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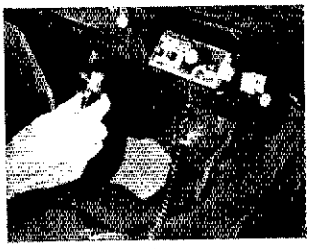

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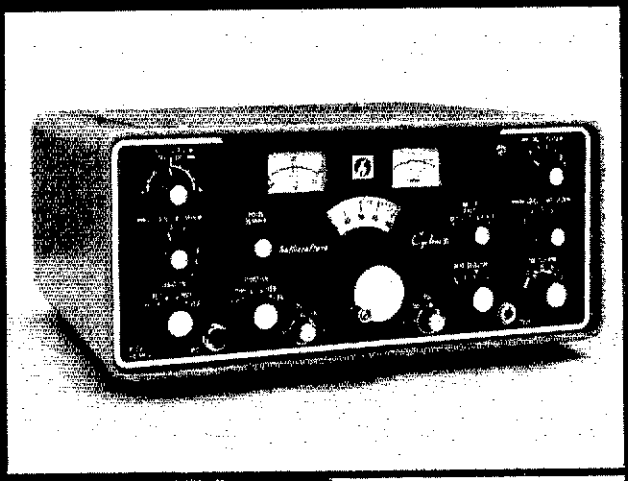

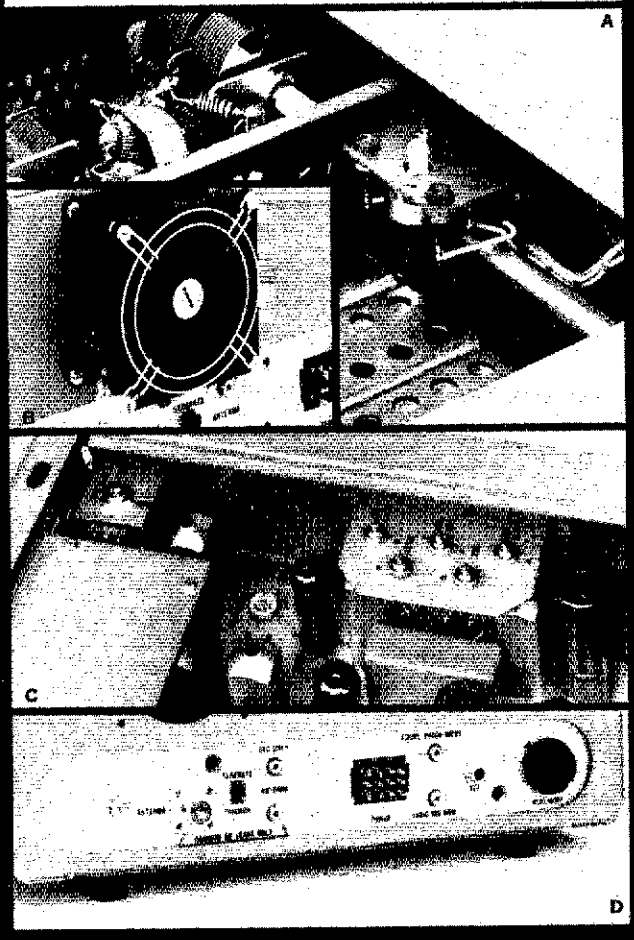

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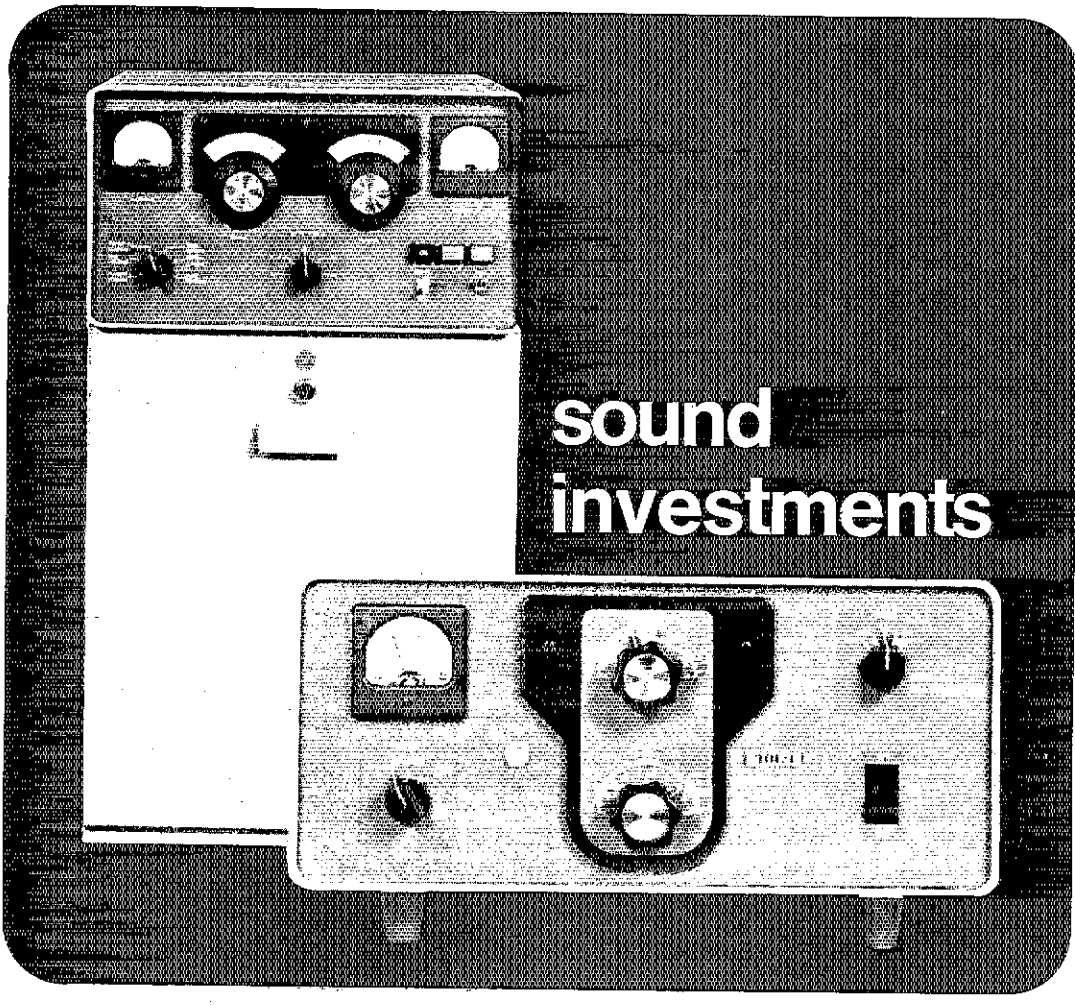

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QST

AUGUST 1971

VOLUME LV NUMBER 8

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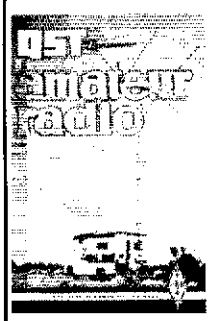

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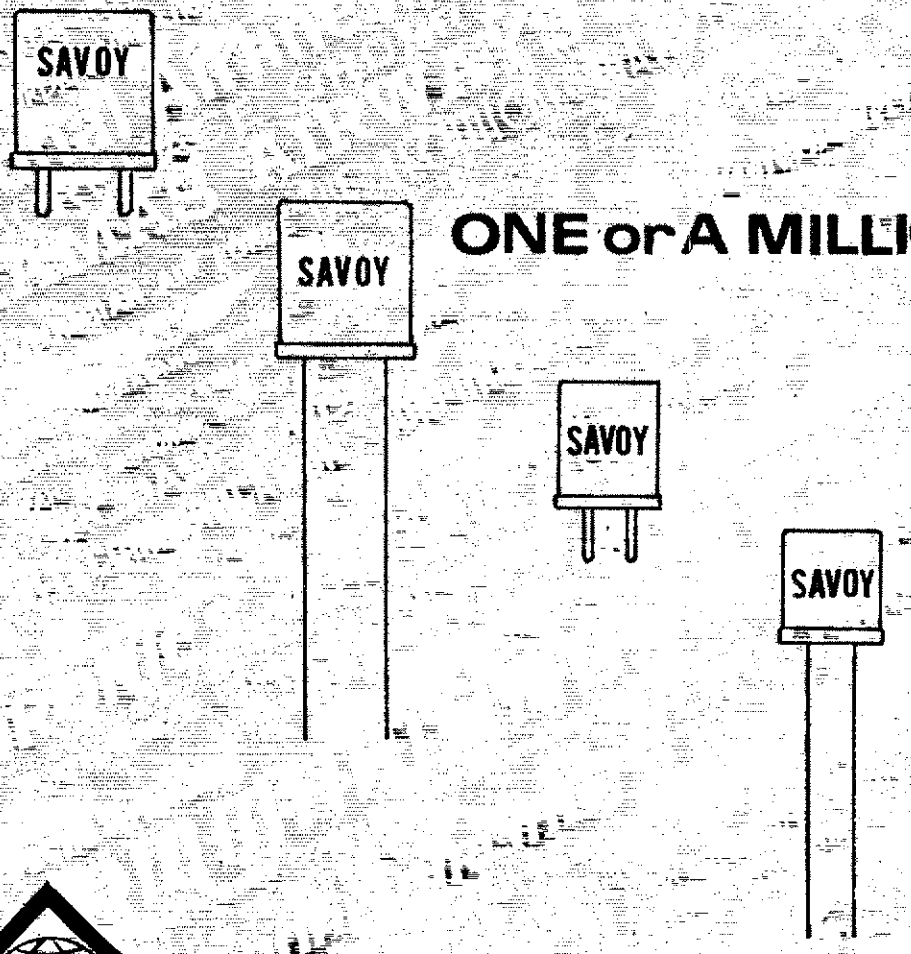

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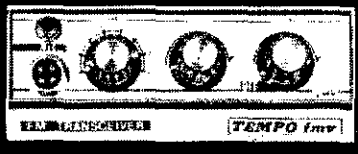

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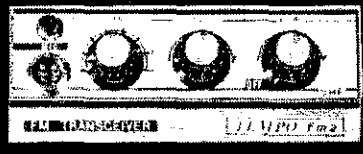

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Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in areas shown to qualified League members. General or Conditional Class licensees or higher may be appointed ORS, OVS, OPS, OO and OBS. Technicians may be appointed OVS, OBS or V.H.F., PAM. Novices may be appointed OVS. SCMs desire application leadership posts of SEC, EC, RM and PAM where vacancies exist.

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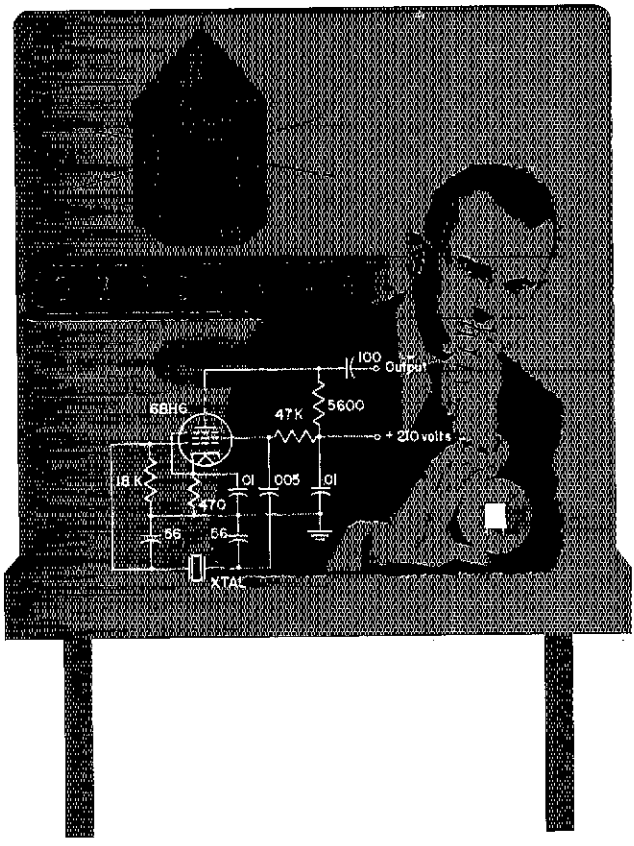

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"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

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

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"It Seems to Us..."

GENEVA – 1971

THE WORLD Administrative Radio Conference for Space Telecommunications of the International Telecommunications Union opened in Geneva, Switzerland on schedule June 7, 1971, with some 700 delegates and observers in attendance. Its task is to review all international regulations involving space communications including – of vital importance to amateurs – a revision of the table of frequency allocations.

An earlier (1963) conference officially provided for amateur space activity only in the 144-146 MHz (worldwide) band. Recognizing the inadequacy of such a provision if strictly interpreted as a restriction, various amateurs and IARU member-societies during the past year or two – largely through IARU coordination – have petitioned their governments to request broadening of such privileges. The happy result has been a number of proposals to that end submitted to the conference, principally by Argentina, Australia, Brazil, Canada, Federal Republic of Germany, United Kingdom, and the United States. Not all of these coincided, but the total effect was to permit space activity in practically all amateur bands.

The matter was not that simple, however, and in the first weeks of the conference it became apparent that a number of societies in other countries had not done their "homework" of liaison with authorities. While tentative approval has been given to the use of space techniques in the exclusive world-wide hf bands (7 through 29.7 MHz), a wave of protest arose from a multiplicity of countries, largely in Europe and Africa. With France and Sweden sounding the keynote of opposition to amateur space use of our higher-frequency shared bands, country after country registered disapproval. There was deep fear that an Oscar might interfere with other services in such bands, principally radio-location but also fixed and mobile. At press time it is apparent that amateurs will by no means get even a substantial portion of our wishes. Indeed there is a possibility, because of the strong opposition, that *none* of the proposals will gain acceptance.

The IARU observer team continues hard at work attempting to drive home the need for additional band segments for our space techniques. In particular, effort is being made to show that a one-watt Oscar will hardly cause noticeable difficulty to a multi-megawatt radar, and little if any to a 25- or 100-watt mobile system. Or, if by chance such should occur, adequate command and control measures exist to turn off the Oscar until remedies are found.

Many delegates present, however, already have a firm policy established months earlier by their national administrations, and so the task is infinitely more difficult during a conference than if – as IARU Hq. has long urged – each society would lay the groundwork with its administration long in advance.

No decisions are firm, however, until the conference has held its final plenary, sometime in July. The IARU observer team fortunately – and for the first time – includes representatives from all three ITU Regions: Win Dalmijn, PAØDD; Noel B. Eaton, VE3CJ; Tom Clarkson, ZL2AZ; and from IARU Hq. President Robert W. Denniston, WØDX; Secretary John Huntoon, W1RW; and ARRL Assistant General Manager Richard L. Baldwin, W1RU. QST

League Lines . . .

Director election time again -- see "Haps" this issue for the call for nominating petitions. Pick your candidate, join with others (minimum ten valid signatures) naming him for the director or vice-director post. A leaflet on basic duties and responsibilities of elected ARRL officials (directors, vices, SCMs) can be obtained from the Secretary of the League at Hq., if you have a potential candidate who want more info.

"The Ham's Wide World," produced for ARRL by Dave Bell, W6BVN, and distributed through Modern Talking Picture Service, had, through the end of May this year, been shown 225 times on television to an estimated viewing audience of 9.3 million All of the air time has been contributed as a public service by the TV stations involved.

If you hadn't noticed, there are still a good many intruders in the amateur bands, stations of other services operating in portions of the spectrum that are supposed to be assigned exclusively to the amateur service. We're doing something about it, and you can help. An hour or two a week of your time participating in the ARRL Intruder Watch can help in our continuing program to rid the amateur bands of signals that don't belong there. For complete instructions, and special reporting forms, please write Hq.

If you're a fan of the government's "Ionospheric Predictions," there have been some changes made. See Technical Correspondence in this issue for details.

See "Haps" this issue for the complete text of the League's filing with the Commission on Docket 19162, the proposed phone-band expansion.

Additional correspondence indicates that a reminder is in order concerning an item on these pages in April. Some of the newer models of luxury cars have an electronically-controlled braking system for the rear wheels. Experiments show that a high-power ham rig might produce interference with the system, causing braking difficulties. Better check it out before you get into trouble.

Hams don't build anything? We've had orders for more than 1100 templates for the 2-Meter FM Pipsqueak transmitter that was described beginning on page 21 of the March (1971) issue. In July we carried an article on the Pip-Squawk receiver, an fm receiver using slope detection. Now, on the facing page, is the FM Pip-Squawk MK-II, a refined model using true fm detection.

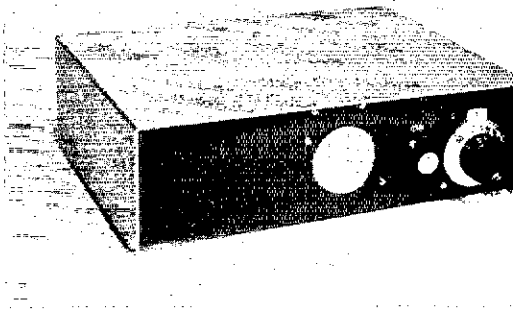
The Communications Department, at this writing, has openings for both public service and DXCC assistants. Interested? Write Hq. for an application form.

Organizing a radio club? ARRL has recently updated a collection of tips on making a club successful. Quite a variety of items are covered, including organization, dues, affiliation, incorporation, training, federations and councils. A stamped, addressed legal-size envelope will bring CD188 to you. No charge, of course.

In response to a specific need, all W1AW RTTY bulletins are now being sent at 850 Hertz shift, then repeated at 170 Hertz. If you're new to this field, W1AW transmits RTTY bulletins at 0300 Tuesday through Sunday, and at 2130 Tuesday and Thursday, and at 2300 Wednesday, all times (and dates!) GMT.

The number of Life Members continues to grow and grow. For the latest rules (Associate Life Memberships are now accepted) please see page 100 of this issue.

FM Pip-Squawk MK-II



BY DOUG DEMAW,* W1CER

THE PIP-SQUAWK fm receiver described in July, 1971, *QST* represents the simplest approach to getting started in fm at low cost. The MK-II version described here takes us away from the slope-detection technique and provides true fm reception. We have added a two-stage limiter and discriminator. Additional refinements include a crystal-controlled converter for better stability, a vernier drive for smoother tuning, and greater reduction of unwanted broadcast-band signal leak-through into the tunable i-f section of the receiver. Most of the components used in the original Pip-Squawk can be employed in the MK-II, thus keeping the cost of the project at a minimum. Reception with the version shown here is excellent. Selectivity is adequate for separating three local repeater output signals which fall at 146.79, 146.88, and 146.94 MHz. Sensitivity is such that a 0.2-μV signal with 5-kHz deviation is plainly audible. A 0.7-μV signal provides 20 dB of quieting. Limiting action is good on all but the weakest of signals. Squelch is not provided since it would add to the cost of the project, and squelch provisions are certainly not essential to any type of amateur operation. The background hiss from the speaker is very low in level during no-signal periods.

Circuit Features

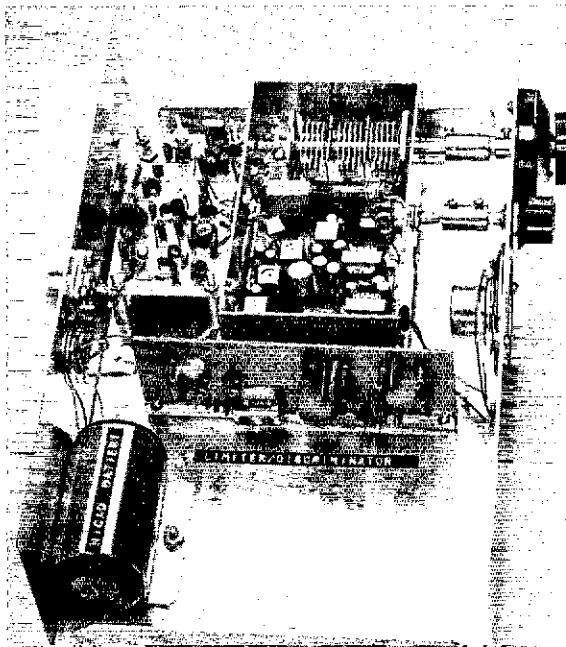
A block diagram of the MK-II lineup is shown in Fig. 1. Two options are offered – FL1 for reducing images and cross-modulation from nearby commercial services, and M1, a zero-center tuning meter. The jack labeled EXTERNAL CHARGE should be included only if a nickel-cadmium battery is used.

* Technical Editor, *QST*.

Fig. 2 illustrates the changes made in the converter circuit of the earlier Pip-Squawk.[1] The wave trap has been eliminated at J1, but the rf amplifier and mixer circuits remain unchanged. The original fixed-tuned oscillator has been converted to a tripler (Q3), and a crystal-controlled 48-MHz oscillator has been added at Q4. Those wishing to use the old circuit board may do so by making the appropriate changes at Q3, then adding the new stage, Q4, on a separate pc-board chip, mounting it as close to Q3 as possible.

Inset drawing A shows how the mixer can be changed to a JFET. The modification was tried in the author's receiver. It reduced cross-modulation effects caused by a nearby commercial repeater. Since the MPF102 is an N-channel device it will be necessary to employ the hookup shown (gate returned to the minus bus, and drain returned to chassis ground through L6). The circuit-board pattern is suitable for either mixer circuit of Fig. 2. The values of resistors R4 and R5 will have to be changed as indicated. R6 will be deleted if the JFET is used. No other changes are required. Though it was not tried, a common-gate JFET rf amplifier might work nicely at Q1, but with reduced gain over the bipolar amplifier shown.

1 Ready-made circuit boards for this project are available from Stafford Electronics, Inc., 427 S. Benbow Rd., Greensboro, NC 24701.



Inside view of the Pip-Squawk MK-II. The vacant area at the bottom has been reserved for a small transmitter and modulator. The limiter/discriminator board is mounted vertically by means of an L bracket. Four metal posts support the 2-meter converter at the upper left. The bc radio and its new tuning capacitor and gain control are housed in the shield compartment at the upper center. An aluminum cover is used to enclose the shield box during operation. The Nicad battery at the lower left is rechargeable and is an 8.75-volt, 500-mA-hour type. It was obtained from Technical Materials Co., 769 Inwood Rd., Union, NJ 07083, for $2.95.

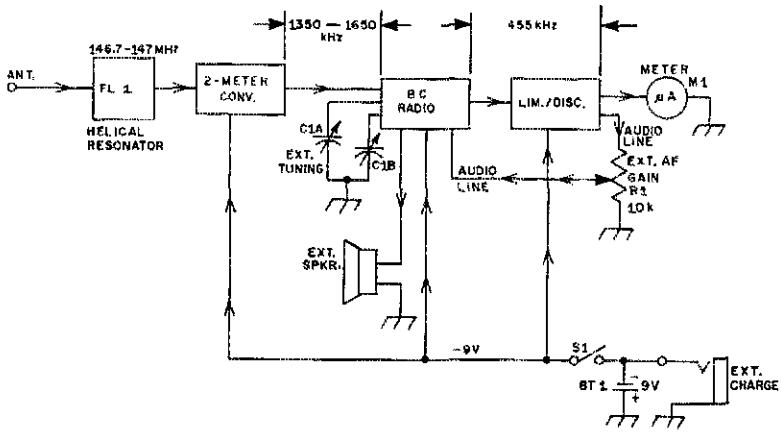


Fig. 1 — Block diagram of the assembled MK-II fm receiver. BT1 should be a large-size 9-volt battery, or 7 or 8 penlite cells connected in series.

C1 — Two-gang miniature variable, one section 40 pF and the other having 20 pF. See text. (J. W. Miller No. 1640 three-section unit used here, two gangs being connected in parallel.)

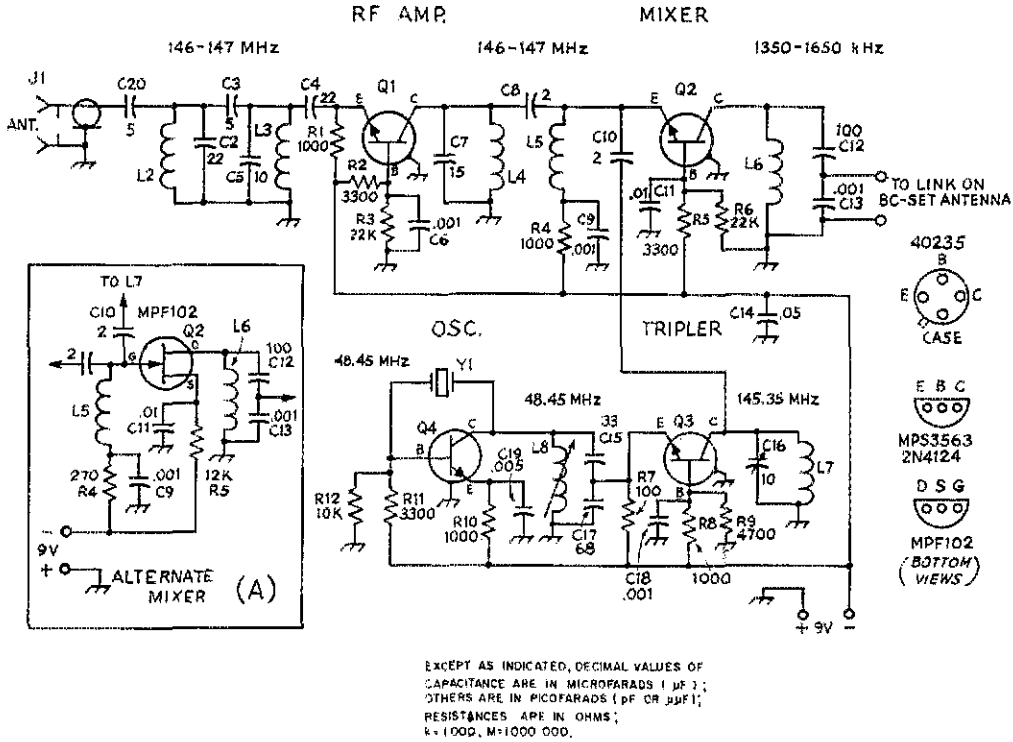


Fig. 2 — Circuit of the 2-meter converter. Parts not listed below are so designated for pc-board layout purposes. Drawing A is discussed in the text. Fixed-value capacitors are disk ceramic. Resistors are 1/4- or 1/2-watt carbon. L1 and C1 are deleted from MK-I receiver.

C16 — 10-pF piston trimmer. Ceramic or pc-board air trimmer can be substituted.

J1 — SO-239-style chassis fitting.

L2 — 3 turns No. 20 enam. wire, 3/16-inch ID, 1/8-inch long.

L3 — 4 turns No. 20 enam. wire, 3/16-inch ID, 5/16-inch long.

L4 — 5 turns No. 20 enam. wire, 3/16-inch ID, 5/16-inch long.

L5 — 15 turns No. 20 enam. wire, 3/16-inch ID, close-wound.

L6 — 100 μH rf choke (Millen J302-100 or J. W. Miller 70F104A1 suitable). *Must be 100 μH in value.*

L7 — 5 turns No. 16 tinned copper wire, 1/4-inch ID, 3/8 in. long.

L8 — 10 turns No. 26 enam. wire, close-wound on 1/4-inch dia slug-tuned form (J. W. Miller 4500-2 blank suitable). Variable inductance 0.35 to 0.6 μH required.

Q1-Q4, incl. — Npn bipolar transistor, RCA 40235 or 40637, Motorola 2N4124 or MPS3563 suitable, or any high-beta npn with f_T of 250 MHz or greater. (Q2 of inset A is Motorola MPF102, 2N5484, or HEP802.)

Y1 — 48.45-MHz 3rd-overtone crystal (International Crystal Co. type GP in FM-2 holder).

Those wishing to use the bipolar arrangement for all four stages of the converter, but with a negative ground system (such as mobile), can simply substitute pnp transistors for Q1 through Q4. The Motorola 2N4126 would be suitable for this purpose. The positive-ground approach was adopted here to make the two additional circuit boards compatible with the bc receiver, which has a *positive-ground hookup. (The foregoing technique* applies only to the use of the converter in combination with the car radio, and not with the remainder of the circuits described in this article.)

Bc-Set Modifications

A 6-turn link of small-diameter hookup wire must be wound over the low-impedance end of the *built-in ferrite-bar antenna of the bc set. This will* connect to the i-f output of the converter by means of twisted wire or shielded conductor. The *two-section tuning capacitor should be set at the* high end of the bc band (1650 kHz or higher), then glued in position. Alternatively, it can be removed and discarded. A two-gang bandspread capacitor of approximately 20-pF maximum capacitance (oscillator section), and 40 pF in capacitance (maxi*mum) for the mixer section is wired in parallel* with the tuning capacitor in the set. A three-section J. W. Miller component was used in the writer's model. Each section is 20-pF maximum capacitance, so two of the gangs are wired in parallel to provide 40 pF for the mixer tuning. A two-section broadcast variable can be used by removing the proper number of plates to secure the desired bandspread. Other styles of two-gang variables can be modified in a like manner. Don't overlook that junk box!

Fig. 3 shows the typical configuration used at the second i-f amplifier and detector of most imported pocket-size bc sets. After locating the detector diode, CR1, the modifications shown can be made. Remove all components between the letters A and B. Audio gain control R2 can be replaced by a panel-mount type of the same value (with switch), or the ingenious builder can retain the original part and mount it on the front panel of *the MK-II. Terminals A and B will connect to the* limiter/detector board of Fig. 4.

The speaker from the bc radio is mounted on the front panel of the *MK-II.* In fact, the speaker grille from the bc set was pried off the plastic case and used between the speaker and the front panel in true miserly fashion. Some sets do not have separate grilles, so perforated metal or circuit board can be used to protect the speaker cone.

Limiter/Discriminator

The circuit of Fig. 4 shows that two bipolar transistors are used in an RC-coupled limiter strip, followed by a diode discriminator. RFC1 and RFC2 are used to prevent vhf parasitics. Two Amidon[2] ferrite beads are used for each choke. Alternatively, a 22-ohm 1/2-watt resistor can be substituted for each choke. It can be seen that here, again, the npn transistors are connected in the circuit for a *positive* ground system. Type 2N4126 transistors can be substituted if one wishes to use this assembly with receivers that have a negative ground.

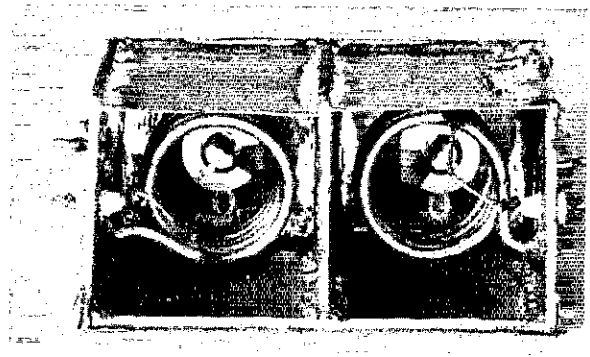
Diodes CR1 *and CR2 function in a self-*adjusting limiter arrangement. They can be omitted if the bc set used ahead of the limiter board is low *in i-f gain. Matched diodes should be used at* CR3 and CR4. Those having an assortment of germanium diodes can select two that have nearly equal dc resistance readings (when checked with an ohmmeter). Match them in resistance in both the forward (low dc resistance) and reverse (high dc resistance) directions.

Terminal E1 of Fig. 4 provides a test voltage (dc) for aligning the discriminator. After alignment, those wishing to can connect a zero-center microammeter between E1 and ground for use as a tuning meter. Lafayette Radio sells a low-cost miniature meter for this purpose.

Assembling the MK-II

The photographs show that the MK-II is not a miniature unit. The writer likes to allow plenty of *extra space in his projects,* and this assembly is surely a case in point. A large portion of the cabinet has been reserved for a 2-watt fm transmitter which is presently in the design stages. However, the builder can certainly shrink the 10 1/2 x 8 x 3-inch dimensions by a considerable margin if he is skilled at packing many parts into a small space. If the Pip-Squeak transmitter of March, 1971, *QST* is to be used with this receiver, the cabinet will have to be tailored accordingly. This enclosure is fashioned from 1/16-inch-thick aluminum stock. The panel is painted dark green.

[2] Catalog and price list available from Amidon Associates, 12033 Otsego St., N. Hollywood, CA 91607.



View of the homemade helical resonator shown in Fig. 5. Double-sided pc board is used for all walls but the top one in this version. Flashing copper was used for the top surface in this model, but pc board would have been suitable.

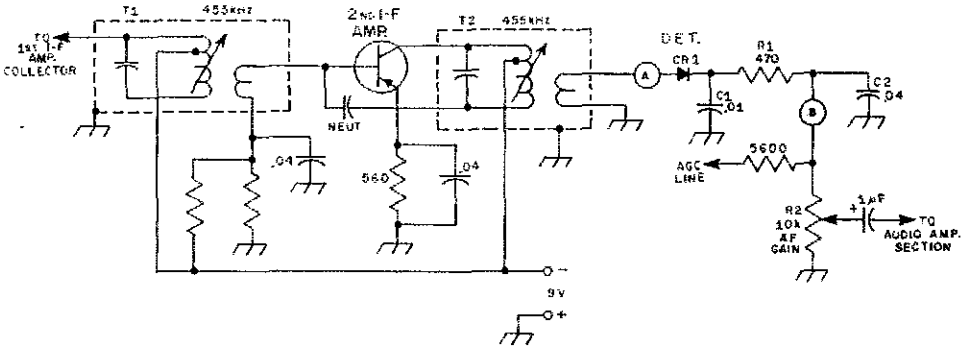


Fig. 3 — Typical circuit of second i-f amplifier and a-m detector of imported bc-band radios. Points marked A and B indicate where circuit is opened for addition of the limiter/discriminator. Components between points A and B are discarded. R2 is replaced by a panel-accessible gain control (see text). Values for R1, C1, and C2 are not necessarily the same in all imported sets.

Fig. 4 — Schematic diagram of the limiter/discriminator. Capacitors are disk ceramic. Larger values are low-voltage types. Resistors are 1/4- or 1/2-watt carbon. Parts not listed below are numbered for pc-board layout.

CR1, CR2 — 1N34A germanium diode.

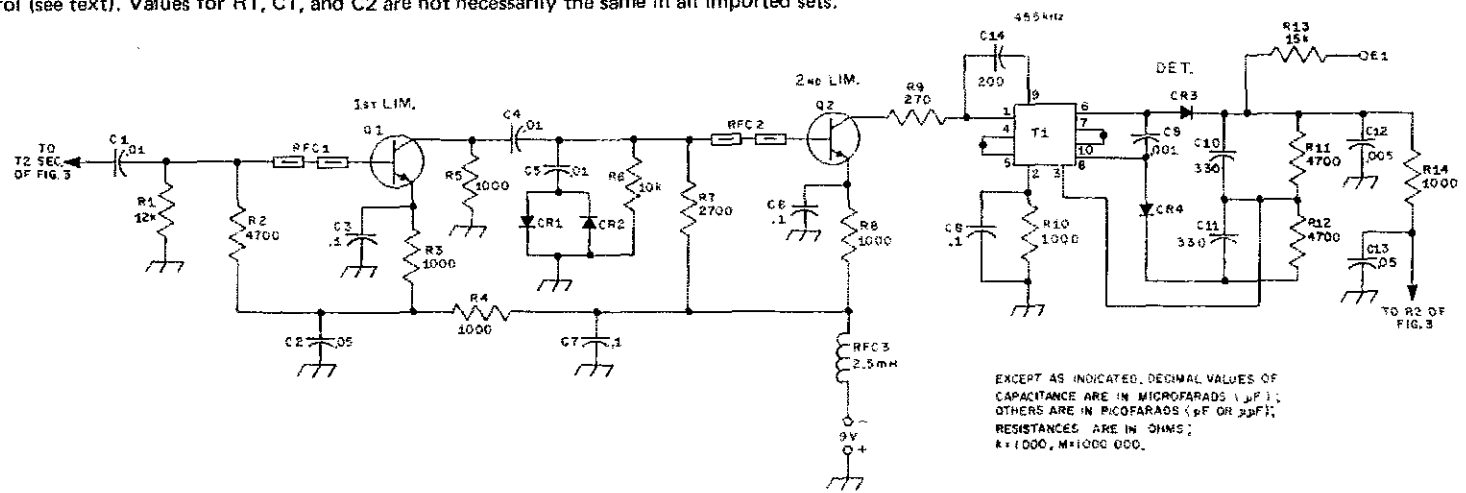
CR3, CR4 — Matched set of germanium diodes (Sylvania 1N35 matched pair available from Allied Electronics. Also, see text).

Q1, Q2 — RCA 40235 or 40637. Motorola 2N4124 suitable.

RFC1, RFC2 — Two Amidon ferrite beads (see text).

RFC3 — 2.5-mH choke (James Millen J302-2500 miniature or equiv.).

T1 — 455-kHz discriminator transformer (J. W. Miller 8806).



EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μF); OTHERS ARE IN PICOFARADS (pF OR μμF); RESISTANCES ARE IN OHMS; K=1000, M=1000 000.

To reduce unwanted pickup of bc stations, the pocket radio is enclosed in a box made from double-sided pc board. A press-fit U-shaped aluminum lid encloses the top of the compartment. The bandspread tuning capacitor and gain control are contained in the same box. No. 6 spade bolts hold the assembly to the main chassis.

The 2-meter converter is supported above the chassis on 1-inch metal spacers. An L-shaped aluminum bracket is used to mount the limiter/discriminator board, which is positioned vertically at one end of the bc-set compartment.

A 2-inch-diameter vernier dial is used to control the tuning capacitor. The imported type shown here has some backlash. Therefore, one might fare better by using the vernier mechanism from a surplus BC-375, or from one of its TU-type tuning assemblies.

Tune-up and Use

It is suggested that the builder test the bc set independently after it is modified and mounted in its shield box. The components which were removed between points A and B of Fig. 3 can be clipped between those points for the test. Connect a 9-volt battery and tune in a bc station. Make certain that the new volume control and tuning capacitor are functioning as intended. Adjust the trimmers on the tuning capacitor to assure tracking of the mixer and oscillator sections of the radio. *Next*, connect a signal generator to the base of the mixer through a 10-pF blocking capacitor. Set the generator for 455-kHz output and align the i-f transformers for peak response at that frequency.

The next step is to connect the limiter/*discriminator board to the circuit in place of the* components temporarily connected between points A and B. Attach a VTVM or zero-center μA meter between E1 and ground (Fig. 4). If a VTVM is used, set it for the 1.5-volt scale and adjust the *meter-set control so that the needle is exactly on* zero. Now, apply a strong signal (several hundred μV) to the mixer input, using 1500 kHz as a test frequency. Vary the signal generator plus and minus 15 kHz while observing the meter. The signal should *swing plus and minus in a linear* fashion. (If a VTVM is used for the test, it will be necessary to switch the polarity back and forth with the meter reversing switch.) The meter should return to zero when no signal is present. If the foregoing conditions are not met it will be necessary to adjust T1 of Fig. 4 for a linear response. The alignment of T1 will be a tedious task, so plan to spend some time in the adjustment process. *Alternately tweak the pink and blue cores of the* transformer, a few degrees of rotation each time, then sweep across the 30-kHz range and observe the meter response. Try various settings of the cores until proper alignment is achieved. If a signal generator *is not available, tune across a strong bc* station and adjust T1 for linear response of the discriminator. After T1 is correctly adjusted, there should be no a-m detection of the bc signal when the station is tuned in to its center frequency. Readable audio will be heard, however, when tuning to either side of center frequency.

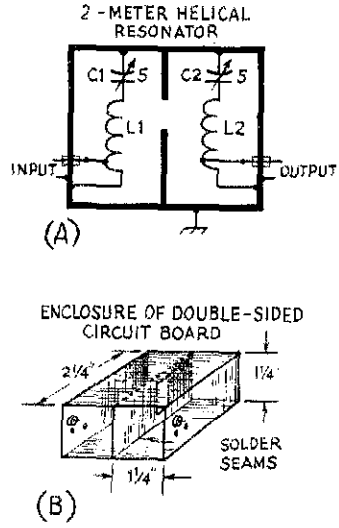


Fig. 5 — Circuit of the helical resonator. Double-sided pc board is used for the box walls, and is soldered along each seam by *means of a pencil-type* iron. E. F. Johnson silver-plated air-variable capacitors (No. 189-563) were used in this model, but *high-dielectric piston trimmers can be substituted.* Coils L1 and L2 consist of 4 1/2 turns of No. 12 copper wire, 3/4 inch in diameter, and 3/4 inch *long. Each coil is centered in its compartment* and tapped 1/4 turn from ground to obtain a bilateral 50-ohm impedance. A 3/8 × 5/8-inch aperature is cut in the center divider, and is opposite the second and third turns of each coil. C1 and C2 are tuned for peak signal response with the resonator connected between the receiver input and the feed line. The bottom end of the assembly need not be enclosed. Ideally, the enclosure should have no soldered seams, and both it and the coils should be silver plated. This suggests the use of large-diameter copper tubing for the outer shield if *maximum Q is* desired.

Install the bc set and the limiter/discriminator assembly in the chassis. Next, connect the 2-meter converter to the circuit. Tune in a weak 2-meter fm signal, or use the output from a vhf signal generator. Adjust L8 and C16 of Fig. 2 for maximum signal response at 146.8 MHz. Spread or compress the turns of L2, L3, and L4 for peak response. Use an insulated rod while *making these* tests. This completes the adjustments. The converter can now be bolted in place in the cabinet.

Some Closing Remarks

Since the MK-II represents one of the least sophisticated approaches to fm reception, some ills may become manifest. Strong signals from nearby two-way commercial services may show up in the tuning range of the receiver. Also, signals from the *lower portion of the 2-meter band may appear as* images. The helical-resonator filter shown in Fig. 5

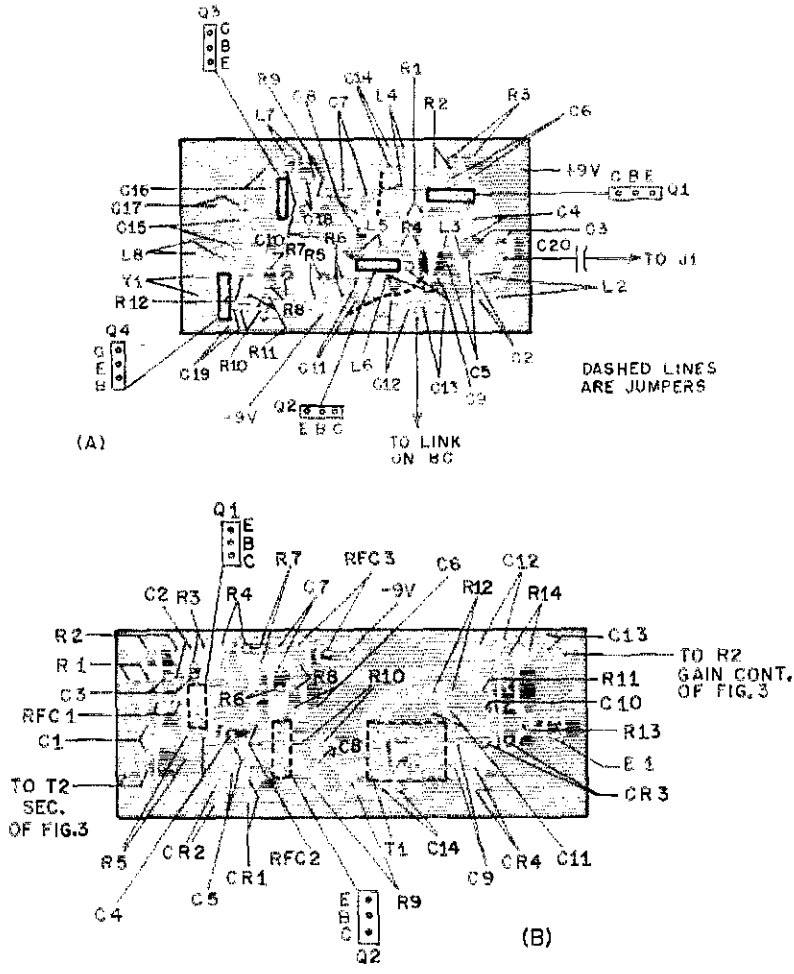


Fig. 6 — Half-scale templates and parts placement for the 2-meter converter (A). The limiter/ discriminator is shown at B. Layout shows the foil side of the boards.

can be built and used ahead of the receiver to reduce or eliminate unwanted responses. FL1 is easy to assemble and is very inexpensive, yet is superior in performance to most strip-line filters. Design data for these filters are given in *ITT Reference Data for Radio Engineers*, 5th Edition, Chapter 22. The filter consists of two very high-*Q* tuned circuits, coupled through a small aperature in the metal wall between them. Input and output taps are set for a 50-ohm impedance.

In three weeks of monitoring fm signals with the MK-II, the writer has noted that reception is as good as was experienced with numerous commercially-made transceivers. In fact, this receiver has pulled in some weak signals that could not be copied on at least two expensive commercial receivers! So, here's that mate for the FM "Pip-Squeak." The packaging and added refinements are up to you. QST

Strays

QST Congratulates . . .

Dave Bell, W6BVN, (producer of the ARRL film, "Ham's Wide World") on winning an Emmy Award from the Hollywood Chapter of the National Academy of Television Arts and Sciences for producing the "On Campus" television series.

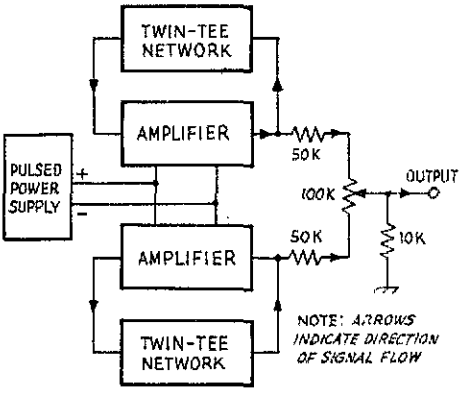
A. Kenneth Johnson, W6FU, appointed full professor at Pasadena City College, Pasadena, California.

LERC Amateur Radio Club, W6LS, for their drive which collected more than $250 to help finance a kidney transplant operation for a 10-year-old Burbank girl.

Frank J. Sholock, K4ELF, who received the commendation of the FCC Engineer-in-Charge, district 24, for his work with the Washington Television Interference Committee.

Ernie Berlucchi, W2GHB the subject of a feature story about his amateur activities in the May 1971 issue of *Maryknoll*.

Fig. 1 -- Block diagram of the pulsed two-tone oscillator.



A Technique for Burst Two-Tone Testing of Linear Amplifiers

BY BOB BUUS,* WA2HVA

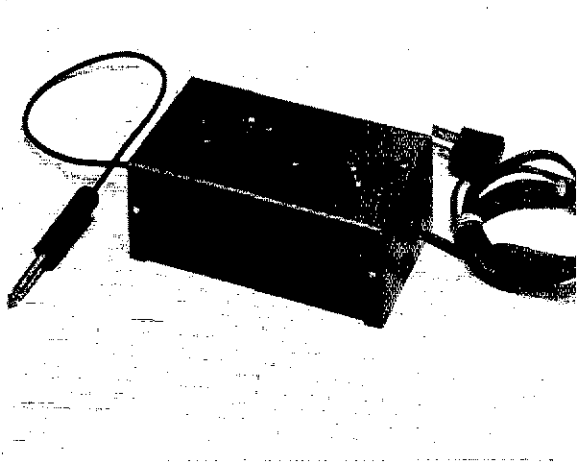
MODERN RADIO transmitters often use single-sideband suppressed-carrier modulation produced in the low-power stages of the transmitter and amplified before being transmitted. To avoid signal distortion and to minimize the generation of spurious frequencies, it is necessary that the amplifiers used for such service display a linear response. Various methods have been used to measure the linearity of these high-frequency amplifiers but the simplest method is to modulate the transmitter with two sinusoids of equal amplitude and to observe the resulting rf envelope at the transmitter output on an oscilloscope. See Appendix A.

Two-tone testing, although useful in practice, suffers from the disadvantage that the peak-to-average ratio of the envelope power is not very high, only 3 dB. On a transmitter designed for speech (having a peak-to-average ratio of 12 to 15 dB), high average power must be maintained during two-tone testing to drive the transmitter to the same peak values attained when carrying speech. This is often undesirable, since many transmitters are designed to handle high peaks without distortion, while they are not expected to carry commensurately large average power. In such transmitters, two-tone testing may not be satisfactory, since the transmitter may overheat even at moderate power levels.

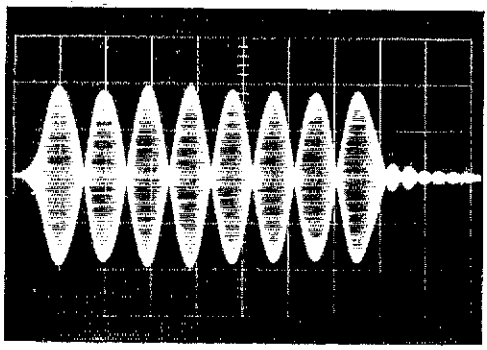
* 8 Donner St., Holmdel, NJ 07733.

Pulse-Input Signals

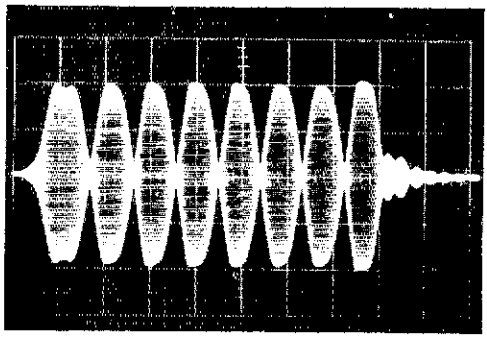
One popular way to increase the peak factor of the rf envelope when two-tone testing is to pulse the modulating audio frequencies. Thus, if the audio is turned on for a fraction of a second, then off for a fraction of a second (50-percent duty cycle), the peak factor is increased by 3 dB and there is half as much average power for the same peak envelope power. Still higher peak factors can



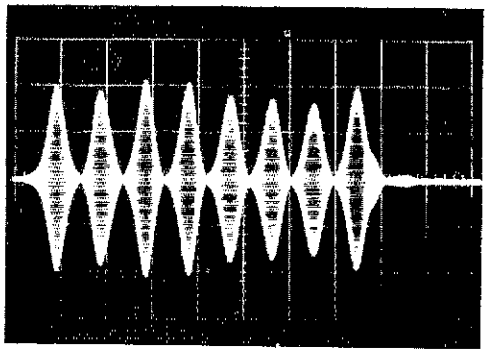
The entire pulsed two-tone generator is contained in a 2 1/8 x 3 x 5 1/4 Minibox. The phone plug connects to the jack of an ssb exciter. The knob controls the mixing of the two tones while the holes on each side of the knob provide access to the feedback icontrols in each pulsed generator. The pin jacks provide the scope test points (the center one is grounded) used for initial alignment, and they may be omitted to minimize cost.



(A)



(B)



(C)

Fig. 2(A) — The rf envelope of a properly adjusted transmitter excited by the pulsed two-tone generator. The sweep speed is 1 millisecond per centimeter so that the burst occupies most of the screen. The distortion on the beginning and end of the burst is normal and will be found to be dependent on the frequency response of the ssb transmitter. Note that there is a slight amplitude variation during the burst. This is because of slight gain and phase ripples in the sideband filter.

(B) The same conditions and sweep as used in A apply except the drive has been increased to overload the transmitter and cause the flat-topping as shown. Such flat-topping must not be permitted in the final amplifier since it produces splatter and harmonics.

(C) The same conditions and sweep as used in A apply except the final grid bias has been set too negative (perhaps to reduce the idling current). Such operation should not be permitted since it also produces distortion.

be obtained by having the audio on for shorter duty cycles. Unfortunately, any pulsing of the audio makes viewing of the rf envelope at the output more difficult. The problem is to find a simple way to obtain a readable trace on the oscilloscope.

The oscilloscope sweep is synchronized or triggered at the pulsing frequency. The burst pattern will appear on the same part of the screen, but the envelope of the burst will not generally be viewable because the envelope waveform is not in phase with the starting of the burst. A common procedure is to provide a vernier adjustment of the pulsing frequency which can be set, while viewing the output envelope, to make the pattern stand still on the oscilloscope. Although simple, such a method is not very stable and requires frequent adjustment.[1]

Another method of obtaining a readable pattern is to synchronize (or trigger) the oscilloscope on a submultiple of the difference frequency of the two audio tones. Thus, the envelope will always stand still on the oscilloscope while the pulsing itself may "crawl" across the screen. In addition to the objectionable crawl, this method requires obtaining a signal related to the difference frequency of the input signals – not an easy function to implement.[2] The conditions for a stable pattern in these cases require the difference frequency to be an exact multiple of the pulsing frequency and are based on the tacit assumption that the phase of the applied tones is continuous during the "off" portions of the pulsing. This is a valid assumption for most practical circuits since pulsed tones are usually generated by switching a continuously running oscillator in and out of the circuit at the pulsing rate. If the restriction that the phase be continuous is removed, the only basic criterion to obtain identical envelope waveforms during each pulse is that the audio tones maintain a consistent phase relationship at the beginning of each burst. Recognition of this difference permits a radically different means of generating the pulsed two-tone signal to be employed.

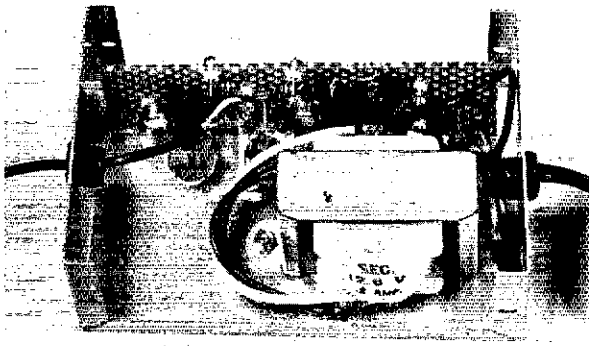
A Pulsed Audio-Signal Generator

A simple way to obtain a pulsed sinusoidal waveform with consistent phase at the beginning of each pulse is through the use of a twin-tee network and an operational amplifier. Either a narrow-band response or an oscillation can be obtained by utilizing a twin-tee in the feedback path of an operational amplifier, as shown in Fig. 1.

If the loss-phase characteristic of the twin-tee network is carefully controlled so that the circuit is just on the border between stability and oscillation, the arrangement will act like an infinite-*Q* tank circuit and will ring with no damping when excited by turning on the power supply. Thus, pulsing the power supply will result in a pulsed audio burst at the output with identical phase relationships in each burst.

1 Lange, "A Pulsed Two-Tone Test Oscillator," *QST*, September, 1965.

2 Noble, "Two-Tone Generator with Scope-Sync Output," *QST*, March, 1968.



This is an inside view of the generator shown in Fig. 2. The 12-V ct transformer takes up most of the space, and all circuitry is on a single board, which is mounted on a bracket with the mixer control. One of the trimmer controls and the μA709 op amps (in 8-pin packages) are readily visible.

The Amplifier Circuit

A practical amplifier configuration using the μA709 integrated-circuit operational amplifier is shown in Fig. 3. Compensation on terminals 1, 5, and 8 is not critical and wide variations in values are tolerable. If you use 741-type op amps, such compensation is unnecessary. An interesting possibility is to use a dual op-amp IC such as the Motorola MC1437L for both oscillators.

The feedback element determining the burst frequency is made up of a symmetrical twin-tee network. The design of this network is covered in Appendix B. Suitable values for a number of audio frequencies are given in Table 1.

Pulsing

There are, of course, many ways of pulsing the dc power to the operational amplifiers. The only unusual aspect is that most operational amplifiers require both polarities of dc power and thus require two power supplies to be pulsed. There are many conventional ways of doing this, utilizing multivibrators and gates. However, if it is suitable to utilize the 60-Hz line frequency to provide the pulsing and if a duty cycle of roughly 50 percent is satisfactory, the simple circuit shown in Fig. 3 is decidedly simple and very effective.

The operational amplifier is powered by half-wave rectified ac and two voltage polarities are provided by a center-tapped transformer. Since practical operational amplifiers do not start operating at zero supply voltage, the duty cycle is slightly less than 50 percent. However, if knowledge of the exact duty cycle is important, it can be readily observed on an oscilloscope for any particular circuit.

TABLE 1

C	*C2*		*R*	f_o		*R2, ohms*	
μF	*μF*	*k*	*Ohms*	*Hertz*	*Total*	*Fixed*	*Control*
.01	.022	.91	8200	1850	4500	3900	1000
.022	.047	.937	8200	855	4370	3900	1000
.01	.01	2.0	12000	1880	3000	2400	1000
.022	.022	2.0	12000	855	3000	2400	1000
.022	.022	2.0	5600	1830	1400	1200	500
.047	.047	2.0	5600	858	1400	1200	500

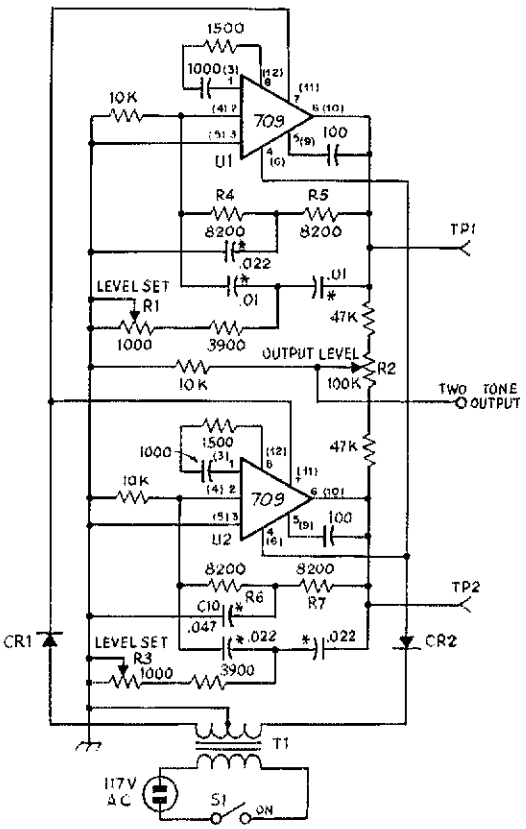
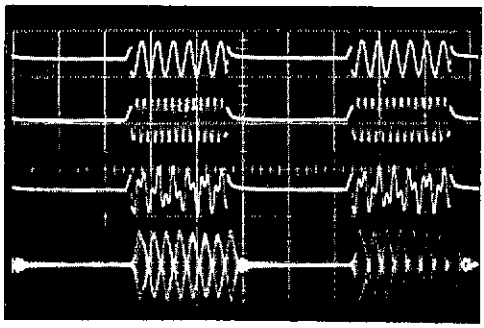
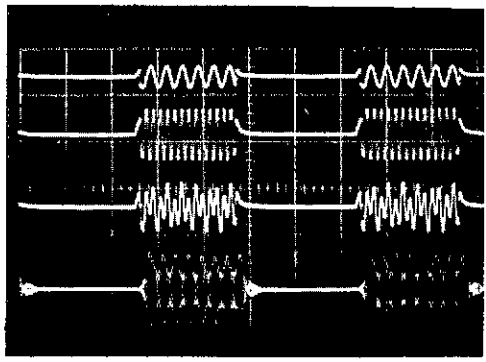


Fig. 3 – Schematic diagram of the pulsed two-tone generator. Capacitors may be mylar, mica, or disk ceramic. Those marked with an asterisk should be 10-percent values. Resistors may be 1/8-, 1/4-, or 1/2-watt composition. Pin numbers for the ICs shown inside the parenthesis are for dual in-line packages, while those outside the parenthesis are for the TO-99 case.
CR1-CR2 – Silicon, 50 PRV, 500 mA or greater.
R1-R3, incl. – Linear-taper composition control.
R4-R7, incl. – 5-percent tolerance.
S1 – Spst toggle.
T1 – Filament transformer, 12.6 V ct, 50 mA or greater.
U1,U2 – Operational amplifier IC, type 709 or 741.



(A)



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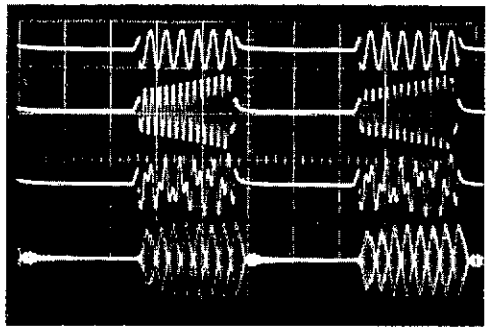


(C)

Fig. 4 — (A) Typical waveforms in various parts of the circuit. The sweep speed is such that 1/30 second corresponds to the total width of the grid. The top trace is the output of the 850-Hz oscillator at test point Z. The next trace is the output of the 1850-Hz oscillator at test point Y. The third trace is the output of the pulsed two-tone generator. The scope gain is much higher for this trace than it is for the top two traces. The bottom trace is the rf output envelope of a properly adjusted ssb transmitter with the mixing balance properly adjusted.

(B) This shows the effect of improper balance between the two tones. In this case, the 1850-Hz tone is approximately twice the amplitude of the 850-Hz tone.

(C) This shows the effect of misadjusting the feedback trimmer (R6) of the high frequency burst. In this case, R6 has too little resistance. Note the growing amplitude of the 1850-Hz burst and the resulting deterioration of the proper mixing for the bottom waveform.

The voltage on each side of the center tap should be between 6 and 9 volts. A 12-volt center-tapped filament transformer will work well. Supply voltages higher than 18 volts can damage the operational amplifiers and should be avoided. Transformers without the center tap are usable if a virtual center tap is derived with 100-ohm, 2-watt resistors.

There are many interesting ways of obtaining the power transformer "free" if the generator is being mounted in existing equipment. Vacuum-tube exciters may have two 6.3-volt heater windings on the power transformer. By grounding the proper side of each of these windings so 12 volts is measured between the hot sides, the transformer will be directly usable. Another possibility, if the exciter uses a vacuum-tube rectifier (5U4, 5Y3) is to remove it and use a pair of silicon diodes instead, which then frees the 5-volt filament winding. By grounding the proper side of this 5-volt winding, it serves as one half of the transformer while the standard 6.3-volt heater string forms the other half. Although the effective center tap is not exactly centered, the error isn't serious when you consider that the 5-volt winding is operating under practically no load. A third possibility is to utilize the center-tapped high-voltage winding of the power transformer. In this case, appropriate series resistors and Zener diodes must be used and, of course, the diode rectifiers must have an appropriate voltage rating. Incidentally, you cannot "piggyback" on the power rectifier because of its filter load.

Adjustment and Use

Mixing of the two bursts is achieved through the 50k-ohm resistors and 100k-ohm control. More than adequate output is available for feeding a mic input. Adjust the LEVEL SET in each twin-tee to the proper value by observing the single-burst output with a scope at test points TP1 and TP2 in turn and adjusting for constant amplitude during the burst (Fig. 4A). The balance adjustment cannot be easily achieved by observing audio. However, by observing the rf envelope of the ssb signal, the balance is easily adjusted to achieve clean "Xs" as shown in Fig. 2A.

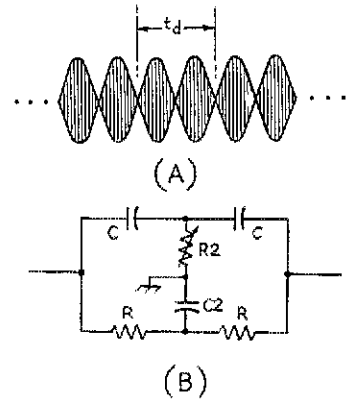
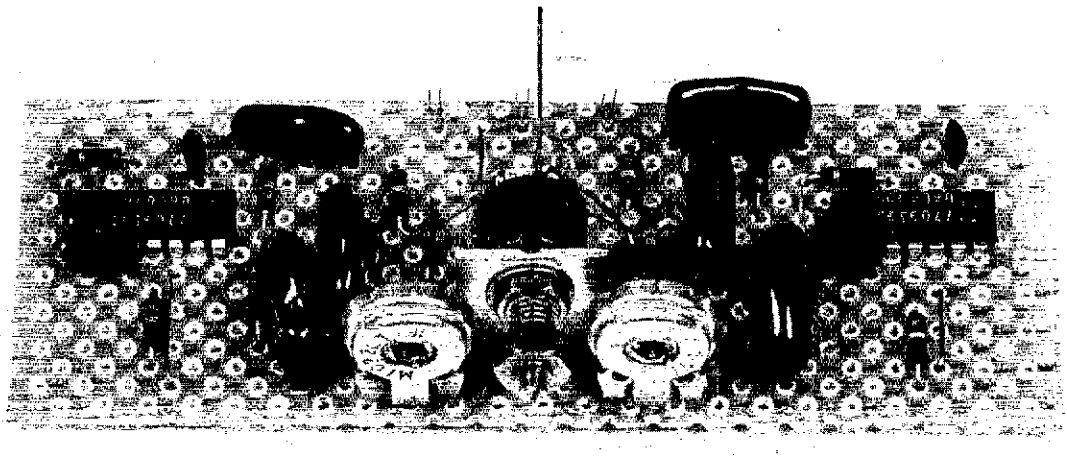


Fig. 5



This is a model of the two-tone generator prior to mounting in the author's ssb exciter. It is complete as shown, except for the power transformer. Note that the ICs used in this unit are in the dual in-line package. However, the same layout can be used with minor changes for the 8-pin IC package.

Pulsing at 60 Hz makes scope sync very easy (sync to the 60-Hz line). However, it can also cover up some hum problems, as your scope pattern will be locked on any hum and thus show it as a stationary pattern with only a half cycle during the burst. This can be easily missed unless you know what to look for. You can find hum problems by applying single tones before proceeding with two-tone tests.

Test setups have been treated by Grammer[3] and Blakeslee.[4,5] To determine your PEP input capability, just crank up the two-tone rf signal into a dummy load until flat-topping of the envelope is just observed at the output. Then use the formula:

$$PEP\ (Watts) = \frac{E_p I_p}{n}\ (1.57 - 0.57\ I_o/I_p)$$

where E_p = Plate voltage under load, I_p = Plate current under load, n = Duty cycle = 1/2 for this circuit, and I_o = Idling (no signal) plate current. Note that for 2000 watts PEP, the dc input, E_pI_p = 637 watts if I_o = 0. Your input power for the FCC is the peak value of E_pI_p as read on your meters (plus drive power, if a grounded grid amplifier is used).

Appendix A

An upper-sideband suppressed-carrier signal modulated by two equal-amplitude sinusoids at frequencies f_1 and f_2 produces an output spectrum consisting of two frequencies — one at f_c+f_1 and one at f_c+f_2 where f_c is the carrier frequency. The waveform of such an output is as shown in Fig. 5A. If the difference frequency, f_d is defined by $f_d = |f_1 - f_2|$, the time t_d is given by $t_d = 2/f_d$. Note that the waveform of Fig. 5 has an envelope which effectively goes through all levels from zero to some peak value. Furthermore, the envelope theoretically should look like the intersection of two sine waves of opposite phase and of frequency $f_d/2$ if there is no distortion. Thus, nonlinear distortion can be observed on such a waveform by noting any deviations from a sine wave. If the peaks are flattened, the gain is decreasing at high levels (usually due to amplifier overload).

If the sine waves are distorted near their zero crossings, the amplifier is nonlinear at low levels (usually due to improper bias point). A simple linearity test of a single sideband transmitter can therefore be accomplished by applying two equal level audio tones at different frequencies and observing the output envelope.

Appendix B

The twin-tee network has a transmission null at a frequency f_o given by:

$$f_o = \frac{\sqrt{k}}{2\pi RC} \text{ where } k = \frac{2C}{C2} = \frac{R}{2R2}$$

I generally stick to values of k between 0.5 and 2. The two capacitors labeled C should be of the same value and capacitors with a ±10-percent tolerance are usually required. Capacitors with a ±20-percent tolerance may be used if they are matched since absolute value is not nearly as critical as having the pair matched in value. Similarly, the resistance, R, of the two resistors should either be of tight tolerance (±5 percent is acceptable) or be matched in value.

To complete a design, choose some capacitors suitable for C and $C2$. Then determine k from $k = 2C \div C2$. Next compute R′ from

$$R' = \frac{\sqrt{k}}{2\pi f_o C}$$

where f_o is the desired burst frequency. Choose the standard value for R closest to the computed R'. Finally, find $R2$ by $R2 = R \div 2k$. The value of $R2$ must be adjustable to compensate for all of the component tolerances. I have found that a ±10 percent or ±20 percent range on $R2$ is satisfactory. Thus, for $R2$ around 4500 ohms, a 1000-ohm potentiometer in series with 3900 ohms makes an appropriate $R2$ as does a 2500-ohm potentiometer in series with 3300 ohms. Some practical values for the components of suitable twin-tee networks are given in Table 1. QST

[3] Grammer, "Oscilloscope Setups for Transmitter Testing," *QST*, October, 1964.

[4] Blakeslee, "Testing a Sideband Transmitter," *QST*, September, 1965.

[5] Blakeslee, "A Scope Adaptor for Transmitter Monitoring," *QST*, October, 1970.

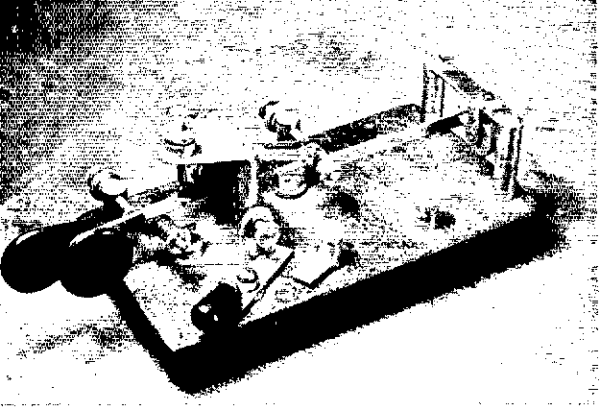


Fig. 1 — Unmodified surplus navy "bug."

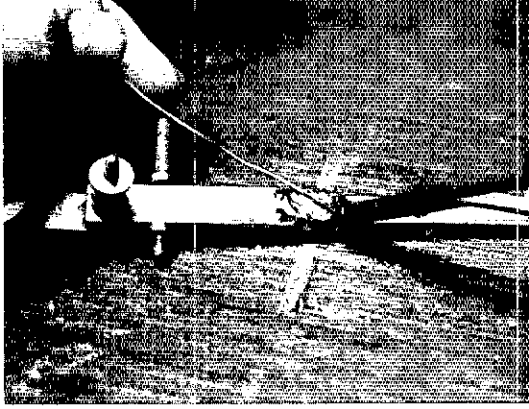


Fig. 2 — A thick flow of solder is used to stiffen the flexible key arm.

• *Beginner and Novice*

How to Make a Low-Cost Keying Mechanism

While we don't recommend that a Novice start off with an electronic keyer, there is no doubt that as the newcomer's cw ability increases so does his interest in automatic keyers. Some Novices are ready for this article, and for those who are not this is one issue of QST *you'll want to save.*

Building a Better Shack for Less

BY A. K. WEIS,* WA5VQC (ex-WB4GIH)

IT'S A REAL pleasure to work cw with someone who has an electronic keyer and is using it correctly. It may not be as personal as the friendly swing of the operator using a straight key or bug, but it is a lot easier to copy, especially in QRM.

With the coming of low-cost integrated circuits, keyers are no longer a luxury around the shack. A fully self-completing keyer can be had for $15 or less. A paddle for your keyer will cost at least $20. It seems that if you can get a keyer at such a low cost, you can probably do the same with a paddle.

* 13502 Westport Lane, Houston, TX 77024.

Chances are that you already have a "bug," or know someone who has one and doesn't use it. If you ask him, he'll probably give it to you, or at least sell it for a couple of dollars. I obtained a navy surplus bug (Fig. 1) at an auction for three bucks and decided to convert it to a keyer paddle.

Modifications

If you want to do the same, the main thing that must be done is to fix the dot-generating mechanism so that the contact is solidly fixed allowing the dot-generation section in the keyer a chance to stay on when you are making dots. The first thing you should do is to make the arm of the bug rigid. I did this by applying a large glob of solder to the flexible piece of thin metal which allows the arm

Fig. 3 — The dot contactor is soldered into a fixed position.

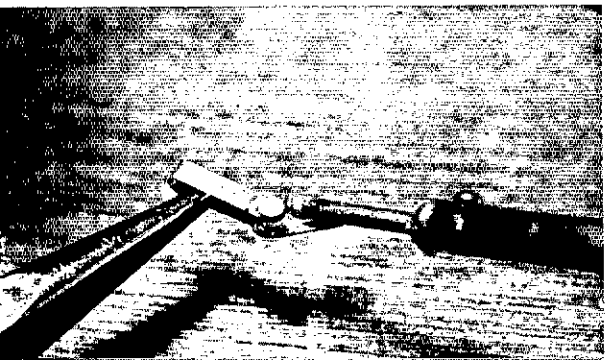
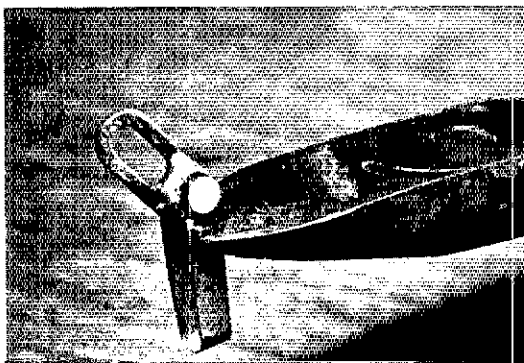


Fig. 4 — The band of spring metal on the dot contactor is cut off after the soldering is completed.



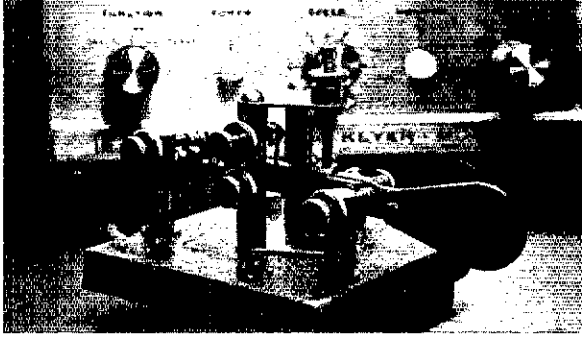


Fig. 5 — Photo of the modified, shortened bug key in position for use in its new "life style."

of the bug to vibrate. Make sure the metal is clean before you solder (Fig. 2). The same could be accomplished using stiff pieces of metal and bolts, but this would involve drilling and other problems. If you wish, you can make a new arm, but since the glob of solder works so well, it really isn't necessary. The next step is to take the contact that generates dots and solder it shut. Here again there are other ways, but the solder works fine (Fig. 3). The next job is to cut the flexible band of metal which held the dot contact. This step is not necessary since the solder has made the contact solid, but the end result is much neater (Fig. 4). The modification can be done with a large pair of wire cutters. If you remount the contact on the arm, and the arm on the pivot, you will find that the bug now functions as a paddle. In other words, it doesn't vibrate anymore.

There are still some things to do. If you want your paddle to look like one, you will have to saw off the back part of the base. This is only logical since now it is of no value anyway. This, however, takes a long time because these bases are usually made of cast iron. If you have a sabre saw with a metal-cutting blade, it is much easier. After you finish this modification, you will also want to saw off the dot arm projecting off the back. I cut mine off right behind the dot contact. If your bug is like mine, it will need some cleaning up. I first removed all the parts and sanded and spray painted the base a glossy black. Next, I took a fine wire brush and cleaned all of the parts. I then relocated the rubber feet so that the paddle balanced properly. I didn't have to drill a single hole. I just removed the shorting bar and put one of the feet in the hole.

Using the Paddle

Before the paddle is ready to use, you must first separate the dot and dash contacts, since they were connected together on the bug. After this is done you will have three screws underneath to which you can connect the three wires coming from the keyer — the ground, dot contact, and dash contact. When you close the dot contact, the dot wire from the keyer should be connected to the ground wire. When the dash contact is closed, the same condition should exist. If you wish, you can put three terminal posts or a three-terminal barrier strip on the back of the paddle. I merely connected the wires to the screws under the paddle. Fig. 5 shows the finished paddle. Everything is ready now, but if you have never used a keyer before, it is a good idea to practice before you go on the air. At first it will feel strange, but you will quickly adapt to it. You will find you can send cw longer and better, and cw will become even more enjoyable. You will probably be a little proud of your finished product. You will have a good time when your ham friends enter your shack and say, "Hey, where didja get that keyer paddle?"

QST

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A Semiconductor Curve Tracer for the Amateur *Part I*

BY RALPH P. ULRICH,* K7UVK

WHEN DESIGNING or building a piece of equipment using solid-state devices, such as diodes and transistors, it can be very helpful to know the characteristics of the units in question. The parameters of a device can be determined by checking its family of curves. For a known device, this is no big problem because the manufacturer makes this information available in his data sheets. However, many solid-state devices that an amateur can aquire, such as those from surplus circuit boards, don't have identifiable numbers. This article shows an adapter that can be used with an oscilloscope to provide a family of curves for any solid-state device.

Theory of Operation

When an ac voltage is impressed across a device that is connected to the horizontal deflection system of an oscilloscope (see Fig. 1), and the current through the device drives the vertical deflection system of the oscilloscope, current through the device will be plotted as a function of the voltage.

If the device under test (DUT) is a diode, the curve shown in Fig. 2 will be traced when a sinusoidal voltage is applied across the diode. If a half-wave supply is used to drive the diode under test, the curve in Fig. 3A or 3B is traced, depending upon the polarity of the half-wave supply. Note that the current trace is downward for positive currents because of the location of the common point in the circuit. If your oscilloscope does not have an inverting capability, an inverting vertical preamplifier could be used to make the curves conform to convention.

To test transistors or other three-terminal devices, a base-current generator is required. If the generator changes levels for succeeding traces, a series of I-V curves are generated as a function of base current. If the tracing rate is sufficient, the display on the CRT appears as a complete family of I-V curves, as shown in Fig. 4. If the value of the base current is known for each trace, and the change in collector current is observed, the beta can be computed by dividing the change in collector current by the change in base current.[1]

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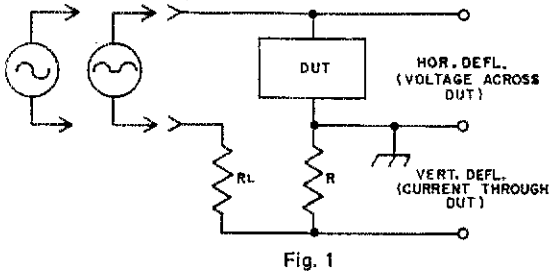

Fig. 1

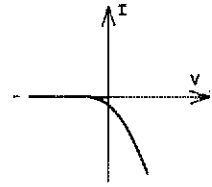

Fig. 2

To generate a base current which increases with succeeding traces, a "staircase" waveform is needed. To produce such a waveform, square waves of one volt amplitude and a period of 1/60 second, 2 volts amplitude and a period of 1/30 second, and 4 volts amplitude and a period of 1/15 second in order are combined. These waveforms are shown in Figs. 5A, 5B, and 5C, respectively. A simple ladder network can be used to combine the waveforms resulting in a staircase as shown in Fig. 5D.

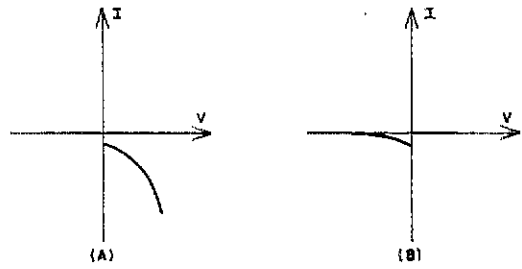

Fig. 3

Since the impedance of the transistor varies greatly with varying values of base current, it is necessary to make sure the base is driven with a current source. One type of current source is illustrated in Fig. 6. The resistance *R* determines the current I1 which flows through diode, CR1, resulting in a voltage across CR1. This voltage is also applied to the base-emitter junction of Q1, causing current to flow in Q1. If CR1 is made from a base-emitter junction which is identical to the base-emitter junction of Q1, then the same current will flow in Q1 as in CR1, assuming that both devices are at the same temperature. If a high-beta

[1] See Bibliography at end of article.

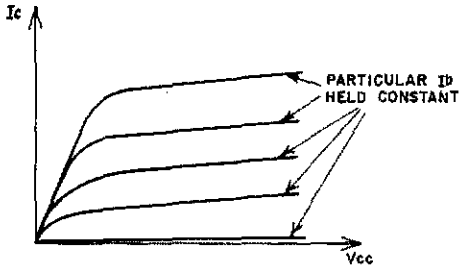

Fig. 4

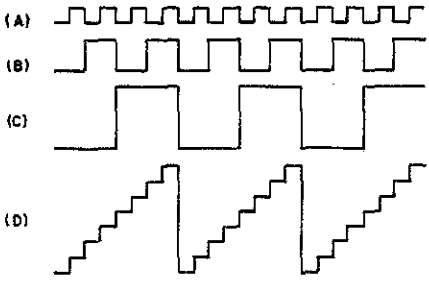

Fig. 5

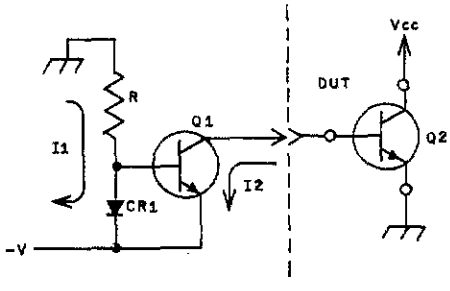

Fig. 6

transistor is used for Q1, the currents I1 and I2 will match very closely for a wide variation of base resistances of the DUT. Changing the resistance of *R* results in a change in the value of I2 through Q1. If the current I2 flows through a fixed resistor, then the current source becomes a voltage source and it can be used to drive the gate of a field-effect transistor.

Circuit Description

The complete circuit diagrams for the curve tracer are shown in Figs. 7, 8, and 9. The 2N3904 and 2N3906 transistors are inexpensive high-beta silicon types. Other similar types which could be used are the MPS3392, MPS3707, and MPS6518. These are available from most large mail order houses for less than $1 each. A 2N709 was used for the 3.6-volt supply because of the higher current requirements. Since Zener diodes are relatively expensive, reversed-biased base-emitter junctions were used. The reference for the 3.6-volt supply

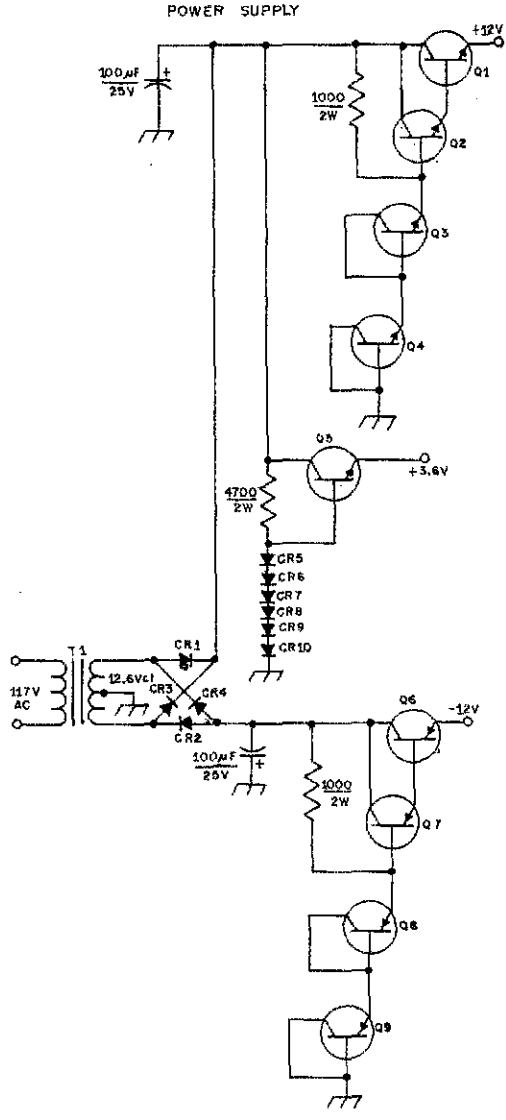

Fig. 7 – Power supply.
CR1-CR4, incl. – 1N4822.
CR5-CR10, incl. – See text.
Q1-Q4, incl. – 2N3904.
Q5 – 2N709.
Q6-Q9, incl. – 2N3906.
T1 – Transformer, 12.6 V ct, 2 A (Knight 54A1420, or equiv.).

consists of several silicon diodes and transistor junctions connected in series, which give approximately a 4.2-volt drop in forward conduction. The power supply shown in Fig. 7 has three output voltages, positive 12 volts, minus 12 volts, and positive 3.6 volts.

The center-tapped transformer, T1, and a bridge rectifier are used to provide positive and negative voltages. Zener-reference Darlington amplifiers are used for voltage regulation. An alternative approach would be to utilize a couple of

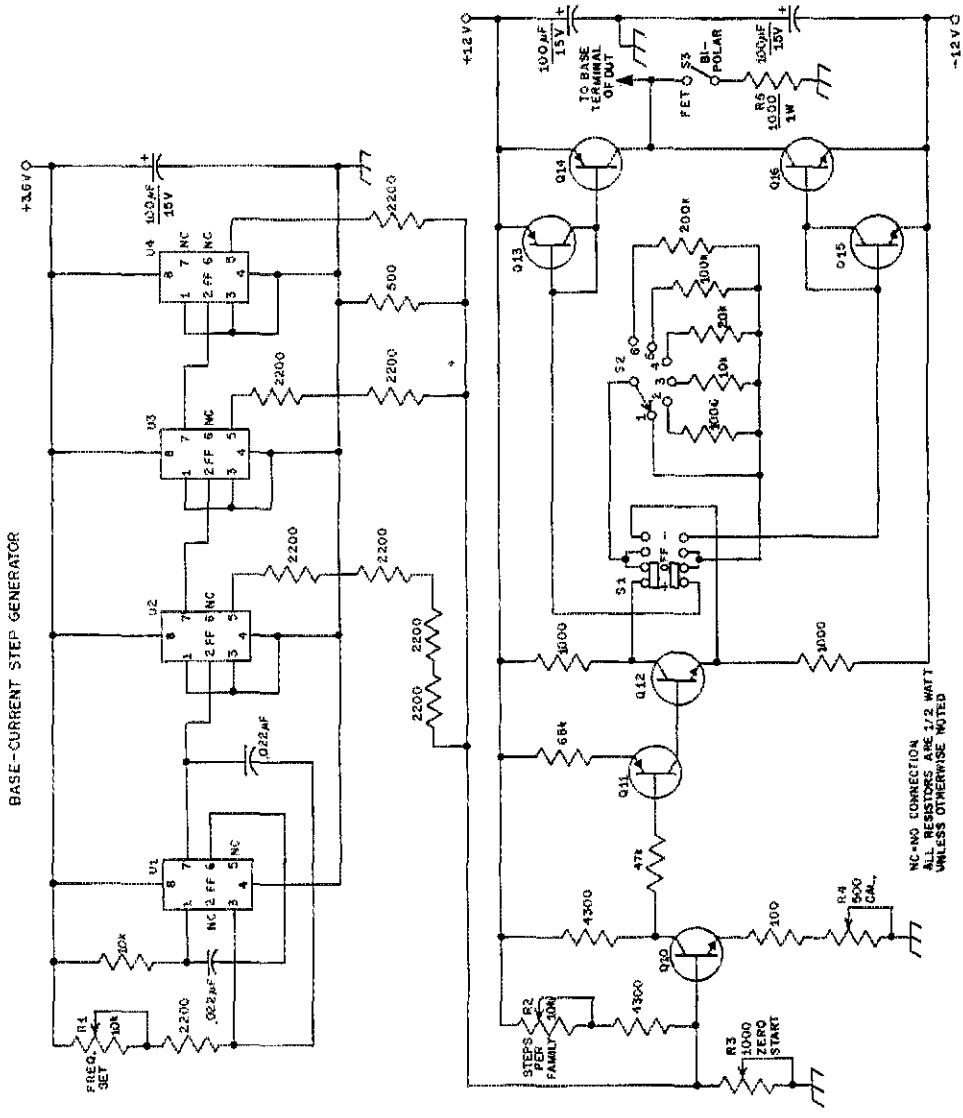

Fig. 8 — Base-Current Step Generator.
Q10, Q12, Q15, Q16 — 2N3904.
Q11, Q13, Q14 — 2N3906.
R1-R5, incl. — For text reference.
S1 — Dp3t toggle, center off.
S2 — 6-position, single-pole, single-section phenolic rotary.
S3 — Spst toggle.
U1 — Fairchild µL914.
U2-U4, incl. — Fairchild µL923.

integrated-circuit regulators as used by W7ZOI.[2] The output from the regulators will be approximately 1 1/2 volts less than the Zener reference voltages. The reference for the 3.6-volt supply is composed of six forward-biased transistor junctions.

The base-current-generator schematic is shown in Fig. 8. U1, a µL914 RTL dual-gate integrated-circuit, *is connected as a free-running multivibrator.* The frequency is determined by R1 and is adjusted to obtain a stable display. U2, U3, and U4 flip-flops count down the output of the multivibrator, and the outputs are used to drive a summing network. A complementary-amplifier stage, Q10 and Q11, is used to drive the phase splitter, Q12. The output of the phase splitter goes through a switch to the appropriate current source, Q13-Q14 or Q15-Q16. The output of the current sources are common and go to the base terminal of the DUT.

With the 3.6-volt supply connected to the RTL integrated-circuits, the output of the multivibrator is checked by putting the probe on pin 7 of U1 and observing the waveform on an oscilloscope. The output of the U2, U3, and U4 flip-flops can be

[2]See Bibliography at end of article.

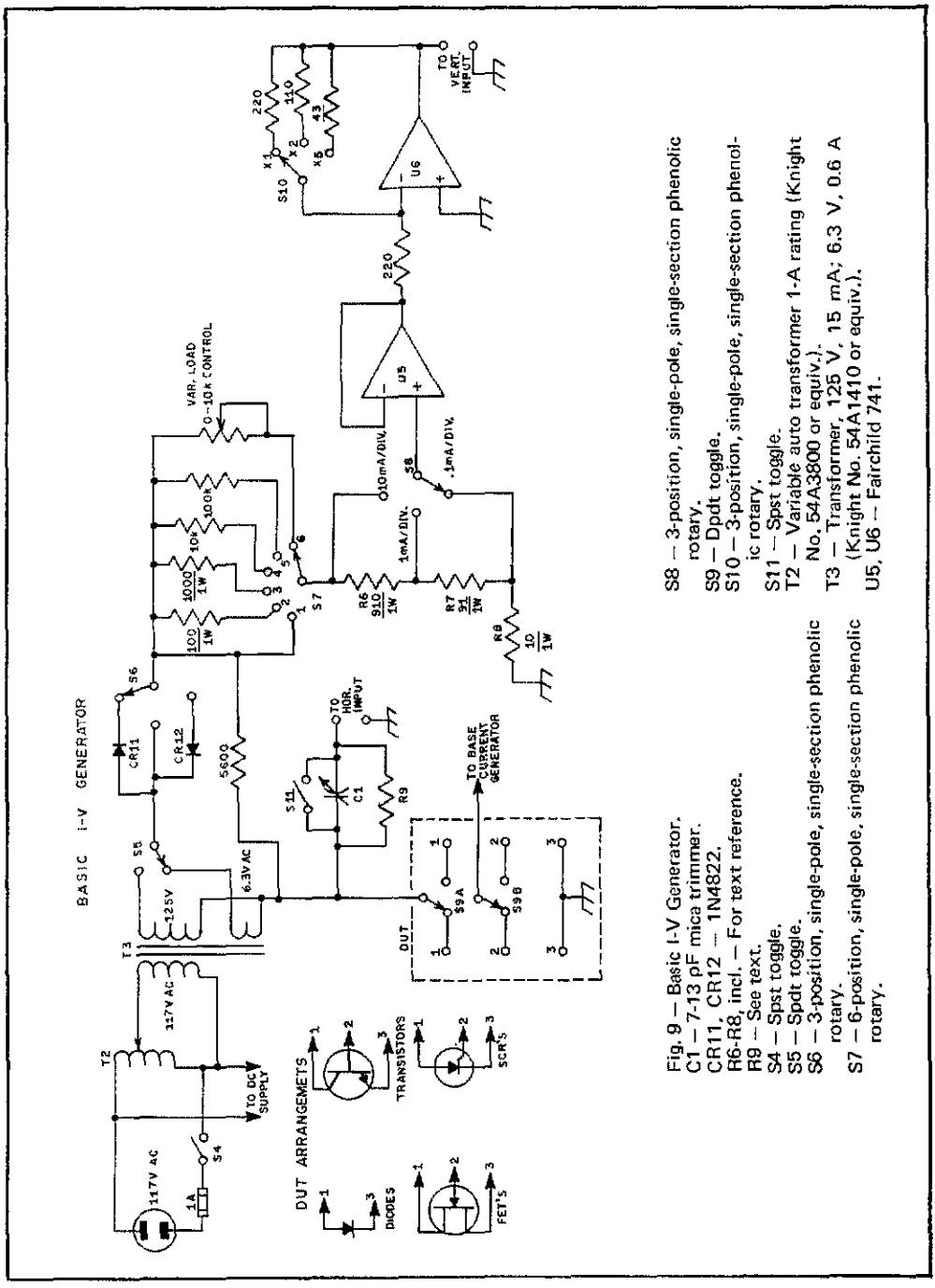

Fig. 9 — Basic I-V Generator.
C1 — 7-13 pF mica trimmer.
CR11, CR12 — 1N4822.
R6-R8, incl. — For text reference.
R9 — See text.
S4 — Spst toggle.
S5 — Spdt toggle.
S6 — 3-position, single-pole, single-section phenolic rotary.
S7 — 6-position, single-pole, single-section phenolic rotary.
S8 — 3-position, single-pole, single-section phenolic rotary.
S9 — Dpdt toggle.
S10 — 3-position, single-pole, single-section phenolic rotary.
S11 — Spst toggle.
T2 — Variable auto transformer 1-A rating (Knight No. 54A3800 or equiv.).
T3 — Transformer, 125 V, 15 mA; 6.3 V, 0.6 A (Knight No. 54A1410 or equiv.).
U5, U6 — Fairchild 741.

checked at pin 5. Make sure that the flip-flops are counting down.

After applying the plus and minus 12 volts to the amplifiers and current sources, the waveform at the input to Q11 (with R3 at midrotation) is observed. It should be a staircase waveform of reasonable fidelity. Next place S3 in the FET position and monitor the waveform across R5. Place S1 in the PLUS position and S2 in number 1 position, then adjust R3 so that the staircase wave form can be varied from zero to eight voltage levels by the STEPS-PER-FAMILY control, R2. Switch S1 to the OFF position, and the waveform should disappear. Switching S1 to the MINUS position should invert the waveform. Adjust the calibration control R4 for one volt per step as monitored

across R5 with S2 in position number 1. This should complete the calibration of the base-current-generator.

The basic I-V generator is shown in Fig. 9. The autotransformer, T2, is the most expensive item used and can be purchased new for about $10. T3 could be a higher-voltage transformer than the one specified, which would give a higher-voltage capability. S7 is used to select the load resistance for the DUT. In position number 1, the DUT load is the resistance of the windings of T3. With an oscilloscope vertical sensitivity of 0.1-volt per division, the range-setting resistors (R6, R7, and R8) yield current sensitivities of 10-mA/div., 1-mA/div., and 0.1-mA/div., respectively. The oscilloscope used did not have an inverting capability, so a cathode follower and an inverting controlled-gain amplifier chain (U5 and U6) was used. This amplifier could be eliminated if it is not deemed necessary to have the DUT current indication in the correct sense. S9 is a transfer switch used when matching devices by comparing their characteristic curves. S10 changes the gain factor by 1, 2, or 5. Control R9 is used to increase the input resistance of the oscilloscope by a factor of 10, which results in a tenfold decrease in sensitivity. C1 is necessary to maintain frequency compensation. The value of R9 was determined by trial and error to achieve a tenfold decrease in sensitivity. This is important if calibration is to be maintained. The value for the author's oscilloscope was determined to be 18 megohms (input resistance was about 2 megohms rather than the 1 meghom advertised). S11 is used to switch the multiplier in and out. The compensation capacitor, C1, is adjusted for minimum distortion of the pattern on the screen with the multiplier switched in the circuit.

TABLE 1

Current Range Switch	*Amplifier Multiplier*	*System Sensitivity*
0.1	x 1	0.1
	x 2	0.2
	x 5	0.5
1.0	x 1	1.0
	x 2	2.0
	x 5	5.0
10.0	x 1	10.0
	x 2	20.0
	x 5	50.0

Calibration

The calibrated accuracies will depend upon individual components and oscilloscope accuracies. With the components specified, accuracies of 5 percent were obtained.

Table 1 lists the device current ranges as a function of the various range switches, with the oscilloscope vertical sensitivity set at 0.1-volt/div. The maximum current is limited by the winding resistance of T3 and the voltage across the current-sensing resistors, which can saturate the inverting amplifier. If it is desirable to measure higher currents, a huskier transformer and another current-sensing resistor of 1 ohm could be added.

The horizontal sensitivity, when set at 0.1-volt/div. on the horizontal-deflection amplifier input, should read 0.1-volt/div. with S11 closed, and 1-volt/div. with S11 open. Of course these figures would change if the oscilloscope sensitivity was changed.

The base-current calibration can be checked by monitoring the voltage steps at the DUT base terminal with S3 in the FET position. With S2 in the 1-mA/step position, adjust R4 for one volt per step.

The second part of this article will describe how to use the curve tracer.

Bibliography

1. Stoffels, "Let's Talk Transistors," Part 6, *QST*, April, 1970.
2. Hayward, W7ZOI, "A Second-Generation MOSFET Receiver," *QST*, December, 1970. QST

Strays

A graduate course in education dealing with amateur radio will be offered this fall at the University of Hartford in cooperation with the Talcott Mountain Science Center. The course will review the fundamentals of curriculum development and also the basics of satellite technology and its impact on education. A primary objective of the course will be the development of unique curriculum for educational use of the Amsat-Oscar B satellite (see *QST* for March, 1971, page 58) in the areas of the physical and social sciences. Eventual publication of this curriculum is expected. Thus the student will participate in the pioneering development team. Anyone interested in further details and enrollment information should promptly contact the Talcott Mountain Science Center, Avon, CT 06001, telephone 203-677-1359.

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A 3 to 4-MHz Franklin VFO

Mechanical considerations are often the toughest problems for a would-be VFO constructor. W2LYH uses junk-box and surplus parts to achieve superior results while using simple metal work.

BY ROBERT V. MCGRAW,* W2LYH

THE TIME and effort spent on building a good VFO can be repaid in signal quality and operating convenience. While it is possible to build a VFO using only one or two tubes or transistors, something more elaborate seems to be justified for a fixed-station frequency control unit – something with an output rated in watts rather than volts. The VFO described here is built along these lines and has performed so well that I thought it might be of interest to fellow amateurs.

Choice of Frequency Range

When designing a VFO, one of the first decisions to be made is the frequency range to be covered. I chose 3 to 4 MHz, which allows direct operation on 80 meters, and 40-through-10-meter operation by frequency multiplying, or by heterodyning with a crystal oscillator on 4, 11, 18, 25, and 26 MHz. The VFO can also be used to help generate an ssb signal in the 3.8- to 4-MHz range, which can then be heterodyned in the same manner as a cw signal. There are two output ranges, 3 to 3.5, and 3.5 to 4 MHz, which are selected by a front-panel switch.

Oscillator

Maybe I should apologize for using vacuum tubes, but the fact is, I have nothing against tubes. They have served me faithfully for many years, and are like old friends, not to be carelessly tossed aside. I will probably feel the same about transistors, when they become obsolete. It seemed sensible to use parts on hand rather than to throw them away and buy new components.

The oscillator uses the Franklin circuit. While there is no particular magic in any oscillator circuit, I believe that the Franklin does have some advantages. The tank circuit has one side grounded, with no taps or separate windings required. The tube cathode is grounded, and light coupling is used between the tank circuit and the tubes. Whatever the circuit, however, mechanical construction is one of the main considerations in establishing frequency stability.

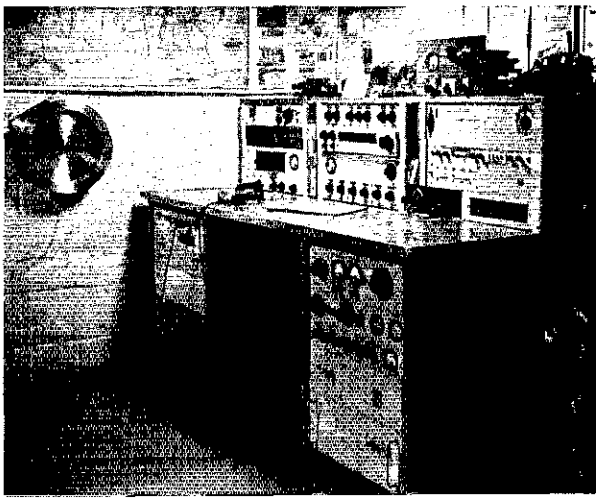
Of all the commonly available twin triodes tested, the old reliable 12AU7A, or its industrial equivalent, the 5963, proved to be the least sensitive to heater voltage changes. In fact, the heater voltage can be turned off for about a second, before the frequency starts to change noticeably.

The oscillator covers 1.5 to 2 MHz, in two equal ranges, by switching the L and C values. For best frequency stability and keying quality, the oscillator is allowed to run continuously while operating the transmitter. There is no backwave audible in the receiver on any band, and, thus, there is no need to key the oscillator.

Buffers and Doubler

The oscillator is followed by three untuned 6BA6 buffer stages. It is the usual practice to use one buffer, and it is better to use two. It takes only a few more parts to put in three stages, and enjoy the advantages of additional isolation of the oscillator from the effects of keying, tuning, or modulation of subsequent states. The type of

* 9 Peg's Lane, Riverhead, NY 11901.



The homemade station of W2IYH, built from surplus components, will inspire all those who still build their own gear. McGraw's hf converters, break-in system, and receiver previously have been described in *QST* (June, 1959; January, 1960; October, 1961, respectively). It is a proud amateur indeed who can say, "The rig here is all homemade."

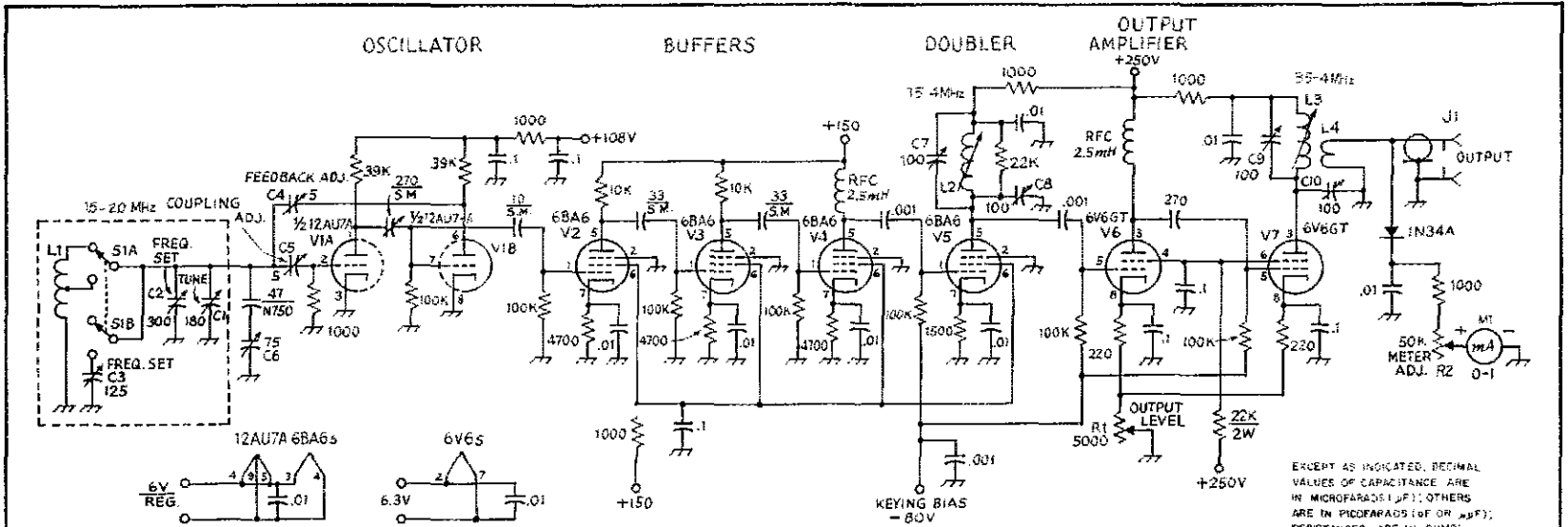


Fig. 1 — *Schematic diagram of the VFO. Unless otherwise noted, resistors are 1/2-watt composition and capacitors are disk ceramic.*

C1 — Air variable, surplus part from an ARC-5 transmitter (see text).
C2,C3 — Air Variable.
C4-C10, incl. — Air variable (Hammarlund type APC).
J1 — Coax receptacle, chassis mount.
L1 - 31 turns, No. 22 enam. wire, tapped at 21 turns, on 1 3/4-inch dia ceramic form; turns spaced as specified in the text.
L2, L3 — 46 turns No. 24 enam. wire on J. W. Miller 4400 form.
L4 — 6 turns insulated hookup wire over L3.
M1 — Surplus milliammeter.
R1, R2 — Linear-taper composition.
S1 — Dpdt ceramic rotary switch, single wafer.

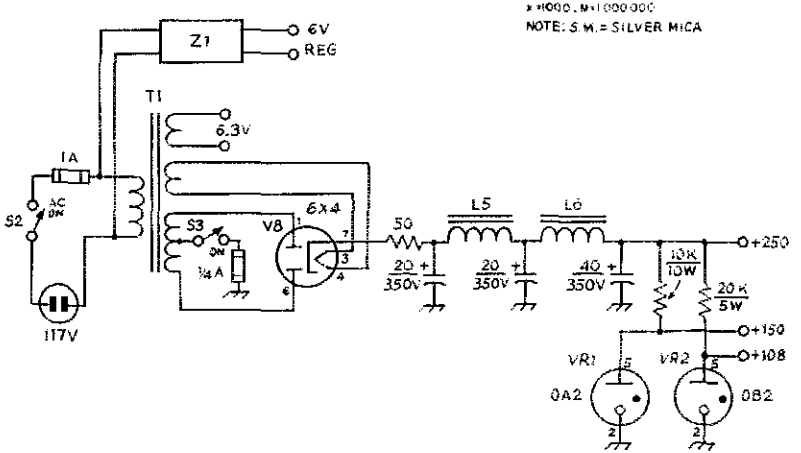
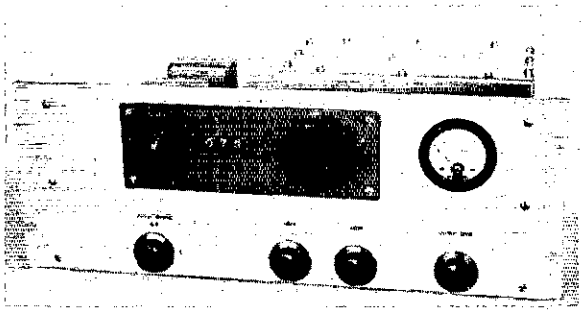


Fig. 2 — *The VFO power supply uses electrolytic capacitors. Resistance values are in ohms, K = 1000.*

L5, L6 — 8-H, 85-mA choke (Stancor C1709).
T1 — Power transformer, secondary windings 600 V at 100 mA and 6.3 V at 3A (Stancor 8405 or Freed 22519).
S2, S3 — Spst toggle.
Z1 — Surplus Raytheon regulator (see text).

The panel meter indicates relative rf output from the VFO. Two 500-kHz tuning ranges are selected by the switch to the right of the digital counter, which provides relative frequency readout.



stability achieved allows only a change of a fraction of a Hertz on 10 meters, when multiplying from the 80-meter output of the VFO. The third buffer drives a 6BA6 doubler, which is keyed by a grid-blocking voltage from the break-in unit.[1] The keying voltage can have any desired wave shape, with absolutely no effect on the oscillator frequency.

Output Amplifier

The output amplifier uses two 6V6GTs. The plate circuit of the first is untuned, and that of the second is gang-tuned with the doubler. The amplifier does not require neutralization. The 6V6s are keyed with the same grid-blocking voltage that controls the doubler, although their grid returns are brought out separately so that they may be left running, if desired. The output level is adjustable from near zero to about two watts maximum by means of a panel control. This control is also used for tuning up at low power and for adjusting the power output of the transmitter when operating cw. A diode rectifier and milliammeter connected to the output link serve as a tuning indicator.

The power supply uses a 6X4 rectifier, plus 0A2 and 0B2 regulators for the oscillator, buffer plate and screen voltages. The heater supply for the oscillator and buffers is held constant by a small Raytheon 6-volt regulator. These are available from Herbach and Rademan[2] for a few dollars, and are excellent for this purpose. Regulation of the heater voltage eliminates frequency variation caused by slight changes in line voltage. The supply is built on a 3 1/2-inch rack panel, and it is mounted separately to isolate the VFO from its heat and hum fields.

Construction

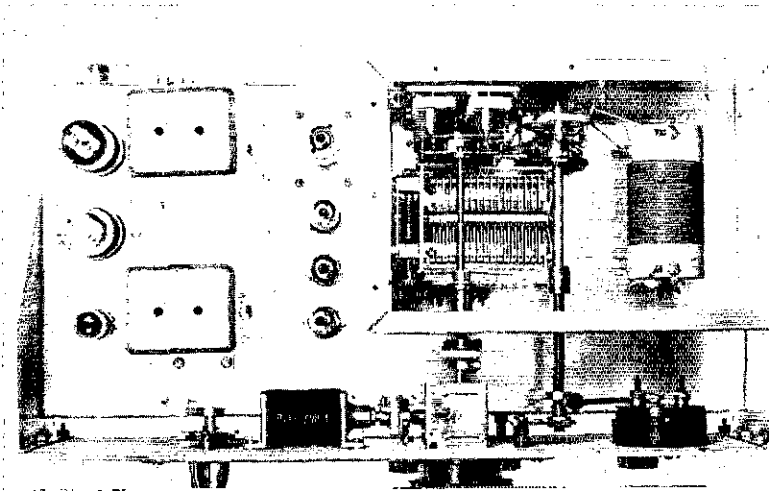
The VFO is constructed as a rack-and-panel unit, with a 7-inch panel and a 7 x 17 x 2-inch chassis. Rack-and-panel construction seems to be a lost art in ham radio these days, but it is still a good way for the constructor to build his home-station gear — better than a lot of odd-shaped boxes piled on top of each other.

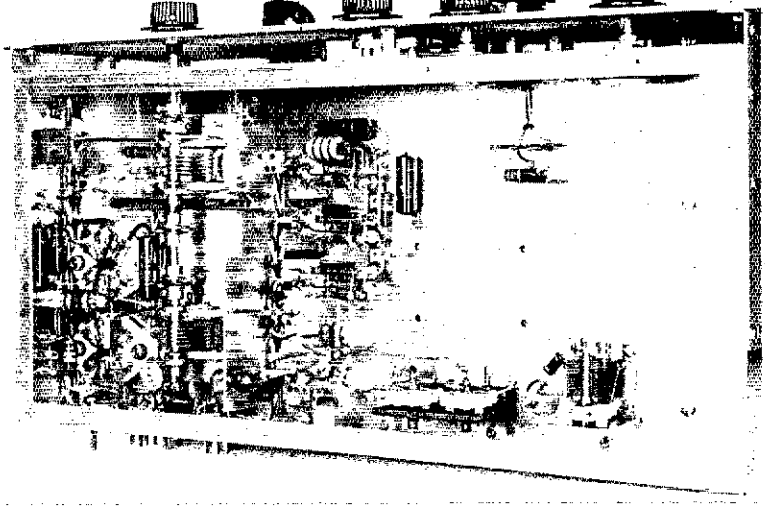
Possibly the VFO could have been made smaller, but, having tried it both ways, the author has found that it is much better to build things a little too large than a bit too small. All of the tank-circuit components are solidly mounted on a 4 x 6 x 1/2-inch piece of aluminum (which acts as a heat sink), preventing rapid temperature changes and movement of the parts relative to each other. The mounting plate is supported on the main chassis by four 1/4-inch spacers, and the whole tank-circuit assembly is shielded by a 5 x 7 x 9-inch aluminum box which is attached to the main chassis. All insulating material in the oscillator circuit is ceramic. A ceramic feedthrough insulator mounted in the base plate connects the tank circuit to the coupling capacitors, C4 and C5, inside the chassis, and this is the only electrical connection brought into the shield box. The tank coil is wound on a National XR ceramic form, 1 3/4-inch diameter, supported on two ceramic standoff insulators. The coil was wound by the old method, winding on two wires at the same time, then unwinding one wire, leaving perfectly spaced turns. The fixed capacitors, C2 and C3, are made up of brass-plate APCs which are more stable than silver micas and which make it easy to adjust the capacitance to the value required. A short jumper wire soldered from the rotor to the ground terminal of each capacitor eliminates the possibility of trouble that is sometimes caused by a faulty wiper contact. The tuning capacitor, C1, is the type used in the ARC-5 transmitters. These capaci-

[1] McGraw, "A Complete Break-in Unit for C.W.," *QST*, January, 1960.

[2] Herbach and Rademan, Inc., 40 East Erie Avenue, Philadelphia, PA 19134.

All oscillator *LC* components are located inside the shield box, mounted on a half-inch-thick base plate. The band switch is driven from the panel knob through a linkage, with the switch detent on the panel. The oscillator and buffer tubes are alongside the shield box, and the doubler and output amplifier tubes are at the edge of the chassis. The doubler and output amplifier plate tank circuits are contained in the shield cans. The tuning capacitor and the counter are driven by a Millen right-angle gear drive.





The doubler and output-amplifier plate-tuning capacitors are ganged. The oscillator coupling capacitors, C4 and C5, are mounted on a bracket, at the rear of the chassis, connected to the feedthrough insulator which projects into the oscillator shield box. Also connected to the feedthrough insulator is the negative-temperature-coefficient capacitor, with the associated variable capacitor, also mounted on a bracket. All three capacitors are adjustable through holes in the rear wall of the chassis.

tors are available from Fair Radio Sales[3] for $1.50 each, and probably there are no better ones for the purpose available at any price within reason. They are beautifully made, with ball bearings at each end, the stators supported on ceramic balls, and with precision 100:1-ratio worm-gear drives.

The panel tuning knob is connected to the variable capacitor through a pair of spur gears having a 2:1 ratio, giving an overall ratio of 200:1. A digital counter, which reads turns and tenths of a turn, ($1 from Fair Radio Sales) is coupled to the tuning-knob shaft through a Millen right-angle gear drive, which also serves as a sturdy panel bearing. It is important to use care when building a smooth-working dial drive, with no backlash. With this VFO, the frequency can be set easily to the desired number of Hz, even when multiplying to 10 meters. The tuning and band-switch shafts are made of insulating material where they pass through the oscillator box, to prevent parallel ground paths which might be caused by metal shafts.

The VFO is not calibrated directly in frequency, but a table of counter readings for each 10-kHz point allows quick setting to frequency. Since frequency spotting is always done by listening in the receiver, and either zero-beating another signal or setting with reference to the frequency standard, it is of limited value to calibrate the VFO directly in frequency.

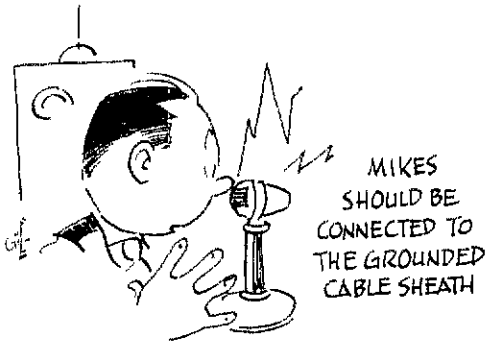
Performance

When first tested, the VFO frequency drift from a cold start was about 50 Hz on 80 meters. At this time there was no provision for temperature compensation. Various values of negative-temperature-coefficient capacitors, mounted inside the tank circuit shield box, were tried, but they had no effect, which attests to the effectiveness of the method of protecting the tank circuit from temperature changes. The compensating capacitor was then mounted under the chassis, where it had the desired effect. A variable amount of compensation is available. It is possible to make the warm-up drift positive or negative, depending on the setting of C6. After many warm-up tests, (you can make only a few per day) I left the adjustment at the point which gave a total warm-up drift of about 20 Hz on 80 meters. This is negligible in normal operation, and it is possible to go on the air immediately after switching on the power, without noticeable trouble from drift. There is no detectable frequency variation when keying.

The oscillator tuning ranges are adjusted by setting the total values of C2 and C3. The two ranges should overlap approximately 5 kHz at 1.75 MHz. The doubler- and output-tank circuits are made to track over the 3 to 4-MHz range by adjusting the slugs of L2 and L3, and the respective padding capacitors. The oscillator coupling capacitors, C4 and C5, are set to the minimum value which allows reliable starting of the oscillator over its range. Only a few picofarads should be required in each capacitor.

Conclusion

The "home brewer," naturally, has a different feeling toward his equipment than does the user of commercial gear, something beyond mere "pride of possession." After all, the sculptor, putting the final polish on his latest creation, could hardly be expected to derive much satisfaction from a plaster copy of another man's work. Even so, I would not hesitate to compare the performance of this VFO with that of any available amateur unit on the market. QST



[3] Fair Radio Sales, Lima, OH 45801.

A Tale of Two Crystals

BY E. E. PEARSON,* W3QY

EVER SINCE the early 30's we've had a preoccupation with frequency standards. For several years we maintained a tube-driven 60-Hz tuning fork at Leeds and Northrup. The output was distributed throughout the plant for use primarily in the calibration of frequency recorders. With ranges of ± 2 Hz (and later ± 1 Hz), we had to supply a fairly accurate standard frequency. When on its best behavior, our fork was good to about 1 part in 100,000. Later, we got into the checking of crystal-controlled units and the accuracies were stepped up. This led to the development of a rotating disk through which was projected a single-shot stroboscopic beam triggered from NSS or CHU.

After building the "NAA Receiver,"[1] we became interested in the vlf stations of NBS, namely WWVL at 20 kHz and WWVB at 60 kHz. With the help of Stan Levy, a young ham, WB2AUA, we put together a WWVB receiver which displayed the signal on a scope. Getting WWVL was a different problem due to the proximity (in frequency) of NAA and NSS, 17.8 and 21.4 kHz, respectively. Ultimately we built a receiver which separated WWVL's miniscule signal from the competition. By means of a frequency-deviation network we finally managed to obtain records of our 100-kHz crystal on an L & N recorder.

* 448 W. Clapier St., Philadelphia, PA 19144.

[1] Pearson, "An NAA Receiver," *QST*, October, 1962.

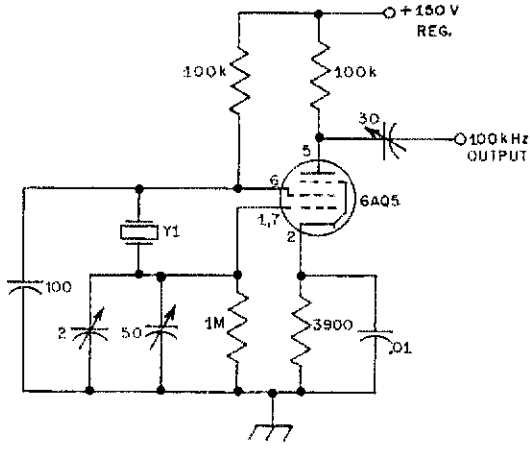


Fig. 1 — Crystal oscillator using 6AQ5 tube. Y1 — 100-kHz crystal.

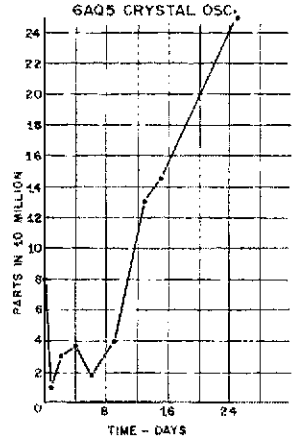


Fig. 2 — Initial frequency change of 6AQ5 crystal oscillator versus time.

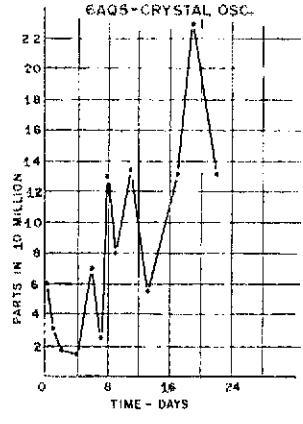


Fig. 3 — Frequency change of 6AQ5 crystal oscillator versus time after six months of continuous operation.

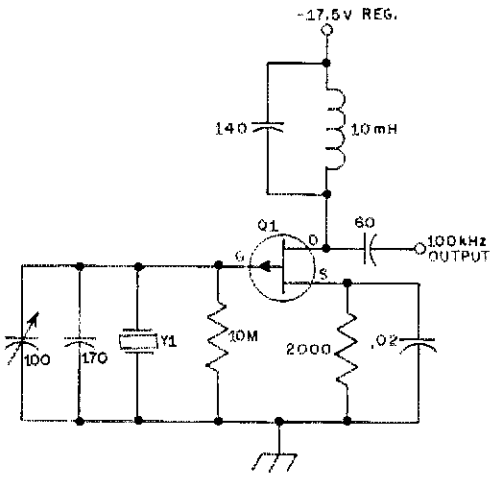


Fig. 4 — FET crystal oscillator. Resistances are in ohms, M = 1,000,000. Decimal values of capacitance are in μF, others are pF.
Q1 — Field-effect transistor, P channel (Siliconix U112 or equiv.).
Y1 — 100-kHz crystal.

A Tube-Type Oscillator

With a comparison system having almost unlimited precision, our next project was to make improvements in the crystal frequency. As a first step, the Valpey unit was mounted in the "precise oven" described in July, 1969, *QST*.[2] This was going to be IT! The circuit for the oscillator is shown in Fig. 1. All of the components were mounted on the under side of a metal shelf holding the oven. Plate and screen voltage was obtained from a supply regulated with a VR-150 tube. The heater voltage to the 6AQ5 was unregulated. The unit was fired up and after it ran 24 hours we began to make frequency-deviation checks. The oscillator was energized continuously from that time on.

It soon became evident that the frequency was drifting with time as shown in the curve of Fig. 2. Although we never were sure whether the frequency was going up or down, we did find that in order to readjust it we had to increase the capacitance across the crystal. Two tests of considerable length were conducted and the same drift appeared on each. Fig. 3 shows the results of a test made after an interval of several months. The drift still showed up.

2 Pearson, "An Inexpensive Precise Crystal Oven," *QST*, July, 1969.

Since we used the same 6AQ5 throughout the period and since that seemed like the principal circuit element which might cause drift, we just left it. We decided the time had come to "go solid state," and hoped for better things.

An FET Oscillator

We look upon the transistor with the same feeling of awe and wonderment that we approached the first "Audiotron" back in 1919! We had purchased a pair of field-effect units, and one of them was still on hand. It bore the Siliconix designation U-112, and the literature included a circuit for a crystal oscillator. After some modifications in the circuit were made, we discovered that we could make our 100-kHz crystal function. (See Fig. 4.)

It was decided to mount the entire circuit (except for the power supply) in one of the W3QY ovens. Accordingly, we designed another one which was somewhat larger than the first, utilizing a one-pound coffee can for the outer container and a "potato stick" can for the inner one. The two cans are shown in Fig. 5. The components are mounted on a circular aluminum plate which is fastened inside the can by means of a bracket. The shaft from the variable calibrating capacitor extends up through both cans so that it can be turned from outside the total enclosure. The crystal is mounted in a metal-tube envelope and plugs into an octal socket. The crystal, obtained from W8HPR, was probably a surplus item. In order to adjust the frequency to exactly 100 kHz, it was necessary to add a 170-pF mica capacitor in shunt with the 100-pF variable capacitor. Fig. 6 shows the complete assembly.

Variations in loading were minimized by feeding the 100-kHz voltage through a coaxial cable to the input gain control of a cathode-follower buffer, and thence to the trigger input of the 5:1 12AU7-type tube multivibrator.

In line with our fervent hopes, the performance of the FET assembly was much better than that of the 6AQ5 unit. During the first 35-day run, the frequency drifted only about 5 parts in 10 million. The "increasing" tendency appeared to be present, as it was with the tube oscillator, although it was far less pronounced. A second run, made over a

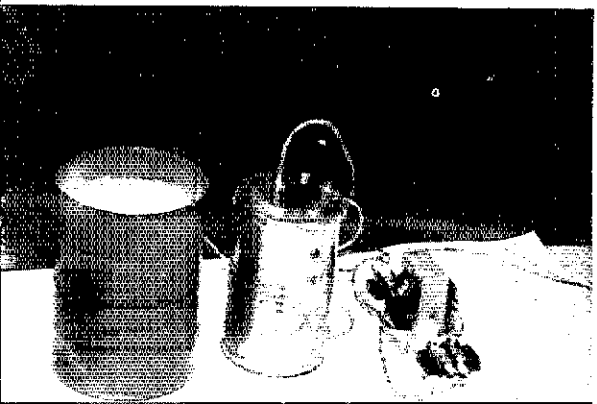


Fig. 5 — The outer and inner can assemblies for the FET crystal oscillator. The power supply, shown at the right, incorporates a full-wave rectifier and a single-stage 18-volt Zener-diode regulator.

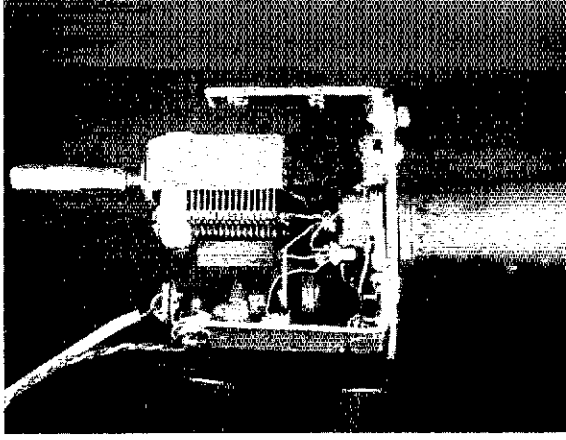


Fig. 6 — The complete crystal-oscillator assembly. Power and frequency-output leads extend out of the picture from the lower left. The shaft to provide for frequency adjustment also extends to the left, passing through the inner and outer can assemblies shown in Fig. 5.

64-day period showed a variation totalling about 7.5 parts in 10 million. (See Fig. 7.) Not shown in the curve is a disappointing sudden jump (between 64 and 66 days) of over 1.5 parts per million. Something had changed — maybe the 170-pF mica capacitor — maybe something else. At any rate, a readjustment has been made and the deviation is once again a few parts in 10 million.

Conclusions

Having reached this point, we begin to see why frequency standards by Hewlett-Packard and others can cost upwards of a thousand dollars. Having gone into the project with the general idea that precise temperature control of the crystal was all that was necessary, we now must conclude that *everything* in the circuit is critical! In order of their influence, any capacitors associated directly with the crystal part of the circuit must be really stable. The output circuitry probably comes next, although plate voltage, heater current (with tubes), or supply voltage (with transistors) may also be equally important. We did not use super regulators, but in the case of the FET oscillator we made a cascade Zener-diode regulated supply prior to performing the test for Fig. 7. According to W9ZTK from CTS-Knights, the 100-kHz crystal itself would have a tendency to increase slowly in frequency with time.

Just what was our aim initially? Perhaps we hoped for a stability of ±1 part in 10 million on a long term basis. At 7 MHz this would amount to roughly ±1 Hz. For short periods there is every indication that the FET crystal unit can be adjusted to 1 part in 100 million with the expectation of it staying put for periods of several minutes to several hours. This should be good enough to allow participation in Frequency Measurement Tests! However, this would involve the construction of a counter of some sort to get a wide range of frequency values — after all, the only thing we now have is a 100-kHz source. Between work on such a counter and application of improvements which we may dream up for the crystal unit, there should be plenty of work ahead! It is a far cry from operating the rig, but it is a "hang-up" which is hard to fight off. QST

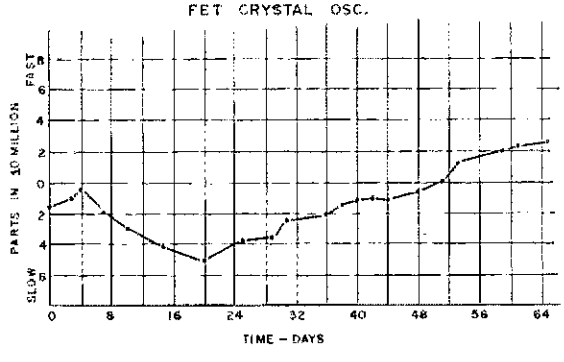
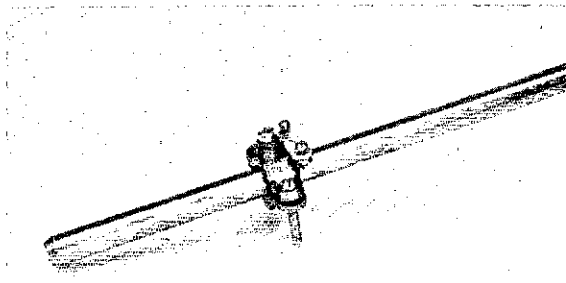


Fig. 7 — Initial frequency drift of the FET crystal oscillator versus time.

• *New Apparatus*

G & F Stainless-Steel Ground Rods



The day of rusting or corroding copper or copper-clad steel ground rods may be ending. G & F Manufacturing Co., Inc., 5555 W. 109th St., Oak Lawn, IL 60453, now markets ground rods made of stainless steel. (The clamp shown in the photograph is not included.)

These rods are both economical and durable, and are being used in a number of pole-line equipment installations as well as for industrial applications. Rods of 5/8-in. dia and 10-ft length are available directly from the manufacturer in the $8.00 price class. — *K1PLP.*

•Gimmicks and Gadgets

Rejuvenating That Old Prop-Pitch Rotator

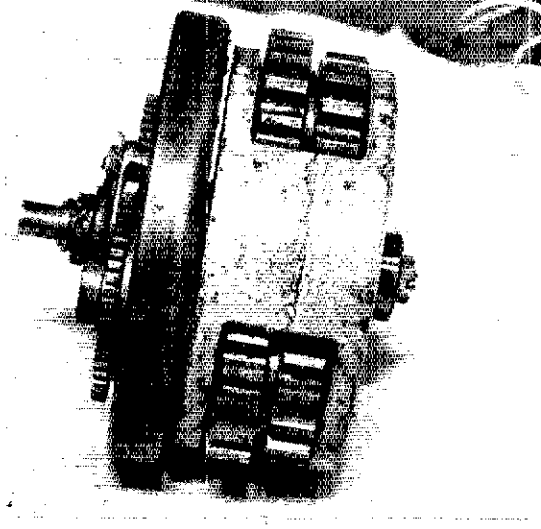


Fig. 2 — This is the gear-housing section — the heart of the rotator.

BY DAN UMBERGER,* W8ZCQ

PROBABLY THE best all-round antenna rotator a ham can find is a surplus prop-pitch motor. These were in plentiful supply up until a few years ago and are still listed in surplus and ham ads. No doubt many hams, like the writer, have had a prop-pitch motor go sour, and rather than throw it away have stored it in the junk box. This was our case until it was decided to see what had to be done to restore the unit to A-1 condition.

The bearings, the bearing seal, and the brushes cause the majority of failures. The bearings and seals are "off the shelf" standard items and are readily obtainable. Worn out brushes cause the major problem because exact replacements are unavailable. However, there is a "dodge" for this problem, if you'll excuse the pun. More about this when we discuss the motor repairs.

A problem develops in the amateur use of prop-pitch units because they were designed to operate in a horizontal position, and hams mount them vertically. This means the gears and bearings may not get adequate lubrication, and thus can dry up and bind.

Taking the Unit Apart

Before dismantling the unit, paint a stripe down the side of the case so you'll be able to align it correctly during reassembly. Also, as you take the unit apart, make a sketch and keep notes. The prop-pitch motor assemblies are complicated and the notes and sketch will help when you reassemble the piece. Don't use a metal-faced hammer. Use a plastic hammer or blocks of hard wood. You'll probably destroy the gaskets when you take the unit apart, but replacement rubber "O" rings are available from most rubber-supply houses.

Fig. 1 shows what you'll have when the main components are separated. Fig. 2 pictures the gear-housing section, and Fig. 3 shows this section opened up.

Naturally, after I repaired my own unit I quickly acquired the reputation of being an expert in prop-pitch motor repair. Consequently, I rebuilt several motors for friends! Most of the units I repaired had bearing failures on the small motor drive shaft because of lack of lubrication. For the most part these were New Departure shielded bearings, No. 3200. A much better bearing for replacement is the New Departure No. Z99500. This bearing is almost the same but is sealed and permanently lubricated. It costs only a few cents more.

There are many versions of the prop-pitch rotator made and what we say here may not be true in all cases, as far as the bearings are concerned. To locate bearings, look up your local bearing distributor in the Yellow Pages. Usually the distributor will be able to identify the bearings and provide a replacement. Also, most automotive parts houses have a stock of bearings and seals.

Getting It Back Together

After you have cleaned the gears you can reassemble the unit. Many people who have

* 2753 Elliott Ave., Columbus, OH 43204.

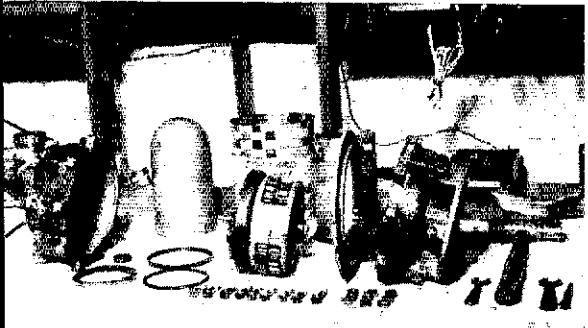


Fig. 1 — Here is the dismantled prop-pitch rotator. Note the plastic-headed hammer which was used in taking the unit apart.

dismantled the gear boxes were never able to put them back together again. I thought there must be a simple answer to the problem but it evaded me. If you put the inner pinion gear in, either the ring gear would not go on or the shaft gear would not mate with the assembly. Any combination always ended up with one of the gears failing to go into place. There was always one gear with a tooth half out of mesh!

Then I noticed that two of the teeth on one of the smaller gears of the large planetary unit were marked with an "O." I checked the other two gears and they were marked the same. I rotated each of the gears with the "Os" facing out, and the whole assembly dropped right into place! Fig. 4 shows the assembly with the marked gears in their correct positions.

Reassembly procedure is as follows: Place the planetary assembly on the work bench (with the smaller gears up) and rotate the gears until the "Os" face out. Next, pick the assembly up and slip the pinion gear into the center, then place the unit on the table. Then set the ring gear over the larger gears in the planetary section. Again, carefully pick up the assembly and install the small planetary drive shaft into the center bearings. This may be tricky, as the assembly must be kept intact. You may have to tap this drive shaft into place, then secure with the nut. Next, slip the large drive shaft over the smaller gears of the large planetary system. Now place the upper half of the housing over the assembly, then install the lower half of the

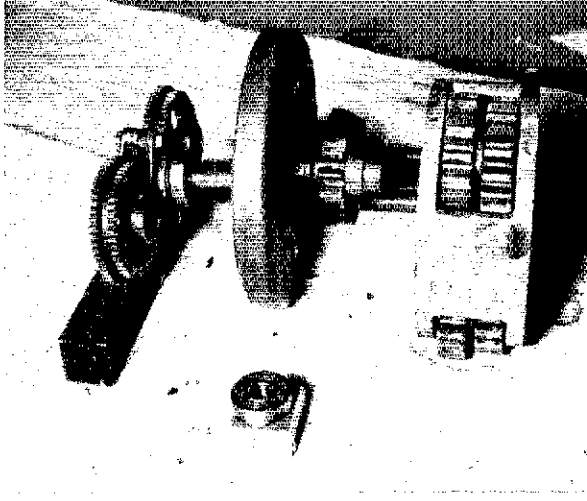


Fig. 3 — View of the opened gear housing to show the arrangement of the various gears.

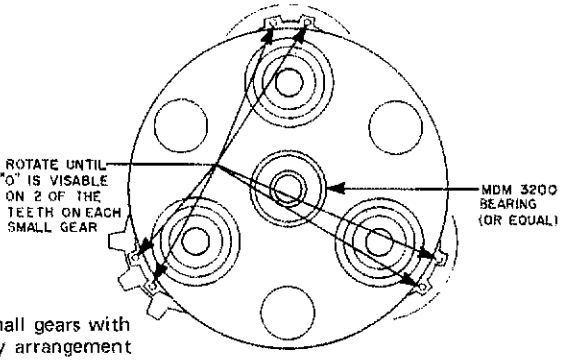


Fig. 4 — This drawing shows the small gears with the "Os" pointing out, the necessary arrangement when reassembling the gear housing.

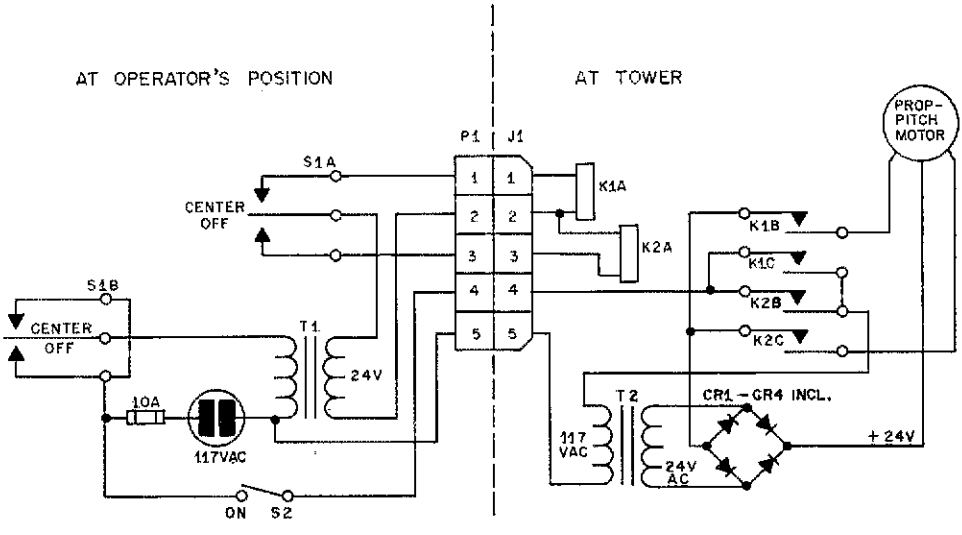


Fig. 5 — Control and power supply for the prop-pitch motor.
CR1-CR4, incl. — 25 A, 50- to 100-volts PRV.
J1 — 5-pin male connector.
K1, K2 — Dpst 24-volt ac coil (Potter and Brumfield PR7AY or similar).
P1 — 5-pin female connector.
S1 — Dpdt, nonlocking, center off, spring return (Switchcraft No. 25312 or similar).
S2 — Spst toggle.
T1 — 24 V, 1 A.
T2 — 24 V, 8 to 10 A.

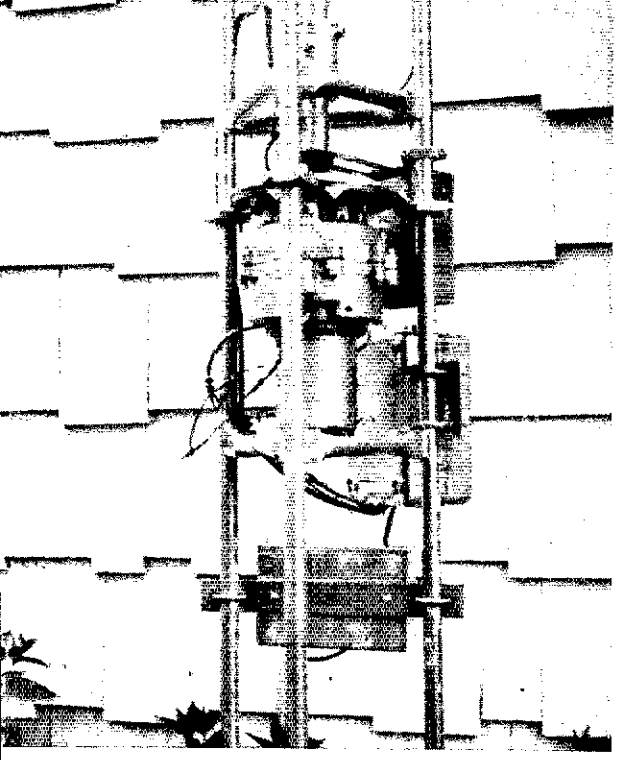


Fig. 6 — Here is the rotator installation at W8ZCQ.

housing over the smaller planetary unit. Orient the assembly so that your paint stripe lines up, and bolt the gear housing together.

One more point in the reassembly is to reverse the front-end bearing seal. This will place the lip of the seal toward the outside. Therefore, when the unit is mounted vertically water won't be drawn down into the housing. Also, don't use ordinary oil or grease for lubrication. The best oil to use is Mobil Avrex-903 aircraft oil or equal. This type will provide a free-turning operation in cold temperatures. Frankly, I prefer to leave the case dry and pack the bearings with Randall plastic-sleeve bearing lubricant. This is a silicone grease that will provide several years of trouble-free service.

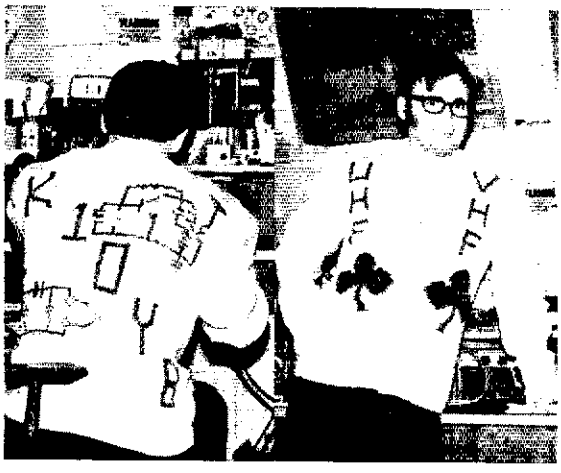
The Brush Problem

Most of the hams using prop-pitch motors operate them on ac and this creates a problem. The motors draw excessive current, which in turn causes burnt brushes and pitted motor commutators. If this has happened to your unit take the armature to a motor shop and have the commutator turned down and undercut. Exact replacement brushes are not obtainable. However, Dodge alternator brushes are similar and can be used. They must be modified slightly. The springs, caps, and flexible leads differ from those of the prop-pitch motor. Clip the alternator brush leads at the cap and do the same to the old motor leads at the brushes. Use the old motor caps and springs. Twist together the leads from the old motor brushes and solder them. Presto! Replacement brushes!

It is not a good idea to operate the motor on ac if dc is available. Four low-cost 25- to 50-A silicon diodes at 50- to 100-volt rating, used in a bridge circuit, will make the motor get up and go as it never went before. Current drain will be greatly decreased and life expectancy will be extended.

I have found that the rotator will operate much better if the power supply is mounted at the tower and remoted with relays from the shack. Fig. 5 shows the details of the power supply and switching system. The 117-volt ac was supplied to the tower through type "UF" direct-burial wire. If you want a really good rotator, resurrect that old prop pitch mechanism! QST

Strays



K1OYB keeps snug while operating with this interesting sweater knitted by his YL. He drew the design on graph paper and she transformed it into an fb sweater.

Stolen Equipment

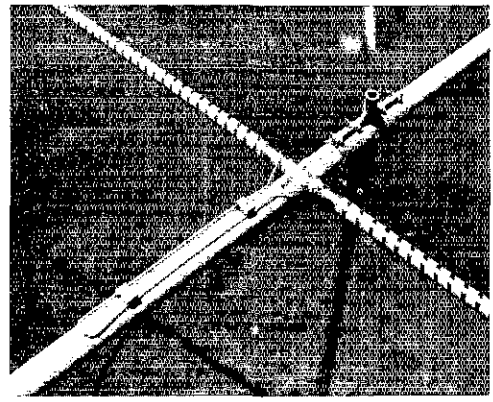
Stolen: RCA 150 transceiver, Serial 10896, with "PC PD #62" inscribed on back plate of unit. WB2FAK asks anyone with information to contact Penn Central RR Police Department, Room 1750, Grand Central Terminal, 15 Vanderbilt Avenue, New York, NY 10017.

- - - -

On June 14 a WRL Duo-Bander transceiver, Serial 8507A1760, was stolen from W1KLG's car. Anyone with information should contact the Saugus, Mass. police department or W1KLG.

• New Apparatus

Kirk Helicoidal Beams



A new concept in reduced-size light-weight beam antennas has been introduced recently by the Kirk Electronics Division of Electrotec Corp. Named Helicoidal antennas by Kirk, these arrays employ laminated tapered fiber-glass element forms, to which is bonded helically wound copper-foil tape. Similar elements, usually wound with small-diameter copper wire rather than tape foil, have been in use for a number of years as relatively efficient mobile antennas for the hf amateur bands. Kirk, however, has expanded the use of this type of element into the Yagi-beam configuration, and now offers 2-, 3-, 4-, and 5-element single-band antennas for 40-, 20-, 15-, and 10-meter operation. The use of a fiber-glass boom plus the fiber-glass/copper-foil elements contributes to a durable but lightweight array. The 3-element 20-meter model, completely assembled, weighs only 14 lb, and can be rotated with a light-duty TV-type rotator such as is often used for 6-meter beams. The 5-element 40-meter version, which uses a subboom assembly (not included with the antenna) and has a 72-ft boom, weighs 82 lb, in contrast to hundreds of pounds for an all-metal array.

The photograph shows the T-mount boom-to-mast hardware and the driven-element feedpoint of the 3-element 20-meter version, Kirk's model 14MH3. A "hairpin" match is used to transform the antenna impedance to 50 ohms balanced, and a 1:1 balun (furnished with the antenna) provides for coax feed of the system.[1] By its inherent electrical nature, a hairpin match exhibits some broadbanding with respect to frequency. This, plus the dimensions Kirk has chosen for element length and element spacing, contributes to a low SWR in a 50-ohm line across an entire amateur band. Kirk's specification for the 3-element 20-meter array, an SWR of 1.4 to 1 or less across the band, was obtained easily by following the directions contained in the instructions.

"Reduced size" is, perhaps, a term not too descriptive of the Helicoidal antennas. The boom length for the 14MH3 is approximately 19 feet, with a director spacing of 0.14λ and a reflector spacing of 0.13λ. Elements of all models are 25- to 35-percent shorter physically than lengths for aluminum-tubing arrays. For the 14MH3, the director, driven element, and reflector, respectively, are 22.09 ft, 23.58 ft, and 25.23 ft long. The fiber-glass form for the elements tapers from approximately 1 1/4-in. dia at the boom to 3/8-in. dia at the tips. The helically wound copper tape is 5/16-in. wide, and is wound with a pitch of approximately 12 turns per foot. The relationship between the physical and electrical length for half-wave resonance of individual elements, determined through the aid of a grid-dip meter, was found to be $l_{ft} = 330/f_{MHz}$, instead of the usual $468/f_{MHz}$.

Structurally, the Helicoidal antennas are strong, indeed, for their weight. On a very gusty day, there is considerable movement of the element ends because of the flexibility of the fiber-glass material, but there is consolation when one considers that fishing rods, made essentially of the same material, can be bent nearly double without breaking. The boom, of larger diameter and greater wall thickness, is rigid.

The electrical performance of a Yagi-type array is dependent upon several factors. The most important of these that can be controlled by the manufacturer are effective aperature (beam size), element length, and element spacing. Because the Helicoidal antennas are somewhat reduced in physical size, they cannot be expected to produce the forward gain of a full-size wide-spaced array. It is also worthwhile to note that element lengths and element spacing interact to affect three parameters: forward gain, front-to-back ratio, and frequency bandwidth/impedance. None of these parameters can be optimized without compromising the other two. The manufacturer has chosen to obtain a low VSWR across the band, perhaps to meet the requirements of the modern-day transmitters having semifixed output-tuning networks. While no gain measurements were made here on this antenna, it would appear that this type of array, with linearly loaded elements, would perform more efficiently than a trap beam with the same element spacing, because of losses in lumped-loading components.

The manufacturer's literature makes no claims that these antennas are the world's finest, but suggests that they may be the most practical and convenient. Prices range in class from $90 to $1100 for the various models. The manufacturer's address is Kirk Electronics Div., Electrotec Corp., 116 Westpark Rd., Dayton, OH 45459. — *K1PLP*

1 The hairpin match, described in detail by Gooch, Gardner, and Roberts in *QST* for April, 1962, is actually a specialized form of an *L* network. The driven element of the array, electrically shorter than that length required for half-wave resonance, provides the capacitive series reactance of the *L*. The inductive shunt reactance of the *L* is obtained from the hairpin itself, which may be considered as a short-circuit-terminated length of essentially lossless transmission line. Design data for *L* networks is discussed by Grammer in "Simplified Design of Impedance-Matching Networks, Part I — Basic Principles and the L Network," *QST*, March, 1957.

Technical Correspondence

5-MHZ OSCILLATOR PHASE LOCKED TO TV COLOR-BURST SIGNAL

Technical Editor, *QST*:

Since my first letter was published,[1] I have been in contact with Mr. D. D. Davis, Frequency-Time Dissemination Research Section, Time and Frequency Division, National Bureau of Standards, Boulder, Colorado. He provided me with detailed information on how they monitor the color-burst signal at Boulder and compare it with 5 MHz from a rubidium frequency standard to obtain the color-burst frequency drift.[2]

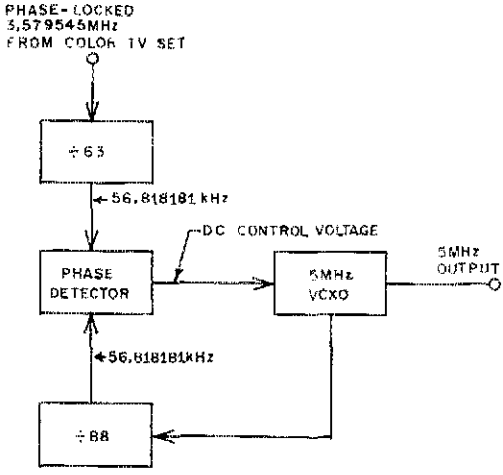


Fig. 1 — Voltage-controlled 5-MHz crystal oscillator in a phase-locked loop operated from the crystal oscillator in a color-TV set. When the TV set is receiving a live network program, the output frequency of this system is phase-locked to a rubidium standard in New York.

I believe that a similar unit could be built using a 5-MHz frequency-synthesized/color-subcarrier-frequency phase comparison unit with suitable dividers. This system, shown in Fig. 1 in block diagram form, would be applicable to amateur use. While the unit might be expensive to build, it should be invaluable for amateur and laboratory use where extreme accuracy and drift information is needed. — *Kenneth L. Huntley, W4CXP, 334 Elliott Road, S. E., Ft. Walton Beach, FL 32548.*

[1] Huntley, "TV Color-Burst Signal for Primary Frequency Reference," Technical Correspondence, *QST*, February, 1971. Also see Dorschug, "More on Color-Television Subcarrier Frequency," Technical Correspondence, *QST*, April, 1971.

[2] The basic information supplied to the author has since been published. See Davis, "Frequency Standard Hides in Every Color TV Set," *Electronics*, May 10, 1971. In this article, accuracies and stabilities of the standards of the three networks and of the standards used at local stations are also discussed. — *Editor.*

PUBLICATION OF IONOSPHERIC PREDICTIONS

Technical Editor, *QST*:

The monthly publication, *Ionospheric Predictions*, will be replaced in a few months by a reference set of world maps for three levels of solar activity. These reference maps include the ionospheric parameters formerly published monthly as *Ionospheric Predictions*, and are designed to replace these publications through the use of interpolation procedures. The last issue of the periodical will be that dated July, 1971, with predictions for October.

The new information, a Telecommunications publication consisting of four volumes, will contain world maps of the MUF(ZERO)F2, MUF(4000)F2, and MUF(2000)E. Volume 1 describes the maps and illustrates their usage in the estimation of maximum usable frequencies. Volume 2 contains maps for a period of minimum solar activity, *R12 = 10*. Volume 3 contains maps for a maximum solar activity period of an average solar cycle, *R12 = 110*, and Volume 4 contains maps for a maximum solar activity period of an above-average solar cycle, *R12 = 160*. The new *Ionospheric Predictions* volumes will be available from the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402, for $9.30 a set (Vol. 1, 30 cents; Vol. 2 through 4, $3.00 each). This information was obtained from the June periodical giving predictions for September, 1971. *Jerry Hall, K1PLP*, QST, *Technical Staff.*

THE RTTY CRYSTAL BALL[3]

Technical Editor, *QST*:

The future of amateur radio teleprinter operations is very easy to forecast with great accuracy. Since hams do not usually purchase their teleprinter equipment new, it is the usual practice to depend on the surplus from large communications organizations. The models 14, 15, and 19 of the Teletype Corporation are being removed from commercial service. The reasons for this are simple and obvious. These models of equipment are now obsolescent or obsolete, depending on the use of the units. New spare parts do not exist. The Teletype Corp. ceased manufacturing parts years ago. Most of the units of the 14, 15, and 19 series have been used to the point that it is no longer practical to keep them in service on a commercial basis. In addition, it should be recognized that the 5-level Baudot code is rapidly being replaced by the 8-level American Standard Code for Information Interchange (ASCII) code. This 8-level code is very similar to the Baudot code but provides an additional 32 functions over those provided by the Baudot code. The significant thing is that the standard "language" for teleprinters that "talk" to computers is the 8-level ASCII code.

Another fascinating facet of the situation is that of machine speed. The 60-wpm machine is strictly a thing of the past for inclusion in new systems. The common speed for conventional teleprinters is 100 wpm. Indeed, printers are now common that operate at 300 wpm. This means that as the old surplus stocks of 60-wpm 5-level machines are exhausted, new stocks of more recent machines will become surplus.

These facts tell us with considerable exactitude what the future holds for us in teleprinter operations. In fact, it is possible *now* to buy very exotic

[3] Condensed from "The Crystal Ball," C.A.R.T.G.'s *RTTY News*, May, 1971.

teleprinters on the surplus market for a price that is directly competitive with the 14, 15, and 19 models. Usually these machines require overhaul, or at a minimum, service. This, however, is the byword of "our gang." RTTYers build.

In the next few years we can expect to become much more familiar *on the air* with names such as Kleinschmidt and Mite. In fact, each upgrading of commercial equipment means an eventual upgrading of ham equipment when this equipment has completed its tour of duty in commercial service. It is true that the release of newer equipment from commercial service to amateur service will make our operations more involved.[4] More elements of decision are involved with one teleprinter station communicating with another teleprinter station. On the other hand, techniques are now available to permit the required conversions electronically. Reference is made to the article, "Electronic Teleprinter Speed Conversion," in the March, 1971, issue of *RTTY Journal*. The future holds the promise of more intensely challenging equipment to work with, which is what it is all about. — *Frank Merritt, VE7AFJ, Box 309, Parksville, B.C., Canada.*

SPACE- AND POLARIZATION-DIVERSITY RECEPTION FOR AMATEUR USE AT HF

Technical Editor, *QST*:

Commercial point-to-point hf receiving stations have long taken advantage of space diversity for the enhancement of received signals experiencing multipath fading through ionospheric propagation. Polarization diversity has also been used to some extent. Either method provides demonstrable advantage in overcoming fading, and should be especially helpful for weak signals under marginal propagation conditions. Triple diversity is desirable, but much of the potential enhancement can be obtained with simple dual diversity.

Although fixed space diversity antenna arrays have undoubtedly been used for amateur purposes for specific directions or point-to-point work, rotatable antenna systems are much more desirable for overall amateur DX work. For years I have dreamed of experimenting with both space and polarization diversity using multiband rotary beams. However, I have never had the time, resources, or proper QTH that permitted exploring these techniques.

Experiments with dual diversity could be conducted using two similar receivers and a simple audio combiner, although this involves the inconvenience of separate manual tuning to the same signal. For all around amateur use, a dual diversity receiver should have two identical rf/i-f channels, a common first local oscillator, single-dial ganged tuning and an audio combiner that automatically selects the strongest signal. This could be a receiver especially designed for the purpose, or some adaptation of commercial equipment.

Space diversity with rotatable antennas could be obtained using identical beam antennas on towers at least five wavelengths apart at the lowest frequency band, and remotely controlled so that they rotate in synchronism. Because of the distance involved, 2- or 4-wire open transmission lines or preamplifiers should be used in bringing the two channels to the diversity receiver without excessive losses.

Polarization diversity should be somewhat easier and less expensive to implement. For example, identical Yagi antenna elements (multiband if desired) could be mounted orthogonally on the same boom, each having a separate coaxial feed system. It might be best to mount the elements at 45 degrees and 135 degrees from the vertical to avoid excessive coupling of vertical elements to a vertical metal tower — but this is a detailed consideration of the specific installation.

There is probably little advantage in diversity for transmitting, but a simple switching system could easily be incorporated to enable either antenna or some phased combination to be used for transmitting, as desired.

I am most interested in learning of any experiments and results on space or polarization diversity along the lines indicated. — *J. Gregg Stephenson, W2OBX/W1DGC, 22 Arosa Ct., Greenlawn, NY 11740*

FEEDBACK

ON THE SOLID-STATE SSTV MONITOR

Technical Editor, *QST*:

I have often been asked if the 22-megohm resistor in the gate circuit of Q11 of the SSTV Monitor[5] should not be 2.2 megohms, the same as in the gate circuit of Q17. The 22-megohm value is correct as shown. There is a very good reason why one is ten times the other. The *RC* time constant in the vertical charging circuit was made 50 times larger than the horizontal to provide the required linearity in the vertical sawtooth.

There is one error in the drawing, however, and additionally some circuit changes will improve operation.

1) The emitter and collector of Q14 are shown reversed.

2) The 22-ohm resistor in the emitter of Q18 should be 220 ohms.

3) The resistor in the supply lead of the 1N4733 Zener diode may be 150 instead of 147 ohms.

4) Add a 0.47-μF capacitor from the base of Q15 to ground for improved noise immunity.

5) Add a 10,000-ohm resistor in series with the base lead of Q6. — *Robert F. Tschannen, W9LUO, 354 North Stewart Ave., Lombard, IL 60148.*

— • • • —

In the article "Two-Toter," *QST* for July, page 23, information on the gamma-match capacitor, C1, Fig. 2, was omitted. C1 is an air-variable, single section, 25-pF, printed-circuit-mounting capacitor (Johnson type "U" 189-509-5).

— • • • —

In the 2-meter converter described in June, 1971, *QST*, capacitors C29 and C30 of Fig. 1, page 12, are shown incorrectly as fixed-value units. They are 5- to 25-pF trimmers as noted in the parts list.

In March, 1971, *QST* (FM Pip-Squeak) coil L9 should be 1/4-inch diameter, not 1/2 inch as called out in the parts list. Also, coil L5 has an inductance of 0.11 μH rather than the 1.1 μH value shown. The FI-4 crystal holders used are available from International Crystal Co., 10 N. Lee Street, Oklahoma City, OK 73102.

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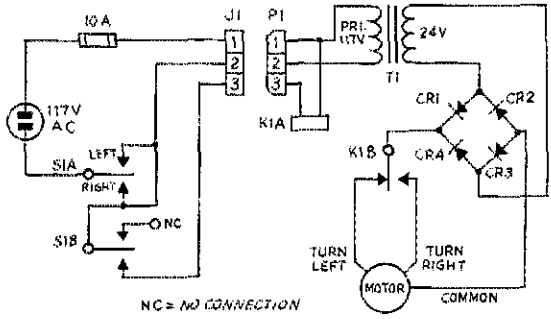
4 FCC action is now pending to permit U. S. amateurs to operate teleprinter equipment at speeds higher than 60 wpm, Docket 19110. (See p. 75 of *QST* for February, 1971.) Comments filed by the ARRL on this docket appear in *QST* for May, 1971, beginning on p. 85. — *Editor.*

5 Tschannen, "A Solid-State SSTV Monitor," *QST*, March, 1971.

Hints and Kinks For the Experimenter

PROP-PITCH ROTOR CONTROL CIRCUIT

I use a simple control system for my prop-pitch motor assembly which requires only one relay, one transformer, and three wires. The diagram shows my hookup. – *Bob De Bragga, W1YNP*



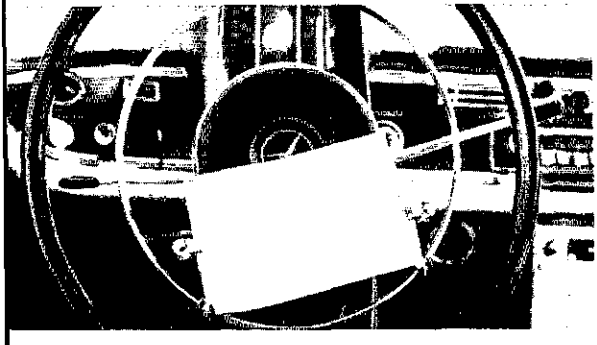
Circuit diagram of the prop-pitch rotor control.
CR1-CR4, incl. – 50-V, 25-A silicon rectifier.
J1 – Three-connection jack (Cinch Jones S-303-CCT).
K1 – Spdt power relay (Potter and Brumfield PR6AY1).
P1 – Three-connection plug (Cinch Jones P-303-CCT).
T1 – 24-V, 10-A.

ANOTHER SEALER FOR ANTENNA CONNECTIONS

If you have problems with water getting into coaxial cable at the antenna connection, Dow Corning has just the product to remedy the situation. It is called Aquarium Sealer. While remaining flexible, it keeps the water out. – *Wayne Tope, WN4TUP*

MOBILE WRITING BOARD

The photograph shows a writing base made from a small piece of sheet aluminum. It is secured to the horn rim by means of two cable clamps. The spring clips allow the paper to be changed easily. – *O. W. H. Johnson, W1JY/6*



DIFFICULT-TO-FIND ARTICLES

As an avid *QST* reader, I have found a need to search through back issues looking for a specific article. Since you publish a detailed index only once a year, a long search is sometimes necessary to find a particular article. Have you ever considered publishing a detailed index every quarter, or even twice a year?

If not, then I have a suggestion for amateurs in the same fix. When an issue arrives, I make index cards for every feature in the magazine. This includes Hints and Kinks, Technical Correspondence, and Strays (if they appear to have reference value). Example: In the April 1971 issue of *QST*, I made a card for the article "The Two-Meter Eggbeater." This card was then filed under *Antenna VHF*. Some articles call for more than one card. I have included a short synopsis of the article too. These cards are kept in a 3 x 5-inch file box for handy reference. The nice thing about this idea is that the file can be expanded to include more than just *QST* magazine. – *William D. Bowen, WB9EDJ*

[EDITOR'S NOTE: At the moment there are no plans to publish a quarterly or semiannual index. The space needed to do the job would require that some other part of the magazine be reduced (or eliminated) in these issues. The problem would compound itself several years hence when the reader would have to consult four different indexes each year in search of a particular article. Hq. maintains a cumulative index, however, covering the period from 1950 to 1970. It is available for 50 cents, postpaid. Although the publication is a reprint of the index in each December issue, it does put all of the indexes in one place and eliminates the necessity for cutting up the issues or filing them all together.]

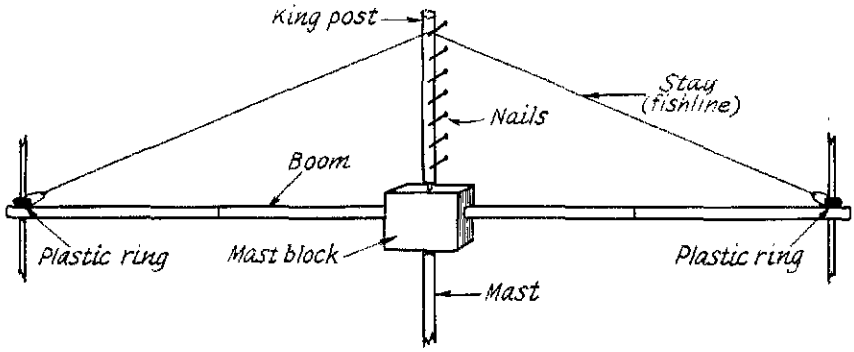
COILED CORD FOR THE SOLDERING IRON

There must be a special section of Murphy's Law covering soldering irons. No matter how carefully you set the iron down, you always end up burning holes in its cord – or the schematic that you are working on. One cure is to replace the present cord on your soldering iron with one of the coiled appliance cords available at electrical supply houses. The cords stretch out to five feet, but coil up to about nine inches when the iron is not in use. – *W1KLK*

ANOTHER WAY TO REMOVE PARTS FROM PRINTED-CIRCUIT BOARDS

In a recent issue of *QST* there was a short article about saving parts from old printed-circuit boards.[1] I have a different way of doing the job. The foil on most boards is only a few thousandths of an inch thick and can be removed, along with the solder, using an emery sanding disc mounted in a hand drill. Most of the parts fall off the board during the sanding process. The few stubborn pieces can be removed easily with a small punch or soldering aid. – *Robert M. Patton, WA3HOW*

[1] Hints and Kinks, *QST*, May, 1971.

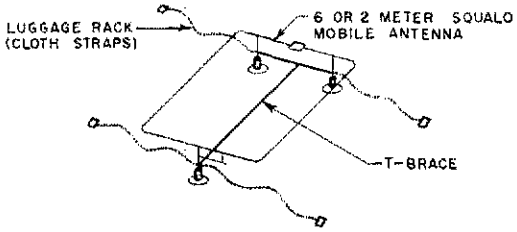


MORE ON THE TWO TOTER

The two-meter beam described in *QST* last month works fine as it is, However, it has been found that, in spite of being pinned, the boom section "plugs" become increasingly sloppy with use and the boom tends to droop. An effective remedy now used by the author is a king-post stay shown in the sketch. The king post is an 8-inch section of 3/8-inch dowel with a 1-inch 4-40 machine screw attached to one end. Hammer several nails or brads at 1-inch intervals up the side of the king post. The stay is a 4-foot piece of fishing line with small plastic rings tied to each end (ask the XYL for a couple of knitting markers). During antenna assembly, put the end elements through the plastic rings so that the rings rest between the element collets and boom. Screw the king post into the mast clamp. The wing screw mentioned in the article will not be needed. Now lift the stay until the boom is straight and hang the stay over a nail on the king post. – *W1CUT*

SQUALO MOUNTING

The Cush Craft 6- and 2-meter Squalos work well, but the method of auto roof-top mounting leaves a bit to be desired. Luggage-carrier straps, available from most automotive stores, can be used to hold the antenna in place, and the suction cups act as bumpers to keep from scratching the car. – *Dennis Silage, WB2LGJ*



TRANSMATCH ARCING

I built the Transmatch described in July 1970 *QST*. Some arcing occurred while running high power on 20 and 15 meters. The problem was corrected by grounding the unused supporting rods which hold the roller inductor together. – *Louis A. Gerbert, W8NOH*

VOX AND ALC PROBLEMS WITH THE SB-102

While troubleshooting my SB-102, I discovered that my homemade power supply was causing problems in the alc and VOX circuits. Hum in the cw tone oscillator triggered the VOX, even with the switch in the PTT position. A constant alc action, with no modulation applied, was caused by a low ripple in the voltage line. Heath's alc system samples variations in screen current and sees the ripple as a signal.

Both of these problems were cured by adding another filter section to the low-voltage supply. – *Steve Hocheiser, WA2QDJ*

Strays

QST congratulates . . .

Harvey L. Bryant, Jr., WA4LPM, elected president of the Beta Toastmasters Club of Norfolk, VA.

Richard Regent, K9GDF, selected for participation in the undergraduate research honors program in Stevens Point State University's physics department.

Lloyd Eberhart, K2CVT, upon his promotion to Associate Publisher, Magazine Division, Boy Scouts of America.

Leonard Jaffe, ex-K3NVS, NASA Deputy Associate Administrator, named a Fellow in the IEEE.

John Kitts, WB2TSX, recipient of the First Army Commander's Annual Mars Trophy for 1970.

Frank A. Gunther, W2ALS, named Chapter Man of the Month by the Armed Forces Communications and Electronics Association.

Marianne Payton, W3LQY, and Doris Dennstaedt, WA3HEN, recipients of the Department of the Army Certificate of Achievement Award.

Bishop Nevin W. Hayes, OA7Q, appointed as an Auxiliary to John Cardinal Cody, the Roman Catholic Archbishop of Chicago.

R. V. Raabe, W4ZV, *upon receiving a plaque from* the Richmond Amateur Radio Club for his 50 years of service to amateur radio.

Kenneth Richardson, ex-W6KMD, recipient of the Marconi Gold Medal from the Veteran Wireless Operators Association.

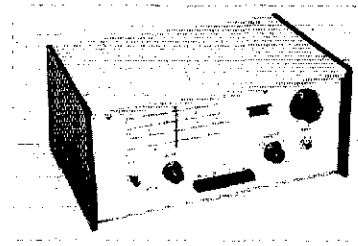
Paul R. Behrman, K3WEU, who received a letter from President Richard Nixon praising him for his volunteer ham radio work.

Katashi Nose, KH6IJ, who marks his 36th year writing the ham radio column for his local newspaper.

Recent Equipment

To acquaint you with the technical features of current amateur gear.

Ten-Tec Model RX 10 Communication Receiver



THE RX-10 solid-state receiver is an interesting and attractive addition to Ten-Tec's growing line of practical and inexpensive equipment for amateurs.

Utilizing the synchrodyne direct-conversion circuit, the RX-10 is a "hot" performer on the 80-, 40-, 20-, and 15-meter bands. Selectivity is determined by an audio filter between the mixer and the first audio amplifier. With the 2-kHz bandwidth provided by the filter, ssb reception is excellent. Measured drift is well within the manufacturer's claim of 100 Hz (no warm-up), and, after 30 minutes, ssb signals stay "locked-in." Although single-signal cw reception is not possible with the RX-10, all one has to do to attenuate an interfering signal is to tune to the opposite side of zero beat. Exalted-carrier reception of a-m signals is possible by zero beating the incoming carrier.

The solid-state direct-conversion circuit produces excellent results with a minimum number of components. An incoming signal is heterodyned in the mixer stage with the output of the VFO to produce an audio beat note that is fed through the 2-kHz-wide filter and then to four stages of audio amplification. The output is sufficient to provide comfortable listening, using headphones, on all but the weakest signals.

A different approach is used for the oscillator circuit in order to cover four bands. Fig. 1 shows the complete circuit of the oscillator and multiplier stages. Basically, the VFO tunes 3.5 to 4 MHz. When going to 40 meters, L5 is switched into the circuit along with changing the connection for C35, the MAIN TUNE capacitor. C35 is moved over to be in parallel with C40, providing the correct bandspread for 40 meters. The output from the oscillator is amplified in Q8 and then fed to gate 2 of Q1. When going to 14 or 21 MHz, Q9 operates as a multiplier, to provide injection voltage for the detector.

With only 20 feet of wire out a window for an antenna, this writer found the receiver's sensitivity to be impressive on all bands. Care should be taken in the adjustment of the ANTENNA TUNE control to prevent interference from out-of-band stations. This type of interference is caused by envelope detection of very strong signals by the mixer. QRM of this sort can be easily recognized, as it is not affected by the MAIN TUNING. If additional rf selectivity is required, a Transmatch such as the Ten-Tec AC5 should be used.

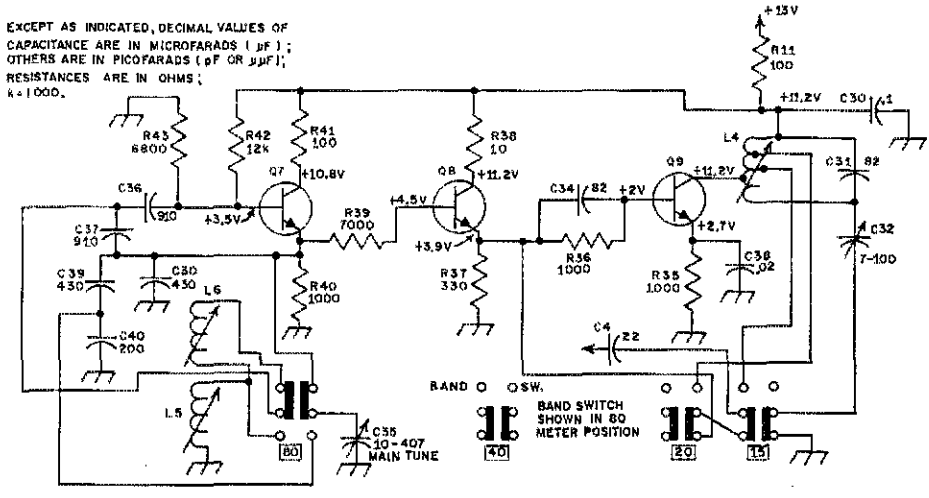
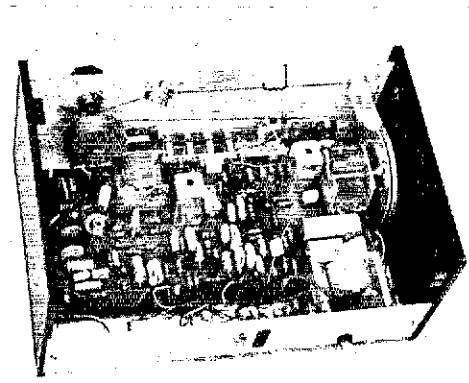


Fig. 1 — This is the circuit of the oscillator and multiplier. All component designations are the same as used in the manufacturer's instruction manual.

An added bonus of special interest to the Novice is the built-in code practice oscillator, which can also be used as a keying monitor. The RX-10 is attractively packaged in a heavy-gauge aluminum cabinet with wood-grained plastic end plates, making a sturdy portable unit. With the option of 117-volt ac or 12-volt dc operation, it should be popular with campers, vacationers, and beginners looking for an inexpensive receiver that will deliver good performance. *W4WFL/1*

Ten-Tec RX-10 Communications Receiver
Height: 4 1/2 inches.
Width: 10 3/8 inches.
Depth: 7 1/4 inches.
Weight: 2 1/4 pounds.
Power Requirements: 117 volts ac, 50-60 Hz, 1/8 A, or 12 V dc, 35 mA.
Price Class: $60.
Manufacturer: Ten-Tec, Inc., Sevierville, TN 37862.

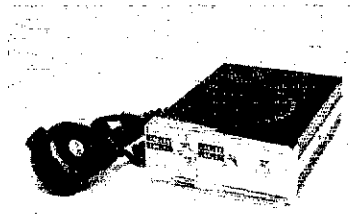


Here's an inside view of the RX-10. The weighted knob on the front panel is used to drive the MAIN TUNING capacitor. The variable capacitor just below the weight knob is the PRESELECTOR tuning.

QST ——— QST ——— QST

Regency Electronics HR-2

FM Transceiver



IMAGINE, IF YOU CAN, a neat looking package measuring 8 x 5 1/2 x 2 1/4 inches, into which is carefully packed a double-conversion receiver, and a transmitter with an output power of 10 watts or more. Next, envision some 24 transistors, 2 integrated circuits and 7 diodes, plus all of the other components needed to make up the transceiver. Dream stuff, you say? Not at all! The foregoing description is a word picture of the Regency HR-2 amateur fm station.

The equipment comes with crystals for 146.34/146.94-MHz operation. The company also provides the buyer with a dc power cable, microphone, mobile mounting bracket, and 12 spare crystal sockets which will be discussed later. The rig can be tucked away under the instrument panel of any automobile – large or small – and will still allow ample leg room for all but the most rotund of passengers.

The writer's HR-2 has been in service for some 6 months. It has seen daily use in a 1970 VW car, and despite the rather minuscule battery dimensions there have been no signs of charge depletion even though "somebody" carelessly left the HR-2 power switch in the ON position overnight on a few occasions. (Making a similar mistake with a tube-type mobile unit will normally leave the red-faced operator with a battery whose best effort will provide a mere grunt from the starter when it is engaged.) Solid-state mobile gear, therefore, has its advantages!

Regency rates the transmitter output power at 10 watts. Checks with a calibrated vhf wattmeter showed 13 watts output into a 5/8-wave antenna tuned for an SWR of 1. Operating voltage (engine running) was 13.6 during the tests. Despite Connecticut's rough terrain (small mountains, if you will), the author has never experienced difficulty in working through area repeaters at distances up to 50 or 60 miles. It is worth mentioning, however, that the 5/8-wave antenna contributes significantly to the aforementioned good results. The slight gain over a 1/4-wave whip (approximately 3 dB) can be beneficial under marginal signal conditions.

The only failure experienced to date, and one that appears to be case history with many HR-2 units, was a faulty set of relay contacts. After several hours of use the B+ transfer contacts of the changeover relay apparently become pitted in the transmit position. When this happens it may take numerous squeezes of the mike button to get into the transmit mode. Being unable to obtain a reply from Regency regarding a solution to the problem, owing, perhaps, to faulty mail service, the writer

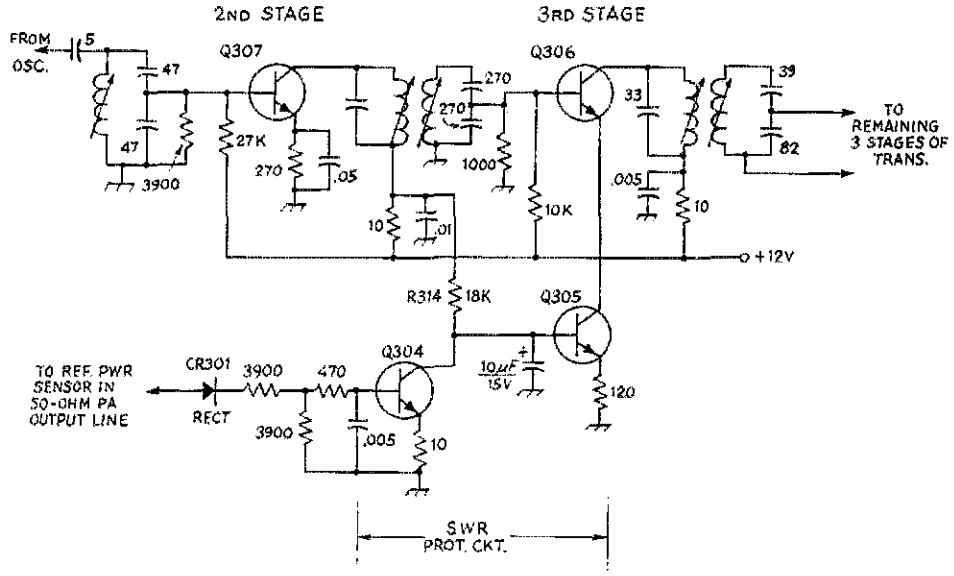


Fig. 1 — Simplified schematic diagram of the SWR protection circuit in the HR-2. A Monimatch-style SWR bridge is used in the 50-ohm output line from the PA stage. Reflected power is rectified by diode CR301. The resultant dc voltage biases Q304 into conduction, causing a voltage drop across R314. The drop across R314 reduces the forward bias on Q305, lowering its conduction to turn off the third stage, Q306. The greater the reflected power (SWR) the greater will be the reduction in drive to the last three stages of the transmitter strip. When Q304 is biased into full saturation from a high SWR condition, Q305 will act as an open switch to cut off Q306.

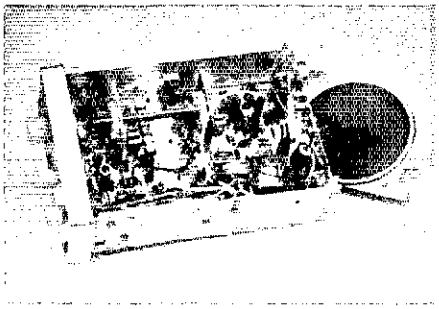
effected his own cure by paralleling the spare set of relay contacts with the B+ contacts. No difficulty has been experienced since making the modification. Others in the area have reported success after placing a 3- or 4-ohm, 5-watt resistor in series with the B+ lead to the relay arm, thus providing some current limiting.

Some Circuit Highlights

It was encouraging to note the use of standard American-made semiconductors in the transceiver. This means that those who are willing to repair their equipment can purchase replacement devices without needing to second-guess the experts on the type of semiconductor to substitute for the defective part.

Balanced-emitter transistors (BET) are used in the power stages of the transmitter to provide a fair margin of safety when a PA load mismatch condition becomes manifest. Additional protection to the high-level transistors is offered by an SWR sensor circuit (Fig. 1). The reflected power is sampled at the PA output, then rectified and fed to two control transistors, Q304 and Q305. Transistor Q305 acts as a saturated switch during normal conditions, permitting third stage Q306 to conduct and drive the remaining transmitter stages. The greater the reflected power, the lower will be the forward bias on Q305, thus opening switch Q305 and reducing the output power of Q306 to lower the collector current of the succeeding stages.

Though the HR-2 has 12 crystal-switch positions, only 6 of them are wired into the circuit. However, the company furnishes with the package, 12 additional crystal sockets, and these can be installed for use with the 6 unused switch positions to permit the reuse of the first six crystal pairs in a different paired arrangement. The instruction



Interior view of the HR-2. When mounted in position, the speaker obscures the left half of chassis. It is bolted to the side walls of the case and points upward to permit the sound to egress from the top of the transceiver. The transmitter section of the unit is just to the right of the front panel. The pc board at the upper right of the photo contains the receiver head end. The remainder of the receiver circuit is built on the pc board seen below the relay, at the lower right in this view.

booklet illustrates how this can be done. So, in effect, one can have a 12-channel setup by subscribing to the foregoing concept.

The receive crystals cannot be "netted" because no trimmers are provided. However, when using Regency crystals there was no need for trimming. The transmitter, however, has trimmers for each crystal position, enabling the user to adjust the transmitter frequency "dead on" with respect to the repeater receiver frequency.

Audio quality from this and all other HR-2s heard in the area is excellent, provided the deviation is adjusted for the bandwidth of the repeater receiver (usually between 5 and 15 kHz, depending upon the deviation in vogue for a given repeater group).

The receiver has a robust larynx. Signals from the speaker easily override the ambient noise in the car (and VW engines are not noted for their quiet manner!). Furthermore, the limiting action of the HR-2 receiver is sufficiently good to prevent ignition noise from impairing copy of all but the weakest of signals. For the record, no noise-suppression measures have been taken to tone down the pulse interference from the writer's engine. However, the antenna is mounted on the end of the car farthest from the engine compartment, and this is a good practice in any mobile installation.

Regency Electronics HR-2 2-Meter FM Transceiver

Height: 2 1/4 inches.
Width: 5 1/2 inches.
Depth: 8 inches.
Power Requirements: 12 to 13.6 volts dc.
Sensitivity: 0.35 μV for 20 dB quieting.
Receiver i-f bandwidth: 16 kHz.
Freq. Range: 144 to 148 MHz.
Deviation: 0 to 15 kHz, adjustable.
Power Output: 10 watts (min.) @ 13.6 volts.
Price Class: $230.
Manufacturer: Regency Electronics, Inc., 7900 Pendleton Pike, Indianapolis, IN 46226.

In Summary

Those wanting a Tom Thumb-size transceiver for 2-meter fm will be wise to inspect and consider Regency's HR-2. It is one of the least costly fm packages on the present market, and may be just what you're looking for! Oh yes, the receive crystals are the 45-MHz overtone variety, and the transmitter employs 6-MHz fundamental rocks. — *WICER*

August 1921

. . . The First National ARRL convention and Radio Show is coming up on the 31st in Chicago. It is going to last for four days and a lot of stuff is planned. A lot of dignitaries have been invited, including President Harding and the Secretaries of the Navy and Commerce. No replies from them have been received.

. . . The second part of R. A. Heising's article, "Modulation in Radio Telephony," completes this classical essay. Circuits are shown and discussed for both modulated oscillators and power amplifiers.

. . . The cover this month says "*QST* — A Magazine devoted exclusively to Citizen Wireless"! I peeked at the cover for September and am glad to report we're back to "The Wireless Amateur."

. . . We have descriptions of the recently introduced RCA audio transformer and a new and relatively inexpensive decremeter designed by F. M. Doolittle which avoids the necessity of using a current-squared meter such as is used in the Kolster decremeter.

. . . K. B. Warner muses about summer radio and notes that ham activity during the summer is on the increase. Lots of new hams with three-letter calls who never learned that summer was the time to shut down. He also discusses a ridiculous ordinance passed by the city of Salem, Mass. Wonder how long it took them to repeal it.

. . . 2XX, the station of Robert F. Gowen is described. He was DeForest's Chief Engineer, and we have some of the components in our Museum.

August 1946

. . . Now that a lot of hue and cry attendant on the re-opening of the ham bands is over, K. B. Warner puts his feet on the desk and does a little daydreaming about ways and means for improving operating practices with related technical improvements. He is leading up to a transceiver, so help me, but doesn't go quite that far.

. . . Byron Goodman, W1JPE, describes his new eight-tube ham receiver. He uses plug-in coils for four bands and incorporates variable selectivity, avc and audio-noise limiter and other features.

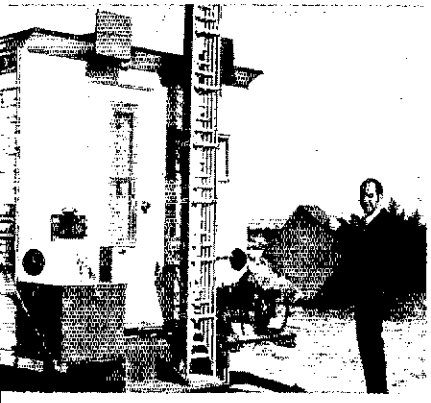
. . . The boys are pushing the frequencies up, all right. Here's a duplex phone rig that operates on 21,900 Mc. It is a wave-guide rig with a horn antenna. Not for the average ham. Uses a Z-668 reflex oscillator. The best DX so far is 800 feet. This interesting article was written by A. R. Sharbaugh, W1NVL/2, and R. L. Watters, W9SAD/2, both of the Research Laboratories of General Electric.

. . . Don Mix, W1TS, has a piece on unstable signals and a lot of hints on how to overcome such troubles. He is talking about chirpy signals, drift, etc.

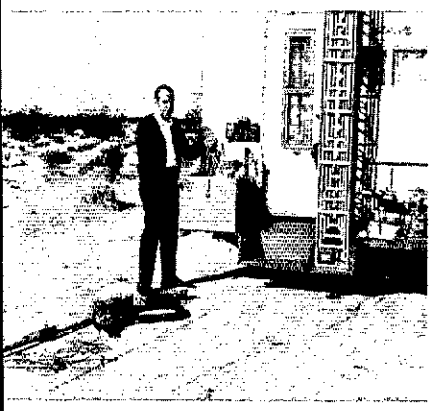
. . . Charles E. Nichols, Jr., W1MRK, after a lot of frustrating experiences on ten meters and after a bit of glancing at the bank roll, makes his decision and comes up with a three-element beam perched on his house and directly rotatable, using an old automobile steering wheel right in the shack. Worked just peachy. — *W1ANA*

The big countdown! (in minutes seconds)

0 00 — Arrival at the site.

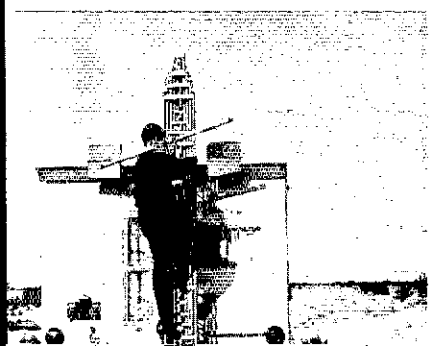


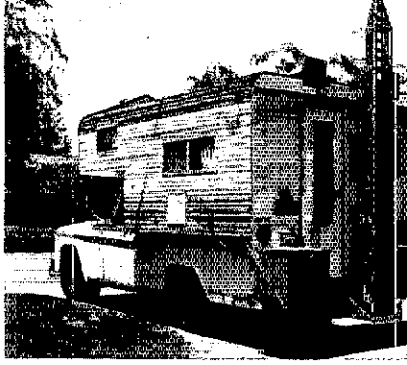
1 00 — Uncovering the alternator.



1 30 — Unpacking rotor, cables, tools.

2 30 — The rotor (with short mast) goes up tower.





The Cabover Kilowatt ready for travel.
(Photographs by K6SVL)

The Cabover Kilowatt

A High-Performance Portable Station Design

BY WAYNE OVERBECK,* K6YNB

GETTING UP a ham radio station in the boondocks can be a hassle, even if you don't mind mobile whips, low power, and S3 signal reports. But operating in the field really gets complicated when you decide you want a good beam and higher power than a 12-volt car battery can provide. Just ask any group that takes Field Day seriously how much trouble it is to haul tents, towers, rotary beams, and the club generator out to the wilds.

After years of mountain-topping for vhf contests and Field Days, the author decided there had to be easier ways to operate in the field – and maybe even a way to make high-performance ham gear compatible with family vacations. Thus began a systematic attack on the things that create inconvenience during Field Days, vacations, and vhf contests. The first result was a 15-meter cubical quad that folded up in a few minutes and went along on family vacations.[1]

Next came a series of ideas to simplify Field Day operating, including a 12-volt alternator system that qualified for the battery multiplier, an operating position for a car, and an inexpensive tilt-over mast.[2] Then, after two more years of mountaintops and Murphy's Law, the next logical step occurred: A complete 1000-watt portable station, including a 2500-watt power plant, a 40-foot crank-up tower, and a four-band cubical quad, all housed in (or on) a cabover camper truck. Its name: The Cabover Kilowatt.

Putting the Cabover Kilowatt on the air isn't as easy as switching on the home station – and it won't outperform W1AX or W6RR in a DX contest. But compared to the hassle and mediocre performance that usually accompany hamming afield, this station is a great improvement. The station's record set-up time, from driving up to a remote site to transmitting a kilowatt signal into a quad 40 feet high, is 23 minutes (with one person doing the job alone). Although the Cabover Kilowatt was originally designed for reliable

* Department of Communications, California State College, Fullerton, 800 N. State College Blvd., Fullerton, CA 92631.

1 Overbeck, "The 20-Minute Portable Quad," *QST*, May, 1967.
2 Overbeck, "Three Innovations for Field Day," *QST*, June, 1969.

'round-the-world communications and six-meter experiments during a summer vacation in Alaska and the Yukon Territory, it has proven highly effective in contests and public service work as well. It's unlikely that anyone will build an exact duplicate of this station, but the author hopes the ideas presented here will be useful to other mountaintop-minded hams. These ideas have certainly revolutionized mountain-topping here at K6YNB/6.

THE TRUCK, TOWER, AND PLATFORM

The portable station is built into a 3/4-ton Dodge pick-up truck with an 8 1/2-foot cabover camper. The truck has overload springs to support the added weight of the tower, alternator, and accessories on the rear deck. In addition, an extra 80-ampere-hour battery was added in parallel to the original battery and the camper roof was reinforced with plywood (so that it could be used as a work platform for antenna installation), but in other respects the truck and camper are quite conventional.

What isn't conventional is the platform on the rear deck – a platform to carry the 2500-watt alternator and a crank-up tower. The platform had to be designed so that it would not overtax the truck's suspension system or violate state laws governing vehicle height, width, or rear overhang. As shown in the photos, the platform runs the full width of the camper (7'7") and increases the length of the vehicle by 16 inches. The platform is made of 3/4-inch exterior plywood, reinforced with 2x2s. It rests on the truck's rear bumper and is supported from above by four cables attached to the camper frame. The alternator rides on the right-hand side and is shock-mounted on foam rubber. A wooden box fits snugly over it for protection from dust and moisture.

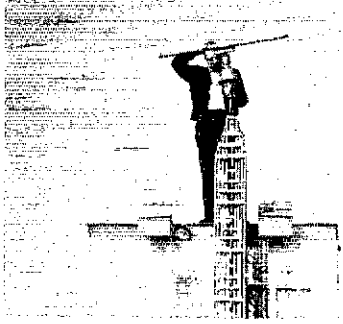
The tower stands upright next to the alternator, with just enough clearance to allow the camper door to be opened. Its base is anchored to the platform with a single carriage bolt, and the tower rests in a vee-bracket attached to the camper roof. Two guy cables run from the top of the tower to the front of the camper unit and then down to the frame of the truck to secure the tower in place. Disconnecting two turnbuckles in these guy cables frees the tower so that it can be tilted over behind the truck and quickly removed.

The tower itself has interested many hams who have seen the installation. It is an ordinary Tri-Ex four-section lightweight crank-up tower. It weighs 144 pounds and has an extended height of 36 feet. With a short mast and a rotor above the top section, the antenna is 40 feet high. Fully telescoped, the tower is only 10 feet 9 inches high – the key to its suitability for upright mounting on a camper truck. With ground clearance of 11 inches below the platform, the top of the tower is still less than 12 feet above the ground, complying with legal restrictions in all 50 states and all Canadian provinces.

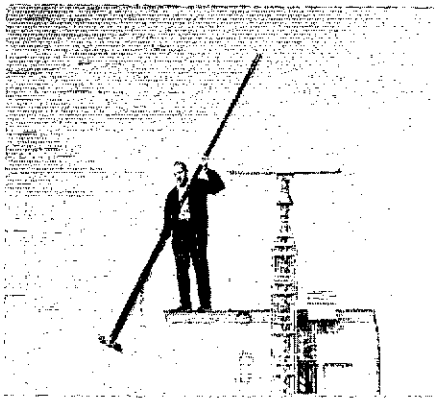
Many persons have asked about the handling of the camper truck with the tower aboard and all of the extra weight in the rear. The author has never driven a cabover camper that handled particularly well under any circumstances, and driving one in heavy winds can be downright frightening. However, the presence of the tower and alternator on the rear makes no noticeable difference in the truck's handling characteristics – it behaves equally like a fish with or without the platform, tower, and alternator.

The photographs show that there is also a large box on the left hand side of the platform. This box provides storage for the antenna rotor, and other accessories. It was put there mainly to provide a better distribution of weight on the rear deck.

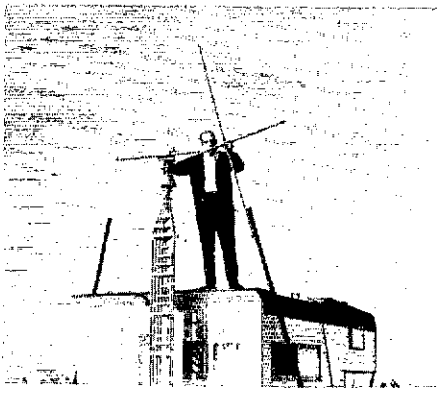
The alternator, a Dayton 2500-watt unit, weighs 108 pounds and is powered by a 6-hp Briggs and Stratton engine. To reduce noise, it is equipped with an oversize muffler and a spark arrestor (a requirement if the unit is to be used in national forest areas). With any gasoline-driven alternator of this size, however, some noise and vibration are inevitable. But with the camper door and windows closed, it is possible to conduct a normal conversation, hear



2 40 – Mounting the rotor and short mast.

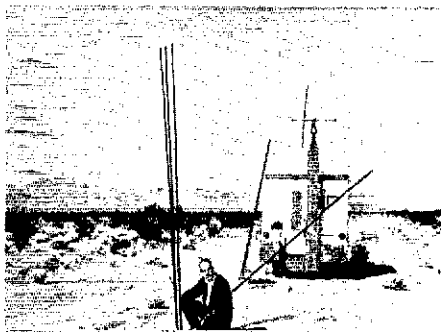


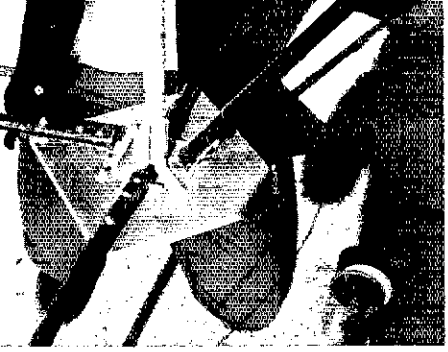
3 30 – Lowering the quad spreaders.



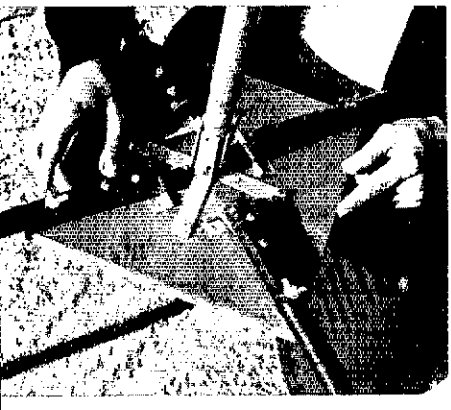
4 00 – Mounting the 6-meter driven element.

6 00 – Unfolding the spreaders.

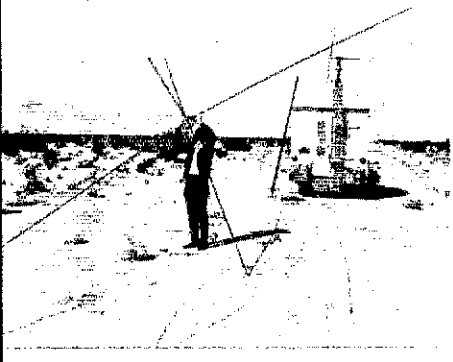




6 00 – Detail of the spreader assembly.

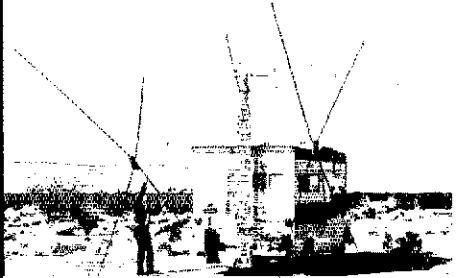


7 00 – Securing a set of spreaders.



10 00 – A spreader goes to the truck.

16 00 – The second spreader is leaned against the truck.



incoming signals, or even sleep with the unit running. For extended operation at one site, the alternator can be lifted off its platform and placed on the ground to further reduce noise.

THE ANTENNA – MECHANICAL DESIGN

The collapsible cubical quad is another aspect of this station that has interested many hams. Actually, once you have a tower standing upright wherever you go (and have a work platform near the top in the form of the camper's roof), mounting an antenna isn't difficult.

Having experimented with collapsible beams of many types, the author concluded that the best bet for portability and four-band coverage would be a quad. The design finally chosen includes two concentric elements for 10, 15, and 20 meters, plus three elements for six meters. The secret of the antenna's speedy assembly lies in the spreader design. Each element consists of four 12-foot bamboo poles (wrapped in plastic electrical tape) mounted on a 12-inch plywood square with hinges. The element wires are permanently strung on the arms.

To assemble an element, you simply lower it down from its travelling position on the camper roof, remove the tie cords that keep the arms from unfolding in transit, and allow the four arms to gently unfold. This pulls the element wires tight. As the photographs show, each arm slides over a bolt in the plywood square and is secured with a wing nut. A 4-foot length of the boom is permanently attached to each plywood square (for travel, the four arms fold up around this length of boom). Thus, mounting an element involves telescoping this boom section into a 2-foot center section of the boom, which is permanently attached to the rotor.

Because the quad straddles the camper, the boom is within easy reach from the camper roof. This greatly simplifies what is usually a very cumbersome job: mounting a 17-foot square of wire on a boom that must be at least 8 1/2 feet above the ground, even with a tilt-over tower.

The six-meter quad includes a director and reflector mounted on the same spreaders as the elements for the other bands, plus a small driven element that mounts near the center of the boom. This element is so small that it can be carried intact on the roof of the camper. It is made with two lengths of half-inch plastic PVC (irrigation) tubing; a U-bolt secures it to the boom. Once the elements are mounted on the tower, coax and rotor cable are plugged into a patch panel on the side of the camper. Finally, the tower is cranked up to operating height.

Except during high winds, it is quite safe to leave the fully-extended tower unguyed (and supported only by the truck). However, it is advisable to tie off three strong nylon ropes to nearby trees, rocks, or whatever is handy – just as a precaution.

THE ANTENNA – ELECTRICAL DESIGN

Although the quad's electrical design is conventional, a few of its features should be noted. The spacing between elements is nine feet, a dimension dictated by the width of the camper and the placement of the tower slightly off center (to allow the camper door to open).

The 10-, 15-, and 20-meter elements are fed with a single 72-ohm coaxial cable. A separate 52-ohm coax feeds the six-meter driven element. SWR data on the quad are given in Table I.

The quad's element dimensions are given in Table II. Experienced quad builders will notice that these dimensions are substantially shorter than those suggested by several authors, including Orr[3] and Lindsay.[4] On the other hand, these dimensions are somewhat longer than those used by one successful commercial manufacturer of cubical quads. Obviously, much contradictory information about quads has been published. This author has no intention of complicating matters. However, these dimensions were determined

[3] Lindsay, "Quads and Yagis," *QST*, May, 1968.
[4] Orr, *Quad Antennas*, Radio Publications, Inc.

TABLE I

SWR Data, 4-Band Quad

Band	*MHz*	*SWR*
20 meters	14.05	1.5 to 1
	14.20	1.2 to 1
	14.35	1.3 to 1
15 meters	21.05	2.0 to 1
	21.20	1.8 to 1
	21.45	2.1 to 1
10 meters	28.05	1.3 to 1
	28.50	1.0 to 1
	28.80	1.1 to 1
6 meters	50.00	1.3 to 1
	50.25	1.0 to 1
	50.80	2.5 to 1

TABLE II

Total Dimensions, 4-Band Quad

Band	*Reflector*	*Driven Ele.*	*Director*
6 mtrs.	19'3" plus 8" loop	19'3"	18'8"
10 mtrs.	33'8" plus 13" loop	33'6½"	–
15 mtrs.	46'4" plus 12" loop	45'7½"	–
20 mtrs.	68' plus 28" loop	68'	–

experimentally and have worked on a number of quads build by the author. In fact, when using lightweight stranded wire (No. 16 or lighter is desirable for a collapsible quad), bamboo spreaders, boom lengths in the 8- to 10-foot range, and a single feedline for three driven elements, the author has never been able to get a quad to show any appreciable front-to-back ratio with dimensions very far removed from the dimensions shown in Table II.

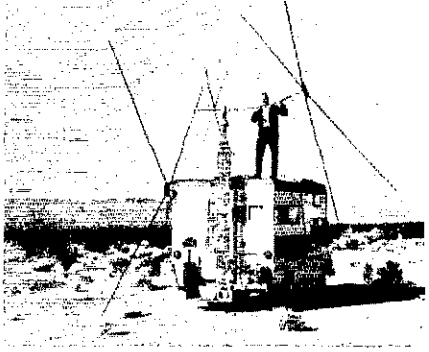
A theoretical discussion of the quad-dimension problem is beyond the scope of this article. The author simply suggests these dimensions as a starting point. In any event, if pattern or SWR plots show that something is drastically wrong, it is quite easy to change element lengths on a quad such as this one. Everything is accessible from the camper roof or the ground.

INSIDE THE CAMPER

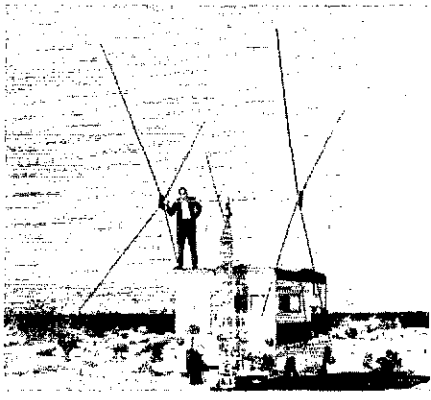
The easiest part of the Cabover Kilowatt system to assemble was the kilowatt station itself. Although most cabover camper units use interior space rather efficiently, there is almost always a place where several pieces of equipment can be mounted. In the author's side-dinette camper, there was a large unused area at each corner of the dinette. A small three-level cabinet was built in one of these corners to house ac and dc power supplies for transceivers, a 400-watt dc to ac inverter, two SB-200 linear amplifiers (one of them modified to cover six meters only), a popular 80-10-meter transceiver and its remote VFO, and a six-meter transceiver. The cabinet is 29 1/2 inches wide, 19 inches deep, and 20 inches high. The power supplies are bolted down, while the remaining equipment is secured with light rope. All interconnecting cables remain in place.

Since the cabinet is the only part of this entire installation that takes up space inside the camper or truck, the unit retains its usefulness for family or group camping. For contest work, the author uses an additional console (not shown in the photos) which replaces the dining table and provides two more shelves for equipment, plus working space for two separate operating positions.

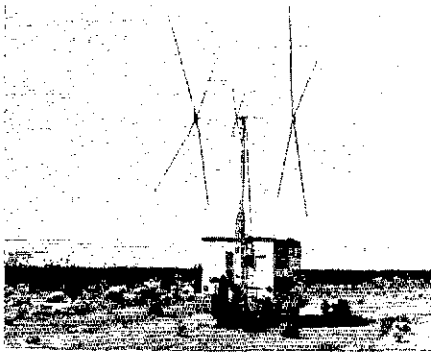
(Continued on page 150)



16 30 – Mounting the elements.

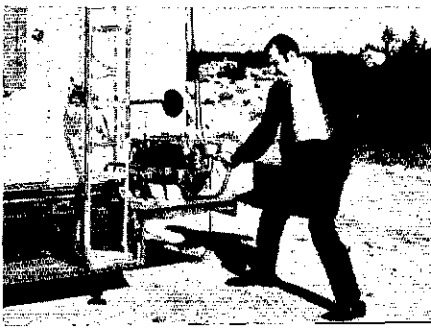


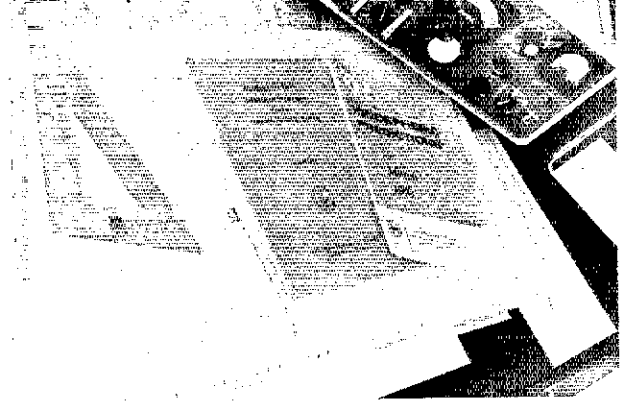
18 00 – Connecting the coax.



21 00 – Cranking it up.

25 00 – The hardest part of the job!





Ionospheric propagation conditions can be forecast with these materials.

Drawing the great circle path between stations and marking the control points on thin paper are the first steps.

HOMEBREW DX PREDICTION

BY FRANKLIN D. MOORE,* WB9GCC

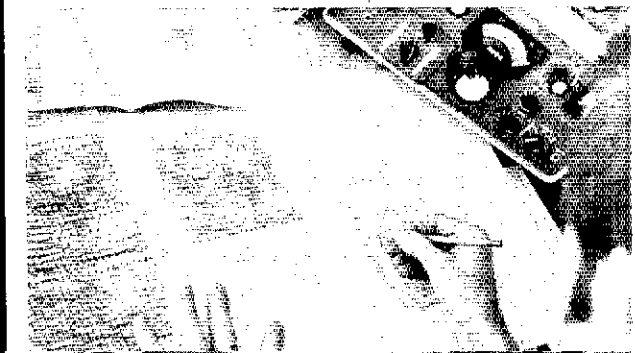
FOR THE serious DX and contest man, the advantages of knowing when a certain band will be open to a given part of the world are obvious, but all of us can appreciate the understanding and efficiency which propagation prediction brings to our hobby. We already know that the ionosphere acts somewhat like a mirror in reflecting radio waves back to earth. Depending on the frequency of the signal, reflection may occur at a low level, leading to a relatively short hop, or at a higher level, leading to a much longer hop, as indicated in Fig. 1. Our basic problem is to forecast which of these two types of reflections will occur at the place and time of interest to us. As we shall see, predicting HF propagation openings between any two points on earth is easy, educational, and very worthwhile.

*7212 Ontario Ave., Hammond, IN 46323.

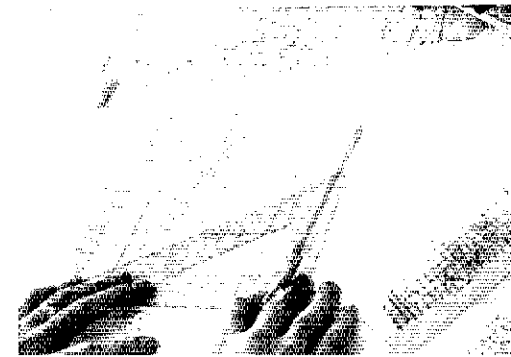
The Equipment Needed

The key to homebrew DX prediction is National Bureau of Standards Handbook 90, *Handbook for CRPL Ionospheric Predictions Based on Numerical Methods of Mapping*, by S. M. Ostrow. It contains 54 pages of explanation, graphs, nomograms, and maps and is sold for 40 cents by the U. S. Government Printing Office, Washington, DC, 20402. In addition to Handbook 90, the monthly ionospheric predictions for the desired month must be on hand. The monthly predictions are also published by the government printing office three months in advance, and the subscription rate is $4 per year. (If you intend to order Handbook 90 and a subscription to the predictions at the same time, place the orders in separate envelopes; subscriptions are handled differently from other orders, and delay can be avoided by sending them separately.) Most university libraries receive these predictions, and a telephone call to the physics librarian of a nearby college may save time and money if you are willing to do your work away from home. Finally, a home-made work sheet for entering data and plotting the results will speed the work considerably. The one I devised is shown in Fig. 2. A master copy is made by gluing semilog-graph paper to a sheet with the table drawn on it, then Xeroxing the desired number of copies. A club or informal group of enthusiasts can share the small cost by purchasing one subscription to the monthly predictions and reproducing the forms.

The F2-4000-MUF is read from the contour maps in the monthly predictions booklet.



The E-2000-MUF is read from a nomogram in Handbook 90.



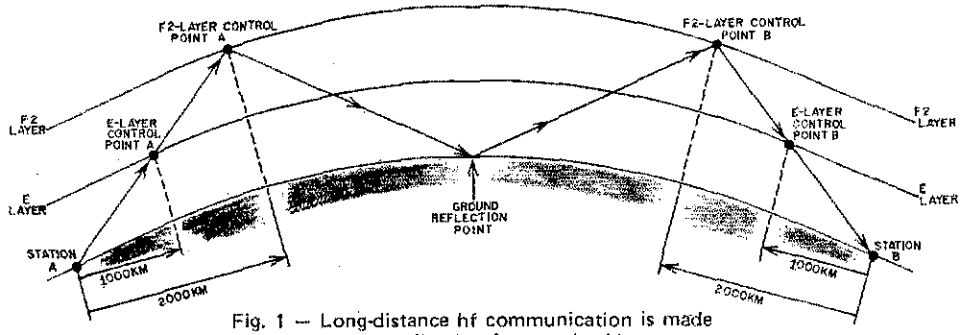


Fig. 1 — Long-distance hf communication is made possible by wave reflection from ionized layers.

Basic Principles

With Handbook 90, the month's predictions, and a copy of the work sheet in hand, we are ready to compute band openings. Even though predictions can be made by persons having absolutely no knowledge of propagation or the ionosphere, it is useful first to learn the basics involved. By considering the curvature of the earth and the average heights of the ionospheric layers as shown in Fig. 1, it is found that a radio wave in the hf bands which is sent off horizontally from the surface of the earth will strike the E layer about 1000 kilometers (621 miles) from the transmitter and, if reflected, will return to earth some 2000 kilometers (1243 miles) along a great circle path from the transmitter. If the E layer is penetrated, the wave will encounter the higher F_2 layer at a distance of about 2000 kilometers and, if reflected, will return to earth 4000 kilometers (about 2500 miles) from the transmitter. The points 1000 km (A' and B') and 2000 km (A" and B") on the propagation path from a station are called the E-layer control point and F_2-layer control point, respectively, for that station and path. Fig. 3 shows these locations for a pair of stations. The highest frequency which is reflected at the E-layer control point is called the "E-2000-MUF," where MUF stands for maximum usable frequency. The highest frequency which is reflected at the F_2 layer control point is similarly called the "F2-4000-MUF."

Our task consists of (1) locating the control points for the desired path; (2) determining the highest frequency which *each* terminal can receive (by finding the E-MUF and F2-MUF for each station, and choosing the higher of the two); and finally, (3) determining the highest frequency which *both* terminals can receive (by comparing the two terminal MUFs and choosing the lower of the two). Additionally, we may calculate a more reliable "optimim working frequency," usually called the FOT (from the French term *frequence optimum de travail*). More about the meaning of MUF and FOT later.

The Procedure

Returning to Handbook 90 and the ionospheric predictions for the month of interest, let's illustrate the method with a sample path analysis. One of my favorite (and successful!) examples is the Heard Island DXpedition, VKØWR, which was active on 20 meters for a few days in March, 1969. We begin by finding the locations of the endpoints of the path on a world map. Heard Island is found at S 54° latitude, E 74° longitude, while the coordinates of my (then) eastern Iowa QTH were N 42° latitude, W 92° longitude. Placing a piece of onionskin paper over the world map on page 34 of Handbook 90, we draw in the equator, the Greenwich meridian (0° longitude), and place dots at the locations of eastern Iowa and Heard Island, labelling one A and the other B (the terminals need

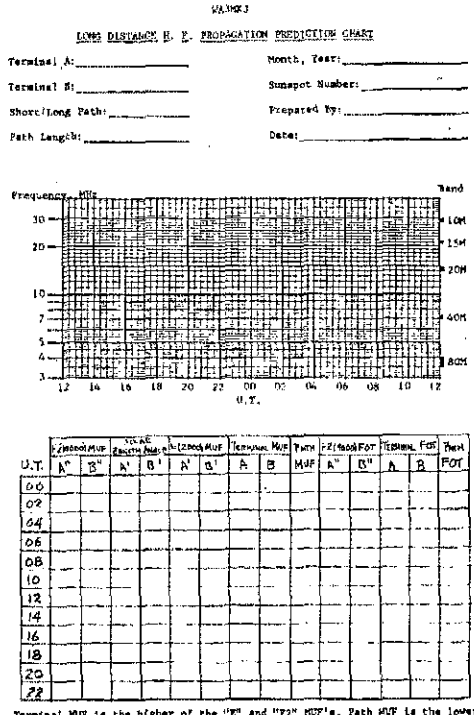
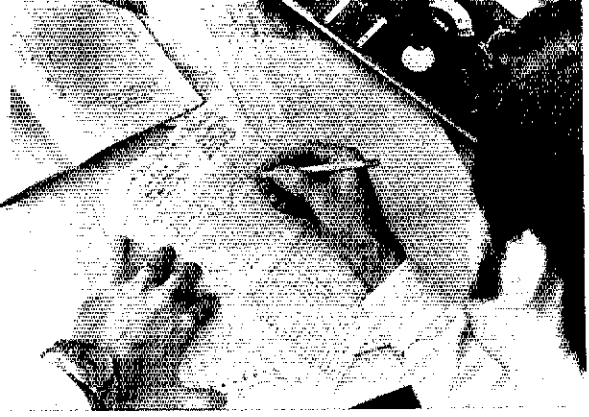


Fig. 2 — A home-made worksheet will speed the calculations. Note that the amateur bands are indicated on the right side of the graph for easy interpretation of the final plot.



Plotting the path MUF makes interpretation easy.

not be placed with much accuracy). Sliding the onionskin overlay down to the great circle chart at the bottom of page 34, we align the equator and Greenwich meridian, sketch in the great circle path connecting the terminals, and note the distance between stations from the scale on the chart. At the same time, we use the distance scale on the chart to locate the *E*-layer control points (labeled A" and B") 2000 km from each terminal. If the great circle path between terminals is less than 4000 kilometers (2500 miles) long, we have a "short distance" prediction problem. This will be easier, because we use a single control point at the midpoint of the path. The procedure is discussed in Handbook 90. If the path is very long, say over 10,000 kilometers, we may want to check the "long path" as well as the "short path," by going around the world in the opposite direction. This is particularly true when the long path lies on the sunlit side of the world. Pointing the beam toward Europe in order to work Australia is a familiar example of long-path propagation.

Having thus prepared the overlay, we go to the booklet of monthly ionospheric predictions. It contains (among other things) world contour maps of median F2-4000-MUF for each even hour of universal time (GMT). Aligning the equator and zero meridian of the overlay with those of the F2-4000-MUF map for 00 UT, we read the F2-4000-MUF under each F_2-control point A" and B" on the map, and tabulate them on the home-made work sheet. Repeat for 02 UT, 04 UT, etc., using the F2-4000-MUF map corresponding to each even hour of universal time.

Next we prepare the *E*-layer prediction, which requires two steps. First we need the zenith angle of the sun at each of the *E*-layer control points A' and B' for each even hour of UT. These angles are found from the solar zenith angle chart for the month in question, pages 42-47 in Handbook 90. Placing the zero meridian of the overlay along the 00 local time meridian of the zenith angle chart (keeping the equators aligned), read and tabulate the solar angle under each *E*-layer control point A' and B'. Next slide the zero meridian of the overlay to the 02 hour meridian of the chart, and tabulate the zenith angles for 02 UT. Repeat for each even hour of UT. (If the zenith angle is more than 105°, the sun is below the horizon; leave the slot blank.) This completes the map reading. From Table A in the monthly prediction booklet, note the predicted sunspot number. Turning to Figure 22 on page 41 of Handbook 90, place a ruler or straightedge on the nomogram between the sunspot number and the solar zenith angle for each *E*-layer control point at 00 UT. Read and tabulate the E-2000-MUF from the nomogram, and repeat for each *E*-layer control point and each even hour of universal time. This completes the hard work.

Now we determine the highest frequency that each station can receive, the terminal maximum usable frequency (MUF). For each terminal, and each even hour of UT, we compare the F2-4000-MUF and the E-2000-MUF; the *higher* of the two is the terminal MUF, and is entered in the appropriate column of the work sheet. Next, compare the two terminal MUFs for each even hour of UT; the *lower* of the two is entered in the work sheet as the path MUF. The path MUF is more easily interpreted if it is plotted graphically against universal time (GMT), as shown for the completed Iowa-Heard Island path in Fig. 4.

Interpreting the Results

The interpretation of the MUF plot is easy. As the MUF rises above a given frequency, that frequency opens for communication between the two terminals, and all frequencies below the MUF are also open. However, since both atmospheric noise and ionospheric absorption increase as the frequency is lowered, the highest signal to noise ratio (not counting QRM!) will be found near the highest open frequency. By examining the sample plot of Fig. 4, we see that the 10-meter band is unlikely to open at all during March, and the 15-meter band is likely to open only between 1200 and 1600 UT. Since VKØWR was operating only on 20 meters, we expect to find the best openings when the MUF is near 14 MHz, roughly 0300-0800 UT. My contact occurred at 0441 UT on March 17.

It is helpful to remember that we are predicting *median* path MUFs, which means that they will be exceeded on fifty percent of the days of the month, on the average. If we drop down a bit in frequency, we can be much more certain of having an opening. If it is assumed that the actual F2-MUF is normally distributed about the predicted F2-MUF, we can multiply the predicted MUF by 0.85 to obtain a frequency (called the FOT, or optimum working frequency) which will be open

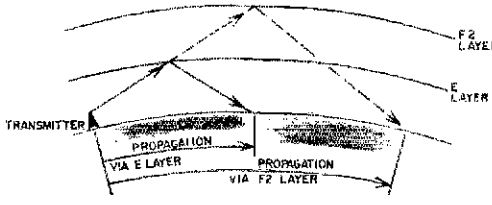


Fig. 3 – Each station has only two control points, one for each layer, although multiple reflections usually occur in hf propagation.

WA3MXJ

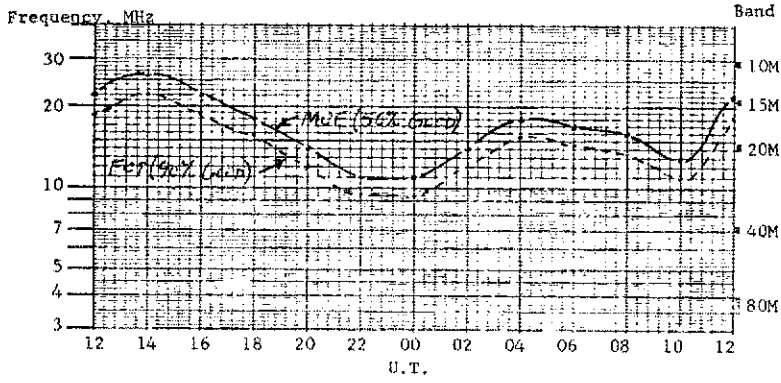
LONG DISTANCE H. F. PROPAGATION PREDICTION CHART

Terminal A: Iowa — Month, Year: MARCH 1969

Terminal B: HEARD ISLAND — Sunspot Number: 99

Short/Long Path: SHORT — Prepared By: F Moore

Path Length: 12,300 KM — Date: 16 March 1969



U.T.	F2(4000) MUF A"	F2(4000) MUF B"	Solar Zenith Angle A'	Solar Zenith Angle B'	E(2000) MUF A'	E(2000) MUF B'	Terminal MUF A	Terminal MUF B	Path MUF	F2(4000) FOT A"	F2(4000) FOT B"	Terminal FOT A	Terminal FOT B	Path FOT
00	31	11	93°	145°	7	-	31	11	11	26	9.3	26	9.3	9.3
02	23	14	-	87°	-	21	23	14	14	19.5	12	19.5	12	12
04	19	18	-	73°	-	179	19	18	18	16	15.3	16	15.3	15.3
06	17	23	-	66°		15.2	17	23	17	14.5	19.2	14.5	14.5	14.5
08	16	28	-	55°	-	16	16	28	16	13.6	24	13.6	24	13.6
10	13	28	-	66	-	15.2	13	28	13	11	24	11	24	11
12	22	28	86°	72°	4.3	151	22	28	22	18.7	24	18.7	24	18.7
14	35	26	66	85°	142	8.8	35	26	26	30	22	30	22	22
16	37	22	45°	105°	171	-	37	22	22	31.5	18.7	31.5	18.7	18.7
18	34	18	35°	-	129	-	38	18	18	32	15.3	32	15.3	15.3
20	37	14	48°	-	16.7	-	37	14	14	31.5	12	31.5	12	12
22	36	11	76°	-	13.5	-	36	11	11	30.5	9.3	30.5	9.3	9.3

Terminal MUF is the higher of the "E" and "F2" MUF's. Path MUF is the lower of the terminal MUF's. The terminal FOT is the higher of the "F2-FOT" and the "E-MUF". Path FOT is the lower of the terminal FOT's.

Fig. 4 — These are the completed predictions for the Heard Island circuit. If you can remember the "rules" at the bottom of the sheet, you may prefer to leave them off.

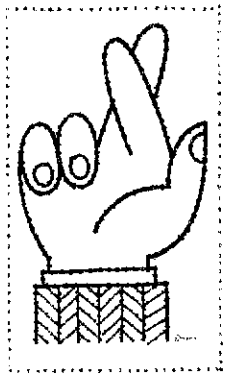
on 90 percent of the days at a given time, compared with 50 percent for the MUF. (Multiplying the MUF by 0.85 is correct only when the path MUF is controlled by F2-MUF; see Handbook 90 for more details. Although the FOT for the Iowa-Heard Island path is calculated and plotted in Fig. 4, we won't describe the procedure here.)

Using the Predictions

I use the predictions in the following way. Since I enjoy general DX, I am interested in band conditions all over the world (if you need to work a given country or zone, you would concentrate on

(Continued on page 57)

How You Can Win —A Fable



BY FRANK FALLON,* ~~WA2YVK~~ WA2VYK

IT HAD all the signs of a good day, you see. It was Election Day 1970. It was a day off for me. That is always good. The sun was out and the temperature was a mild 62 degrees. Although ten was open, I had been fighting the battle of the leaves for some fifteen minutes when the U.P.S. man came along and saved me with a little R and R as he requested me to sign for a flat rectangular package. When I spotted the ARRL label I knew what it was. I dropped the rake as I realized that this was it, my life membership plaque. Finally!!!

I walked quickly to the house. Actually, I almost ran. I called to my wife before I reached the side door, and as I walked into the kitchen she met me with a worried look on her face, the kind she gets when we get the bank statements. I showed her the package and her worried look changed to a warm smile. She knew too.

"Great!" she said as she hugged me. 'It's finally come. I hope they have it right this time."

I frowned at her, for I wanted so much to forget the past, but in a rush it all flashed before me. The wait. The letters to and from Headquarters. The other two packages. First the wrong call, and then the wrong name. Oh, how I wanted to forget those past two debacles. I trembled, I hesitated, as I thought of the past horrors.

Finally, I muttered, "What the . . . It couldn't happen again." I proceeded to open the package with a kitchen knife.

"Are you sure?" my wife asked.

"It's got to be right this time," I said aloud as I took the plaque from the package slowly and carefully. When the last wrapping papers were out of the way I held it before me so that we could both share this great moment together. It was beautiful. I ran my fingers across the smooth black walnut and then admired the impressive ceramic insert. Wonderful. I checked the name. F R A N K F A L L O N. Okay. The call, W A 2 V Y K. Okaaaaa . . . No, no, no! The call's wrong. It couldn't be? Not again. They've got the Y and the V reversed. It should be Y–V–K.

My loving, devoted wife, who had bravely stood beside me through that year of hardship, sagged a bit as she too caught the error. "The call's wrong," she moaned. "I knew it was too good. . . . "

"I know," I said as I slid into a kitchen chair.

"What are you going to do?" she asked with a note of despair in her voice.

" don't know, honey. I just don't know, hone . Things like this aren't supposed to happen in an election year," I theorized.

"But it did! This is the third one," she reminded me.

"I know. I can't make up my mind."

"What?"

"Maybe I should ask the FCC to change my call? Or, if they can't do that, perhaps I can get the other plaque back . . . "

"Which one?"

"The one with the wrong name. Then, maybe I could change my name. It would be simple. I could get my brother to do all the paper work. You know, the one that's the big lawyer. Certainly it's too late to make a campaign issue out of it," I said as I sat limply in the chair.

"Honey," my loving wife said as she held my hand, "you're not making sense."

"But I am. Listen! They did it to Goldwater too."

"Who?" she pleaded holding my hand tighter.

"Barry Goldwater!" I almost screamed.

"Barry, who?"

"Goldwater, Barry Goldwater, the senator. He's a ham and a life member too. They got his wrong too. They told me that in the fourth letter. At least I think it was the fourth letter. I lost track. In his case they finally got it right on the fifth plaque. Honey, I'm up there with the big boys." I smiled and looked at the plaque again.

My wife looked at me in disbelief.

"Did you read my horoscope today? This could be a sign. I'm serious, this could be important. Well, just look at it. You see, it's election day. Right? They're doing the same thing to me that they did to him. You see?"

"Who?"

"Goldwater. Get the connection?"

"No."

"Well, I think it means that I should go into politics. Nothing big at first, you see. I could start in on the red tape issue and that bureaucracy stuff. I could get pretty good at that."

"Oh, come on! Get off it!" she pleaded. "You in politics? Ha, that's a good one!"

"Okay, but what about the horoscope? This has got to be a sign."

My charming wife reached for the paper on the kitchen table before us, opened to the comic

*118-43 228th St., Cambria Heights, NY 11411

section of *The Short Island Weekly Press* and quickly found the horoscope. A nervous chill came over me as she read aloud from the paper, "Capricorn, December 22 to January 20. Get busy on important projects instead of criticizing others. Make your appearance more charming. Looks are more important than you think."

She paused and added on her own, "Well, perhaps you could start with a shave, and then we could begin saving for the plastic surgery. It's going to cost a fortune for . . . "

"That's it," I roared as I sprang to my feet. "I'll write the letter right away. I won't criticize. I won't even complain. I'll just ask for confirmation that I have 'Badly Screwed Up Plaque' number three. That'll do it. This certainly is going to be important. I'm going to be *numero uno*. I'll be up there with the big guns yet. I may have missed the honor roll, 5BDXCC, and 5BWAS, but there's a darn good chance that with just a little more bad luck I can get Number One for 5BSUP. Oh boy! Just think of it! And, yes, I'll have to do something about my looks. They take your picture for those things. It even gets in *QST*. But what if they get the name or the call wrong then too?"

It was about here that she called the family doctor, who also happened to be a ham but not a life member. QST

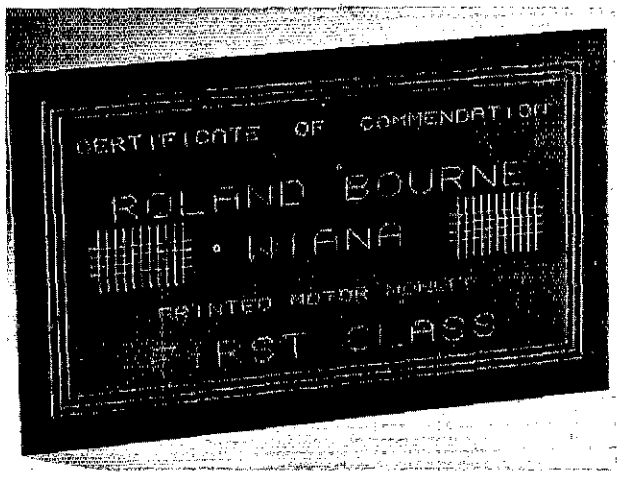
DX Prediction

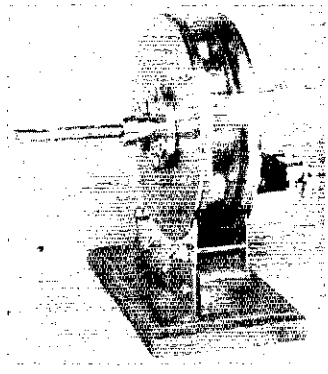
(Continued from page 55)

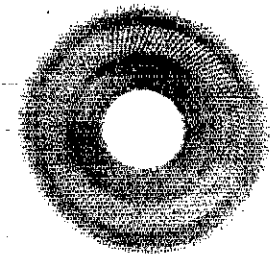
that area, of course). I choose about four areas, usually Central Europe, Australia, Central Africa, and Japan, and run out predictions for each of them. Once the MUFs are plotted, it is easy to spot the favored times for good DX to each part of the world. And after you have worked out MUFs for several months (or years), the effect of seasonal and sunspot-cycle trends on band conditions becomes clearly visible. The predictions are good for an entire month, and can be made as much as three months in advance, so it is worthwhile to spend an evening or two making up a large stack of them. Besides, your friends are going to seek your advice in planning schedules and contest strategy, so you may as well stay in practice!

After a bit of experience, you will be able to run a path prediction in five minutes, and once you have accumulated a few overlays for your favorite parts of the world, the time will be even less. Should your curiosity grow, both Handbook 90 and the monthly predictions pamphlet contain references to more detailed and advanced literature on propagation theory and practice. If you have half the fun with DX prediction that I have enjoyed, your effort will be well repaid. Happy hunting! QST

Strays

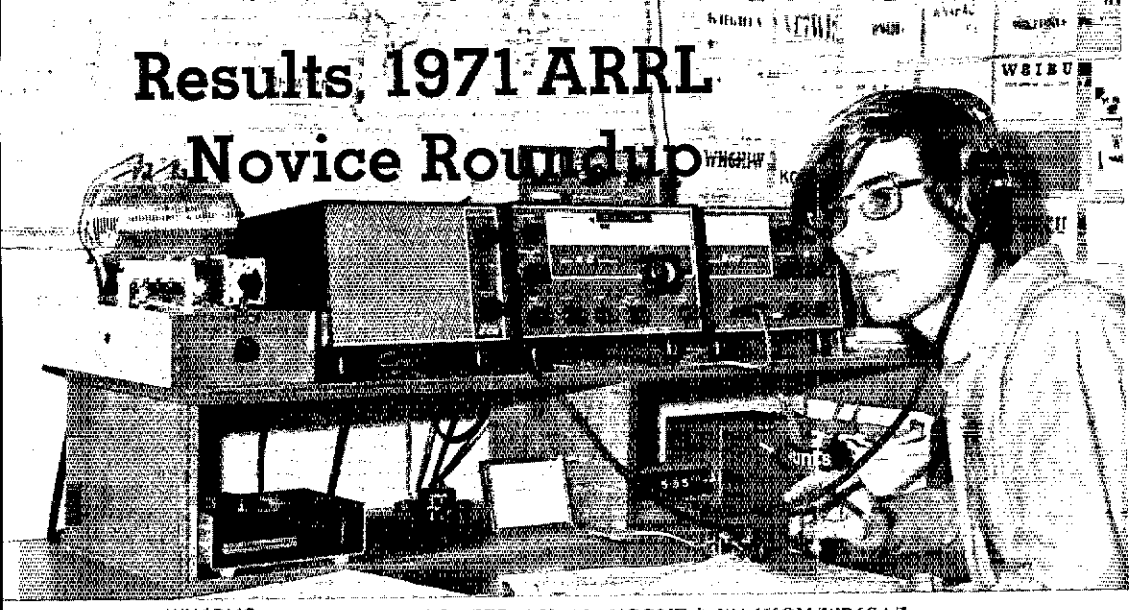






Here is a Plaque awarded to our Museum Curator, W1ANA, by Photocircuits Corporation for his interest in "Printed Motors." The legend is "wired" in place by a "multiwire machine" which is programmed by a computer-prepared tape. This is a fine example of the highly sophisticated and advanced techniques developed in the field of printed circuits. "RB" is not quite sure what a "printed motor monger" is, but he can prove he is one anyway. Page Burr, W2KQP, V.P. for Corp. Development, instigated the whole thing. The printed motor, as built by RB is shown below left, and the printed armature is at the right. One of these motors is capable of reaching 1200 rpm in .001 seconds. There is no iron in the armature.

Results, 1971 ARRL Novice Roundup



WNØBYO

REPORTED BY AL NOONE,* WA1KQM/WB6SAZ

FOR THE PAST three years, the Novice Roundup has enjoyed a period of continuous growth. The February 6-21, 1971 event was certainly no exception with entries reaching 647, some 57 more than the previous year. Breaking the total down, we find 487 were Novices, 126 higher classes and 34 check logs. Returns were received from 63 sections, including Hawaii and Puerto Rico. Certificates are scheduled for a July 15th mailing.

Scores were fantastic! Why, to make the TOP TEN you needed a minimum of 600 QSOs in 60+ sections. That's going some for a Novice!

The state of Washington was evidently the place to be in the NR as John, WN7OTT/7 (operating from the W5QQQ/7 QTH) easily took first place with 1000 QSOs in 74 sections, final score 74,000. His closest competitor, Gerald, WN7KYZ (also a Washingtonian), had to settle for second place with 755 QSOs, 72 sections, final score of 54,360. Even that was by a slim margin over Andre, WN2PQD, placing third from the ENY section with 53,265-795-67. The remainder of the TOP TEN entrants are as follows: WN1MAO 49,335-705-69; WN6FVO 49,210-650-74; WNØAMD 46,008-623-71; WN5ZNY 45,885-665-69; WNØANT 45,016-647-68; WNØBYO 41,730-642-65 and WN4OJR 41,607-606-67.

As always, we'd like to thank all the higher-class licensees for their participation; you do much toward making the NR a success each year.

Now is the time to give some thought toward operating in the November CW Sweepstakes. (October *QST* will carry full rules) We'll even help by urging that the higher-class licensees tune the Novice bands for your calls.

SOAPBOX

I enjoyed the contest very much. Wish there were more for us novices but with a shorter time limit on the contest. – WN8IIH. I found this contest very enjoyable and I'll be around next year although hopefully I'll be Advanced or General by then. – WN6FRX. I enjoyed the contest very much especially working new states. I would have logged more hours but had to QRT on February 17th to have a baby girl! – WNØBED/KP4. Thanks very much for making the NR possible. I had the pleasure of QSOing W1AW who I copy regularly! – WNØBPC. I think a lot of the fellas in the contest could have done better if they would only listen a lot more and tune a couple of kHz either side of their operating frequency. – WN8DSG. I really enjoyed the contest this year but found it hard to make many contacts out here in the west. – WN7NKV. Big spot was when a UAØ answered my CQ NR and gave me his NR No. 1! – WN7MZF. Please include RST and shorten the NR to two weekends. – WN7PSQ. FB contest. Big thrill working W1AW. – WN7PMA. Many thanks to all the fine hams who put up with me and my new bug. – WN7PJT. My thanks to all for a very nice NR '71. – WN8EOX. Thanks for a great contest and maybe next year I'll be talking to novices as a general. – WNØCDY. Considering the antenna problems, transmitter going to pieces and crystals being dropped on the floor, everything went pretty well. – WNØBAZ. I enjoyed the contest quite a lot and worked enough new states to complete my WAS. – WNØDBU. The roundup enabled me to pick up four new states and two new countries which made all worthwhile. Yes, this 45-year-old Novice had fun too along with the other kids. – WNØCCF. Happiness is having 6 generals calling you all at once in the NR. – WN5BWV. Many thanks for a splendid contest, keep it as is. – WN6FNI. Finally worked Delaware for my WAS. – WN6FVO. I appreciate the QSOs I got from the General and higher class licensees who were more than half of my total contacts. – WN6FNH. Enjoyed my first ham contest. Being a full-time radar repairman for the U.S.A.F. meant I could only be a part-time contestant. – WN6RDV. I sure had fun competing with my fellow hams and their truly respectful patience when QRM was a problem. – WN6AJJ. The NR is a great idea, I worked 11 new states and one new country. – WN6GZS. This was the first time I had any such experience and I sure learned a lot about operating procedures and how to get a lot of QSOs in short order. – WN9DKS. Even though I did not really try for NR, I thought it was an exciting experience. Thanks for running it. – WN9FMU. Great, really enjoyed it. Especially working HB9AMZ, new country for me. – WN9EBP. I worked 5 new states for WAS.

* Asst. Communications Mgr., ARRL.

Thanks for having a real great contest. – WN9FEN. I found the NR very exciting. I had just finished aligning my new rig on Feb. 6. The contest was a good way to break it in. – WNØCVW. Many thanks to all the Generals and VEs who participated in the NR. I think the roundup could be shortened, not much activity toward the end. – WNØCRQ. I got about 20 new states. – WN2MZW. Thanks for a FB NR, can't wait till next year! – WN3NZJ. Many thanks to all the hams, especially the higher tickets for coming into our bands and generating more contacts/sections. – WN3POZ. Where was New Hampshire? – WN3PHG. Really great, wish I could have worked the full 40 hours. – WN3PKS. Sure enjoyed what few contacts I got. Didn't hear much 5 wpm, your novices sound more like bug-equipped extras at 25 wpm. – VE2BFW. My biggest thrill was when HB9AGH and F6AWP answered me. – WN3OJM. My only comment on the NR is, WOW! – WN3NTJ. I improved my code speed tremendously and felt that the time was well worth it. – WN3PAO. Win or lose, I can say one thing, I sure had lots of fun. – WN4SPB. The contest was super, but between the NR, dating and homework, I'm lucky to still be alive! – WN4PSP. Was really surprised by calls from UK5XAA, I1AWK, SM6ASK and DJØVY. – WN4STA. This was the first contest that I have entered since I got my license. I even worked W1AW which was a big thrill. – WN4SON. I added 8 new states to my WAS including Hawaii. – WN4SOC. This contest was worth the dues itself, not to mention *QST* etc. – WN4KNJ. This was my first NR and I enjoyed it tremendously. I might suggest that OP Aid 6 be revised to include a method of reporting Novice QSOs. High point for me was when DL5JF came back with a number when my beam was pointed at KZ5 land. – WN4MUR. I really had a great time in the contest, my WAS award will be soon in the coming. I also worked 3 foreign countries(England, Yugoslavia and Germany). – WN4RGQ. Seems as though the bands were very crowded on weekends. – WN4PTM. I think the roundup was the most fun I have had since I received my license. It helped raise my state total to 44 in 3 months! – WN4SXX. I realized a real improvement in operating technique and in code speed – enough to wish I could start over again knowing what I know now, hi! – WN4SIJ. It was a great contest. – WN4SVX. From the XYL point of view, the only trouble with contesting is having to QRT just when the band is good (hi) to feed the family and clean house – but it's great fun. – WN5ZZA. Had to share antenna system with dad, W5RSZ, during the roundup. – WN5BHN. Conditions were great on 15, but rig here was in bad shape. – WN5CMX. Too bad my transmitter went out at the beginning of the NR. I got it fixed though and worked the last state I needed for WAS. – WN5BIR. The NR helped me build my speed to 10 wpm. I also worked great DX, KG6AAY on Guam who was in the roundup. – WN5DML. If I had a comment to make regarding the NR, I'd say that the fact that over 60 percent of my contacts were with other than Novice stations speaks well for the ham fraternity that I have recently joined. – WN5DCY. Biggest thrill since my first contact was working W1AW. – WN5BBA. I must thank you for organizing the NR. It was my first experience with any type of on-the-air competition and I enjoyed it thoroughly. You can be sure you'll have my log, along with all the others, in future ARRL contests. – WN2NSO. The contest was fun indeed but it is for the youngsters, not us old-timers – hi! Perhaps next year I can be of some help to the Novices that will operate. Expect to pass at least the General class this April. – WN2JNV. The NR helped me learn to dig out those weak signals from a pile. Most of all it was lots of fun. – WN2OHU. This enjoyable contest brought me 9 new states toward my WAS. – WN2PVH. What happened to all the W7s? – WN2OWC. Being in this contest was a mighty big thing for me, but going for General will be my biggest yet. – WN1LXZ. The high speed contacts helped improve my code speed so I could pass my General class test two weeks after the contest. – WN1NTU. I finally put up a wire for 40 and 80, unfortunately in the rain on the second Saturday of the contest! A little conflict developed since Mom(W1YYM) and Dad(W1CW) wanted to work both the E.O.C. contest and the DX Test, luckily I got priority. – WN1NNC. During the NR I had many stations call me that I had already worked. I suggest that stations use their OP Aid 6 to avoid duplicate QSOs! – WN1NLD. Big let down when I waited for a Novice to send "CQ NR" no less than 18 times with no call letter, only to find that I had already worked him. – WN1NOF. Greatest appreciation should go to the higher class who really help and encourage the novices by working this contest. Was really surprised when VE5RI called on ssb, a nice thing for him to do. – WN1MZA. I really had a ball working the contest. – WN1NBS. A great contest, I was pleased to get some new states and acquaintances. – WN2IXQ. Great contest, my father is glad its over so now he can get back on the rig. – WN2PYM. Enjoyed the NR but would like to see DX stations made multipliers. – WN2MQA. My biggest thrill was working WN7KYN on 80 meters! – WN2PSV.

Division Leaders

Atlantic	WN2PKE
Central	WN9DQU
Dakota	WNØANT
Delta	WN4OJR
Great Lakes	WN4SIJ
Hudson	WN2PQD
Midwest	WNØAMD
New England	WN1MAO
Northwestern	WN7OTT/7
Pacific	WN6KMV
Roanoke	WN4NRL
Rocky Mt.	WN4NVM/5
Southeastern	WN4SDH
Southwestern	WN6FVO
West Gulf	WN5ZNY

Scores

Listings are grouped by ARRL divisions and sections. The operator of the station first listed in each section is award winner for that section. An asterisk indicates Hq. staff member, ineligible for an award. Example of listings: WN3NZJ 13,662-253-54-27, or total score 13,662, different stations worked 253, sections worked 54, total operating time 27 hours.

Ross, WB5BNG, placed second in North Texas with 435 QSOs in 62 sections.

ATLANTIC DIVISION

Delaware

WN3NZJ	13,662-	353-54-27
WN3PHG	12,556-	277-43-40
WN3OVC	6270-	175-33-30

Eastern Pennsylvania

WN3MME	24,475-	420-55-40
WN3POZ	20,458-	351-58-25
WN3NIT	12,960-	294-40-38
WN3PLC	9894-	219-41-22
WN3PHL	8211-	151-51-27
WN3PHM	*7182-*	*139-48-30*
WN3NYP	5848-	136-43- 4
WN3NNK	4960-	114-40-17
WN3PWY	4059-	99-41-11
WN3NXA	3996-	98-37-19
WN3PEP	3740-	110-34-12
WN3PNI	2976-	114-24-20
WN3PXR	2461-	107-23-15
WN3OUB	1904-	68-28- 7
WN3PWX	1254-	66-19-16
WN3OZR	640-	*25-21-20*
WN3PIR	399-	23-13- 6

Maryland-D.C.

WN3PAO	14,550-	287-50-32
WN3OJM	11,233-	224-47-20
WN3PVK	8844-	168-48-12
WN3PCT	5980-	115-46-16
WN3OXR	4551-	101-41-30
WN3OJN	4224-	122-32-33
WN3OER	1518-	51-23-12
WN3PKS	630-	25 18- 6
WN3OZE	513-	27 19- 3
WN3PAS	108-	12- 9- 4
WN3OIB	72	9- 8-11

Southern New Jersey

WN2YSW	26,360-	394-68-40
WN2LXV	13,475-	220-55-40
WN2IXQ	2662-	121-23-27

Western New York

WN2PKE	34,375-	624-86-28
WN2MBN	32,273-	532-59-39
WN2MBP	26,240-	410-64-36
WN2RSQ	17,388-	308-52-39
WN2MR7	12,818-	206-58-39
WN2IIG	12,712-	217-56-30
WN2MEW	10,863-	213-51-44
WN2MZW	8904-	168-53-33
WN2KRL	5658-	123-46-21
WN2LNB	5106-	101-46-16
WN2OUS	5082-	154-33-18
WN2INV	4477	101-37-30
WN2NHV	3255-	90-41- 9
WN2NIV	2944-	*128-23-29*
WN2MEG	2706-	82-33-12
WN2OIL	2322-	86-27-21
WN2PSM	1767-	57-31-14
WN1QA/2	1652-	44-28- 8
WN2NAG	1064-	56-19- 8
WN1RFR	240-	20-12-12
WN2OWH	208-	11- 8-14
WN2OMN	138-	23- 6-16
WN2MOR/2	39-	3- 3- 2

Western Pennsylvania

WN3PMI	30,240-	504-60-34
WN3MYH	6201	159-39-24
WN3PIV	2310-	77-30-28
WN3OBD	2280-	61-30-13
WN3NJJ	1216-	64-19-13

CENTRAL DIVISION

Illinois

WN9DZP	34,000-	490-68-40
WN9LJA	24,056-	388-62-33
WN9LGV	18,900-	300-63-39
WN9FBP	17,934-	351-49-37
WN9CGI	9180-	184-45-23
WN9DVQ	8016-	152-48-37
WN9EHM	6888-	153-41-29
WN9CPT	4230-	126-30-17
WN9GAR	3914-	88-38-14
WN9LLV	2296-	82-28 15
WN9EWI	1680-	60-28-13
WN9THL	1188-	54-22-12
WN9BKI	1012-	46-22 11
WN9CYI	952-	56-17-13
WN9CYO	903-	43-21-10
WN9LXI	714-	34-21-13
WN9EHI	465-	31-15- 5
WN9DMM	432-	21-12-10
WN9DLQ	300-	25-16- 1
WN9DDI	190-	19-10- 2
WN9ECK	160-	20- 8-
WN9IOK	84-	12- 7- 2

Indiana

WN9DOU	39,000-	600-64-48
WN9HII	*22,900-*	*450-62-47*
WN9DAW	14,350-	287-50-19
WN9DLZ	13,900-	266-50-24
WN9PUR	12,720-	217-51-31
WN9IZO	9890-	215-46-40
WN9CUK	8900-	163-50-21
WN9RSJ	8112-	169-48-25
WN9EOL	7056-	144-49-24
WN9ETI	4920-	105-41-21
WN9DIF	3034-	82 37-11
WN9DNP	602-	44-14- 8
WN9FOS	442-	34-13-10
WN9EAZ	286-	22-13-
WN9EQY	84-	6- 4- 1
WN9DRZ	1-	1- 1-

Wisconsin

WN9EBG	28,954-	452-62-40
WN9DKS	26,950-	370-70-40
WN9EOB	18,462-	362-51-29
WN9EJN	17,000-	340-50-39
WN9DOC	12,740-	250-49-32
WN9EZS	*11,600-*	*212-50-24*
WN9DRL	4836-	114-39-12
WN9EKI	3360-	112-30-16
WN9EEJ	2920-	73-40- 6
WN9FTC	1738-	79-22-10
WN9RTQ	1196-	52-23- 9
WN9HEM	966-	46-21- 8
WN9BPQ	451-	31-11-10
WN9IRN	400-	25-16- 9
WN9CDO	396-	36-11-19
WN9EWR	196-	23-17- 7
WN9CHP	195-	15-13-10
WN9EEN	170-	17-10- 2
WN9DZF	152-	19- 8- 5
WN9FMU	36-	9- 4- 4

DAKOTA DIVISION

Minnesota

WN0ANT	48,016-	647-68-32
WN0BYO	41,730-	642-65-36
WN0CBP	30,872-	454-68-30
WN0CJV	20,700-	348-60-37
WN0DRU	19,256-	332-58 24
WN0COQ	18,900-	318-60-13
WN0CAI	16,416-	273-57-24
WN0AUZ	13,309-	253-53-40
WN0CGT	10,834-	229-46-33
WN0CFR	10,350-	207-50-33
WN0BJK	9120-	54-30-30
WN0CAP	1680-	70-24-10

North Dakota

WN0BPC	15,688-	296-53-26
WN0CJP	3840-	96-40-18
WN0CMI	3145-	85-37-22

South Dakota

WN0CVW	2175-	65-29-35
WN0CDY	1064-	56-19-14

DELTA DIVISION

Arkansas

WN5CKR	19,096-	298-62-39
WN5CKS	17,284-	283-58-40
WN5YQN	1890-	55-27-11
WN5DRX	90-	10- 9-
WN5DRY	88-	11- 8-

Louisiana

WN5CMX	19,580-	346-55-24
WN5ZZA	17,920-	300-56-39

Mississippi

WN5DCY	*12,960-*	*230-54-38*
WN5HVP	99-	11- 9- 9

Tennessee

WN4QJR	41,607-	606-67-40
WN4RRA/4	15,624-	248-63-31
WN4RJT	8050-	175-46-29
WN4RIG	6235-	130-43-25
WN4OMJ	2945-	98-31-13
WN4SHE	2788-	82-34-17
WN4SEZ	*2166-*	*52 38-16*
WN4QCK	304-	19-16- 3
WN4PTM	70-	10- 7- 6
WN4QBL	49-	7- 7- 2

GREAT LAKES DIVISION

Kentucky

WN4SII	25,088-	377-64-40
WN4PSP	21,616-	371-56-22
WN4QVS	18,660-	311-60-38
WN4OZI	13,008-	271-48-16
WN4STA	11,800-	200-59-38
WN4IDV	2010-	67 30- 8
WN4SYX	884-	42-17 10

Michigan

WN8HUI	22,852	394-58-40
WN8EIZ	19,278-	378-51-31
WN8IDK	19,098-	320-57 23
WN8DSG	16,231-	292 53-40
WN8GLO	15,510-	272-55-40
WN8GLL	12,488-	227-55-28
WN8BIJ	12,393-	228-51-39
WN8ERI	9818-	145-47-23
WN8IZR	*6800-*	*150-40-20*
WN8GKH	6174-	137-42-32
WN8IWR	5202-	127-41-12
WN8ISU	2178-	99-22-22
WN8IHR	2070-	59-30-16
WN8IFT	1998-	74-27-20
WN8HYX	1980-	65-31-18
WN8HCV	588-	32 14- 4
WN8HII	525-	35-15-13

Ohio

WN8GLY	22,098-	381-58-40
WN8HEM	21,780-	355-58-22
WN8HKO	19,380-	340-57-34
WN8HMP	18,806-	304-52-33
WN8GAU	15,789-	289-54-21
WN8HHN	15,272-	322-46-16
WN8IIH	14,934-	262-57-41
WN8UMD (WN8GVE, op.)		
	14,877-	252 51-24
WN8FBH	10,665-	212-45-27
WN8GXA	9828-	189-52-
WN8HRW	9758-	238-41-15
WN8EOT	9600-	260-48-18
WN8EGA	6750-	150-45-12
WN8BXO	4888-	124-37-13
WN8HBY	3456-	86-36-16
WN8DVD	2250-	75-25-11
WN8EJH	1860-	60-31- 9
WN8HMG	1660-	83-20-21
WN8GGH	1113-	53-21-13
WN8IEV	1054-	47-17- 4
WN8ILP	817-	43-19- 6
WN8IDG	693-	33-21-10
WN8HRX	585-	45-13- 7
WN8ELU	570-	30-19-10
WN8IBZ	372-	31-12- 8
WN8GBY	252-	16- 7- 3
WN8HAK	221-	17-13-10
WN8GKI	220-	22 10- 8
WN8ITV	128-	16- 8- 7

HUDSON DIVISION

Eastern New York

WN2POD	53,265-	795-67-38
WN2IAM	28,035-	435-64-36
WN2NAA	22,680-	378-57-23
WN2NSU	19,440-	324-60-33
WN2QUO	17,280-	300-54-
WN2MQA	17,028-	285-66-20
WN2LYN	16,986-	298-57-40
WN2KDC	12,720-	225-53-16
WN2LBB	12,174-	249-47-26
WN2ILA	10,557-	192-51-32
WN2LXC	10,320-	215-48-20
WN2PSV	7185-	211-35-16
WN2OPS	5580-	155-36-22
WN2LXF	*3948-*	*141-28 17*
WN2NYR	1470-	49-30-22
WN2NKO	1218-	58-21- 9
WN2RYB	630-	35-19-13
WN2RTV/2	56-	8- 7
WN2SKD/2	24-	6- 4- 1
WN2SKB/2	4-	2- 2- 2

V.E.C.-A.R.

WN2MAN	40,320	566-70-40
WN2MLS	34,204-	503-68-18
WN2LOM	26,432-	428-59-36
WN2PMT	16,840-	270-58-40
WN2OHU	15,544-	268-58-40
WN2PFU	14,968-	277-54-25
WN2MRS	10,980-	224-45-22
WN2PYM	10,176-	197-48-14
WN2PYV	7849-	201-39-31
WN2MGN/2	7464-	171-44-18
WN2KNC/2	6900-	141-49- 9
WN2QDE	5000-	110-40-16
WN2PWO	4715-	115-41-18
WN2PVH	3969-	147-27-20
WN2LRB	3955-	103-38-13
WN2MGS	3780	90-42-27
WN2QDF	3360-	86-35-
WN2REW	1583-	69-23-13
WN2PLI	1463-	77 19-18
WN2QAY	708-	44-12-15

Northern New Jersey

WN2NXD	36,036-	572-63-24
WN2LOV	27,365-	406-65-35
WN2PGG	18,753-	314-57-39
WN2LHA	18,727-	287-61-33
WN2PWS	12,502-	251-47-21
WN2NAM	12,324-	227-52-33
WN2LCG	10,608-	204-52-20
WN2RIU	8800-	210-40-40
WN2MVR	7831-	191-41-16
WN2QBO	7290-	162-45-12
WN2OWC	7216-	166-41-21
WN2QIR	6300-	140-45-30
WN2NAB	5976-	166-36-26
WN2QQV	4998-	137-34-17
WN2RVM	3161-	109-29-12
WN2LMZ	3120-	80-34-17
WN2MFI	1480-	74-20-15

MIDWEST DIVISION

Iowa

WN0BPH	18,386-	307-58-40
WN0CPB	8084-	172-47-34
WN0ZOD	5130-	115-38-20
WN0CSG	3906-	93-42-14
WN0CHP	3800-	95-40-16
WN0ADI	2910-	82- 30
WN0AIK	560-	28-20- 8

Kansas

WN0AMD	46,008-	623-71-30
WN0YRL	20,358-	331-58-25
WN0BAZ	15,876-	279-54-36
WN0ZVB	13,824-	256-54-13
WN0BBE	12,540-	220-57-21
WN0CRQ	12,320-	209-58-44
WN0YMK	12,296-	212-52-17
WN0ZNU	9995-	120-37-15
WN0CCL	2844-	79-36-18

Missouri

WN0QYEA	28,426-	466-61-27
WN0QYMC	28,320-	460-59-17
WN0QARH	20,460-	341-60-29
WN0DLI	16,245-	285-57-39
WN0CCF	14,148-	247-54-37
WN0QAVR	13,364-	237-52-20
WN0QME	*8580-*	*150-47-32*
WN0DAS	5203-	121-43-20
WN0DAR	180-	18-10- 4
WN0CSL	150-	10- 6- 4
WN0YLW	104-	13- 8- 2
WN0QLP	24-	6- 4- 1

Nebraska

WN0QBRJ	6670-	115-46-32
WN0CNK	432-	27-16-12
WN0CWR	406-	29-14- 6

NEW ENGLAND DIVISION

Connecticut

WN1MAO	49,335-	705-69-37
WN1EWR	40,870-	600-67-29
WN1NES	25,288-	436-58-40
WN1NLD	25,056-	432-58-27
WN1NNC	20,473-	337-59-40
WN1NMZ/1	14,840-	260-57-35
WN1LZU*	12,544-	226-49-16
WN1NOI	12,150-	225-54-40
WN1LXZ	11,804-	212-52-16
WN1NTR	11,613-	237 49-31
WN1LOH	10,494-	188-53-38
WN1NYU	9400-	200-47-30
WN1MWD	6345-	141-45-
WN1MTZ	3500-	100-35-12
WN1NUI	1825-	48-25-10
WN1NKZ	1711-	49-29-19
WN1NBS	986-	59-17- 9

Eastern Massachusetts

WN1NRV	25,650-	440-57-36
WN1NIW	18,354-	312-57-36
WN1NUH	11,664-	216-54-15
WN1NPO	8648-	178-46-28
WN1NNL	7137-	163-39-15
WN1MEZ	6847-	167-41-17
WN1NRI	6240-	141-40-20
WN1MXV	1577-	69-19-21
WN1NDP	432-	26-12-
WN1NZY	299-	23 13-
WN1MWU	42	7 6- 9

Maine

WN1MZA	15,433-	258-61-36
WN1MFZ	4428-	108-41-12
WN1MHY	1092-	52-21- 6
WN1NMW	688-	28-16-17

New Hampshire

WN1NIE	495-	29-17-15

Rhode Island

WN1LSV	21,855-	352-59-27
WN1MNO	8272-	166-47-29
WN1NZR	6028-	137-44-17
WN1MOT	3294-	112-27-24
WN1MPU	230-	13-10-

Western Massachusetts

WN1LWS/1	32,640-	465-68-40
WN1MWW	31,054-	473-63-40
WN1NJL	1806-	78-21-17

NORTHWESTERN DIVISION

Idaho

WN7PDV	1550-	52-25-13
WN7MLK	1081-	47-23-

Montana

WN7NKV	4407-	113-39-1

Oregon

WN7PEZ	36,040-	530-68-3
WN7OOP	34,500-	500 69-3
WN7MHP	7399-	151-49-
WN7MMQ	3024	69-36-1

Washington

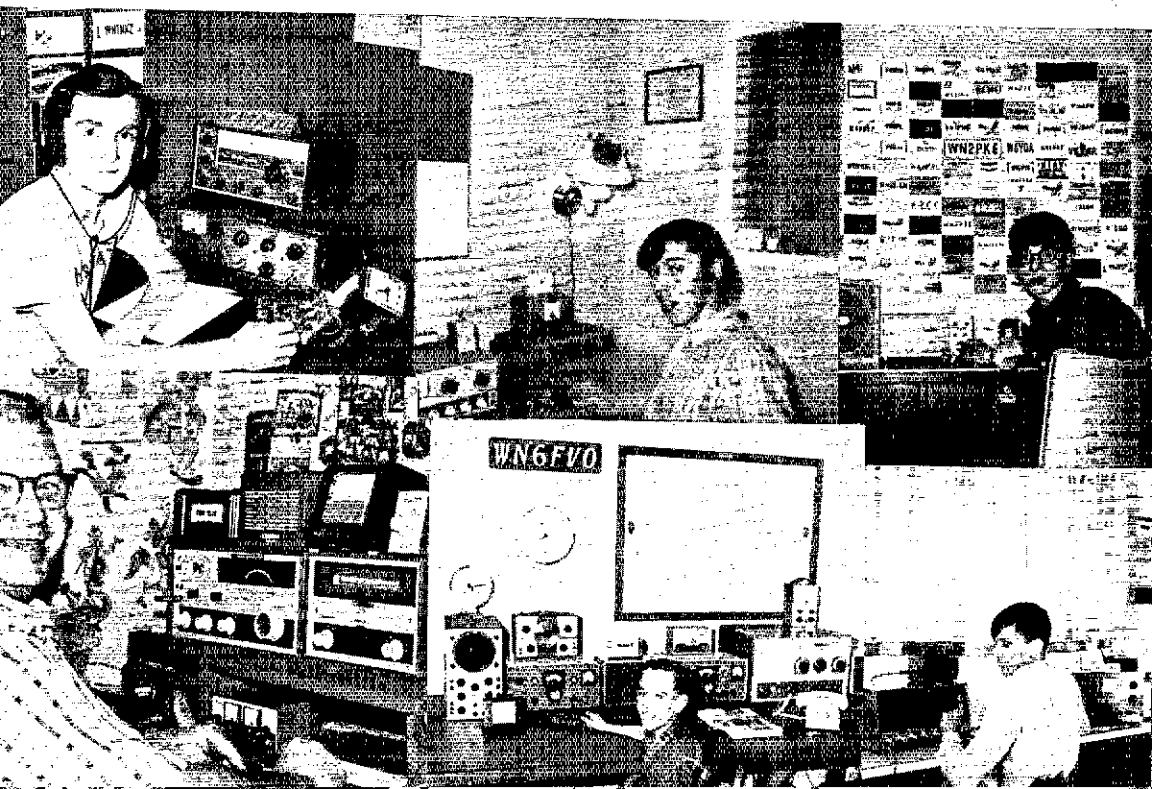
WN7OTT/7	74,000-1000-74-4	
WN7KYZ	54,360-	755-72-4
WN7OMX	22,995-	350-63-4
WN7POI	12,474-	231-54-2
WN7MNR	8232-	158-49-3
WN7OJI	3800-	95-40-17
WN7PAM (+WN7OXQ)		
	22,784-	347-62-2

PACIFIC DIVISION

East Bay

WN6DHD	19,550-	300-62-2
WN6AYD	14,396-	229-59-4
WN6RDV	1350-	54-25-1
WN6ZLQ	276-	23-12-

der who had the big signals in the NR? Well, here they are. This years's Section Leaders include(l to r,t to b): Hans, NRV in EMass; Jeffrey, WN4OSC in EFla; Chuck, WN7NKV in Montana; John, WN7PMA in Arizona; Eric, DIW in Puerto Rico; James, WN6FNI in Orange; Bob, WN3PAO in MDC; Steve, WN6DHD in EBay; Vince, WN2PKE in WNY; Frank, WN2YSW in SNJ; Dean, WN6FVO in L.A.; and Mike, WN4SDH in Georgia,



Hawaii

WH6HH	7661-	163-47-40

Nevada

WN7MZI	22,320-	350-62-38
WN7PUD	8600-	172-50-40
WN7OLU	1176	49-24-27
WN6OAA/7	210-	21-10- 1

Sacramento Valley

WN6AGI	2010-	67-30-11
WN6CXU	1950-	65-30-15

San Francisco

WN6ESI/6	7614-	162-47-30
WN6BKD	2496-	151-49-22
WN6GZS	6660-	130-49-32

San Joaquin Valley

WN6FNH	27,873-	489-57-47
WN6IVC	11,440-	193-55-17
WN6AJJ	3597-	109-33-21

Santa Clara Valley

WN6KMV	37,060-	545-68-44
WN6JXW	12,100-	210-55-40
WN6GGW	10,500-	206-50-40
WN6DGX	9506-	184-49-34
WN6GEQ	8635-	157-55-38
WN6JCT	2650-	150-51-
WN6OMB	6045-	140-39-18
WN6BQT	2675-	83-25-12
WN6CXC	1350-	49-25- 5

ROANOKE DIVISION

North Carolina

WN4SXA	12,544-	256-49-32
WN4TBL	2080-	70-26-12
WN4OUB	42-	7- 6-14
WN4FMD	4-	2- 2- 4

South Carolina

WN4KKW	8008-	139-52-28
WN4UOJ	3895-	95-41-15
WN4OJT	2822-	73-38-27
WN4SYJ	15-	5- 3- 1

Virginia

WN4NRL	38,216-	552-68-29
WN4RKN	16,620-	260-60-40
WN4RTK	16,400-	328-50-32
WN4QLG	13,932-	248-54-29
WN4RHV	11,128-	204-52-40
WN4PVQ	6708-	114-52-12
WN4SHZ	1008-	101-28-14
WN4PML	968-	44-22-11
WN4SAJ	704-	32-22- 7

West Virginia

WN8LND	24,490-	370-62-30
WN8IIL	18,648-	318-56-
WN8EPS	12,296-	232-53-14
WN8GYT	3150-	75-35-38

ROCKY MOUNTAIN DIVISION

Colorado

WN0AXW	9270-	116-45-15
WN0AAY	3069-	93-33-35
WN0BWW	1475-	59-25-14

New Mexico

WN4NVM/5	32,110-	484-68-25
WN5DMR/5	27,280-	425-62-30
WN5BEN	19,695-	295-65-30
WN5AID	3267-	89-33-11
WN5CRW	121-	11-11- 5

Utah

WN7PDT	7950-	144-50-22
WN7PXT	5300-	130-41-35
WN7OAH	5076-	84-54-36

Wyoming

WN7PNW	1078-	43-25-15

SOUTHEASTERN DIVISION

Alabama

WN4SVX	23,954-	391-59-38
WN4RUH	16,107-	258-59-25
WN4SVH	14,400-	300-45-25
WN4SON	8036-	164-49-24

Eastern Florida

WN4SOC	17,600-	320-55-36
WN4RGQ	16,166-	329-47-18
WN4RSV	14,798-	292-49-35
WN4SJQ	7268-	158-46-
WN4QUH	3740-	110-34-13
WN4SGC	3649-	89-41-17
WN4KNJ	2244-	88-33- 9
WN4SKJ	1166-	33-22- 7
WN4TCL	442-	34-13-28
WN4OBI	378-	27-13-16

Georgia

WN4SDH	32,040-	430-72-40
WN4SMZ	21,120-	330-64-
WN4MUR	17,995-	285-61-40
WN4IBM	7605-	169-45-18
WN4SPB	4680-	104-45-18

West Indies

WP4UHW	38,188-	471-58-32
WN0BFD/KP4	8016-	167-48-23

SOUTHWESTERN DIVISION

Arizona

WN7PMA	21,452-	336-62-20
WN7PJT	17,877-	293-59-32
WN7PYT	3360-	84-40 10
WN0DFM/7	920-	40-23-14
WN7PSQ	700-	35-20- 8

Los Angeles

WN6FVO	49,210-	650-74-35
WN6AIQ	24,339-	399-61-21
WN6GGO	23,376-	319-64-39
WN6MBO	20,894-	327-62-33
WN6BNZ	15,455-	281-55-30
WN6EPS	11,610-	215-54-23
WN6HGR	11,130-	195-53-26
WN6FQL	9568-	184-52-20
WN6RO/6	8008-	154-52-25
WN6MYS	5744-	114-46-
WN6CWH	4953-	117-39-18
WN6HRR	1984-	64-31- 9
WN6QVD	1596-	57-28-24
WN6DRQ/6	288-	18-16- 5

Orange

WN6FNI	52,688-	444-72-40
WN6BAH	8100-	162-50-19
WN6DBA	5544-	120-42-40
WN6DEF/6	2720-	80-34- 5
WN6ZLX	378-	21-18-12

San Diego

WN6CWU	22,035-	343-65-28
WN6IDL	6992-	152-46-13
WN6OIP	4758-	107-39-16
WN6CWV	1550-	50-31- 9
WN6COM	125-	25-15- 4

Santa Barbara

WN6NEB	3471-	89-39-22

WEST GULF DIVISION

Northern Texas

WN5BBA	27,522-	397-66-25
WN5BNG	26,470-	418-62-40
WN5ZZP	15,300-	270-57-31
WN5AZL	11,985-	240-47-21
WN5CXT	8800-	176-50-18
WN5AAS	6149-	143-43- 9
WN5URG	280-	30-28- 4
WN5UKW	35-	7- 5- 0

Oklahoma

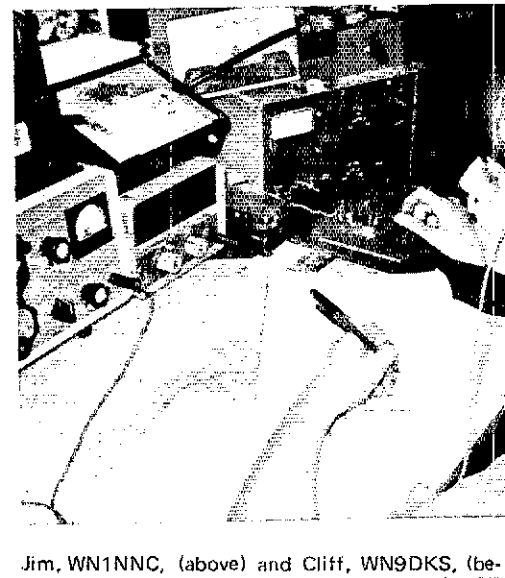
WN5ZWW	35,945-	538-65-30
WN5BVH	19,800-	330-60-30
WN5DMT	4160-	104-40-20
WN5BNP	143-	13-11- 3

Southern Texas

WN5ZNY	45,885-	665-69-41
WN5CLS/5	20,191-	331-61-33
WN5BIR	17,400-	300-58-26
WN5CTH	13,255-	231-58-30
WN5BWV	12,648-	233-54-35
WN5BBW	9984-	192-52-21
WN5DBT	5187-	133-39-22
WN5CQA	4367-	107-41-26
WN5RSB	1920-	51-32- 7
WN5AYK	920-	36-20- 7
WN5DGQ	805-	35-23- 6
WN5AFQ	119-	7- 7- 1
WN5CSC	56-	8- 7- 2

WA1MCY 4017, WA1MNI 3201, WA1MYK 1800, WA1NDM 2728, WA1JSU/1 435, W2UW 10,314, W2NEP 6028, W2WO 14,796, WA2CDF 1711, WA2LDV 8446, WA2LDX 3465, WA2LWC 1842, WA2LOI 279, WA2GMD 12,950, WA2HSG 493, WA2KJB 9353, WA2MPC 3960, WA2MXI 2528, WA2MZL 380, WA2OOH 88, WA2RGW 7990, WB2IPU 2294, WB2KJT 10,780, WB2KSK 4216, WB2LOW 2970, WB2MUK 10,608, WB2OLQ 546, K3HNP 13,860, W3ADF 14,848, W3OLI 8064, W3RYV 14,905, W3ZSR 161, WA3LKL 729, WA3LQV 4350, WA3LZS 742, WA3MRI 2187, WA3NQX 2856, WA3NQY 1242, WA3ONA 6044, K4ADI 12,040, K4BNC 1196, K4LZL 2262, K4RU 117, W4DR 9630, W4PKS (WA9SXQ, op.) 14,840, WA2SSL 4 1081, WB4OGW 9588, WB4OJU 1748, WB4OMK 1080, WB8AML 4 23,851, K5PXV 13,284, W5DFI 14,790, W5RE 1992, W5RSZ 154, W5RUB 8456, WA5WCK 9894, WB5AAO 6930, K6ASK 4592, K6KVC 6960, K6MHG/6 2728, W6UK 1848, W6KYA 5280, W6OLO 10,659, W6RGG 494, WA6AUF 1144, WA6GGK 16,680, WA6HAD 2030, WA6HMT 12,031, WA6RUL 56, WB6LLL 2001, WB6YLI 3649, WB6YMW 8300, WB6ZHD 8000, WB6ZSE 4784, KH6IGL 4, KJ6GD 3526, W7BJ 18,183, W7TVT 1040, WA7BCL 2278, WA7NOH 3737, WA7OGH 2220, W8KAJ 36,992, WA8KPN 3648, WA8MEC 585, WA8RXM 416, WB8BIJ 7436, WB8DIG 1860, WB8EJN 1060, WB8FBC 13,684, K9DVK/9 144, K9HYI 18,200, K9KLP 1225, K9VER 1296, W9TAI 8040, W9WR 2014, WA9RJI 17,157, WA9Y7G 5934, WA9ZOS 1250, WB9BIU 5676, WB9CYY 688, WB9DDR 7250, WB9DPW 6095, WB9EAY 7704, WB9ELV 4, WB9FNH 285, WØOMS 21,592, WØYCR 11,576, WAØATY 3399, WAØNZA 6674, WAØOCU 2968, WAØOTV 1008, WAØWOV 6018, WAØZSH 2400, WAØZXQ 13,197, WBØAFT 2080, VE3BUC 2150, VE3EWB 4640, W1AW (5 ops) 119,140.

QST



Jim, WN1NNC, (above) and Cliff, WN9DKS, (below) both registered scores over 20K from the CT & WI sections, respectively.

Check Logs: K1QFD W1BDI K2COR W2EMW W2HAL W2KZN WN2KLB WN3POB K4WRT/4 W4NM WB4POD W5QNQ WA5ROU WN5BOQ WN5ZAP WB6GIJ WA7OUB WA8YVK WB8AYW WN8EOX WN8HKM WB9AOU WB9BDK WB9CNF WB9CNH WN9CWS WØEIX WØEGV WAØZJU WB0CLH WNØBSS VE2BEW VE3GFA VE5RI

Non-Novices

W1EER 5850, W1FJN 8211, W1MRW 2688, WA1JWQ 7650, WA1JZC 162, WA1JZG/1 259, WA1LBP 5082, WA1LPT 9495,

1971 VE/W Contest Announcement

September 25-26, 1971

THE MONTREAL Amateur Radio Club Inc., invites all W and VE amateurs to participate in the 1971 VE/W Contest. The contest period this year is the weekend of Sept. 25-26.

Contest Period

Starts 2300 GMT Sat., Sept 25.
Ends 0200 GMT Mon., Sept 27.

Rules are similar to those of last year's event. Log sheets and check logs for both Canadian and American entrants are available from the VE/W Committee at the address shown below. (Do not write ARRL for these) upon receipt of SAE with IRC's or sufficient Canadian postage.

Stations should look for each other in the "General" part of the phone and cw bands, and are reminded to check all bands for openings.

Be sure to send in your log regardless of score. It will be of definite interest in preparing the contest summary. Soapbox comments (unusual occurrences, exceptional QSOs, etc.) and station photos will be of great interest.

1) *Eligibility*: The contest is open to all amateurs located in the ARRL sections listed on page 6 of any *QST*.

2) *Contest Period*: All contacts must be made during the period shown above. Only 20 hours total operating time may be used in this period. Times on and off the air must be shown in the log. Minimum time off period allowed is 15 minutes. Listening time must count as operating time.

3) *Bands*: All bands and modes for which the participant is licensed may be used. A station may be worked once on cw and once on ssb on each band.

4) *Classes of Entry*: The contest is divided into parts, phone and cw. These scores must be tabulated separately and not combined. There are two classes of entry, single operator and multioperator.

A single operator station is one manned by an individual amateur who receives no assistance from other persons during the contest period. He may not have assistance in any manner in keeping the station log and records, or in spotting stations during the contest period. Such entries must be placed in the multioperator category.

5) *Exchange*: W/Ks will work VE/VO stations and vice-versa. W-to-W and VE-to-VE QSOs don't count. Valid points can be scored by contacting stations not working the contest if complete exchanges are made. The exchange consists of QSO number, RS or RST report, and ARRL section for W/Ks, geographical areas listed below for VE/VOs.

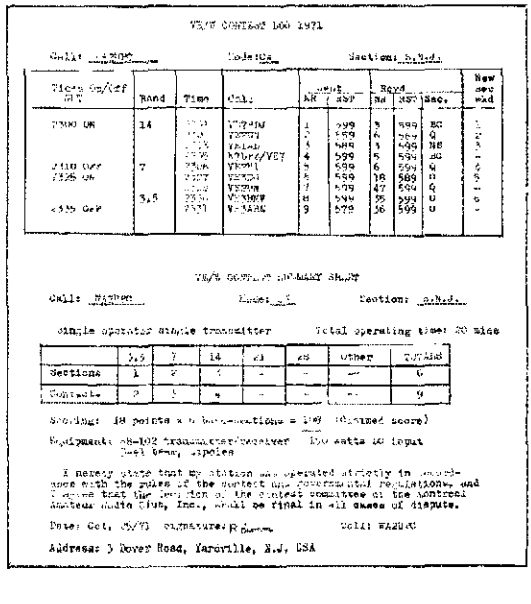
GEOGRAPHICAL AREAS:

Area	*Prefix*	*Abbr.*
Newfoundland	VO1	NFLD or NF
Labrador	VO2	LAB or L
Prince Edward Island	VE1	PEI or P
Nova Scotia	VE1	NS
New Brunswick	VE1	NB
Quebec	VE2	QUE or Q
Ontario	ve3	ONT or O
Manitoba	VE4	MAN or M
Saskatchewan	VE5	SASK or S
Alberta	VE6	ALTA or A
British Columbia	VE7	BC or B
Yukon	VE8	YUK or Y
Northwest Territories	VE8	NWT or NW

6) *Scoring*: Each completed contact is 2 points times the number of sections worked on any one band, plus the number of sections worked on each other band.

Example: 22 contacts in 9 sections on 21 MHz, 16 contacts in 4 sections on 14 MHz, and 12 contacts in 7 sections on 7 MHz = 22 + 16 + 12 = 50 contacts x 2 = 100 points x 20 sections = 2000 points.

(Continued on page 75)



VE/W CONTEST LOG 1971

Call: [redacted] Location: Section: [redacted]

Time On/Off GMT	Band	Time	Call	W/VE Nr	W/VE Sect	Band Nr	Band Sect	New Sect Wkd
2300 ON	14	[redacted]	[redacted]	1	599	1	599	BC
				2	599	14	599	Q
				3	599	3	599	NS
2310 OFF	7	[redacted]	K1bzf/VE7	4	599	5	599	BC
2325 ON			VE2QU	5	599	6	599	M
			VE2QU	6	599	18	599	M
			VE2QU	7	599	47	599	Q
			VE2QU	8	599	35	599	Q
0345 OFF	3.5	2355	VE-XMEN	9	599	36	599	Q

VE/W CONTEST LOG SUMMARY SHEET

Call: [redacted] Name: [redacted] Section: [redacted]

Single operator single transmitter Total operating time: 20 Hrs

	3.5	7	14	21	28	other	TOTALS
Sections	1	2	4	—	—	—	6
Contacts	2	5	9	—	—	—	9

Scoring: 18 points x 6 Sections = 108 (Claimed Score)

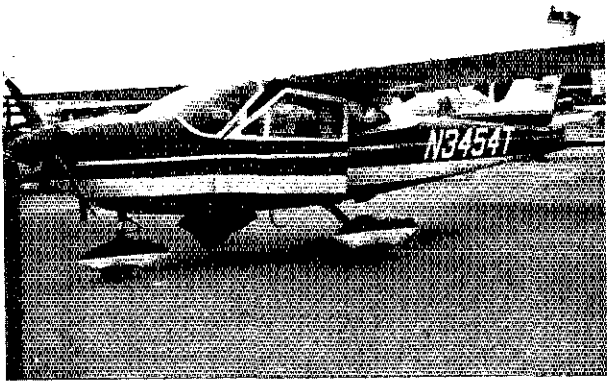
Equipment: SB-102 transmitter/receiver 150 watts DC input
Dual 6mm, dipoles

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

Date: Oct. 25/71 Signature: [redacted] Call: [redacted]

Address: 3 Dover Road, Yarmville, N.J. USA

Oscar Aircraft Competition Results



BY RAPHAEL SOIFER,* K2QBW

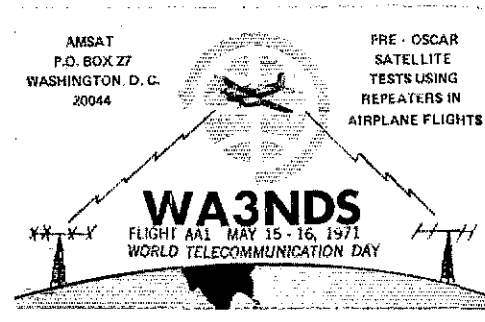
AT 1330 GMT May 15, 1971, a light plane carrying Amsat's prototype 2-to-10-meter translator took off from Friendship Airport near Baltimore, heading northeast toward Hanscom Field in Bedford, Mass. From Hanscom, the aircraft flew west to Michigan and Indiana, then back to Baltimore for touchdown at 2055 GMT, May 16th. All along the route, participants in Amsat's first contest (co-sponsored by ARRL) beamed signals at it in the band 145.9-146.0 MHz, and listened for re-transmitted signals from 29.45 to 29.55 MHz. Two-way contacts through the translator (both ways) counted two points, stations heard through the translator counted one point. Five bonus points were earned by reporting reception of the WA3NDS beacon, operating from the aircraft at approximately 29.45 MHz; the sum of the above to be multiplied by the number of ARRL sections worked and/or heard, constituting the final score.

Simple rules, but not so simple to win. The contest, developed as a training exercise for 1972's planned Amsat-Oscar B satellite,[1] proved to be quite a challenge. With less than 0.5 watts output to a quarter-wave wire, the translator proved extremely downlink-limited[2] (the satellite probably will be too). For those stations located more than 40 or 50 miles from the aircraft, very good antennas were required on both 10 and 2 meters if one wished to be copied on the ground, and to hear the more distant stations. With 10-meter signals so weak, cw was the order of the day for all but relatively short-range communication. Pounding brass in the space age? You'd better believe it! For paths involving relatively short downlinks, ssb worked quite well. The majority of participants reported disappointment with the results of a-m and fm attempts; receiving stations generally reported carrier but no readable modulation.

Nationwide, the top score was reported by Rich Zwirko, K1HTV, who had also done an outstanding job in the Oscar 5 experiments. Rich worked 10 stations, heard two more (including himself through the translator) in a total of six sections for 162 points. His equipment was a pair of 4CX250Bs driving a 40-element vertically polarized collinear at 40 feet, and on ten meters a rotary dipole mounted on the two-meter mast with an HQ-170. His best DX, in Livingston, N. J., was WA2BLE.

The second-place entry, Cincinnati's WA8LOW, had perhaps the most interesting story of the contest. Ron, a Technician, built especially for the contest a *24-element 10-meter array*, consisting of four six-element Yagis at 55 feet. Unfortunately, a power failure knocked out his two-meter transmitter, so his was a receiving-only entry. Although the aircraft was never close to his QTH, Ron heard 12 stations in seven sections, including K2SS (NYC-LI), W3ZPO (MDC), K1HTV (CT), and his best DX, Eastern Massachusetts' redoubtable W1QXX. This last path was approximately 725 miles; with the aircraft over New England, it probably resulted from sporadic-*E* propagation on ten. Ron heard the beacon over the East Coast from 1346 GMT, soon after takeoff, to 1601 GMT on May 15th. His was the only fully-documented report of skip propagation; a couple of others might have heard some but could not fully identify the calls.

The third-place entry, close on Ron's heels, was the Talcott Mountain UHF Society, WA1IOX, which put together a multioperator effort which worked seven stations, heard four others in a total of five sections for 115 points. They, in turn, just nosed out another club, the Kokomo (Ind.) Firebird Amateur Radio Club which had gathered at the station of WA9UHV. With four sections they totaled 112 points for fourth place. In fifth place, with 18 stations heard (tops in the contest) was Ohio's WB8ELK.



A special QSL is being sent to all stations who participated in the aircraft test.

* Amsat, P.O. Box 27, Washington, DC 20044.

1 See *QST* for March, 1971, page 58.

2 I.e, it was easier for a ground station to produce a strong signal for the repeater than it was for the repeater to produce a strong signal at the ground receiver.

SCORES

In the tabulation to follow, scores are listed by ARRL divisions and sections. Columns indicate final score, number of two-way contacts, number of stations heard but not worked, and number of different sections heard and/or worked. An asterisk indicates a multioperator station.

ATLANTIC DIVISION

Eastern Pennsylvania

K1SFF/3	44-	0-	6-4
W3DYL	24-	0-	3-3

Maryland-D.C.

W3ZM	44-	0-	6-4
W3CPU	39-	0-	8-3
K3JTF	39-	2-	4-3
W3KMV	36-	0-	13-2
W3LUL	34-	3-	6-2
W3AWN	33-	0-	6-3
K2QBW/3	28-	0-	9-2
W3OTC	20-	1-	3-2
W3QBC	20-	0-	5-2
W3YMB	18-	0-	4-2
W3GMG	16-	0-	3-2
WA3FKG	14-	0-	2-2
WA3KZR	12-	0-	6-2
K1YLU/3	10-	1-	3-1
W3CQM	8-	0-	3-1
WDX3RGT (SWL)	6-	0-	1-1

Southern New Jersey

W2AXU	42-	3-	3-3

Western Pennsylvania

WA3GTV	16-	0-	3-2
W3KVS	6-	0-	1-1

CENTRAL DIVISION

Illinois

W9BGX (WA9ULU, opr.)	42-	2-	5-3
WA9QZF	24-	0-	3-3
WB9FDP	6-	0-	1-1
WA9GRK	6-	0-	1-1

Indiana

WA9UHV*	112-	8-	7-4
K9UNM	48-	0-	7-4
W9HTF	39-	2-	4-3

GREAT LAKES DIVISION

Michigan

WA8LLY	36-	0-	7-3
WB8IDZ	12-	3-	1-1
W8DIV	9-	0-	4-1
W8TZZ	9-	0-	4-1
WB8DMD	7-	1-	0-1

Ohio

WA8LOW	119-	0-	12-7
WB8ELK	92-	0-	18-4
W8SMC	57-	6-	2-3
W8LRE	26-	3-	2-2

HUDSON DIVISION

Eastern New York

K2ARO	30-	1-	3-3
WB2NPR	18-	3-	2-2

NYC-LI

WA2UWA	75-	0-	10-5
WB2UZU	32-	0-	8-4
W2TUK	9-	0-	3-3

Northern New Jersey

W2GAX	78-	0-	8-6
WA2BLE (WA2s BLE FUD)	70-	2-	5-5
W2GRD (W2GRD + K2BMD)	56-	3-	3-4
WB2TFH	6-	0-	1-1

NEW ENGLAND DIVISION

Connecticut

K1HTV	162-	10-	2-6
WA1IOX*	115-	7-	4-5
W1BIH	33-	0-	6-3
WA1JZC	27-	0-	4-3
WA1KPG	16-	0-	3-2
WB2CHO/1*	9-	2-	0-1
WA1NUH	6-	0-	1-1

Eastern Massachusetts

W1MGP	80-	0-	11-5
K1PTF	42-	2-	5-3
W2AQV/1	30-	2-	1-3
WDX1DG (SWL)	6-	0-	1-1

Maine

WA1LTD	6-	0-	1-1

New Hampshire

W1JSM	42-	3-	5-3
W1UXS	39-	1-	6-3
W1FZA	30-	0-	5-3

Western Massachusetts

W1YK (WA2BCT, opr.)	24-	0-	7-2
WA1UUI	20-	2-	1-2
W1ALL	16-	0-	3-2

ROANOKE DIVISION

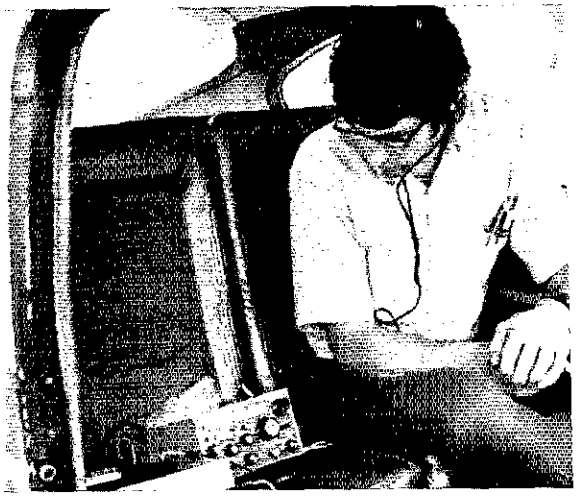
Virginia

K4FKD	28-	4-	1-2
K4AKE	20-	0-	5-2
WA4DGU	18-	0-	4-2

CANADIAN DIVISION

Ontario

VE3CTN	6-	0-	1-1



The WA3NDS flight crew consisted of pilot Jim Cristo, co-pilot WA4EAG, and repeater operator W3GEY. In this photo, Jan is shown with the monitor receiver he used to copy over 80 stations through the repeater.

The contest had a total of 69 valid log entries: the real story, however, lay in the running check sheet kept by W3GEY aboard the aircraft. Of the 80 stations copied by Jan through the repeater, 40 did not send in logs, including at least one probable high scorer up Massachusetts way. If ratios of logs-to-participants established in other contests held true here, we probably had 200 to 300 stations involved. Check-ins to the Amsat net on 7225 totalled well over 100.

In addition to the plaque signifying overall leadership going to K1HTV, special certificates will go to the winners in each of 18 ARRL sections (U.S. and Canada) represented by valid entries. Every station turning in a valid report, whether or not a contest entry, will receive a special QSL card. QST

Here are a few of the WA1IOX gang. In addition to participating in the Competition, the station served as control point for the 40-meter net which provided location-information about the aircraft.

September

VHF QSO Party

Announcement

STARTS	ENDS
1900 GMT Sep. 11	0600 GMT Sep. 13

Operate any two 14-consecutive-hour periods

All set for the September VHF QSO Party? If band openings are even half as good as we had in June, this is one contest you can't afford to miss!

Remember you may pick any two 14-hour periods out of the 35 hours available. All you do is exchange sections for QSO credit, add up your contact points and multiply that sum by the sum of your band-section-multipliers.

Read the rules carefully, then send right away for your free party log forms; a sample is shown below.

Mail your entry to us no later than October 5, 1971. C U then.– *WA1KQM.*

Rules

1) The September 1971 V.H.F. QSO Party begins at 1900 GMT, Saturday, Sept. 11, and ends at 0600 GMT, Monday, Sept. 13. Entrants may operate any two 14-consecutive-hour periods beginning no earlier than 1900 GMT Saturday (starting on the hour) and ending no later than 0600 Monday. All claimed contacts must be within the two chosen periods and must be made on amateur frequencies above 50 MHz., using authorized modes of operation.

2) Name-of-section exchanges must be acknowledged by both operators before either may claim contact point(s). A one-way exchange, confirmed, does not count; there is no fractional breakdown of the 1-, 2-, or 3-point units.

3) Fixed, portable or mobile operation under one call, from one location only, is permitted. A transmitter used to contact one or more stations may not be used subsequently under any other call during the contest period (with the exception of family stations where more than one call is assigned to one location by FCC/DOC).

While no minimum distance is specified for contacts, equipment in use should be capable of real communications (i.e. able to communicate over at least a mile).

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

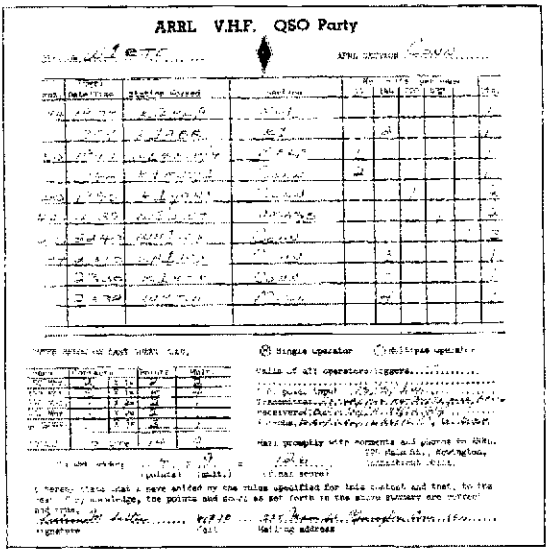
4) Scoring: 1 point for completed two-way exchanges on 50 or 144 MHz.; 2 points for such exchanges on 220 or 420 MHz.; 3 points for such exchanges on the higher v.h.f. bands. The sum of these points will be multiplied by the number of different ARRL sections worked per band; i.e., those with which at least one point has been earned. Reworking sections on additional bands for extra section credits is permitted. Cross-band work does not count. Aircraft mobile stations cannot be counted for section multipliers.

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

6) A contact per band may be counted for each station worked. Ex.: W2EIF (S.N.J.) works K1YON (Conn.) on 50, 144 and 220 MHz. for complete exchanges. This gives W2EIF 4 points (1 – 1 – 2) and also 3 section-multiplier credits. (If W2EIF contacts other Conn. stations on these bands, they do not add to his section multiplier but they do pay off in additional contact points.)

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

8) Awards: Entries must be postmarked no later than October 5, 1971. 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 multiple-operator entries are received. Certificates will also be given to the top Novice in each section where three or more such licensees submit logs and to Novices in sections of less than 3 entries, who in the opinion of the Awards Committee, displayed exceptional effort. Awards Committee decisions will be final. QST


ARRL V.H.F. QSO Party

Two Hams Receive High Honor

TWO RADIO amateurs have recently been awarded the President's Trophy – the nation's highest tribute to the courage and determination of its handicapped citizens. The recipients are Richard and Robert Santin, KØULQ and KØVTD, twin brothers born with muscular dystrophy, permanently confined to wheelchairs, each with an almost 100 percent physical disability. At 31, they are now self-employed as electronic technicians as a result of self-training which began with their interest in amateur radio.

Since as children, the boys were unable to attend school, their mother began to teach them at home. The county superintendent of schools arranged for a teacher to visit the home once a week, to advise Mrs. Santin and to help her develop a curriculum. The twins were quick to learn. When ready for the sixth grade, they had outgrown home tutoring and were provided a communications system that enabled the children to participate in classes at the nearby one-room schoolhouse. Everything that went on in class was relayed to a speaker in the Santin home where the boys sat in their wheelchairs at a work table.

Like other seniors in the class, Richard and Robert took tests and graduated from grade school. Then, through the Division of Correspondence of the University of Nebraska, they got the equivalent of a high school education. Throughout, their marks were high, and their papers showed no signs of the difficulty they had in writing.

Enter Ham Radio

The twins were becoming intrigued by articles they read on amateur radio and electronics. They studied and got amateur radio licenses and their own transceiver. Marilyn (their sister) also earned a license (KØEEV) and Mr. Santin, a Novice license.

Now, the world really opened up. Daily, Richard and Robert communicated with other hams in this country and overseas. Some of these people visited the Santins and became fast friends. Often, amateurs within a 200-mile radius of Fullerton gathered at the Santin farm, in a clearing on the banks of the Loup River, for Field Day activities.

Eventually, an engrossing hobby became a serious study. In 1964, Richard earned an FCC 1st class radio-telephone operator's license. Gradually, friends and those who heard by word of mouth of their knowledge of electronics, began to bring the twins radios and other equipment to repair. It could hardly be called a business. The remoteness of the farm and Richard's and Robert's lack of mobility kept it at the level of a hobby that brought in some pay. But as their experience grew – along with rejections by potential employers they approached – so grew their determination to open a business that would make them financially independent.

Determination!

When they made their decision, almost two years ago, the twins said, "Most people figure we're too handicapped to do anything. We've waited 30 years for our ship to come in. We're tired of waiting, so now we're paddling out to meet it."

There was much to be done. A van was purchased and the interior modified to hold Richard and Robert in their wheelchairs, plus test equipment and components of the communications systems they got a franchise to sell. The E. F. Johnson Company, of Waseca, Minnesota, granted the franchise, more impressed by the twins' know-how than by their disability. An able-bodied young man in Fullerton, with some training in electronics, joined Richard and Robert. The sign, "Santin Two-Way Communications – Sales and Service," in red letters on white, was erected on the country road.

Like any venture, it took time to get started. Many people thought it would be impossible for the two severely disabled men, with just one assistant, to make a go of it. But little by little, they found customers – a veterinarian who treated livestock on area farms and who would save time and travel by having a two-way radio system, the manager of an aerial spraying business, the St. Paul police and fire departments, an ambulance service, a school system, and others. The twins' reputation as professionals grew. A businessman who hired them, not knowing they were handicapped, summed it up this way, "They know what they're doing and do it so well, it's unbelievable."

To date, the van in which Richard and Robert travel the state of Nebraska has logged more than 50,000 miles, in summer and winter, in good weather and bad.

(Continued on page 89)

In the Rose Garden of the White House, President Nixon congratulates Richard and Robert Santin, KØULQ and KØVTD, after they received the President's Trophy as Handicapped Americans of the Year. With them is Harold Russell, chairman of the President's Committee on Employment of the Handicapped.

AMATEUR RADIO PUBLIC SERVICE

NTS RACES AREC

In the Public Interest, Convenience, Necessity HRH

CONDUCTED BY GEORGE HART,* WINJM

FIELD DAY INTROSPECTION

AS WE WRITE this, Field Day has not yet taken place. By the time you read it, FD will have *been over about a month. The subject will still be* on everyone's mind, so perhaps this is a better time to discuss it than in January or February. We have a whole year before the next FD, so we can take our time and deliberate at leisure on just what Field Day is, how it should be handled, what the rules should be. Despite the careful deliberations of the Contest Advisory Committee, there was some unhappiness.

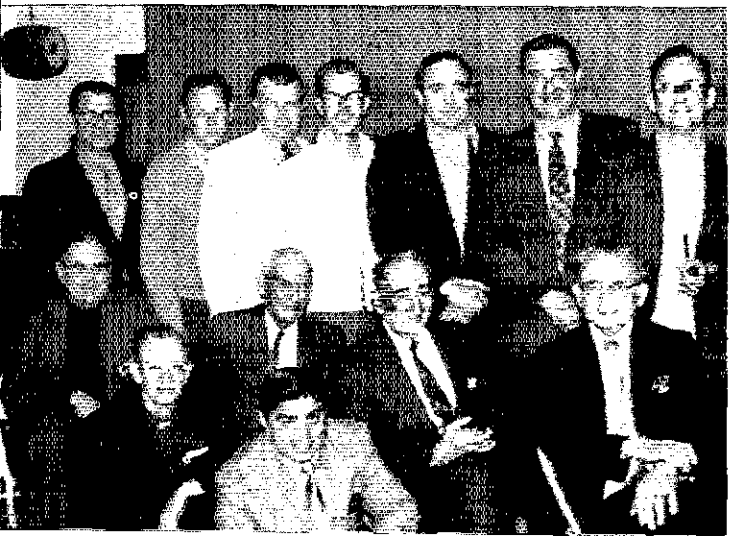
Field Day is so important and so popular because it is so many different things rolled into *one activity in which just about every kind of* amateur participates. If you have never been "out" with a group, you have missed an experience that should be part of every amateur's life, no matter what your "thing" is. Yet, despite the all-encompassing features of the Field Day, its rules were largely considered and determined by deliberations of the *Contest* Advisory Committee.

Why should this be so? Is Field Day, then, purely and simply a contest? Or is it just that it's closer to being a contest than any other one thing? Or does its contest complexion outweigh all other aspects? Or is the Contest Committee the only one of the existing committees which even remotely can advise on Field Day?

The fact is, we guess, that the really avid participants in Field Day are out to *win*, and from their standpoint it most certainly is a contest, and little more. This comparative handful of participants – as a guess, not more than 10% – make the most noise, submit the most suggestions and have the greatest effect on Field Day rules deliberations. The other 90%? Mostly, these go out for other reasons, of which there are many. The biggest reason we give the public in our publicity releases, of course, is to prepare for emergencies. To ourselves, we have to admit other reasons. One, as one of the original FD announcements said, might be "to get out in this fine spring weather." Others make it a family outing, or a social affair, or just a chance to be fellows together with no inhibitions, or to test new gear. Why, for example, does a club group of 40 or 50 amateurs of highly diversified interest take six transmitters into the field and make a couple of hundred contacts? Answer: it makes a good club activity, something for everyone. Certainly not to win a contest, and most likely not with the specific intention of testing emergency equipment. Let's face it, the majority of participants consider the Field Day a success if everybody (or 'most everybody) "has fun." Most of them couldn't care less about the rules; they'd go out no matter what the rules were. It's only that (estimated) 10% who get emotional about the rules.

If the above is a valid evaluation (some will no doubt disagree), then on what do we base our rulemaking? If the majority don't care, can we ignore them, and concentrate on the wishes of *those who do care? If an individual or group is a* low-key participant, but does care about the rules, should his views carry as much weight as the guy or group that goes all out? Should a committee member who doesn't go out for *FD* carry any weight on deliberations on this subject?

*Communications Manager, ARRL.



The "Policy Committee" of the New York State Phone Traffic and Emergency Net met at Syracuse, N.Y. on May 8, 1971. Shown in the photo are, standing, WA2NKI, K2YJR, WB2QEI, WB2MWZ, WB2QAP, WB2ASK, WB2VJB; sitting, WB2QKQ, K2HOH, K2AAS, W1UX; kneeling, WB2AEK, WB2HLV. *(Photo by WB2VBK, using W1UX's equipment.)*

East Bay SCM WB6DHH visited the amateur radio exhibit at the Oakland Hobby Show in April. That's Paul second from the left. Others, left to right, are WB6CBW, Hobby Show Queen Patty Rounke, W6BSW and WA6BBG.

Well, we're not picking on the CAC; they spent a lot of time and effort on the FD Rules and deserve all kinds of kudos. We're just discussing general principles. And for the purposes of this department (i.e., this magazine department, Public Service) we would like to see more emphasis on the public service aspect of Field Day, more incentive and encouragement given to simulation of actual emergency conditions and use of emergency power. If you have strong thoughts on this, it would be a good idea to let your nearest CAC member know about it – or write to headquarters, we'll see that your comment is routed to the committee. *WINJM.*

Public Service Diary

On May 15, amateurs of the Massasoit Amateur Radio Assn. helped to provide emergency communications during the 150 acre forest fire in the Myles Standish State Reservation in Plymouth, Mass. Mobile stations were operated by WA1ILN, WA1OEZ, WA1KFQ and WA1OEW, with W1CUY providing a landline link to the Plymouth Civil Defense and with the Plymouth Fire and Police Departments. – *WA1MPZ.*

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On May 20, K1LTJ was working on the repeater, WA2SUR, atop the same building in which was located WXTV-TV on Channel 41. A fire developed in the building, so Al crawled to a telephone and tried to call for help, to no avail. All but overcome by smoke, he then "fired up" the repeater transmitter and yelled for help. At the time, WA2DHF was on his way to the repeater site and heard the call. Upon arrival at the building, he found it blocked off by fire equipment, and a fire marshall told him that all occupants were out of the building. It took a little convincing, but finally they sent some firemen up in an elevator and rescued K1LTJ. By that time about 20 hams were on the scene, having heard the exchange. – *WN2SQQ.*

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Late in the evening of May 21 a single-engine aircraft went down in foul weather near Lander, Wyoming. Because of the weather, search operations could not begin until May 12, at which time K7YJX called on local hams to assist the CAP with communications. K7YJX set up portable operation in a hangar at the Lander airport. K7VEW and K7TXZ assisted with operations at the airport while WA7OEC stood by with his mobile to move to the crash scene. K7WUR, from his home, enlisted W7BKI at Riverton and W7CQL and K7SLM at Casper to help coordinate CAP communications between those cities. K7LOH flew one of the search planes. K7TWK served as contact in Kemmerer, home of the two men in the downed aircraft. The aircraft was located early Sunday afternoon (23rd) and WA7OEC immediately proceeded to the scene, where he maintained contact with search headquarters until operation was secured about 1500 Sunday afternoon. Both occupants of the plane perished in the crash. *K7TXZ.*

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Rain beginning on Sunday morning, May 23 and lasting until early Tuesday, May 25, caused serious flooding and disruption of communications in the Thunder Bay (Ont.) area. By late Monday the situation was so bad that the Lakehead Search and Rescue Unit set up a base camp on Current River near the Onion Lake Dam. Members of the Lakehead Amateur Radio Club and the local AREC provided communications. Using the club's call, VE3ZCD, operation was established on 3750 kHz by VE3EEW, VE3EFI and VE3EDC, in contact with VE3AJ, VE3ARN, VE3BPZ and VE3EDZ in town, to keep rescue units and city officials informed of the situation. – *VE3AYZ, EC Thunder Bay District, Ont.*

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On June 4, WA2TNC was monitoring Manhattan Repeater WA2SUR on 146.19-146.73 MHz when he heard W2PMX/mobile call for an emergency, one-way phone patch. Warren responded and was informed that a pedestrian was struck by an automobile and required an ambulance. Experiencing some difficulty in dialing (from Scarsdale), Warren got an emergency connection with the New York police through a cooperating local telephone operator. By 0912 the message had been delivered to New York City police and an ambulance was on the way. At 0925 W2PMX

W3KPJ's car leaves no doubt that it contains a ham station, or whose station it is. In case you can't quite make out from the picture, he is the SEC for Western Pa. Taken at a Western Pa. net meeting and picnic.

BRASS POUNDERS LEAGUE

Winners of BPL Certificates for May Traffic

Call	Orig.	Rcvd.	Rel.	Del.	Totals
W3CUL	307	1204	1121	61	2693
K9APD	1058	–	–		1058
K3NSN	101	475	410	65	1051
W3VR	211	342	309	21	883
K5ILY	–	409	392		801
W7BA	13	358	304	45	717
WAØVAS	108	245	55	190	598
WB4NNO	36	303	245	1	586
WØLCX	22	274	202	16	514
WA4VEK	152	192	142	17	503
W3EML	33	286	181	–	500

BPL for 100 or more orignations plus deliveries

WA7AVI	147	WA4MKH	121	W6NLG	108
K8ONA	147	WB4OKI	119	WA8VKF	106
WA1GCE	145	WB4AIW	118	WB9BJR	106
WA6BYZ	139	W8ILL	116	WNØCGT	106
W3TN	137	WN4SON	114	WB2FTW	105
W3MPX	127	W8QCU	114	WAØFBZ	105
KØCSF	127	WB6ZVC	111	W2OL	104
WA3OGM	121			WN9FBG	101

BPL Medallions (see July, 1968 *QST* p. 99) have been awarded to the following amateurs since last month's listings: WA1JVY, WA1MEB, WA2EGS, W3EZT, WB4KDI, WB6AKR, WB6SXY, WB8BPB, W8BPU, KØCSE.

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 originations 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.

reported that the victim had been evacuated to the hospital and the operation was terminated. During all this operation, with an estimated 200 amateurs monitoring, not one "broke the frequency" while the emergency operation was in progress. – *WA2TNC.*

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On April 17, amateurs from the Diablo Valley (Calif.) once again provided communications for the annual Spring Trial Ride, a horse-riding event, on Mt. Diablo. This year, 128 horsemen participated, with the following amateurs in their mobiles: *W6s* LKE QEN, *K6s* IMV OSE, *WA6s* OAZ DIL DKG HIS, WB6TZR and K7CNP/6.

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The Austin (Tex.) Amateur Radio Club set up a message booth at SAFARI '71, a carnival type outing sponsored by the local Natural Science Center. The booth was open for five hours on April 24 and six hours on April 25. Things were slow the first day, but the second day over a thousand people visited the booth and 72 messages were filed, most of them given to W7WAH/5 to be put into NTS. – *K5EJL.*

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On May 1, twelve amateurs operated for 11 hours providing communications for the Waterford Township (Mich.) Project Concern Walk for Mankind. Two-meter fm was used. – *K8DUF, RO Oakland Co., Mich.*

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Ten members of the San Antonio (Tex.) Radio Club and the San Antonio Repeater Organization provided communications for the regional and national races held by the Sports Car Club of America on May 1-2. Mobile and portable units operating on 2-meter fm were stationed on each of the six corners of the 2-mile course. The solid communications provided race officials at the start-finish line with immediate information concerning hazardous conditions and rules violations as the more than 30 cars sped around the course. One instance of possible serious consequences was averted when crash-rescue vehicles were dispatched to a car that caught fire at high speed. FM is required because of the terrific ignition noise.

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On May 1 & 2, 19 members of the Glens Falls Area AREC provided communications for the 6th straight year at the Annual North Creek White Water Derby, a 2-day canoe and kayak race held on the upper stretches of the Hudson River. The first day, AREC members set up three communications sites, one at the common starting line and one at each of the two finish lines, with one mobile shuffling equipment and operators. Each radio site was equipped with 6 and 2 meter gear. The former was used for transmission and reception of starting and timing signals, and 2 meters was used as a backup and common talk frequency.

On the following day, amateurs set up and operated the two radio sites necessary for operation of the down-river race. The two radio sites were located at the start and finish lines some 7 miles apart with a mountain in between. All communications worked well except for failure of a two-meter transceiver on Saturday which was replaced within five minutes. – *K2AYQ, EC Glens Falls Area, N.Y.*

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April reports were received from 41 SECs, representing 13,914 AREC members, a drop of one SEC report and about a thousand AREC members from last year. Since we have better than 50% now, we're going to start listing those sections whose SECs do *not* report. Maybe *that* will smoke 'em out! So here are the sections whose SECs did *not* send in an April report: Ala., Alaska, B.C., C.Z., Del., E. Bay, E.N.Y., Ga., Hawaii, Idaho, Ill., Ky., Los A., Me., Man., Minn., Miss., Mo., N.H., N.Mex., N. Dak., R.I., Sac.V., San F., S.C.V., S.J.V., Santa B., S.C., S. Tex., Vt., W.I., Wis., Wyo.

Traffic Talk

We ought to use more break-in. Again and again, even on NTS area nets, one hears a station begin to send traffic by saying NO QSK (whatever that means) or NO BK (which makes more sense). What goes? Have we become so married to plug-in gear that we are letting it dictate our operating habits? All cw operators, at least in NTS region and area nets (and TCC, of course!) should be capable of full break-in operation. This doesn't mean you can hear the other station when you stop sending, it means you can hear him when you *are* sending – not only between characters, but in between your dits and dahs. When he "breaks," you hear him – not after the second or third time, but the first time, and instantly.

Much cw traffic is handled, these days, using sideband rigs keying through VOX relays. This is no good. Some of them are fast-acting enough to make for partial break-in, but not in the true sense of the term. Most of them are *lousy*. They don't close fast enough to complete that first dit, even if set for maximum sensitivity, and they open between words so that the tendency is to run your words all together, like saying "Ahhhhhhhh..." on sideband to keep the relay closed. Both are "liddy" habits.

Okay, so you have a sideband transceiver and that's your only rig, and that's that. Maybe you feel lucky that the manufacturer made provisions for cw at all. As long as you restrict yourself to

Public Service Honor Roll May, 1971

This listing is available to amateurs whose public service performance during the month indicated qualifies for 30 or more total points in the nine categories below. A delineation of the points awarded for each function is given in the category key at the end of the Honor Roll listing. Please note maximum points for each category.

Category / *Max. Pts.*	*(1)* *10*	*(2)* *10*	*(3)* *12*	*(4)* *12*	*(5)* *12*	*(6)* *20*	*(7)* *3*	*(8)* —	*(9)* *5*	*Totals*
WA8ETX	10	10	12	12	12	2		8	5	71
K7CTP	10	10	12	12	12	10				66
WB4OKT	10	10	12	12	12		3		5	64
K3ZNP	10	10	12	12	12	1			5	62
WA2FVH	10	10	12	12	12				5	61
WB4KDI	10	10	12	12	12				5	61
WB8BBG	10	5	12	12	12	6				59
WØLRW	10	10	9	12	12				5	58
WB2AEH	10	10	12	12	12					56
WA2ICU	10	10	12	12	12					56
W8LT*	10	10	12	12	12					56
W2OE	10	10	12	12			3		5	52
W3MPX	10	10	12		12		3		5	52
W7BQ	10	7	12	12	6				5	52
W7CAF	10	10		12	12	3			5	52
W7OCX	10	10	3	12	12				5	52
WAØVYV	10	10	12	8	12					52
WA1JVV	10	5	12	12	12					51
W3EZT	10	8		12	12	4			5	51
WAØVAS		10		12	6	20	3			51
WA8UPI	4	10	12		12	7			5	50
W6BGF	10	10	12		12				5	49
W8IMI	10	10	12		12				5	49
WA9WMT	10	10	12		12				5	49
KØMRI	10	10	12		12				5	49
WB6ZVC	10		12		6	20				48
W7MCW	10	10		12		16				48
WA2JIM	10	10	3	12	12					47
WB4JMH	10	10	12	3	12					47
W4NOG		10		12		20			5	47
WAØYMU	10	10	12	12		3				47
WA8NOQ	10	10		12	12	2				46
WA8VKF		10		12	12		3	2	5	46
WA1GCE	10	5	12		12				5	44
WB2NOM	10	10	12		12					44
WA2VLS	10	10	12	12						44
K5ROZ	10	10	12		12					44
W5SBM	10	10	12		12					44
W6MNY	10	5	12	3	9				5	44
W9PRN	10	10	12		12					44
WØBV	10	10	12		12					44
WAØHTN	10	10	12		12					44
WAØJFC	10	10	12		12					44
WØLCX	6	1	12		12		3	5	5	44
W6LRU	10	5	12		12					44
VE3GI	10	5	12		12				5	44
W9HRY	10	4	12		12				5	43
WAØVYB	4	10		12	9	8				43
WB4OMG	10	10	10		12					42
W6FJT		10	12			20				42
WA3OGM	5	4	12		12		3		5	41
W5RBB	10	6	12		12					40
W2FR	10		12		12				5	39
W2RUF	10		12		12				5	39
W3LOS	10		12		12				5	39
W3NEM	10		12		12				5	39
WA7MAD	10	5	12		12					39
K7UYW	10	4	3		12	10				39
WA8PIM	10		12		12				5	39
WØHI	10		12		12				5	39
WAØSIG	10	5	12	12						39
VE3ARS	10	5	12		12					39
VE3ERU	10		12		12				5	39
W1BVR	10	4	12		12					38
W4FFF	10	4	12		12					38
WB4SGV	10	10	12	6						38
W7PI	10	10	6		12					38
Vk4BQ	9		12		12				5	38
W3TN	10			12	12		3			37
WB4LAA	10	10	12						5	37
K1EIR	5	4	12	6	9				5	36
W2MTA	10	8	12						5	35
WA3LAK	10	1	12		12					35
W6DEP	10	10	12	3						35
WB8ALU	10	1	12		12					35
K1SXF		5		12	12				5	34
K2KTK	10		12		12					34
W3YA*	10		12		12					34
K4KNP	10		12		12					34
WB4KSL	10		12		12					34
W6YBV	10	12	12							34
WA6ZKI	10		12		12					34
W2AXT	10	6	12		6					34
WA8ETW		10		12	12					34
K8LGA	10		12	12						34
KØBAD/4	10		12		12					34
VE3AWE	10		12		12					34
VE3CYR	10		12		12					34
VE3FX1	10		12		12					34
VE3GFN	10		12		12					34
WA3PLP	10		8	12		3				33
W6LYY	10		12		6				5	33
W6MIF	10		12		6				5	33
WA1MFB	2	10		12	3				5	32
W4UQ	5	3	12		12					32
WB8CWD	10	10	12							32
W6INH	10		10		6				5	31
W2USO	10	8	12							30
W8IZ	6		12		12					30

*Denotes multioperator station.

Category Key. (1) Checking into cw nets, 1 point each; (2) Checking into phone/RTTY nets, 1 point each; (3) NCS cw nets, 3 points each; (4) NCS phone/RTTY nets, 3 points each; (5) Performing assigned liaison, 3 points each; (6) Legal phone patches, 1 point each; (7) Making BPL, 3 points regardless of traffic total; (8) Handling emergency traffic directly with a disaster area, 1 point each message; (9) Serving as net manager for entire month, 5 points.

equipment intended primarily or solely for voice operation, you're not going to be a first class cw operator. For best cw traffic operation, you need a separate receiver and 100% break-in. If you don't have it, then you are as handicapped as you would be with less than mediocre operating ability. — *W1NJM.*

National Traffic System. At the moment, following the departure of WA9HHH from the headquarters scene, things are a bit hectic in the Public Service Branch of the CD. We hope we have all the reports received, but at the time of compilation there may be some missing.

Deadline for receipt of reports at headquarters is the *fifteenth* of the month. At this time, or shortly afterward, we start compiling the report statistics and in general preparing *QST* copy. *Our* deadline is the 20th. *Your* deadline is the 15th. If you don't have your report in our hands by that date, you stand an excellent chance of being left out.

Procrastination is a terrible thing. As long as we say *our* deadline is the twentieth, we know there are going to be a sizable percentage of net managers who will call us on the telephone at 4:15 P.M. on the twentieth and expect to get their reports in. Since by then we have our copy turned in (or else!), this means it is necessary to retrieve it (not always possible), make pencilled entries and refigure all the statistics. We have occasionally done this in the past, but no more. Please have your reports here by the 15th of the month, or let's not hear any complaints about being left out.

EAN moved to 7070 kHz on June 1, on a trial basis. Hail and tornado weather, with attendant QRN, is hampering CAN. 1RN is losing some of its young stalwarts. W2FR has issued 2RN certificates to *W2s* FZK ZEP, *WA2s* FBI ICU HOP, *WB2s* FEH TUL (at W2DSC). Congrats on second 100% month in a row for 2RN. W7BQ reports things tough on RN7 but is sticking to 80 meters. W9HRY notes poor conditions, traffic low, and lack of enthusiasm on 9RN, but is still optimistic.

Morrie Hope, W8EWD, Mich. State Radio Officer, addresses the League Officials Meeting at the Great Lakes Division Convention, Muskegon, Mich., in March of 1971.

May Reports

Net ..... *Sessions*	*Traffic*	*Rate*	*Avg*	*Rep. (%)*
1RN 62	528	.345	8.5	88.2
2RN 62	466	.676	7.5	100.0
3RN 62	421	.369	6.8	98.9
4RN 53	422	.323	8.0	81.5
RN5 62	669	.341	10.7	88.7
RN6 62	670	.498	10.8	100.0
RN7 57	176	.268	3.1	45.4
8RN 61	351	.371	5.7	94.1
9RN 62	434	.439	7.0	90.7
TEN 62	415	.357	6.7	74.8
ECN 30	128	.199	9.2	92.8
EAN 31	1384	1.171	44.6	98.9
CAN 31	990	.796	31.9	100.0
TCC Eastern ....121[1]	634			
TCC Central ....93[1]	528			
TCC Pacific ....128[1]	739			
Sections[2] 1829	9292		5.1	
Summary *3526*	*18248*	*EAN*	*6.5*	
Record *3237*	*29677*	*1.313*	*18.4*	

[1]TCC functions, not counted as net sessions.

[2]Section and local nets reporting (48): QKS (Kans.); PITN, TPA, WPA (Pa.); OSSB, BN, (Ohio); MSN, MJN, MSPN (Minn.); CN CPN (Conn.), GN EMTN VEN (Fla.); AENB AEND AENT AENM (Ala.); WSBN WIN (Wis.); NCN SCN (Cal.); OQN (Ont.-Que.); GBN (Ont.); WMN (Mass.); MDCTN (Md.-D.C.); RISPN (R.I.); BUN (Utah); West Que. V/UHF; TEX, TFN (Texas); MTN (Man.); GSN (Ga.); PVTEN (N.J.); WSN (Wash.); QMN (Mich.); OZK (Ark.); LAN (La.); NYS (N.Y.); CN (L) (N.C.-S.C.); KTN (Ky.); BSN (Ore.); VSBN VN VSN (Va.); SGN (Me.); ILN (Ill.).

Transcontinental Corps. W3EML reports traffic down, successful functions up, as usual; vacations and leaves of absence will make things tough this summer. Failures on TCCC due mostly to inability to contact counterpart stations, according to W0LCX. W6VNQ also having troubles with stations not keeping skeds. All in all, however, the percentage of reliability on TCC has been remarkable.

May Reports

Area	*Functions*	*% Successful*	*Traffic*	*Out-of-Net Traffic*
Eastern 128		98.4	1820	634
Central 93		95.6	1082	528
Pacific 128		97.6	1478	739
Summary *349*		*97.4*	*4380*	*1901*

The TCC Roster: Eastern Area (W3EML, dir.) – *W1s* BIG QYY NJM EJI, K1SSH, WA1JTM. *W2s* GKZ ER OC, K2KTK, WA2UWA, WB2LZN, W3EML, K3MVO, *W4s* NLC UQ SOQ, *K4s* GTS KNP, WB4NNO, *W5s* RYP PMJ, K8KMQ, *WB4Bs* POS PIM YVR ZGC. Central Area (W0LCX, dir.) – *W4s* OGG ZJY, *WB4s* HQW KPE, *W5s* MI SBM, *W9s* CXY DND, WA9VZM, *WØs* HI INH LCX ZHN, *WAØs* IAW WEZ, KØAEM. Pacific Area (W6VNQ, dir.) – W5RE, K5MAT, *K6s* DYX KCB, *W6s* BGF EOT IPW MLF MNY VZT VNQ, *WA6s* DFI UFA, *W7s* EM KZ DZX EKB, KØJSP.

Independent Net Reports (May)

Net ..... *Sessions*	*Traffic*	*Check-ins*
Eastern Area Slow 30	133	
ECTTN 24	61	235
3290 40	1553	537
Clearing House 26	231	427
20 Meter Interstate SSB 20	1035	397
North American 26	410	439
Mike Fatad 26	157	290
All Service 5	21	77
Northeast Traffic 31	215	340
Northeast Area Barnyard ..... –	5	670

–30–

Strays

W7KON Memorial Fund

The Foundation for Glacier and Environmental Research, with headquarters in Seattle, has created an Irving Herrigstad Memorial Fund to help finance the participation of a young person in a field-science expedition to Alaska or elsewhere in the Northwest.

Herrigstad, who died March 12, at the age of 44, was a radio amateur, W7KON, who established the original radio communications system for the Mountain Rescue Council in the 1940s. He was a member of the Advisory Board of the Foundation, especially interested in encouraging young people to enter field science and exploratory careers. He was a member of the Explorers Club, the Mountaineers, several amateur radio clubs, and the Boy Scouts of America. Contributions to the fund may be made to the Foundation, 5001 25th Avenue, NE, Seattle, Washington 98105.

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Did you know that –

3.5 MHz is not 80 meters but 85.71 meters.
7.0 MHz is not 40 meters but 42.85 meters.
14.0 MHz is not 20 meters but 21.43 meters.
21.0 MHz is not 15 meters but 14.28 meters.
28.0 MHz is not 10 meters but 10.71 meters.
144.0 MHz is not 2 meters but 2.08 meters.
50 MHz *is* 6 meters – the only frequency that is correctly designated as such. *W1NF*

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Feedback

Apparently someone was having a bit of fun at K4UGC's expense (Strays, page 77, June *QST*); the item, furnished over his name, was completely spurious.

SOUTHWESTERN DIVISION CONVENTION

Anaheim, CA — September 4-6

The 1971 Southwestern Division ARRL Convention will be held Saturday through Monday, September 4-6, at the Disneyland Hotel, Anaheim. An outstanding program has been arranged for your special interests and enjoyment.

Senator Barry Goldwater, K7UGA/K3UIG, will be featured speaker at the Sunday banquet, and he will be introduced by former Air Force Chief of Staff General Curtis LeMay, W6EZV. Technical sessions, displays of the latest equipment, a hidden transmitter hunt, YL operators forum moderated by Louise Moreau, WB6BBO, and a Midnight Wouff Hong initiation are but a few of the attractions this year. ARRL Hq. staffer Lew McCoy, W1ICP, will conduct the Novice forum, and you'll be able to get the latest word on League affairs from Southwestern Division Director John Griggs, W6KW, and General Manager John Huntoon, W1RW, at the ARRL forum on Sunday afternoon. There will be a special XYL and Harmonics program Saturday and Sunday.

A special call, WD6WD, in honor of the late Walt Disney, has been authorized by FCC for operation September 1-7. The station will be set up to operate around the clock on all bands, vhf through 3.5 MHz, phone and cw. Talk-in on 2, 6, 40, and 80 — just look for the pile-up! A commemorative QSL will be sent to all who work WD6WD and mail their card (with s.a.s.e.) to K6VDP.

The convention commences Saturday, September 4, with registration opening at 0800, in the main lobby, Marina Tower, Disneyland Hotel. Monday, September 6 (Labor Day) has been left open for those who wish to attend Disneyland. Registration is $4, combined banquet and registration $15, banquet only $9. XYL & Harmonics program $6, XYL & Harmonics program with banquet $15. Make checks payable to ARRL Convention and send to G. Legel, W6KNE, 1306 Sheppard Drive, Fullerton, CA 92631. Room reservations should be made directly with the Disneyland Hotel, or through the Anaheim convention Bureau, Anaheim.

COMING A.R.R.L. CONVENTIONS

September 4-6 — Southwestern Division, Anaheim, California

September 25-26 — North Carolina State, Raleigh

October 9 — Dakota Division, Sioux Falls, South Dakota

January 22-23 — Southeastern Division, Miami, Florida

NOTE: Sponsors of large ham gatherings should check with League headquarters for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL Hq. for up to two years in advance.

Hamfest Calendar

AUGUST 1971

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Michigan — The 18th Annual South Western Michigan VHF Picnic, sponsored by the Van Buren County ARC, will be held at the Allegan County Park, August 1.

Missouri — The Southwest Missouri ARC will hold its annual Hamfest and Picnic on the north side of Lake Springfield in Springfield on Sunday, August 22. A ssb station will be operating for talk-in on 7280 kHz. Lunch starts at 12 noon; bring service and covered dish; all else provided. Donation and entry fee $1. All hams welcome. Used equipment table supplied for those interested.

Nevada — The Sierra Hamfest sponsored by the Nevada ARA is scheduled for August 14 at Idlewild Park, Reno. Write Chairman K7ZAU for additional information.

New Jersey — The South Jersey Radio Assn. will sponsor its Annual Gala Hamfest on Sunday, September 12, 11:00 A.M. to 5:00 P.M., at Molia Farm, Malaga (Rain date September 19). Talk-in on 3.930, 50.3, and 145.3 MHz. Molia Farm is near intersection of Route 40 and 47 near Malaga, N.J. Advanced donation is $2 per family until September 6. General donation at the gate is $3 per family. Obtain advance tickets from Joe Duffin, W2ORA, 247 Kings Highway, West Haddonfield, NJ 08033. Checks should be made out to South Jersey Radio Assn.

New Jersey — Saddle Brook Park will be the site of the East Coast VHF Society's (WA2WEB) 13th Annual Hamfest and Old Style Picnic, Sunday, August 1, beginning at 10:00 A.M. Displays, contests, and games will be featured for hams and non-hams alike of all ages. An antenna measuring contest will be a highlight of the day. The park is located on Saddle River Road, Saddle Brook. Admission and parking are free. Food and soft drinks will be available. Listen for talk-in stations or follow signs from major arteries.

New Mexico — The Amateur Radio Clubs of New Mexico will sponsor the New Mexico Hamvention 1971 on September 17, 18, and 19. Convention headquarters will be the Sheraton Western Skies Motor Hotel on East Highway 66, Albuquerque. The program will feature technical sessions on antenna theory, ssb, vhf/fm, traffic, MARS, QCWA, DX, Laser communications, RACES/AREC, solid-state electronics and many others. Major manufacturers will exhibit. The ladies' program will feature a fashion show. Tours of the Albuquerque area will be available, including tours of the Sandia Base and Atomic Museum. The banquet will be Saturday. Pre-registration is $8.50, $12.00 at the door (this includes banquet meal and other extras). Talk-in on 3.940,7.255, and 146.34/146.94 MHz. For information and registration, contact the New Mexico Hamvention, P.O. Box 14381, Albuquerque, NM 87111.

New York — The Emergency ARC of the American Red Cross in Greater New York will hold its annual Hamfest on September 12 from noon until 5:30 P.M. For more information contact Gregory L. Sievers, The American Red Cross in Greater New York, 90-07 166th St., Jamaica, NY 11432.

Ohio — The Warren ARA 14th Hamfest will be held Sunday, August 22, at the new site on Yankee Lake, on Ohio Rt. 7, five miles north on I-80. Picnic, swimming, playground, displays, giant free flea market, and fun for all. For details and map

(Continued on page 75)

Phillips was a high-speed operator; his goal was to get as much as possible on the wires and into the newspapers. His code is actually a consolidation of the more popular abbreviations used by the telegraphers to cut down sending time, because these fellows used to clear from 10 to 18 thousand words in a trick! So, in 1879, Phillips published the first edition of his "code." It was not designed to alleviate "telegraphers' paralysis" but was a method of telegraphers' shorthand. – WB6BBO

Phillips Who?

BY RAYMOND B. BRIGHTMAN,* WA6HDX

WALTER P. PHILLIPS is the name, and that is about all the writer knows about him except that he was an American telegrapher, and probably a good one, in the last part of the 19th and first part of the 20th centuries. He invented "Phillips Code," a telegraphic shorthand designed principally for use on news wires.

In the latter part of the 19th century the use of wire telegraphy expanded rapidly and "press" was transmitted daily by various news associations such as McClure's Syndicate, Associated Press, and others. Although some electro-mechanical telegraph systems existed, most traffic was handled by manual methods and a means of increasing words per minute on the limited number of lines available was of great economic value. Bonuses were often paid on total words or messages handled per "trick."

The point is that Phillips code as applied to amateur radio communication can be a source of benefit and pleasure to those who use it for QSOs. Most ham abbreviations are familiar to all and, in fact, many of them appear to derive from Phillips code origins. Both phone and cw operators may use the system for receiving purposes. When several stations operate on one frequency, as in nets, the subjects of conversation may be wide-ranging indeed. When your turn comes around, notes you have made can be illegible because you must write so rapidly, and you can't remember what W6— asked ten minutes ago. A working knowledge of shorthand or Phillips is surprisingly effective in jotting down information.

After a year of experiment, the writer has compiled some words which occur frequently in ham communications. When receiving, if the code abbreviation is known, just jot it down. A little practice will build up a vocabulary and, if you are a cw man, the next step is to insert a Phillips word now and then. Complete use of the code can cut sending time up to one third. It is best to start with words or contractions that are almost self-evident before going all out. As an example, WB HAP TO SND U TT RP is quite easy to interpret as "Will be happy to send you that report." Where a Phillips word and common-use ham abbreviation are different, either may be used, at least for our purposes. Additionally, it should be noted that only a few of the total code abbreviations are shown. Phillips should be sent distinctly with sufficient space between each word so that no confusion can result from running letters and words together.

It is hoped that old-time press men will forgive some of the detail which has been left out. For amateur use, however, the material presented will serve its purpose. So . . . BV TS WB A GD CHC TO LEARN SMG AND HV FUN. C U SN AND RMB USE PHILLIPS CODE.

*224 Pageantry Dr., Placentia, CA 92670

Phillips Code Words for Amateur Use

AB — ABOUT	BS — BEST	DD — DID	FQ — FREQUENT
ACG — ACCORDING	BTN — BETWEEN	DDNT— DIDNT	FRI — FRIDAY
ADS — ADDRESS	BTR — BETTER	DFC — DIFFERENCE	FRV — FOREVER
AFN — AFTERNOON	BV — BELIEVE	DFT — DIFFERENT	FRW — FORWARD
AJM — ADJUSTMENT	BZ — BUSINESS	DNR — DINNER	FS — FIRST
ANR — ANOTHER	CA — CAME	DT — DONT	FU — FEW
APC — APPRECIATE	CD — COULD	EA — EACH	FW — FOLLOW
AVB — AVAILABLE	CDRY— CONSIDERABLY	EH — EITHER	GA — GAVE
AYB — ANYBODY	CFUD— CONFUSED	EJO — ENJOY	GD — GOOD
AYG — ANYTHING	CHC — CHANCE	ENH — ENOUGH	GG — GOING
AY — ANY	CHN — CHILDREN	ESPY — ESPECIALLY	GLS — GIRLS
	CK — CHECK	EV — EVER	GN — GONE
BF — BEFORE	CNCD— CONCERNED	EXA — EXTRA	GNI — GOODNITE
BFL — BEAUTIFUL	CNDS — CONDITIONS	EXK — EXPECT	GP — GROUP
BFT — BREAKFAST	CPT — COMPLETE	EXQ — EXCUSE	GS — GUESS
BH — BOTH	CQY — CORRECTLY	EYB — EVERYBODY	GT — GREAT
BKN — BROKEN	CY — COPY	EYG — EVERYTHING	GV — GIVE
BLDG— BUILDING	DA — DAY		GVT — GOVERNMENT
BN — BEEN	DAU — DAUGHTER	FO — FOR	HAP — HAPPY

HB — HAS BEEN
HD — HAD
HDB — HAD BEEN
HF — HALF
HN — HAS NOT
HND — HUNDRED
HP — HOPE
HPN — HAPPEN
HR — HERE
HVR — HOWEVER
HVU — HAVE YOU

IFN — INFORMATION
IKN — INDICATION
IM — IMMEDIATELY
IMMY — IMMENSELY
IMT — IMMEDIATE
IP — IMPROVE
IPT — IMPORTANT
ITD — INTEND

JF — JUSTIFY
JGM — JUDGMENT
JN — JOIN
JS — JUST

KGNS — CONGRATS
KD — KIND
KJ — COMPLAIN
KN — KNOWN
KVN — CONVERSATION
KP — KEEP
KU — CONTINUE
KW — KNOW

LAF — LAUGH
LG — LONG
LIC — LICENSE
LK — LIKE
LOV — LOVE
LTR — LETTER
LUK — LOOK
LV — LEAVE

M — MORE
MAB — MAY BE
MD — MADE
MDA — MONDAY
MDT — MODERATE
MH — MUCH
MMY — MEMORY
MO — MONTH
MS — MOST
MSJ — MESSAGE
MSK — MISTAKE
MST — MUST
MSY — MOSTLY
MTG — MEETING
MTR — MATTER
MVM — MOVEMENT

NA — NAME
NBR — NEIGHBOR
ND — NEED
NI — NIGHT
NR — NEAR
NTG — NOTHING
NUM — NUMBER
NUP — NEWSPAPER
NUS — NEWS
NV — NEVER
NW — NOW
NX — NEXT

OFN — OFTEN
OFS — OFFICE.
OFY — OFFICIALLY
OFC — OFFICER
OG — ORGANIZE
OGN — ORGANIZATION
OJ — OBJECT
OP — OPPORTUNITY
OV — OVER
OWG — OWING
OWZ — OTHERWISE

PAP — PAPER
PB — PROBABLE
PBM — PROBLEM
PBY — PROBABLY
PCY — PRACTICALLY
PFT — PERFECT
PKJ — PACKAGE
PLS — PLEASE
PLSR — PLEASURE
POX — POLICE
PSK — PROSPECT
PW — POWER

QA — QUALIFY
QAY — QUALITY
QK — QUICK
QKY — QUICKLY
QNY — QUANTITY
QSN — QUESTION
QT — QUITE
QTN — QUOTATION

RCR — RECEIVER
RDY — READY
RFU — REFUSE
RG — REGULAR
RHT — RIGHT
RJ — REJECT
RKO — RECORD
RMB — REMEMBER

SATY — SATURDAY
SD — SHOULD
SDY — SUNDAY
SH — SUCH
SJ — SUBJECT
SKJ — SCHEDULE
SM — SOME
SMG — SOMETHING
SPO — SUPPOSE
SPZ — SURPRISE
STO — STORE
SU — SURE
SUGN — SUGGESTION
SVL — SEVERAL
SYS — SYSTEM

T — THE
TBL — TROUBLE
TDY — TODAY
TFK — TRAFFIC
TG — THING
TGR — TOGETHER
THD — THURSDAY
TI — TIME
TMP — TEMPERATURE
TN — THEN
TND — THOUSAND
TNI — TONIGHT
TNK — THINK
TR — THERE
TS — THIS
TUY — TUESDAY
TW — TOMORROW
TWM — TMRWMORN
TWP — TMRWAFTN
TWV — TMRWEVE

UF — UNFORTUNATE
UFBY — UNFAVORABLY
UCN — UNCERTAIN
UK — UNDERSTAND
UKN — UNKNOWN
ULY — USUALLY
UN — UNTIL
UPN — UPON

VB — VALUABLE
VCY — VICINITY
VET — VETERAN
VKN — VACATION
VOL — VOLUME
VSB — VISIBLE
VSR — VISITOR
VST — VISIT
VU — VIEW
VY — VERY
VYJ — VOYAGE

W — WITH
WB — WILL BE
WDA — WEDNESDAY
WD — WOULD
WDF — WONDERFUL
WEA — WEATHER
WF — WIFE
WG — WRONG
WGT — WEIGHT
WH — WHICH
WHL — WHOLE
WI — WILL
WK — WEEK
WL — WELL
WLD — WORLD
WN — WHEN
WO — WHO
WOT — WITHOUT
WR — WERE
WRD — WORD
WRK — WORK
WT — WHAT
WTV — WHATEVER
WY — WHY

XLT — EXCELLENT
XM — EXTREME
XMY — EXTREMELY
XPC — EXPERIENCE
XPS — EXPENSES
XT — EXTENT
XTV — EXTENSIVE
XU — EXCLUDE

Y — YEAR
YA — YESTERDAY
YAM — YESTAM
YAP — YESTDYAFTN
YL — YELLOW
YOA — YRS OF AGE

VE/W Contest Announcement

(Continued from page 63)

7) *Reporting*: Follow the sample log shown. Check sheets (or ARRL Op. Aid 6) are required for every entry consisting of 200 or more QSOs. *ANY LOG OMITTING CROSS-CHECK SHEETS OR A SUMMARY SHEET WILL NOT BE CONSIDERED FOR COMPETITIVE QST LISTING OR AWARDS.* Such logs will be counted as check logs and processed accordingly. Entries must be postmarked no later than October 31. All entries become the property of the committee and none can be returned. Participants are encouraged to submit station photos and comments.

Log sheets will be available from the address shown, upon receipt of self addressed legal size envelopes and IRCs, or Canadian stamps.

8) *Awards*: Certificates will be awarded to the highest scoring cw and phone entry in each section. A minimum score of 25 QSOs is required. Certificates for the high scoring multioperator entries will be issued only when there are at least three entries per section. Phone and cw scores will be listed separately. A trophy will be issued to the high scoring Canadian and to the high scoring US entry.

9) *Mailing*: Please make sure that your call and section are on each page, and especially on the top left-hand corner of your envelope. Mail logs to: VE/W Committee, D. R. Weiner, VE2DCW, 676 Wiseman Ave., Outremont 154, Quebec, Canada.

Hamfest Calendar

(Continued from page 73)

send card to Hamfest, Box 809, Warren, OH 44480.

Pennsylvania — The 16th Annual Hamfest by Four York County clubs will be held at the Adam's County Fair Ground, 4 miles north of Abbottstown, September 5, rain or shine. Registration begins at 9:00 A.M. Talk-in on 50.62, 145.62, 7.280 plus fm on 146.34/146.76 and 146.94 MHz. This year the emphasis will be on fm swap and sell. Plenty of eats, drinks, transmitter hunt and auction. Free bingo for the XYLs. More information from K3POR, 1705 Albemarle St., York, PA 17403.

Tennessee — The 12th Annual Cedars of Lebanon Hamfest will be held August 29 at the Cedars of Lebanon State Park ten miles south of Lebanon on Route 231 S. Talk-in for mobiles on 50.25 and 3.980 MHz. Pot luck lunch at 1:00 P.M. Everyone should bring enough food to feed his party. Drinks will be available on the grounds. Bring your gear to swap, sell, or auction. More information from W4VJW, Tenn. Phone Net, 3900 kHz, weekdays 6:45 A.M. CDST., or write to him at 203 West Main, Gallatue, TN 37066. QST

I.A.R.U. News

INTERNATIONAL AMATEUR RADIO UNION, THE GLOBAL FEDERATION OF NATIONAL NON-COMMERCIAL AMATEUR RADIO SOCIETIES FOR THE PROMOTION AND CO-ORDINATION OF TWO-WAY AMATEUR RADIO COMMUNICATION

DL EDUCATION PROGRAM

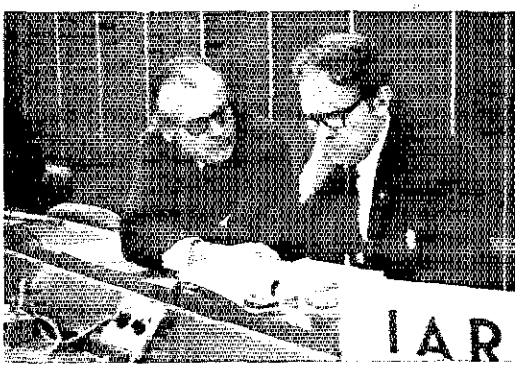
Each year about 1200 newcomers join the national German amateur organization, reports DL1FL. This represents an increase for the *Deutscher Amateur Radio Club* of about 8 percent per year. Extensive training is the key to this success. In addition to local club meetings, *DARC* also provides training through 2 to 3 week summer camp courses. Since 1964, 1000 people between 15 and 65 years of age have attended.

The German school system has also become aware of the positive aspects of amateur radio in the science curriculum. Several reference books for teachers have been published. Hopes are to intensify this aspect of the program.

CX RECIPROCITY

With an exchange of diplomatic notes on May 28, the United States and Uruguay entered into a reciprocal operating agreement. Thus, it is now possible for amateurs of one country to apply for operating privileges in the other. A complete list of other such agreements appeared in last month's column. QST

The IARU delegation at the start of the space conference: (from left, back row) ZL2AZ, W1RW, PAØDD, VE3CJ; (front row) W1RU, WØDX.



During a conference session, WØDX and W1RW review a proposal concerning the amateur service.

The World Administrative Radio Conference for Space Telecommunications opened in Geneva, June 7. A report of the initial activities appears as this month's editorial. Shown left is a view of the opening session with delegates from many nations. An IARU observer team is participating in the conference to represent the amateur interests. Shown in right-hand photo are *ARRL*/IARU Secretary W1RW, *ARRL*/IARU President WØDX (leader of the IARU delegation), and *ARRL* Assistant General Manager W1RU. The headphones worn by the participants permit them to hear the proceedings in any of the four working languages of the conference: English, French, Russian, and Spanish.

Happenings of the Month

ELECTION NOTICE

To All Full Members of The American Radio Relay League Residing in the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific and Southeastern Divisions:

An election is about to be held in each of the above-mentioned divisions to choose both a director and a vice-director for the 1972-1973 term. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the Articles of Association and By-Laws will be mailed to any member upon request.

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

Executive Committee
The American Radio Relay League
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 1972-1973 term.
(Name Call City Zip Date)

The signers must be Full Members in good standing. The nominee must be the holder of at least a General Class amateur license, or a Canadian Advanced Amateur Certificate, must be at least 21 years of age, and must have been licensed and a Full 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, is commercially or governmentally engaged in frequency allocation planning or implementation, or is commercially engaged in the publication of radio literature intended in whole or in part for consumption by radio amateurs.

All such petitions must be filed at the headquarters office of the League in Newington, Conn., by noon EDST of the 20th day of September, 1971. 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 8 and November 20, except that if on September 20 only one eligible

OVERSEAS AND ABSENTEE BALLOTS

All ARRL members who are licensed by FCC or DOC but are temporarily resident outside the U.S. or Canada are now eligible for Full Membership. These members overseas who arrange to be listed as Full Members in an appropriate division prior to September 20 will be able to vote this year where elections are being held.

Even within the U.S., Full Members temporarily resident outside the ARRL division they consider home may now notify the Secretary prior to September 20, giving the current *QST* address and the reason why another division is considered home (e.g., holding an amateur call appropriate to the division). So if your home division is the Atlantic, Canadian, Dakota, Delta, Great Lakes, Midwest, Pacific or Southeastern, but your *QST* goes elsewhere because of a different residence, please let the Secretary know, as soon as possible but no later than September 20, so you'll receive a ballot for your home division.

candidate has been nominated, he will be declared elected.

Present directors and vice-directors for these divisions are – *Atlantic:* Harry A. McConaghy, W3EPC and Jesse Bieberman, W3KT; *Canadian:* Noel B. Eaton, VE3CJ and A. George Spencer, VE2MS; *Dakota:* Larry J. Shima, WØPAN and Edward C. Gray, WAØCPX; *Delta:* Max Arnold, W4WHN and Franklin Cassen, W4WBK; *Great Lakes:* Alban A. Michel, W8WC and Currin L. Skutt, W8FSZ/K8EPT; *Midwest:* Sumner H. Foster, WØGQ and Ralph V. Anderson, KØNL; *Pacific:* J. A. Doc Gmelin, W6ZRJ and Hugh Cassidy, WA6AUD; *Southeastern:* H. Dale Strieter, W4DQS and Charles J. Bolvin, K4KQ.

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

For the Board of Directors:
July 1, 1971

JOHN HUNTOON
Secretary

ARRL FILES ON PHONE EXPANSION

Responsive to decisions made by the Board of Directors at the meeting in May (See "Haps" in the July issue), ARRL has filed comment in favor of expansion of the phone bands, but modified with respect to FCC's proposals in Docket 19162. The League asks no changes from the present status of the ten-meter band, and no changes in the present 25 kHz Extra Class cw bands at 80, 40, 20, and 15 meters. The document seeks 75 additional kilohertz for General and Conditional Class on 75, with an Extra-Class-only band at 3775-3800 kHz and Advanced and Extra, 3800-3825 kHz. Since many amateurs holding the top two tickets take part in nets during the busiest hours, the directors agreed that less exclusive space was needed on this band. The special 40-meter interregional band 7075-7100 kHz was thought to be unnecessary, but the rest of FCC's proposals were "bought" here. On 20, the Board asked for only 25 kHz for Extra; a wider expansion would, in the composite view, endanger the various informal working arrangements whereby part of the band is for cw DXing, part cw ragchewing, part RTTY, part DX-to-DX phone, and part DX-to-W phone. The *fifteen meter proposals of FCC were fully* supported.

These views were carefully-worked-out compromises of widely-varying initial opinions and represent a serious attempt by the Board to arrive at middle ground. The text of the paper carrying the ARRL recommendations to the FCC follows.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	DOCKET NO. 19162
Amendment of Part 97 of the	)	RM-1306, RM-1349, RM-1477,
Commission's Rules to provide	)	RM-1479, RM-1544, RM-1550
for expansion of the telephony	)	RM-1593, RM-1603, RM-1614
segments of the high frequency	)	RM-1616, RM-1644, RM-1665
amateur bands.	)	RM-1695, RM-1723, RM-1729

COMMENTS IN RESPONSE TO NOTICE OF PROPOSED RULE MAKING

The American Radio Relay League, Incorporated, respectfully submits the following comments in response to the Notice of Proposed Rule Making released March 1, 1971.

Introduction

Amateur radio is truly a worldwide fraternity with almost a half million members in virtually every inhabited place in the world. Amateur radio, with thousands of international contacts each day, has a unique ability to enhance international goodwill as it has no political, racial or religious barriers. In times of disaster – earthquakes, tidal waves, hurricanes, typhoons, tornados, floods, blizzards, ice storms and fires – amateur radio's assistance in saving lives and aiding the unfortunate has been so extensive each year that even rough estimates of the number of lives saved and persons assisted are not possible. The contributions of scientists and engineers to the development and growth of telecommunications as the direct result of their interest in amateur radio have been so far reaching that documentation has been far from complete.[1] Amateur radio has provided and will continue to provide a reservoir of skilled technicians and operators for the ever expanding telecommunications industry, particularly in the nations which most actively support the teaching of the sciences, including amateur radio, in their schools.

With somewhat more than half of the amateur radio operators of the world residing in the United States, any proposal by the Federal Communications Commission to modify the suballocations of the high frequency (HF) bands may have far reaching effects around the world. This is particularly true when, as in this proposal, an expansion of the bands available for radio telephony by United States amateurs is proposed. Suballocation of the amateur bands by government rules and order is far more extensive in the United States than in any other country of the world. In fact, suballocations throughout the world are based largely upon those of the United States and have been established and observed in most nations by informal "band plans" of the many national amateur radio societies. Extreme care must be exercised to make certain that modifications of some suballocations in the United States do not bring about such modifications of the "band plans" of other areas of the world that other suballocations in the United States will be upset.

In formulating the counterproposals which follow, the League's Board of Directors, at its annual meeting in May, gave careful and extensive consideration to both the domestic and international impact of the Commission's proposal as well as to

[1] One comprehensive but far from complete study is the subject of the report of the Stanford Research Institute of a study commissioned by the ARRL; "Amateur Radio: An International Resource for Technological, Economic, and Sociological Development," August 1966.

the desirability of enhancing the incentive licensing program which has been generally successful since it became effective in November 1968.

The League's By-Laws provide that Canadian as well as United States amateurs are eligible for membership, and that the Canadian Director has the same rights and duties as each of the Directors from the fifteen United States divisions. The comments and proposals submitted herein do not necessarily represent or reflect the views of the League's Canadian members or the Director for Canada, and their comments are being submitted separately and directly to the Commission and to the Canadian Department of Communications. The comments and proposals which follow, therefore, are the concensus of the Directors, in reference particularly to the domestic implications of the Commission's proposal.

The problems vary so widely from band to band that each band will be considered separately.

The 3.5 - 4.0 MegaHertz Band

This is one of the most useful and heavily used bands in North America, with short distance communication capability during the daytime and medium and, to a lesser extent, long distance capability at night. Most of the emergency and traffic nets operate in this band. Canadian amateurs use the portion of the band immediately below the present United States radio telephone suballocation for essential communication with remote and sparsely settled areas for which no other band is suitable.

The League's registration of emergency and traffic nets operating in this band discloses the following utilization:

Frequency	*Present U.S. Allocation*	*Number of Nets*[2] *CW*	*Phone*	*Present Operating*[3] *Privileges*
3,500-3,525kHz	CW only	–	–	E
3,526-3,550	CW only	2(2)	–	C,G,A,E
3,551-3,575	CW only	8	–	C,G,A,E
3,576-3,600	CW only	14	–	C,G,A,E
3,601-3,625	CW only	9	–	C,G,A,E
3,626-3,650	CW only	12(2)	–	C,G,A,E
3,651-3,675	CW only	12(2)	–	C,G,A,E
3,676-3,700	CW only	15(2)	–	C,G,A,E
3,701-3,725	CW only	11	–	N,C,G,A,E
3,725-3,750	CW only	5	(1)	N,C,G,A,E
3,751-3,775	CW only	4	(7)	C,G,A,E
3,776-3,800	CW only	5	(3)	C,G,A,E
3,801-3,825	CW & Phone	–	–	E
3,826-3,850	CW & Phone	–	2	A,E
3,851-3,875	CW & Phone	–	2	A,E
3,876-3,900	CW & Phone	3	6	A,E
3,901-3,925	CW & Phone	–	72	C,G,A,E
3,926-3,950	CW & Phone	–	56	C,G,A,E
3,951-3,975	CW & Phone	–	51	C,G,A,E
3,976-4,000	CW & Phone	–	30	C,G,A,E
Totals		97(8)	219(11)	
Grand Totals		105	230	

The number of nets registered with the League represent an unknown percentage of all nets in operation. Nevertheless, the registrations are representative of the distribution of nets between CW and phone and the distribution in various segments of the band.

It is most significant that 100% of the CW nets, 95.85% of the phone nets, and 96.83% of all registered United States nets are concentrated in the portions of the band available to Conditional and General Class licensees. Even more significant is that 209 of the 219 phone nets are concentrated in only one fifth of the entire band. This concentration occurred after the modified incentive licensing plan adopted in Docket No. 15928 became effective on November 22, 1968, and has become so severe that the effectiveness of many nets has been reduced to a most undesirable level.

The most pressing need in the 3.5-4.0 MHz band is to relieve the overloading of the top 100 kHz. If possible, this relief should be provided without removing any incentives earned and enjoyed by the Amateur Extra and Advanced Classes.

The League is particularly concerned over the lack of significant relief to the overloading of 3,900 - 4,000 kHz provided by the Commission's proposal. Far more than an additional 25 kHz is required. Accordingly, the League recommends and requests that an additional 75 kHz be provided for phone operation by Amateur Extra, Advanced, General and Conditional Classes rather than the 25 kHz proposed by the Commission.

The heavy participation by Amateur Extra and Advanced Class licensees in net operations makes somewhat less significant the size of the band available for phone operation by those classes. Accordingly, the League recommends and requests that the 100 kHz between 3,775 and 3,875 kHz proposed by the Commission for both classes be reduced to the 25 kHz between 3,800 and 3,825 kHz.

The Commission proposes to continue to provide 25 kHz for phone operation only by Amateur Extra Class licensees, but to shift the band downward 50 kHz from 3,800 - 3,825 kHz to 3,750 - 3,775 kHz. The Canadian operations immediately below the present United States phone band have been noted earlier in these comments. The League recommends and requests that the 25 kHz available for phone operation by only Amateur Extra Class licensees be from 3,775 to 3,800 kHz.

Finally, the Commission proposes that the band available for CW operation by only Amateur Extra Class licensees be reduced from 25 kHz to 10 kHz. So many amateurs have upgraded to the Amateur Extra Class since enlargement of the incentive licensing program by Docket No. 15928 that, in the League's opinion, those hard earned and cherished privileges should not be reduced.

The suballocations at present, as proposed by the Commission, and as proposed by the League are tabulated as follows:

Class	*Mode*	*Present*	*Commission's Proposal (kHz)*	*League's Proposal (kHz)*
E	CW only	3,500-3,525	3,500-3,510	3,500-3,525
C,G,A,E	CW only	3,525-3,800	3,510-3,750	3,525-3,775
E	Phone & CW	3,800-3,825	3,750-3,775	3,775-3,800
A,E	Phone & CW	3,825-3,900	3,775-3,875	3,800-3,825
C,G,A,E	Phone & CW	3,900-4,000	3,875-4,000	3,825-4,000
N	CW	3,700-3,750	3,700-3,750	3,700-3,750

The 7.0 - 7.3 MegaHertz Band

The frequencies between 7,000 and 7,100 kHz have been allocated by the International Radio Regulations, Geneva, 1959, to the Amateur Radio Service on a world-wide basis, and the frequencies between 7,100 and 7,300 kHz have been allocated to the Amateur Service only in Region 2. In Regions 1 and 3, the band from 7,100 to 7,300 kHz has been made available to the Broadcast Service.

2 Nets registered with the League's Communications Department. Canadian only nets are listed in parentheses. United States only nets are listed without parentheses.

3 E = Amateur Extra Class; A = Advanced Class; G = General Class; C = Conditional Class; N = Novice Class.

K4IAK — No. 1000

During early May we watched the flow of Life Membership applications with more than usual interest, as paid-up application No. 1000 would soon be received. It turned out to be from William T. Powell, K4IAK, of Lynchburg, Va., to whom go our hearty congratulations. Life Memberships are, of course, still available, at $130 each for U.S.- and Canadian-licensed amateurs. In addition, at the May Board Meeting the directors voted to make Life Membership available to Associate members in the U.S. and Canada, also for $130, and to Associate members overseas, for $140. As before, payments may be made on a quarterly basis. Write to Hq. for an application blank with further details.

The full potential of this band has not been realized by the Amateur Radio Service. Broadcast operations in disregard of the International Radio Regulations have been conducted for many years between 7,000 and 7,100 kHz in spite of complaints and objections by the United States Government. The high power broadcast operations, particularly in Region 1, have greatly reduced the usefulness of the frequencies from 7,100 to 7,300 by the Amateurs in Region 2.

The Commission, in recognition that certain United States possessions are within Region 3[4] and that the rules at present do not permit phone operation in the 7,000 - 7,100 kHz band available in that region, proposes to establish a special 25 kHz phone band from 7,075 to 7,100 kHz for phone operation by United States amateurs in Region 3 and for use by United States amateurs in Region 2 only for calling and communicating with amateurs in Regions 1 and 3.

The League supports the Commission's proposal to make the 7,075 - 7,100 kHz band available for use by United States amateurs in Region 3. However, the League opposes the proposal to permit phone operation between 7,075 and 7,100 kHz in Region 2 even with the limitations proposed by the Commission. In recent years, a "window" has existed in the 25 kHz immediately below 7,100 kHz where low power phone stations in Regions 1 and 3 have congregated. A very high percentage of phone contacts between United States amateurs and amateurs in Regions 1 and 3 have been made with the United States Stations operating between 7,200 and 7,300 kHz and the Region 1 and 3 stations operating between 7,075 and 7,100 kHz. Operation between 7,075 and 7,100 kHz by United States amateurs in Region 2 would so overload that band that the effectiveness of the "window" would be greatly reduced. For this reason, the League recommends and requests that no Region 2 phone operation be permitted between 7,075 and 7,100 kHz, and that phone operation in that band be limited to amateurs in the United States possessions in Region 3.

The present phone band lies between 7,200 and 7,300 kHz, with the lower 50 kHz available only to Amateur Extra and Advanced Class licenses, and the upper 50 kHz available as well to General and Conditional Class licensees. The Commission proposes to create a phone band for the exclusive use of Amateur Extra Class between 7,150 and 7,175 kHz, to make the band from 7,175 to 7,225 kHz available for phone by the Amateur Extra and Advanced Classes, and to expand by 25 kHz from 7,225 to 7,300 kHz, the band available for phone operation by the General and Conditional Classes as well as the Amateur Extra and Advanced Classes.

The League supports this portion of the Commission's proposal. During evening hours and substantial portions of the daytime hours, the number of useable channels (or frequencies) for phone operation are most substantially reduced by the broadcast operations in Regions 1 and 3 in the 7,200-7,300 kHz band. This is one of the most popular bands for mobile operations and is widely used for message traffic. Expansion of the band available for use by Conditionals and above will relieve much of the congestion which now exists from 7,250 to 7,300 kHz.

The League supports the proposal to provide a phone incentive for the Amateur Extra Class between 7,150 and 7,175 kHz. However, for the reasons stated in the discussion of the 3.5-4.0 MHz band proposals, the League opposes the proposal of the Commission to reduce the CW privileges of the Amateur Extra Class by 15 kHz, to between 7,000 and 7,010 kHz.

Expansion of the phone band to 7,150 kHz will require a shift of the Novice Class band from 7,150 - 7,200 kHz to 7,100 - 7,150 kHz. Such a shift will not present difficult problems or undue hardship provided the Novice operators are given reasonable time to obtain new crystals.

In summary, the sub-allocations at present, as proposed by the Commission, and as proposed by the League are as follows:

Class	*Mode*	*Present(kHz)*	*Commission's Proposal (kHz)*	*League's Proposal (kHz)*
E	CW Only	7,000-7,025	7,000-7,010	7,000-7,025
C,G,A,E	CW Only[5]	7,025-7,200	7,010-7,150[6]	7,025-7,150
E	Phone & CW	—	7,150-7,175	7,150-7,175
A,E	Phone & CW	7,200-7,250	7,175-7,225	7,175-7,225
C,G,A,E	Phone & CW	7,250-7,300	7,225-7,300	7,225-7,300
N	CW	7,150-7,200	7,100-7,150	7,100-7,150

The Commission's proposal to shift the Novice band from 7,150-7,200 kHz to 7,100-7,150 kHz is supported by the League provided the other proposals relating to the 7,100-7,200 kHz band are adopted.

[4] United States possessions in Region 3 which are under the jurisdiction of the Federal Communications Commission are Baker, Canton, Enderbury, Guam, Howland, Jarvis, Palmyra, American Samoa, and Wake Islands. (Section 97.65(b)(4) of the Rules.)

The 14.0-14.35 MegaHertz Band

This is by far the most important and widely used band for long distance domestic and international communications, not only in the United States but throughout the world.

The Commission proposes to expand the United States phone band by 50 kHz, from 14,150 to 14,350 kHz, to make the lower 25 kHz available for use by only the Amateur Extra Class, to make an additional 25 kHz, from 14,250 to 14,275 kHz, available for the Conditional and General Classes, and to shift the 75 kHz available only to the Amateur Extra and Advanced Classes from 14,200 to 14,275 kHz to 14,175 to 14,250 kHz.

The League supports only the proposal to provide 25 kHz for use by only the Amateur Extra Class as a substantial incentive to upgrade under the incentive license plan. The expansion of the band available for operation by Conditional and General Class licensees would tend to reduce the incentive to upgrade under the incentive license plan.

As in the case of the 3.5-4.0 and 7.0-7.3 MHz bands, the Commission is urged not to reduce to 10 kHz the CW band available only to the Amateur Extra Class. Not only would hard earned incentives be reduced, but also the incentive to upgrade in the future would be reduced.

In summary, the suballocations at present, as proposed by the Commission, and as proposed by the League are as follows:

s	*Mode*	*Present (kHz)*	*Commission's Proposal (kHz)*	*League's Proposal (kHz)*
	CW Only	14,000-14,025	14,000-14,010	14,000-14,025
,A,E	CW Only	14,025-14,200	14,010-14,150	14,025-14,175
	Phone & CW	"	14,150-14,175	14,175-14,200
	Phone & CW	14,200-14,275	14,175-14,250	14,200-14,275
,A,E	Phone & CW	14,275-14,350	14,250-14,350	14,275-14,350

The 21.0 - 21.45 MegaHertz Band

The usefulness of this band for long distance domestic and international communications varies widely throughout each day and throughout the eleven year sunspot cycle. For these reasons, and because of the width of the band, expansion of the United States phone band will have minimal impact upon foreign amateurs.

The Commission proposes to expand the phone band by 50 kHz. The 25 kHz now available only for the Amateur Extra Class would be shifted from 21,250-21,275 kHz to 21,200-21,225 kHz. The 75 kHz now available to the Amateur Extra and Advanced Classes between 21,275 and 21,350 kHz would be expanded to 100 khz between 21,225 and 21,325 kHz. The 100 kHz now available for the Conditional and Extra Classes between 21,350 and 21,450 kHz would be expanded to 125 kHz between 21,325 and 21,450 kHz. Under the Commission's proposal, the Novice Class CW band would be reduced from 21,100-21,250 kHz to 21,100-21,200 kHz.

The League supports each of those proposals.

As with the other HF bands, the Commission proposes to reduce to 10 kHz the band available for CW operation by only Amateur Extra Class licensees. For the reasons set forth above, the League strongly opposes any reduction of the CW privileges of the Amateur Extra Class.

The suballocations at present, as proposed by the Commission, and as proposed by the League are as follows:

Class	*Mode*	*Present (kHz)*	*Commission's Proposal (kHz)*	*League's Proposal (kHz)*
E	CW Only	21,000-21,025	21,000-21,010	21,000-21,025
C,G,A,E	CW Only	21,025-21,250	21,010-21,200	21,025-21,200
E	Phone & CW	21,250-21,275	21,200-21,225	21,200-21,225
A,E	Phone & CW	21,275-21,350	21,225-21,325	21,225-21,325
C,G,A,E	Phone & CW	21,350-21,450	21,325-21,450	21,325-21,450
N	CW Only	21,100-21,250	21,100-21,200	21,100-21,200

The 28.0-29.7 MegaHertz Band

The usefulness of this band for long distance communications is even more variable than the 21.0-21.45 MHz band. During a substantial portion of the eleven year sunspot cycle, reliable communication is possible only by ground wave signals. For these reasons, this band presents far less incentive for upgrading proficiency and licenses than do the other HF bands discussed above.

The present suballocation of this band permits CW only operation between 28,000 and 28,500 kHz and phone and cw operation between 28,500 and 29,700 kHz. The entire band may be used by Conditional, General, Advanced and Amateur Extra Classes.

The Commission proposes to expand the incentive licensing program to this band and to reduce by 150 kHz the band available for CW only operation. Specifically, the Commission proposes CW privileges between 28,000 and 28,350 kHz for the Conditional, General, Advanced and Amateur Extra Classes, phone privileges between 28,350 and 28,375 for only the Amateur Extra Class, phone privileges between 28,375 and 28,500 kHz for the Amateur Extra and Advanced Classes, and phone privileges throughout the rest of the band for the Conditional, General, Advanced and Amateur Extra Classes.

In addition, the Commission proposes to establish a Novice Class CW band between 28,150 and 28,250 kHz.

The League recommends further study before the incentive licensing program is expanded to this band, including the League's proposal in RM-1535 for Technician Class privileges between 29,500 and 29,700 kHz. That proposal was filed on November 19, 1969 and was not included in this rule making proceeding. The League also recommends that establishment of a CW Novice Class band not be considered until the possibility of harmonic interference to VHF television Channels 2 (54-60 MHz) and 6 (82-88 MHz) has been fully explored.

Additional Incentives and Privileges

The Commission's Report and Order in Docket 15928, released August 29, 1967, amended Section 97.51(a)95) relating to the assignment of call signs to provide as follows:

§97.51 Assignment of call signs.

(a) ***

(5) One unassigned two-letter call sign (a call sign having two letters following the numeral) may be assigned to a previous holder of a two-letter call sign the prefix of which consisted of not more than a single letter. Additionally, a two-letter call sign may be assigned to an Amateur Extra Class licensee who first held an amateur radio station license issued by the United States

5,6,7 The Commission proposes to make 7,075-7,100 kHz available for phone to United States amateurs in Region 3 and to amateurs in Region 2 for interregional calling and communications. The League recommends phone operation in the 7,075-7,100 kHz band not be permitted in Region 2.

Government 25 years or more prior to the receipt date of an application for such assignment. Applicants for two-letter call signs are not permitted to select a specific assignment except in accordance with subparagraphs (1) and (2) of this paragraph.

Prior to that amendment, a new two-letter call sign would be issued only to a previous holder of a two-letter call and a request for a specific assignment would be entertained.

The League continues to believe that the honoring of requests for specific call signs would provide an added incentive for many amateurs to upgrade their licenses. One such petition, RM-1597, was filed by the League in April 1970 and proposes that new Extra Class licensees may request and be assigned, if available, a one letter prefix and a three letter suffix (1 x 3) call sign. That petition is pending before the Commission.

The Commission is requested to amend its present rules and policies so as to provide additional incentives for an amateur to earn a higher grade of license by acceptance of requests for specific call signs.

THE AMERICAN RADIO RELAY LEAGUE INCORPORATED
Robert M. Booth, Jr.
Its General Counsel

June 1, 1971

WAØCPX NEW VICE DIRECTOR

Edward C. Gray, WAØCPX, of Rapid City, South Dakota, has been appointed by President Denniston, WØDX, to the vacant post of vice director from the Dakota Division, effective June 23, 1971, until the term ends at noon, January 1, 1972. The appointment was made under a revision in the Articles of Association adopted at the 1971 Board meeting; the vacancy occured a year ago when Charles Compton, WØBUO, resigned as Dakota director to accept the first vice president's office and Larry Shima, WØPAN, became the director.

Ed is 28 years old and works as an assistant county agent with the South Dakota State University. He's been an assistant director of the Dakota Division and SCM of South Dakota both since autumn 1969, and is a past president and past vice president of the Niobrara Valley Radio Club. A former EC and SEC, Ed is assistant net manager of an Air Force MARS Net and holds appointment as OPS. First licensed in 1962, Ed holds the Extra Class license. His wife, Edith, is WAØUFS.

Governor John Love of Colorado puts his signature on HB 1385, reducing the extra fee for call letter license plates from $5 to $2. B. R. Slats Council, KØATZ/WØKWX (left) and Ramon Bill Walker WØOWP, together with Leonard Hallam, WØNUZ and Rodin Rogers, WØNNI were among those who worked for the passage of the bill. *(WØLVI Photo)*

OHIO HAM WINS CASE

Carl J. Dettmar, W8NCV, of Cincinnati, Ohio, has won an appeal in Common Pleas Court from an earlier unfavorable decision of the County Board of Zoning Appeals. Judge Bettman's Opinion appears below:

COURT OF COMMONPLEAS
HAMILTON COUNTY, OHIO

CARL J. DETTMAR: No. A 249109
Appellant: OPINION
vs.
COUNTY BOARD OF ZONING APPEALS:
Appellee:

BETTMAN, J.:

This is an appeal from the decision of the County Board of Zoning Appeals upholding the decision of the Building Inspector denying appellant's application for a permit to construct a sixty-four foot radio antenna adjoining his residence on his property.

The property in question is located in a Residence "B" District which, under the Zoning Resolution of Hamilton County, is controlled by the following regulations.

"Sec. 62 USE REGULATIONS: A building or premises shall be used only for the following purposes:

Sec. 62.14 Single family dwellings.

Sec. 62.15 Accessory buildings and uses customarily incident to any of the above uses.

The applicable height regulations are as follows:

"Sec. 63 HEIGHT REGULATIONS: No building shall exceed two and one-half (2-1/2) stories or thirty-five (35) feet in height, except as hereinafter provided in Article XVII.

ARTICLE XVII

ADDITIONAL USE, HEIGHT AND AREA REGULATIONS AND EXCEPTIONS

Sec. 171.3 Church spires, domes, flagpoles, aerials, antennas, windmills, chimneys, cooling towers . . . . . may be erected to any lawful and safe height."

Bearing in mind the well established principle that zoning ordinances, being in derogation of the common law, ought to be strictly construed and the ancient principle that the ownership of real estate extends from the center of the earth to the heavens, we find nothing in the Zoning Resolution making appellant's proposed use unlawful.

Appellant is an amateur radio operator. This is a hobby through which the "ham" operator gains skill in science, electronics, and radio technique. It is carried on purely for the development of the individual and not for any financial gain. Family hobbies, recreation and education are without question accessory uses customarily incident to single family dwellings. The words "uses customarily incident to single family dwellings" mean the class of activity a family customarily does in or

Who The Devil Is Who?

Number 22 in a Series of Call Conversion Charts

Now that twenty-five years have elapsed since licensing was resumed at the end of World War II, activity has picked up among Extra Class licensees swapping their old calls for two-letter calls. Here are some recent ones, plus a few we accidentally overlooked in earlier tabulations:

Now	*Was*	*Now*	*Was*	*Now*	*Was*	*Now*	*Was*
W1NV	W1LHA	K3AX	W3FHT	W6GG	W6LVN	W7KX	K7GLD
W1QL	W1MXP	K3AZ	K3QAX	K6RP	W6GHG	W7TG	W7KJN
W1PK	W1QCN	K3BJ	W3ESZ	K6SE	WA6EQW	W7TP	W7ESV
W1SG	W1PPN	W3ZK	K3WAN	K6SX	W8FOV	W7TY	W7GCR
W1SP	W1OOS	K4NM	W4RLZ	W6TB	WØAXQ	W8MQ	W9KMP
K2CP	W2YAM	K4NV	WA4FUW	K6TD	WB6YZB	W8MS	W8MRS
K2CJ	W2BGG	K4OK	WB4ERM	K6TG	W6EUH	W8NB	W8SAI
K2CX	W2YEJ	K4OS	WB4CLH	K6TL	WA6NZM	W8NJ	W8JEY
K2DF	W2QZN	K4PR	W4ROG	K6TP	W6EBO	W8NL	W8UGE
K2DW	WA2DNO	W5RC	W5MCU	K6TO	WB6ZWF	W8OK	W8YCP
K2EA	K2UYX	W5TI	W5CVW	K6TR	W6VYI	W9IP	W9ZHR
K2EL	W2FRQ	W5TY	W5ERM	K6TV	W6SCI	W9JA	W9IHN
K3AK	W3BGO	W5UA	W5HHA	K6TW	W6WOC	W9JE	W9PIC
K3AM	W3JGW	W5UO	W5MDH	K6TX	K6DMI	WØMU	WAØYWU
K3AU	WA3LNL	W5UR	W5LEF	K6WR	W6VUW	WØMV	WØTUO

about their home. It does not limit the use to the identical activity chosen by the neighbors. As long as the activity is a form of family hobby, recreation or education it is permissible even though it may be unusual unless it is specifically excluded by a zoning restriction. The fact that not many people have amateur radio antenna no more precludes this use than the fact that not many people have tennis courts precludes their use.

As for the height of the proposed antenna – this is provided for by Sec. 171.3 which specifically permits erection to any lawful and safe height.

We have considered the case of *Presnell V. Leslie*, 165 N.Y.S. (2d) 488, which reaches a contrary conclusion but prefer the logic of *Skinner v. Zoning Board*, 80 N.J. Super, 380, and *Wright V. Vogt*, 7 N.J. 1.

Accordingly we find the decision of the Board of Zoning Appeals, and that of the Hamilton County Building Inspector contrary to law.

APPEARANCES:
Ben Turpen,
Attorney for the Appellant.
Robert W. Worth,
Ass't. Prosecuting Attorney
Attorney for the Appellee.

May 10, 1971

This case, with earlier decisions, is part of the ARRL "legal kit" available to members on request.

OFFICERS' REPORTS AVAILABLE TO MEMBERS

Each year the offices of the League make comprehensive written reports to the directors. The Board has made these reports available to interested members in a volume which also *includes reports of the directors*. The cost price is $1.00 per copy, postpaid; the supply is limited. A copy of the financial statement only is available without charge. Address the General Manager, ARRL, Newington, CT 06111.

MONTANA EXAM POINT CHANGES

Missoula, Montana, has been cancelled as an August FCC examination point, but Helena has been added in its stead, with the annual tests to be in May.

"EYEBANK" DOCKET EXTENSION

FCC has extended the time for filing in Docket 19245, Inquiry into amateur message handling on behalf of non-amateur organizations, from the original deadline of July 1 to the new date of August 31. ARRL requested the delay so that interested amateurs would have time to file with FCC after reading the text of the Inquiry in July *QST*.

EXTRA CLASS FILING BY ARRL

ARRL has filed its support for a reduction in the waiting period for Extra Class from two years to one, and renewed its request that holders of the former Amateur Extra First Grade license of the 20s and 30s be granted the Extra Class license without examination. Comment went like this:

Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	DOCKET
Part 97 of the Commission's Rules)	NO. 19163
regarding licensing and operating)	RM-1590
requirements for the attainment)	RM-1591
of the Amateur Extra Class license)	RM-1646

COMMENTS IN RESPONSE TO NOTICE OF PROPOSED RULE MAKING

The American Radio Relay League, Incorporated, respectfully submits the following comments in response to the Notice of Proposed Rule Making released February 26, 1971.

Amateur Radio Week in Washington State is September 6-12, 1971. Governor Daniel J. Evans signs the papers while a host of club officers looks on: (left to right) K7LRD, W7UWT, SCM W7PI, K7RSB, WA7JXL, K7VNI, WA7LOQ, Northwestern Director W7PGY, W7LQ, and W7UBA.

Introduction

When the Commission adopted a major revision of its rules for the Amateur Radio Service in 1951 (Docket No. 9295), it created the Amateur Extra Class Operator license. One of the provisions of what now is Section 97.9(a) of the rules is that an Amateur Extra Class license will be issued, without examination, to a United States citizen or national who "submits evidence of having held a valid amateur radio station or operator license issued by any agency of the United States Government during or prior to April 1917." Another provision incorporates a two-year waiting period before an Advanced, General or Conditional Class licensee is eligible for an Amateur Extra Class license.

In response to petitions by the League (RM-499) and others, the Commission issued a Notice of Proposed Rule Making on April 1, 1965 (Docket No. 15928), inviting comments upon proposed rule amendments intended to expand the then existing incentive licensing rules and policies. The League, in its comments filed July 15, 1965, recommended that Amateur Extra Class licenses be issued without examination to former holders of the Amateur Extra First Class license, which had been in existence between June 1923 and June 1933, and which had been twice downgraded, first to Class A and again, in 1951, to Advanced Class. The Report and Order adopted August 24, 1967 denied the League's request.

The Directors of the League continued to recognize the ever increasing difficulties of the elder amateurs in qualifying through examination for the Amateur Extra Class license. In response to directives of its Board of Directors at its annual meeting in 1969, the League filed a petition again seeking revision of the eligibility requirements for former Amateur Extra First Class licensees. (RM-1590) The instant rule making proceeding is based, in part, upon that petition and proposes to give examination credit for the 20 word per minute code requirement (Element 1(C)) but not for the other examination elements.

In a companion petition (RM-1591), the League proposed a one-year reduction of the present two-year waiting period to be eligible for the Amateur Extra Class examination. The Notice of Proposed Rule Making in this proceeding invites comments upon this proposal.

The League's Recommendations

The League supports the proposed amendments of Sections 97.9 and 97.25 to reduce the waiting period to one year and to give credit for the 20 WPM code requirement for the Amateur Extra Class. However, the League continues to believe the proposal in its petition (RM-1590) is sound and again urges that credit also be given for other examination elements to former holders of Amateur Extra First Class licenses.

In not proposing to give credit for any examination elements other than the code, the Commission states as follows in its notice:

> "A comparison of the present day and former examinations indicates that the level of difficulty of the Extra First Class license examination was far below that for the present Amateur Extra Class license. . . When the Extra Class license was established in 1952, it was intended to be a new class, indicative of attainment distinctly above that of any then existing or previously available amateur operator license. Therefore, it is determined that no credit should be given for the written portion of the examination."

Great Lakes Director Alban A. Michel, W8WC/W8SMQ, holds the 1971 Amateur of the Year plaque awarded him at the Dayton Hamvention in April.

The League respectfully submits that, when consideration is given to the state of the art of radio technology and the scarcity of training aids and instructional material during the 1923-1933 era, the level of difficulty of the Amateur Extra First Class examination was comparable to that of the present Amateur Extra Class examination. Further, almost without exception, the holders of the Amateur Extra Class license continued to progress in technical knowledge and proficiency throughout the intervening years. If there was evidence to indicate that the former holders of the Amateur Extra First Class license had not continued to stay abreast of technological developments, the League would not continue to press for credit for written elements of the examination.

The use of the term "grandfather rights" never has been more appropriate. If the youngest holder of an Amateur Extra First Class license was 16 years old in June 1933, he now is 54 years old. Actually, the term "great grandfather rights" is more appropriate, because almost everyone who would be eligible for the Amateur Extra Class license without examination is a grandfather and many are of such advanced age that they either are or soon will be great grandfathers. It is significant that the spread between 1917 and 1951, when the Amateur Extra Class was established with complete "grandfather rights" to those who held an amateur license before April 1917 was only 34 years, while the spread between 1933 and 1971 is 38 years. If "grandfather rights" were appropriate in 1951, they are far more appropriate in 1971.

No further comment is necessary in support of the proposal to reduce the two year waiting period to one year as proposed by the League (RM-1591) and the Commission.

Wherefore, the premises considered, the Commission is respectfully requested to amend Section 97.9 as proposed by the League in its petitions for rule making (RM-1590 and 1591).

Respectfully submitted,

THE AMERICAN RADIO RELAY
LEAGUE INCORPORATED
Robert M. Booth, Jr.
Its Attorney

June 1, 1971

MORE AMATEUR RADIO WEEKS

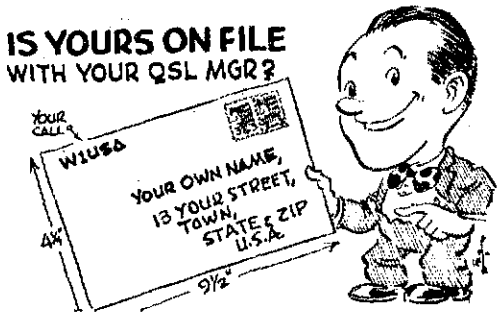
New York celebrated the Week June 20-26. Governor Nelson A. Rockefeller's proclamation called attention to the humanitarian work amateurs do by providing communications after disaster, by offering free message service, at Christmastime in particular, and by relaying messages to the men in the armed forces.

Next door in Connecticut, Governor Thomas Meskill, marking the same period, mentioned especially the Medical Amateur Radio Council ("Marco") and its "speed in seeking and receiving urgently needed medical data."

In the May issue of the *Newfoundland Amateur* we read:

> "By direction of the Honourable Minister of Provincial Affairs, I acknowledge . . . [the letter from Newfoundland Amateur Radio Association] . . . wherein *you request* . . . Amateur Radio Week. In this connection, I have to inform you that the Executive Council has approved that the week of June 20th be proclaimed as Amateur Radio Week."

Congratulations to all concerned! QST



A.R.R.L. QSL Bureau

The function of the ARRL QSL Bureau is to facilitate delivery to amateurs in the United States, its possessions and Canada, of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped, self-addressed envelope, about 4¼ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner.

Cards for stations in the United States and Canada should be sent to the proper call area bureau listed below. Recent changes are in bold face.

W1,K1,WA1,WN1[1] – Hampden County Radio Association, Box 216, Forest Park Station, Springfield, Mass. 01108.

W2,K2,WA2,WB2,WN2 – North Jersey DX Assn., PO Box 505, Ridgewood, New Jersey 07451.

W3,K3,WA3,WN3 – Jesse Bieberman, W3KT, RD 1, Box 66, Valley Hill Rd., Malvern, Pennsylvania 19355.

W4,K4 – H. L. Parrish, K4HXF, RFD 5, Box 804, Hickory, North Carolina 28601.

WA4, WB4, WN4[1] – J. R. Baker, W4ER, P.O. Box 1989, Melbourne, FL, 32901.

W5,K5,WA5,WB5,WN5 – Kenneth E. Isbell, W5QMJ, 306 Kesterfield Blvd., Enid, Oklahoma 73701.

W6,K6,WA6,WB6,WN6[1] – No. California DX Club, Box 11, Los Altos, California 94022.

W7,K7,WA7,WN7 – Willamette Valley DX Club, Inc., PO Box 555, Portland, Oregon 97207.

W8,K8,WA8,WB8,WN8[1] – Columbus Amateur Radio Assn., Radio Room, 280 E. Broad St., Columbus, Ohio 43215.

W9,K9,WA9,WB9,WN9 – Northern Illinois DX Assn., Box 519, Elmhurst, Illinois 60126.

WØ[1] – Reggie Hoare, WØOYP, P.O. Box 115, Mitchellville, Iowa 50169.

WAØ[1] – Lloyd Harvey, WØQGI, P.O. Box 7, Attica, Iowa 50024.

KØ,WBØ,WNØ[1] – Dr. Philip D. Rowley, KØZFL, Route 1, Box 455, Alamosa, Colorado, 81101.

KP4 – Alicia Rodriguez, KP4CL, PO Box 1061, San Juan, P.R. 00902.

KZ5 – Canal Zone Amateur Radio Association, Box 407, Balboa, Canal Zone.

KH6,WH6 – John H. Oka, KH6DQ, PO Box 101, Aiea, Oahu, Hawaii 96701.

KL7,WL7 – Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.

VE1 – L.J. Bader, VE1EQ, PO Box 663, Halifax, N.S.

VE2 – John Ravenscroft, VE2NV, 353 Thorncrest Ave., Montreal 780, Quebec.

VE3 – R.H. Buckley, VE3IIW, 20 Almont Road, Downview, Ontario.

VE4 – D.E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.

VE5 – A. Lloyd Jones, VE5JI, 2328 Grant Rd., Regina, Saskatchewan.

VE6 – Karel Tettelaar, VE6AAV, Sub. Po 55, N. Edmonton, Alberta.

VE7 – H.R. Hough, VE7HR, 1291 Simon Road, Victoria, British Columbia.

VE8 – George T. Kondo, c/o Ministry of Transport, Norman Wells, N.W.T.

VO1 – Ernest Ash, VO1AA, PO Box 6, St. John's Newfoundland.

VO2 – Goose Bay Amateur Radio Club, PO Box 232, Goose Bay, Labrador.

SWL – Leroy Waite, 39 Hannum St., Ballston Spa, New York 12020.

[1]These bureaus prefer 5x8 inch or #50 manila envelopes.

QSL Bureaus for other U.S.Possessions and for other countries appear in the June and December issues of *QST*.

Note: First Class mail in the U.S. is now 8¢ an ounce. QSL Bureau users should send their manager enough two-cent stamps to cover the envelopes on file.

Correspondence From Members-

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

AMAZED

● Just finished reading all the flap about *QST* content in the June issue of our journal. It's amazing how many of these guys say they subscribe to *QST*: I get mine free — it comes with my membership in ARRL. And I don't quibble about anything that's free. I've been a non-quibbler since 1924 and can only conclude from that spate of letters that too many hams take their hobby too seriously. — *Morton Blender, W1KGR, Providence, RI*

"TRIVIA" FINALE

● You are certainly getting a lot of mileage out of our comments on the "Trivia" content of *QST*. I am also amused at the motives that some of your readers are trying to ascribe to Don and me as the reasons for saying what we did. Is it selfish and "wanting our own way" to suggest something that we honestly feel would improve the magazine, or perhaps keep costs down without impairing its appeal to a majority of the members?

I enjoy the news and reports columns in *QST* because your staff has sifted out the chaff and published that which is newsworthy and of more general interest. Names and calls mentioned here are those of fellows who have done something worthy of our attention.

Time was in ham radio when most of the active hams all over the country knew each other and personal notes could be appreciated by everyone. To maintain the personal touch when an organization grows, it becomes desirable to decentralize and of necessity the local clubs and their newsletters should take over this function. If anyone yearns to know what the boys back home are doing, he need only to crank up the rig and find out over the air or get out the call book and drop a line to one of his former buddies. I just don't think we can afford the luxury of all that space in *QST*.

Incidentally, no one has been out to chop down my beam, and I have had just one letter . . . from a W1 who didn't go along with my thinking. Otherwise, all has been peaceful! — *Edson B. Snow, W2UN, Rochester, NY*

GOOD HUMOR

● I thoroughly enjoyed the "Dear Logbook" story in June *QST* by Lynda Crowley, KP4DIP. It was an excellent piece of writing and her style of humor unique. — *Eleanor H. McMullen, W1RNT, Collinsville, CT*

● Thanks very much for the article, "Dear Logbook." It was very nicely written, and beautifully touched with humor. My congratulations to KP4DIP and her talent. *QST* could use much more of this type of article. It adds some color (not literally!) to the magazine. Keep up the good work, you humor hounds! — *Rich Maltzman, WN1NRT, Sharon, MA*

● I want to say that Lynda Crowley's "Dear Logbook" is the greatest. I've read *QST* for awhile now, but this article is really good. She's got my vote. — *Daryl A. Bertolino, WN9EKS, Oregon, WI*

● Articles like "Dear Logbook" would be welcome in every issue of *QST*. — *David W. Fuller, WB8HIZ, Litchfield, MI*

APRIL SPOOF

● I get tired of seeing letters like K3QAX/W2QEX's griping about the annual April Fool spoof article. This time was just too much!

The first time I encountered an April *QST* was shortly before I received my Novice ticket. That particular issue featured an article by Larson E. Rapp on his new receiver, the QS-59. I became so fascinated that I went to a neighboring ham's QTH and wanted him to help me get one. Well, . . . the joke was completely on me. After several minutes of trying to suppress his inner merriment, my neighbor explained that I had fallen prey to one of Mr. Rapp's April articles. I hated to admit it, but I had been duped. The article sounded so great that I had to go along with it. No harm was done. . . .

Mr. Aurick fantasizes about a young Novice "spouting off at the first opportunity with his new knowledge." Fine, let him spout off. If he takes the article he read and parrots it back as if he had thought of it, it's his fault for getting caught. If he parrots it back but gives the author the credit, then it's on the author's back.

It sounds to me as though Mr. Aurick got caught at his own game and now is raising Cain with *QST* to make himself feel better. If we get taken by a story once in a while, it's good for the soul and just serves to point up that none of us, Novices or Extra Classers, are infallible, and if we can't laugh it off, we are in pretty sad shape. I always look forward to reading your April spoof and I feel the magazine would be less than *QST* if it were missing.

As to Mr. Aurick's comment that he has been "an Extra Class licensee for 19 years (the hard way)," I wasn't aware that there was an easy way to become an Extra Class licensee. Mine didn't come easily. Are they having a sale on them now . . . did I miss out? — *Tom Hammond, KØRPH, Jefferson City, MO*

● Each year, your annual April Fool's article seems to bring out a number of sour notes. I, for one, would like to go on record as giving these articles my hearty applause. In a world that threatens to come apart at the seams from serious matters, it is most refreshing to read a clever product of someone's imagination. I would think that the stuffy folks who object to this sort of thing ought to somehow be able to survive one article a year.

I still have fun remembering the "More Sock for Cents Antenna," NSB, and various other escapades of Larsen E. Rapp, even though I can recall not another thing from those same issues. What better test of value is there than survival?

As K3QAX points out, you are indeed 55 years old. Yet how enviable it is to be able to stay young

at heart! Indeed, some Novices may become confused after reading their first April article. Nevertheless, the real dum-dums will pass these articles up as being too complicated, and those with enough technical competence to appreciate them will not be fooled more than once. If these articles really cause a source of embarrassment, most of us would like to be so lucky as to be embarrassed only once in our ham careers! In any case, I have yet to run into anyone whose general electronic confusion can be blamed on April Fool articles, or who still suffers from a childhood trauma generated by them.

My signal-sucking receiver has just cleared a spot on the band for me, I have just modified my NSB transmitter for polydimensional cw, and am about to load it into my More-Sock-For-Cents antenna. If a combination like that doesn't get me the best DXCC score in history, I will be very disappointed. I will be even more disappointed if next April's *QST* doesn't bring another of those beautiful articles. Keep them coming. – *Gordon R. Smith, K7HFV, Salt Lake City, UT*

LOOKING BACK

● Having received my notice for renewal a couple of weeks ago, I find myself looking back upon my membership in the ARRL. Although I have only been a member for two years, I find the League has done a lot during that time.

I have not been for everything the ARRL has done, but, when I didn't agree, I kept my mouth shut. I find that in the long run, the League has helped me. For instance; I was against incentive licensing, but now that I have passed my Amateur Extra exam, I see what it is all about. It wasn't easy for me to get the code, but incentive licensing made me get it, and I am proud of my licence.

There are other examples, too numerous to mention. I still have disagreements with the ARRL, but I am only one ham of many in the U.S., and I can't expect the League to agree with me on all the cases. But it is doing a great job, and I am all for it. Therefore, please send me an application for Life Membership. I just hope I can do as much for the ARRL as it has done for me. – *Jerry D. Stuckle, WAØVBX, Urbandale, IA*

COLD SHOULDERED

● I am a thirteen-year-old Novice. I got started in ham radio when I was eleven, and I derive great pleasure from it.

There is one thing, though. I like to experiment with circuits and build equipment, but whenever I go into a radio supply house or the like, I get treated with the cold shoulder. The proprietors treat me (and I am sure other young hams have this problem) like I was a little kid who didn't know a capacitor from a crystal. I can't make them realize that I am just as good a ham as anyone else.

I look to the League for help. There isn't much you can do about my specific problem, but perhaps you could help instill the older hams with some respect for the younger ones by featuring a "junior ham of the month." – *Larry Budner, WN2KVN, West Long Branch, NJ*

PERKED UP!

● What happened to Margaret Koerner, WBØBEM? After seemingly unending articles of technical material and dry traffic news far above the head of this would-be ham, I perked up with the sudden appearance in the February issue of "CQ From a Novice," written in the true beginner's language – explaining things from scratch, and thought again seriously of renewing my subscription. After that – nothing. Bring Maggie back please. – *A. G. Zanelli, Falls Church, VA*

PHONE PATCHES

● Chairman Dean Burch of the FCC, in his speech to the QCWA, says, (May, *QST*), in referring to the Amateur Service, "This service was never intended, after all, as an alternative to Mother Bell!" He also says, in referring to non-amateur organizations,". . . that the bands would not be available to the individual amateur for whom the service was created." These quotes may be somewhat out of context, but I think they bring out a point. How long are we going to be permitted to provide domestic phone patches between non-amateurs for the obvious purpose of avoiding toll calls? Does this come under that part of the rules quoted by Mr. Burch: "Recognition and enhancement of the value of the amateur service to the public as a voluntary non-commercial communications service, particularly with respect to providing emergency communications."? Most of these patches are not emergency, so are they a voluntary non-commercial communications service?

Also, what happens when two non-amateurs say something considered unethical in the amateur fraternity? For example; I heard a discussion the other day between two parties being phone patched, concerning the effectiveness of the recent trip to the Middle East by the Secretary of State. This was on 15 meters. Some government agency might not consider this appropriate for the amateur frequencies, but are the amateurs running the patches responsible?

It seems to me we are leaving ourselves wide open for criticism by the FCC at a time when they seem to be in a mood to want to criticize. Also, can we not but admit that a great deal of the interference on the 20 meter band is caused by phone patches? We have all heard them lasting for as long as 30 minutes, discussing everything from baby's first tooth to the condition of his little toe! And frequently overmodulated!

Is there a voluntary solution before we are severely restricted? How about limiting all patches to 10 minutes? How about cautioning the people using the patch that their conversation can be heard by many; possibly over great distances? How about trying to have an amateur on one end or the other of the patch? How about *not* promoting domestic phone patches? How about telling me to forget it? – *Stark Totman, W4YB, Stuart, FL*

UNREPRESENTED?

● I note with interest that you keep running at a deficit. I don't wonder. The ARRL lost me as a member years ago. Perhaps if you began working for all hams instead of only the appliance operators you would see a big increase in membership.

I don't feel I, as a cw only operator, am being represented by the League. If that day ever comes, I will be glad to rejoin. *Jane Schlesselman, WB2JDM, Bath, NY*

EGO BOOSTER

● I agree wholeheartedly with K4FW's "The 52nd Contest" (May, *QST*). Here are some additional ways to obtain bonus points: (1) Com-

peting with a Novice for a station who just called CQ (the Novice is in the same city) and the Novice wins out. (2) Having "blackout" TVI. (3) Getting "bit" 2 times in a row by the linear's power supply. (4) Observing Murphy's Law faithfully.

Also, instead of exchanging Zip codes, I think it would be much more fun to exchange telephone numbers. This would make it more interesting should a YL-OM QSO occur, and also, the score would soon multiply into the novemdecillions — a big advantage to the guy who was in his first contest, because it would boost his ego tremendously! — *Mark Rotter, WA6KYE, Sacramento, CA*

LIFESAVER

● Although I am not a radio amateur, I must congratulate you on your excellent publication *The Radio Amateur's Handbook.*

In a week or so, I shall hopefully be receiving an Associate of Applied Science Degree in Electronics Technology from Jefferson College in Hillsboro, Missouri. Throughout the past two years of college-level study in electronics and also one year of high school vocational training in radio-television repair at the college, your 1968 edition, now getting tattered and torn, has stayed by my side for additional reference.

Rarely does a book of this quality and content come along at so modest a price. The *Handbook* has particularly aided me by illustrating the practical end of electronic communications theory, a technique which none of my theory-filled college texts employs. Your book is a lifesaver for "nuts and bolts" people like me. — *Tim Wehner, Crystal City, MO*

220 MHZ PROPOSALS

● The members of the Amateur Radio Technical Society of St. Louis have long been interested in and active on the 220 MHz band, and have never been asked by anyone whether we felt that a portion of it should be relinquished to other services. Without being asked, we would like to volunteer our conviction that the purposes for which the 220 MHz band and other VHF and UHF bands were originally set aside for amateur use are still valid. Far from being unused, they remain as the frontier of amateur exploration and offer opportunities for the serious experimenter in the fields of design, construction, and operation that are unavailable elsewhere and carry a challenge by their inherent nature that commercial interests have largely elected to leave to the homebrew enthusiasts.

We strongly urge and support the League's opposition to any proposal aimed at reducing existing amateur bands, and most certainly including those which present a challenge and an opportunity to that portion of our ranks who enjoy building and designing our equipment and exploring new dimensions in amateur radio. — *Wm. F. Johnson, K9ABK, Secretary, A.R.T.S., St. Charles, MO*

DISTILLED *QST*

● During my recent move to California, it became obvious (more so to the XYL) that I needed to reduce the total weight of my household goods through the thinning out of my radio and electronics publications.

My solution to the problem was to scan all of my issues (1948-1970) for articles of interest and to photocopy those for looseleaf filing. Articles of interest included: (1) Receivers and related subjects, (2) VXOs and VFOs, (3) Antennas, (4) LDE and whistler phenomena, (5) Technical correspondence and related feedback.

The information selected from *QST* outweighed the total from all other sources combined by 20 to 1. — *Warren A. Wolff, W5KKW, San Bernardino, CA*

TECH INCENTIVE

● I agree that it is not a tribute to Tech Class stature to learn that half are turning in their tickets without trying, (League Lines, May, *QST*) but let's look at the motivation behind it.

I doubt if, in most cases, it is a fear of failure but rather disgust with the second class status associated with the Tech ticket that has been allowed to exist for years. I personally could never understand why the Technician Class is the only class that loses privileges when advancing from Novice to Technician. Is this incentive? Why can't Techs hold the higher League offices when they pay the same $6.50 yearly dues? Why are a great majority of General and higher classes of amateurs against proposals for Tech privileges on a band where activity is almost nil (10 Meters)?

After listening in on the CB band, I'm convinced more DX is worked there in two weeks than is worked on 50 MHz in six months. Rather than re-examine Techs, I think the FCC should first allocate this time to eliminating the gross violations that occur consistently on 11 Meters.

I support the ARRL 100 percent and agree with most aspects of incentive licensing. My Tech ticket was earned at an FCC field office and 90 percent of my station is homebrew. I work 50, 145, and 432 MHz, intend to go for the Advanced ticket and still work those frequencies, so sour grapes is not my game. But it seems to me there is still injustice somewhere. — *E. Allen Lind, K3VRS, Baltimore, MD*

ALL KINDS OF VIEWS

● I think your frequency proposals are perfect in every way. I also think the frequency breaks should be slanted at the General Class. — *Jack Golden, WA2YPW, Portville, NY*

● You people at ARRL are something else, coming up with a proposal like you did. I am in favor of the FCC proposal in Docket 19162 and have told them so. I am for incentive licensing, and I studied and passed my Advanced and Extra . . . for what? You have made me so angry I had to write and tell you how I felt. I feel like dropping my membership, and I know others feel the same way. Your thinking is not with the rest of us. — *Nils Jansson, WA8OJI, N. Muskegon, MI*

● Although I enjoy working DX and my barefoot signal certainly could use a little more "elbow-room," I am against any expansion of the phone bands. Until a majority of the active amateurs can learn a few lessons in courtesy and proper operating procedures from our DX friends, I don't think we should take a chance on losing that friendship by crowding them out of even more of the already limited amateur radio allocations. — *Ken Van Ardel, WB9FRV, Aurora, IL*

* * * *

The Post Office Department promises faster mail service with Zip codes. Use yours when you write ARRL. Use ours, too. It's 06111.

Strays

WN5CKR (right) and WN5CKS qualified for WAS on March 3. Both received their initial Novice licenses in August of 1970 and both are League members. Oh yes, that's Dad (Jerry) on the left and son (Randy) on the right!

Hams Receive High Honors

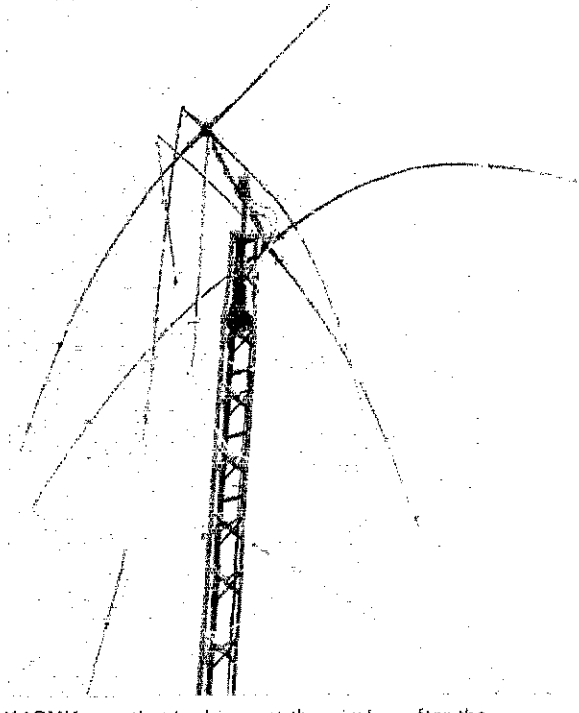
(Continued from page 67)

The Future

With this behind them, what are the twins' dreams for the future? They would like to open an office and shop in town, where they would be closer to customers. They would like to enlarge the scope of their business and service aircraft in addition to the other vehicles on which they now work. They would like to hire a staff that included handicapped, qualified workers like themselves. They would like to achieve as much independence as possible and prove to others that disabled individuals can make a contribution to society.

This last hope they have, very obviously, already realized. Their achievements in the face of incredible adversity have astounded, touched, and inspired countless other human beings. For this, today, we honor Richard and Robert Santin as Handicapped Americans of the Year.

If we have not, before now, used the word "courage" in our tribute, it is because, in the face of the evidence, the word is inadequate. *(Excerpted and adapted from a speech by Howard K. Smith, ABC News, April 15, 1971.)*



K4QXK says that looking out the window after the first ice storm of the winter and seeing your new quad looking like this is bad enough, but what really hurts is seeing the neighbors peeking out their windows and wondering what next.

The World Above 50 Mc.

CONDUCTED BY BILL SMITH,* KØCER

Moonbounce on 1296

THE CRAWFORD HILL (N.J.) VHF Club, W2NFA, has resumed moonbounce operations on 1296. Dick Turrin, W2IMU, says their transmitter runs 300 watts output from a water-cooled amplifier using 4 2C39s, feeding a 60-foot Kennedy dish. The antenna has about 44 dB gain at 1296. A feedline loss of 3 dB allows some 150 watts to be delivered to the antenna. The receiving equipment at W2NFA consists, in part, of a two-stage transistorized preamplifier mounted at the feedpoint, a Schottky-barrier mixer, and a 9-MHz tunable i-f system. The system operating temperature measured by sun noise, is about 1100 degrees Kelvin.

W2NFA's first moonbounce contact of this year was made May 5 with G3LTF – a repeat of earlier contacts between the two stations. On May 30 and June 1, W2NFA worked W9WCD, DeKalb, Illinois. Signal reports exchanged during both contacts were 449.

While moonbounce is becoming more commonplace at 144 MHz, and its difficulty, given sufficient antenna size, has lessened, moonbounce at 1296 is not easily achieved. According to W2IMU, George, W9WCD, is the first successful 1296 moonbouncer who is not an engineer and did not have elaborate professional test equipment available for determining station performance. The fact that George's station is purely amateur should serve to encourage potential moonbouncers who have limited technical background, test equipment, and financial resources. Dick says the most important ingredients are hard work and patience. Congratulations to W9WCD for his fine work and for joining the elite group of successful 1296 moonbouncers.

W2NFA, available for moonbounce and tropo schedules, is operated by W2IMU, K2KII, WA2HVA, W2OJ, W2CQH, and Roger Abson.

OVS and Operating News

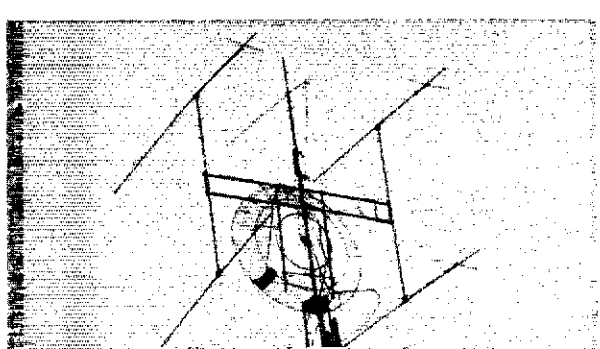
50-MHz DXers were pessimistic in May, fearing that the late start indicated that the sporadic *E* season was not going to be too productive. Although the season was slow until the third weekend of May, one week later, on Memorial Day weekend, the band really came alive. Openings were widespread, from the Caribbean to Alaska. By call area, here is a sampling of who worked whom. WA1DFL, Mass., says May 30 brought a two-hour opening to Puerto Rico, the best KP4 opening Steven had ever observed. The following day, WA1DFL worked K7ICW, Nev., for state number 40, as well as stations in all other call areas of the U.S. WA1IFE had similar success, including a host of W5 contacts. W2AZL, a New Jersey vhf veteran, worked the KP4s and exchanged DX notes with a number of W6s. WA3MHF, Pa., was among the lucky ones who caught Cuba's CO2DC May 31, operating near 50.4, a portion of the band usually neglected by the DX hunters. Ed also worked KP4s and a helping of midwest U.S. stations. He commented on the strong *E* backscatter prior to the opening to Puerto Rico and Cuba, around 0120 GMT. In the south, WB4LRK, S.C., worked 5s and Øs.

Across the country, the 6s were having a field day, being popular catches on the east coast, via multi-hop. WA6IYC began Memorial Day by working 1s and 2s, then the band opened simultaneously to all call areas, followed by a contact with KL7GLL, Sitka, Alaska. WA6HXM did even better: besides a large helping of 1s, 2s, and KL7GLL, Pete also worked KL7GFB, likewise in Sitka. WA6JRA worked many of the same stations including KL7GLL. On June 7, Sam heard the beacon of KH6EQI, Hawaii, on *E*. W6YKS heard or worked all call areas except W9 including K2HCF, N.J., for state number 42.

After a two-year layoff while completing school and establishing himself in business, Harley, WA6HXW, is back to six-meter DXing, in time to catch KL7GFB on Memorial Day, for state number 50 on 50 MHz. He has worked 49 of the 50 via E_s. His cards have been checked and his WAS award is in process. "The best opening I've heard in years" is how W6DPD described his May 31 success.

K7ICW, Nev., is still seeking that elusive final state, Maine, for his WAS on six. Al nearly had it worked on May 31, but an ill-timed call from a KP4 who needed a Nevada contact wiped out W1YTW. For most operators west of the Mississippi River, Maine is one of the most difficult states to work, due to distance, skip zones, and low 50-MHz occupancy. Nevada is hard for easterners for similar reasons. K8UNV, Ohio, has tried to work K7ICW for three years, but with no success. Phil heard Al for several minutes Memorial Day.

WØPFP, Iowa, also reported the May 31 opening, working KP4DHC, while WAØTRC,



Four bands on one support! W2DWJ, Elizabeth, NJ, has two Yagis for 220, left; two for 144, right; a single Yagi for 432, upper center; and a 7-foot homemade dish for 1296.

QST for

* Send reports and correspondence to Bill Smith KØCER, ARRL, 225 Main St., Newington, Conn. 06111.

Summertime marks the return to the field for many microwave enthusiasts. Pictured are K3HEC (left) and W3OLV checking 3400-MHz gear prior to a 21-mile line-of-sight schedule with K3MAW. *(WA3HMK photo)*

Kans., was was working 1s, 4s, and 6s. Other reports were received from WB2HEO, K5LZJ, WB5DVD, WBØELN (new in S.D.), WBØAAM, WAØVJF, VE3DSS, WA1NQV, WAØTRO, WA3KFT, and four others which were not signed.

It is nice to have detailed reports from Alaska. KL7GLL runs 150 watts input on cw on 50.118 and 145.008 MHz. His 1971 DX season began May 22, with reception of WA5HNK at 1830 GMT. E_s contacts were made with British Columbia, Washington, Oregon, and Wyoming, with W7VDZ providing a new state for Gene. Between 2130 and 2200 GMT May 31, Gene worked W6NIT, W6ABN, WA6JRA, WA6IYC, and K6KSY, along with single-hop to Washington. His only June VHF Party work was a scatter QSO with W7FN, Seattle. He can hear Don via scatter, even when the latter's antenna is turned in other directions. He will be glad to keep scatter skeds, and will try 145-MHz ms, "if anyone is willing." Is anybody "willing" to try for Alaska on 145-MHz cw? Line up, boys! Gene is on 7.035 MHz evenings for work with vhf enthusiasts, especially around 0600 GMT. Other KL7s on 50 include GFB and GQQ, the latter on 50.22, with low-power a-m and cw. All are in Sitka. KL7GZZ is in Ketchikan.

From Hawaii, KH6GRU says that the KH6EQI beacon (50.105) will be on continuously, courtesy of KH6GRT, though Bert will be on the West Coast during July. KH6EQI was heard weakly, 1751-1858 GMT June 7, by WA6JRA.

At this writing, one week after the June contest, I don't have reports from the several DX stations who were active. But prior to the contest, KØCER operated ZF1DT, Grand Cayman Island, from May 31 to June 5 leaving behind a TR-6 and 4-element Yagi, to be activated the next morning by K8BBN, operating ZF1RS. A second-hand report from K8UNV says Jim proceeded with 105 contacts in 16 states and Canada on June 7. I'm pleased Jim found conditions favorable. He was joined for the contest weekend by W4GDS, who supplied the equipment for the two-week Cayman operation.

Our friend Michio, JA1MRS, in Yokohama, writes that he and five other JAs worked a station signing KL7HAM for one hour, beginning at 0745 GMT, May 30. Michio says they exchanged mostly 5-7 reports on ssb and hopes the station worked actually was in Alaska. He is awaiting QSL proof, as are his JA friends. Michio reports that several JAs worked ZK1AA in March and April, and that JA2IIY has confirmed a March 16 contact with LU1MBJ, Argentina, nearly halfway around the globe. Thanks Michio for the letter. It is always a pleasure to hear from you. One final DX note, VP2MJ, who signs VE3EVW when not wintering in Montserrat, says he left six meter gear on the Caribbean island for more anticipated operation next winter.

144 MHz and UP reports continue to be scarce. WA8MVV, Ohio, returned to 2 meters in late May after an 8-month absence. Terry caught several minor tropo openings in late May and early June to K4EJQ, Tenn., and several locations in the Ohio River Valley, always a favorable tropo area. Terry says ssb activity above 145 MHz is increasing in Ohio. W3BDP, Del., sent a report of the May 18 aurora. Sam worked a number of 1s, 2s, K4FKD (Va.), 9s and VE2s BZD, LI, DSS, FKX, and VE3EMS for an interesting evening. WA9QZE, near Chicago, had similar success with our Canadian friends, plus WØRLI, Minneapolis, logging 9 states during the buzz session. Al is running 900 watts input. He cautions those using the Knight SWR bridge at 2 meters. The diodes included in the kit will not take high power at vhf.

KH6GRU reports that fm and repeater operation is increasing rapidly in the Hawaiian Islands. A repeater on Diamond Head (146.2 in, 146.8 out) links with one on Haleakala, Maui, (34-94) to give inter-island coverage.

Our only 220 mention this month is by KH6GRU. Bert says that WA2KDZ/KH6 will be listening for WB6NMT in July, from an excellent beach location at Mokuleia, on the north shore of Oahu.

432 and 1296 get more mention. K7ICW says he is continuing work on a W1QWJ kilowatt for 432. K4GGI/1 reports that W1QXX now has a 4X150A amplifier following his varactor multiplier. With a 96-element collinear W1QXX now works VE2LI regularly, over a 250-mile rough path. Lew predicts that 1296 activity will be growing, as a number of New England stations now have 50 to 100 watts output. I'm curious to see if 1296 contacts will be made this fall between well-equipped stations in Indiana and Illinois and the comparable 1296 stations of the east. Tropo down the East Coast seem almost a forgone conclusion.

K3CFA reports several tropo sessions on 432, though distances involved were not great. The fall season, with stable inversions over much larger areas, is not far off. Joel has 6 states. He says K8RPL is new in Ohio.

We are sorry to hear that K8DEO and K8REG are giving up 432 DX-ing because of interference from ATV operation near 432. Don and Vince did much to pioneer long-haul tropo and meteor scatter interest, and their complete loss would be serious. We are trying to reach the ATV people concerned, in the hope that frequency usage can be ironed out to the satisfaction of all parties. Should this be hard — in a band 30 MHz wide?

W6ORG, of the Southern California ATV Club, says that they have solved the problem by using 435 MHz as the standard for video and 439.5 for

fm sound. Does this spacing really take care of it? Would ATV people use space below 432? Increasing occupancy of the 420 band generally, the rapid growth of repeaters, the boom in ATV, and nationwide interest rising as a result of satellite work in prospect — all these give rise to problems hardly dreamed of a few years back!

Finally, K5ZCO says that the Dallas Chapter of the Texas VHF FM Society is sponsoring a new open repeater, 449.0 in, 444.0 out.

WAØJBH, Dubuque, Iowa, has 500 watts input, ssb, on 432, with a 44-element Tilton Yagi array and a Parks Converter. His line is 3/4-inch aluminum-jacket coax. He will keep skeds with interested parties.

WA5UVM writes of a 432 expedition to Rich Mtn, in Arkansas, about 200 miles north of Dallas. Ben has a 2N5637 rig delivering 20 watts output and a 14-element Yagi. With this he worked W5HN, W5GLV, and K5UGM, all of Dallas; W5HPT in Bedford, near Ft. Worth, and W5LDV, Houston, a distance of over 400 miles. Back in Dallas for the June VHF Party, Ben worked W5LDV, 250 miles, and W5GVE in Waco, 100 miles.

K4QIF, newly settled in Hobson, Va., is going on 144 and 432, with 1296 coming. He has been hearing W1GAN, K1PXE, W1OOP, K1AGB, and K9AQP/1 on 432 frequently.

Contest Within a Contest

Recently we have considered sponsoring a "220-and-Up Contest," either as a separate entity or as a substitute for the June or September VHF Party. A project of the East Coast VHF Society now makes this choice unnecessary. Beginning this year, ECVHFS is sponsoring an Annual National UHF Competition, to run concurrently with the ARRL September VHF Party. (By some semantics stretching, "UHF" is made to include the 220-MHz band.) The Competition format will follow that of the September VHF Party (see rules elsewhere in this issue) with the following exceptions:

1. All claimed contacts must be made on amateur frequencies above 220 MHz.

2. A travelling trophy will be awarded yearly to the highest-scoring single *or* multioperator station, US or Canadian.

3. Certificates will be awarded to the high-scoring station in each ARRL Section (where at least three valid entries are received), and nationally to the leading single-operator station *on each band*.

4. There will be no Novice award.

5. All entries must be post-marked no later than three weeks after the end of the contest period. Send them to East Coast VHF Society, PO Box 1263, Paterson, NJ 07509. Use ARRL VHF Party forms or reasonable facsimile. Do not send copies of your ARRL contest entry, unless all contacts are on 220 or higher bands.

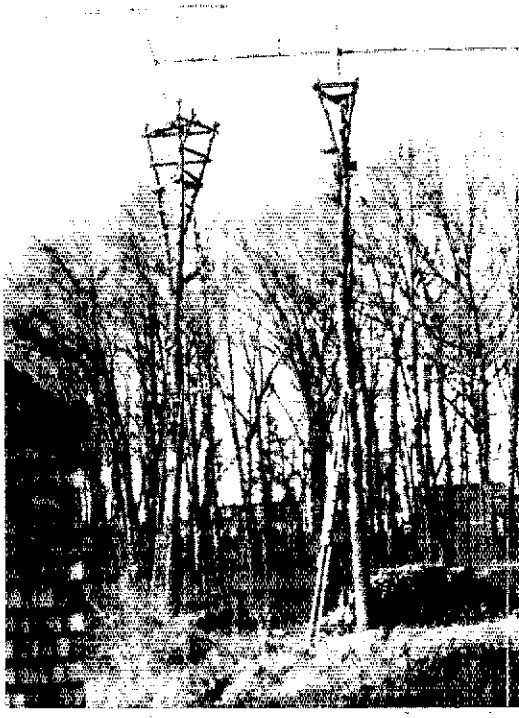
The purpose of the National UHF Competition is to encourage activity and innovation in the uhf and microwave bands. Results will be published in a special edition of the Society's newsletter, *The Web*. Enclose a stamped self-addressed envelope with your entry to receive a copy. Results will be forwarded to ARRL in advance of publication in *The Web*.

CARC Meeting Held

A midyear meeting of the California Amateur Relay Council was held June 5, in Los Angeles. Several organizations and individuals were admitted, bringing CARC membership in California, Nevada, and Hawaii to over 60. Jay O'Brien, W6GDO, reported on frequency coordination efforts, and prospective division of responsibilities between the areas of Northern and Southern California and Nevada. Members and nonmembers alike are encouraged to coordinate vhf and uhf frequency usage through the Council, to minimize interference problems.

Recognizing the problem involved in travel over the 800 miles of territory now represented by the Council, a study of regional planning was started. Changes in the constitution and by-laws to effect regionalization will be presented to the next meeting, to be held in Sparks, Nevada (Reno) Oct. 2. The site will be the Nugget, and the meeting is to be sponsored by the Sierra Nevada Amateur Radio Society. Make reservations with Frank Cherne, WA7DUL, 840 Rhode Island Drive, Reno, NV 89503, before Sept. 25. QST

Strays



Taking advantage of what nature had to offer, W1HLX has devised a couple of interesting supports for his homebrew 4-element monoband quads for 15 meters. Everything in the shack, except for a scope, is also homebrew.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

W h e r e ?

With Grommethead Schultz it's often hard to tell where fact, if any, ends and where fancy, if any, begins. Like last week when we ran into him wearing a dirty rainbow poncho, soggy tangerine bellbottoms, battered sandals, and a three-day growth of beard. No, *him*, not us. Grom looked even hungrier than usual so we invited him to share an anchovy pizza and made our usual mistake of asking him what's new.

"Been out of town, man," he chomped. "Not my idea, either. Noise-blanker quit." Another typical Schultz *non sequitur*, we figured. He chomped on. "Finally got on the list for that new ZM7. Four mornings in a row up at four A.M. and they finally get through the sixes, sevens and are finishing the eights. Suddenly I hear nothing but skick-skick-skickety-skick on the band. No ZM7, not even net control. I run to the shack window and there's this milk delivery truck parked right under my zepp, motor idling while the milkman makes his stops. Naturally I hop out in my pajamas to flick off the ignition. But I hear him coming around the corner behind me so I zip into the back of the truck until he grabs another case of juice and goes away. Hard to explain, you know, and no time." Chomp, chomp. " But he doesn't go away." Chomp, chomp. "Instead he revs up the clunker and zooms back to the dairy. Bill-day, I guess, and he must have forgotten his customer list. Man, I panic those clowns by galloping out of the place in my orange sacksuit and hotfoot for home. Two miles in fifteen minutes ain't bad." Chomp, slurp, chomp.

Grommethead washed down some of our side of the pizza with another milkshake. "Grom, do you get him, did you get the ZM?" we impatiently urged, still wondering how he grew three days of whiskers in one confused morning. He wiped his stubble with that wild poncho and went on.

"Well, I get back to the shack and find the ZM7 just beginning on the nines. Fine signal, too. I touch up the VFO, cough a few PEPs – all set. Then out goes the band again under even worse *skick-skick-skickety-skick*. I run to the shack window. . . ."

"We know, we know. That darned milk truck is back again!"

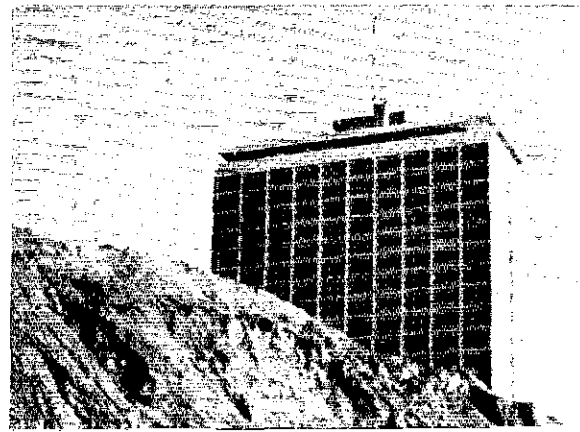
"Wrong, wrong," chomped Grommethead Schultz, rooting about for stray crumbs. "Let's work another pizza and I'll tell you about this crazy long-distance moving van. . . ."

\+ + +

W h e r e :

HEREABOUTS – For dependably swift QSL response these "QSLers of the Month" are hereby recommended by correspondents Ws 1SWX 4JUK 8YMB, Ks 1DYA 2QHT, WAs 2FOS 9ZCP ØVZC, WB9CJS and VE7BAF: C21AA, CE8AO, CN8CF, CX2CN, FG7TD, FR7ZX, HR2GK, KC6RS, KG6AAY, KP4CL, PW4AP, PX3BXW, SU1IM, SVØWP, TA3GB, TR8MR, UA9VH/JT1, VPs 2GLE 9GE, W9IGW/CEØ, WA1ARF/KS4, XE1AE, ZD8AB, 4M7AV, 5U7AW, 9G1WW, and 9U5DP, together with QSL aides Ws 2SNM 5EGH 8BMS and VE2DCY. Any other quickies for these kudos?. . . . Halp! These italicized colleagues seek hints toward confirming contacts with holdouts specified: *K4RON*, C31DG, CR4AE, EA8FA, FMØXF, KJ6BZ, OY7JO, UK9AAN, VP8LW, VR2ET, ZB2A, 3A2AV; *WA2FOS*, HUØA, I1BH, FG7TI/FS7; *WA2GMD*, VK5TG; *WA4FDR*, 9V1NV '67; *EAs IIY 7IR 8GZ*, SVØWT, VP1WMU, VQ9CD, 4S7s AB PB and 5A5TH. Any 'alp? . . . WA2GMD adds his call to the list of those willing to help tackle DX stations' QSL problems. . . . DXers should be aware of the increased International Reply Coupon and overseas postage rates. – *WCDXB*. . . . QSLs for HI8XPM, VP1s FW and TM should now be sent direct. – *VE3DLC*. . . . HP1s AC IE JC JI and XYZ were authorized use of Panama's 3F prefix in May. – *DXNS*. . . . Beginning with this year's ARRL DX Test QSOs I act as QSL manager for CP3BY. Phil intends to provide logs monthly to keep the turn-around time as short as possible. – *WAØEMS*. . . . Questions from new DXers have caused our ARRL QSL Bureau branch to prepare a booklet of information for beginners. Many who normally would turn away from DX for lack of info will now be looking for those "new ones." – *NCDXC*. . . . I'll QSL 100 percent on receipt. – *VP2LAW*.

EUROPE – The DL4-DL5 QSL Bureau is dissolved and all QSLs should be sent via the DARC bureau address. This action is necessitated by the realignment of German prefixes. – *DL4sCB MG via W6NLG*. . . . Special cards will confirm all contacts with EIØDI. – *EI7CD*. . . . Please QSL for HW6KAW's Five-Band DXCC! – *F5QF*. . . . Just shipped about 3000 cards for EI2VDX, GDs 3YBH 5ATG and GI5ATG via the bureaus route. Having an XYL who is an active ham (WA6IEB) really saved the day. – *G5ATG (K6TWT)*. . . . DL7AH, striving for the Califor-



VE3MR/4X recommends this sixteen-story edifice atop a Mediterranean-lapped 150-foot cliff as prime QTH-of-the-Month material. Martin and friend 4X4DK find the Netanya location particularly good for 75-meter DX.

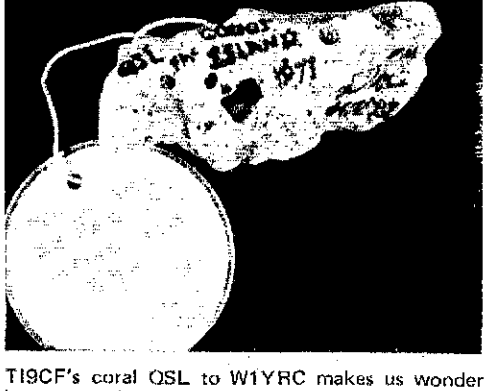
*7862 West Lawrence Ave., Chicago, Ill. 60656.

nia Award, complains of a meager 20-percent QSL response from sixland. – *NCDXC*. . . . . Those who worked HV3SJ on cw May 30th (mostly 29 MHz) may QSL to DK2DZ. – *VERON*.

ASIA – Society of Thai Amateur Radio maintains an efficient bureau run by HS1ABP at P.O. Box 2008, GPO, Bankok. All HS amateurs must be members and all like to QSL. – *HS1ABU, v.p. STAR*. . . . . TA1KT's call was pirated on 80, 40, and 10 meters during October and November, 1970, *so I cannot confirm those* QSOs. *Kamuran* used only 14-MHz ssb and cw. I hold logs through March 20, 1971. – *K4IEX*. . . . BY3NK gives the address MPO 32, Canton, says "no radio call" on envelope, and indicates his QSL will arrive in six months via Hong Kong and ISWL of London. – *W6QPF*. . . . . I'm QSL manager for HM1EX starting with QSOs of October 12, 1970. I have logs to April 26, 1971, and more should be coming through. – *WB8EUN*. . . . . JE1 calls are showing up, presumably to go with Japan's big JA1–JH1–JR1 block. – *WCDXB*. . . . I'll be QSL manager for K7CBZ's future operations in southeast Asia. Don's TI9CF "card" was a piece of Cocos Island. – *W1YRC*. . . . UA9VB alone has logs for *UA9VH/JT* whose *QSLs* go out through *W3HNK*. *DXNS*. . . . W2SAW's mint Mongolian postage brought me back a UA9VH/JT1 QSL *fast*. – *WA9ZCP*. . . . I will handle cards for YA1OS, active in Kabul, and will give direct reply to unusual postage stamps or IRCs, others via bureau. – *SM5BGK*.

AFRICA – Due to pressure of business it is necessary to curtail my QSL managerial activities. Cards for 5Z4KL should now go direct, those for ET3DS via VE2DCY. – *VE3DLC*. . . . As of this May 1 QSL for EL2CB. – *W3HNK*. . . . 8Q6 appears to be the revised Maldives prefix. 8Q6s WA and YL, formerly 8QAWA and 8QAYL, recieve QSLs via their home addresses as 4S7s WA and YL. – *DXNS*. . . . VE6AKV will handle QSLing for WA6FSC's Rodriguez trip, possibly also for Darlene's other Indian Ocean stops. – *WCDXB*. . . . Apparently no amateur has been formally licensed in Guinea since 1967, but several 7G1s are intermittently active, most QSLing via Stateside managers or through the Czech bureau. – *UBA*.

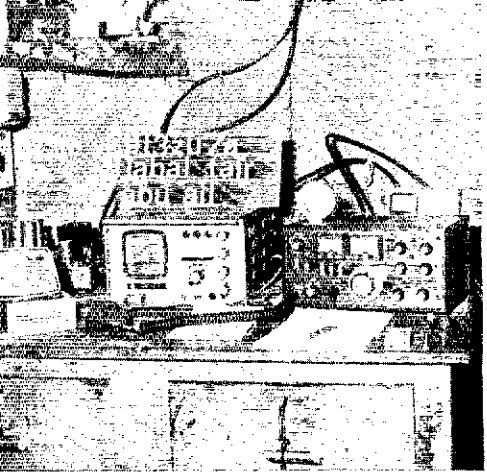
OCEANIA – Cards sent direct to my Indonesia address will suffer delay, so QSL only via K7DVK who holds logs. Some 2500 cards are about to go out. I previously signed CP1HW, HC1GK, VP1EG and OA4YM. – *YBØAAN (WA7IQT)*. . . . K7TER tells me he knows nothing about KS6RS operation or QSLing. – *K4AUA*. . . . KX6DC should be QSLd direct with s.a.s.e. (self-addressed stamped envelopes). – *WA2HZR*. . . . Here goes with the mailbag's latest individual specifications but remember that each suggestion is necessarily neither accurate, complete nor "official." Just might work, though.

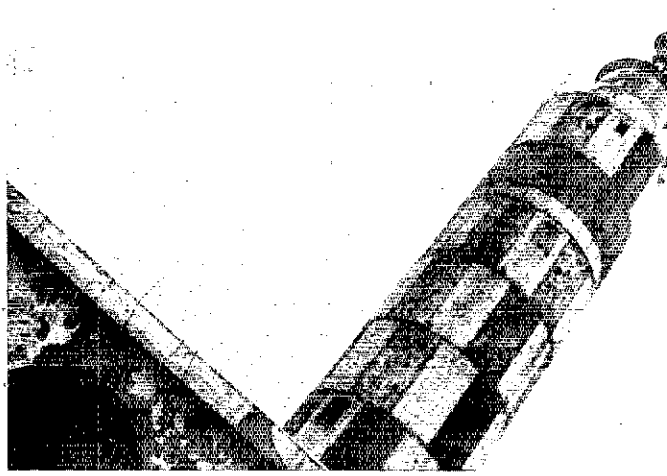


TI9CF's coral QSL to W1YRC makes us wonder how many hams have "rockhound DXCC." (*Not* via the ARRL Bureau, please!)

DL4VA, H. Vandegrift (WA4WME), MatCom-DSO, APO, New York, NY 09052
EI6S, G. McClarey, Moynehall, Cavan, Eire
FO8AF, P.O. Box 1825, Papeete, Tahiti
GC3APA, E. Kendall (G3APA), Caro Mio, Sark, C.I., U.K.
GM5AQR, Box 223, FPO, New York, NY 09518
IA5s BGJ BUP (to I1BGJ)
II4FGM, Box 2128, Bologna, Italy
K1DYA/VE2, B. Cushman, P.O. Box 301, Ecowi, P.Q., Canada
K6PWX/KG6, A. DiBona, Box 87, Cal Lab, FPO, San Francisco, CA 96637 (or to K6PWX)
KC2GMF, Box 111, Freehold, NJ 07728
KC6HG, Box 131, Yap, Caroline Islands, 96943
KCØKC, P.O. Box 753, Shawnee Mission, KS
KR6IU, J. Lofgren, P.O. Box 1922, NSGA, Hanza, Okinawa, APO, San Francisco, CA 96331
Ex-MP4TDI, S. Rhodes, 1st Sqdn., 14th Sig. Reg., Worcester, England
PAØVDV, J. van der Velde, Torenzicht 67, Eemnes, Netherlands
PYØATG, P.O. Box 345, Belo Horizonte, M.G., Brazil
PZ5RK, P.O. Box 1439, Paramaribo, Surinam
VP1s FW TM (see text)
VP2s DAN GBG GBH (via VE3GMT)
VR2FY, Box 1168, Suva, Fiji Islands
VS5CB, C. Berakas, c/o WWH Ltd., Officers Mess, Brunei, Brunei
VU2IJZ, P.O. Box 6538, Bombay 26, India
VU2SRE, Swami Parijnanashram, Shri Chitrapur Match, P.O., Shirali, North Kanara, Mysore, India
WA2HYX/8R1, R. Muller, Box 337, U.S. Embassy, Georgetown, Guyana
WB6MQV/KG6 (via WB6HDG)
YBØAU, Box 106/DNG, Djakarta, Indonesia
YJ8BG, Box 138, Vila, New Hebrides
YN1GDL, P.O. Box 1364, Managua, Nicaragua
Ex-YO2BO, G. Pataki, WB2AQC, 34024 76th St., Jackson Hts., NY 11372
ZD9s BS TDC (via GB2SM)
ZK1CF, P.O. Box 474, Rarotonga, Cook Islands
5W1AU, P.O. Box 1069, Apia, Western Samoa
8P6s AH BN BX CP (via VE3GMT)
9Q5KP, c/o U.S. Embassy, APO, New York, NY 09662
9X5QC, Box 396, Kigali, Rwanda

BY3NK (see text)
C31DP (to ON5TO)
CP3BY (via WAØEMS)
CR3ND (via CT1BH)
Ex-DL4GN (to W6NLG)
DLØSD/LX (via DL8HC)
EI2VDX (see text)
EIØDI (via IRTS)
EL2CB (via W3HNK)
EL2CJ (via DL2YN)
ET3DS (via VE2DCY)
GD3UMW (via RSGB)
GI5ATG (see text)
GM5ASI (via WA3KOC)
HB9XTK (to DL4VA)
HBØAFM (to HB9AFM)
HBØXTK (to DL4VA)
HI8XPM (see text)
HM1EX (via WB8EUN)
HT1MG (via WA5GFS)
HV3SJ (see text)
HW6UIT (via F9OE)
IP1RBJ (via W2GHK)
IS9LAW (via ARI)
JD1ACH (via JA3GZN)
JD1YAA (via JA1WU)
JE1CKA (see text)
JY9AL (to 9K2AL)
JY9B (to EP2WB)
KD4ITU (via W3ZA)
KS6RS (see text)
LX1FF (via LX1JH)
ON8HR (via F9IO)
Ex-PV2VD (to PAØVDV)
SMØCER (via W3HNK)
SPØITU (via SP5PFK)
TA1KT (see text)
VK2JK (via K1MPD)
VK8EG (to WB6IZF)
Ex-VR2FT (to G3HZG)
VS9MF (via G3VAQ)
WM8IQH (via W8HS)
WU3SNA (via W3ADO)
WZ6SNI (to WA6WWC)





ET3ZU/a cooked up a rare one in early May while servicing the Jabal at Tair and Abu Ail Islands lighthouse in the Red Sea off Massawa. Among 1200 QSOs in 37 hours were 370 lucky Statesiders. Aldo will return next year but other DXpeditioners threaten earlier reactivation. *(Photos via K3BSY)*

YB8AAP (to WB6IZF)
YBØAAN (via K7DVK)
YN1MG (via WA5GFS)
ZD8RC (to G3ZJT)
ZD9BR (via ZS2RM)
ZL4JF/a (via ZL1AUF)
ZP5PK (via ZP5IT)
ZS3AK (via DJ9FH)
3AØFN (to DL4VA)
3F1IE (see text)
5T3ITU (to 5T5AD)
5Z4KL (see text)
6Y5GB (via VE3GMT)
8Q6WA (see text)
8R1U (via VE3GMT)
9L9ITU (via GW3AX)
9Q5ITU (via 9Q5EP)
9Q5WV (to ON5WV)
9V1QF (to WB6IZF)

These data come courtesy Ws 1CW 1SWX 4KO 6GSV, Ks 1DYA 1PLP 2QHT 4AUA 6PO, WAs 2FOS 9ZCP, WBs 2AMO 6HDG 9CJS, DL8BL, EI7CD, J. Treesh, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), *DX News-Sheet* (G. Watts, 62 Bellmore Rd., Norwich N.72 T., England), Far East Auxiliary Radio League (M) *News* (KA2LL), Florida DX Club *DX Report* (W4FRO), Japan DX Radio Club *Bulletin* (JA3UI), Long Island DX Association *DX Bulletin* (W2GKZ), Newark News Radio Club *Bulletin* (J. Heien, 3822 Marshall Ct., Bellwood, Illinois, 60104), Northern California DX Club *DXer* (Box 608, Menlo Park, California 94025), Southern California DX Club *Bulletin* (K6s AUC HIH), UBA's *On the Air* (ONs 4AH 5VA), VERON's *DXpress* (PAØs FX LOU TO VDV WWP), West Coast *DX Bulletin* (WA6AUD), and 3KM *DX Bulletin* (JA1KSO, JH1EXV). Got a QTH we missed? Join the generous!

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W h e n c e :

ASIA – Spent a delightful evening with the Hong Kong gang while visiting VS6FE. Stan says the BY1C occasionally on 20's low edge is in Peking, all right, but apparently acknowledges no answers to his CQs. Another authorized amateur station is active there but makes no international contacts. – *WA2HTU*. . . . Ran into Peking possibility BY3NK on 14,010 kHz at 0730 GMT. – *W6QPF*. . . . The well attended 12th (1970) All-Asian DX Contest, a radiotelegraph romp sponsored by Japan's JARL, had U.S.A. call areas paced by W1YYM, K2DJD, W3CRE, K4II, WA5QZG, K4BVD/6, VE7AZT/W7, WA8QIY, W9EWC, KØGJD, KH6RS, and KL7MF. By sheer score size it went K4BVD/6, WA6IVN, WB6QJD, Ws 9EWC 6AFI 9IOP 1YYM, K2DJD, Ws 1BGD/2 and W6DQX. Winners by continent: CX3BN, K4BVD/6, KH6RS,JT1AW, UB5CV, and UL7BG. By country: CE8AA, CR7IZ, CT1LN, DL7AA, EA2IA, EI5F, EL2CB, F8TC, G3LNS, GM3CFS, HA5DJ, HB9PQ, HP1BR, HS1ACM, I1ZGA, JT1KAA, KG6JAC, KR6TK, LA6U, LU3DSI, LZ2DC, OE3AX, OH5SE, OK2RZ, ON4XG, OZ1LO, PAØABM, PY4ABH, SM2EKM, SP2AOB, TA3OZ, UK1ABA, UAs 2BI 9WS, UC2RL, UD6BW, UF6LA, UH8DC, UI8OJ, UJ8AH, UM8FM, UO5SA, UP2NK, UQ2GW, UR2FU, VE1AI, VP2GLE, VKs 3KS 9KS, ZL3GQ, ZP5CE, 4S7DA, WB6NWW/4X, 7Z3AB, and 9G1HM. Call-area biggies on the home front were JAs 1AEA 2HO 3IKG 4ELC 5MG 6CNL 7COE 8AYN 9BSK, and ØGRF, with largest scores filed by JA1s AEA ANP, JH1BBT, JAs 1GDN 2HO 3IKG 9BSK 5MG 3IG and JH1EIG in that order. These are single-op statistics but JA3YBF, KH6UL, UK2PAF, and W3AU led their continents in the multiop category with massive totals. Probe delicious QRM in No. 13 of the All-Asian series scheduled for later this month, details elsewhere in *QST*. – *JARL via W1YYM*. . . . July 15th was my cut-off date on Minami Tori Shima. – *JD1ABO*. . . . 9K2AM's son Jim, 9K2CM, lives in Stoney Point, New York. – *K2QHT*. . . . TA2EM confirms that the Istanbul and Ankara TRAC bureau has been closed by authorities. All gear including eleven transmitters and many QSLs were seized. It appears that TAs are now QRT except for clandestines. – *W7TE*. . . . WA3IUV usually gives the call-up for UA9VH/JT1's 14,207-kHz net Sundays at 0100 GMT. *W3HNK*. . . . HM1EX is mostly QRV on 40 cw between 1300 and 1500 GMT. – *WB8EUN*. . . . VU2SRE, active on 14-MHz voice and code, may be the first of India's monks to enter amateur radio. I am also a new ham and ARRL member. – *VU2IJZ*. . . . XW8DZ doesn't hear much in the pile-ups with his 15-meter dipole so he's firing up a quad. – *W6SO*. . . . TA1KT is starting an 18-month army hitch. – *K4IEX*. . . . JY1 is doing great things for amateur radio in Jordan. Club stations are getting ready to go on the air. *WA3HUP*. . . . ZC4CB is available now for preparation of winter SB-DXCC skeds on 40 and 80, and ex-TJ1AZ may try to get some BV biz going while on Taiwan assignment. – *WCDXB*. . . . New or renewed memberships are claimed by KAs 2AB (WAØEGD), 2AK (WA7MZY), 2AW (WA6DRZ), 2MU (W7CMU), 5AR (WA6CVG), 7GP (K4KDJ), and 8AU (WB4SRC). Beginning in July our KA Net meets twice each Sunday, 0000 and 1200 GMT, on 14,300 kHz with world-wide check-ins. – *FF4RL*.

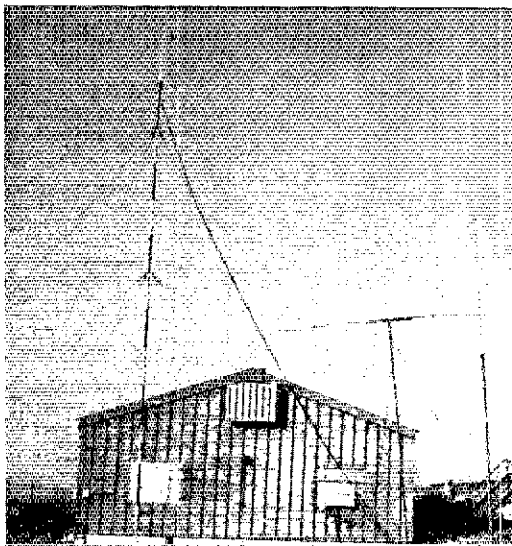
EUROPE – IRTS Region One members will be active as EIØDI from Dalkey, a small island off Ireland's east coast, on 3.5 through 30 MHz over the first weekend of August. – *EI7CD*. . . . Our EIØDX DXcursion to Bantry Bay's Bere Island in early June saw operation on 160 through 10 meters, code and voice. *EI4BK, Limerick Radio Club*. . . . Left KA2TP in 1965 for a Pentagon

assignment and retired from the Army in '68 after 33 years of service. My present work with NATO deals with extremely interesting communications from landwire all the way to orbiting-satellite data networks. I was issued a Belgian license last August and operate ON8VH on 20 cw. A new ground-plane will take care of 15 and 10. – *W2BTQ*. . . . DJ1US has fun with QRP while building higher-power equipment. – *WA7LMZ*. . . . For WAS I still need Delaware, Idaho, Mississippi, Montana, Nevada, North Dakota, Oklahoma, Utah, Wyoming, and Hawaii. Watch for my cw on 21,070 or 21,140 kHz over week ends. – *SM3ALR*. . . . WABRA is a new certification offered by our Bolinas Radio Amateurs society based on QSOs with member stations, s.a.e. with IRCs for full info. – *SM3BCZ*. . . . After operating from Luxembourg I'll be on cw from Switzerland 'til September, call as yet unknown. – *WA3JSU*. . . . I kept looking for a *QST* centerfold when I caught that June UA1JL photo. – *W8BSS*. . . . Our Kiel DARC branch, DLØPD, expeditioned into the Hartz mountains in late July. – *WA2CEC*. . . . Former 9S4s of Saarland who are now DLs and LXs held a June operating reunion in Luxembourg where we signed LX1FT, KLØSD/LX, and other calls. – *DL8BI*. . . . Really enjoyed a visit to PAØSCH in May! – *WA2ETN*. . . . My 3AØFN Monaco location in May was a beauty overlooking the harbor. – *DL4VA (WA4WME)*. . . . Stencil troubles slowed our *QUAX 10-Meter Bulletin* output this summer. – *G3DME*. . . . SVØWO, 21,030 kHz at 1800 GMT or so, still hunts Washington state for WAS. – *W9BRD*. . . . WA6IEB and I plan to sign a GW5 call from Anglesey shortly, then on to Monaco, Corsica, and/or Andorra if all goes well. – *K6TWT*. . . . IS1DFO is still operated by W4YFX. – *K2QHT*. . . . Plaudits to ZA2RPS for tuning up to 14,275 kHz while transmitting on 14,195. Democracy in action! – *W9WHM*. . . . II4FGM's operation at Bologna marked Marconi commemorative festivities. – *DXNS*. . . . Worked 97 countries in my first five weeks as DJ1AP with an SB-101, verticals and dipoles. I also operate DA2CL, the MARS layout upstairs. No beam yet but I'm working on it. – *W6PMA via SCDXC*. . . . "Where have all the Gs gone?" The fear of TVI here is much worse than the thing itself. One high-pass filter cleared the only problem at my station. Perhaps when BBC-TV goes completely uhf Gs will return to hf DXing from vhf and 160. – *G5ATG*.

OCEANIA – I operate YB8AAP at Bula, Ceram, with an FTdx-400, Vees and various long-wires in the 14,320-kHz Southeast Asia Net at 1200 GMT and the Confusion Net on 21,400 kHz at 0000-0200, also after 1200 on 21,250 kHz with other YBs and skeds. I'm not much for DX but will be happy to arrange schedules. When not signing YB8AAP you may hear me from 9V1QF where I run a 270 into a triband yagi. I also hold the call VK8EG. – *WB6IZF*. . . . East Java has had few active hams in the past but the number is growing. I'm very active on 21 MHz at 1330-1500 GMT, and on 14 MHz from 1500 onward. – *YB3AAY (WA3LJM)*. . . . VK9BS and I schedule several times a month on 20 meters so anyone wanting Papua should drop me a line. – *W3HNK*. . . . 5B-DXCCers needing KG-land on 75 should watch for me on 3805-3810 kHz at 0900-1200 GMT. I also listen on 3830-3840 kHz. Recently worked LUs 7AAC and 8AJC there with my 500 watts and 33-ft vertical. – *K6PWX/KG6*. . . . KR6IU (WB6OHT) is assembling a radio-teletype facility to go with his FL-2000B and three-element triband beam. – *K1PLP*. . . . KG6SI sometimes is passed up as just another Guam station. He's on Saipan. – *WA9ZCP*. . . . KX6DC, encouraged by W3KVQ, is workable on 21,041-kHz cw around zero GMT. Ed is with RCA on Roi Namur, a one-mile dot of coral. – *WA2HZR*. . . . 5W1AU was second op at 5W1AR, and ex-6O1KM hopes to fire up as a Fannings VR3 presently. – *WCDXB*. . . . VK6MO's U.S.A. visit should find him in the New York area by now. – *LIDXA*. . . . G3LQP directs British Commonwealth Net operations on 21,354 kHz daily at 1430 where MP4 VS ZB2 9H1 9V1, etc., personnel abound. – *NNRC*. . . . WB6MQV/KJ6 works his father, WN6ITH, at 0215 GMT on 21,105 or 21,135 kHz almost daily and will be on Johnston until next May. – *WB6HDG*. . . . VKØs CC, 14,155 khz at 1700 GMT, and MX ought to radiate from Mawson base 'til spring. – *DXNS*. . . . On my 78th day as VK2JK I find I've worked 78 countries on 20 sideband, not bad for 200 watts and a low folded dipole. Now it gets harder! W1BCR's Vee beam attracts large VK gatherings on 14,257 MHz at 1030-1200 GMT. – *K1ZCH*.

SOUTH AMERICA – HC8FN operates a hotel where licensed guests may give out QSOs from rare Galapagos. Incidentally, 9Y4PA, a commercial broadcast man, is an amateur magician. – *K2QHT*. . . Enjoyed about 1700 contacts from OA4DX in March. – *K4OD*. . . . DXers are welcomed to qualify for our Radio Club of Argentina 50th Anniversary Award, a certification based on fifty QSOs with LUs in at least ten provinces. S.a.e. with IRCs, please, for details.

IS1DFO, a loudie on 20 phone, was fired up by DA1JJ and military friends in sunny Sardinia. The shack sports antennas for 10 through 40 meters (disregard the parabolic). At left John makes a quickie test with an east coaster using a choice example of ham ingenuity, that GI-can operating table. *(Photos via K2QHT)*



LU1DJU. . . . After three sunny successful years in Curacao I return to Holland and PAØVDV. It was great to be among my U.S. friends, especially the DXpeditionary crews of PJØs CW and FC. – *PJ2VD*. . . . PJ2PS returns to Holland this month and will soon be a PAØ. – *W1YYM*. . . . CP3BY wants QSOs with Hawaii, Alaska, Montana, North Dakota, Utah, Vermont, and Wyoming for his ARRL Worked All States diploma. Phil is on most evenings around 0130 GMT near 21,315 kHz. – *WAØEMS*. . . . CE3HG/Ø would be Juan Fernandez again next month. – *DXNS*.

HEREABOUTS – Hurray for Elmer! He's also W2CBY, the old-time spark operator who encouraged and helped my uncle, WB2QOK, me, and many others toward ham licenses. Why not look up your old Elmer and see how he's doing? You may have a chance to repay his kindness with some of your own. – *WN2SXD*. . . . The 19th Annual W9-DXCC Meeting, all Century Clubbers welcome, takes place in Chicago on the afternoon of September 18th. Rush registrations and inquiries to my address. – *W9GIL*. . . . Spent a lot of time splashing in Grand Cayman waters and made 69 QSOs as ZF1LM before line surges popped a fuse. – *W8LUI*. . . . Still quite active, on cw mostly, after ten years in the Virgin Islands (formerly signed KH6ARA). 5B-DXCC is rough on close semi-rare DX who tire of QSLing. I'm still a homebrew ham but obtaining parts is more difficult every year. – *KV4CI*. . . . The waning of higher-band DX finds lower frequencies coming alive to the sport. I'm especially pleased with 40 cw where EP2BQ gave me a surprise call on 7030 kHz at 0230 GMT. – *DP4DJI*. . . . W4GIW's ZF1WF venture in mid-May concentrated on 10 and 15 meters with a TR-3 and TA-32. – *K4CDZ*. . . . Finally got the house rebuilt after our last hurricane and I've included a 15-kW auxiliary generator. – *W5VA*. . . . I'm especially interested in working South Americans on 21,150 khz at 2230-2330 GMT nightly except Thursdays. – *WN1NHF*. . . . Our *National Journal of QRPP* offers two awards of interest to DXers: DXCC QRPP for work with less than five watts output, and DXCC Milliwatt for less than a watt. Certification begins at the 25- and 20-country mark, respectively. For complete data send s.a.s.e. to Editor, the *Milliwatt*, Meckling, SD 57069. – *K8EEG/Ø*. . . . My internship began in July and will conflict with DX interests. Fifteen meters could hardly have been better during both phone and cw periods of this year's ARRL DX Contest. – *W4ZYT*. . . . After reaching 300 worked the hard way I finally tied an LPA-1 to my HT-37. The hard way can get *too* hard! – *W1FTX*. . . . Anybody needing Vermont can make arrangements with me for voice or code skeds on 10 through 80 meters. – *W1WTE*. . . . I've really enjoyed 15-meter DXing so far. Just got a few more crystals to help build up my 25-country total. – *WN2PWS*. . . Asia is so tough from the east coast I've sold my house for a move to Arizona. – *WA2FOS*. . . . Roamed a lot since I last wrote you 14 years ago as KN2SYN. Back on from Alabama now with SB gear and a vertical, 58 countries so far. DXing's still a ball! – *K4FLV*. . . . Finally got U.S. citizenship and received my license in May. Three 21-MHz weeks later I had worked 314 stations, 54 countries and six continents! I also passed Radiotelephone First and now work for WCBS-TV on the Empire State's 83rd floor. XYL Eva passed her General and is waiting for her WB2 call. Though born in Roumania where I signed YO2BO I am Hungarian and speak both languages. There are so many ex-Hungarians on the air I am thinking of a possible Hungarian-speaking international net. – *WB2AQC*. . . . Novices shouldn't give up on 15 during times of poor skip. Fantastic conditions still come along, especially around sunset when I recently caught JA2LL and VK5FM. – *WN5EBC*. . . . Working good DX while stationed at Ecowi with the USAF. – *K1DYA/VE2*. . . . My little Ten-Tec and 20-ft-high dipole need only Alaska, Kansas, North Dakota, and Wyoming for WAS on 14,025-kHz cw, also occasionally 14,065, at 1045-1145 GMT almost daily, 2300 onwards Mondays and Fridays. – *VP2LAW*. . . . Rediscovered 15-meter DX thrills after being away from 21 MHz since '67. Captured 9M6HM on an apparently dead band, both of us running under 150 watts. – *WA2HZR*. . . . Those great DX harvests on 15 are now under attack by Murphy. Twenty cw currently holds the honors here. – *VE7BAF*. . . . W4UF's "DXCC-squared," a photo of QSLs with ARRL DX Century Club members in 100 countries, is the first filed by a YL, No. 63 all told. – *W9BRD*. . . . Southern Asia and the western Pacific are a lot tougher from Florida than from old W9DSO but Africa is almost local here. Ran ARRL's nineland QSL Bureau back in 1957-62. – *K4AUA*. . . . Just made DXCC with my 17-syllable callsign, a terrific pile-up handicap let me tell you. Equally rough on cw, seventeen dits and twenty dahs! – *WA7OJW/HR1*. . . . VP2SAH does all right on 7008 kHz with his cw 10-watter and dipole. – *WB2AMO*. . . . Recent weeks have been hard for 160-meter DX men but long-haul possibilities are always there. – *W1HGT*. . . Two more QSLs will give 200 countries confirmed on 80 meters. – *W1SWX*. . . . Five-Band DXCC No. 98 was well worth while. Now for some relaxation before the next DX project. – *W3TV*. . . . Say, do I qualify for WAP*QST*? Worked all the stations pictured in June's "How's." – *WB9BUV*. . . . We need more honor in the honor rolls, more courtesy and honesty, less repetitive belching of calls with superpower, a return to decent DX ethics. – *WØIBZ*. . . . KP4CL controls the Western Hemisphere Net on 7205 kHz at 0200 on Wednesdays, a Caribbean Net on 3845 kHz one hour later. – *NNRC*. . . . North Texas DX Association was launched at Richardson in June with rover W4VPD attending. Concerned fives can check with W5KYD for organizational details. W7s EKM and VRO hope to sign FMØIX, VP2LAM, 8P6DM, etc., next month, and W1DPL lays claim to the first Yank/6Y5 reciprocal credentials. – *WCDXB*. . . . K6s AUC and HIH now edit our *DXer*. Though club membership has doubled since 1967 the number of member entries in ARRL's annual DX Test stays around 60. EL2CB, OHØNI, XE1LLS, YO2BB, and FR7ZG qualified for our California Award Nos. 184 through 188 in April. – *NCDXC*. . . . The west coast 160-meter shift from 2 to 1.8 MHz was marked by an immense pile-up on 1803 kHz May 1st. Loran's QSY from 1850 to 1950 kHz leaves a much quieter low end. – *SCDXC*. QST

5VZWT of Lome is one of the more available among a handful of Togo actives. Andre's QSLing is managed by W4SPX who supplies this photo.

YL news and views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

19th Annual Mid-west YL

EACH YEAR the women radio amateurs of the mid-west schedule a convention for the YLs in the central part of the country to meet and enjoy a weekend. Women have met in different towns each year, and in 1971 it was Cleveland with the warm hospitality of the Buckeye Belles and the Chix-on-six, who were our hostesses under the very efficient leadership of WA8EBS and K8ECN. When the 76 women who registered for the event left the Ramada Inn on Sunday they said, "Thanks for the Memories," and meant it, for this was a most memorable convention.

It will be remembered for people; for renewing acquaintances of other conventions and hamfests, and the delightful moment of putting faces on voices or fists; women from six of the ten districts, and two of the Canadian Provinces, reaching from coast to coast; the representation of NYC-YLRL, TASYL, Buckeye Belles, WAYLARC, CHIX-ON-SIX, LA-YLRC, PJYL, RWW, CLARA, and the Ontario Trilliums; and they in turn were YLRL and YLISSB; the ARRL represented by the Great Lakes Division Director, Alban Michel, W8WC, and the Ohio SCM, Dick Egbert, W8ETU.

It will be remembered in the swaps, and the prizes, so many prizes that no one went home empty handed. Those swaps were, as always, those very personal souvenirs that are as individual and different as the personalities of the women they represent, for the swap is a special part of these gatherings.

*YL Editor, *QST*. Please send all news notes to WB6BBO's home address; 1036 East Boston St., Altadena, CA 91001.

On Friday they came from California and New York, from Canada and West Virginia and Michigan, from New Jersey, Pennsylvania, and Virginia, and Ohio's gals were there to welcome them as the Ramada Inn filled with the YLs and the OMs who accompanied their ladies. Fun was the official order of the evening,.beginning with supper as guests of the host clubs, continuing through informal games, a radio skit, and then "Swing Your Partners!" with a square dance group that set the mood for the entire weekend.

On Saturday, the OMs went off on a special tour that was for men only while the ladies began the business of being there together, beginning with a shopping tour in Cleveland. The Luncheon was a business meeting, speeches, and music, and our long heritage of women in communications was the theme. Jan Fontana, WB2JCE, YLRL President discussed the coming election of officers for 1972, and the special vote for changes in the contest rules. It will be particularly remembered for the generous support of YLRL's latest service to bring *YL Harmonics* to sightless YLs through the Tape Topics activity, and the appointment of Dot, WA8IJW, as the Eastern Librarian for this program.

There was the group picture that was taken again and again as the photographer obliged the many who wanted copies on their personal cameras to add to the official one.

Saturday was the day for W8YL, the Convention station with Extra Class, Carmella Cicerello, W8NAL, as custodian. Also on Saturday was the banquet, when the OMs all suddenly appeared and joined the gals to laugh at the anecdotes of "Laughter on the Turnpike" given by the speaker,

Midwest YL Convention, (l. to r.) Front row: WA8ARJ,VE3EUV, VE3DXZ, VE3IV, WA8EKQ, WA8OFH, K8OVF, K8VMY, K8ITF, K8TVX, K8NQK, WA8GPO, WN8FIN, WB8IBU, WA8VNV, K8PAM. Second row kneeling: W8WRJ, K8MZT, WB2YBA, WA2UAB, VE3CLT, W8UAP, WA8OZB, WA8BQG, Marie (SWL), K8CEN, VE3BEI, VE3DGG, WA4UWK, W3TNP, W3RXJ, WB2JCE, VE3BBO. Third Row: K3FYS, VE3ASZ, VE3EVA, WB6BBO, K3ZDN, WA8IJW, Marge Doles (SWL). Fourth Row: VE4ST, Alberta (SWL), WA8VXE, W8TAY, K8ONA, W8WRH, W8EFB, W8UAU, WA8BWD, K8RGY, WA8EBS, WA8ZOC. Fifth Row: K8TYK, WA3ATQ, WA2FGS, Helen Griebenow (SWL), K8UKM, WA9TVM, W8UTM, K8RZI, WB8DAL, WA8OCD, WA8ZMU, WA8DXY, WA8QFL, K8BZJ, WA8ULS, W8DRP, K8CKI, W8NAL, WA8CXF. *(Photo: Fred Barnes, WA8CPT)*

to watch movies of former conventions in the bright atmosphere of the state symbolism of Ohio's red carnations, cardinals, and Buckeye leaves.

We danced, conducted serious business, met new friends, and laughed in the warm hospitality of the Mid-west YL, and left on Sunday with a heartfelt, "Thanks for the memories that will be with us long."

May 3-9, 1971, Buckeye Belles Week.

Governor John J. Gilligan of Ohio honored the Buckeye Belles, Ohio's state-wide women's amateur radio club, when he designated the week of May 3 through 9, 1971, as Buckeye Belles Week in that state.

The official proclamation stated in part:

"Whereas, the Buckeye Belles in the State of Ohio have been devoted to the provision of a communications system at their own expense which stands ready for instant duty in the case of a *local or national emergency or disaster*; and

Whereas, these dedicated women are among the many thousands of amateur radio operators who find a fascinating and educational challenge in the field of amateur radio and enjoy not only a unique hobby, but are making a distinct contribution to national and international friendship and understanding . . ."

"YL News and Views" congratulates the Buckeye Belles on this recognition of their activity and service to the public.

YLRL Howdy Days Rules

Start: Sept. 22, 1971 at 1800 GMT
End: Sept. 24, 1971 at 1800 GMT.

Rules: Scores will be based on contacts with licensed women operators only. All bands and modes of emission may be used. No crossband operation. Net contacts do not count. Only one contact with each station will be counted.

Scoring: Score two (2) points for each YLRL member worked. Score one (1) point for each non-YLRL member worked. No multipliers.

Awards: Top scoring YLRL member will receive her choice of a YLRL pin, charm, or stationery. Non-YLRL member will receive a one-year membership in YLRL. Logs must be mailed to Mae Hipp, K7QGO, 5655 Yukon Drive, Sparks, NV 89431.

Talk to one gal, talk to a dozen, for this contest is like no other. The easy chatter can lead to lining up contacts for the coming YL-AP. That's Howdy Days, a relaxed way for women to get to know each other with a contest flavor, and, if the log is submitted, perhaps a prize is the result. Try it.

Los Angeles YLRC 1971-72 Officers

President: Roberta Baldwin, WB6DFN; Vice-president: Esther Gerdner, WA6UBU; Corresponding Secretary: Nell Devitt, WB6ERF; Recording Secretary: Evelyn Brightman, WA6ZTW; Treasurer: Mary Savage, W6VDP.

WA8EBS, Eila, convention co-chairman; Betty Peterson, VE3ASZ; Harriet Creighton, WA3ATQ, at convention Headquarters. *(WA2FGS photo)*

Midwest YL shoppers' special. Harriet, WA3ATQ, giving instructions to Betty, VE3ASZ, foreground. Left center Irene, W3RXJ; right center, Maxine, WA4UWK; left rear, Doris, VE3BBO. *(WA2FGS photo)*

Carmella Cicerello, W8NAL, custodian of W8YL at the convention station. *(Photo: Fred Barnes, WA8CPT)*

VK3YL, Austine Henry, 41 years in amateur radio.

The officers were installed at the June meeting of the club, and will begin their duties in September.

The following plans have been made for club activities calendar:

1971 — August, YL-OM Picnic, El Segundo Park; YL Forum and Luncheon at the Southwestern Division ARRL Convention, at Disneyland, on Labor Day weekend. October, Silver Birthday of the Club, special meeting. December, Annual Christmas Party.

1972 — February, YL-OM Valentine Banquet. March, Annual visit to the Dishongs, W6TDL, in Hemet. May 26-28, YLRL Convention, Hyatt House, Long Beach.

VK3YL, Austine Henry

Austine has managed a few envious records since 1930. She is the first woman to earn WAC-YL and the third YL to acquire the difficult WAZ award.

When amateur radio privileges were restored after World War II, Austine was on the air with crystal control, 30 watts of power and a 4-tube receiver. Now, as she celebrates her 41st year as an amateur radio operator with commercially-made equipment, she has 302 countries confirmed to her credit, and many certificates to authenticate her activity. Despite equipment changes over the years, her favorite mode of operation is still cw.

During 1970, VK3YL entertained many visitors from this country including, W5BUR and W5NW, WB2YBA, WB4BYD, W2LH and W2EED, and W3CDQ.

Cathy Soehl, W4BAV.

W4BAV, Cathy Soehl

The radio bug bit in 1928, but it wasn't until 1953 that Cathy found there is only one treatment and that is get a license and "join the club," and join it she did. Six meters isn't the easiest band on which to acquire certificates, but Cathy has a very satisfying 27 to her credit, including HAWK, Floridora, CHC, RCC, and SPARC.

She is a member of ARRL, YLRL, SAWRC, AREA, CHC, CLARA, Georgia Peaches, Sarasota Amateur Radio Ass'n, National Award Hunters, and a charter member of SPARC, SPARCILS, and Floridora YLs. She is former 4th District Chairman of YLRL, Asst. Director Southeastern Division ARRL in 1968 and 1969, and has been a correspondent of Florida *Skip* since the publication began in 1957.

Her active participation in organizations has been recognized with the Florida *Skip* Award, YLRL Continuous Membership Award for 15 years, Amateur Radio Achievement Award, and the Award of Merit from both the Apricot Net and the Amateur Radio Club of Florida. QST

RULES FOR LIFE MEMBERSHIP

1. A paid-up Life Membership in the League shall be available to any Full or Associate Member, other than a Family Member, upon payment of a fee twenty times the annual dues rate, and upon approval of the application by the League's Executive Committee.
2. The Life Membership fee for U.S. and Canadian applicants is currently $130, and for other applicants is currently $140.
3. An applicant may choose an alternative time-payment plan of 8 quarterly installments ($16.25 each for U.S./Canadian applicants, $17.50 each for other applicants). In such instance he will be provided an interim two-year Full Membership certificate. Upon completion of the payments, Life Membership will be granted.
4. Life Memberships are non-transferable, and dues payments are non-refundable. In the event an applicant is unable to complete payments on the installment plan, he will be given a term of membership, at the annual dues rate, commensurate with payments received.
5. Other licensed amateurs in the same family, and at the same address, of a Life Member may retain or obtain Family Membership upon payment of the annual dues of $2, but without receipt of *QST*. The dues of the Family Member may be prepaid for any number of years in advance, but there is no special rate.
6. Life Membership is also available to blind amateurs upon payment of a fee of $40, without the receipt of *QST*.

Operating Events

de W1YYM

AUGUST

4 W6OWP Qualifying Run (W6ZRJ, alternate) at 0400 GMT on *3590/7129* kHz, 10-35 wpm. This is 2100 PDST the night of August 3. Copies to ARRL for grading.

7-8 Worked All Europe (WAE) DX Contest cw runs full *48-hour period GMT* on *80* through 10 meters. (Phone session scheduled for Sept. 11-12.) Single Operator all-band and multioperator single transmitter categories. Single-op. stations have a mandatory 12-hour rest period which may be taken in 3 portions. QSOs only between EU and non-EU stations, exchanging report plus serial no. Eighty-meter QSOs worth 2 points, others 1 point. Each QTC (report of an earlier contact in the contest) worth a point with a maximum of 10 sent to the same station per band. Final score QSO points plus QTC times multipliers all bands with 80-meter multipliers times 3 and 40-meter multipliers times 2. Multipliers are *as follows for non-EU stations: C31 CT1 CT2 DA/DJ/DK/DL/DM* EA EA6 EI F FC G GC GD GI GM GM(Shetlands) GW HA HB9/4U1 HBØ HV I IS IT JW JW(Bear) JX LA LX LZ M1 OE OH OHØ OK ON OY OZ PA SK/SL/SM SP SV SV(Crete) SV(Rhodes) TA1 TF UA/UV/UW1-6 UB/UT/UY5 UC2 UN1 UO5 UP2 UQ2 UR2 UA(Franz Josef Land) YO YU ZA 3A2 9H1. Contest forms available from the DARC (Deutscher Amateur Radio Club) for an s.a.s.e. Deadline for cw entries is Sept. 15. Write WAEDC Committee, D-895 Kaufbeuren, Postfach 191, Germany.

7-8 Ohio QSO Party, p. 104 July.

10 W1AW Qualifying Run, 10-35 wpm, at 0130 GMT on 1.805 3.52 7.02 14.02 28.02 50.02 and 145.588 MHz. This is 2130 EDST the night of Aug. 9. Underline one minute of top speed copied, state no aids used (typewriters OK), sign and mail to ARRL with your full name, call (if any) and full mailing address.

14-15 Md.-DC QSO Party, p. 104 July.

20-29 The Des Moines Radio Amateur Assn. will be operating and handling traffic at the Iowa State Fair. The club hopes to be using either KIØISF or WIØISF. Club mail goes via KØUKN.

21-22 QRP ARC QSO Party, p. 104 July.

21-22 Scandinavian RTTY Contest, p. 104 July.

21-22 NJ QSO Party, p. 104 July.

21-23 Ten Meter Band-Opening Contest sponsored by the West Valley ARC, open to all from 1300Z Aug. 21 to 0100Z Aug. 23. No cross band permitted. Exchange reports. Score 1 point for each station worked plus 1 point for each state worked plus 1 point for each country worked plus 3 points for each continent worked plust 1 point for each WVARC member worked (members will identify themselves as such). Use ARRL Countries List. Note that some contacts are worth more points since they fall into a number of categories. Log forms are available from the committee for an s.a.s.e. Appropriate certificates. Full log info, plus comments and *suggestions by Sept. 23 to Matt Futterman, WB6KPN, 23320* Canzonet St., Woodland Hills, California 91364. An s.a.s.e. will assure results.

28-29 *All Asian DX Contest, cw, p. 104 July.*

28-30 SC QSO Party, p. 104 July.

28-30 Delta QSO Party, sponsored by the ARRL Delta Division *from 2000Z Aug. 28 to 0200Z Aug. 30, no time or power* restrictions. Amateurs outside of the Delta Division (Arkansas, Louisiana, Mississippi, Tennessee) will attempt to contact as many amateurs as possible within the Division. Division amateurs may QSO each other as well as outside stations. Exchange QSO no., RS(T) and QTH (ARRL section for non-Delta division, county/state for Delta Division). Logs must include date/time, stations, exchanges, bands, emission and mults. Stations may be worked on each band/mode. Mobiles may be reworked if they change counties. Suggested freqs.: 3550 3990 7050 7290 14050 14290 21050 21390 28050 28590. Delta amateurs score by multiplying QSOs times the number of ARRL multipliers (74 sections plus VE8 = 75 mults.). DX stations worked earn point credit but not multiplier credit. Outside stations multiply QSOs times the number of different counties worked (max. 316). Appropriate awards. Any station disrupting a working Delta traffic net or whose log exhibits obvious irregularities will be disqualified from award consideration. Logs must be postmarked no later than Sept. 27. Mobiles and portables must file a lot from each county for award purposes. Mail logs to: Malcolm P. Keown, W5RUB, 213 Moonmist, Vicksburg, Miss. 39180.

SEPTEMBER

1-6 SW Division Convention operation under call WD6WD will take place on all bands, 24 hours daily. Special cards will be sent. QSL via K6VDP.

2 W6OWP Qualifying Run.

4-12 The Puget Sound Council of ARCs will issue an operating achievement award signed by Governor Evans for contacts made during Wash. State AR Week. Out-of-state hams must work 10 Wash. stations, in-state amateurs must work 20 other Wash. stations during this week. Send list of stations worked, locations, dates and *your name/call/address to The Puget Sound Council of ARCs,* 12306 80th Avenue East, Puyallup, Washington 98371. An sase appreciated.

5-6 *Nebraska QSO Party, sponsored by the Lincoln ARC from* 0000Z Sept. 5 to 2300Z Sept. 6. Suggested freqs.: 3560 3982 7060 7260 14060 14300 21060 21360 28060 28560. Nebraska stations send report and county, others send report plus state. Neb. stations score 2 points per QSO on each mode, using states, provinces and countries as multipliers. Others score 3 points per Neb. QSO using Neb. counties as multipliers. Mobiles in a different county count as a separate QSO and multiplier. Any contact with Nebraska State Fair station KQØNEB from Sept. 1-9 will count for points in the party regardless of when worked before or during the party *(KQØNEB QSOs count for 10 points each mode). KQØNEB also* counts as a separate mult. If worked on 4 separate bands, add 1000 points to the total score. Appropriate awards. Logs by Oct. 15 to Michael Nickolaus, 4921 Tipperary Trail, Lincoln, Neb. 68512. A business sized sase will bring results. QSL address for KQØNEB: Lincoln ARC, Box 83208, Lincoln, Neb. 68501.

11-12 VHF QSO Party, rules this issue.

11-12 WAEDC phone, see info. under Aug. 7-8 listing. Deadline for phone entries is Oct. 15.

11-13 Washington State QSO Party, sponsored by the Boeing *Employees AR Society (BEARS) 2000Z Sept. 11 to 0200Z Sept.* 13. Open to all and all bands may be used. Stations may be worked on each band/mode for contact points and more than once each band/mode if they are additional multipliers. Wash. stations score 1 point per contact (including contacts with other Wash. stations. Others score 2 points per Wash. contact. For mults., Wash. stations use no. of different states/VE provinces/foreign countries. Others use the no. of different Wash. counties worked (max. of 39). Exchange QSO no., RS(T) and county (for Wash. stations) or state/province/country for others. Appropriate awards. Suggested freqs.: 3560 7060 14060 21060 28060, 3960 7260 14280 21380 28660, Novice 3735 7175 21204. Logs with usual info. plus check sheet for entries of over 50 QSOs must include the regular signed statement. No logs returned. All entrants will receive results. Mailing deadline is Oct. 9, send to: Boeing Employees' Amateur Radio Society, c/o Willis D. Propst, K7RSB, 18415 38th Avenue South, Seattle, Washington 98188.

12 Frequency Measuring Test, open to all, starts with a callup at 0130 and 0430 GMT Sept. 12. (Remember, this is the evening before, local time!) The periods for measurement start at 0137 (80 meters) 0145 (40 meters) and 0153 (20 meters); *for the "late" run,* 0437 0445 and 0453, respectively. Each measuring period lasts five minutes. Submit your average for each 5-minute period which will be compared with the umpire's average during the same period. The umpire is a professional frequency measuring laboratory. Tell how many readings you took to form your averages. Approx. frequencies for the early run are 3527 7090 and 14068 kHz. Late run *frequencies are 3549 7070 and 14102 kHz. We must RECEIVE* your report by Sept. 23 to qualify for the QST report of the competition. W1AW will start transmitting the official readings starting Sept. 24. Next FMT scheduled for Nov. 13.

15 W1AW Qualifying Run.

22-24 YL Howdy Days

25-26 North Dakota QSO Party, sponsored by the Forx and Sioux ARCs, in cooperation with other clubs of No. Dak., open to all from 1700Z Sept. 25 to 2359Z Sept. 26. ND stations send QSO no., report and county. Others use state/province/country for location. Stations may be worked on different bands/modes. Suggested freqs.: 3580 7080 (4080 21080 28080, 3980 7280 14300 21380 28580. One point per QSO. For mults, ND stations use states/provinces/countries. Others use no. of different ND counties worked. Appropriate awards. *Mailing deadline Oct. 15.* Send to: Paul Kube WAØOVW, 630 Boyd Dr., Grand Forks, ND 58201. For list of scores, please include sase.

25-26 VE/W Contest, rules this issue.

28 W1AW Morning Qualifying Run.

NOVEMBER

3-4 YL Anniversary Party, phone.

4 W6OWP Qualifying Run.

13-14 *SS, phone.*

20-21 SS, cw.

QST

Operating News

GEORGE HART, W1NJM
Communications Manager
ELLEN WHITE, W1YYM
Deputy Communications Mgr.
ROBERT L. WHITE, W1CW; *DXCC*
GERALD PINARD, *Training Aids*
ALBERT M. NOONE, WA1KQM; *Contests*

Friendship Nets. The Gloucester Amateur Radio Club of New Jersey and the West Side Amateur Radio Club of Toronto have established an interclub net to help cement friendship across the border between Canada and the U.S. and in particular between the two clubs. The instigator of the idea was WN2MEM, who belongs to both clubs. The first meeting, on May 15, was so successful that they decided to make it a monthly affair. That first meeting was a "round table" sort of affair in which each club member described his equipment and gave some details about himself and his amateur activities. Topics for the future will include other means by which the two clubs can work together, inter-club contests of various kinds, exchange of bulletins and perhaps even plans for the two groups to get together in person.

Friendship nets of this sort aren't the kind we usually harp about, but what's the matter with this idea? Amateur radio has some tremendous potential for creating international good will. Usually we think of this in terms of working DX, but here is a new angle – friendship *nets* of amateurs in two or more different countries. Club-to-club is just one way, a *good* way, to get it started. We have no language barrier with our Canadian friends (even most French-speaking VE2s can handle English with almost equal facility) and we need better rapport with them, so this is a good place to start. Similarly, most Mexican amateurs speak English, so there may be some good possibilities in this direction also. The possibility of international friendship nets with Great Britain, South Africa and other English-speaking countries is not remote, possibly worth working on. As for countries that don't speak English, it is far from inconceivable that amateurs in both countries familiar with the others' language can set up something.

Of course the idea is applicable intramurally as well. Most of our roundtables are very definitely of the "friendship" type, but the practice of developing such conclaves between or among clubs seems to have further possibilities – especially among clubs having something in common.

Isn't everybody in favor of friendship? This is just to call the matter to your attention and urge its implementation.

W1AW on 170-Hertz shift. Maybe some of you have already noticed it, but since mid-June W1AW has been repeating all RTTY bulletins with 170-Hertz shift, after the initial transmission using the more standard 850-H shift. The gear is available, the same tape is used, and for the average bulletin it takes little time, so this has become standard practice on all our RTTY bulletin schedules before we stand by for contacts. WB6FMC and W4GCE made the suggestion, and after study and discussion at staff level it was found to be practical.

Last Call for A-1 Operators. A few months ago we asked that all amateurs who had been on the A-1 Operators Club list but who had changed their calls since, notify us their new (and old) calls so we could bring the list up to date. We have in mind the possibility of issuing a new list in the near future, containing the calls of all still on the list who are still in the callbook or who have notified us of their new identity, if different from the original

Meet Your SCM

(Left to right) E. Lee Ulrey K5HZR, SCM Southern Texas; Keith Witney VE4EI, Manitoba SCM; S. M. Pokorny W9NRP, Wisconsin SCM.

identify when they were first nominated. This applies to the holders of new 2-letter calls, those who have moved to a different call area or for other reasons have changed calls. Those we cannot find or account for will be dropped from the A-1 list until or unless they notify us.

Someone asked us why we could not look up the call in an old callbook and check out the name in the membership file. Even if this were possible, it would mean a tremendous amount of work; as it happens, it is not possible. The membership file is by postal "zip" codes within each state. If we don't have the zip code, we're licked. The new A-1 list will be alphabetical by name, rather than by call letters as before. Not many people change their names, but a lot of amateurs seem to jump at any chance to change their calls.

The Official Bulletin Station. This is one of two standard ARRL appointments open to technician licensees. OBS appointees declined 18% from 1969 to 1970. We need more OBS.

Why do we need them? Well, to spread the word that comes out each Thursday over W1AW. We need them especially on vhf, because there are many vhfers who cannot copy W1AW direct. We need vhf OBS who *can* copy W1AW direct to receive the bulletins and retransmit them on vhf in their local area.

You may think that there is often nothing so very hot on W1AW Bulletins, and you would be correct. FCC meets on Wednesdays and usually does nothing of interest to amateurs, so the W1AW Thursday bulletin may carry only news of a DXpedition, a special event of some kind, or a reminder of a contest or other activity coming up. Once in a while something real hot comes up, and W1AW comes on the air, at regular bulletin times, with a "special." OBS should be alert to pick these up and put them on the air either at special times or on their regular schedule or both.

OBS appointees who have to wait for receipt of the mail bulletin are at a big disadvantage, especially these days when mail service is so slow. Most of them don't get the mailed bulletins until the following week; that is, the bulletins are mailed on Thursday, arrive at their destinations Monday or Tuesday of the following week or maybe even later. By that time, the news has spread all over the place and as often as not is distorted.

What are *most* needed are OBS who can copy W1AW often, but at least on Thursdays, and retransmit the bulletins on vhf very shortly thereafter. Okay, so reception isn't very good and you don't copy W1AW so good at 2400Z, only get part of the bulletin. Listen for the voice bulletin at 0100Z, maybe you can get some "fills" or confirm some uncertain parts. If still not complete, you have a number of other possibilities: RTTY at 0300Z, phone again at 0330Z and cw again at 0400Z. Surely, by this time you have a complete copy. If not, you have another full evening of W1AW transmissions the following day. The enterprising and determined OBS can do it, and what a feather in his cap to be the first to put it on the air in his area! By the time he gets the mail copy, it will only be for confirmation: he will already have been transmitting the bulletin for several days.

On the left, W7MB (ex-W7GBW) is shown receiving 5BDXCC No. 65 from Northwestern Division Director W7PGY. George was the first W7 to meet the requirements. Just one other (W7SFA, No. 78) has done so since. By mid-June 1971, 105 have qualified for this top DX achievement.

Are we communicators, or aren't we? Can we communicate by amateur radio, or must we depend on Uncle Sam's mail or Ma Bell's twisted pair?

You affiliated clubs, how about selecting one of your members, preferably a young, enterprising one, to apply for OBS appointment and be made responsible for (1) bringing the latest bulletin to club meeting, or seeing that it gets there, and (2) putting it on the air locally so that all area amateurs can benefit from the service. Technician licensees are eligible, but pick someone with low frequency receiving gear (unless you are in range of W1AW direct on 50 or 144 MHz) and the ability to copy code. *Or*, if the above doesn't seem practical, give the job to a committee of two, one a low frequency man to do the copying, the other a vhf man to put it on the air locally.

Let's get with the applications for OBS appointment. They are important and can mean the difference between the fraternity getting the straight dope promptly and listening to and spreading rumors and other kinds of misinformation.

Staff Opening. At the moment of writing, there is a staff opening in the Communications Department in the Public Service Branch. It may be filled (we hope) by the time you read this, but the headquarters is nevertheless interested in keeping information available on young amateurs who are interested in making a career at ARRL headquarters. The start is usually near the bottom, but someone with unusual ability, enthusiasm and ambition works himself up with comparative rapidity. Many young amateurs have an exaggerated idea of salaries paid and how much fun it will be to work here. The truth is that the salaries aren't all that great (but comparable with other non-profit organizations), and once the glamor has worn off the job can become as monotonous and humdrum as any other job. The key staff positions

W1AW SPRING-SUMMER SCHEDULE
(April 25–October 31)

(Specific frequencies shown below indicate general operating periods)

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 1 P.M.-1 A.M. EDST, Saturday 7 P.M.-1:00 A.M. EDST and Sunday 3 P.M.-11:00 P.M. EDST. The station address is 225 Main Street, Newington, Conn., about 7 miles south of Hartford. A map showing local street detail will be sent upon request. If you wish to operate, you must have your original operator's license with you. The station will be closed May 31, July 5 and September 6.

	Sunday	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000	.....	← C.W.-OBS[1]					→
0020-0030[4]	.....	.....	3.700[6]	14.020	14.020	7.150[6]	14.020
0030	.....	.....	3.700[6]	14.100	14.100	7.150[6]	14.100
0100	.....	← Phone-OBS[2]					→
0105-0130[4]	.....	.....	3.820	50.120	145.600	1.820	21.270
0130	←	CODE PRACTICE DAILY[7] (35-15 wpm TThSat), 5-25 wpm MWFSn)					→
0230-0300[4]	.....	.....	3.555	.....	1.805	.....	3.555
0300	RTTY-OBS[3]	.....	RTTY-OBS[3]	←		RTTY-OBS[3]	→
0310-0330[4]	.....	.....	3.625	14.095	7.095	14.095	3.625
0330	Phone-OBS[2]	.....	←		Phone-OBS[2]		→
0335-0400[4]	.....	.....	7.220	3.820	7.220	3.820	7.220
0400	CW-OBS[1]	.....	←		C.W.-OBS[1]		→
0420-0430	.....	.....	3.700[6]	7.020	3.945	7.150[6]	3.520
0430-0500	.....	.....	3.700[6]	7.080	3.945	7.150[6]	3.555
1300	.....	← CODE PRACTICE[1] (5-25 wpm MWF), 35-15 wpm TTh)					→ .....
1700-1800	.....	21/28[5]	21/28[5]	21/28[5]	21/28[5]	21/28[5]	.....
1900-2000	.....	14.280	7.255	14.280	7.255	14.280	.....
2000-2100	.....	14.100	14.280	14.095	21/28[5]	7.080	.....
2200-2300	.....	21/28[5]	21.100[6]	21/28[5]	7.255	14.280	.....
2300-2330	.....	.....	.....	RTTY OBS[3,7]	.....	.....	.....
2330	←	CODE PRACTICE DAILY[1] 10-13-15 w.p.m.					→

[1] CW OBS (bulletins, 18 wpm) and the code practice on 1.805, 3.52, 7.02, 14.02, 21.02, 28.02, 50.02, and 145.588 MHz.
[2] Phone OBS (bulletins) 1.82, 3.82, 7.22, 14.22, 21.27, 28.52, 50.12, and 145.588 MHz.
[3] RTTY OBS (bulletins) 3.625, 7.095, 14.095, 21.095 and 28.095 MHz.
[4] Starting time approximate. Operating period follows conclusion of bulletin or code practice.
[5] Operation will be on one of the following frequencies: 21.02, 21.08, 21.27, 21.41, 28.02 or 28.52 MHz.
[6] W1AW will listen in the Novice segments for Novices, on the band indicated, transmitting on the frequency shown.
[7] Bulletins sent with 170-Hertz shift, repeated with 850-Hertz shift.
[8] Sent with 170-Hertz shift.
Maintenance Staff, W1s QIS WPR, WA1NEU. *Times-days in GMT, Operating frequencies are approximate.

are worked up to gradually, over the years; they are not the type that any amateur can fall into without staff experience.

The ideal candidate for the present opening is a young, unmarried amateur with an extra class license who has completed his military obligation or is ineligible, with experience in traffic nets and emergency operation and preparedness (i.e., NTS and AREC), both phone and cw, and some writing experience or training. He (or she) would start out as a communications assistant, spend a year in intensified training at the job, then be considered for promotion to assistant communications manager. The latter is a considerable step upward and is by no means automatic. You have to work for it.

There will also be an opening as DXCC assistant the end of August or early in September. This position has to do with assisting W1CW in his many DXCC chores, of course, and would be a "natural" for a young amateur gung-ho about DX.

Anyone interested in being considered for these or future openings? Ask us for an application form. — *W1NJM*

DXCC Notes

Announcement is hereby made of one addition to the ARRL Countries List, Abu Ail and Jabel At Tair. These islands, located in the Red Sea, qualify for separate country status under point one of the DXCC criteria relating to a distinctively separate administration. DXCC credits for this listing may be submitted starting August 1, 1971. Confirmations submitted for this listing before August 1, 1971 will be returned without credit.

W1AW CODE PRACTICE

W1AW transmits code practice according to the following schedule. Approximate frequencies are 1.805 3.52 7.02 14.02 21.02 28.02 50.02 and 145.588 MHz. For practice purposes the order of words in each line may be reversed during the 5-13 wpm transmissions. Each tape carries checking references.

Speeds	*Local Times/Days*	*GMT*
10-13-15	7:30 PM EDST dy 4:30 PM PDST	2330 dy
5-7½-10-13-20-15	9:30 PM EDST SnTThS 6:30 PM PDST	0130 MWFSn
5-7½-10-13-20-15	9:00 AM EDST MWF 6:00 AM PDST	1300 MWF
35-30-25-20-15	9:30 PM EDST MWF 6:30 PM PDST	0130 TThS
35-30-25-20-15	9:00 AM EDST TTh 6:00 AM PDST	1300 TTh

The 0130 GMT practice is omitted four times a year on designated nights when Frequency Measuring Tests are sent in this period. To permit improving your fist by sending in step with W1AW (but not over the air!), and to allow checking the accuracy of your copy on certain tapes, note the GMT dates and May *QST* practice text to be sent in the 0130 GMT practice on the following dates.

Aug. 9: It Seems to Us
Aug. 12: Correspondence
Aug. 18: League Lines
Aug. 24: ARPS

The subject of practice text for the following sessions is *Understanding Amateur Radio*, First Edition.

Sep. 1: Keying, p. 201
Sep. 3: A Practice V.F.O., p. 203

DX CENTURY CLUB AWARDS

Radiotelephone listings follow the general-type "New Member" and Endorsement" listings.

May 1-31, 1971

New Members

YV5AHR	318	WB6VZI	135	DL6GN	111	WB2FBF	107	K4IA/KC4	102	G3JTO	100
W9JQD	302	W6ZYC	133	DL9ZS	110	WA8PXO	107	W1IDA	102	K1AJ	100
W8GHN	285	K6ZXS	131	WB9BGJ	110	WA8TBQ	107	W1QHC	102	K4ZQR	100
EA3NC	207	DK3SD	129	CP1GF	109	DJ4PS	105	W2OH	102	VE3FSV	100
PY6FI	203	G3HDB	127	VE3HD	109	DL2UU	105	WA3JXC	102	WA1JWQ	100
SM5CMP	184	WB4NND	126	OH5VS	109	W4DGJ	105	W8KCJ	102	WA2IRS	100
W3YX	164	W5HD	124	W6THR	109	DJ6NT	104	YU2CBM	102	WA2MDR	100
DJ3EJ	159	JAØGRF	123	CE2PN	108	DK3GK	103	ZL3ADF	102	WB2ISX	100
DL9EY	145	PJ2HR	121	DK2LM	108	WB8ADP	103	VE2HN	101	W3BBE	100
KP4DKZ	143	SMØEWM	118	DLØSA	108	WØNFL	103	W1KUO	101	W4EWR	100
K2LOQ/TF	142	ZE1BL	116	I1FID	108	ZS4RH	103	WA1KZE	101	W4JIK	100
W5NBI	140	PY2EWZ	114	K8KFJ	108	WA7OJW/HRJ		WA2JUX	101	WB4MAR	100
DK3QJ	139	VE3BHZ	114	WB4DOY	108		102	W8GBH	101	WA7HSD	100

W9JQD	285	W5QHF	137	K4LSP	126	DK2XZ	112	DJ4PS	103	DK2ZD	101
I1BGJ	201	VP9GE	133	K9UTI	124	G3ZBA	110	K4CPQ	103	VP9GD	101
WA9VGY	181	WA8VRB	132	W8EXD	124	W3QND	109	W1FAY	103	WA1KQM	101
ZD8AB	162	W6ZYC	131	KH6GMP	123	W6THR	109	WA4WHO	103	WA8YVY	101
ZL2AFT	158	KP4DKZ	129	CE7DW	121	PY9FJ	107	W2ITG	102	EL2BA	100
I8TMY	153	WA2VDA	128	CE8AO	120	WB4NND	107	WB2MQI	102	G3WBT	100
HC8GS	149	K6ZXS	127	DJ2YE	120	W8MBB	107	W4VSV	102	G3XBE	100
W3YX	143	WA1HXA	127	EA8GK	120	FY7AE	106	WB4INE	102	WA7OJW/HR1	
WA9UCE	143	DK3SD	126	WB9BXQ	120	VE3CWE	104	W6QSF	102		100
EA3NC	139							WA6HYI	102	W5RMC	100

Endorsements

In the endorsement listings shown, totals from 120 through the 249 level are given in increments of 20, from 250 through 300 in increments of 10 and above 300 in increments of 5. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

W2CKY	330	WA4PFD	290	W6GC	260	K4ARP	220	WAØOCU	180	JA1MUZ	140
ZS6LW	330	W6DOD	290	W9CL	260	OH2ZD	220	W6KHS	180	JA3BTR	140
W1RLQ	320	WA6DUG	290	W9NVJ	260	VE4ZX	220	WA6JVD	180	K2BDG	140
W5NW	320	W9ZRX	290	K2SHU	250	W3KJ	220	W5RO	180	K4NE	140
W6KTE	320	G6VQ	280	K4MG	250	W9ELG	220	WA5RXT	180	WA2VDA	140
G2FYT	315	PY4AJD	280	K6BTT	250	WØCDC	220	WA5UCT	180	W3YHR	140
HB9PL	315	K2QOU	280	OZ7KV	250	K5ABV	200	W4LF	180	WA3MSU	140
K5GOT	315	K5DFZ	280	W4DUQ	250	K9VQK	200	WA4HHW	180	W4EXO	140
W5LCI	315	K6ZIF	280	W6AEM	250	W2DT	200	W3HCW	180	W4OZF	140
W9ZTD	315	W2AWK	280	WB6PNB	250	W4YOK	200	DL7NS	160	W4VSV	140
F9RM	310	W2LWI	280	W8CC	250	W5LUJ	200	K2JJK	160	W5QBM	140
OZ3Y	310	W4REZ	280	WØBE	250	W7CNL	200	K6UWD	160	WA7MKC	140
W3VW	310	W6ANB	280	F2QQ	240	WA9VGY	200	OH2BFJ	160	WA9VIY	140
G3IEC	305	W6EYR	280	K1UDD	240	YV5BPG	200	WA1ANR	160	WAØPRS	140
PY4AP	305	W8ELE	280	K2ZRO	240	JA3DWT	180	W2AQT	160	5A1TY	140
W1MIJ	305	W9TKR	280	K5LIW	240	K2QHT	180	W2NYU	160	DL4JS	120
W1FTX	300	WØMYN	280	W3AXW	240	K6OVJ	180	WB2NUU	160	K1DEK	120
DL8NU	300	F8CW	270	W3ZUH	240	K7GYA	180	WA6FOF	160	OE2HVL	120
VK3YL	300	OZ5DX	270	W8CFG	240	K8RCT	180	W9RZZ	160	VP9GD	120
K2BKU	290	WA3IUV	270	W8SRK	240	PAØLRK	180	WA9UCE	160	WA2RQH	120
VE3GCO	290	WB4BDO	270	W9YGN	240	PY4ALC	180	WØTRF	160	WA5WQF	120
WA2HSX	290	YV5AK	270	5H3LV	240	SP8MJ	180	DJ8EQ	140	WA5YQV	120
WB2YQH	290	W2FPM	260	DL5GJ	220	VE2UN	180	JA1ILN	140	W9KDX	120
		W3CRF	260			VO2GD	180			WAØUAV	120

W4QCW	335	ZL3MN	290	WB6DXU	260	W3MDJ	220	W1EEP	180	KH6FQE	140
ZS6LW	330	W2YYL	280	K1BDP	250	W4WVF	220	W3KCS	180	WA4FZA	140
W7ADS	325	WA2HSX	280	K4MG	250	W6HUR	220	W5RO	180	W6BWM	140
W2ODO	320	W4TUC	280	K6BTT	250	W7GOC	220	DK3LP	160	W6HRB	140
W9SFR	320	W8HGN	280	W2AWK	250	W9YGN	220	K1OKW	160	W5QBM	140
K5GOT	315	W8LUZ	280	WB2IEC	250	WB9BGS	220	K2JJK	160	WA5UCT	140
W6KTE	315	W9ZTD	280	DK2BL	240	5H3LV	220	K8LUH	160	WA7BPS	140
F9RM	310	WØMYN	280	K2SHU	240	VE3AGC	200	W2CCS	160	W8KVF	140
ZL3OY	305	XE3EB	280	W2ESC	240	VO1CU	200	W5NQR	160	W9OKL	140
G3IEC	300	F8CW	270	WA3HGV	240	W1VRK	200	W7PJY	160	VE2DHF/YV1	
W4PJG	300	K2QOU	270	W4REZ	240	W2BHK	200	WØUCK	160		140
W5MB	300	W4EAL	270	W6AOI	240	W3KVS	200	ZL1UR	160	ZL2ACP	140
W6ZKM	300	W9ZRX	270	W8CFG	240	W9LAA	200	DJ3EJ	140	6Y5LA	140
IT9GAI	290	WØBK	270	DL5GJ	220	YV5BPG	200	DJ3PY	140	LA2BK	120
K1LHT	290	DL8NU	260	K6AO	220	CE3OE	180	I1ADW	140	OZ7KV	120
K2JMY	290	G5AFA	260	LA6RL	220	K2QHT	180	K1IXP	140	W3YHR	120
W8ZOK	290	K3PDC	260	OH2ZD	220	K4ARP	180	K2BDG	140	WA3MSU	120
W9KRU	290	W3COR	260	WA2CRD	220	K7GYA	180	K6SX	140	WA5WQF	120
WØQGI	290	W4QAW	260	W3KJ	220	KH6BZF	180	KC6WS	140	W7MI	120
										W9OKL	120

SCM ELECTION NOTICE

To all ARRL members in the Sections listed below.

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

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been both the holder of amateur Conditional Class license (Canadian Advanced Amateur Certificate) or higher and an ARRL full member for at least two years immediately prior to receipt of petition at headquarters. Petitions must be received on or before 4:30 PM Eastern local time on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, Zip code of the candidate and signers should be included with the petition. It is advisable that a few extra full-member signatures be obtained, to assure a valid petition.

Elections will take place as soon after the closing dates specified as full information on the candidates can be obtained. Candidates' names will be listed on the ballot in alphabetical order.

The following nominating form is suggested. (Signers should be sure to give city, street address and Zip code.)

Communications Manager, ARRL (Place and date)
225 Main St., Newington, Conn. 06111

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

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

George Hart, W1NJM, Communications Manager

Section	*Closing Date*	*Current SCM*	*Present Term Ends*
Del.	8/9/71	J.L.Penrod, K3NYG	10/10/71
Manitoba	8/9/71	K.Witney, VE4EI	10/10/71
Va.	8/9/71	R.J.Slagle, K4GR	10/11/71
R.I.	8/9/71	J.F.Johnson, K1AAV	10/12/71
Vt.	8/9/71	E.R.Murray, K1MPN	10/17/71
C.Z.	9/10/71	F.K.Johnson, KZ5DA	11/10/69
Maritime	9/10/71	W.J.Gillis, VE1NR	3/11/70
N.C.	9/10/71	C.M.Dempsey, WA4UQC	4/10/71
Ind.	9/10/71	W.C.Johnson, W9BUQ	11/1/71
S.Dak.	9/10/71	E.Gray, WAØCPX	11/1/71
Orange	9/10/71	J.L.VerDuft, W6MNY	11/10/71
Hawaii	9/10/71	L.R.Wical, KH6BZF	11/11/71
E.Fla.	9/10/71	J.F.Porter, W4KGJ	11/28/71
Wis.	10/11/71	S.M.Pokorny, W9NRP	12/10/71
Okla.	10/11/71	C.C.Cash, W5PML	12/11/71
W.Fla.	10/11/71	F.M.Butler,Jr., W4RKH	12/15/71
Ill.	10/11/71	E.A.Metzger, W9PRN	12/15/71
N.Y.C.-L.I.	11/10/71	F.J.Brunjes, K2DGI	1/2/72

SCM ELECTION RESULTS

Valid petitions nominating a single candidate were filed by members in the following sections, completing their election in accordance with applicable rules, each term of office starting on the date given.

Alaska	K.R.Klopf, KL7EVO	5/11/71
San Diego	P.C.Thompson, W6SRS	7/11/71
W. Mass.	P.C.Noble, W1BVR	8/11/71

Balloting results: In the Sacramento Valley Section of the Pacific Division, Mr. John F. Minke III, W6KYA and Mr. Everett G. Taylor, W6DOR were nominated. Mr. Minke received 177 votes and Mr. Taylor received 96 votes. Mr. Minke's term of office began May 6, 1971. In the Los Angeles Section of the Southwestern Division, Mr. Eugene H. Violino, W6INH and Mr. Harvey D. D. Hetland, WA6KZI. were nominated. Mr. Violino received 634 votes and Mr. Hetland received 587 votes. Mr. Violino's term of office began May 19, 1971. In the Maine Section of the New England Division, Mr. Peter E. Sterling, K1TEV and Mr. Martin J. Feeney, Jr., K1OYB, were nominated. Mr. Sterling received 113 votes and Mr. Feeney received 97 votes. Mr. Sterling's term of office began June 9, 1971. In the Tennessee Section of the Delta Division, Mr. O. D. Keaton, WA4GLS and Mr. Terry D. Climer, WB4EHD were nominated. Mr. Keaton received 298 votes and Mr. Climer received 179 votes. Mr. Keaton's term of office began July 1, 1971. QST

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The Post Office Department promises faster mail service with the new Zip codes. Use yours when you write League Headquarters. Use ours, too. It's 06111.

Silent Keys

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

Ex-W1CKY, Vernon J. Meader, North Berwick, ME
W1EBU, Charles C. Burns, North Brookfield, MA
Ex-W1FVI, Arthur D. Bennett, Springdale, CT
W1HXK, Arthur H. Shulman, Malden, MA
W1IEC, Carroll K. Cheever, Middletown, RI
W1LXR, William R. Purrier, North Walpole, NH
W1NY, Henry M. Baier, Wilbraham, MA
Ex-W1YGK, Harold A. Woeber, Jr., Canton, CT
W2AMZ, Clifford J. Fellows, Haddonfield, NJ
W2CLX, Ralph H. Schneider, Saratoga Springs, NY
W2DRY, Royal E. Schrack, Buffalo, NY
K2GM, Charles F. Harnish, Naples, NY
W2ISI, Richard B. Shannon, Manlius, NY
W2KG, William P. Schweitzer, Colts Neck, NJ
W2QKB, Dr. Charles G. Lyon, Binghamton, NY
W2RBJ, Burton C. Carpenter, Syracuse, NY
W2RR, Earl C. Hull, Niagara Falls, NY
W3DEC, Guy E. Bonawitz, Selinsgrove, PA
WA3KLO, Herbert W. Fiester, East McKeesport, PA
W4BYV, Stephen N. Moore, Phenix City, AL
W4HGO, Charles R. Dawson, DeBary, FL
K4LH, Alfred L. Turner, Clearwater, FL
WA4MZT, Abner C. Jones, Mobile, AL
WA4OPS, Taylor C. Cottrell, Sr., Bowling Green, KY
WN5AAB, Edmond H. Gibson, Grove, OK
W5BEX, Tom Parrish, Jr., Albuquerque, NM
W5JIF, Horace C. deYampert, El Paso, TX
W5KXA, Danny K. Elder, LaMarque, TX
W6BNE/KX6DQ, John V. Draggie, San Diego, CA
W6HVU, Merle A. Green, San Francisco, CA
W6QCG, Glen F. Bright, Long Beach, CA
K6QVT, Joseph A. Frabutt, Northridge, CA
K6RWA/W9SZV, Stanley G. Harris, Woodside, CA
K6TXU, Larry E. Rucker, Santa Clara, CA
K6UUG, Edwin A. Beardsley, Capitola, CA
K7BDD, Lyman B. Keyes, Phoenix, AR
W7SVC, Raymond M. Walley, Portland, OR
W7VZG, Jaroslav Skala, Phoenix, AZ
W8GFW/Ex-W2UCA, Elmer J. Trent, South Haven, MI
K8INK, Lee M. Rush, Bridgeport, OH
K8JES, George H. Czarnitzki, Middleburgh Heights, OH
W8VEV, Lawrence C. Brown, Akron, OH
WA8ZZW, Rolland C. Hoy, New Carlisle, OH
K9HEU, Irene A. Tidwell, Hillsboro, IL
W9JD/Ex-W1PWV, Arthur L. Hare, Arlington Heights, IL
WØDCD, Merle W. Clark, Clinton, MO
WØDEF, Max M. McCartney, Denver, CO
Ex-WØDWV, Stephen C. Dier, Sioux City, IA
WØENV, Glenn G. Fordyce, Denver, CO
WAØILN, Thomas C. Floyd, Littleton, CO
WØLVT, Charles M. Edens, Denver, CO
KØPMS, William F. Harrison, Englewood, CO
Ex-VE3BVD, M. A. Watt, Welland, ON
VE3FGB, F. Bing, Toronto, ON
VE3YE, Hubert J. A. Durant, Oshawa, ON
IS1AEW, Delio Lubau, Sardinia, Italy
HC2RA, Alfanso Ramos, Guayaquil, Ecuador, SA

The League Headquarters building is open to visitors Monday through Friday, 8:30 to 4:30 on a "drop-in" basis, and at other times by appointment. The headquarters is on Main Street (Conn. Route 176 and 176-A) about a mile north of the center of town, and about 3 miles west of Conn. 15-U.S. 5, the Wilbur Cross Highway. (For W1AW visiting hours, see the schedule in "Operating News.")

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FØUG operates on occasion from Foug, France (small village near Nancy).

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

DELAWARE – SCM, John L. Penrod, K3NYG – SEC/PAM: W3DKX. RM: W3EEB. The New Castle EC, WA3DYG coordinated with the First State ARC and supplied communications for the "Walk for Mankind." Amateurs participating were WA3DYG, WA3HDS, K3JXR, W3URR, K3YBW, K3CEW, W3TRC. The KCARC home brew contest was won by K3NVV with W3MCD and W3QQV getting 2nd and 3rd place. The Delaware Novice Net meets on 3740 at 2230 in the summer and 2130 in the winter. For more details write WN3QJU. K3NYG copied the Oscar 10-meter signal, but too poorly to feed a 2-meter signal into it. W3QQV has a completed homebrew station on 432. WA3LTA is very active in the traffic nets. The Kent County ARC will show the movie "Hams Wide World" Aug. 10, at 8 P.M. at the Kent County Courthouse, Dover, Del. All amateurs are invited. Traffic: W3DKX 31, W3EEB 30, WA3LTA 25, WA3GSM 2, K3NYG 2.

EASTERN PENNSYLVANIA – SCM, George S. Van Dyke, Jr., W3HK – SEC: W3ICC. RMs: W3EML, W3MPX, K3MVO, WA3AFI, K3PIE, W3CDB. PAMs: K3PSO, WA3GLI. VHF PAM: W3FGQ. OO reports were received from K3DRT, K3NSN. OVS reports from WA3KFT, WA3MCK, WA3EEC, K3NSN. OBS reports from WA3AFI, A3KFT, W3CBH, WA3JRV, WA3EEC. BPLs: W3MPX, W3EML, WA3OGM, W3CUL, W3VR, K3NSN. PSHR: WA3OGM, *WA3LAK, WA3PLP, W3MPX. Net activity picked up a little this month.*

WA3EXW is leaving Pa. for NJ but will try to keep in touch with EPA. K3NSN is getting WA3EXB back on with a new antenna. WA3MCK will be on vacation for a few months. He hopes to get his "A" ticket before he goes. Henderson Senior High School ARC officers are WA3OGM, pres.; WA3OAM, vice-pres.; WN3QHO, secy-treas. W3VR says the best part of a banquet is meeting the *YLs! W3MPX still is carrying a heavy load, how about some more* liaison stations. WA3ATQ received an Honor Award from Freedoms Foundation for her ham traffic work. WA3CKA is back from school. Twilight baseball is cutting into activities at W3ADE. W3GMK is working on a break-in setup for RTTY. The VHF contest was a real gas with a couple of band openings! FD saw some real competition, maybe some new faces in the winner column. Hope all the antenna repairs were made – *its a little late now.* Traffic: W3CUL 2693, K3NSN 1051, W3VR 883, W3EML 500, W3MPX 333, WA3OGM 316, K3PIE 272, WA3LAK 161, WA3EXW 145, K3MVO 133, W3CDB 117, WA3ATQ 110, WA3PLP 73, K3PSO 69, WA3MQP 58, W3HK 47, K3OIO 33, WA3PGT 29, K3BHU 27, WA3LMH 26, WA3LVC 24, W3VA 24, W3VAP 24, WA3IYC 23, W3FPC 22, W3MGF 19, K3KKO 16, W3BNR 14, WA3EEC 14, W3CBH 11, WA3CKA 11, W3ADE 10, K3KTH 10, WA3MCK 8, K3HKW 7, W3OY 7, W3BUR 4, WA3JRV 4, WA3IAZ 3, WA3IUV 3, WA3BJQ 2, WA3KFT 2, WA3BSV 1, W3EU 1, K3FOB 1, W3GMK 1.

MARYLAND-DISTRICT OF COLUMBIA – SCM, Karl R. Medrow, W3FA – SEC: W3LQY. BPL: W3TN. PSHR: W3EZT and W3TN. WN3OSC joins the AREC. W3FCS renews as OPS. WA3AJR becomes EC for Charles and Prince Georges. WA3APQ has applied for OVS. Net/mgr./sess./traffic/QNI average: MDD/W3EZT/31/117/8.7; MDDS/WA3LWT/25/55/6.0; MDCTN/W3FCW/18/37/15.4; MTMTN/K3IAG/6/1/8. Daylight time takes its toll of old timers and brings out the school youngsters. K3RUQ reports another ham in Cambridge WN3RCH – his mother. K3GJD fights work and BCI. W3FZV visited his dad W4IA, and attended the Orlando, Fla. hamfest. W3OKN keeps active in the northeastern nets. W3GEL is now disguised as K3BA. WA3MJF moves to Calvert County for the summer. W3EOV went on his northwest continent trip. W3HXF reports the Goddard Club station WA3NAN can crystal control any 6 kHz on 2-meters. WA3LFU is home from Case College with lots of antenna work ahead. W3LFD took a vacation from ham radio. WA3APQ found a good 6-meter opening in May. W3ZSR is still going around with the *Bowie "city fathers" on the proposed tower ordinances. W3CDQ is* back from her South Pacific vacation and is fully rejuvenated after visiting her VK friends. W3EZT is at 50-ft. after the neighbor uprising died off. W3LQY fought off a lingering illness and has an FB report on MDs Feb. SFT. See your NCS or EC for details on the 90 participants. WA3GXN is a grandpa. WA3IIV and K3QDC report by radiogram. K3TZK is doing 3RN liaison on call. WA3MSW holds *a regular 3RN liaison spot on MDD. WA3LWT reports net mgrs.* have a lot of traffic. W3ADO, Naval Academy Club station reports WA1DHQ, pres.; WA3PAN, vice-pres.; WB4TIL, secy.; K4EVT, treas. They also report a successful Armed Forces Day as WU3SNA with 1608 QSOs. WA3NUL was in the VHF party and W3CWC was ready for Field Day and prime mover WA3EOP plans that fateful step in Aug. Traffic: W3TN 247, W3FCS 85, W3EZV 83, W3EZT 69, WA3LWT 62, W3OKN 51, W3FA 43,, WA3MSW 40, W3GEL 29, K3LFD 27, K3GZK 24, K3RUQ 15, W3EOV 12, WA3MJF 10, WA3IIV 9, WA3GXN 6, W3HXF 6, WA3LFU 4, K3QDC 1.

SOUTHERN NEW JERSEY – SCM, Charles E. Travers, W2YPZ – SEC: W2LVW. PAMs: WB2FJE, W2YPZ. RM: W2JI.

Net	*Freq.*	*Time(PM)*	*Sess.*	*QNI*	*Tfc.*	*Mgr.s,*
NJN						WA2BAN
NJPON	3930	6 Su	5	100	29	WB2FJE
NJEPTON	3950	6 M-S				WA2TAF
NJSN	3740	7	31	111	42	WA2FVH
MCFPTN	145.9	8 F	5	16	1	W2YPZ

It is a pleasure to announce the appointment of W2JI as RM for NJN. Walt reports daily schedule with W4YLR. Russ has a new triband Yagi and breaks through the 20-meter QRM very well. W2ORS was batting 1000 for the past 5 months with his regular activity reports. Rose Ellen was recently elected secy. of ARNS. Congratulations to W2FBF on winning the W2SUA trophy of the Gloucester Co. ARC for the highest DX contest score. WA2KWB has completed exams at Rutgers School of Engr. and is with the U.S. Steel as an industrial engineer. W2LVW is recuperating at home after a spell in the hospital. On May 29 the Gloucester Co. ARC held a surprise party for W2KE, now retired. Our very best wishes to you Van for a very enjoyable and happy retirement in Delaware. Congratulations are also in order for W2VQR of Asbury Park. A very happy and enjoyable retirement and we will continue to meet you each Sun. on the N.J. CD Net. Traffic: WB2VEJ 118, WA2FGS 32, *WA2BLV 17, W2ORS 17,* K2RXB 17, *W2YPZ 17, W2JI 15,* WA2KAP 12, W2ZI 8, WB2SFX 7, WB2WHB 7, WB2EWS 5, W2IU 5, K2IJC 3.

WESTERN NEW YORK – SCM, Richard M. Pitzeruse, K2KTK – Asst. SCM: Rudy M. Ehrhardt, W2PVI. SEC: W2RUF. The list of section nets appears in the Apr. Station Activities column. I was very pleased to meet many of the CD gang at the Western New York hamfest in Rochester – a real big bash again this year as usual. W2CFP reports a good sunburn at the flea-mart at that hamfest. K3JH gave a most interesting talk to RAGS on his giant antenna farm per May 1970 *QST*. The gang from BARRA have voted to go narrow band fm by the end of summer. Don't forget in the fall when YOUR radio club gets active again to help support it and be sure to let your SCM know what your club is doing also. WA2YNS has a new layout consisting of a KWM-2A, NCL-2000, HRO-500 and a six-element Telrex tribander. WB2YEE's other hobby deals with collecting railroad magazines and materials. Congratulations to the State U. of N.Y. at Buffalo Amateur Radio Club, the Sullivan County ARC and the Oswego County ARS on their recent ARRL affiliations. W2CFP continues to do a fabulous job of editing the ECARS Monitor. W2DBU has a new tribander. WB2WGF has built a new electronic keyer. NYS reports clearing 283 messages with 749 check-ins for May. Nearly all inputs bemoan the traffic lull or decay whichever he the case. WB2FPG is making his way back into traffic work. WA2DHS has some new 3-500Z bottles raring to go. WA2AWK's son, WB2ZJX received his M.D. cum laude from the Upstate Medical Center. W2OE made BPL. Traffic with the *indicating PSHR: W2OE* 300, W2FR* 223, WA2ICU* 200, W2RUF* 119, W2MTA* 86, W2MSM 71, K2KTK* 54, W2FZK 52, W2FEB 39, W2RQF 38, WB2IKL 27, K2OFV 20, K2UIR 19, W2DBU 18, WA2ITJ 18, K2DNN 14, WB2QAP 14, WA2KAT 11, W2PVI 10, WB2LQP 9, WA2MPC 7, W2EVH 6, WA2AIV 4.

WESTERN PENNSYLVANIA – SCM, Robert E. Gawryla, W3NEM – SEC: W3KPJ. PAM: K3ZNP. RMs: W3LOS, W3KUN, WA3IPU. WPA CW Net meets daily 3585 kHz at 7:00 P.M. KSSN meets Mon. through Fri. 3585 kHz at 6:30 P.M. It is with deepest regret that we record the passing of W3TAS, W3OUA, K3JCZ as Silent Keys. Remember the WPA annual picnic Aug. 8 at Cook Forest. Everyone is invited. Main road to rangers cabin and watch signs. See you there. The Etna RC had its first swap and shop which was quite successful. The Uniontown ARC reports WA3OGO is now a General Class licensee and that W3QYH, W3RUK, WA3KNS and W3UUZ are now retirees. The Presque Isle ARC reports the McDowell RC, WA3GMV, is very active in DX. They recently purchased an HW-16 and an HW-101 from the proceeds of a candy sale. The Two-Rivers ARC reports W3OC was nominated and accepted for life membership in the Society of Wireless Pioneers. Indiana County ARC says W3CFC and XYL spent two weeks in the Phoenix, Ariz. area and visited several clubs and hams including K7UGA. W3IDO contacted all four Armed Forces stations during the May Armed Forces Day Contest. WA3JIH received his Extra Class license and qualified for DXCC in May. WA3MDY operated portable during the recent YWCA hobby show and made the local paper with his picture for his efforts. WN3QVS and WN3RDG are new Novices in the WPA section. Congrats to the Hickory High School ARC of Greenville, Pa. and The Presque Isle ARC of Erie, Pa., as newly ARRL affiliated club stations. Net traffic for May: WPA – 31 sessions, 427 QNI, 246 messages; KSSN – 20 sessions, 71 QNI, 28 messages. Traffic: WA3IPU 203, W3YA (W2KAT, W3NEM ops) 175, W3NEM 148, K3ZNP 108, W3LOS 101, WA3NAZ 87, W3KUN 82, W3ATQ 56, WA3MDY 37, K3HCT 35, W3MJ 19, K3SJN 6, WA3JIH 4, W3IDO 2. Total traffic 1063.

CENTRAL DIVISION

ILLINOIS – SCM, Edmond A. Metzger, W9PRN – SEC: W9RYU. PAMs: WA9CCP and WA9PDI (vhf). RM: WA9ZUE. Cook County EC: W9HPG.

Net	*Freq.*	*GMT/Days*	*Tfc.*
IEN	3940	1400 Su	no report
ILN	3690	0030 Dy	177
NCPN	3915	1300/1800 M-S	99
Ill PON	3915	2245/1430 M-F	549
Ill PON	145.5	0200 MWF	4
Ill PON	50.28	0200 M	27

Newly elected officers of the Belleville Township High School West Amateur Radio Club are WA9TZW, WN9EON, WB9DHA, WN9GLY and WN9GKA. W9HRY reports that the traffic total for the Ninth Region Net was 431. W9IDQ was married May 8 in Springfield, Ill. This column's sympathy to the family and friends of WN9BIR and W9AHC who have joined the ranks of Silent Keys. Ed Mehnert, former asst. Editor of *QST* and more recently returned from Vietnam now is QTHing at Rantoul, Ill. The Northern Ill. Amateur Wireless Assn. (Chicago) has been granted League affiliation by the ARRL Executive Committee. W9DY, WA9OWK, WB9CJS and WA9KHR are the new officers of the Radio Amateur Megacycle Society (RAMS). The Ill. QSO Party will be held Nov. 6 and 7. WB9AUR now is on phone with a Galaxy 300. WN9CCO now is WB9CCQ. W9EJP has been elected to the city council of Mt. Carmel. W9QKE gave a slide presentation at the May meeting of the York Radio Club on his recent trip to Hong Kong, Singapore and Bankok. WN9FEP was active in disaster work at Thompsonville following the tornado which hit that area. W9BFO gave a talk on amateur radio to the Carmi Rotary Club. W9BDM and wife celebrated their Silver Wedding Anniversary May 16. WN9GNU, WN9GNT and WN9GLI are new Novices in the Wheaton Community Radio Amateurs. WB9FJB is an Advanced Class licensee. WA9FGP and W9BOI are new fathers. W9LEX has a new dipole and finally got WAS and WAC. Traffic: W9NXG 231, WB9BXX 207, WA9ZUE 156, WB9AWY 152, K9AVQ 119, WA9NZF 84, W9JXV 68, W9HOT 52, W9LNQ 42, W9FHJ 38, WA9LDC 34, WA9RTB 23, WA9SFB 23, W9EUN 22, W9PRN 22, WB9ELP 11, W9LEX 9, WA9LHU 9, W9LDU 5.

INDIANA – SCM, William C. Johnson, W9BUQ – SEC: W9FC. RMs: W9FC, W9HRY, WA9WMT, WA9ZKX. PAMs: K9CRS, WA9OHX, (vhf) W9PMT.

Net	*Freq.*	*Time(Z)/Days*	*Tfc.*	*Mgr.*
ItfcN	3910	1330 Dy 2130 M-S 2300 Dy	420	WA9OHX
QIN	3686	0100 Dy 0400 Dy	203	WA9WMT
IIN	3740	0100 Dy		WA9ZKX
PON	3910	1245 Su 1830 Su	104	WA9UMH
PON VHF	50.7		1257	K9APH
Hoosier VHF			37	W9PMT

I would like to thank everyone for the cards and messages sent while I was in the hospital. I also appreciate the help received from W9FWH in getting out the report for Apr. The IPON VHF SSB Net meets at 0000Z-0200Z-0400Z, Dy. on 50.2. K9APH with his ssb 6-meter rig has been doing a very good job for the IPON. K9JWJ is building a new quad antenna. WN9HHQ and WN9HHR are father/son Novices getting their ticket in May. W9OAC is back on 2 with a new quad. The Delaware Amateur Radio Assn., Inc. held their Hamfest at the Praire Creek Reservoir Shelter house and all who attended had a good time. Two-meters is picking up in Marion County as more are getting HR-2 transceivers. The Bloomington ARC donated 6 copies of the "Radio Amateur's Handbook"and "How to Become a Radio Amateur" to the Bloomington Library. QIN Honor Roll: WB9ANT/21, W9BDP/21, W9EI/15, W9HS 23, W9QKE 21, K9VHY 20, W9ILS 17/17, K9FUJ 15. Amateur radio exists because of the service it renders. A BPL Certificate went to K9APH. Traffic: (May) K9APH 1058, K9FZX 250, WA9WJA 204, WA9UMH 192, WA9OHX 158, WA9VZM 137, W9HRY 109, W9QLW 89, WA9WMT 78, K9EFY 64, K9RPZ 53, WA9WNH 44, W9PMT 38, W9KWB 37, W9FWH 35, WA9VBG 27, W9BUQ 26, WA9AXF 25, K9YBM 25, K9RWQ 23, W9ENU 21, K9VHY 21, K9CBY 19, W9HWR 13, WA9LGO 12, K9JQY 11, K9DIY 9, WA9BHG 8, W9DZC 7, K9ILK 7, WA9OAD 7, W9RTH 6, W9EI 4, WA9AQW 1, W9BDP 1. (Apr.) W9QLW 174, K9HYV 63.

WISCONSIN – SCM, S.M. Pokorny, W9NRP – Asst. SCM: Joseph A. Taylor, W9OMT. SEC: W9NGT. PAMs: WB9CKE, K9FHI, WA9OAY, WA9PKM, WA9QKP. RMs: WB9BJR, K9KSA.

Net	*Freq.*	*Time(Z)*/Days*	*QNI*	*QTC*	*Mgr.*
WSSN	3662	0030 TTS			K9KSA
WIN	3662	0115 Dy	216	134	WB9BJR
WRN	3620	0130 Su RTTY			K9GSC
SW2RN	145.35	0230 Dy	176	3	WA9PKM
SW6RN	50.4	0300 M-S	136	4	WB9CKE
BWN	3985	1245 M-S	461	240	WA9OAY
W RACES	3993.5	1400 Su	89		W9NRP
BEN	3985	1800 Dy			WA9QKP
WSBN	3985	2300 Dy	1188	137	K9FHI
W PON	3925	1801 M-F	326	54	W9EMC

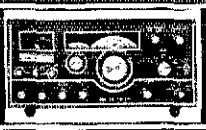
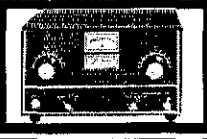
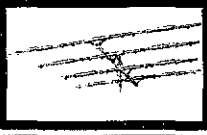
*All nets one hour earlier during the Daylight Saving Time period.

WB9FFY cancelled his RM because of work and school. WB9BJR is the new RM for WIN. It is with regret that we note the sudden passing of W9PIW and offer our sympathy to his family. PIW was NRP's neighbor in the mid-30's. The following have renewed their appointments: K9KSA, W9ODD as OPSs; K9KSA as RM for WSSN; WA9OAY as PAM for BWN; K9KSA as ORS; W9EWC as OVS. A petition for a WIS Chapter of QCWA had about 40 signatures, let's make it 50. For more information on QCWA contact W9CTI or W9NRP. K9PKQ reports the Yellow Thunder ARC banquet was a success. Traffic: (May) WB9BJR 413, W9CXY 379, K9CPM 272, WA9YSD 184, WN9FBG 134, W9DND 112, WA9UNN 86, K9FHI 71, WB9DXK 54, WB9ABF 44, WA9OAY 33, W9KRO 31, W9ESJ 29, WB9GPG 27, WA9BZW 21, W9OMT 21, W9NRP 18, WB9DAK 15, K9KSA 11, WA9TZY 11, WA9THF 10, W9RTP 8, WB9DKT 6, K9UTQ 5. (Apr.) WA9UNN 68, W9YT 3.

DAKOTA DIVISION

MINNESOTA – SCM, John H. Halstead, KØMVF – Asst. SCM: Edna M. Thorson, WAØRRA. SEC: WAØMZW. RMs: WAØIAW, WØAAU. PAMs: WAØHRM, KØFLT. One of WAØRRA's Novices made BPL. WNØCGT had 106 ouginations plus deliveries this month. WBØCAP is now an ORS and looking for NCS opportunities on MJN. John made BPL as a Novice also. Both KØFLT and his XYL were in the hospital but in different towns. Both are now home and feeling better. WØZHN received the Operator of the Year Award presented by WØPAN, Dak. Div. Dir. at the annual MSN picnic. Tornado weather has caused the Minnesota AREC Net to be activated several times. The response has been gratifying. The St. Cloud Radio Club picnic will be Aug. 7 and 8. The Grand Rapids picnic will be held Aug. 15. Traffic: WAØVAS 598, WØZHN 291, KØCSE 250, WAØEBZ 186, WAØRRA 185, WAØWEZ 141, WNØCGT 31, WØBUC 114, WAØIAW 104, WAØYVT 91, WAØEPX 72, KØZRD 64, WAØTFC 63, WAØVYB 62, WAØYMU 62, WØPET 60, WBØBRG 59, KØORK 58, WAØVYV 57, WØWFA 55, KØMVF 53, WAØHRM 45, WBØCAP 30, WAØTQT 30, WØIYP 26, KØICG 21, WAØMMV 21, WAØRKV 21, WAØYER 21, KØZBI 21, WØKNR 20, WAØSGJ 19, WØATO 18, WAØYAH 12, WAØQAK 11, WAØUWT 9, WØBUQ 7, WAØNOH 7, WAØJPR 6, WØISJ 4, WØUMX 4, WAØMNE 3, WØOBB 2, WAØOEF 2, WAØYGE 2, WØSZJ 1.

NORTH DAKOTA – SCM, Harold L. Sheets, WØDM – SEC: WAØAYL. OBS: WAØATJ. PAM: WØCAQ. RM: WAØRSR. OO: WØBF. The big event coming up Sept. 25, 26 is the N. Dak. QSO party sponsored by the Forx Radio Club and the Sioux Amateur Radio in cooperation with other clubs of the state. Complete details

RECEIVER		**600-R** 10-80 meters		$395
TRANSMITTER		**600-T** 600 watts 10-80 meters		$495
TRANSCEIVERS 	**500-CX**	550 watts	10-80 meters	$489
	270B	260 watts	10-80 meters	$429
	250-C	240 watts	6 meters	$429
	160	400 watts	160 meters	$429
	FM-2X	10 watts	2 meters (FM)	$259
LINEAR AMPLIFIERS 	**MARK-II**	2000 watts	10-80 meters	$599
	1200 W	1200 watts	10-80 meters	$219
	MARK 6B	2000 watts	6 meters	$599
	VHF-150	240 watts	2 meters	$279
ANTENNAS 	Tri-band Beams 10-15-20 meters			
	Trap Vertical 10-80 meters			
	Mobile Antennas Single and Multi-band			

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elsewhere this issue. Incidentally it will be for all bands and all modes. WAØOVW is chmn. of this endeavor. Certificates will be awarded. WAØBIN has a new beam operating and WØMXF has been doing some tinkering with his dipole. WBØATB has a new Tempo linear and a Heath power meter going. WAØTOF came out with some more power – a new SB-200 which puts out a nice signal for him. KØZXE has returned to Minn. WØYEQ is taking another trip to Norway. WØDM took the HW-101 on a trip to Minn. and tried it as a portable with the Band spanner and it works very well. WAØRSR made sessions of TEN for Apr. while KØZXE made 9.

Net	*kHz*	*CDT/Days*	*Sess.*	*QNI*	*QTC*
Goose River	1990	0900 Su	5	80	–
NDPON	3996.5	0900 Su	15	321	17
		1830 S-S			

Traffic: KØITP 59, WAØRSR 48, KØPYZ 19, WAØSUF 11, WØDM 10, WAØSJB 9, WAØBIN 6, WØCDO 6, KØZXE 4, WAØHUD 3.

• **SOUTH DAKOTA** – SCM, Ed Gray, WAØCPX – Dakota Division Dir. WØPAN has recommended the appointment of WAØCPX as Vice-Dir. Anyone having ideas or comments are encouraged to give them to WAØCPX. Your SCM is now employed with the Cooperative Extension Service and his new address is 2402 Hoefer Ave., Rapid City, S.D. 57701. WAØLYO is going to teach at Wood, S.D. this next school year. WAØNUX at Springfield has a new FT-100 Japanese built transceiver. WAØVJG of Centerville is in the Airforce Basic Training school near San Antonio, Tex. Please remember if you hear of an emergency to get on 3.955 MHz. AREC membership is 120 as reported by SEC WAØFUZ. The Morning Net had 466 check-ins and 50 formals; NJQ Net had 458 check-ins and 10 formals; Early Evening Net had 376 check-ins and 2 formals; Late Evening Net had 1080 check-ins and 40 formals; and the CW Net had 62 check-ins.

DELTA DIVISION

ARKANSAS – SCM, Jimmie N. Lowrey, WA5VWH – RM: WA5TLS. PAM: WA5KJT. W5PBZ has resigned as SEC effective in July. Congratulations on the fine job done while SEC. WA5WMC has 99 countries confirmed but his DX activities have stopped while he and WA5TAF are on a trip to Alaska on motor bikes. Thanks go to K5DKT and WA5KJT for the fine job they did on the Razorback Net during a special session because of the Joplin, Mo. tornado. W5RIT and XYL participated in the YL ISSB QSO party; they were high team in the USA in 1969. WA5ZKE received his General Class license and has been active as OBS and net control on the Razorback Net. WA5SKI is a new Class I OO and is active in the Intruder Watch. W5NND again is the top reporting traffic man in the section. W5KL has been busy with trips out of the country to Haiti and Jamaica and several around the U.S. WA5PGB has a new Regency HR-2. WA5CQZ has a new Kenwood R-599 and T-599. The Fort Smith Repeater Society has received the license for a new repeater on 146.94-.34 with the call WA5YUT. The North Arkansas Radio Society had a big Field Day under the direction of VP W5KL. The Razorback Net has changed times and is issuing a new certificate to stations that check in 16 times per month. A new net has been formed on Sun. afternoon at 2000 CDT on 3995 for Ark. clubs and all clubs are invited to participate. Repeaters: Little Rock, W5DI 146.34/146.94. Fort Smith, WA5YUT 164.34/146.94. Net changes: Razorback Net, 0100Z, 3995 kHz, M-S; Ark. Club Council Net, 0100Z, 3995 kHz, Sun. Traffic: W5NND 144, WN5ZKE 71, WA5TLS 68, WA5WMC 3, W5KL 2.

LOUISIANA – SCM, J. Allen Swanson, Jr., W5PM – SEC: W5OB. RM: WA5VQE. PAM: WA5NYY. VHF PAMs: WA5DXA, W5UQR. Don't forget the Central La. ARC Hamfest Aug. 28 and 29. Under the leadership of W5NOP and WA5WEY the Delta DX Assn. has been organized, with WA5YFQ, secy. Meetings will be on the 1st Tue. of each month for dinner and information swapping. Contact one of the above for more information. The gang in the Ozone ARC at Slidell are finalizing plans for their own club building. W5OB has been nominated for membership in the famous FOC organization with headquarters in England. LARC has received the video tape "Hams Wide World" and has a booking for Channel 3. The club has become most enthusiastic over the Handbook's 1971 Broad band dipole with W5EXJ the local expert! WB5CHP, a new VHF appointee, has submitted his first very fine report on VHF propagation. The La. Tech ARC is a new ARRL affiliate. New Orleans has a new repeater, 444.2 MHz/449.2 MHz with 100 hz tone. Any dope you need may be had from WA5DXA or WB5CHP. We also understand there is a new SSB Net meeting at 0100 GMT on 50.150 MHz being organized by the GNOARC with W5UK as NCS. WB5CHP is very active in ARFC activities. LAN meets at 2330 and 0300 GMT on 3615 kHz. WB5EBI and WB5EBJ both YLs are new

(Continued on page 118)

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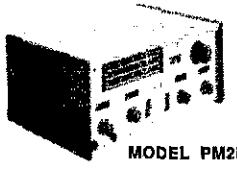
POWER-MITES



MODEL PM2B

MODEL PM2B. Popular two watt CW transceiver. Operates on 80-40-20 meters. Side-tone. Lantern battery or 12 VDC power source. Size 10⅜" W × 4½" H × 6⅝" D. Weight 2¾ lbs. **Price $64.95.**

MODEL PM3A. Advanced 5 watt CW transceiver. Operates on 40-20 meters. Side-tone. Push pull final. Pi Network. Break-in keying. Size 10⅜" W × 4½" H × 6⅝" D. Weight 3 lbs. **Price $79.95.**

ANTENNA TUNER

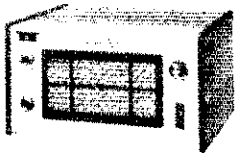
MODEL AC5. Matches 52 ohm output of Power-Mites to open wire on random length antennas. Maximum power 10 watts. Size 4" W × 2" H × 4" D. Weight 1 lb. 4 oz. **Price $8.95.**

SWR BRIDGE

AC4

MODEL AC4. Favorite for QRP. Measures from ¼ watt to 200 watts. Size 4" W × 2" H × 4" D. Weight 1 lb. 4 oz. **Price $14.95.**

SIGNALIZER



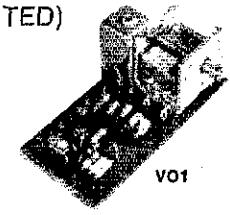
S20

MODEL S20. Complete audio and speaker system for receivers/transceivers. Plugs into headphone jack. Provides maximum AGC to keep all signals constant level. Front panel headphone jack. Size 8¼" W × 4½" H × 6½" D. Weight 3½ lbs. **Price $39.95.**

MODEL S30. Similar to S20 but has built in FR4 CW filter; switchable. Size 8¼" W × 4½" H × 6½" D. Weight 4 lbs. **Price $49.95.**

MODULES (WIRED AND TESTED)

TX1



VO1

MX1. Detector-converter. Uses dual gate MOSFET. Size 4" W × 2" H × 2" D. **Price $7.95.**

AA1. IC audio amplifier. 100 db gain. Drives high impedance head phones. Size 4" W × 1" H × 2" D. **Price $7.95.**

VO1. Oscillator-buffer. 40-80 meters. Drift less than 100 Hz. Output 2 volts R.M.S. Size 4" W × 2" H × 2" D. **Price $7.95.**

TX1. Crystal oscillator and power amplifier. 2 watts input. Covers 80-40 meters. Size 4" W × 1" H × 2" D. **Price $7.95.**

MR1. Four modules listed above, with instructions for inter-connecting to make a 80-40 meter transceiver. **Price $29.95.**

AC1. Convenience kit for MR1. Includes meter, antenna switch, knob and connector. **Price $7.95.**

AC2. Keying side-tone monitor. Operates on 6 volts DC. Size 4" W × 1" H × 2" D. **Price $5.95.**

AC6. 20 meter converter/side tone converts PM2 to PM2B. Added to MR1 will provide side tone and 20-meter band. Size 4" W × 2" H × 2" D. **Price $7.95.**

AC7. Send-receive switch to convert Power-Mites to automatic semi-break-in. Adjustable hold time. Size 4" W × 2" H × 2" D. **Price $9.95.**

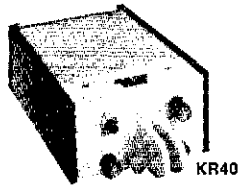
AC9. Electronics for Signalizer. Can be installed in receivers to provide enhanced AGC. Requires 12 VDC. Size 3" W × 1" H × 4" D. **Price $19.90.**

AC10. Filters used in FR4. 400 Hz band width with control. Size 4" W × 2" H × 2" D. **Price $12.90.**

KR3. Solid state keyer electronics used in Model KR20 and KR5. Operates from 12 volts DC. Size 4" W × 1" H × 2" D. **Price $17.95.**

KR4. Squeeze keyer electronics used in squeeze keyer model DR40. **Price $47.95.**

KEYERS AND KEYER PADDLES



KR40

KR5

MODEL KR40. Squeeze keyer. Iambic sequence. Full memories. Variable weighting. With dual paddles. Speeds from 6-60 wpm. 115 volt AC operation Side tone. Size 4¾" W × 2½" H × 8" D. Weight 4 lbs. **Price $89.95.**

MODEL KR20. Keyer. Self-completing. On/off weighting. With dual paddles. Speed 6-60 wpm. Monitor side tone. 115 V AC operation. Size 4¾" W × 2½" H × 8" D. Weight 4 lbs **Price $59.95.**

MODEL KR5. Keyer. Self-completing. Optimum weighting. Single paddle. Speed 6-60 wpm. Operates from 6 or 12 volts DC. Size 4" W × 2" H × 6" D. Weight 1 lb. 6 oz. **Price $34.95.**

MODEL KR1. Paddles as used in KR40 and KR20. Mounted in formed aluminum case. Size 4¼" W × 2" H × 6" D. Weight 1 lb. **Price $18.95.**

MODEL KR2. Paddle as used in KR5. Mounted in formed aluminum case. Size 4¼" W × 2" H × 6" D. Weight 1½ lbs. **Price $12.95.**

If you want detailed information on any of these products, just drop us a line. If a TEN-TEC dealer is near you, by all means patronize him. It helps you and Amateur Radio. If, however, you are not in a trading area covered by a dealer, send your order direct and it will be shipped postpaid.

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PS-3000 3KW Supply	400	350

CENTRAL ELECTRONICS	reg.	NOW
RM-80 Ad. for MM-2 Scope		$ 5

CLEGG	reg.	NOW
418 Thor DC sup/mod	$139	$ 89
Allbander	129	85

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EICO	reg.	NOW
315 Deluxe Sig. Gen. Kit	$ 69	$ 54
536 VOM Kit	17	12
536 VOM Wired	23	19
891 Car Burglar Alarm	15	12
430 3" Scope Kit	80	60
1050 Battery Eliminator Kit	33	28
791 Sol. St. Pwr. Sup. Wired	22	17
751 AC Supply Kit	$ 79	$ 54
751 AC Supply Wired	109	79
752 DC Supply Kit	79	54
752 DC Supply Wired	109	79

The Eico power supplies listed above provide all the necessary operating voltages for the Eico model 753 transceiver. Those output voltages are: 750v DC at 300ma, 250v DC at 170ma, and -100v DC at 5ma. The AC supply also provides 12.6v AC at 4 amps, has a built-in speaker and is 5-1/2" w, by 8" h, by 11-1/4" d. The power supplies come with interconnecting cables, to match the Eico model 753 transceiver. By changing the power plugs, these supplies should work with the National NCX-3, NCX-5, NCX-200; Swan single-band units; and Swan 240's. They can be made to work with most Heath kits by removing a series resistor in the bias supply. They might also work with the Collins KWM-2 by adding an adjustable potentiometer in the bias circuitry. Persons wishing to use these supplies with other than the Eico 753 should have some electronic background and the ability to make the necessary modifications. AES does not furnish information on converting these supplies for use with units other than Eico. These supplies are a real buy for those who have an Eico 753 or like to tinker.

GALAXY	reg.	NOW
GT-550A 80-10m Xcvr.	$550	$389
2000 + Linear Supply	$495	$349
SC-35 Speaker Console	19	15
RX-2 Mars VFO for Gal. V's	79	59

SAVE $100 - Galaxy FM-210 12 volt 2 meter FM transceiver (reg. $229) with PA-210 35 watt Mobile Amplifier (reg. $149) for only $278

GONSET	reg.	NOW
GSB-201 Mk IV Linear	$525	$395
902A DC Sup. for 900A 2m	62	49
912A DC Sup. for 910B 6m	62	49
3409 CD Kit for Comm. IV	39	19

HY-GAIN	reg.	NOW
DB-1015 3 el. 10-15m Beam	$109	$ 69
SD-150B 159-175mc 1/4wave	125	75
HB2-S4 4 stacked 2m halos	60	29

JOHNSON	reg.	NOW
6N2 Converter (14-18) wired	69	49

KIRK	reg.	NOW
1322 2 el. 10, 15, 20m Quad	$159	$119
908 4 el. CB Quad	149	99

LINEAR SYSTEMS	reg.	NOW
250-6 6v DC Supply	$345	$ 45
350-6 6v DC Supply	165	65
400-12 12v DC Supply	145	95

MOSLEY	reg.	NOW
MA-3 10, 15, 20m mob. ant.		$ 10

NATIONAL	reg.	NOW
NCXA MK II AC Supply	120	89

RAYTRACK	reg.	NOW
6 meter, 2kw PEP, Linear	$649	$549

Regency Monitor Receivers for 2m FM Ham Band (less Crystals) reg. NOW

TMR-1H Single channel	$109	$ 79
TMR-12H 12 channel	129	99
TMR-8H 8 channel Scanner	149	119

Regency Monitor Receivers	reg.	NOW
PR-25B 30-50mc Tunable	$ 69	$ 49
AR-136 Aircraft Receiver	89	69
M-40 30-50mc Tunable 12vdc	150	89
M-160 Hi-band Tunable 12vdc	150	89

Regency Citizens Band	reg.	NOW
Imperial 1 CB Set	$329	$249
Ranger 12 ch. 12vdc CB Set	175	95

SBE	reg.	NOW
SB-34 80-15m 12-110v	$449	$339
SB2-LA Linear Amplifier	259	219
SB2-VOX Accessory Unit	38	24
SB2-MB Mobile Mtg. Bracket	12	7
SB2-CW CW Codaptor	42	27
SB2-MIC Mike (dynamic)	16	12
SB-XC Crystal Calibrator	29	28
SB3-DCP Mob. sup. /SB2-LA	249	149
W-72 cable for SB3-DCP	8	6

SIGNAL ONE	reg.	NOW
CX-7 Transceiver	$2195	1695

SONAR 25-50 Mc Tunable FM Receivers reg. NOW

FR-101 (110v)	$ 89	$ 69
FR-101D (110 & 12v)	114	89
FR-101DX above plus 1 xtal.	134	99

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FR-102 (110v)	$ 89	$ 69
FR-102D (110 & 12v)	114	89
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SS-1RS Speaker	35	15

SWAN	reg.	NOW
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66'er 6m Xcvr	169
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418 DC sup/mod.	75
Zeus VHF Xmtr	289
Interceptor Rec.	249
Interceptor B Rec.	299
Venus 6m SSB Xmtr	189
416 AC supply	69
SS Booster	49
Apollo Linear	169

COLLINS	
75A-2 Receiver	$219
75A-3 Receiver	269
75A-4 (ser.#601)	349
75A-4 (ser.#4182)	449
Speaker (A1, A2, A3)	9
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32S-3 Xmtr	575
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312B-4 stn. control	149
516F-1 AC supply	75
516F-2 AC supply	115

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2B Receiver	$189
R-4A Receiver	299
R-4B Receiver	349
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SC-6 6m conv.	49
CPS-1 supply	12
CC-1 conv. console	19
TR-3 Transceiver	375
AC-3 AC supply	65
T-4X Xmtr	299
T-4XB Xmtr	379
TC-2 2m Xverter	225
TC-6 6m Xverter	175
2NT Xmtr	109
729SRD mike	9

EICO	
722 VFO	$ 34
730 Modulator	54
753 SSB Xcvr	129
751 AC supply	49
330 RF Sig. Gen.	49

ELMAC	
AF-68 Xmtr	$ 69
PMR-8 Receiver	79
PSR-612 DC supply	19

ESPAY	
R-366 Receiver	$195

GLOBE/GALAXY/WRL	
Scout 680 Xmtr	$ 34
PB-1 Booster	9
LA-1 Lin. Xmtr	69
DSB-100 SSB Xmtr	49
SR-175 SSB Xmtr	89
Galaxy V Xcvr	339
AC-35 AC supply	65
DC-35 DC supply	75
DC-384A DC supply	49
RF-550 wattmeter	59
DAC-35 dlx. console	75
VOX-III	9
DB-68 Preselector	29
R-530 Rec. w/8 extra filters	595
SC-530 Speaker	19
FM-210	139
AC-210 AC/DC booster	29

GONSET	
Comm I 6m	$ 69

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Comm IIB 2m	89
Comm IV 6m	169
GC-105 2m Xcvr	149
903A DC supply	39
910B 6m Xcvr	199
911A AC supply	39
Thin Pak	19
G-76 DC supply	59
G-77 Transmitter	45
GSB-201 Linear	199

HALLICRAFTERS	
S-38B Receiver	$ 39
SX-62 Receiver	189
SX-62A Receiver	225
SX-71 Receiver	99
SX-100 Receiver	139
SX-101 Mk III Rec.	149
SX-101A Receiver	199
SX-110 Receiver	99
SX-117 Receiver	199
SX-120 Receiver	49
SX-122 Receiver	175
SX-130 Receiver	149
SX-146 Receiver	179
S-200 Receiver	49
R-46 Speaker	9
R-47 Speaker	9
HA-19 Calibrator	12
HT-32 Transmitter	225
HT-32A Xmtr	249
HT-32B Xmtr	299
HT-37 Xmtr	199
HT-40 Transmitter	49
HT-44 Transmitter	219
HT-46 Transmitter	239
PS-150-120 AC sup.	75
MR-150 Rack	15
SR-400 Xcvr	595
SR-500 Xcvr	225
P-500AC AC supply	75
HA-5 VFO	49
HA-10 L.F. tuner	19

HAMMARLUND	
HQ-105TR Receiver/ CB transmitter	$119
HQ-110C Receiver	129
HQ-110AC Rec.	169
HQ-170 Receiver	169
HQ-170C Receiver	179
HQ-180C Receiver	239
HQ-180AC Rec.	349
HQ-205 Rec/CB x-mtr CB Transmitter	169 139
SP-600 Receiver	175
SP-600 JX-26	275

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HUNTER	
1000A Linear/sup.	$175
2000B Linear	275

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HR-20 Receiver	99
SB-300 Receiver	225
SB-301 Receiver	249
SB-310 SW Rec.	249
XC-6 6m conv.	25
SBA-400-4 6m conv.	19
DX-40 Transmitter	34
TX-1 Transmitter	115
SB-10 SSb adaptor	75
HX-10 Transmitter	189
HX-20 Transmitter	129
HX-30 6m Xmtr	175
SB-101 Xcvr	349
SB-110A 6m Xcvr	289
SB-400 Transmitter	225
SB-401 Transmitter	249
SB-200 Linear	219
SB-500 2m Xverter	149
SB-620 Scanalyzer	69
VF-1 VFO	17
HW-10 (Shawnee)	139
GP-11 DC supply	9
HW-16 Novice xcvr	99
HW-17A 2m Xcvr	125
HP-10 DC supply	24
HP-23 AC supply	45
HW-17-1 DC supply for HW-17A	24
HW-17-2 FM adaptor for HW-17A	19
UT-1 AC supply	24
HRA-10-1 calibrator	9
GR-78 Receiver	119
ID-22 elect. switch	25
GD-125 Q-Multiplier	12

JOHNSON	
Ranger I	$ 89
Valiant I	139
Pacemaker	139
Invader 2000	475
Courier Linear	139
6N2 VHF Xmtr	85

KNIGHT	
T-175 6/10m Lin	$ 59
TR-106 6m Xcvr	29

LAFAYETTE	
HA-460 6m Xcvr	$ 79
KT-320 Receiver	69

NATIONAL	
NC-66 Receiver	$ 39
NC-88 Receiver	69
NC-98 Receiver	79
NC-155 Receiver	99
NC-190 Receiver	139
NC-270 Receiver	195
NC-300 Receiver	139
NC-300-C6 6m conv.	39
HRO-60 Receiver	225
HRO Speaker	12
NTS-2 Speaker	14
NTS-3 Speaker	12
XCU-27 calibrator	15
XCU-300 calibrator	9
NCX-3 Xcvr	169
NCX-5 Mk II Xcvr	389
NCXA AC supply	75
200 Xcvr	239
AC-200 AC supply	69
NXC-500 Xcvr	299
AC-500 AC supply	69

P&H	
AFC-2 Compressor	$ 19
LA-400C Linear	99
2-150 SSB conv.	169

POLYTRONICS	
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PC-6 6m Xcvr	139

RME	
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VHF-126 conv.	99
VHF-602 Xmtr.	49
Clipper	9

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SB2-DCP Inverter	25
SBI-LA Linear	149
SBI-MIC mike	9
SB-34 Xcvr	279
SB2-LA Linear	189

SINGER	
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SWAN	
SW-240 (late) xcvr	$169
117AC AC supply	59
400 Xcvr (only)	169
400 Xcvr/420 VFO	259
350 (late) xcvr	289
SW-117C AC supply	75
500 Xcvr	339
117XC AC supply	80
14-117 DC supply	100
14C DC module	45
406 MARS xmtr.	39
270 Xcvr	325
NS-1 noise silencer	29
250C 6m Xcvr	225
TV-2 2m xverter	225
TV-3B xverter	249

TEMPO	
DC-ONE DC supply	$75

UTICA	
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PS-1500 supply	39

WATERS	
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369A Reflectometer	59

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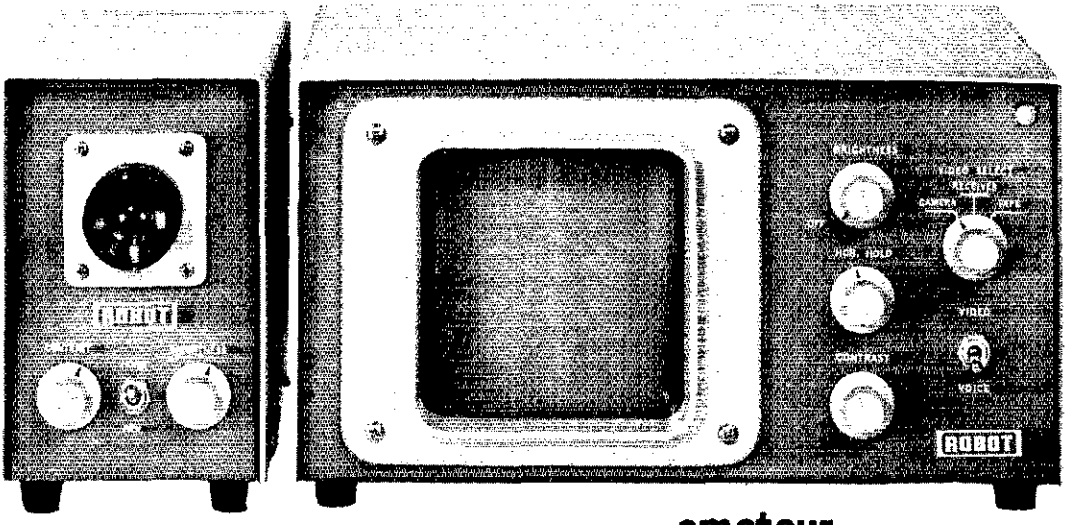

ROBOT

amateur slow scan television equipment

Ray Grenier, K9KHW, Mail Order Sales Manager at AMATEUR ELECTRONIC SUPPLY, says:

Activity on Slow Scan Television is growing every day. I was skeptical at first but I tried it and now I'm really hooked. Tune in around 14.230 MHz and listen to the boys (and some YL's, too) having a ball QSO'ing and swapping TV pictures world wide.

Robot Slow Scan equipment is the ultimate! It's so easy to use and is compatible with all modern SSB equipment. For more information on operation, trading your good clean used gear, or financing, write or call me at AMATEUR ELECTRONIC SUPPLY.

73 – CU on SSTV!

Ray, K9KHW

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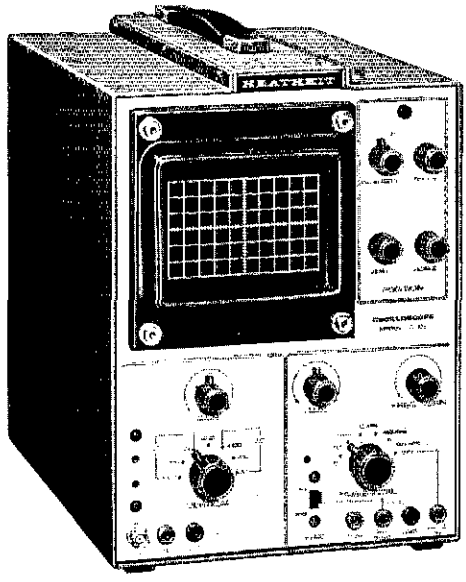
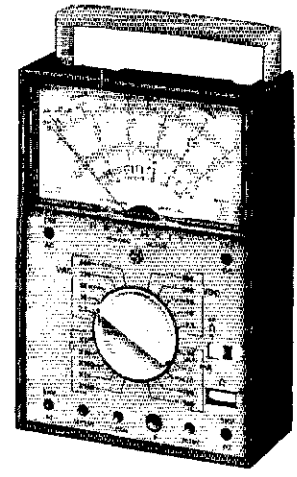




Order the new Heath IO-102 solid-state scope and the new IM-105 portable VOM

The new Heath IO-102 5" solid-state scope offers maximum performance at a price every ham can afford. Ideal for almost any job in the shack.

Wide DC – 5 MHz bandwidth, 80 ns rise time and high 30 mV/cm sensitivity make the IO-102 a truly high performance scope. AC or DC coupling adds extra convenience. Frequency compensated 3-position attenuator accommodates varying input levels. FET input minimizes circuit loading.

Five position time base. *A recurrent, automatic* sync type sweep generator provides 5 sweep ranges from 10 Hz to 500 kHz, variable between ranges. External horizontal and sync inputs. 1 volt P-P output for comparison against unknown voltages.

Additional high performance features include a type 5DEP1 CRT that provides a brilliant, easily-read trace even in high ambient light areas... 6x10 cm ruled graticule makes trace amplitude easy to determine. Horizontal and vertical amplifiers and sweep circuit are all operated from zener-regulated supplies, providing excellent display stability. All solid-state design, easy circuit board construction and modern styling round out the picture of the best value around in a rugged, low cost, versatile scope. Put the new Heath IO-102 in your shack now.

Kit IO-102, 29 lbs. **$119.95***
Assembled IOW-102, 31 lbs. **$179.95***

The new Heath IM-105 portable VOM... an extremely rugged, highly versatile instrument every ham needs.

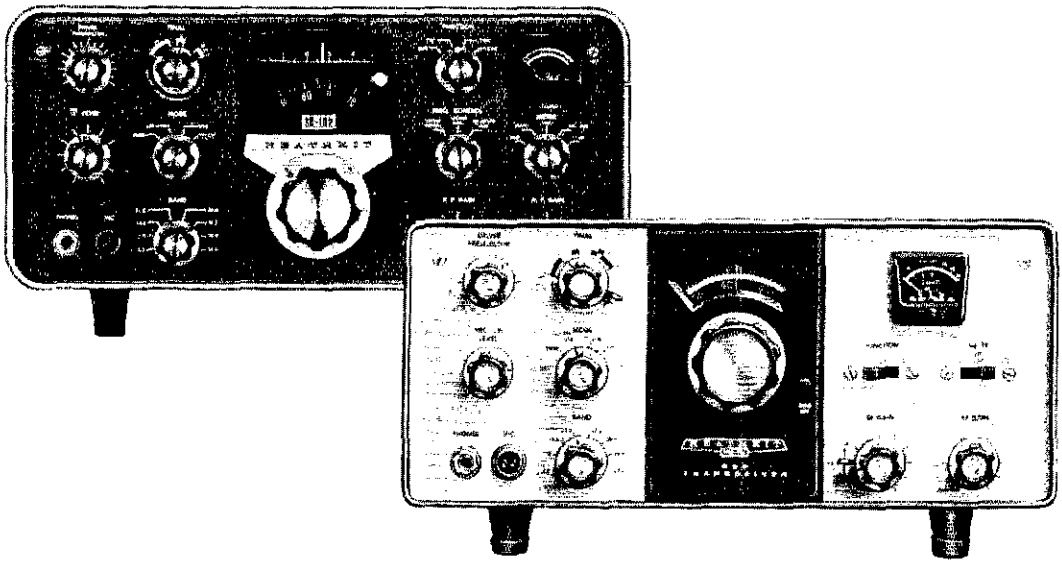
Ruggedized taut-band meter movement and high impact Lexan® case provide excellent immunity against shock. A fuse in-line with the input and diodes across the meter movement deliver extra insurance against both high intermittent and continuous overloads.

High accuracy. The IM-105 gives ±3% on all DC voltage and current ranges... ±4% on all AC ranges. A continuous rotation 20-position switch provides instant selection of any function and range... 8 DC volts ranges from 0.25 – 5000 V... 7 AC ranges from 2.5 to 5000 V... 6 DC current ranges from 0.05 mA to 10 A... 5 resistance ranges from x1 to x10 k with a center scale factor of 20. For audio measurements 5 dB ranges are available, −10 to +50 dB range.

Additional high performance features include separate high voltage & high current front panel inputs for 1 & 5 kV AC & DC, as well as a 10 amp DC current input... convenient DC polarity reversing switch... ohms zero adjustment... self-storing handle and easy circuit board construction. Put this versatile new meter to work in your shack soon.

Kit IM-105, 4 lbs. **$47.95***

How to get into top gear without paying top dollar:



Run with the performance/value leaders — Heathkit SB-102 or HW-101 transceivers!

Heathkit SB-102 SSB/CW Transceiver: $380!* Full 80-10 meter coverage with unequaled stability and dial linearity thanks to the all solid-state Linear Master Oscillator with 1 kHz calibration. The SB-102 stabilizes itself in half the time, tracks more accurately than any other rig on the market! The new receiver section delivers an S+N/N ratio of less than 0.35 uV for 10 dB. Front panel selection of built-in 2.1 kHz SSB crystal filter or optional 400 Hz crystal filter. And there's a dial resettable to 200 Hz; 180 watt PEP SSB input, 170 watts CW input; switch selection of upper or lower sideband and CW; built-in sidetone for monitoring; built-in 100 kHz crystal calibrator; Triple Action Level Control to reduce clipping and distortion; built-in VOX, and complete metering.

Fast, easy assembly! The incomparable SB-102 goes together with simple circuit board/wiring harness construction. Order your SB-102 today, and get on the air with the world's finest rig!

Kit SB-102, 24 lbs., mailable **380.00***
Kit SB-600, 8 ohm matching speaker with mounting space for AC supply, 7 lbs., mailable **19.95***
SBA-301-2, 400 Hz CW crystal filter, 1 lb., mailable **21.95***
Kit HP-23A, AC supply, 19 lbs., mailable **51.95***
Kit HP-13A, DC supply, 7 lbs., mailable **69.95***
SBA-100-1, mobile mount, 6 lbs., mailable ... **14.95***

Heathkit HW-101 80-10M Transceiver: 249.95!* Descended from the fantastically popular HW-100, the HW-101 has even more features and it costs a nickel less! The new receiver has sensitivity better than 0.35 uV for 10 dB S+N/N. Image and IF rejection are better than 50 dB. Ball-bearing dial drive, with 36-to-1 ratio, is coupled with a new preselector circuit and thermal stabilized FET VFO wth 5 kHz readout for solid, drift-free tuning. And there's front panel selection of SSB or optional CW crystal filter, too! Order yourself a Heathkit HW-101 now and join a growing family on the air!

Kit HW-101, 21 lbs., mailable **249.95***
Kit HS-24, mobile speaker, 4 lbs., mailable... **8.95***
GH-12A, push-to-talk & VOX microphone, 1 lb., mailable **8.95***
HDP-21A, grip-to-talk desk mike, 4 lbs., mailable **29.95***

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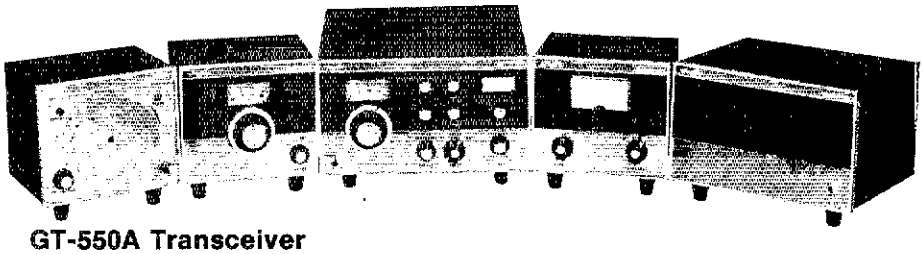

GT-550A Transceiver

- Unmatched dependability, flexibility and low cost
- Top performance either fixed station or mobile
- Higher power output than other popular transceivers available today
- Standard of the industry in frequency stability
- Outstanding receiver stability and selectivity
- Full line of accessories for integrated station capability

Order No. 855 Ham Net $495.00

RV-550A Remote VFO

- Solid-state construction
- Complete with plug-in cables
- Function switch controls Receive-Transceive-Transmit frequency independently

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RF-550A R.F. Console

- Contains precision wattmeter with top accuracy in range of 3.5/30.0 MHz
- Switch select forward or reflected power—calibrated scales are 400 and 4,000 watts full scale
- Switch select 5 antennas plus a dummy load

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RB-550A Rotator Control

- All new control head for Hy-Gain model 400 Rotor Brake Rotator
- Contains solid-state logic circuit to furnish electrical information for rotation and control of tower mounted rotator

Order No. 859 Ham Net $59.95

SC-550A Speaker Console

- Matching speaker with headphone jack for the transceiver, complete with cable
- AC-400 power supply mounts inside console

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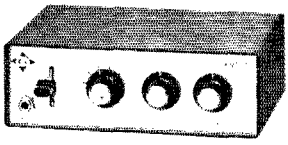
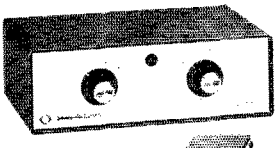
..Quality Equipment.....
GT-550A System

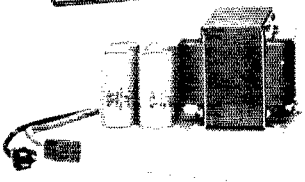
Phone Patch PR-550
Order No. 812 Ham Net $49.00



Crystal Controlled Adaptor XO-550
Order No. 811 Ham Net $49.00



AC Supply AC-400
Order No. 801 Ham Net $99.95



Mobile Supply G-1000DC
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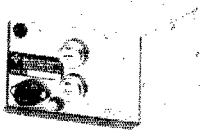
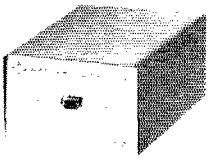


CW Filter F-3
Order No. 808 Ham Net $37.50



Calibrator CAL-250
Order No. 806 Ham Net $25.00

VOX Accessory VOX-35C
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Mobile Dashboard Mounting Bracket—GTM
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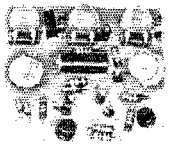
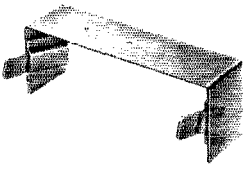


Floorboard Adaptor—ZZM (Not Shown)
Order No. 810 Ham Net $6.00



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Techs. WN5ENQ is a new member of the Springhill group. The La. Traffic Net has been organized and meets on 3915 kHz nightly at 0000 GMT with WA5TYJ as net mgr. The hurricane season is back with us. Are you prepared! WA5VQE has a new T-4XB. The entire La. gang wishes a speedy recovery for the XYL of W5CEZ. WB2UFG/5 won first place in the New Mex. QSO party. All net mgrs.: Please don't forget to register your nets with ARRL. Traffic: W5MI 200, WA5VQE 159, WA5WBZ 18, W5EA 10, W5CEZ 9.

MISSISSIPPI – SCM, Walker J. Coffey, W5NCB – SEC: WA5JWD. RMs: W5SBM, WA5TMC. PAMs: W5JHS, WA5KEY, K5MDX. The Jackson ARC voted to serve as EC for the Metro area; also voted to handle an Intruder Watch assignment. Nice going fellows. K5IKB is the new EC for Amory; WA5BNH is new EC for Jackson County. New hams include WN5BVO, WN5EJE, WN5EJB, WN5EJF, WN5EIN, WN5EIO, WN5EJX, WN5EKA. WA5TMC got out a nice net bulletin on the Miss. Novice Net. Appointments: W5EDT as ORS and OPS; WA5WQT, WA5ECL, K5IKB and WA5BNH as OPSs. The Aberdeen ARC is on the ARRL Club Honor Roll. WA5YJA is the proud owner of an Extra Class ticket. K5MDX reports working a new one ET3ZU/A. WA5YZW has offered to help with the Novice Net. WB5DVD sent us a fine report of 6-meter activity in May. W5SBM made PSHR again.

Net	*kHz*	*Time(Z)/Days*	*Mgr.*
MNN	3733	2300 MWF	WA5TMC
GCSBN	3925	2330 Dy	W5JHS
MTTN	3665	2345 Dy	W5SBM
MSBN	3990	0015 Dy	WA5UYW
CGCHN	3935	0100 Dy	W5OEB

Traffic: W5SBM 269, WA5YZW 102, W5EDT 82, W5NCB 39, W5WZ 36, W5BW 7, WA5KYB 6, W5PDG 6, W5RUB 6, K5MDX 4.

TENNESSEE – SCM, Harry A. Phillips, K4RCT – SEC: WB4ANX. PAMs: W4PFP, WA4EWW.

Net	*Freq.*	*Time(Z)/Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
TSSB	3980	2330 M-S	27	1719	113	
TPN	3980	1145 M-F 1300 S-Su	31	1583	79	W4PFP
ETPN	3980	1040 M-F	21	600	18	WA4EWW
TPON	3980	2330 Su				WB4BHZ
TN	3635	0000 Dy				
ETVHF	145.2		8	37		WB4IOB
ETVHF	50.4		13	155	2	WB4IOB
MTTM	28.8	0200 T&F	9	98	5	WA4GIS

This will be my last report as SCM for Tenn. I want to thank the many people who have helped amateur activities by doing the various jobs that must be done. The Tenn. Council of ARC is to be congratulated for their work in bringing the clubs together in a common bond. I hope to remain active on the nets and other activities as time permits. The Murfreesboro Hi RC has started the Middle Tn. Pi-Net on 28.7 Wed. and Fri. W4ZJY has completed his antenna installation. EC K4LQO reports plans for a new repeater in the Knoxville area. Traffic: W4OGG 140, W4RUW 75, W4ZJY 37, WB4ANX 33, WA4GLS 33, WB4HMA 29, WB4FVM 28, W4PFP 12, K4LQO 11, WB4MPJ 6, K4UMW 5, W4SGI 1.

GREAT LAKES DIVISION

KENTUCKY – SCM, Ted H. Huddle, W4CID – SEC: K4YZU. Appointed: W4EWM and K4FLT as ECs; WB4AUN as OPS; K4KSC as OVS. Endorsed: K4YCB, K4YZU, WB4EOR and WA4MXD as OPSs; W4OYI, WB4FDK and WB4KPE as ORSs; WA4GHQ as PAM; K4YZU as SEC.

Net	*QNI*	*QTC*	*Net*	*QNI*	*QTC*
KRN	357	24	KYN	212	204
MKPN	585	80	FCATN	41	4
KTN	1041	198	KPON	96	36

K4GGI from Maysville is now at MIT and using W1QXX while doing his vhf and uhf work. The Prestonsburg Hamfest was revived this year and was a big success. Orchids to WB4KUC for his work in bringing this one back. New officers of the Blue Grass ARC are WA4RCD, pres.; WA4CXJ, veep; W4TPD, secy.-treas. The club is planning a ham picnic this summer in addition to their regular Sept. Hamfest. KYN has dropped its early session during the summer months. Many thanks to retiring ECs WA4FMY and K4KZH for jobs well done. Traffic: WA4MKH 311, WA4DYL 85, W4OYI 80, K4MAN 67, WA4VZZ 57, WB4EOR 51, WB4AUN 48, K4UNW 44, WN4PSJ 43, WA4AGH 38, K4TRT 34, WA4MXD 33, K4AVX 32, WA4GHQ 26, WA4ENH 19, WB4LIL 16, WA4WQZ 16, WA4AVV 6, WA4FAF 6, W4OXM 5, K4QHZ 5, WN4UGH 2. Total: 1024. Reports: 28.

MICHIGAN – SCM, Ivory J. Olinghouse, W8ZBT – SEC: W8MPD. RMs: WA8PIM, W8RTN, W8WVL, K8KMQ, WB8DTT. PAMs: WA8TAN, K8MJK, K8PVC. VHF PAMs: W8CVQ, K8AEM.

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speaker optional

SX-190 SWL RECEIVER
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Sold only by Allied Radio Shack

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THE SX-190. 80 meters, 49 meters, 40 meters, 31 meters, 25 meters, 20 meters, 19 meters, 16 meters, 11 meters, plus two 500 kHz bands (crystals extra) between 3.5-10 MHz.

THE AX-190. 80 meters, 40 meters, 20 meters, WWV (15 MHz), 15 meters, 11 meters, 10 meters in 4 bands, plus one 500 kHz band (crystal extra) between 3.5-10 MHz.

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*Include all Sales Taxes if applicable where you live

Net	*Freq.*	*Time/Days*	*QNI*	*QTC*	*Sess.*	*Mgr.*
QMN	3663	2300 Dy	1029	361	93	WA8PIM
WSSB	3935	0000 Dy	805	112	31	K8PVC
BR/MEN	3930	2230 S-F	861	49	26	WA8TAN
UPEN	3920	2230 Dy	402	27	28	K8MJK
GLETN	3932	0130 Dy	836	86	31	K8PVC
PON-Ph	3955	1600 Dy	710	253	31	K8LNE
PON-CW	3645	0000 M-F	186	18	27	K8LNE
M1.6M	50.7	0000 M-S	194	19	21	WA8LRC

I regret to report WA8ENV as a Silent Key. The CARS station in Burmingham for Michigan Week, WM8ICH did a very good job. Made over 2000 contacts, all states and 61 countries. W8KBI is getting out real good with SSTV. Hazel Park ARC graduated 58 pupils from its code and theory class and are starting a new class. K8PSL now has an "A" ticket. WB8DRC received his General Class. WB8ICX made General and is putting up a new quad. WB8JRY moved to Escanaba. WAØFEW now is a DJ at the Escanaba Radio station. WA8HJR is on 6 again after the loss of his beam in the big wind. WB8DUK now has 43 QNI on the Catalpa 2-meter net. W8CQ is having a lot of fun on 2-meters. WA8MJT has new HR-2 transceiver and is busy on fm. K8SKZ has new Swan Cygnet. K8SHX has a new Collins 7551. WB8HGP has a new Rhon tower. WA8CGB is using a new eleven-element 2-meter beam. WB8CNW has new TR-4 on the air. WA8GJD is using a new linear amplifier. K8TNZ has a new Tri-bander. WB8AKY has a big signal with the new SB-220. K8QHA is using a new HW-101. WB8JRY has a fine signal with the new rig. W8ZUL has a new 2-meter transceiver. W8ZMI is on 3997 every night for a ragchew. K8MJK is having a hard time operating, he spends all his time selling tickets for the U.P. Hamfest raffle. WA8OIK is active again after a hard winter. W8ATB and W8QBO are back from Fla. and on the air from Flint. WB8BYB got a new drive system for the HW-100 before Field Day. The St. Clair Co. emergency net meets every Tue. on 145.26 at 0001Z and reports 54 check-ins and five formal messages for Apr. This net has a record of continuous operation for over eight years. The Mich. PO Net amateur of the month for May is WA8ZDE. ARABSS is a new club at Berrien Springs. Traffic: (May) WA8YVR 249, K8KMQ 234, WA8WZF 230, WA8PIM 187, K8LNE 168, K8PVC 104, WA8LXY 94, W8NOH 82, WA8GBG 79, W8KBZ 78, W8FZ 74, K8ZJU 74, W8SH 73, W8DCN 72, W8ZBT 70, WA8TAN 62, W8JYA 60, WA8ONZ 56, W8MO 46, WB8DTT 40, K8DYI 40, WB8EEU 40, WA8ENW 36, W8EU 35, W8WVL 35, W8RTN 34, W8BJAJ 24, WA9WYI/8 22, WA8ZDE 22, W8IUC 19, WA8OJI 19, WB8AXI 17, WB8ETB 14, W8FX 14, W8UFS 14, K8IHA 13, WB8ANR 12, W8BEZ 10, WB8BYB 10, K8JFD 10, W8QBF 10, WA8CUP 8, W8VXM 8, WB8ANR 7, WB8BJJ 6, WB8BJP 6, W8VIZ 6, K8AEM 5, WA8WVV 5, WA8ZPF 3, W8AGQ 2, WB8AMH 2, WB8DKQ 2, WB4JFZ/8 2, (Apr.) W8IZ 95, W8KBZ 63, WB8BJJ 27, WB8JAJ 6.

OHIO – SCM, Richard A. Egbert, W8ETU – SEC: W8OUU, RM: W8IMI, PAM: K8UBK. VHF PAM: WA8ADU. May section net reports:

Net	*QNI*	*QTC*	*Sess.*	*Freq.*	*Time(Z)*	*Mgr.*
OSSBN	2247	827	63	3972.5	1430/2245	K8UBK
BN	562	348	62	3580	0200/2300	W8IMI
O6MtrN	529	51	62	50.61	2300	WA8ADU
				50.16	0100	
OSN	104	30	30	3580	2225	WA8WAK
BN RTTY	195	78	31	3605	2200	WA8YUB

W8QCU, K8ONA, WA8VKF and W8TEL made BPL in May. Section Net Certificates for regular participation went to W8DIB, WB8DZW, WB8EWK, WA8IJD, K8IOW, WA8IDM, WA8JEH, WA8PFC, WA8SSI, WA8VWH and WA8WPO of the Ohio Six Meter Net. RM W8IMI and the Buckeye Net invite all traffic-minded amateurs to attend the Fourth Annual Traffic Nets Picnic Sun. Aug. 15. Details from W8IMI. The Case ARC elected the following new officers: WA3BGE, pres.; WA8RXM, vice-pres.; WA3MSZ, secy.; WA8WCO, treas. Longtime DXer W8WZ was presented with a certificate at the Columbus ARA's DX night meeting, commemorating his 52 years of amateur operation under the same call. Springfield ARC's new call is W8OG, former call of charter member Don Ream. I had the pleasure of attending the YLRL Midwest Convention in Cleveland which was put on by the Buckeye Belles and the Chix on Six. OVSs WA8VBK, WB8BOK and K8TUT reported numerous good openings on 6-meters in May. The Central Ohio AREC provided communications for the annual Scioto Valley Bicycle Trip over a two day period in May. They covered the course from Columbus to Portsmouth. WB8BOK is a new OVS, K8EHE a new OPS and K8BPX a new ORS. K8WHX now is K4FSX in Gainesville, Fla. and K8HBR now signs K4ERM in Clearwater, Fla. We regret to report that W8HR has joined Silent Keys. Toledo area's Ham Shack Gossip salutes "Ham of the Month" W8RZQ who has served the area as TVI committee chairman for 15 years. EC K8ONV reports that she's been invited by a Sandusky radio station to make a taped interview on how

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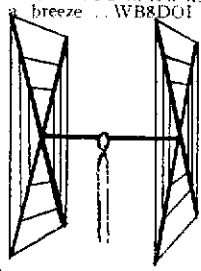
made ordinary, everyday, run-of-the-mill antennas. No, no, no. We make winners through superior materials and design. WA1JFG won the New England Round-Up championship with our 3-element 15-meter beam by a margin of 5,982 points! In QST since '53.

QUADS

Totally satisfied with quad. Worked DK4VJP, SM7DLH, XE1AB, DM4SEE, FL8SR, F6AUM, HK7YB in few hours. Instructions a breeze . . WB8DOI



CUBICAL QUAD ANTENNAS— these two element beams have a full wavelength driven element and a reflector(the gain is equal to that of a three element beam and the directivity appears to us to be exceptional! ALL METAL (except the insulators) — absolutely no bamboo. Complete with boom, aluminum alloy spreaders; sturdy, universal-type beam mount; uses single 52 ohm coaxial feed; no stubs or matching devices needed; full instruction for the simple one-man assembly and installation are included; this is a foolproof beam that always works with exceptional results. The cubical quad is the antenna used by the DX champs, and it will do a wonderful job for you!

10/15/20 CUBICAL QUAD SPECIFICATIONS

Elements: A full wavelength driven element and reflector for each band.

Frequencies: 14-14.4 Mc.; 21-21.45 Mc., 28-29.7 Mc.

Dimensions: About 16' square

Power Rating: 5 KW.

Operation Mode: All.

SWR: 1.05:1 at resonance.

Boom: 10' × 1¼" OD, 18 gauge steel, double plated, gold color.

Beam Mount: Square aluminum alloy plate, with four steel U-bolt assemblies. Will support 100 lbs.; universal polarization.

Radiating elements: Aluminum wire, tempered and plated, .064" diameter.

X Frameworks: Two 12' × 1" OD aluminum 'hi-strength' alloy tubing, with telescoping ⅞" OD tubing and dowel insulator. Plated hose clamps on telescoping sections.

Radiator Terminals: Cinch-Jones two-terminal fittings.

Feedline: (not furnished) Single 52 ohm coaxial cable.

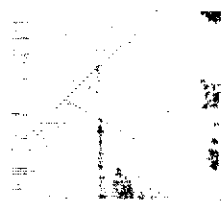
Now check these startling prices — note that they are much lower than even the bamboo-type:

10-15-20 CUBICAL QUAD	$37.00
10-15 CUBICAL QUAD	32.00
15-20 CUBICAL QUAD	34.00
TWENTY METER CUBICAL QUAD	27.00
FIFTEEN METER CUBICAL QUAD	26.00
TEN METER CUBICAL QUAD	25.00

(all use single coax feedline)

BEAMS

"Just a note to let you know that as a Novice, your 3-El. 15 Beam got me R1 Section Winner and New England Division Leader in Novice Round-up. See June QST, p. 57 for picture of ant. (below). Tnx for a fine working piece of gear. 73s, Jay, WA1JFG"



Compare the performance, value, and price of the following beams and you will see that this offer is unprecedented in radio history! Each beam is brand new! full size (36' of tubing for each 20 meter element for instance); absolutely complete including a boom and all hardware; uses a single 52 or 72 ohm coaxial feedline; the SWR is 1:1; easily handles 5 KW; ⅞" and 1" aluminum alloy tubing is employed for maximum strength and low wind loading; all beams are adjustable to any frequency in the band.

2 El 20	$21	4 El 10	$20
3 El 20	27*	7 El 10	34*
4 El 20	34*	4 El 6	20
2 El 15	17	8 El 6	30*
3 El 15	21	12 El 2	27*
4 El 15	27*	*20-ft. boom	
5 El 15	30*		

ALL-BAND VERTICALS

"All band vertical!" asked one skeptic. "Twenty meters is murder these days. Let's see you make a contact on twenty meter phone with low power!" So K4KXR switched to twenty, using a V80 antenna and 35 watts AM. Here is a small portion of the stations he worked: VE3FAZ, TI2FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2-FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1-MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2-KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! **Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1-LC, PY5ASN,FG7XT, XE2I, KP4-AQL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!**

V40 vertical for 40, 20, 15, 10, 6 meters $14.95

V80 vertical for 80, 75, 40, 20, 15, 10, 6 meters $16.95

V160 vertical for 160, 80, 75, 40, 20, 15, 10, 6 meters . . . $18.95

How to order: Send money order only (bank, store, or United States) in full.

We ship immediately by REA Express, charges collect. *DEALERS WRITE!*

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amateur radio functions in the area during emergency situations. Al those seriously interested in emergency communications should b sure to read and re-read "After Shocks" in the June *QST*. Don' forget the Ohio QSO Party on Aug. 7, 8. Traffic: WA8ETX 374 W8OCU 265, K8ONA 257, WA8DWL 218, WA8ETW 215, W8IM 187, K8BPX 182, WA8VKF 173, W8LT 163, W8CUT 159, W8MOK 159, W8TEL 140, W8PMJ 139, WB8GED 136, W8QXQ 136 WA8WAK 125, WA8SED 117, W0AVS/8 105, W8JMD 100 WA8UPI 95, K8QYR 85, K8LGA 77, WB8ALU 75, W8GVX 74 K8UBK 71, WB8FNC 67, WA8HGH 64, WB8DHY 60, WA8NOC 59, WB8CWD 55, WA8QFK 45, WA8VWH 41, W8QE 38, W8BHI 37, W8UX 36, W8ERD 33, WB8GVI 33, K8FHE 32, WA8WPQ 32 W8JD 31, WA8FCQ 30, W8FGD 30, W8UDG 26, W8ETU 25 WB8BLH 24, K8BYR 24, WA8ZTV 24, WA8ADU 23, WA8MIH 23 WA8ZUK 23, WA8ULF 22, WB8AYC 21, WB8DEA 21, WB8AJC 20, WA8JEH 19, K8DHJ 18, W8GOE 17, WB8FXD 16, WB8EEZ 15, W8NAL 15, WA8YIB 14, W8ARW 11, W8GTS 11, W8BZX 10 W8LAG 10, W8TV 10, WA8ZYE 10, WA8SHP 9, W8GRG 8 W8UPD 8, WA8FSX 6, WA8STX 6, WA8TYF 6, WB8DQV 4 WB8DZU 4, WA8MCR 4, W8OUU 4, K8PBE 4, WA8VNU 4 WB8AZN 1, K8CKY 1, WB8CQC 1, WB8DNZ 1, WB8EHI 1 WB8FWX 1, K8RXD 1.

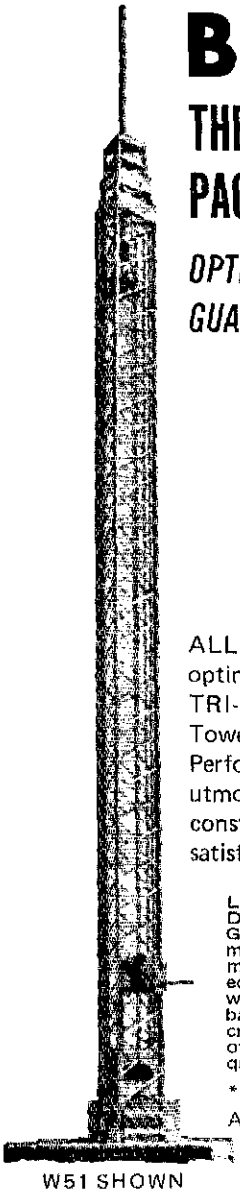
HUDSON DIVISION

EASTERN NEW YORK – SCM, Graham G. Berry, K2SJN – Asst. SCM/PAM: Kenneth Kroth, WB2VJB. SEC: W2URP. RM WA2VYS. VHF PAM: WB2YQU. Nets: ESS 2300Z daily, 3.590 NYS 0001Z and 0300Z daily, 3.675; NYSPT&EN 2300Z daily 3.925; NY County Net 1400Z Sun., 0045Z Tue.-Fri., 3.677 NYPON 2145Z daily, 3.912. To all service-minded section mem bers: W2URP is now in the process of reorganizing AREC for th section. County ECs now active are: Schenectady W2PKY, Alban WA2EAH, Rensselaer WA2SRW, Ulster WA2WGS, Westcheste WA2JWL. ECs needed in the rest of the counties as of press time ar Columbia, Greene, Dutchess, Orange, Rockland, Putnam. Volun teers please contact *W2URP* or SCM. Appointments and renewals K2DN, WA2VLS as ORSs; K2DNR, K2CBA and WB2SIH as OVSs On the club circuit: Albany heard a report from Motorola on in equipment; RPI Club (W2SZ) held an auction in May. The 188 Westchester Club is a new ARRL affiliate, welcome aboard Schenectady ARA elected WA2WFI, pres.; WB2VJC, vice-pres K2YGI, secy.; WB2HNW, treas.; K2HYO, WA2BLC, WA2JJN an *WB2VJB, dir. At Harmonic Hills, W2KGV described the Arecib* Observatory. The Communications Club of New Rochelle heard Ir Strauber of Swan; W2TUK and K2SJO were at the May meeting o the Crystal ARC. The Westchester ARA visited ARRL Ho Individual station activities: WA2FBI and WA2FIQ are teachin general theory for LERA ARC classes; W2IB and K2SJN ditto i New Rochelle; K2DLD is making news with classes for 6th grader for the 4th year at Euclid School, Schenectady. W2ODC, K2DLD W2IR and many others are manning the Schenectady Museur station May through Sept. WA2VEG got the last card for DXCC 25 and WAZ – worth waiting for. With the new club season about t start, secy.'s be sure SCM and asst. SCM are on mailing list fo bulletins. Traffic: WA2VYT 149, WA2FBI 116, WA2VLS 104 WA2VYS 61, WA2HHO 59, WB2IXW 56, W2URP 53, WB2VJB 45 WB2FUV 38, WB2KDC 31, WA2FIQ 21, K2SJN 21, WA2EAH 10 W2ANV 8.

NEW YORK CITY AND LONG ISLAND – SCM, Fred Brunjes, K2DGI – SEC: K2OVN. RM: K2UAT. HF PAM WA2UWA. VHF PAM: WB2ROF.

NLI*	3630 kHz	1919/2200 Nightly	WB2TUL Mg
NLI VHF*	145.8 MHz	1900 MTWTF	WB2ROF PA
NLI Phone*	3925 kHz	1600 Dy	WA2UWA PA
Clear House	3925 kHz	1100 Dy	WA2GPT Mg
Mic Farad	3925 kHz	1300 Ex. Su	
East U.S.	3685 kHz	0001 Nightly	
All Svc.	3925 kHz	1300 Dy	W2OE Mg
NYSPTEN	3925 kHz	1800 Dy	WB2HLV Mg

*Section nets: All times are local DST. It's my pleasure to repo that WN2BDB, WN2BDA, WN2QPU and WN2SAL are now active the section. Please note change in OBS schedule of WB2HWI: Sa Sun. and Thurs. at 2330Z on 7052 kHz. WB2WFJ reports enjoyin his efforts working with the Fresh Air Fund of Greater New Yor K2AAS now is camped out in Lost Wages, Nev. Keep an ear out f him! W2PF reports he now has a shiney new tri-band antenn system to work the world. It appears that the interest in hidd transmitter hunts is not dead yet! The Larkfield ARC and Nass 10-meter AREC/CD groups are bringing avid hunters out on regular basis to keep the 10-meter activity alive around these par Attention all appointees: Is your appointment up to date? If no and if you still desire an appointment, get those cards, letters a



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LAE MW35 "STANDARD" Package
(Free Standing Crank-Up Tower 9.5 Sq. Ft. - 50 MPH)
CDR AR-22R Rotator*
100 ft. RG-58A/U Coax
100 ft. 4 Cond. rotor cable
Complete with one of the following antennas:

HY-GAIN TH2MK3	**$259**
HY-GAIN TH3JR	**$259**
HY-GAIN DB10-15A	**$265**
HY-GAIN HY QUAD	**$280**
HY-GAIN TH3MK3	**$290**
*TR-44 rotor w/cable add:	**$ 30**
HAM-M rotor w/cable add:	**$ 60**

LAE W51 "DELUXE" Antenna Package
(Free Standing, 9 Sq. Ft. - 50 MPH)
CDR TR-44 rotor*
100 ft. RG58A/U coax cable
100 ft. control cable
Complete with one of the following antennas:

HY-GAIN DB10-15A	**$575**
HY-GAIN HY QUAD	**$590**
HY-GAIN 204BA	**$610**
HY-GAIN TH3MK3	**$610**
HY-GAIN TH6DXX	**$635**

Free stdg. base incld. NO/CHARGE
*HAM-M rotor w/RG8/U add: **$ 40**

LAE LM354 "SUPER" Antenna Package
(16 Sq. Ft. - 60 MPH)
CDR HAM-M Rotor
100 ft. RG8/U coax cable
100 ft. control cable
Complete with one of the following antennas:

HY-GAIN TH3MK3	**$735**
HY-GAIN 204BA	**$740**
HY-GAIN TH6DXX	**$765**

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certificates in to your SCM (*QST* p. 6) post haste. It's appointees' responsibility to maintain his appointment (including ARRL membership) and to report station activity to his SCM to fulfill part of appointment requirements; failure to do so may result in cancellation of appointment(s). I would like to thank WB2AQC (ex-VO2BO) for the fine job he is doing for visiting foreign amateurs to our area. George operates a Welcoming Center for hams visiting this area which is very successfull. If interested in this operation, please contact WB2AQC, George Pataki, 34-24 76th St., Jackson Heights, N.Y. 11372. The XYL of WB2AQC passed her General Class exam and should have her call by next report. I am compiling a list of active radio clubs in the NLI section for the benefit of those individuals who desire an answer to "where is there a club that I can join?" and also to the clubs who ask "how can we get new members." Please forward information regarding the date/time, meeting place, any special information on your club so I may include it in this column from time to time as space permits, and that I may have it on file for those who may desire information. Operating note: Traffic for the SCM of NLI may be delivered via the VHF Traffic Net or direct on most of the fm channels in our area. Traffic: WB2LZN 192, WB2UFG 169, WA2HOP 84, WA2CIS 69, WB2LGA 69, W2DBQ 25, W2LGK 21, WB2WFJ 18, W2EC 16, K2AAS 12, WA2LJS 8, W2PF 5, WB2HWI 2.

NORTHERN NEW JERSEY – SCM, Louis J. Amoroso, W2ZZ – SEC: K2KDQ. RM: WA2BAN and WA2TAF. PAMs: K2KDQ, K2SGX and WA2TAF. ARPSC section net schedules:

Net	*kHz*	*Time (PM)*	*Days*	*Sess.*	*QNI*	*Tfc.*	*Mgr*
NJN	3695	7:00	Dy	31	498	250	WA2BAN
NJN	3695	10:00	Dy	31	293	101	WA2BAN
NJSN	3740	8:00	Dy	31	111	42	WA2FVH
NJEPTN	3950	6:00	M-S	31	652	157	WA2TAF
NJAN	50425	8:00	M-F				K2SGX
PVETN	145710	7:30	Dy	31	115	70	WA2JNO
ECTN	145800	8:30	M-S	27	110	58	WB2LTW

Endorsements: K2EQP as ORS. New club officers for the K2MFF group are WB2WIG, pres.; WA2IOC, vice-pres.; WB2DBK, rec. secy.; WA2LCH, corr. secy.; WN2RRH, treas. Good luck to all. W2QPN now is W2LA. Recent graduates include WA2FUI from NCE, WB2TUL from NYU and WA2UOO from American U in Wash., D.C. Congratulation and its nice to have you back. WA2JNQ, editor of the PVTEN bfurb did an FB job with his first issue. WB2AEH put a new beam up on his Hilltop house. WB2LTR is mobile with a Swan 270 and 55-B antenna. W2CVW was in the recent USSR contest. WB2NOM plans to attend American U in the fall. WB2FEH is going to Calif. Tech. K2CBG has a new TR-22 fm rig. WA2BCT moved to W6-Land. W2LT is on 80 RTTY with a Twin-City TU and a Mainline shifter. We ask all stations who participated in the NJ QSO Party to send in their logs. We need them for checking. Can all 21 counties show up? The Bergen County FM Assn. received good publicity after they provided communications for a recent Walk for Hunger March sponsored by the "Freedom from Hunger Foundation". We would like to hear from more of the clubs in our section. W2ZZ will be on vacation during the last three weeks of Aug. This is your space so let's hear from more of you. Traffic: WA2BAN 495, WB2DDQ 185, WB2LTW 168, WB2VPR 160, WB2NOM 124, WB2TUL 119, WB2AEH 100, K2RXQ 87, WA2JIM 75, WA2FVH 71, WA2JNQ 57, K2MFF 51, WA2JNO 43, W2CU 39, WA2EPI 38, WA2YXQ 38, WA2CAK 32, W2ZEP 32, WB2NSV 29, WA2CCF 20, W2EWZ 20, W2ZZ 19, K2DQT 18, WA2UOO 13, WA2FUI 12, K2OOJ 6, K2CBG 4, W2CVW 4, WA2DMF 2, WA2LDX 2, K2ZF 2.

MIDWEST DIVISION

IOWA – SCM, Al Culbert, KØYVU – SEC: KØLVB. A new Charles City ham is WNØEWN. The North Iowa ARC May meeting was held at Waseca, Minn. where as the guests of the Viking ARC they toured the F.F. Johnson Co. facilities. Perhaps those of you holding EC appointments have been wondering why your certificates have not been endorsed for 1971. Our SEC has been very busy working out an acceptable marriage between the AREC and RACES in Iowa which became effective July 1 and provides that the leadership positions of both organizations shall be identical. The RACES name shall be the surviving name. KØLVB will be both the SEC and the State RO. We believe that this new organization will be unique and that it will provide the flexibility of the AREC along with the official backing of the Iowa Office of CD. The system will utilize 30 zones as opposed to 99 counties for jurisdictional purposes. The top man in each of these zones will be referred to as an ECRO and he will hold simultaneous appointments from the AREC and RACES, and will be able to have assistants as necessary. We are most pleased with the support we have received from the state officials on this project, and ask for your support in making

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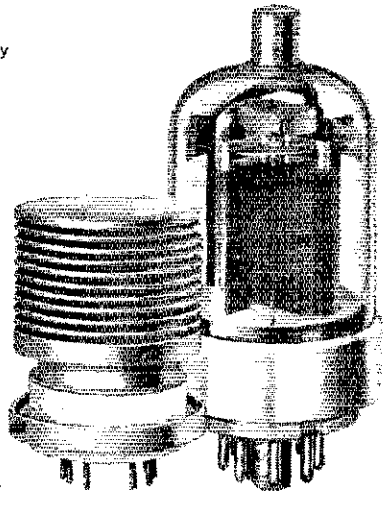

RCA

this project a credit to the amateurs of Iowa. I hope to see you all at Marshalltown on Aug. 15 for the 75-meter picnic. Net traffic: Ia Fone (noon) QNI 1424, QTC 92; Ia Fone (eve.) QNI 1167, QTC 91; TLCN (ew) QNI 145, QTC 57. Traffic: WØLCX 514, WAØAUX 96, KØDDA 61, KØAZJ 54, WAØVZH 47, WØMOQ 44, KØJGI 25, WØBW 8, WAØDAG 8, WBØAAM 4.

KANSAS – SCM, Robert M. Summers, KØBXF – SEC: KØLPE. PAMs: KØJMF, KØENU. RMs: KØMRI, WAØTZK. VHF PAMs: WAØCCW, WAØTRO. WAØLLC reports something new in a Kansas Weather Man of the Month in the form of female, WAØJSL, Mary. Congratulations! KØGZP lost an antenna again because of storms. Zone 1 AREC Nets: 75-meter QNI 78, QTC 6; 2-meter QNI 119, QTC 6 in 4 sessions each. Zone 6A reports 5 regular sessions of AREC Net activity plus two tornado watches and a long service of Wx watches. Zone 11 75-meter net in 4 sessions had QNI 49 with QTC 6. Zone 12 and 15A also report good QNI into AREC Nets but had no QTC. AREC standings as of June 1 are 531 members with 36 active nets. Our goal for this time next year is 1000 members. KØAYO is looking for a Colo. QSO to complete his SSB-WAS on 10-meters. WØHI reports Kansas hams topped the list in most QNI to Tenth Regional Net in May. The cw gang is doing a real fine job of Public Service in traffic handling. WAØCTP recently joined the list of Silent Keys. New appointment: WØBLI as EC Zone 2. The Kansas Net Picnic at Wilson was attended by 46 hams and their families. All are looking forward to meeting more of the gang next year. The Douglas County ARC, Lawrence, Ks. and the Heights (HS) ARC, Wichita have become affiliated with the League. Net reports: KEC – 2 sessions, QNI 30, QTC 0. KWN – 31 sessions, QNI 654, QTC 13. KSBN – 26 sessions, QNI 1039, QTC 100. KPN – 13 sessions, QNI 228, QTC 21. QKS – 62 sessions, QNI 476, QTC 159. HBN – 21 sessions, QNI 506, QTC 43. Mid States Monitor – QTC 83, phone calls 53. QNI 1042, fixed stations 154 mobiles in 123 hours. Traffic: WØNH 272, WØHI 183, KØMRI 168, WAØJEC 73, WØGCJ 54, KØBXF 44, WAØRCZ 36, WØFCL 35, KØJMF 35, KØLPE 25, WAØLLC 24, WØCHJ 22, WØGUR 17, KØGII 16, WØPB 15, WØBGX 12, KØGZP 8, WAØOZP 5, WØRDJ 4, WAØOWH 4.

MISSOURI – SCM, Robert J. Peavler, WØBV – SEC: WØENW. New appointments: WAØDHR as EC for Adair County, WØQMF as EC for Cape Girardeau County, KØRPH as EC for Cole County, WAØTAA as EC for Clark County. Appointments renewed: WØENW as SEC, WØOUD as ORS. It is with deep regret I report KØRCL and KØØHUO as Silent Keys. Net reports:

Net	*Freq.*	*Time(Z)/Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MoPON	3963	2200 M-S	27	544	58	WAØTAA
MEN	3963	2230 MWF	13	183	8	KØKUD
MoSSB	3963	2300 M-S	27	1278	70	WØRTO
MON	3585	0000 Dy	31	134	77	KØAEM
MON2	3585	0245 Dy	31	142	90	WØHH
PHD	50.45	0030 T	5	126	9	WAØKUH

Stations with traffic for Missouri have a good chance of finding a Missouri station on 3963 or 3585 kHz. My thanks to WØOUD and WØHH for monitoring 3585 kHz during the tornado season. On May 5 a tornado struck Joplin and Marceline. Many Mo. amateurs took part in handling emergency traffic into and out of the area. Look for report by WØENW. Congratulations to: WØRDF, who now has call WØNL; to WNØBOR and WNØYPL, who passed the General Class exam; and to new Novices WNØDVA and WNØDVB. Traffic: WØHH 283, KØONK 209, KØAEM 133, WØOUD 79, WØBV 78, WAØHTN 62, WA4OWY/Ø 18, WAØKUH 10, WØGBJ 8, WØBVL 3.

NEBRASKA – SCM, V.A. Cashon, KØOAL – Asst. SCM: Velma Sayer, WAØGHZ. SEC: KØODF. Appointment: WØTQD as RM. Renewed appointments: KØODF as SEC, WØDMY as ORS and WØFQB as OPS. May net reports:

Net	*Freq.*	*GMT/Days*	*QNI*	*QTC*	*Mgr.*
NSN I	3982	0030 Dy	881	25	WAØLOY
NEB	3590	0300 Dy	146	23	WØTQD
NMN	3982	1230 Dy	1200	30	WAØIUF
WNN	3950	1300 M-S	529	22	WØNIK
AREC	3982	1330 Su	222	2	WØIRZ
CHN	3980	1730 Dy	1364	48	WAØGHZ
DEN	3980	2000 M-F	231	5	WAØAUX
NSN II	3982	2330 Dy	832	14	WAØLOY

I regret to report that WAØIBB has joined Silent Keys. WAØAUX of Iowa is temporarily acting as mgr. for DEN. WØTQD, the newly appointed RM for NEB requests support. Thanks to WAØHWR for his fine work while RM for NEB the past several years. Box Butte County EC KØWPF reports QNI 21 for the 2-meter AREC Net. Congratulations to new Novices WNØDHH and WNØDWV and to Advanced Class licensees WAØYHD and WBØAEA. The Midwest Division Dir. WØGQ will not be seeking reelection. Candidates for this office should be considered. The Pine Ridge ARC Hamfest at Chadron State Park had 51 amateurs and a total attendance of

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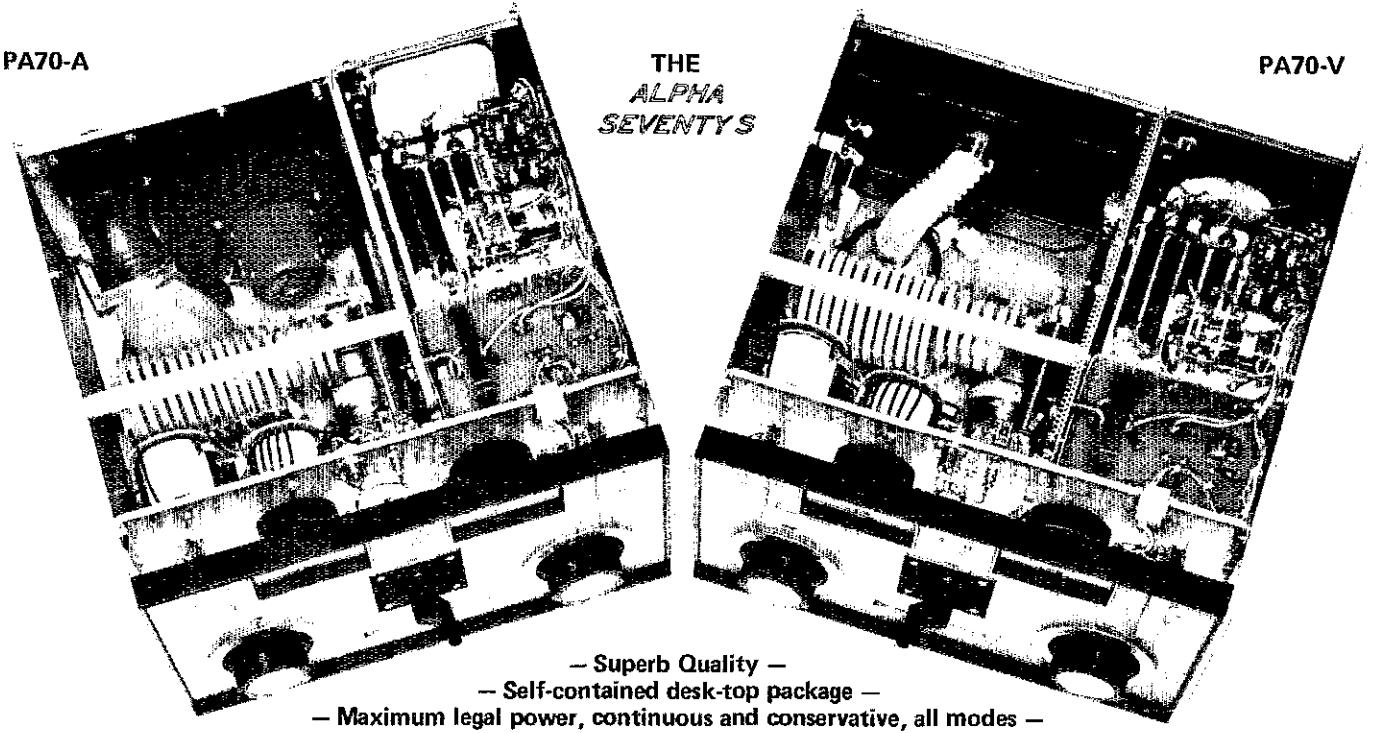

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approximately 120. The Loyal Order of Smoke Signal Senders had 22 members present. Don't forget the Neb. QSO Party Sept. 0500000-1623002. Traffic: KØUWK 118, WØLOD 106, WAØSCP 99, WØTQD 50, WØHOP 28, KØHNT 22, KØJFN 22, WØNIK 21, WAØQEX 16, KØODF 14, WØKPA 13, WAØPCC 13, KØDGW 10, WAØGHZ 10, WØDMY 9, KØOAL 9, WØYFR 5, WBØCAU 4, WØEDI 4, WØLJO 3, WØAGK 2, WAØEEI 2, KØFRU 2, WAØJUF 2, WAØLOY 2, WAØPIF 2, WAØQLE 2, KØSFA 2, WBØAEA 1, WØVEA 1.

NEW ENGLAND DIVISION

CONNECTICUT – SCM, John J. McNassor, W1GVT – SEC: W1HHR. RM: K1EIR. PAM: K1YGS. VHF PAM: K1SXF.

Net	*Freq.*	*Time/Days*	*Sess.*	*QNI*	*QTC*
CN	3640	1845 Dy 2200	62	556	353
CPN	3965	1800 M-S 1000 Su	31	434	174
VHF 2	145.98	2200 M-S	21	90	38
VHF 6	50.6	2100 M-S	21	107	1

High QNI: CN – WA1GFH, K1EIR, W1MPW and W1CTI. CPN – K1EIC, W1GVT, W1LUH, W1MPW, WA1NMZ and K1SXF. SEC W1HHR requests Amateurs for Windsor Civil Defense contact CO K1ZFE or RO K1AOX Windsor Town Hall or W1HHR. Director W1QV sends Bi-monthly letter to all affiliated clubs and many individuals – please circulate this information as much as possible. All club bulletins indicate Field Day to be the first order of business – this ARRL activity is the most popular of all – hope you enjoyed it. The Danbury CARA held an auction but did not make arrangements with the weatherman first! The Hamden ARA did very well with their annual auction and they also provided an EC for a community project. New officers of Tri-City ARC: W1NBP, pres.; WA1IVW, vice-pres.; WA1MOW, secy.; WA1GKU, tec. secy; WA8AHV/1, treas. K1SSN is the new call for the Sub. Base ARC in Groton. W1BDI vacationed in Maine, W1YYM put up a new 80-meter antenna. Congratulations to: WA1CXE for Advanced Class; WN1OFL, WN1OST, WN1OTA, WN1OUO, WN1OII and WN1OIH for new Novice; W1KUO for DXCC; WA1NMZ, WA1NMX for WAS; Univ. of Hartford ARC affiliated club and W1BGD a new XYL! My activity was low again this month – the XYL was in the hospital. Time now for new guy wires or changes needed on your tower and beams! Traffic: (May) W1EFW 216, WA1JVV 213, W1MPW 136, WA1NMZ 104, K1FQT 93, WA1GFH 87, W1CTI 76, K1SXF 56, K1YGS 41, WA1JMO 27, W1GVT 24, WA1OFP 24, W1YYM 23, W1AW 20, W1BDI 18, W1KV 15, W1YBH 15, W1CUH 12, WA1MOW 12, W1DQJ 9, WA1JGA 6, W1YBI 4, W1QV 3. (Apr.) W1OBR 21.

EASTERN MASSACHUSETTS – SCM, Frank L. Baker, W1ALP – The EM2MN had 21 sessions, 135 QNIs, 94 traffic. New officers of Whitman ARC: W1AXK, pres.; W1BDC, vice-pres.; K1YBS, treas.; WA1MGC, secy.; K1s UMP, TZC, WA1s HIH, DUZ, W1PL/YV5, dr. for 2 weeks. W1HXK is a Silent Key. The Somerset ARC now is affiliated. K2MDJ is in Chelmsford. WN1OPV is a new YL in Dedham. New officers of Norfolk County RC: W1HTR, pres.; W1IDV, vice-pres.; W1AYI, treas.; K1HRV, secy. T-9 RC met at W1IIB's. W1VYS retired, has the call FG0GE. K1EPL reports the New Eng. Emerg. PN had 5 sessions, 116 QNIs, 6 traffic. W1MD had OA4OK XYL of OA4BI from Lima, Peru as a visitor. The South Shore ARC had their ladies night with 1IJUE as a guest. WA1FSI arranged a picnic for the EMN. W1PEX has a TR-4, W1UX is getting his 56-ft. tower up. WA1KZE on 6-160, has DXCC and RTTY. WA1MHJ rebuilt the shack. K1OIC has an SBE-33 ssb for mobile. K1IBR is working with the astronomy group at W1AEC. WA1MAU has an HA-460. WN1OMM has an HR-10B, DX-60B, on 15 and 80. WN1NDP attended classes at Whitman RC. W1NF reports good turnouts on 2 transcontinental nets, 14115 and 14250. OOTC and Soc. of Wireless Pioneers. WA1LXE has his Advanced. Members of the Massasoit ARA helped out with communications during a forest fire in the Myles Standish State Reservation in Plymouth: WA1ILN, WA1OEZ, WA1KFQ, WA1OEW with W1CUY providing a link to the CD, fire and police depts. Nice work fellows. K1DJG, Dir. of the N.U. Sigma Alpha, the International AR Fraternity, had 31 phone patches. For certificate and card write to the above at Box 310, Boston, Ma. 02101. K1HHN donated an HT-30 ssb rig to the Norwood ARC. WA1DFL says KP4s are coming in on 6, and WA1IFE heard a Mexican on 6. New officers for the Mass. chapter NAHC: WA1EZA, pres.; K1YBS, vice-pres.; W1DKD, secy.-treas.; W1DOM, awards custodian; W1DFR, K1WRO, WA1DFL, trustees. K1CIJ is in the hospital. WA1EMN has a new tower. WA1s GSF, EMN are planning a new class for General Class. WA1KFJ is a new OPS. W1RM, K1HHN endorsed as ECs. WA1OPJ is Deputy Dir. for area 2 of Sector 1 E and uses the call W1RPB, has rig in the car and

several emergency power generators. K4GGI/1 at W1MX says T night is 220 night in N.E. and heard recently were W1s QXX, YT GAN, OOP, K1CQX, K9AOP/1, K1AGB, W2EIF. Capeway RC n at W1UOH's. W1EYU is retired. W1WSN spoke at the Middles ARC. SEC W1AOG had reports from W1s LE, IHG, K1s NF ZUP, DZG. WA1DXI, WA1MHJ is a new OPS. W1AOG suggests th all New England hams monitor 3945 for any emergencies. Traff (May) W1OJM 470, W1QYY 514, WA1EYY 366, W1PEX 16 W1ABC 108, WA1IFE 58, W1UX 39, W1DOM 36, WA1BYM 3 W1MNK 34, WA1KZE 19, W1AOG 18, WA1AKR 11, WN1OM 10, WN1NDP 7, WA1MHJ 6, WA1MSK 4, W1NF 2. (Apr.) W1EM 51, WA1MHJ 13, WA1LXE 3.

MAINE – SCM, Peter E. Sterling, K1TEV – SEC: K1CL PAM: WA1FCM. RM: W1BJG, W1AZM, his XYL WN1MVD a son WN1OUN are operating portable 8 from Dayton, Ohio. Th are active on 80-, 40-, 20-meters on cw. The Yankee Repeater As still meets on the 3rd Sat. of every month in Augusta at the Cent Maine Power Computer Center. For more information conta K1QIG or W1MFD. New hams in Maine are as follows: WA1OO WA1OQE, WA1OQD, WN1OPM, WN1OQQ, WN1OLF, WN1OL WA1OMX, WN1ONU, WN1ONV. Welcome to the fraternity, f lows. K1TEV is building an SB-220 and hopes to have it on soo Don't forget the Ham Gathering at the QTH of WA1GRA on Au 8. K1BBJ/1 is on with a new SB-220. I still am looking for new any item will be welcome. Interested in an appointment? Get touch with your SCM for information. Traffic: (May) WA1FC 167, K1TEV 14, WA1JHT 3. (Apr.) W1VLU 38, K1TEV WA1JHT 4.

NEW HAMPSHIRE – SCM, Robert C. Mitchell, W1SWX – R WA1GCE. Welcome to new hams WN1OOJ, Pelham; WN1OO Manchester; and WN1OQS, New London. W1RCC is running 4 wa mobile on 6-meters. WA1JTM needs only a Utah QSL for 5BWA The traffic bug has bit K1ACL. W1JSM is chasing DX wh 15-meters is open. W1EVN is home from sunny Calif. completi over 6 months of vacation. W1BYS was on vacation in June a July, mobile cross country on 2-meter fm. W1CTW worked NS plus AIR and NPG on Armed Forces Day. W1JY/6 reports t XYL is now WN6JSM. K1BCS recently was honored for l leadership in the Red Cross Blood Program. WA1GCE reports l traffic in 31 sessions for the only reliable week day traffic net N.H. WA1FSZ is on 6- and 2-meters with ssb and is building a 4 ssb rig. Traffic: WA1GCE 247, K1YMH 109, WA1MXT 10 K1ACL 20, W1BYS 5, W1SWX 2.

RHODE ISLAND – SCM, John E. Johnson, K1AAV – SE W1YNE. RM: W1BTV. PAM: W1TXL. VHF PAM: K1TPK. RISE report: 31 sessions, 579 QNI, 64 traffic. With the summer seas upon us, many hams will take to the outdoors and vacations. Take few minutes and drop the SCM a line to tell him what you a doing. W1WAC has plans for erecting a new 6-meter antenna. He now operating on an antenna that could not survive the Ne England winter. K1LII will erect an 80 through 10-meter vertical his new QTH. K1AGA has been operating 80 cw and K1AMG h kept 20 cw open for DX. W1OP, the Providence Radio Club invit all boys to join the explorer scout unit that they sponsor. All bo interested may contact any club member or write to the PR Traffic: W1TXL 51, K1QFD 17, K1VYC 16, K1CEP 8.

VERMONT – SCM, E. Reginald Murray, K1MPN –

Net	Freq.	Time(Z)/Days	QNI	QTC	Mgr.
Vt. PO	3909	2200 Su	89	13	K1BQB
Carrier	3945	1300 M-S	370	9	W1BLC
VTSB	3909	2130 M-S 1230	481	67	WA1HSG
VTNHN (Apr.)	3685	2300 Dy	153 155	175 98	WA1GCE
Vt. Fone	3935	1300 Su	105	4	W1KKM
Gr. Mt.	3932	2130 M-S	525	19	W1JLZ

Welcome to new Novices WN1OLG (Bennington), WN1OPY a WN1OQU (Pawlet), WN1OQR (Hinesburg), WN1ORO (Essex Jc and WA1OLW (St. Albans), WA1ONQ (Rockingham). WA1EI moved to W. Barnet. We're sorry to lose W1MRW to Waterfo N.Y. Don't forget the International FD Aug. 14, 15. Conta W1DQO, Gen. Greene Rd., Shelburne, Vt. for information. T VTCD RACES Net (3990.5 Sun.) has been suspended until fa Traffic: K1BQB 126, K1MPN 12.

WESTERN MASSACHUSETTS – SCM, Percy C. Noble, W1BV – SEC: WA1DNR. CW RM: W1DVW. 75-Meter PAM: WA1MF 6-Meter PAM (Berkshire Co.). W1KZS. The SEC reports f following for the various AREC nets: Section Net (Sun. 9:00 A. on 3935 kHz.) 5 sessions, QNI 36, traffic 13; 10-Meter Net – sessions, QNI 18, traffic 3; 6-Meter Net – QNI 15. WA1MFB replacing K1SSH as Worcester Co. EC. W1KZS is now an Asst. E

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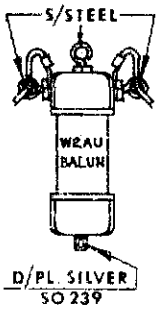

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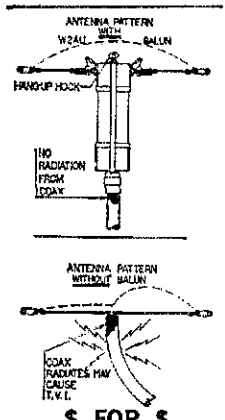

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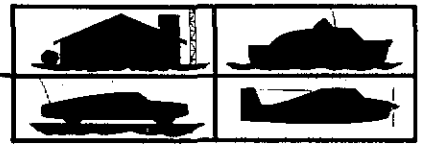

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The CW RM reports that WMN had 111 QNT and handled messages. Top five in order of attendance were W1BVR, W1D WA1LNF, WA1FBF and WA1LPJ. The 75-meter PAM reports WMFN had 9 sessions, QNI 27, traffic 27. Highest in attend were WA1MFB, WA1IZS, WA1EYF, with WA1GFW, WA1 K1SSH and WA1KZE tied for next place. WA1MFB visited W at Worcester Tech and in looking over some old logs there fo W1BVR's name as an op there in the mid-20s. New ORS and Class I: WA1FBF. WA1LNF is mobile (ssb and cw) with an HW- WA1LPJ has an SB-200 linear and a new 40-ft. tower. WA1FBF *a Drake fm mobile unit and will be in Maine all summer. W1* also has 2-meter fm equipment. W1EYC is using a B and transmitter. WA1DNB now has an emergency power generator, call of the Mt. Tom repeater station is WA1KGR. Fifteen mem of the Hampshite County Training Course visited ARRL Members of the CMARA participated in the Worcester Walk Development Program by providing communications for the var groups. Speakers at HCRA were W1KK, W1MDM and Ro Stevens. K1DPP is working on new antenna structures. WA1L editor of the VARC Oscillator, will be mobiling through most of USA this summer. VARC is presenting a subscription to The Br Technical Press to the Association for the Blind in Springf K1PKZ, pres. of the HCRA, is now in the news departmen WWLP-TV. Traffic: (May) K1SSH 147, W1BVR 86, WA1LPJ WA1LNF 61, W1DVW 58, W1PUO 23, W1KK 22, WA1MFB W1STR 10, WA1BXQ 8, W1CSF 6. (Apr.) WA1LPJ 83

NORTHWESTERN DIVISION

IDAHO – SCM, Donald A. Crisp, W7ZNN – SEC: WA7E The FARM Net meets at 0200 GMT each day on 3935 kHz. Idaho RACES Net meets week days at 1415 GMT on 3991.5 k The Post Office Net meets at 0130 GMT on 3930 kHz on T Thurs. and Sat. The Orofino repeater frequencies: Receiver 146 Transmitter 146.76 and 146.94 kHz. WA7GSM is moving to a QTH in Nampa. W7HZL recently moved to Weiser. WN7PUX completed her WAS and has passed the Advanced Class exam. K has been licensed for only 5½ months. Want to increase your proficiency? Check in on the Northwest Slow Speed Net wh meets daily on 3700 kHz at 0200 GMT. The Northwestern Divi Convention is scheduled for Aug. 21, 23, 1972 in Tacoma, Wash courteous, check to be sure the frequency is not occupied be transmitting. FARM Net report: 31 sessions, 887 check-ins, *traffic handled. PO Net: 13 sessions, 78 check-ins, 32 tra* handled. Traffic: W7IY 66, WA7BDD 63, W7ZNN 26, W7GHT 4

MONTANA – SCM, Harry A. Roylance, W7RZY – Asst. S Bertha A. Roylance, K7CHA. SEC: W7TYN. PAM: WA7IZR, V PAM: W7IAC. Daily nets are Montana Traffic Net 3910 kH 1800 M, Post Office Net 3950 kHz at 1945 M. Active 2-m repeaters in Mont. are Kalispell 34-76 (changing to 94), Butte 34 Great Falls 34-94, Missoula, Billings and Helena are working on t repeaters. With deep regret we report the passing of W7OOY. sincere sympathy is extended to Vern and family. Several pic have been held in the section and good times had at all of th W7OIO is spending more time outside working on the flower ga and fishing. Appointment renewed: K7BMT as OO. WA7OBH Dinnon working on his Masters degree. WA7PDC is experimen *with a radio control airplane on 6-meters. Traffic: W7EKB* WA7IZR 20, K7EGJ 16.

WASHINGTON – SCM, Arthur Henning, W7PI – SEC: W7U Asst. SEC: K7WTG. PAMs: W7GVC, W7MCW. VHF PAM: K7L Our thanks to W7IWJ popular outgoing SCM, Silent Key: W7V New appointments: WA7LOQ, WA7GVB, WA7EDQ, WA7AV OPSs: WA7HCL as ORS; WA7CYY, W7IEU, K7LRD as O W7QCV, K7NZV, WA7CYY, W7JWJ as OBSs; K7RSB as OO.

Net	*Freq.*	*Time(Z)*	*QNI*	*Tfc.*	*Sess.*	*Mgr.*
WSN	3590	0145	298	81	31	W7G
NSN	3700	0200	307	90	31	WA7
NTN	3970	1830	1037	106	31	WA7
WARTS	3970	0100	1498	105	31	W7Q
NWSSB	3945	0130	829	52	31	W7V
CBN	3960	0200			31	K7M

The Walla Walla Valley ARC Silver Anniversary Hamfest is Sep and 26. WA7OSO is a new AREC registrant. WA7LQO, WA7 are new General Class licensees. Hams Amateur Mobile Service new 2-meter fm Everett club, operating a fully equipped Car ready for all emergency work, just provided a 3 day around clock communications and PA system for the Boy Scout and Scout Camporees. Officers are K7KSZ, pres.; K7THW, vice-p K7NQR, secy.; WA7HKB, treas. WA7BIU has added an NCL-7 linear. Alternate frequency for WSN is 7075 kHz reports W7GYF. New WSN instruction manual as revised by W7AIB

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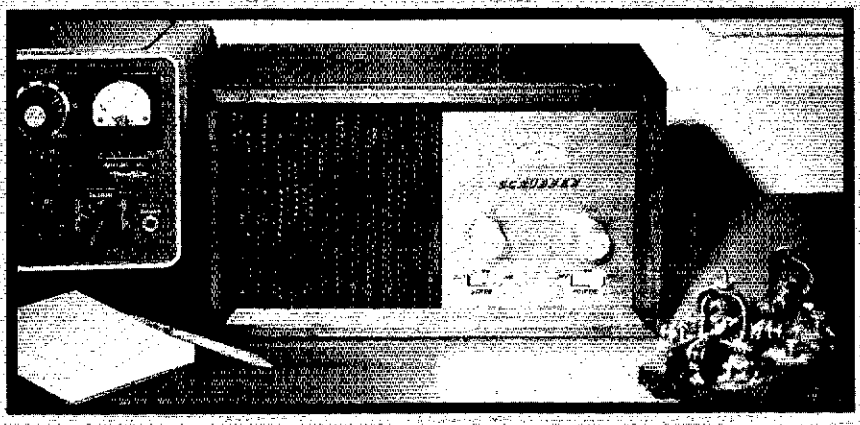

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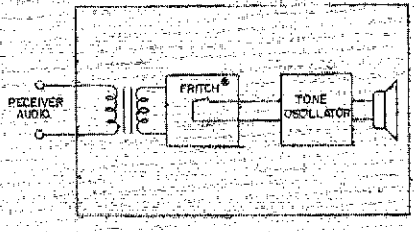

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process for new WSN members. OBS W7AXT now sending bulle on RTTY 3620 kHz and getting good response but says WI hard to copy at his QTH. K7UDG reports the new Chehalis 2-m fm repeater on Bawlaw Mountain provides the final link in repe chain down the coast for mobilers. It's open access, 1950 Hz t control, frequency 146.34 in 146.94 out. W7BUN reports mos the Radio Club of Tacoma is on 2-meter fm. Please ch endorsement date on your appointment certificates. Send them me for renewal. Station activity reports should reach me not l than the 5th of the month to make publication deadline. Trai (May) W7BA 717, W7PI 197, WA7AVI 178, WA7HKR 105, W7 78, K7CTP 75, WA7HCL 75, W7GVC 62, W7AXT 57, W7BUN W7MCW 44, W7BQ 43, W7GYF 37, W7APS 31, W7JWJ WA7NYI 21, W7IEU 15, W7USO 14, W7FQE 13, WA7LOQ WA7GVB 3, W7AIB 2. (Apr.) W7FQE 10, WA7GVB 5.

PACIFIC DIVISION

HAWAII – SCM, Lee R. Wicat, KH6BZF – Asst. SEC: KH6B RM: KH6AD. PAM: KH6GJN. VHF PAM: KH6GRU. QSL M KH6DO. ECs: KH6s GPQ, BAS, GLU, GKD, KIHNO/KH6 KC6EJ. RACES Net coordinator Dick Hamada, RO.

Net	*MHz*	*Time(Z)/Days*
Friendly	7.290	2030 M-F
World-Wide Boy Scout	21.360	1800 S
Confusion (Patches)	21.400	0030 All
Pacific Interisland	14.335	0830 M-W-F
MICRONESIA	14.335	0800 T-Th-S-Su
S.E. Asia	14.320	1200 All
Islander	21.111	0600 M-W-S
PACDX	14.265	0600 F
Pacific Typhoon*	14.265	*

*During typhoon alerts. Congratulations to K2SIL/KH6G KH6RS as a new OO. KH6YL/6 reports that he traded his KH6 a K6QT call. KH6GPP/6 reports he will be shifting his QTH JA-Land in Aug. where he will serve as fleet Communications C for COMSEVENTHFLT aboard the USS Oklahoma City for years. WB4QXD/KH6, the CHOP at Tripler Army Medical Hospit station KH6EOQ, will be reassigned to Walter Reed Army Med Center in Washington operating K3WBJ. KH6LP now /6 recei had his article on "Communications Discipline" printed in AFCF organ SIGNAL. WH6HJE worked portable Kahana Valley duru recent Boy Scout (Windward District) camporee. Even KH6E took a turn at the key during the camp out. KH6OO is home fr the hospital. W7UZH, ex-KH6, reports he is at the Service Sch Command USNTC San Diego, CA 92133. New equipme KH6RS/KH6GPQ has a new Alpha Seventy linear. KH6BZF KH6HCM have Omega Tee bridges. KH6BZF added an SB- scanilizer to his growing "plant" as well as a DX Engineering bl box! KH6BAS has applied for OBS. In town and visiting a gathe at the KH6BZF home recent ly were W1QV, WØBWJ and FO8 KH6HLN returned from business trip to SFO. KH6HIF recei landed his DXCC award. KH6CU reports by postcard that he XYL are enjoying Bengazi, Libya. The QCWA recently hono KH6AX with another certificate! He'll be in the thick of TRANSPAC race again. Please get those reports in the mail bet the end of the month. Keep your column going. File your stat activities today.

EAST BAY – SCM, Paul J. Parker, WB6DHH – W6CBF wor all the Armed Forces Day stations again this year. Here is a t find, WA6ZNT will be the call for the Naval Reserve Submarine U Charr operating all modes 80-10-meter bands on the 1st and week ends of each month. WA6DIL is our RM for this section would like to hear from anyone who has a desire for a stat appointment in the traffic world. W6TTS recently put up antenna that took 12 people to raise. There are many nets in section and all who are interested are invited to join. NCN me daily on 3630 kHz at 7:00 and 8:30 local times; The Novice meets Wed. 8:00 to 9:00 P.M. local time on 21,150 MHz. Maxim code speed is 5 wpm. A special thanks to the East Bay Radio C for their fine paper every month. Congratulations go to K6IMV operating another fine trail ride this year and providing sup communications. Traffic: WA6DIL/6 95, WB6VEW 13, K6TX 3.

NEVADA – SCM, Leonard M. Norman, W7PBV – SEC: I "Mike" Blain, WA7BKU/W6OBS. The W7AKE repeater has b removed from Angel's Peak. The Sierra Hamfest sponsored by Nevada Amateur Radio Assn. is booked for Aug. 14 at Idlew Park, Reno. Contact K7ZAU, chmn. for additional informati W7IEF reports good DX with new tower and quad. WA7B conducts a code and theory class at Nellis AFB. K2AAS is new Nev. and is interested in handling cw traffic. W7EFJ, W7F WA7GIV, W7VYC, K7TDQ and K7ZMA have run some repea

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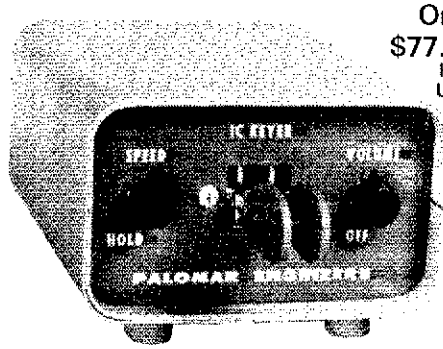

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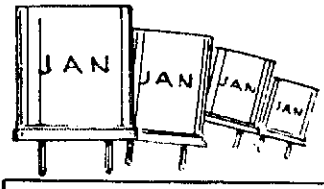

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surveys to try and tie Kingman, Az. into Las Vegas, Boulder Cedar City, Ut., and Salt Lake City with very good results, so for a repeater in the Cedar City/St. George, Ut. area soon. K has a new bride, K7RBM reports married life is FB. W7O constructing a sold state cw ID keyer for the K7UGE repeater.

SACRAMENTO VALLEY – SCM, John F. Minke, III, W6 – I am now in my fourth term as SCM. I wish to thank all c who voted in the recent SCM election, the returns being apj mately 50 percent of the section membership. As far back as remember this is the first time in many a year Sacramento V has had an SCM election. With the membership of the North Radio Club growing as it is, it looks like maybe a new meeting is in order to account for the overflow. WB6LXH is in Yos working as Smokey the Bear's assistant for the summer. WB6A starting a general interest amateur radio publication, mailed every three weeks. For details contact Worldradio, 2509 D Way, Sacramento, CA 95818. W6NKR has rebuilt my old tr beam into a two-bander and has it performing FB at his QTH. you all are enjoying your summer. Don't forget the Calif. QSO coming up in Oct. Traffic: (May) W6VUZ 4, (Apr.) W6 19.

SAN FRANCISCO – SCM, Kenneth S. McTaggart, K6SRM SEC: WB6KMI. ORSs: WB6KMI, WB6FZN, WA6NQZ, W6 WA6BYZ, W6BIP, W6MTI, W6WLV, W6GGC, W6JXK *WB6JQP. OOs: W6RQ and W6EAJ. Anyone in the section who* ARRL member and interested in an appointment is request drop me a card or letter. W6EAJ has two claims to fame: (OTH has the greatest rainfall in the 48 contiguous states with inches annually and (2) his station is the most westerly v powered station in the same 48 states! WB6FIR is active Bolinas on 40-, 20- and 15- meters. WB6FZN is off to college fall to take an electronic engineering program. W6RNL is operating with a new FTDX-101 transceiver. W6WLV was the winner of a VTVM at a recent meeting of the Sonoma Co Amateur Club. WB6JQP is home from shipboard duties for months. W6SLX continues to be active in weather nets in Hum County. WB6KSS is building an external vfo for his SB-101 holding down an NCS job on NCN/2. Many amateurs from clubs participated in A. F. Day at NPG, Skaggs Island. Fo first time NPG was able to make more QSOs with amateurs NSS, Washington, D.C. By the way, this section includes following counties: San Francisco, Marin, Sonoma, Mendocino Humboldt. W6BIP keeps skeds with son, K6DJC/7, and daug *operating K6MCA, on 40-meters. Traffic: WA6BYZ 267, W6* 149, W6KVQ 140, WB6FZN 9, WB6JQP 9, WB6KSS 6, W6RN

SAN JOAQUIN VALLEY – SCM, Ralph Saroyan, W6JI WB6OPO has a 60-ft. tower up, WB6WQV has a 75S-3B and 3 with a four-element Quad on 10, 15, 20. WA6YBN is teaching and theory, and 5 out of 7 passed their exams in Bakers WA6CPP was traveling in June and operated from 16 states. He is active in phone patching. W6MOG is heard on 75-ssb. W6M WB6BJI, W6JUK, WA6FWS, W6YKS and W6DPD were activ 6-meters in May. W6PNY is on 6-meter ssb. W6YLO and WB6 are active on 6 from Tuolumne Co. W6YKS has worked 26 stat 6-meters, using a pair of 4-125A. K6RAU is transmitting a class for beginners on 3843 kHz, 0630 Pacific time, M-S. The c begins on the 2nd Mon. of every month. Anyone reading *column, please pass the word. WB6OSH, W6OWL, W6YEP* W6JPU have new 2-meter fm transceivers. WB6ETQ is back Mexico. W6OON is heard on the Buzzards Net. W6YKS repo dozen stations operating regularly in the Stockton area. Fr WA6CPP 17.

SANTA CLARA VALLEY – SCM, Albert F. Gaetano, W6 – RM: WA6LFA. If any of you fellows in the Monterey Bay are interested in handling traffic on NTS NCN they sure could some more outlets in that area. K6DYX is working on a solid slow-scan TV monitor and flying spot scanner. W6LFA now ha RTTY going in the receiving mode and as soon as the weather too bad for golf he is going to get the transmit mode fixed W6NLG who works very hard at the northern Calif. OSL bu reports that they still have thousands of QSL cards that are being claimed so will you DXers please send them a self-addr stamped envelope. W6VMY was able to work the San Jo Valley from Loma Prieta with only three watts on 220 MHz. H used a fourteen-element gamma matched yagi made out of old antenna parts by WA6EWR. W6KHS is the new trustee for the S Cruz County Amateur Radio Club, K6BJ. Any of you guys want to copy taped English on RTTY don't forget W6Z bulletins every Tue. night on 3620 kHz at 8:30 P.M. PDT. Tra W6RSY 478, W6NLG 216, W6NW 194, W6BVB 193, W6YBV WA6LFA 186, K6DYX 124, W6DEF 112, W6VZT 101, W6 48, W6ZRJ 10, WA6DKF 9, K4BVD/6 1.

ROANOKE DIVISION

NORTH CAROLINA – SCM, Calvin M. Dempsey, WA4U SEC: W4EVN. PAM: W4AJT. VHF PAM: W4HJZ. We are hap have WB4UGA from Eden as a new ham and we hope Joe w our new EC in Rockingham County. WA4KWC reports a lot on 10-meters with a short skip. WB4EBW and WA4ZPC ordered new 2-meter fm rigs and hope to be on the air soon N.C. Navy MARS group had a real nice meeting at Pope Air Base last month. They visited the MARS station and were impr with the operation there.

Net	Freq.	Time(Z)/Days	QTC	
CN (E&L)	3573	0200 Dy 2245 Dy	64	K
NC SSB	3938	2330 Dy	18	WB4

Traffic: (May) W4EVN 178, W4PCN 56, K4MC 29, W4RW K4VBG 21, W4WXZ 20, K4TTN 18, WA4UQC 9, WB4H W4TYE 5, WB4BGL 4, WB4HGS 3, WA4KWC 2. (Apr.) W4 45.

SOUTH CAROLINA – SCM, Mrs. Elizabeth Y. Miller, WA SEC: WA4ECJ. Asst. SEC: W4WQM. PAM: W4JSD. RM: K4 The winner of the Sidebander-of-the-Year award, WB4MXW the recipient of the new Lynn Kalmbach award, W4MTK, presented with handsome plaques at the annual Sideband St Our congratulations to both. This section is seeking a metropolitan-area club able and willing to sponsor a Di Convention next year. Any takers? If no single club feels a swing it alone, how about a combination of two or more? For reasons SC has abandoned plans of initiating its own CW Ne NC-SC merger is much more productive than two separate s nets. W4GCS has returned from Vietnam. While over the conducted classes which produced 17 new hams. Good work K4RLR is EC for Colleton Co. WN4UUU is the newest Nov Spartanburg. Also in Spartanburg, EC WB4MCI is now locate new antenna farm.

Net	Freq.	Time(Z)/Days	
SC SSBN	3915	2300 Dy	W
SCPN	3930	1600 M-S 1230/1930 Su	
CN (early)	3573	2245 Dy	K
CN (late)	3573	0200 Dy	WB

Net traffic: SSBN 97, CNE 64. Traffic: K4LND 75, W4NT W4MTK 39, WA4RMZ 22, W4JA 11, K4HCD 2.

VIRGINIA – SCM, Robert J. Slagle, K4GR – Asst. SCM Martin, Jr., W4THV. SEC: WA4PBG. Asst. SEC: WB4CVY, WA4EUL, WB4NNO, W4SHJ. PAMs: W4OKN, WA4YXK. was reelected chmn. of EAS. WB4RNT has a new 24-year-old WB4KIT was in the hospital, but is OK now. K4JYM had Fiel itchings. Director, W4KFC had a busy month at the Board me Va. Station Convention and visited the Northern Panhandle A Wheeling, W. Va. W4MK is neglecting us for Fla. We regret W4ZYT to Calif. K4JM reports nothing new, 2686/2209 c count by WA4WQG/W4 JUJ; JUJ back from Italy where he Marconi's home. WB4QWM has been a ham a year and is goi Advanced. WB4DRB is active at the club station K4EFL. sweating 2-meter fm. W4HU is fixed and mobile with 2-met W4DM reports the doldrums. WB4TMA, 13, is a General licensee and is going for the Advanced Class. Nice State Conv in Roanoke this year. WB4DRC/8 was elected pres. of O Radio Club. K4LHB is active on vhf. Congratulations t Potomac Area VHF Society on League affiliation; K4L moderator. Looks like May was the slowest month ever, hop with school out things will pick up.

Net	Freq.	EDST(PM)/Daily
VSBN	3935	6:00/10:00
VSN	3680	6:30
VN	3680	7:00
VFN	3947	7:30

Traffic: (May) WB4NNO 585, W4SQO 309, K4KNP 193, WB 190, W4UQ 166, WB4KSG 120, WB4RNT 89, K4KA 77, WI 72, W4NLC 72, W4OKN 63, K4FSS 47, WB4PWP 43, WB4SC K4GR 37, WB4KBJ 22, WB4SIK 20, W4SHJ 18, W4LQ WB4GMC 15, K4JYM 11, W4KFC 10, WB4RDV 10, WB4F W4MK 9, W4ZYT 9, K4JM 8, WA4NJG 8, WA4WQG 7, W4 W4YZC 6, W4KAO 4, W4OP 4, WB4DRC/8 3, K4LHB 2, WB 2. (Apr.) W4NLC 202, WB4TMA 10.

WEST VIRGINIA – SCM, Donald B. Morris, W8JM – WA8NDY. RM: WB8BBG. PAMs: W8DUW, K8CHW, W Phone Net Mgr.: WA8LFW. CW Net, 3570 kHz at 2300 and Net, 3995 at 2230. Governor Moore issued an Amateur Radio Proclamation covering Field Day and the State Radio Conven

egret to report the passing of W8MJJ of Weirton. WA8ACF and 8CFT won prizes at the Huntington, Tri-State Hamfest. Weirton nateurs chose Steelworkers Amateur Radio Assn. for their name nd elected WA8FED, ptes.; WA8KWG, vice-pres.; WA8SSM, ecy.-treas. W8AEC reports good activity on 6 and 2 during band penings. The CW Net reports 21 sessions, 185 stations and 41 essages. Phone Net with 31 sessions, 385 stations, 48 messages andled. W8HZA started as 9CHO in Iowa in 1921 and has received onfirmation of this date from ARRL. WA8YCD is increasing -meter net activity in the Morgantown area. WB8GYY and W8EKG isited K8QYG and confirmed his ease in working DX. W8DUV oke on YLRL activity at the Wheeling clubs YL-OM Dinner. emember the Bluefield Hamfest Aug. 29. Traffic: WB8BBG 142, A8POS 82, WB8CYB 41, WB8AKQ 31, WA8LFW 26, W8HZA 21, 8JM 20, K8QEW 8, W8AFC 7, W8DUV 6, WA8NDY 6, WA8YCD , WA8ZNH 5, W8AFB 1, WA8AMF 1, W8CKX 1, WA8CMW 1, B8DQX 1, WA8HSW 1, K8HUH 1, W8QEC 1, WA8LFZ 1.

ROCKY MOUNTAIN DIVISION

COLORADO – SCM, Clyde O. Penney, WAØHLQ – SEC: AØQOY. RM: WØLRN. PAMs: WBØAWG, KØIGA, WØLRW, ØCXW. All traffic nets in Colo. have reported an increase in their affic load as the summer months approach. While they have an dequate number of operators at present to handle the load, ewcomers are always welcome. Contact your SCM for a listing of ie Traffic Nets in Colo., their frequencies and times of operation, nd then join in. It's a very rewarding experience. It is with deep egret that we report WØENV, WØTX, WAØNGP and KØTFL as llent Keys. They will be sorely missed by all in this section. KØTIV now on 160-meters and a new member of the Silver State Net. He so is enjoying his new Drake 4-line equipment. Net traffic for ay: Hi-Noon QNI 936, QTC 61, 11 phone patches, time of 1075 in. Colo. Code QNI 147, QTC 68, time of 592 min. for 26 ssions. Traffic: (May) WØWYX 284, WØLQ 165, WAØSIG 92, 3TEZ/Ø 60, WØLRW 55, KØJSP 45, WØLLA 39, KØTIV 24, ØCXW 17, WØLEK 16, KØEC'R 15, KØIGA 13, WAØYFD 12, ØBY 9, WAØYNP 6, WAØHLQ 3. (Apr.) WAØZWA 98, K7OPO/Ø 4, WØLEK 10.

NEW MEXICO – SCM, James R. Prine, W5NUI – SEC: W5ALR. major search for a lost child supported by the Albuquerque group as conducted in May with success. W5ALR was presented an SEC rtificate at the Albuquerque ham breakfast June 5 and before the ay was over many of the amateurs in northern New Mexico were volved with an extensive forest fire in the Santa Fe National orest Jemez Mountain area, which has burned over 2000 acres. 5UH concluded destructive testing of the phenolic sockets in his 2-S3 power supply. Replacement with ceramic has corrected the fficulty. The Road Runner net is pleased to have W5SHJ check in om Silver City. There are many towns in the state not represented; ow about making your town known? Traffic: K5MAT 170, W5RE 2, W5MYM 24, W5NON 19, W5DMG 18, W5PDY 17, WA5UNO 0, WB5AXC 9, WA5BLI 8, WA5JNC 8, WA5MIY 6, W5DAD 4, A5OHI 4.

UTAH – SCM, Carroll F. Soper, K7SOT – SEC: W7WKF. RM: 7OCX. The Utah Medical Association called a simulated, unannounced earthquake exercise on May 15 to test transportation, ospital facilities and communications. 15 members of the Utah HF Society assisted in the communication on 2-meter fm and eceived high praise for their efforts and assistance. On May 29 and 0, 14 Utah amateurs furnished complete communications for the riendship Cruise, in which 506 boats participated in the 190 miles own the Green River, from Green River, Utah to the confluence of ie Colorado River up to Moab, Utah. The Utah Beehive Net, perating daily on 7272 MHz, reports QNI 757, QTC 51, average me 17.03 minutes. WA7MBL issued BUN certificate. K7ZJS issued 9 cooperative notices. Traffic: W7FM 98, W7OCX 49, K7CLO 10, 7SOT 10, W7QWH 4, WA7MEL 3.

WYOMING – SCM, Wayne M. Moore, W7CQL – SEC: K7NQX. M: W7GMT. PAMs: W7TZK, K7SLM. OBSs: K7SLM, K7NQX, 7SDA, WA7FHA. Nets: Pony Express, Sun. at 0800 on 3920; YO aily at 1830 on 3608; Jackalope Mon. through Sat. at 1215 on 260; Wx Net Mon. through Sat. at 0630 on 3920; PO Net 1900 on. through Fri. on 3950. New appointment: K7KMT as OVS. ur AREC around Lander, Riverton and Kemmerer was very elpful to the CAP in the search for a lost plane during the latter art of May. Then, early in June, there was a tornado alert in the asper area. Responding were W7TVK and the 2-meter group and 7WRS as emergency net control on 80-meters and coordinator ith the 2-meter net. Luckily, none of the twisters came closer than bout 30 or 40 miles to Casper. The convention and hamfest will be ver by the time this goes to press but, hope everyone enjoyed at ast one of them. Traffic: K7NQX 369, W7TZK 73, K7VWA 33, 7SDA 32, W7GMT 17.

SOUTHEASTERN DIVISION

ALABAMA – SCM, James A. Brashear, Jr., WB4EKJ – S
W4DGH. RM: W4HFU. PAM: W4WLG. WB4OKT has been appo
ed as EC for Houston Co. K4UMD has a good system for gettin
2-meter fm; win a rig at a hamfest! K4HJM reports he has
getting some goodies on 40-cw using a 14-AVQ as gound plane -
it also is good on 20, 15 and 10. Congratulations to WA4V
WB4OKT and WN4SON on making BPL. The Auburn U. ARC
up a demonstration station the first week of May and origin
almost 900 pieces of traffic. WA4OGT has a quad on a 6
fold-over tower but has a bit of trouble with parts falling off
quad. K4JK got awfully close to actual frequencies in the May
using a Heath SB-102 with its built-in calibrator. There still
many counties/areas in the section without an EC; if you are in
of these areas and can serve as EC, please get in touch with
W4DGH or myself. The AEND Net (the slow-speed training
enjoyed a real big month in spite of the summer QRN/QRM, et
361 QTC. The Huntsville ARC recently provided communicat
for boat races and motorcycle races held in the local area. D
forget, we still need "weather-watch" stations in most all area
the section. Traffic: (May) WA4VEK 503, WB4OKT 310, WN4S
164, WB4FKJ 152, WB4KDI 122, WB4NLK 111, WB4ADT
WB4OJD 91, WB4KSL 80, WB4JMH 69, K4AOZ 65, WN4SVH
WN4SFV 45, K4UMD 44, WA4BDW 37, WB4OVR 32, WB4
21, W4DGH 16, WB4NLU 6, K4HJM 5. (Apr.) WB4OJD
W4HFU 93.

EASTERN FLORIDA – SCM, John F. Porter, W4KGJ –
SCM: Regis Kramer, W4ILE. SEC: W4IYT. Asst. SEC: W4S
RMs: K4EHY, W4ILE. PAMs: W4OGX 75 and W4SDR 40. We
only one BPL this month, WB4AIW. Traffic will be slow for
summer but we hope everyone will stay with our section
WB4OMG, W4FFF and WB4LAA made PSHR. W4FRL took
place for Fla. for the second year in the QRP contest, 12 w
input. BARS is starting up a new novice class. They also now
their incorporation papers. K4VFY is the new QFN mgr. Congr
lations to W4YPX and his XYL on the birth of a son May 26.
QFN breakfast at the Orlando Hamfest was well attended with
K4BAI from Ga. also present. Thanks for giving me a chance to
a few words fellows. W4IYT SEC for E. Fla. has worked ou
agreement with the Red Cross for amateurs to handle at least
message a week between the local Red Cross offices and the M
Divisional Hq. You ECs and others contact your local RC office
arrange for test messages to be filed. This will be a big boost for
section nets. A record crowd enjoyed the showing of an ARRL
entitled "Radio Waves" June 17 sponsored by the West Palm B
Amateur Radio Club. WB4NXR reports that the club will start
novice classes again in Sept. All area would-be hams are inv
Instruction is free; all you add is time and effort. Fellows if an
you do not see your traffic count this month please bear with
just returned from a two week vacation. Things sort of pile up w
you are not around. Traffic: WB4AIW 470, W4FPC 236, W4
168, WB4HJW 130, WB4OMG 127, WA4SCK 114, W4ILE
W4SDR 97, W4DFP 95, K4FAC 95, WB4PWD 95, WB4HKP
WA4ABY 90, W4DFU 90, WB4LAA 82, WA4IJH 81, K4IEX
W4YPX 62, WB4GHD 55, W4NGR 51, W4IA 50, W4LSR
K4JWM 42, WB4HML 41, WA4HED 38, W4GUJ 37, W4DVO
K4DAX 33, K4BIM 32, W4KGJ 29, W4ZAK 28, WA4EJA
W4IYT 24, W4SMK 20, 8R1Y/W4 19, WA4ZUZ 16, W4EH
W4GDK 12, W4IAD 12, WB4QKR 11, WA4OWG 10, WN4RGC
W4TJM 9, K4SJH 7, W4DOS 6, W4LK 6, WA4BGW 5, K4EBI

GEORGIA – SCM, A.J. Garrison, WA4WQU – Asst. SCM:
T. Laney, III, K4BAI. SEC: WA4VWV. RMs: K4BAI, WB4
(act.). PAMs: K4HOI, W4LRR.

Net	Freq.	Time(Z)/Days	QNT	QTC	
GSN	3595	2300/0200 Dy	759	309	K4
GRN	3975	0000 Dy	–	–	WA4
GTN	3718	2200 Dy	–	–	WB4
Teen Age Fone	3985	2030 Dy	–	–	W1
Ga. Cracker	3995	1200 Su	152	7	WA4
Atlanta ARC	3975	2100 S	–	–	K4Z

All who missed the Georgia State ARRL Convention/At
Hamfest sure missed a good one. A DX forum by SE Dir
Strieter and an Antenna forum by Lew McCoy, W1ICP were
well received. Congratulations are in order for WB4JXO
WB4MWC who have been selected to attend the Governor's H
Program in Macon, Ga. during the summer quarter. WB4SPE
taken over the RM duties of GTN in the absence of WB4JX
reminder to all traffic handlers; please get your Station Act
Reports to your SCM by the 7th of each month. We also would
to remind all appointees who desire to have their appointm
renewed to please return your certificates to the SCM

endorsement. Traffic: K4BAI 200, WB4RUA 169, W4EEP 153, WA4RAV 139, WA4WQU 66, W4RNL 61, W4AMB 59, W4CZN 38, W4FBQ 20, K4NM 17, W4REI 11, WA4ZHC 5, W4FDN 3.

WESTERN FLORIDA – SCM, Frank M. Butler, Jr., W4RKH – SEC: W4IKB. RM: K4LAN. RTTY: W4WEB. PAM: W4NOG. VHF: W4OUF.

Net	kHz	Time(Z)/Days	Sess.	QNI	QTC
WFPN	3957	2230 Dy	31	501	63
QFN	3651	0000/0300 Dy	62	–	–

Pensacola: The Pensacola FM repeater received its license – WB4QEQ. Power output has been boosted to 250-watts. K4CFS renewed his OPS appointment. Ft. Walton: WA7DVD/4 is photographing a number of hams for stories to appear in the local paper. Field Day this year was at a downtown shopping center. The newly affiliated Choctaw H.S. Radio Club received its own call – WB4VCZ. Asst. SEC WB4EQU prepared a fine Section Emergency Plan, with a list of ECs and phone numbers. WB4NHH is in the hospital. Defuniak Springs: K4VWE has the CD station in the Courthouse operating on hf and vhf. Panama City: The new call for the fm repeater is WB4QER. Other new hams are WN4UTJ, WB4UXJ and WB4VCV. Port St. Joe: W4WEB has installed a 50-ft. tower for 2-meter antennas at his new store. Blountstown: WB4UQH is the new EC for Calhoun County and also the county CD dir. Tallahassee: New TARC officers are WB4RCI, WN4RFV and WN4RCG. A number of new hams resulted from the second novice class. Traffic: (May) K4VFY 284, KØBAD/4 118, WB4EQU 47, WB4UQH 41, 8R1Y/W4 19, W4RKH 11, W4FDJ 9, W4IKB 8. (Apr.) K4CFS 9.

SOUTHWESTERN DIVISION

ARIZONA – SCM, Gary M. Hamman, W7CAF – SEC: K7GPZ. RM: K7NHL. PAM: W7UXZ. A repeater in operation but omitted from previous listing is K7VOR, 146.94/146.28 MHz in Phoenix. W7AJU remote base is in operation atop Mingus Mountain with coverage from Phoenix to Kingman to Flagstaff to Payson and usually monitoring 146.94 or 146.85 MHz. K7AWI, K7JNK and K7STA are control stations for W7AJU. K7UGA is giving the banquet address at the SW Convention in Disneyland Labor Day week end. K7UGA has a new log periodic array erected. Members of the Bash-Hal-Ne-Ae Club operate K7UGA/WA7UGA and complete more than 1000 overseas phone patches every month. W7FEW moved to San Diego and is awaiting a two letter call. K7CEH XYL are planning to visit their son, K7CEG, in Washington summer. WA7NHQ in Snowflake received her General Class tic WA7GAE is now mobile on hf. With regret K7LFS was added to Silent Keys list. Stations earning Section Certificates for May w K7EMM, WA7GAE, WA7HIT, WA7IXC, WA7KQE, WA7N W7OUE and K7UOK. PSHR: W7CAF 52, WA7MAD 39, K7U 39, W7FVD 23. Traffic: W7CAF 73, WA7GAE 67, WA7MAD K7EMM 46, K7UYW 33, K7UOK 26, WA7IXC 18, W7DQS W7OUE 7, W7LLQ 5, K7EXF 4, W7FVD 4.

LOS ANGELES – SCM, Eugene H. Violino, W6INH – A SCM: Archie Willis, W6LPJ. SEC: WA6QZY. RM: W6LYY. Tha to all who helped in the SCM election. WB6QWC has slow-scan W6LYY is doing a great job on SCN. W6OQZ now has RTTY 2-meters. There have been many activities recently with the Fre Hamfest which was well represented by the WPS gang WB6K K6KIH and W6OAW. The LERC hamfest was a big success. D forget the SW Division Hamfest at Disneyland Sept. 4 and 5. Crescenta Valley Radio Club had an antenna talk by W6QJW. W6 has been doing a good NCS job, for the QCWA on Sun. mornin miss WB6BBO on SCN lately, been traveling to YL Clubs. K6 won a pair of 4-250 tubes at the MARS breakfast. WA6KZI is do a very good job regarding the earthquake report. W6DSP car found on 2-meters with the Wind-Jammers almost nightly. The Fernando Radio Club is forming a Valley emergency net, anyon the area interested please contact WA6OQL. The Santa Cl Valley club had a transmitter hunt and potluck dinner. Congrat the San Gabriel Valley Radio Club on their very full and ac calendar. Regarding our possible loss of part of the 220 MHz ba let's hope we at least get 11-meters back. The JPL Radio Clul Pasadena are planning to install RTTY facilities. W6FD has been of town but will soon be back on SCN. WB6ZVC, newly appoi RM, will assist W6LYY. Congrats to WA6QQL on ORS appoi ment. WA6ZKI has a Yaesu Rec-Trans combination. OBS WB6K is active. W6USY is going great guns with a new Kenwood Thanks to W6OFO for helping with LA traffic on SCN. W6E having rig troubles. Congrats to K6BUU on his DXCC. W6RV doing a good job on 14 MHz OO monitoring. K6VFF, of Fresno be retiring after 50 years of dedicated service to her community. new QTH will be in Ventura. WB6TFU, Fresno, and his X

organized an antenna raising party on Sat. June 5, 1971. WB6VS and XYL, WB6TUR and XYL, WB6KOL and XYL, WB6LC WA6OQZ and of course WB6DPP, Bro. Ivo of Fresno, made t trip to Ventura to help with the venture. Traffic: WB6ZVC 37 W6INH 373, W6MIF 225, W6LYY 128, WB6BBO 114, W6USY 7 K6CL 42, WA6ZKI 36, WA6KZI 32, WB6ZTI 25, W6OEO 1 W6FJT 16, K6EA 14, W6IVC 14, WWB6KGK 9, K6ASK 8, W6DI 7, K6CDW 5, W6FD 4, WB6GHH 1.

ORANGE – SCM, Jerry L. VerDuft, W6MNY – Asst. SCM Richard W. Birbeck, K6CID, SEC: WB6COR. RMs: WB6AKR W6BNX. The Fullerton Young Amateur Radio Club (YARC members held a mini Field Day May 29. They meet every Tue., P.M. at the Amerige House in Amerige Park, Fullerton. YAR member WN6EAU now is WB6EAU, conducted a 3 day orientatio class of ham radio for the Troy High School "Project Learn. WB6GWZ succeeds W6WJ as Editor of the Anaheim ARA Squelc bulletin. I'm finally receiving a report from the Corona area v WA6CZA. OO W6FB reports good results in the May EMT. W6QB says a new Novice in Lucerne Valley is WN6JFW formerly W9NZN Orange County 40-meter EC WA6TVA reports his net is going wc with 16 member check-ins. Steve also is acting RO for the Cos Mesa city RACES and has 6- and 2-meter stations set up at C Hall. Inyo County EC WA6YWS says his AREC organization growing and they may start a net soon. Riverside County 75-met EC WB6YXA now has a special asst. in the form of his XYL wh now is WN6JVS. Congratulations. RM WB6AKR has written a excellent procedure for ORS qualifying skeds which W1NJM says h may incorporate into a new ORS examination form. OO W6CPB h obtained his 15 wpm Code Proficiency Award. OO W6VOZ has new 2-meter fm receiver and is working all the southlan repeaters. Any newcomers to traffic handling should try out th Southern California Training Net (SCNT) on 3600 kHz, Sat. an Sun. at 1630 local time. Don't forget the Southwestern Divisio Convention at Disneyland Hotel Labor Day week end. PSHE W6MNY 44, W6QBD 26, WA6TVA 17. Traffic: (May) W6MN 119, W6QBD 56, WB6ZOK 20, WB6AKR 16, K6GGS 14. W6WR 13, WA6TVA 11, WA6CZA 5, W6FB 5, WA6YWS 2, WB6YXA (Apr.) WB6ZEC 2.

SAN DIEGO – SCM, Paul C. Thompson, W6SRS – Asst. SCM Art Smith, W6INI. I would like to express my thanks to all for you support in electing me SCM for the following two years. Specia thanks to the outgoing SCM, WA6COE, and all other appointees fo a job well done. AREC growth in the first six months of 1971 wa 64 new members. June total was 339! Those who are not ye members may obtain an application from the SCM, ECs, Weste Radio or Shanks. June AREC activity included the Slobb clean u and the Amigos de Americanas Walk. Clubs: SOBARS had an NT type meeting for June by W6BGF. The No. Shores group also ha W6BGF present a traffic-handling session in June. W6QJW presente his precise tuning of antennas lecture and demonstration for the F Cajon ARC while the IVARA group planned their FD activitie Station activities: W6YES was busy in El Centro on May 1 communicating for the De Anza Rescue Unit while on a search i Mexico. K6SLA is heading up the Palomar Mountain fm repeate group. W6DFY is in charge of the Ecological Field Day involvin scouts, campfire girls, etc. WA6FXM has moved to Long Beach W6BGF has a new 500-CX. WA6MUH put up a new quad for goo summer DX work. Traffic: W6VNQ 349, W6LRU 274, W6BGF 27 WB6HMY 140, K6HAV 87, WB6LYG 65, W6YKF 42, W6DEY 24 W6MI 8, WA6COE 4, W6TAI 3, WA6MIW 1.

SANTA BARBARA – SCM, Cecil D. Hinson, WA6OKN – SEC W6JTA. RM: W6UJ. The Los Padres VHF Society made its firs attack on the airwaves June 12 and 13 during the VHF QSO Party The mountain top operation was atop 8800-ft. Mt. Pinos wit special USFS and Navy permission. WB6WKC, who has bee heading things so far for the Los Padres VHF Society, will be leavin the area soon. The Santa Barbara ARC net meets each Mon. at 193 local time on 145.8 MHz. Anyone who owns a TV set knows tha the 6-meter band now is open and WA6YJZ reports he worked dozen or so states. K6BUD has left the Oxnard area but you ca catch him operating mobile on 75 and 40 from his Winabago hous van. WB6BUQ took down a twenty-two-element beam and replace it with a five-element job and got a bunch of better reports. W6KZ is putting together all the equipment and will soon be on RTTY W6NYG sends a nice report from Santa Maria. He has 96 countrie toward his DXCC. Y6YHK is reported to be the best equipped ha in Santa Maria and is a soft touch for those needing parts. W6AB ha had two work parties to get up rehabed antennas on 80 through Traffic: WA6DEI 156, W6JTA 31, W6UJ 5.

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(Please see the other side of this page for an application for membership in ARRL and 12 issues of QST)

THE AMERICAN RADIO RELAY LEAGUE, INC., NEWINGTON, CONN. 06111

QS 8-71

WEST GULF DIVISION

NORTHERN TEXAS – SCM, L.E. Gene Harrison, W5LR – Asst. SCM: Gene Pool, W5NFO. PAM: W5BOO. RM: W5QGZ. The Kilocycle ARC of Ft.Worth, W5SH, elected W5QU as pres. Their new address is P.O. Box 6881, Ft. Worth 76115. WN5DSR wants to join AREC. He works 80, 40 and 15 cw. The Arlington ARC held a rummage sale and added $160.00 to the building fund. The Tex. cw traffic bulletin lists 17 stations in the slow speed traffic net, using 3770 and 7110 kHz. WB5DPR also is interested in AREC. WB5BAM is on E1TN. W5EYB reports the board meeting induced 29.2% response from the West Gulf Division. Your SCM attended the NETEN meeting at the James S. Hogg Memorial State Park, Quitman. K5ZVZ and many other members were present including K5VVW, W5BVC and K5DOM. WB5AQI is active in traffic. WA5KHF plans to attend the Murval hamfest. Net Certificates issued to NoTex. members TEX Traffic Net are WA5VJW, WA5VJX, W5QU, W5QGZ, W5JSM, WA5DUP and W5UGX. RM W5QGZ reports an RTTY net on 3625 kHz, 0200Z. Members are needed. The Garland ARC was active on FD and a new Kriss-Kross directory will be ready soon. EC W5SHN is an Advanced Class licensee. It is with regret that we announce the resignation of W5JSM, SEC NoTex. We'll miss you. W5GWF had 91,200 points in the recent CD party. W5KYD, NoTx OO and act. mgr. Richardson ARC served as SEC. The No. Tex. DX Assn. banquet was held in Richardson June 5 with an attendance of 80 plus. Speakers were W5EYB and W4VPD. The DARC, Dallas reports a new address for the club mailings is P.O. Box 173, 75221. Your SCM attended a meeting of the NoTex EMG Net held in Breckenridge. NC and mgr. W5URW was relieved by WA5UGR. Attendance was 60 plus, including the organizers K5ENE and W5RV. Net frequency is 3930 kHz. OO W5QPX reports 55 observations 5 of which were from W5-Land. Many NoTex. amateurs copied Dept. of Defense broadcast via NSS, WAR, AIR and other authorized stations. Congrats folks. Traffic: WB5AQI 45, WN5EBC 16, W5LR 14, W5IZU 10, WA5RUF 8, WA5KZA 5.

OKLAHOMA – SCM, Cecil C. Cash, W5PML – Last minute rush before vacation. Very little news was received this month and here it is only the 4th and I am sure a lot of you did not get the word that I was leaving for vacation on the 5th. Please let this be a notice that your station activity reports and news items are due to your SCM real early each month. This May report will appear in the Aug. *QST* and the new net directory will be out in Sept., so refer to earlier issues for the 2 meter repeater information until you get your copy of the new net directory which will carry all the repeater information. W5FW is a candidate for governor of the Chickasaw Nation. K5WPP has the emergency power plant hooked into his house. K5OCX finished a keyboard keyer, now you hot shots look out for a burnout on cw. Congratulations to new Novices WN5EIB and WN5EKD. Check previous issue for the Okla. net schedules. Traffic: K5TEY 801, WA5YRO 171, WB5CFZ 115, WA5ZOO 82, WA5IMO 74, W5FKL 51, W5CDG 43, W5PML 19, W5FW 17, WA5LWD 13, WB5BNS 11, W5MFX 8, K5OCX 4.

SOUTHERN TEXAS – SCM, E. Lee Ulrey, K5HZR – SEC: K5HXR. PAMs: W5FUA, W5KLV. RM: W5EZY. Congratulations to new OO K5HGB. Renewed appointments: W5AC as ORS and OPS. OBS WA5AUB reports the vhf fm group at Corpus Christi now totals 31 members. OBS WA5IQV advises that the Houston and Pasadena VHF Repeater Net furnished communications for the Galveston boat races and gave valuable assistance in rapid recovery of boats and drives. W5ABQ is the new NCS for the cw section of STEN with W5EJY and W9AEX/5 as alternates. K5ZOD held a test exercise on STEN. OPS WA5CBT is attending school in Okla. EC WA5MKV reports building going well for meeting of the Brazos County ARC. EC W5ICL is recuperating from surgery and should be about soon. OVS W5PTG reports that the San Antonio Radio Club and San Antonio Repeater Organization provided communications for sports car and go-kart races. EC W5KR indicates possibility of a vhf repeater for the Rio Grande valley. Congratulations to new ARC The Waveguiders at Univ. of Tex. at El Paso. Section Net Certificates were issued to W5ABQ, WA5AUZ, W5EZY, WA5GZX, WA5MXY, WA5OMB, W5QO, W5RBB, K5ROZ, WA5THM, W7WAH/5 and WA5YEA. W5RBB and K5ROZ made PSHR again. OO reports were received from W5NGW, W5RBB and W5VW. RM W5EZY reports the TEX Net slow speed section is now attempting traffic with some members acting as liaison to RN5. Congratulations.

Net	*kHz*	*Sess.*	*QNI*	*QTC*
TEX*	3770	58	372	193
TTN*	3961	31	1446	114
7290 Tfc	7290	40	1593	537

*NTS Traffic: W5RBB 107, K5ROZ 100, W5EZY 87, WA5FJN 82, WA5AUZ 58, K5HZR 58, W5ABQ 55, W7WAH/5 43, W5VW 32, W5BGE 25, W5QO 20, K5RVF 10, W5TFW 10, K5HUA 7, WA5CBT 4, W5KLV 2.

CANADIAN DIVISION

ALBERTA – SCM, Don Sutherland, VE6FK – SEC: VE6XC. PAM: VE6ADS. ORSs: VE6LZ, VE6YL, VE6WG. OPSs: VE6SS, VE6AFQ, VE6YL, VE6ASL. OOs: VE6HM, VE6MJ, VE6TY. OVS: VE6MX. OBS: VE6OE. ECs: VE6SS, VE6AZU. The May 24 BEBA project was a reasonable success. EC VE6AZU of Calgary could have used more help. VE6AW did a nice job as 75-meter provincial control. VE6PM with the assistance of 22 shifers covered the Edmonton area. The Red Deer amateurs held a successful get together at the end of May. Sorry I was unable to join the 100 plus who attended. The NARC once again held a fine Awards Night, to honor outstanding members in many categories. It was nice to see VE6NF, ex-Calgarian and past pres. of CARA receive an award (even if it was the Boner Award). Most members of the APSN prefer the new format whereby traffic listings are taken and handled prior to roll call. We will continue this method. Traffic: VE6FK 13, VE6QY 4, VE6FV 3, VE6GS 3, VE6ZC 3, VE6KS 2.

BRITISH COLUMBIA – SCM, H.E. Savage, VE7FB – VE7LL, EC for Burnaby now is our new Asst. Director. VE7GG, OO and ORS now is VE7TT. The B.C. Technology station was VE7BQK and now is VE7IS. VE7AFJ finished the 160 transmitter but B.C. has no frequencies to use. VE7AC is active after a long bout in the hospital. VE7AMW, ORS and EC for Vancouver is bound for England. VE7UM is the EC for greater Vancouver. VE7CC who lost a leg this year, took a fall and is in the hospital with the whole one shattered. VE7DH celebrated his 50th Wedding Anniversary. VE7PW has the bugs out of his HW-100. Thanks to Prince George, Nanaimo, East Kootenay, Beaver Valley and Zero Beat for their fine papers. Would like to hear from others. VE7BVU is home but must take it easy for some time. VE7SR, VE7BY, VE7BYA and others are sporting those multi-channel fm 2-meter from Japan. The SCM has a new rig FT-101 and to fit it a three-element beam. Not up yet, he is reading the instructions for 10, 15, 20; one problem is air space. Traffic: WA7NXO/VE7 149, VE7BLO 43, VE7AC 41, VE7TT 5.

MANITOBA – SCM, Keith C. Witney, VE4EI – It appears that VE4EO is moving out to the coast and I hope he will enjoy the change of scene. MTN has slowed down for the summer but the Phone Net appears to still be going strong. When traveling this summer keep in mind the hamfests. Traffic: VE4RO 24, VE4FQ 16, VE4JA 14, VE4AP 12, VE4HR 8, VE4XN 7, VE4QJ 5, VE4FU 2, VE4JJ 2, VE4RO 1.

ONTARIO – SCM, Holland H. Shepherd, VE3DV – A couple of very active 2-meter fm men, and former hf traffic men VE3GP and VE2SD came up with an interesting and novel communications exercise which was conducted by the members of the Renfrew County ARC and the users of the repeater, VE3STP. The objective was to provide communications to the area normally covered by the repeater in the event it was ever disabled. Covering a distance of over 100 miles, base and mobile 2-meter fm station, operating on emergency power and in a simplex arrangement originated and handled test messages in record time. Ontario ARCs sponsoring repeaters and ECs are asked to consider similar exercises in your areas of coverage. A warm welcome to a new friendship net between the Gloucester ARC, Pitman, N.J. and the Toronto West Side Radio Club. The new net is a natural development by both clubs to promote understanding and good will between amateurs on both sides of the border. The net meets each Sun. morning on 7265 kHz. How about other "twinnings" by Ont. ARCs? I do wish I could give some form of accolade to the ARCs that, over the years, have conducted beginner's classes. Without these clubs, their active executives and dedicated instructors, amateur radio would not have the constant stream of bright new faces that gives us the much needed shot-in-the-arm. At the closing session of the Ottawa ARC, VE3BRS, former Chief, Radio Inspector, Eastern Ont. and now retired after 35 years government service, was presented with a 2-meter fm transceiver in recognition of his many year's service and unfailing courtesy to amateur radio operators. Traffic: VE3GI 111, VE3DPO 95, VE3ERU 89, VE3ARS 46, VE3GFN 36, VE3DV 31, VE3EHL 13, VE3FRG 11, VE3BUR 10, VE3NO 4, VE3FXI 84.

QUEBEC – SCM, Joe Unsworth, VE2ALE – SEC: VE2BTZ. VE2DR has regular skeds with VE2s in W4-Land, Fla. on a daily basis. VE2CK now is VP9CK in Bermuda. VE2BQK reports he has a gooy paper transmitter? The MARC is sponsoring the VE/W Contest in Sept. and hopes that many more VE2s participate this year. VE2IJ is off to Europe for a few weeks. VE2DZ had a bad accident at home and now is much better. VE2AVP passed the Advanced Class exam May 26 but says that XYL VE2DGV chickened out. From VE2DLD. Le congres RAQI '71 a Trois Rivieres a remporte beaucoup de succes. Felicitations aux organisateurs et au nouvel executif elu. Beaucoup d'amateurs de differentes regions ont fourni

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des communications au Rallye Tiers Monde. Merci aux amateurs du Saguenay qui ont reserve un chaleureux accueil aux directeurs de RAQI au mois de mai. Pour la deuxieme anne plusieurs VE2 fournissent des communications au comite technique des Jeux du Quebec. VE2BUB a donne des cours conduisant a L'obtention du certificat superieur d'anateur. VE2EC QSOed with HV3SJ, his most religious QSO of the year. VE2AJD has antenna problems again and VE2BWW, DCB regulars on the Quebec net. 25 units IC20 are expected in the Montreal area soon for vhf. PSHR: VE2APT 30. Traffic: VE2ALE 36, VE2APT 18, VE2DR 16, VE2EC 13.

SASKATCHEWAN – SCM, Barry Ogden, VE5BO – The last active AREC emergency participated in was the search for three lost children north of LaRonge. The RCMP were very grateful for the availability of extra communications. The boys were found safe and sound after being in dense bush country for two days. The Lake Net daily on 1830Z at 3780 kHz is gradually getting active as more move to the northern lakes. FB. VE5XG is Net Control. RTTY is soon to be active in Prince Albert. Three or four hopefuls will be writing for their tickets this summer sponsored by the NSARC. Hats off to VE5CU who has been responsible for over 500 VE5s obtaining their tickets over the past 15 years! FB. It was with deep regret we learned of the passing of VE5PV of Lloyminster. I am pleased to hear many of the old calls back on the air again with FB signals. Traffic: VE5BO 9, VE5DN 8, VE5RE 6, VE5KZ 4. QST

The Cabover Kilowatt

(Continued from page 51)

Performance

Compared to other portable stations the author has seen, this one is a pleasure to set up and operate. Almost all of the major sources of inconvenience are eliminated. In most cases it is possible to choose a good site, unpack the rotor, assemble the quad, crank up the tower, start the alternator, and get on the air within half an hour. Guying the tower to several fixed objects, if desired, takes another ten minutes.

Equally important to good contest performance, the camper provides a comfortable, warm, indoor operating position that is ready to go when you arrive at the site. This is a far cry from the author's days of pitching a tent and hooking up a jillion pieces of gear with patch cords after all the other chores were finished.

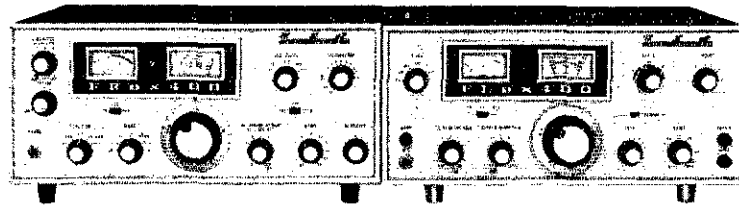
Once the Cabover Kilowatt is on the air, its performance matches that of most home stations. During a six-week trip to Alaska and the Yukon Territory last summer, the author set up this station in 13 different places – always in spots far from the nearest power line or television receiver. The fun of running phone patches home from these places with solid S9-plus signals, or of generating a pileup of DX stations with one CQ and a portable-VE8 call sign, is hard to match.

A portable station that combines high performance with provisions for rapid setup has obvious potential for many kinds of public service communications as well as vacation and contest work. The Cabover Kilowatt proved itself in this area during last November's running of the Barstow (Calif.) to Las Vegas across-the-desert motorcycle race.

In contest work, traffic handling, and on vacation, the Cabover Kilowatt has been worthwhile. About the only problem it creates is a constant flow of questions and curious glances from passing motorists. You can't drive the thing into a gas station without facing a barrage of inquiries about the "oil drilling rig" or "television antenna" on the back.

If you think the tower in your backyard is conspicuous, try driving down the freeway with it. QST

Now you don't have to pay twice the price to get twice the rig.



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Get a big ear on the world with complete amateur band coverage from 160 meters through 2 meters, including WWV and CB reception. Four mechanical filters do it — they provide CW, SSB, AM and FM selectivity. Separate AM-SSB-FM detectors are included, along with squelch and transmit monitor controls. Plus a noise limiter and a variable delay AGC. And a built-in notch filter with front panel adjust for notch depth.

The FRdx includes calibration markers at 100 KHz and 25 KHz, with accurate calibrator checks verified by WWV. A solid-state FET VFO for unshakable stability. And a direct-reading 1 KHz dial affords frequency read-out to less than 200 Hertz.

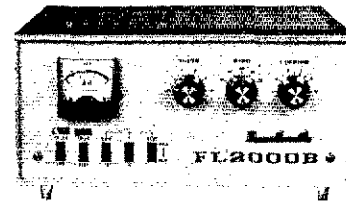
The FRdx 400 sells for $359.95.

The FLdx 400 Transmitter

Here's how to set yourself up with dual receive, transceive or split VFO operation. The FLdx 400 with its companion receiver brings you the ultimate in operational flexibility. Flexibility like frequency spotting, VOX, break-in CW, SSB, AM and even an optional FSK circuit.

The completely self-contained FLdx 400 features a built-in power supply, fully adjustable VOX, a mechanical SSB filter, metered ALC, IC and PO. A completely solid-state FET VFO provides rock-solid frequency stability.

We rate the FLdx 400 very conservatively. That rating guarantees you 240 W PEP input SSB, 120 W CW and 75 W AM. The FSK option will go all day at a continuous 75 W. And you get full frequency coverage on all amateur bands — 80 meters through 10 meters — with an optional provision for certain other bands that you can personally specify. For all that, you pay just $299.95.



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Ideal companion to the Series 400, this hand-crafted linear is another example of Yaesu's unbeatable combination of high quality and low cost. Designed to operate at 1500 watts PEP SSB and 1000 watts CW, this unit provides superb regulation — achieved by a filter system with 28 UF effective capacity.

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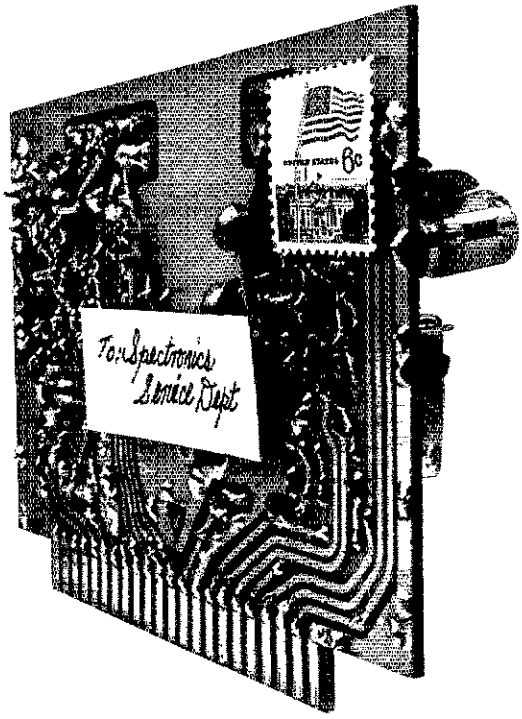

Except for driver and finals, the Yaesu FT-101 is all solid state. Ten FET's, 3 IC's, 31 silicon transistors and 38 silicon diodes do the job — solidly. Most of these components are found on computer-type plug-in modules. Should one of them ever give you trouble, just send us the module. We'll send you a factory-new replacement by return mail.

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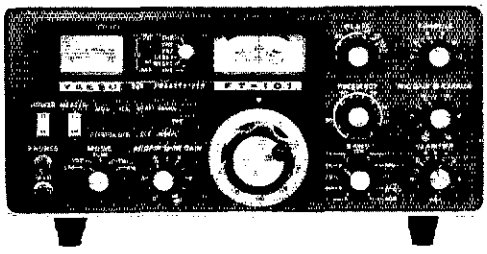

a high Q permeability tuned RF stage and a 5 KHz clarifier. All of that in a portable rig that sounds like it was home base.

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FOUNDATION for Amateur Radio Annual Hamfest Sunday, 24 October, 1971, at Gaithersburg, Maryland Fairgrounds.

PEORIA Hamfest — September 19, Peoria, Illinois, same place as last year. For details, see Sept. issue of QST, Hamfest Calendar. Advance registration: $1.50. Write: Wendell McWilliams, WN9DZJ, Box 1, Rome, IL 61562.

NEW Mexico Hamvention 1971 will be presented 17, 18, and 19 Sept., 71, at Sheraton Motor Hotel, Albuquerque. Technical sessions, top speakers, ladies' program, entertainment, and swapfest. Banquet on 18 Sept. For info and registration: New Mexico Hamvention, Inc., Box 14381, Albuquerque, NM 87111

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WANTED: Teletype machines, parts, Models No, 28, 32, 33, 35, 37. Cash or trade for Drake equipment. Alltronics-Howard Co., Box 19, Boston MA 02101. (Tel: day or night 617-742-0048)

1000 PIV @ 2 amp, new epoxy diodes includes disc bypass & bridging resistors. 10 for $4.50. Diodes only 10 for $3.50. New 490 MF @ 500 volt Electrolytic caps, $1.60 ea. Postpaid USA. East Coast Electronics, 123 St. Boniface Rd., Cheektowaga NY 14225

WE'RE still trying to complete our collection of callbooks at Hq. Anyone have extra copies of Government Callbooks 1922-1925 and Radio Amateur Callbooks 1928-1934? ARRL, 225 Main St., Newington CT 06111

WANTED — For personal collection, The Radio Amateur's License Manual, Edition 12, W1CUT, 18 Mohawk Dr., Unionville CT 06085

SAVE on all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Rd., Swampscott, MA 01907. Tel: 617-598-9700/617-598-2530

VERY in-ter-est-ing! Next 6 issues $1. "The Ham Trader," Sycamore, IL 60178

CLUBS: Send membership list for QSLs. World QSL Bureau, 5200 Panama Ave., Richmond, CA 94804

AMPLIFIER 4-1000A, TR-44A rotor, antenna parts, 371 Jackson Ave., W. Hempstead, NY 11552. Tel: 516-481-2021

TRANSFORMERS rewound, Jess Price, W4CLJ, 507 Raehn, Orlando, FL 32806

DUMMY loads, 1 kw, $9.95; phone patch, $8.95. Wired, $4.00. Ham-Kits, Box 175, Cranford, NJ 07016

PRIVATE collector wants old wireless gear. Buy, trade. Dick Sepic, 1945 E. Orangegrove Blvd., Pasadena, CA 91104

WEST Coast hams buy their gear from Amrad Supply, Inc. Send for flyer. 1025 Harrison St., Oakland CA 94607

AMATEUR paradise vacation, Livingstone Lodge, Mascoma Lake, N.H., cosy cabin for two weekly, $55. Swimming, fishing, boats, sports, ham radio, hot showers, fireplaces, light housekeeping, children half, camp sites, literature, A. Q. Livingstone, W2QPN

WANTED: R390, R390A, R389, 51J4, 51S1, Racal, Nems-Clarke, marconi receivers. SWRC, P.O. Box 10048, Kansas City, MO 64111

LOOKING for skeds with YLs. Interested in astronomy, hovercraft vehicles, astronautics, politics of technology, ecology, computers, railroads, aerostats, electronics, and art. WB9BVI Extra Class Nickolaus Leggett, Department of Political Science, Johns Hopkins University, Baltimore MD 21218

GREENE — center insulator, with or without Balun — a tough number to beat — free flier. Greene Insulator, 3 Pilgrim Dr., Bedford, NH 03102

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NOVICES: Need help for General Ticket? Complete recorded audio-visual theory instruction. Easy, no electronic background necessary. Write for free information. Amateur License, Box 6015, Norfolk, VA 23508

TOROIDS & teletype. Lowest prices anywhere. 40/$10 postpaid, 32KSR printer, reconditioned; $225. Mite UGC 41 too! Model 14, 15, 19, 28, 32, 33! Many more bargains. List, stamp please! Van, W2DLT, 302Z Passaic, Stirling, NJ 07980

VHF/UHF frequency meters, VFO or generator 85-1000 Mc, 144-148, 220-225, 400-450, schematic, calibration book. Portable $108, rack mounting $88, no calibration book $68. Nylon climbing belt with lanyard $20. R388/51J3 Collins receiver $295. Link, 1000 Monroe Tpk., Monroe, CT

GROUNDED grid filament chokes, 30 amps $5. Plate chokes 800MA $3, 3-30MCS, PPUSA48 William Deane, 8831 Sovereign Rd., San Diego, CA 92123

DEALERS: all major lines CB/ham equipment at lowest prices. We urge that you contact us before you buy. Delmar Electronics Inc., 280 N. Wellwood Ave., Lindenhurst, NY 11757

WANT wireless (early) magazines and equipment for W4AA historical library. Wayne Nelson, Concord, NC 28025

NOVICE crystals: 40-15M $1.60, 80M $2.10. Free flyer. Nat Stinnette Electronics, Umatilla, FL 32784

SELL: Galaxy 5 MK 3, with G-1000 dx supply only, $275 you pay shipping. WA2NDO, 210 Appian Way, Middlesex, NJ 08846

SB301 — 2 filters, SB401 with crystal pack, Drake R4. All excellent condx. Best offer. Stern, WA4QXA, 6980 Roswell Rd., Apt. J-1, Atlanta, GA 30328

FOR SALE: SBE-34 transceiver, 75 - 15 meters ssb, 130 watts PEP, Collins 2.1 kHz mech. filter. Both power supplies built in, 12 VDC and 115 VAC. Hustler mobile antennas for 20 and 75 meters and bumper mount. Mobile Mic, unmodified. All $250 prepaid 48 states. W4VRO, Ray Crawford, P.O. Box 424, Royston, GA 30662

CONTACT us for new or reconditioned Collins, Kenwood, Tempo-One, Drake, Galaxy, Hy-Gain, Mosley, Henry linear, towers, antennas, rotators, other equipment. We try to meet any deal and to give you the best service, best price, best terms, top trade-in. Write for price lists. Try us. Henry Radio, Butler, MO 64730

ESTATE sale — Many items: Phone or write WB2OHF for free list. xmtr: 3-1000Z, 2kW linear amp with power supply, HX-10 Marauder, parts for 3-400Z linear including supply, recvr: Hammarlund HQ-101, Lafayette KT-320, SK101, all in perfect working condition with manuals, cables, mic, vibroftex, x-tals, tubes, etc. Phone 608-724-5115 after 5 P.M.

WANTED: Drake MN-2000, DC-4, BTI 2000, or Henry 2K3 or 4 linears. H. Cushing, W6LXZ, 5224 Bobbie Ave., San Jose, CA 95130. Tel: 408-379-8562

MUST sell Collins 75S-1 with spinner knob and cw filter. Excellent $250. Mosley A-203C 3 el. 20 meter beam $50. W8KIT, Paul Darwattor, 927 South West St., Findlay, OH 45840. Tel: 419-422-7240

TOWER, EZ Way, 13 sections, 130 feet. Fine condition, best offer. D. C. White, W3TE, 719 Walker Ave., Baltimore, MD 21237

HALLICRAFTER'S SR-46A six meter a-m transceiver. Full band coverage, 110VAC or 12VDC power supply, works with 8 MHz crystals, $100. Bob Sull, WA8IMO, 230 Moore, Avon Lake, OH 44012

COLLINS 75A4 W/3 filters $375 Collins 3283 transmitter $475, Heath SB200 $195, 75S1 receiver $245, Measurements 84 generator $100, Swan 410C VFO mint $85, Clegg Venus 6M ssb $245, Measurements 59 megacycle meter $95, Simpson 303 VTVM $29, 4CX1000A new $85, 4-1000A slightly used $45. Wanted VFO HA5 or others. WA2VHW, 18 Hillcrest Terrace, Linden, NJ 07036. Tel: 201-486-6917

FOR SALE: Alternator system, Leece-Neville, 28V/100A, with mounting hardware for Jeep use, new sealed cartons, $150. HQ-215, $250, Viking Desk Kilowatt (left-side desk), $350. KWM2-A, †17200 (sealed-relays), 516F-2, $950. Bandit 2000-B, $200. 30S-1, $950. James W. Craig, 29 Sherburne Ave., Portsmouth, NH 03801. Tel: 603-436-9062

SWAN 270, Heath Keyer HD-10, both perfect condition. Best offer. WA1MKQ, 40 Oak Hill Rd., Nabnasset, MA 01861

WANTED: Motorola 2 meter fm Handi-talkie, model P33A or AB. Also HW-17A with fm adapter. WA5YJM, 422 Cottonwood, Ardmore, OK 73401

WEBSTER Band spanner mobile antenna: 1 — adjustable top whip †MA-7 $5. 2 — 20 meter traps †A72 $5 each. All new. K3AHN, 3117 Jeffrey Rd., Baltimore, MD 21207

SWAN TV2B 2 meter transverter for 50 Mc, bought new in Sept, 1970. Mint condition. Also 2-meter 15-element Hy-Gain Model 215B $195. Charles M. Bryant, WB9ETS, RR1, Hillsboro, IN 47949. Phone: 317-397-3568

CUSTOM made CW-AM xmtr. 450 W. CW, 250 W. Phone. In enclosed cabinet on relay racks, including Collins 310 VFO. Perfect operating cond. 80-10 meters. $300. FOB W2BVM, H. F. Riesenkonig, 267 Fox Meadow Rd., Scarsdale, NY 10583. Tel: 914-SC3-3824

HW-101, HP-23A es mic, used 2 mon. $300. HP-13 $40, HD-10 $20. Baby coming, WA4CTC, 404 Hollow Creek Rd., Apt 22, Lexington, KY 40511

TOWER 50 ft. Rohn foldover, MP-33 triband beam, AR22R rotor, all two yrs old. Make offer. You pick up. L. Iannone, M.D., W82VQG/3, 10408 Leslie Ct., Silver Spring, MD 20902

SELL: Hammarlund HQ-110A, excellent condition $110, Heath DX-60 xtmr, HR-10B rcvr, both like new, $100. Steve Clegg, WA2DCX, 80 Andover Ln., Matawan, NJ 07747

SELL: Tempo One, AC-1, Hustler 4-BT-Vertical, mike and bug. All new. Make offer. R. J. Sager, K9GVE/6, Box 394, Corona del Mar, CA 92625

FOR SALE: SB-102 with cw filter $400, HP-23A with SB-600 spkr $55, SB-610 $50, HDP-21 ssb mic, $20, Omega TG7-01 noise bridge $18, Johnson 275W matchbox with swr unit $35, Allied Archer rotator for 3 el beam $25, Hy-Gain TH3 JR triband beam with balun $50. All items mint. U-ship. W. H. Wiley, P. O. B 659, El Granada, CA 94018. Tel: 415-726-5406

MANUALS — $6.50 each: R-390/URR, URM-25D, CV-591A/URR, SP-600JX. Hundreds more. S. Consalvo, 4905 Roanne Dr., Washington, DC 20021

FOR SALE: Hallicrafter SR400 transceiver with ac supply. Excellent condition, a real buy at $525. Jack Yeoman, W8VHY, R†4, Washington C.H., OH 43160

COLLINS 30S1 plus extra 4CX1000 $800. Comdel speech processor $70. John Dwyer, W9IY, 2285 Holly Ct., Northbrook, IL 60062. Phone: 312-272-2443

SELL: DX60, HG10, $50, DX40, VFI, $30, HQ 145, clock not working, R46B speaker $125. No shipping. Cash and carry. J. M. Smyth, WA2KEL, 2794 Valentine Ave., Bronx, NY 10458. Tel: 212-365-2853

SELL or trade for Hammarlund gear — Motorola D43GGB, Aerotron 6N10, 6AT15, Heath HW-10. Gary Sauls, 2017 Evergreen, La Marque, TX 77568, K5-KLF.

COLLECTORS: Will sell Robison's Manual, 1918; Wireless Telegraphy by Zenneck, 1915; Radio Handbook, 1942; bound volumes of QST for 1931 and 1967. W1VG, 99 Bentwood Rd., West Hartford, CT 06107. Tel: 203-521-0416

WANT: Central Electronics 10A or 10B exciters. Ken Cornell, W2IMB, PO Box 721, Westfield, NJ 07091

DRAKE R-4B $340, 2 NT $105. Both mint, will ship FOB. WA7NHP, 1143 So. Durbin, Casper, WY 82601

2m FM transistorized transceiver. Multichannel 12 vdc/110 vac. 1-10W. $170. D. Anderson (213) 478-6738

FOR SALE: DX-100 $50, 75AZ $250. Fred Ciarochi, K3AVE, 506 Briarwood Ave., Pittsburgh, PA 15228

YAESU FT DX 650 6 meter transverter with 4X 150 final 500 watts $115. NCX3 with NCX-AC, $195. Extra clean. K1BWC. 203/6332489

WANTED: information circuit, mods, to amplifier converter, AM913/TRC, Western Electric Co., M. K. Dodd, 1 Nansen St., Bulwell, Nottingham, England

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BOUGHT horse, need cash. Drake TR-3, RV-4, AC-3 never mobile. All for $400. Ameco CN144W 11 mHz output, never used $20. Hallicrafters SR-42 with VFO $65. Gonset GPP-1 Phone patch $15. Many other items. Send S.A.S.E. for list. W1FBS, D. Vuillequez, 6 Pine Ln., New Milford, CT 06776. Tel: 203-354-9932

SWAN 350, ac and dc power supplies. Webster mobile antenna, $375, K6RPD/9, Richard Prokop, 1269 Porlier St., Green Bay, WI 54301. Tel: 1-414-432-2097

KWM-1 M14 distortion test set Viking Ranger National 2M RFI & TFT fm gear fm sweep gen. Best offer. W3YB, 580 Durham, Penndel, PA 19047

FOR SALE: Galaxie fm 210 & AC 210. New, never opened cartons, birthday present, warranty card. First $150 money order. Bernard Madrick, 84-57 126 St., Kew Garden, NY, LI 11415. Phone: VI-9-8484

HEATH HW-16, HG-10 VFO, Novice crystals, and manuals. Fine cond. $100 or offer. Allen Gilchrist, 209 Foch, Bryan, TX 77801

SELLING: complete station, package deal only. KWM2-A, 516F2 supply, 312B4 control, NCL2000 linear, Ten Tec KR-40 keyer, EU664 mike & stand, Drake low pass filter, TM30D 6 el Telrex Tri-band, W-51 Tri Ex tower with thrust bearing, Ham-M rotor, all cables, etc., Sollins gear new 2 mos. old. $2200. J. Perry, 177 Paris Rd., New Hartford, NY 13413. Tel: 1-315-732-4936

HAVE new ssb rig. Selling the following equipment just taken from everyday service: Viking Valiant f/w & Apache TX 1 xmtrs, fine cw/a-m gear; Sixer HW 29A, p/s GP-11 & RA 20. WB2VND, Box 31, Corbettsville, NY 13749

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"DON and Bob" new guaranteed goodies. Motorola HEP170 epoxy diode 2.5A/1000PIV 39c; Amphenol PL259 SO239 3.95/10; Ham-M rotor 99.00; TR44 59.95. Quote new discontinued tubes; industrial surplus list; quote Drake, Galaxy, Hy-Gain, Mosley, Triex, 2 meter transceivers, Tempo, Kenwood write specifications. Prices collect. Mastercharge, Bankamericard. Warranty guaranteed. Madison Electronics, 1508 McKinney, Houston, TX 77002

COMPLETE TMC station for sale; consists of GPR90 with ssb slicer, SBE-2 and pwr. supply, PAL 350B and pwr. supply. Will separate. A. Bruno, 24 Butternut Dr., New City, NY 10956

WANTED: damaged SB-110, Swan 250, 2 meter linear in good condition. Chris, WA3HMK/2, 491 Weymouth Dr., Wyckoff, NJ 07481

COLLINS 75A4 with 3.1 and 0.8 filters and speaker $400. Very clean. Herb Becker, W6QD, 3500-339 W. Manchester, Inglewood, CA 90305

WANTED: side-band adapters, Johnston or Heath SB-10. WA2KDB, Kings Park, NY 11754. 29 Carriage Dr. Jerry

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FOR SALE: Clegg 22'er fm with 146.16- 146.34, 146.94 xtals, used about 10 hours also includes GAM TG2R mobile antenna. all for $355. W7GSQ, Roy Hendrickson, 342 West 23rd Ave., Torrington, WY 82240

WANTED: Crank-up tower, beam, rotator. Tell model and make. E. J. Stidham, General Delivery, Lot †A21, Hon Dah Dr., Pinetop, AZ 85935

COLLINS complete S-line 32S-3 75S-3B 12B-4 516F-2 Serial no. on all units over 30,000. Bought April 1971. Trade for self-contained travel trailer. Mrs. Phyllis Chapman. Phone: 704-857-9507

SALE: SB401 $275,never used, Collins 75A2 receiver $125, 40 ft steel tower $40, Ham-M rotor $75, Mosley TA36 $100. All in excellent condition. J. Staley, W2CHT, 713 North St. Ext., Batavia, NY 14020

PERFECT little used SB-101 transceiver, ac ps, $400 or best offer. Dave Siddall, WA1FEO, 298 Lincoln Rd., Hyannis, MA 02601

WANTED: HW-101, HP-13, SB-610, GR-98, AR-19 Stereo amplifier & Nikon equipment. WB2LDJ/3, Box 25, Yorklyn, DE 19736

HQ215 mint condition with WWV 15mc xtal $350. 2 meter fm GE Progress Line mobile H.B. 4 channel xmit on 34, 46, 76, 94 receive on 94 and 76. H.B. T power complete $125. Art Fury, WA6JLJ, 1096 Wilmington Ave., San Jose, CA 95129

SELL: Knight kit R100, Heath DX 40, 6 xtals, VFO, antenna system, ultimate xmatch and swr, QST 1970, complete station. $120 or best offer. J. Miller, WN0EFS, Heaton, ND 58450. Tel: 984-4262

KWM-2/516F-2 very good condition $700. MP1DC + 351D-2 $165. Heath HR-20 $75. Like new Clegg Thor VI w/ps $150. Eico 720 $40. NCL-2000 w/new tubes $325. WB2IEC

FRANKLIN Museum of Communications still needs early ham gear and small BC sets 1912-25. K4PI, 92 - 31st Ave., St. Petersburg Beach, FL 33706

JOHNSON Invader 200/2000 K.W. P.E.P. new PLs 175 immaculate, w/ps, cables, manual. $325. Drake R4A w/ms4 mint $285. Roger, WB2ABM, 1219 Taylor Ave., Bronx, NY 10472

FOR SALE: ART-13, TCS-6, TCS-14, ARC-1, ARC-2A, BC-457, BC-458A, BC-625, SCR-522, 6 meter xmtr, and power supplies for some. $225 takes it. WN5DEA, 200 Santa Fe, Borger, TX 79007

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SELL: Heath equipment: HW-17 2-meter transceiver with fm adapter, 6 crystals, dc power supply, $100; Twoer, mike with base, external crystal socket, $20; dc supply for twoer, never used, $10; HD-15 patch, $12; reflected power meter, $5; 1000 3x5 QSO record cards $3; Hy-Gain lightning arrestor $12; FOB Connecticut. Heath HR-10B receiver, partially assembled, all parts intact, FOB Louisiana, $50. R. Dopmeyer, Box 1043, Manchester, CT 06040. Tel: 203-646-6038

COMPLETE 73 magazines, from first issue to present, all in binders, all mint. Also ten years CQ. Highest bidder. Samuels, WA2NDJ, 76-13 251st St., Bellrose, NY 11426

HEATH HA10 kilowatt linear, cw/pep ssb, 650W RTTY, excellent, new finals $129. DX40 $29. K3VAX, Box 186, Paradise, PA 17562

NOVICES: Ranger II $125 160-6, 75 watts. General coverage HA-700 $35 & WR600 $20. Excellent. You pay shipping. WA2MDX, 2245 Story Ave., Bronx, NY 10473

WANTED: SBE33 in any condition. Price must be reasonable. WA5EIJ, 1922 Kent Dr., Arlington, TX 76010

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2 FM I.C.E. xcvr, transistor. Make offer or trade. WA5AAO, Box 335, LaGrange, TX 78945

SWAN 350-117xc p.s. xtal calibrator - VX-1-VOX - new driver - finals - electrically - mechanically perfect. $275. WB2PGR, 786 Grand Terrace Ave., Baldwin, L.I., NY 11510. Tel: 516-223-0101 212-592-9942

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HQ 170-A with speaker, Excellent condition. Asking $150. G. Vanis, 27 Marilyn Ln., Westbury, NY. Tel: 516 Ed 3 6822

NEW: Signal-Ones, Kirk, Wilson antennas. Want Collins, Drake, trades/quotations. Payne Radio, Box 525, Springfield, TN 37172. Nites: (615) 384-5643

WHO'D like excellent 180-watt Heath HX-10 Marauder xmtr, ssb-cw 80-10? UR offer welcome. KØLJO, 9432 Oakland, Minneapolis, MN 55420, 888-8093

R390 w/cabinet + manual, ex. cond., $495. EV 635 mike, 50-250 ohms w/stand $8. A. Berger, 8519 Braeburn Dr., Annandale, VA 22003

CRYSTALS airmailed: Novice FT-243, 80M $1.75, 40M-15M $1.25. August QST "Novice Special," five or more - 80M $1.65, 40M-15M $1.25. Mix OK. Postage/crystal - Airmail 12c, 1st-cl. 8c. General purpose FT-243, any frequency, .01%, 3500-8600 kilocycles, $1.90, (minimum five same or mixed $1.75), (crystalize your net, ten same frequency $1.45). 1700-3499 $2.95. .005% add 50c/crystal. MARS a specialty. Free general frequency order-bulletin. Your crystal shop since 1933. Bob Woods, WØLPS, C-W Crystals, Marshfield, MO 65706

SIX meter Virginia kilowatt final, pushpull 4CX1000s; $495. Send $2 for photos. W4UCH

FOR SALE: QSTs beginning 1936. Write for more information. Leo J. Hoog, 1111 Ridgeway, Ste, Genevieve, MO 63670

FOR SALE: IBM Selectric typewriter, with 3 elements $325, Swan 250 $225, stereo tape recorder $75, APR4Y+CV253/ALR converter covers 38-1,000 MC. $125. All excellent condition. K4BPY 205-881-3908

LOW $ ssb. Perfect GSB-100, low hours, $150. Excellent CE-20A, factory 458 VFO, drives pants off Valiant, $90. HQ-170AC, clean, excellent, $200. Bob May, Box 30, Jonesboro, TN 37659. Tel: 615-753-3662

WANTED: Davco DR-30 receiver and NCX-5. State price and condition. OA1BU - K4MUP, Findley, POB 504, Pickens, SC 29671

DRAKE TR-4, RV-4, and AC-4. All excellent, like new. Original owner. Ed Tischer, W8JLO, 2061 E. Whipp Rd., Kettering, OH 45440

DRAKE R4-A, T4-X, AC-4, MA-4 with WWV/160/10 meter crystals $630. L-4B with TV-1000 LP filter $620. Tristao 71' crank up tower with Ham-M rotator $500. W2PCJ, 18 Adrian St., E. Northport, NY 11731

SELL: homebrew linear 3-400Z kilowatt PEP/DC with p.s., kW Millen matchbox, S8-610 scope, phone patch, keyer, all Heath. Gerry Huber, 80 Park Ave., Emerson NJ 07630. Tel: 201-261-6463

SB33, mike, and nonworking inverter. New finals and recent factory alignment. $150. WB4HDP, 1414 E. Main, Lakeland, FL 33801

HW-32A 20m xver, little used, 1 year old, like new, GH-12A mic $105. HP-23A ac pwr spply $45. You pay shipping. All for $150, includes shipping. HA-100C rcvr, reconditioned Dec. '69. Excint Novice rcvr $90. David Landers, WB4PDN, 4021 Chaparral Dr., SW, Roanoke, VA 24018. Tel; 703-774-3334

FOR SALE: Heath HW22-A mint condition with HP-10 mobile supply $130. Also Lafayette HA-410, new condition $110. will ship. M Heiman, K7BDY, Box 744, Showlow, AZ 85901. Tel: 602-537-2450

INSTRUCTOGRAPH excellent $40. Postpaid. Kraco 8 track car stereo needs adjustment $25. Postpaid. WA2GMD, 516HA1-9286

SONOBOUY 2M-FM transmitter on 146.000 MHz $13. Ameco 6M converter $10 LM-21 frequency meter $25. 3-4 MHz Command transmitter $8. VHF manual 6M receiver $10. 6-9.1 MHz ARC-5, 110V, speaker $15. 3-2M-AM transceivers, approximately 1W output $12 each. Trade for sixer, VOM, tube tester, Heathkit AR-3 receiver cabinet. Tubes, parts, send needs. WB4OJJ, 1644 Reece Rd., Salem, VA 24153

COLLINS 51S-1, perfect, $1,000. 200 cycle filter for 75S3B, $70. New Signal One and Alpha Seventy in stock. Used NCL-2000, $395, HQ-180 with speaker, $225. Douglas Electronics, 1118 South Staples, Corpus Christi, TX 78404

SB-101, HP-23A ac supply and SB-600 speaker for sale. Like new, never used. All for $335 cash or certified check. Can demonstrate. Will deliver 50 miles of Los Angeles, otherwise REA collect. Phil Smith, W6MZW, 16263 Midwood Dr., Granada Hills, CA 91344, 213-360-4536

SELL QSTs from 1932 thru 1966, 25c ea or $2.50 per yr. Larry, W6LSG, 12700 Elliott Av., SP287, El Monte, CA 91732, 213-442-0015

SIGNAL One CX-7 excellent condition, less than year old $1500, K7GRE, Frank Geisler, 3626 Fremont Ln. North, Seattle, WA 98103. Tel: (206) 634-2141

SELL: Heathkit HW-17 two meter transceiver $85. WA3NGT, 178 Newport St., Sheatown, Nanticoke, PA 18634

FOR SALE: Clegg 99'er $65. Ameco Nu-vistor conv 6 meter $20. 6 meter VFO transmitter $15. K3NBC, 602 Haven Ln., Clarks Summit, PA 18411

EFFECTIVE Preparation for FCC Code Examinations is an 1971 copyrighted booklet of forty seven pages which analyzes and overcomes difficulties in copying cw 13, 20, 25 wpm. $2.95 check or MO. Postage prepaid. Effective Preparation, P.O. Box 10125, St. Petersburg, FL 33733

COLLINS 32S-3 $495, PM-2 $95, KWM-2 mount $75, & blanker $85, 75S-1 2.1 & .5 $295, Drake L4-B $575, HT-33A 2KW PEP $215, T8S-50C $15. Want KWM-2, 30L-1, TR-4, FT-101, etc. Don Burns, 4410 Reading Rd., Dayton, OH 45420, PH 513 256 0345

ESTATE of K4PUG. Drake 2B and speaker A1 cond. Simpson VOM, 3 keys, Ameco code practice oscillator, Heathkit balun model B-1. Signal corps xmtr BC-696-A. Calrad crystal mike. Make offer. SASE. Frank Whitaker, 545 Oak Hill Rd., Petersburg, VA 23803

WANTED: Drake SPR-4 receiver in A-1 condition. K4ANN, 813-726-4238

QSTs for sale, 1947-1959, and 1965 to 1967, also 1970 inclusive. No reasonable offer refused. Earl O. Fuller, 11222 Nashville, Whittier, CA 90604. Phone (213) 941-2033

SWAN 350, 117XC p.s. xtal calib cw sidetone. $300. G. Stanko, 304 21 St., Irvington, NJ 07111. Tel: 201-374-3858

"HOSS Trader Ed Moory" says he will not be undersold on Cash Deals! Shop around for your best price and then call or write the "Hoss" before you buy. New equipment: Gonset 2000 watt linear Mark IV. Reg. $525, cash $389; new Rohn 50 ft. foldover tower, prepaid, $235; new Mosley Classic 33 and Demo Ham-M rotor, $209. Used equipment: Summer clearance sale: Viking Valiant, $119; Ranger II, $109; HX-500, $139; SB-101 transceiver and HP-23 supply, $319; Demonstrator TR-4 with noise blanker, $489; T4XB, $359; R4-B, $339; Ham-M $85; CE 100V (as is), $169; NCX-5 (as is), $229; NCX-3 (as is), $129. Moory Electronics Co., P.O. Box 506, DeWitt, AR 72042. Tel: 501-946-2820

SB-301 with cw filter, $200: Micro-to keyer, $30; Hy-Gain 18AVQ vertical, $30. WB4RKA, R. Wanat, 443 Atlas Dr., Madison, AL 35758

HEATH HX-10 Marauder transmitter, manual, $175. W0LMI, 1449 Windemere, Minneapolis, MN 55421

SB301 with cw filter; SB401 with crystal pack for sale. Will sell as a pair or separately. Asking $260 for the 301 and $280 for the 401. Also have Comdel Speech Processer, $60. R. Myers, 225 Main St., Newington, CT 06111

SELL: Swan 350C, perfect; SX-130 receiver; Heath HO-10. K2MBM, Art, 914 778-1417

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HQ-180C $250. ATKO minikever all tapes & capstams $35. WB2BHN, 130 Senix Ave., Center Moriches, NY 11934

HQ170 speaker, $150. RCA BC-224-H, 200KC to 18.0MC, $75. Jones, 1132 W. 124 St., Los Angeles, CA 90044

2-METER fm IC-20, solid state, mint condition w/mike, m-mount, xtals. $220. Bob Brunkow, 15112 S.E. 44th, Bellevue, WA 98004

COLLINS rcvr 75 S-1, like new $295. S/N 11,505, manual, cable. A. I. Aaronson, 6609 Edenvale Rd., Baltimore, MD 21209. Tel: 301-486-5909

HEATHKITS wanted: SB-400, SB-401, or HX-10 Marauder transmitters. Must be located in New York City area. Contact: George Hawrysko, WB2GWU, P.O. Box 568, Borough Hall Station, Jamaica, NY 11424. Phone AC 212-277-4001 between 5-9 P.M.

Yaesu FTDX100 solid-state ssb transceiver, 80-10 meters, built-in ac/dc power supply, VOX, 100 kHz xtl calibrator, RFA. Used less than 8 months, mint condition. $395. D. Rapisardi, K1FSQ/2. 114 Franklin St., Morristown, NJ 07960 (201-267-7448)

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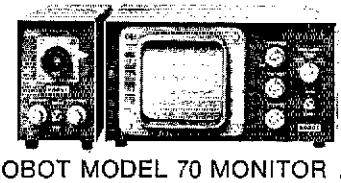

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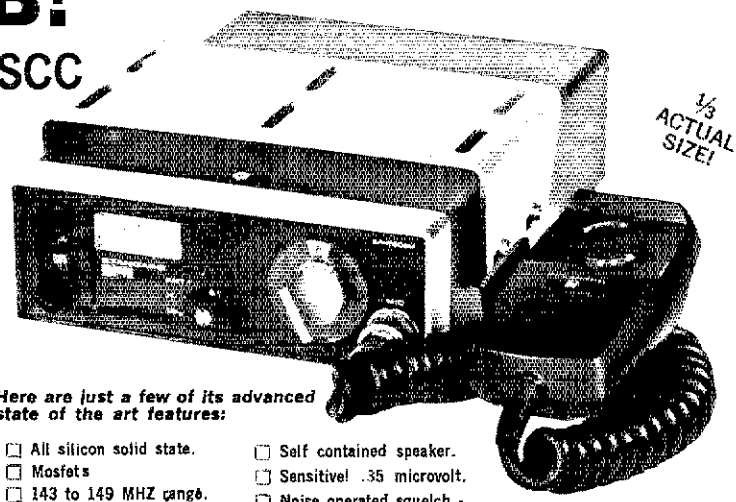

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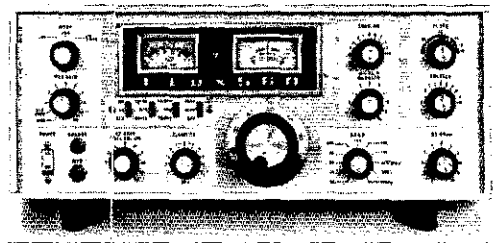

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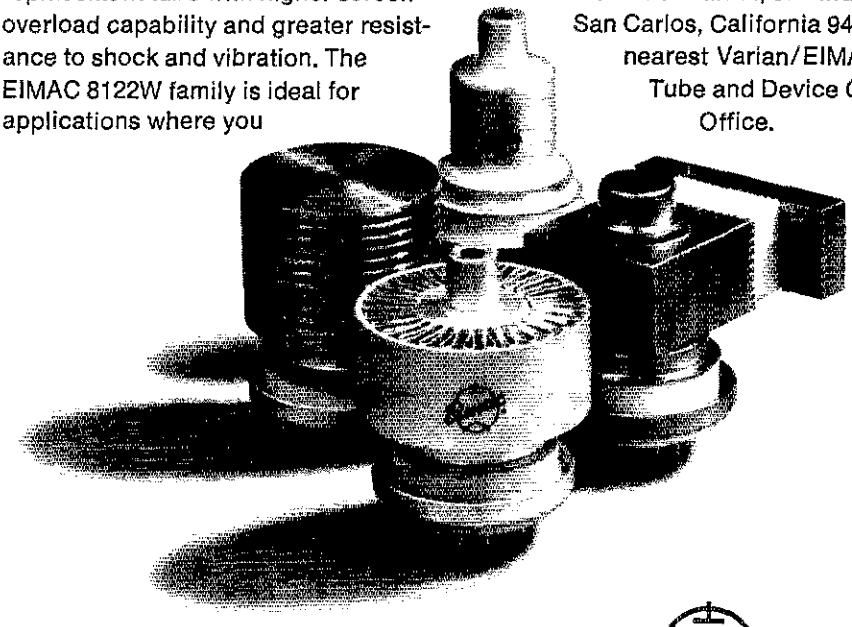

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