, treas. Field Day messages were received from W8ACW/8, W8AM/8, W8CDZ/8, K8DAC/8, K8DTU/8, K8DXF/8, W8EST/8, W8HLD/8, W8KSL/8, K8MIT/8, W8MO/8, W8OHR/8, W8RYI/8, W8SIO/8, W8VV/8 and W8ZZ/8. This fall some non-working OOs are going to be cancelled. The CMARC Picnic will be held Sept. 13 at S. Washington Park, Lansing. The Michigan School for the Blind now has 5 Conditionals and 13 Novices, thanks to K8ATU and WA8IBU. W8TIJ and K8PKU are both out of the hospital and feeling better. New officers of the Metrop. Rag. Chewers Club are K8UXY, pres.; K8PUS, vice-pres.; WA8HYL, secy.; WA8EHV, treas.; WA8EJU, WA8HXI, K8DYN, WA8JJI, W8QGE, board of directors; K8WTU, chaplain. WA8DNZ built a new 250-watt transmitter and W8BEZ finished an HR-10. W8MGQ made another U.P. Trip. The SMARA finally sent its bulletin to me. K8JJC wrote a good article on s.s.b. for the *Kent Radio Club News*. K8BPT has a new NCX-3 and W8IWF has a new HT-44. W8HGN moved to Ann Arbor. W8NOH6 says he will be back home in 8 months. W8IXJ has been in the hospital. W8HA bought W8NOH's crystal/heterodyne exciter, with 70-watt input. It was quite a hamfest that the Sault Ste. Marie gang put on. The QMN Biz/Picnic was held at W8SCW/W8SJF in July. Traffic: (June) K8KMQ 237, K8GOU 200, K8HLR 189, K8LNE 179, K8WQV 177, K8NJW 113, K8QKY 111, W8ELW 103, W8GTL 76, WA8DZP 57, W8BEZ 42, W8EU 41, W8FWQ 36, K8VCB 34, WA8DNZ 31, W8FX 31, K8JED 22, K8BYX 16, WA8HGE 16, K8VDA 16, W8ZHB 12, W8AUD 11, W8HKT 10, W8TBP 9, W8DSE 8, K8EXE 7, W8EGI 6, W8QQK 6, K8GJD 5, W8AAM 2, WA8JJH 2. (May) WA8DNZ 62, K8JJC 34, K8TWW 15, K8YRO 10, K8GJD 6.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8HNP. RMs: W8BZX, W8DAE, K8LGB. PAMs: W8VZ, K8BAP, K8UBK. K8HTM is cruising the Mediterranean with the U.S. Navy. W8QCU is on active duty at Fort Knox, Ky. K8RXD received his Cardinal V.H.F. Award on 2 meters. Massillon ARC's *MARC News* informs us that W8ZWE is in the hospital. Our Great Lakes Division Director Dana Cartwright, W8UPB, and your SCM attended the Lancaster Hamfest where between 1500 and 1800 persons attended. The writer won a coaxial relay. Two hundred ninety-two licensed amateurs and their families attended the North East Ohio V.H.F. Group's Picnic and Hamfest with WA8JXK winning a Clegg Twoer transceiver and WA8FNE a complete 2-meter station. K8BYR sent me this information. K8MMZ attended an Army camp. WA8GYT has a new HT-32. W8IBX graduated from college. K8LMJ received his General Class license and has a new HX-50. WA8EFX has a new HQ-170. WA8KND is on 6 meters with a Polycomm 6. W8GGG joined the Silent Keys. Toledo's *Ham Shack Gossip* tells us that WA8MHP received his General Class license. W8SON moved to Toledo. W8UEL showed the Toledo RC color slides he took at the New York World's Fair, the St. Lawrence Seaway Net held its annual picnic and K8YKD is home recuperating from surgery. The Apricot Net of Cleveland held its Field Day on a parking lot in downtown Cleveland with television cameras recording the operation, a broadcasting station broadcasting the operation along with newspaper coverage with pictures. WA8AYH joined the Air Force. WA8FQC vacationed in Italy. K8JFK vacationed in Toronto. Warren ARA's *Q-Match* tells us the club's new meeting place is in the Assembly Room of Trumbull Memorial Hospital in Warren. W8KAK is visiting in Italy, the club toured the FAA tower at Youngstown Municipal Airport. Traffic: (June) W8PUH 461, W8DAE 320, WA8CFJ 206, K8DIU 147, K8UBK 82, WA8AJD 78, W8BZX 76, W8TV 73, K8BAB 57, W8GRG 57, K8GLA 55, WA8GYX 49, W8IEP 48, W8MGA 43, W8QCU 43, WA8AJZ 33, WA8EIF 31, K8VWN 31, WA8JXM 29, K8RXD 29, K8BNL 28, WA8BZR 16, W8ERD 11, WA8FKD 11, WA8AWH 10, K8LGB 10, W8LZE 10, K8ONQ 9, W8ILC 8, WA8BOV 7, W8EEQ 6, K8DDB 5, K8RFU 4, WA8EEW 3, W8DIH 2, K8PJH 2, W8RO 2, W8UID 2, W8IBX 1. (May) K8DDG 61, K8RXD 33, W8WEG 8.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RMs: W2PHX and WA2VYS. PAM: W2IJG. Section nets: NYS on 3670 kc. nightly at

(*Continued on page 122*)

There is just no better way of getting started in VHF than with the newest of the new in the Clegg line — the 22'er two meter transceiver. This ready-to-go station combines many of the fine features that have made the Clegg name famous in VHF ham circles for years plus refinements to make 2 meter AM phone operation more interesting and challenging. It is realistically priced — *your distributor will have complete information.*

$239.50
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Features

RECEIVER

1. Dual conversion with crystal controlled first injection oscillator
2. Crystal lattice filter providing selectivity of about 10 KC at 6 db and less than 16 KC at 50 db
3. Freedom from spurious responses, IF leak through and images
4. Panel Meter doubles as calibrated S Meter on receiver and "relative output" meter for transmitter tune up
5. Full 143.8 MC to 148.2 MC coverage with calibrated tuning dial
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7. Excellent AGC performance
8. NUVISTOR RF stage and low noise first mixer provide .2 μv sensitivity (10 db S + N to N)
9. 3 watts audio output available with self contained high efficiency speaker for operation in high ambient noise associated with mobile operation
10. Effective Automatic NOISE LIMITER

TRANSMITTER

1. Broadband exciter stages to simplify rapid QSY
2. High efficiency straight through final amplifier with crystal controlled 18 WATT input
3. High level plate and screen modulation with speech clipping for typical Clegg "HIGH TALK POWER" performance
4. PUSH TO TALK with provisions to switch external LINEAR and VFO
5. TRANSMITTER frequency SPOTTING SWITCH
6. Self contained universal solid state power supply for 115 volts AC and 12 volts DC
7. Tube line-up

6CW4	Rcvr RF	12AX7	AF Amplifier
6KE8	Mixer/Xmtr Osc	6BQ5	Rcvr Audio Output/ Xmtr Modulator (2)
6KE8	VLO/Buffer		
6BA7	2nd Mixer	6EA8	Xmtr XLO/1st Multiplier
6AZ8	IF Amplifier		
6BA6	IF Amplifier	12BY7	Buffer Amplifier
6AL5	Diode Detector/ Noise Limiter	12BY7	Xmtr Driver
		2E26	Xmtr Final Amplifier

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2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT; Emergency Coordinators on 146,550 kc. Fri. at 0130 GMT. Appointments: K2IOW as EC and WA2JWL as OPS. Messages were received from the following Field Day groups: W2HCS/2, K2IOW/1, K2YCJ/2, WB2FVD/1, WA2DNR/2 and K2AE/2, to establish a new record for E.N.Y. during the FD. At the Albany Club, WB2BZE was speaker on "Operation of a Community TV Antenna System." It was Family Night at the Schenectady Club, during which K2HNW was presented the Broughton Award for Community Service as Emergency Coordinator. Schenectady drills three AREC nets each Sun. with a total membership of 125. Congrats to WA2KUL on his recent marriage. WA2VYS, manager of ESS, edits a very informative bulletin; ditto W2RUF, manager of NYS, both busy YLs. WB2HZY has a 2E26 on 2 meters and nuvistor converter for 10 meters, all home-built. A new call in Athol is WB2NNA. When in N.Y.C. he is WA2PZD. Nice to have you with us. WA2ZPD has a Communicator III and new preamplifier ahead of his receiver. WA2HGB is building a portable station for those trips. Among the campers was WB2FVD, who taught radio at Camp Tomahawk in N. H. W2ECU, an OO, has the call W2BS. Hope your friends recognize you, Verne. The Westchester Club had a talk on microwaves by a member of the N.Y. Telephone Co. We had no BPLs in June but the traffic reports have increased. Keep it up. Traffic: (June) WA2UZK 309, WA2VYS 226, WA2MHY 122, K2SJN 107, WB2FZC 95, WB2FVD 87, WA2JWL 39, W2URP 39, W2PKY 31, WA2VYT 27, W2ANV 23, WB2FXB 18, WB2NNA 17, WA2HGB 14, WA2WGS 14, WA2PUM 13, WB2HYA 11, WA2ZPD 8, WA2LJM 7, K2DEM 2. (May) WA2LJM 106, K2TXP 71.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2IDB—SEC: K2OVN. Section nets:

NLI	3630 kc.	2315Z	Nightly	WA2EXP —RM
V.H.F. Net	145.8 Mc.	0000Z	TWTh	W2EW —PAM
V.H.F. Net	145.25 Mc.	2300Z	FSSnM	W2EW —PAM
NYCLIPN	3932 kc.	2000Z	Ex Sun.	WA2QJU —PAM

Remember, quite a few of the boys and girls who carried last season are now off to college so it's up to us old guys once again to bring up the new young talent for AREC and traffic. Let's go! BPL certificates went to WA2RUE, W2EW and WA2TQT. ARPSC Net certificates went to Exemplars WB2AOU, WB2ASR, WA2OOL, W2MAN, WB2JRV and WB2CHC of the Kings County AREC Net. WA2WIJ, who graduated from Bronx H.S. and is going to Coopers Union, has a new keyer and made RCC, Al-Op, received a CP endorsement and won the Bronx County 1st place in the '64 NYC-LI QSO Party. New officers of the L.I. Tri-Banders ARC are WA2YLO, pres.; WB2HAV, vice-pres.; K2ULU, treas.; K2UEP, secy.; and, WB2BGS, WB2MCL, WB2LPM, WA2OFY, directors. This club runs a 6-Meter Bunny Hunt the 2nd Fri. of every month starting from Howitt JHS. Betcha can't find 'em! The Sept. and Oct. meetings will be held at the Waldon G. Howitt J.H.S. in Farmingdale on the 25th and 30th, respectively. All are invited! W2HAE has a new Valiant and vertical dipole at the new QTH. K2HTX has a new homebrew 60-ft. tilt tower for the beam. WB2CSS is now CHC #1320. New officers of the Wantagh ARC are K2QNU, pres.; WB2DIN, vice-pres.; WB2FCB, secy.; W2MVX, treas. Also, WB2FCB has a new G-76 and TA-33 jr. WB2ECR is working on some new 40-meter c.w. gear. Like many others, WB2BKS received a QSL card from K2US, the World's Fair station. Remember W2PF's beam that I tole ya about? It works real fair-ta-middlin' and it's only 15 feet off the roof of a little 14-story apartment building. After being on c.w. for two years, WB2AWX is now on phone with a screen modulated rig. WA2WAO says, "We ought to have more AREC members!" How about it? Hey, WA2YLL has a new Matchbox! WA2PZD was operating as WB2NNA from E.N.Y. this summer. WB2IQG is using a new homebrew keyer. The Larkfield ARC reports that only 2 out of the original 25 older hams turned out for Field Day this year. Unfortunately, many clubs reported that FD was carried mainly by high-school-age amateurs this year without the assist of the experienced boys. Oh boy, W4TRU/2 has gone mobile with an SB-33 and a Band-spanner and I'm gonna look for him on 3950 at 6:30 A.M. with the rest of the mobile group. Look at ole buddy W2DBQ, he's up there on 2 meters makin' a buncha new friends. WA2PMW has grabbed the first Michigan Counties Award in the New York area. Look, the L.I. DX Assn. has gone and elected a new batch: W2GKZ, pres.; K2MGE, vice-pres.; W2LJF, secy.-treas. You know, don't you, that if you're interested in phone traffic you're cordially invited into both the V.H.F. Traffic Net and the NYCLIPN? Traffic: (June) WA2RUE 741, WA2GPT 365, W2MTA 240, WA2PJL 231, W2EW 207, WA2TQT 172, WA2QJU 159, WB2HLM 123, WA2UWA 110, WA2ZJF 101, WA2PMW 75, W2GKZ 71, WA2LJS 61, W2DBQ 58, WB2-

(Continued on page 124)

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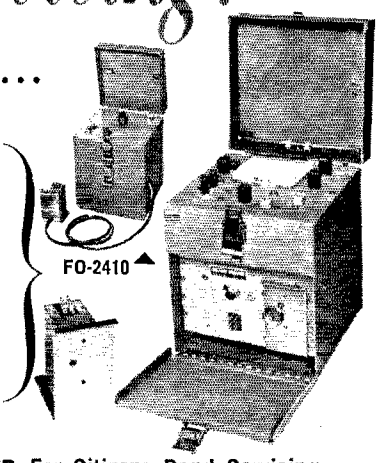
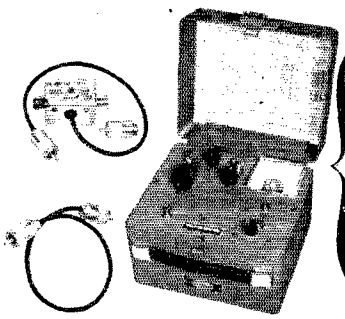


FM-5000 FREQUENCY METER 25 MC to 470 MC

The FM-5000 is a beat frequency measuring device incorporating a transistor counter circuit, low RF output for receiver checking, transmitter keying circuit, audio oscillator, self contained batteries, plug-in oscillators with heating circuits covering frequencies from 100 kc to 60 mc. Stability: ± .00025% +85° to +95°F, ± .0005% +50° to +100°F, ± .001% +32° to +120°F. A separate oscillator (FO-2410) housing 24 crystals and a heater circuit is available. Dimensions: FM-5000, 10" x 8" x 7½".

FM-5000 with batteries, accessories and complete instruction manual, less oscillators, and crystals. **Shipping weight: 18 lbs. Cat. No. 620-103 . . . . . $375.00**
Plug-in oscillators with crystal $16.00 to $50.00



C-12B FREQUENCY METER For Citizens Band Servicing

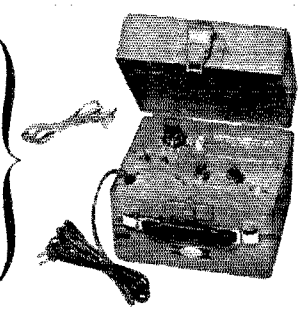
This extremely portable secondary frequency standard is a self contained unit for servicing radio transmitters and receivers used in the 27 mc Citizens Band. The meter is capable of holding 24 crystals and comes with 23 crystals installed. The 23 crystals cover Channel 1 through 23. The frequency stability of the C-12B is ± .0025% 32° to 125°F, .0015% 50° to 100°F. Other features include a transistorized frequency counter circuit, AM percentage modulation checker and power output meter.

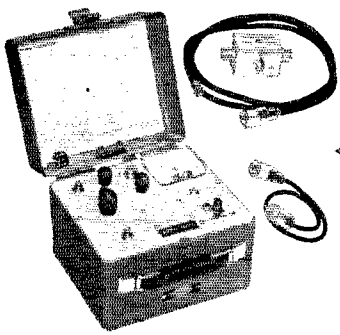
C-12B complete with PK (pick-off) box, dummy load and connecting cable, crystals and batteries. Shipping weight: 9 lbs. Cat. No. 620-101 . . . . . $300.00

C-12 CRYSTAL CONTROLLED ALIGNMENT OSCILLATOR

The International C-12 alignment oscillator provides a standard for alignment of IF and RF circuits 200 kc to 60 mc. It makes the 12 most used frequencies instantly available through 12 crystal positions 200 kc to 15,000 kc. Special oscillators are available for use at the higher frequencies to 60 mc. Maximum output .6 volt. Power requirements: 115 vac.

C-12 complete, but less crystals. Shipping weight: 9 lbs. Cat. No. 620-100 . . $69.50





C-12M FREQUENCY METER For Marine Band Servicing

The International C-12M is a portable secondary standard for servicing radio transmitters and receivers used in the 2 mc to 15 mc range. The meter has sockets for 24 crystals. The frequency stability is ± .0025% 32° to 125°F, ± .0015% 50° to 100°F. The C-12M has a built-in transistorized frequency counter circuit, AM percentage modulation checker and modulation carrier and relative percentage field strength.

C-12M complete with PK (pick-off) box and connecting cable, batteries, but less crystals. Shipping weight: 9 lbs. Cat. No. 620-104 . . . . . $235.00
Crystals for C-12M (specify frequency) $5.00 ea.

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18 NORTH LEE OKLAHOMA CITY, OKLAHOMA

EUH 58, K2QBW 43, W4TRU/2 41, WB2IQG 29, W2KCX 21, WA2PZD 17, WA2YLL 14, W2IAG 13, WA2TPM 8, WA2WAO 4, WB2AWX 2, W2PF 2, WB2FCB 1. (May) WA2UWA 215, WA2GPT 176, WB2HWB 120, WA2ZJF 83, WA2PZD 2.

NORTHERN NEW JERSEY—SCM, Edward F. Erickson, W2CVW—Asst. SCM, Louis J. Amoroso, W2-LQP. RMs: WA2GQZ, W2NAK. NNJ ARPSC nets:

NJN	3695 kc.	7:00 P.M.	Daily	W2TFM-RM
NJ Phone	3900 kc.	6:00 P.M.	Ex. Sun.	W2PEV-PAM
NJ Phone	3900 kc.	9:00 A.M.	Sun.	W2PEV-PAM
NJ 6&2	51,150 kc.	11:00 P.M.	MWSat.	K2VNL-PAM
NJ 6&2	146,700 kc.	10:00 P.M.	Tu. & Sat.	K2VNL-PAM
NJNN*	3725 kc.	7:20 P.M.	MTWTh	WA2SRK-RM

*Novice and slow speed. AREC local net skeds are available from the SEC. K2ZFI. New appointments: WB2ALF as OO; WB2HLH as ORS and OPS. WB2-DEA spent 2 weeks at K9NBH boot camp. WA2AXV is on 220 Mc. WA2VEB has a new minibeam. WA2UOO has a ½-watt rig on 80. WA2QGZ replaces W2CCK as RO for Belleville; K2OR1 is deputy. WB2HLH built a two-element quad for the AREC. WA2SRK is visiting and speaking at various clubs on the New Jersey Novice Net. WB2COZ reports the new call of the Teaneck P.A.L. is WB2NUW. WA2WHZ, a 17-year-old student, is a newcomer to traffic work. John has 50 watts, c.w. and a.m., 80 through 10. W2OXL received a DOD certificate for Armed Services Day c.w. competition. WB2-GFV visited K2US. K2AGJ is a member of YL International Sideband, 14,331 kc. K2OKA is on 40-meter c.w. in addition to keeping OBS skeds on 6. Nap also is contemplating emergency power, something we all should have. K2BEV, South Amboy EC, has appointed WA2NJB as his assistant. The Sparta School club installed new officers: WB2JWS, pres.; WB2LDV, vice-pres.; J. Huyett, secy.; P. Conklin, treas. W2ECO has a new Tri-bander. K2ONE and W2ZAL are NCSs for Jersey City AREC. Both the Jersey City Radio Club and the Radio Association are very active groups. K2-IBF has a new five-element 2-meter beam. WB2GQT and son, WB2CLV, were summer visitors to the section at Mt. Freedom. WN2KQJ has a new V-80 antenna. Congratulations to Rev. Wood, W2VMX, OPS and OO, who can now add the letters Ed. D. (Doctorate) after his name. WN2LUT is going to Phillips Academy (W1SW). Tony was a radio counselor at summer camp. WA2ZOW and WB2JPR are planning a 432-Mc. intercom. WA2CCF is both EC and Communications Officer in Englewood. K2UKQ finally got Nantucket County, Mass., after 7 years of trying. WN2KLD is looking for information on radio astronomy. Tom also is constructing a battery-powered 2-meter station for camping trips. K2ZFI reports that the N.N.J. AREC now has 552 members and 42 networks. The Windblowers' V.H.F. Society will hold its tenth annual "Big Blow" Sat., Sept. 26, 1964, from 1400 to 2400 local time on the 2-meter band. The following calls will be used at the locations listed: Pennsylvania, W2ERZ; New Jersey, W2ZDR; New York, K2GOS; Connecticut, K2ILO. Any amateur station working all four locations will receive a certificate. There still is need for Emergency Coordinators in certain areas. Official Observers still are very badly needed on phone and v.h.f. Write to me for information on appointments or any of our public service activities. *New ideas* from *experienced, progressive* amateurs are always welcome. Traffic: WB2ALF 206, K2VNL 191, WA2MYB 146, K2UCY 82, WB2HLH 79, WA2SRK 68, WA2VID 68, WB2AEJ 66, K2ZFI 36, K2-JTU 33, WA2KVQ 30, W2TFM 28, WA2AKM 19, W2ANG 17, WA2CCF 17, WA2WAJ 17, WB2COZ 16, W2PEV 16, WA2TBS 15, WA2WHZ 11, K2EQP 8, W2NAK 6, W2-OXL 6, WA2PWI 6, WA2ZKT 6, WB2GFV 5, WB2BCS 4, WA2KRC 4, K2SLG 4, W2DRV 3, K2UKQ 3, K2-AGJ 2, WN2KLD 2, K2VVL 2, W2EWZ 1, WB2GFY 1, W2NIY 1.

MIDWEST DIVISION

IOWA—SCM, Dennis Burke, WØNTB—Asst. SCM: Ronald M. Schweppe, KØEXN. SEC: KØVBM. RMs: WØLGG, WØUSL. PAMs: KØBBL, WØLSF. Field Day has come and gone and some new calls will top this section for 1964. I predict that an XYL will be on or near the top. The hot weather blues are upon us and with humidity at 99% and the temperature at 100 degrees it is difficult to concentrate upon any hobby. My OESs are mostly students or teachers, which accounts for meager reports at this time of year. Much interest is being shown in OO activity, not only by old-timers but by new Generals as well. Remember that most amateurs are willing to cooperate when they are convinced that the criticism is justified. Looking over the Field Day reports I notice a lamentable absence of AREC members. It occurs to me that either many AREC members are not participating in Field Day, which is of special interest to that group, or else we are poorly organized in that department. Field Day messages came from KØQWM/Ø, WØOM/Ø, WØCVJ Ø.

(*Continued on page 126*)

How red the rose?

(Or 599X Color TV)

We have a magnificent new color TV picture tube at Sylvania. And a colorful story to tell on how it was developed.

To begin with, you might say that the picture tube has been the industry's biggest bottleneck in color TV. Partly because the red phosphor has been a weak and shifty character. Give it half a chance and it turns orange or refuses to cooperate with the blue and green phosphors. To compensate for this weakness, it has been necessary to damp down the blue and green phosphors to achieve some semblance of color balance---at the expense of brilliance.

You'll get the picture if you'll view the screen of a color tube as islands of phosphor dots. Each island is made up of a red, a blue and a green dot in the form of a triangle. The dots in each triangle are optically coupled. If all three are equally excited, you get a pure white. If they are unequally excited, you achieve the same results as you would by mixing paints.

Great---except for that weak link in the color chain. If the red won't stay red, you're bound to come up with some odd hues that bear no relation to reality.

Well, it just so happens that our research people were working on a laser for communications. What they were seeking was a laser capable of generating an intense beam in the red spectrum. They tried hundreds of "lasing" materials without success. Until they hit on europium. Europium, as you may know, is a metallic element of the rare-earth group, first discovered in 1896. Anyhow, they fused the europium into a crystal, put it in a laser and, presto, it worked beautifully!

This immediately led us to the assumption that a europium-base phosphor would also solve the red problem in color TV. Sure enough. It came through with flying colors. This allowed us to upgrade the blue and green phosphors and, all together, resulted in a measured brightness some 43 percent greater than the industry standard. And, for the first time, a picture that could be viewed in daylight. But the most spectacular thing is the ability of the tube to reproduce faithfully what it "sees."

There's one other thing we think is important to mention---we came up with a new screening process. (The conventional "slurry" process where you take a watery mixture and shlup-shlup it around, doesn't guarantee the formation of perfectly round and uniform phosphor dots.) We call our process "dusting." Picture a woman setting her coiffeur with a hair spray and you'll get the idea. Result: Phosphor dots as uniform and clear-cut as a stencil done with a spray gun. The whole thing adds up to far better picture definition and color control.

Funny thing about europium---it's never had any really useful purpose in life until now. Which leads one to wonder about the riches of the earth and man's mind, and the way they come together.

73, Bob Lynch

K2RMN

SYLVANIA

SUBSIDIARY OF GENERAL TELEPHONE & ELECTRONICS GT&E

KØKAQ/Ø, KL7DPX/Ø, WAØCDD/Ø and WØOSC/Ø. Net reports: Interstate SSB Net, QNI 672, QTC 136, sessions 30. 75 Meter Phone Net, QNI 1179, QTC 49 sessions 26. 160-Meter Net, QNI 438, QTC 0, sessions 29. Hamilton County Net, QNI 131, QTC 0, sessions 29. Traffic: WØLGG 2003, WØBDR 1142, WØNTB 81, WØUSI, 57, WØGPL 11, WØYDV 7, WØDRE 4, WAØDQD 3, KØTDO 3.

KANSAS—SCM, C. Leland Cheney, WØALA—SEC: KØBXF. PAM: KØEFL. RM: WØQGG. V.H.F. PAMs: KØVHP, WØHAJ. The following are net schedules and data for June:

Net	Freq.	Time	Days	Sess.	QTC	QNI	Ave.
KPN	3920	1245Z	M-W-F	17	26	281	16.53
KPN	3920	1400Z	Sun.				

NCSs: WØORB, KØEFL and KØZHO

QKS	3610Z	0030Z	Daily	23	19	67	2.9

NCSs: WØCGZ, WAØDFZ, KØMWU, WØQGG and KØYTA

The Field Day activity was the big effort for June. WØYCT writes that he is now the Radio Officer of the USNS *Rose Knot* and will be operating in the Atlantic and Pacific under the call WØYCT/MM. Bill will be working 40 through 10 during openings. Give him a shout from his home state. Winner of the SCM Field Day Trophy will be announced in this column next month. Would appreciate it if each active club in the section would send the names of its pres. and secy., together with the current meeting place and night to your SCM. Reporting monthly traffic does not require that you be a League member or a member of a particular net. Why not send in a resumé of your traffic each month to the SCM for inclusion in this section of *QST*. Traffic: WØOHJ 525, KØGII 204, WØALA 4, KØEFL 3, KØYGR 1.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK—SEC: WØBUL. KØFPC has been appointed EC for Johnson and Cass Counties. New OPS appointments: KØLQH, KØEQY, WAØEMX. FD messages were received by the SEC and SCM from the following stations operating portable: KØARK, Ridge Runners ARC; KØAXC; KØAXU, N.W. St. Louis ARC; WAØBHY; WØBRI; WØBRN, Three Rivers ARC; WØCBL, Kirksville ARC; WØCTV, Raytown HS ARC; WØDRC, Tri-State Radio Soc.; WAØDSE, Harrisonville ARK; WØEAO, KC V.H.F. ARC; WØEBE, S.W. Mo. ARC; WAØFXD, St. Charles ARC; WØGWX, Lees Summit ARC; KØJMO, Macon Co. ARC; WØKY; KØLIR, St. Louis ARC; WØMKJ, Jeff. Co. ARC; KØOYM, Mid-Mo. ARC; WØRFU, Bandhoppers RC; WØRZH, Western Elec. ARC; WØVQ, Wilcox Elec. ARC. WØBUL reports a 7-year plan to move the beam to the crank-up tower in the backyard is now completed. WAØHMN graduated to Gen. Class from WNØ. KØONK reports her picture was in the '64 *Popular Electronics Handbook*. The Greene County ARS has been dissolved as of July 1. WAØFLL won the 6-meter transmitter hunt at the Mo. Picnic. To bring you up to date, NCSs for Mo. nets are MEN, KØEQY, KØWKC, WØBUL, WØTPK; MON, KØFPC, WØOUD, KØAFM, WØJXI, WØKIK; MNN, KØLQH, WØOUD; SMN, WØOUD; MØSSB, WØHTO, KØTCB, KØTGU, WØORB, KØIHA. KØIHA is acting as net manager for MØSSB until WØOMM is able to get back on the air. Net reports for June:

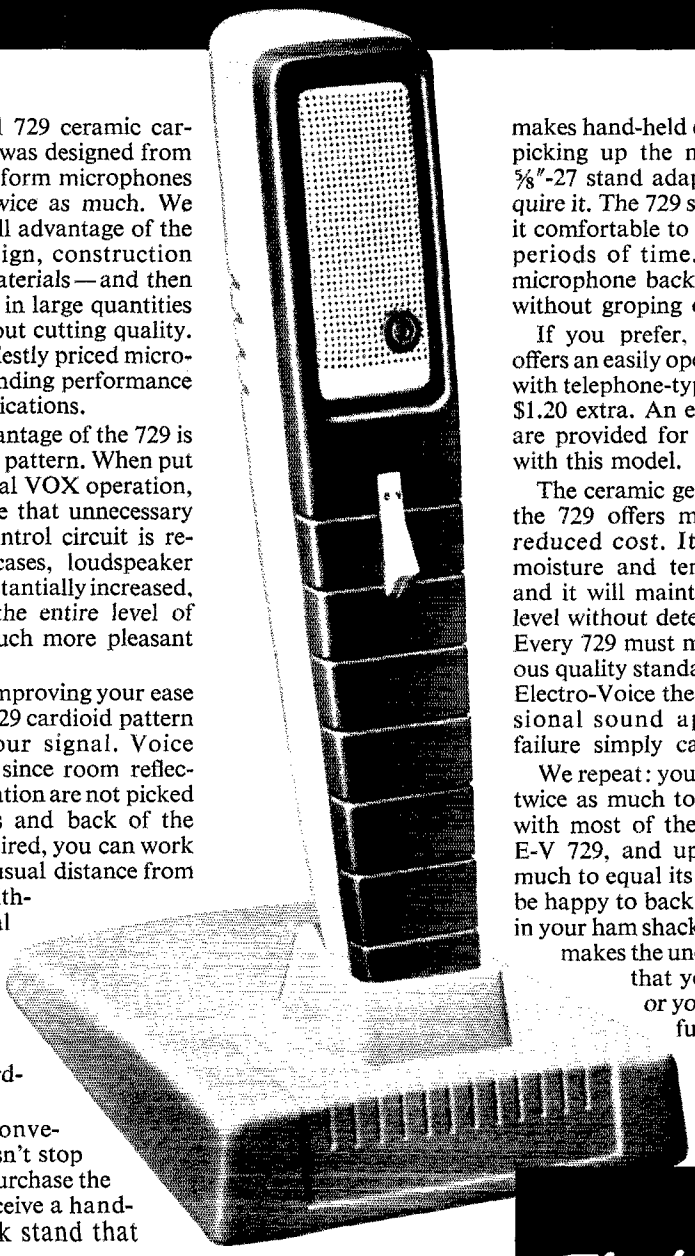
Net	Freq.	Time	Days	Sess.	QNI	QTC	Mgr.
MEN	3885	2345Z	M-W-F	12	242	88	WØBUL
MON	3580	0100Z	Tu.-Sun.	26	150	162	WØOUD
MNN	3580	1900Z	M-Sat.	26	68	102	WØOUD
SMN	3580	2200Z	Sun.	4	11	4	WØOUD
MoSSB	3963	2400Z	M-Sat.	26	468	78	KØIHA

Traffic: (June) KØONK 1562, KØFPC 295, KØAEM 263, WAØEMX 146, WØOUD 128, KØLQH 57, WØBWE 49, WØTPK 47, KØTCB 38, WØBUL 37, WAØCWV 22, WØKIK 18, KØEQY 15, WAØDJG 14, WAØDGT 13, WØRTO 11, WØBVL 10, WØRTW 10, KØQCQ 8, KØWOP 8, WØGBJ 6, WØCTV 5, WAØFLL 3, WØGQR 2, WØHVJ 2, (May) WØTPK 23, WAØEUE 3.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØJXN. Appointments: KØYDS as RM, KØDIN, KØJFN, KØLAL, KØUWK, KØKKJ, KØOPC, KØRPC, WAØEUM, WØPDH and WØLOD as ECs. June net reports: Neb. C.W. Net, KØYDS and WAØBYK, NCSs: QNI 103, QTC 3, West Nebr. Net, WØNIK, QNI 606, QTC 37, Nebr. Emergency Phone Net, WØFIG reporting, QNI 879, QTC 64, Nebr. Storm Net, KØJXN, QNI 752, QTC 7, Morning Phone Net, KØUWK, QNI 499, QTC 96, AREC Net, QNI 68, KØJXN, our new SEC, has announced that the Nebraska Emergency frequency has been established on 3982.5 kc. LSB and 28.600 Mc. USB. The AREC designated nets on 3982.5 kc. are at 1930, 0130 and 0230Z daily and the Nebr. State AREC Net meets at 1530Z Sun. KØJXN is attempting to get ECs appointed for all counties, so if your county does not have an EC, contact Larry now. Traffic: WAØBID 96, KØYDS 42, WAØBYK 38, KØJFN 37, WAØEGK 34, KØUWK 19, KØBYK 17.

(Continued on page 128)

Unless you pay $30.00 or more, you can't buy a microphone as good as the E-V 729...for only $14.70*!



The E-V Model 729 ceramic cardioid microphone was designed from the start to outperform microphones selling for over twice as much. We did it by taking full advantage of the most modern design, construction techniques, and materials—and then producing the 729 in large quantities that cut cost without cutting quality. The result is a modestly priced microphone with outstanding performance for voice communications.

The biggest advantage of the 729 is its cardioid pickup pattern. When put to the test of critical VOX operation, you'll quickly note that unnecessary tripping of the control circuit is reduced. In most cases, loudspeaker volume can be substantially increased, as well, making the entire level of your operation much more pleasant and effective.

But more than improving your ease of operation, the 729 cardioid pattern also improves your signal. Voice quality is crisper, since room reflections and reverberation are not picked up from the sides and back of the microphone. If desired, you can work at up to twice the usual distance from the microphone without losing essential audio clarity. This working flexibility simply cannot be matched by an omnidirectional microphone, regardless of price.

And the 729 convenience story doesn't stop there. When you purchase the Model 729 you receive a handsome slip-in desk stand that makes hand-held operation as easy as picking up the microphone, plus a ⅝"-27 stand adapter should you require it. The 729 shape and size make it comfortable to hold, even for long periods of time. And putting the microphone back in its base is done without groping or fumbling.

If you prefer, the Model 729SR offers an easily operated rocker switch with telephone-type contacts for only $1.20 extra. An extra set of contacts are provided for controlling a relay with this model.

The ceramic generating element of the 729 offers many advantages at reduced cost. It is impervious to moisture and temperature changes, and it will maintain its high output level without deterioration for years. Every 729 must meet the same rigorous quality standards that have made Electro-Voice the standard in professional sound applications where failure simply cannot be tolerated.

We repeat: you have to pay at least twice as much to find a microphone with most of the advantages of the E-V 729, and up to three times as much to equal its performance. We'll be happy to back up our claims right in your ham shack. For Electro-Voice makes the unequivocal guarantee that you must be satisfied or your money will be refunded. Write for free E-V catalog and list of the E-V distributor nearest you.

*Model 729 amateur net. Model 729SR (illustrated) $15.90 amateur net.

ELECTRO-VOICE, INC., Dept. 942Q, Buchanan, Michigan

Electro-Voice®
SETTING NEW STANDARDS IN SOUND

WØGGP 17, WAØBIE 16, WØFIG 16, WØNIK 15, WØNOW 11, WØEGQ 10, WAØEUM 8, WØBKW 6, WAØERN 6, KØKJP 5, WØLJO 5, KØCGM 4, WØCJP 0 4, WAØHAL 4, WAØAES 3, WAØCEZ 3, WØPQP 3, WØVEA 2, WØZHV 2, WØOCU 1.

NEW ENGLAND DIVISION

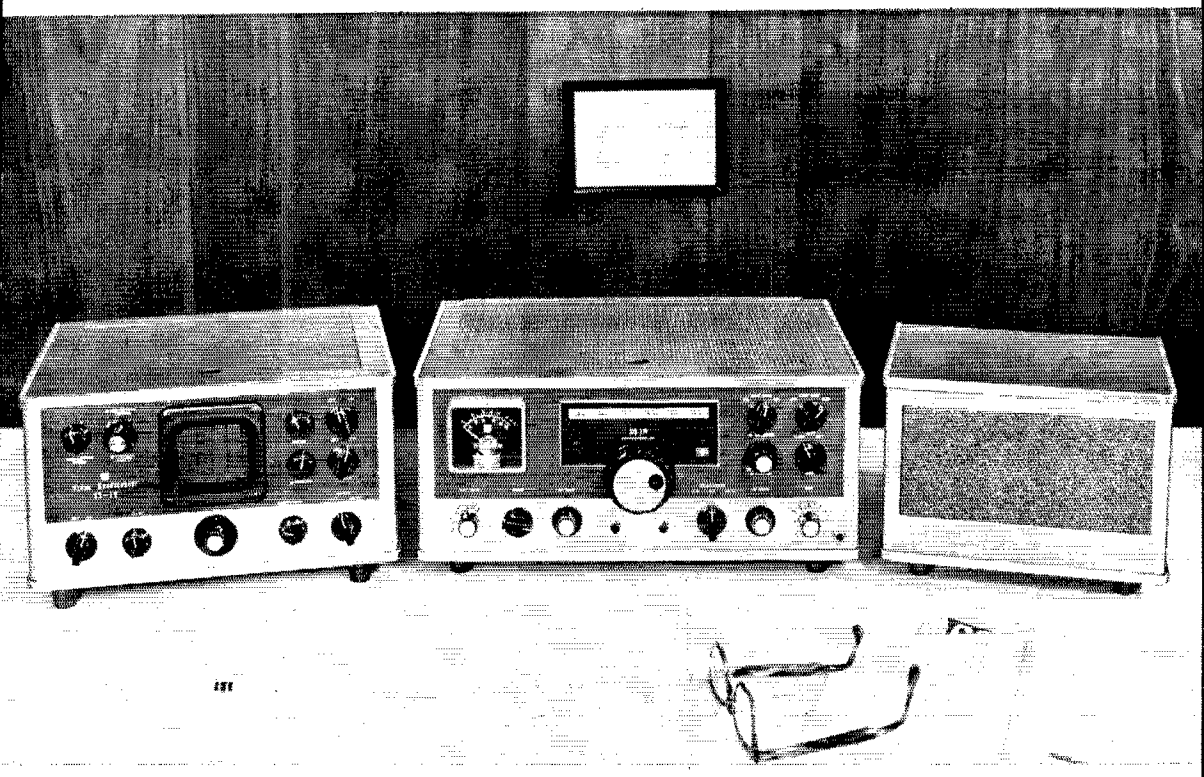
CONNECTICUT—SCM, Robert J. O'Neil, W1FHP—SEC: W1EKJ. RM: K1GGG. PAM: W1YBH. Traffic nets: Nutmeg Net, 3640 kc. daily 1845; CPN, 3880 kc. Mon. through Sat. at 1800 and Sun. at 1000; Emergency Coordinators Net, Sun. at 0900 on 3880 kc. Any and all stations are welcome to join in, with or without traffic, to these nets. CN reports 30 sessions, 305 messages, average of 10.8 stations per meeting; High QNI to K1GGG, K1WKK, K1UYZ, W1s RFJ and ZFM. CPN reports 30 sessions, 109 messages, average attendance 19 stations; High QNI to W1YXB, K1NTR, K1AQE, W1YBH, K1s SRF, BOP, EIC, W1LUH and K1DGK, in that order. A few highlights on Field Day, 1964: Looks like a record year for Connecticut—CWA score, around 1400 contacts in the 2-transmitter class; Southington RC 1200 in the 3-transmitter class. Others reporting better scores than previous years are the Candlewood ARC, Westchester ARA from Greenwich, the Easton group with K1LOM and W1MEH, Stamford with K1SDX, Waterbury ARC with W1LAS, Trumbull with K1WKK and K1YIX, Torrington with K1BCI. The Tri-City Hamfest will be held Oct. 10; this is the 17th annual time for the boys around New London. A CP certificate for 30-w.p.m. went to K1ZND. K1QVX is a new student at IBM school. W1APA reports good DXing with the boys down on the ice (KC4s USB, USN and USV, Antarctica), with daily contacts. The Hamden Club, with W1WHF, worked harder and made more FD contacts than any time in many a year at it. CN member K1ZND, now also an EAN representative, has a new Apache. New design Section Net Certificates went to W1ZFM, K1WXN, K1STM and K1UQQ for CN (Nutmeg Net) and to W1EKJ for CPN. K1WKK made the BPL with over 500. A new CPN member is K1OQG. Active again is K1MVQ. An OPS certificate went to K1YIX. Traffic: (June) K1WKK 507, K1UYZ 307, K1DQC 173, K1ZND 114, K1GGG 82, K1YIX 81, W1AW 71, W1BDI 70, W1CTT 54, K1IFJ 40, K1PLR 38, W1ZFM 25, W1FHP 20, W1YBH 20, K1WXN 14, WA1ALZ 12, W1APA 12, K1OJZ 12, W1CUH 10, W1BNB/1 8, K1NTR 8, W1QV 8, W1BGD/1 6, K1QNF 1, W1QVX 1. (May) W1CUH 4.

MAINE—SCM, Arthur J. Brymer, W1AHM—SEC: K1DYG. PAM: K1ADY-K1DYG. RM: K1MZB. Traffic nets: Phone: Seagull Net 3940 kc. 1700-1800 and 2000-2100 daily except Sun. Maine State C.D. Net meets Sun. at 1100 EDT on 3993 kc. and Wed. on 3530 kc. at 1900 EDT with K1BYK as NCS. The AREC Net meets Sun. mornings at 0900 EDT on 3940 kc. with K1DYG as NCS. C.W.: Pinetree Net meets daily at 1900 EDT on 3596 kc. Mon. through Fri. First Regional Net meets at 1815-1930 daily on 3605 kc. K1GUP now is working the Europeans on 40 and hopes to get the tri-bander up soon. He also is interested in 2 meters and is also looking for more activity on the PTN. K1UXZ has a new c.w. monitor built and we are now looking for him on the PTN. K1NAN now has a kw. with the Heath HA-10 linear, a new four-element beam (TH-4) up on a 50-ft. tower. The station is moved into new and larger quarters. The SCM checked on the ham convention at Swampscott and the hamfest at Augusta and had a great time. Ed Ward got his General at the Swampscott shindig so we should hear from him on the air now. Here are some new hams around the state: WA1BZA, Auburn; WA1CAF, Orono; WN1CCU, Saco; WN1CCO, S. Portland; WN1CBM, Fairfield; WN1BZH, Portland. Traffic: K4BSS/1 63, K1NAN 30, K1GUP 23, K1TEV 23, K1SZC 18, K1UXZ 5.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP—This section is made up of the following counties: Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk. If you live in any of the others you are in the Western Mass. section. New Novices: WN1s BXR, BXS, BXU, BXW, BXX, BXY, BXZ, BYA, BYB, BYG, BYJ, BYK, BYM, BYN, BYO, BYP, BYQ, BZO, BZD, BZE, BZF, BZG, BZJ, BZT, CAB, BYC, BYD, BYH, BYT, BYV. New Generals and Techs: WA1s AXQ, BXG, BXH, BXJ, AJO, BXN, BXO, BYS, BZC, BZK, BZL, AJH, BZN, K1s YRF, ZZY. Silent Keys: W1BJB and WN1APG, the son of W1LHR. WN1APG was a young ham electrocuted while building a transmitter. W1s BGW, OSQ, AYG, TZ and K1CCL took part in the May FMT. K1ROA is secy. of the Capeway Club. W1ZLX is NCS for our 80-meter c.w. net on Wed. W1EPE had a heart attack. W1UE has an Eico-transmitter with v.f.o. on several bands. W1OSQ is on his boat a lot. K1MOD has renewed his OBS appointment. K1BGK is on 220 Mc. looking for contacts. The Framing-

(*Continued on page 130*)

SS-1R, SS-1S, SS-1T, SS-1TF.....



THE SQUIRES-SANDERS family of HF amateur equipment—which started with the announcement last fall of a genuinely new approach to HF receiver design and performance (SS-1R) and original developments in noise silencing techniques (SS-1S) continues to grow. The original objective of a complete HF amateur *system* which is unsurpassed in quality and performance will soon be realized. The SS-1R receiver, SS-1RS matching speaker, and SS-1S noise silencer are currently available. The superb performance of this receiver and silencer—especially in frequency accuracy, rejection of strong adjacent signals, and the spectacular elimination of impulse noise (plus really fine construction)—has been talked about by hams the world over.

The SS-1V Video Bandscanner (see photo, left) is just as unusual as its predecessors. This unique oscilloscope display unit, when used with the SS-1R, shows all signals in the band in use, or any portion of the band can be expanded to full screen for detailed examination. Both linear and logarithmic displays are provided. A unique feature is that the *signals displayed do not move as the receiver is tuned*, but a marker pip constantly shows the exact frequency to which the receiver is tuned. The sharp resolution of this unit permits observation and measurement of two AM sidebands displaced only 2.5 kc. from the carrier. In addition provision is made for transmitter monitoring or analysis with automatic switching on "transmit."

The matching transmitter—SS-1T—has been released for production also and will be available shortly after the Bandscanner. Designed for transceive mode operation with SS-1R receiver frequency control, SS-1T will operate at 200 watts PEP input and will embody still other unusual Squires-Sanders developments which provide operating features not available in similar equipment. Complete specifications and operating characteristics will be published shortly. For those operators who prefer separate receiver/transmit frequency control, the separate transmit frequency unit (SS-1TF) will be available. Keep in touch with your distributor or write for further detail.

AMATEUR NET PRICES: SS-1R Receiver, $895; SS-1RS Speaker, $35; SS-1S Noise Silencer, $135; other prices to be announced.

Squires-Sanders, Inc.

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ham Club held a meeting with a supper. The QRA held a final meeting with a Smorgasbord and square dancing afterwards. W1ALP and his XYL were there. W1EFW and W1EAE were at the Townsend Club when Milt presented them with their ARRL charter of affiliation. W1ORV is back in Winthrop. Some of our OOs have been critized for sending out cards for various offenses on the air. Remember, it is better to get a card from a fellow ham who is trying to help you than to get one from the FCC. W1AKY is on a trip to Sweden. WA1BEV-BXE has a Ranger and is on 75 some. W1-YJG got married. W1HKG has new Tri-bander beam. W1HXK is on 75 some. K7OTR, formerly of Quincy, is back for a visit. W1BHY is on 6, also K2VJP. W1LMV is on mobile. K1YJK is on 75. W1ZLX is a new ORS. W1AOG received reports from the following ECs: K1s ICJ, DZG, PNB, W1STX. K1ESG worked K2US. W1-AOG, our SEC, wants all ECs to send him lists of mobile and emergency radio units to bring his records up to date. K1VPJ says 6-meter skip was in to W4-Land and then WØ-Land. He and K1ZKK are in nets on 6. Appointments endorsed: W1YYI Carlisle, W1DWY Beverly, W1UE Wellfleet as ECs; W1OSQ and K1CCL as OOs; K1SCJ as OBS; W1UE as ORS. W1QFN is Communications & Radio Officer for Fall River. SM5-BNB writes that he is going to visit our state. K1EZX is active as NC on the 6-meter Crossband Net. K1-PNB operated portable in Fesendens Field as RACES station for people as a public service. K1YSJ, Asst. RO, helped as an operator. K1PNB was in the hospital. The Central N.E. Net had 26 sessions, 712 QNIs, 5 traffic. K1ZDI is on many bands. K1OVA/1 is on from Orleans. K1ZHS has a Drake 2-B and an HT-32. K1BGK worked K7UJV in Phoenix on 6. K1LJT as NCS and W1RZA/m and W1SVN/m monitored the Lynnfields Sesquicentennial Parade by c.d. units. K1VOK worked the FD groups. K1ONW has a Viking II and a CP2573. The Six-Meter Crossband Net had 22 sessions, 359 QNIS, 38 traffic. K1YRF, in Hingram, is on 6. EM2MN reports 22 sessions, 190 QNIs, 133 traffic. EM8OMN had 29 sessions, 168 QNIs, 154 traffic. K1TSD moved to N.H. Traffic: (June) W1PEX 728, W1LES 215, W1EMG 159, K1PNB 140, K1ESG 124, W1OFK 97, W1ZLX 94, K1ZHS 85, W1DOM 66, WA2UFI/1 55, W1EAE 51, W1-ZSS 45, K1GKA 29, W1BJE 27, K1LCQ 23, K1VPJ 23, K1MEM 15, WA1ALM 11, K1FJM 10, K1VOK 9, K1-ONW 8, K1BGK 6, W1RST 4. (May) K1WJD 39, K1-BGK 10.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: W1BYH/K1APR. C.W. RM: K1-UJV. 75-Meter PAM: K1RYT. Net manager of the Hampden County 10-Meter Traffic Net: K1PKZ. There sure is slim pickings for news this month, but after a very active season, guess all the boys and gals are entitled to a rest from ham radio. Field Day results were received from the following: W1USF/1, Pittsfield, reported 10 operators with one AREC member; W1AEW, West Hampton, reported the Holyoke, South Hadley, Easthampton group operated 4 transmitters; W1ALL and K1WXU/1 reported 2 operators at West Granville. Our C.W. RM, K1IJV, and OM K1IJU are at Cape Cod for the summer, and old W1BVR is trying to swing skeds five nights per week! A nice bulletin was received from the Montachusett Amateur Radio Club, K1LNC, Gardner, EC, is now Radio Officer for Sector 3-E. K1-RYT has a new four-element Tribander. And that, my friends, seems to be it for this month. Traffic: K1SSH 173, W1BVR 105, K1LNC 56, K1YMS 32, K1LBB 29, W1DVW 2.

NEW HAMPSHIRE—SCM, Albert F. Haworth, W1YHI—The Granite State Prone Net meets on 3842 kc. (alt. Freq. 3845 kc.) Mon. through Fri. at 2330Z and Sun. at 1430Z The. Vermont Traffic Net meets Tue. and Thurs. on 3520 kc. at 7 P.M. New Hampshire c.w. stations are welcomed and needed. Endorsements: W1QGU as ORS; K1DWK as Asst. EC. Summertime activities are replacing radio as reports are scarce this month. The Nashua Mike and Key Club operated Field Day and we await the results. The NH Post Office Net is looking for more check-ins on 50.6 Mc. at 2000 EDT Mon. and Thurs. 6-meter operators can perform a public service by checking into this net. W1ET is closed for the summer but will be on in the fall for WAS on RTTY. W1TFS will be on RTTY shortly. Because of a lack of response to notices the following are cancelled as indicated: W1RMH and W1GAH as ECs; K1CIG and K1PDA as OESs; W1ARR and K1MID as OPSs; K1TMD and W1ARR as ORSs; W1IJB as OO. If anyone is interested in appointments and renewals, please notify me immediately as I would like to have correct files by the expiration date of my current term.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: W1YNE. RM: W1BTV. PAM: W1TXL. RISPN report: 30 sessions, 545 QNI, 81 traffic. Field Day messages were received from the following: K1CRN/1, W1-SYE/1, K1JFI/1, W1AQ/1, W1OP/1 and K1WEW/1. Elected officers of the NCRC of Newport were WA1-

(Continued on page 132)

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ACO, pres.; K1YQP, vice-pres.; K1VQO, rec. secy. The club also provided communications to assist the police during the recent Jazz Festival. A Command Post was set up at the Newport Hospital, Estons Beach and Bellvue Center. W1JFF, EC and RO for Newport, and K1VQO set up the stations and monitored procedures. Members operating the stations W1s LUO, WLG, TXL, AMT, JFF, K1s IRK, ELI, VQO, MCT, PTV, TAQ, ZIE, YQP, WA1s ACP, AQZ, AUL and WN1BLC assisted. The W1AQ Club of Rumford had 3 stations in operation for FD in Lincoln, R.I. K1THE served meals to keep the operators going. W1YNE has modified his DX-100 for 200 watts input. New Novices are WN1s CBB, CCV, CCW, BVL, BVO, BVB, BVX, BXL, BXT, BXV, BYE, BYL, BYI, BZM, BZX, BZY, BZ- and CAA. W1JFF, Secy. of the Newport County Radio Club reports that Fred Spaulding (at K1YQP, Block Id.) *through K1YQP* was installed as vice-pres. even though stranded far from the installation ceremonies. The R.I. Emergency Net meets Mon. at 2000 EDST on 51.5 Mc. The R.I. AREC Rag Chew Net meets at 2030 EDST Mon. on 51.0 Mc. Licensees wishing to join the AREC, send applications to the SEC or SCM. Traffic: W1TXL 499, W1BTV 82, K1TPK 76, K1VYC 23, K1VEV 22, WA1BJS 17, W1YNE 16, K1EWL 2.

VERMONT—SCM, E. Reginald Murray, K1MPN—RM: W1WFZ. The Green Mt. Net is on 3855 kc. daily at 2130Z; the Vt. Fone Net on 3855 kc. Sun. at 1300Z; VTN on 3520 kc. Tue. and Thurs. at 2300Z; Vt. C.D. RACES Net on 3993 kc. (a.m.) Sun. at 1400Z. Congrats to new Conditionals WA1ACN and WA1BZI; also to new Technicians WA1BNJ and K1ETG. W1FRT is EC for CVARC. Any ECs whose term has expired, please let me know and I will be glad to reinstate and endorse your certificate. VTN will continue during the summer months and plans are being made to enlarge the net by combining with N.H. We welcome W1IZS back to north country. K1YZK is doing a real FB job on the Green Mt. Net. W1KKM and K1IJJ are ORS appointees. The BARC deserves a big hand for staging another successful International FD. June check-ins for Vt. Fone Net 102, VTN 36. Traffic: K1BQB 128, W1WFZ 40, K1UZG 27, K1YZK 13, K1MPN 9.

NORTHWESTERN DIVISION

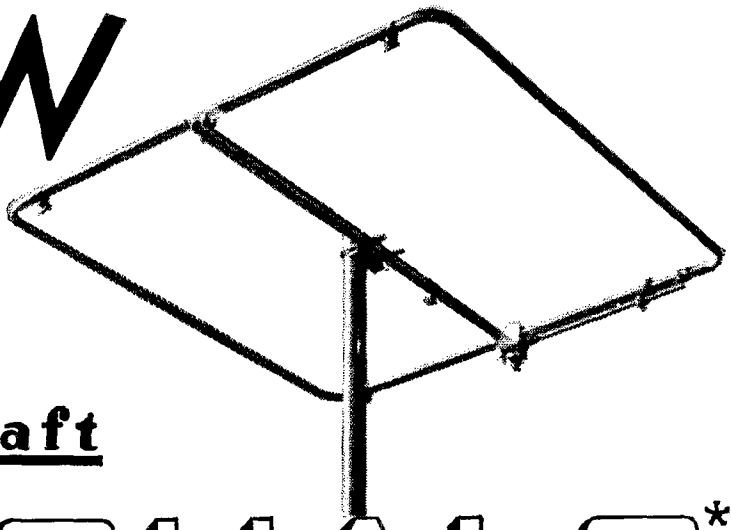
IDAHO—SCM, Raymond V. Evans, K7HLR—RM: W7EMT. Seven groups in the section participated in Field Day activities. Two sent the SCM a Field Day message to pick up the extra 25 points. Activity on RTTY still is increasing with W7KXJ and K7NHA now on. There is some talk of autostart on 80 meters. If interested, contact K7MNZ or K7DMZ. The new editor of the *Eagle Rock Radio Club News* is Anita Napper, K7PGC. FARM Net activity, under the leadership of W7MJZ, is holding up well in spite of summer vacations, etc. The GEM Net continues to keep Idaho a part of the NTS, with W7EMT, W7FGM, K7HLR, W7KXJ and K7CXG taking an active part. W7GGV took a vacation to the eastern states to attend the YL Convention and meet the many friends she has made on the air. FARM Net: 22 sessions, 624 check-ins, 44 traffic. GEM: 17. Traffic: W7EMT 106, K7OAB 13, W7FGM 9, K7HLR 8.

MONTANA—SCM/SEC, Walter R. Marten, W7KUH—Asst. SCM/L.F. PAM: Dr. Marvin Hash, W7YHS. V.H.F. PAM: W7TYN. RM: W7FIS. K7EWZ acquired another Armed Forces Day certificate. W7EWR moved to a new QTH and worked UA1KAE, USSR Antarctic Expedition. Those receiving degrees at M.S.C. are W7EVT, W7WMW, K7CBI, K7DNV, K7EVS, W7FFM, K7LCT and K7RAU. W7NJI has a new jr. operator. K7CBI moved to Los Angeles. K7NKS moved to Seattle. W7ED is the new call of the Gallatin Amateur Radio Club. This club had a very successful Field Day. KN7YRI has joined Silent Keys. K7PWY has been appointed Montana Net Manager of the Post Office Net. K7OGF made 5 Frequency Measuring Tests with an average error in parts per million of 6.7. K7AFQ passed the General Class test while visiting the World's Fair. A new call in Billings is WN7ASQ. W7JLD has sent in his confirmations for DXCC. A new ham who has moved to Billings is K5IUZ/7. WA6OZM, ex-W7FTV, is visiting friends and relatives in Montana. W7KUH had eye-ball QSOs with W7CPY, W7IWW and WA6ZOM. K7PKV still is building a pair of 4-1000s. W7BOZ and K7PKW are busy hunting rocks. The Big Sky Radio Club holds transmitter hunts every Sun. at 2 P.M. The Montana S.S.B. Net had 22 sessions, 734 check-ins and handled 174 pieces of traffic. Traffic: K7EWZ 324, K7PWY 39, W7NPV 17, K7UPH 14, W7EWR 11.

OREGON—SCM, Everett H. France, W7AJN—SEC: W7WKP. RM: W7ZFH. New appointments: K7SGX as ORS and active on OSN, RN7. Nets: OSN, 3585 kc, 6:30 P.M. Mon. through Fri.; AREC, 3875 kc, 7 P.M. daily. K7IWD, OSN mgr., reports June sessions 21, attendance 157, high 12, traffic 75, high 26, average 3.57, BRAT awards to W7JHA, W7ZFH, K7SGX. Field Day reports:

(*Continued on page 134*)

NEW



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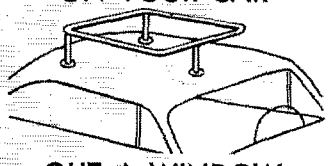
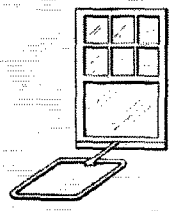
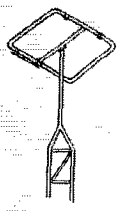


OUT A WINDOW



ON A MASK



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K7PUV/7 had 2 operators no AREC; K7CBP/7, 19 operators 16 AREC; K7RJL/7, 4 operators 2 AREC on 80, 40, 20, c.w. and a.m.; K7KUK/7, 5 operators no AREC; W7PXL/7, 6 operators no AREC with 3 transmitter divisions; W7TDK/7, 9 operators 2 AREC with 3 transmitter divisions; K7LFT/7, 2 operators 1 AREC 2 transmitter division. W7DEM reports for the Grants Pass area: Ex-KN7YQM now has his General Class license. 2-meter activity is good with 15 active stations. K7-VMV is on 2-meter mobile using a Heath Twoer. K7-OVK reports on a new net just formed called the Northwest Sidebanders on 3945 kc. 6:30 P.M. Mon. through Fri. At the time of this report the net, only a week old, has an attendance of 30 and a phone call from K7OVK indicated that this net will be a success. W7JHA is using a B&W 6100 with a GSB-201 kw. linear and Ranger II for stand-by. It could be that this helped him to make BPL again this month. Traffic: (June) W7JHA 512, K7IWD 91, K7SGX 54, W7ZFH 52, W7AJN 11, W7MAO 9, W7DEM 7. (May) W7GUH 293.

WASHINGTON—SCM, Robert B. Thurston, W7PGY—Asst. SCM/SEC: Everett E. Young, W7HMQ. RM: W7AIB. PAM: W7LFA. Your SCM received sixteen Field Day messages from different sites throughout the section which denotes about the average turnout for Field Day activity in the section. The WSN had 30 sessions with 274 QNI's and 129 QTC's for the month. W7BTB received a copy of the February 1964 *Amateur Radio* published in Norwegian at Trondheim Norway from LA4KG, which featured his article on his quad which *QST* published in Jan. 1962. The Northwest Slo Speed Net had 428 QNIs, 150 QTCs during 31 sessions for May. The Lower Columbia Amateur Assn. reports nineteen amateurs at its Field Day site and that its 50-Mc. station, operating a goony bird with a doublet, contacted 19 stations from 21 states. The WSN has changed its operations skeds and is now on a seven-day-a-week schedule at 0200Z. W7AMC says he has had a rough month because of health problems but the good Doc still is hopeful. K7SRI is building a 20-meter quad. W7-FIX, ex-SCM, says he just retired the second time around and again is active with a couple of the old-timers from W6-Land on morning skeds, while the rest of his time is spent on MARS with at least three skeds and sometimes six. W7GVC, from Walla Walla, received a letter of commendation from the Governor for his consistent support of the state RACES Net. W7NSU is vacationing in Idaho and has his NCX-3 on 75 meters. W7ZEI is home from school in Cambridge, England. W7OQN reports a new harmonic born May 22. K7WTA is reported broken down with a burned-up power supply. W7JRV reports excellent results with his new beam rotator. K7ISV is en route to the World's Fair and to pick up a new camper. W7GXI recently celebrated 26 years as an amateur and at the Fourth International ULRL Convention she was awarded a life membership. Rumor has it that W7ULK will hit the trail back east for another session of summer school. We understand there is an s.s.b. traffic net on 2945 kc. at 0230Z Mon. through Sat. K7QOM is operating portable from Bumping River with a new 1-kw. Zeus generator. K7OFX and K7OFW are fishing and hamming at Twin Lakes. W7-OEB spent his vacation in the Tacoma and Puyallup area. W7YFO boxed his TR-3. K7NIH and K7VSD motored to Salt Lake City and the mobile furnished many contacts. K7RSM joined the Navy and is currently at boot camp at San Diego, Calif. K7IYR has a new triband beam in place of the quad. Traffic: W7BA 1323, K7CTP 315, W7DZX 267, W7APS 250, K7JHA 196, W7-OEB 99, W7AMC 36, W7AIB 26, K7SRI 19, W7BTB 16, K7JRE 9, W7JC 4.

PACIFIC DIVISION

HAWAII—SCM, Lee R. Wical, KH6BZF—Every active amateur is invited to submit a monthly station activity report to his SCM on the *first* of each month. Your SCM welcomes club, net or traffic news as well as operational data from individuals and other groups and also invites applications for one of the many ARRL field organization posts available to qualified amateurs. Appointments are available along the line of your natural interest to aid in your operating pleasure. Novice or Technician Class licensees interested in v.h.f. may be eligible for OES appointment, while General and higher class amateurs may qualify for appointments such as ORS, OPS, OO or OBS, in addition to OES. Your SCM, also will consider applications from Technicians for OBS and V.H.F. PAM. Your SCM, address page 6 *QST* will be happy to furnish forms and additional data. Traffic: (June) KH6BZF 5, KH6ATS 4. (May) KH6USA 2215.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: W7JU/K7JU (the K7JU is his retreat QTH). NARA officers for the coming year are K7VYT, pres.; Dave Thimgan, vice-pres.; W7CXH, secy.-treas.; Chris Miller, sgt. at arms. W7YDX and family have moved

(*Continued on page 136*)

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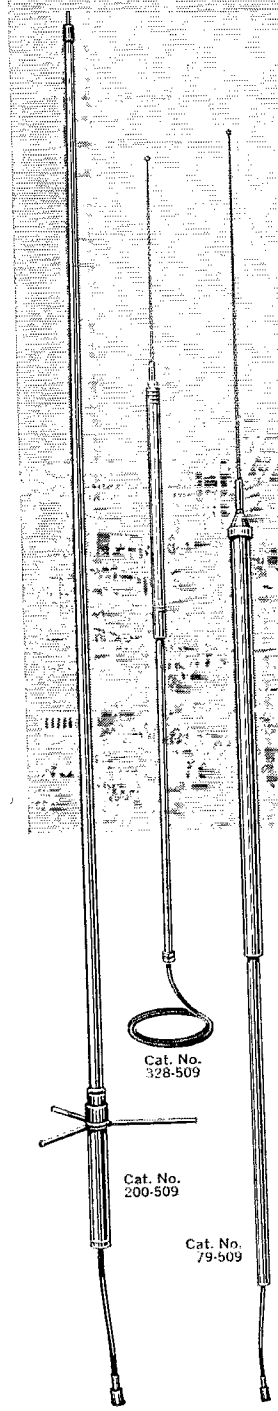

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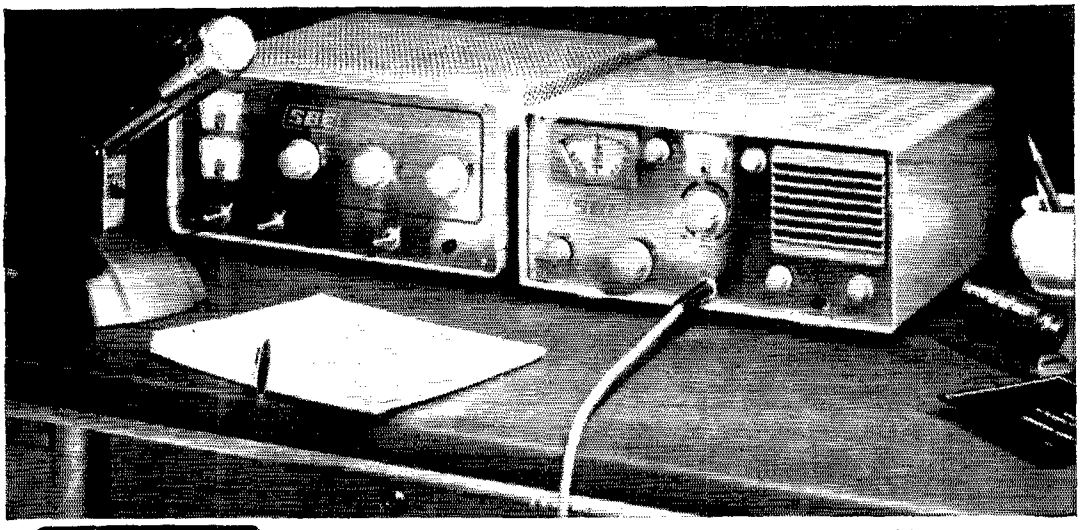
to Wells. Watch for Jerry on 6-meter f.m. K7RKH and family are vacationing on the East Coast. K7PYF is active on 6 meters. WA6ARS is a new station in B.C. and is active on 2 meters. K7USU and family are vacationing in Colorado. K7ZOK says that if 6 meters stays open just a few more times he'll have WAS on 6 for the second time. WA7AVE is active on 2 meters from Henderson. W7YRY is putting out a nice signal on 2 meters. The NARA Annual Dinner at the Starlite Bowl was a success with over forty in attendance. W7AZF is hearing wedding bells and W7ZHW is losing a daughter. K7ICW still is FB on 6 and 2 meters. Traffic: (June) W4CJD/7 65, W7JU 11, W7PBV 4, W7PRM 2. (May) K7SFN 238, W7SHY 9.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM: Ed Turner, W6NVO. SEC: WA6HVN. V.H.F. PAM: WA6RXB. The Santa Clara Valley Section Two-Meter Net reports 12 sessions, 76 check-ins, traffic 11, with 19 stations taking part. WA6DAU sends a nice report on NCN activity, which remains high so far this year. Stations reporting Field Day operations thus far are WB6ABL/6, WA6CBQ/6, W6EE, WA6GWS/6, W6MXO/6, WA6NVQ/6, W6WWJ/6, WA6TNY/6, W6TYB/6. W6UW/6 and W6VZT/6. W6RSY made the BPL and reports that activity remains high even though he has not been on as often in recent months. K6GZ made the BPL. W6YBV is active on NCN. New officers of the Salinas Radio Club (Monterey Bay Radio Club) are WB6AFE, pres.; WA6KEV, vice-pres.; W6HXY, secy. K6DYX is active on RTTY. W6HC reports on Field Day activity as well as TCC activity. W6ZRJ is active with code practice and on NCN. W6QMO is back on the air on NCN and those who remember when Jeri was net manager welcome her back. W6AUC is active as OO and taking part in QCWA affairs. Russ attended the QCWA Picnic at Adobe Creek and the SCCARA Old Timers Meeting. W6ASH is active on the Oscar World Wide Net. WA6UAM is active with 6-meter traffic. WA6YDF has organized the South Bay Six-Meter Net, which meets at 0300Z on 50.4 Mc. daily. WA6HVN works the Mission Trail Net and is active in the Santa Clara County Amateur Radio Assn. WA6RXB reports a new group in Santa Clara called the Santa Clara County Communications Society. The Mission City C.D. Net group was active on Field Day. WA6YMX is the new Radio Officer for Santa Clara County and is organizing a Society of Radio Officers for the county on the order of the very active SORO in San Mateo County. WB6JZY, in Mountain View, aided by WA6KKK and K6VOQ, worked KP4BPZ during the recent V.H.F. Contest on 144.001 Mc. The group used a kw. into a thirteen-element yagi. Our congratulations from the section on this fine Moonbounce work. WA6RXM is very active as OO and sends in a full report. Our thanks to Roger for his fine work. The members of the SCARS enjoyed a fine picnic at San Mateo County Memorial Park on July 19. W6JWD is active as an OO. W6AIT works NCN. Traffic: (June) W6RSY 831, K6GZ 193, W6AIT 90, W6YBV 79, W6HC 77, K6DYX 73, W6ZRJ 56, W6QMO 22, W6AUC 17, W6ASH 14, WA6UAM 6, WA6HVN 4. (May) W6ASH 2.

EAST BAY—SCM, Richard Wilson, K6LRN—The Oakland Red Cross is planning an emergency drill for Oct. 20. Tentative plans call for the Oakland Club, The Hayward Radio Club, SACEN/6, the Livermore Radio Klub and RACES Oakland C.D. Other clubs, groups or individuals are invited to participate. Contact our new SEC, Jack Palmatier, WA6OLF, 4135 Porter St., Oakland, Calif., phone 261-4725, for further details. Some preliminary Field Day scores: LARK reports 1600 QSOs with 13 transmitters, Oakland Radio Club 800 with 5 transmitters, the MDARC about 1100 with 7 transmitters. K6TFT is in Southern Calif. on vacation and operated Field Day with K6QHQ on the Mexican border. K6JZR is a regular on NCN and has been RN6 liaison twice. Ken vacationed in the East with trips to G.E., R.C.A. and as far as Columbia, S.C., to see school TV systems. K6GK has been on vacation but still has time to run up a better traffic count than we who are not. Congratulations to W6NBX on receiving his Extra Class license. K6ZYZ has returned from vacation in Washington and Oregon and may be signing a 7 call this fall. W6OJW has the Heath Twins mounted in his car and was in Alpine and Mono Counties the last week of June and the first of July. WB6ETY, WB6JGA and K6JZR have been issued Section Net certificates. Since there is no regular section net participation in the NCN the Northern Calif. Net will substitute until there are enough East Bay section stations to supplement NCN. To be on the active list, you need only QNI once a week but to be effective I think you should QNI at least every other night. This will be the criterion for the Section Net certificate. WB6ETY is using an ARC-5 while rebuilding the regular rig. The NAPA Valley Net meets every Thurs. at 1900 PDST/0200Z Fri. on 3510 kc. The AREC Net meets on 3900 each Sun. at 1030/1830Z. The NCN meets daily on 3635 at 0300Z. We could use a few more check-ins from the Napa Vallejo Area and the

(*Continued on page 188*)



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SB-33/SB1-LA . . . diminutive duo . . . four-band (80-40-20-15) SSB transceiver/exciter and high power linear amplifier. Bright, state-of-the-art version of a full thumping kilowatt . . . entirely self contained, **including all power supplies** . . . in two tiny cabinets! The only "extras" needed are microphone . . . antenna . . . two lineal feet of mounting space . . . and a strong desire for a clean-cut big signal. And when you look at the photograph above, (the 664 dynamic **does** look big in comparison to the linear amplifier behind it) consider that the SB-33 transceiver on the right also includes **an outstanding receiver** capable of solid-copy reception of the DX that is bound to be stirred up by the KW signal from your powerful pair.

Aside from the use of advanced solid-state circuitry and techniques, there are at least 37 other good reasons why SB-33 can be so small and still deliver in such a convincing manner—18 transistors, 18 diodes and 1 zener diode! (The heavy-duty work is done by two rugged PL-500 beam tetrodes and a 12DQ7 driver). The SB1-LA linear uses 6—6JE6's for 1000 watts P.E.P. on 80-40-20 and 750 watts P.E.P. on 15, achieves its small size in part by careful design and by the use of an all-solid-state voltage-multiplying power supply.

See these best buys at your SBE distributor—**compare** them fully with anything else available, feature-wise, price-wise. (Remembering that SB-33 has **4-bands—panel selectable sidebands—Collins Mechanical Filter—built-in 117V AC power supply** and **loudspeaker,** is 5½"H, 11¾"W, 10¼"D, weighs 15 pounds.

SB-33
TRANSCEIVER

389.50

SB1-LA LINEAR
AMPLIFIER

279.50

Please send full information on SB1-LA Linear and SB-33 Transceiver.

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SBE SIDEBAND ENGINEERS
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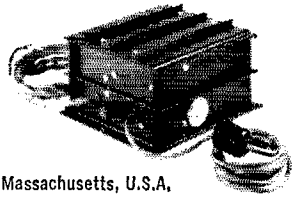
DC to AC INVERTER
for SB-33 (only)
Quiet . . . entirely solid-state.



Export sales: Raytheon Company, International Sales & Services, Lexington 73, Massachusetts, U.S.A.

Southern Alameda County Area. W6TYM is the new president of the LARK and also is a new OO. WA6SQY is vice-pres.; WA6WHY, secy.; Don Campbell, act. chairman; WA6KLL and WB6BSP, executive board members. K6TFT has been appointed OO, OBS and OPS. Cancelled appointments: WA6NOV-W6OHQ as OES. WA6UQM as OBS; WA6RGD as ORS; WB6EKX as ORS and W6NOP as EC. Traffic: (June) W6NBX 66, K6GK 25, K6JZR 24, K6TFT 17, K6LRN 11, WB6ETY 6, WB6ILH 6, WA6FBS 4. (May) WA6FBS 12.

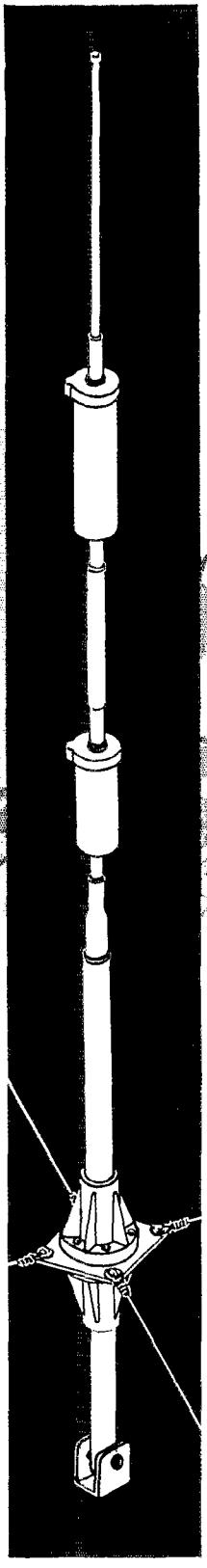
SAN FRANCISCO—SCM, C. Arthur Messineo, W6UDL/K6CWP—SEC: W6KZF, K6TZS, an engineer at K1EM-TV is now active from Eureka. WA6MDL now boasts a 1st-class commercial phone ticket. Activity on u.h.f. is on the increase in that area. The NCARTS enjoyed a guided tour of the FAA Air Traffic Control Center at Fremont. K6LHN, recently discharged from the service, is up and at 'em again. Thanks to new power supplies for the transmitter and receiver our SEC, W6KZF, is now back on the air. The BAYLARC gals and their OMs had an enjoyable meeting at Jamestown, hosted by W6ALL and her OM, W6EWW. W6BDE and her pal from the southland, W6DXI, jetted back East to the YLRL convention and then to the World's Fair in N.Y. Donna, granddaughter of WA6QZA and WA6PTU, is on s.s.lj. from San Francisco. She is only 12 years old. Her call is WB6AUB. For those who feel they need code practice, a scan of the bands almost any night will find transmissions going on between 7 and 9 P.M. Also note: Bay Area liaison is on 3900 kc. and the AREC net meets there Sun. at 10:30 A.M. for informal discussions. Check in and keep in touch. The Santa Rosa boys hold regular SETs on their AREC nets. SF's AREC net would like more mobiles to check in Sun. at 8 P.M. on 50.6 Mc. Plans for the Greater Bay Area Hamfest continue to progress and the week end of Oct. 17 promises to be a great one. Come one, come all! Send reservations and information to the Hayward Radio Club, P.O. Box 113, Hayward, Calif. K6USN's code practice schedules have been temporarily assumed by W6ZRJ, the SCM of S.C.V. A great number of the clubs in this section participated in the Annual Field Day and most of them were unanimous that it was one of the best. It was with great regret that I could not be active with the San Francisco Club as I have been in the past, but business commitments of utmost urgency would not permit it. Alcatraz Island was on the air on FD with W6CUB operating from that location. Howd'ja do it, Dave? Once again I appeal to you traffic men, let's get those reports in so that we know, and everyone else does too, how many messages we really handle during a month. I know by monitoring the bands that many of you are real go-getters but do not send in those totals. Traffic: (June) W6YKS 173, WA6IVM 10, WA6QXV/6 10, W6UDL 10, WB6GBI 2, W6PZE 1. (May) W6YKS 161.

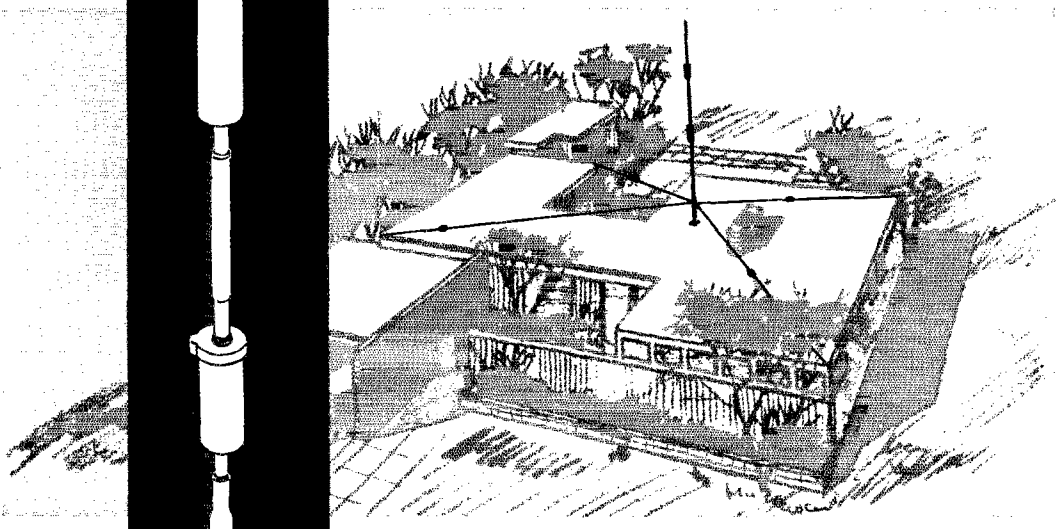
SACRAMENTO VALLEY—SCM, George R. Hudson, W6BTY—Asst. SCM/SEC: Mary Ann Eastman, WA6HYU. Now is the time for you to send in your reservations for the Pacific Division ARRL Convention to be held in Sacramento, at the Hotel El Dorado, Sept. 25, 26 and 27, 1964. For preregistration write: 1964 Pacific Division Convention Committee, P.O. Box 214155, Sacramento, Calif. Preregistration deadline is midnight, Mon. Sept. 14. The Radio Amateur Mobile Society's recent "run" from Sacramento to the Ichthyosaur Paleontologic State Monument in Nevada was a memorable experience and greatly enjoyed by 11 hams and their guests. Good band conditions added to the spice of the safari. The RAMS welcomed four new members: W6LTG, W6LTN, K6UVE and K6ZPQ. Seven FD messages were received by your SCM. Your Asst. SCM/SEC gave over 200 contacts during the 24-hour period on 40 meters FD QSTs from stations WB6IJW, W6TEE, W6GDO, W6AK, W6AF, K6YOU and K6SOU. Despite the fact that the OARS using W6AF's station was QRL in Los Angeles and San Diego, the club had a ball with five operators and racked up a neat score. With the advent of fall comes the opportunity to dedicate or rededicate our amateur radio knowledge and capabilities to the furtherance of the art of amateur radio in all its aspects. In essence, the pleasure we derive from the pursuit of our hobby is offset only by our dedication to (public) service. Many hams ask: "How can I be of service?" The opportunity is yours to gain experience, be effectively prepared and ready for any emergency through assisting your Sacramento Valley section in the appointments of EC, OBS, OES, OO and PAM on v. h. f. and u.h.f. Please direct your correspondence to your SCM for application forms and/or information regarding these appointments. *You* are needed! Your SCM has returned from a brief rest in Palm Springs, well browned and in better health.

SAN JOAQUIN VALLEY—SCM, Ralph Sarovan, W6JPU—The Fresno Amateur Radio Club held Field Day near Dinkey Creek with 30 operators; W6JPS was in charge. WA6BAI, with 18 operators, held Field Day

(*Continued on page 140*)

What's New in Verticals?





Setting the pace in 10, 15, 20 and 40 meters is Mosley's new RV-4 vertical antennas. These outstanding performance giving antennas can now be mounted on any roof as well as on the ground. They operate as a quarter wave vertical antenna on all four bands. The RV-4 features the Mosley slim line Trap-Master traps that have earned user acclaim through daily use in tens of thousands of installations throughout the world. These antennas have automatic band switching for 10 thru 40 meters. The RV-4 antennas are self-supporting and completely factory pre-tuned to maintain low SWR over entire range. The RV-4RK kit for roof mounting includes radial wire mast and hinged mounting. No radials required for ground mounting if a good ground connection can be provided within a few inches of the antenna base. Maximum power rating 750 watts on AM phone, 1000 watts CW and 2000 watts P. E. P. on SSB, input to final amplifier, Uses single 52 ohm coax line. Antenna height 20' 8-5/8" above insulator, with roof mount 25' 2-5/8" Weight of antenna 10 lbs., with roof mount 14½ lbs.

(In request of further information write for literature code # (8)

Mosley Electronics, Inc. 4610 N. Lindbergh Blvd. Bridgeton, Mo. 63044

on Bear Mountain. The Turlock Amateur Radio Club held Field Day on Devil's Nose, near the cabin of W6FYM. W6TZJ is experimenting with an RCA variable silicone diode on 420 Mc. WA6DNI is on all bands with an SBE-33 transceiver. W6NKZ and K6ZCD are operating portable at Shaver Lake, practically across the street from each other. W6FXV is on 2-meter f.m., mobile. W6HXR has a Galaxy III and is mobiling. W6TUI is mobile on 75 with an HW-12 transceiver. K6IFL has a Swan 240. WB6DNG is on 6 meters. WB6ETQ lost his 4CX1000 tube in his 30-S1 amplifier and promptly got a new one! W6BJI and W6TZJ are running 200 watts on 1296 Mc. The v.h.f. gang held a v.h.f. gathering in Porterville on May 15, 1964 with 60 attending. The Turlock Amateur Radio Club had twenty members present and operated on 6 bands during Field Day. W6JPS, K6ZCD, WB6ETQ, W6DUD, K6ACO, W6ZFN and others helped with communications during the Powder Puff Derby take-off here in Fresno. All bands with all modes of transmissions (except c.w.) were used with success. K6ACO is the new Fresno Amateur Radio Club pres. K6HMK gave a talk to the Delta Radio Club on miniturization of equipment. The new call of the Delta Amateur Radio Club is W6BWK, in memory of Bill Shaw.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: Robert B. Corns, W4FDV. SEC: W4MFK. RM: WA4FJM. PAM: W4AJT. V.H.F. PAM: K4MHS. W4EVN and the Robeson County RACES gang operated during FD. K4IEX is working on 6-meter gear. K4EO says he monitors 3865 kc. from 10 A.M. until noon and 1 to 2 P.M. daily. WA4QJA is getting a Sixer for his mobile. W4AJT reports that work on a 2-meter ARPSC net for Guilford County is shaping up. WA4JCS has gone 6-meter mobile with a transceiver and halo. WA4FFW reports ARPSC net activity is off some in Alamance County probably because of summer vacations. K4QIF picked up state No. 3 on 432 Mc. WA4ICU is rebuilding his electronic keyer. K4MHS picked up state No. 20 on 144 Mc. WA4LWE is the new SSBN manager replacing WA4MLV, who is being transferred out of state. W4VON is going to N.C. State for work toward his Ph.D. in addition to his job as chemist at the Research Triangle Institute and says his ham activities will have to be shelved for some time. K4YYJ and the Rowan County AREC operated in FD. From all reports it seems that Operation Election (second stanza) was almost as successful as the first. Many thanks, fellows, for your cooperation. Net Traffic: NCN (E) 251, CCEN 198, NCSSBN 126. NCN (L) 125, THEN 121. Traffic: WA4ICU 204, W4LWZ 166, WA4PDS 110, W4EVN 105, W4IRE 101, WA4ANH 64, K4CDZ 61, WA4FJM 56, W4BNU 34, K4EO 34, WA4DKZ 31, K4IEX 30, W4BAW 24, K4YYJ 23, WA4ASI 12, WA4QJA 8, K4ZKQ 7, WA4JCS 5, W4AJT 4.

SOUTH CAROLINA—SCM, Lee F. Worthington, K4HDX—SEC: W4BCZ. RM: K4LND. A.M. PAM: K4OCU. Nets: C.w., 0000Z and 0300Z, 3795 kc.; a.m., 0000Z, 3820 kc.; s.s.b., 0100Z, 3915 kc. Congrats to WA2TGC/4 on his appointment as OES; also to W4NTO again for the best Frequency Measuring score in the state. The four entries and their average parts per million error are W4NTO 2.3; K4HDX 9.3; W4JA 31.2 and WA4LPV 53.7. W4TLC reports good activity on 220 and 432 Mc. during the June V.H.F. Party. This is the final *QST* column by the outgoing SCM. The association has been enjoyable and I have tried in my small way to serve the amateurs of S.C. Our new SCM, W4PED, certainly is most capable and deserves all our support. WA2TGC/4 reports daily openings on 6 meters with contacts in VP5, VP7 and KP4. Congrats to K4NUG, appointed EC for Orangeburg County. K4OCU is doing a fine job with the new a.m. net on 3820 kc. Give a call into this fine net. Net traffic: A.m. 5. Traffic: WA4PFQ 209, WA4EMY 54, K4OCU 39. W4PED 34, WA4JHD 25, WA4ILO 15, W4JA 8, W4NTO 8.

VIRGINIA—SCM, Robert L. Follmar, W4QDY—Asst. SCM and SEC: H. J. Hopkins, W4SHJ. RMs: K4MXF, WA4EUL, W4SHJ, W4QDY. PAMs: W4JMA (s.s.b.) W4DLA (a.m.). W4OKN says the summer doldrums are running his traffic totals UP! The Virginia Civil War Centennial Award is entering its last year, according to W4JUJ—224 Awards have been issued to date. W4DLA is working some new DX and fighting QRN on the traffic nets. K4TZF has an SR-160 with both power supplies—is both mobile and fixed. W4RHA has returned from a 2500-mile trip. W4CVO got caught in a snowstorm near Cheyenne, Wyo., in June! K4BAV said K4US was a very commercial-looking station at the World's Fair. WA4DUW got himself a receiver for the summer from a friend. WA4EUL is wearing a double hat these days what with managing both the VSN and now the 4RN while W4SHJ is on vacation. WA4FCS has put up a 50-ft. tower and is working 20-meter nets. Another feller with a new receiver is WA4SHD—it's an

(Continued on page 142)

GONSET **SIDEWINDER**
TRANSCEIVER **Model 900A**

SOLID STATE "SCOOP" FROM GONSET!

FIRST AND ONLY TRANSISTORIZED 2 METER SSB-AM-CW TRANSCEIVER FOR MOBILE, PORTABLE AND FIXED COMMUNICATIONS

The totally new Gonset Model 900A *Sidewinder* is the first and only transistorized SSB-AM-CW transceiver (except mixer, driver, final stages in transmitter) to provide complete coverage of the 2 meter amateur band in 4 segments 1 MC wide. Yet it's so compact it fits quickly under the dash of the newest cars! Transistor design makes possible a primary power requirement in the receiver of less than ½ amp! Separate power supply accessories snap-fasten to back of transceiver, or may be used for remote installation. Here's the trouble free, solid state transceiver with power to spare for any fixed, portable or mobile application!

For complete information, visit your Gonset Distributor, or write Dept. QS-9.

CHECK THESE HIGH-PERFORMANCE SPECIFICATIONS:

TRANSMITTER: Transistorized (except for mixer, driver, final states) • **Frequency Range:** 144-148 MC • **Power Input:** 20 watts PEP SSB, 6 watts AM, 20 watts CW • **Spurious Suppression:** —50 db • **Carrier Suppression:** —50 db on SSB • **Unwanted Sideband Suppression:** —40 db • Features include VFO low frequency 1st conversion, with crystal controlled high frequency 2nd conversion for stability, filter type side-band generation and broadband circuits for easy operation.

RECEIVER: All-transistorized • **Frequency Stability: Highly** stable; utilizes same VFO as transmitter • **Sensitivity:** ½ microvolt or better for 10 db $\frac{S}{N}$ • **Selectivity:** 3.5 kc filter for both receiver and transmitter • **Audio Output:** 3.0 watts • **Spurious Suppression:** —50 db or better • **Image Rejection:** —50db (receiver and transmitter utilize double conversion) • Full RF amplifier with three tuned circuits for low noise figure, good selectivity. Separate RF and AF gain controls.

TRANSCEIVER: Both the receiver and transmitter are dual conversion, using 15 MC and 9 MC frequencies with a **hermetically sealed** crystal lattice filter. **Dimensions:** 8⅞" W., 4⅞" H., 7¾₆" D. • **Wt.:** 10 lbs.-8 oz. POWER SUPPLY: **Dimensions:** (AC or DC) 8⅞" W., 4⅞" H., 5¹⅝₆" D. • **Wt.:** 13 lbs.-8 oz.

PRICE: TRANSCEIVER: $399.50 Amateur Net; POWER SUPPLY: AC—$67.75 Amateur Net • DC—$79.50 Amateur Net

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NC-303. K4GRZ still is trying to get a 6-meter net organized but band conditions are making it tough. W4PFC, the Marine Corps station, is sporting some new blood. WN4QIT has passed the General Class exam. W4PTR still is trying to find the right kind of antenna for his location. W4ZM says that he attended a hamfest in his home town where he started in amateur radio 50 years ago. SEC W4SHJ and family are vacationing in the Southwest and other parts. W4BZE, one of our Richmond regulars, is planning a fishing trip to oblivion in the near future. Field Day seems to have been quite a success in Virginia section according to reports. Traffic: (June) W4PFC 436, W4DLA 409, W4DVT 262, WA4-EUL 184, W4RHA 178, W4JMA 177, W4OKN 119, W4-MXU 103, W5VZO/4 95, WA4FCS 93, WA4KTZ 65, W4-NLC 62, W4DKP 59, WA4SHD 54, WA4FSC 51, K4ITV 50, K4ISM 48, W4TE 48, W4PTR 45, WA4JRY 25, W4-BZE 20, W4SHJ 16, K4LJK 15, W4LK 14, WA4IVM 13, WA4KVR 11, K4NOV 10, WA4DUW 8, W4KX 8, K4-BAV 6, W4MK 6, K4SDS 6, W4WO 6, W4CVO 5, W4UUJ 5, K4GRZ 3, K4TZF 2, W4WBC 2, W4ZM 2, K4JKK 1, W4ZAU 1. (May) W4DVT 299, K4SDS 149, W4JMA 145, WA4SHD 135, K4ITV 76, W4NLC 48, W4SHJ 48, W4BZE 46, W4WO 46, WA4JRY 34, W5VZO/4 20, K4NOV 18, W4LK 17, K4KNP 10, K4JKK 4, K4BAV 2, W4KX 2, W4WBC 2.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. RM: K8HID. PAM: K8CHW. West Virginia Nets meet on 3570, 3890, 3903 and 3905 kc. WA8-CRW reports 17 sessions of the S.S.B. Net with 262 stations and 4 messages. K8EEO was elected net manager at the s.s.b. meeting during the State Convention. K8-CHW, the new PAM and Phone Net Manager, reports 22 sessions, 443 stations and 47 messages for WVN (phone). John Huntoon, **General Manager of the League,** attended the State Radio Convention, then visited the Kanawha Radio Club. K8CAY worked Utah for the 48th state on 6 meters. WA8FIC continues his fine traffic work. W8LMF has been elected c.w. net manager. WA8-MRK is a new General in Fairmont. W8NTV operated mobile 14-Mc. s.s.b. on a trip to the West Coast. K8-MQB and W8DUV attended the YLRL Convention at Columbus. With the State Radio Council announcing a Field Day award, FD activity was quite high with East River, Kanawha and Tri-State ARC having fine turnouts and many contacts. Who has worked the most counties in West Va. on frequencies above 30 Mc.? Traffic: WA8FIC 148, K8TPF 96, WA8DGE 22, W8LMF 19, K8EEJ 8, W8CKX 3.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Donald Ray Crumpton, KØ-TTB—Summer time has cut activities and reports down to nothing. Field Day activities were reported by two groups. It seems they had lots of fun, but not many participated. The SCM spend a hot 10 days in Mississippi, had the mobile rig along, but not too much activity on 80 meters. The *Greeley Colorado News* had a nice article regarding hams and the Alaskan earthquake. WØOUI, Denver Radio Club, expects to have some s.s.b. gear to go aong with the present setup in the near future. High Noon Net traffic: 174. Traffic: KØZSQ 138, KØDCW 68, WØHXB 66.

UTAH—SCM, Thomas H. Miller, W7QWH—Asst. SCM: John H. Sampson, W7OCX: SEC: W7WKF. The race for the annual Field Day trophy presented by the Utah Council of Amateur Radio Clubs is over now and it looks as though it will be very close. The UARC (Salt Lake) went to Saltair and racked up a good score. Another group, made up mostly of UARC members but not representing UARC, called themselves Murphy's Rebels, camped out in the high Uinta Mountains at 9500 feet and also made a fine score. Reports from the Ogden, Bountiful and Hill Air Force Base Clubs are not in at this writing. This will be the last report that W7-QWH will write as SCM. Thanks are due to the people who have worked so hard over the last 7 years. Please give your new SCM your support. It is an easy job when the SCM hears regularly from the membership; a tough one otherwise. Traffic: W7LQE 170, W7OCX 40, W7VTJ 20.

New Mexico—SCM, Newell Frank Greene, K5IQL—Asst. SCM: Kenneth D. Mills, W5WZK. SEC: K5-QIN. RM: W5ZHN. W5LUX, formerly of Arkansas, is becoming acquainted and active in his new home. We appreciate those offers of help from members. The Caravan Club assisted in the Ft. Sumner Road Races, May 2 and 3. Among the mobiles taking part were K5HAN, K5YQP, K5FXQ, K5WNE, W5LQM, K5BKT and WA5-DVZ. In the Artesia flood, W5ROH manned his h.c. station all night then got on 40 to handle welfare traffic. We had two cases recently where CBers turned out in force . . . but no amateurs! Is AREC headed for "a wreck"? The moving finger writes, and having writ moves on . . .". A sightless doctor in Artesia has been trying to get into amateur radio for years. W5ROH assisted, and a Novice license has been issued (we mis-

(*Continued on page 144*)

New powerful compact Galaxy Transceivers designed with a touch of elegance and hard core engineering. Never before has so much quality been offered to the amateur for so little cost. For the 80-40-20 meter Fan it's the Galaxy III and only $349.95 amateur net. Want all Bands? "Cover all five, 80-40-20-15-10 meters, with the sensational Galaxy V — only $469.95."No matter which Galaxy you choose,a full line of Galaxy accessories are interchangeable with either transceiver. Add up the features: POWERFUL — 300 watts • COMPACT — only 6" x 10¼" x 11¼" (less than one cubic foot in size) • FILTER — the only 6-crystal filter available • RECEIVER — it's the "HOTTEST" with full coverage on all bands. LOOK at the new VFO side view dial — perfect for mobiling — plus many other outstanding features too numerous to list. *Why wait? The Galaxy Transceivers were built for your pleasure . . . ask the man who owns one!*

SEE THEM AT YOUR FAVORITE DISTRIBUTOR NOW!!

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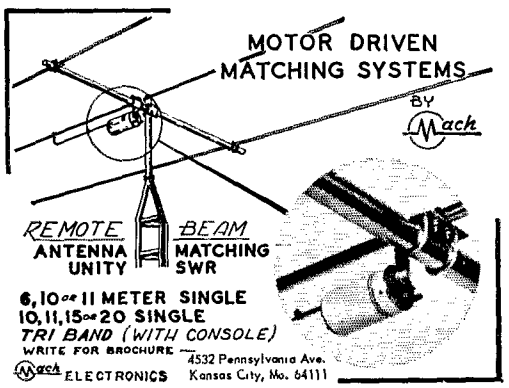

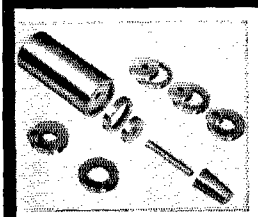

placed the call). However, the doctor insists he will not get on the air until he passes the General Class test. Traffic: W5UBW 79, W5LUX 35, WA5FFL 7, K5RWB 4, W5GD 2, W5MVP 2.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM and ORS: K7QYG. OBS: W7TAQ. Nets: Pony Express, Sun. at 0800 on 3920; YO, Mon., Wed., Fri. at 1830 on 3610: AREC, Mon. through Sat. at 1230 on 3920. Note that we have had an SEC since June and your support and cooperation is invited in helping us get an efficient AREC organization set up. We had a very fine showing of activity for Field Day in June with Worland, Cheyenne and Casper participating. W7VB and K7AHO represented Worland on top of Bald Ridge. Cheyenne had 14 operators and Casper had 12 operators. I wish to take this opportunity to thank all of you whom I haven't seen in person by now for the very fine vote of confidence I received in the SCM election. We need more requests for station appointments and monthly reports from appointees. Traffic: K7AHO 8, K7VTM 7, K7YPT 4, K7SLM 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, William S. Crafts, K4KJD—SEC W4NML. RM: WA4EXA. PAMs: K4NSU and K4WHW. Thanks to K4WWP for handling AEND while WA4AVM was off the air. New Novices in Birmingham: WN4s TSF, TSG, TSI, TSJ, TSK, TSL, TSM, TUU, TUV and TUW. New Jasper hams: WA4TXI and WS4UBO. W4RLS had severe wind damage to his beams but they are OK now. K4PND has 700 watts on 6 and is preparing for Moonbounce. WA4HKY and WA4HSB have a Utica 650 and beam. W4USM has a new Tri-Bander. June net reports (times GMT):

Net	*Freq.*	*Time*	*Days*	*Sess.*	*Ave. Tfc.*	*Ave. QNI*
AENB	3575	0100	Daily	31	4.4	8.8
AEND	3725	2200	Mon.-Sat.	25	1.2	5.45
AENM	3965	0030	Daily	30	3	43
AENO	50.55	0115	T/T/Sat.	13	2.8	22.1
AENP	3955	1230	Mon.-Sat.	27	1.7	14
AENP	3955	2400	Daily	31	2.4	20
AENT	3970	2230	Daily	34	1.047	7.36

New officers of the Tuscaloosa club are WA4EXY, pres.; WA4NFS, vice-pres.; WA4JQP, secy.-treas. If you are not checking into one of our nets, how about doing so? Traffic: (June) K4WWP 172, WA4EXA 167, W4NML 104, K4WOP 77, K4NUW 53, K4BSK 48, W4YNG 46, WA4GLX 44, K4WHW 42, K4ANB 41, K4AOZ 38, WA4EXB 37, K4KJD 19, K4CFD 18, W4YRM 14, K4NSU 12, K4GXS 11, K4BTO 9, W4DGH 8, WA4HKY 4, K4JDA 4, WA4MGI 4, K4FZQ 3, K4HJM 3, W4KCQ 3, W4CIU 1, K4RIL 1. (May) WA4IGV 6.

EASTERN FLORIDA—SCM, Guernsey Curran, W4GJI—SEC: W4IYT. A.M. PAM: W4SDR. S.S.B. PAM: W4OGX. C.W. RM: K4KDN. RTTY RM: W4RWM. VHF. PAM: WA4AZZ. It's a fact that this report is served up monthly in *QST*. There are more members who read "Station Activities" in entirety than I could ever conceive. This necessarily tends to abridge the expression of some direct opinions, also it's difficult to determine how much of the truth should be set forth. Unequivocally, however, I will start with the statement that those 21 who arbitrarily on March 1, 1931, got Hobbs to get Handy to sylit Florida into two sections were, to say the least, unthinking except for themselves. Some of 'em are still around, same as I am, but I wonder if they vote in Georgia—same as always; or Alabama maybe. The State of Florida is a military, naval and Coast Guard fortress from Pensacola to Key West. The State of Florida is an entity of civil defense under the National Department of Defense. As such it is a potential target area of great concern. This has to be as long as there is hostile support to an island to the southeast with funds, personnel, ships and logistics. Under the circumstances a prime and vital need is adequate, let alone specialized, communications of every type that can be made available. The tripe that has come across my desk with regard to the subject of resectionalizing Florida appalls me for it is obvious that the thinking does not extend beyond League, and even personal opportunity. One official even proposes Florida be divided into three sections. Gruss Gott! and may your tubes run cool! Traffic: (June) WA4BMC 473, K4BY 225, K4YFN 212, K4KDN 187, K4COO 132, W4URX 129, W4TRS 115, W4SDR 88, W4LUV 87, W4DFU 84, W4IEI 78, K4LCF 75, W4OGX 73, WA4NBE 68, W4TUB 67, K4ADD 66, K4ODS 52, WA4RSQ 46, W4GJI 38, W4IYT 36, W4VWL 31, K4QAY 30, W4AKB 27, K4SJH 20, K4DAX 19, K4FQP 19, W4TJM 16, W4BKC 15, K4MTP 14, WA4RBM 14, W4YJM 13, W4EBE 12, W4AYD 10, W4FP 10, W4IE 8, WA4DKG 7, WA4OBD 4, W4EHW 3, WA4EVQ 2, W4LVV 2, WA4STJ 2, WA4PNZ 1, K4VEJ 1. (May) K4WXS 16, W4LVV 5.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE. PAM: K4NMZ. RM: W4BVE. Tallahassee: New officers of the TARC are K4DAD,

(*Continued on page 146*)

NEWS

B & W OFFERS AMAZING Model 6100 TRANSMITTER FACTORY DIRECT!

NEW LOW PRICE!

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$495.00

NO TRADES

FOB FACTORY

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- Digital Dial System offers a high degree of dial accuracy.

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See you at the National ARRL Convention

pres.; WA4AMH, vice-pres.; WN4PUK, secy.-treas. K4SRI had an interesting talk on transceivers at the last meeting. WA4GES had his station demolished by lightning. Local WFPN stations are kept busy handling traffic for the Weather Bureau. K4DAD has his kw. rig about done. Marianna: The Jackson Co. ARPSC Net, organized by WA4DED, meets Tue. at 0100Z on 3836 kc. Panama City: WA4FIJ is now on v.h.f.s.s.b. with HA-6 and HA-2 transverters. The PCARC was active in FD using the call W4JJ/4 and made over 1000 QSOs in the multi-transmitter class. WA4FJF accompanied W4BWR to Ohio for the YLRL Convention. Fort Walton/Eglin AFB: EARS, W4SRX, operated from Silver Beach during FD and beat last year's score by a good margin. W4TFL is a new OO appointee in the Crestview area. Milton: K4NMZ is new net mgr. of WFPN; also PAM and ops. Pensacola: The PARC had the ideal FD site—a 120-ft. barge anchored in the Bay! Nearly 600 contact were made in the single-transmitter class. New PARC officers are K4SMB, pres.; W4ETE, W4OOW and K4FKV. W4SRM has gone s.s.b. with a Swan. W4QK is working DX on 6 meters. Traffic: (June) K4VFY 243, WA4FIJ 111, K4NMZ 92, K4SMB 70, WA4NRP 2. (May) WA4IMC 282, K4NMZ 76.

GEORGIA—SCM, Howard L. Schonher, W4RZL—SEC: K4MDC. RM: W4DDY. PAMs: W4FYH, K4PKK, WA4EHT. K4VGQ earned DXCC No. 7136. K4BAI, with a new NCX-3 is active again as ORS and OO. K4BVD is spending twelve weeks in England this summer. K4YZE, with the new stacked array for 2-meters and 220-Mc. rig completed, now is setting out to conquer 432 Mc. W4LNG adds 2-meter f.m. at home and in the car for c.d. work. K4BXU has a new panadapter. W4PIM reports from his new QTH. WA4PRZ got his new quad in the air the second try. K4CRC returns to the air as the club call of the Elberton Amateur Radio Society. WA4HSN is new on the list of Official Bulletin Stations. WA4GPA is DXing on 20 and experimenting with v.h.f. antennas. The Cobb County AREC Net meets Mon. at 0100Z to 0200Z on 145.350 Mc. K4FUE reports 2-meter interest growing in the Thomasville area. K4VGQ reports several good 50-Mc. openings. WA4MPD earned commercial third and is working on first. WA4FNY with a Heath Sixer, is giving the band a workout. WA4PSA is going to the University of Georgia next year. W4PPW has a new all-band home-brew s.s.b. transceiver. Traffic: W4DDY 145, K4MCL 63, K4BAI 36, W4RZL 36, WA4PSA 34, W4NSO 33, W4PIM 24, K4FLR 18, WA4MPD 12, WA4GPA 10, W4MLA 10, WA4HSN 9, WA4BVD 7, WA4LLI 7, WA4JXL 6, WA4CJN 5, K4YZE 5, K4BVD 3.

CANAL ZONE—SCM, Thomas B. De Meis, KZ5TD. —(Report by Eugene D. Rossel, KZ5OC). The CZRA met July 2 and discussed the 50th anniversary QSL cards. KZ5PR and KZ5UR presided. These cards will be distributed to a coordinator in every city and military base in the Canal Zone. KZ5HH and KZ5II have adopted a baby girl. KZ5VR and KZ5RV left for the states Aug. 3 and will return probably in Oct. VK6KK, from Trig Island, Australia, was in the CZ for an evening before going to England. KZ5AX had an Air Force MARS Field Day June 27-28. Cerro Cedro, one of the many hills at Albrook AFB, was used as base camp by KZ5AX and his 11-man MARS station. KZ5s KL, KY, EH, WE and BY braved the hill from 1614 EST Sat. until 1614 EST Sun. A total of 625 messages were sent out. KZ5AX collected 3900 points in the Field Day exercise operating on 15, 20, 40 and 80 meters with two Eldico transceivers, one 32V2 transmitter, an SP-600 receiver, two three-element beam antennas on 15 and 20 meters, an inverted "V" on 40 and a dipole on 80 meters. KZ5AA operated Field Day on Contractor Hill with three transceivrs. KZ5s HO, AA, BX, BT, EV, KK, CU, IM, VR, RV and AW spent their week end at the hill. KZ5OA and KZ5OB operated Field Day on a hill at Gatun. KZ5OC just returned from 20 days leave.

SOUTHWESTERN DIVISION

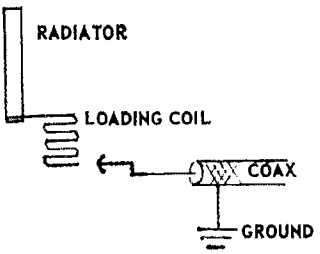
LOS ANGELES—SCM, John A. McKowen, W6FNE—Asst. SCM: Richard H. Ingham, WA6DJB. SEC: K6YCX. PAMs: K6PZM, W6ORS, WA6TWS. RMs: W6BRG, W6QAE. K6LVA is planning to ham TV and is looking for equipment. Plans are going ahead full steam for the RTTY link between Red Cross Headquarters and the Section AREC Headquarters at K6BPC. Many problems are being solved with ARC tie-in. WA6YEA traded his Tech Class ticket for a Gen. Class. Many groups reported a good time on Field Day. W6NAA finds college math is cutting into his ham time. K6LDM is busy holding down several NCS spots on SOCAL SIX. K6PZM is out of the hospital and feeling better. K6YCX finished a Gal/2 linear for 80, 40 and 20 meters using a 4CX300A in grounded grid. W6BHG worked Field Day independent of mains from his home QTH. Pretty soft, Hank! K6SIX reports the 6-meter antenna is fixed and the nuvistor converter for 2 meters is working FB. W6FB reports convention registrations are pouring in.

(Continued on page 148)

HISTORY - AND THE BIG SECRET

It is an historical fact that the Gotham 23' base-loaded, all-band vertical antennas have been consecutively advertised in QST for a longer time than any other antenna, and perhaps consecutively longer than any ham product.

When a product is popular and long-lived we sometimes lose sight of those newcomers who are not familiar with the 'secret' of its design. Here is the basic circuit:



A single 50 ohm coaxial feedline (either RG8/U or RG58/U) connects to the resonant point of the loading coil for operation on 80 or 40 meters, at SWRs of close to 1:1. On 20, 15, 10 and 6 meters, the loading coil is bypassed and loading is accomplished by the transmiter pi-network output or antenna tuner output.
Note that the antenna is not grounded, and that radials are not used.

We are often asked if a Gotham vertical antenna will operate on MARS, C.D., C.B., MARINE, or other non-ham frequencies. Here is a simple method of tuning to any desired frequency within the range of the antenna: The inner conductor of one end of the coax is moved up the loading coil a turn at a time while the other end is coupled to a grid dipper tuned to the desired frequency. At one point, there will be a decided dip, and this is where permanent connection is made. With an SWR indicator, this point will indicate minimum SWR. With a field strength meter, maximum radiation will be achieved. Using a transmitter, this point will permit proper loading.

GOTHAM VERTICALS DELIVER THE CONTACTS

PROVEN! PROVEN! BY THESE EXCERPTS FROM UNSOLICITED TESTIMONIALS:

CASE HISTORY #71
"I am very delighted with the first V80 and want another for a different location." A. C., California.

CASE HISTORY #159
"I ordered a Gotham V40 Vertical Antenna and found it so successful that several others are wanting them, too. Will you please send me four more." W. A., Alaska.

CASE HISTORY #248
"I just wanted to let you know how pleased I am with my Gotham V80 antenna. I have worked a W.A.S. of 46/43, a WAC of 3/3, and DXCC of 14/12 in about 12 months." G. W., Maryland.

CASE HISTORY #111
"The V160 did a beautiful job on a VE1 for me. Also, I forgot to take it down during the hurricane of last week. It is just as straight as it was when I bought it." D. S., New Jersey.

CASE HISTORY #613
"I have never been happier with any antenna than I have been with the V80. I have worked all bands with it and have had tremendous success — i.e., DL4s, ZS3, etc., all solid copy." R. D. S., Penna.

CASE HISTORY #483
"My V80 is working wonders. I am able to maintain a 1:1 SWR all across the 40 meter band. After many years on 10, 15, and 20, the XYL and I are getting great kicks out of some of the lower bands." J. A., New Mexico.

CASE HISTORY #146
"I have had very good luck with mine (my V80) feeding it with a Johnson Adventurer; works fine on all bands." B. I., Nebraska.

CASE HISTORY #555
"Being an owner of your V80 vertical I would like to let you know of the excellent results I am getting with it, both working the DX and the local stations on the lower bands. It certainly is an excellent antenna system." F. H. Jr., New York.

CASE HISTORY #84
"A few months ago I purchased your V40 vertical and have achieved outstanding results on the air." K. G. B., North Carolina.

FREE CATALOG

AN ANTENNA THAT SURVIVES THE COMPETITIVE STRUGGLE CONTINUES TO BE ADVERTISED.

WHY

THE GOTHAM VERTICAL ANTENNA IS THE BEST ALL-BAND ANTENNA

- Absolutely no guying needed.
- Radials not required.
- Only a few square inches of space needed.
- Four metal mounting straps furnished.
- Special B & W loading coil furnished.
- Every vertical is complete, ready for use.
- Mount it at any convenient height.
- No relays, traps, or gadgets used.
- Accepted design—in use for many years.
- Many thousands in use the world over.
- Simple assembly, quick installation.
- Non-corrosive aluminum used exclusively.
- Multi-band, V80 works 80, 40, 20, 15, 10, 6.
- Ideal for novices, but will handle a Kw.
- Will work with any receiver and xmitter.
- Overall height 23 feet.
- Uses one 52 ohm coax line.
- An effective modern antenna, with amazing performance. Your best bet for a lifetime antenna at an economical price.

73,
GOTHAM

DO YOU KNOW

1. YOU WILL HAVE NO DIFFICULTY INSTALLING YOUR GOTHAM VERTICAL ANTENNA IN JUST A FEW MOMENTS, REGARDLESS OF YOUR PARTICULAR PROBLEM, SO ORDER WITH CONFIDENCE EVEN IF YOU HAVE RESTRICTED SPACE OR A DIFFICULT SITUATION.
2. LOADING COIL NOT REQUIRED ON 6, 10, 15 AND 20 METERS. FOR 40, 80, AND 160 METERS, LOADING COIL TAPS ARE CHANGED MANUALLY EXCEPT IF A WIDE-RANGE PI-NETWORK OUTPUT OR AN ANTENNA TUNER IS USED, IN THIS CASE BAND CHANGING CAN BE DONE FROM THE SHACK.
3. EVERY GOTHAM ANTENNA IS SOLD ON A TEN DAY TRIAL BASIS. IF YOU ARE NOT FULLY SATISFIED, YOU MAY RETURN THE ANTENNA PREPAID FOR FULL REFUND OF THE PURCHASE PRICE. THIS IS YOUR GUARANTEE OF FULL SATISFACTION.

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☐ V40 VERTICAL ANTENNA FOR 40, 20, 15, 10 AND 6 METER BANDS..... $14.95

THE V40 IS ALSO MADE FOR CITIZENS BAND OPERATION, WITH SPECIAL INSTRUCTIONS. DESIGNATE CB-11 ANTENNA. PRICE SAME AS THE V40

☐ V80 VERTICAL ANTENNA FOR 80, 40, 20, 15, 10 AND 6 METER BANDS. MOST POPULAR OF THE VERTICALS. USED BY THOUSANDS OF NOVICES, TECHNICIANS, AND GENERAL LICENSE HAMS.. $16.95

☐ V160 VERTICAL ANTENNA FOR 160, 80, 40, 20, 15, 10 AND 6 METER BANDS. SAME AS THE OTHER VERTICAL ANTENNAS, EXCEPT THAT A LARGER LOADING COIL PERMITS OPERATION ON THE 160 METER BAND ALSO..... $18.95

HOW TO ORDER. Send check or money order directly to Gotham. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

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Address.....

City.....Zone.....State.....

Don't be too late! W6AM's oldest grandson is on the air with the call WN6HRB. K6GIL visited K6BX in Bonita, 1964 "QSO Field Day" for school club stations is set for Oct. 23 and 24. Several stations are busy trying to figure out why traffic listed on RN6 as SCN never reaches SCN. The first two reports are very interesting. WB6DMB is having good luck with 1230-Mc. preselectors. New officers of the Tri-County Radio Assn. are K6YTQ, pres.; WA6ZMA, vice-pres.; WB6DSP, treas. The LERC will continue its 18-week course for the General Class ticket. The next class starts Sept. 14. Contact Bill Welsh at 2814 Empire Ave. Burbank for an application blank and information. New officers of the Rio Hondo RC are WA6RVB, pres.; K6YTO, vice-pres.; WN6GZH, secy. Support your section nets: Southern California Net (SCN) 3600 kc. daily at 0300Z; SOCAL SIX (SCS) 50.40 Mc. at 0145Z and 1900Z daily. See you at the Southwest Division Convention Sept. 11, 12 and 13. Look for the AREC Booth while there. Traffic: (June) W6WPF 862, WB6BBO 791, K6IWV 735, W6GYH 659, WA6WTK 544, K6MDD 506, WB6GZY 260, WA6TAW 251, W6QAE 247, WA6TWS 203, WB6HRH 172, WB6EUU 94, WA6YEA 80, WA6WTX 74, WB6BBH 60, WB6GXI 40, W6NAA 27, W6VOZ 26, W6USY 24, K6LDM 21, K6GIL 20, K6PZM 19, WA6AAH 16, WA6WKF 16, W6CK 14, K6YCX 14, W6BHG 12, K6SIX 10, WB6FPQ 5, W6SRE 4, W6FB 3, W6LVQ 3, W6ORS 3, W6AM 2. (May) WA6TWS 482, K6LDM 67, W6FD 22, K6GIL 8, WA6YMY 2.

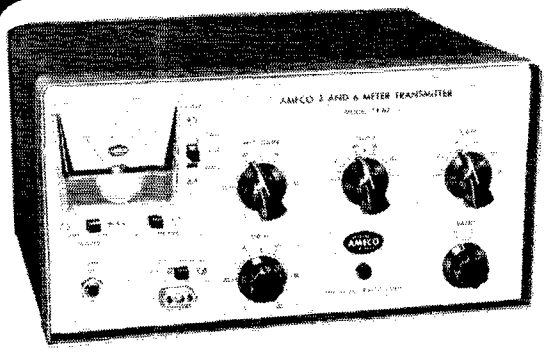
ARIZONA—SCM, Floyd C. Colyar, W7FKK—SEC: K7NIY. PAM: W7CAF. AM: K7TNW. Appointments: W7CAF as PAM. New officers of the Phoenix V.H.F. Radio Club are W7RVY, pres.; K7UKV, vice-pres.; K7UJV, secy.; K7UJU, treas. It is with deep regret that we report the passing of W7JKY's YXL. Your ARRL offers many opportunities to increase your pleasure of amateur radio and not only to League members either. We welcome you on the Copper State Phone Net, which meets on 3880 kc. at 0200 GMT Mon. through Fri., and the Arizona C.W. Net (ACN) which meets on 3575 kc. at 0200 GMT Mon., Wed. and Fri. K7RUR attended the Mission Trail Net Roundup. Field Day was a great success and FD messages were received from a number of groups. Best wishes to the Scottsdale Amateur Radio Club which celebrates its sixth anniversary. The club was originally formed through the efforts of W7FXT, K7ASK and W7HXH. K7VQI reports the FD two-way TV transmission attempt from Mt. Lemmon to Tucson failed because of generator trouble. Your EC would like your assistance in the Amateur Radio Emergency Corps. Drop a line to K7NIY if you don't know who your local EC is. Or maybe you would be interested in being an OO, OBS, OES or EC for your locality. Surely we have something that can interest you. Please let us know. Traffic: W7FKK 22, K7VQI 10.

SAN DIEGO—SCM, Don Stansifer, W6LRU—Thirteen stations in the section sent their SCM activity reports for the month of June, and three clubs sent in their bulletins. W6DGM, ORS, Newport Beach, was visited by his father, W9HNS, in July. They have had several thousand QSOs over the years. WA6ROF, Orange County ORS, vacationed to Yosemite after school was out in June. W6BGF, ex-traffic man, operated the ARPSC-C.D. van at the San Diego County Fair. W6WRJ reports an Orange County RACES drill connecting 14 hospitals into control center via mobiles in a test of emergency communication facilities. W6WRJ is Radio Officer, and W6QAT is the Operations and Training Officer. K6MTN is the newest member of the SOBARS. W6HAW, of the Palomar Club, has his new seven-element 20-meter beam on top of his 80-ft. tower. The Orange County Council of Amateur Radio Organizations has a Blood Bank for amateurs and their immediate families. The American Red Cross is handling the paper work and cooperating. W6PM vacationed to the World's Fair and enjoyed mobiling to and from. Sorry to report that ex-San Diego area amateur W6JUM was killed in an airplane accident near Bishop, Calif., while flying for the Civil Air Patrol on a rescue mission. Traffic: (June) W6IAB 4114, K6BPI 4053, W6YDK 3543, WB6JUH 512, W6EOT 305, WA6ROF 101, WA6RRG 53, W6BGF 50, K6IME 40, WA6CDD 35, W6DGM 32, K6LKD 16, W6WRJ 10. (May) W6YDK 1957.

(Continued on page 150)

AMECO *Leader in Compact, Quality Ham Gear*

NEW 2 and 6 Meter TRANSMITTER



The NEW AMECO TX-62

In response to the demand for an inexpensive compact VHF transmitter, Ameco has brought out its new 2 and 6 meter transmitter. It is easy to tune because all circuits up to the final are broadbanded. There is no other transmitter like it on the market!

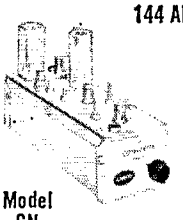
SPECIFICATIONS AND FEATURES

Power input to final: 75W. CW, 75W. peak on phone.
Tube lineup: 6GK6—osc., tripler, 6GK6 doubler, 7868 tripler (on 2 meters) 7984-Final. 12AX7 and 6GK6 modulator.
Crystal-controlled or external VFO. Crystals used are inexpensive 8 Mc type.
Meter reads final cathode current, final grid current and RF output.
Solid state power supply.
Mike/key jack and crystal socket on front panel. Push-to-talk mike jack.
Potentiometer type drive control. Audio gain control.
Additional connections in rear for key and relay.

Model TX-62 Wired and Tested only $149.95

• HAS BUILT-IN MODULATOR AND POWER SUPPLY • 75 WATTS PHONE AND CW • ATTRACTIVE LIGHT GRAY PANEL AND DARK GRAY CABINET • COMPACT SIZE 11½" WIDE, 9½" DEEP, 6" HIGH.

NUVISTOR CONVERTERS FOR 50, 144 AND 220 MC. HIGH GAIN, LOW NOISE



Model CN

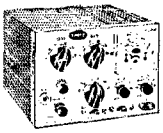
Has 3 Nuvistors (2 RF stages & mixer) and 6J6 osc. Available in any IF output and do NOT become obsolete as their IF is easily changed to match any receiver. Average gain — 45 db. Noise figure — 2.5 db. at 50 Mc., 3.0 db. at 144 Mc., 4.0 db. at 220 Mc. Power required 100-150V. at 30 ma., 6.3V. at .84A. See PS-1 Power Supply. Model CN-50W, CN-144W or CN-220W wired, (specify IF.) **$49.95.** Model CN-50K, CN-144K or CN-220K in kit form. (specify IF.) **$34.95**

ALL BAND NUVISTOR PREAMP 6 THRU 160 METERS

MODEL PCL, Wired, $24.95
MODEL PCLP with built-in power-supply, wired, $32.95

2 Nuvistors in cascode give noise figures of 1.5 to 3.4 db. depending on band. Weak signal performance, image and spurious rejection on all receivers are greatly improved. PCL's overall gain in excess of 20 db. Panel contains bandswitch, tuning capacitor and 3 position switch which puts unit into "OFF," "Standby" or "ON," and transfers antenna directly to receiver or through Preamp. Power required—120 V. at 7 ma. and 6.3 V. at .27 A.—can be taken from receiver or Ameco PS-1 supply. Size: 3"x5"x3".

COMPACT 6 THRU 80 METER TRANSMITTER



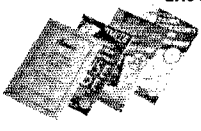
Model TX-86

Handles 90 watts phone and CW on 6 thru 80 meters. Final 6146 operates straight thru on all bands. Size — only 5" x 7" 7 7" — ideal mobile or fixed. Can take crystal or VFO. **Model TX-86 Kit $89.95 — Wired Model TX-86W $119.95. Model PS-3 Wired $44.95. Model W612A Mobile Supply wired $54.95.**

CB-6

CB-6K — 6 meter kit, 6ES8-rf Amp., 6U8-mix./osc. $19.95
CB 6W — wired & tested $27.50
CB-2K — 2 meter kit, 6ES8 1st rf amp., 6U8 — 2nd rf amp/mix, 6J6 osc. $23.95
CB-2W — wired and tested. ... $33.95
Model PS-1 — Matching Power Supply — plugs directly into CB-6, CE-2 and CN units. **PS-1K — Kit ... $10 50**
PS-1W — Wired $11.50

EASY TO UNDERSTAND AMECO BOOKS



Amateur Radio Theory Course **$3.95**
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EL 3 ..... **1.75** EL 4 ..... **1.25**
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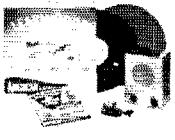
Radio Electronics Made Simple **1.95**

CODE PRACTICE MATERIAL



Ameco has the most complete line of code records, code practice oscillators and keys. Code courses range from start to 18 W.P.M. and are on 33, 45, or 78 r.p.m. records. Model CPS oscillator has a 4" speaker and can be converted to a CW monitor.

Write for details on code courses and other ham gear. **Dept. Q9** **Ameco equipment at all leading ham distributors.**

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SANTA BARBARA—SCM, William C. Shelton, K6AAK—SEC: WA6OKN. RM: W7WST/6. Field Day in the section was a huge success. Messages were received from K6CST and W6LUG reporting their activities. K6NCT also participated but did not send a message to the SCM. K6SCT/6, located on Laguna Peak, had 12 operators with 6 AREC. W6LUG had 6 operators on El Camino Cileo. *Flash*: K6QOE reports a new YL, 8 pounds 2 oz., born July 5. WA6OKN has been elected as your new SCM. Poor eyesight and the press of my work kept me from running again. W7WST/6 made the BPL again. His OW was on vacation so all he did was pound brass. The mobile frequency of 3890 kc. is very active with over 15 units reporting in at times. The Pt. Mugu Ham Club is very active in emergency work with weekly drills on 75 and 2. Keep up the good work, Dave. Traffic: W7WST/6 505, WB6DVP 10, K6AAK 12.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG Asst. SCM: E. C. Pool, W5NFO. SEC: K5AEX, PAM: W5BOO. RM: W5LR. The 34th Annual West Gulf Convention was hosted by the Brownwood ARC, which is to be commended on a job well done. The program was very well arranged and went off with clockwork precision. To my knowledge this is the first convention where the hosting club members paid their registration fees and were not permitted to win prizes. This unselfish attitude of the club members should not go unnoticed and my hat is off to the Brownwood Club. Herb Hoover, Jr., W6ZH, and John Huntoon, W1LVQ, cleared up many questions and doubts about the actions and operations of the League at the open forum meeting. More than 400 hams were registered. Oklahoma City was selected as the site for the next convention. W5FIR is back home and on the air after a long stay in the hospital. Judging from the reports received the high temperature did not hamper Field Day operations in this area. Field Day messages were received from K5BIT, W5CVB, WA5FCQ, K5FOD, W5GZG, K5IJT, W5JEF, W5KVI, W5SJZ, W5US, K5VAT and W5WUE. It can happen—lightning hit the antenna on the car as W5JDZ was driving in a thunderstorm. Damage? Ruined antenna and relay contacts and power supply. Brad? Oh, he is OK but still white and shook up. Traffic: W5DTA 501, WA5DQP 153, W5BOO 30, W5BSM 26.

OKLAHOMA—SCM, Bill F. Lund, K5KTW—Asst. SCM: Cecil Andrews, W5MFX. SEC: K5DLP. We had a nice meeting with a large group of ARRL officials and a pleasant visit with Herb Hoover at the West Gulf Division Convention. Because of the efforts of our friends south of Red River and the promise of political immunity to the N. Texas SCM Les Harbin and Director Doc Rest we were able to move the West Gulf Division Convention to Oklahoma City next year. New officers of the Bartlesville Amateur Radio Club are K5OVF, pres.; K5OVI, vice-pres.; W5YLH, secy.-treas. The club was given the call W5NS in the memory of Eli, WA5JSE, formerly WN5GBN, is a new General. W8KCN has been issued the call W5NML. KØRRG also is a new resident of Bartlesville. I spent Field Day with the Lawton-Ft. Sill Amateur Radio Club in the heart of the Wichita Mountains. It seemed like the "Old-Timers" were satisfied to stay with long-wire antennas but the younger group wanted beams so the oldsters ended up putting the beams together and getting them up at midnight Sat. It was quite a sight to see K5AYD, who weighs about 220 pounds swaying around in the top of a tree holding the pole up until the beam was tied down. The skip was very unusual about 2 A.M. and W5OK, in the Tulsa area, worked K5VOZ on 20 meters. M.B. wanted to talk to me but by the time they rolled me out of the sack the skip changed and left me sitting there working a lot of stations but no W5OK. Traffic: W5QMJ 431, K5TEY 340, K5KTW 43, W5MFX 32, K5OCX 26, K5LZF 22, K5DLP 20, WA5BNG 19, K5CBA 19, K5CAY 8, WA5FLV 6.

SOUTHERN TEXAS—SCM, Roy K. Eggleston, W5QEM—SEC: W5AIR. PAM: W5ZPD. W5AQK and W5BKG have been vacationing out in W6-Land, as well as up around Yellowstone. W5HQR and W5YCV have been down Mexico way. W5WPC has been visiting in Virginia. The South Texas Emergency Net Convention, as well as the ARRL West Gulf Division Convention, are now fond memories. The fellows and gals at both Victoria and Brownwood are to be congratulated on the FB conventions. We were proud to have John Huntoon and Herbert Hoover, Jr., at Brownwood. The new president of the Houston Amateur Radio Club is WA5BUV. Congratulations to W5PM, formerly of Corpus Christi and Houston, in being elected as SCM of Louisiana. W5IMF is on vacation in Alabama. K5HZR, EC at San Antonio, recently lost his antenna, two large trees, and had to pick all his peaches off the ground because of high winds. The San Antonio Radio Club station, W5SC, was operated by the teen-age

(*Continued on page 152*)

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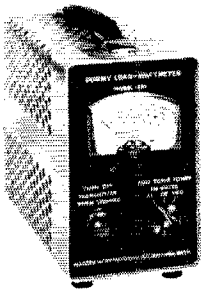

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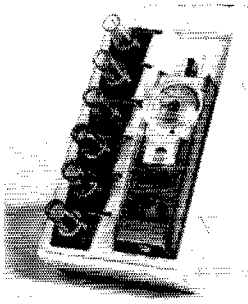

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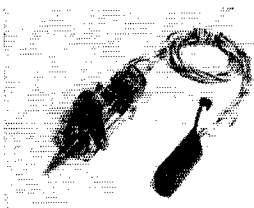

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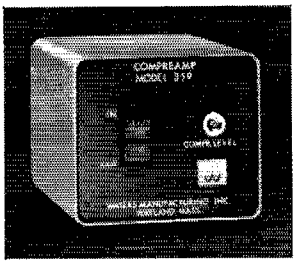

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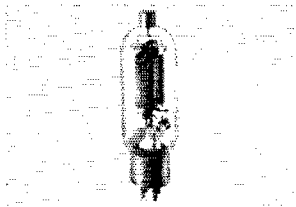

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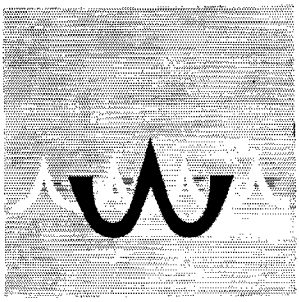

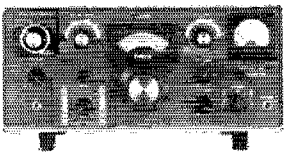

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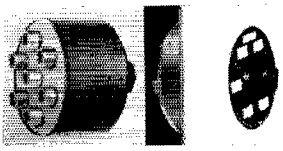

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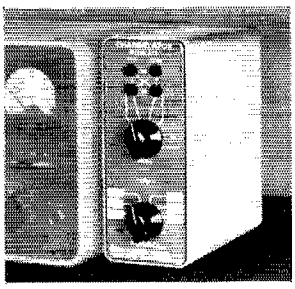

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members of the club during the Teen Fair June 5 to 12. W5ZPD and W5ITA have been in Columbus, Ohio, attending the International YLRL Convention. W5ZPD was district chairman. WA5ABG is the new V.H.F. OBS in Houston. The traffic count of 529, credited to W5GDH in July *QST*, should have been credited to K5GDH, Duke Campbell, of Austin. Sorry, Duke. Traffic: K5GDH 701, K5HZR 170. (May) K5GDH 418, K5HZR 105, W5AIR 69.

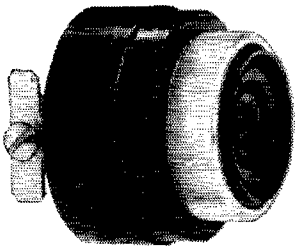
CANADIAN DIVISION

MARITIME—SCM, D. E. Weeks, VE1WB—Asst. SCM: A. E. W. Street, VE1EK. The Loyalist City Club provided additional communications facilities to the Saint John Police Dept. thereby assisting in the handling of motor vehicle traffic during the Billy Graham Rally held recently. Those assisting included VE1s AJI, AJS, AIO, AKZ, EE, HN, IZ, LC (club), RN, SI and XN. Operations were carried out on the 2-meter band. VE1VC has a new SB-300. VE1AGN is back on the air with an Apache and an HBR-11 receiver. VE1AOH has transferred to Yarmouth. VE1s XN, ADC and their families have been vacationing south of the border. VE1FN has been attending summer classes also in W-Land. VO1EI has a new NCX-3 mobile. Congratulations to VO1AP and VO1FE on the new arrivals in their families. VO1CK is now a member of the Newfoundland Law Society. VO1DZ is back home after a sojourn in the British Isles. VO1BL has been vacationing in the U.S.A. Field Day equipment has once again gone back into *mothball* storage. Rumor has it that many clubs are looking for more effective bug protection this season! How about using some of the equipment in the Simulated Emergency Test?

ONTARIO—SCM, Richard W. Roberts, VE3NG—VE3EZY visited VE1-Land. The transceiver he bought recently, turned out to be one he used in the Navy 25 years ago. Those of you who are interested in DX should write the Ont. DX Assn., Box 212E, Toronto 4. From the records we find that there are almost 11,000 hams in Canada, as of Mar. 31, 1964. (D.O.T. figures). The VE3 area has 4000. The Nortown ARC of Toronto elected VE2EVZ, pres.; VE3CSE, vice-pres.; VE3EAK and VE3CMA, secy.; VE3FTS, treas. The Kitchener-Waterloo ARC has a smart, concise club bulletin. The club's Field Day setup was A-1. Three new hams in the Cornwall area are J. Bush, J. Barnhart, J. Campbell. Calls were not available at the time of reporting. New officers of the Sudbury Club are VE3EAT, pres.; and VE3FCO, VE3CUO, VE3EXL, as the club's new pilots for 1964-5. From Ottawa we learn that VE3BJO is camping in Ontario, VE3CSF is in VE1-Land (scoffing lobsters no doubt). VE3GX and VE3CGO are headed West. VE3CGP will be a new resident of Timmins soon. VE3DKR is the new EC for eleven meters in the Toronto area. The following were successful in obtaining their tickets recently via the Sky-Wide ARC in Metro, Toronto: VE3FWA; VE3FWN; John Tedesco, W. L. Staples and Leo West. Those getting Advanced tickets in the same club were VE3FOX, VE3FIB, VE3FNT, VE3DXC and Dave Enwright. Sorry, Dave, your editor omitted your call. One of our XYLs, VE3DXZ, has been awarded membership in the Yawn Patrol, a YL early morning net in Tenn. Another XYL, VE3EZI, scored 33,392 points in the recent YL-OM Contest, not 26,492 as reported. VE3EAO is a Silent Key. Traffic: VE3CYR 105, VE3CFR 79, VE3NG 74, VE3BZB 65, VE3FGV 56, VE3BUR 55, VE3DPO 55, VE3AWE 47, VE3EHL 47, VE3BTV 45, VE3GI 32, VE3CLK 31, VE3DRF 25, VE3DVE 25, VE3AKQ 21, VE3ETM 21, VE3BLZ 20, VE3CFI 20, VE3TT 13, VE3DUU 10, VE3DH 6, WA8ETX/VE3 5.

QUEBEC—SCM, C. W. Skarstedt, VE2DR—Asst. SCM: Michel St. Hilaire, VE2BEZ. Many groups enjoyed good weather and fine conditions during Field Day. Looks like VE2NE or VE2AGQ may carry off the honors. The AREC mobile group will supply communication on 11 meters during a large non-commercial car rally on Oct. 3. VE2BOC is back with new s.s.b. and linear. VE2BMI uses a homebrew 200-watt transmitter; estimated cost: 20 cents per watt. VE2ANK finally made the DXCC. VE2AUI is an active and reliable c.w. man. VE2ANY was in charge of the picnic for the St. Maurice group at St. Eduard. W1JM played host to VE2s SF, TA, BG, BE, NB and several XYLs. In memory of VE2AOM the North River Radio Society (Que. and Ont.) has made a collection to purchase a small monument to be placed on his grave. VE2AWK a eu en mauvais accident mais très actif quand même portatif VE1 malgré un support en acier. VE2BLA était portatif au Lac Manitou pour FD. VE2BOZ organize un raleigh pour amateurs. VE2AN très actif sur le réseau du Quebec. VE2BUJ était en charge des communications pour la St. Jean Baptiste avec la coopération de l'armée. VE2ADL et VE2UZ sont sur l'air avec des bandits 2000A. VE2AGH et VE2TJ sont en vacances au Nouveau Brunswick et opérant un SR-150 et un final. VE2OB se promène en jeep. VE2ALH a un nou-

(Continued on page 154)



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veau NCX 3 et sera en RTTY bientôt. Traffic: VE2DR 113, VE2BEZ 105, VE2AGQ 102, VE2ALH 96, VE2JJ 47, VE2BMS 44, VE2OJ 44, VE2EC 31, VE2AIR/2 26, VE2ABT 25, VE2SD 18, VE2BCB 15, VE2CI 14, VE2AAU 11, VE2BRT 10, VE2BG 9, BE2HV 9, VE2CO/2 7, VE2BBH 6, VE2CP 6, VE2BCK 5, VE2TM 5, VE2BJV 2, VE2ADX 1, VE2SC 1.

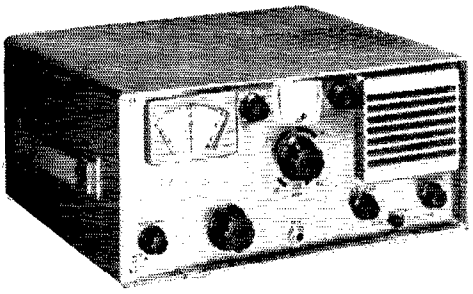
ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK, PAM: VE6PV, ECs: VE6SA, VE6SS, VE6ABS, VE6AJY, VE6PZ, VE6AFJ, OPSs: VE6CA, VE6PV, VE6HM, VE6SS, VE6BA, OOs: VE6HM, VE6NX, OBSs: VE6HM, VE6AKV, ORS: VE6BR, OESs: VE6DB, VE6AKV, VE6AJY, VE6MC. The APN has been having some trouble from long-skip conditions. In the southern portion of the province 3740 kc. is recognized as the emergency frequency. A.m. stations in QSO on this frequency should observe a brief listening period say on every 15-minute period commencing on the hour. There was considerable Field Day activity this year. I wish to welcome VE6HB and VE6SA as new ECs. VE6SA is for the Calgary area. VE6HB, of course, will continue as before on the EMO net. I see from the latest copy of *Hom Hum* that the number of subscribers is coming up. VE6SU and I visited the CARA meeting recently and were greatly impressed with the ease with which VE6AKV obtained volunteer workers for Field Day and VE6AIF and VE6MX received the same support for their Calgary Stampede and Exhibition Booth. The CARL picnic was well attended. The museum show and Badlands are very interesting. You fellows who were afraid of the weather missed an FB do. VE6HB, VE6PZ and gang are to be congratulated on their fine efforts. Traffic: VE6HM 166, VE6FK 6, VE6SA 3, VE6ADS 2, VE6PZ 2.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —VE7DH has been honored by the Queen by being admitted into the order of St. John as serving Brother. The investure will take place in Ottawa this fall by the Governor General of Canada. New active stations in Nanaimo are VE7BQB and VE7BPP. VE7LP is sporting a tri-band beam 40 feet up. VE7BBB and VE7AGC still are bringing the diplomas, the newest is Al-Operator. VE7BMS and VE7AON are the proud owners of an SR-150. VE7BPG has been transfered to Kamloops, also VE7AGF has been transfered to Williams Lake Aeradio Stations and nothing is heard of our new R.M. VE7QQ is operational at Usk, B.C., on his own hydro-gas-gene. Richmond amateurs have formed their own club, the Richmond ARC with VE7AKE, pres.; VE7AAN, secy., and 10 licensed members meeting on Mon. in Steveson. VE7AJK has been making the 150-watt homebrew rig on 6 meters dig into the eastern states. East Kootenay ARC's new officers are VE7AIT, pres.; VE7BKW, vice-pres.; VE7BKR, secy. VE7AQW has an old Pontiac that will tow. Well, after FD days towing he can claim that right. Funny the sun shone every day since Field Day—why not FD? Traffic: VE7BHH 51, VE7DH 18, VE7BBB 16, VE7AC 5, VE7AJK 3.

MANITOBA—SCM, William H. Horner, VE4HW—The visit of Canadian Director Noel B. Eaton to Winnipeg was a July highlight and many had the opportunity to meet him and listen to his most interesting talk. Interest in 6-meter operation has taken a big upsurge and our 6-meter PAM, VE4MA, reports logging 92 calls in one 8-hour session. Field Day saw the Bison-WARA group operating from VE4BF's Birds Hill estate. The U. of M lads also were set up at Birds Hill. The DX Club took over VE4CJ's Falcon Lake summer home. The Beausejor Club was at the Milner Ridge Radar Base. The Cranberry Portage gang went to Big Island Lake and the Garden City boys were at Petersfield. Our SEC, VE4OL, had the pleasure of meeting some of the VE1 group on a recent business trip to the Maritimes. VE4TT and VE4MR created lots of interest with their station setup at the Melrose Community Fair. VE4TP is mobile on 20 meters with a Swan 400. VE4TK has left for Ontario after a two-year stint with the RCAF here. VE4CZ is breaking in VE4SK's new NCX-3. We still are looking for ECs for points outside of Winnipeg and we need two more OOs and an OBS. Traffic: VE4QD 10, VE4JY 7, VE4AN 4, VE4OL 4, VE4HF 3, VE4JA 3.

SASKATCHEWAN—SCM, Mell Mills, VE5QC—Winner of the "QC" FD trophy was VE5AA, the Saskatoon Club, with honorable mention going to VE5US, the University Club. The Wood Mountain Club had power trouble, the Regina Club was hit by lightning and the "QC" Club had "harmonic cycling" trouble. During the July 4th week end the Regina Club hosted the 1964 Hamfest with the theme "50 Years of Organized Amateur Radio." Manager was VE5JW, with able assistance from many including VE5SC, VE5JI, VE5TP, VE5JU, VE5BN, VE5CM, VE5BL, VE5QA, VE5GD, VE5GN, Ted McRoberts, VE5JK and VE5VP. The ARRL meeting was very well attended with a report by SEC VE5CU, and a most interesting down-to-the-

(*Continued on page 156*)



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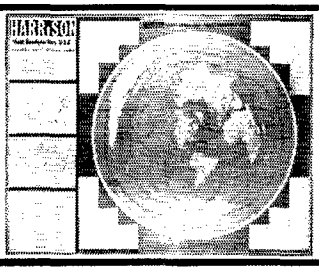

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facts talk by Canadian Director Noel Eaton, VE3CJ. Winners: Liars, VE5KZ, Youngest, VE5CC, Oldest, VE5AT, Farthest, G3WRI; Gus Cox, VE5JT; Tech, VE5PM; HBR VE5DC; Art Driver Award ,VE5JU; Big Noise, VE5HP. Mobile, Comm., VE5LM; HBR, VE5EO, VE5SY and VE5MR along with Gard and Bmg, plowed mud to Father's Day due at Malta, Mont. Congrats to VE5HP, new pres., and VE5HQ, new vice-pres., of the SARL. Traffic: VE5HP 99, VE5LM 63, VE5HQ 5, VE5AT 2.

The World Above 50 Mc.

(Continued from page 99)

lina K4MHs worked six states during the June contest on two meters, one of which was a new one for him. W4TKH brought John's total up to 20 states worked on 144 Mc. He suggests that anyone needing his state on two meters check his frequency, 144.062, as he expects to be a great deal more active. K4GBL/5 is interested in converting his low frequency s.s.b. gear to the high frequencies. John asks that anyone who can help him please write to John Crosby, K4GBL/5, 105 Pine Branch Drive, Marietta, Georgia. WA6ROJ, Ukiah, California sez there are at least three kw. stations on two in his area on the low end of 144 Mc. There is also a low power a.m. net on 145.350 operating almost nightly. In Michigan WA8CTC, W8CVQ, WA8DZP and W8PT agree that conditions on two meters were good during June. WA8CTC sez that f.m. skip was noted on 146.94 Mc from Detroit and Milwaukee several times. W8CVQ notes "occasional extended ground wave transmissions received." WA8DZP sez conditions were extremely good with ground wave into Ohio and Pennsylvania every night. K8ZES sez that condition at Galien, Ohio on 144 Mc. have been typical for the summer. Illinois and Wisconsin have been heard several times and on the evening of June 11 contact was made with WA4EBR in Tennessee.

WA9HQP sez the nuvistor in the front end of his converter is making the difference. More and more activity being heard since the change was made. Among other things Denny worked his first Iowa station on two meters (WØRWC) during the contest. State number 24 on 441 Mc. was totaled up on June 14 by WØDQY when he worked into Georgia. After two years of skeds with K4SFJ he made the Georgia contact while K4SJF was in his shack (St. Louis) visiting him. Glenn would now like some M/S skeds with 1 land stations on c.w. or s.s.b. From Wisconsin both K9DBR and W9FBC report good conditions during June. QST

Correspondence From Members

(Continued from page 100)

came into my mind that did not alleviate my laziness any, but threw things into reverse. It went something like this: "The FCC's examination for the Extra Class ham ticket isn't going to get any easier. If anything, it will be made a little more difficult." "So, Bud," I thought to myself, "you'd better get high behind and get on down to the FCC and pass that Extra Class examination." Laziness

(Continued on page 158)

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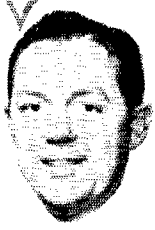
Bob Henry
WØARA
Butler, Mo.



Ted Henry
W6UOU
Los Angeles, Calif.

Walt Henry
W6NRV
Anaheim, Calif.

COLLINS

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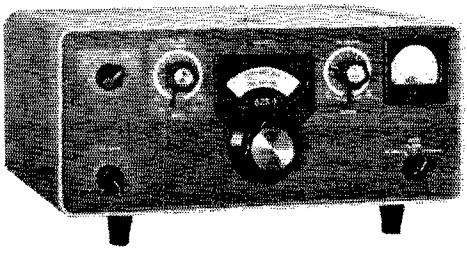

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triumphed again, only this time in my favor. So it was down to the FCC on July 1, and the Extra Class ticket should be arriving in the mail box in a few weeks. — *W6ODX*

¶ I hold a General class ticket and I climbed from Novice to General. When the time limit expires on my General, I'll try for the Extra. In the meantime, I'll remain on c.w. only, and also be active in the workshop trying to further my education and technical knowledge above that of the average teen-age amateur of the General Class. If the incentive plan fails, I still want the Extra Class license for my own personal satisfaction. — *WA8MJZ*

¶ . . . I am barely 20, a junior in college with an A-grade average, and work as part-time announcer at a local BC station (plus any other job I can pick up) to support myself. I put in at least 16 hours a day of study, classes and work. Yet, I have taught myself sufficient theory and practice to get a Second Class Commercial ticket — and build my complete six- and two-meter station. I hold a six-year-old Technician license and if I can afford to lose a Tuesday morning, I will hop a Greyhound bus for Atlanta's FCC office and come back with a General.

Perhaps this is patting one's own back and stressing an extreme but it points up one fact. The completion of a task lies in the doing thereof. The very nature of amateur radio is incentive-based. The first incentive is to learn the code and theory and get a ticket, then to get a station on the air. It's tragic that much incentive ends here. The history of the hobby is incentive; from spark coils and galena to milk-bottle triodes to today's specialized techniques. One who cannot at least familiarize himself with the theoretical and practical aspects of equipment and operation deserves no recognition as a ham. — *K4FPT.*

¶ As a member of the League I would like to inform you that I back your incentive licensing proposal 100%. Since I'm a citizen of Finland, and not even a ham yet, I have nothing to gain by backing one side or the other in this U.S.-only struggle. But I think the incentive licensing program would be a tremendous advantage for all hams, and I think it would make our — oh pardon, your — bands a lot cleaner. — *Per Gustavsson*

Armed Forces Day Results

(Continued from page 57)

W1MCG, W1MEG, W1MFJ, K1NAG, K1OCS, W1OHM, W1OMN, K1OOZ, K1OQA, W1OQC, W1OUG, K1PLP, K1SDX, K1TZO, W1UGV, K1USN, K1YZG, K2AXM, WA2BEI, WA2BGI, W2BLV, W2BVE, W2BXW, WB2CTU, K2CWI, W2DLT, WA2DMY, W2DXD, K2ECQ, K2EID, WA2ELE, WA2ELK, WA2EMB, K2EQP, WB2GJG, K2GOS, WA2GPF, W2GQN, WA2GSO, WA2GTH, K2GYX, WA2HDP, W2HHP, WA2HIK, WB2HPC, W2HWH, WB2IGL, WA2IKT, W2ISK, W2JAV, K2JTU, K2KAQ, W2KDE, W2KLD, W2KQZ, K2KUC, WA2LKF, W2LKP, W2LVW, K2MWN, W2MXB, W2MXN, W2MZB, W2OKO, W2ORX, K2OWC, K2OWD, W2PEE, WA2QFK, WA2QOI, WA2QPW, K2RJF, WA2RSE, W2SMX, K2SOX, K2SQL, W2SUH, W2TAM, K2ULY, K2VAM, K2VRK, K2VBJ, WA2WDW, W2WNN, WA2WWF, K2YQK, WA2YXX, WA2YZN, W2ZKY, W2ZMK, WA2ZVL, W3BHK, W3CA, W3CRO, W3DJZ, K3ECF, K3ENA, W3EOV, K3ETV, K3FMH, K3GBV, K3GGQ, W3GUS, W3HLD, W3JNE, W3JRV, W3KQE, K3LDD, K3LLI, K3LTI, W3MHD, W3MWV, K3MYW, W3NMP, W3NNV, W3NQA, W3PQZ, W3RCJ, W3RDF, W3SXL, W3TUX, K3TZD, W3UDG, W3UKO, K3UPR, W3USA, W3VQX, W3VYY, W3WAL, K3WGV,

(Continued on page 160)

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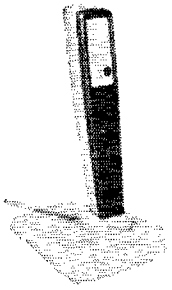
VALUES OF THE MONTH



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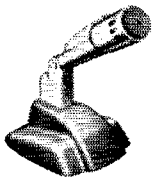

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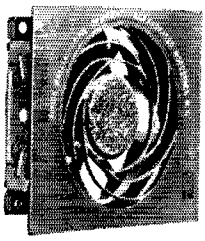

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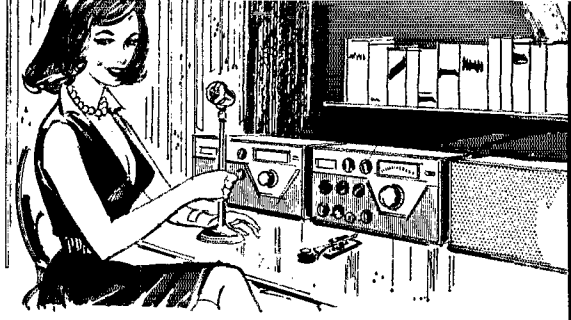

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DRAKE 2B	207
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DC3 DC supply	99
SX111	167
SX100	179
SX117	269
S40	44
SX43	79
S86	69
SX99	84
S108	77
S120	47
SX105 152-173mc	47
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FPM200	975
HT18	37
HT32B	389
HT37	279
HT40	49
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NC270	159
NC300	189
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G76 xtal call	14
G76 DC supply	79
GSB100	249
SUPER 12 conv	39
G66B receiver	67
3 WAY supply	22
G77A & 3 way sup	139
RME4350A	127
XE93 & AC supply	127
CLEGG 99er	99
INTERCEPTOR	319
POLYCOM 62B	299
DX60	64
DX40	44
GR91	37
HR10	79
AR3	22
MT1 xmtr	47
HG10 vfo	34
VF1 vfo	19
HW20	187
HM10A gdo&coils	34
AC1 antenna tuner	16
HD11 q mult	15
QF1 q mult	9
HEATH signal tracer	17
V7A vtvm	22
6er	39
LAFAYETTE HE35	37
KNIGHT R55	39
KNIGHT 100A	79
T50	29
T60	37
T150A	89
PMR7	62
AMECO TX86W xmtr	47
EICO 723	34
EICO 730	47
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June V.h.f. Party Results

(Continued from page 63)

K4GPL 126- 42- 3-B
WA4FJM 116- 29- 4-AB
K4NUB 100- 25- 4-AB
W4PAR/4 (6 oprs.)
2128-151-14-ABD
WA4SHA/4 (4 oprs.)
1100-100-11-AB
WA4DKU (K4JQW, WA4DKU)
602- 86- 7-B
W4YSB (W4s CPI YSB)
228- 57- 4-AB

South Carolina

K4JQY 429- 39-11-AB
W4TLC 243- 22- 9-BCD
W4GG/4 (7 oprs.)
1089- 99-11-AB

Virginia

W4VCC
11,692-311-37-ABCD
K4VWH 4352-256-17-A
W4TBQ 1164- 97-12-A
W4BOS/4 736- 92- 8-A
K4WYS 238- 34- 7-A
K4NOV 66- 22- 3-A
WA4JJW 24- 8- 3-A

West Virginia

K8CAY/8 (9 oprs.)
8762-337-26-AB
K3HNP/8 (6 oprs.)
6532-284-23-AB
WA8FSE/8 (12 oprs.)
3140-156-20-ABC
K8HKM/8 (11 oprs.)
2706-122-22-ABC
W8FGL/8 (6 oprs.)
1243-113-11-AB
K8OAJ/8 (K8OAJ, WA8KJX)
820- 82-10-AB

ROCKY MOUNTAIN DIVISION

Colorado

W9EVZ 624- 97- 6-ABCD
K0ZZM 450- 90- 5-AB
WA0BBP 340- 68- 5-AB
W0EYE 324- 29- 9-ABCDE

New Mexico

W5CK 270- 27-10-AB
W5KDT/5 (K5HMN, W5KDT)
602- 43-14-AB
K5YRQ/5 (K5s WYY YRQ)
407- 37-11-AB
K5QPV (9 oprs.)
336- 28-12-AB

SOUTHEASTERN DIVISION

Alabama

K4ZAJ 65- 13- 5-B
K4WOP 3- 3- 1-A
K4BSK 1- 1- 1-A
K4WOQ 1- 1- 1-A
K4BEI/4 (K4BEI, WA4SJA)
1375-125-11-A
K9LCR/4 (WA1AUP, K9LCR) 402- 67- 6-AB

Eastern Florida

WA4PIX 180- 30- 6-A
WA4QVW 28- 14- 2-A
WA4RVT 2- 2- 1-A

Western Florida

WA4FIJ 1060- 52-20-ABC

Georgia

W4PHB 324- 54- 6-AB
K4YZE 124- 31- 4-B
W4GIS 24- 12- 2-B
W4FWH/4 (W4s FWH VHH) 6660-211-30-ABCD

SOUTHWESTERN DIVISION

Los Angeles

WA6SLF 584-146- 4-B
W6HPH 320- 27- 8-BDE
WN6HWQ 144- 48- 3-B
WN6JLV 130- 26- 5-B
W6ULL/6 (4 oprs.)
8862-388-21-ABD
WB6CDF/6 (7 oprs.)
1917-213- 9-AB
WB6GFD/6 (K6UMV, WB6s CSZ GFD)
972-243- 4-B
WB6ITG (4 oprs.)
952-119- 8-A

Arizona

W9KLD/7 13- 13- 1-A
K7GNV/7 (K7s CVT GNV)
72- 36- 2-B

San Diego

W6NLO/6
6512-277-22-ABCDE
K6RCK 1794-138-13-AB
K6QWZ 400-100- 4-B
W6PUZ/6 (8 oprs.)
16,258-661-22-ABCDE

Santa Barbara

K6OKC/6 170- 17- 5-D
WA6UPX 60- 20- 3-B
K6BPC/6 (8 oprs.)
21,384-754-27-ABCDE

WEST GULF DIVISION

Northern Texas

WA5EYO
1824-152-12-A
K5BXG 1032- 86-12-AB
K5IVB 990-110- 9-A
WA5FYF 693- 99- 7-A
K5CMC 564- 94- 6-A
K5PDD/5 520- 65- 8-A
K5PCN/5 378- 63- 6-A
K5MLD 224- 56- 4-A
WA5AYX 192- 64- 3-A
WA5HIQ 112- 56- 2-A
WA5GEO 23- 23- 1-A
K5ZBM (K5s TKR ZBM)
2016-144-14-AB
WA5CDG (WA5s CDG FPT) 280- 56- 5-A

Oklahoma

W5WAX/5
594- 66- 9-AB
K5FZG 490- 70- 7-AB
W5HUJ 290- 58- 5-AB
W5LOW 125- 25- 5-AB
W5KHT (4 oprs.)
4272-178-24-ABCD
K5PTK 108- 27- 4-A
K5DRF 28- 14- 2-A
WA5ABG 22- 22- 1-A

CANADIAN DIVISION

Quebec

VE2ALE 114- 38- 3-B
VE2CK 104- 26- 4-B
VE2BMQ 88- 22- 4-B
VE2SH/2 (10 oprs.)
4727-158-29-ABD

Ontario

VE3CXK 370- 74- 5-B
VE3DNR 64- 32- 2-B
VE3AAH 50- 25- 2-B
VE3DWQ 42- 21- 2-B
VE3CIT 28- 7- 4-AB
VE3ZZZ (VE3s ABG BQN)
2822-164-17-ABCD
VE3DFB/3 (4 oprs.)
735-105- 7-B
VE3CBM (4 oprs.)
292- 73- 4-B

Manitoba

VE4YW 1- 1- 1-A

British Columbia

VE7ASM 357- 51- 7-AB

Yukon — N. W. T.

VE8BY 4- 2- 2-A

FOREIGN

VP7CX (VP7s BG CX)
1071- 63-17-A

[1] WA2OIR, opr. [2] K2LZF, opr. [3] K2ORA, opr. [4] Hq. staff not eligible for award. [5] K1WXY, opr.

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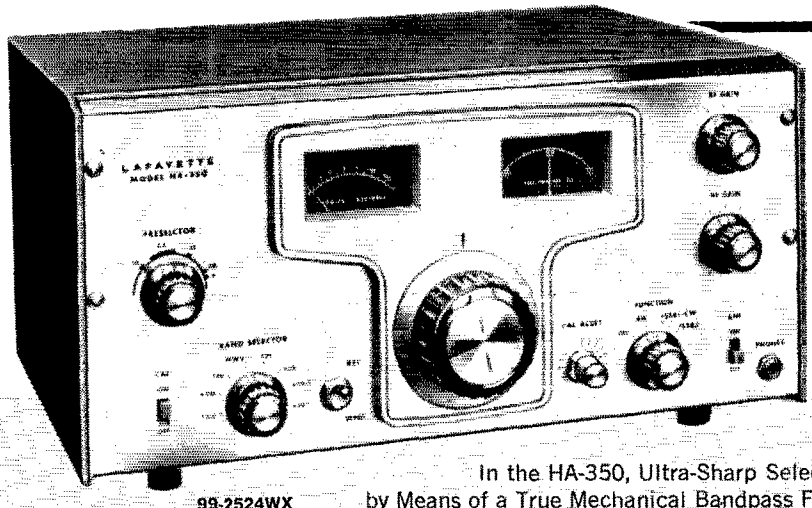

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About Those February *QST* Linears

(Continued from page 31)

Pipe fittings not like those shown. Apparently there are various designs for T fittings and junctions. If yours are not exactly like the ones used in the *QST* amplifier the instructions given for making the assembly may not apply. Dimensions of the tank assembly are as follows: tube end of line to center-line of short—10⅜+ inches; spacing of pipes—3½ inches, center to center.

Position of coupling loop. The 1¼ by 4-inch portion of the output coupling circuit of the 144-Mc. amplifier is mounted so that its bottom edge is approximately flush with the bottom of the pipes. Optimum coupling to a 50-ohm load is with the closed end of the "U" about ¼ inch lower than the open end. Looking down at the top, the "U" is centered between the pipes, of course.

About silver plating. The statement made in regard to the 50-Mc. tank circuit showing no improvement after being silver-plated was not made to discourage anyone from plating the r.f. circuit components. W2OLU points out that long periods of use could change this picture, as silver oxide is still a good conductor, whereas copper oxide is not. Neil also suggests that if one is tempted to try doing without soldering of the 144-Mc. assembly he avoid the use of pinned joints. There is likely to be thermal concentration at such scattered points of contact: slotting the joints and then clamping with a hose clamp is a superior method of making a slip-on fit, such as is required between the tube anodes and the bronze castings, and between the pipes and the T fittings. Silver-plating of all contact surfaces would be advisable if this is done. —*E. P. T.*

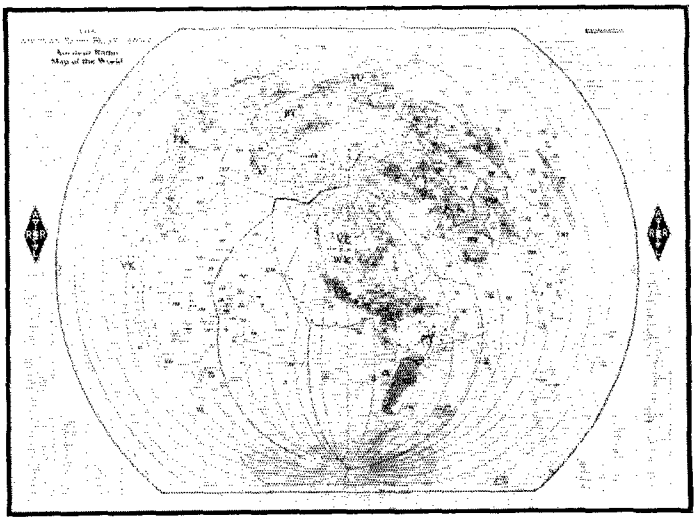
Feedback

In the 432-Mc. kilowatt amplifier described by W6FZA in August, 1964, *QST*, the schematic diagram, page 48, shows the high voltage applied directly to the screens of the 4CX300As. Obviously, the connection between *RFC*3 and the plate line should be omitted.

Our thanks to Donald W. Froude, WA2TEQ, who was the first reader to tell us about this incendiary goof.

There is another, but less spectacular discrepancy in the plate circuit: the pipes that make up *L*4 are 7¾ inches, not 3¾ inches in length.

Strictly Modern



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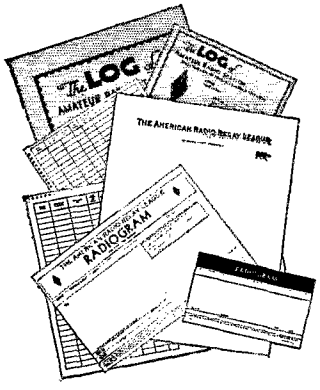

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An I.F. Tracking Filter

(Continued from page 17)

Doppler output is shown in Fig. 6. Satellite signals can be acquired before they can be heard with a conventional receiver. Similarly, the signal will stay locked for a period after it has disappeared from the audio system.

For the amateur who can not borrow a strip chart recorder, a tape recorder can be used. A clean audio tone varying in frequency with the Doppler shift can be obtained by recording the audio output from the frequency-comparator circuit. This, coupled with methods described by W6VMH,[4] can be used for producing a graphical plot of the Doppler curve on satellites like Oscar.

Acknowledgments

The author would like to express appreciation to The Standard Oil Co. (Ohio) for permission to publish this information. The circuits were developed largely as a spare-time effort to improve operations of the Sohio Moonbeam Tracking project. A special acknowledgment is due Roy Rankins, W8CWL, who spent many sleepless nights helping debug the circuits and track various satellites. QST

[4] Norgaard, "Eyeball and Eardrum Doppler Tracking," *QST*, Apr., 1962.

NEW BOOKS

Radio Data Reference Book, by G. R. Jessop. Published by Radio Society of Great Britain, 28 Little Russell St., London, W.C. 1, England. 123 pages, plus index, 5¾ by 8⅞ inches, cloth cover. Price, 12/6. (approximately $1.75 U.S. funds)

An excellent collection of curves, tables and charts for the radio engineer, designer and radio amateur. Accompanied with sufficient text to permit its effective use, the information in the book ranges from general formulas to step-by-step methods for TVI cure and prevention. Space does not permit listing all of the areas covered but here are just a few of the subjects contained in the handbook: R.f. power amplifiers, Pi-network circuits, wide-band couplers, filters, antennas (resonant lengths of half-wave dipoles, V and rhombics, folded diopoles, broadside arrays, Yagi arrays etc.), transmission lines, coaxial resonators, waveguide sizes, coil winding, rectifier and voltage multiplier circuits, and lots and lots of charts and tables on such things as conversion factors, metric equivalents, properties of metals, reactance and resonance. At the end of the book are tables for natural sines, cotangents and cosines, logarithms, and square roots. The possessor of this book with its large amount of essential reference data will certainly save lengthy research through many volumes.

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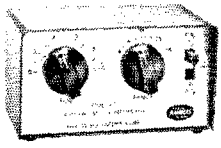

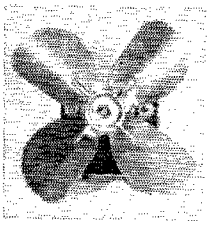

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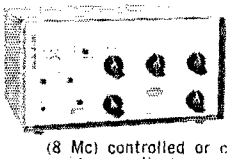

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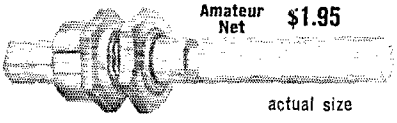

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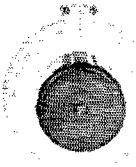

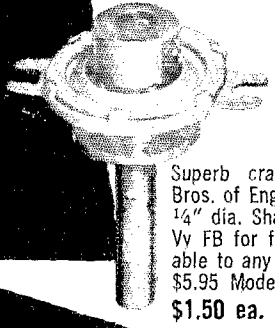

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K2HC, Carl H. Jones, Bergenfield, N. J.
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K2RPE, Edward H. Cox, Hamburg, N. Y.
K3EHM, Harry Snyder, Petersburg, Pa.
W3KMT, Paul E. Custer, Baltimore, Md.
W3WCH, Bert M. Compton, Towson, Md.
W4DRC, Bobby E. Smith, Gastonia, N. C.
K4FHJ, Jack Oakley, Springfield, Tenn.
W4KJW/VP9, Lowell W. Belter, Sumter, S. C.
W4KUL, Earl E. Kingsbury, Miami, Fla.
W4VIA, John C. Allison Pompano, Beach, Fla.
W5CZZ, Frederick T. Brewer, Terrell, Tex.
W5JU, Raymond B. Frank, Albuquerque, N. Mex.
W5MNC, Anthony J. Korkmas, Tyler, Tex.
W5UKE, Kenneth G. Shaver, San Antonio, Tex.
W6CWS, Frank N. Bette, La Habra, Calif.
W6FHR, Lewis H. Abraham, Los Angeles, Calif.
W6RKU, Ewald V. Dill, Culver City, Calif.
W7ABK, Wayne L. McCrary, Mountain Home, Ida.
K7ETB, William E. Godsey, Milwaukie, Oreg.
W8GGG/WA4FPY, Ralph R. Coleman, Circleville, Ohio
W8HZC, Wyman B. Hubbard, Detroit, Mich.
W8IJ, Francis R. Gibb, Columbus, Ohio
W8MBI, Marie H. Helminski, Toledo, Ohio
W8REK, Kenneth S. Barber, Clarkston, Mich.
K8UBD, Charles Hadad, Lansing, Mich.
W8VHO, Ralph E. Crammer, Columbus, Ohio
W9CTZ, Willard A. Hayward, Decatur, Ill.
W9ECW, Donald R. Stebleton, Union City, Ind.
W9EUY, Melvin V. Murray, Chicago, Ill.
K9GKD, M. C. Shubinski, Berwyn, Ill.
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OE3WB, Willy Blaschek, Klosterneuburg, Austria
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VE3EAO, Charles A. Ransom, Kitchener, Ontario, Canada
VK5LL, G. F. Lucas, Trinity Gardens, S. Australia
XE1GA, Gilberto Garza, Vera Cruz, Mexico

It is with sadness that we report the death of Willy Blaschek, OE3WB, one of the earliest Austrian radio amateurs and a tireless fighter for amateur licensing and amateur privileges in his country. Willy was also the first editor of the Austrian amateur radio magazine, OEM, and a pillar of the *Oesterreichischer Versuchssenderverband*, IARU member for Austria. A great deal of his time and energy went into building a strong amateur organization and training youth through the magazine. His loss is a loss to amateur radio the world over.

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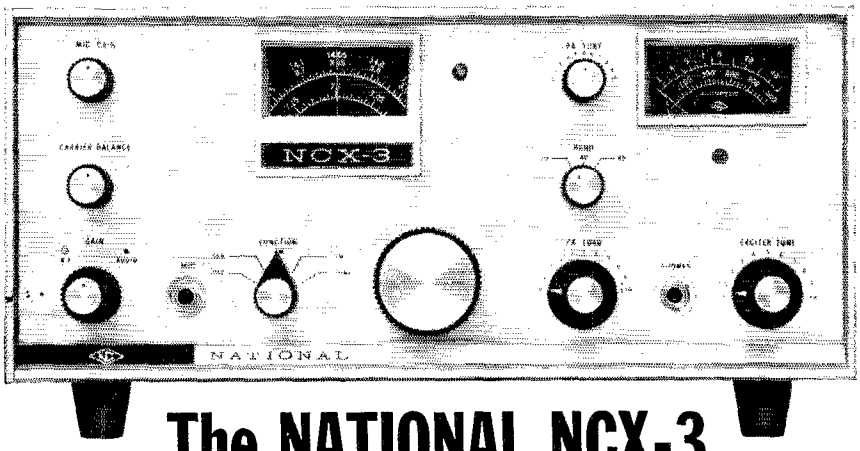

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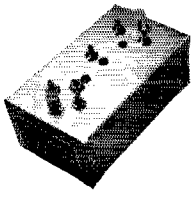

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(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-Ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) **Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.**

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) **A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously noncommercial in nature.** Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) **Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking-copies can be supplied.**

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

MICHIGAN STATE Convention, Grand Rapids, 17th Annual, ARRL Sanction, October 17, 1964, Pantlind Hotel, Michigan's Best. Inquire Post Office Box 1333.

PEORIA Hamfest September 20. Exposition Gardens, Peoria Area Amateur Radio Club, Registration $1.00 until Swpt. 11. Write Ferrel Lytle, W9DHE, 419 Stonegate Rd., Peoria, Ill.

10th ANNUAL VHF Roundup will be held Saturday, October 10th, at Three Rivers Inn, Liverpool, New York. Speakers, dinner floor show, all for $6.00 advance registration: $6.50 at the door. Tickets, Dick Holbert, 1607 Stolp Avenue, Syracuse, N.Y. 13207.

WANTED: Early wireless gear, books, magazines, catalogs before 1922. Send description and prices. W6GH, 1010 Monte Dr., Santa Barbara, Calif.

MOTOROLA used FM communications equipment bought and sold. W5BCQ, Ralph Hicks, Box 6097, Tulsa, Okla.

WE buy all types of tubes for cash, especially Eimacs, subject to our test. Maritime International Co., 199 Front St., Hempstead, N.Y.

TOROIDS: Uncased 88 Mhy, like new. Dollar each. Five $4.00. P. P. DaPaul, 309 South Ashton, Millbrae, Calif.

SOUTHERN California: Transmitters and receivers repaired, aligned. Bandwidth, frequency, harmonics measured. Used ham gear bought, sold, traded. Robinson Electronics, 922 W. Chapman, Orange, Calif. Tel KEllogg 8-0500.

WANTED: Military or Industrial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y.

WANT 1925 and earlier ham and broadcast gear for personal collection. W4AA, Wayne Nelson, Concord, N.C.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP. Purchase Radio Supply, 327 E. Hoover St., Ann Arbor, Michigan. Tel NOrmandy 8-8262.

WANTED: All types of aircraft or ground ratios. 17L 618F or S 388, 390, GRC, PRC, 51J, RVX. Especially any item made by Collins Radio, ham or commercial. Also large type tubes and test equipment in general. For fast cash action contact Ted Dames, W2KUW, 308 Hickory, Arlington, N.J.

MUST Sell: 75A-4-500A, Globe King, Johnnie Brines, K4GGM, 16 Barbrick St., Concord, North Carolina.

SELL, swap or buy ancient radio sets and parts, magazines. Laverty, 118 N. Wycombe, Landsdowne, Penna.

COLLINS Equipment bought, sold & repaired. Paul A. Reveal, 129 Midland Ave., Glen Ridge, N.J.

ESTATE Of K5UXP, all equipment new with less than 5 hours actual operating time: 32S3, $550; 516F2, $85; 75S3, $475.00; LPA-1 linear, $195; HA1 keyer/paddle, $60; Heath SWR, $10; 10-D mike, $10. No trades, F.o.b. and shipped promptly upon receipt of certified check or money-order. H. L. Parrish, Jr., W5PSB, 2701 Dunoon Dr., El Paso, Texas.

75A-4, speaker, 6.0 Kc. 3.1 Kc, $400; MM-2 with 455 Kc adapter, $50; Want Johnson Matchbox K2HWP, 125 Amherst Ave., Syracuse, N.Y.

SAVE On all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts; 617-598-2530 for the gear u want at the price u want to pay.

QSLS? WPES? Personalized made-to-order one-day service!! Largest variety samples, 25¢. DeLuxe samples, 35¢ (refunded). Sakkers, W8DED, Box 218, Holland, Michigan (Religious QSL samples, 25¢).

QSL, SWL, cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elm, Hamilton, Ohio.

C. FRITZ, bringing hams greater QSL returns, over a quarter century! Samples 25¢ deductible. Box 1684, Scottsdale, Arizona (formerly Joliet, Illinois).

QSLS: samples 25¢ (refundable). Schuch, W6CMN, Wildcat Press, 6707 Beck Ave., North Hollywood, Calif.

QSLS "Brownie" W3CII, 3111 Lehigh, Allentown, Penna. Catalog with samples, 25¢.

QSLS-SMS. Samples 10¢. Malgo Press, Box 375 M.O., Toledo 1, Ohio 43601

DELUXE QLS. Petty, W2HAZ, Box 27, Trenton, N.J. Samples, 10¢.

CREATIVE QSL Cards. Free, new catalog and samples. Personal attention given. Wilkins Creative Printing, P.O. Box 787-1, Atascadero, Calif. 93422.

QSLS, Distinctive samples dime. Volpress, Box 133, Farmingdale, N.Y.

DON'T Buy QSLS until you see my free samples. Bolles, W5OWC, Box 9363, Austin, Texas.

QSLS. See our new "Eye-Binder" cards. Extra high visibility. Samples 25¢. Dick, W8VXK, 1996 N. M-18, Gladwin, Mich.

QSLS, SWLS, WPE. Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

ZIP Code rubber stamp, call, name, address with ink pad, $1.00. K4ISA, E. Perry, Box 8080, Allendale, Fla.

QSLS, SWLs, XYL-OMs (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing; eye-catching, comic, sedate, fatabulous, DX-attracting, prototypal, snazy, unparagoned cards (Wow!), Rogers, KØAAB, 961 Arcade St., St. Paul 6, Minn.

QSLS, 100 for $3.00, 28 new drawings. Samples 10¢. Brigham, Colson St., No. Billerica, Mass.

SUPERIOR QSLs, samples 10¢. Ham Specialties, Box 73, Hobbs, New Mexico (formerly Bellaire, Texas).

QSLS 300 for $4.35. Samples 10¢. W9SKR, "George" Vesely, Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLS. Samples 25¢. Rubber stamps: name, call and address $1.55. Harry Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

QSLS 3-color glossy. 100, $4.50. Rutgers Vari-Typing Service Free samples Thomas St., Riegele Ridge, Milford, N.J.

QSLS. Kromekote 2 & 3 colors, attractive, distinctive, different. Free ball point pen with order. Sample 15¢. Agents for Call-D-Cal decals. K2VOB Press, 31 Argyle Terrace, Irvington, N.J.

PICTURE QSL Cards of your shack, etc. Made from your photograph. 1000, $14.50. Also unusual non-picture designs. Samples, 20¢. Raum's, 4154 Fifth St., Philadelphia 19140.

QSLS $2.50 per 100. Free samples and catalog. Garth, Box 51Q, Jutland, N.J.

ATTRACTIVE QSLS: Guaranteed largest variety of individual samples (25¢ deductible). Paul Levin, K2MTT, 1460 Carroll St., Brooklyn, N.Y. 11213.

QSLS. All kinds, free samples. W7IIZ Press, Box 183, Springfield, Ore.

1½" Call QSLS $2.40/100, $2.90 (2 sides). Samples. Gariepy, 2624 Kroemer, Ft. Wayne, Ind.

QSLS: Quality with Service. Samples Free. R. A. Larson Press, Box 45, Fairport, N.Y. 14450.

QSL Specialists. Distinctive samples 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago, Ill. 60639.

GREET Ham Friends with 3-D Personalized Christmas cards. Newest holiday idea. Brilliant, sparkling designs. Samples 10¢. 3-D QSL Co., Monson 2, Mass.

QSLS. Samples, dime. Printer, Corwith, Iowa.

QSLS—100 3-color glossy, $3.00; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64114.

QSTs, 1932 to 1961—except the war years. Send stamped envelope for list. Priced reasonable. H. Wilcox, W3KLA, White Marsh, Md.

ELEGANTE . . . QST . . . "A luxury to Send; an Honor to Receive". Sample, 25¢. Crafted by Samco, Box 203-T, Wynantskill, N.Y. 12198.

QSLS. Large selection including photos, rainbows, cuts, etc. Fast service. Samples dime. Ray, K7MLR, Box 1176, Twin Falls, Idaho.

AT Last! Something new in QSL cards! All original designs. Send 25¢ for samples to YARSCO, Box 307, Yorktown Heights 1, N.Y.

QSLS. Gorgeous Rainbows, etc. Top quality! Fast service! Low prices. Samples 10¢ (refundable). Joe Harms, WA4FJE, 905 Fernald, Edgewarter, Fla.

QUALITY QSLs. Custom and stock. Samples, 10¢, 25¢, 50¢. Savory, 172 Roosevelt, Weymouth, Mass.

QSLS, $1.50-100 and up. Many styles. Samples. K. Kidd's, Rd. 1, Box 254, Telford, Penna.

QSLS. Free samples. Dave's Printing Service, Box 573, Broaddus Branch, Philippi, West Virginia.

QSLS. $1.90. Dime, Filmcrafters, Box 304, Martins Ferry, Ohio.

QSLS. Stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

RUBBER Stamps $1.00. Call and address. Clint's Radio W2UDO, 32 Cumberland Ave., Verona, N.J.

WANTED: Collins KWS-1, Hallicrafters SX-42 or SX-62. VE7QI, E. 60th Vancouver, B.C., Canada.

FOR Sale: Hammarlund receiver SP600JX17, TMC RTTY receiving converter model CFA1 with 'scope, Northern Radio VFO 2-32 Mcs. continuous with homebrew FSK unit, Kleinschmidt machine Model TT4A/TG, 60/100 w.p.m. regulated DC loop supply, 6 ft. aluminum rack with rear door. Selling as complete unit, all in like-new condition. Also have VHF receivers, Transceivers, Transmitters, etc. List and prices on request, VOIEC, Box 863, St. John's, Nfld., Canada.

CANADIANS: Invader 2000, Valiant, HRO Sr., DB23, R390 rcvr, Tapetone rcvr and converters; BC375E, ART-13, oscilloscope, G4ZU antenna. More! Send for list. Want: Dumont 'scope 275; GR Bridge 916, 1606A or similar. VE3BVX, 11 Sussex N., Lindsay, Ont., Canada.

WANTED: For personal collection: QSTs March and May 1916 WICUT, 18 Mohawk Dr., Unionville, Conn.

WANTED: Tubes, all types, write or phone W2ONV, Bill Salerno, 243 Harrison Avenue, Garfield, N.J. Tel: GArfield Area code 201-471-2020.

CASH For callbooks. Old callbooks prior to 1925 or after 1931 wanted. W8EF, 795 Lake Shore, Grosse Pointe, Mich. 48236.

SELL: KWS-1, $650.00. In excellent condition. Dave De Armond, W6MSD, 3024 Seminary, Oakland, Calif.

CASH For Callbooks. Old citizens amateur callbooks before 1924. Also 1941 or 1942. U.S. Government Amateur Callbooks, any year, wanted. W8EF, 795 Lake Shore Road, Grosse Pointe 36, Mich.

BIRTHDAY Anniversary, Christmas Gift. Page 176 May QST DX QSO Recorder, $2.50. Pen pencil set with gold name and call, $4.50. Viking Products, Dept. A-5, Orange, Mass.

FOR Sale cheap: QST or CQ, any quantity. Send your list for quotation. Cash for call books before 1942. Want early radio gear and publications. Erv Rasmussen, Box 612, Redwood City, Calif.

FOR Sale: W6BWK estate: Clegg Zeus 33T, $495.00; Clegg Interceptor and power supply, $295.00; Lettine 262 and U.F.O. supply, $150.00; RME converter 56-220 Mcs, $175.00; Hallicrafters SX-1001A, $300.00. Collins 75A2, $225; Johnson Kilowatt desk, Ranger exciter, kilowatt Matchbox with SWR, condx as new, $1000. Many other items. Ted Brix, 5573 No. Van Ness Blvd., Fresno 5, Calif.

ATTENTION RTTY'ers: Typewriter ribbon re-inking device, $3.00 postpaid. W7ARS, Walter, Walter E. Nettles & Companies, 8355 Tanque Verde Rd., Rte 2, Box 694R, Tucson, Ariz.

WASHINGTON Amateur Radio News. Free copy. Foundation for Amateur Radio, 2509—32nd St. S.E., Washington, D.C. 20020.

INTERESTED Florida for DX and TVI free hamming? Three bedroom two-bath home on oversized corner lot, landscaped, extra carport for boat, forty feet E-Z Way tower with 5-element Tel-Rex Triband beam. Small equity, twelve miles from Tampa. Complete S/Line with 30L-1, if wanted. WA4QPR, Wolford, Box 823, Brandon, Fla.

32S-1, 516F-2, 75S-3 with cables and manuals, $995.00. K3JZH.

HW12-22-32 owners inexpensive Triband conversion. Complete plan, $4.00 postpaid. Plans, Box 17, West Bend, Wisconsin.

"HOUSE Of Happy Hams!" Get your new or used gear for less with cash and no trade. Make us an offer or ask for ours H & H Electronic Supply, 506-510 Kishwaukee St., Rockford, Illinois.

WANTED: De Forest spherical Audion with candelabra screw base, Type "H", kilowatt oscillion, other early tubes, books, catalogs, QST before 1922. Send description and prices. W9EWK, 610 Monroe Ave., River Forest, Ill. 60305.

RTTY Channel Filters. Octal mount, tuned. Specify frequency. $3.00 each. WA6JGI, 3232 Selby Ave., Los Angeles, Calif. 90034.

FOR Sale: HQ-180C, $275; HT-37 w/PTT, $295, factory wired Ranger w/PTT, $150; BS-221 w/power supply, $49.50; D-104 w/G-stand, $20. All in like-new condx. Heath XC-2 2 meter converter, $40. WA2LIM.

4CX250B tunes, $15 pair. 4X150, $7.00 pair, both types guaranteed. 1 Kw, DC input linear amplifier, 80 thru 10, power supply built-in, small and light, $139. Silicon rectifier stocks 3" x 5", completely built up, 3000v, 2 amp, $10.95. 2000 V, 2 amp, $8.95. Will trade. Inquiries answered. C. M. Pruett, K4BHV, Star Rte. C, Flamingo Bay, N. Ft. Meyers, Fla.

BARGAINS For sale: Dow-Key relay, $10; TA-31Jr rotary dipole complete with direction meter, rotor and 75 ft. four conductor cable, $35.00; B-4 Mini Products mobile vertical for 6-10-15-20 meters, $10.00; Shure microphone, $5.00; Lafayette omnidirectional mike, $4.00; 200 ft. assorted lengths RG/58-U coax (some very long lengths) $8.50; 15 meter Signal Corps collapsible vertical mobile, $5.00, mobile base mount, $3.50. WA2PBY or call 212-BA-5-2933. Everything shipped collect express. WA2PBY 163-70 16th Ave., Whitestone 57, L.I., N.Y.

BOOST Reception, 3.5-30 megacycle SK-20 Preselector kit, $18.98; boost modulation—AAA-1 clipper-filter kit, $10.00. Reduce noise—NJ-7 Noisiector, IF, wired, $4.49. Postpaid! Literature free. Holstrom Associates, Box 8640-T, Sacramento, California, 95822.

FOR Sale: Plate transformers 36000-3600 VAC @ 1000 Ma. CCS, with 110V and 220 volt primare, $35. One year guarantee. Peter W. Dahl Co., 5331 Oaklawn Ave., Minneapolis, Minn. 55424. Tel: 922-7618.

CRYSTAL Bargains. Free list. Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

ST. GABRIEL decal for mobile hams. 25¢ coin. Wizpatronics, Candia, N.H.

FOR Sale: KWM-1, 516IF and heavy duty 516F1 with mount, $550; P&H distortion indicator, $75; Invader 200 watts, $450.00; 75A4 3 Kc, 1 Kc filters, spinner dial, $500 (with spkr), all gear perfect. W2STW, Newfield, N.J. OX 1-4435.

FOR Sale: Johnson 6 & 2 converter, 30-34 Mc. IF. Gud condx, $40.00. W2OQO, Joseph Calvanico, 2951 Pearsall Ave., Bronx 69, N.Y. Tel: 212-OL-2-7376.

BEFORE You buy receiving tubes, Industrial and Communication tubes, transistors, test equipment, hi-fi components, kits, parts, etc. send for your Giant Free Zalytron Current Catalog, featuring standard brand tubes: RCA, G-E, etc. All brand new, Premium Quality Individually Boxed, one year guarantee, all at biggest discounts in America! Also, sensational savings on new surplus Industrial and Communication tubes! We serve professional servicemen, hams, experimenters, engineers, technicians. Why pay more? Zalytron Tube Corp., 469-Q, Jericho Turnpike, Mineola, L.I., N.Y.

MUST Dispose: 82 copies Proceedings of the IRE, 3 vols. complete, 1926 to 1952. Real bargain for lot. Write for list. Mrs. Miriam Y. Knapp, W1ZIM, 191 Beechwood Road, West Hartford 7, Conn. Tel: 521-2055.

TUBES, Diodes, transistors wanted. High cash prices paid. Astral Electronics, Box 636, Elizabeth, N.J. Tel: 354-3141.

ACT Now!! Barry pays cash for tubes (unused) and equipment. Barry Electronics, 512 Broadway, NYC 12. Call 212-WAlker-5-7000.

CRYSTALS: Free Bargain List. Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

WANTED: Parts, sets, as is GRC-9, BC-610, GRC-27, Autodyne. 236 Park Avenue, Bethpage, L.I., N.Y.

HAM Discount House. Write us for lowest prices on Ham Equipment. Factory sealed cartons. Specify equipment wanted. NC-300 w/matching spkr, $150; Valiant, $150; Valiant FW, $195; Apache, $150; TR-44, sealed carton, $50; HT-44, $316; SR-150, $520; HT-45 with PS, $395. F.o.b. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn.

RTTY Gear for sale. Write for list. 88 or 44 Mhy Toroids five for $1.75 postpaid. Elliott Buchanan, W6VPC, 1067 Mandana Blvd., Oakland, Calif. 94610.

304TL tubes wanted. Also other xmttg and special purpose tubes. We will buy military or commercial transmitters and receivers with designations ARC, GRC, URR, 51 and MN. Air Ground Electronics Co., 64 Grand Pl., Kearny, N.J.

TUBES Wanted. All types, highest prices paid. Write or phone Lou-Tronics, Inc., 131 Lawrence St., Brooklyn 1, N.Y. Tel. UL5-2615.

HR-10 Rcvr, $49; K3JFV, 18 W. Front St., Media, Penna.

ELECTRONIC Tubes: Top brands sold at substantial savings! (Minimum order $15.00). Authorized G-E Distributor. Send for Free Buyers' Guide for all your Tube Requirements. Top Cash Paid for your excess inventory (New Only—Commercial Quantities). Metropolitan Supply Corp., 443 Park Avenue South, New York, N.Y. 10016. 212-MU 6-2834.

SELLING Out: NC-300 with manual, $160; DX100B with grid-block keying, $140. Can't use the rig from a city apartment. Andy Faber, WA2BWS, 1010 Fifth Ave., N.Y., N.Y. 10028.

HEATH HW-12 80-mtr., xcvr, HP-13 DC supply, GH-12 mic HRA-10-1 calibrator, $180. W1GQK, 201 Concord, Nashua, N.H.

FOR Sale: KWM-2 and complete station as a package only. Will consider trade on boat. Write for complete list to W2UPY, A. Ostrochovsky, 70 Rea Ave. Ext., Hawthorne, N.J.

SALE: Ameco 6-meter mobile converter, Model CLA (12v), $10; Heath VC-1 voltage calibrator, $4.00; Silver AM/FM signal generator, 90 Kc-170 Mc., Model 906, $25; Eico 145 signal tracer, $5.00; Triplett 3256 freq. meter, $5.00. Trimm headphones, $1.00. F.o.b. K1YDG.

SELL: Collins 51J-3 (R-388/URR), excellent condx, w/vernier knob, manual, $550.00; Hallicrafters SX-28, w/manual, fair, $70.00; Telrex Beams: 10mtr, wide-spaced 3 el., excellent, $45.00; 15mtr wide-spaced 3 el., good, $55.00; 20mtr Supermini, 2 el., excellent, $45.00; Telrex R-100 medium-duty rotator, fair, $20.00; Proppitch rotator, w/transformer, reversing relay, good, $25.00; Gonset 10mtr convertor, $10.00; PE-103 motor/generator, excellent $25.00; 50 foot tower, excellent, 5 ten foot sections, triangular, 6.5 inches, complete w/top-plate, 3 galvanized screw guy-anchors, turnbuckles, guywire clamps, $75.00; All F.O.B., Jackson, N.H., Mack Beal, W1PNR.

POWER Supply, Heath HP-23. Factory wired and tested, in Heath's sealed carton, $40.(2) 5-el. 6-m. beams, $20. Halo, $5.00. K2TGH, 67-19 172 St., Flushing, L.I., N.Y. 11365.

FOR Sale: DX-60, in gud condx: $45.00. James Stafford.

YOUR Call in plasthesive tape, 25¢. Five tapes, $1.00. May, WA4DBG, Box 270, Jonesboro, Tenn.

WANTED: Hickok VTVM Model 209A, Hallicrafters S-36A and S-37 receivers. MacGregor, 5820 Orgon Ave., Washington 15, D.C.

AM Going UHF, selling: DX-100, $95.00; Mohican receiver, $70; BC-221 with book, $65; Elmac A-54, $35.00; 12V mobile TX supply, $40. All in gud wkg. condx. Robert E. Gibson, 15 Harvard Ave., Burlington, Mass.

WANTED: Monitoradio PR-9 152-162 Mc. or equivalent. H. L. Danner, 840 So. 29th St., Omaha, Nebr.

CENTRAL Electronics 200V for sale. All mode transmitter with manual. New condition, taken from storage. No shipping carton. $625 complete. Howard Eddy, K6SHB, 72-17th Ct., Hermosa Beach, Calif.

COLLINS 75A-4, #2838, like new, vernier knob, speaker, 1.5, 2.1, 3.1 filters. Excint KWS-1 without power supply. Extra 4X250Bs. Check for $750 gets both prepaid. Bruce, W7JMS/5, 2844A Quay Loop, Holloman AFB, N.M.

COLLINS 75A4. Two filters. In mint condx. $425.00. Heath HX-10 Sideband transmitter. Factory checked. Never used. $335. David Barbour, 2200 Grant Building, Pittsburgh, Penna. 412-471-9900.

APACHE, SB-10 in excellent condition. Both $175. Am going transceive. Mike Herbstman, WA2PHB, Shop: (212) CH 4-1226, home (212) DE 6-2324, Brklyn, N.Y.

FOR Sale: Russian callbooks. Save months with Rare UL, UO, UH, UR calls. $1.00 plus mailing. W8MSG.

SW-120. No modifications. 800 volt AC supply, mike, external VOX SWR bridge. Perfect. All for $150. Don Choice, 2132 East Montemar, Escondido, Calif. 714-745-5580.

SELL: Drake 2B, speaker, Q multiplier, Vanguard, 6 mtr., converter, extra xtal. $220. K4WQZ/1, 4433766 51 Vauxhall St., New London, Conn.

DRAKE 2B HX-20, both for $295, excint condx. Trade for Lampkin meters. D. Phillips, 5449 Ardonna Lane, Dayton 32, Ohio.

WANTED: Commercial, Military. All types, ARC, ARN, ARM, BC, GRC, PRC, TRC, URN, URM, TS, 618S-T, 17L, 51R-X, others. Ritco, P.O. Box 156, Annandale, Va.

HAMSHACK in the living room. NC-300 and Apache, also 300 watt home brew job for stand by, tower 56 feet high and four more antennas on three-acre plot. Am going to South America. Will rent this four-room hamshack and home, reasonably, from November 1st to April 1st to ham operator. K2SPZ, Box 35, East Syracuse, N.Y.

SELL: Globe LA-1 linear, 300 watts, $60; AR-22 rotor, $20; both beautiful condition. Globe DSB-100 needs 1000 VCT pwr. transformer, $20; Ken Goodwin, K10NW, 382 Warren St., Needham, Mass.

SELL: Collins 75A4 serial 3860 with 3.1 and 0.5 kc filters. With speaker, $425. W2PUL, c/o Squires-Sanders, Inc., 475 Watchung Ave., Watchung, N.J.

WANTED: HA-1TO keyer, state condx, age, price. W4OGG.

FOR Sale: Brand new complete Clegg 99ER, mobile or fixed transceiver, 12V PS also halo ant., with Turner mic: $125.00. Danil Conlin, W1ZJW, 92 Chatham St., Worcester 9, Mass.

MOHAWK Receiver with matching speaker, excint condx, like new, with no scratches, etc. Will not ship, sry. Price: $200 cash. Mr. Alan R. Harvey, WA2UVM, 106 Willis Ave., Syracuse, N.Y. 13204. Tel 315-468-5242.

SELL: HT-32, $320; SX-101A, $320.00, immaculate. K5TNR, 2463 Wisteria St., New Orleans, La.

SX-101, Mark II, sell: $175.00. Cash or trade for Gonset G-28, vy gud condx. Will not ship, sry. K2VKS, 609 267 9208 Pemberton, N.J.

RTTY TRANSMITTER (also cw/phone/fax)-AN/SRT-15/16 has synthesizer frequency control in 10-cycle increments 300 kc-26 mc. Digital frequency setup. Variable shift 0-1000 cps. 4-400A final. Made by Federal, cost govt. $15,000. Three available $850 each or $2000 for lot. TOWERS—Stainless-Construction Co. triangular 26-inch face welded tubular. 5-10-20 foot sections. Extremely strong. $3/foot. FOB Washington, D.C. J. D. Ahlgren W4YHD Rt. 2 Box 35 Herndon Va. (703) 437-2416.

TRANSISTOR Characteristic Curve Plotter, manufactured by Dunn Engineering, Mod. 331 w/schematic and manual, 26 tubes. VC sweep adj. 0-50v. I in steps 1 microamp/steps to 1 ma/step. Original cost, $800. F.o.b. $200. In perf. condx. Peter von Raits, 1145 Jerico Tpke., Woodbury, L.I., N.Y. 516-guest. VMY2-5090. Hewlett-Packard VTVM Mod. 410B perf. condx, orig. $245.00. Write or call for complete specs. $110.00.

WANTED: AA coil set and dial scale (10 meter bandspread) for HRO-60. D. Palmer, W6PHF, 638 Benvenue, Los Altos, Calif.

FOR Sale: Complete station, Hallicrafters S-108, Heath DX-40, Eico 722, Heath Q-mult., bug, mike, monitor, relay, antenna. WA2JWD, Alan Lichstein, 2979 Marion Ave., Bronx, N.Y.

COMPLETE Station: HQ-170C, Valiant II, TR switch, EV-729SR mike, All-band antenna with coax, Rayco traps, wire: $600. KØCRJ, Box 527, Minneola, Kansas.

SX-100 Mark II in excint condx, with manual: $145.00; new R-48A spkr, $13.00. WA5ERC, 154 Ronald Blvd., Lafayette, La.

VIKING Ranger for sale. Has just 10 hours since factory overhaul. I am getting married and moving, has to go! Write or call Bob Martin, 145 East Monroe, Villa Park, Illinois: $115.00.

GONSET Communicator IIB, 2 mtr. CD model. In excint condx, cover, xtals, S-meter, 3-el. beam included. $99.50. WB6JCI, 1240 Yale St., Santa Monica, Calif.

PRINTED Circuits: Technical information supplies copper board chemicals. Artwork, camerawork and custom-made. QSLS. Exclusive printing. Samples complete information. 25¢ refundable. Marion Hill, W5HOW, Rte. #2, Box 1005, Humble, Texas.

ENTERING College this Fall. Must sell entire rig to pay for college. No reasonable offer will be turned down, but on first-come first served basis! SR-150 with AC power supply, HA-1 keyer with key, Knight SWR Bridge, AR-22 Toro, Bud low-pass TA-33JR. B&W antenna switch. WA8ASV, 1121 Millbourne, Flint, Michigan.

RTTY: 15s and 19s complete on a waiver of commercial intent basis to licensed hams. Leslie Johnson, WA9HDG, RR1 Tinley Park, Ill. 60477.

WØGFQ offers you hundreds of reconditioned equipment bargains. Write for free blue book list. Samples: Galaxy 300 with AC P/S, $289.00; Swan 40 $129.00; AF-67, $62.00; HT-37, $299.00; HX-50, $279.00; Invader, $329.00; Viking 500, $389.00; King 500B, $299.00; Ranger, $119.00 and many more. Save now! Write Leo, Box 919, Council Bluffs, Iowa.

G-76 with rugged homebrew AC supply and speech clipper, $200; 250 Kc. sideband filters Collins F-250-Z4 and F-250-Z5, $25.00 pair. 3000v, 500 ma. Power supply, $100 (can't ship this one, sry!). 6-meter Communicator III, $160.00; NC-183D, vy clean, $165.00. W2TJD, 130 Whitford, Nutley, N.J.

WANTED: E-Z Way Tower (50 ft. to 70 ft.) and ground post. State model, age, condition, and your asking price. WØENL, Box 2721, New Brighton, Minn. 55112.

PRINTED Circuit boards. Hams, Experimenters. Catalog, 10¢. P/M Electronics, Box 6288, Seattle, Washington. 98188.

FOR Sale: HT-37, $275.00; Drake 2A with 2AQ spkr-multiplier and xtal calibrator, $195.00; all equipment is in perfect condx. Ken Wyatt, K4BCP, Rte. 4, Taylors, S.C.

B&W 6100. Sell or trade for all-band transceiver and power supplies. AT-1 Novice transmitter, $20.00. Kodak Varifax office copier ($25.00 value) or trade for ham-gear. Curt Fouse, Washington, W.Va.

NATIONAL NCX-3, $275.00; NCXD, $85.00; Heathkit HP-23, $30; Hammarlund HQ-150, $160; Hammarlund HC-10, $85. Frank Mrozak, 59 Wellington Ave., Kenmore 23, N.Y.

RTTY Gear: Model 19 and 14-TD, steel table and W4TJU converter, extras, all for $200.00. K8BIT.

HALLICRAFTERS SX-101A, in excint condx, new tubes, never in need of service. Never tampered with. $210.00. F.o.b. Ellicott City, Md. T. V. Appler, W3GBJ, 12 Normandy Drive.

RUBBER Stamps, 3-line. $1.00. Andrew Travis, 2002 West 8th, Austin, Texas 78703.

ELMAC AF-67, PMR-7, Webster trans. power, New-Tronics mobile antennas, mike, 6-meter conv., mtg. brackets, ant. relay, cables, complete, $225.00. K9DEQ, R. Hochsprung, 10715 S. Tripp, Oak Lawn, Ill.

WANTED: F455B-08 800-cycle mechanical filter for 75A-3. Shelby Ennis, Germantown, Ky.

SELL: Eico 720 in gud condx, $60. Harry Majxner, 303 East Oak, Olivia, Minn.

COLLINS 32V-2 drives this 600 watt AM rig. Rack-mounted on casters includes final, modulator, power supplies, modulation 'scope, RF switching section. Run final on CW, AM, Linear. $350.00. W1HRO, 27 Birchwood Rd., Springdale, Conn.

SELL Complete station: HT-37, Drake 2B with multiplier, Shure mike, antenna, Dow-Key relay, etc. Used only a few hours, $650.00. Ralph Dill, WB6AEC, 33832 El Encanto, Dana Point, Calif.

FOR Sale: HQ-170C, $235.00; Gonset GSB-101 Kw GG amp, $160.00; both in excint condx. Also a used Industrial Instruments type RN-1 bridge, $45.00. Walt Kozacko, W1NS, 1711 Central Ave., Needham, Mass.

SALE: NC-300 rcvr, W5KVE, 1307 S. 21, Temple, Texas.

SELL: Receiver, Hallicrafters SX-110, with spkr, in perf. condx Not a scratch, $110.00. You pay shipping. Robert Hamilton, K2HRD, 70 Hudson St., Port Jervis, N.Y.

FOR Sale New York area—all perfect condition—Collins 75A4 serial 3645, vernier dial, matching speaker, $500.00; Central Electronics 20A with VFO 160 thru 10 meters, $185.00; Johnson Ranger factory wired with FSK added, $145.00: Beautiful, efficient homebrew final—pair 811A's for 500 watts S.S.B. or 350 watts CW/AM including power supply and modulator—$140.00. K2LGS, Auguste Schwab, Jr., 560 Woodmere Blvd, Woodmere, L. I., N.Y., 516-FR4-9470.

FOR Sale: Johnson Viking KW, desk, best offer. Doug Ryan, 58-23 185 St., Flushing 65, L. I., N.Y. FI-7-8144.

MOBILE Antenna coils, 80 thru 10 with adjustable tap. $15.95 prepaid. J. W. Falloure Co., 4811 Saxon, Bellaire, Texas.

W9YFV selling his beautiful 7-room all-face single floor ranch home. Three large bedrooms individually air-conditioned. Large living room and separate dining room luxuriously carpeted. Huge family room completely finished in Cypress. Radio room in finished basement. Attached garage. Quality construction and material throughout. 3-element 20-meter wide-spaced Yagi on 30 ft. boom supported by 65-ft. Douglas Fir pole above a most effective ground system. Near schools, transportation and shopping. Possession 30 days after closing. Realistically priced in mid 30's. Please only interested, qualified individuals apply. Ed Schmeichel, 190 E. North Ave., Elmhurst, Illinois. Phone 312-834-5971 late evening.

75A4 serial 4054 with 3100 cycle filter and tuning knob, $450. Collins 51JS serial 6597 with tuning knob, $625.00. Both received in mint condx. Heath HA-10 Warrior KW. Linear complete, $175.00. Mosley TA33 Senior with CDR rotator, $80. All F.o.b. Norm Alexander, W9QQN, 3N384 Wilson St., Elmhurst, Ill.

KITS Wired and rebuilt. Write for estimate. W4OYE, A. B. Reynolds, 159 Dennis Dr., Williamsburg, Va.

HARVEY-WELLS T-90 plus dynamotor, filter, $75.00; Knight T-150A, $75.00; 100 amp. alternator, $90. Nelson Bigelow, Jr., W1RVN, Box 535, Camden, Maine.

FOR Sale: Viking Ranger, factory-wired, first check for $100 takes it. You pay shipping. Alex Rotker, 2526 Bronx Park East, Bronx, N.Y. 10467.

BARGAIN List, clearing out: Transformers, chokes, meters, diodes, relays, resistors. Ranger, excellent, mike, key, relay, manual, xtals, spare tubes, $110.00; Heath HR-10 receiver, new, $55.00; power supply, homebrew, deluxe, panel mounted, metered, 2000 VDC at 375 Ma., $45.00; Bud cabinet, 78 in., black, door, castors, mint condx, $25.00; 3000 VDC, 2 KW power supply parts, $75; Vibroplex Blue Racer, $10.00 Variac, 1 amp $2.00, 20 amp., $20; prop pitch transformer, new, $4.00. WØLWZ, 1030 So. Dudley, Denver, Colorado, 80226.

WANTED: 30S1. Must be reasonable. W9MJH.

WANTED: 220 volt, 10 amp. Variac. Will buy or swap. Have KW linear parts, Johnson rotary inductors, mica capacitors, used 4-1000As. Jack Slais, KØTJW, 1204 Fernleaf Dr., St. Louis, Mo. 63126.

MAGAZINES: "QST", "CQ", and Handbooks back to 1943 and earlier, mostly complete. Will sell by volume. If interested, write and make offer. Len Hoops, KH6DJL, Box 246, Hoolehua, Hawaii, 96729.

WANTED Pre-war or surplus HRO. Main tuning condenser must be OK but coils, speaker or PS not needed. W. E. Lawrie, 4739 Saratoga, Downers Grove, Ill.

HUNTER Bandit 2000A, like new condx. $329.00; noise-blanker for 75A-4 with instructions 136C-1 new, $49.00; noise blanker for 75S-1, new 136A-1, $49.00; VFO for 75A-4, 70E-24; VFO for KWS-1, 70E-23, VFO for KWM-1, 70K-1, all new, $39.00 each. Richard E. Mann, 7205 Center Dr., Des Moines, Iowa.

SELL: 500 Mc. double conversion receiver, lighthouse RF, mixer, oscillator Navy surplus, 1947, unused, unmodified, $20. J. Kinzer, 107 Evergreen Ave., Springfield, N.J. 07081.

GONSET G50, 6-meter, 48 watt, VFO, transceiver; late serial number. In excint condx, $210.00. WA6IQV, Robert Caliva, 6927 Cedar St., Huntington Park, Calif.

NRI TV Course, $15.00; CIRE Radio Math Course, $10; Pickett sliderule, $10.00; RCA Geiger counter, $20. Send for complete list. Witmer, FAA, King Salmon, Alaska.

CLEARANCE: Dumont 4 Beam 'scope, $99; SWR Bridge 250-350 Mcs., new, $40; Chart Recorder, $35; computer-metals, $75. Sorenson reg. 8 & 15 amps, $79. Hickok 100 microamps, new, $3.50, many others. Trades. Milton Meinwald, 2043 E. 52nd St., Brooklyn, N.Y.

CLEAN C.E. Exciter, F.W. with home-made VFO's form ARC-5 and QT-1s and manuals: 20A, $100. 10A, 5 sets coils, $60.00. W5EDX, 645 East Woodlawn, San Antonio, Texas.

COLLINS 75A-3, 3.1 kc. mech. filter, one owner, excint condx, with manual, $300. Frank Butler, W4RKH, 494 Elliott Road, Fort Walton Beach, Fla.

SELL: SX-88, $275.00. WAØAWL.

200V SSB, $545; HT-32, $225; AN/FRR-21 rcvr, 14-600 Kc, $175; SP-600JX-17, $425; Collins R-390, R-390A, R-391, R-388, 51J-3, 51J-4 general coverage receivers. Alltronics-Howard Co., P.O. Box 19, Boston, Mass. 02101. Tel: 617-742-0048.

JOHNSON Invader 2000; $700. HQ-170C, $200. From estate of WA6BGS. Mrs. Eddy Quinn, 195 North Mollison, El Cajon, Calif.

HEATHKIT 90W Cheyenne, Comanche mobile combination w/DC and AC pwr. supplies, mike, spkr, brackets and cables. Very nice mobile, portable or compact home station: $160.00. 15W 10-meter Lysco xmttr with T-17 mike and dual vibr. pwr. supply, $15.00. H. F. Cushing, WB6CQG, 2348 Menzel Pl., Santa Clara, Calif.

RG9B/U coax, 50 ohm, silver coated, 35 ft. length, $4.90; RG214/U coax, 50 ohm, silver coated, slightly larger conductor, 125 ft. length, $12.50. Very fine. W6QAE, 1302 Morningside Way, Venice, Calif. 90291.

LAFAYETTE HE-45A, hardly used. Looks and operates perfectly. $85.00. (Will include 6-meter Heliwhip). Mike Hauer, 80-15 Grenfell St., Queens, N.Y. 11415.

C-E 100V, $425.00; SBE-33 with mike, $300; Mohican GC-1A with AC power supply, $90. All are in mint condition. Carl Bacon, 808 Owego Dr., Pontiac, Mich. FE-2-8733. W8NS.

SELL: Invader 200. Mint. Low operation time: $325.00. Fred Pichitino, W8KML, 19199 Blake, Detroit, Mich.

SELL: Homebrew five-element, two-meter beam. Approx. 10 db. power gain. $3.80. New Trans-Pro TM-1 monitor, $14.00. Include postage. Daniel Brandt, 6035 Acacia St., Los Angeles, Calif. 90056.

FOR Rent: January thru April 1965. Hamshack, tower, TH-4 beam ant. attached to 2 bedroom 2-bath home, beautifully furnished. Completely equipped in quiet neighborhood. Convenient shopping, golf, beach. 1212 Park Road, Hollywood, Fla.

COLLINS 75S-3, $550; Cheyenne, Comanche, AC/DC supplies, Ctr. load whip, $165.00; simple X Super, $25.00; Sixer, $40. WA2GHK, 46 Kinter St., Clinton, N.J.

FOR Sale: VHF-152A: HT-17 excellent condx, complete with original manuals. Best offer. Whitticar, 261 West Court Street, Boylestown, Penna. 18901. K3DGO.

COLLINS 75A-4, in perf. condx. Finest receiver made. Will ship for $465.00. W9GXZ, 2113 N. Sherman Ave., Madison, Wis.

BARGAINS. Buy, Sell, or Trade your gear through HEED Directory. Only $1.00, 12 issues. Free sample copy. WA2NHH, 1225 Hillside Place, North Bergen, N.J.

HOWARD Radio specials: 75S-1, $350; KWM-1 & 516F-1, $449; 75A-4, $475; 136B-2 NB, $85; 30L-1, $450; Invader 200, $379; NC-300, $199; SX-101 Mk III, $209; Globe 500B, $289; Globe 350 F/W, $179; Courier, $189; HT-37, $309; HT-32, $339; NC-183D, $179; 5100, $149; 5100B & 51SB, $289; Drake 2A, $189; 20A and Bandhopper VFO, $229; Loudenboomer (No PS), $189; HQ-170C, $219; HQ-140XA, $159; HQ-129X, $119; DX-100, $129; DX-60 and HG-10 VFO, $99; Commanche-Cheyenne & AC PS, $219. Store Demo 75S-3, $630; LSA-3 & DC PS, $219; NC-270 w/spkr, $269; SX-110, $154; Free List, Box 1269, Abilene, Tex. 79604

HT-37. Sell in good condition: $250. Prefer pick-up deal. W2PZS, Phone 609-5873509, Trenton, N.J.

HALLICRAFTERS S-40A, $30; Tecraft 2-meter converter, $30. WB2CVZ, 57 Livingston St., Rhinebeck, N.Y.

SELL: HQ-110, in gud condx, $100 or your best offer; Lafayette HE-35, halo, pwr. supp., $40; Ameco 6M conv., $8.00; QSTs, Nov. 1957-Jan. 1962, $8.00 the run, or 20¢ per copy. Brian Treadwell, 176 Colonial Parkway, Yonkers, N.Y. Tel: WO-1-4857. K2LRR

DRAKE 2-B, almost new, $210; Heath HR-10 rcvr, $60; Eico 730 modulator, unused, $45. Myron Adams, 644 Riverside Dr., NYC.

LIKE New Collins 30S1 linear, $925.00; E-Z Way Tower RBX-60-G, Ham-M rotor, TA-33 beam, all for $325.00; SR-34 and 6-M, $195.00; SX-43 with R-44 spkr. $110.00. Sold at this address only. Slutske, 1801 N. Natoma Ave., Chicago, Ill.

SELL: Knight T-150, Hallicrafters S-85, Heathkit Q-multiplier, Preselector, electric keyer, for $150. Rich Comins, WA2ZEL, 39-07 211st, Bayside, N.Y.

SWAN Transceivers: Each a complete SSB station. SW-240 with SW-117 AC pwr. supp./spkr. $335.00; SW-175 with Heath HP-20 pwr. supp. $155.00. K6AY, 2819 Park Boulevard, Oakland, Calif. 94610. Tel: 415-452-3466.

COLLINS 75S1, 500 cycle filter, other extras, $345.00; 32S1 and 516F2, recent factory realignment, $445.00; Gonset GSB-201 linear amplifier, transceiver relay, $195.00; Gonset Communicator IV for 2 meters and IV VFO, later models, $295.00; All one owner gear with extremely little use. Spotless condition. W6VIV 845 Darrell, Costa Mesa, Calif. Tel: 714-548-1679.

SWAN 175 and Heath HP-10 DC P.S., $195.00, or trade in on Swan 240. W5NGX, 2532 E. 10th St., Odessa, Texas.

SELL: Collins R388/51J3, thirty 1 Mc. bands 0.5 to 30.5; manual. Aligned. Free homemade product detector optional. Gud condx. Ur best offer. 11TLR, 4817 Hickory, So. Charleston, West Va., Tel: 304-768-6618.

MEASUREMENTS Model 444, signal generator, 300 to 1000 Mc., calibrated output, gud operating condx, $100; frequency meter, LM-18, w/calibr. book, and w/issue P/S, el calibrated in Western Primary Standards lab, in excint condx, $75. Will trade the above on KW Johnson Matchbox or counter such as HP-522. K6YCX, Frank Merritt, 2041 S. Benson, Ontario, Calif.

SX-99 with QF-1 Q-mult. Vy gud condx, recently realigned and calibrated, with both manuals. $95 or best offer. Karl Juul, 128 Somerset Rd., Glastonbury, Conn.

HALLICRAFTERS SX-140, $95; HT-40, $75. OO; factory wired, used vy little and in excint condx, manuals included. Both for $160.00. Hamilton Webb, Walpole, N.H.

MONITORSCOPE, HO-10. Unassembled. $49.00. Prefer trades. Send 10¢ for list of other equipment. Belvidere, Box 1103, New Britain, Conn.

COLLINS For sale: 32S1, $410; 75S1, $325; 516F2 power supply, $100; 312B4 control, $85.00. Only one owner and equip. in excint condx. Original cartons. Will ship C.O.D. W7EBG, Frank E. Shopen, 4411 No. 47th Drive, Phoenix 31, Ariz.

SELL: Exceptional condition, SX-100, Apache. Best offer. Norman Wise, K2QDM, 108-14 65 Road, Forest Hills 75, L.I., N.Y.

FOR Sale: 2 DX-100's, 1-trouble in high voltage circuit, $75; other is converted back from SSB and won't load up past 50 mils. $85. WAØCRH, Lynn Schroeded, Bondulac, N.D.

SELL: VF-1 VFO, instrux, in excint condx. $13.00. John Sellers, WA9EEF, 6701 East 17th St., Indianapolis, Ind.

VHFers: 2 meter Nuvistor converter with regulated power supply, per QST1 SX-99 with VR tube and antenna switch; Heath 'scope, RF signal generator; Hycon VTVM; 20-watt push-pull audio amplifier. Wanted: factory-wired Heath Mohican. Write to Pocock, K3OKC, 1225 Elm Ridge Ave., Baltimore, Maryland 21229.

NCX-3 and NCX-A, used 3 hours on CW only. $350. K2CPR, 5667 Birch, Pennsauken, N.J.

TRADE Heath 8 Mc. Twoer, new wired for Heath Sixer. Same value. K4QOX, 6309 Augusta Rd., Greenville, S.C.

HAMMARLUND HX-500 transmitter, in new condx, used little, $450. W2WZT.

RTTY Model 19, immaculate, complete, $200; Model 15, $75.00; converted ATS TV camera with p/s, $125.00; 6N2 receiving converter, $45.00; Triplett 3434 TV-FM sweep generator, $75.00; Clouge-Brengle LCR bridge, $45.00; 150 W AM-CW xmttr, $65. Cash or trade, K1HOP, 45 Clintonville, North Haven, Conn. 06473.

HALLICRAFTERS SX-100 rcvr, $145.00; Globe Scout 680A xmttr, xtals, mic, $45.00. Gud condx. Chas. Hyde, WB2GKZ, RD #2, Ballston Spa, N.Y.

FOR Sale: DX-60 and matching VFO, HG-10, both in excint condx, $100. Also Heath Hi-Fi equipment. Write for details. Wanted: Heath Seneca transmitter in excint condx. WA9ESU, 10929 W. Cleveland Ave., West Allis, Wis.

SELL Locally: Almost new, Mosley TA36 6-element Tribander, $90; new, Johnson antenna T-R switch, $17.00; Johnson 275-watt Matchbox, $20; New UTC components, 2000 volt 500 Ma. DC pwr. supply with silicon rectifiers, $50.00; military LM (BC221) freq. meter with matching AC supply, $65.00. K2HFU, Westbury, L.I., N.Y. (516)-ED-3-7312.

GONSET G-28 Communicator, perf. condx: $250.00. S.A. King, W8POZ, 5808 Wayburn, Detroit, Mich.

SELL all or partials, QST run 1921-1964; CQ 1945-1964; Radio, 1937-1942. W8FGV, 720 Ecton Rd., Akron, Ohio 44303.

VIKING Adventurer with modulator and VF-1, VFO, $49.00; HE-30 with built-in Q-multiplier, $60. Dan Fine, WB2NKL, 197 Davis Ave., White Plains, N.Y. Tel: 914-WH-8-7105.

MUST Sell: Collins 75S-1 with rejection tuning, $300.00, and Invader 200 SSB, xmtr one year old, $325.00. Both like mint condx. W. Todd, WB2BBZ, 42 Campbell Ave., Port Monmouth, N.J. 07758. Tel: 787-4635.

CIRCUITS From Handbook, QST, CQ, etc. constructed. All work guaranteed. Reasonable. Write for free list. WA6IKV, Whitmore, 3240 Machado Avenue, Santa Clara, Calif.

FORCED To sell, College, One Knight T-50, vy gud condx, $40. One Hallicrafters SX-99, vy gud condx, $115.00. If package deal, will throw in one co-ax relay, free. Len Montanari, 9 Dwight Rd., West Hartford, Conn.

TOROID RTTY Kit: Mark-Space/Discriminator and bandpass filters. Includes 4-88 mhy and 1-44 mhy uncased, like new toroids; info sheet, mounting hardware and six mylar capacitors, $5.00 ppd. Toroids 88 mhy less capacitors, $1.00 each. 5/$4.00 ppd. KCM Products, Box 88, Milwaukee, Wis. 53213.

600 W. AM-CW, 80-10 mtrs. 813's, VFO, TVI filter, ant. relay, rack: $300. R. Klein, WB2LXZ, 2501 Chesnut Lane, Riverton, N.J.

FOR Sale: Central Electronics 10A with QT-1 and new BC-458; pair of BC-611 walkie-talkies in original cartons; new edgewise "S" meter. Write: Byron E. Fortner, W9FYM, RFD #10, Box 486, Indianapolis 19, Ind.

SELL: Eico 723 xmtr, new with manual and two (2) extals. $55.00. J. Titus, 18 Hendrie Lane, Greenlawn, N.Y. 11740.

APACHE: $165.00. Englund, 1409 Jadwin, Ricgland, Washington.

HALLICRAFTERS SX-100, excellent, except needs AVC work to correct inaccurate S-meter. Best offer over $125.00. E. P. Tilton, Box 137, Canton, Conn.

POWER Amplifier: Homebuilt linear, two 572A's grounded grid, rugged KW power supply. Well-built, attractive, all components brand new. $200. For info, photos, etc., write: WA8-HBS, 230 Highland Ave., East Lansing, Michigan 48823.

SELL: Hallicrafters S-76, mint condx, $80.00; DX-40, $45.00; *VFI-VFO, $15.00; pair Knight CB C-100 w-t's, new, $20.* Write: WA8GVQ, Box 73, Indian River, Michigan.

WANTED: Cash offer on a clean perfect working-condition Hallicrafters BC-610-D, complete with BC-614 speech amp. Will deliver within 200-mile radius. F. N. Lambour, W3DCY, Nicktown, Penna. Tel: 814-9486000.

SELL: HW-29 six-meter transceiver. Best bid over $35.00. Dwight McCall, K4NFP, Rt. #1, Young Harris, Georgia.

FOR Sale: Reconditioned HT-32A, NC-300, electronic keyer and chrome paddle, Mosley 10-40 vertical, mike and spkr: $625.00. Steve Buroff, WA9EOT, 2744 W. Winnemac Ave., Chicago, Ill.

DRAKE TR3, AC supply, in mint condx: $550. K6TTH, 22432 Shadycrest Ave., Torrance, Calif.

FOR Sale: Meissner 150B, 160 to 20 meters, with book and spare parts, $150. W1HRR, Taconic, Conn.

COLLINS gear, immaculate: 75S-3, $450; 312B-4, $115; 32S-1, $400; 516F-2, $65; 30S-1, $975 and RF distortion indicator P & H D1-1, $65; package deal for $1,950. Want 51S-1. W1WPY, John Ashton, 25 Bayberry, New Canaan, Conn. Tel. 203-966-1346.

KWM1, Ser. 868, Collins AC power supply MP-1, Mark Hellwhip Tribander, Hallic. spkr, mike, mobile mount, all cables. If bought locally will help with installation. $550. W2MEA.

VALIANT F/W, $220. K2MMS, 3 Archer Lane, Scarsdale, N.Y.

30L1, $365.00. W3AFM, 5800 Hillburne, Chevy Chase, Md.

SALE: Apache, $170; Mohawk, $180; Eico 460 'scope, $70; Heath SG-8, $10. All very clean. WØBXD, Alden Noble, 3723 7th Ave., Sioux City, Iowa.

CUSTOM Built kilowatt with high level 600-watt modulator. Has nineteen G-E square meters and seven power supplies. A real ham power-house. No reasonable offer refused. Hubert Ingalls, W1NQ, McCrillis Rd., Nottingham, N.H.

COLLEGE Bound. Sell complete 500-watt AM-CW station. K1TMM, Bruce Herrick, Yarmouth, Me.

BEFORE You buy receiving tubes, Industrial and Communication tubes, transistors, test equipment, hi-fi components, kits, parts, etc. send for your Giant Free Zalytron Current Catalog, featuring standard brand tubes: RCA, G-E, etc. All brand new, Premium Quality Individually Boxed, one year guarantee, all at biggest discounts in America! Also, sensational savings on new surplus Industrial and Communication tubes! We serve professional servicemen, hams, experimenters, engineers, technicians. Why pay more? Zalytron Tubs Corp., 469-Q, Jericho Turnpike, Mineola, L.I., N.Y.

APACHE, $165; HQ-110, $130. Local sale. WA2HYT, 1340 Raleigh Rd., Mamaroneck, N.Y.

KWS-1, 75A-4, MM-2 'scope, Master Control in beautiful *custom-built birch console.* KW *Matchbox with* SWR, spkr. *with* clock, TH-4 beam, rotator; a real neat station. Cannot ship, sry. You pick up. No reasonable offer refused. K9GWC, 19 Elm St., Glenview, Ill. PA 4-4225.

"HOSS TRADER" Ed Moory closes out new demonstrator equipment on a cash—no trade deal: SB-33, $309.00; TR-3, $469.00; SR-150, $449.00; HQ-170-AC, $299.00; Drake 2-B, $209.00; Galaxy III, $279.00; Hunter Bandit, $369.00; Swan 400, $309.00. Following new equipment: 75s-3, $499.00; Collins 399C-1 PTO, $129.00; NCX-3, $289.00; New Hy-Gain TH-4 beam and demo Ham-M rotor, $169.00; new Panadaptor, $129.00. Used gear: factory reconditioned KWS-1 and 75A-4, serial #5234, $1195.00; 2-B, $179.00; KWM-2, $795.00; 32S-1, $399.00; 75SO1, $269.00; SX-111, $139.00; NC-300, $129.00; Eico 720 xmtr and 730 modulator, $98.00; DX-100, $79.00; Heath Warrior, $165.00; HT-32-A, almost new, $349.00. Terms Cash. Ed Moory Wholesale Radio, Box 506, DeWitt, Arkansas. Tel: WHitney 6-2820.

REAL Bargain: Go SSB-AM-CW Viking Valiant and SB-10 combination, factory modification so SB-10 could use Valiants VFO; 300 watts PEP, in mint condx. Sacrifice both, $210. Prepaid. Bill Hodges, K4NQR, Box 230, Vidalia, Ga.

COLLEGE Expenses force sale: Immaculate factory-wired Viking Valiant, $230.00 and Hammarlund HQ-110C with S-100 spkr, *$165.00.* K8IOS, *1012* Nottingham Rd., Grosse Pointe 30, Mich.

SELL: DX-100 (modified keying and loading), in excint condx: HE-45A 6-meter transceiver, also excellent. Make offer. W3-EAI, J. R. Henrich, 517 Third St., Catasauqua, Penna. 18032.

SUPER-PRO SP-400X in A-1 condx w/manual: $100.00. RME DB23 Preselector, mint, $25.00. Sry, no shipping. W1EV, H. A. Hatchinson, 11 Gault Park Dr., Westport, Conn.

SELLING Heathkit Apache in excint optg. condx and appearance: $195.00.Need money for college. WA2CPL, 119 Guilden St., New Brunswick, N.J.

FROM Estate W6RUO: KWL, $1000; 75A4 with spkr, $435; 32V2, $125; Millen grid dipper, $30; B&W 51SB, $100; Gonset 3220 3-el. antenna $50, new; Mosley TA33 Jr. antenna, new, $50. *Many microphones, relays, etc. Phone* 293-2895 *or write to* W6-IXJ, 1346 Kotenberg, San Jose, Calif.

FOR Sale: Los Angeles area only! Eldico SSB 100M, Drake 1A, $449.00; Swan 40 mtr. with Topaz pwr. supp., $200. K6IMW, 240 W. Cypress St., Monrovia, Calif. 3594172.

EVINRUDE longshaft 1955, 7½ hp motor; Sears *1955* air-cooled 2 hp, both in excint condx. Used on sailboat. Trade for amateur equipment. #730 mod., etc. Will ship collect. J. E. Howe, 92 Lawlor Terr., Stratford, Conn.

NEED College expense money. G-76 in excint condx: $300 with A.C. supply. John Wilson, RR #1, Carmel, Ind.

WANT: R-391/URR receivers, parts, assemblies. Nick Thompson, 99 Water, Millinocket, Me.

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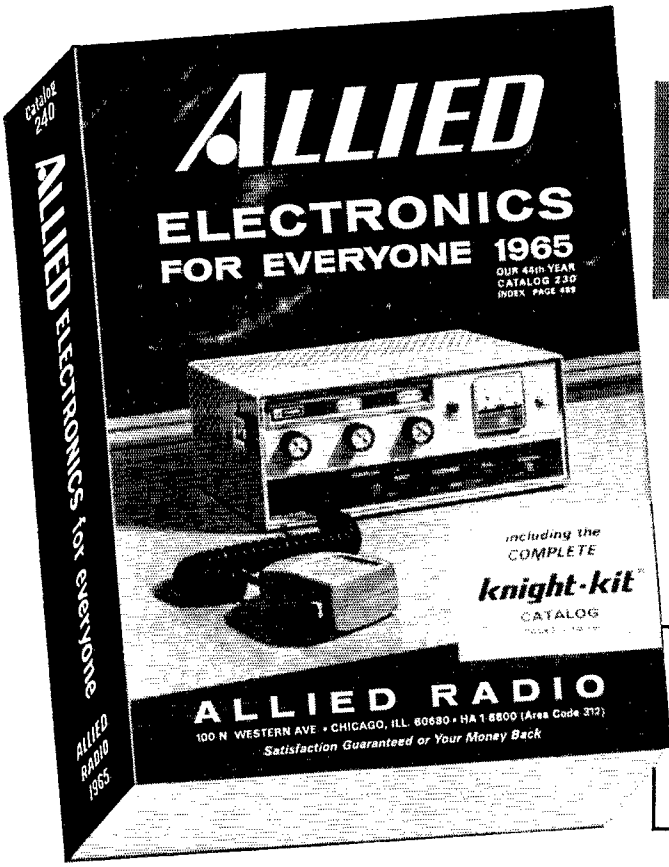

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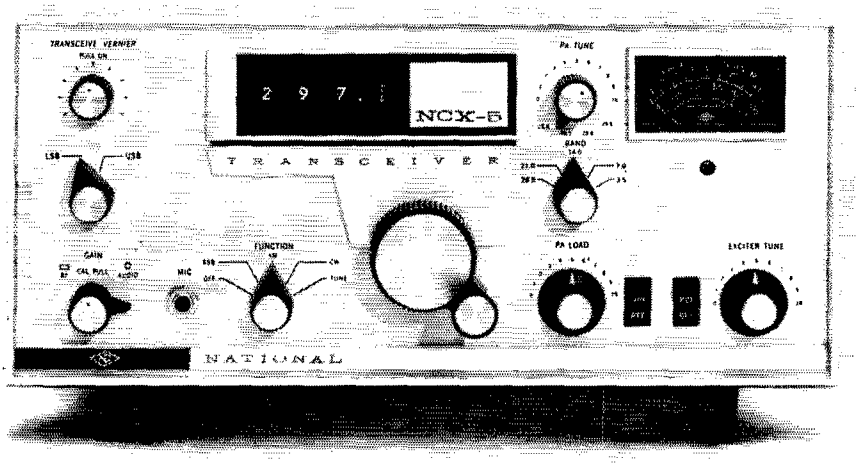

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ICAS Operating Conditions (Heater voltage range, 6 to 7.5 volts)			
Class of Service	DC Plate Volts	Plate Dissipation Watts	Plate Input Watts*
SSB	750	35	120
Class C AM	600	23	85
Class C CW	750	35	120

*Full input to 60 Mc; reduced input to 175 Mc.

For technical bulletin on new RCA-6146B/8298, write: Commercial Engineering, Section 1-37-M, RC Electronic Components and Devices, Harrison, N.J

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