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QST

MAY 1967

VOLUME LI NUMBER 5

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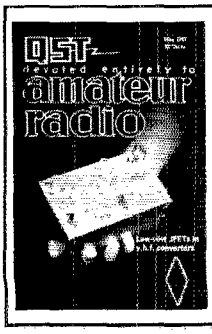

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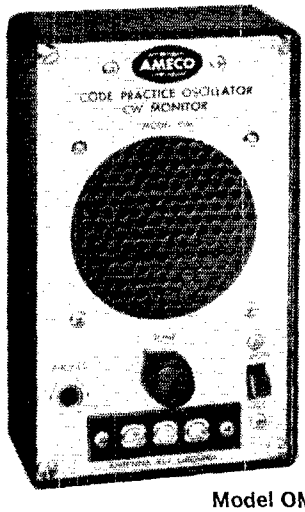

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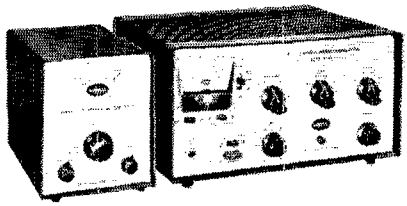

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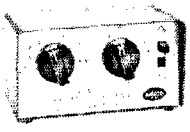

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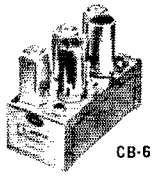

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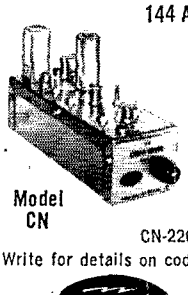

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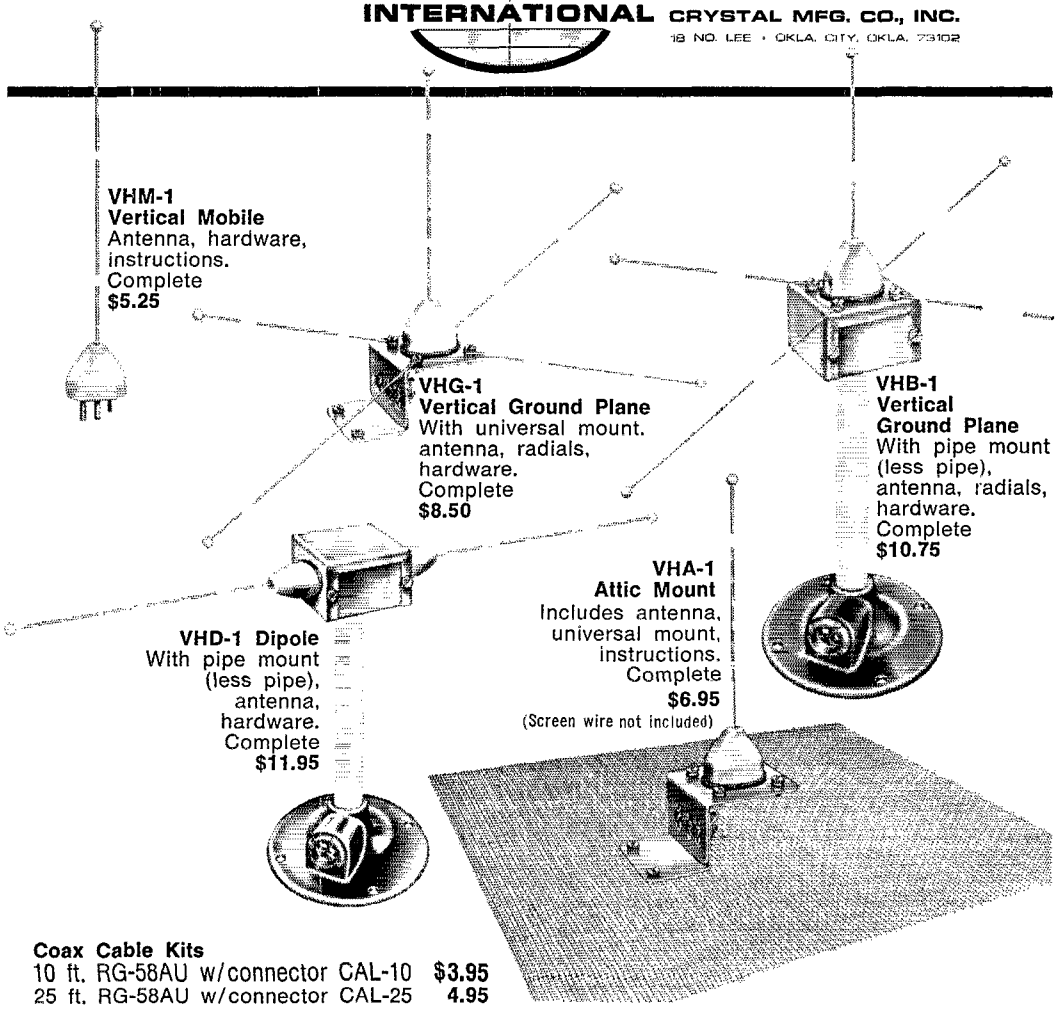

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West Gulf Division

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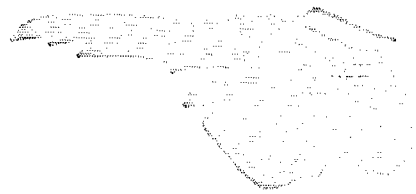


"It Seems to Us..."

PUBLIC RELATIONS

Every now and then a newspaper or magazine item will include mention of amateur radio activities in something less than complimentary fashion. The subject is usually amateur interference. Occasionally the item is directly antagonistic; more often the disparagement is implied, or conveyed by an inaccurate headline.

Usually, an alert local ham or club will take immediate action by contacting the paper or writing a letter to the editor in an attempt to obtain clarification and set the matter straight. While a desirable procedure, it still has the disadvantage of again mentioning interference and amateurs in the same breath, and thus tends to accentuate the association of ideas.

There's a much better basic approach.

What is needed is full, complete and accurate accounts of all *other* amateur doings, so that any localized problems such as interference will seem (as indeed they are) minor in comparison to the good that can be and is being accomplished by public-spirited hams. In other words, a good long-range public relations program. To paraphase the song title, you eliminate or neutralize the negative by accentuating the positive.

Naturally, any emergency activities of amateurs should be promptly and fully reported to newspapers, radio and TV stations. If the report reaches the media while the emergency still exists there is a good possibility the editor will give pictorial coverage. But in any one community emergencies are few and far between. You can't create a disaster. Yet you can be alert to participation in civic projects, or to initiation of some of your own, to maintain and improve the local standing of your amateur group.

A number of clubs have cooperated in fund-raising drives — e.g., an all-night telethon on behalf of cerebral palsy, where a net control station at the Hq. channeled incoming pledge calls to mobile units spread around the city for prompt pickup. In another city, famous for its huge parades, hams offered their services to the grand marshal; the procession started on schedule for the first time in the city's history — and hams did themselves a world of good in public relations.

But you don't need to wait even for fund drives or parades. Except in the larger cities, a great many amateur occurrences are considered newsworthy. The local club receiving its charter of ARRL affiliation; a local amateur making DXCC; setting up an e.m.e. or Oscar ground station; appointment of an emergency coordinator or RACES radio officer; participation by clubs members in a contest, Field Day, or hamfest; delivery of a message from a serviceman in Viet Nam to his mother — these and a host of other activities, however common they seem to us, can mean an inch or two in the Daily Bugle or 30 seconds on "The Voice of Podunk."

Next month ARRL Field Day June 24–25 will present a special opportunity for good public relations. Moreover, the week of June 18–24 is listed as "Amateur Radio Week" in Chases' *Calendar of Annual Events*, which many editors, columnists and on-the-air personalities use as an idea starter.

What else? Well, is your PTA putting on a hobby show? Be in it! Kiwanis looking for a speaker? Volunteer! Does your company have a "house organ"? Its editor would probably be delighted to have a feature story on hams in the company.

Publicity helps are on tap at League Hq. to make it easier for you, too. A sample speech, interview, and b.c. program, each available for the asking, can be the basis for a presentation spiced with local color from your own experiences. And we have reprints of outstanding stories, which have appeared in nationally-known magazines, as handouts to an audience after your talk, or for distribution at your club's hobby show exhibit.

Good public relations are important to nearly every society, corporation or charity, but especially important to us — our very licenses depend on our activities being "in the public interest, convenience or necessity." We must leave no doubt in the minds of the public that we fill this requirement to overflowing. QST

League Lines . . .

Don't forget the Board meeting May 5--see the April editorial and convey to your director any views you may have on those or other subjects.

Most League publications are best-sellers, but one seems little-known--the ARRL Annual Report, a spiral-bound 100-page summary of activities during 1966 related by extensive reports of officers and directors. Complimentary copies will go to affiliated clubs who have requested them; and are also available to individual members at approximate cost of production--$1, which includes recently-increased postage costs. For those not wanting the full report but having an interest in the financial statement, this extract of the report is furnished without charge to members sending a stamped self-addressed envelope.

Remember the letters in February "Correspondence" about QST for the handicapped and for a country minister with a large family? We've had membership fees paid for 25 deserving amateurs as a result of this prompting. FB!

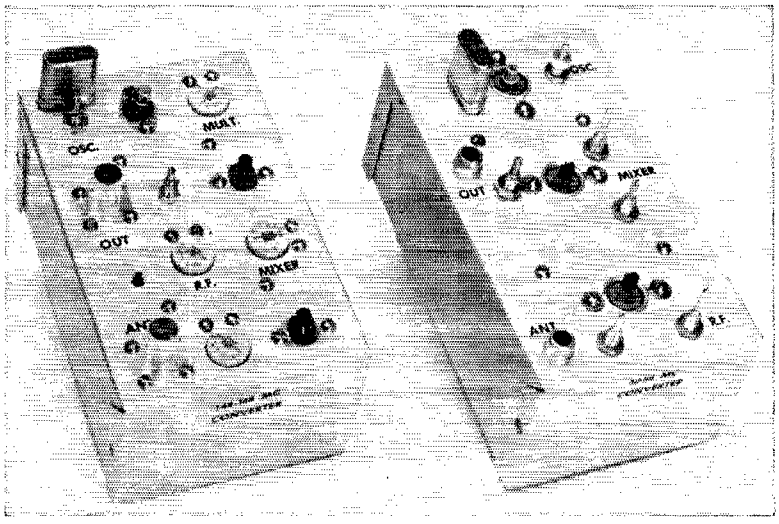
Following the IEEE show in New York, 37 representatives of the amateur radio equipment manufacturing and distributing businesses accepted an invitation to visit Hq. for a mutual exchange of views and establishment of closer cooperation between the League and the industry. Promotion of growth of amateur radio here and overseas, expanded public relations, and more assistance and guidance to radio clubs, were some of the subjects explored. One specific conclusion of the industry group, almost every one a ham himself, was the desirability of making the Novice license more attractive by renaming it ("basic" license?) and granting phone privileges on about 200 kc. of the high end of 10 meters. The group formed its own internal committees, to work with the League, on public relations, growth patterns, market data, and upgrading amateur radio technical capabilities.

W1BKC enjoyed the "Football Score Network" and other articles in the April issue but points out that a portable voice identification such as W8SJT/8 (yes, we used it for brevity) is improper and geographical location must be specified. He points out surely some ham will answer an FCC citation saying, "Well, I saw it in QST!" Touché!

The improving sunspot cycle is putting a lot of zing back into hamming; during the DX contest we were knocking 'em off one after another on 10 meters with only a mobile whip atop a tower. Wait 'til we get the beam back up!

And don't forget Field Day--are your club's plans in the works?

FET Converters For 6 and 2 Meters



Top view of the 6- and 2-meter FET converters. Both units are built in standard-size Miniboxes. The 6-meter model is at the right.

BY DOUG DEMAW*, W1CER

PUTTING the field-effect transistor (FET) to work for the first time need not be a frightening experience, even though the constructor may not have previously worked with transistors. Actually, the transition from vacuum-tube to transistor thinking is easier when FETs are used. The FET is not an exact counterpart of the vacuum tube, of course, but sufficient similarity exists to enable the user to employ many of the techniques common to vacuum-tube circuit design. With ordinary transistors, a non-vacuum-tube philosophy must be adopted because there is little similarity between the normally high-impedance circuitry of tubes and the characteristically low-impedance circuit values common to transistors. The FET, happily, exhibits high-impedance characteristics, permitting the use of the more familiar impedance-matching methods practiced in vacuum-tube work.

If one were to attempt a comparison between a triode tube and an FET, the gate could be thought of as a grid, the source could be regarded as the cathode, and the drain could be considered similar to a plate. A thorough treatment was given FETs in a previous issue of *QST*[1], so a discussion of how FETs work is not necessary here.

Low-cost Motorola JFETs were chosen for these converters. They are available at one dollar each from any distributor who handles Motorola parts. Although these MPF102 units are designed primarily for use up to 100 Mc., they perform well at 144 Mc. No doubt slightly better noise figures and more overall converter gain would be realized if u.h.f. FETs were used in the 2-meter version. The Siliconix 2N3823 N-channel JFET[2], although more expensive, is directly interchangeable with MPF102 in these circuits and is designed for v.h.f. and u.h.f. use. It costs $5.95 in single- lot quantities. IGFETs (insulated-gate FETs) were not considered for these converters because they are easily damaged and are rather costly. They are relatively safe in the hands of an experienced user, but are not recommended to the newcomer who is working with FETs for the first time.

Most transistorized receiving equipment is subject to cross-talk and overload if conventional transistors are used in the r.f. and mixer stages. These simple converters use field-effect transistors, whose characteristics resolve this common problem.

* Assistant Technical Editor.

[1] George, "Field Effect Transistors," *QST*, October 1966.

[2] Siliconix Incorporated, 1140 West Evelyn Ave., Sunnyvale, California 94086.

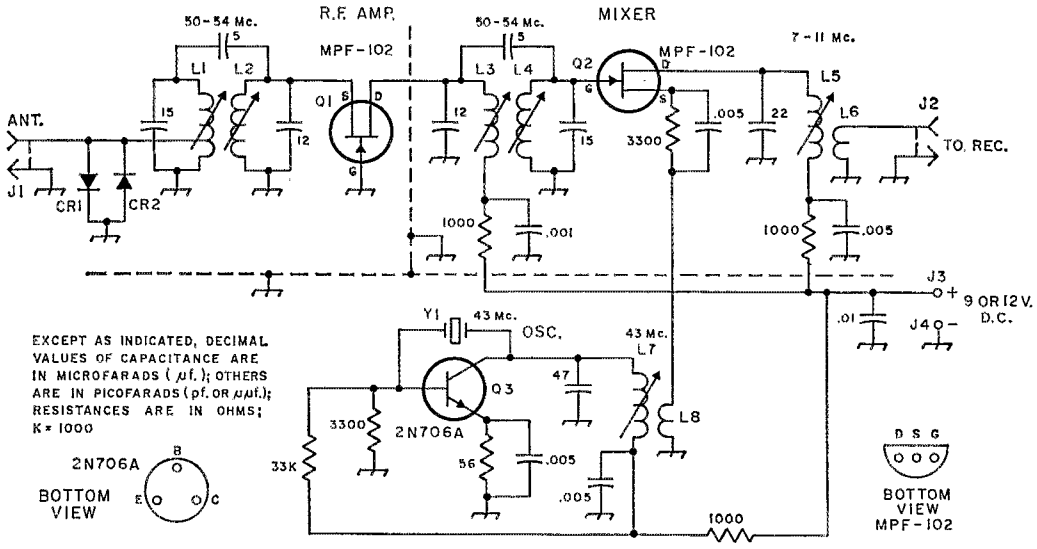
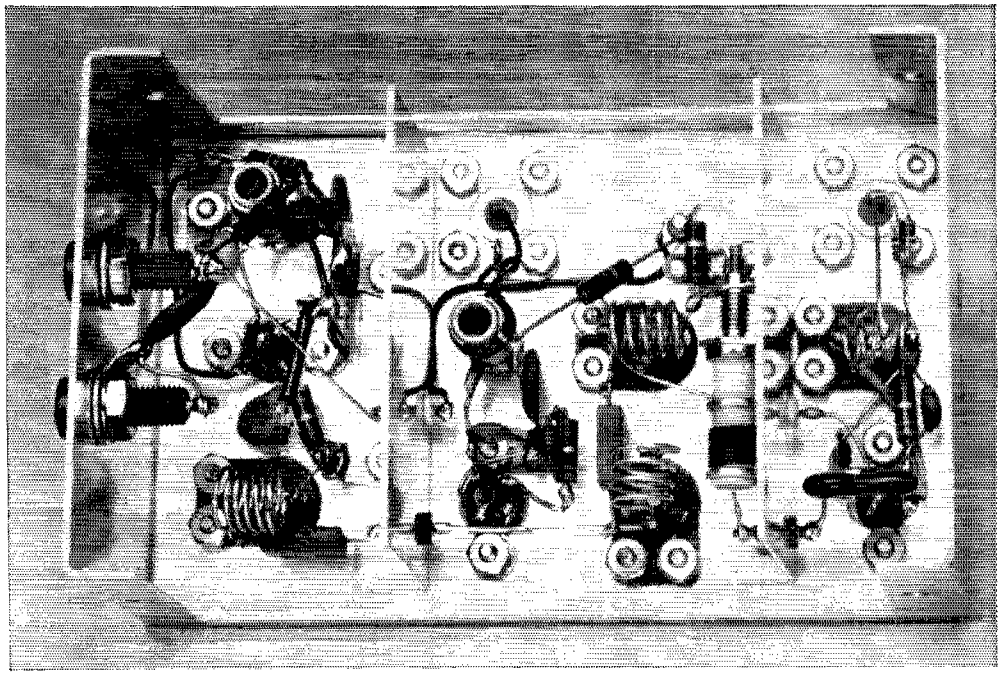


Fig. 1—Schematic of the 6-meter FET converter. All resistors are ½-watt composition. All capacitors are disk or tubular ceramic.

CR_1, CR_2—Small-signal germanium diode (1N34A suitable).
J_1, J_2—Phono connector.
J_3, J_4—Insulated banana jack, one red, one black.
L_1, L_4, inc.—0.68 μh., slug-tuned (Millen 69054-0.68*). L_1 has tap added at 2nd turn from ground end.
L_5—16-24 μh., slug-tuned (Miller 4507).
L_6—5 turns small-gauge insulated wire over cold end of L_5.
L_7—0.33 μh., slug-tuned (Millen 69054-0.33*).
L_8—1 turn small-gauge insulated wire over cold end of L_7.
Y_1—43.0-Mc. third-overtone crystal (International Crystal Co.).
*Available directly from James Millen Mfg. Co. 150 Exchange Street, Malden, Mass.



Bottom view of the 2-meter converter. The oscillator chain is at the left end of the chassis, the mixer is in the center, and the r.f. stage is at the right. The neutralizing inductor is in the mixer compartment, adjacent to the shield partition.

The 6-Meter Circuit

A 7 to 11-Mc. i.f. is used for the 6-meter converter of Fig. 1. The choice was made to permit the use of low-cost receivers as tunable i.f.s. Most receivers in the lower price class lack sensitivity and stability at 14, 21, and 28 Mc., making them unsuitable for use with v.h.f. converters. Normally, the 7-Mc. range is acceptable on such receivers. Alternatively, this converter can be used in combination with a 6 to 9-Mc. Command receiver, provided a high order of selectivity is not desired.

Diodes CR_1 and CR_2 are bridged between J_1 and ground to limit the level of r.f. or transient voltages at the converter input. This measure was taken for the protection of the r.f. amplifier, Q_1. Since Q_1 is operated as a common-gate amplifier — similar to grounded grid in a tube circuit — no neutralization circuit is necessary. A shield plate is needed, however, between bandpass circuits L_1L_2 and L_3L_4 to prevent stray coupling. The bandpass circuits provide better input selectivity than single-tuned circuits, hence reduce image response. Q_2, the mixer, operates in a common-source circuit with its oscillator injection fed into the source by means of L_8. The oscillator, a 2N706A, uses a standard overtone crystal circuit operating at 43 Mc.

The converter can be operated from 9 volts, drawing approximately 7 milliamperes, or from 12 volts with a current drain of about 12 ma.

2-Meter Converter

Referring to Fig. 2, CR_3 and CR_4 serve as protective diodes as in the 6-meter version. Q_4 works as a neutralized r.f. amplifier, with L_{10} serving as the neutralizing inductor. L_9 is shielded from the $L_{11}L_{12}$ bandpass circuit as shown in the photographs.

Mixer stage Q_5 is common-source connected and combines the incoming 2-meter signal with a 130-Mc. oscillator signal to provide an i.f. of 14 to 18 Mc. This i.f. range was chosen to allow for dial-calibration convenience — 14.0 Mc. equals 144.0 Mc., and so on. Oscillator injection is by means of a 5-pf. capacitor connected to the gate of Q_5.

An overtone oscillator is used at Q_6, producing output at 43.333 Mc. This frequency is multiplied to 130 Mc. by means of diode CR_5 which is connected between L_{16} and L_{17}. The tuned circuit, $L_{17}C_4$, provides selectivity and peaks the 130-Mc. output from CR_5.

The converter draws 6 milliamperes when operated from 9 volts. With a 12-volt supply, the drain is 8 ma.

Construction

Each unit is assembled in a $3 \times 5\frac{1}{4} \times 2\frac{1}{4}$-inch Minibox. Shield partitions are placed across the inside of each chassis as shown in the photos. The shields are made from pieces of 16-gauge aluminum and the dimensions are not critical. The main idea here is to break up the stray-coupling paths between the tuned circuits of the various stages.

Transistor sockets, per se, were not used in these converters. The 6-meter model uses standard Nuvistor sockets. The 2-meter version uses 8-pin subminiature tube sockets, all of which happened to be available in the author's junk drawer. The latter are too expensive to buy as "new" items, at least for this application, so it is recommended that either Nuvistor sockets or good-quality transistor sockets be used in both converters. A word of caution: Most of the low-cost imported transistor sockets found in bargain houses are too flimsy to be reliable. They soon become intermittent, even during nonrigorous use. For this reason, the more-reliable Nuvistor sockets were used. They're not only inexpensive but are universally available.

Phono connectors are used for the input and output jacks on the 6-meter unit. BNC fittings were decided upon for the 2-meter converter, primarily to keep the connecting lines as flat as possible on that band. Actually, the i.f. output connector on the 2-meter model can just as well be a phono jack.

Banana jacks, one red and one black, are mounted on the rear wall of each converter chassis and are used as connectors for the supply voltage. The color coding helps remind the operator to observe the correct battery polarity when hooking up the equipment.

Small E. F. Johnson feedthrough bushings are used between the sections of the converters. The bushings are mounted on the shield partitions and are used to route the signal leads from one stage to another. In the 2-moter model, neutralizing inductor L_{10} is supported by its coil terminals between two of the feedthrough bushings by soldering it in place with short lengths of stiff wire.

Converter Adjustment

The completed converters should be given a thorough visual inspection before applying power to them. Make sure that there are no physical short circuits, and inspect the work to see that no joints have been left unsoldered. An ohmmeter can be used to make a superficial check for d.c. shorts in the B+ line. The semiconductors should not be removed from their sockets for this test. A normal reading for the 6-meter converter will be approximately 1000 ohms with the ohmmeter connected between the B+ and B− minus jacks. A reading of 2000 ohms is typical for the 2-meter unit. If the ohmmeter leads are reversed, the readings will be about 500 ohms less than these values.

With the converter connected to the antenna system (or v.h.f. signal generator), and with its output connected to a suitable i.f. receiver, tune in a weak signal in the part of the band where you expect to operate. Peak all of the tuned circuits for maximum signal strength. If the signal cannot be found, chances are that the oscillator stage is not operating. Carefully adjust the oscillator collector tuned circuit, L_7 or L_{15},

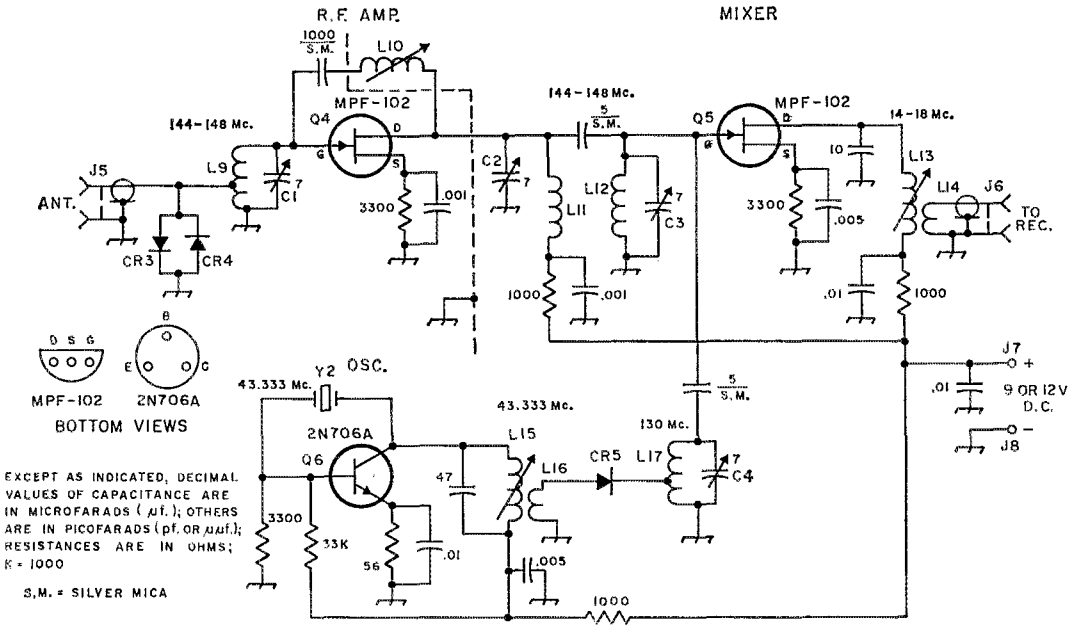


Fig. 2—Schematic of the 2-meter FET converter. Resistors are ½-watt composition. Fixed capacitors are tubular or disk ceramic unless otherwise noted.

C_1-C_4, inc.—1.5 to 7-pf. ceramic trimmer.
CR_3, CR_4—Small-signal germanium diode (1N34A suitable).
CR_5—Small-signal crystal diode for v.h.f. use (IN82A suitable).
J_5, J_6—BNC chassis fitting.
J_7, J_8—Insulated banana jack, one red and one black.
L_9—4 turns No. 20 tinned copper wire, 5/16 in dia., ½ inch long. Tap one turn from ground end.
L_{10}—10 turns No. 24 enam. wire, close-wound on ¼-inch dia. ceramic slug-tuned form (Miller 4500-4).
L_{11}—5 turns No. 20 tinned-copper wire, 5/16 inch dia., ¾ inch long.
L_{12}—4 turns No. 20 tinned copper wire, 5/16-inch dia., ½ inch long.
L_{13}—5-9 μh., slug-tuned (Miller 4505).
L_{14}—5 turns small-gauge insulated wire over cold end of L_{13}.
L_{15}—5 turns No. 24 enam. close-wound on ¼-inch dia. ceramic slug-tuned form (Miller 4500-4).
L_{16}—2 turns small-gauge insulated wire over cold end of L_{15}.
L_{17}—6 turns No. 20 tinned-copper wire, 5/16 dia., ½ inch long. Diode tap ½ turn from ground end.
Y_2—43.333-Mc. third-overtone crystal (International Crystal Co.).

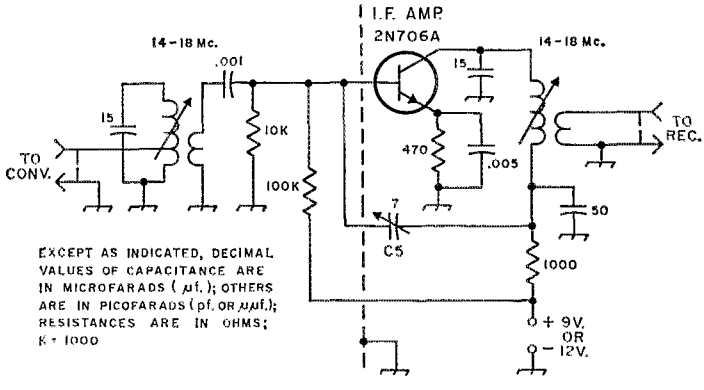


Fig. 3—Typical i.f. amplifier circuit for use between the 2-meter converter and the tunable i.f. receiver. Resistors are ½ watt composition. Capacitors are disk ceramic. C_5 can be a 1.5 to 7-pf. ceramic trimmer. Input and output tuned-circuit coils can be wound on Miller 4500-2 slug-tuned ceramic forms or equal. The amplifier could be built on a small Minibox, or could be incorporated in the 2-meter converter. C_5 is a neutralizing capacitor and should be adjusted for best circuit stability.

until an increase in receiver noise is noted. This should indicate that the oscillator "kicked" in. Once the point is found where the oscillator starts working, unscrew the coil slug two or three more turns (this will assure quick starting of the oscillator each time the converter is turned on). Then tune in a weak signal and peak the stages as described in the foregoing.

It should be possible to stagger-tune the two bandpass circuits of the 6-meter converter so that near-uniform response across approximately 500 kc. of the band can be achieved.[3] A little experimenting should be all that is required to accomplish this. The 2-meter converter, when stagger-tuned, will not provide uniform response across a spread of more than about 700 kc. without a sacrifice in converter gain. If wider coverage is required, an i.f. amplifier of the type illustrated in Fig. 3 should be used between the converter and the i.f. receiver. Some may wish to include the i.f. amplifier as a permanent part of the 2-meter converter. A slightly larger chassis could be used and the added stage could be contained in a separate compartment. Converter gain is adequate in the 6-meter model.

Performance

Both converters were tested at 9 and 12 volts. The performance showed little difference when going from 9 to 12 volts, making them useful as mobile converters or as portable units operated from a self-contained 9-volt battery. A small transistor radio battery will give many hours of operation. A Burgess D6, or equivalent, is a bit huskier and should last almost as long as its normal shelf life.

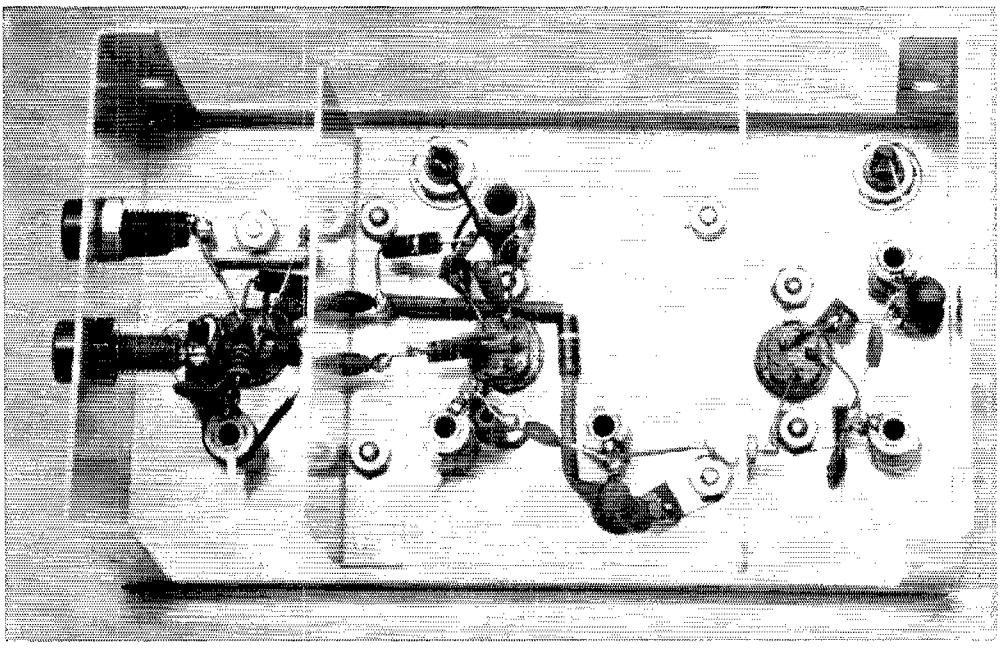
Although the noise figures of these converters were not measured, weak-signal tests were made to see how low in level a c.w. signal could be before copy was impossible. Using a Model 80 generator, and with the converters connected to a Collins 51S1 receiver, a c.w. signal of 0.25 μv. proved to be *Q5* on the 2-meter model. The signal was prominent enough to be located and tuned in, even if one did not know it was going to be there. A 0.1-μv. signal produced the same results with the 6-meter converter.

Stability is good with either unit and "birdies" were not evident when tuning across either i.f. range. If the r.f. stage is unstable in the 2-meter unit — evidenced by "blurps" and squeals when L_9 or C_2 are adjusted — simply adjust L_{10} a turn at a time until the condition disappears.

For those who have noise generators and wish to set the converters up for the best noise figure, the taps on the input coils can be adjusted for optimum performance. The neutralization circuit in the 2-meter model should also be adjusted for the lowest noise figure.

There is no reason why these converters cannot be modified to work into i.f.s other than those specified. It will be necessary to select the appropriate oscillator crystals if this is done, and to make modifications to the tuned circuits in the oscillator chain. The i.f. output coil will have to be altered for resonance at the chosen intermediate frequency. QST

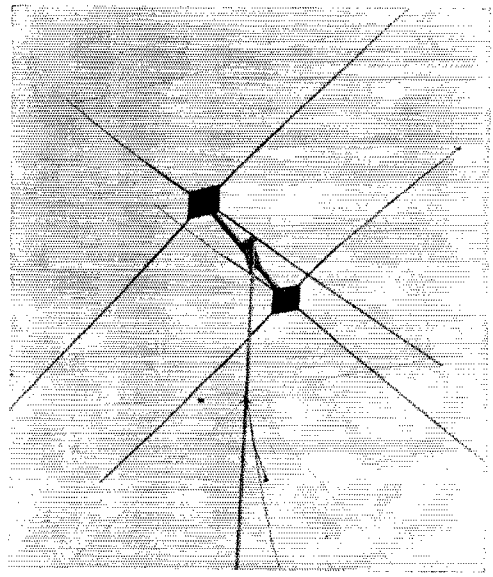
[3] The actual bandwidth of the converters will be determined to a greater extent by the characteristics of the i.f. output tuned circuits. By lowering the *Q* of the i.f. output circuits, greater band width will be possible, but at the cost of reduced converter gain.



Looking into the under side of the 6-meter converter the oscillator stage is at the left, the mixer is in the center, and the r.f. stage is at the far right. Shield partitions divide the sections. (This model built by C. Utz, W1DEJ.)

THE 20-MINUTE PORTABLE QUAD

BY WAYNE E. OVERBECK,* K6YNB



A sight to delight the eye of the touring ham—a 15-meter quad that can be assembled in only a few minutes. Knocked down, it takes up little room in a station wagon.

A two-element 15-meter cubical quad that can be assembled and raised by two people in a few minutes, costs $10 to build, and leaves room in the family wagon for other people, too. Really!

AND the antenna out here is a portable cubical quad which I've been carrying around with me in the back of the station wagon. W9XXX from K6YNB portable VE1, Nova Scotia, go ahead."

"WHAT did you say your antenna was, OM??? Break."

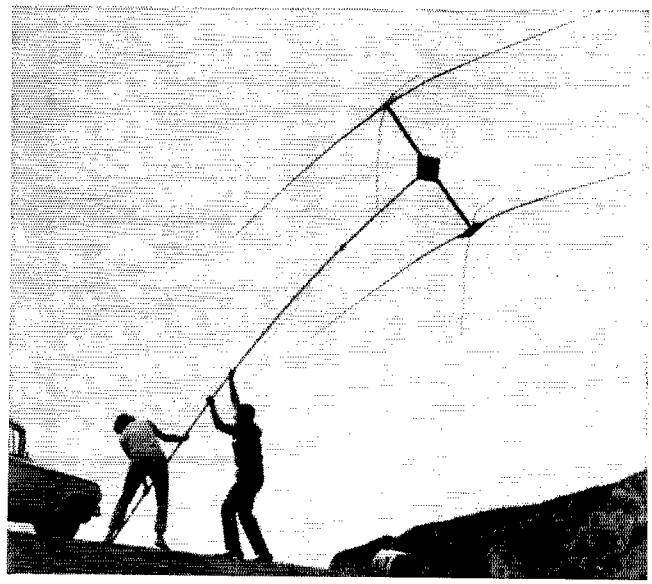
"I said a portable quad. I'm on a 12,500-mile trip by car, and it goes with me."

"Mister, I don't believe you."

Not too many people did, but the writer really did take a 15-meter quad along on a two-month vacation last summer. Not only did the quad fit neatly inside the car, a station wagon, but it left room for the XYL (there were no junior ops involved, but room could have been found for them too, if needed).

Furthermore, the thing cost less than ten bucks to build, including mast, and it worked amazingly well.

* 5163 Bushnell, Riverside, Calif.



Going up! Last summer K6YNB and his XYL raised this array about twenty-five times altogether.

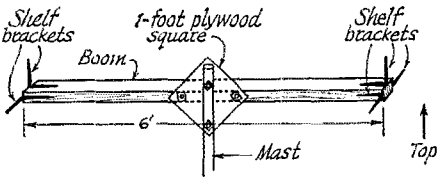


Fig. 1—Detail of boom and method of mounting to mast.

How it All Happened

After several years of hauling an s.s.b. transceiver and an assortment of dipoles — the tossed-over-a-branch variety — around, the writer decided something had to be done about portable antennas. The dipoles (or a mobile whip, for that matter) were fine for ragchewing on 75 or 40 meters, but they just didn't do an adequate job on the high-frequency DX bands — the author's favorite bands.

Why couldn't a beam of some kind be taken along? The usual home-station arrays, complete with a tower, were obviously out. The big arrays that are hauled off to field-day locations aren't usually too practical for a family vacation, either.

After trying just about every antenna known to amateur radio, the writer settled on a 15-meter two-element quad at a modest height. Unlike Yagis, the quad doesn't seem to mind a low height too much, and a quad isn't very complicated to put together.

We (the writer and his long-suffering XYL) finally decided to try having a quad as a traveling companion — and the results were simply unbelievable. Other hams refused to believe the antenna was anything less than a lofty home-station beam, and almost nobody believed we could raise the thing as fast as we claimed. Usually, a demonstration converted the skeptics.

Antenna Design

To keep things simple, we decided to build a quad for 15 meters only; 20-meter elements would have made the spreaders too long to fit into the car, and would have made the whole thing just too big to handle easily. Ten-meter elements would have been simple enough to mount inside the 15-meter loops, but 10 seemed to offer little prospect for reliable communications at the time. At a different point in the sunspot cycle, the writer would have definitely included 10-meter elements.

In another effort to achieve simplicity, we decided to use four ordinary five-foot TV mast sections to support the quad. The masts overlap by a few inches, so the boom ends up 19 feet above ground. This is low by the usual standards, but it is nearly a half wavelength on 21 Mc., and the excellent performance on long-haul DX work suggested that the radiation angle wasn't hopelessly high. Also, try putting a 15-meter quad on 30 feet of mast and then walk it up with a raising crew of two — you'll soon come to appreciate a 19-foot-high antenna, especially if you plan to raise it often.

Another compromise the writer made in the interests of simplicity, economy, and ease of raising was to exclude a rotator. Since the mast was normally within reach of the car-seat operating position, this seemed like a good bargain.

Mechanical Details

The portable quad uses a six-foot boom made of 2 × 2 lumber. Three shelf brackets are permanently attached to each end of the boom, as shown in Fig. 1.

The boom attaches to the mast by means of a one-foot plywood square which is bolted diagonally to the mast and the boom with short carriage bolts and wing nuts.

Two more plywood squares serve as end spiders (see Fig. 2). Each spider is fastened to the shelf

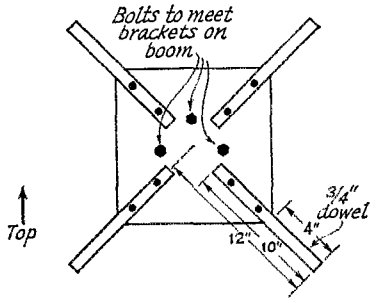


Fig. 2—End spider (2 required) which bolts to bracket end of boom.

brackets on the boom with short carriage bolts and wing nuts. One bolt for each bracket is plenty. The spiders have four lengths of ¾-inch dowel protruding from their corners. This makes it possible to assemble the spreaders quickly by sliding them on.

The spreaders consist of lengths of bamboo permanently attached to short pieces of ¾-inch plastic irrigation tubing, which fit snugly over the dowels on the spider. The overall length of each spreader arm needs to be slightly over eight feet for a 15-meter quad, when the spider itself provides eight inches of the spreader's total length, as it does here.

You could eliminate the plastic tubing altogether, but then you would have to find a way to fasten the bamboo directly to the plywood square. In any language we could speak, that meant tightening another 16 nuts each time the thing went together. You could use tubing for the entire length, too, but the tubing we found in a builder's supply house wasn't very rigid. Besides, it costs twice as much as bamboo.

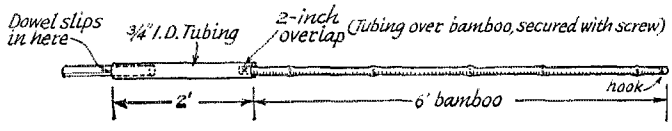
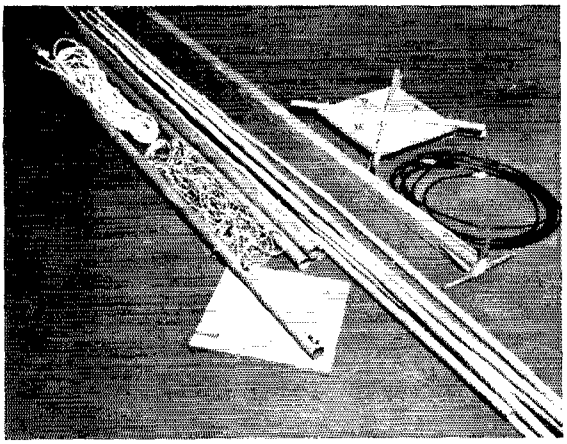


Fig. 3—Spreader arm details.



The entire antenna system is shown dismantled here. It fits easily inside a station wagon, leaving room for several people and luggage. The only parts that will not fit inside a sedan are the bamboo and plastic spreaders. They could easily be carried on top of the car, or could be cut into two sections each.

Each loop of wire is measured out and solder lugs are attached at the four corners, so the loops can be quickly slipped over hooks placed at the proper points on the spreaders. By the way, don't use heavy unstranded wire, or else you'll never get it rolled up and unrolled as you assemble and disassemble the quad. We used No. 20 stranded hookup wire.

The antenna is guyed by means of nylon rope and a guy ring at the 15-foot level on the assembled mast. The ring can be held in place and kept from binding when you rotate the quad by placing three small machine screws in the mast just below the ring's level.

Electrical Details

Electrically, the quad is conventional. Its elements measure about 11 ft. 4 in. for the top end of 15 meters. The driven element is fed with RG-59/U 72-ohm coax, and the reflector is tuned by means of a small loading coil.

The coil is used because the usual tuning stub is pretty cumbersome and gets in the way when you roll the element up. We found that four and a half turns of No. 14 enameled wire close-wound on a one-inch plastic form provided the optimum front-to-back ratio on our model, but it wouldn't hurt to experiment here.

The six-foot boom length is not critical, but the reflector tuning and s.w.r. will change with a different boom length. The s.w.r. on the writer's quad read 1.3 to 1 at 21.4 Mc.

Assembly and Raising

We found that a minute or so devoted to a study of the terrain around a potential site was worthwhile. Of course, a hilltop is a good bet, but the best radio location we ever found was on flat ground 50 yards away from a salt-water beach. Always check the radio noise level on a mobile antenna before raising the quad somewhere. Putting up a quad is an awful lot of work just to discover an S9 noise level.

Choose your guy anchors (trees, fence posts and car bumpers make good ones) at this point or you'll regret it later.

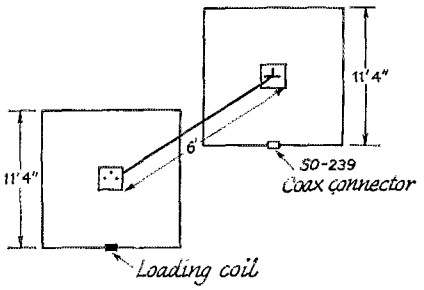


Fig. 4—Elememt dimensions of the assembled quad.

Portable Quad Materials List

8 bamboo poles (20¢ each)
1 2 × 2 boom, 6 feet long (surplus)
6 shelf brackets (3 for 39¢)
2 10-foot lengths of ¾-inch i.d. plastic tubing (39¢ each)
1 8-foot length of ¾-inch dowel (50¢)
3 one foot × 1½-inch plywood squares (surplus)
4 5-foot sections of extension-type TV mast ($1.25 each — $5)
100 feet of nylon rope for guying ($1.50)
100 feet of stranded antenna wire, about No. 20 gauge ($1)
Miscellaneous carriage bolts, wing nuts, length of 72-ohm coax, PL-259 and So-239 connectors, one-inch coil form, short length of No. 14 plain enamel wire, etc. (Estimated total cost $10, if coax and a few junk-box parts are on hand).

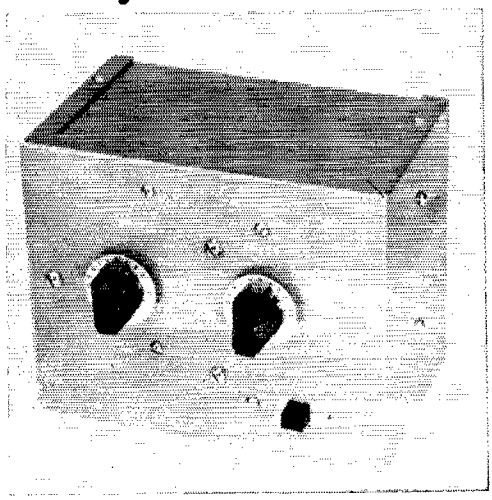
In the assembly sequence, the first step is to slip the four arms onto each spider and string the elements. Then stand the boom on one element and place the other element atop the boom. Bolt both in place. The four mast sections should now be slipped together, and the top one secured to the boom. The coax can now be tied to the mast above the guy ring and connected to the driven element.

Finally, one person walks the antenna up, while the other holds the bottom of the mast down. At last, the ham in the family holds the quad upright while the XYL runs around tying the guy ropes down. We tried the reverse of this last procedure, and had to pick up the pieces on one of our early raising attempts.

Evaluation

Obviously, this quad is no match for a big home-station array. In a series of about 75 tests,

(*Continued on page 140*)



The knob at the left is the r.f. peaking and the mixer trimmer is at the right. At the lower right is S_1, the power switch.

The Bonus FET 21-Mc. Converter

Improving Receiver Performance on 15 and 10 meters

BY LEWIS G. McCOY,* W1ICP

MANY Novices starting out in amateur radio acquire either used or low-priced receivers. And in many instances, such receivers may do a good job on the 80 and 40-meter bands but leave much to be desired on the higher bands. Usually there is a lack of sensitivity on the higher bands. One approach to the problem is to rework the receiver but this can require technical experience and can be a time-consuming job plus the fact that the newcomer doesn't usually have access to the necessary test equipment to do a proper job. A simpler method of improving performance on the higher bands is by use of converters.

This article describes the construction and adjustment of a simple converter for the Novice that will provide a great deal of improvement for 15-meter reception. The converter makes use of field-effect transistors, which are a fairly new arrival in electronics. A recent *QST* article[1] described what they are and how they work, so they won't be discussed here except to state they are ideal for the type of project described in this article. Before getting into the actual construction details of the converter, let's see how a converter works to improve your receiver performance.

Converters

Fig. 2 is a block diagram of the essentials of a crystal-controlled converter. The converter consists of an r.f. amplifier, a mixer stage, and a crystal-controlled oscillator.

Coming into the r.f. stage from the antenna are our 21-Mc. signals. These are amplified and fed into the mixer. Also fed into the mixer stage is a signal from the 25-Mc. crystal-controlled oscillator. The two signals, 21 and 25 Mc., beat against each other in the mixer stage, producing a third signal at 4 Mc., the difference between the two incoming signals. Actually, there are several combinations produced by the mixer, but we are only concerned with the "difference" frequency in this case.

The 4-Mc. output from the mixer is then fed into the communications receiver, which is tuned to 4 Mc. What we hear is the original 21-Mc. signal, now shifted to 4 Mc., that appeared on the antenna. As was stated earlier, most receivers, even the older models, will do a pretty fair job on the 80-meter band, so what we do in this case is make use of the 3.5- to 4-Mc. tuning range of the receiver to tune in our 21-Mc. signals. This usually provides more selectivity, a better tuning rate, and more sensitivity.

As stated in the title, this is a "bonus" converter. The bonus comes from the fact that it is also possible to tune in the first 500 kc. of American phone portion the 28-Mc. band with the same converter. If we *add* 3.5 Mc. to 25 Mc.,

Want to soup up that old receiver? Here is a simple crystal-controlled converter using the new FET's that will step up the performance of your receiver on 15 and 10.

* Novice Editor.

[1] George, "Field-Effect Transistors," *QST*, Oct. 1966.

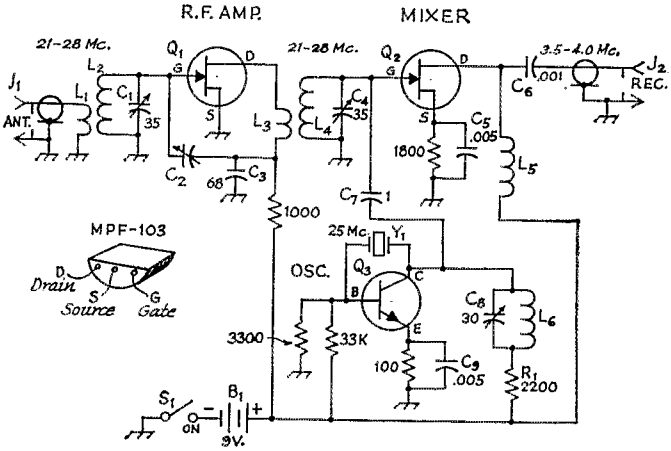


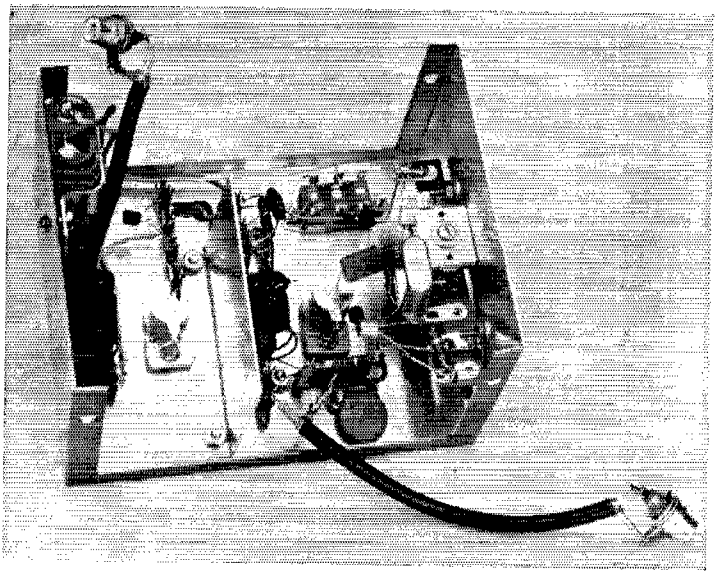
Fig. 1—Circuit diagram of the 21-Mc. FET Bonus Converter. Resistances are in ohms, all resistors are ½-watt. Decimal value capacitors are in μf. all others are in pf.

B_1—9-volt battery
C_1, C_4—35 pf. miniature variable (Millen 25035-E).
C_2—Gimmick capacitor, see text.
C_3—68-pf. silver mica.
C_5 C_6, C_9—Disk ceramic.
C_7—1-pf., mica.
C_8—3-30 trimmer, compression type.
J_1, J_2—Phono jacks.
L_1, L_3—5 turns close-wound, at the ground ends of L_2 and L_4
L_2, L_4, L_6—14 turns No. 20 enam., close-wound, ½-inch diameter.
L_5—25-μh. r.f. choke (Millen J-300-25).
Q_1, Q_2—JFET transistor, (Motorola type MPF-103).
Q_3—NPN transistor (Type 2N706).
R_1—2200 ohms.
S_1—Single-pole, single-throw switch.
Y_1—25-Mc. overtone crystal (International Crystal FA-9).

the crystal-controlled frequency, the resulting output from the mixer is at 28.5 Mc. Both the r.f. and mixer input circuits can be peaked in either the 21- or 28-Mc. bands. It should be pointed out that in the 21-Mc. band the 80-meter portion of your receiver will tune "backwards." In other words, to tune in 21,000 kc., the low end of the band, your receiver is tuned to 4000 kc., and as you tune down towards 3500 kc. you are actually tuning *up* the 21-Mc. band. For the 28-Mc. band, you tune up from 3500 kc. to go higher in frequency. If you don't care for the bonus feature, you can change the crystal-oscillator frequency to 17,500 kc. and in that case, you'll tune up from 3500 kc. to go from 21-Mc. up the band. All this may sound confusing but a study of Fig. 2 will help clarify the process.

Constructional Information

The converter shown in the photographs and Fig. 1 is housed in a Minibox, 3 × 4 × 5 inches. All of the components, with the exception of C_1, C_4 and the two phono jacks, are mounted on terminal strips. Transistor sockets could be used, but it is more economical to mount the transistors by their own leads. Important: when soldering transistor or diode leads be sure to use a heat sink between the body of the transistor and the point where the lead is being soldered. Too much heat can easily ruin the component.



The components to the left of the shield are in the r.f. stage, the FET transistor is mounted on the terminal strip near the top in this view. Just to the right of the shield are L_3 and L_4. Immediately to the right of the mixer trimmer is Q_2. The oscillator components are all mounted on the terminal strip on the right hand wall. In testing, J_1 and J_2 are attached to the coax leads and the two jacks are later mounted on the back of the cabinet.

We used a copper clip as a heat sink, clipped to the lead being soldered. This leaves your hands free to do the soldering.

Referring to the circuit diagram, Fig. 1, and the photographs, you can see that all the components for the crystal-controlled oscillator stage are mounted on a single terminal strip. L_6 is supported by its own leads and the crystal, Y_1, is soldered to the terminal strip with short lengths of wire which are soldered directly to the crystal pins. Be sure to use a heat sink on the crystal leads when soldering them. A crystal socket could be mounted on the front panel but it adds to the cost.

The r.f. and mixer coils are made from No. 20 enameled wire and are supported by their own leads. All the coils in the unit are close-wound. We had a piece of ½-inch-diameter dowel rod which we used for a form when winding the coils. Be sure that L_1 and L_3 are wound in the same direction as L_2 and L_4.

You can buy a ready-made bracket for holding the battery in place, but we made a small metal bracket to hold the battery. A small metal shield, 2 × 3 inches with a ¼-inch lip, is mounted between the r.f. and mixer circuits to prevent undesired coupling between the two circuits.

An FET is very similiar to a triode tube and unless precautions are taken, self-oscillation can take place. In our unit, it was found that the r.f. stage didn't oscillate when an antenna was connected to the input. However, when the antenna was removed and C_1 tuned through its range, the r f. stage would take off. To be on the safe side, a neutralizing circuit was installed. C_2 is the neutralizing capacitor and consists of two 1½-inch-long pieces of No. 20 insulated wire. One wire is connected to the gate of Q_1 and the other wire to the top of C_3. The wires are then twisted together. We found that two twists provided enough capacitance to stabilize the r.f. stage. You can try your converter without the neutralizing circuit, but if it is unstable add the neutralization.

Short pieces of RG-58/U coax cable are used to connect the input and output to the phono jacks which are mounted on the back of the converter. It is important that a shielded lead, such as coax, is used between the output of the converter and the input of the receiver. Otherwise, you are likely to get pick-up and feed-through of 80-meter signals.

Tuning Up The Converter

The first step in adjusting the converter is to make sure the oscillator is working. Open the lead that connects the 2200-ohm resistor, R_1, to the plus-B line and insert a milliammeter in series with resistor and the plus line. Any milliammeter with at least 5 ma. full scale is suitable. Next, adjust the trimmer capacitor C_8 to the point where you get a current reading. In our unit the maximum was about 4 ma. and we found the oscillator worked OK with as little as 2 ma. Set the trimmer for the maximum amount of current at this time, connect an antenna to the converter input, and make another connection from the output jack to your receiver.

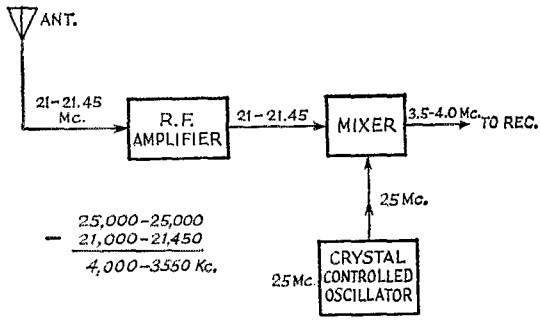


Fig. 2.—Block diagram of frequency conversion.

Tune your receiver to about 3950 kc. Next, peak both C_1 and C_4 for maximum background noise. There will be two spots in the tuning range of C_1 and C_4 where there will be a peak in the noise. The settings with the capacitors closest to maximum capacitance (plates meshed) will be the 21-Mc. peak. The other point, with the capacitances near minimum, will be the 28-Mc. setting. If the band is open you should be able to tune the receiver and hear some stations. With a station tuned in, retrim the oscillator capacitor for the lowest current drain while still maintaining good signal strength. The object, of course, is to keep the current drain as low as possible, to maintain the longest battery life. The total drain on our unit was less than 4 ma.

The 25-Mc. crystal specified in Fig. 1 will provide dual band coverage. In order to cover 21 Mc. and have the receiver tune "forward," you would need a crystal at 17,500 kc. (17.5 plus 3.5 equals 21 Mc.). In the event you use a 17.5-Mc. crystal, change L_6 to 16 turns of No. 20 enamel, ½-inch diameter, close-wound.

One question that many builders would have is what the battery life would be in "normal" use. According to the battery manufacturer (in this case Eveready because we used their 9-volt Model 216) the battery life will depend on current drain, hours of use, and cut-off voltage. "Cut-off" in this case means where the battery voltage drops to a point where the converter will no longer operate. In our unit, the cut-off voltage was determined by running the voltage down to the point were the oscillator no longer oscillated, while listening to a signal on 21 Mc. The cut-off voltage was about 5 volts. According to Eveready's engineering guide, this would mean a battery life of about 140 hours, with two hours per day use and a current drain of 4 ma.

As to performance, the converter does an excellent job in pulling in the weak stations. We found that the converter was not inclined to overload in the presence of strong signals. A couple of very strong local signals were on 15 when the unit was tested and there was no cross-modulation. QST

Solid-State Receiver Design with the MOS Transistor

In Two Parts — Part II

BY GEORGE T. DAUGHTERS,* WB6AIG, ex-K9KDE, WES HAYWARD,** W7ZOI, ex-WA6UVR, and WILL ALEXANDER,*** WA6RDZ

Part I, in April QST, *discussed the use of the MOST in receiver front ends. The remainder of the receiver developed by the authors is the subject of this second part.*

The Intermediate Frequency Amplifier

The heart of the i.f. amplifier in the HBR-TR is a 9-Mc. crystal lattice filter. The filter used in the receiver described is commercially manufactured[9] and is currently used in the Hallicrafters SX-146. Good 9-Mc. filters are also available from McCoy and from International Crystal. The bandwidth obtained is dependent upon the exact filter chosen. The authors recommend that prospective builders buy or build a 6- or 8-pole filter. The less-expensive 4-pole filters are somewhat lacking in skirt selectivity. The 9-Mc. frequency was chosen because of the availability of commercial filters; however, there is nothing special about this frequency. The earlier receivers built by the authors used 5.5-Mc. 8-pole home-brew filters. Those interested in building their own filters should consult the work of Vester.[10]

The i.f. amplifier is shown schematically in Fig. 6. Direct coupling is used, with d.c. feedback for bias stabilization. The direct coupling has two distinct advantages. The first is simplicity, but more important is the ease with which the gain of the amplifier is controlled. The gain is varied by shunting the base of Q_7 to ground either through the manual gain control (see Fig. 11) or through the a.g.c. system. R.f. isolation of the base of Q_7 is provided by RFC_1. As the base of Q_7 is shunted toward ground, the Q_7 collector current decreases. Q_7 was chosen for its good reverse-a.g.c. characteristics: thus the gain decreases as the current drops. As the collector current in Q_7 decreases, the base current of Q_8 increases, yielding an increase in the collector current of Q_8. Q_8 was chosen for its good forward a.g.c. characteristics. Hence, Q_8's gain decreases with increased collector current. When the base

* Palo Alto Medical Research Foundation, Palo Alto, Calif.

** Microelectronics Research, The Boeing Co., Seattle, Wash.

*** Fairchild Semiconductor, Mountain View, Calif.

[9] Crystal Filters, Inc., Phoenix, Arizona.

[10] Vester, "Surplus Crystal High Frequency Filters," *QST*, January 1959.

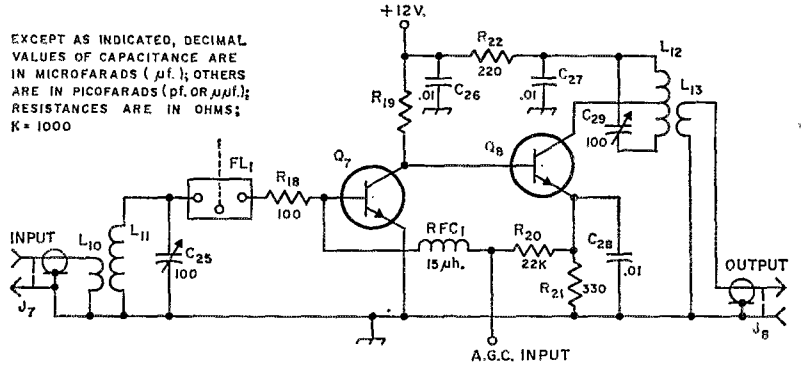
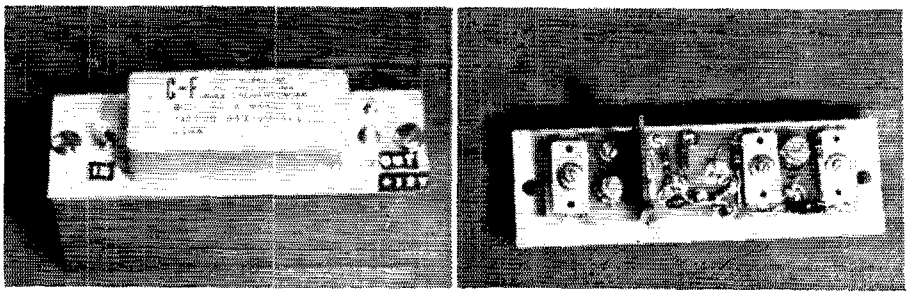


Fig. 6—The 9-Mc. intermediate-frequency amplifier circuit.

C_{25}, C_{29}—7-100 pf., mica trimmer (Arco 423 or equiv.).
C_{26}, C_{27}, C_{28}—Disk ceramic.
FL_1—9-Mc. crystal filter, bandwidth as desired (see text).
J_7, J_8—Miniature coax connector, chassis mounting.
L_{10}—5 turns No. 30 enam. on same type toroid core as used for L_2 (Arnold A4-310-125-EP or equivalent).
L_{11}—20 turns No. 30 enam. on same core as L_{10}.
L_{12}—30 turns No. 30 enam. on same type core as L_{10}, tapped 18 turns from collector end.
L_{13}—3 turns No. 30 enam. on same core as L_{12}.
Q_7—2N3692, SE-1001 (Fairchild) or equivalent; see text.
Q_8—2N3688, 2N3689, 2N3690, or, SE-5021 (Fairchild); see text.
R_{18}, R_{20}, R_{21}, R_{22}—½-watt composition.
R_{19}—½-watt composition; select value to give 5-ma. collector current in Q_8.
RFC_1—Miniature r.f. choke, 15 μh.



Outside and inside views of the 9-Mc. i.f. amplifier and filter. The crystal filter and coax connectors are mounted on one side of the metal cover of the small enclosure; other components are on the other side. Note the shield at left center for separating the input and output circuits. The third trimmer in the inside view was found to be unnecessary and does not appear in Fig. 6.

of Q_7 is at d.c. ground, Q_7 is cut off and Q_8 is approaching saturation, producing very low gain. The maximum gain in the i.f. amplifier was 55 db., and the gain could be controlled over an 80-db. range.

In one of the authors' receivers, the crystal filter consisted of two 5.5-Mc., 250-cycle wide, 4-pole filters in series. Although the skirt response was superb, the attenuation in the filter was rather high. Because of this attenuation and the relatively low gain in the MOST mixer front end, the overall receiver noise figure was degraded. This problem was easily solved by the addition of an extra i.f. stage in between the filters. A 2N3564 was used, biased to provide a collector current of 6 ma. Typical commercial filters have in-band attenuations of less than one db. Hence, the noise-figure degradation experienced by the authors should not be typical.

The i.f. amplifier is constructed on Vector board using flea clips or rivet-in terminals. Because of the high gain of the i.f., it is necessary that shielding be used. This is accomplished by building the i.f. in a long, narrow aluminum box, and by mounting the Vector board as close to the grounded metal wall as possible. A shield is placed to prevent a signal being fed around the crystal filter. A resistor may be connected across the Q_8 collector coil, L_{12}, to stabilize the amplifier if it tends to oscillate. The amplifier is aligned easily by placing a 1000-ohm resistor across the primary of the output transformer and measuring

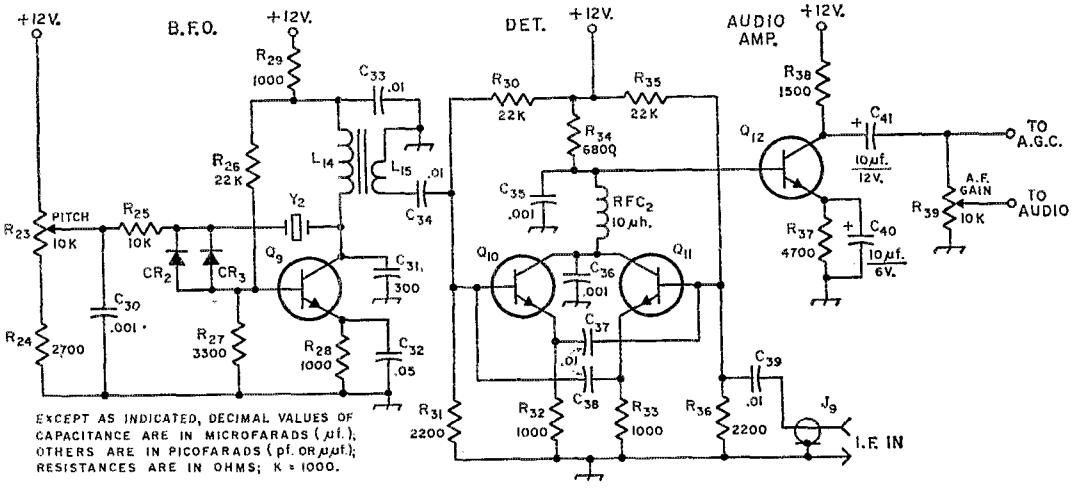


Fig. 7—Circuit of the product detector, beat-frequency oscillator, and first audio stage.

C_{30}-C_{39}, inc.—Disk ceramic.
C_{40}, C_{41}—Electrolytic.
CR_2, CR_3—FD-200 (Fairchild) or equivalent.
J_9—Miniature coax connector, chassis mounting.
L_{14}—20 turns No. 28 enam. on toroid core (Arnold A4-310-125-EP or equivalent).
L_{15}—8 turns No. 28 enam. on same core as L_{14}.
Q_9—2N3641 or equivalent.
Q_{10}, Q_{11}—2N3564 or equivalent.
Q_{12}—2N3566 or equivalent.
R_{23}—Linear control.
R_{24}-R_{38}, inc.—½-watt composition.
R_{39}—Audio-taper control.
RFC_2—Miniature r.f. choke. 10 µh.
Y_2—B.f.o. crystal, to match filter; see text.

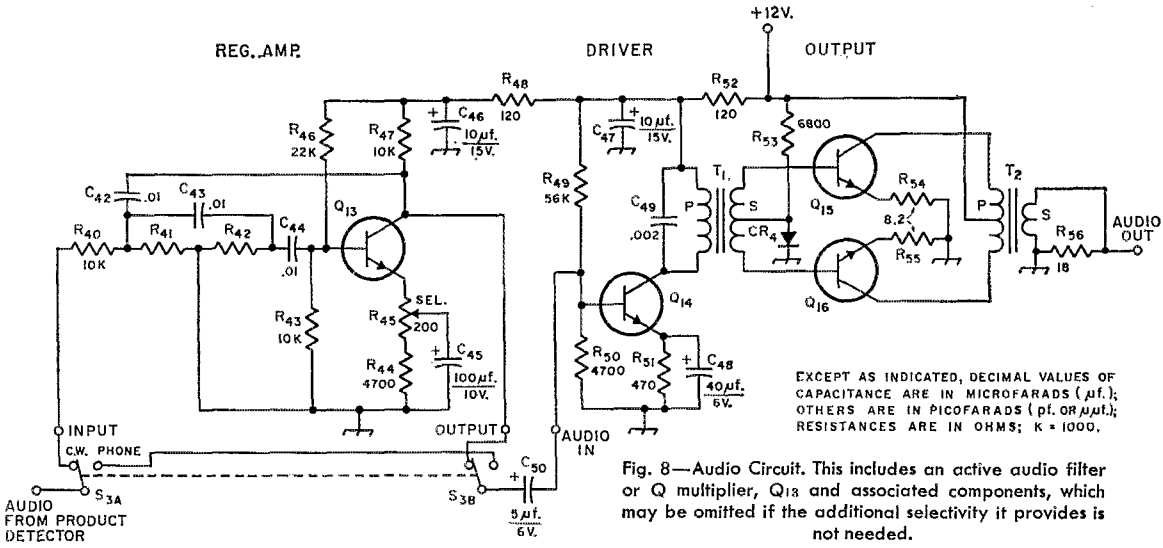


Fig. 8—Audio Circuit. This includes an active audio filter or Q multiplier, Q_{13} and associated components, which may be omitted if the additional selectivity it provides is not needed.

C_{42}, C_{43}, C_{44}—Disk ceramic.
C_{45}, C_{46}, C_{47}, C_{48}—Electrolytic.
C_{49}—Disk ceramic.
C_{50}—Electrolytic.
CR_4—Any signal-type silicon diode (Fairchild FDM-1000 used).
Q_{13}—2N3566 or equivalent.
Q_{14}, Q_{15}, Q_{16}—2N3567 or equivalent.
R_{10}, R_{43}, R_{44}—½-watt composition.
R_{41}, R_{42}—20,000 ohms total, ½ watt composition. Ratio of R_{41} to R_{42} determines the peaking frequency.
R_{45}—Linear control.
R_{46}-R_{56}, inc.—½-watt composition.
S_3—D.p.d.t. toggle or slide switch.
T_1—Driver, 10,000 ohms to 2000 ohms center-tapped., (Argonne AR-109 or equivalent.)
T_2—Output, primary 100 to 500 ohms center-tapped, voice-coil sec. (Stancor TA-39, TA-40, etc.).

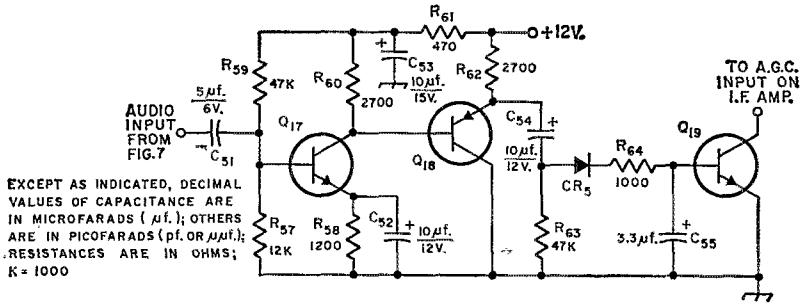


Fig. 9—Hang audio-a.g.c. circuit for controlling i.f.-amplifier gain.

C_{51}-C_{55}, inc.—Electrolytic.
CR_5—Any signal-type silicon diode; (Fairchild FDM-1000 used).
Q_{17}, Q_{19}—2N3566 or equivalent.
Q_{18}—2N3568 (Fairchild) or equivalent.
R_{57}-R_{64}, inc.—½-watt composition.

the voltage with an r.f. probe and v.t.v.m. A small signal may be "stolen" from the b.f.o. and fed to the filter input as a signal source. If an inexpensive signal generator is used, an extremely steady hand is required, especially if a c.w. (500 c.p.s.) filter is used. Slight mechanical deformation of the signal generator's cabinet has been found to be a useful means for fine tuning. L_{11} and L_{12} should be tuned to resonance by their respective capacitors, C_{25} and C_{29}. C_{29} may need a final "touching up" in actual use because the v.t.v.m. adds capacitance in the preliminary alignment. After the r.f. and detector are completed and operating, C_{29} should be adjusted for maximum gain.

The Product Detector and B.F.O.

Shown in Fig. 7 is the schematic for the detector and b.f.o. of the HBR-TR. A printed circuit board layout is shown in Fig. 12.

The beat oscillator is a VXO circuit similar to that used by Vester.[5] However, the variable capacitor is replaced by a pair of silicon diodes, CR_2CR_3, that act as a voltage-variable capacitor. The capacitance is controlled by a potentiometer mounted on the front panel. In the circuit shown, over 5 kc. variation in frequency is obtained.

If the prospective constructor decides to buy a filter such as the McCoy, a switching system may be easily implemented.

[5] See part I.

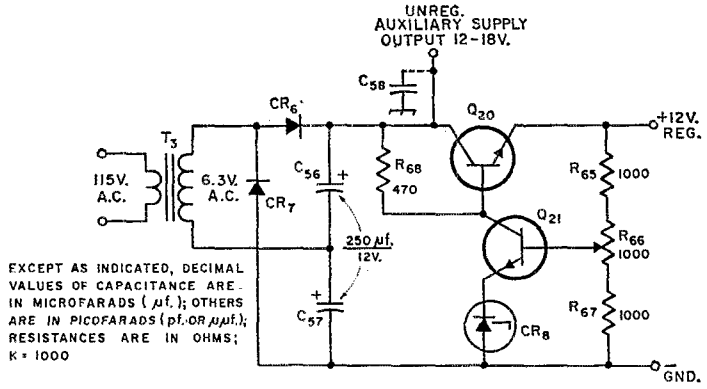


Fig. 10—Power supply circuit for 12-volt regulated output; available current is 150 ma.

C_{56}, C_{57}—Electrolytic.
C_{58}—Optional; 1000-μf. 25-volt electrolytic if unregulated aux. output is used.
CR_6, CR_7—Silicon, 750 ma., 200 p.i.v. (1N2069 or equivalent).
CR_8—5-volt Zener diode (2N3564 used as described in text).
Q_{20}—2N3567 or equivalent.
Q_{21}—2N3566 or equivalent.
R_{65}, R_{67}, R_{68}—½-watt composition.
R_{66}—Linear control (Bourns 3067P or equivalent for board mounting).
T_3—6.3-volt 1-amp. filament transformer.

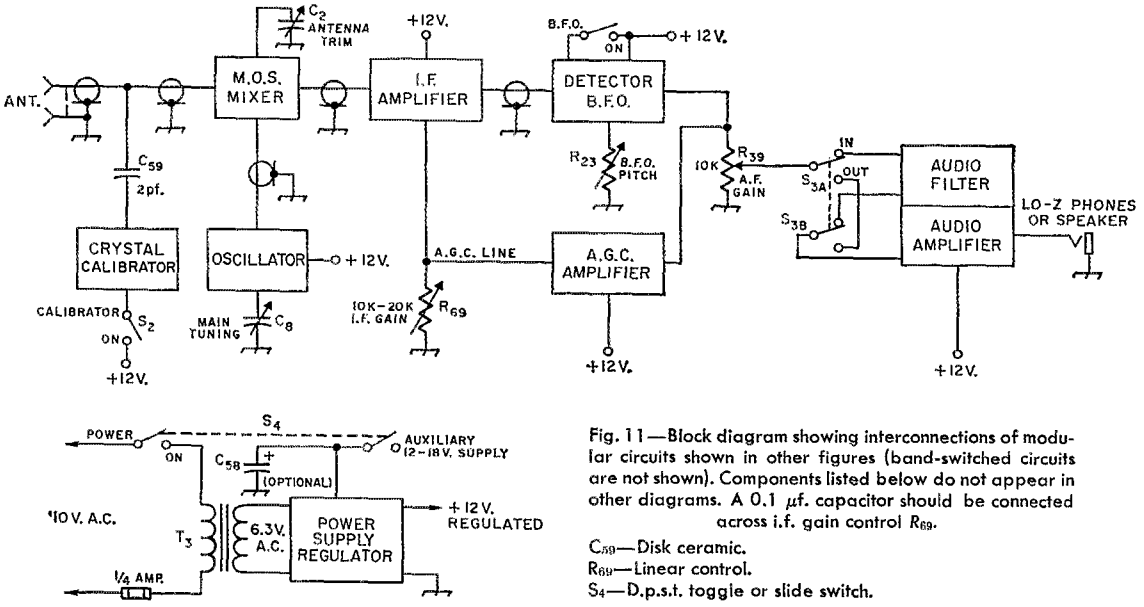


Fig. 11—Block diagram showing interconnections of modular circuits shown in other figures (band-switched circuits are not shown). Components listed below do not appear in other diagrams. A 0.1 μf. capacitor should be connected across i.f. gain control R_{69}.

C_{59}—Disk ceramic.
R_{69}—Linear control.
S_4—D.p.s.t. toggle or slide switch.

The product detector is similar to a balanced detector described by McAleer.[11] As shown, the emitter of Q_{10} is tied directly to the base of Q_{11} through a capacitor. The emitter of Q_{11} is similarly returned to the base of Q_{10}. The two collectors are common. If one input alone (b.f.o. or signal) is applied to the detector, the collector signal current will, to first order, be zero. This is because one transistor looks like a common-base amplifier (non-inverting), and the other looks like a common-emitter amplifier (inverting). Hence, the detector is balanced for both the signal and b.f.o. inputs. However, when both signals are present the sum and difference frequencies will appear in the common collector circuit. The difference frequency is selected by the low-pass filter formed by RFC_2 and the associated capacitors. An audio voltage thus appears across the 6800-ohm audio load resistor, R_{34}. This is amplified by the direct-coupled audio amplifier, Q_{12}, and fed to the audio gain control, R_{39}.

The measured output amplitude of the detector with a b.f.o. signal applied is a linear function of the input voltage for inputs to 5 mv. peak to peak. This produces full a.g.c. and full audio output. If the b.f.o. signal is removed, the output is zero until the detector is overdriven. An a.m.

[11] McAleer, H. T., "Mixer Circuit has Clean Output", *Electronic Industries*, October, 1960.

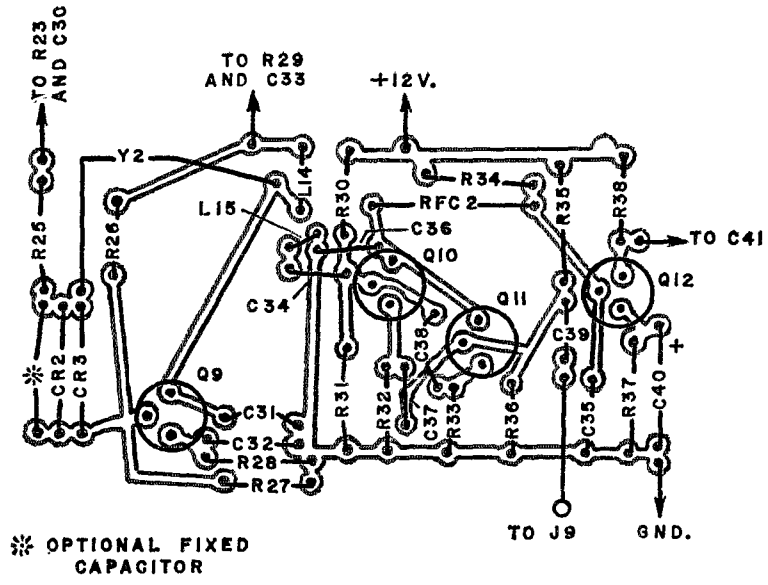


Fig. 12—Full-scale etched-circuit layout of b.f.o.-detector.

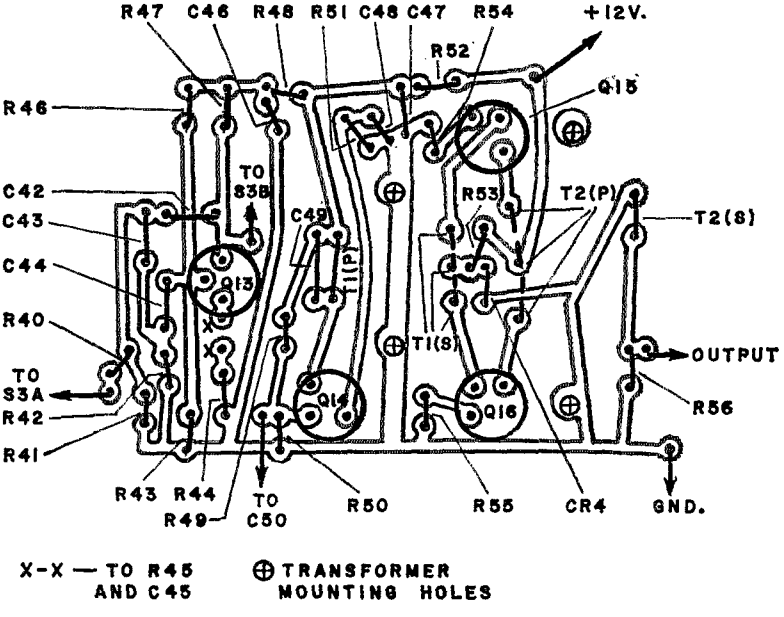


Fig. 13—Full-scale etched-circuit layout for audio amplifier.

signal of 70 mv. peak to peak is easily detected, giving *full* audio output.

The construction of the detector/b.f.o. module is in general non-critical. Lead lengths should be minimized, and the b.f.o. circuit of course should be located well away from any i.f. components.

The Audio Section

The schematic of the audio section of the receiver is shown in Fig. 8 and a printed circuit layout is suggested in Fig. 13. The circuit consists of a regenerative amplifier[12] followed by

[12] Delpech, J. F., "Simple Circuit Tunes Audio Amplifier," *Electronics*, March 22, 1965.

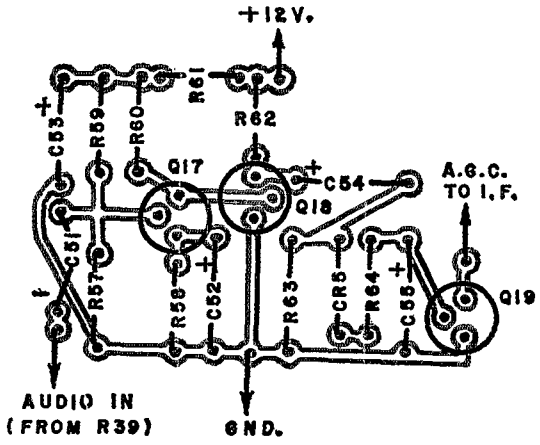


Fig. 14—Full-scale etched-circuit layout for hang a.g.c

a typical driver and push-pull output stage. One-third watt of audio power is available. The active *RC* audio filter circuit has been found to be a very useful addition for c.w. reception when the i.f. filter has a bandwidth compatible with s.s.b. If a narrow filter is available in the i.f., this *Q*-multiplier is generally redundant except for the purpose of reducing the receiver noise bandwidth. A 40-c.p.s. bandwidth has been obtained at 800 c.p.s. with the values shown. Adjustment of R_{45} controls the *Q* of the circuit.

If the prospective builder should decide to omit the audio filter, it would be worthwhile to consider one of the commercially-available inexpensive audio amplifiers such as those offered by Lafayette Radio. The audio amplifier section from a five-dollar transistor radio also could be used.

A Hang A.G.C. System

Automatic control of the i.f. gain is achieved with the circuit shown in Fig. 9. An audio signal is obtained from the high end of the a.f. gain control, R_{39} (Fig. 7), and applied to Q_{17}, a voltage amplifier. This is followed by Q_{18} which is a direct-coupled emitter follower. The output of this stage is rectified by the diode, CR_5, and the resulting d.c. current is used to charge C_{55}. When the voltage on C_{55} reaches a threshold of 0.6 volt, the control transistor, Q_{19}, begins to conduct, thus reducing the gain of the i.f. amplifier. This threshold effect provides the usual voltage delay.

The rise time with this circuit is quite small, typically less than one millisecond. As a result, high-amplitude noise pulses may activate the a.g.c. The rise time may be lengthened by increasing the resistance, R_{64}, in series with CR_5. Similarly, the decay time may be decreased by reducing C_{55} or R_{64}. Ideally, a low-pass filter should be placed just ahead of Q_{18} to reduce the amplitude of noise pulses.

This a.g.c. system has proven entirely adequate for typical s.s.b. and c.w. operation. The figure of merit has not been measured for the circuit, however.

The a.g.c. may be built on Vector board, or the printed circuit of Fig. 14 may be fabricated. Layout is noncritical.

A Power Supply

Shown in Fig. 10 is a circuit for a simple 12-volt power supply suitable for the HBR-TR. A printed circuit board is shown in Fig. 15. The circuit consists of a full-wave voltage doubler and a series regulator, Q_{20}. The regulator is driven by an error amplifier, Q_{21}, which is referred to a zener diode, CR_8. The base-emitter diode (no collector connection is necessary, but the collector may be tied to the base) of a 2N3564 is used as an inexpensive zener diode[13]. The

(*Continued on page 136*)

[13] Daughters, "The Field Day Gallon", *QST*, March, 1966.

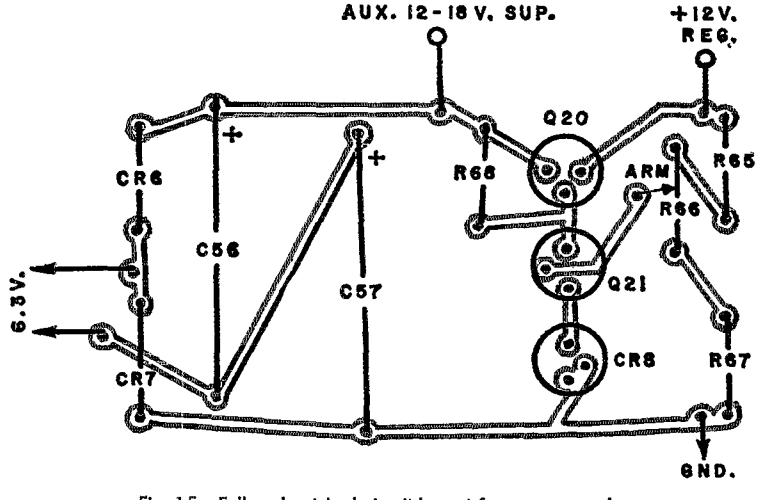
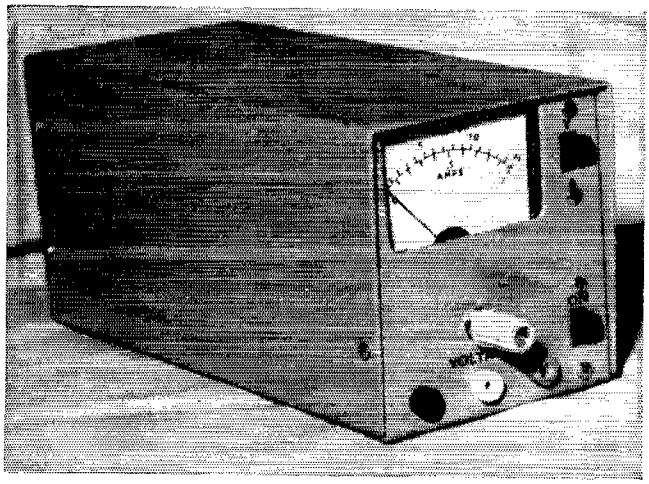


Fig. 15—Full-scale etched-circuit layout for power supply.



The regulated power supply is housed in a homemade two-piece metal box. Pin jacks are used for the d.c. output, neither side of which is grounded. The third jack is a ground connection to the case. On-off and meter switches are along the right side; the knob in the middle is on the voltage-control potentiometer.

An Adjustable Regulated Transistor Power Supply

1 to 15 Volts at Up to 1 Ampere

BY ARLEIGH B. BAKER,* KØPSG

For most electronic construction projects it is desirable that a reliable regulated power supply provide the source of d.c. power. These days a lot of projects are becoming transistorized and require a stable low-voltage source. The power supply described in this article will develop from 1 to 15 volts at currents up to 1 ampere, which should be adequate to power most transistorized devices. Short-circuit protection is also provided.

One important requirement is that the source be variable over a wide voltage range without degrading the regulation properties of the supply. A common approach is to use feedback from the output voltage and compare it to a Zener-diode voltage in an amplifier stage, thus developing a correction voltage for the supply to work on. Tapping the output voltage with a potentiometer then will provide variable-voltage output. However, the regulation is not generally good, and neither is the linearity of adjustment.

The power supply described in this article uses a novel approach to provide an adjustable voltage output. Instead of tapping the output voltage, the reference voltage is varied over the desired range and amplified to provide a stiff, adjustable reference voltage. The circuit is shown in Fig. 1.

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How It Works

The maximum required reference voltage is set by Zener diode CR_1. The desired reference voltage is taken from R_1, the voltage-control potentiometer. This reference voltage is applied to the base of Q_1, a d.c. amplifier, which in turn establishes a stiff reference voltage at the emitter of Q_2, the heart of the regulator.

Transistors Q_3 and Q_4 form a two-stage emitter-follower d.c. amplifier. Thus the voltage applied to the base of Q_3 will determine the the voltage at the emitter of Q_4, and also the output voltage. Suppose a voltage is applied to the emitter of Q_2 from Q_1, the reference-voltage amplifier. The output voltage is also applied to the base of Q_2 via R_5. If the output voltage is greater than Q_2's emitter voltage, base current will flow, causing Q_2 to conduct. This reduces the voltage at the collector of Q_2, and the output voltage accordingly, since the output voltage is a result of Q_2's collector voltage. In the

This supply will handle a wide range of transistor-equipment requirements with good voltage regulation, and uses a novel variable-reference arrangement for obtaining adjustable output voltage.

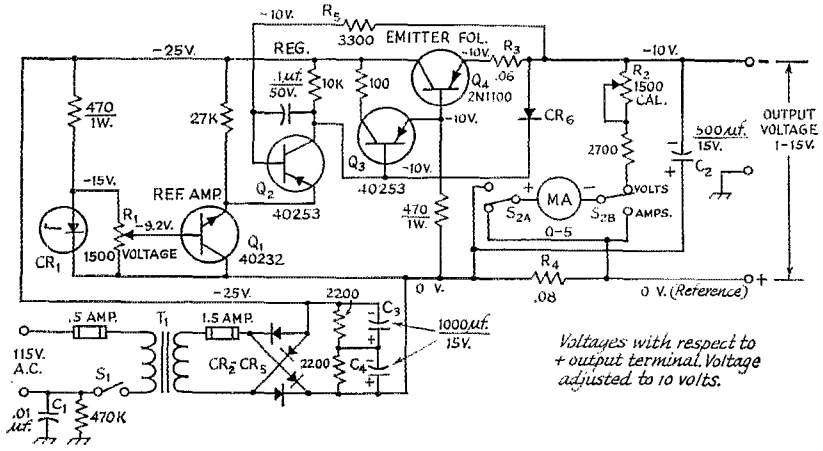


Fig. 1—Circuit of the adjustable regulated transistor power supply. Resistances are in ohms; resistors are ½-watt, 20 percent tolerance, unless otherwise specified. Capacitors with polarity indicated are electrolytic; others are ceramic. Voltages shown are with respect to positive output terminal with R_1 adjusted for 10 volts output. Components not listed below are numbered for reference.

C_1—A.c.-type ceramic.
CR_1—Zener diode, 15 volts, 1 watt.
CR_2-CR_6, incl.—Silicon, 50 volts p.i.v., 1 amp.
M_1—0-5 ma. d.c., 20 ohms internal resistance.
R_1, R_2—Linear control.
R_3—0.06 ohm, 5 percent tolerance (see text).
R_4—0.08 ohm, 5 percent tolerance (see text).
R_5—For text reference.
S_1—S.p.s.t. slide switch.
S_2—D.p.d.t. slide switch.
T_1—Power, 18 volts, 1 amp.

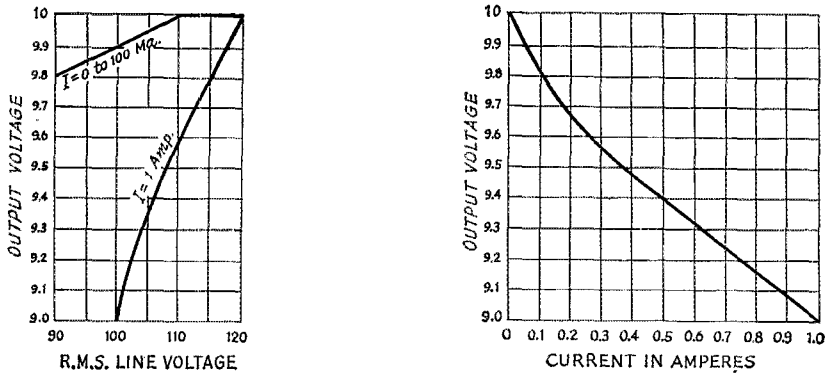
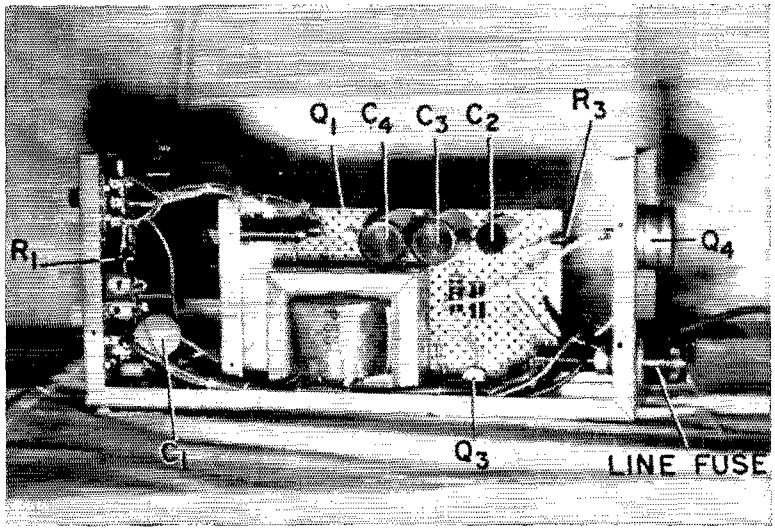


Fig. 2—Output voltage vs. line voltage (left) and output current (right). The curves at the left are for two values of load current. Curve at right is with constant line voltage (117 volts). Output voltage adjusted to 10 volts d.c. no load, in both cases.

TABLE I

Basic Requirements of Transistors

Stage	*Type Used*	*Style*	*Minimum Current Gain*	*Maximum Current*	*Maximum Voltage*	*Maximum Dissipation*
Q_1	40232	NPN	50	25 ma.	15 v.	40 mw.
Q_2	40253	PNP	30	25 ma.	25 v.	65 mw.
Q_3	40253	PNP	30	100 ma.	25 v.	400 mw.
Q_4	2N1100	PNP	50	2.0 amp.	25 v.	25 watts



View from the side with the cover off. The transistor mounted on the rear chassis wall is Q_4. The two fuses also are mounted on this wall. Q_1 is just above the center of the transformer, to the left of the two electrolytic capacitors, while Q_3 is at the bottom to the right of the transformer. Q_2 is below Q_1, but hidden by the transformer.

opposite case, suppose that feedback current doesn't flow: then Q_2 won't conduct, thus the collector voltage rises to a point where Q_2 again conducts slightly. Since the available current at Q_2 is many times less than the desired output current, transistors Q_3 and Q_4 amplify the current to a useful level.

Short-circuit protection is provided by CR_6 and R_3, which develop a feedback voltage at the base of Q_3 if the current load exceeds 1 ampere. This prevents the supply from being overloaded if the output is accidentally short-circuited. R_3 serves to trim the point of feedback current; most of the required voltage drop will occur between the base and emitter junctions of Q_3 and Q_4. Obviously, the point of feedback will depend upon the junction temperature, resulting in what could be an undesirable effect if the supply is to operate at currents near one ampere. Removing CR_6 and shorting out R_3 will result in better regulation at currents near one ampere, so it might be useful to many to delete these parts.

Circuit Notes

A d.c. input to the regulator of 25 volts is used to permit the supply to be useful at low a.c. power-line voltages. Good regulation can still be obtained with an a.c. supply of only 90 volts.

Two 15-volt capacitors in series were used to filter the input voltage, since a 500-μf. 30-volt electrolytic capacitor did not happen to be in the goody box.

The transistors used are relatively new RCA types and are not very expensive. However, the types are not critical should substitution become necessary. Table I lists some of the more important data for the transistors and should prove helpful if substitutions are made. Be very careful that the transistors selected are rated for at least slightly more than the no-load d.c. source voltage, or else one of them might short, causing others to be destroyed. Try to pick a transistor with a high value of d.c. current gain for Q_2, since the actual regulation takes place in this stage, and is a function of the gain provided.

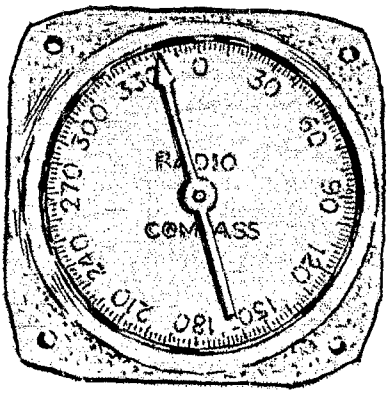
The meter is calibrated to read full scale at 15 volts when in the voltage position, and one ampere when the meter switch is in the current position. The voltmeter calibration can be adjusted to a known standard with R_2.

R_3 and R_4 are homemade from lengths of No. 30 copper wire wound over a 1-megohm ½-watt resistor. The wire for R_3 is 7 inches long. R_4 requires 9.3 inches. The length of wire used for R_3 can be adjusted for the resistance required to limit the maximum-current protection to any desired value. R_1 should be adjusted to calibrate the ammeter to a known standard.

Construction

The power supply is built in a two-piece cabinet assembly. The bottom piece serves as the main chassis, front panel, and rear panel. The top piece serves also as the sides. Tapering of the top piece, at the front, adds to the decorativeness of the cabinet. Since the meter available was damaged, it had to be mounted behind the front panel, behind a plastic pane.

Circuit components are mounted on a slab of perforated board for simplicity. The board is secured to the meter bracket and a lug on the chassis. Q_4 is mounted on the rear panel, on mica insulation, for good heat transfer to the cabinet. This is very important if Q_4 is to dissipate 25 watts without overheating. Note that Q_3 is mounted to the chassis with a metal clamp, for good heat transfer. The case of Q_3 must not be internally connected to any of the leads, so keep this in mind if a substitution is made. QST



Antenna Rotators and Indicators

In Two Parts

Part II—Indicators

BY E. LAIRD CAMPBELL,* WICUT

How Rotator Indicators Work

EVEN if the antenna is rotated by hand, it is nice to have some kind of readout in the shack to show where the antenna is pointed. Of course, the simplest and probably the most reliable indicator is an optical one. Simply looking out the window is okay if the antenna is situated so that it can be viewed from the operating position. This has disadvantages, especially at night. If the rotator is placed at the bottom of the tower and the shaft is visible (or if the rotator is at the top and an extension indicator shaft can be brought down the tower), some identifying marks or a pointer can be put on the shaft to show direction.

When the antenna is located at a distance, an optical indicator such as a system of mirrors can be used. If the antenna is rotated manually from the shack with pulleys and ropes, the heading can be determined by calibrating the rope as it passes a particular point in the shack.

Electrical indicators make beam direction readout much easier and these indicators can usually be boiled down to six basic types.

The simplest indicator is shown in Fig. 9. A rotating switch, S_2, is attached to the rotator drive shaft and connects the appropriate lamp to indicate the rough direction of the antenna. Of course, more than four lamps (and 4-switch sections) can be used to get finer resolution.

The indicator in Fig. 10 tells even less than the lamp indicator just described. In fact, it gives beam direction, plus or minus 360 degrees! When the direction switch, S_1, is closed (for either clockwise or counter-clockwise rotation), the rotator motor, B_1, operates and turns the antenna. A cam, attached to the rotator shaft, has a switch, S_2, associated with it, and when the rotator comes around after making one rotation, the cam opens one set of contacts and turns off the motor. Another set of contacts turns on a lamp, I_1, in the indicator box to show that the rotator is at the end-of-travel in that direction. When the direction switch, S_1, is closed in the other direction, the motor makes one revolution in the opposite direction until the cam stops the motor and the lamp comes on again.

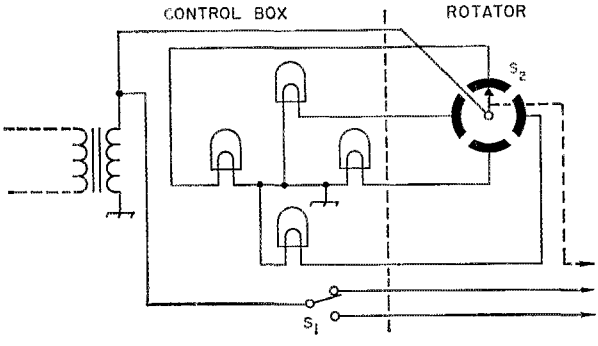


Fig. 9—Simple quadrant rotator indicator uses lamps to show approximate antenna direction.

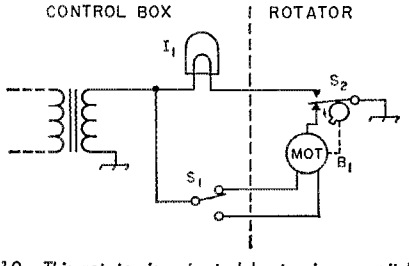


Fig. 10—This rotator is actuated by turning a switch on the control box to the right or left. An indicator lamp, I_1, comes on at the control box when the rotator reaches its full clockwise or counter clockwise limits.

Probably one of the most common indicator schemes involves the use of a voltage source applied to a meter and a linear variable resistor which is attached to the rotator. When the rotator turns the resistance changes in proportion to the amount of rotation, and this change is indicated by the meter current. Fig. 11 shows a typical indicator. The antenna direction is registered by M_1, which is actually a voltmeter measuring

* Managing Editor, *QST*

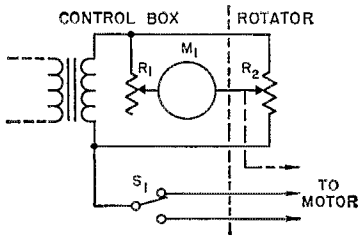


Fig. 11—This rotator indicator, M_1, is a voltmeter which measures the voltage across a potentiometer, R_2, mounted in the rotator unit. R_1 is a calibrating resistor.

the voltage across potentiometer R_2. R_2 is part of the rotator assembly. Resistor R_1 is in the control box for calibration. One of the shortcomings of this indicator is the possibility of indication error because of line voltage variations. A difference of only a few volts on the a.c. line can cause as much as a 20 or 30 degree change on the indicator!

A variation of the indicator just described is shown in Fig. 12. Instead of using a straight voltmeter to measure the voltage across a potentiometer in the rotator, a ratiometer or bridge-type meter is employed, so that the antenna direction is indicated at all times, even when the rotator power is turned off. Potentiometer, R_2 is attached to the rotator shaft. The two other pots, R_1 and R_3, are calibrating resistors and form legs of a bridge along with the two windings of the ratiometer, M_1. The indicator, M_1, has no spring return so the pointer remains fixed at whatever position it held last. The principal advantage of this indicator is its independence of line-voltage variations. Since the indicator is measuring the ratio of currents in its split coil, it is unaffected, within limits, by the supply voltage.

Automatic rotators have found popularity in recent years. The selector dial on the control box is calibrated in degrees or compass headings and is simply positioned to the desired direction. The rotator automatically turns on and rotates the antenna to the position dialed and then stops. Sometimes, a lamp on the control box comes on and follows the antenna rotation around, turning off when the antenna reaches the desired position. Fig. 13 shows one kind of automatic rotator.

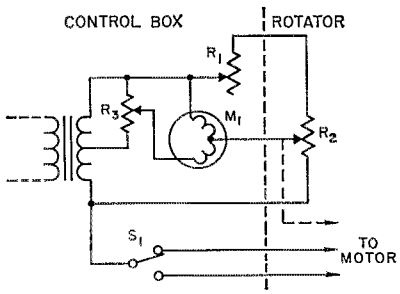


Fig. 13—Indicator M_1 is actually a ratiometer with no springs to return the pointer to zero. The indicator's pointer continues to show antenna heading even when the rotator power is turned off.

When the selector dial switch assembly, S_1, is turned to the desired direction, the motor turns on. Attached to the rotator shaft is a cam switch, S_2. As the shaft turns, S_2 switches current on and off to the solenoid L_1 which is part of an escapement that drives a mechanism under the selector dial. When the antenna reaches the desired heading, the solenoid has moved S_1 to the off position and turns the motor off.

More advanced automatic indicators use an electro-mechanical system involving an armature, pawl and pawl wheel instead of a solenoid to achieve greater accuracy and smoother operation. It is possible for the automatic indicators to get out of sync and give false antenna headings. However, this can usually be corrected at the control box; the rotator need not be removed from the mast. The resettability of these electro-mechanical indicators is about 10 degrees.

A sophisticated type of rotator indicator is shown in Fig. 14. This is a silent, fully-transistorized, stepless, automatic rotator (Alliance Model C-225). It is self synchronized and is independent of variations in line voltage. The simplified circuit diagram in Fig. 14 shows how the system works. Basically, the circuit is a four-arm bridge made up of the secondary of T_1, R_3, and the combination of R_1, R_2. Potentiometer R_2 is mechanically attached to the shaft of the rotator. R_1 is part of the control-box selector dial which

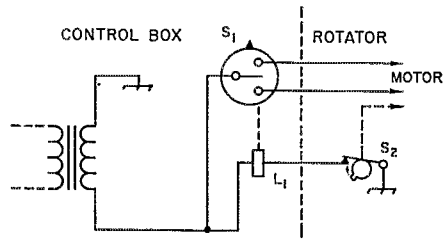


Fig. 12—On this automatic rotator, a selector dial indicator switch, S_1, is turned to the desired direction and the rotator automatically rotates the antenna to that position and stops.

is calibrated in degrees or compass headings. When the sum of R_1 and R_2 is equal to R_3, the bridge is balanced and there will be no voltage difference between points A and B. There is then no base-emitter bias on Q_1 and the transistor is cut off, so no collector current flows. There are two collector return circuits, one through the coil of relay K_1, CR_1, and the upper half of the secondary of T_1, and the second through K_2, CR_2 and the lower half of the secondary of T_1. Current can flow through either of these paths only when the base of Q_1 is negative with respect to the emitter, and then only when either CR_1 or CR_2 will allow current to flow in the proper direction to make the collector of Q_1 negative.

When the selector dial, and thus R_1, is set to a desired antenna heading the bridge becomes unbalanced. There is then a difference in voltage between points A and B, also, if the resistance

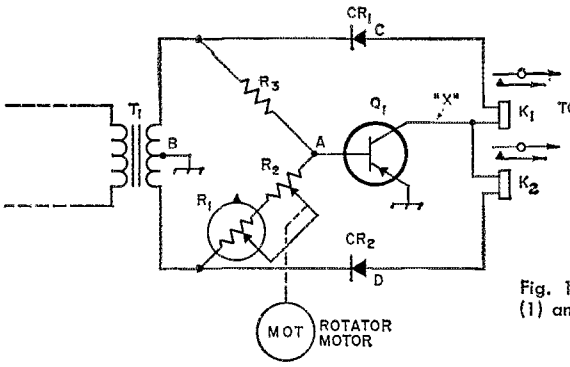


Fig. 14—A transistorized rotator control and indicator can be calibrated for resettability accuracies of from 1 to 3 degrees.

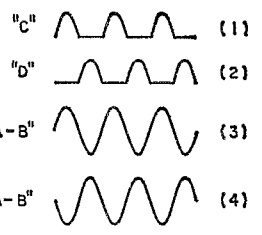


Fig. 15—Alternate conduction in rectifiers is shown in (1) and (2) when phase of voltage at transistor base is reversed as in (3) and (4).

of R_1R_2 is less than that of R_3, point A is reversed in phase with respect to B; if R_1R_2 is larger than R_3 the two points are in the same phase. Thus, depending on whether R_1 is increased or decreased, the transistor will be biased into conduction on one or the other half of the a.c. cycle, but not during the entire cycle, and the setting of R_1 determines *which* half-cycle will cause conduction.

CR_1 can conduct only when the upper end of T_1 is negative with respect to B, while CR_2 can conduct only when the lower terminal is negative with respect to B. Since R_1 can determine the phase of the base voltage, its setting will determine which of the two rectifiers supplies collector current to Q_1, and thus causes the associated relay to operate. If R_1R_2 is less than R_3, current flows through CR_2 and relay K_2 closes. The current flows through K_1 and CR_1 if R_1R_2 is larger than R_3. (A third load could be placed at point "X" and would be actuated upon either a decrease *or* an increase of R_1).

Contacts on relays K_1 and K_2 are used to control the direction of the rotator motor, which in turn moves the potentiometer R_2 in a direction to rebalance the bridge. When a balanced condition is reached, the transistor stops conducting and the desired antenna heading is achieved. Resettability of the transistor indicator rotator is about 3 degrees but, with special adjustment, can be made as close as 1 degree. The transistor indicator requires a five-wire connection to the rotator.

Building Your Own Indicator

Although rotators and indicators designed for TV are quite reasonable in price and readily available in a variety of models, some hams would rather build their own or are forced to because their present rotators have no indicators.

Mechanical schemes were mentioned earlier and usually consist of a string- or cable-driven indicator along the lines of that shown in Fig. 16.

Electrical indicators are a bit more complicated to construct, primarily because of the difficulty of obtaining key components. The simplest electrical indicator involves the use of a potentiometer ganged with the antenna drive shaft (Fig. 11). The pot is used to control voltage to a voltmeter indicator that has been calibrated in terms of direction. The problem here is to find a potentiometer that has full 360 degree rotation. Surplus computer pots that have 360 degrees rotation have been appearing lately on the scene and are a possibility for use here. Regular potentiometers could be used if the rotating system has limit switches or other means for preventing rotation beyond the angular distance that the potentiometer can handle.

Fig. 17 shows a typical home-built indicator. T_1 is a 6.3 volt filament transformer; M_1 can be a 0-5 volt a.c. voltmeter. Calibration resistor R_2 is adjusted so that the voltmeter reads full scale when the rotator potentiometer arm is at the maximum-voltage end (fully clockwise in Fig. 17). To allow for adjustment, the maximum value of R_2 should be at least ⅓ the resistance of R_1, and the total of the two resistors should not overload the transformer. If the current taken by M_1 is small compared with the current through R_1 and R_2, the indications will be directly proportional to the angular travel of the potentiometer arm.

Probably the most deluxe system of beam direction indication uses "synchro" or selsyn generators and motors. These devices are also available in the surplus market and can be found in models that operate on 115 volts, 60, 400, or 800 cycles. The 400/800 cycle units are less expen-

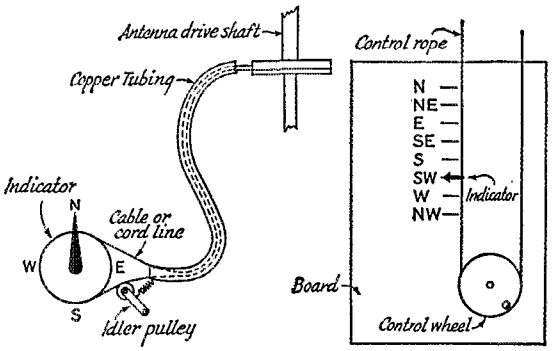


Fig. 16—Some mechanical direction-indicator systems.

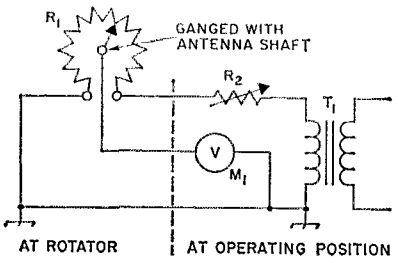


Fig. 17—Voltmeter-type indicator circuit.

M_1—A.c. voltmeter (0-5 range if T_1 is a 6.3-volt filament transformer).

R_1—Wire-wound potentiometer, 20 ohms or more, see text.

R_2—Wire-wound slider type resistor or rheostat, 1/3 to 1/2 resistance of R_1.

T_1—Step-down transformer, 6.3-volt filament transformer suitable.

sive and usually lighter in weight than the 60-cycle jobs. As a general rule, the 400-cycle units can be used at 60 cycles if loads on them are small (a simple pointer is a negligible load) and the a.c. voltage is reduced to something less than 24 volts or so. Some of the 400-cycle units available on the surplus market come with instructions and diagrams showing how to connect and use them with 60-cycle current. When the high-frequency units are used at 60 cycles, there is a reduction in accuracy, sometimes as much as 20 degrees or so, and the action may be sluggish or jerky.

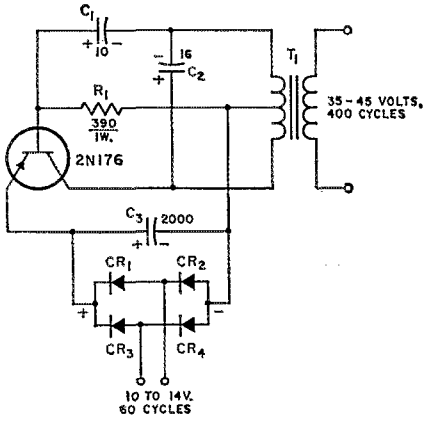


Fig. 18—Circuit of the 400-cycle supply (W8GZ). Capacitance is in microfarads, resistance in ohms. Capacitors are electrolytic.

C_1, C_2—50 to 150 w.v.d.c.

C_3—2000 μf. or more, 25 w.v.d.c. or more (Mallory CG452U50D1 or equivalent).

CR_1–CR_4 incl.—Silicon diodes, 100 p.i.v. or more, 1 amp. or more, each, or bridge rectifier unit with equivalent ratings.

R_1—See text.

T_1—Filament transformer, 26.5 volts, c.t., 0.6 amp., 60 cycles, secondary used as primary (Thordarson 21F27).

W8GZ uses a simple transistor 400-cycle oscillator to power his selsyns and the circuit is shown in Fig. 18. Although a 2N176 transistor is shown in the diagram, any similar transistor should prove satisfactory. R_1 is not critical — a value of 390 ohms is suggested as giving the highest output voltage. The critical frequency-determining components are the output transformer, T_1, and the capacitors, C_1 and C_2. If a transformer other than that suggested is used, the capacitors must be adjusted to compensate for any change in transformer impedance. Best results are obtained

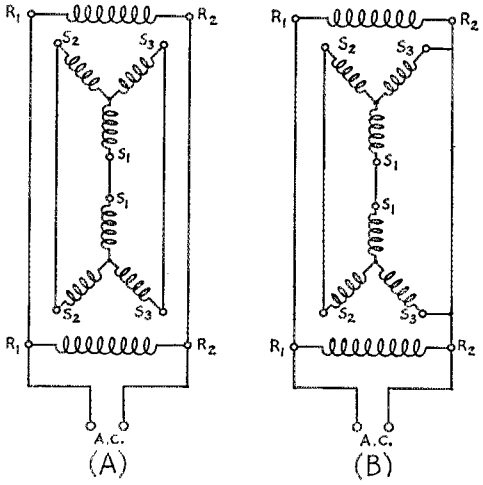


Fig. 19—Interconnections for selsyns used for beam-direction indicators. The system at B requires only four wires instead of the usual five. With either circuit, the relative direction of rotation can be reversed by interchanging the leads to S_1 and S_2 at one of the units.

by fixing C_1 at about 10 μf., and then varying the value of C_2 until an output frequency of 400 cycles is obtained. Reducing the value of C_2 increases the output frequency. Tests with several different output transformers resulted in using values of C_2 ranging from 4 to 20 μf., depending upon the particular transformer. Capacitors in the range of 50 to 150 w.v.d.c. should be used for C_1 and C_2.

A check on the output frequency of the unit can be accomplished by either of two methods. First, and most desirable, is the use of an oscilloscope and calibrated audio oscillator. The second check is the use of a speaker or headphones across the output of the supply (connect a capacitor of about 0.2 μf. in series with the speaker-transformer primary or phones) to compare the output frequency by ear with that of a tuning harp or fork or, even better, by beating against the 440-cycle transmission from WWV. In the final adjustment of the value of C_2, it is desirable that the 400-cycle power supply be connected either to the selsyns it is intended to operate or to a similar pair.

When it comes to hooking up the selsyns, the circuit in Fig. 19 will be of help. Most selsyns

have two rotor leads, three stator leads and two power leads. There is no difference in operation in the two hook-up systems shown in Fig. 19, except that B requires one less wire. The relative directions of rotation can be reversed by interchanging two of the stator (*S*) connections at one unit.

Many different ways have been devised for indicating the beam direction at the operating position when using selsyns, ranging from simple pointers moving over a compass chart to backlighted world maps and rotating globes.

The rotating-globe indicator in Fig. 20 uses a 7-inch globe. Locate the home town and its antipodal position, drill ⅛- or ¼-inch holes at these points, and pass a shaft through the globe, fastening the shaft to the globe with glue or suitable cement. Cut a strip of Lucite or Plexiglas to the shape shown and drill the two holes that pass the shaft. At the same time, the hairline can be scribed along the plastic, on both sides if parallax is to be avoided. The plastic is then heated until it can be bent to the shape shown in the drawing. It is then assembled with two supports on a small box that houses the selsyn.

To align the indicator, point the beam due north, align the globe so that the hairline is directly over the North Pole on the globe, and tighten the coupling screws. The globe will then rotate in sync with the beam.

Another example of a neat beam indicator using selsyns is shown in Fig. 21. This indicator has a great-circle map sandwiched in between two

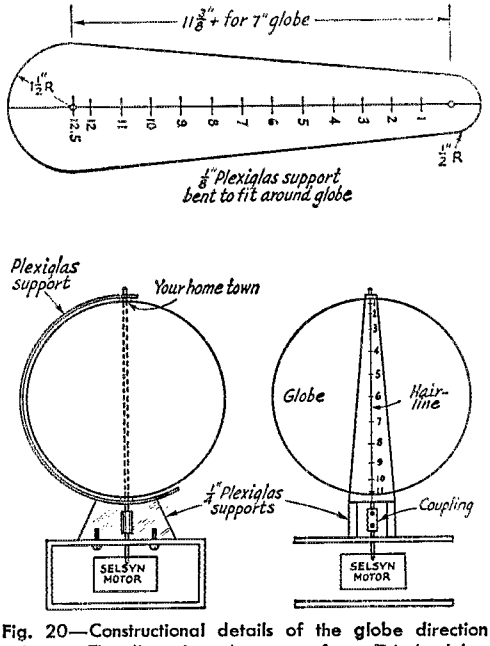


Fig. 20—Constructional details of the globe direction indicator. The dimensions shown are for a 7-inch globe, and should be modified for other sizes. The curved piece of Lucite is cemented to a base that is then bolted to the top of a box that houses the selsyn.

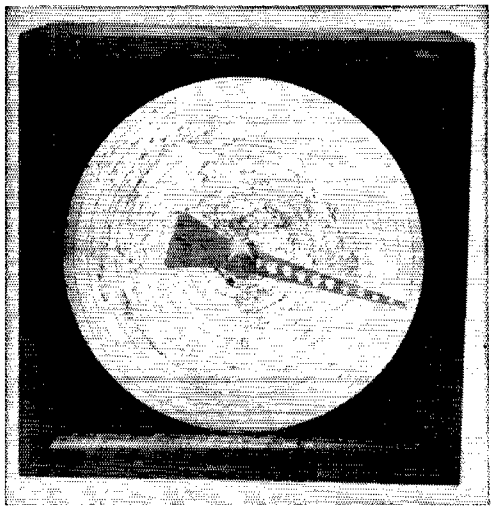


Fig. 21—An indirectly-lighted beam indicator constructed by W1IKE.

⅛-inch pieces of Plexiglas. The map is 12 inches in diameter, photographically reduced from a larger chart (some 36 inches square) centered on New York City and available for 40¢ as Chart 3042 from the Coast and Geodetic Survey. Black opaquing liquid was used to blank out the four corners, and behind this opaquing the 7-watt back-lighting bulbs are mounted. A regular shaft bearing is mounted at the center, with a counterbalanced pointer positioned over the face of the chart and the selsyn connected at the rear. The selsyn is held in place by means of a split board — this has a cut-out hole the diameter of the body of the selsyn, and a saw cut from one end of the board into the hole. A carriage bolt draws up on the "split" to apply pressure to the body of the selsyn, holding it in place. The wooden frame is painted or stained to match the decor of the operating position, and is mounted on the wall over the operating position. Control cabling runs down to a suitable switch handy to the operator. QST

First-Day Covers Still Available

When the Amateur Radio First-Day Covers were processed in Anchorage on December 15, 1964, we gambled and had a few extra unaddressed covers prepared, because orders for the first-day covers were still coming in and we didn't want anyone to be disappointed. We still have some of these left. They are all singles, unaddressed but carrying the stamp and the official first-day cancellation, and they will be mailed to you in an envelope. Prices are 35c each, three for a dollar. Send your orders to ARRL Hq., 225 Main Street, Newington, Conn., 06111.

The Squarer

A Sine-to-Square Wave Accessory for Audio Generators

BY DOUGLAS A. BLAKESLEE,* WIKLK

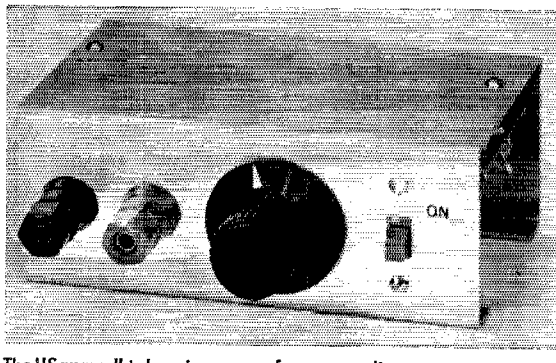
SQUARE waves are useful for testing audio and radio equipment, digital and pulse circuits, plus microphones and relays. A good book says so! But after examining the prices on square-wave generators, the writer decided to try and adapt the old shack audio oscillator to produce "economical" square pulses.

The gadget in the photographs is the result of a little reading and a lot of tinkering. When driven by an audio generator, it will produce square-wave pulses of excellent symmetry (on and off times equal) and rise time.

The basic circuit, which evolved from an idea suggested by Jack Shagena and Aaron Mall of Bendix, uses a Schmitt trigger. This configuration produces a positive output pulse for each positive swing of the input signal. The pulse length is determined by the input voltage. Thus, symmetry can be adjusted with the output control of the audio generator. Although normally set for 50 percent "on" time, the duty cycle can be reduced to 20 percent or so by reducing the generator's output.

An emitter follower is used to isolate the trigger circuit from the load. The emitter resistor, R_1, is the output control. The popular 2N404 transistors are used, although any of the 50-odd other similar switching types will work as well.

* 114 Shelley Rd. ,Meriden, Conn.



The "Squarer" takes sine waves from an audio generator and shapes them into rectangular waves having a duty cycle dependent on the audio input voltage. In this model jack-top binding posts are used for the output connections. Any convenient layout and terminal type can be used.

Construction

The unit was constructed on a homemade 2 × 3 × 5-inch open-end chassis. "Nonmetal-benders" can use a Bud C-1788 or a Minibox of

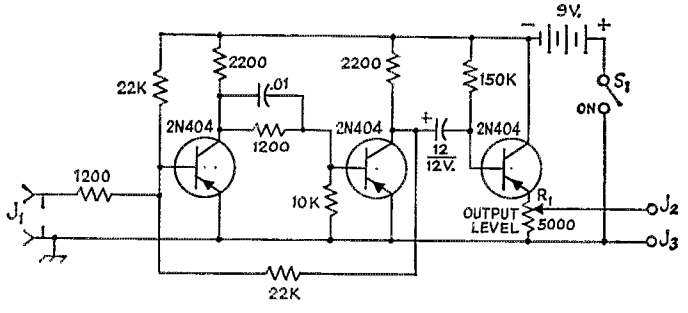
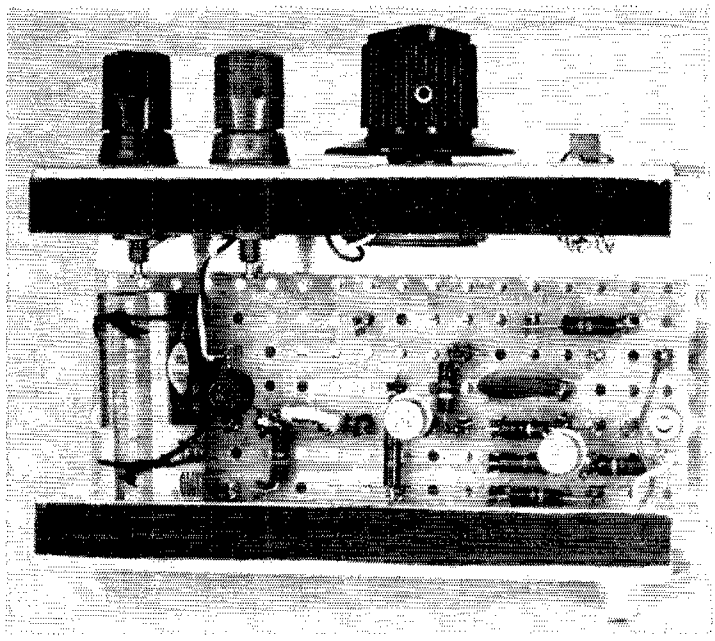


Fig. 1—The "Squarer" circuit. Resistances are in ohms (K = 1000); resistors are ½-watt composition. Capacitances are in μf.; the 0.01 capacitor is a ceramic disk; capacitor with polarity marked is electrolytic.

R_1—Linear-taper control.
S_1—S.p.s.t. slide switch.

J_1—Phono jack.
J_2, J_3—Banana-jack-top binding posts.



The simple circuit is assembled on punched phenolic board, using flea clips for connections. Adhesive-backed felt keeps the homemade chassis lips from scraping the surface on which the unit is set.

appropriate size. The circuit is built on Vectorboard, with the parts mounted on top and the interconnections made below. As there was no battery clip in the junk box, the battery was simply tied to the board with lacing twine.

Each side of the chassis bottom was covered with a strip of "Flan," a sticky-back flannel material (sold in discount stores) that makes excellent scratch-proof feet.

The Squarer requires an input of approximately 6 volts peak to peak for 50-percent duty cycle, producing an output of 8 volts peak to peak. The rise time at 1000 c.p.s. is 2 microseconds. QST

• New Apparatus

Waters Dummy Loads

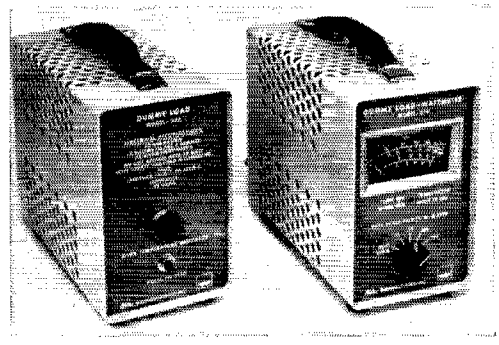
A RECENT addition to the Waters Manufacturing Co. line of amateur equipment is a pair of dummy loads, Models 374 and 384. The primary difference between the two models (aside from cost) is that the Model 374 contains an accurately calibrated wattmeter. The nominal impedance, 52 ohms, remains constant from 2 to 230 Mc.

The heart of each load is what the manufacturer refers to as a "structural monolithic" 52-ohm noninductive resistor. This resistor, along with other resistors and capacitors used to break up any resonances, is mounted in a sealed coaxial structure that is filled with a dielectric oil. Also encased in the container is a diode for the wattmeter.

Four power ranges are provided in the calibrated wattmeter, with full-scale readings of 15, 50, 300, and 1500 watts. Accuracy of the power scales is guaranteed to within plus or minus 5 percent of full scale for the 2- to 30-Mc. spectrum only. The manufacturer states that above 30 Mc., the wattmeter will read somewhat more than the actual power. However, as dummy load only, the rating is 52 ohms up to 230 Mc.

The 1500-watt rating is for c.w. or s.s.b. peak envelope power on an intermittent basis. At 1500 watts the maximum inner case temperature of 220° F. will be reached in four to six minutes (key down condition). When the load reaches this temperature, a thermostatic switch closes and turns on a panel-mounted warning light. Power for the light is obtained from the 117-volt a.c. line. The input terminal is a specially designed coax chassis fitting of the SO-239 type.

Both models are 4¾ inches wide, 9 inches high, and 10¼ inches deep, and weigh 12 pounds. Model 374 (wattmeter version) is in the $135.00 price range and Model 384 in the $65.00 price class. — *W1ICP*



A TRANSMATCH FOR 160

BY LEWIS G. McCOY,* W1ICP

Most transmatch articles describe units designed to cover the 80- through 10-meter bands. And, usually, requests are received from 160-meter fans for information on putting such transmatches on 160. Using an 80-meter transmatch on 160 is rather difficult because a large amount of inductance, compared to 80, is required. For example, to tune a circuit to 3500 kc. with a 100-pf. variable requires an inductance of about 20 μh. With the same variable and 1800 kc. as the desired frequency, an inductance of almost 80 μh. is needed. The simplest way out is to build a transmatch especially for 160, rather than trying to modify an existing design.

This article describes the construction and use of a transmatch for 160 that will handle the maximum amount of power permitted on the band, 500 watts.[1]

Looking for a transmatch for 160? Here is a versatile unit that will permit you to couple most any antenna to your 160-meter rig.

The Circuit

A conventional parallel-tuned circuit is used, as shown in Fig. 1. A dual 200-pf. per section variable, C_2, is connected across approximately 70 μh., L_2. Either 50- or 70-ohm input can be used to the link, L_1, which is tuned by C_1. C_1 is approximately 1200 pf., consisting of a three-gang t.r.f.-type variable with the three stators connected in parallel.

Also included in the transmatch is a Varimatcher[2]. This is a reflectometer installed in the line between the input connector, J_1, and the link. Most reflectometers of the Monimatch type don't have sufficient sensitivity for a satisfactory meter deflection on 160, even with relatively high power. With the Varimatcher shown here, 40 to 50 watts input will give full-scale readings on a 0-1 milliameter. The Varimatcher makes the job of correctly adjusting the transmatch much easier.

The Parts

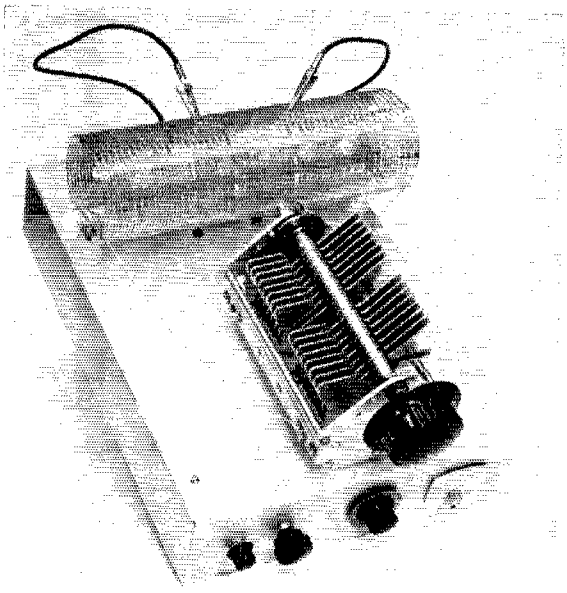
You probably could wind your own coils for L_1 and L_2 if you had a large-enough coil form. However, the commercial coil shown, which sells for about $3.50, makes the job easier. Any dual variable of at least 200 pf. per section can be used for C_2. If you are a low-power enthusiast, you don't need a variable having the plate spacing specified in Fig. 1. For 50 to 100 watts input, a plate spacing of 0.025 inches should be adequate. If your junk box yields some single-section variables they can always be ganged to form a dual. Also, variables with up to 300 pf. per section could be substituted without making any circuit changes necessary.

Construction Data

The coil combination, L_1L_2, is supported by lugs soldered to the next-to-the-end turns on L_2. The lugs are mounted on 1-inch Isolantite stand-off insulators. The entire transmatch is mounted on 3 × 10 × 13-inch aluminum chassis, although any suitable size of chassis could be used.

To facilitate placing the feeder taps on L_2, every other turn is indented towards the center of the coil. (A clip would short out adjacent turns as the turn spacing is quite close). If you push in on a turn with a screwdriver the wire will bend toward the center of the coil. Do this with every other turn and you'll have clearance for the clips.

Fig. 2 gives the details for cutting the coil stock to make L_1 and L_2.



Top view of the 160-meter transmatch.

* Novice Editor.

[1] The 500-watt figure is maximum power input permitted for daytime operation in some parts of the U. S. A.

[2] De Maw, "The Varimatcher," *QST*, May, 1966.

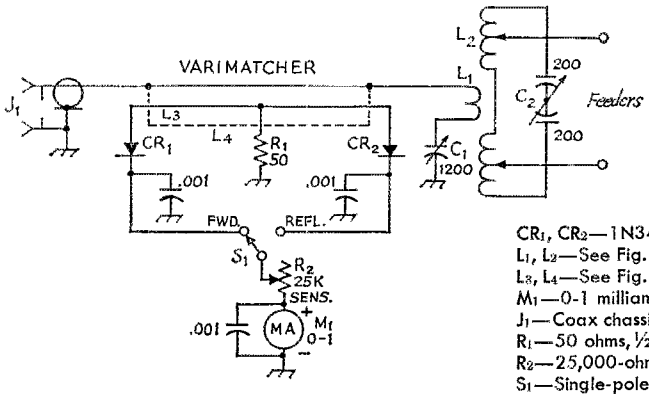


Fig. 1—Circuit diagram of the 160-meter transmatch.

C_1—1200 pf. (three-gang 400 pf. per section variable with stators in parallel).

C_2—200 pf. per section dual variable; 0.077-inch air gap for 500 watts (Millen 16200), 0.022-inch air gap for low power (Millen 28200).

CR_1, CR_2—1N34A diodes.

L_1, L_2—See Fig. 2.

L_3, L_4—See Fig. 3.

M_1—0-1 milliammeter.

J_1—Coax chassis receptacle, SO-239.

R_1—50 ohms, ½ watt carbon or composition.

R_2—25,000-ohm control.

S_1—Single-pole, double-throw toggle or wafer switch.

The Varimatcher

Fig. 3 shows the essential constructional details of the Varimatcher. The outer channel, shown at A and B, can be made from aluminum or copper sheet. L_4 (C) is a piece of ¼-inch-diameter copper tubing. The ⅛-inch slot at the center of the copper tubing is made with the narrow side of a flat file.

L_3 is a length of RG-58/U with the vinyl cover and braid removed. Cut the polyethylene insulation around the inner conductor at the center of the piece as shown at D. Slide L_3 into L_4, so the exposed conductor is under the center slot of L_4. The two ends of L_3 should protrude ⅛ inch at each end of L_4. The lead on R_1 should be cut to ¼ inch before attaching it to the center conductor of L_3. A pencil-tip type soldering iron should be used to make the joint between R_1 and L_3, and particular care must be used to prevent the resistor lead from shorting to the copper tubing.

The trough is mounted to the chassis rear by the screws that hold J_1, plus a nut and bolt at the opposite end of the trough. One end of L_4 is soldered to the inner pin of J_1. The other end of L_4 is soldered to a short piece of No. 14 or 16 solid wire which is connected to the tie point that holds CR_1 (see bottom view). In soldering CR_1, and also CR_2, use a heat sink between the body of the diode and the point being soldered, to prevent heat damage.

Using The Transmatch

With this transmatch, practically any type of antenna can be made to work on 160. One common variety of antenna is an 80-meter half wave, center fed with either open wire feeders or Twin Lead. In this case, put the feeder taps on L_2 on either side of L_1, (Fig. 4A) as close to L_1 as pos-

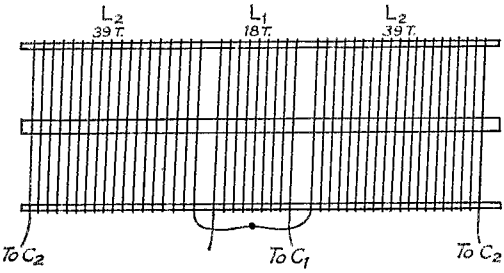
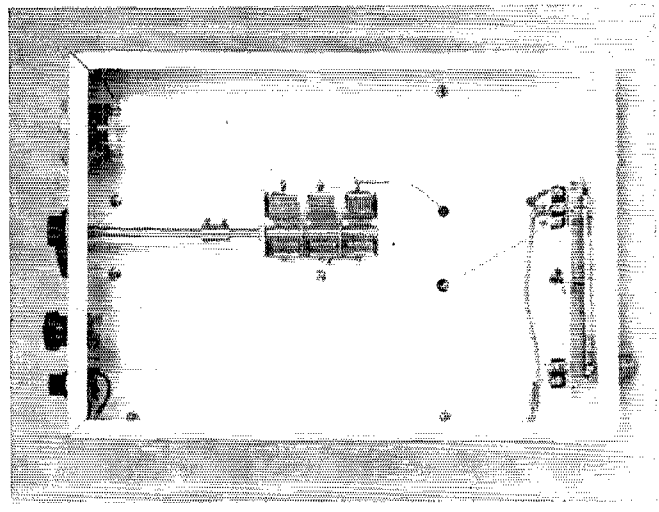


Fig. 2—Construction of the L_1 and L_2 coils. The coil stock used has 10 turns of No. 14 per inch and is 3 inches in diameter (Polycoils type 1780 or Illumitronic type 2410).



Bottom view of the 160-meter transmatch.

sible. Feed enough power through the Varimatch to get a full-scale reading in the forward direction, and then set S_2 to read reflected voltage. Adjust C_1 and C_2 to reduce the meter reading to zero, which indicates a matched condition on the coax line connecting the transmatch to the transmitter. If you cannot get a match, move the feeder taps out a turn or two and try again. Try to set your feeder taps out as far as possible from the link while still getting a match, as this is the desired operating setup.

Another common type of antenna is the 80-meter half wave with coax feed. If the outer conductor of the coax is not connected to an earth ground, or can be ungrounded, both the inner and outer conductors can be connected together and tapped on one side of L_2 as shown in Fig. 4B. An earth ground can be tapped on the other side and a match achieved as outlined with open-wire

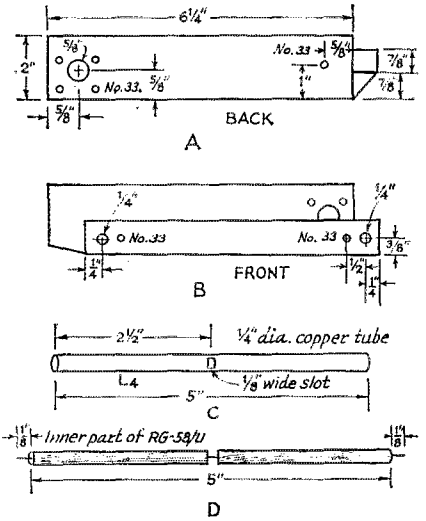


Fig. 3—Constructional dhtails of the Varimatcher. A and B, front and back sides of the trough. C is the copper tube, L_4. D is the section of RG-58/U inner line that makes up L_3.

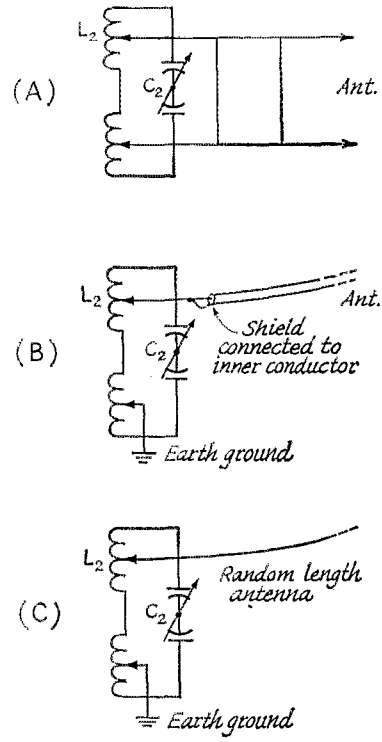


Fig. 4—Transmatch connections for types of antennas described in the text.

line. The ground connection should go to a ground rod and, if possible, to as many radials as can be installed. The radials don't have to be ¼ wavelength long, but the longer the better.

The other type of antenna commonly used as the random-length wire, with one end as high as possible above ground and the other end tapped on one side of L_2, as in C, Fig. 4. Make the antenna as long as possible — preferably a minimum of 130 feet. A ground should be tapped on the other side of L_2 and the transmatch set up as with open-wire feeders. QST

NEW BOOKS

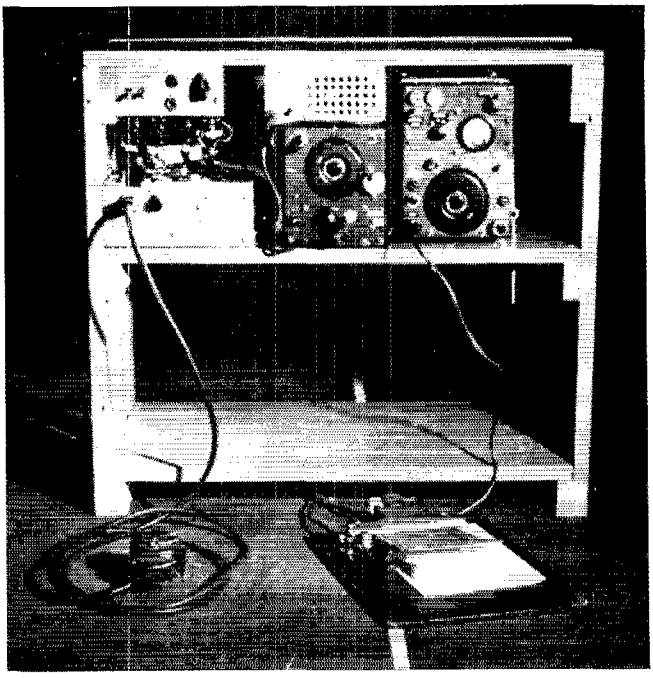
RCA Receiving Tube Manual, published by Commercial Engineering, Electronic Components and Devices, Radio Corporation of America, Harrison, New Jersey 07029. 608 pages, including index, 5⅜ by 7⅞ inches, paper cover. Price, $1.25.

The latest edition of the *RCA Tube Manual* includes revised up-to-date information on the complete RCA line of home-entertainment receiving tubes, picture tubes for black-and-white and color television receivers, and voltage-regulator and voltage-reference tubes.

An important feature of the Manual is the popular circuit section, which includes detailed descriptive writeups of the various applications of vacuum tubes shown in the book.

This RC-25 edition also includes new text material on basic system functions, tuned amplifiers, wideband (video) amplifiers, and television scanning, sync, and deflection circuits. As in the past, the revised and augmented text chapters are well illustrated and written in an easy-to-understand style.

All the other handy features of the Tube Manual still remain: the handy Application Guide, comprehensive data and curves for all active RCA receiving types, charts and abbreviated data on discontinued and replacement types, tabular charts of data on picture tubes, and voltage-regulator and voltage-reference tubes.



The "Vacation Special"

BY R. F. LATTER,* W2YFM

THE inspiration to build the 80- and 40-meter package described in this article resulted from the author's desire to own a portable-mobile station that would operate from either 12 volts d.c., or from the 115-volt a.c. mains. Also, it was desired to assemble such a station at minimum cost, and to make it as compact as possible. The result of the effort, the "Vacation Special," assembled and "ready to go," is shown in the photo at the top of this page.

The basic station consists of an ARC-5 transmitter, an ARC-5 receiver, a 30-watt transistorized modulator, and a control box. Power to operate the equipment is taken from a home-built d.c.-to d.c. converter, Fig. 4, or from the a.c. power supply shown in Fig. 5. A portable 2-band antenna is used with the Vacation Special.

Although the Command-series equipment was designed for the military more than 20 years ago, the transmitters and receivers are still sold as war surplus and are frequently available as "swap" material from other hams. Because of this availability, Command equipment seemed like a logical choice as the basis of the portable station, permitting a modest outlay of cash while minimizing the amount of time spent in constructing the station.

* 179 Pittsford Way, New Providence, New Jersey.

The completed package is housed in the top section of a wooden "book case" rack which is equipped with handles. The author's car is a 1960 Chevrolet station wagon, hence the necessity for this type of rack so that the equipment could be mounted behind the back seat as shown in Fig. 1. In addition to lending itself to convenient use in station wagons, the rack can be quickly removed from the car and set up for portable operation. There is ample room on the bottom shelf for an a.c. power supply, a 12-volt battery, and a battery charger.

Transmitter Modifications

Much of the conversion work carried out on the transmitter will not be discussed in this article since information on the subject is contained in past publications of *QST* and in other

A low-cost portable-mobile package for a.m. and c.w. operation on 80 and 40 meters is described by W2YFM. Command-series equipment is used as the heart of the station and solid-state circuits are used in the modulator and d.c. power-supply units.

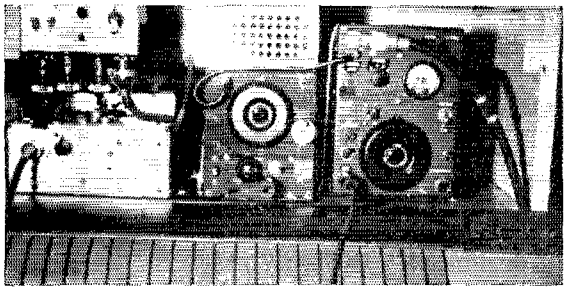


Fig. 1—A close-up look at the Vacation Special. The wooden equipment rack is mounted behind the back seat of the author's car during mobile operation. Transmitter is at the right, receiver is at the center, modulator is at left and the control box is at the upper left. The speaker is mounted above the receiver (upper center).

printed matter.[1] The important changes in circuitry, relative to this design, are described so that those wishing to duplicate this package may do so.

A BC-696 (3–4 Mc.) transmitter is used in the portable setup. The major circuit changes call for the addition of a 12BY7A untuned buffer-doubler stage which isolates the v.f.o. from the p.a., greatly reducing chirp on the c.w. signal (Fig. 2). A band switch is added to the plate tank of the 1625s for changing from 80- to-40-meter operation. Also, a frequency "spotting" switch is added to the transmitter circuit. A meter is included on the front panel and monitors p.a. grid current, p.a. plate current, and p.a. plate voltage.

To make room for the circuit modifications, the rotary inductor is removed from the front of the transmitter, enabling the builder to mount a false panel over the upper front of the case. The new panel contains the band switch, meter, meter switch, and receptacles for both the antenna cable and the antenna lead to the receiver. The 8-hy. 40-ma. choke, L_3, is mounted behind

[1] *Surplus Conversion Handbook*, Cowan Publishing Corp., Port Washington, L. I., N. Y. 11050.

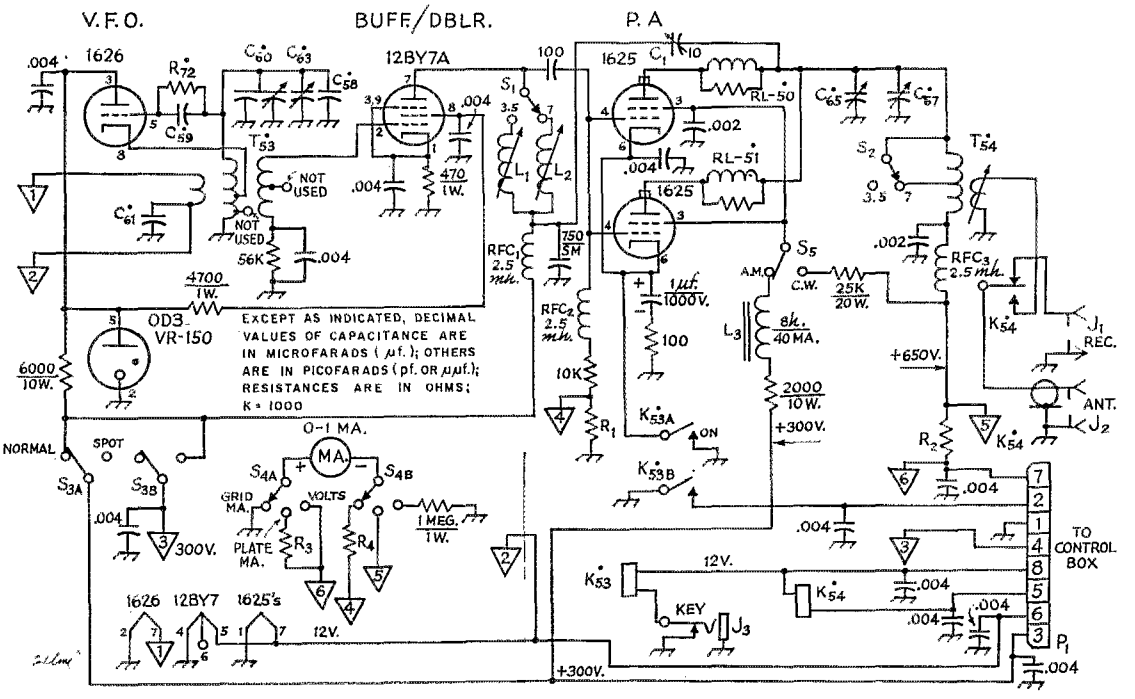


Fig. 2—Schematic of the transmitter after modification. Components marked with black dot are original parts and bear original identification numbers for ease of following circuit. Capacitors bearing polarity marking are electrolytic; others are disk ceramic. SM = silver mica. Resistors are ½-watt composition unless otherwise stated.

C_1—Neutralizing capacitor, 10-pf. double-spaced miniature (Hammarlund HF-15X suitable).
J_1—Phono connector.
J_2—Coax fitting (type SO-239).
J_3—Closed-circuit key jack.
L_1—85 turns No. 30 enam. wire, close-wound on ⅜-inch diam. slug-tuned ceramic form (powdered-iron core).
L_2—45 turns No. 30 enam. wire, close-wound on same type form used for L_1.
L_3—Audio choke, 8 henrys at 40 ma.
P_1—8-pin, male plug (Cinch Jones 8PB).
R_1—1000-ohm, ½-watt, 5-per cent resistor.
R_2—10-ohm 2-watt 5-per-cent resistor.
R_3—2000-ohm 1-watt 5-per-cent resistor.
R_4—20,000-ohm 1-watt 5-per-cent resistor.
RFC1-RFC3 incl.—2.5-mh. 150-ma. r.f. choke.
S_1—S.p.d.t. slide switch.
S_2—Ceramic rotary, 1 section, 1 pole, 2 positions.
S_3—D.p.d.t. toggle switch.
S_4—Ceramic rotary, 1 section, 2 pole, 3 positions.
S_5—S.p.s.t. toggle switch.

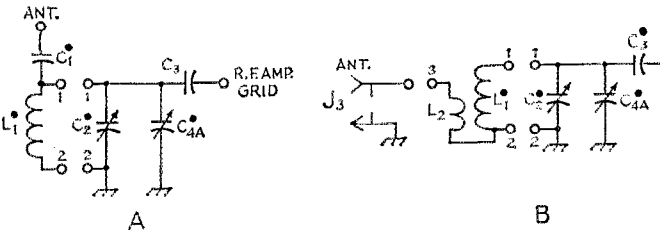


Fig. 3—Schematic of the receiver input circuit. At A, the original hookup of the r.f. coil. At B, J_3, a phono connector, has been added. A link, L_2, has been wound over the cold end of L_1 to provide a low-impedance connection to the antenna.

the panel in the space that was formerly occupied by the rotary inductor.

The 1629 tuning-eye tube is discarded and its socket is rewired for the VR-150 voltage regulator shown in Fig. 2. The calibration crystal is also removed and its socket is replaced with a 9-pin miniature unit which is used for the 12BY7A.

The meter, its switch (S_4), and phone-c.w. switch S_5 are mounted on the front panel of the transmitter. P.a. band switch S_2, "spotting" switch S_3, and the key jack are also located on the front panel. A fixed 3-section capacitor (C_{58}) is removed and discarded from the right-rear section of the chassis. Then S_1, L_1, and L_2 are mounted in that area.

The 40-meter tap on p.a. tank coil T_{54} is placed 12 turns from the high impedance end of the inductor. To make tuning of the p.a. tank easier, a ¼-inch shaft extension and coupling should be added to p.a. padder C_{67}. This addition will enable the operator to tune C_{67} from outside the cabinet.

Although designed for 28-volt d.c. operation, the original antenna relay, K_{54}, will work satisfactorily on 12 volts. It can be modified to work with the new antenna fittings, J_1 and J_2, by revising the mechanical layout to permit the swinger contact of the relay to switch between J_1 and T_{54}. Keying relay K_{53} also works satisfactorily from a 12-volt d.c. bus and requires no mechanical changes. A 1-μf. capacitor and a 100-ohm resistor are series-connected and bridged between the swinger of K_{53A} and ground. This addition proved helpful in rounding off the "break" characteristic of the c.w. note.

Don't forget to rewire the filaments (in parallel) for 12-volt operation.

Receiver Changes

The author used a BC-454 receiver, the tuning range of which is 3–6 Mc. before modification. The heaters were rewired (in parallel) for 12-volt operation and a b.f.o. switch, headphone jack, and r.f. gain control were added to the front panel as is done in most conversions.

Further modifications to the receiver were carried out in accordance with W2AWH's *QST* article.[2] The conversion alters the tuning range of the receiver to cover from 3.5 to 7.3 Mc. Some additional changes, shown in Fig. 3 at B, were also made: An additional turn was removed from L_1, making a total of 8, and a 3-turn link, L_2, was added at the cold end of antenna coil L_1. No. 24 enamel wire was used for L_3. These changes enable the receiver's input circuit to match into low-impedance feed line. In the original form (Fig. 3A), the receiver was designed to "look" into a high-impedance single-wire antenna. The change resulted in improved performance. A further aid to receiver performance was effected by carefully bending the tabs on the mixer section of the tuning capacitor until good tracking occurred across the entire tuning range. Make certain that the B-plus voltage applied to the receiver does not exceed 225 volts, the level the equipment was originally designed to handle.

D.C. to D.C Converter

The design of the 12-volt power supply, Fig. 4, follows that of K2BQK, presented in *QST*.[3] This writer used less-expensive transistors, de-

[2] Beers, "Two-Band Coverage with the BC-454," *QST*, January 1960.

[3] Tetz, "Design and Construction of Transistor Power Converters," *QST*, April 1960.

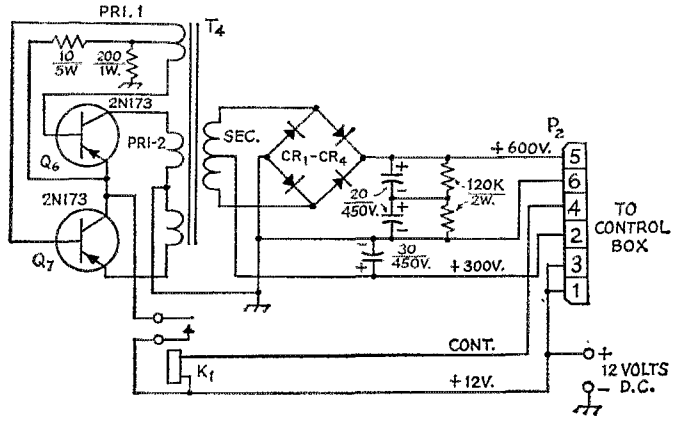


Fig. 4—Schematic of the d.c.-to-d.c. power supply. Design follows that of K2BQK (see text). Resistance is in ohms. K = 1000. Capacitance is in μf. Capacitors are electrolytic.

CR_1-CR_4, incl.—1000 p.r.v. 750-ma. silicon diode.

K_1—12-volt d.c. relay. (S.p.s.t. with 15-amp. contacts.)

P_2—6-pin female connector. (Amphenol 78S6).

T_4—Transformer wound on toroidal core of 2-inch o.d. (Arnold Engineering No. 5772-D4 suitable).
Pri. No. 1 = 16 turns No. 26 Formvar wire (center-tapped).
Pri. No. 2 = 36 turns No. 14 Formvar, center-tapped.
Sec. = 900 turns No. 26 Formvar, center-tapped.

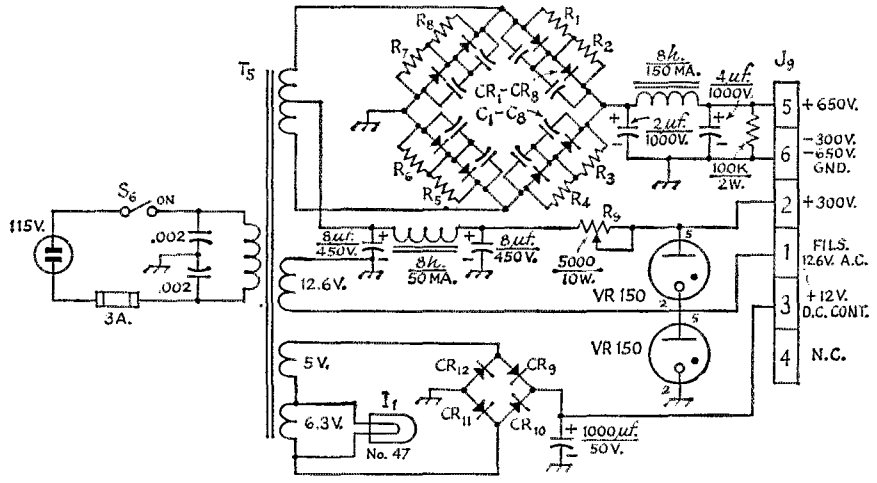


Fig. 5—Circuit of the a.c. power supply. Capacitance is in µf. Capacitors are disk ceramic, except those with polarity marking, which are electrolytic. Resistance is in ohms. K = 1000.

C_1-C_8, incl.—0.01 µf., 1000 volts.
CR_1-CR_8, incl.—800 p.r.v., 750-ma. silicon diode.
CR_9-CR_{12}, incl.—50 p.r.v., 2-amp. silicon diode.
I_1—6.3-volt pilot lamp.
J_9—6-terminal female chassis connector.
R_1-R_8, incl.—0.33 megohm, ½ watt.
R_9—Adjust for proper firing of VR-150 tubes.
S_6—S.p.s.t. toggle.
T_5—Power transformer, 720 volts, center-tapped, 200 ma.; 12.6 volts, 3 amp.; 6.3 volts, 10 amp.; 5 volts, 3 amp. (Surplus type from Advance Electronics, N. Y. C., or equiv.).

signed the unit for 300-volt output, and used silicon diodes with a higher p.r.v. rating (1000-volt diodes are used, cutting the total quantity used to ½ the original number).

The unit is built on a 3 × 4 × 5-inch Minibox. Heat sinks are used to cool the transistors and are made from medium-gauge aluminum stock.

A.C. Power Supply

The power supply shown in Fig. 5 produces 650 volts d.c., 12 volts a.c., and 12 volts d.c. If the operator wishes to do so, the d.c. to d.c. power supply of Fig. 4 can be used for fixed-station operation by attaching a battery charger (line-operated) and 12-volt storage battery to the equipment.

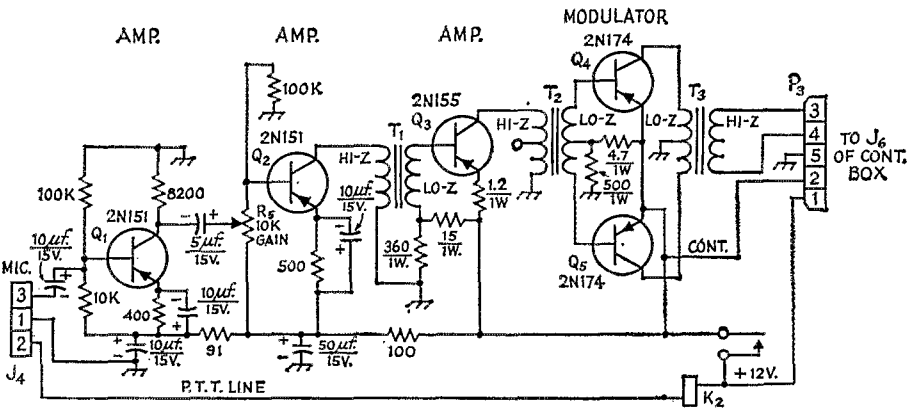


Fig. 6—Circuit for the solid-state modulator. Capacitors are electrolytic. Resistance is in ohms; K = 1000. Resistors are ½-watt unless otherwise noted.

J_4—3-terminal microphone jack.
K_2—12-volt d.c. relay, s.p.s.t. with 10-amp. contacts.
P_3—5-pin male plug. (Amphenol 78RS5).
R_5—10,000-ohm audio taper control.
T_1—Driver transformer, 10,000-ohm primary to 1000-ohm secondary (Lafayette 99R6124 suitable).
T_2—Driver transformer, 48-ohm primary to 16-ohm secondary (Thordarson TR-61 or equiv.).
T_3—Modulation transformer. 115-volt primary, 5-volt center-tapped secondary at 3 amp. (Stancor P6467 filament transformer or equiv.).

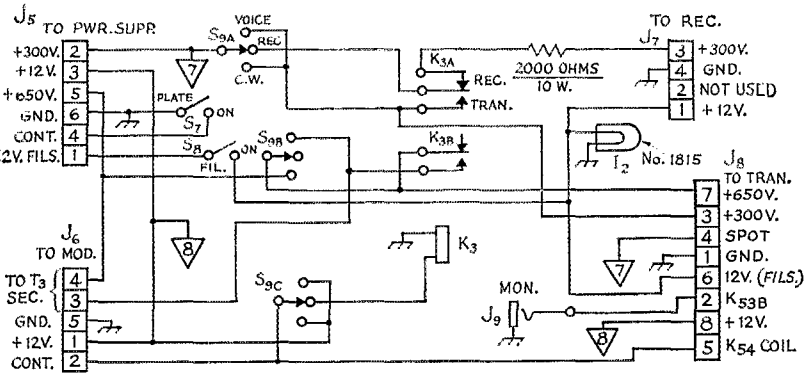


Fig. 7—Circuit for the control box. The jacks used can be of the builder's choice.

I_2—12-volt lamp (No. 1815 suitable).
J_5—6-pin male connector (Amphenol 78RS6).
J_6—5-pin female connector (Amphenol 78S5).
J_7—4-pin female connector (Amphenol 78S4).
J_8—8-pin female connector (Amphenol 78S8).
J_9—Open-circuit phone jack.
K_3—12-volt d.c. relay, ceramic insulation, d.p.d.t. 5 amp. contacts.
S_7, S_8—S.p.s.t. toggle.
S_9—Ceramic rotary, 1 section, 3 poles, 3 positions.

The a.c. supply used by the author was designed for c.w. use only. It produces sufficient voltage to permit a maximum input power of approximately 150 watts on c.w.

The 15-volt d.c. bus operates the relays but does not have a high-enough current rating to handle the solid-state modulator of Fig. 6. Hence, phone operation is not practical when using the a.c. power supply.

Modulator

The circuit for an a.m. modulator is given in Fig. 6. The unit is transistorized and will produce about 30 watts of audio output. A high-impedance push-to-talk dynamic microphone is used with this modulator at W2YFM, providing sufficient audio for full modulation.

If desired, a carbon microphone can be used with the modulator. If this is done, merely eliminate Q_1 and Q_2 and replace T_1 with a carbon mike transformer.

The modulator is built on a 7 × 5 × 3-inch chassis.

Control Unit

A control unit is used to tie all of the pieces together and to coordinate their operation. It includes a relay for push-to-talk operation on a.m. phone.

The circuit is built in a 2 × 2¼ × 5-inch Minibox and is mounted at the upper left of the equipment rack (Fig. 1).

A jack, J_9, is wired into the control box so that side-tone monitoring is possible during c.w. operation. If this is done, an external audio oscillator can be keyed by relay K_{53}, which is connected to J_9.

Some Finishing Touches

A plug-in unit for crystal-control operation was built along the lines of the one described in the *ARRL Handbook*.[4] A 12BY7A was used in place of the 6AG7, however. The oscillator assembly is plugged into the 1626 socket when crystal-control operation is desired.

A folded-dipole antenna for 80- and 40-meter operation is included in the package. Jumper blocks are mounted 32½ feet out from the feed point of the dipole so that a shorting strap can be used to make the antenna 65 feet long for 40-meter operation, or 130 feet long for use on 80 meters. A transmatch is used for matching the feed line to the transmitter and receiver.

A center-loaded 8-foot whip antenna serves as a mobile radiator. Any mobile antenna should do the job provided it is properly tuned and matched to the transmission line.

A straight key is used during c.w.-mobile operation. The key is mounted on a clip board which also holds the log book and a supply of paper for note taking.

The wooden equipment rack is 22 inches high, 26 inches wide, and 13 inches deep. An L-shaped aluminum bracket is mounted under the center of the top shelf (Fig. 1) and holds the 500-ohm to 8-ohm output transformer, and the speaker.

Operation

Operation was a pleasant surprise. With the XYL driving, the author sat in the back seat of the station wagon and worked several stations on phone, and an equal number on c.w. Contacts were made on 80 and 40 meters with stations that were several hundred miles away, indicating that the portable-mobile setup was well worth the effort required to put it together.

The "Vacation Special" was one of the most rewarding and educational projects attempted to date. It achieved all of the design objectives and at a minimum of expense. If any hurricanes hit the East Coast this year, I'm ready for emergency operation! QST

[4] *The Radio Amateur's Handbook*, 43rd ed., p. 227.

Technical Correspondence

MORE REED SWITCHES

Technical Editor, *QST:*

Further with regard to reed switches for RTTY ("Technical Correspondence," March 1967 *QST*). I have used the reed by Hamlin (DRG-DTH) procured from Allied Radio for $3.00, and it works great. The Coto-Coil deal is as good, as is also a switch available from Douglas Randal of Hartford at a similar price.

Further searching around revealed that a very good switch made by Gordos, type MR200-0 with a type R-580 coil, will work directly into the teletype local loop. The units cost $2.50 and $2.00 each, respectively. Unfortunately, the company has a $15 minimum-sale policy. Mr. Robert Duffy of Duffy Associates, 49 Century Road, Weymouth, Mass., the representative for Gordos, has been very helpful in providing data regarding his switch and will assist amateurs around the $15 minimum charge. According to Mr. Duffy, the Radio Shack has this line in the East, and Allied Radio carries Gordos as well as Hamlin in the Middle West.—*Stirling Olberg, W1SNN/AF1SNN, 79 Apple D'or Road, Framingham, Mass. 01706.*

TOWER HINTS

Technical Editor, *QST:*

I have two comments to make on W5OSL's tower article in March 1967 *QST*.

1) Never, never run a tower or other structure's ground lead through the concrete foundation. A direct lightning stroke will probably have such heavy current as to vaporize the ground wire, or at least, the wire will become so hot that expansion and gases will blow the concrete to bits. Either run the wire around the outside of the concrete, or run it through an insulating tube or pipe large enough to permit easy flow of gases. Much larger conductor than No. 8 should be used, and 2-inch or wider copper strip is preferred.

2) Some sort of ratchet, working against the horizontal tower members, should be employed to prevent sudden fall of a tower section if the cable should break. Thus, a drop of a foot or so, depending upon tower design, is the maximum drop to occur accidentally. Stops to prevent cranking the tower apart are also good insurance. — *G. T. DeLaMatry, W5BRR, 170 W. Caldwood Drive, Beaumont, Texas 77707.*

WEATHERPROOFING THE QUAD

Technical Editor, *QST:*

Having built several cubical quads over the past ten years, I was very interested in the fine article by W5HVV/7 in *QST* for February 1967 ("Practical Consideration and Application in a Multielement Quad").

Since most areas of the country are not blessed with the mild, dry climate enjoyed by the author, a couple of modifications to the design would improve the life expectancy of quads built by others. In attaching element wires to the bamboo canes, my experience indicates that one should *never* drill holes in bamboo. To do so will allow water to enter, and if it should freeze the cane will surely split. Instead, a double layer of friction tape should be wrapped around the cane for about four inches at the point of attachment. Then a scrap of No. 12 or No. 14 copper wire is close-wound, starting one inch below the element wire, and continued for an inch above the wire, binding the element to the bamboo. The ends of the wrap-around wire are joined and twisted together. The whole assembly should then be painted with marine varnish or epoxy cement. This is also the best way to attach elements to fiber-glass canes, which also are vulnerable to freezing of internal moisture.

Internal moisture in the plastic gamma boxes cannot be kept out, so make it easy for it to run out by cutting several ¼-inch holes at the bottom.

Air-dielectric variables as gamma capacitors have worked well for me for years, but their bulkiness left something to be desired and there is a chance for I^2R loss in the wiper contact. The latter can be avoided by soldering a heavy bus bar around the wiper after the capacitor has been adjusted. This is not too easy to do. Recently I changed to a different type of capacitor with excellent results. Simply, the capacitance between conductors of RG-8A/U is used. For the 14-Mc. unit, about 30 inches is used. To determine the correct length, use a variable capacitor temporarily wired in and adjust it for match. Remove the capacitor and compare it on a bridge with the coax, which is then trimmed to give equal capacitance. The exact capacitance need not be known — just trim the coax to give a null at the same bridge setting as with the temporary variable. Another method would be to mount an oversize length of coax to the antenna and trim for best match. The coax may be coiled and attached to a sheet of insulation board and the ends waterproofed with epoxy cement or G-E Silicone Rubber such as used for bathtub caulking. — *Bud Frohardt, W9GFF/K9MWE, 3620 N. Oleander Ave., Chicago, Ill. 60634.*

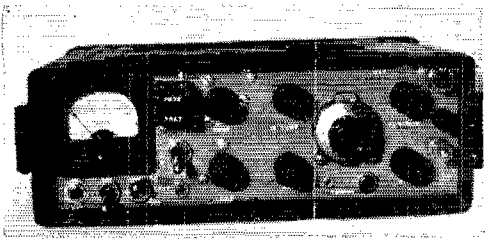
QST-INSPIRED TRANSMITTER-RECEIVER

Technical Editor, *QST:*

It seems that every month *QST* carries another description of someone's transistorized amateur equipment. I trust that you would be interested enough to read one more.

My endeavor is the 40-meter receiver and transmitter shown in the accompanying photographs. It runs about 3 watts input on crystal-controlled frequencies in the c.w. end of the band, and is built in a surplus .30-caliber ammo box for ruggedness and extreme portability.

The project was motivated by WA6UVR's description of a transistor 7-Mc. station in August 1964 *QST*. The transmitter is the same rig except that it has a 2N697 in the final to get a little extra punch. The receiver uses the same r.f. and i.f. circuits except that the output of the last i.f. amplifier is fed into a six-transistor b.c. receiver stripped down for that purpose. Using the b.c. receiver is cheating a little, but for the five bucks that the thing cost I couldn't begin to build a comparable



detector-audio system. Of course, I also get the advantage of receiving the broadcast band as well as 40 meters. The receiver setup produces so much gain that the coupling to the b.c. receiver had to be reduced to a four-turn link to prevent overloading.

The unit uses etched circuit boards, and etching my own boards was one of the most pleasurable experiences I have had in homebrew work. The perforated shield separates the receiver and transmitter sections. The gray metal box houses the b.c. receiver. The cut-down i.f. cans in the receiver are a possibly-unnecessary precaution against feedback. The larger coils on the transmitter board also have shields, which serve the double purpose of holding trimmers. The large batteries provide 27 volts for the transmitter, while the small 9-volt battery runs the receiver. The transmitter at full input draws about 130 ma., and the battery life with normal use seems to be about eight months.

Building this little set was a pleasure, but operating it is more so. I have had many contacts from the home station with its average antenna installation. I've taken the rig along on several hill-climbing and camping trips, and worked some of my best DX to date with quarter waves of No. 28 wire connected to the antenna terminals and thrown out in different directions. At present I am using it at school in Cambridge, and the usual contact is a 579 report from about 400 miles or so. — *Penn Clower, W1AJZV, Box 3441, 420 Memorial Drive, Cambridge, Mass. 02139.*

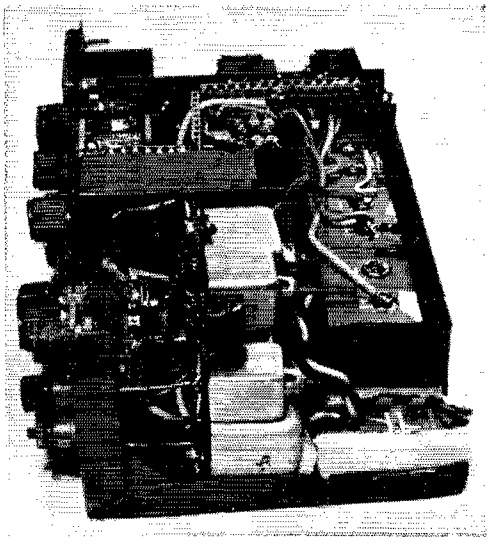
NO ROOM FOR AN ANTENNA?

Technical Editor, *QST:*

They laughed when I spoke of my plans for a 75-meter antenna to be erected within the confines of a 12 × 14-foot room. "Ten meters, yes, maybe 15, but 75 — really!" But, being one of hundreds of college students who want to operate 75 but have limited space for antenna erection, I decided to pursue the dubious.

The materials: 100 feet of wire, a length of RG-58, some thumbtacks to hold the antenna to the walls, my trusty KWM-2, and a desire worthy of a PhD.

The plan takes shape: A 20-meter dipole around the top of the walls . . . simplicity. A 10-meter inverted V down the side of the wall attached to the same feed point . . . super simplicity. Will it load? It does, at 1.2 to 1 on both bands! Some more wire — say, about 30 feet — a couple more thumbtacks to secure it . . . string it at angles across the room, one end tied to the end of the 20-meter dipole by means of an alligator clip. Ground the other side of the feed line. Now, will it load? Not very well. Perhaps it isn't long enough. Wow — the end of the antenna is within inches of a 10-foot curtain rod . . . should I? Why not? Attach loose end of antenna to curtain rod. Load up the KWM-2. Yes, it



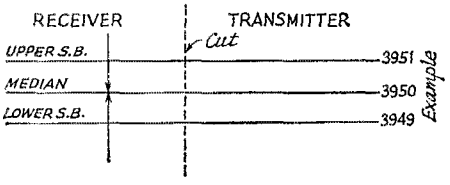
does load — s.w.r. 1.3 to 1 at 3.900. How about that? The entire antenna, the last ten feet of which is a curtain rod, is inside the room.

As of this time, the system has been in use for about two weeks and I have worked both coasts on 75 with 9-plus reports. The performance on 10 and 20 is comparable to the same types of antennas outside. My room is on the third floor, about 35 feet up, which no doubt helps tremendously. However, the moral of the story is the important part: If you're in a limited space area and want to get on a particular band, use a little ingenuity! — *Richard L. Helton, W9CTY/9, 209 E. John St., Champaign, Illinois 61820.*

HIGH OR LOW?

Technical Editor, *QST:*

If it is true that a picture is worth a thousand words, then perhaps a simple diagram may be worth a couple of dozen. Many newcomers and a few old-timers have some difficulty grasping the relationship between voice pitch and frequency in single sideband operation. We have all heard "I sound low? Which way should I go?"



A glance at the pictorial example may clear the confusion about "When you are high on upper you are high or when you are high on lower you are low."

By cutting along the dotted line, the "transmitter" may be raised or lowered with respect to the "receiver." The vertical arrows at the left indicate the direction of decreasing voice pitch as zero beat is approached.

I suggest the use of the word "median" rather than "carrier" to denote the position of something that does not — or at least should not — exist. — *Robert V. Austin, W8DVB.*

Hints and Kinks For the Experimenter

SHOTGUN-SHELL COIL FORM

SHOTGUN shells have taken on a new look! The upper portion of the shell casing is now made from rigid plastic. A *spent* shell can be converted into a coil form in a matter of minutes. Here's what to do: remove the primer cap from the *exhausted* shell by driving it out from the inside. Hitting a small punch lightly with a hammer should do the job. Next, trim off the crimped end of the plastic with a knife or razor blade. The ends of the coil can be held in place on the plastic shell body by passing the wire through two sets of small holes. An ice pick or a small-diameter drill can be used to make the holes.

The completed coil assembly can be attached to the chassis by using a 6-32 screw which has been passed through the empty primer-cap hole. A selection of shells, 410, 20, 16, and 12 gauge, will provide the experimenter with a useful assortment of coil-form diameters with which to work.

Apparently the dielectric properties of the plastic used are good. A *Q*-meter check on the coil shown in Fig. 1 resulted in a reading of 175 at 6 Mc. CAUTION: Use only those cartridges that have been fired! Even a live primer cap is dangerous. — *W1CER*

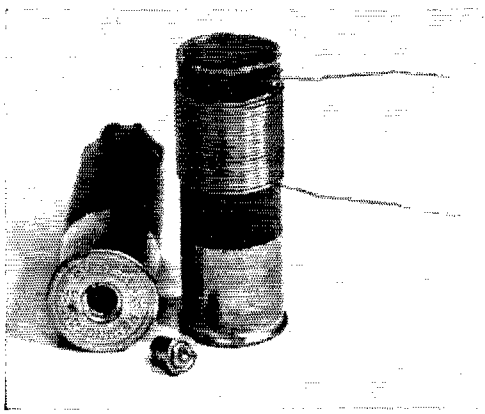


Fig. 1—A spent shotgun shell and a coil form made from same.

WINDING COILS

WHEN winding coils of small gauge wire, it often becomes difficult to maintain the desired spacing and still have a neat coil. To avoid this problem, I first wrap the coil form with cellophane tape that has adhesive on both sides. Then when winding the coil, the wire may be placed exactly where it is intended to be located and it will stay put. The completed coil may be protected by covering it with a heavy coat of lacquer or varnish. — *Robert A. Pautsch, WA8KIE*

CABINETS BY THE GALLON

RECTANGULAR cans of the one-gallon size used to contain antifreeze or turpentine make fine modular cabinets when modified as shown in Fig. 2. The end of the can with the spout is cut free with a can opener in order to leave a smooth edge. By tack soldering the cans at the points shown, they are held together. Spray paint and decals complete the job. — *Morton Fromer, W2RKF*

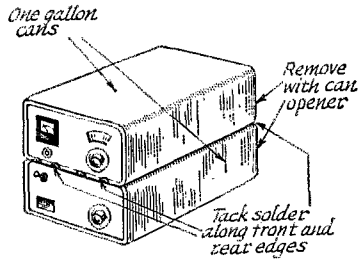


Fig. 2—Sketch of how antifreeze cans can be converted into equipment cabinets.

TOWER SAFETY

RECENTLY I had occasion to make some minor repairs on my quad, which necessitated climbing the tower and drilling new holes in the face plate. Since the plate is heavy guage steel, an electric drill was needed to complete the job. The decision confronting me was whether to take a chance on drilling only two holes, which would not take over five minutes, or to postpone the job until a safe extension cord could be purchased. The only extension cord I had of sufficient length was a heavy-duty two-wire cord with no ground wire.

Like most hams, I only have time to make antenna repairs on weekends, so I decided against postponing the work. My thoughts were on how to use the available equipment with no risk. Taking a four-foot length of heavy gauge aluminum guy wire, I strapped one end securely to the metal handle of the electric drill with a U bolt. After mounting the tower, I secured the other end of the wire in the same fashion to the tower itself. This wire served two purposes: first, to hold the drill in the event that I dropped it, and second, to act as a good, safe ground connection. Confidently I drilled the two holes, knowing that now, if any defect did manifest itself, the tower and not I would take the brunt of any short. — *Peter Donchik, WB2VFR*

STICKING METERS

THE magnetic field of a D'Arsonval movement exhibits a persistent tendency to attract small iron and steel particles and to orient them in such a way as to interfere with the free movement of the moving coil. This can cause unreliable readings and a sticking pointer.

It is often possible to remove the foreign particles with adhesive tape. Fold a short length of tape sticky side out and trim it with a pair of scissors to make a narrow paddle. Move the tape in the circular path between the pole pieces until all the foreign particles have been picked up by the tape. Fresh, sticky tape will succeed with the most obstinate slivers. If you are careful, the chances are good that no mechanical damage will result from the process. — *T. D. Koranye, W2SFW*

QUALITY CONTROL

FEW hams bother about quality control in the gear they construct. However, to keep down the bugs in homemade equipment, we might take a tip from industry and check components *before* they are wired into a circuit. It does not take much time to test every resistor and capacitor that goes into a project. Regardless of whether the parts come from the junk box or are brand new, they should be checked. A quick test for shorts and opens, as well as for resistances that are out of the required tolerance, is sufficient to reduce some of the trouble-shooting time involved when a gadget does not work, and can save needless rewiring. Continuity checks on coils and transformers are also worthwhile.

— *Julian N. Jablin, W9IWI*

INCREMENTAL TUNING FOR THE SB-100

INCREMENTAL tuning for the SB-100 [1] is an easy task and requires only a handful of parts, including a capacitor diode.[2] Fig. 3 shows the hookup. The value of C_1 can be varied to give a wider or narrower range of tuning. Increasing the capacitance of C_1 will give a greater tuning range. A push-pull switch is recommended for S_1 since, for calibration, the potentiometer R_2 is adjusted with S_1 closed (on) for zero beat with the crystal calibrator in the SB-100. Switch S_1 is then turned off and the l.m.o. restored to zero beat again by adjusting R_2. During this last step, it may be necessary to "slip" the main tuning dial slightly, as outlined in the SB-100 manual under "Calibration." This action may result in the loss of a few kc. at the lower end of each band. However, by experimenting with the value of C_1, it may be possible to include the entire band with this modification.

Finding a place to mount the new components may be somewhat difficult because space is at a minimum in the SB-100 chassis. The phone jack on the front panel may be transferred to the rear apron and R_1 mounted in its place in the front-panel PHONES hole. With a little ingenuity, the rest of the components can be mounted just behind R_1. One other possibility is to build the unit completely outboard from the SB-100.

The connection to pin 2 of the 6BZ6 l.m.o. is a problem since it would require breaking the seal on the l.m.o. box. The easiest way to make the connection, therefore, is to simply wrap a piece of small copper wire around pin 2 of the 6BZ6 tube and then carefully plug the tube into the socket. Connection can then be made to the small copper wire. Be careful that the wire doesn't short to other components or to ground. — *C. A. Weed, M.D., WA1BDJ*

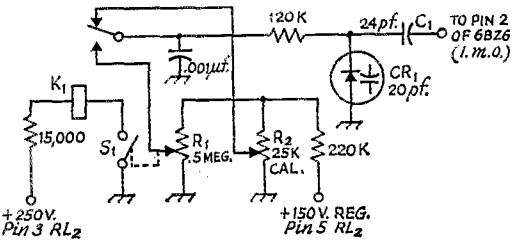


Fig. 3—Circuit for incremental tuning for the Heath SB-100 transceiver. Resistors are ½-watt composition unless otherwise specified; all resistances are in ohms (K-1000).

C_1—24-pf. silver mica.
CR_1—20-pf. Varicap (TRW V20E, available from Allied Electronics, Chicago, Ill.
K_1—5,000-ohm s.p.d.t. relay (Guardian series 200).
R_1—0.5-megohm log-taper potentiometer with push-pull switch (Mallory PP55A).
R_2—25,000-ohm potentiometer (Mallory U-29).

HEAT SINK SOURCE

WHEN in need of a heat sink for power transistors, simply cut off the desired length of material from a piece of aluminum door or window channel. A six-inch length will handle two good size power transistors with no trouble, and shorter or longer lengths can be used, depending upon the number and type of transistors employed. A good source of supply for aluminum channel is the scrap pile at the construction site of a new house or office building. Of course, if you want to purchase the material, it can be obtained from most hardware and building-supply stores. Before using a channel where good electrical contact is desired, note that there is a clear coating on the channel that must be removed. — *Bill Johnston, WA6MCU/5*

SIMPLE CB CONVERSION

THE Town & Country MC-27 CB transceiver, manufactured by Utica Communications Corporation of Chicago, can be converted to 10 meters without any additional components or crystals. Since the transceiver's receiver oscillator operates 1680 kc. above channel frequency, the receiver crystal is in the phone portion of the 10-meter band. To convert the unit to 10 meters, just swap crystals; that is, put the transmitter crystal in the receiver-crystal socket, the receiver crystal in the transmitter-crystal socket, and repeak the necessary coils. — *Joseph F. Moomaw, Jr., W4FZG*

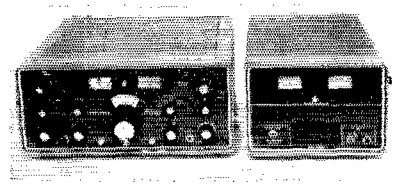
[1] "Recent Equipment," *QST*, Sept. 1966.

[2] See Swanson, "Offset Tuning and F.S.K. for the Drake TR-3," *QST*, June 1966.

Recent Equipment

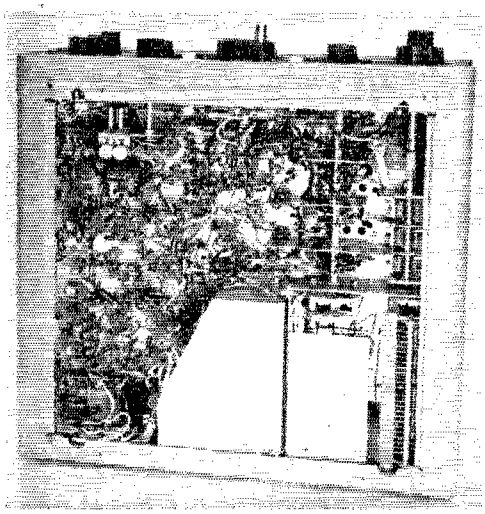
To acquaint you with the technical features of current amateur gear.

Hallicrafters SR-2000 Transceiver and P-2000 Power Supply



PUTTING a complete 2-kw. p.e.p-input transceiver into one table-top cabinet would be quite a feat. Hallicrafters hasn't quite achieved it in the SR-2000, although everything except the power supply *does* go into an ordinary-sized cabinet that an ordinary-sized man can handle with ease. The separate power supply isn't inordinately large — it takes only about half as much table room as the SR-2000, and side-by-side the pair won't swallow all the space on a desk by any means — but it weighs 60 pounds. When it's set alongside the 26-pound SR-2000 the table underneath had better have sturdy legs; a card table definitely won't do.

The combination has all the features a sideband usually demands. The frequency coverage is amateur-band, 3.5 to 30 Mc. in 500-kc. tuning ranges, one range for each band except 10 meters, which has four. Double conversion is used, with a tunable intermediate frequency of 6 to 6.5 Mc. and a fixed i.f. at 1650 kc. The latter contains the crystal lattice filter for sideband selection. All oscillators are crystal controlled except the tunable conversion oscillator (v.f.o.) which covers 4.35 to 4.85 Mc.



Nothing much visible here except a maze of components and wiring! The boxed-in section at the lower right is the final amplifier, the tubes being in the left-hand part. Cooling air from the fan is directed up through the sockets to exhaust through a perforated cover over the amplifier compartment on top of the chassis.

In receiving, incoming signals are first converted to the 6-6.5 Mc. range by mixing with a crystal-controlled h.f. oscillator, then converted to 1650 kc. by v.f.o. tuning. In transmitting, the output of one of two carrier oscillators (b.f.o.) is combined with audio in a balanced modulator, the desired sideband is selected in the 1650-kc. i.f., and the s.s.b. signal is then mixed with the v.f.o. to be shifted to the 6-6.5-Mc. range. There it is mixed with the same crystal-controlled h.f. oscillator used for receiving on that particular band, coming out on the desired amateur-band frequency. Signal and other paths can easily be traced for both receiving and transmitting in the block diagram, Fig. 1, thanks to the coding system "lifted" from the SR-2000 instruction book.

Receiver Lineup

Altogether, there are 18 tubes in the transceiver, the majority of them dual types. Running through the receiving lineup first, the r.f. amplifier is a high-transconductance pentode, a 12DK6. Separate antenna transformers are used for each band, with their secondaries tuned by one section of the ganged preselector variable capacitor. The primaries are adjusted for 50-ohm input. Single tuned circuits, choke-capacitance coupled, are used between the r.f. stage and first mixer; these likewise are tuned by the ganged capacitor. In the mixer, the amplified signal is combined with the output of the appropriate h.f. crystal oscillator, a Pierce-type circuit, to convert it to the 6-6.5-Mc. range. The mixer tube is a triode section of a 7059 (the industrial version of the 6U8), with the signal applied to the grid and the oscillator output injected in the cathode circuit.

The first-mixer output goes through a double-tuned band-pass transformer to the grid of a 7059 pentode section as an i.f. amplifier, and from there through a second band-pass transformer to the grid of the triode second mixer. The v.f.o. output is injected into the cathode circuit of this mixer. The signal selected by the v.f.o. tuning comes out at 1650 and is capacitively coupled, by means of a single tuned circuit, to the grid of the first 1650-kc. i.f. amplifier. (The tuned circuit in the mixer-stage output, incidentally, is the tuned winding

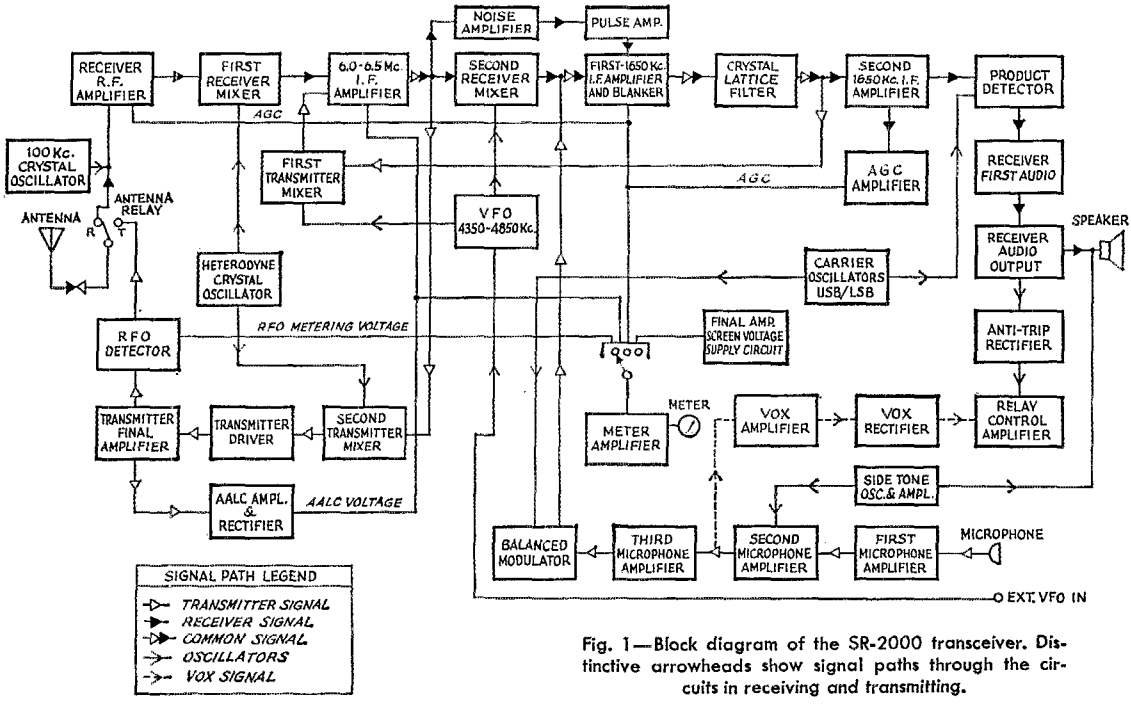


Fig. 1—Block diagram of the SR-2000 transceiver. Distinctive arrowheads show signal paths through the circuits in receiving and transmitting.

of the balanced-modulator output transformer used in transmitting).

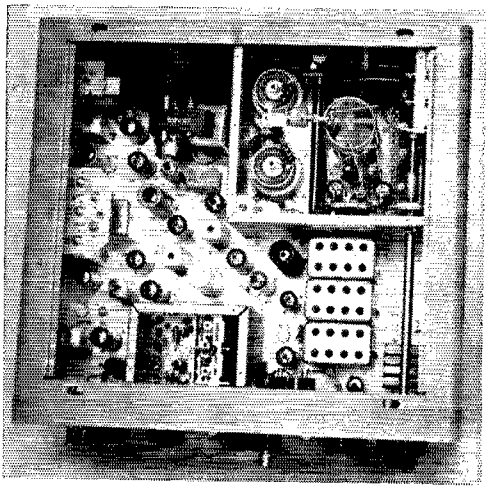
At this point the circuit differs from the ordinary. The first 1650-kc. tube, a 6GX6, is a combination i.f. amplifier and noise blanker, with the signal applied to the No. 1 grid and the noise-blanking pulses applied to the No. 3 grid. The blanking pulses are formed by amplifying noise "spikes" in a 7059 pentode stage having its grid in parallel with the second-mixer grid (at 6 Mc.), and having controllable grid bias so only spikes of amplitude above a selected level — the "noise threshold" — will actuate the amplifier. This prevents ordinary signals and low-level noise from initiating blanking pulses. The pentode output is rectified and applied to a 7059 triode section for further amplification and shaping of the pulses, and the triode output is again rectified and applied in proper polarity to the 6GX6 for silencing the 1650-kc. i.f. during a noise pulse. Those familiar with the Lamb-type silencer will recognize the similarities.

The sideband filter, a six-crystal lattice, is between the first and second 1650-kc. i.f. amplifiers. The output of the second stage is coupled to the product detector through a double-tuned 1650-kc. transformer. The grid of the 7059 pentode-section a.g.c. amplifier also is driven from the secondary of this transformer. The amplified-a.g.c. circuit is one we haven't seen for some time; it uses the pentode as a plate rectifier with its cathode below ground so plate rectification will develop a negative d.c. voltage referenced to ground. The a.g.c. threshold can be adjusted by controlling the cathode voltage, which is obtained from a —90-volt source. The same source is also used for biasing other stages in the transceiver to make them inoperative either while transmitting or receiving, as required.

The product detector is in principle essentially the same as the mixers earlier in the receiver — a triode with the signal applied to the grid and the b.f.o. voltage introduced into the cathode circuit. The crystal-controlled b.f.o. is a simple tuned-plate triode with the carrier-frequency crystals (one for upper and one for lower sideband) in the grid circuit. Sections of 12AT7s are used for both the detector and oscillator. The detector is followed by another 12AT7 section as an audio amplifier, and the output of this amplifier drives a 6AQ5A audio output stage. Audio output impedances are 500 ohms and 3 ohms, with the headphone jack connected across the latter winding on the output transformer.

Special Tuning Features

The "receiver incremental tuning" (RIT) shown in Fig. 2 is not an innovation in the SR-2000, having been used in earlier Hallicrafters transceivers. It is particularly useful for c.w. operating, since it allows the receiver to be tuned a couple of kilocycles on either side of the transmitting frequency without disturbing the latter. In receiving, with the RIT switch "on", varying the d.c. bias on CR13, a V100 Varicap, tunes the v.f.o. over the RIT range. When the vox relay is in the transmit position it disconnects the manual-tuning bias and substitutes a "calibrate" bias which sets CR13's capacitance at a fixed figure. The bias comes from a regulated d.c.



In this internal view of the SR-2000 chassis the covers of the shields for the final amplifier, upper right, and variable-frequency oscillator, lower left center, have been removed. The tops of the 8122 tubes can be seen in the amplifier compartment, with the pi-network coil to their right. Tuning and loading capacitors are at the right-hand edge of the compartment; they are driven by concentric shafts, one direct-coupled to the loading capacitor and the other coupled through pulleys to the tank capacitor mounted underneath. The shield cans between the amplifier compartment and the front panel contain the r.f. mixer and driver tuned-circuit coils. The band switch and ganged tuning capacitor for these coils are directly underneath, and can be seen at the upper right in the bottom-view photograph. The i.f. circuits are along the left side of the chassis. At the top, just to the left of the amplifier shield, is the cooling fan.

source, and is further regulated by the 1N963A Zener to make it "stiff" in both transmitting and receiving.

The lower part of Fig. 2 shows the method used for shifting the v.f.o. so retuning won't be necessary when switching from one sideband to the other. The v.f.o. frequency is moved the same number of kilocycles as the difference between the two b.f.o. crystals, 3 kc. On the LSB setting of the mode switch no d.c. voltage is applied to the 1N295 diode, so it is nonconducting and the two capacitors (15 pf. fixed and 0.8-13 pf. adjustable) are not in the circuit. With the selector switch on USB, TUNE, or CW, d.c. voltage is applied to the diode, making it conductive and connecting the two capacitors into the circuit. A similar arrangement could be used for frequency-shift keying, although the SR-2000 has no specific provision for f.s.k.

Transmitting

The transmitting setup reverses much of the receiving procedure. Here the b.f.o. is used as a carrier generator, with two crystal-controlled frequencies, one on each side of the crystal lattice filter, for sideband selection. The carrier signal is taken from a coil coupled to the oscillator's tuned plate circuit; both sides of the coupling coil are off ground so a balanced r.f. voltage can be applied to the modulator. The modulator uses the well-known two-diode circuit (1N87s in this case) with parallel audio input to the diodes. The single-ended suppressed-carrier output of the modulator goes through a d.c.-actuated diode gate (nonconducting while receiving) to a winding coupled to the tuned circuit between the second receiving mixer and the first 1650-kc. i.f. amplifier. After amplification at 1650 kc. one sideband is removed by the lattice filter and the resulting s.s.b. signal goes on to the first transmitting mixer, a 7059 pentode section. Here it is mixed with the v.f.o. output for conversion to the 6-Mc. range, and then after amplification at 6 Mc. it moves on to the second transmitting mixer to be combined with the output of the h.f. crystal oscillator for final conversion to the desired amateur-band output frequency.

This is the end of the "transceiver" setup. The remaining transmitting r.f. stages, of which there are two, are used only for transmitting. The first is a 12BY7 driver, which has its plate circuit gang-tuned with the receiving preselector. The second is the final amplifier, using a pair of 8122s in parallel operating Class AB_1. This circuit has the customary pi-network tank and is neutralized by the capacitive bridge method. Capacitance values are changed in the tank and neutralizing circuits as necessary for proper loading and neutralizing of the amplifier, fixed capacitors being switched in or out by the band switch. The plate tuning capacitor has two sections, one in use on all bands and the second switched in on bands where more tuning range is needed.

Overall r.f. gain in transmitting is controlled to prevent overdriving the final stage, using a control signal taken from the d.c. grid return of the 8122s. At zero bias there is a slight amount of rectified grid current which follows envelope peaks in the r.f. driving voltage. This pseudo-audio variation is amplified by a 7059 triode section and then rectified to develop a negative d.c. voltage which is used to bias back the 6-Mc. i.f. stage and reduce its gain when voice peaks tend to exceed the limits of linearity.

The microphone amplifier has three triode stages using 12AT7 sections, with the third stage a cathode follower driving the balanced modulator. The first and third of these are biased beyond cutoff while receiving and also when the function switch is set to CW. In c.w. operation a neon-tube side-tone oscillator goes into action, driving a keyed 7059 triode amplifier connected to the audio output transformer so the keyed side tone can be heard in the speaker or headphones, whichever is used. Some tone output also is fed to the grid of the second microphone amplifier tube, and after amplification in that stage is used to actuate the vox circuits for automatic send-receive switching. The transmitter itself is keyed by the grid-block method in the second transmitting mixer and driver stages, with keying time constants such that the keying is firm but without clicks.

The usual VOX and anti-trip circuits are in-

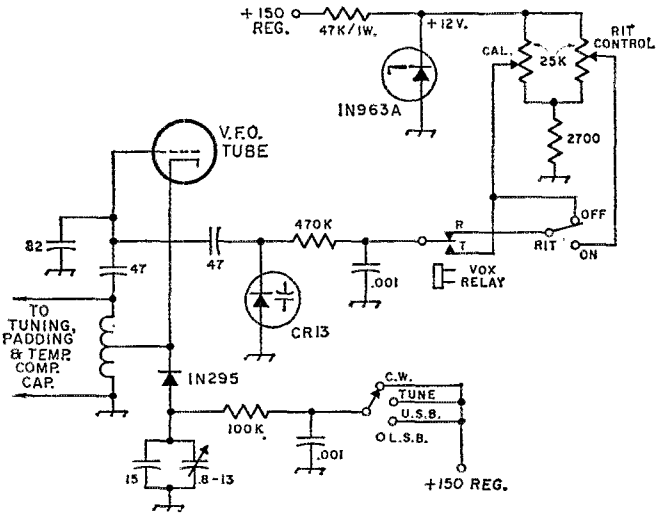


Fig. 2—Circuits used for separate tuning of receiver over a small range ("receiver incremental tuning") and for maintaining constant carrier position on the tuning dial when sidebands are switched. V.f.o. frequency is varied over a range of about ± 2 kc. by changing the bias voltage on CR13, a V100 Varicap. The RIT control is inoperative when the VOX relay switches to the transmitting position. In the sideband frequency-compensating circuit at the bottom, the v.f.o. frequency is shifted to compensate for the change in basic carrier frequency when going from upper to lower sideband and vice versa. The 1N295 diode is used as a switch to connect or disconnect the small compensating capacitors.

cluded, using a 12AT7 for amplification and relay control.

The panel meter on the transceiver is used for four measurements: as a receiving S meter (where it measures the a.g.c. voltage), as an r.f. output meter, as a meter for monitoring the a.a.l.c. (amplified automatic level control) voltage in transmitting, and as a screen-current meter for the 8122s. The receiving and transmitting functions are automatically set up by the vox relay; the three choices in transmitting are selected by a panel switch.

Power Supply

Theoretically, the SR-2000 can be used with a power supply of your own construction. Considering the number of voltages, controls and meters needed to work with the transceiver itself, though, it hardly seems practical to use a supply other than the P-2000. Besides, the latter is designed to match the appearance of the SR-2000 as well as to meet its electrical requirements.

The P-2000 includes a loudspeaker as well as all the power supplies needed by the SR-2000. It has two transformers in it, one a big brute having a high-voltage winding for the 8122 plates and a low-voltage winding for their screens, and the other a smaller one having a 12.6-volt winding for the heaters of all tubes, a bias winding, and a winding for supplying the plate power for all tubes in the transceiver except the final amplifier. Operation of the transmitter at two power levels is provided for. One of these, for which the final-amplifier plate voltage is nominally 1700 and the screen voltage is 300, is used for tuning, c.w. operation, and for s.s.b. at the kilowatt p.e.p. level. The "high" power, where the plate voltage is 2700 and the screen voltage is 400, is used only for 2-kw. p.e.p. s.s.b. The two levels are switch selected, and the same switch also changes the grid bias on the final stage to match the change in plate and screen voltages.

The primary circuit of the high-voltage transformer is closed through a relay, operated by on-off pushbuttons through a 90-second time-delay device. This insures that power will not be applied to the final-amplifier tubes before their heaters are up to temperature. The changeover from 2700 to 1700 volts (and the accompanying change in screen voltage) is made by means of taps on the transformer primary; this is also done by a relay. Overload protection is provided for by a relay in the negative high-voltage lead. The plate-current meter (1 ampere full scale) also is in the negative lead. A 5-kv. voltmeter is across the d.c. output voltage to monitor the voltage actually applied to the amplifier plates. The plate supply uses a voltage doubler having 5000-volt semiconductor rectifiers and series-connected electrolytic capacitors. The screen supply has a bridge rectifier with a single-section choke-input filter.

Center-tap rectification is used in the low-voltage (280 volts) supply for the transceiver. The bias supply has half-wave rectification with two *RC* filters. The output from one is −90 volts and from the other is −20 to −30 volts; the former is used for the transmit-receive control of various stages in the transceiver and the latter for biasing the final amplifier. The amplifier bias is adjustable by means of a front-panel control on the SR-2000.

The P-2000 can be operated from either 115 or 230 volts 60-cycle a.c. As supplied, it is wired for 115 volts, but the changeover is easily done.

General

Space doesn't permit going into all the details of a complex set of equipment such as this, and there are many circuit and mechanical kinks that could not be covered. It must suffice to mention just a few:

Liberal use is made of concentric controls to permit getting the necessary knobs out where they can be handled in the limited panel space. One such pair is the final-amplifier plate tuning and loading. Concentric combinations, in general, group similar functions — e.g., audio and r.f. gain

Hallicrafters SR-2000 Transceiver
Height: 7¾ inches.
Width: 16½ inches.
Depth: 15 inches.
Weight: 26 pounds.
Price Class: $995.
P-2000 Power Supply
Height: 7¾ inches.
Width: 10⅝ inches.
Depth: 15 inches.
Weight: 61 pounds.
Power Requirements: Transmit, 2300 watts; Receive, 175 watts; 60 cycles, either 115 volts (2-wire) or 230 volts (3-wire).
Price Class: $395.
Manufacturer: The Hallicrafters Co., 5th and Kostner Aves., Chicago, Ill. 60624

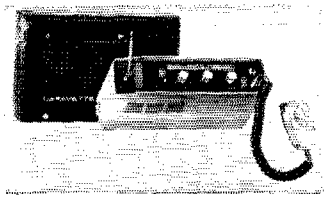
for receiving, audio gain and drive level for transmitting, and so on.

The main tuning dial is calibrated in 1-kilocycle intervals and has two 500-kc. ranges, one starting at 0 and the other at 500. These are in different colors, and the band-switch markings are similarly colored so that for a band such as 7000–7300 kc. the calibration starting at 0 is used, and for 3500-4000 kc. the dial starting at 500 is used. Thus it is only necessary to add the dial reading to the frequency of the low edge of the band to get the actual frequency to which the transceiver is set. With RIT, the dial reads the *transmitting* frequency; a panel lamp lights up when RIT is used.

The v.f.o. uses a 12BA6 operating as a hot-cathode Hartley oscillator with the screen and plate grounded for r.f. It is followed by a 12AT7 section as an amplifier, the oscillator r.f. voltage for which is taken from the 12BA6 cathode through a small coupling capacitor. The amplifier, with cathode output, drives all the associated mixers in the transceiver. An external v.f.o. can be used with the set, provision being made in an accessory socket for introducing it and for simultaneously disabling the internal v.f.o. An accessory package, the model HA-20 "DX Adapter", provides such a v.f.o. — similar to the one in the SR-2000 — for operating the receiver and transmitter on different frequencies.

The final amplifier is well boxed up for TVI prevention. There is a built-in cooling fan which operates at low speed during receiving when there is no plate power on the 8122s, and which is speeded up for transmitting when the 8122 plates are dissipating several hundred extra watts. — *W1DF*

Next Month



Lafayette HA-144 2-meter Transceiver

Silent Keys

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

W1AFW, James H. Hanly, Pawtucket, R. I.
W1BIV, Alton L. North, Stoughton, Mass.
K1HBS, Katherine M. Blackford, Newbury, Mass.
K1SNP, Edwin F. David, Framingham, Mass.
W1TVU, Herbert E. Merrill, Chaplin, Conn.
W2DOK, Charles J. Schultz, Margate, N. J.
W2DW, Harold W. DeMyer, Westbury, N. Y.
W2FT, Albert J. Sonnick, Plainview, N. Y.
W2GAR, Albert J. Mitchell, Potsdam, N. Y.
WA2HDY/5, Kenneth J. O'Dea, Maspeth, N. Y.
K2IQ, William S. Gruber, New Hartford, N. Y.
W2MMS, William K. Storrs, S. Plainfield, N. J.
WB2UBW, Raynard L. Whitney, Elmira, N. Y.
K3AAC, Oswald A. Henninger, Harrisburg, Pa.
ex-3AKZ, G. Park Weaver, Camp Hill, Pa.
W3ARM, Wesley W. Brogan, Ambler, Pa.
W3GPY, Duane R. Abraham, Tyler Hill, Pa.
W3GZX, Allen E. Winter, York, Pa.
W3LP, Harold O. Landis, Reading, Pa.
W3NNS, Anabel M. Garrahan, Forty Fort, Pa.
W4AQO, Leon E. Persons, Bayou La Batre, Ala.
W4BM, Harlow M. Case, Sarasota, Fla.
WA4HZK, John A. Curry, Montgomery, Ala.
W4JAF, Harrison D. Willcutts, Jr., Nashville, Tenn.
W4JIT, Theodore E. Obrig, Sarasota, Fla.
K4OPX, John C. Pulos, Columbia, S. C.
W4ORS, Simon H. Klinghagen, Enterprise, Ala.
W4PWY, Neeley J. Smith, Summerville, S. C.
W5AOT, Henry L. Brown, El Paso, Tex.
WA5EJF, Donne W. Gikas, San Antonio, Tex.
K5EMQ, Teddy F. Topoleski, San Antonio, Tex.
W5PHO, George F. Kendrick, Corpus Christi, Tex.
W6CPT, James Brennan, Stockton, Calif.
W6HW, Clyde L. Sweeten, Monrovia, Calif.
W6HXD Arthur C. Adams, San Carlos, Calif.
WA6ITL, Charles F. Starr, Beverly Hills, Calif.
W6LSO, Howard C. Dumm, Long Beach, Calif.
W6NMC, Myron Zobel, Palm Springs, Calif.
WA6QMY, John G. Johnson, San Ysidro, Calif.
W6UQL, Frank A. Wood, Arcadia, Calif.
WA7EIS, Carl L. Kopf, Tacoma, Wash.
W7FPN, Francis W. Linklater, Coos Bay, Ore.
8JA, Ross Gunn, Oberlin, Ohio
W8NQQ, Michael J. Mohan, Newton Falls, Ohio
WA8NYC, Henry Derda, Bedford Heights, Ohio
WA8OBQ, Donald L. Jones, Flint, Mich.
W8OSI, Milton S. Hobbs, Clawson, Mich.
WA8QWK, Albert G. Niese, Lima, Ohio
W9AMC, John W. R. Johnson, Belleville, Ill.
W9HDB, Andrew A. Collins, Valparaiso, Ind.
W9IQS, Robert A. Lerche, Downers Grove, Ill.
W9KCX, Anderson M. Evans, Springfield, Ill.
W9PCB, Howard L. Wood, So. Holland, Ill.
W9WPC, A. L. Ballard, Carmi, Ill.
W9ZYK, Paul E. Metzner, Mishawaka, Ind.
WAØAMR, Samuel R. Moser, Raytown, Mo.
WØEEL, Ted J. Coltrin, Louisburg, Kan.
WAØHIO, Dougias Dayhuff, Saint Paul, Minn.
KØHIX, Kenneth Johnson, Saint Paul, Minn.
ex-WØIAJ, Nathan G. Brown, North Platte, Neb.
WAØJOP, Arden H. Belling, Cottonwood, Minn.
WØKQX, Dean W. Hagemeister, Potter, Neb.
WAØOJB, Robert E. Sipes, Ottumwa, Iowa
WØPOY, Carleton C. Boe, Sioux City, Iowa
WØVOA, Marvin H. Rossell, Atwater, Minn.
VE3BEY, Harry A. Ward, North Bay, Ont.

Don't Lose Your Mobile Rig [1]

BY MIKE CRESTHALL

AUTHOR'S note: This article is the result of an interview with an EX car thief. This person, anonymous for obvious reasons, consented to grant me this interview for *Marcogram* providing his identity be withheld. For this interview, I will call him Mr. X.

Marcogram: Mr. X, before we start, perhaps you would like to give us a bit of an insight into your background.

Mr. X: I am 42 years of age, and I spent 17 years in jail for crimes ranging from safecracking to auto-burglary. My last prison term ended in September, 1966, having spent 7 years of a ten-year term for breaking and entering, and for forgery.

Marcogram: What type of vehicle would you consider the easiest to enter, and what would you look for?

Mr. X: I preferred unlocked vehicles, but in general, all cars are simple to enter, locked or not. The easiest from my point are ragtops (convertibles) and the two-door hardtops. However, most car-men (Note; car-men are thieves who specialize in theft from automobiles.) will not bother with a securely locked car because it is risky to slit a ragtop or use a "snake" to open a locked car. (A snake is a hooked wire used to catch the door lock and open a locked door.) The hardest are Volvos and Volkswagens.

Marcogram: How about lock-picks and skeleton keys?

Mr. X: Good question. I never liked lock picks for automobile work, as the locks are not suitable for picking. Auto locks differ from standard locks in that the home type work on the pin and tumbler principle; automobile locks are wafer types, and they are difficult to pick due to their construction. As for skeleton keys, some like 'em, but I don't for the reason that you have to carry 120 of the devils around. I prefer hooking the latch with a snake wire, or in some cases, making a key impression. (Note: I was given a demonstration on my own mobile of this art of "impressioning". It truly must be seen to be appreciated. Simply by placing a blank in the lock and turning the key blank he knew where to file the blank. It took him exactly 3½ minutes to open my door.)

Marcogram: What sort of things do you look for in a parked car?

Mr. X: We look for cameras, portable radios, furs, salesmen's cases, jewellery, and the like.

Marcogram: What use would a salesman's case have?

Mr. X: We can sell it to his competitor for a good price.

Marcogram: How about ham radios? Have you ever stolen one, and if you did, how did you go about disposing of it?

Mr. X: I don't know whether I should tell you or not; but I have stolen a few ham radios in the past. They are easy enough to get out, but they are difficult to fence. (Note: a fence is a person who knowingly buys stolen goods.) I got one a while back and sold it for $100.00. Afterwards I found out the darn thing was worth at least $1,000. I didn't bother with 'em after that.

Macogram: Where do you strip a car?

Mr. X: If the car is parked in a dark remote spot it is better to do the job where the car is. This is because auto burglary is a lesser crime than stealing the whole damn car.

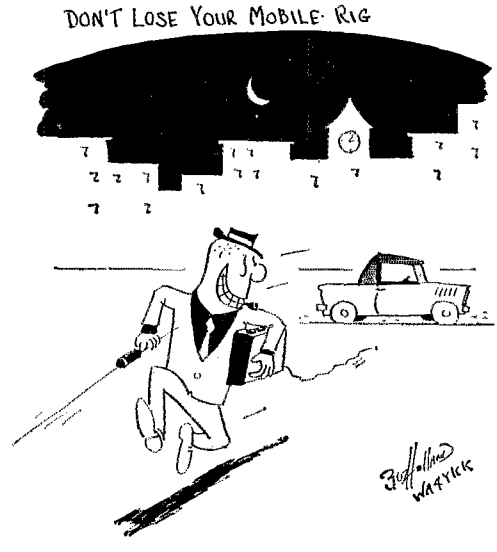
Marcogram: How would you remove a ham rig, and approximately how long would it take?

Mr. X: It's pretty hard to say because each time is different. I remember one time I beat (stole) one of those ham radios. I spotted this VE2 license tag and he hadn't locked his car. It was parked on a dark street and no one was around. It took me 10 minutes to strip his car, including aerial and wires. You know the screws holding the wires on the radio? Well, I just cut 'em.

Marcogram: How much would you get for a rig worth, say, $1,000.00?

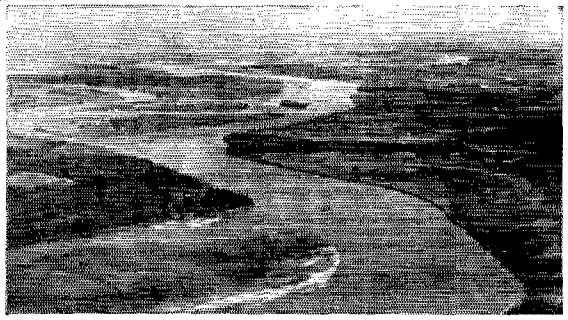
Mr. X: About 5 years. Seriously, I figure about ⅛ the current market value. The fences know their values on anything and everything. One guy stole some lithographing blotters and the fence knew exactly what they were worth. On the other hand, if I steal "on order," I can get a lot more — say ½ the current value. It is very hard to say on these things.

(*Continued on page 142*)



[1] Reprinted from *Marcogram*, Jan., 1967.

OPERATION YUKON 800



The twisting, many-channeled Yukon River in the flats near Ft. Yukon.

BY FLORENCE R. WEBER,* KL7AZJ

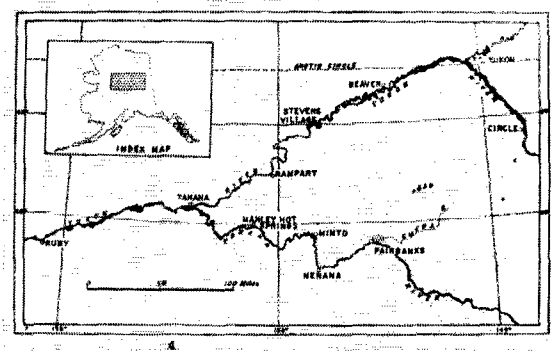
For those who think of Alaskan amateurs largely in terms of communications after the Good Friday Earthquake of 1964 we believe you should also be acquainted with one of our more leisurely activities. We, of the Arctic Amateur Radio Club of Fairbanks, undertake each year a large and complicated communication program to furnish progress reports and general communications for the annual "Yukon 800 Marathon," a boat race sponsored by the Fairbanks Outboard Club.

This race, run on the weekend closest to the longest day of the year — 18th and 19th of June in 1966 — when there are 24 hours of daylight, starts in Fairbanks on the Chena River, proceeds down the Tanana River to the Yukon River and down the Yukon River to the village of Ruby and return, a total river distance of approximately 800 miles (see map). The boat people here consider this the longest and toughest of any riverboat race in the world.

The first marathon race of this type took place in 1960 and was called the "Yukon 700 Marathon," as the race course started at Circle, followed the Yukon River west to Tanana, then up the Tanana River to Fairbanks, a hundred miles less than the present course. During the first race in 1960 the boats encountered bad weather and there were some mishaps. Although none of the accidents were very serious, much time was lost in locating and rescuing stranded boatmen as there were practically no communications. Native villages enroute have only a once-a-day schedule into Fairbanks by government radio, providing band conditions are good.

Members of the Arctic Amateur Radio Club observed these shortcomings and offered their help. In 1961 we started our first "Operation Yukon 700." Although the faces in the club change from year to year, our procedure has been much the same. For the three years of the "Yukon 700" we operated a ham owned aircraft air-mobile unit to set up three ground stations and then to fly the entire race route. The time and effort involved carrying the radio and power equipment, as well as the personnel needed to set up these stations, and the adventures of the people manning the "bush" stations makes a story too long to relate. The primary purpose of the aircraft, however, was to cover the section of the Yukon River between Circle and Tanana. In part, the river in this area meanders with hundreds of twisting channels and side sloughs through a broad lowland where boatmen got lost; some capsized on sunken logs or submerged sand bars. The river then passes through a canyon in a single broad channel, which is frequently whipped by strong winds. The air cover by float-equipped or amphibious aircraft was a necessary item. Gas for the airplane was furnished by the boat club. The boat club also had planes in the air, but these were without direct communication to Fairbanks.

For numerous reasons the Fairbanks Boat Club dropped the "700" route and settled on the present "Yukon 800". Since then our setup has been essentially the same. Operations are on 75 meters, a.m. and s.s.b., and on 2 meters, a.m. and a.f.s.k. RTTY. A base station, 5 miles north of Fairbanks at a low-noise receiving site, is used for the 75-meter work. Results are collected and transmitted via 2-meter a.f.s.k. to a station at the Fairbanks Chamber of Commerce Log Cabin, in downtown Fairbanks opposite the starting line on the Chena River. Voice communications via 2 meters to the Chamber of Commerce is also maintained. The teletype messages are available to the news media and the results are tabulated on a bulletin board for everyone to see. The boats, as they progressed along the route, are clocked by the ham stations. If a boat



Map of the central part of Alaska showing the rivers followed in the Yukon 700 and Yukon 800 Marathons.

* Box 735, College, Alaska 99701

fails to pass a check point after a reasonable time, it is reported as missing, the section is pinpointed, and a search mission begins.

This last year we had 5 reporting stations — Nenana, Minto, Tolovana (omitted from the map but located half-way between Minto and Manley Hot Springs), Tanana, and Ruby a total of almost 30 hams is involved. The club has ham members in residence at Nenana and Tanana but their homes are not located near the river and auxiliary stations on the river bank were necessary. A carmobile unit and several hams went by road to assist at Nenana.

Minto, a native village, and Tolovana, an abandoned village site, were occupied by ham boat parties. After reporting the "Class B" riverboat turnaround at Minto, a boat with ham gear aboard was to follow the racers down the river to act as "pickup boat" in case of an accident. Rough water caused a gas tank leak and the ham boat was forced to make temporary repairs and return to Minto for the duration of the race. The Tolovana boat party set up a portable station and operated from storage batteries.

The author flew to help out at Tanana. A novice-class couple there had passed their general class tests in Fairbanks six weeks prior to the race; they hounded the mail for their tickets from the FCC but these failed to arrive in time. They had a brand-new 75-meter s.s.b. setup complete with 1½-k.w. generator and they were not legal to operate it. It was unfortunate that I had to be the first to use their new outfit, but they provided the important 2-meter link from their home 3 miles down to the riverbank where they set up a truck battery-powered rig.

The boat club provided air transportation for the race officials and two hams to the important turnaround point at Ruby. The hams got on the air in the nick of time after trouble shooting a short in their antenna, just as the first boat arrived. They operated on 117 volts with power supplied by the general store owner in Ruby.

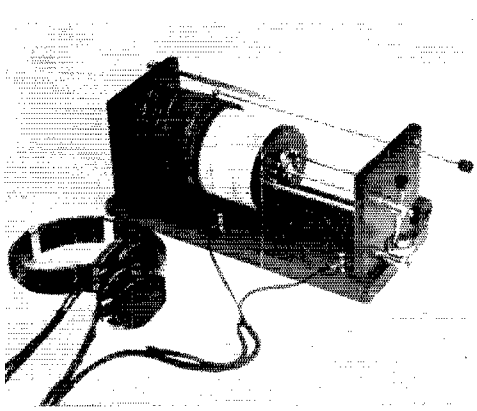
The finish line at Fairbanks was alerted to the boats' return by a car-mobile on 2 meters located 5 miles downstream. The race takes about 24 hours to report.

The Arctic Amateur Radio Club has been lucky all these years in that 75-meter band conditions have held up and we have not been subjected to a disastrous auroral blackout. At times we have had to relay from one station to another but we always got the information through. Conditions in 1966 were the best yet. We have alternate plans to use v.h.f. in the event of a 75-meter failure, but have yet to test them. We have a solid 2-meter link to Nenana and a tenuous link to Tanana. Almost all the stations in the bush, as well as the airplane which I flew to Tanana, had 2 meter equipment. By using the aircraft, centrally located, at a high enough altitude we feel we could get the bare minimum messages through.

We have handled this type of event, including the North American Championship Dog Sled Races, so many times now that only one or two planning meetings in advance are necessary. Everyone is responsible for, and works on, the logistics of his own particular part — Alaskans are an independent lot! Needless to say, we have a ball.

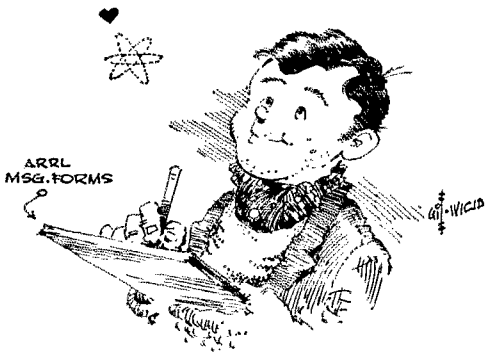
Our new major club project is to set up a station which has been authorized the special call KL7ACS, "Alaska's Centennial Station," at the Alaska 67 Centennial Exposition Grounds here in Fairbanks this summer. Come up and see us! QST

Bob Mitchell, KL7FNL, waves at a racing boat as it passes the Tanana checkpoint. Boats are required to pass within sight of the town, as this is one of two large channels of the Yukon River here. Bob transmits information on two meters to his home, where it is then relayed on 75-meters.



From the Museum of Amateur Radio

This month we show a complete wireless receiver built in 1909 by Harry D. Copland, ex-10S, who was then 12 years old. He had, in fact started his own company, catering to hams. Unusual is the mounting of the Perikon detector on the vertical block. The slider on the primary is actuated by the rod. The blocking condenser is mounted in a recess in the base. The phones are the original Holtzer-Cabots. Real good ones, too. We hooked this rig up to an outside vertical antenna and found it to be in working order. It wasn't very good and we wondered how we ever heard NAX from up north on an almost identical receiver! —W1ANA, Curator.



A Funny Thing Happened On The Way To BPL

BY JOHN SANDERS,* K1IFJ

You say one goes to college to study? If you're a ham, that's okay, as long as you're a two hundred and twenty gigcycle sideband man. Otherwise, you had better submerge your identity and bury your ticket beneath four hundred pounds of books because, if you are found to be one of "those guys" who send free telegrams, you're dead. And, in the course of my first year at college, I made the fatal error of letting on that I was one of "those."

At this school, we are fortunate enough to possess a well-equipped club station, W1UYY. Grades, down 10%. And, when the club members are enlightened to the fact that you were a traffic man in your high school days, it's all over. The clever idea is brought forth at a meeting that the club should offer to send radiograms for the student body. Public service, and all that. Motion passed. Widespread advertising of free service. Club post office box choked with hundreds of messages to girls, friends, nuns, parents, and Barry Goldwater. Grades, down 40%.

Having now spent many hours with canned ears and sore keyer fingers, I have found only one solace in all these endeavors and that has been in reading the messages authored by some of our more creative campus creatures. And, not being a selfish person (usually), I have decided to present for your enjoyment some of the gems which have delighted the heart of many a traffic man.

This being an institution restricted to those of the male sex, it can be verily surmised that a goodly portion of the outgoing traffic is addressed to "the girl back home." The texts vary in subject matter from the simple "I love you" and "See you next weekend" types to the more extravagant and interesting. The following went to a loved one in New York.[1]

I LOVE YOU X I LOVE YOU X I LOVE YOU X PLEASE MARRY ME

Indubitably, there is a long and interesting story behind that message. In fact, our interest was tripled when we found three more messages from the same gentleman with identical texts, addressed to three other gals. I'd like to borrow that man's little black book! But the most entertaining messages by far are from the lonely hearts. Often, we get the following laments.

ARE YOU STILL SPEAKING TO ME QUERY ARL SEVEN

Brings tears to your eyes, doesn't it? But there are a number of ways of remedying matelessness, not the least of which is the following.

MA X I NEED A DATE X SEND UP ANN

The next is a little more "suave."

DEAR CONNIE X I'M JOE SMITHS ROOMMATE, GENE X HE WAS TALKING ABOUT YOU AND I WAS WONDERING IF YOU WOULD LIKE TO COME TO HOMECOMING WITH ME X JOE SAYS YOU SHOULD SEE HELEN ABOUT IT

Okay, but by amateur radio?

When one takes out a girl, one needs money. The age-old problem of the penniless student returns. But in the electronic age, the poor scholar can turn to the campus amateur radio station and dispatch an SOS posthaste. The following is a text which may soon have an ARL number.

HI X SEND MONEY

Check four, that's all. Nothing like that good old-fashioned New England bluntness. Yet, there are exceptions.

DON'T WORRY X DON'T NEED MONEY X HAPPY BIRTHDAY MA X NEED A WATCH

Might have known there'd be a catch. But money is not the only thing requested via amateur radio.

DON'T FORGET TO SEND SHOELACES X WILL WRITE SOON

We had quite a debate as to whether or not this should be a "priority" message. However, we decided that if it were really an emergency, he would have spent the dime for a pair.

During the orientation of the freshman class this year, we set up an exhibit from which the frosh could send radiograms home. Personalities are quite vividly defined by what was written in the texts. Examine the following two messages on the same topic.

I LOVE IT HERE X I AM MAKING MANY NEW FRIENDS X I HOPE TO SEE YOU SOON X I LOVE YOU VERY MUCH

* P.O. Box 1382, Holy Cross College, Worcester, Massachusetts, 01610

[1] All texts are quoted word-for-word as given to us. Only the names in the texts have been changed.

and

I'M HAVING A REAL BLAST X COOL GUYS AND TOUGH FOOD X I'M STOKED

"Tough," I think, means "good," but as for the word "stoked," I'm at a loss for definitions. Incidently that text was the unexpurgated version. We edited it before it was sent. This was done out of kindness toward the station who would have to telephone the addressee.

And speaking of weird texts, we do get some. The campus poets do their level best to foul up EAN with stuff like:

THE SOUND OF GOLDEN LEAVES CRUNCHED BENEATH COUNTLESS DEJUNED FEET FAR OFF IN THE OCTOBER NIGHT

And then there are the moral philosophers.

TRUST IS A BELIEF OR A HOPE THAT SOMEONE WILL ACT OR PERFORM IN THE WAY YOU WANT IN THE FUTURE

Both of these examples are the complete texts as sent by W1UYY. Nothing like a little culture for the NTS. On the other hand, the following may have raised or wrinkled a few eyebrows.

HOW FREE THE LIFE OF THE MEMBER OF THE HOUSE OF SEVEN

* * *

HOW'S EVERYTHING QUERY JILL IS A FINK AND THE GIANTS STINK

* * *

THERE IS A SKUNK ON THE ROAD AND HE'S HAVING ONE FOR THE ROAD

* * *

G-2 REPORTS YOU MAY EXPECT CAL COMMUNICATION TUESDAY 15 OCTOBER 2100 TO 2230 HOURS

signed: THE BOYS

"The boys" of the last message refused to divulge to me the meaning of G-2. I felt left out. I hope the guy who took the message didn't take it as hard as I did. And speaking of hard (Day's Night), this one is of questionable taste.

I SAW THE BEATLES ON TV LAST NIGHT X DID YOU STAY UP TO WATCH THEM QUERY

Nope.

In conclusion, I think the following message from an incisively critical student sums up the situation at W1UYY.

A HELLO TO ALL X OUR RADIO CLUB IS NUTS X THIS IS FOR FREE X ARL SEVEN

We never received a reply. QST

May 1942

Your "25 Years Ago" Editor is vacationing in Florida this month and his thoughts while basking in the sun are of more modern things. However, we will strive to bring you the highlights of the issue of 25 years ago but without the sparkle and wit of its usual creator.

. . . The cover this month is enhanced by a beautiful YL, and it should be since several features inside the magazine are devoted to the important radio role women were playing in the war. Clint De Soto, W1CBD, *QST*'s Assistant Editor, reports the story in his article "U. S. A. Calls and the YLs Answer." One interesting note: A photograph in the article shows several attractive coeds surrounding an instructor who is giving lessons in soldering, drilling holes in metal and construction of simple receivers. The instructor is Dr. Yardley Beers, then W3AWH. See his articles in *QST* 25 years later, in January and February 1967!

. . . In case a substitute for radio communications is necessary because of the war, *QST* reports some unorthodox methods of communications, at least for hams. James and Eleanor Stevens, W6PCB and W6TOY, have a scheme for transmitting voice with a flashlight in their article "A Simple Light-Beam Communication System." Following this in the "Experimenter's Section," are communication projects involving carrier current by Don Mix, W1TS, and light beams by R. B. Bourne, W1ANA, and John Huntoon, W1LVQ, now ARRL's General Manager. Other project cover a.f. induction fields, r.f. induction fields, acoustic aircraft detection, supersonics, and (this is a good one) earth-current communications.

. . . Speaking of W1LVQ, he also has another article in this issue entitled, "Yhpargotpyre Ni Detseretni?" No, our typesetter didn't make an error; the article concerns the solution of an elementary type of cipher for the amateur interested in the science of cryptanalysis.

. . . George Grammar, W1DF, with his usual thoroughness presents a technical review in "An Analysis of the Signal-to-Noise Ratio of Ultra-high-Frequency Receivers."

. . . The first line in an article by Arthur Bent, W1COO, shows how far the amateur radio art has progressed in 25 years: "Most of the transmitters used on 225 Mc. by amateurs are not stable enough to allow the use of superheterodyne technique. . . ." The article goes on to describe a 225-Mc. converter to be used with a superhet, based on the hope that the rapid development in u.h.f. equipment will make it compatable with future transmitters. QST

18th Armed Forces Day

1967 Armed Forces Day Communication Tests

Each year on the third Saturday in May, the Department of Defense sponsors the observance of Armed Forces Day. As a part of this observance the Departments of the Army, Navy and Air Force annually conduct communication tests designed to demonstrate to the world the close partnership and mutual respect enjoyed between U. S. amateur radio operators and the U. S. military. This year's program will be conducted on Saturday, May 20, 1967 and all licensed radio amateurs are encouraged to participate.

The wholehearted support of the American people is basic to a strong Department of Defense. Such support requires knowledge and understanding of what the Department is doing and why it is doing it. Throughout the years amateur radio has consistently made contributions to communications training, international goodwill, military morale and the general public service. The Armed Forces Day Communication Tests are intended to be a tangible demonstration of the firm and long standing Department of Defense policy to encourage and support amateur radio activity.

On this eighteenth observance of Armed Forces Day, several military radio stations will participate in communication tests which include military-to-amateur crossband operations and receiving contests for both c.w. and RTTY modes of operation.

Special QSL cards confirming crossband communications will be forwarded to those amateurs who establish two-way contact with participating military stations. Certificates will be awarded to those who aptly demonstrate their operating ability and technical skill by receiving a perfect copy of the Secretary of Defense originated c.w. and/or RTTY message(s) transmitted during the receiving contest portion of the communication tests. Interception by short wave listeners will not qualify for a QSL card in confirmation of crossband communications. However, anyone who has the equipment and abilities may copy the Secretary of Defense messages and receive a certificate.

Military To Amateur Crossband Test

Military radio stations WAR, NSS, NPG and AIR will be on the air from 201400 GMT to 210245 GMT. During this test of crossband operations, the military stations will transmit on specified military frequencies while amateur stations will transmit in the indicated portions of the amateur bands. Contacts will consist of a brief exchange of locations and signal reports. No traffic handling will be permitted.

Station	*Military Frequency (kc. unless otherwise noted*	*Emission*	*Appropriate Amateur Band (Mc.)*
WAR	4001.5	c.w.	3.5 — 3.65
(Army	4020	c.w.	3.65 — 3.8
Radio,	6992.5	c.w.	7.0 — 7.1
Wash.,	7325	c.w.	7.1 — 7.2
D.C.)	14405	c.w.	14.0 — 14.2
NSS	3397.5	c.w.	3.5 — 3.65
(Navy	4012.5	RTTY	3.60 — 3.65
Radio,	4015	c.w.	3.65 — 3.8
Wash.,	4040	s.s.b.	3.8 — 4.0
D.C.)	7301	c.w.	7.1 — 7.2
	7380	RTTY	7.0 — 7.05, 7.1 — 7.15 and 14.05 — 14.10
	14386.5	s.s.b. (u.s.b.)	14.2 — 14.35
	14480	c.w.	14.0 — 14.2
	*143820	RTTY a.f.s.k./a.m.	144.0 — 145.5

* Provided it is consistent with operational and training commitments, this frequency will be keyed from a U.S. Navy aircraft flying between Washington, D.C. and Boston, Massachusetts during the major portion of the time allotted for military to amateur crossband contacts. The flight path will be over Baltimore, Philadelphia, New York City and Hartford, Connecticut. The call sign NSSAM will be utilized from the aircraft.

NPG (Navy	4001.5	RTTY	3.65 — 3.8
Radio San	4005	c.w.	3.5 — 3.65
Francisco)	4013.5	s.s.b.	3.8 — 4.0
	4016.5	c.w.	3.65 — 3.8
	7301.5	s.s.b.	7.2 — 7.3
	7332	RTTY	7.0 — 7.2
	7375	c.w.	7.1 — 7.2
	13975.5	c.w.	14.0 — 14.2
	14383.5	s.s.b. (l.s.b.)	14.2 — 14.35
	20954.5	s.s.b.	21.0 — 21.45
	49.692 Mc.	a.m.	50 — 54
	**143.700 Mc.	a.m.	144 — 148
	148.410 Mc.	a.m./f.m./ a.f.s.k.	144 — 148

**Provided it is consistent with operational and training commitments, this frequency will be keyed from a U. S. Navy aircraft flying between San Diego and Seattle during

(*Continued on page 138*)

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* W1NJM

The Rebels

REBELLION usually comes from the younger element. In amateur radio traffic, however, it seems to flow primarily from the old timers, those who are used to doing things a certain way and would rather fight than switch, even if it can be proved, with some basis in logic, that a newer method has advantages. What's more, these old timers feel their seniority should command a certain amount of deference, that they should be listened to and respected.

We do respect them, and we do listen to them, and sometimes we even agree with them, because in a lot of ways we are old timers ourselves. At the same time, we have to be sensitive to changing times and the changing methods that inevitably arrive with them. Let's try to be reasonable and logical first, stand on our seniority later.

The above observations are apropos of nothing in particular, but they lead up to a couple of traffic-handling details we think ought to be trotted out and examined.

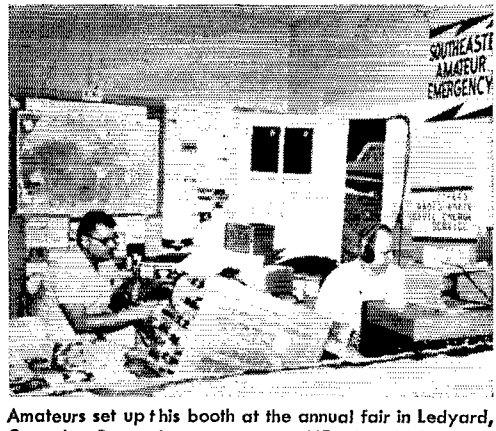
First, the *book message*. There are two disagreements on this. One is that there should be any such thing, and the other is the method of counting them. A "book" message is two or more messages having common (i.e., identical) parts put into a combined form for ease, convenience and speed in transmission. You don't *have* to use book form; but if you do use it, please do it properly. The usual type of book message is one having a common preamble (except for number), text and signature but going to a number of different addresses. The procedure is simple and logical. You start off by indicating the number of variables in the book (e.g., "book of six"), follow with all the common parts (usually precedence, station of origin, check, place of origin, date, text, signature), then send the variable parts, each one separated by a break (BT on c.w. and RTTY).

This is all in the booklet *Operating an Amateur Radio Station* (free to members), but it bears pointing to. What is not stated in the booklet is the admonition to use the book form sensibly and logically. Because you receive a message in book form, this doesn't necessarily mean you have to relay it that way. Conversely, if you receive a batch of messages having many common parts, it may make sense to combine them into book form. It depends on how many common parts they have and how much of a hurry you are in. For example, it would hardly make sense (or save much time) to combine a batch of messages just because they all originate at the same station and place but have different addresses, texts and maybe signatures. There is no hard and fast rule; amateurs are thinking individuals (we hope) and should decide for themselves.

Substituting the word "same" for any part of any message is a liddy practice. It requires the receiving operator later to remember what it is the same *as*, and where and how to find this reference, thus inviting garbling and confusion.

As long as a book can be received and relayed in the same form, *in toto*, everything is fine. When you have to break it down for relay or delivery, you run into complications. We have found that marginal notations indicating the destination of each part of the book, later followed by indication of to whom it was sent and when, can usually solve this difficulty. There are times, especially if you handle traffic in large quantities, when the situation gets a little "hairy," but this is no real reason for setting up your own procedures. Don't be an old grouch. If the rules of procedure are bad, a majority can change them. Until or unless this happens, let's string along, eh?

Counting of book messages has a history all its own. When amateurs first started using this device, back in the 20's, they naturally counted one message for each part of the book. Pretty soon the traffic lanes were full of books, sometimes of hundreds, BPL totals soared, accusations of cheating started flying about, and the use of books was discouraged because it seemed an unfair way of making BPL the easy way. So,



Amateurs set up this booth at the annual fair in Ledyard, Conn., last September, operating on 75, 20 and 10 meters. Other attractions were a code-practice oscillator and an oscilloscope. Some message traffic was handled by attendants K1SRF (left) and K1LMS.

* Communications Manager.

This is WA2UCP, EC for Kings County, N.Y., at the Governors Island Landing Site Command Post during Operation Metro Air Support 66 Exercise on Nov. 5 and 6, 1966. A total of 28 amateurs participated in this exercise for New York Civil Defense, most of them RACES/AREC members.

we went to the opposite extreme: a book counted as a single message, no matter how many parts it had. In more recent years this rule was re-evaluated on the basis that the book was a useful device in traffic handling if used properly, and so some middle point was sought for a counting method. We ended up with the present counting method — one point for each three parts in the book, plus another point for anything over a multiple of three. That is, a book of two or three is one point, a book of four, five or six two points, and so on. This rule applies *only* to traffic sent or received in book form.

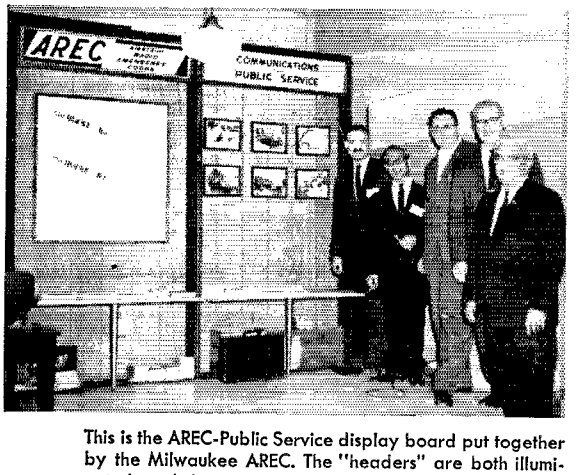
Now, as our second topic, let's talk briefly about the "service" message. This form is used only when one amateur is addressing another about the status of another message — usually about difficulty in delivery. The format is the same as any other message, *except* that the word SVC (service) precedes the number (it is *not* used in place of the check).

The service message text should refer to the number of the message in question (and you can leave off the precedence: this is not part of the number), its date, and whatever other data are necessary to convey the difficulty. Again, you have to use your head. If the message could not be delivered because the address is garbled, then the garbled address should be given. If the intended recipient moved and left no forwarding address, no need to repeat the address. If there is no such person at the address given, give the person's name as you received it, in case it was garbled beyond recognition. Whatever you do, *avoid long texts in service messages.* You can always say what you have to say in 20 words or less.

Don't tell the originator you are cancelling his message. This is not your prerogative. If he does not answer your service, you "file undelivered." It amounts to the same thing, but keeps things in proper perspective.

On c.w., certain text abbreviations for service messages have been used to shorten the procedure. SYM means "see your message," SYS means "see your service." These are followed by message numbers, of course. GBA means "give better address."

There is a standard way of doing almost everything in amateur message handling. Some of it is adopted from the commercial, some from the military, some of it just evolved from old time amateur practice. The procedures are *amateur* procedures, used in the Amateur Service. Let's use them right, and proudly. — *W1NJM.*



This is the AREC-Public Service display board put together by the Milwaukee AREC. The "headers" are both illuminated, and the unit contains a bulletin board, two table tops and space for display photos or placards. Shown at the right are (l. to r.) W9QKE, K9ZPP (Wis. SEC), K9GSC (Wis. SCM), W9HPG (ARRL Director), W9QHR. Contact K9KJT, Milwaukee EC, for more info on the display unit.

National Traffic System

Our little exposé of the new procedure for reporting traffic into NTS nets (see page 61, Jan. '57 *QST*) has aroused quite a bit of excitement. We thought we had made it quite clear that this was just a recommendation, but we have been told by many that a proposal by the "great white father" is more than a recommendation, it's practically a mandate. Sorry about that, we really did intend it just as a recommendation and wanted to see what kind of response it would bring.

As usual, most of the response has been negative. This does not necessarily mean that it has been turned down by the NTS fraternity, because the ones who object are the ones we hear from. But it does cast some doubt on the advisability of making the change in standard procedure at this time. Should we, or shouldn't we? That's one question. Another question, based on a proposal that the matter be left to the net manager, is whether we should insist on a standard practice for *all* NTS nets.

WB6BBO, RN6 manager, sums the matter up in her own priceless manner: "In standard business terminology the suggestion is ridiculous. Any reputable establishment's invoice will show the number first, followed by the name of the article. If we take a bunch of kids to the circus we don't order peanuts 6, pop 6. Imagine the impression we would make if asked how many in our family and we said: 'Mothers 1, fathers 1, sisters 2, brothers 0.' Suppose when we went to buy articles we would ask for bolts 20, nuts 20, or pork chops 8, doughnuts 6. The only place I know where the number comes second is in knitting instructions, where knit 1, purl 1 is traditional. If we are about to turn the

National Traffic System into a nightly sewing circle, then there is indeed logic in the change."

So now we have both sides of the story. Anybody for listing all the destinations, then the numbers respectively for each? — *W1NJM.*

February Reports:

Net	Sessions	Traffic	Rate	Average	Representation (%)
2RN	56	544	.576	9.8	97.9
3RN	56	771	.547	13.8	100.0
4RN	52	701	.483	13.5	91.3
RN5	56	854	.508	15.2	93.8
RN6	56	1,042	.798	17.1	100.0
RN7	28	646	.658	23.1	80.8[1]
8RN	55	611	.435	10.9	97.0
9RN	28	661	.829	23.6	97.3[1]
TEN	56	771	.650	13.7	90.5
ECN	28	188	.295	6.7	96.4[1]
TWN	28	346	.434	12.4	78.6[1]
EAN	28	1958	1.368	67.8	100.0
CAN	28	1381	1.155	49.3	100.0
PAN	28	1388	1.073	49.6	100.0
Sections[2]	2384	15,877		6.7	
TCC-Eastern	122[3]	810			
TCC-Central	84[3]	723			
TCC-Pacific	102[3]	976			
Summary	2967	30,248	EAN	9.3	75.9
Record	2981	25,982	1.049	12.5	....

[1] Region net session based on one session per day.

[2] Section nets reporting (85): RISPN (R. I.); Wolverine (Mich.); KSSN (Pa.); PHD (Mo.); SCN (S.C.); MEPN (Md.); BUN (Utah); NCNL & NCN (N.C.); AENR, AEND, AENH, AENB, AENT, AENO (Ala.); GN (Fla.); KYN & EMKPN (Ky.); Mich. 6 Meter; Alberta SSB, WVN (W. Va.); VFN, VSBN Late, VSN, VSBN Early & VN (Va.); QIN (Ind.); W. Va. Phone; BN (Ohio), So. Wis. Relay; Ark. SSB; MDDS & MDD (Md.-Del.); EMNN (Mass.); PTTN, WPA, Abington AREC & EPA (Pa.); Alberta Phone; HNN (Colo.); OPEN & OLZ (Okla.); FMTN (Fla.); SoCal 6, SCN, NCN (Calif.); PTN (Me.); Iowa 75 Phone; CPN (Conn.); GBN (Ont.); LAN (La.); GSN (Ga.); OQN (Ont.-Que.); Ohio Slow; Ohio SSB; NCSB (N.C.); BEN (Wis.); QMN (Mich.); MNN (Mo.); NCN Slow (Calif.); WSBN (Wis.); W. Fla. Phone; OZK (Ark.); OLN (Ohio); WSN (Wash.); VTNHN (Vt.-N.H.); MSN, MJN, MSPN Noon, MSPN Eve (Minn.); TN, TSSBN (Tenn.); NYS, NYC-LI VHF, NLS (N.Y.); Tenn. Phone; NJEPTN, NJN (N.J.); TEX, NTTN (Texas); YO (Wyo.); QKS (Kans.); MON (Mo.); NYC-LI Phone.

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

How do we calculate the over-all percentage representation? Easy. We add up the number of times each section was represented in its region net, plus the number of times each region was represented in its area net; this is the dividend. Then we calculate the number of times each section *should* have been represented in its region or area if the system were running at full strength and 100% represented; this is the divisor. Dividing the former total by the latter and multiplying by 100 gives us our percentage overall representation for the month.

More records toppled, despite a missing region net report. We made all time highs in traffic and rate. This is all caused by the great influx of section net reports coming in. Our NTS is getting a high percentage of reporting these days; let's make it a habit to report the first of each month, or as soon thereafter as possible.

WA2GQZ has presented his crew with "The Sad Statistical Story of 2RN-1966," but notes some areas of improvement in February. K3MVO likewise noted an improvement over January's performance. Texas came through with 100% in RN5, but Miss. is lagging behind again. RN6 is setting up a "service department" for message routing advice, headed up by W6RSY. W7UU and W7KZ are keeping Alaska represented on RN7 via out-of-net skeds. W8CHT says 8RN actually missed a session in February — no one QNG'd! W9QLW reports good results with the 9RN second session so far; this started on Mar. 1. WAØHUD is keeping North Dakota among the top sections represented on TEN; WAØEPX and KØYGR were awarded TEN certificates. VE3BZB reports the Atlantic Providences Net doing an excellent job keeping Maritimes represented on ECN. Good TWN bulletin by K7NHL emphasizes phone procedure; Bob points out that much traffic in the Twelfth Region has to be delivered on phone nets. K1WJD says the post-Christmas letdown doesn't seem to have occurred this year; EAN certificates have gone out to *W1s* DWA YKQ, *K1s* EIR LMS, W2GVH, WB2OHK, *W4s* EVN HJS, WB4BGL, W8BZX, K8LGA, WA8PMN, VE8RD. W6VNQ reports the first 100% month on PAN since he became manager.

Eight amateurs participated in the Mothers March of Dimes on Jan. 22 in Brazoria County, Texas. Above (r.) is K5HMF, EC for Brazoria County, taking a breather from the arduous task of controlling the net. At left is the program chairman.

Transcontinental Corps. All three TCC divisions are "on the ball," and traffic is moving nicely. Missing functions are the exception rather than the rule, and cause some raised eyebrows among the three directors. W3EML reports traffic up, all functions operating and scheduled for alternates when necessary. W9JUK enthuses about the breed of operator on TCC-Central, but shudders at an occasional missing report. W7DZX reports traffic down from a year ago, but up from January; he and W3EML are collaborating on some ideas for emergency activation of TCC.

February reports:

Area	Functions	% Successful	Traffic	Out-of-Net Traffic
Eastern	112	97.3	2277	810
Central	84	92.9	1476	723
Pacific	112	95.5	5705	976
Summary	308	95.5	5705	2509

Here's WA8DWL doing her stuff at her operating position during the Jan. 26-27 ice storm in Van Wert, Ohio. See the "Diary" for details.

Some of the traffic gang present at the Ontario Section ARRL Convention in Niagara Falls last September. Shown above back row (l. to r.): VE2SD, VE3GCE, VE3DBG, VE3GP, VE3AUU, VE3ATI; front row, VE2OJ (SCM), VE3EUM (SEC), W2RUF (SEC WNY), VE3GEJ, VE3DU, VE3EHL. Most of these calls you can hear 'most any time on OQN or ECN.

The February TCC roster: Eastern Area (W3EML, Dir.) — *W1s* EFW EMG NJM, K1WJD, *W2s* SEI ZVW, *K2s* RYH SSX, *WA2s* BLV UPC UWA WBA/5, WB2OHK, *W3s* EML NEM, K3HKK MVO, WA3EEQ, *W4s* DVT HJS ZM, K4EOF, W8CHT, *K8s* KMQ LGA, WA8CFJ. Central Area (W9JUK, Dir.) — WA2WBA/5, W4OGG, K4DZM, WA4WWT, *W5s* GHP KRX, WA5JOL, *W9s* CXY DYG HRY JUK QLW VAY ZYK, WA9MFS, *WØs* LCX TDR YC, KØAEM, WAØMLE. Pacific Area (W7DZX, Dir.): *W6s* EOT VNQ IDY TYM HC IPW BGF EMIS, *K6s* AJU LRN, WA6ROF, WB6HVA, *W7s* DZX ZIW HMA AAF, K7HLR.

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Net reports:

Net	*Sessions*	*Check-ins*	*Traffic*
75 Meter Interstate SSB	...	1106	450
HBN	28	412	842
20 Meter Interstate SSB	20	403	2982
7290	40	1401	821
Mike Farad E & T	52	466	392
North American	24	843	691

Diary of the AREC

The "Expedicion Pacifia" started from Guayaquil, Ecuador, the week before Christmas to drift to Australia. On March 12 the first SOS was sent on 14,120 kc. by HC9EP. XE1EEI and W6ZOM answered and the latter notified the State Department. Panamanian Coast Guard, our USCG and Ecuadorian naval units were out looking for the two Spaniards and the Frenchman. They inflated the rubber raft as the main raft was water-logged and sinking. March 15, HC9EP reported before they were located "things look bad," but a freighter rescued them that day about 350 miles from the Galapagos Islands.

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January 1: I1RCD sparked a search for a rare drug needed to save the life of a patient in Milan, Italy. Within six hours amateurs had contacted drug manufacturers, research laboratories, universities etc., in ten different countries. Twenty-meter band conditions allowed VE1AGH to maintain control for a time and then ZS1JM passed information from Cape Town, South Africa. Finally DL7FT located the medicine and made arrangements for delivery. Some of the amateurs involved were VO1EL, VE1TG, *VE2s* BUD SU BFK, *VE3s* CT DKU EUU, WB2ND and 5A5TB.

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January 26-27: An ice storm in Van Wert, Ohio, felled power and telephone lines. W8DHG got on the air with a gasoline generator supplying power. Immediately, hams across the state responded to the call for help. Within minutes, Civil Defense of Columbus was in direct communication with Van Wert. The Ohio SSB Net was activated and ran all day. W8DHG, WA8CPA and WA8TGA operated from Van Wert, supplying the necessary outgoing communications for both personal and commercial messages. WA8BUW and WA8DWL maintained constant contact with the Van Wert hams and furnished outside communications during the entire weekend. Others helping were W8EIK, K8VAC, WA8OHF and W8RWK.

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January 28: A small bus carrying 10 skiers plunged off rain-swept interstate 80 west of Reno, Nevada. Because of the remote location of the accident, Nevada Highway Patrol Communications were useless. The sheriff called W7YKN for aid. W7DNX, WA7EKN, W7YKN and K7VYT set up communications between the accident scene and the hospital and the sheriff's office. These were the only communication means available between the site and Reno for about 6 hours.

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Some of these emergency situations get complicated. On January 31, XE1JY called KØRPH and advised him that a special medicine was needed for a patient who turned out to be XE2SA. Unable to contact WA5FCU in El Paso, where he thought he could get the drug, he contacted KØRPH to whom we are indebted for this report. This touched off a chain of events entirely too complicated for detailed explanation. Suffice to say that it eventually involved K5RDP, SEC for Southern Texas; WA5FCU, who was finally reached by telephone; K7MEZ in Phoenix; XE1YH in Mexico City; several drug companies and drug company officials and a number of other amateurs. The drug was finally located in Mexico City, with the possible result that a man's life was saved.

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February 9: KL7FNW, partially paralyzed from tuberculosis, fell and broke his leg. There was no telephone at home so he called for help from his amateur station, KL7FSF, Fire Island, relayed to KL7FKO and KL7FMO who called an ambulance.

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February 13: K7OJF fell asleep at the wheel of his car 70 miles from civilization, in Western Utah on U.S. Route 50. He had a cut on his head and other injuries but managed a "Mayday" call on 75 meters. K6GJ heard the call, cleared the frequency (385 kc.) and contacted the highway patrol. WØACQ/7 in Oregon also called the local sheriff who wired the Utah Highway Patrol. A patrolman from Delta, Utah, and the sheriff from Baker, Nevada, arrived and administered first aid.

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February 11: There was a multi-car traffic accident at the intersection of Trans-Canada Highway and St. Marie service road in the west end of Montreal Island, Quebec. There were no police at the scene, so VE2SH made an emergency call through the repeater. VE2ALE received the call and informed the Quebec police of the accident. One youngster was taken to the hospital and VE2SH took another couple involved in the accident to Beaconsfield, a few miles from the scene.

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February 14: WA6JZH originated a message to W6JFD/KL7 inquiring about the rabies vaccination status of the latter's dog, which had just bitten a small child. The YL International Sideband Communications System relayed it through K7UXN to KL7FQQ who contacted the highway patrol for delivery of the message at Delta Junction. W6JFD/KL7 then got on the air and relayed positive vaccination information to WB6CGA who passed it to WB6IZF on the West Coast Amateur Radio Service. The latter delivered it to WA6JZH, six hours after origination. — WB6IZF

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W6YSP assisted early in March when two mountain climbers were missing for five days. He brought first word of the searchers finding one and when all hope was given up for the other, was able to relay "Alive but weak, mom" to folks in Oregon.

(Continued on page 144)

Happenings of the Month

CANADIAN BRIEFS

Canadian Director Noel B. Eaton, VE3CJ, has been appointed a member of the Canadian Radio Technical Planning Board (which advises the Canadian Government on technical matters connected with telecommunications) replacing the late Alex Reid, VE2BE. Colin C. Dumbrille, VE2BK, our Canadian vice director, was named an alternate member of CRTPB at the same time.

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The Department of Transport recently moved toward five-year licenses both for amateurs and for other radio services. Each Regional Office will handle details of the changeover from annual licenses; a letter explaining procedures will accompany renewals of licenses.

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A standard policy toward two-letter calls has been adopted by the regional offices of DOT. Where there are no requests on file for two-letter calls, such calls will not be reserved but will be reissued as they become available to the next applicant for an Amateur Experimental License.

Where there are requests on hand for two-letter calls, they will be reissued as they become available in the following order of priority:

a) to an amateur (i) with full radiotelephone privileges and (ii) ten years or more active operation on amateur bands and (iii) previously the holder of a two-letter call sign;

b) to an amateur meeting any two of the requirements above;

c) to an amateur with any one of these requirements. Club call requests will depend on the status of the sponsor in relation to the requirements above.

W2JIO, (right) often regarded as the "patron saint" of blind amateurs in the U. S., here accepts a check for his Braille Technical Press from K2IES, president of the Hudson Amateur Radio Council.

The article, "The Field Effect Transistor as a Stable V.F.O. Element," won for its author G. D. Hanchett, W2YM, the Cover Plaque Award for December. At the presentation in Somerville, N. J. February 9 were: W2ZWA, Hudson Division Director W2TUK, W2YM, W. E. Babcock, Manager Special Products Development at RCA (W2YM's boss) and ex-W2LHP

Exceptionally, in the case of the death of an amateur holding a two-letter or three-letter call, the Regional office may upon request reissue the call in memoriam to a qualified member of the amateur's immediate family or to the station of a club of which he was an active member. Where no such request is received the deceased amateur's call will be held for one year before being reissued to allow time for amendment of callbooks, etc.

At present, two DOT regional offices have no waiting list and are issuing the two-letter calls as they become vacant. The remaining four have eligibility lists.

[The above applies only to Canada. U. S. amateurs may obtain two-letter calls only if they held such calls previously. A particular three-letter call can be assigned only to the most recent holder if it has been under assignment during the past five years. Otherwise, any previous holder may apply. Section 97.51 of FCC's rules applies, and a $20 fee is required.]

NO TYPEWRITERS

The Federal Communications Commission's Field Engineering Bureau has instructed its engineers supervising examinations to permit use of a typewriter for 20 w.p.m. (and slower) code tests *only* where proof of physical disability is shown. The reason is given as "room noise."

K4CG JOINS NAVY MARS

The amateur station at the headquarters of the U. S. Coast Guard, K4CG, has formally joined the MARS program affiliating with the Navy's branch of the amateur/military cooperative ef-

K3WUW and WA4WJJ at the Coast Guard hq. station, amateur K4CG and MARS NØACG in Alexandria, Va.

fort. The MARS call for the station, operating on a trial basis since July 1966, is NØACG.

A First Class Radioman will be assigned to the station; presently the lucky man is Bob Phillips, WA4WJJ. Dallas Carter, K3WUW, a Coast Guard civilian employee, also does a great deal of operating from K4CG/NØACG. The station acts as n.c.s. for the Coast Guard s.s.b. net which meets at noon, E.S.T., on 14,337 kc.

Amateurs interested in participating in MARS under a USCG hat may contact the Coast Guard MARS Radio Station, 7323 Telegraph Road, Alexandria, Virginia, 22310.

STAFF NOTES

In the February issue we reported on the retirement of Ed Handy, W1BDI, as Communications Manager, and appointment of George Hart, W1NJM, to that post.

Mrs. Ellen White, W1YYM, moves up to Deputy Communications Manager and will serve as "executive officer" (to borrow a term from the military) of the department. Ellen was first licensed as W2RBU in 1946 and received her Class A ticket a year later, along with the call W6YYM. Later she acquired first phone, second telegraph and Amateur Extra. She moved to Hawaii in 1947 where she hammed as KH6QI, and worked at KPOA as an engineer and d.j. She returned to the mainland in 1949 to study at a San Diego technical school and San Diego State College. She served as founder-president of the San Diego YLRL and was active in the San Diego and Palomar radio clubs.

From 1950 until she came to headquarters in 1952 she was Section Communications Manager of the ARRL San Diego Section. Her first job at headquarters was the handling of training aids. Later she became very involved in contest work —log-checking, statistical analysis and the writing of *QST* reports thereon. She is an early-morning DX chaser and has 301 confirmed. Ellen also holds the BPL medallion and appointment from the Connecticut SCM as ORS/OPS. She has been chosen as a member of the A-1 Operator Club and First Class Operators Club (FOC).

Besides full time employment at ARRL and a minimum of fifty hours a month on the air, Ellen is a housewife and mother of 11-year-old James Arlen. The rig never gets a chance to cool off, for her OM is "Mr. DXCC" Bob, W1WPO!

Joining the staff to be assistant communications manager for public service is William Owen, W4YAU, of Bristol, Tennessee. He is married to Patricia, K4TYE and they have three children. Bill earned a B.S. in electrical engineering at Case Institute of Technology. He's been licensed since 1952 and holds the Amateur Extra and First Class Radiotelephone licenses. He has been emergency coordinator for Bristol, and has held appointments as ORS, OPS and OO. He's a past president of the Case Radio Club and the Bristol Amateur Radio Club. He has been a Navy pilot with the rank of LT(jg).

Other changes on the CD lineup include designation of several Assistant Communications Managers: Robert White, W1WPO, for DXCC awards; Lillian M. Salter, W1ZJE, for administration; Murray Powell, W1QIS and Charles R. Bender, W1WPR for headquarters station supervision and maintenance; and Stanley Israel, WA2BAH, for contest administration.

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Byron Goodman, W1DX, retired at the end of February from full-time League service as editor of the *Handbook* and assistant technical editor of *QST*. By is a native of San Francisco and a graduate in electrical engineering of the University of California. First licensed in 1930, he has held the calls W6QV, W6CAL and W1JPE. He was a pioneer of the ten-meter band in the thirties, enjoying with J2HJ the first confirmed North America to Asia QSO in 1935.

The 11th Annual Dinner of the Washington Chapter Quarter Century Wireless Association featured Chairman Rosel Hyde of the Federal Communications Commission as the principal speaker. (See page 60, April *QST* for the text of his talk.) With the chairman (second from left) are W2MM, National President QCWA; ARRL Secretary W1LVQ and W3RE, chairman of the Washington Chapter.

Barry Goldwater, K7UGA, was given honorary life membership in the Fort Myers, Florida Amateur Radio Club on February 3. The former Senator was also presented a trophy for his service to amateur radio. Making the presentation were club president K4CAH (l.) and W4PJG (r.).

Later that year he came to headquarters as an assistant secretary. In 1939 he transferred to the Technical Department as an assistant technical editor of *QST*. In this capacity he became well-known for his many articles on keying, modulation, single sideband and receivers. The war years were spent at Raytheon in Waltham, Massachusetts, where he helped design radar receivers.

In 1936, By originated the famous *QST* column "How's DX?" which he conducted as a sideline until 1947; his mythical "gentleman's gentleman," Jeeves, is still a fixture of the column. In 1948 he launched the regular feature, "On the Air with Single Sideband," and kept it going until it was well established in 1953.

By, who is several years short of regular retirement age, intends to catch up on many personal projects he has had to defer.

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Doug DeMaw, W1CER/W8HHS, already an assistant technical editor of *QST*, will take on the additional job as editor of the *Handbook*, especially as concerns its "do-it-yourself" chapters. Doug was the founding editor/publisher of the *VHFER* and since coming to ARRL in 1965 has attracted quite a following with his v.h.f. and solid-state articles.

ARGENTINA/U. S. AGREEMENTS

Argentina and the U. S. have agreed effective April 30 to grant reciprocal operating privileges to amateurs of one country visiting in the other, and to permit the exchange of unimportant communications on behalf of third parties. QST

Hamfest Calendar

California — This is the big month for the 25th Anniversary Fresno Amateur Radio Club's annual Hamfest to be held in the second week of May at the Hacienda Motel.

Florida — The St. Petersburg ARC, Inc., will hold their annual Hamfest at Phillipi Park, near Safety Harbor, Sunday, May 14, same location as we have held it for many years. All hams and guests cordially invited. Good time for everyone. This year there will be no charge for cars to enter the Park! This is the old fashioned hamfest, picnic lunch, swap table and prizes.

Illinois — The Starved Rock Radio Club will hold their Annual SRRC Hamfest, at the La Salle County 4-H Home and Picnic Area Southwest of Ottawa, Illinois on June 4. This all-day affair suggests advance registration until May 29 at $1.50 or at the gate at $2.00. Free coffee and doughnuts from 10 to 10:30 A.M., food available and ample parking provided. For a full day of activities, follow big, yellow HAMFEST signs on Route 71 from south end of Illinois River bridge at Ottawa. For further details, including data on available motels and/or camp facilities write W9MKS, RFD #1, Box 171, Oglesby, Illinois 61348.

Indiana — The Delaware Amateur Radio Assn., Inc. Hamfest is scheduled for June 4 and will be held at the Lions Delaware County Fairgrounds, Muncie, Ind. Activities will begin at about 1400Z and are scheduled to terminate at about 2000Z. Activities are scheduled for the young and old.

Indiana — The Mid-West YL Convention is to be held at Holliday Inn, May 19, 20 and 21. Sponsored by H.A.W.-K.S., pre-registration is $2.00 until April 15. Camping facilities are within walking distance. Reservations and information from K9BWJ, Mary Alice Koctur, 3116 Backmeyer Rd., Richmond, Indiana 47374, or W8DQA, Evelyn Tibbits, 3415 Riggs Road, Oxford, Ohio.

Iowa — A Mobile Rally sponsored by the Northeast Iowa Amateur Radio Assn. will be held May 21 at Black Hawk Park, Cedar Falls, Iowa. A 75-meter transmitter hunt and mobile judging contest are planned with trophies for the winners. There will be plenty of space for camping over the weekend. For more information contact Dave Knittel, K9CQH, 703 Boston Ave., Waterloo, Iowa 50703.

Kansas — The Kaw Valley Radio Club will hold its annual Hamarama at Lake Shawnee Shelter House No. 1, Topeka, Kansas on Sunday, May 21, 9 A.M. to 5 P.M. Registration fee $1.50, free drink, bring family and covered dish. Swap bench, auction, bingo for the ladies, 29.6 Mc. mobile hunt. Come one, come all. For more information write KØYHI, William R. Powell, 1654 Withdean Road, Topeka, Kansas.

Kansas — Plans are being made for the 14th Hamfest of the Hi-Plains ARC which will be held Sunday, May 21 at the grade school in Plains, Kansas. Bring the family, a basket lunch with your own service. Drinks are to be furnished by the club. There will be entertainment and favors for the XYLs, fun and games for the kids, and a swaptable for the OMs.

Louisiana — Don't forget the BRAC Hamfest, May 6 and 7. Headquarters will be the Bellemont Motel. There will be a banquet Saturday night and an all-day picnic Sunday.

Maine — The Portland Amateur Wireless Association announces they will hold their Annual Banquet at the Holiday Inn in Portland on May 13. For info. write Tom Duran, K1JKT, 227 Spring St., Portland, Maine 04102.

Michigan — Old Timers' Night at the Henry Ford Museum will be May 6.

New York — Rochester is the location for the Annual Western N. Y. Hamfest and V.H.F. Conference, Saturday May 13. Full-day schedule covering all phases of v.h.f., DX, s.s.b., and YL program plus QCWA luncheon, code contest and huge flea market. Location is Vince's 50 Acres, Rte. 15 just south of Thruway Exit 46. Advance registration and banquet only $5.00. Send check to Ernest Crewdson, WA2FVG, 124 Parkere Rd., Rochester, N. Y. 14617.

Pennsylvania — The North Penn ARC invites you to attend their 14th Annual Banquet. This will be held at The Audobon Inn, Egypt Road and Pawlings Rd., Audobon, Pa. The time scheduled is from 7:00 P.M. to closing, Saturday, May 13. The menu will consist of roast beef with all the trimmings and dessert at a cost of $5.00 per person. After dinner, awards will be made, installation of new officers, and then a social gathering in the Rathskeller Room with an orchestra and dancing. Tickets may be purchased from W3DJL, Gil Axford, 218 Miami Ave., Norristown, Pa. 19401. May 6 is the deadline for tickets to be purchased and there will be no tickets sold at the door.

(*Continued on page 68*)

Pennsylvania — The Breezeshooters will hold their 13th Annual Hamfest at West View Park, May 21 at Pittsburgh, Penna., noon to 6 P.M. For information check in on 29 Mc., Monday nights at 0900 EST.

Pennsylvania — The Reading Radio Club, Inc., will celebrate its 45th anniversary and its 12th annual banquet on Saturday, May 20 at the Temple Fire Co. Dinner will be at 6:30 P.M. Tickets are $5.00 each with a choice of roast beef or baked ham. Refreshments and dancing will follow the dinner program. For further information contact W3EYN at 215-375-6889 or W3GII at 215-374-5798.

Pennsylvania — The 22nd annual banquet of the Lancaster Radio Transmitting Society, Inc., will be held on Saturday May 13 at the Meadow Hills Dining House located on Pa. Route 324, one mile south of Lancaster. Dinner wil. be served at 6:30 P.M. Tickets are $4.00 and may be purchased from Floyd R. Jury, W3OLV, 2730 Harrisburg Pike, Lancaster, Pa. 17601. Tel.: 717-898-7749.

South Carolina — The Blueridge Radio Club will hold their annual Hamfest May 7 at the Cleveland Park Recreation Center in Greenville, S. C.

South Carolina — The s.s.b. net will hold their annual Sideband Supper at the Coach House in front of the Travel-eze Motel, May 6. Net, AREC, and Radio Council meetings will be held during these dates.

Tennessee — The Memphis ARC Hamfest will be held May 20 and 21 at Memphis Tenn. Delta Radio Club, Mid South ARA and Mid South VHF radio club are sponsoring the Hamfest. No admission. Saturday night dinner with an outstanding amateur radio personality. Hamfest all day Sunday. For information and reservations contact Dave Goggio, W4OGG, 1419 Favell Drive, Memphis, Tenn. 38116.

Virginia — Roanoke Hamfest this year on May 27 and 28. Make your plans now.

Washington — ARAB will hold its 33rd Annual Hamfest on May 20, at the West Side Improvement Club Hall. Registration opens at 1000. There will be transmitter hunts, QCWA meeting. Conducted tours of the Puget Sound Naval Shipyard, technica talks, c.w. contest, swap shop, rag chews, etc. A fine banquet at 1900 followed by an evening of entertainment and dancing. Registration prior to May 13 is $4.00 per person and $4.50 after that date and at the door. For reservations and further information contact Harold James, K7KWV, 141 S. Wycoff, Bremerton, Washington 98310.

Wyoming — The annual Wyoming Hamfest will be held May 20 and 21 at the American Legion in Douglas. OST

ARRL OREGON STATE CONVENTION

Portland **June 2-4**

The ARRL Oregon State Convention convenes in Portland at the Portland Sheraton Hotel June 2.

Nationally known figures such as League President Robert Denniston, WØNWX, Bill Orr, W6SAI, and slow-scan TV pioneer Bob Gervenack, W7FEN, are among the many fine speakers scheduled to present technical sessions.

The Sheraton provides a city block of free parking. The hotel rates are $10.00 for a single, $13.50 for a double. There is no charge for children under 14 in the same room with adults.

Saturday night activities include the banquet dinner followed by dancing, both of which are included in the registration fee. As an added bonus you will be able to attend many colorful Rose Festival activities including the Merrykhana parade and carnival, and various other shows including a Teen Fair for the kids. All of these functions are within walking distance of the hotel.

The pre-registration fee for hams is $9.50 and $7.00 for non-hams. After May 5 the fees will be $10.50 and $7.50.

All pre-registering hams will receive free of charge a copy of the brand new Oregon callbook. The book will be available to all others attending the convention for $1.

For further information about the Oregon Amateur Radio Associated sponsored convention, contact registration chairman Ron Mayer, W7NGW, or general convention chairman Jay Hauger, K7UKP. The address is OARA, P.O. Box 1335, Portland, Oregon 97207.

ARRL DAKOTA DIVISION CONVENTION

Minneapolis, Minnesota **May 27 & 28**

The Dakota Division Convention will be held Saturday and Sunday, May 27 and 28, at the Radisson Hotel in Minneapolis. Activities have been planned to interest the ham and his XYL. Several manufacturers will exhibit and give technical talks on the latest in radio equipment. Additional technical talks and seminars are scheduled for DX, v.h.f., s.s.b., MARS, emergency communications and many other phases of amateur radio.

FCC Engineer Don Murray will speak on FCC Rules. The ARRL meeting will be led off by Dakota Division Director Charles G. Compton, WØBUO. League President Robert W. Denniston, WØNWX, will be present at the ARRL Forum. Representatives of Army, Navy and Air Force MARS will address a special MARS seminar.

Included in the activities is a swap table, QSL card contest, c.w. contest, mobile judging and field strength measurements. And for the ladies, a special program and tour has been arranged. Luncheons are planned for DX, QCWA, RTTY and traffic groups. The Wouff Hong ceremony follows the Saturday night banquet.

Convention headquarters is the Radisson Hotel, 45 South 7th Street. Convention registration is $4.00, $9.75 with the banquet. For tickets and reservations, write to the ARRL Dakota Division Convention, P.O. Box 5096, Minneapolis, Minnesota 55406.

COMING A.R.R.L. CONVENTIONS

April 22-23, 1967 — New England Division, Swampscott, Massachusetts
May 27-28, 1967 — Dakota Division, Minneapolis, Minnesota
June 2-4, 1967 — Oregon State, Portland
June 24-25, 1967 — Midwest Division, North Platte, Nebraska
June 30, July 1-2, 1967 — ARRL National, Montreal, Quebec
July 1-2, 1967 — West Virginia State, Jackson's Mill
July 7-8, 1967 — Central Division, Milwaukee, Wisconsin
July 14-16, 1967 — Alaska State, Anchorage
September 9, 1967 — Kentucky State, Louisville, Kentucky
October 27-29, 1967 — Ontario Province, Ottawa, Ontario

Correspondence From Members-

The publishers of *QST* assume no responsibility for statements made herein by correspondents.

GEAR OVERSEAS

¶ Have just finished reading "Gear Overseas" in March *QST*.

Many thousand high school and university exchange students come to America from foreign lands every year. For the most part these are among the most gifted students available and should be the easiest to teach. As a result of their sojourn in America, they return home with greatly enhanced prestige. They also take home impressions of America which will last a lifetime and a desire to do something to improve their homeland.

We could sell these people on ham radio while they are here and then follow through by teaching them how to become proficient ham operators. In addition, clubs could sponsor projects to build equipment.

The cost would be within the capability of most clubs and many individuals. The training acquired in building and debugging the equipment would be invaluable when the students returned to their homeland and were ready to put it on the air.

. . . Perhaps, with a little push from the ARRL, the FCC might see fit to issue temporary permits which would enable these aspiring hams to get "on the air" experience in traffic handling, DXing and other fine points of hamming and the permit would also serve as a certificate of proficiency to take home as an aid to getting a license in their homeland.

Our government could well afford to make this small gesture of good-will in the interest of world peace and closer ties to the free world by these young people who are destined to lead their countries in a few years.

What have we got to lose? — *Russ Allen, WA9GKT, Kokomo, Indiana.*

¶ The International Telecommunications Union, the organization to regulate international communications, may be meeting in the next couple of years. To keep amateur radio and allow it to grow, we need the neutral countries, i.e. the Afro-Asian countries who have no need of our bands for propaganda purposes.

A few years back, the balance of power was held by the European countries and the U. S. But, with ITU's "one country, one vote," the power balance is in the hands of Africa, because it has most of the new countries. We need Africa!

I have talked to many African students. The majority of them don't even know what amateur radio is. These are the future leaders and the sons and daughters of the ruling families. If these, the leading families, don't know, we must teach them.

Why don't the various ham publications start a campaign to educate these students to the good of amateur radio? We all have extra gear in our junk boxes that could be donated to this cause. — *William Henry White, 3rd, W3TYV, Philadelphia, Pennsylvania.*

[Editor's Note: We second the motion! In fact, ARRL headquarters is already in touch with college radio clubs at a number of schools having large foreign-student bodies. Other student-amateurs willing to help in similar projects at their own college should write Hq.]

SUPERPOWER

¶ W4GF's letter (March *QST*, p. 84) reiterates the FCC's position on "superpower," and in so doing, it implies a solution to the problem that seems incredibly simple to have been overlooked this long.

The competitiveness of DX operating creates a strong incentive for some amateurs to exceed the power limit. This competitiveness obviously reaches its peak during the major DX contests, and the result is that a few of the best and most successful contest operators sometimes resort to "superpower." This is not a pleasant reality for us to face, but the fact is that just about anyone who knows his way around in contest circles can cite examples of "big guns" exceeding the legal power limit. There are some hardened contest veterans who insist that you can't win if you stick by the rules.

The FCC's position — and the ARRL's — has been that amateurs should keep their own house in order by self-policing. To this end, the ARRL service organization includes Official Observers, and ARRL DX Contest rules provide for the disqualification of stations that receive two or more OO citations during the contest.

Why in the world haven't we carried this approach to its logical conclusion? Two or three-man OO teams should be appointed to methodically inspect the stations of all prominent operators (and everyone else they have reason to suspect) during certain contest periods, with the authority to disqualify those stations found to be violating FCC power restrictions. ARRL policy already gives the OO almost this much power over contest operators, and certainly the OO corps could provide enough qualified people to carry out such a saturation inspection project two or three times a year.

When somebody runs up double my score in a contest, I want to know I lost to a better operator or a better antenna system, not to a linear that is good for ten times the power I can manage with my one-kilowatt peanut whistle. — *Wayne E. Overbeck, K6YNB, Riverside, California.*

¶ Although you were courteous enough to omit the name of the DX Club in question, the club's identity is certainly not unknown to numerous amateurs who attended the Fresno Joint NCDXC/SCDXC DX Meeting where W4GF's letter was read before the rather large gathering. Furthermore, the text of Bill Grenfell's letter implies that his remarks were directed to a California DX club.

Our letter to W4GF did not, as you imply, intend to speculate that the FCC would, in any way, be negligent in administering its affairs. On the contrary, realizing that FCC regulations mean what they say, our purpose in writing to Bill was, in effect, to publicize and to underline this particular regulation at the Joint Meeting so that proper atti-

tudes concerning this particular regulation could be promoted.

To amplify the point, in addition to the reading of Bill Grenfell's letter, we were privileged to have as a guest speaker on our program Mr. Ney Landry, FCC Field Engineer in charge of the San Francisco district office. I am pleased to report that Mr. Landry did an excellent job of presenting the FCC's case on this and other matters pertinent to the operation of an Amateur Radio Station. . . . — *D. Baker, W6WX, President, Northern California DX Club, Menlo Park, California.*

LEADERSHIP — LEYDEN JARS TO LASERS!

¶ Each year as I renew my League membership, I relive the many years since 9EA days prior to World War I. I also remember our limited possibilities then, as compared to now.

While taking a backward glance, I can't help but also think ahead to the day when hard-way communications relying on skip may become as obsolete as a rotary spark gap. What complexities will then confront our art? I hope a few of the old old timers will endure to see the full use of satellite communications enjoyed by the world's amateurs!

Let us insure that ARRL remains strong and vital so as to serve the needs of all amateurs as the art becomes evermore intricate. Amateurs, regardless of their specific interest should always be guided by good judgment around the pitfall of taking too much for granted. We must realize the importance of solidarity within our ranks. Regardless of little squabbles, let us always be friends within a family, maintaining a solid front against interests who may be looking at our treasured privileges with a greedy eye! — *Army Brattland, K6EA, Long Beach, California.*

ENCOURAGING YOUNGSTERS

¶ . . . FCC Chairman Hyde has bemoaned the fact that the younger generation is not taking up ham radio and lays it to the toy walkie-talkies available. [See April *QST*.]

I suggest that the main reason is that the ARRL does not play up the fun and excitement of building one's own equipment and experimenting with v.h.f., etc. I feel that it is time that the League stopped pushing the commercial aspects of ham radio and again made it interesting to the kids. I have no fight with the technical articles in *QST*. There are just not enough of them and they do not seem to be interesting enough. . . .

How about a new deal or a fair deal, or at least another deal, and get the kids back in ham radio where they belong? — *Cliff Rowe, W2CTH, Troy, New York.*

¶ If you are sincerely interested in young people and increasing the membership of the ARRL, why not correct a few impressions that the Technicians have about the ARRL. The potential market of interest afforded by the Technicians is enormous. . . .

Why not mention and recognize the fact in *QST* that Technicians do exist and are not outcasts just because they prefer to be Technicians. You sometimes neglect the Novices, too. These two groups could give the League great support if they were given the proper encouragement and recognition. You are passing up, and going to lose completely, the support of a great group if something is not done soon. — *Warren B. Barnes, K7EZP, Forest Grove, Oregon.*

COUNT YOUR BLESSINGS

¶ . . . Those fellows who assume that amateur radio got to be what it is today strictly by accident should stop for a few moments and count their blessings: Blessing No. 1 . . . ARRL. Blessing No. 2 . . . *QST*. Blessing No. 3 . . . What happened to the Citizens Band could have happened to amateur radio, except for the inspiration and exampl set by ARRL members and *QST*.— *Nelson J. Harrill, WB4EED, Greensboro, North Carolina.*

CORRECTION

¶ On page 59 of March *QST* under "Strays" your item regarding the late Ralph Barber, W2ZM, quoted as being the radio operator on the S/S *Carpathia* at the time of the sinking of the S/S *Titanic* on April 14th, 1912, I am sure is not correct.

Being an old friend of Ralph, we both received our amateur licenses in late 1912, I am very familiar with his early background n Wireless. Further the *Carpathia* was a Cunard Line vessel and not a sister ship to the White Star Liner *Titanic*.— *Richard S. Egolf, W2WX, Brooklyn, New York.*

NOVICE ROUNDUP

¶ Your Novice Roundup for 1967, was one of the most fascinating experiences I have had so far as a Novice. I got so involved that I worked almost around the clock 'til my forty hours were up. Thanks again. — *Jack Williams, WN4DOR, Florence, Alabama.*

DUES

¶ . . . I, for one, condone a dues increase.

If those who complain about "freeloaders" and "high" dues would only stop for a moment and think about what a League membership is worth, we would have absolutely no financial worries today.

Let's cease all of this insidious complaining and keep amateur radio the wonderful fraternal group that it is. Costs of living rise, and so must dues. It is natural that a few must share the entire burden. I am proud to be one of the select few. — *Paul Plakosh, W3DGI, Coraopolis, Pennsylvania.*

¶ I might make one small suggestion — my first contribution in four years of membership with ARRL. Why not set up a form of membership something like the NRA and other similar organizations? Below is an example of what I mean:

1 year	$ 5.00
3 years	13.50
10 years	42.00
Life	100.00

As it stands now, an ARRL member is given the opportunity yearly to drop out, a very brave but improvident opportunity. For my part, and I guess others feel like I do at times, I do not like to be notified every year that I owe more money, nor do I like paying two or three years in advance where no discount is offered. — *Dwight R. Rudisill, WB4EPM, Atlanta, Georgia.*

¶ You should raise the dues! I am sure *QST* expenses run almost as high as $5.00. The benefits derived are well over $5.00 and the code practice is valuable. I still sit in and my speed is improving. — *Edward C. Brown, Jr., W3FXQ, King of Prussia, Pennsylvania.*

¶ I would like to recommend for League consideration on increased income, the idea of two types of

membership, such as: Regular membership at $5.00 *per year, and Booster membership at* $8.00 per year.

The recognition of those giving over and above the regular membership fee should receive some kind of distinctive membership recognition such as a gold certificate, or special seal applied to the regular certificate to indicate booster support.

In this way we should lose no membership on account of increased dues, but would leave the way open for those who feel they can afford to do more for a cause they believe in, and would like to do it. — *Douglass M. Armes, K2ICQ, Lockport, New York.*

ABOLISH C.W.?

¶ After reading that proposal for the abolition of the code test (in *CQ*), I realize I have been a nonmember for far too long.

If anything, let's increase the code speed to 20 w.p.m. for General, and 35 w.p.m. for Extra Class. We have too many lids on the bands as things now stand, let along opening the gates for everyone by doing away with the code test.

Yours for a bigger and better League. — *John F. Reynolds, WA1FYN, Malden, Massachusetts.*

¶ . . . I want the FCC to recognize the fact that c.w. is on its way out. I have tried to learn the code but haven't succeeded because I am in the U. S. Army and can't set up a regular practice session, and, it is very difficult to teach yourself something you have no interest in! . . .

I am on my way to Viet Nam now, but have been studying for that 1st Class and will have it in a couple of years. When I get it, I surely will be putting on the pressure to downgrade the seemingly prime importance of c.w. — *Roger D. Fetters, LaGrange, Georgia.*

[EDITOR'S NOTE: A code test for an amateur license involving operation below 144 Mc. is required by international and domestic telecommunications rules. This requirement exists not to filter lids from the ranks, nor to favor the c.w. buff, but to equip all amateurs with a skill valuable in emergency communications. League Lines in January *QST* carries a statement by FCC Chairman Hyde on this subject. Reader Fetters should also be reminded that the U. S. Army recently up-graded its code training program. (p. 9, Aug. 1964, *QST*.)]

THANKS

¶ Last summer I was employed for a few months in Arizona, and on very short notice applied to the FCC for permission to operate while in the southwest. I was first disappointed to learn from fellow amateurs that such applications normally require one or more months to process, but was very pleased *to receive permission in only one week.*

I wish to thank the FCC through your organization, for the prompt and efficient response to my request. Such service helps promote the strong international bonds of friendship which amateur radio fosters so readily. — *Chuck Hooker, VE3CQH, Kingston, Ontario, Canada.*

[EDITOR'S NOTE: We second the bouquets to FCC, but normally Canadian amateurs should allow 30–40 days for processing of applications for U.S. operation, and W/K amateurs heading North should extend a similar courtesy to the Canadian authorities.]

THE LEAGUE'S VOICE

¶ In recent years, many hams have forgotten that if it were not for the efforts of the founders of ARRL, there might not have been an Amateur Radio Service. I feel that there are altogether too few hams in ARRL. A ham should not become a member out of gratitude for what Mr. Maxim and others did, but for the preservation of ham radio. We must consistently show to the FCC that we are deserving of the frequencies awarded to us. One of the chief ways to do this is to appear as a unified group and not as a bunch of quibblers.

The ARRL should have the support of every ham also for the services it gives. Many non-members are taking advantage of ARRL's generosity. If this continues, ARRL, and therefore ham radio as a whole, will suffer. Therefore, I am enclosing a check for the renewal of my membership. I hope others will do the same — if for no other reason than the bargain on the *QST* subscription! — *William H. Eilberg, WA3BBB, Philadelphia, Pennsylvania.*

¶ It seems to me that ARRL used to be almost a semi-official organization in that the U.S. government seemed to give it quite a bit of responsibility over the amateurs, and used to listen to its recommendations to a great extent. Now, in this era of big government and big spending, the FCC seems set on the regulation of amateur radio without outside help and advice. With only 30% of the amateurs as members, we cannot really be said to speak for all amateur radio, although I suspect ARRL represents the majority of active amateurs.

I would not be against higher dues if it would lead to better services (elimination of the tiny type in parts of the mag, for example). ARRL was of tremendous help in teaching me radio and getting me on the air. I still enjoy building an occasional project though not as many as I would like! . . . — *Fred V. Gwyer, W9BIU, LaGrange, Illinois.*

NEW AWARD

¶ After looking over the list of holders of DXCC, and I'm sure there would be even longer ones for the holders of WAS, WAC, WAZ, etc., I came to the conclusion that if amateur radio is to keep current and on the main stream there should certainly be another award instituted — WAZPC (worked all zip codes). This really could turn into the very highest of amateur attainment. There is available from the Government Printing Office a full listing of all the zip codes presently in existence and this could be the acceptable official list. Maybe even the Postal Department would administer the award in the interest of promoting zip code use. Along with a suitable certificate a prize such as free franking for a year might be made to the ones attaining this award.

Of course we amateurs would have our zip code with addresses on our QSL cards. Well, there it is. Anyone needing Zip 07716 can find me on the low end of 40 nearly every evening between 0100 and 0300 hours GMT. — *John W. Krieg, K2ZGF, Atlantic Highlands, New Jersey.*

PRESERVE AMATEUR RADIO

¶ During the last year I have participated in five military shows in Washington, D. C. In reviewing the numerous communication exhibits I observed the requirements for spectrum space from that quarter. We as amateurs should and must look carefully in many directions in order to prove our merit and thus advance our status as well as retain our frequencies. — *Dick Apgar, W.12GHK, Flemington, New Jersey.*

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

Thank you, Mr. Morse

IN a way we might say that we gals have been involved in the communications story from the beginning. Three thousand years ago, the first recorded message, (if we are to believe Aeschylus,) telling of the fall of Troy was delivered to a lady. A number of studies of early communications describe women operating some of the odd systems that were evolved such as the "lung telegraph," so called because it was nothing more than shouting short staccato phrases across distances, by which system they were able to communicate even through a storm. There were women operators in England who read, and called out the characters as the flying needles indicated them on the dial plate of the old needle telegraphs that could, and did operate, according to existing records, at a rate of 15 words a minute, sometimes more!

It was a YL, Miss Annie Ellsworth, who dictated the famous phrase that Morse sent over the first telegraph wire in 1844, and by 1851 there were YL operators working on the existing telegraph systems in this country. In 1857, the first publication devoted exclusively to the new communications industry acknowledged their excellent operating ability, and saluted them with "73," which, at that time meant "my love to you," and remained with that meaning for two more years before it changed to a greeting.

The gals held their own with the men operators, often surprising them when they discovered that the crisply-sent sine following some lengthy, and well sent dispatch came from a feminine fist. This was particularly the case in 1889, following the disaster in Johnstown, Pennsylvania, when Western Union announced that "HM" had been a victim of the flood, and, for the first time many of the telegraphers who had worked "HM" on the wire found that it was the sine of Mrs. Hettie Ogle, office manager at W.U. in Johnstown. Mrs. Ogle's daughter, who was one of the operators, also was a casualty of the flood.

The famous Morse Tournaments, forerunners of our code copying contests, included special categories for women. The gals participated as long ago as 1890 not just copying, but in the sending contests as well, with records of winners sending 217 words in a five-minute period. (Remember the "bug" was not yet invented, and these rates were accomplished on a straight key, from texts such as the famous "Command of Gideon," or a stack of telegrams using words of varying lengths.)

We all have to learn the code, the law requires it. Some of us stick our key in a bottom drawer the day our General arrives, others operate both phone, and c.w., while some of us find there is a satisfaction in achieving an ease in chatting with a key. We learn that sending styles ("key writing," the early telegraphers called it) are as distinctive as voices, and that a persons personality flows from his key. To those who have attained this facility with the code, there is nothing quite like c.w., but for the ones who would rather do anything than operate this mode, it is for the birds. All of us, whether 100% c.w., 100% phone, or are 50/50 in our choice of emission, should breathe a short "thank you" to Samuel F. B. Morse, for his idea of a binary code. Imagine tak-

WA2WBA. Marty Colburn

WB6KUG. Bernie Babcock. Eye surgery that kept her from doing anything but just sitting got Bernie going on Code records to keep from going nuts. Now fully recovered, and with a General class ticket, Bernie is active on 80 c.w., and loves chasing DX on 20 meters. OM, Stan WB6HVA is manager of Northern Calif. Net and their son WB6MWY is a radioman aboard an icebreaker in the Coast Guard.

*YL Editor, *QST*. Please send all news notes to WB6BRO's home address; 1036 East Boston St., Altadena, Calif. 91001.

ing that General Class screaming over a long distance, or watching a four-inch long indicating needle flying back and forth at 13 w.p.m.!

Coming Events

It's not too late to register, and enjoy the 16th Annual Midwest YL Convention, at Holiday Inn, Lafayette, Indiana, on May 19, 20, 21, 1967. The HAWKS have been working hard to make this a special and memorable weekend. A "Welcome Dinner," will be followed by an informal "Eyelash Party." Saturday morning has been booked for a trip to the airplane installation of MPATI, the Midwest Program Airborne Television Instruction, a plane that flies and televises the lessons for grade school pupils in Indiana, Ohio, Michigan, Illinois and Kentucky.

There will be a banquet on Saturday night, of course, all done in the old fashioned Hoosier hospitality manner.

If the OM isn't too sure he wants to join you, remind him that it is traditional with this affair, that the men will have a chance to watch the time trials for the Indianapolis Speed Race.

Reservations should be sent to Betty Timberlake, W9LYU, 1109 Logan Avenue, Lafayette, Indiana.

WA2WBA, Marty

Take an amateur call and add a constantly changing "portable" designation, and if it's a YL, she's probably related, by marriage, to a serviceman. WA2WBA is one of those gals who just gets all settled, antenna up, gear on the air, joins a local group, and suddenly shows up with a different numeral after that fraction bar following her call.

Licensed in 1961, Marty used the call DI4IQ first. In 1962, they moved to North Carolina and she used WA4PDS. Since she had neither phone nor a v.f.o., all Marty worked was c.w., and was active on the North Carolina Net as assistant Net Manager, and through all the net levels including Transcontinental Corps. Another move found her as WA2WBA operating in Denver for a while, but before she got used to that zero, they were again moving, this time to Mississippi. Her brief stay in zero land found her busy with the Colorado YL gang, as well as Air Force MARS, and net control on the Pacific Area Net.

Marty operates 20-meter s.s.b. with her HT-32, and 75A4. She has built her own break-in system, a "Marty Special." She has big plans for a "dream c.w. rig with all the refinements a brasspounder wants."

When she isn't on the air on a net, traffic, or YL, or keeping house for the OM, two sons, ages 7 and 9, keeping an eye on the family dachshund and two turtles, Marty repairs mobile radios, not to keep the wolf from the door, but to earn her radio gear. An Extra Class, and First Radiotelephone licensee, she is the only member of the family who is interested in amateur radio.

W9JYO

Thelma Zimmerman is known to the amateur fraternity as a whole as W9JYO, but to the Army MARS people, she is A9JYO, the first woman to become a state director of the Army Military Affiliate Radio System.

Thelma received her amateur license in 1932 and was the first YL operator in Kentucky. Her activity was mainly traffic, both c.w., and fone, and when

(*Continued on page 136*)

WB6BKE, Lynn Motschenbacher is active on 2 meters. A senior in high school, she became interested in radio when her brother WA6WTD was studying for his license. Besides amateur radio, Lynn enjoys music and dancing.

W9JYO. Thelma Zimmerman.

W7ZIW. Pat Urie. Licensed since 1955, Pat is active in traffic from Section through TCC. A holder of WAS, BPL and Public Service Awards, Pat met OM, W7AAO on the air and their first date was a radio club meeting. They have two daughters who are not yet interested in radio. Pat also enjoys boating, horseback riding, and bowling.

The World Above 50 Mc.

CONDUCTED BY BILL SMITH,* W1DVE/KØCER

"Closed" Band DX on 50 Mc.

Six meters is never "closed." There are many days the 50-Mc. band may sound dead compared to the robust sporadic *E* signals common to early summer and late December, but the six-meter man willing to work with weak signals can make contacts over 500 to 1200 miles or so nearly every day of the year — on scatter.

In response to those of you who had inquired about the subject, here is what a sampling of those who work 50-Mc. scatter have to say.

First from Ames, Iowa and Jim McMechan, WØPFP.

"The general field of scatter is a rather unusual one. My comments are made on the basis of several years of operation on the 50-Mc. band. Scatter to me is the weak signal which is always identifiable as a signal which is coming from beyond 'normal ground wave' range. Admittedly, I cannot specify 'normal ground wave range' but on 50 Mc., I suppose it is around 100 miles at least here in the Midwest. Even at this distance, 100 miles, there will be periodic fading and 'good' and 'bad' days so it probably shows some tropospheric effects.

A good idea of the possibilities of any station can be obtained with the technique of K2LMG, see *QST* for November 1961, or the *Radio Amateur's V.h.f. Manual*, page 21. The results obtained are quite near what one will experience as the path length goes over about 100 miles. However, this method seems to fall down at the extremely long distances, i.e., about 1000 miles as signals are generally better than expected.

It should be stated, I believe, that scatter is not a fast nor particularly enjoyable way to have a contact. Much time is spent straining for a signal at or slightly below the noise level. In fact, I am sure that one can, by training your ears and mind, ignore much of the noise. I am often amazed at the amount of noise present after I get done with a contact that I was not even aware of while making the contact. It should be noted that all of my comments apply only to s.s.b. as this is the mode I normally use. On a few occasions, I have used c.w. but for me, I fail to be able to find any advantage in c.w. Part of this I am sure is because I believe I have trained my ears to match a 3-kc. bandwidth; when I go to a narrower bandwidth, such as 500 cycles for c.w., my ears do not hear as well because of the noise causing ringing of the narrower bandwidth. To be sure, many repeats are necessary but if you are not in a hurry, it can be done.

Who can work scatter? Almost anyone who is willing to work at it. Some general rules of the type of equipment may help. A good stable receiver is a must; accurate calibration certainly makes the task easier; power of 300 watts and up helps; a low-noise location obviously helps; big, high antennas help but I have worked a Swan 250 at about 500 miles who was using a 4-element beam at 30 feet. Naturally, this was when very 'good' conditions prevailed but it was done with no band opening. I find earphones to be a big help for two reasons, first they reduce the amount of noise you hear from your own shack and secondly, the signal and/or noise is all right at your ears. I think phones are a 3 to 6 db. improvement over a speaker.

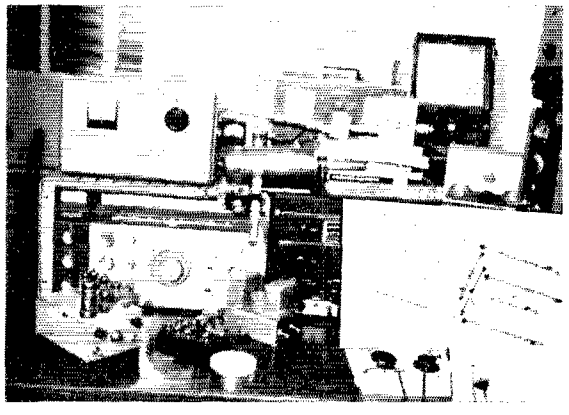
How to start working sideband scatter? First try to get as many of the requirements listed before as you can. Second, start listening on 50.110 to 50.115 Mc. on Saturday and Sunday mornings. It may be necessary to ask around to find out what others in your area can hear or at least know about. After a while, you should find that you can copy a signal at the noise level — practice doing this. When you think you are ready, write for a sked with someone at about 200-300 miles and run the sked for a while; again learning more what to expect. After you are able to have good luck at this distance, try your luck at any other distance even though you 'know' you can't make it; you may be surprised.

Typical results from here in Central Iowa are K8MMM near Cleveland, Ohio, W3KWH near Pittsburgh, Pennsylvania, K3HFV in Maryland, WA5CZM at Dallas, Texas, (now in New Mexico), WØEYE and WAØIQN near Boulder, Colorado. My rig is a 10B exciter, with homebrew mixer into pair of 4CX250Bs. Antenna is a 6-element 24-foot boom Yagi mounted 83 feet above ground. The receiver is a home-built copy of the Tapetone XC50 using a pair of 6DJ8s in a double cascode into a 75A3 modified for s.s.b. operation. A panadaptor used with the receiver is a great help as you can 'see' the signals sometimes if a large meteor burst occurs. Generally the early morning hours around sunrise are best. I have noticed many times an increase in signals about one-half hour after local sunrise. This increase is not too long lived, however, lasting only about 15-20 minutes. This time of day is also advantageous in as much as most man-made noise seems to be less than at other times of day.

Probably the single most important thing one needs in order to have scatter contacts is persistence; without it no contacts will result."

Don Hilliard, WØEYE, near Boulder, Colorado offers these opinions.

"In my opinion any well-equipped station can work consistently 1000-1200 miles on 50 Mc. at any time. This, of course, assumes a quiet location among other things. Well-equipped is something that is hard to define but I would



The shack and Parabeam array of Canadian 432-Mc. regular VE2LI in Montreal. The rig runs 600 watts output and effectively covers New England.

*Send reports and correspondence to Bill Smith, W1DVE, % ARRL, 225 Main St., Newington, Conn. 06111.

Six of these gentlemen represent 158 states worked on 144 Mc.! Gathering at Waltham, Mass. for a recent discussion about meteor scatter with Dr. Brian G. Marsden of the Smithsonian Astrophysical Observatory at Cambridge, Mass. were (seated, left to right) K1HTV, W1HDQ, Dr. Marsden, and W1JSM; (standing, left to right) K1BKK, K1ABR, and K2HLA.

define a well-equipped station as one which has an output of 500 watts minimum, a 10 db. gain antenna, a feedline loss of no more than 1 db. and a converter noise figure of no more than 4 db. Also the transmitter and converter local oscillator should be very stable. Again stability is hard to define here. Let us say, in this instance 100 cycles. One should also have receiver calibration good to 1 kc., preferably less than 1 kc. Of course we know it is easy to work meteor scatter on 50 Mc. with quite low power. The above should be considered for ionospheric scatter. C.w. by far is the best mode of the commonly used ones. S.s.b. shows quite well for meteor work where much higher signal levels occur. As far as results go, I regularly work the Los Angeles area, the Seattle area and the southern New Mexico area. None of these are over 1000 miles from here. I hear a lot of s.s.b. activity to the east on Sunday mornings but apparently they have their antennas in another direction and are working stations rather close in as I find it quite difficult to raise these stations."

Dave Robinson, K7BBO, of Tacoma, Washington is a West Coast 50-Mc. stalwart.

"I have been working 50-Mc. scatter for almost three years and find it very interesting and a lot of fun.

The best path seems to be north and south though I work W7UFB in Casper, Wyoming who has a real nice signal and WØEYE in Colorado who comes in on bursts.

You can work 50-Mc. scatter anytime of the day or night. Skeds with WB6GKK in Tustin, California are completed at almost anytime during the day. However, the best time is about 0630 to 1000 local time.

The summer months from about May to September are the best with signals much better than from October to April.

I also use s.s.b. with real good luck and during the summer ragchew for a few minutes on scatter with some of the California stations. However, you do have to repeat things two or three times.

You can work 50-Mc. scatter with as little as about 200 watts input but signals have to be real good to copy a 200-watt station.

The least power that I would say anyone interested in 50-Mc. scatter should use is 500 watts input. With 500 watts you can get out and be heard but a kw. is much better.

The best speed for c.w. is between about eight to thirteen w.p.m."

Both WØEYE and K7BBO use kilowatts and about the optimum for receiving equipment and antennas. At Canton, Connecticut, Ed Tilton, W1HDQ, was one of the first to try 50-Mc. scatter.

"In the early 1950s, a test of the reliability of v.h.f. communication over distances in the 1000-mile region was set up between Cedar Rapids, Iowa and the Washington, D.C. area. People experienced in v.h.f. propagation research had felt that a path of this order could be covered reliably, if enough power and large enough antennas were employed. This was not a very new idea, even then. The late K. B. Warner, W1EH, ARRL Secretary and General Manager, advanced the idea in a tongue-in-cheek editorial describing "The Warner Splatter System," 20 years earlier. Hams tried it, before 1930, but failed, mainly because of dubious receiver performance in the 10- and 5-meter regions.

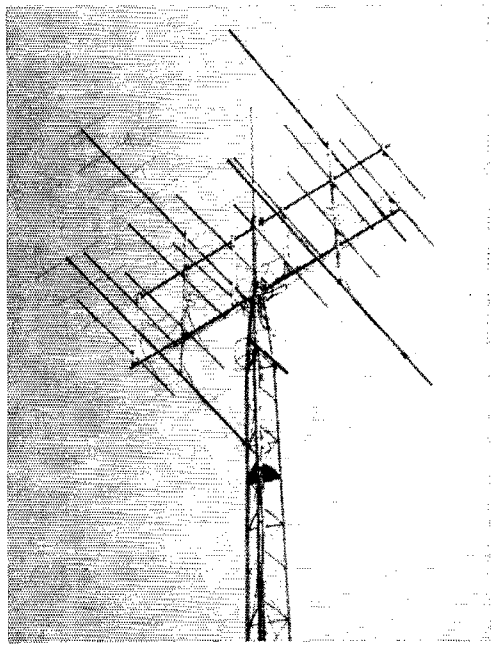
The Cedar Rapids to Sterling experiment worked right from the start. In fact it practically overwhelmed even its sponsors with the tremendous signals. Set up for operation at the 50-kilowatt level, the Cedar Rapids transmitter overloaded the receiver at Sterling an appreciable part of the time. Eventually it was operated at far lower levels, and still provided reliable communications.

I and many others found that the 49.8 Mc. 'Big Signal' could be heard around the clock, even at angles far off the main path of the big rhombic array first used. Obviously, this was something to try on 6, at amateur power levels.

Accordingly, in the spring of 1955, I asked the cooperation of W4HHK, Collierville, Tennessee, in a receiving test. I transmitted on schedule on a Saturday and Sunday morning. Paul was not told the nature of the transmission, except that it would be on 50.004 c.w. with 400 watts output and a 10 db. antenna. W4HHK used a 4-element Yagi for receiving. I transmitted at random, partly key-down periods of up to one minute, with short identifications and concluding with 'please wire reception details collect.' The request was sent just once each morning. Monday there was a detailed wire on my desk. Yes, ionospheric scatter *did* work!

Next we tried weekend morning scatter tests with more publicity, inviting anyone who heard them to report results. Reports filtered in from W4GJO, Ft. Myers, Florida; W4IKK, Rome, Georgia; W4LNG, Atlanta, Georgia; W4OLO, Bristol, Tennessee; W4RFR, Nashville, Tennessee; W9AAG, Woodhull, Illinois, and W4HHK. Not bad for one beam heading!

More tests were tried over various distances. Results were nil beyond 1300 miles; best around 1000, and on paths to the southwest rather than straight east-west. East-west works, but apparently not quite so well. I hear s.s.b. 8s and 9s almost any Sunday morning working into the eastern states.



40-elements on 144 Mc. and 156-elements on 432 at 120 feet account for the loud signals on those two bands from W9BRN at Liberty, Indiana.

For sked work, though, I'll take c.w. any day that conditions are less than topnotch.

It would be interesting to see how the distances between about 300 and 700 miles work on consistent skeds. My results years ago made the distances beyond 700, but under 1200 miles, look best. Out to 300 miles or so was good solid tropo on c.w., but there seemed to be a more-or-less blank area from 400 to 700 miles — yet now I hear K8MMM, about 425 miles, pretty regularly on sideband. Only consistent skeds really tell you much, however, and I have not tried any at intermediate distances.

I agree with WØPFP that scatter is not a fast, nor particularly enjoyable, way to make contacts — unless you enjoy pushing the limit of the medium, which is what either tropo or iono scatter does. If you do enjoy seeing what you can get out of a none-too-encouraging situation, then keeping scatter skeds on any v.h.f. band will be a very interesting business. And you can't beat it for getting the jump on your more casual competition during v.h.f. contests."

There you are: get busy and form your own opinions.

OVS and Operating News

50 Mc. DX is a popular subject these days. For those who have requested a list of countries allowing 6-meter operation, here is the most accurate I can provide. Not listed, but allowing operation, are the possessions of several of the countries listed below.

CE, CM-CO, CX, EL, HC, HI, HK, HL-HM, HP, JA, K-W, LU, OA, PJ, PJ2-5M, PY, VE, VP-7, VP9, VS6 VU, XE, XZ2, YS, YV, ZE, ZP, ZS, 4S7, 6Y5-VP5, 9J2-9M2-4, and 9Q5. VP6 has 54 to 56 Mc.; VK and ZL, 56 to 60 Mc. band; EI, 70 to 70.4 Mc.; G, 70.1 to 70.7 and 7X allows 70 to 74 Mc.

A sidelight to the 50-Mc. DX question is the *CPRL* prediction that this fall may be the peak of Cycle 20. The actual sunspot count is far behind the predicted numbers, a complete reversal of the Cycle 19 situation. There may be some 6-meter openings this fall, but it is unlikely they will resemble those of the late 1950s. Past observations note a new cycle rises quite rapidly for 12 to 18 months before the peak, followed by a gradual decline. Apparently Cycle 20 has just about completed its climb so this summer would be a good time to polish that 6-meter beam.

W6PUZ says Chile's CE3QG monitors 50 Mc. every night between 2300 and 0400Z. CE3QG operates s.s.b. on the low end and was widely worked in Southern California in February.

ZB2VHF, a 70.260 Mc. beacon on Gibraltar, is operating continuously beaming toward England. According to G3JHM, the station runs 20 watts to a 4-element Yagi and has been heard on meteor scatter and *Es*. G3JHM hopes to stir up interest in work towards Southern Africa via *TE* as illustrated by the work of ZC4IP and ZE2JV.

A possibility for Maine on 50 and 144 Mc. during July and August will be WA1HBB, who is also WA1EFN in Arlington, Mass. Another station reported active in Maine by WA1HDQ, is WA1GPI.

144 Mc. news continues to be dominated by the e m.e. enthusiasts. Want to work Greece on 2 meters? In Athens, SV1AB, is ready for e.m.e. (earth-moon-earth) skeds with K6MYC and F8DO. George has a 5894 exciting a pair of 4-125As in push-pull to a kilowatt on s.s.b. and c.w. The receiving is done with a Collins R-390, Nuvistor converter, a 417A preamp and a noise clipper. SV1AB's antenna is a Yagi array of eight 9-element beams polar mounted in a configuration 4 wide and 2 high. George says the array automatically tracks the moon and has a gain of 22 db. over a dipole. George is also a meteor-scatter buff having worked 11 countries and a best distance of 1,300 miles. During the 1966 Leonids, George caught 30 to 40 second bursts which enabled contacts with Russians UB5KDO and UP2ON, and ON4FG in Belgium. SV1AB is also active on 432.

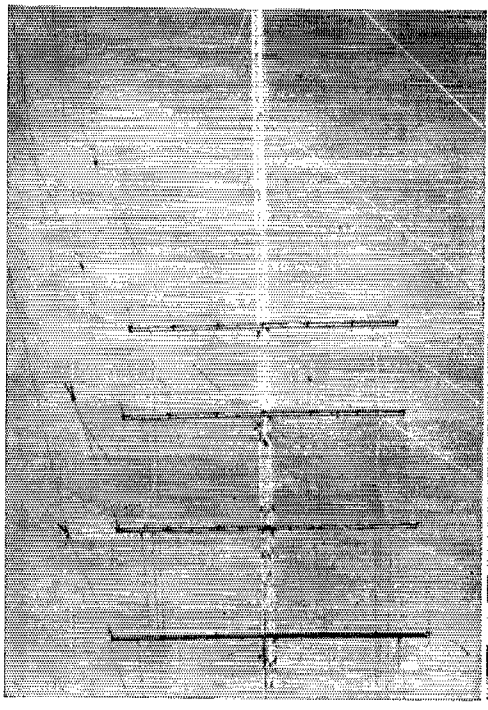
At Saratoga, California, K6MYC has 160-collinear elements polar mounted on the roof of his garage. The array is half of that used to work VK3ATN (March, 1967 *QST* page 91). Mike is again scheduling the Aussie. Victor Frank, WB6KAP, was heard by VK3ATN on March 22. Vic has the other half of the original K6MYC array at his Woodside, California home. WB6DEX at Malibu is also scheduling VK3ATN and each has heard the other. WB6DEX uses 4 cross-polarized Yagi's.

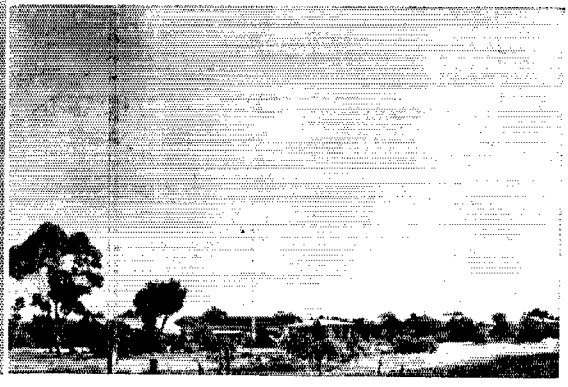
W5ORH in Oklahoma City reports TI2NA, Eric at San Jose, Costa Rica may soon be ready for e.m.e. on 144 and 432. Other 144 e.m.e. prospects according to W5ORH are KH6EEM in Honolulu, KA7AB in Japan and VK3BM at Quambatook, Victoria some 40 miles from VK3ATN.

Bill Conkel, W6DNG, has been at e.m.e. again. On February 21 he made another two-way with OH1NL in Finland with good signals, and then to keep the system warm, Bill and F8DO swapped e.m.e. signals again on February 25.

During the 1966 Leonids shower there was at least one report of signals being heard over a path in excess of 1,500 miles. Extensive work has been done on the tape recording but without any conclusive results on whether or not the signal is actually there; too bad!

We have not been able to substantiate a report received in February at ARRL from a listener in the British Isles who claims to have heard both ends of an aurora contact between





This is the station location of VK3ATN, Birchip, Victoria, Australia. The view below shows part of the 4-wire stacked rhombic used to work 144 Mc. e.m.e. At the left is a close-up look at the arrangement Ray Naughton uses for steering the array. The four horizontal trusses carry barn door tracks allowing the antenna to be moved a few degrees in the horizontal plane. Ray has a low-band rhombic aimed at the U.S. and a 153-foot vertical for 1.8 and 3.5 Mc.

220- and 420-Mc. STANDINGS

220 Mc.

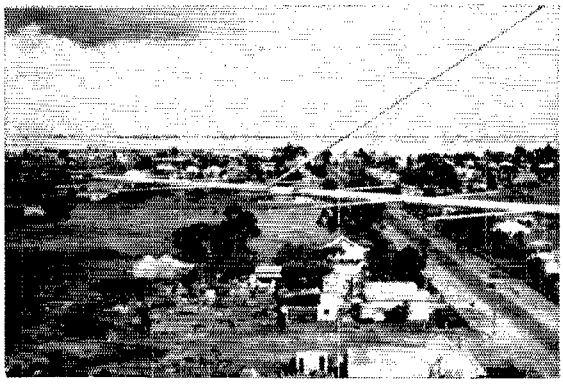
W1BU	14	5	600
W1HDQ	12	5	450
W1AJR	12	4	480
K1JIX	11	4	615
K1UGQ	9	3	400
K2CBA	16	7	660
W2AOC	15	5	530
W2SEU	12	5	450
W2DZA	12	5	410
W2NTY	12	5	300
K2DZM	12	5	400
W2LWI	12	4	400
K2KIB	12	4	300
K2ITQ	11	5	265
K2ISA	11	4	300
K2ITP	10	5	265
K2AXQ	9	3	240
K2JWT	6	3	244
K2UUR	6	3	210
WA2BAH	6	3	200
K2DIG	4	3	140
W3FEY	11	5	350
W3RUE	10	5	480
K3IUV	10	3	310
W3LCC	10	3	300
W3JYL	8	4	295
W3JZI	4	3	250
W4TLC	5	1	315
K4QIF	4	2	500
W5AJG	3	2	1050
W6GDO	2	2	100
K7ICW	4	2	250
W7AGO	2	1	160
K8AXU	11	5	1050
W8PT	11	7	660
W9QVL	6	3	475
W9JCS	6	2	340
WØEYE	4	2	175
VE3BPR	3	3	300

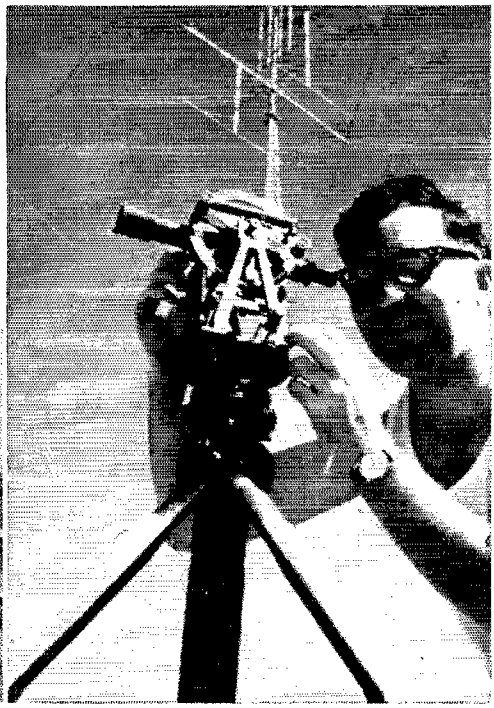
420 Mc.

W1BU	13	3	390
W1AJR	12	4	410
W1OOP	11	3	390
W1UHE	10	4	430
W1HDQ	10	3	250
W1QWJ	10	3	230
K1JIX	9	3	310
W2BLV	13	5	460
K2DZM	10	4	390
W2OTA	10	4	300
K2CBA	9	7	220
W2VCG	9	4	280
WB2EGZ	9	4	260
WA2EUS	9	4	220
K2UUR	9	3	280
K2ACQ	8	5	525
WA2HQE	8	4	280
K2HQL	8	4	250
W7PUA/2	7	4	500
K2YCO	6	5	500
W2YPM	6	3	300
WA2DTZ	6	3	200
WA2TOV	5	3	140
K2GGA	4	4	383
W3MMV	11	5	410
W3RUE	11	5	470
K3CLK	9	4	——
W3FEY	8	4	296
K3IUV	9	3	310
W3SZD	5	4	300
W3UJG	4	2	350
W4HHK	12	4	550
K4SUM	7	4	368
W4GJO	6	2	1000
W4TLV	6	2	500
WA4BYR	6	2	420
W4GOO	6	2	415
W4RFR	5	2	665
W4TLV	4	2	500
K4QIF	4	1	285
W5RCL	16	5	725
W5AJG	7	3	1010
W5SWV	7	3	525
W5RTZ	5	3	440
W5ML	5	1	350
W5UKQ	4	2	500
W6GDO	2	2	493
K7ICW	3	2	165
W7JRG	2	2	420
W8PT	11	7	715
W8YIO	11	6	560
W8TYY	9	5	580
W8IFX	8	5	470
W8FWF	6	4	450
K8REG	6	4	275
W8JLQ	6	3	275
W8RQI	6	3	270
K8AXU	5	3	660
WA9HUV	11	6	500
W9AAG	10	4	600
K9AAJ	10	5	432
K9UIF	9	6	520
W9GAB	9	4	608
WA9NKT	7	3	310
W9OJI	6	3	330
WØEYE	5	2	425
WØENC	2	1	400
VE3AIB	5	4	450
VE3BQN	5	4	447
VE3BPR	4	4	600

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

Look at that view below! The picture was taken from the 100-foot level of one of VK3ATN's towers showing a 144-Mc. Yagi overlooking Birchip and the Pacific Ocean. Ray uses a theodolite to align the apex angle of the 144 Mc. rhombic before his e.m.e. schedules. He says the temperature was 108 ° in the shade when this picture was taken. (Photos courtesy of VK3ATN)





W9BRN in Indiana and W1HDQ in Conn. during October. The contact had been reported in this column before the reception report was made. Considerable effort has been made to determine if the report in indeed valid, but our conclusion is that it is not. Again, too bad — if only someone on this side of the Atlantic had heard a G, or if there was another report from Great Britain to support the claim.

W1HDQ and others believe such a possibility might exist, perhaps similar to the work of KL7FLC and VE8BY on 50 Mc. This all raises the question, can anyone prove a two-way contact, or heard report, over a distance of more than 1,500 miles on 144 Mc via the ionosphere?

WB6GHB in Los Angeles says a good source of information as to the height of the inversion layers in Southern California is Los Angeles Radio operated by the FAA on 332 kc. This information could be the tip-off to tropo openings. Similar broadcasts are undoubtedly made elsewhere.

Walt Cummings, K9UIF, finds the going rough to work new states after hitting 41 from his Hobart, Indiana location. Walt is working with K7NII in Arizona and Utah's W7MFP in hopes of two new ones. Walt's rig is a kw. into 44 elements 60-feet high.

Meteor scatter buff Don Learned, W1AZK, of North Chichester, New Hampshire is concerned about what can be considered a bona fide contact. Don writes, "I have always considered a complete contact must consist of receipt by both stations of both calls, a signal report and an acknowledgement." Don says he has received letters and telephone calls saying 'I think we made it, shall we exchange QSLs?' During another sked Don says he received nothing from the other station except a few pings, so he was not sending a report. At the end of the sked time, Don sent VA VA and immediately received a telephone call from the other station thanking Don for a '*new state.*' Don pleads to the m.s. boys to not let skeds deteriorate to a point where a station claims a contact simply because he heard a few pings. *I sincerely hope this isn't happening. Meteor scatter and e.m.e. enthusiasts have long been respected for their integrity.*

220 Mc. activity was represented by four stations this past month. WØEAH at Davenport, Iowa is active with 20 watts and 7-element Yagi. Connecticut's K1YON reports W1QVF and K1GQO, both also in Connecticut, now active. W6NLZ is converting a 200-acre farm into a v.h.f. "DX factory." John reports about 20 stations on 220 in the Los Angeles area. At Northridge, K6SQH reports that Sunday night at 8:00 (PST) a group of 25 or so get together on 222.075 Mc.

Revised Meteor Shower Data for V.H.F. Use

Shower and Date	Time Visible Rise	Set	Optimum Paths and times N-S	NW-SE	E-W	SW-NE	Hourly Rate Visual	Radio	Velocity, km/sec.	Period, Years	Next Maximum
*January 3–5 Quadrantids	2300	1800	—	0300–0800 SW	0800–0900 S	0900–1400 SE	35	45	39	—	(Note 1)
*April 19–23 Lyrids	2100	1100	0230 W 0530 E	2330–0100 SW	—	0700–0830 SE	8	12	51	415	(Note 1)
May 1–6 Aquarids	0300	1200	—	0830–1000 NE	0630–0830 N	0500–0630 NW	12	12	66	76	(Note 1)
June 2–17 Scorpiids	2000	0300	—	0100 NE	2300–2400 N	2200 NW	—	—	—	—	—
July 26–August 4 Aquarids	2200	0600	—	0300–0500 NE	0100–0300 N	0000–0100 NW	10	22	50	3.6	(Note 1)
*July 27–August 17 Perseids	Does not set; min. at 1730		—	2330–0300 SW	0300–0800 S	0800–1130 SE	50	50	61	120	(Note 1)
August 10–20 Cygnids	1200	0700	—	1700–1930 SW	2130 S	2330–0200 SE	—	—	—	—	—
October 8–10 Giacobinids	0600	0300	—	1100–1600 SW	1600–1700 S	1700–2200 SE	(Note 2)		20	6.6	1972
*October 15–25 Orionids	2230	0930	0000–0200 W 0600–0800 E	0430–0600 NE	0330–0430 N	0200–0330 NW	15	30	68	76	(Note 1)
*October 26–November 16 Taurids	1900	0630	2100–2300 W 0300–0500 E	0130–0300 NE	0030–0130 N	2300–0030 NW	10	16	27	3.3	(Note 1)
*November 14–18 Leonids	0000	1230	0300–0500 W 0800–1000 E	—	—	—	12 (Note 3)		72	33.2	1999
*December 9–14 Geminids	1900	0900	0030 W 0330 E	2130–2300 SW	—	0500–0630 SE	60	70	35	1.6	(Note 1)
*December 20–22 Ursids	Does not set; min. at 2030		—	—	0130–1530 S	—	13 (Note 4)	13	38	13.5	1971
*May 19–21 Cetids	0530	1430	—	1100–1230 NE	0900–1100 N	0730–0900 NW	—	—	—	—	—
*June 4–6 Perseids	0500	1730	0800–1000 W 1300–1500 E	—	—	—	—	—	—	—	—
*June 8 Arietids	0330	1530	0600–0800 W 1100–11300 E	—	—	—	(Note 5)		—	—	—
*June 30–July 2 Taurids	0500	1700	0700–0900 W 1300–1500 E	1130–1300 NE	1030–1130 N	0900–1030 NW	—	—	—	—	—

*Major showers—Last four are daylight showers.

NOTES

1. These streams are evenly distributed and little year to year variation is to be expected.
2. Very concentrated stream. Peak years give up to 400 meteors per minute, but with duration of only 6 hours. 1946 peak was most concentrated shower in amateur radio experience (see December, 1946, QST, page 43) but 1959 recurrence was deflected and was hardly observable. A reverse deflection indicates the possibility of excellent displays in 1972 and 1988.
3. Peak years give 60/hour visual. In the peak years of the 1800s, prior to being deflected by Jupiter and Saturn, this shower gave 1200 per minute. There was an excellent display in 1966.
4. Short duration shower. Peak years the radio rate is 165/hour.
5. This intense daylight shower begins June 2 and runs to June 14 with radio rates from 25 to 70/hour.

Several of the stations are running kilowatts heterodyned from 50 Mc.

432 Mc. e.m.e. tests are being conducted between the Crawford Hill V.h.f. Club station K2MWA and G3LTF and GM3FYB. W3SDZ and W2IMU report the tests were held April 15–16 and 22–23, the results of which may be aired from W1AW. G3LTF runs 450 watts into an 18-foot dish; GM3FYB has 600 watts and a 16-foot dish. In Australia, VK3AEE reportedly has a 30-foot dish ready. John Fox, WØLER, in Minneapolis writes of an e.m.e. project in the Twin Cities involving a kw. and 32-foot dish. At Denver, WØIUJ and WØWYZ are reported ready for e.m.e. with an array of eight helices. VE2HW at Dollard des Ormeaux is looking for skeds. Don has 120 watts out of a 4X250B coaxial cavity. His antenna is the W2CCY quad of four Yagis. K9UIF at Hobart, Indiana is running 500 watts to a 32-element extended expanded collinear. Walt heard W3RUE at Belle Vernon, Pennsylvania on 432 aurora February 7. He also schedules W9MAL in Peoria, Illinois on 432.060 at 9 P.M. (CST) on Sunday, Tuesday and Thursday for those of you who want to check on band conditions.

In Las Vegas, K7ICW is continuing schedules with W6DQJ at Rivera. Al observes the 225-mile path is very dependent on the air temperature being at least 57 degrees at both ends. Usually a warmer day produces stronger signals. Al reports evidence that cross-polarized antennas are useful for long-haul u.h.f. tropo work, but that the fade times are longer (*than with linear*). A cyclic variation of 20 minutes for fade has been observed.

For the ATVer, WB2RVE at Blackwood, New Jersey, says K3IHA has found a source of used vidicons. K3IHA notes TV stations change vidicons every two or three months (more often in a color operation) and are usually available for the asking, if the amateur explains why he wants the tube. The vidicons will likely be good for several hundred hours of amateur service.

1296 Mc. and up is receiving the attention of VE2HW. Don is using crystal-controlled equipment and a 10-turn helical on 1296. The tripler produces 5 watts. He and VE2LI are testing over an 11-mile path.

In Czechoslovakia, a group led by OK1HE is "about 50 percent ready" with an 18-foot dish and 300 watts for 1296 e.m.e. Josef wants some stateside correspondents; the address is Radio Club of Ceske Budejovice, Post Box 76, Ceske Budejovice, Czechoslovakia.

Another group that is interested in e.m.e., but on 2300 Mc., is the Amateur Radio Association (WA5BNE) at the New Mexico Institute of Mining and Technology in Socorro, New Mexico. Association President "Sparky" Summers, W5MVP, says they have a 28-foot dish, but will have to prototype the transmitter. They would prefer c.w. to pulse and are looking for someone similarly interested in 2300 e.m.e. The address above is complete.

Meteor Shower Data Revised

Ten years ago Walt Bain, W4LTU, wrote an article for *QST* (April, 1957 page 20) entitled "V.h.f. Meteor Scatter Propagation" which has become a classic in its field. Included in the text was a chart listing the best showers and times for possible meteor scatter contacts. As several of you have suspected the chart is not entirely accurate. More recent information is now available as a result of extensive research in the field of comets and their debris known as meteors. It is the concentration of these meteors that produces meteor showers.

(*Continued on page 142*)

How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

Whew!

Ducking two well-aimed empty fifths of Old Haywire, Hoffis Rocker abandoned his useless gavel in favor of a sixteen-pound sledge, smashed the rostrum and flung the hammer toward hecklers in the riotous gallery. Thus commenced the 16th annual May meeting of our DX Hoggery & Poetry Depreciation Society.

Our quivering guest of honor, a myopic, wizened creature with battered briefcase and tattered suit, perched nervously on the speakers' platform of Long Hall, eager to accept his nomination as DXHPDS DX Hound of 1967. His sickly visage, tics, twitches, bandaged fingers and general debilitation revealed his foul and fraudulent racket: DX editor.

We suitably mangled the Wouff Hong Song, our DXHPDS anthem, and Izzie Alldare crept forward to keynote the proceedings:

"I'll BLAST 'em!" howled yowlin' McShout
As he yanked all his clipper tubes out.
So far overloaded,
His larynx exploded —
Now Mac's inside out, just about.

Otto Hiskull's contribution, delivered over Izzie's remains, was the next agenda item:

Two-by-two's ample, I know,
But no good for hotshots like Joe.
His multibucks keyer
Has got to send three or
More — nothing's right twice in a row.

A low but distinct subterranean rumble further disconcerted our quaking visitor as Mustafa Skrooluse presented his minority report:

DXpeditioner Costia A Wodd
Looked up from his maps with a nod.
"This could be quite funny —
I'll save me some money
By doing Nepal from Cape Cod."

Now the entire stage creaked menacingly. That cringing thing licked cracked lips and clutched its stomach while Easeway Outman continued the commentary:

One misguided ham in Conniption
Whose DX cards beggar description
Was forced by inflation
To hock his whole station.
He "works" them, you see, by subscription.

Raleigh Gawn next bravely introduced our gruesome guest amid rising tumult and thickening missiles. The stage lurched crazily as the V.U.P. teetered up with his acceptance speech. He croaked, in a voice like mistuned sideband:

"These deadlines become *such* a curse,"
I fearfully sob to my nurse.
And in maddening May,
When spirits grow gay,
My output's considerably verse.

*7862-B West Lawrence Ave, Chicago, Ill., 60656

The clank and jar of massive machinery drowned out all chorused boos, jeers and catcalls. Before our very eyes the stage became a gigantic treadmill, causing our visitor to stride forward furiously. Soon he was running frantically to stand still as the whirling platform whined into high. Punishing obstacles popped up magically to maim the galloping goof, each labeled "June," "July," "August," etc., and a thundrous barrage of ink bottles, dictionaries, atlases, prefix blocks, Slinkys, typewriters, galley proofs and hosed mucilage brought him to his bloodied knees.

The fink never had a chance. That treadmill, swinging into overdrive, became a great flapping conveyor belt that swept him screaming backstage into the arms of waiting men in white. A kookwagon mercifully rolled away our delirious DX Dog of the Year.

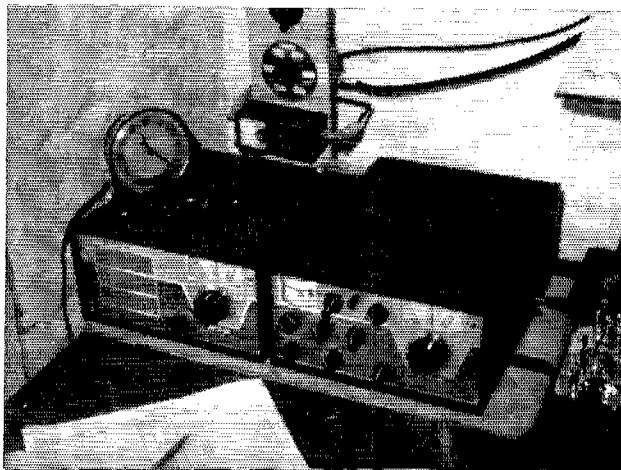
What:

Bet you (tic) thought you recognized that (twitch) journalistic jerk. Hah — fooled you! We're still on hand to help haul your "How's" Bandwagon over the 14-Mc. DX coals this month. Remember that figures in parentheses go for kilocycles above the lower band limit, digits outside parens for Greenwich Mean Time in whole hours. *E.g.*, "M1B (15) 18" means that M1B was observed near 14,015 kc. around 1800 GMT, shorthand that saves us room for another photo maybe. 'Tis the key clan's turn to kick things off. . . .

20 c.w. meets with the approval of correspondents **Ws** 1BGD 1CNU 2ADP 2JBL 3DPR 3HNK 4YOK 4ZSH 7VCB 7VRO 8PKU 8YGR 9LNQ 9CVZ, **Ks** 2QMF 5MHG/6 5VTA 5WWC 6SRM/4 9DEQ, **WAs** 2HLH 2LOR 3DSD 5IIS 8GGN 8MCQ 9MQI 9QXT 9FRM, **WBs** 2LBJ 2RJJ 6TIF and 1IER. Their dispatches deal with **CEs** 1FF (60) 23, 3ZW (70) 23, 6EF (63) 1, 8CF 9AP 9AT (55), **CM2WS, CNs** 2AQ 8FC 8FF (38), **COs** 2BL 2OR (26) 23, 2FC (33) 23, 2GR (15) 0, 2JB (10) 20, 2RL (7) 14, 3BU (75) 23, 8HB (76) 22, **CPs** 5AB (56) 23, 5AQ (70) 23, 5EZ (55) 23-0, 6AC, **CRs** 6AI 6CK (30) 22, 6EI (8) 5, 6GO (47) 22, 6HH 19, 6IK (50) 22, 7HC, **CTs** 1IT (54) 21, 2BO 21, 3AE 3AS (19) 20, **DM2BGN, DUs** HR (20) 15, OR (50) 19, **EAs** 6BH (54) 8, 8EO 12, **EIs** 5BH 13, 9AR (40) 22, 9J 22, **EL2AD, EP2s** BQ (15) 14, HB (25) 21, **Fs** 2CD/FC (70) 12, 8TT/FC (70) 7, **FB8s** XX (45) 16, ZZ, **FG7s** XF XJ 22, XZ, **FK8BJ** (18) 11, **FL8s** HM (17) 28, RA (60) 17, **FM7s** WD 19, WH (80) 21, WP (45) 22, **FO8s** AA BL (35) BQ (15) 1, BT (16) 8, **FP8CS** (70) 18-19, **FR7ZF** (30) 16-17, **FU8AG** (10) 11, **GD3AIM** (25) 13, **GC8HT, HAs** 5DA (51) 20, 5FG (46) 19, 5KFR 7PJ 17, 8CZ (45) 18, **HC1LE** (82) 23, **HIs** 7JMP (55) 18, 8LC (15) 20, 8XAL, **HKs** 3AVK 3HY 3RQ (50) 23, 0AI (38) 14, **HL9s** KN TS, **HPIs** AD XHG (19) 0, XYZ (28), **HR2BS** (16) 2, taboo **HS1NO, HZ3TYQ, IS1SBB** (90) 18, **JAs** 1AEA (55), 1CEQ 1CWZ (27), 1FI (28), 1IPX (44), 1PAQ (40), 2CMD (37), 3AA (6-37), 3IG (62), 6FB (55), 7FS (15) 23, 8JL 9BM (57), **JT1s** AG AQ (40), **JXs** 5AK (70) 10, 5CI (24) 22, 5WA (5) 19, 6XF (110) 12-18, **KC4s** USG USL, **KG6SF, KL7s** AIZ (25) 2, BZO EME (70) 16, EWY FKO RD, **KP6BA** (43) 2, **KR6s** AG (15) 11, FG 11, JM (75) 8, JS JZ (30) 22, **KSs** 4CC 6BT 6CG (40) 5, **KV4s** AA (81) 21-23, AM (28) 21, CI (35) 21, CK (86) 22, EU (60) 23, **KX6EM** (75) 23, **KZ5s** BC (15) 12-14, EM (83) 15, FX (8) 23, TX (41) 21, **LU2s** ZG ZI (90) 9, **LZs** 1BK 23, 2KHM (59) 18, **M1B** (15) 18, **MP4s** BEU (1)

18-20, BFK (12) 18, BGH (20) 18, **OA**s KF (14) 23, PF (8) 23, **OD5**s EJ (5) 23, FC (27) 6, LX 14, EL (52) 18, **OH0**s NF NM (40) 8, **OX**s 3FR 19, 5BO (20) 19, **OY**s 2YL (40) 22, 3H (54) 20, 4M (45) 18-19, 7ML (70) 13, **PE2**EVO (25) 18, **PI1**LC/mm (20) 6, a dozen PYs, **PJ3**CI (75) 13, **PZ1**CQ (30) 23-0, **SL6**CY 14, **SM2**AZH, **SV**s 1CX (85), ØWLL (3) 15, ØWU (33) 17, TAs 1AW (30) 18, 1DS (40) 19, 1SK (30) 19, 2AC (5) 7-18, 2BK (60) 19, **TF**s 2WJW (69) 21, 3AIA (23), **TI2**PZ 22, **TR8**s AG 21-22, AH (32) 20, **TU2**s BA BK (49) 18-1, **TT8**QQ (25) 19, **U5A**RTEK 14, **UA**s 1KAE 18, 1KAE/2 22 both of the antarctic, 1KED (20) 4 of F.J.L., 2KAW (33) 16, 9JO 9PG (36), 9US (40) 1, 9VB (25), 9VX (18), 0EE (10) 1, 0EQ (60) 2, 0II (21), 0IK (5) 1, 0IM (22), 0KAE 0KCA 0KFG (15) 3-4, 0KKT (14) 22, 0KYA (35) 7, 0KZB (65) 2, 0KZD (64) 1, 0LK (27) 23, 0SN (12) 19, 0YO (56), **UB5**s KAW (66) 18, KNF 18, KNH 18-19, **UD6**CE (32) 6, **UF6**s AS (55) 5, KPA (81) 15, LA (38) 23, **UG6**s AD 13-14, KAA 16, **UH8**CI (40) 3, **UI8**s AI AX (8) 16, CX (7) 3, IK (20) 7, KAA (35) 7, KAD LK (50) 19, UG (20) 13, **UJ8**s AH (49), AJ (42) 2, AV (7) 3, **UL7**s BG GH (13) 13, GW (5) 12, QJ RM (10) 8, **UM8**s AP (23) 3, AX 13, IE KAA (70) 10, **UN1**BJ (37), **UO5**KAA (46) 13-16, UPOL-15, **UP2**s KMU 13, PT 19, **UQ2**s KBC (22) 13, KFG (16) 16, UWs 9WB (40) 14, 0IF 23, 0HI (31) 13, 0IK (37) 11, 0IW 5, 0JK 0SC (35) 9, **VE8**s BB 19, MA, **VK**s 6WT (15) 15, 7FB 15, 9RH (90) 8, VO2AW 21, **VP**s 1VR (7), 2AZ (58) 15, 2GLE (86) 21, 2MD (32) 15, 2MK (60) 22, 2MX (68) 15, 6AK (95) 0, 6FD (50) 0, 6YF (23) 22, 7NT (14) 0, 8HJ 8IJ (60), 8IN (10) 22-23, 8IQ (52) 23-0, 8IY 0, 8JC 23, 8JD (14-27), 8JG (8) 21-10, 9BY (81) 0, 9EU (31) 0, VQs 8AW (60) 20, 8BJ 16, 8BP (22) 18, 9AR (44) 18-20, **VR**s 2FF (72) 10, 4CR (18) 8-12, VSs 5JC 9ARV (30) 8, 9ASP (30) 0, 9OS (50) 17, **VU2**s GW (24) 1, DIA (65) 14, JA (66) 2, JN (28) 18, LE (35) 13-14, RQ (10) 7, SV XO (17) 16, WA2DIJ/3V8 (65) 23, XEs 1CK (50) 6, 2SSL, YA3TNC (25) 17, YJ8BW (28) 11, YK1AA (20) 22, YN1s AA CW (30) 13, YO2BV (19) 18, YU5s CXY XAM (3) 18, YVs 3IY 4MC 22-23, ZB2AM (10) 22, ZC4GB (73) 19, ZDs 3G (25) 6, 5G (45) 20, 7IP (50) 20, 8BJ (26) 22, 8CX (76) 23, 8J (10) 23, 9BE (3) 23, ZEs 1AE (40) 20, 1CQ (75) 18, 2KL (10) 18, ZK1AR (69) 9-10, ZP5CF (109) 2, ZSs 3XG (20) 5, 3XQ 8L (80) 4, 3A2BM (1) 21, 3B1HK (30) 17, 4S7EC (38) 16, 4U1ITU (28) 18-19, 4X1s KL QA (30), 4Z4AG (29) 21, 5As 1TY 2TV (35) 22, 5H3KJ (65) 21, 5N2s AAF ABF (25) 18, 5R8AL, 5U7AK (55) 21, 5Z4JD (13) 20, 6O6BW (5) 18, 6W8s BF (5) 22, BL (56) 22, DD (50) 18, DQ 0-1, 6Y5JB (21) 19, 7Q7s EC LC (55) 17-18, 7Xs 2ARA (65) 18, 2ED (60) 15-16, ØAH 0, ØBB (35) 16, 7Z3AB (81) 19, 8R1P (30), 9G1FY (38) 22, 9H1AD (72) 20, 9J2s AB (62) 22, IE (55) 5, 9L1s JM (16) 0, TL (25) 20-22, 9Ms 2LO (4) 14-15, 8RS (30) 0, 9Q5s HD QC (15) 18, SS (50) 22, 9V1s LK (9) 15, MT (15) 16, MV (50) 14-15, NV (15) 15, 9X5SA 20, 9Y4s LC (64) 22, LJ (30) 23 and RA (40) 22.

20 phone is thoroughly tapped by Ws 2DY 4HOS 5KGJ 7VRO 8PKU 8YGR 9LNQ ØPAN/KH6, Ks 3FOP 5VTA 5WWC 9UCR, WAs 2LOR 5AER 8KEX, WBs 2RJJ 6RMIZ, s.w.l. Kilroy and VE1ASJ for such juice as CEs 3KW 3ZN (266) 3, 6EZ, CN8s AW (332) 20, BV 20, CS 21, CP8BB (282) 3, CRs 5SP (193) 20, 6FV 6EO (200) 18, 6GO 0, 6GZ 6HH 6II (224) 18, 6IB 6IK (205) 23, 7CO 7JA 21, 9AH (185) 13, CTIs IW (330) 1, PK, CXs 3BBD 9AAN (137) 23, 9PP (238) 23, DUs 1FII (130) 17, 7AL, EA8s AH (220) 12-13, CB 17, EU 16, FG, EI3AK 20, ELs 2AF (330) 23-0, 2O 3C 0-1, 8C (240) 22, EPs 2AX 2BQ (182) 14, 2BL (230) 13, 3AM 14, ET3USA (205) 23, F2CD/FC (150) 8, FB8s WW (140) 13-14, XX (140) 14-18, YY (190) 6, ZZ (140) 5, FG7s XF XL (140) 22-23, FH8CD (198) 14-15, FK8AC 7, FO8s AQ BS (198) 4, FS7RT (145) 13, FR7ZD (195) 3, FY7s YL 21, YM, GD3ENK 18, HCs 1AF 1BE (269) 23, 2MF 5, 8FG (110) 13, 8FN (191) 14, HIs 3RAP 3XEG 7XTM 21, 8LAL 13, 8XJG (268) 23, HKs 1AZF 4KL, HRs 1JAP 1JMF 5AY 8JG 6-7, off-limits HSs 1WF 4AK (113) 16, HV3SJ (206) 19, IS1VAZ 4, IT1STG 18, JA1AEA (124) 18, KØCZN/KP6 (217) 8, KA7AB (194) 23, KB6CZ (215) 5, KCs 4USC (254) 4, 4USL 4USM (230) 1-10, 4USN (330) 3, 4USX (314) 7, 6BW (240) 8, KGs 4AA 4AN 22-23, 6AAY (224) 17, 6AQE 15, 6IJ (234) 22, 6SB (230) 7, 6SF (215) 15, KL7EFO, KR6s DI 23, MB 23, KS6BT (222) 9, KV4s AA AM CK EY, KX6DB, LX1s BB WR, MP4s BCC (198) 13, BQS (245) 23, MAY (144) 13, TBO (163) 18, OAs ICD 4EU 8AE 8V (240) 12, OD5s FA 12, FC (147) 15, OH0NI 16, OXs 3AY 18-19, 3BX 21, 5AN (210), OY2H, PJ2s AQ MI (203) 13, PX1PA (115) 17, PZ1s BW (120) 20, CF, SM2BHX, SVs 1AE ØWL, TFs 2WJX 2WKG (240), 3EA (110) 19, TGs 8CJ 9EP (332) 22, 9RU (250), ØAA, TIs 2CAP 0, 2KZ 14, 8CAB, TN8AA 20, TR8AG (214) 22, TU2s BA 22, BB (122) 19, BD, TY3ATB, U5ARTEK 13, UAs 2KAW (215) 12, 2KBD (201) 8, 9YO (215) 12, UB5KAW, UD6BV (205) 4, UF6FA (246) 5, UG6SG (220) 13, UH8s AY BO (196) 4-13, UJ8s AC (212) 3, KAA 12, UL7AZ (121) 15, UM8FZ (194) 3, UQ2KFG, UR2AR, UW0AA, VEs 3FJZ/SU (140) 18, 6QQ/SU, 8MIA (223) 18, ØMY ØNC, VKs 2AIF/XV5 under ITU/FCC ban for W/K/VE/VOs (261) 12, 6KK 6RU (210) 0, 9AG 9BW 20, 9MK (215) 13, 9XI (103) 15, VO1FB, VPs 1LB 2AA 23, 2AC 2AZ (196) 23, 2DM 2GAI (202) 1, 2GR 2KI 5, 2KM 13, 2KR (330) 21, 2MII 2MW (146) 23, 2SJ 2SY (202) 23, 2VV (125) 17, 5AB (104) 23, 5HM 23, 5RB 1, 6AQ (330) 0-1, 6KH 21, 6KL 13, 6RV (154) 23, 6WR (190), 7CK 15, 8IE (198) 0, 8IK 0-1, 8IU (202) 2-3, 8JB (206) 4, 8JC 2, 9FX 9H, VQs 8AX 20-21, 9AR 20, 9EF 0, 9TC (192) 15, VR1C, VSs 5MII (192) 15, 6FS (153) 15, 9ABL 19-20, 9ALV (202) 20, 9ARV (106) 17, 9MB (122) 13, VU2s BC (205) 20, CK DKZ 15-16, FN (185) 13, JW KV, W0ICJ/KM6 2, WAs 8SDP/VP9 9PAE/VP9, WB6AXG/4X4 (188) 15, XEs 1AAN 1BJ 2EEN/m ØYCM, XW8s AX 14, BQ (208) 13, BS CE, YAs 1FV (220) 13, 1HD 17, 5RG (125) 13-17, YJ8BW (114) 9, YK1s AA (219) 15, AM (212) 14, YNs 1BKC 3KM ØBM (150) 7-8, YO2BB, YS1s ERE HUKE SKD 23, YUs 2CE 3LB, YVs 2IL 3KV 4AQ (154) 21, ZC4RM 14, ZDs 3F (105) 23, 3G (170) 19, 7IP 21, 7KH (230) 1-3, 7SD (203) 21, 8CH 20, 8CX 22, 8JES 20, 8SKI (200) 0, ZEs 1JT 21, 6JC (145) 18, ZF1GC (211) 22, ZK1AR (211) 5-6, ZL1AI of the Kermadecs (208) 7, ZPs 3AL (109) 20, 5CF (115) 20-21, ZSs 3HT 19-0, 8L 4, 9D (107) 5, 3As 2MJC 14, ØAE 14, 3C3FJZ/SU, banned 3W8D (120) 15, 4S7NE (195) 13, 4U1SU, 4W1G 16, 4X4s BL CW DK FQ 19-23, 5As 1TV 1TX 2TR (331) 19-20, 5H3KG 18, 5N2s AAF 6, AAW ABI, 5R8s AS (263) 5, BC, 5U7AL (193) 21, 5VZ8RQ 23, 5W1AZ 20, 5Z4s JW 21, PB (123) 18, 6O1s AU GB 19, 6W8s AX CD (199) 22, DX (192) 0, 6Y5s AK 15, BM 17, GG (157) 23, MJ 12, UC, 7Q7EC (240) 15, 7Xs 2MD 2, ØAH (194) 16,

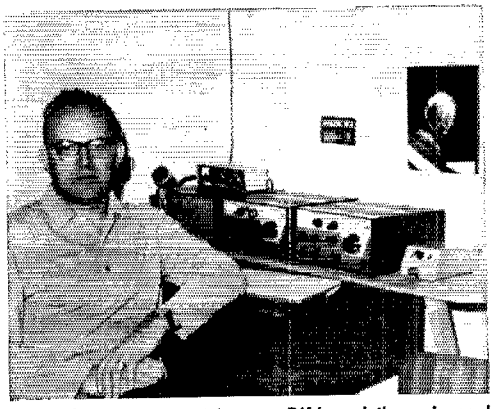


VP9BK provides our Shack of the Month, a neatly up-dated Bermudian outbuilding of ancient origin—coral, limestone and volcanic ash modernized with wall-to-wall carpeting and a tidy complement of DX gear. Colin is better known up our way as ARRL Vice-Director VE2BK. (Photo via W1VG)

7Z3AB (220) 14, 8R1s CG (138) 3, P (111) 23-0, 9E3USA 14, 9G1s DU 22, FF 17-18, JM 0, YG YJ (154) 22-23, 9H1s A AD (72) 20, AN (109) 17, 9J2AD (129) 18, 9L1s HX JW, 9M2s BO (115) 15, DQ (198) 1, GV (200) 13, LO (118) 15, PO (231) 13, 9N1BG (210) 12, 9Q5s CM (210) 0, HF SS, 9U5BB, 9V1NG 14-15, 9X5s CE 19, PB (106) 13-21, SA and 9Y4VT 0, all but a few using single-sideband. Got 'em all? On the wall?

—.-.-.—

If factors are favorable we'll document DX doings on other bands next month thanks to (15 c.w.) Ws 1BGD 1CNU 2ADP 3DPR 3HNK 7VCB 8PKU 8YGR 0CVZ, Ks 2QMF 3FKU 3FOP 5MHG/6 5VTA, WAs 2LOR 3DSD 6JDT 8GGN 8MCQ 8QJK 9MQI 9QBM 9QXT, WB2s RJJ UOO, WNs 1GTH 1HEC 2YOJ 6TIF 6TQS 6UUH 9SUU, 11ER; (15 phone) Ws 1 CNU 3HNK 7VRO 8PKU 8YGR 9LNQ, Ks 5VTA 5WWC 6QPG, WAs 2LOR 8GGN 8PKG 8QJK 9MQI 9QBM 9QXT, WB2s LBJ NGI WHB, W. Kilroy; (10 phone) Ws 1CNU 2LFL 7VCB 8YGR, K5s VTA 5WWC, WAs 2LOR 6HXW 8QJK 9MQI, tuners Kilroy and D. Smith; (10 c.w.) Ws 1CNU 1DGT 3DPR 7VCB, WA9MQI, WB6ITM, 11ER; (40 c.w.) Ws 1CNU 3DPR 3HNK 7VCB 8PKU 8YGR 9ZQT, Ks 2QMF 5VTA, WAs 2HLH 5IIS 6JDT 8MCQ 8RQQ 9QXT, WB2LBJ, WNs 1GTH 2YOJ 5RAI 8UIP; (40 phone) W7VCB, WA5IIS; (80 c.w.) Ws 1CNU 1SWX 3DPR 7VCB, K5VTA, WA2HLH, WNs 1GTH and 6TIF, plus reporters about to file. Doggone these great conditions — less time for the mail at "How's" outposts!



DJ1ZN/W2 is typical of that new DX breed, the reciprocal licensee, active in Fishkill, N. Y., since October. In addition to regular skeds with the homeland, Knut pitches into general DX chasing and enjoys participating in ARRL's lively series of operating activities. (Photo via W1YYM)

Where:

HEREABOUTS — "The OM got his Swan call, KS4CE," reports spouse K6QPG. "I'll be QSL manager, also for W6PEU/KS4, although some cards may have to go later via bureaus." .-.-.- "Despite repeated requests for 6Y5MJ log transcripts they have not been furnished since last summer," regrets K0TYO. "In view of this I am terminating my services as QSL manager for that station after acting in the capacity for over six years." Curt shipped a stack of unanswerable QSLs to 6Y5MJ, observing, "A manager can do nothing without the DX station's co-operation." .-.-.- W2ICO suggests that more U. S. operators indicate county locations on QSLs, but don't get this info confused with postal addresses .-.-.- REF secretary F9OE says the French bureau keeps receiving QSLs bound for FP8 vacationers. This would be okay except that REF can't be sure of forwarding addresses. You ex-FP8s are urged to claim your piles .-.-.- "I assumed QSL managerial duties for OX5AN effective February 14, 1967," notifies K1QGC. "All of Merle's Thule logs are on hand. Self-addressed stamped envelopes and Greenwich Mean Time will help me catch up on a 400-card backlog." .-.-.- "Sure hope everyone sends s.a.s.e.," says WB6ITM, QSL tender for KS4CC as of this March .-.-.- K9GZK helps with QSLs for VP7s NA and NP on an s.a.s.e.-only basis, as instructed by these stations in QSOs. Yet only two of every three petitioners follow instructions. QRM, perhaps? .-.-.- Instead of QSL "remarks" that a foreign op may be unable to comprehend, WB2UHY sketches clasped hands with his call on one, the DX station's call on the other. Seems to get the message through and bring home the bacon for Bob .-.-.- Your "QSLers of the Month," each nominated for particularly prompt production of pasteboards, include CR4BA, CT3AS, CX2CO, DJ3TU, DM3UEA, EA7GF, F9IF, Gs 2AOB 6YJ, GC8HT, GI3RXV, HP2JC, I1s GAD YJ, JA6CUX, KGs 4AM 6AAY, KH6s CH/KW6 IJ, KM6BI, KP4BBN, KS4CC, KV4AA, KZ5FX, OD5CA, OD5CA, OZ5CV, PJs 3CL 5BC, 8Ms 4MI 5CAK 7VX, VKs 2AGO 3AVK 3XM, VP7EE, ZC4MO, ZSs 1XR 5OV, 3C3FJZ/SU, 5U7AL, 6W8BF, 9H1AM, 9J2MM and 9Q5HJ, as well as QSL charges Ws 6UNP 9WHM, Ks 6UTO and 0DQI. The nominating committee: Ws 3DPR 4RLS 8PKU, K8GQG, WAs 2HIU 3DVO 8MCQ 8OKL 8QJK and 9MQI. Any likely candidates in your recent collection? .-.-.- *Halp!* W4DUQ seeks the QSL story on FM8BS, PX1OW, ZS8AL; K1NHR is foiled by FF4AL, MP4TAC, VP8s FF '61, GQ '63; K5CAO is troubled by ZD7IP; K9TZH still wonders about PX1HK '62, TU2AW '63, VP8GB '60, 9U5DM '62; and WA3DVO will settle for some YK1AA cheer. Ideers? .-.-.- W8PKU, WA8OKL, WBs 2RJJ 6TEE and D. Heil, 10990 SW 34th St., Miami, Fla., 33165 volunteer to perform as QSL aides to DX stations in bona-fide need of such service.

SOUTH AMERICA — "I've been receiving numerous QSLs for OA4U lately, many for operation in April '66," muses K5ABV. "I did operate OA4U in July, August and September, 1965, and can handle the station's QSLs for that period only. To confirm other contacts I suggest the OA4U *Callbook* address or Aptdo. 46, Huancayo, Peru." .-.-.- "HC1GK has been transferred to Lima where he now signs OA4YM," discloses K7DVK who, because of close liaison with friend Gerry, can help confirm OA4YM QSOs .-.-.- WA6MWG says HC5NW has promised logs twice monthly. "I should be able to give same-day service in answer to s.a.s.e.," thinks Pete .-.-.- K2KTK's QSL client YV5BTS keeps him busy with fine 75-meter phone fishin' .-.-.- W1s WPO and YYM of Hq. have it that WA2OJD, guest operator at PJ3CC on March 25th-28th, will confirm resultant Curacao contacts .-.-.- VERON's *DXpress* states that QSLs for W9WNV DXpeditionary QSOs after February will be handled by RCV's YV5BPJ. W4ECI has more than enough receipts to keep him busy for a spell.

EUROPE — QSOs with Cambridge U.'s March-April Isle of Man stomp as GDs 3VBL and 6UW will be confirmed via traditional bureau routes unless s.a.e. and IRC are supplied .-.-.- So far as HV3SJ QSLs go, WB6OOP stresses that he can confirm only those contacts made by visiting WA5GEW and WB6CFE on Dec. 17, 18 and 21, 1966 .-.-.- "There may be delay if cards are sent direct to my Crete address," warns SV0WFF, urging use of his K4FUV QTH or W4AM's ARRL Bureau branch .-.-.- S.a.s.e. will secure your UA6KAF/UF6 QSL from W4WHF. This was a November 24-28, 1966, foray by UW6BA and s.w.l. friend George .-.-.- "The March *QST* address for TF2WKE is essentially correct," agrees WA2FJW, "but there are uncertainties in mail delivery in his part of Iceland. S.a.s.e. to me will gain faster QSLs, for I usually have Bob's log transcript the day after contact." .-.-.- Interesting swap of services reported by DL7KX: DJ8UC handles QSLs for European QSOs with WB2FNT and DL7KX/W2, while WB2FNT takes on QSL chores for DJ8UC's contacts with North and Central America. DL7KX/W2 is K. Gueldenpfennig, Comm. Engr., 42-20 192nd St., Flushing, N. Y. .-.-.- "I've sent out 1600 QSLs with a return of only 300," bemoans DL4LA (K6SXX-WA0ISO). "Best QSlers are fellow GIs." .-.-.- K0HUU worries that his photo QSLs won't make it to U stations via the Moscow bureau. We've heard of such discrimination in the past, but definitions of ideological propaganda fluctuate. Why not play it safe with plain-as-possible QSLs?

ASIA — South Arabian Federation's independent status, due early next year, should shelve the VS9A prefix for all time, so VS9ASP & Co. are making an all-out effort "to give it as much circulation as possible during its last remaining months, a last fling, in fact. Unless advised to the contrary, QSLs will be via RSGB. Any stations requiring direct reply should state this during QSO and each should forward self-addressed envelope with one International Reply Coupon for surface mail, five IRCs for air return." .-.-.- OD5FC (SM5BFR) gives P.O. Box 1217, Beirut, Lebanon, as the RAL bureau address but he, OD5s EJ and EN desire their mail via the QTH in the list to follow .-.-.- K9TZH's QSL managerial responsibilities for HL9US started with December '66 QSOs .-.-.- "Anyone needing confirmation of operator Colin's VS9OSC contacts can get same by sending me s.a.s.e.," offers K2KTK .-.-.- You can QSL VU2s AO ARC BB BG BW GZ CG CPZ CX DZ DIA DOZ DX EN ER EV FC FRZ GBZ GO GS GV GW GX HYZ IK IVZ JR KC KLKY LA LC LD LE LH LR LS LX MG NE NS NY OK OM PE PN PQZ RM RQ RT RVZ SE SO TD TEZ TG TH TIZ TO TS TT TX TZ UNZ VE VIZ VI, VN VOZ WO WP XX YRZ and YZ via their club bureau, BARC, P.O. Box 53, Bangalore 1, India, according to VU2GV .-.-.- KA2LS takes over operation of the FEARL(M) QSL Bureau, Hq. 5th Air Force, Box C-89, APO, San Francisco, Calif., 96525, a revised address for Yanks in Japan. FEARL *News* states, "QSLs are automatically forwarded to FEARL members but nonmembers

VU2HGZ, one of India's leading medical doctor-scholars, enjoys DX hunting with 25 watts of phone and c.w. from Ahmedabad. He's a regional secretary of ARSI and has undertaken an ambitious campaign to bring more of India's professional people into amateur radio. (Photo via VU2CZ, ARSI)

must have large s.a.s.e. on file at the bureau to obtain their cards."

AFRICA — NARS 5N2 Bureau, P.O. Box 2873, Lagos, is the proper route for Nigeria-bound pasteboards, according to ARRL Assistant Secretary W1DYE . . . . . FB8WW's comely QSL aide, formerly K2MGE, now signs W4MYE at 10 Carjen Av., Asheville, N. C., 28804. Dorothy points out that logs for 1967 Crozet contacts will take plenty of time to arrive . . . . . Mauritius QSL chief VQ8AD complains via W6QFU, "Some time ago U. S. Project Mercury hams were VQ8s for a few days. Never did they drop me a line with instructions on where to forward QSLs that might arrive for them." How about claiming (and answering) those cards, space guys? Paul also tells Al that the 1965 VQ8CG was fictitious . . . . . W3DPR finds that would-be CR7IZ QSL helper K3HQJ has received no logs from Rutilio since 1964 . . . . . "I do QSL 100 per cent," declares 5U7AL (W4KIL), "although cards unaccompanied by s.a.s.e. are answered via bureaus, a four- to six-month trip in some cases." Fred is able to use U. S.-stamped s.a.e. because his QSLs are remailed via diplomatic pouch . . . . . "As of February 1, 1967, I am QSL manager for ZS5NZ's Stateside contacts," announces W2PPG, desirous of the customary s.a.s.e. courtesy . . . . . Unless otherwise advised, cards for K6KA's global tour should go to the home QTH . . . . . 9Q5FV (WA4CCW) has his old OQ5FV records . . . . . W6BBE has no connetion with "3V8AC."

OCEANIA — "I'll forward copies of my Lord Howe log to WA2RAU soon after leaving the island," promises VK2AVA. "Cards for the eager beavers should be handled by early June." . . . . . W7ZAS, kept busy by CR9AH QSL requests, also holds ZK1BS logs for QSOs from January, 1960, through December, '63. Larry's new address: 216 Fife Heights Dr. NE, Tacoma, Wash., 98422 . . . . . ARRL SCM KH6BZF tells ARRL's W1ZJE that VR1C (ZL2NS) will wrap up his Ellice QSLing from New Zealand shortly . . . . . VR2EK (W6ALM) wants QSLs to Fiji, not the home QTH, according to VERON's most informative *DXpress* . . . . . Individual specifications now, bearing in mind that each datum is necessarily neither "official", complete nor accurate:

AP2NMK, Ashar Shah, 164-B3 Pecha, Karachi, Pakistan
AP5NO (via DJ3KM)
CR3KD (via W2CTN)
CT2AN (via CT1IW)
DJs 6FN 0PX (via WB2JGO)
DJ8UC, DL7KX/W2 (see preceding text)
DL9YG (via WB2JGO)
EA8FE, A. Jimenez, Box 860, Las Palmas, Canary Islands
EL9A, Box 548, Monrovia, Liberia
EP2KW (via DL2NS)
FB8WW (via W4MYE; see preceding text)
FK8AT (via W2CTN)
FR7ZL/t, G. de la Rhodiere, Box 4, St. Clothilde, Reunion
G3ESP/LX (to G3ESP)
GB3PAS (via G3KPO)
GC3s POI/p SHZ/p (via W2CTN)
GC8HT (W/Ks via W6UNP)
GD3AIM (via W2CTN)
GD3VBL, C. Pedder, 107 Oak Ln., Preston, Lancs., England
GD6UW, % DOTM, Box 7388, Newark, N. J., 07107
GM5AFF (to W7NXJ)
ex-HG1GK (to OA4YM)
HC8FN (via WA2WUV)
HC9CA (to SM6CKU)
HI8NGH, Box 1215, Santo Domingo, D.R.
HL9US (via K9TZH; see preceding text)
HV3SJ (see preceding text)
I1AV/M1 (to I1AV)
I2FRC (via I1JT)
ex-KA2CM (to OX5BO)
KB6CZ (via K4MQG)
KG6SL (via W4FRO, P.O. Box 714, Eau Gallie, Fla., 32935)
KH6CH/KW6, Y. Arakaki, Box 365, Wake Is., 96930
KS4CC (via WB6ITM)
KS4CE-W6PEU/KS4 (via K6QPG)
KS6BZ, L. Rector, Dept. of Education, Pago Pago, Am. Samoa
KV4EY (W/K/VE/VOs via W3HNK)
KX6s DG DR DR/KC6, Box 997, RCA, APO, San Francisco, Calif., 96555
LAs 7QI 8D, P.O. Box 88, Sandnes, Norway (or via NRRL)
LX2KR (via WB2JGO)
OA4YM, G. Kangas, Aptdo. 1539, Lima, Peru
OA4U (see preceding text)
OD5s EJ EN FC, c/o L. M. Ericsson, Rue du Parlement, Beirut, Lebanon
OX5AN (via K1QGC)
OX5BO, C. Carter, Box 2189, 1983rd Comm. Sqdn., APO, New York, N. Y., 09023
PX1BX (to F5BX)
PZ1BW (via VE3EUU)
SV0WFF (to K4FUV)
TF2WKE (via WA2FJW)
TT8QQ (via W4DQS)
TU2BQ, B. Deumeland, B.P. 1617, Abidjan, I.C.R.
UA6KAF/UF6 (via W4WHF)
VK2AVA/p (via WA2RAU)
VK3AHI/VK9 (via VK3ACW)
VP8IE (via CX3BBD)
VR1C (to ZL2NS)
VS9OSC (see preceding text)
W0TUT/mm, S. Prewitt, R/V *J. E. Pillsbury*, Marine Lab., U. of Miami, 1 Rickenbacker Causeway, Miami 49, Fla.
WA0KXJ/mm (to WA0KXJ)
WB2IEG/LX (via WB2JGO)
XW8BW, Box 392, Vientiane, Laos
XW8CA, W. Bright, American School, APO, San Francisco Calif., 96352
YV3KX (via YV3KV)
YV5BTS (via K2KTK)
ZB2AY, 11 Old Naval Hospital, Gibraltar
ZD3H (via W2CTN)
ex-ZK1BS (via W7ZAS; see preceding text)
ZS1XX (via W2LFL)
ZS2MI (via ZS4OI)
ZS2PD, Box 1863, Port Elizabeth, So. Africa
ZS5NZ (W/Ks via W2PPG)
ZS5OV (via WA3DVO)
ZSs 8L 9B 9D (via W4BRE)
3V8AC (See preceding text)
6W8CD, *Yasme* Foundation, P.O. Box 2025, Castro Valley, Calif.
6Y5MJ (see preceding text)
7Q7LZ, Box 13, Msusu, Malawi
9G1YJ, Canadian High Commission, P.O. Box 1639, Accra, Ghana
9M2DQ, J. Pershouse, c/o Plantation Agencies Ltd., P.O. Box 706, Penang, Malaysia
9Q5BY, Box 305, Kinshasa, R. C.
9Q5FV (to WA4CCW)
9X5PB, Box 420, Kigali, Rwanda (or via DJ5DC)

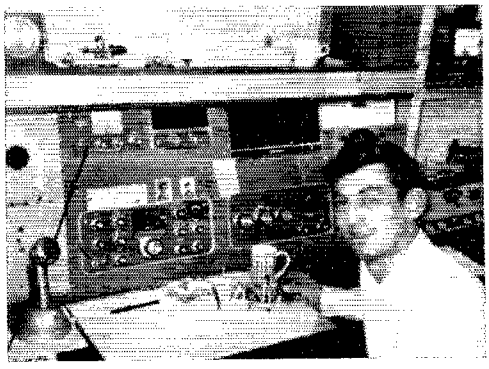
Your good providers are Ws 1CNU 1DTY 1DVE 1UED 1WPO 1YYM 2CHT 2JBL 3AEV 3DPR 3JZJ/9 8YGR, K5VTA, WA2LOR, WBs 2RJJ 6RMZ, LA7QI, SM5BFR, D. Smith, DARC's *DX-MB* (DLs 1EP 3RK), DX Club of Puerto Rico *DXer* (KP4RK), Far East Auxiliary Radio League *News* (KA2LL), Florida DX Club *DX Report* (W4BRB), International Short Wave League *Monitor* (A. Miller, 62 Warward Ln., Selly Oak, Birmingham 29, England), Japan DX Radio Club *Bulletin* (JA1DM), Long Island DX Association *DX Bulletin* (WA2EFN), Newark News Radio Club *Bulletin* (L. Waite, 39 Hannum St., Ballston Spa, N. Y.), North Eastern DX Association *DX Bulletin* (K1IMP), Northern California DX Club *DXer* (Box 608, Menlo Park, Calif., 94025) and VERON's *DXpress* (PAØs FX LOU TO VDV WWP). The parenthesized data indicate the editors or other responsible sources of information should you be inclined to inquire about terms of subscription or membership in the clubs or groups specified. Come again!

Whence:

EUROPE — The 1966 Helvetia-22 DX Contest, sponsored by Switzerland's USKA, saw W1TX, WB2CKS, W3QQL, K4BYN, Ws 5WZQ 7LVI 8VSK, VEs 1AE 2AFC and VO1AW pace reporting call areas on our side. In order of score, U.S. entries came out W1TX, K4BYN, WB2CKS,

Ws 8VSK 5WZQ 2QKJ 1HOS 1DYE 1BHV, WA2DIG, W8NAN, K4BAI, Ws 2ZV 3QQL 3UVH 1AYK 2NFP 1WY, WA2UWA, Ws 7LV1 2HAE and 3CBF. VO1AW, VEs 1AE and 2AFC ran 1-2-3 for Canada. Continental highs were registered by W1TX, YV5ACP, CN8FF, VK2PV, UA9MR and DL1CF. Non-W/K/VE/VO rankings outside Europe: HI8XAL, YV5ACP, CN8FF, KP4CKX, CR6DX, VK2PV, LU7AS, UD6AM, CR7IZ, UD6BZ, VK3RJ, PY7AKQ, UA9MR, VK5MQ, UA9ES, ZK4KF, UA9KCA, UW9s PT OU, UH8BO, CR6JA, UL7RN, VK3s AXK APJ, UA9CC, UL7RR, UI8A, UW9WB, HP1AC, UA9HM, UH8DP, UD6BW and UH8DH. European leaders per country include DL1CF, DM2BFM, F3RG, G3PUW, GW3MRI, I1VIB, LA7H, OE3AX, OH3TH, OK1AEZ, OZ2NU, PA0PN, SM5BNX, SP6TQ, UA4KKC, UB5SP, UC2BZ, UP2KNP, UR2GX, YO8MH and YU3BDE. These data via HB9SR — don't delay filing your 1967 H-22 Test results for last month, lads . . . . . As detailed in April's "How's," the annual Russian International Telegraphic Contest comes off on the 6th-7th of this month. Your set all set? . . . . . W1DGT ran into OK5RAR on 10 who explained his unusual label by claiming to be the official station of the Czech *Amateur Radio Journal* . . . . . WB4ACY, 19, now has a close DX friend in 20-year-old OH5VY via 15 meters . . . . . OTTER, who grew up in the wide open DX spaces of the early 1920s, remarks, "At present all bands are congested. Only during week days is it possible to rag-chew with old friends like Ws 2HL 3DKT 3EIS 4KJL and 9GIL. Why so much 'CQ DX' and RST-CUL? That is not the true friendship spirit of ham radio." Mario's new KWM-1 does its best to work over the hills surrounding Milan but the 11ER location gets noisier and noisier . . . . . "I'll be on Crete for at least another year," soothes SV0WFF (K4FUV), "with 4-CX250-Bs and ground-planes on 10, 15 and 20 meters." . . . . . DL4LA reports more than 2000 QSOs with 110 countries on less than 100 watts to indoor antennas. Jim signs K6SXX or WA0ISO back home . . . . . Continental clippings courtesy club literature: G3AIM permanently becomes GD3AIM, preferring 21,045-kc. c.w. around 1500 GMT. . . . G3UPK takes an 1828-kc. turn as ZB2AY occasionally. . . . G3s ESP HCX and US signed G3ESP/LX in a multimode March maneuver. . . . W5LSX/LA is mentioned as a fresh Norwegian variety on 14,260 kc., 1700 GMT, and is former DL5IN. . . . Clipperton, Malpelo, Revillagigedo, Willis, British Phoenix, Rio de Oro, Heard, Aves, Pitcairn, Navassa, Marcus, Kure, Laccadives, Juan Fernandez, Easter, Spanish Guinea, South Georgia, Rodriguez, Tonga, Albania and Niue are, in that order, very desirable countries among DARC's *DX-MB* subscribers.

OCEANIA — If all goes well VK2s AVA and EX should be nearing Lord Howe isle as you read this. Arie comments, "Operations will be on 10 through 80 meters, mainly s.s.b. with some c.w., never transceive, with listening frequencies announced during operation." Weather permitting, it's May 5th-15th. Then VK2AVA plans to hit Montreal and New England in early July . . . . . KX6DR vacationed on Ponape in February, chumming with KC6s BW and JC, and KX6DR/KC6 QSOs ensued. Bob also signs KX6DC once in a while . . . . . ZL2AFZ, with some of the sharpest ears in Oceania, made it all

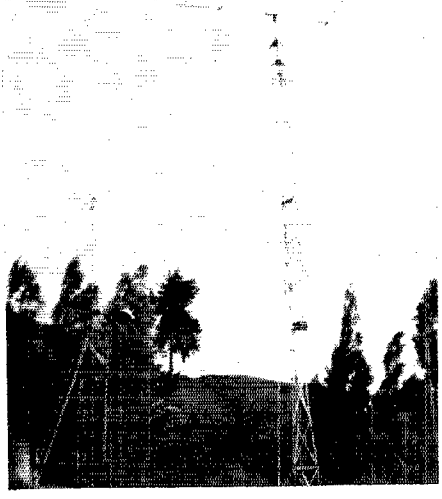


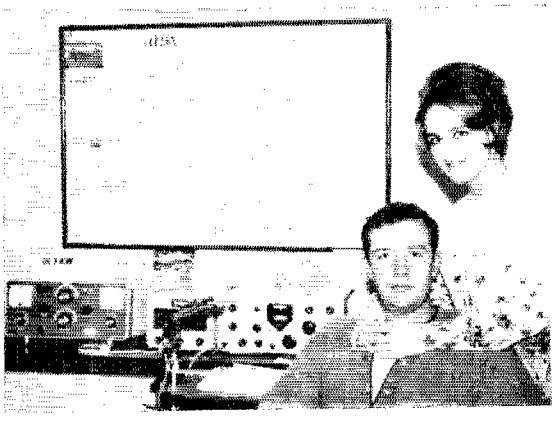
KL7FKO finds his c.w. and sideband in much demand from our rarest State. Al has shipped out some 6000 QSLs after less than two years at Anchorage. XYL WL7FQV ably assists. (Photo via W1BDI)

continents for W2ICO's 35-watt Navigator. "Took me 108 countries to WAC," chuckles Jim? "QRP DX work is great fun, especially when one is retired and has the time to stick with it. Five hours in the first c.w. half of this year's ARRL Test produced 33 fast countries on 14 and 21 Mc. through the kilowatt pack, the best being VQ9AR." Dig that indoor dipole! . . . . . "I'll be QRT by May 18th," warns KB6CZ. "There should be one or two new Canton stations in the near future. Meanwhile watch for me near 28,600 kc. at 2200 GMT, Sundays, and 14,225 kc. at 0400, week days." . . . . . KH6BZF calls attention to the Hawaii DX & W/K/VE/VO QSO Party slotted for 0001 GMT, May 13th, to 2400 the 14th. "Special certificates for country leaders and other top scorers are planned." Check your KH6 rhombic, OM . . . . . Oceannegans via club news sleuths: KØCZN/KP6 expects to be back on Palmyra for a spell after a Fanning VR3C look-see on scientific assignment. . . . K6CAA hopes to greet the DX elite from Rota, Saipan, Palmyra, Gilberts, British Phoenix, Line isles, Tonga, Cook, Manihiki, Tokelaus and Western Samoa on a venture commencing next month. . . . ZL1AI anticipates trading Kermadecs status for the Gilberts soon. . . . CR8AH stays deliciously rare on 15 a.m.

AFRICA — Niger notes courtesy 5U7AL: "I usually work 14,190-14,200, 21,275-21,300 and 3775-3800 kc., s.s.b. or c.w. Haven't used my new 10-meter antenna yet. Other actives here are 5U7s AC and AK. Also licensed but inactive are 5U7s AH and YL. I have tickets pending for XT-land, Tchad and Dahomey. Being with the State Department I may be found anywhere in Africa as duty calls." . . . . . 9Q5FV leaves Luluabourg for WA4CCW by the end of this month . . . . . "I'm with the Peace Corps in Botswana," writes K7GTC. "Should be here through next year, so I've applied for my Z8 license. Botswana's five or six hams are not very active. Nearest a.c. source, 220

(*Continued on page 144*)





HC5NW is comfortably situated in Cuenca with quads for 10 and 15, a Yagi for 20, and a KWM-1 pumping a kilowatt linear. Gus and Zonia keep company with a flock of friends world wide. (Photos via WA6MWG)

Operating News

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Training Aids: GERALD PINARD
Public Service: WILLIAM A. OWEN, W4YAU

Identification. One thing many of us take a great deal of liberty with on the air is the procedure for proper identification of our transmissions. Note that we say our *transmissions*, not just stations. Identification consists of sending the call of the station being called or being communicated with, *or other appropriate purpose of the transmission*, followed by the call of the station transmitting. Proper identification, in the eyes of FCC, does not consist of sending only the transmitting station's call. This might be OK for BC stations, but amateurs must indicate what they are doing as well as who they are.

Thus, the sending of one's call alone is citable by FCC as *improper identification*. A great deal of this goes on during DX operations, and especially in the ARRL DX contest. Most get away with it. In the recent contest, however, some did not. Most drivers get away with occasionally violating speed limits, too, but this is no reason why speed limits should be abolished, or why offenders should not be punished.

We are not talking, above, about disqualifications. This is another subject entirely. *No one* is automatically disqualified from the DX or any other contest. Each case is reviewed by the rules committee that advises the Communications Manager on such matters. As of this moment, no decisions have been made. All we are saying is that the so-called practice of "tail ending" *is* a violation of FCC regulations and any amateur who can read should know it. The fact that "everybody does it" does not make it any less so.

Your Club Bulletin. The number of bulletins received each day in the headquarters mail is great. We have no data (for which you'll be thankful) on this, but offhand we'd estimate about 15 or 20 a day. There are different kinds of bulletins, but the majority are club papers. If we read thoroughly and digested every bulletin and other piece of mail received, our entire day would be taken up just reading, and we'd still have some to do. In other words, while it may be a pleasant way to spend the time, it just isn't possible.

But we want to stay on your mailing lists. Each bulletin will be scanned and "juicy" items extracted, photostated or briefed. These items, properly identified as to bulletin and date, will be kept in a cumulative file and used as source material for the annual ARRL Affiliated Club Bulletin. We hope in this was to be able to "skim the cream" of material as it crosses our desks.

Old bulletins? Golly, we wish it were possible to keep a file of all old club bulletins, but this is out of the question. We keep them on file for one year, then they are discarded. But we hope *you* keep a file of old bulletins, even if only for historical purposes. It makes for some mighty interesting reading in years to come.

Field Day. How are your plans coming along for Field Day? Time is growing short, you know. It will be late April or early May when you read this, leaving only a couple of months to go, at the

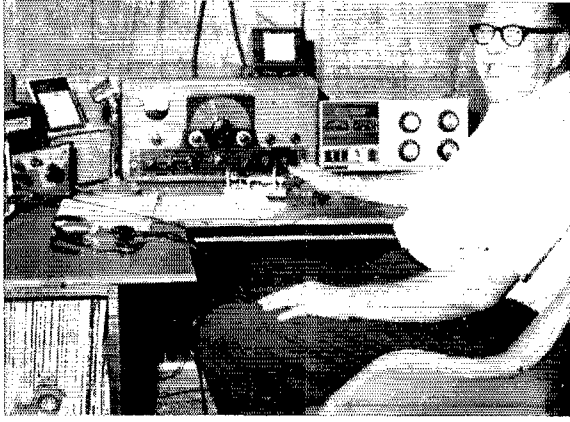
OPERATING EVENTS (*Dates in GMT*)

ARRL-IARU Societies-SCM-Affiliated-Club-Operating Events

May	June	JULY
4 **Qualifying Run, W6OWP**	10-11 **V.H.F. QSO Party**	6 **Qualifying Run, W6OWP**
6-7 Russian Contest, p. 82, April *QST*.	10-12 New York State QSO Party (next issue)	12 **Qualifying Run, W1AW**
6-8 **LO Party** (League Officials, *only*).	11-12 Nebraska Centennial QSO Party (next issue)	8-10 **CD Party (c.w.)*.**
12 **Qualifying Run, W1AW.**	13 **Qualifying Run, W1AW**	15-17 **CD Party (phone)*.**
13 **FMT** (ARRL Official Observers, *only*).	16 **Qualifying Run, W6OWP**	* League Officials and Communications Dept. Appointees, *only*.
13-14 Hawaii QSO Party, p. 132, March *QST*. Georgia QSO Party, p. 124, this issue.	24-25 **Field Day**	
20 Armed Forces Day, p. 60, this issue.		

Meet Your SCMs

Maryland-D. C. SCM Carl E. Andersen, **K3JYZ,** has an interest in amateur radio dating back to 1938. He has previously held the call K6BCG and plans some day to return to San Diego. In addition to the post of SCM, Andy holds Asst. Dir., ORS and RM appointments and he has earned the BPL Medallion, WAS, WAS RCC and Public Service Awards. He is a past president of the Potomac Valley Radio Club, charter member and past president of the South Bay Amateur Radio Society of Chula Vista, California and a charter member and president of the Maydale Amateur Radio Club, *and* is an avid contester active in the DX Competitions, SS, CD Parties, etc.



outside. Better get on it.

You will remember that last year we had a 500-point bonus for two-out-of-three extra "spirit of FD" activities, namely: (1) the customary message origination, (2) publicity, or (3) complete independence of commercial power. As it worked out, all but those groups who were in places without any commercial power took the first two alternatives to get the point bonus. This was not unexpected, if one stops to think about it, but a little disappointing. If Field Day is to be an emergency-preparedness activity, it seems we should prepare to get along *completely* without commercial power, whereas most FD groups use it for lights, keyers, cooking, refrigeration, television and everything else except powering the receivers and transmitters. What does it prove?

Personally, we have always thought of Field Day as being somewhat along the lines applied by the name — a setup out in a pasture or mead-

DX CENTURY CLUB AWARDS

From February 1, through February 28, 1967, DXCC Certificates based on contacts with 100-or-more countries have been issued by the ARRL Communications Department to the Amateurs listed below.

New Members

HK3AFB...238	G3OXI.....120	K1UHY....190	HA3MB....104	W4WWG...102	KØBHT.....100
K4AQQ.....169	K2QOU.....120	YU3CDE...109	K9DJQ.....104	W5JTB.....102	LU1AD.....100
VE3ZN.....169	VE7JF.....118	CE6EZ.....108	DM2CDO...103	WA9LGC...102	VQ9BC.....100
DJ4SS.....160	DJ7YR.....116	KL7FMM..107	WB2PCF...103	DM4WPL..101	WA1DJG...100
DJ5DU.....152	W2FYS.....113	OK1WV....107	WØSEA.....103	K9IHG.....101	WA2YYJ...100
WA4IRR...142	EI4AN.....111	OH3MF....106	HA5FE.....102	W3CAU....101	WA6YMX...100
JA1BJS.....140	W7QYA.....111	W2EBW....106	HA7PG.....102	HB9PQ.....100	WA9LMY..100
OK3KAS...132	DJ7GJ.....110	W6EZL.....106	K4DGL.....102	K7AGJ.....100	WA9ITB....100
DM3ZBM..120	WA8SNM...110	LZ1KAA....105	LA4VG.....102	K7INQ.....100	

Radiotelephone

VE3ZN.....168	DJ4SS.....135	WA8SNM...110	CE6EZ.....105	KP4COX...102	CP5AD.....100
K4AQQ.....158	VE7JF.....113	EI4AN.....109	VE6PL.....104	WB2KTO...102	DL9XR.....100
ZS2FA.....147	W7AS.....113	WA1BQS...108	DJ9MW....102	WØPVZ.....102	K2HLK.....100
WA4IRR...140	PY2DYI....110	W9MZP....106			

Endorsements

Endorsements issued for confirmations submitted from February 1 through February 28, 1967 are listed below. Endorsement listings through the 300 level are given in increments of 20, above the 300 level they are given in increments of 10. The totals shown do not necessarily represent the exact credits given but only that the participant has reached the endorsement group indicated.

340	**310**	W4JDR	**220**	**200**	**180**	**160**	W4ZSH	SP8SR	WA6OIU
W4ML	W5VSQ		K3FGO	DJ2MN	K4THA	JA2TH	W7TLG	K8UDJ	W7YEX
WØDU	W6SQP	**280**	K4IIF	K4AUL	OZ9N	K5SSZ	W8QBG	VE5JS	WA8RWU
	W8CUT	DJ4TZ	K6ALH	LA1H	PY5ASN	OE1ZL	WØNWX	W1COI	
330		W4EEO	WA5CBE	OZ5DX	WA2FQG	VE3FKL	ZU2NEG	WA2UBC	**120**
W2HO	**300**		WA6GFY	W1EOA	WA2MNQ	VE8BB		WB2UKP	DL5JJ
W2RGV	JA2JW	**260**	W6OMR	W4GYP	W4BRE	W1QUS	**140**	W3HNK	W2COT
W5EGK	WAZDIG	HPP	SP9ADU	W4ID	WB6EED	WA2ZKO	DL9PR	WA4-	W8CRI
	330			WA4QBX	ZL1QW	WB2GHI	OE3SJW	HHW	W9ZEN
330	W3DJZ	**240**							YU2NFJ
WØJYW	W4FPS	DJ5DA							

Radiotelephone

320	**300**	**280**	**220**	**200**	**180**	**160**	**140**	**120**	WB2CGW
W2RGV	W2CKY	W3DJZ	HPP	DJ4TZ	WA5DAJ	K4IIF	VE3FKL	DL6JJ	WB2WOU
	W9JYJ	W8CUT	W3AEV	JA2JW	HP1JC	W4BRE	WA6OIU	K8VCB	WA8LSO
			WØCPM			W4FRO		VP7NH	
						W6ISQ			

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for Feb. Traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
K6BPI	4911	1789	1611	178	8889
W3CUL/4	303	2763	2879	16	5961
W1PEX	40	1060	981	40	2121
WØLGG	15	1030	930	14	2019
KØONK	121	957	918	15	2011
W8UPH	11	883	810	69	1773
K6EPT	11	788	742	46	1587
W7BA	13	703	640	60	1416
W5OBD	32	611	611	0	1254
K5TEY	26	882	334	6	1248
W6GYH	46	514	508	5	1073
WA4DXJ	199	350	371	115	1035
W7HMA	24	418	412	3	857
K6IOV	10	444	388	0	842
WA2UZK	16	403	378	18	815
K3MYS	14	401	362	12	789
W7ZIW	23	380	375	5	783
W3EML	36	424	315	1	776
W9MM	4	382	356	26	768
WØZWL	1	482	4	271	758
W4RUW	5	372	363	9	749
WB4AIW	6	369	357	12	744
WA4SCK	40	336	335	8	719
WB6BBO	54	353	296	12	715
W6RSY	87	317	254	56	714
K7TCV	19	342	302	40	703
WA4LJH	3	347	346	1	697
K4VFY	43	321	316	5	685
K9IVG	7	406	266	5	684
WA4WWT	25	328	324	1	678
WA4DYL	19	369	200	26	614
W8ZGT	9	283	278	5	575
WA9CCP	400	109	45	14	568
W6WPF	195	184	78	106	563
WØLCX	25	257	245	12	539
W1EFW	36	283	209	7	535
W6EOT	0	266	265	0	531
WA7DXI	35	267	217	6	525
WAØEPX	25	250	193	53	521
WA3EEQ	38	243	211	28	520
W4FX	5	259	244	4	512
WB6QXY	28	242	241	1	512
WA9CNV	3	256	230	23	512
WA9SEO	27	231	225	20	503

More-Than-One-Operator Station

W4DUG/4	3625	0	0	0	3625

BPL for 100 or more *originations-plus deliveries*

K7LDZ 319	WA3ATQ 127	WA6OQM 105
W6DSC 260	W3TN 114	W9CGC 105
WA4BMC 241	WA9QKP 113	W8NAL 104
K4CG 208	W4ILE 111	W6LNZ 102
WB2WWH 190	WA4NEV 110	W9EET 102
W8IV 187	WB4CIY 107	Late Report:
K4HJX 146	WB2UQJ 106	K1PNB (Jan) 128
K1PNB 136	K4TRT 106	W8IV (Jan) 120

More-Than-One-Operator Station

WØZLN 164	WØEEE 121	Late Report: KG6ALV (Jan) 231

BPL medallions (see Aug. 1954, p. 54) have been awarded to the following amateurs since last month's listing WA4VUE, WA5NTI, W6YBV, WA8PII, WAØGHZ, KØRPH.

ow, somewhere, in tents, at the mercy of the blazing sun or the wind and driving rain as the case may be, run by one or more putt-putts. Of recent years, however, field days are held in permanently-erected shelters, complete with hot and cold running water and modern bathrooms and cooking facilities and refrigerators to keep the beer cold and soft bunks to sleep in. It's an activity, all right, and a means to get out in an unaccustomed place with the boys and get dirty and sweaty and sunburned and grow a beard — but usually it's a long way from simulating the kind of conditions you would meet in an emergency operation.

The dream of many a 160-meter fan is achieving WAS Not more than a handful have so qualified since the end of WW-II. Apparently the very first of the 50-state 160-meter WAS Awards has been earned by **WØGDH**, 5 years in the making! (John says please note that the rig at the right hasn't been used for six years!)

So in this year's FD we are giving a little more emphasis to the emergency power bit by offering a 200-point bonus for having *no* commercial power *at all*. Everything you do is run off the generator or batteries. We realize 200 points isn't a heck of a lot, but it's a start. Even if you don't think it's worth the suffering, how about accepting the challenge? Pull that main power switch at your FD location, wherever it is, and get an idea what you'd be faced with in a real emergency. — *W1NJM*.

Briefs

The March report of last November's SS brought to light a few discrepancies which we would like to correct as follows: The c.w. Kentucky score of W4CVI should be shown as 65,800; and we inadvertently omitted the phone tally of Connecticut's WA1FGN which should read 11,934-118-34-A-12.

SUGGESTED OPERATING FREQUENCIES

RTTY 3620, 7040, 14,090, 21,090 kc.
WIDE-BAND F.M. 52.525 146.94 Mc.

GMT CONVERSION

To convert to local times subtract the following hours:

ADST -3, AST -4, EDST -4, EST -5, CDST -5, CST -6, MDST -6, MST -7, PDST -7, PST -8, Hawaiian -10, Central Alaska -10.

A convenient GMT conversion card is available, free of charge, from the ARRL Communications Department, 225 Main St., Newington, Conn. 06111.

C. D. ARTICLE CONTEST

A Communications Department article contest, a continuation of the very successful *QST* Article Contest during the 1964 anniversary year, needs your best ideas (in 800-1200 words) relating to League organization, clubs, training exercises, and operating techniques. Periodically, the best articles submitted for the "CD Contest" will be chosen to appear, with the winner electing to receive (a) a bound 1967 *Handbook* or (b) a *QST* binder, League emblem and the ARRL DX map. Our winner this month is Kurt T. Meyers,* W3DPR/W8IBX, and his article appears on the facing page.

WILL YOU TEACH A RADIO CLASS?

Kurt T. Meyers,* W3DPR/W8IBX

MANY of us are indebted to those who have served as instructors in code and theory for giving us our start in amateur radio. However, I suspect that a very small portion of all instruction as experienced by budding radio amateurs takes place in the classroom situation under a formal program of instruction. The major portion occurs in the day-to-day exchange among radio amateurs. Every amateur meets opportunities for instruction. There are the times when the embryo Novice comes around with a problem, for example. But in many instances these teaching opportunities are not recognized and as a consequence fail to materialize.

Suppose the budding Novice asks to bring his new homebrew transmitter over. It does not work. Several responses are possible. First, the amateur consulted can refuse on the grounds that he is too busy or does not wish to be bothered. Perhaps he will make a referral to another amateur in the area. Secondly, the amateur can tell the Novice to bring his transmitter over and leave it for a few days so that he will work on it in his spare time. Third, the amateur may invite the Novice to bring over the transmitter. Then he will lead the way to his elaborate work bench where he will begin to appraise the situation, while the Novice stands gaping at the vast collection of parts, tools, and test instruments which the amateur employs in checking over the transmitter. It should be said at this point that possibilities two and three can be considered within the spirit of amateur radio. But there are still other approaches which can be taken. Fourth, the amateur can take the novice to the work bench, discuss fully with him what he has already done and what other steps should have been taken. He can talk over everything he does so that the Novice can learn something from this experience, and not merely be impressed with the knowledge and skill of the amateur whom he has consulted. When the transmitter is put into operating order, the Novice should understand where he slipped up, or what he did not carry through to its conclusion, and so on. Fifth, if factors will permit, the amateur can take the Novice to his work bench. After discussing the problem, he can guide the novice in making his own further checks so that he himself can learn by doing his own work on the transmitter. The point to be made should be obvious. In situations four and five, the work bench has become the classroom, and the well meaning amateur has not simply repaired the set and given it back to the novice. Rather he has become a teacher of the Novice.

Of course these opportunities do not occur only in the workshop. The chances are good that the Novice will ask the same amateur to come over and look at his new shack. This will allow for some hints and suggestions properly presented. Maybe he will also request assistance in stringing up the antenna. It is likely that the Novice will have selected his antenna according to the physical layout of his property. His dimensions will be figured from formulas available. Maybe it will be helpful and not overly complicated for the newcomer if the amateur will mention factors such as standing waves, impedance, current points, voltage points, radiation patterns, and so on. In this instance, the back yard can become the classroom.

Finally the Novice is on the air. It is probably not new to speak of the Novice bands as the untended nurseries of amateur radio. Certainly a real challenge is presented to the Novice when he arrives on the air, since he must cope with his own lack of confidence and his own unpolished operating technique while trying to establish contact with others who are in exactly the same position. Is it any wonder that many Novices, once a higher grade license has been attained, will never again touch a telegraph key? It is somewhat refreshing for the seasoned General or Extra-Class operator who will pay an occasional visit to the Novice bands. He may be surprised when his first Novice contact says, "You are my first general .__ .__ .__" In so doing, the more experienced operator gives the novice a welcome boost by sending clean, well spaced, even c.w., and by demonstrating proper operating procedure. After warming up, the General Class operator can do a little DXing. Say the frequency is 7.1 or 3.7 Mc. If he is on the east coast, he can listen through the QRM for the faint CQ of a WN6 or a WN7. With his advanced receiver and operating skill, he can pull in these signals with clear reception. With a transmitter capable of several hundred watts input, his signal will have the added punch necessary to reach the Novice's receiver on the west coast. Once contact is made, he will sense the excitement as he hears, "You are my first W2 .__ .__ .__" Many Novices will be encouraged by the thrill of such an experience. As a Novice, I recall my first trans-oceanic QSO, a 21 Mc. exchange with F3MS. F3MS, G3IDG, and others should be applauded for their work with WN stations on 21 Mc. Thus the Novice bands can become an effective classroom.

Traffic men are always looking for new, young blood to help keep the ranks full. Many sections have organized Slow Speed Nets which meet thirty minutes prior to the regular Section Net, so that the newcomers can train for participation in the regular Section Net. However these slow nets, like the Novice bands, can become untended nurseries, if they are not watched carefully. W4MLE speaks a true word in the new *Operating Manual* when he says concerning slow nets that "the Net Control Station operators are (or should be) experienced traffic men who provide training by setting a good example." (p. 74) Not only should the NCS be experienced, but other capable traffic men should check into the net to offer examples in the actual formulation and transmission of messages, at the reduced pace of the slow net. The Slow Speed Net is a classroom of the air.

Further examples could be provided to demonstrate the many ways in which every amateur can become a teacher. The active amateur, concerned for the future of amateur radio and those who may aspire to enter its ranks should keep these ideas in mind the next time someone asks, "Will you teach a radio class?" Teach a class? Maybe not. But this should not overrule the many opportunities for individual instruction which occur ever so frequently in the normal routine of radio activity.

* 5702 Edmondson Ave., Baltimore, Md. 21228.

W1AW SCHEDULE, MAY 1967

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.–2:30 A.M. EDST and Sunday 3 P.M.–10:30 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. The station will be closed Memorial Day, May 30.

GMT*	*Sunday*	*Monday*	*Tuesday*	*Wednesday*	*Thursday*	*Friday*	*Saturday*
0000	.....	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]
0020–0100[4]	.....	.....	3.555[6]	14.1	14.1	7.08[6]	14.1
0100	.....	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]
0105–0130[4]	.....	145.6	3.945	145.6	50.7	1.82	21.41
0130	**Code Practice Daily[1] 15-35 w.p.m. TThSat., 5-25 w.p.m. MWFSun.**						
0230–0300[4]	.....	.....	3.555	7.08	1.805	7.08	3.555
0300	RTTY-OBS[3]	.....	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]	RTTY-OBS[3]
0310–0330[4]	.....	.....	3.625	14.095	3.625	14.095	3.625
0330	Phone-OBS[2]	.....	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]	Phone-OBS[2]
0335–0400[4]	.....	.....	7.255	3.945	7.255	3.945	7.255
0400	CW-OBS[1]	.....	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]	CW-OBS[1]
0420–0500[4]	.....	.....	3.555[6]	7.08	3.945	7.08[6]	3.555
1700–1800	.....	21/28[5]	21/28[5]	21/28[5]	21/28[5]	21/28[5]	.....
1900–2000	.....	14.28	7.255	14.28	7.255	14.28	.....
2000–2100	.....	14.1	14.28	14.095	21/28[5]	7.08	.....
2200–2300	.....	21/28[5]	21.075[6]	RTTY-OBS[3,7]	7.255	14.28	.....
2330	**Code Practice Daily 10, 13 and 15 w.p.m.**						

[1] CW, OBS (bulletins, 18 w.p.m.) and code practice on 1.805, 3.555, 7.08, 14.1, 21.075, 50.7 and 145.6 Mc.
[2] Phone OBS (bulletins) on 1.82, 3.945, 7.255, 14.28, 21.41, 50.7 and 145.6 Mc.
[3] RTTY OBS (bulletins) on 3.625, 7.045, 14.095 and 21.095 Mc. 170/850 cycle shift optional in RTTY general operation.
[4] Starting time approximate. Operating period follows conclusion of bulletin or code practice.
[5] Operation will be on one of the following frequencies: 21.075, 21.1, 21.41, 28.08 or 28.7 Mc.
[6] W1AW will listen in the novice segments for Novices on band indicated before looking for other contacts.
[7] Bulletin sent with 170-cycle shift, repeated with 850-cycle shift.

Maintenance Staff: W1QIS W1WPR W1NPG. *All times/days in GMT, general operating frequencies are approximate.

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made May 12 at 0130 GMT. Identical texts will be sent simultaneously by transmitters on c.w. listed frequencies. The next qualifying run from W6OWP only will be transmitted May 4 at 0400 Greenwich Mean Time on 3590 and 7129 kc. *CAUTION!* Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0130 GMT May 12 becomes 2130 EDST May 11.

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

Code practice is sent daily by W1AW at 2330 and 0130 GMT, simultaneously on all listed c.w. frequencies. At 0130 GMT Tuesday, Thursday and Saturday, speeds are 15 20 25 30 and 35 w.p.m.; on Monday, Wednesday, Friday and Sundays, speeds are 5 7½ 10 13 20 and 25 w.p.m. For practice purposes, the order of words in each line may be reversed during the 5 through 13 w.p.m. tests At 2330 GMT daily, speeds are 10 13 and 15 w.p.m The 0130-0220 GMT runs are omitted four times each year, on designated nights when Frequency Measuring Tests are made in this period. To permit improving your fist by sending *in step with W1AW* (but not on the air!) and to allow checking strict accuracy of your copy on certain tapes note the GMT dates and texts to be sent in the 0130-0220 GMT practice on those dates:

Date	Subject of Practice Text March *QST*.
May 1:	*It Seems to Us*, p. 9
May 9:	*Six-Meter Kilowatt . .* , p. 11
May 17:	*Are You Putting Out On The Correct Band* , p. 25
May 18:	*Ninety Feet for One Hundred Dollars**, p. 28
May 22:	*A Four-Band Rotatable Dipole**. p. 35
Date	Subject of Practice Text from *Understanding Amateau Radio*, First Edition
May 26:	*The Product Detector*, p. 66
May 29:	*How Transmitters Work*, p. 67

*Speeds will be sent in reverse order, with highest speed first.

Strays

The R.I.D. Association (Radio Intelligence Division, FCC) requests all former members of the Federal Communications Commission who were employed in National Defense Operations and/or the Radio Intelligence Division to forward their names and addresses (and call signs), regardless of whether or not this was done previously, together with the names and whereabouts of other known employees to Mr. E. Merle Glunt, W3OKN, 10003 Gardiner Avenue, Silver Spring, Maryland, 20902

Pierre Asselin, VE2AIX, Vice-Consul, Canadian Consultant General, New York, N. Y. (l.) recently gave an interesting talk and slide presentation on the subject of Expo 67 to the Westchester A.R.A., White Plains, N. Y. On the right is Jesse Daughtrey, K2EEM, President of WARA.

• 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 M. Thompson, W3HC—SEC: K3NYG. RM: W3EEB. Renewals: K3NHL as OPS, K3BBR as OBS, W3HC as ORS, K3KAJ as EC, W3EJU as OO, K3NYG as SEC. WA3DYG is working lots of DX on 10 and built a new portable rig. W3BDP gave an interesting talk on Meteor Scatter and Aurora at the Delaware Amateur Radio Club Feb. meeting. The First State Amateur Radio Club planned a transmitter hunt and had DARC members as guests at its Feb. meeting. The Delaware Hamfest committee is making plans for a hamfest to be held at Banning Park Aug. 27 and would like the cooperation of all Delaware amateurs. Kent County Amateur Radio Club holds code classes on Wed. evening. WA3DUM is busy with school work. WA3CRU had fun in the DX Contest. K3NYG would like to set up AREC and RACES Net on 145-260 Mc. DEPN reports QNI 47, traffic 5. DSMN QNI 78, traffic nil. Traffic: W3EEB 234, W3HC 42, W3DKX 18, WA3CRU 16, K3MPZ 10, WA3DYG 2, K3NYG 2. WA3-DUM 1.

EASTERN PENNSYLVANIA—SCM, Allen R. Breiner, W3ZRQ—SEC: W3ELI. RMs: W3EML, K3-YVG, W3CBH, K3MVO. PAMs: W3FGQ, W3SAO. EPA C.W. Net had QNI 434 and QTC 374. PTTN Training Net had QTC 201. EPA Emergency Phone and Traffic Net had QNI 717 and QTC 262. K3YVG directed the high school production of "Carousel," which cut deeply into his net time. W3NNL now has to get the knack of using his new home-brew keyer. WA3FVK was number one in the Norristown Area Science Fair. With the basketball season completed, WA3CTP plans more traffic and net time. K3SWZ entered Uncle Sam's service. A talk on "Traffic Handling" was given by Net Mgr. W3-CBH at the Bishop Kenrick High School in Norristown. WA3EMO is looking for a keying relay for his home-brew keyer. Any assistance will be appreciated. K3VBA, a relief man in the milk business, says it has its drawbacks when it comes to net time. WA3ECI is an announcer at WGET, Gettysburg. OES WA3EEC is now active on the EPA Emergency Fone and Tfc Net. WA3-ERA added a new antenna and mast, then went to Florida. New Gear Dept.: WA3EXW added an ART-13. WA3CFU went QRO 200 watts with a pair of 6146s. W3RV added an SB-610 monitor and a.f. generator. WA3BSV vacated c.w. for his new HW-12. K3GAS added an HW-32A. K3BIG added a TR-106. New officers of the R.F. Hill ARC are K3SXR, pres.; W3KRF, vice-pres.; WA3CMD, secy.; K3EOU, treas. Now on active duty with the US Navy, K3UKZ plans to retire in June with an SB-100 and operate on 80 meters. W3ZRR, now retired, again is active as an OES. XYL K3NNE and OM W3DJW were presented a YL harmonic. W3ELI spent a few hectic days in the hospital with a serious back ailment. I suggest you complete plans for the Annual Field Day which is only weeks away. Traffic: K3MYS 789, W3EML 776, K3PIE 407, WA3ATQ 349, K3MVO 348, W3AEQ 212, W3AIZ 173, WA3EXW 141, W3MPX 135, K3YVG 122, K3RTX 117, W3FGQ 105, K3-WAJ 88, W3ZRQ 83, W3NNL 82, W3VAP 72, WA3FVK 62, W3KJJ 52, WA3CFU 48, WA3AIB 47, WA3BYH 47, WA3CTP 44, K3EHB 43, WA3AFI 41, W3CBH 36, K3HNP 36, WA3GLI 35, W3JKX 35, W3RV 34, WA3BSV 32, WA3EXB 32, WA3EMO 31, W3OY 30, K3KKO 28, K3HKW 21, K3VBA 21, WA3FWT 20, K3KTH 19, K3-MDG 18, K3HLN 17, W3ELI 11, W3BUR 7, WA3EEC 7, W3OML 7, K3WEU 6, W3ADE 5, W3FAF 5, WA3DQR 3, K3FOB 3, K3SWZ 3, W3BFF 2, WA3BJQ 2, WA3ERA 1.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Carl E. Andersen, K3JYZ—SEC: W3CVE. RMs: K3-OAE, W3ZNW. PAMs: W3JZY, K3LFD, K3NCM.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QTC*	*Ave. QNI*
MDD	3643	0000Z	Daily	28	325	11.2
MDDS	3643	0130Z	Daily	28	46	
MEPN	3820	2200Z	M-W-F	23	42	20.2
MEPN	3820	1800Z	S-S			
Nite Owl	50,250	0400Z	Daily	28	15	8
MTTN	145,206	0200Z	Wed.	4	64	31.5

New Appointee: K3NCM as PAM. Renewals: WA3CVM, WA3CFK, K3QDD and K3URZ as ORSs; W3RKK as OPS; W3PRC as RM/ORS; W3ECP as OO/ORS. Our one long Intruder Watcher, K3CYA, keeps plugging away at reporting unauthorized stations in the amateur bands. He needs help. How about *you*! W3GKP sends a nice OVS report with a keying circuit for the GE transmitter Model ET2OA. K3LLR reports antennas are slowly being replaced and hopes to be back in full swing soon. W3BWT is QSOing haphazard from 0400 GMT on to the wee hours. WA3GAD is spring-cleaning early and soon will be on with a Galaxy V MK II. W3DPR has earned his WAC award. K3QDC is QRL with MDD reports. WA3EEQ and W3TN earned BPL certificates. Warning to all 2 meter operators, WA3EOP will soon be on with a Clegg 99er and a TR-62. At the annual eating meeting of the Frederick ARC, K3NCM passed the president's gavel to W3BJV. Congratulations. W3-CDQ brightened the QCWA dinner with her presence. She also reports a new TR-4 for active use in the *YL/OM* Contest. W3ECP is off to Florida for spring training with no ham gear. WA3CFK reports that chasing DX on 15 meters in the early morning beats sleeping. K3OAE has his transmitter and antenna repaired but his receiver is now on the sick list. K3URE is continuing his 6-meter phone bulletins and has added them on c.w. on 50.150 Mc. at 0200 GMT Mon. and Fri. The Md. Two-Meter Termite Club has applied for ARRL affiliation. The Maydale ARC has been formed for the purpose of sponsoring the annual Md-DC QSO Party. For information contact the secretary, W3DVO. Sad News Dept.: W3HLE is in the Bethesda Naval Hospital. Traffic: (Feb.) WA3EEQ 520, W3TN 263, WA3CEK 212, K3LFD 139, W3LBC 97, K3JYZ 96, K3QDC 59, K3GZK 57, W3-DPR 43, K3UXY 42, WA3ERL 35, K3OAE 33, W3ZNW 32, W3FCP 27, WA3CCN 22, W3MCG 16, K3ORW 16, WA3CEK 12, K3LFN 11, K3URE 11, WA3GAD 9, W3-PRC 4. (Jan.) K3OAE 62, W3LBC 42, W3BWT 8.

SOUTHERN NEW JERSEY—SCM, Edward G. Raser, W2ZI—Asst. SCM: Charles E. Travers, W2YPZ. SEC: W2BZJ. RMs: WA2KIP, WA2BLV. PAM and NJPN Net Mgr.: W2ZI. NJN reports QNI *540*, total traffic *373*. NJPN reports QNI 601, total traffic 234. Please have your monthly activity report in to me *not later* than the *6th of the month*. The N.J. Post Office Net now operates on 3900 kc. at 1800 Sun. WB2MOQ made 74,000 points in the CD Party. He was in Florida during part of Dec. WB2MNF is a new member of NJPN. W2SDZ visited 4U1ITU in Switzerland recently. W2ZI and WA2KIP received their QSL cards from WWV, first transmission. W3VJ, in Browns Mills, showed up on 80 meters after 30 years. He was ex-3ARV in Trenton. W3-AXU worked Mass. using 2 watts s.s.b. on 432 Mc. W2ZI worked 65 members in the QCWA QSO Party, sponsored by the Delaware Valley Chapter. W2BWF received his DXCC. WA2UPC worked a ZL4 on 80 meters! WB2WSH is becoming interested in traffic work and may join NJN soon. WB2VFX joined Navy MARS. WB2GTE, ex-W1PY, joined the SJRA. W2ZI has a new TR-4 transceiver as his "emergency" rig. WA3BBI/2 has a new HW-12A in the car. K2ARY transmits his OB skeds faithfully. K2BG is enjoying his new OO post. WA2BBI/2 is a new EC for Burlington Co. W2BZJ has a new SB-200 linear. W2IU still laments there is no traffic net on 160. Gloucester Co. Amateur Radio Club's new officers are WA2NPD, pres.; WB2WKV, vice-pres.; WB2FJE, rec. secy.; W2LVW, treas.; W2AFZ corr. secy. WB2FJE is a new member of the NJPN. WN2WQH made a nice score in the Novice Roundup. Traffic: WA3-BBI/2 97, W2CKF 69, W2ZI 59, K2SHE 57, WB2MOQ 56, W2YPZ 52, WA2DVU 42, W2BEI 10, WA2KAP 8, W2-BZJ 5, WB2SBD 4, WB2MNF 1.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2RUF. PAM: W2PVI. RMs: W2EZB, W2FEB. NYS C.W. Net meets on 3670 kc. at 1900, ESS on 3590 kc. at 1800, NYSPTEN on 3925 kc. at 2200 GMT

NYS C.D. on 3510.5 and 3993 kc. (s.s.b.) at 0900 Sun. and 3510 kc. at 1930 Wed., TCPN 2nd Call Area on 3970 kc. at 0045 and 2345 GMT, NYS County Net on 3510 kc. Sun. at 1400 GMT and 2345 GMT Mon. Congratulations to WB2UQJ on his first BPL. Appointments: W2CFP/WB2QGK as EC Tomkins County, WA2ANE as OPS. WB2ERK, WA2TCZ, K2DNN and WB2HSR as OVSs. Our deepest sympathy goes to W2-RUF on the death of her husband, John Reger, although not a ham, had made many friends in hamdom for he accompanied Clara on her many visits to clubs and hamfests. W2QDO, from the Adirondack Area, reports that he lost power during the Feb. blow at 42 below zero, but his 5-kw. generator started without a whimper. 82-mile-an-hour winds in the Buffalo Area did much damage to antennas and we have heard many sad tales and some stories of remarkable results with makeshift antennas. The Policy Committee of the NYSPTEN met at Exit 36 in Syracuse Apr. 9. The Canisteo Valley ARC elected K2PFC, pres.; WB2TUN, vice-pres.; K2-TAA, corr. secy.; WB2ZAQ, rec. secy.; WB2UHK, act. mgr. This news is from the first issue of the club paper, *The Skull*. WB2UHK is editor. RARA pres. WA2-KMI is recuperating nicely from a recent illness. Don't forget May 13 at Vmces 50 Acres for the WNY Hamfest. The event, sponsored by the Rochester ARA, will feature special v.h.f. programming this year, known as the East Coast Spring V.H.F. Conference. WB2VSL acquired a new Swan 350. K2TXB is working on a 432-Mc. moonbounce project. He would like to compare notes with other interested persons. His address is R.D. 3, Lawson Rd., Jamestown 14701. W2OZR has presented a talk on "The Good Old Days of Radio" to both the RAWNY and ARATS. June 17 is the date of the Penn-York Hamfest. 2-meter f.m. continues to grow with stations now heard in Rochester and our Canadian friends have a blockbusting signal from the St. Catherines repeater which covers just about all of the northern shore of Lake Erie. Traffic: W2SEI 449, W2RUF 253, WB2OYE 155, WB2UQJ 123, WA2MWF 115, WB2GAL 102, K2RYH 94, WN2IHP 79, K2JBX 71, W2MITA 60, WA2HSB 56, WB2SMD 56, W2FEB 50, K2SSX 40, W2RQF 39, W2HYM 29, W2FCG 24, K2IMI 20, K2DNN 17, WB2QAP 16, W2PNW 12, WB2BJN 9, K2MQN 9, WA2-GLA 1, WA2NDC 1.

WESTERN PENNSYLVANIA—SCM, Robert E. Gawryla, W3NEM—SEC: K3KMO. PAM: K3VPI (v.h.f.). RMs: W3KUN, W3MFB, W3UHN, K3SOH. Traffic nets: WPA, 3585 kc. daily at 0000 GMT and KSSN, 3585 kc. Mon. through Fri. at 2330 GMT. The Pittsburgh area hams donated $213.00 and equipment to an ex-area teacher now at a mission in VK-Land to put a station on the air from there. We welcome WA8-VHT, a newcomer to WPA. K6QPZ has moved to WPA from California and will be working at Letterkenny Army Depot. WA3FLM and WA3ERT have started a student ragchew group on 7 Mc. The South Hills Brass Pounders and Modulators report via *The Radial* that W3LHN, of the Mobileers, presented the clubs award to the South Hills Club for winning in the recent Ground Wave Contest. WN3HBA is a new Novice in our area. The *Spark Gap* reports the Western Pennsylvania Mobileers are now meeting at the Wilkinsburg Boro Bldg. the 2nd Mon. of each month at 8 P.M. Also, the Two Rivers Radio Club holds its 2-Meter Net Mon. and Thurs. at 9:00 P.M. on 145.150 Mc. At 8:30 P.M. Mon. nights on 145.300 Mc. the Foothills Radio Club of Greensburg holds its 2-Meter Net. WA3BLE is a new ORS in WPA and very active on KSSN, WPA and 3RN. WPA had another record-breaking month of traffic with 28 sessions, 307 messages, 444 WPA stations QNI plus 22 visitors during Feb. Traffic: (Feb.) W3-NEM 222, W3KUN 205, K3HKK 185, (W2KAT, K3-KMO, W3NEM operators), WA3BLE 154, K3SOH 121, WA3AKH 112, W3BLZ 82, WA3EPQ 46, K3PYS 45, W3-LOS 40, WA3EHF 24, K3HCT 20, K3SJN 20, K3RZE 16, K3TEZ 11, W3YA 10, W3SMV 8. (Jan.) W3BLZ 107.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU. RM: WA9GUM. PAMs: W9WVJ, WA9-CCP and WA9KLB and WA9RLA (v.h.f.s.). Cook County EC: W9HPG. Net reports:

Net	Freq.	Times	Days	Tfc.
IEN	3940 kc.	1400Z	Sun.	26
ILN	3760 kc.	0000Z	Daily	244
NCPN	3915 kc.	1300Z	Mon.-Sat.	187
NCPN	3915 kc.	1800Z	Mon.-Sat.	113
Ill PON	3925 kc.	1700	Mon.-Fri.	138
ILL PON	50.28 Mc.	2000	Mon. & Thurs.	10
Ill PON	145.5 Mc.	2000	M-W-F	136
TNT Net	145.36 Mc.	2100	Sun.-Fri.	246

WA9IWU, WA9FXH, WA9OBQ, WA9MRE, WA9HQS and WA9NWK were elected officers of the Hamfesters Radio Club. WA9QFT and WA9QXT were appointed Official Observers. The Ninth Regional Net handled a traffic count of 661 during February, according to net manager W9QLW. New officers of the Six Meter Club of Chicago include K9ZWU, K9ZWV, WA9GVF, WA9IRZ and WA9BWB. The Carroll County Two-Meter Emergency Net meets Thurs. at 8:30 P.M. with WA9PSA as NCS. This column's sympathy is extended to the family and friends of WA9MHD, whose wife and newborn son passed away. She was the daughter of W9DRV. Also our sympathy goes to the families and friends of W9WPC and W9KCX (one of the charter members of the IEN), who also joined the ranks of Silent Keys. The Rock River Radio Club will hold its 1st Annual Hamfest on Sun., Apr. 23 at the Lee County 4H Center near Amboy, Ill. K9PPX worked his 300th Country for DXCC. WA9-KKM is on 2 meters with a new home-brew rig. K9KNX made his solo flight and passed it with flying colors. WA9NJB is operating mobile with his new HW-12A. WA9RYB, WA9SGO, WA9QWZ and WA9SQH are new General Class licensees from the Tri Town Area. W9GOG is bringing in 20-meter DX with a new TR-4. New Novices heard were WN9TZH, WN9TZJ and WN9TZK. Make a note now to write for reservations for the Central Division ARRL Convention which will be held in Milwaukee July 7 and 8 under the sponsorship of the Milwaukee Amateur Radio Club. WA9NFS received his A-1 Operator award. W9NWK reports that the 75-Meter Interstate Single Sideband Net handled 450 pieces of traffic. WA9CCP, WA9CNV, WA9SEO, W9EET and W9CGC are recipients of the BPL award. Traffic: WA9CCP 568, WA9CNV 512, WA9SEO 503, W9EET 278, W9CGC 253, K9KZB 225, W9JXV 183, WA9OTD 154, WA9NFS 137, W9NXG 130, W9DOQ 113, WN9SPA 79, WA9RSN 65, W9ELL 48, WA9BRQ 46, W9HOT 46, W9-YCH 45, K9BTE 44, W9LDU 34, K9RPX 33, W9IDY 21, WA9GUM 19, WA9MHU 19, WA9QXT 19, K9HSK 14, WA9LDC 13. W9HJM 9, K9HRC 9, W9PRN 9, W9LNQ 7, WA9POZ 6, K9TXU 4, WA9FIH 3, W9MTO 3, WA9HSZ 2.

INDIANA—SCM, Mrs. M. Roberta Kroulik, K9IVG—Asst. SCM: Ernest Nichols, W9YYX. SEC: WA9GKF. PAM: W9PMT. Hoosier v.h.f. nets mgr., reports Feb. traffic of 90. K9EFY, IPON mgr., reports Feb. traffic of 137. WA9GKF reports Feb. traffic of 2 for Randolph Co. AREC. W9QLW reports Ind. was represented 96.4% in Feb. He's RM of 9RN. QIN Honor Roll: K9VHY 27, WA9KOH 24, K9HYV 20, K9DHC 19, W4BDP and W9HRY 18, K9LMG/9 and W9SNQ 17, WA9RNT 16, K9WWJ and W9ZYK 15. Congrats to WA9BSR and WA9RZY, both new Generals. Randolph Co. ARC has been reactivated with WA9GKF, pres.; WA9OAO, vice-pres.; WN9SSI, secy.; W9VJX, treas. K9PYI is chief radio engineer at the new Martinsville radio station. WA9GJZ is now on 2 meters. Don't forget the Delaware ARA Hamfest June 4 in Muncie at the Delaware Co. Fairgrounds. WA9RJI is enjoying a new National 200 receiver and a new vertical. Clark Co. ARC elected WA9INJ, pres.; W9HRY, vice-pres.; WN9RUP, secy.; K9QWK, treas. K9UV has been DXing, worked an ST2 and a VR6. WA9DBK has joined AF MARS. Should be hearing W9HRY on s.b. soon with an Apache and an SB-10. W9DKR is running code practice sessions on 50.7 Mc. at 0100Z. BPLers: W9MM and K9IVG. *Amateur radio exists because of the service it renders.* Traffic: (Feb.) W9MM 768, K9IVG 684, W9ZYK 306, W9UUK 221, W9HRY 214, K9FZX 204, W9QLW 187, K9HYV 119, WA9OYI 103, WA9LTI 89, K9VHY 88, WA9KOH 65, K9IU 58, W9SNQ 56, K9DHC 55, WA9KAG 52, K9CRS 51, W9PU 48, K9EFY 47, W9CC 44, W9UB 40, WA9GNA 39, WA9GKF 36, WA9FDQ 31, WA9BHG 30, WA9RNT 30, WA9LUG 29, K9WGN 28, WA9KVP 26, K9RWQ 24, WA9BNX 23, W9DKR 22, W9FWH 22, K9JQY 22, WA9-TKZ/9 21, W9DOK 20, W9RTH 20, WA4RBQ/9 18, WA9BHG 17, W9YYX 17, W9EJW 16, K9ILK 15, K9-OXA 15, K9YFT 15, W9BUQ 14, W9DZC 14, K9FUJ 14, K9FZU 14, W9LG 14, K9LMG/9 14, W9PMT 14, WA9GJZ 12, WA9QAH 12, W9FJI 11, W9HWR 11, WA9CFW 10, WA9NGN 10, K9ONB/9 10, WA9CSS 9, K8KNI/9 9, W9BDP 8, K9BSL 8, W9CMT 8, WA9DBK 8, W9URQ 8, W9ZZR 8, K9UEO 7, WA9CHY 6, W9JSV 5, K9UHQ 4, WA9AXF 3, K9FPA 3, K9IIV 3, K9PNJ 3, WA9JIX 2, WA9QXM 2. (Jan.) W9QLW 204, WA9LGQ 21.

Net	Freq.	Time	Feb. Tfc.	Mgr.
IEN	3910	1330Z daily, 2300Z M-F	255	K9IVG
ISN	3910	0000Z daily, 2130Z M-S	781	K9CRS
QIN	3656	0000Z daily	241	W9HRY

WISCONSIN—SCM, Kenneth A. Ebneter, K9GSC—SEC: K9ZPP. RM: WA9MIO. PAMs: K9IMR, W9NRP and WA9QKP.

Net	Freq.	Time	QNI	QTC	Mgr.
WIN	3662 kc.	0115Z Daily			WA9MIO
BEN	3985 kc.	1200Z Mon.-Sat.	273	224	W9NRP

Technical Notes from RAYTHEON

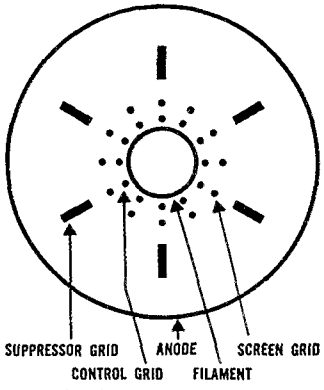
PENTA PL-177A: a pentode developed for SSB. The vane-type suppressor grid pentode was developed to meet the need for low distortion high efficiency vacuum tubes for use as Class C rf amplifiers.

The growth of SSB transmission in both amateur and military applications pointed out the need for better performance amplifier tubes. The Penta PL-177A pentode is one example. The PL-177A was developed to meet a need for a 50-250 watt output transmitting tube having the following combination of characteristics:

(1) instant heating filament
(2) reasonable efficiency at V.H.F.
(3) good performance as both a Class C and Class AB radio frequency.

Tubes in this power classification meeting requirements 1 and 2 were available before the development of the PL-177A. Other tubes were available which would meet requirements 2 and 3, at the lower power levels. There was, however, no single tube capable of satisfactorily meeting all three requirements.

The PL-177A is an aligned-grid 75-watt plate dissipation pentode. Reasonably close electrode spacings and the thoriated tungsten filament allow it to satisfy requirements 1 and 2 above. A vane-type suppressor grid provides electron focussing in the screen-grid-to-plate space, which allows the wide plate voltage swing necessary to meet requirement 3.



Other tubes developed along this line are the PL-175A of 400 watt dissipation, PL-172/8295, 1 kw dissipation, and the 8432 1 kw. These tubes were developed primarily for ham use but have since found wide application both for military and commercial applications in SSB transmitters.

As can be seen in the illustration, perfect alignment of the elements including the vane suppressor grid accounts for the high performance and linearity of this tube type.

These beam pentodes have found other successful applications as high voltage regulators switch tubes and in variable frequency power supplies.

The Machlett Laboratories, Inc., Penta Plant, 312 N. Nopal St., Santa Barbara, California 93102

RAYTHEON

EXCELLENCE IN ELECTRONICS

BEN	3985 kc.	1700Z Daily	503	211	WA9QKP
WSBN	3985 kc.	2215Z Daily	1029	409	K9IMR
SWRN	50.4 Mc.	0200Z Mon.-Sat.	325	2	W9JZD

A net certificate went to WA9OFF for SWRN. New appointees: K9OSK as OO, WA9OMO as OBS. Renewed appointments: W9NRP as PAM; K9GDF and W9KCR as OOs; W9CBE and K9KJT as OBSs; K9GDF, WA9NPB and W9IHWQ as OPSs; W9YT, W9DYG, WA9NPB, W9WJH, W9CBE and K9DKU as ORSs; W9NRP, W9HWQ, W9SZL, WA9JGI, W9CFS, WA9IZK, W9SQM and K9PKQ as ECs. Coming events: Central Division Convention at Milwaukee July 7 & 8, WNA Picnic at Wisconsin Rapids. The Wisconsin Rapids ARC is now affiliated with the ARRL. WA9QKP made the BPL in Feb. K9GDF led the OOs with 43 notices sent. WA9KFL has a new tri-band beam. K9KSA is new chief engineer for W9YT. K9UTQ is operating mobile with an SR-160. W9JKM's XYL received her ticket and has the call WN9UBC. W9KQP is teaching TV servicing on the job. Traffic: (Feb.) W9CXY 462, WA9QKP 239, W4DYG 200, WA9IFS 169, WA9NPB 168, W9YT 168, W9JKM 134, K9FHI 128, WA9OMO 95, W9DND 89, WA9QNI 82, WAØHRM/9 81, W9ODD 80, K9GDF 77, W9AYK 73, W9DXV 66, K9UTQ 57, WA9IZK 54, K9IMR 48, K9GSC 33, K9JMP 30, WA9NFG 28, W9NRP 27, W9KQB 25, W9IRZ 24, WA9NDV 21, K9CPM 20, W9CBE 18, WA9NFS 17, WA9PKM 17, WA9NVY 11, W9HWQ 9, WA9LWJ 7, W9HQT 6, W9OTL 5, WA9KFL 3, W9SQM 2, K9ZMS 2. (Jan.) WA9KFL 8.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopischke, Jr., WØTCK—SEC: WAØIEF. RMs: WØISJ, WAØEPX. PAMs: WAØMMV, WAØJKT, WAØDWM, WØHEN. MSN meets daily on 3595 kc. at 0030Z. MJN meets Tue.-Sun. on 3595 kc. at 0100Z. Noon MSPN meets M-Sat. on 3820 kc. at 1805Z and Sun. at 1500Z. Evening MSPN meets daily on 3820 kc. at 2400Z. MSTN meets Tue.-Sat. on 50.4 Mc. at 0430Z and Sun. at 0200Z. Minn WX Net meets daily on 3830 kc. at 0030Z. During DST nets meet one hour earlier by GMT. Same local time. It is with deep regret we report the passing of WØVOA, who was killed in an auto accident in Arizona. WAØFFU received his Worked All Minnesota Award and also made WAS on 75-meter s.s.b. WAØKQU is now on the air with the SB-401 he built. WAØJPR is enjoying 20-meter c.w. with the help of a new antenna. OES WØPHD worked K8CLA/Ø for his first No. Dakota 432-Mc. contact. Wally reports a 2-meter repeater, using a 250-ft. high antenna with input on 145.050 Mc. and output on 146.975 Mc., is now serving the Red River Valley area. Rochester ARC members participated in the annual Eagles Cancer Fund Telethon. The Mankato ARC held an emergency drill in Feb., with 20 members participating. PAM WAØMMV is publishing a newsletter for noon MSPN members. The former WNØMYC is now WAØQMP. Congrats to WAØMQX, new EC for Todd and Morrison Counties. ECs renewed are KØMEQ, LeSueur & Rice Co.; WAØIIJ, Renville Co.; KØAYU, Brown Co.; WØLW, Wilkin Co. and KØSXP, Beltrami Co. WAØKQU renewed as ORS, and WAØIIJ and KØZRD as OPSs. WAØEPX received the BPL award for Feb. traffic. Traffic: (Feb.) WAØEPX 521, KØQBI 93, WAØJKT 83, WØIPU 71, KØORK 70, WAØEDN 61, WØKYG 56, WØISJ 51, KØAQT 50, WØOEZ 42, WØTCK 39, WAØDOT 30, WAØFUR 29, WAØMMV 27, WAØPXT 26, WAØJPR 25, KØIGZ 24, KØICG 23, WAØLVK 23, WØBUO 19, WAØDFT 17, KØFLT 15, KØAKM 14, WAØQAK 14, KØZRD 14, WØKLG 11, WAØMJF 11, WØHEN 10, WAØPEV 10, WØUMX 10, WAØHRM 7, WAØFFU 6, WAØIEF 5, WAØODB 5, KØSRK 5, WAØEZQ 4, WØKNR 4, WØTOF 3, WAØIAW 2, KØZRC 2, WØSZJ 1. (Jan.) WAØNQH 4.

NORTH DAKOTA—SCM, Harold L. Sheets, WØDM—SEC: WAØAYL. OBS: KØSPH. The Forx Radio Club held a Valentine Party at the Westward HO Motel. WØUGM blossomed out with a new Swan 350. WNØOVW was a certificate winner in the SS Contest. Since he received his Conditional he has been busy working DX on 15 meters, c.w. and phone. KØDQX has a new NCX-3. WØRSA has a new Gonset Communicator and KØQWY has a GC-105 for 2-meter work. WØTUF has an RME receiver in operation. BARK, the Bismarck Radio Club, has a new SR-150 and soon will have WØZRT on the air. The club's code and theory classes are progressing well. WNØQVC is a new Novice down there. WAØIVI, at Northwood, got the bugs out of that linear and has been putting out a strong a.m. signal. WNØPPK worked hard in the Novice Roundup. Carol also took the Conditional Class exam. The Jamestown Radio Club has been reorganized with WNØOTC, pres.; WAØIEQ, secy.; and meets the 2nd and 4th Tue. WNØOTC, WAØIEQ and WØEOZ are on 2 meters working across town while WØEOZ works Watertown regularly. KØTKK/Ø has a Swan 240 on the air while WØYIZ is trying his hand in putting together an SB-101. WAØIEQ and WNØOTC are going after a 20-meter s.s.b. kw. rig. KØHOJ has a rig at Jamestown College. YL Weather Net, 341 check-ins, 14 messages. NDRACES Net, 128 sessions, 834 check-ins, 215 messages. ND PO Net, 8 sessions, 146 check-ins, 58 messages. Traffic: (Feb.) WAØHUD 154, KØITP 47, WAØGRX 35, WAØLRE 16, W9QNI O 15, KØSPH 15, WØCGM 10, WAØDLB 5, WAØGZA 5, WØBHT 4, WØEFJ 4, WØNMV 4. (Jan.) WØDM 20.

SOUTH DAKOTA—SCM, Seward P. Holt, KØTXW—SEC: WØSCT. RM: WAØAOY. PAM: KØBSW. KØFKK is now stationed at Ft. Gordon, Ga., starting his tour of duty. WAØBWF and WØDNV mobiled to the West Coast on their vacations. KØVYY has his 500 back on the air after being in WØCTZ's shop. Congratulations go to WAØJUM for his QNI in TEN. KØZMP and WAØNRE are heard from School of Mines station, KØVYY. The So. Dak. C.W. Net reports 71 QNI, 9 QTC, 307 min. in 11 sessions; So. Dak. S.S.B. Net, 1128 QNI, 55 QTC, 155 informals for Feb. Traffic: WØZWL 758, WAØAOY 88, WAØNZA 86, WAØPDE 61, WAØLLG 53, KØAIE 50, KØVYY 49, WØDVB 36, WØDJO 28, WAØMIWN 28, KØYGZ 22, WØSCT 14, WØHOJ 12, KØTNM 6, WØRWM 5, WAØBZD 4, WAØNEQ 4, KØJGM 2.

DELTA DIVISION

ARKANSAS—SCM, Don W. Whitney, K5GKN—SEC: W5DTR. PAM: WA5GPO. RM: W5NND. NMs: WA5PPD, W5DTR, W5MJO, and K5ABE. W5CAM, editor of the Southeast Arkansas ARC's *The Grid Drive*, has an excellent article in the Feb. issue of *The Grid Drive*. Why not write him for a copy? His address is 1505 W. 14th St., Pine Bluff. K5TCK, in the *Razorback Radio News*, relates what's happening "Down in the Ham Band" or "The World Below 3800 kc." and vows that amateurs in this portion of the band *still* hold to one of our precepts, "politeness." Net reports for Feb.:

Net	*Freq.*	*Time*	*Day*	*Sess.*	*QTC*	*QNI*	*Time*
RN	3815 kc.	0001Z	Daily	28	67	721	588 min.
AFN	3885 kc.	1200Z	Mon.-Sat.	24	17	663	1525 min.
OZK	3790 kc.	0100Z	Daily	28	114	332	706 min.
APON	3825 kc.	2130Z	Mon.-Fri.	20	173	379	610 min.

WA5AER, one of our OOs, reports DX good on 20. It is reported that W5RIT took 1st place for Ark. in both the Maryland and Iowa QSO Parties. K5QMO and K5KAC, Huntsville, are conducting a code class for 10 C'Bers who hope to be hams. Traffic: W5OBD 1254, W5DTR 166, W5NND 144, W5MJO 84, WA5KEF 48, WA5PPD 34, WA5HNN 17, WA5LYA 9.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—RM: W5CEZ. V.H.F. PAMs: W5UQR, WA5DXA.

Net	*Freq.*	*Days*	*Time*	*Net Mgr.*
LAN	3615	Daily	0030Z	W5GHP
LaPON	3870	Sun.	1300Z	W5KC
Delta 75	3900	Sun.	1330Z	WA5EVU

WA5EID worked Vermont to achieve WAS. WA5LQZ says LAN needs more outlets in the smaller towns. Check into LAN at either 0030Z or 0400Z. New officers of the Jefferson Radio Club are J. DeBlanc, pres.; Leo Russell, vice-pres., according to W5MXQ. K5WOD says during a test, the Springhill ARC, using W5ADE, K5QNK and WA5FRU as mobile and K5WOD at operating base, had excellent coverage of North Webster Parish with the local city fathers and c.d. director observing. W5BJG experimented with an 8JK beam for 20 and participated in various contests. WA5LGO gave an amateur radio demonstration at the Winnisboro HS Science Fair. K5OKR has her beam working and is working some DX. WA5KLF enjoys working into LAN. WA5PWX works 80 through 10 with high power on 80-10 c.w. WA5DES sends OBs on 7095 kc. at 0000Z. W5EA recently celebrated his 74th birthday and Golden Wedding Anniversary. W5CEZ has been overhauling antennas. The GNOARC held its first meeting in the new Trade Mart Bldg. WA5QIB and WA5PMZ are new on 6. W5PSQ and W5HZA are now on 146.94 f.m. W5PM and W5BUK joined the Old Old Timers Club. W5EXI has 30 prospective hams in the Novice/General class. W5BWA is aboard a Navy carrier. WA5LWL moved to NOLA. New officers of the Lafayette RC are W5NQR, pres.; K5ARH, vice-pres.; W5NQQ, secy.; WA5NDW, treas. W5AJY has been working some nice DX including FR7ZD on Reunion Isl. The Ozone ARC is ARRL affiliated. Don't forget the BRAC Hamfest, May 6 and 7 at the Bellemont Motel. New officers of the Teche ARC are WA5GIR, pres.; WA5GOX, vice-pres.; W5FTK, secy.-

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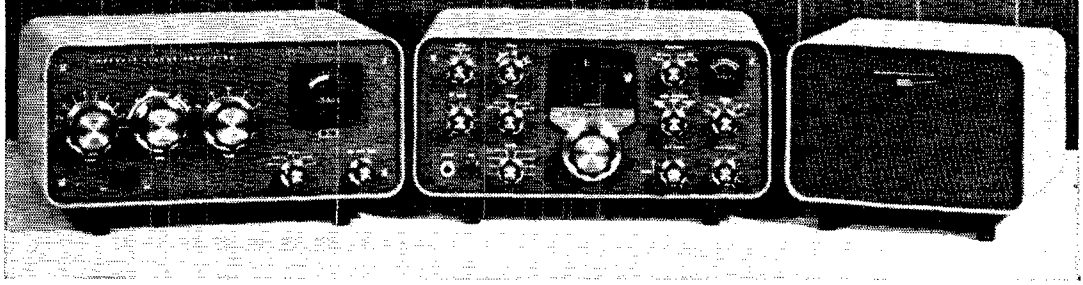

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• 1200 watts PEP, 1000 watts CW • Drives with 100 watts • Built-in SWR meter, antenna relay, solid-state power supply • ALC • Shielded, fan-cooled amplifier compartment • Pre-tuned cathode input • Circuit breaker • 120/240 v.

Assembled SBW-200, 41 lbs..... **$320.00**
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• Styled to match SB series • For fixed station use • 8 ohm speaker with shaped 300-3000 Hz response • Has space for HP-23 power supply

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• Supplies voltages for SB-101 • Provisions for remote operation (can be located in engine compartment) • Circuit breaker protection • 12 to 14.5 VDC input (neg. ground only)

Assembled HPW-13, 7 lbs..... **$89.95**
Kit HP-13, 7 lbs..... **$64.95**

HP-23 Solid-State Fixed Station Power Supply

• Supplies voltages for SB-101 • Excellent dynamic regulation • Fused primary • Can be installed inside SB-600 speaker cab.

Assembled HPW-23, 19 lbs..... **$64.95**
Kit HP-23, 19 lbs..... **$49.95**

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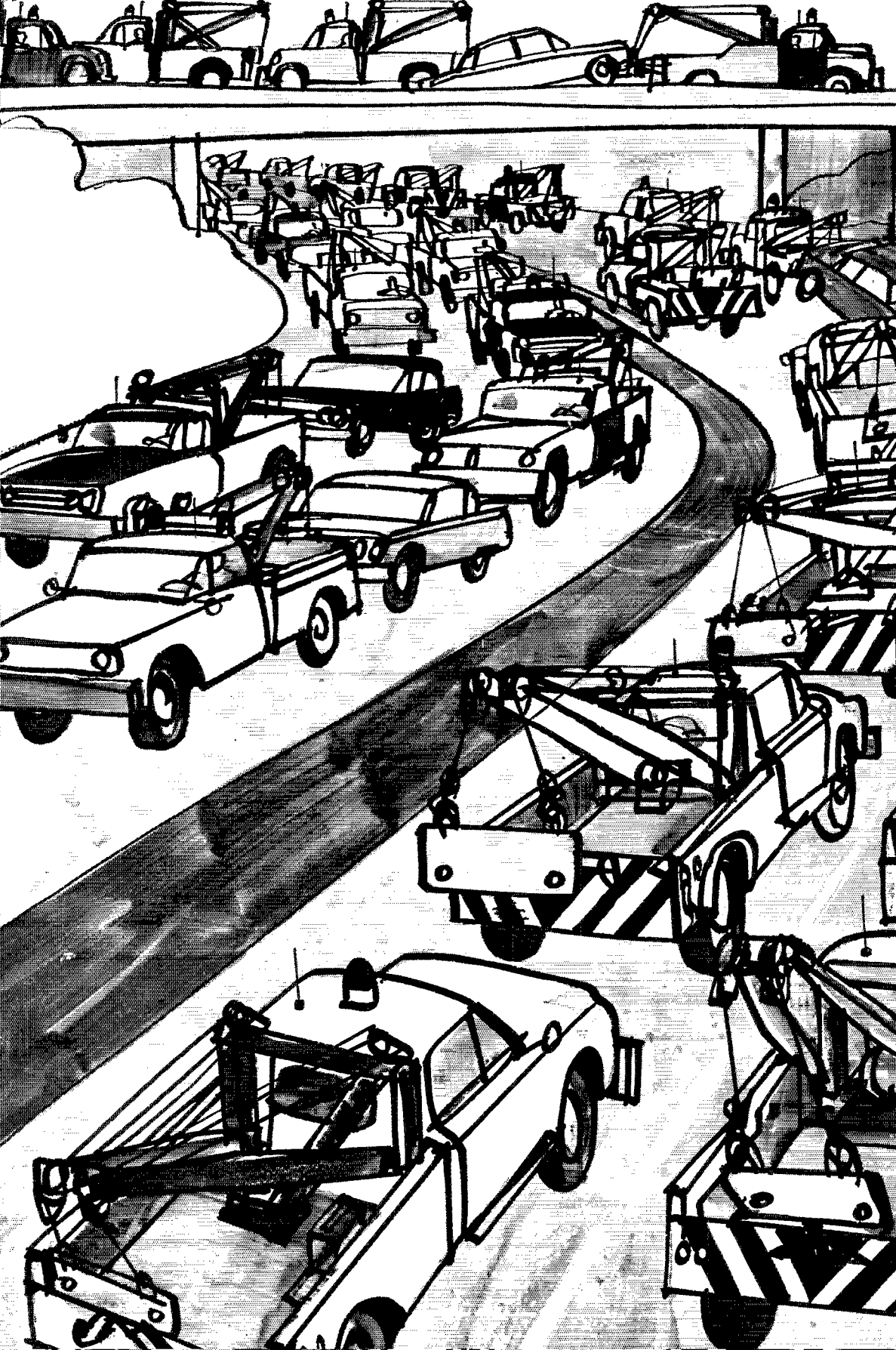

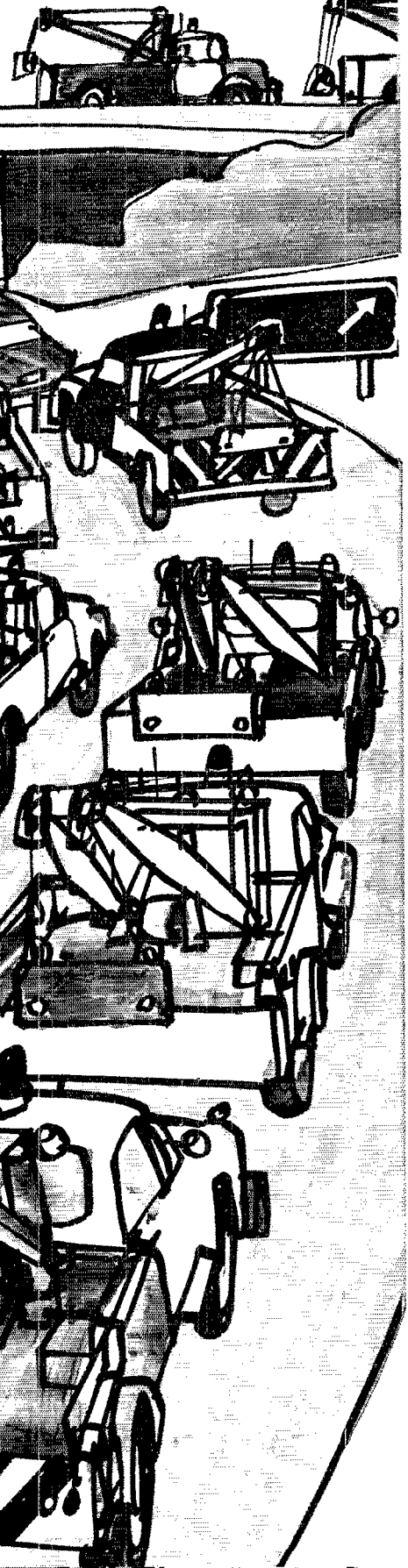

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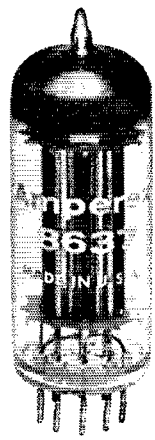
ICAS	450v.	34w.	0.82w.
PTTS	**600v.**	**84w.**	**0.86w.**
175 MHz			
CCS	300v.	18w.	1.4w.
ICAS	350v.	26w.	1.6w.
PTTS	**560v.**	**63w.**	**2.2w.**



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TOMORROW'S THINKING IN TODAY'S PRODUCTS

treas. W5UQR is busy with various transistor projects. St. Tammany-GNO coverage is ably afforded by the OARC Net Wed. at 0130Z on 50.55 with WA5LVW as NCS. WN5PLH has dropped the "N" for an "A." The Lafayette Group assisted in the Annual Cancer Drive W5NQQ is now Asst. Director. Traffic: W5CEZ 160, W5KRK 154, W5PGT 87, K5OKR 72, WA5DES 53, W5MXQ 52, W5BJG 46, WA5LQZ 45, WA5FNB 32, WA5-LGO 25, WA5KLF 23, W5MBC 18.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF. WA2WBA/5 had some excellent suggestions on the "Intruding Watch" situation. WN5RAX really is making the contacts with his EICO 723. Glad to have WA5RKP, formerly W1CIA, in Clinton. We are all thrilled about W5JHS acquiring an XYL. WA5OKI is doing a fine job as asst. mgr. for MSBN. W5BW has been working lots of retirees. WA5CAM is doing a fine job on his NCS night. K2DEM/5 made a fine score in the YL-OM Contest. New officers of the Keesler Club. K5-TYP are K7RSD, pres.; WA4UPE, vice-pres.; WN2-ZMC, secy. WA2WBA/5 has really been handling traffic. Glad W5WMQ is over his back trouble, and back on the net. W5EHZ does a fine job relaying on bad QRM nights as does W5ODV and others. Cooperation is fine on our nets. K5SYG is always available for traffic. Check in to our nets: Gulf Coast Sideband Net, daily 1730 CST on 3925 kc.; Mississippi Sideband Net, daily 1815 CST on 3888 kc; Mississippi C.W. Net, daily 1845 CST on 3647 kc. Traffic: WA2WBA/5 294, WA5OKI 161, W5WZ 77, W5BW 35, WA5CAM 13.

TENNESSEE—SCM, William A. Scott, W4UVP—SEC: K4RCT. RM: K4UWH. PAMs: W4PFP, WA4-CGK, WA4EWW.

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
TSSB	3980 kc.	Tu.-Su.	0030Z	24	1626	320
TPN	3980 kc.	M-Sat.	1245Z	28	1133	276
	3980 kc.	Sun.	1400Z			
TN	3635 kc.	Daily	0100Z	56	392	180
	3635 kc.	Daily	0230Z			
ETON	3920 kc.	M-F	1140Z	20	426	38

May I take this opportunity to thank all of you for your cooperation during the three years I have been SCM. I leave the section for other employment and hope it will be possible to check in on the nets within a few months. W4WBK, active on all the nets, has agreed to serve as Acting SCM. New officers of Johnson City RC are K4UWH, pres.; W4UVY, secy.; WB4CXM, treas.; WB4EBH, act. mgr. W4WJH the new EC for Franklin County, reorganized with 16 members. W4JAF, ex-vice-pres. of the Nashville ARC, was killed in a plane crash Feb. 24. Oak Ridge RC's officers are K4-COT, pres.; K4VOP, vice-pres.; K4LTA, secy.; K4LTA, pub. chmn.; K4APY, treas.; K4FKO, tech. chmn. Congrats to W4RUW and W4FX on making the BPL. Traffic: W4RUW 749, W4FX 512, W4OGG 310, K4UWH 247, W4PQP 167, WA4YDT 116, W4SQE 106, W4UVP 71, W4-KAT 66, W4WBK 66, K4UMW 56, WA4YEM 46, W4CXY 39, W4PFP 33, K4VIS 33, WA4NEC 32, W4CAT 25, W4MXF 25, W4TZB 20, WA4CGK 17, W4TZJ 14, WA4-MCC 13, WA4NUJ 11, W4TYV 8, W4FLW 5, K4MQI 4, WA4SBF 4, W4SGI 4, WA4ZBC 4, WA4EWW 3, W4MRD 3.

GREAT LAKES DIVISION

KENTUCKY—SCM, Lawrence F. Jeffrey, WA4KFO—SEC: W4OYI. Appointments: WA4AGH as OO, WB4-BTM as OPS and WB4CIY as ORS. Endorsements: WA4DYL as ORS, K4LOA as OPS, W4WNH as OVS and WA4WWT as ORS.

Net	*Freq.*	*Days*	*GMT*	*Sess.*	*QNI*	*QTC*	*Mgr.*
KRN	3960	M-F	1130	20	410	56	K4KIS
MKPN	3960	Daily	1330	28	404	166	WA4KFO
KTN	3960	Daily	0000	28	831	312	WA4AGH
KYN	3600	Daily	0000	44	334	616	W4BAZ
KPON	3945	Sat.	1800	No Report			WA4AVV

Note that the Early Morning Kentucky Phone Net is now popularly known as the Kentucky Rebel Net and is so listed (KRN) above. WA4AGH has a new Drake 2C receiver. WA4OMH helps keep the Lexington Area 6-Meter Net going. K4DZM and WA4WWT both help 9RN as NCSs. W4CDA reports the Danville Club is working on a plan to get traffic from deaf students at the local school for the deaf. K4FPW reads OBs on 6 meters for Louisville. W4OYI says he is on 10 with a CB rig. WA4-ZVQ has been NCS for the Lexington Area V.H.F. Net. W4JSH is working hard on getting AREC members in Lexington. WN4ZXK is the harmonic of WA4GHQ. W4BAZ has the Falls City Training Net operating on 50.4 M,W,F. Late Jan. report shows 8 sessions for the Falls City Area 6-Meter Traffic Net. K4YZU is the new pres. of the Kentuckiana Radio Club, Louisville. Traf-

SWAN 500

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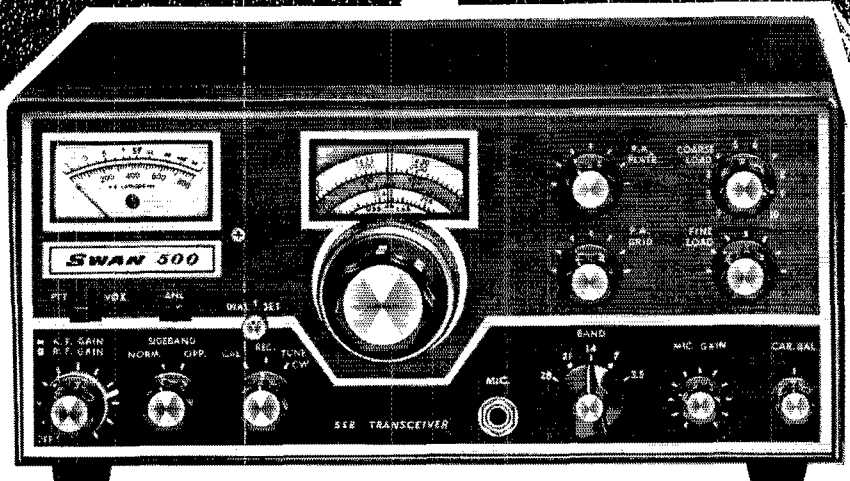

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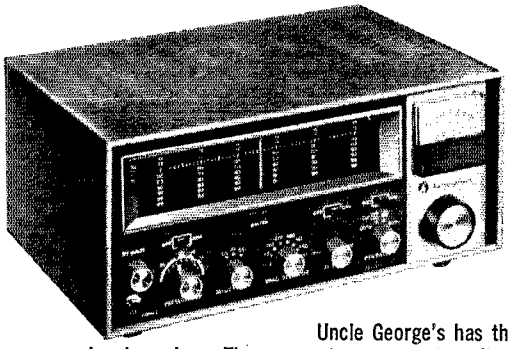

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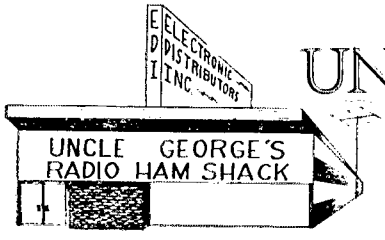

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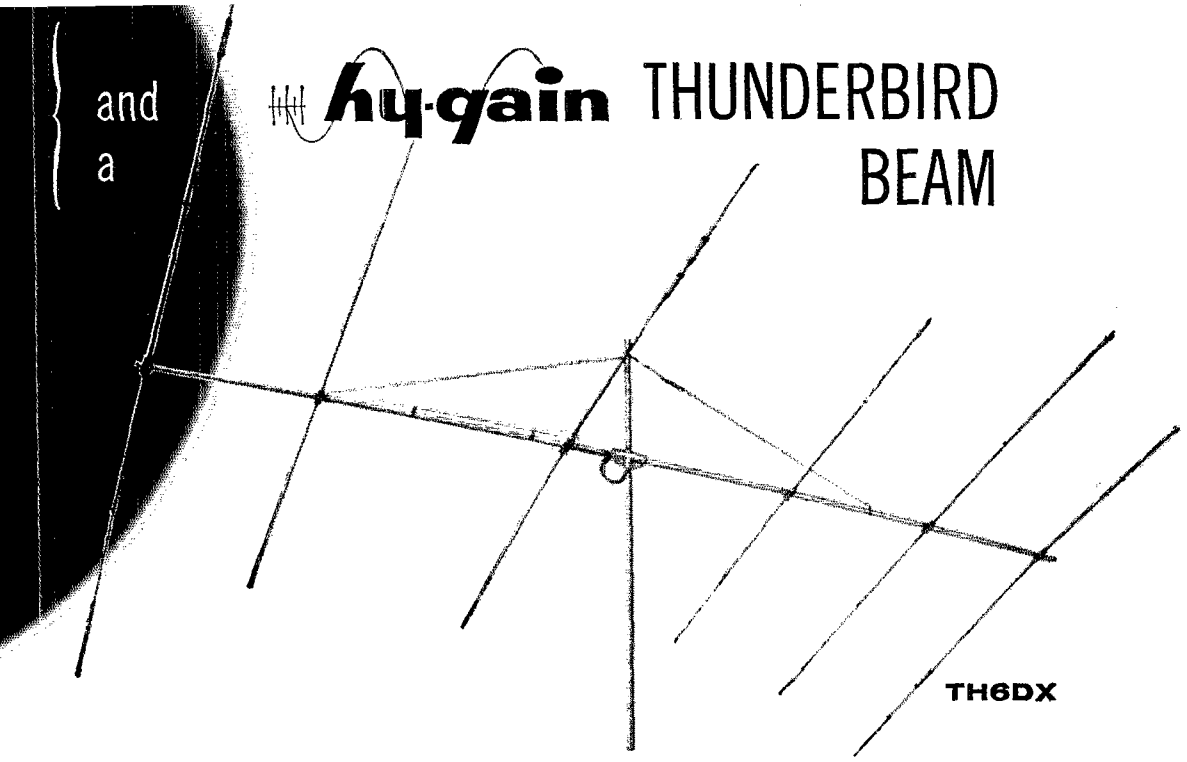
and a

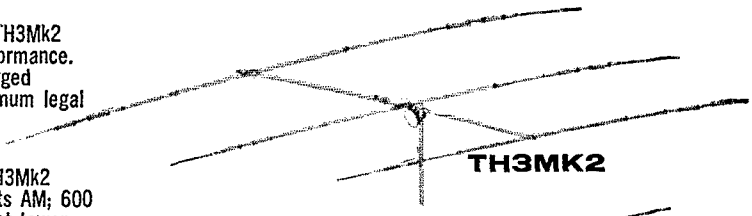
hy-gain THUNDERBIRD BEAM



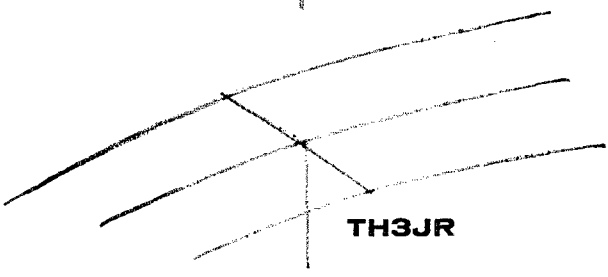
WHERE YOU WANT IT!

Hitch your Hurricane to a Hygain Thunderbird Tribander Beam . . . specifically, the ALL-NEW 6-element TH6DX for the ultimate in tribander performance and mechanical reliability on 10, 15 and 20 meters. Superb on DX and other long haul contacts. Separate Hy-Q traps, featuring large diameter coils developing exceptionally favorable L/C ratio and very high Q. Peak performance on each band—phone or CW. Takes maximum legal power. Model TH6DX, **$149.50**

The new, improved 3-element Model TH3Mk2 Thunderbird delivers outstanding performance. New "Hy-Q" traps for each band. Rugged construction throughout. Takes maximum legal power. **$114.95**



The fabulous Thunderbird Jr. Model TH3Mk2 3-element beam takes up to 300 watts AM; 600 watts PEP. For roof-top or light weight tower. Rotates with heavy duty TV rotator. Turning radius 14.3 ft. **$74.50**



The ruggedly constructed 2-element Thunderbird Model TH2Mk2 installs almost anywhere . . . delivers excellent performance. Features the new "Hy-Q" traps. Takes maximum legal power. **$74.50**

WE STOCK ALMOST EVERY ITEM IN THE HY-GAIN LINE — AVAILABLE FOR IMMEDIATE SHIPMENT

HAM SHACK

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fic: WA4WWT 678, WA4DYL 614, W4BAZ 340, WA4AGH 185, K4DZM 159, K4TRT 151, WA4VUE 126, WA4BZO 123, WB4CIY 121, WA4KFO 120, W4YOQ 82, W4NBZ 73, WA4AUG 50, WA4GMA 44, WA4TTE 44, W4CDA 40, WB4BTM 30, WA4UAZ 30, WA4GHQ 26, W4KJP 20, WA4BZS 14, K4HOE 13, K4VDO 12, K4LOA 10, W4BTA 9, WA4ZIR 6, W4SZB 5, K4UMN 5, WB4AFH 4, K4FPW 2, W4OYI 2.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—Asst. SCM: K. E. Stecker, W8SS. SEC: K8GOU. RMs: W8ELW, K8QLL, W8EU, K8KMQ. PAMs: W8CQU, K8LQA, K8JED. V.H.F. PAMs: W8CVQ, W8YAN. Appointments: WA8DEX, W8IUC, K8YHJ as ECs; W8EMD, K8YEK as OOs; W8IBB as OVS; W8DVB, W8EJR, W8TIC as OPSs; W8HKT, W8QQK, W8TBP, W8ZJE as ORSs.

Net	*Freq.*	*Time*	*Day*	*QNI*	*QTC*	*Sess.*	*Mgr.*
QMN	3663	2300	Dy.	909	507	56	W8ELW
WSSB	3935	0000	Dy.	907	80	28	K8VDA
U.P.N.	3920	2230	Dy.	810	98	28	W8OQH
B.R.	3930	2230	M-F	702	45	20	K8JED
PON-DAY	3860	1600	M-Sat.	506	402	26	WA8OGR
PON-C.W.	3645	2330	M-Sat.	145	60	24	3C3DPO
MICH 6	50.7	2400	M-Sat.	287	51	24	WA8LRC
LENAWEE 2	145.35		Dy.	234	70	26	WA8AAQ
M.T.N.	3605					14	WA8QAF
M.E.N.	3930	1400	Sun.	230	14	4	K8JED
SW MICH 2	145.25	0100	Mon.	70	5	4	W8CVQ

New officers: Kent ARC—K8BPT, pres.; WA8IGT, vice-pres.; WA8IGW, secy.; WA8MZG, treas.; K8CGD, W8VV, K8ZKU, WA8CTC, WA8DOA, WA8OET, board. Monroe County RCA—W8WXO, pres.; K8YKD, vice-pres.; WA8RRT, secy.-treas.; W8NDM, W8BSZ, WA8-EFK, trustees. SPARS—WA8MJT, pres.; WA8GLH, vice-pres.; K8TEI, secy.; WA8QCV, treas. The U.P. conducts a swap and shop each Sun. at 2230 on 3920. Old Timers' Nite at Henry Ford Museum will be held May 6. The U.P. Hamfest will be held at Manistique Aug. 5 and 6. BPLers: W8ZGT and W8IV. K8DYI, WA8RKF and W8DZU are recovering from heart attacks. K8YJZ. WA8TUE and WA8THK made General. WA8CSR has a new Clegg 22er. K8ILN, WA8PII, W8-JPJ and W8AUT are recovering from illness or surgery. The U.P. Telethon, handled by the Hiawatha RC with, W8JXJ as chairman and W8ZUL and W8IOC as co-chairmen, was a big success. WA8CHD, K8YHR, K8-IWP, WA8RJL, W8EFF, WA8BQR, W8HRL were tied up in the Boy Scout Klondike Derby. WA8BQQ is getting better after a fight with a snow-blower. W8ENT took his winter vacation in California and Mexico. Old-Timer W8FOV is in Running Springs, Calif., for the winter. WA8RZS built a 6146 50-watt 6-meter final. W8-MWG has an HA-10/SX-117 combination. WA8QCV has a new Johnson 6N2 with a v.f.o. Traffic: (Feb.) W8ZGT 575, K8KMQ 372, WA8OGR 329, W8IWF 294, W8IV 189, W8HQL 181, W8IUC 165, WA8LXY 106, W8FX 100, K8ZJU 98, W8EU 88, WA8MCQ 67, W8ELW 66, K8-JED 62, WA8MAM 56, WA8IAQ 55, W8YAN 50, K8-GOU 48, W8MRM 46, WA8CQB 45, K8HLR 45, WA8PII 45, WA8CQR 44, W8OQH 40, K8QLL 38, W8QQK 37, K8VDA 33, WA8LRC 32, WA8PWF 31, WA8CZJ 30, W8RTN 30, W8WVL 28, W8TBP 26, WA8SLP 25, K8-TYK 24, WA8GTM 23, K8KRX 8 22, WA8LRB 21, K8-HSJ 20, WA8KME 19, WA8ORC 18, W8BEZ 17, WA8-LKI 15, W8UFS 15, W8AUD 12, W8DSE 10, W8QF 10, W8NOH 7, WA8SQC 5, W8AAM 4, W8USH 1. (Jan.) W8IV 120, K8HLR 65, W8UM 59, K8YGH/8 52, WA8PII 50, W8MTI 40, K8QLL 32, WA8SLP 28.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE. SEC: W8OUU. RMs: W8BZX, W8DAE and K8LGB. PAMs: W8VZ and K8UBK.

	QNI	*QTC*	*Sess.*	*Percentage*
OSSB	1625	874	52	16.8
BN		255	28	9.1
OLN		140	28	

Mahoning Valley RA's 1967 officers are WA8GLF, pres.; WA8VPC, vice-pres.; W8PS, secy.; W8DPK, treas. WN8SAQ is a new Novice. WA8VPC is a new Technician. WA8EDH has a tri-bander beam. WA8AGV has a new Invader 200. K8ORG has a new 51S1 receiver. K8ZIC has a Sixer. WA8OVD has a new SB-110. WA8-SCN is now using a 75A-4 receiver. Someone stole K8-EOK's SB-100. WA8IFI says W8VRR is a new Technician in Wharton; WA8SKS and WA8SWG received their General Class licenses and WA8KHR lost his quad in an ice storm. K8DIU is in Viet Nam. K8HDO reports that W8ILC and W8NDP received their Worked All Ohio Counties certificates. The Student Net works weekdays at 2045Z on 7245 kc. and welcomes all students to participate in the rag chews. Those wishing to handle traffic should get into the Ohio Slow Net at 2325Z, the Buckey Net at 0000Z or the Ohio Late Net at 0300Z. All these nets are on 3580 kc. Inter-City RC's *IRC News Bulletin* says the club held an auction and W8FGB toured Europe visiting many ham shacks in Germany and Yugoslavia. Stark County C.D. had a meeting to reorganize c.d. communications. Queen City Emergency Net's 1967 officers are WA8ELC, pres.; W4PII, vice-pres.; K8JZA, secy.; W8MXR, treas.; WA8GPQ, comm. mgr. W8UPB, our Great Lakes Division Director dropped in on the Lima Area ARC. The club has 21 enrolled in code and theory classes with theory by W8LEV and code by WA8NFY. W8WCW lost his antenna in a wind storm. Toledo's *Ham Shack Gossip* tells us W8CFN and WA8RWE (ex-W8IPM) joined the Silent Keys, WA8SYE and WA8VPA received their General Class licenses, WN8VMC and WN8VMD received their Novice licenses, Toledo Mobile RA held its 12th Annual Auction. Toledo RC held its Ladies Night Dinner and 1967 officers are K8KYB, pres.; WA8GEL, vice-pres.; K8GOP, treas.; WA8WHA, rec. secy.; K8DTL, corr. secy, Wood County ARC's 1967 officers are WA8ONA, pres.; WA8IXU, vice-pres.; K8YLM, secy.; W8PXK, treas. W8BZX spoke to the Treaty City RC on the national traffic system. K8BXT reports that WA8SRB received his General Class license and WN8VOI is a new Novice in Howland. W8GIU lost his 15- and 20-meter quad in an ice and wind storm. WA8AJD moved to Wash. Parma RC saw two films. "Happy Holidays-Camping in the Smokies" and "The World of Stainless Steel." The Steubenville RC's code and theory classes conducted by K8LQM had 12 pass the Novice exam. Springfield ARC's *Q-Fire* says W8LAB was released from the hospital and WA8QNI was appointed communications chairman for the Red Cross Clark County disaster committee. Greater Cincinnati ARA's *The Mike & Key* has a large picture of W8HDB, W8UPH and W8NAL made the BPL in Feb. Last warning to all appointees: Send me your certificate for my endorsement or your appointment will be cancelled. Traffic: (Feb.) W8UPH 1773, WACFJ 264, WA8PZA 255, W8NAL 252, K8LGA 227, W8CHT 213, W8BZX 195, WA8OUG 165, WA8FSX 163, W8DAE 145, W8OUU 118, WA8QXQ 105, WA8LAM 96, K8UBK 96, W8QCU 92, WA8QNN 80, W8-DQD 74, WA8NTA 72, WA8LOW 65, W8TV 59, K8BYR 58, W8OE 56, WA8FGD 54, K8EZJ 52, W8GOE 49, W8-GVX 39, K8DHJ 36, K8LGB 36, WA8PQL 36, W8LZE 33, K8BXT 30, W8CXM 30, WA8RWK 28, WA8FZS 25, WA8SJN 21, WA8SED 20, WA8MHO 18, WA8CXU 17, K8DDG 17, WA8CXV 15, WA8NSL 15, W8QZK 15, W8-WEG 14, K8DVM 13, K8QYR 12, WA8AJZ 10, W8LT 10, W8GIU 7, K8ONQ 7, K8QEW 7, K8APH 4, WA8RLM 4, K8RXD 3. (Jan.) K8DIU 30, W8ILC 10.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC. RM: WA2VYS. PAM: W2IJG. Section nets: NYS on 3670 kc. nightly at 2400 GMT; NYSPTEN on 3925 kc. nightly at 2300 GMT; ESS on 3590 kc. nightly at 2300 GMT. Appointment: W2CRS/K1UGQ as OVS. Endorsement: W2WXP as EC. A CP-30 and new driver's license is reported by WB2UHZ. Congrats. W2VP likes his new TD3 Jr. trap dipole on 10-15-20. Also, WB2RBG has a new Heath HO-10 scope. Again congrats. EC WB2WXB reports future nets on 6 and 10 meters plus a possible northern 2-meter net for Westchester County ARPSC. A review of the ENY clubs shows that WB2VBI spoke to the Albany Club on balloons and radio as a representative of the Dudley Observatory. The Albany Club is 55 years old; was organized in 1912 and functioned through two wars. It may be the oldest club in our section. Congrats. In Schenectady, WB2EAF spoke on s.w.r. indicators and their application. He is a member of General Electric's Research & Development Center. Also in Schenectady, WB2NYM received ARRL's Public Service award for obtaining a drug for a critically ill woman in France. A beautiful new masthead crowns *The Bandspread* of the Westchester County Club where VE2AIX, vice-consul of the Canadian Embassy, spoke on Expo '67. At New Rochelle, the Communications Club featured transistors and solid-state devices. Officers were elected at the RPI Club according to their *ESS-ZED News Letter* and Pres. WA0DEV. Our congrats to WA2UZK on making the BPL for Feb. traffic. Traffic: WA2UZK 815, WB2-UHZ 352, WB2UUD 69, WA2VYS 60, W2ANV 58, K2LKI 46, WB2FOA 44, K2HNW 37, WA2SPL 36, WB2JYV 31, K2SJN 29, W2EAF 27, W2UC 23, W2URP 21, WB2FXB 18, WA2ZPD 10, WB2RBG 2.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2UDB—Asst. SCM: Fred J. Brunjes, K2DGI. SEC: K2OVN. PAM: W2EW.

NLI	3630 kc.	1915 Nightly	K2DXV — RM
NLIVHF	145.8 Mc.	2000 TWTh	WB2RQF — PAM
NLIVHF	146.25 Mc.	1900 FSSnM	WB2RQF — PAM
NLIPN	3932 kc.	1600 Daily	WB2SLH — PAM

EIMAC vapor-cooled high-linearity tetrode powers unique new 2000 watt PEP linear amplifier

The unique new linear amplifier shown here is powered by an EIMAC 4CV1500B tetrode. The ultimate in amateur equipment, this fine linear was designed by Jack Quinn, W6MJG, and uses the advanced concept of vapor-phase cooling for ultra-quiet operation. The amplifier runs cooler than most forced-air-cooled amplifiers, and because there is no extraneous noise from air blowers, your shack is quiet—ideal for receiving weak DX signals! On CW, the amplifier has an average input of 1 kW, with only 400 watts of plate dissipation at 60% efficiency.

High SSB performance of the amplifier is credited to the 4CV1500B's outstanding intermodulation distortion characteristics...better than −40 db third-order products at all drive power levels from zero to 2 kW PEP. The 4CV1500B—and its air-cooled brother, the 4CX1500B—are products of a four-year development study which included optimization of internal tube geometry by computer techniques. Because the tube has very low grid interception (typically less than 1.5 mA grid current) it is possible to drive the grid positive without adverse effects upon the distortion level of the driver. Both tubes are recommended for Class AB_2 linear amplifier service. For further information on advanced EIMAC power tubes, write Amateur Services Department or contact your nearest EIMAC distributor.

4CV1500B
TYPICAL OPERATION (Frequencies below 30 MHz)

DC Plate Voltage	2500	2750	2900	V
DC Screen Voltage	225	225	225	V
DC Grid Voltage	−34	−34	−34	V
Zero-Signal DC Plate Current	300	300	300	mA
Single-Tone DC Plate Current	720	710	755	mA
Two-Tone DC Plate Current	530	555	542	mA
Driving Power	1.5	1.5	1.5	W
Useful Output Power	900	1100	1100	W
Intermodulation Distortion Products				
3rd Order	−38	−40	−43	db
5th Order	−47	−48	−47	db

We have a new brochure entitled "Linear Amplifier and Single Sideband Service." Write for your copy.

EIMAC
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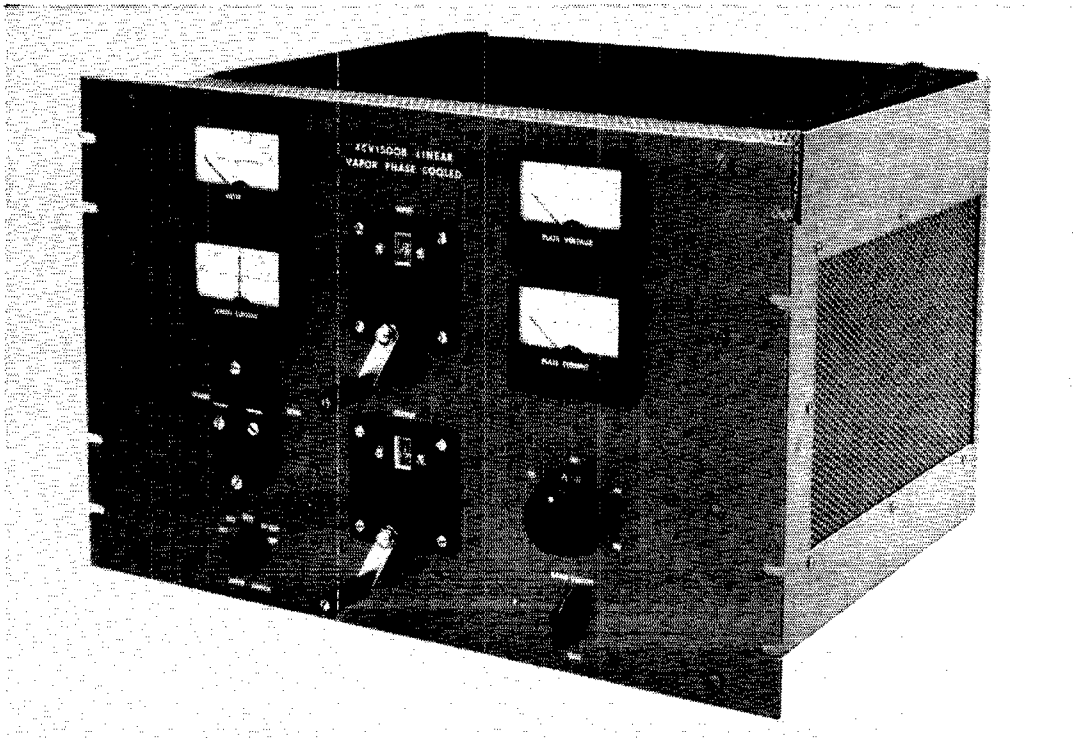

NLS (Slo) 3630 kc. 1845 Nightly WB2UQP — RM

K2UBG says, "Traffic is dogboned dull, dull, dull!!" Let's spike the system with a few *originations* expertly garnered from the recipients of the traffic that is coming through, as *himself* (Feb. '67 *QST*, p. 66) hath said. WB2UQP joined up with Army MARS. WB2DVK built a superhet receiver which has no i.f. transformers but performs well on s.s.b. and c.w. On the other hand, a.m. is still like, Yuk! WB2HYK has been doing NCS duty on the Queens RACES Net. SWLs are loading WB2CB up with QSL cards. W2DBQ has been telephone relaying the dickens out of the 15- and 20-meter bands since he put the big outspoken linear on. WA2MUG, of the NYS National Guard 101st Sig. Batt., is now with the Army Signal School at Ft. Gordon, Ga. WN2UBE has now become WB2ZSP, which is the way some things go. K2DDK has now put together a Heathkit SB-301 receiver, SB-401 transmitter and an SB-610 monitor scope so he's ready for business. WB2EUH, exalted-ORS-on-college-leave type operator, still is "head above water" at Notre Dame. Listen, our revered old Hudson Division Director was promoted to full commander USNR just a little bit ago! Visited Phoenix, Ariz. in March and had a very pleasant chat with W7FKK, SCM of Arizona. WB2SHZ, vice-pres. of the Cardinal Hayes HSRC, passed the test for General. Congratulations. WA2JZX got married a short while back and has set up an HE-50 portable two in Valley Stream, but the big rig *one* still is back at Mom's. K2PHS and WN2YGO recently joined up with the Suffolk County RC, which just as recently appointed the dauntless K2KJX to lead them through the wilds of Po-Qua-Tuk this coming Field Day. Over at the Rockaway ARC, the intrepid W2VZQ has received similar Field Day honors. In the meantime, back in the 5-transmitter class, the New York RC and the Lake Success RC are girding up to whomp the Five Towns RC guys who have been the undisputed leaders of that class for the past two seasons. W2NBI, indomitable pres. of the Lake Success RC, recently remarked, "We'll expunge 'em!" (Gee, I love that kinda talk!). The Massapequa RC TVI Committee, under K2PQY, has gotten off to a very good start. More and more stations are required to bridge the gap between our v.h.f. net on 2 meters and the other nets, NLI, NLIPN and NLS down on 75/80 meters. This section is a difficult piece of real estate to cover and it takes all of our facilities to do it. Why not look up the RMs and PAMs and casually say, "Hey, I can do it!!" Watch 'em flip! W2TUK, our faithful old DD, goes to the ARRL Board type meeting in May and he loves to go armed to the teeth gums with recommendations on all sorts of things. So, if you haven't done it yet, do it now! Don't waste your peachy-keen idea on the earpans of some guy on the bands. Traffic: K2UBG 192, W2GKZ 146, WB2UQP 113, WB2AEK 92, WB2SLH 76, WA2WYL 75, W2EW 66, WB2QIL 57, WB2DVK 55, WB2RQF 54, WB2DXM 37, WB2HYK 33, WB2TCS 33, WB2ACH 32, WB2HLX 28, WB2NGZ 24, W2EC 20, W2UJN 19, W2BCB 13, W2DBQ 13, W2PF 10, WA2RUI 10, K2IDB 7, WB2TWH 7, WA2QJU 4, WA2JZX 2, WB2BKS 1.

NORTHERN NEW JERSEY—SCM, Louis J. Amoroso, W2LQP—Asst. SCM: Edward F. Erickson, W2CVW. SEC: John W. Banke, K2ZFI. ARPSC Section net schedules:

NJN	3695 kc.	Daily	7:00 P.M.	WA2KIP RM
NJ Phone	3900 kc.	Ex Sun.	6:00 P.M.	W2PEV PAM
NJ Phone	3900 kc.	Sun.	9:00 P.M.	W2ZI PAM
NJ 6	51,150 kc.	M W Sat.	11:00 P.M.	K2VNL PAM
NJ 2	146,700 kc.	Tu. Sat.	10:00 P.M.	K2TPZ Mgr.
NJ P.O.	3900 kc.	Sun.	6:00 P.M.	WA2TEK Mgr.

All times shown local. AREC net skeds are available from SEC K2ZFI. New appointment: WB2TKP as OPS. Endorsements: WB2BCS, WB2NSV and W2TSN as ECs; W2BVE, W2JAE, W2TPJ, W2VMX and WA2CCF as OOs; WB2IYO and WB2QLF as OPSs. Glad to have them all back for another year. Also glad to have K2VNL and W2PEV continue on as PAMs. Hudson Division Director W2TUK and SCM W2LQP spoke at one of the Bergen Amateur Radio Assn. meetings. WB2RJJ is waiting for that KL7 QSL for his WAS. W2MUI built an AZL converter. WA2CCF applied for DXCC with 102 on phone. A new radio club has been started at the Madison YMCA. Club officers are WB2GTK, trustee; WB2RKK, pres.; WB2WFO, vice-pres.; ex-WN2UEP, secy.; WN2ZQN, treas. The club station includes a TR-4 and an SB-100. WB2WWH is now the editor of the *NJN Bulletin* and expects to put out a 4-page edition. WB2UFV's new equipment includes the T4X and SB-200. He has the R4X on order. Sounds like an FB traffic setup. WB2IYO has a 2-meter net going for the ECs. It's on Sun. at 8 P.M. on 146.7. WN2YDV is now using an HT-40 and an SX-130 at his QTH. WB2-YHI, a new ham in Closter, has a Drake R4A. W2PBZ's DXCC total is 119. W2NHZ is building a four-element tri-band quad using plastic spreaders. W2ABL is working on a new linear. WB2KTO's DXCC is now 177/170. W2BVE has been appointed to the state staff of Army MARS. W2CVW is replacing the 866s in his Valiant with silicons. WB2HJW received his new Swan 350 and is erecting the quad again. WB2NHT and WB2TEA are members of Navy MARS. K2KDQ expects to have sixteen elements and 65 watts on 220 by June. Hudson Division Director W2TUK, with Vice-Director K2SJO and SCM W2LQP, presented the ARRL affiliation charter to the Knight Raiders V.H.F. Club. Traffic: (Feb.) WB2WWH 308, W2PEV 149, WB2RKK 124, WB2-UFV 112, WA2IGQ 89, K2VNL 70, WB2OHK 64, WA2-TAF 53, W2BVE 44, WA2TEK 37, WB2WWH 33, W2LQP 32, WB2IYO 31, K2EQP 30, WB2TKP 22, WB2SJH 21, W2TFM 20, K2ZFI 18, WB2UIR 16, W2DRV 15, WA2-TBS 14, WA2KZF 13, WB2UOQ 11, WB2NZU 9, K2MFX 5, WB2VHG 5, WB2VCC 4, WB2RJJ 2, WB2QGB 1, W2-QNL 1. (Jan.) W2CVW 28, K2USA 19, WB2VUJ 6.

MIDWEST DIVISION

IOWA—SCM, Owen G. Hill, WØBDZ—Asst. SCM: Bertha V. Willits, WØLGG. SEC: KØBRE. PAM: WØNGS. RMs: WØTIU, WØSCA. Officers of the new Tri-State ARC are WØVPW, pres.; WAØDYG, vice-pres.; WAØKTN, secy.-treas. New officers of the Central Iowa ARC are WAØMIT, pres.; WAØAVW, vice-pres.; WØEFL, secy.-treas. WØCXN was in England for his son's wedding. Jack, ex-WAØFSQ, is now WB4ELY. KØVDY is on 6 meters in Iowa City. WAØ-PUJ now has a General Class license after only three months as a Novice. New appointees: WØTGQ as OO; WØJIG, WØOSC as ECs. The Lee Co. WX Net meets Tue. at 0030Z on 50.46 Mc. The HPAK AREC Net meets on 3910 kc. at 1:30 P.M. Sun. The Iowa 160-Meter Emergency Net reports QNI 823, QTC 10 in 28 sessions. The Iowa 75-Meter Net reports QNI 1296, QTC 249 in 24 sessions. WØNWX is enjoying 10-meter DX with low power. Traffic: WØLGG 2019, WØLCX 539, WØCZ 89, WØZCQ 67, WAØDYV 34, KØTFT 32, WAØJUT 29, WAØNEV 29, KØBRE 23, WØJPJ 23, WAØAFY 14, KØTDO 13, WAØBSF 12, WAØMIH 12, WAØAIW 9, WAØNEH 9, WAØPUJ 7, WAØDUB 6, WØLJW 6, WA9RCS/Ø 5, WØNWX 4, WØNGS 3, WAØMIT 2.

KANSAS—SCM, Robert M. Summers, KØBXF—SEC: KØEMB. PAM: KØJMF. RM: WAØMLE. V.H.F. PAMs: WAØCCW, WØHAJ, WAØKSK, WAØ-LSH. Wx Net Mgr.: WAØLLC. Boothill Amateur Radio Club's officers are KØJDD, pres.; WNØOPX, vice-pres.; WAØJFV, secy.; WAØKHN, treas. Aug. 20 has been set for the hamfest date in Dodge. At Emporia the NVARC has at its helm this year WNØMUI, with WAØBMS as vice-pres. and WØZGB secy.-treas. and editor of *QRM*. Newton ARC elected KØSJX, pres.; WØCIZ, vice-pres.; KØWER, secy.-treas. On Feb. 11 and 12, KØYRQ went mobile covering some 1400 miles of Kansas soil, 42 counties to be more exact, giving 1352 QSOs in a 36-hour period to stations looking for various Kansas counties. WAØMLE soon will be heard with a new SB-101. WAØLSH has a new TR-108. WØGDH has worked WAS on 160 after several years of hard work with less than 100 watts of power. The new 6-Meter EKN is in operation Thurs. only at 2100 CST on 50.22 Mc. as a state net combined with ARPSC, e.d., and the JARS club in KC. The net will handle traffic and be affiliated with the NTS through proper liaison. WAØLHN is NCS. WAØNGV is Asst. EC of Zone 9. Zone 7 lists WØHNC, KØFIG, KØGZP, KØPUX and WAØFCO as new Asst. ECs. Net control stations for KWN are WAØPMC, WØCWJ, KØLPE, KØEMB and WAØLLC. Zones 7, 10, 11 and 15 report increases in membership. Zone 7, 11, 15 and the Coffeyville area nets report a total of 59 sessions, 241 QNI, 30 QTC. Individual reports are listed as received. Zone 7, 75 meters, QNI 63, QTC 5; Zone 10, 75 meters, QNI 73. Zone 11, 2 meters, 18 sessions, QNI 64, QTC 7; the 75-Meter Net, 4 sessions, 127 QNI, 12 QTC with 13 stations reporting 100%.

	Sess.	*QNI*	*QTC*	*Days*	*CST*	*Freq.*
KPN	15	341	50	MWF	0645	3920
				Sun.	0800	3920
KSBN	27	817	191	M-Sat.	1830	3920
KEC	4	61	9	Sun.	1300	3920
KWN	28	28	770	Dly.	1800	3920
QKS	28	280	156	Dly.	1900	3610
QKN	4	26	12	Sun.	1600	3735
KAN PI Net				Sat.	2105	145.350
NE Ks.	4	36	5			
N. Cntrl	4	30	11			
SW Ks.	4	9	2			

Traffic: WØINH 310, KØMRI 199, KØJMF 194, WAØ-MLE 163, KØYRQ 121, WØAVX 108, WAØLLC 106, KØGZP 101, KØHGI 86, WAØCCW 79, KØBXF 72,

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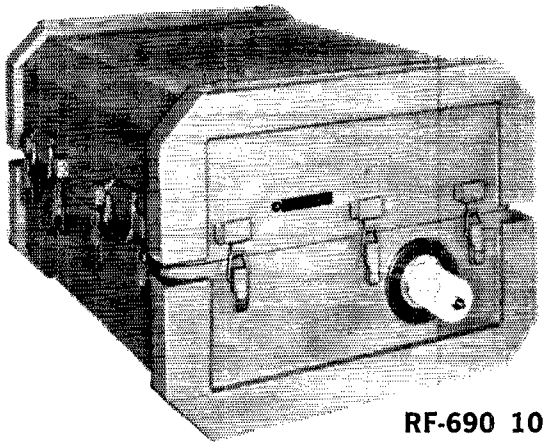

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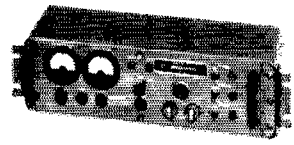
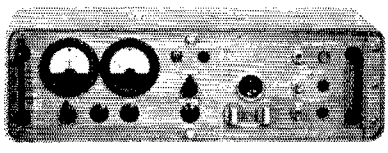
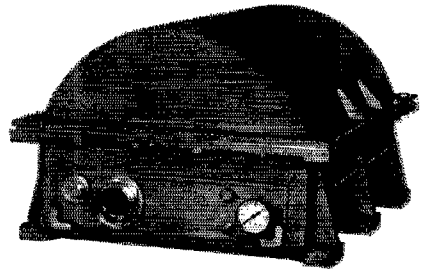


RF-690 10 KW COUPLER

The RF 690 10 KW p.e.p. and average power antenna coupler automatically matches any known 10 KW transmitter to a 35 foot whip over the 2-30 Mc band. Manual and automatic tuning are available. No band information is required and all solid state circuitry is employed. There is a built in dummy load. The RF-690 is designed to MIL-E-16400.

AN/URA-38 (RF-601)
1 KW COUPLER





The AN/URA-38 (RF-601) 1 KW p.e.p. and average power antenna coupler matches any known 1 KW transmitter to a 15, 25 or 35 foot whip antenna over the 2-30 Mc band. Full MIL-E-16400. In high quantity production for the U.S. Navy under NOBSR 93367.

BOTH THE RF-690 AND THE AN/URA-38 (RF-601) CAN OPERATE AT HIGHER POWER LEVELS DEPENDING UPON THE ANTENNA USED.

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KØEMB 62, WAØNKQ 42, KØJDD 40, WØCWJ 38, WØFII 22, KØKED 21, KØGII 19, WAØEMQ 15, WAØJII 15, WAØJOG 15, WAØKDQ 14, WAØHMZ 6, WØFDJ 5, WAØKDZ 3, WØWFD 1.

MISSOURI—SCM, Alfred E. Schwaneke, WØTPK —SEC: WØBUL, WØGCL and KØONK renewed as ORSs; WAØHQR as OPS and WAØFLL as OBS. Dates to mark on your calendar: June 17-18, Hambutchers Net Picnic in Shadow Rock Park, Forsyth, Mo.; June 24-25, club competition for SCM Field Day Award, ARRL FD; Aug. 27, SMARC Annual Hamfest and Picnic at Fassnight Park in Springfield, Mo. Scoring for the SCM FD Award last year gave special advantage to operation on certain bands, so this year the score will be simply the total number of FD contacts on any one selected band without regard to the number of different sections worked. WNØQYR is a new Novice after attending classes of the ARC of Central Mo. (Sedalia). WØCHO has a new tri-bander on a 50-ft. tower. WAØCWV is at Keesler AFB in Miss. and can be heard on club station K5TYP. WNØOTS passed the Gen. Cl. license, got CP-20 endorsement and completed WAS as a Novice. NCSs for the Hambutchers Net are WØAVX, WØGQR, WAØBHG, KØICB, KØHGI and WAØHWJ. KØORB has a new HRO-500 and LF-10 preselector. WAØITU organized a joint CB and RACES simulated disaster drill in Jackson Co. with 16 RACES and 18 CB units active. The St. Louis Contest Operators Club placed 4th in its first SS. OO reports were received from KØGSV, WØQWS and KØYIP. Net reports for Feb.

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
MEN	3885	2330Z	M-W-F	12	193	16	WØBUL
MON	3585	0100Z	Daily	28	242	214	WØTDR
MMN	7063	1900Z	M-Sat.	25	84	15	WØOUD
MoSSB	3963	2400Z	M-Sat.	25	572	145	KØTCB
MoPON	3810	2100Z	M-F	21	311	189	WØHVJ
MTTN	3940	2300Z	M-F	19	255	106	WAØELM
QMO	3580	2200Z	Sun.	4	11	8	WAØFKD
PHD	50.4	0130	Tue.(GMT)	4	77	9	WAØFLL
HBN	3880						
	7280	1805Z	M-F	20	524	143	WAØBHG

Traffic: KØONK 2011, KØAEM 242, WØTDR 238, KØYGR 190, WØZLN 183, WØOUD 180, WØEEE 175, KØRPH 168, WØHVJ 114, WAØFMD 106, WAØJIH 96, KØRWL 73, WAØITU 42, KØENH 38, WØGQR 32, WAØEMS 28, WØBUL 27, WAØHQR 25, KØVVH 20, WAØELM 17, WØRTO 15, KØTCB 14, KØORB 13, KØREV 8, WØZBR 8, KØGOB 7, WAØFLL 5, WAØIHV 5, KØFPC 2, WØGBJ 2, KØYIP 2.

NEBRASKA—SCM, Frank Allen, WØGGP—SEC: KØOAL. Appointments: WØHOP as EC. Section Net reports for Feb. 1967: West Nebr. Net, WØNIK, QNI 623, QTC 74. Wx QTC 146. 160 Meter Wx Net, WAØCBJ, QNI 635, QTC 0. Dead End Net, WAØMCX, QNI 1401, QTC 67. Nebr. Morning Phone Net, WAØJUF, QNI 934, QTC 47. Nebr. AREC Phone Net, WØIRZ, QNI 148, QTC 9. Nebr. Storm Net, WAØKGD, 1st session, QNI 1184, QTC 91; 2nd sessions, QNI 1264, QTC 80. Nebr. C.W. Net, NEB, WAØGHZ, 1st session QNI 76, QTC 204; 2nd session QNI 68, QTC 104. Nebr. Emergency Phone Net, WAØGHZ, QNI 1988, QTC 143. Nebr. AREC C.W. Net, WAØEEI, QNI 9, QTC 5. All ECs are urged to get their Form 5s to KØOAL by the 5th of each month. The Chadron Picnic will be held at Chadron State Park June 4; the Smoke Signal Senders Annual Pow-Wow at Chadron State Park June 3 and 4. Traffic: WAØDOU 337, WAØGHZ 296, WØNIK 124, WØLOD 110, WAØLOY 84, KØUWK 78, KØRRL 63, WAØIBL 53, WØGGP 43, KØJFN 43, WØGEQ 39, WAØORO 38, KØKJP 35, WAØKGD 24, KØQKW 24, WAØBOK 22, WØEWZ 22, WAØJZL 22, KØVTD 22, WØAGK 20, WAØOHO 20, WØBFV 16, WØVEA 16, KØJTW 14, WAØIXF 13, KØOAL 12, WAØGVJ 10, WAØCBJ 8, WAØEEI 7, WØHTA 7, WAØIBB 7, KØIXY 6, WØWKP 6, WAØJUF 5, WAØAES 4, KØFJT 4, WØWR 4, KØDGW 3, KØHNT 3, WAØIKJ 3, WAØIXD 3, WØPQP 3, WØYFR 3, WØHOP 2, WØKFY 2, KØODF 2, KØPTK 2, WAØKFP 1.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, John J. McNassor, W1GVT —SEC: W1PRT. RM: W1ZFM. PAM: W1YBH. Net reports for Feb.

Net	*Freq.*	*Days*	*Time*	*Sess.*	*QNI*	*QTC*
CN	3640	Daily	1845			
CPN	3880	M-S	1800	28	421	156

High QNI CPN: W1GVT 28, WA1EEJ, W1LUH and W1YU 22, W1YBH 21, K1DGK and K1SRF 19, WA1GBA 18, W1MPW 16, K1MBA and W1QV 15. Conn. Net report (Feb.): 28 sessions, QNI 361, QTC 300. High QNI: W1-

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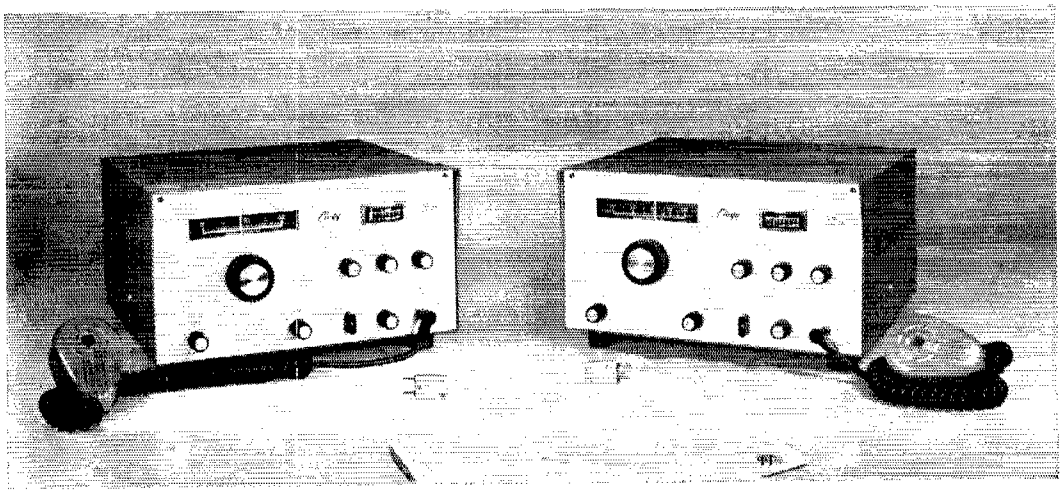
*QST — APRIL 1967, PAGE 48 **QST — APRIL 1965, PAGE 38



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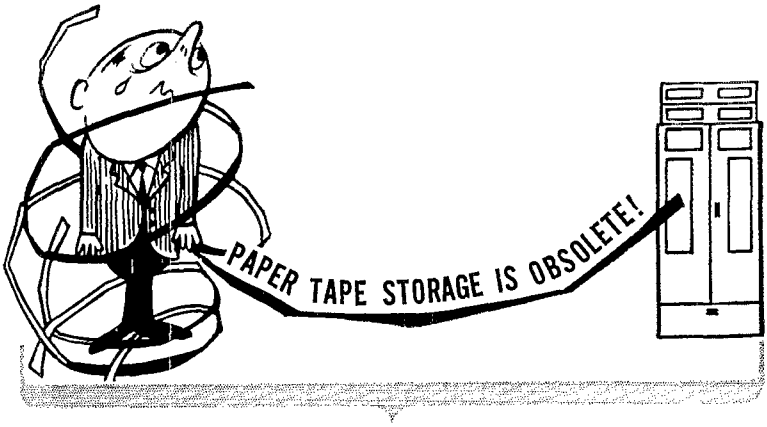
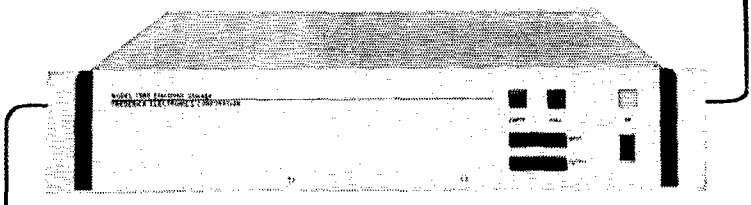
105

KUO, W1ZFM, W1RFJ, WA1FNJ. SEC W1PRT is working hard for complete statewide emergency communications. He is looking for an EC in the Willimantic area and would appreciate contact with stations in this area. Southington AREC mobile units assisted in the local Heart Fund Drive. The help of all available 10-, 6- and 2-meter mobile units will be appreciated by K1SRF for Parade Duty in Norwich Sun., May 7. Our most sincere sympathy to K1LMS on the sudden death of his XYL. The Willimantic Radio Club notes with sorrow the addition of W1TVU to the roster of Silent Keys. The new Canaan High School ARC is waiting for its club call. WA1CUV is pres.; WN1GJD is treas. Officers of the Bridgeport Jewish Community Center ARC are WA1EEO, pres.; WA1DTX, vice-pres.; WA1DTB, treas.; K1QGB, act. mgr. The Danbury CARA monitors 28.6 and 144.9 Mc. nightly at 8 P.M. W1KAM is developing the Slo Speed Net on 3740 kc. at 6 P.M. WA1EEJ is net mgr. of the N.E. Teenage Net, which meets daily at 4 P.M. on 3885 kc. and welcomes all stations. Congratulations to WA1HEW on the 20-w.p.m. certificate; W1EFW on making the BPL; Conn. Council on its request to provide an Official Conn. Amateur Radio Week including Field Day weekend! W1BDI is using some of his retirement time to really enjoy amateur operating. K1OMK is recovering from a recent illness. K1OQG is active on 160 meters with a 250-ft. dipole antenna. W1BKC is handling traffic with only low power. Traffic: (Feb.) W1EFW 535, W1AW 296, W1KAM 175, K1UDD 170, WA1FNJ 169, W1NJM 127, K1LMS 105, WA1CYV 97, W1GVT 89, W1BDI 83, K1SXF 72, K1RWF 60, K1QPN 51, K1RQO 51, K1OQG 48, W1YU 44, W1MPW 34, K1SRF 32, WA1DEM 31, W1CTI 30, WA1DUV 29, W1YBH 28, W1KUO 27, WA1HEW 22, WB2PFT/1 21, W1CHR 15, W1BNB 13, W1OBR 13, W1QV 13, WA1GBA 12, W1CUH 7, K1MBA 7, K1YGS 7, W1BKC 5, K1QPM 2, W1WHR 2. (Jan.) W1NJM 147, WA1DEM 35.

EASTERN MASSACHUSETTS—SCM, Frank L. Baker, Jr., W1ALP– W1AOG, our SEC, received reports from WIs QMN, RPF, LVK, UJF, K1s PNB, ERO, DZG. New appointments: K1DDE, K1IFY as ECs; W1IAU as OBS/OVS; K1OKE as PAM for 6; K1YZB, W1CT, WA1FSI, W6JCF/1, WA1ECY as ORSs. K1HBS, K1BGK's wife, is a Silent Key. Our sympathy to WA6-CQF on the death of his mother and to W3ROQ/1 on the death of his father. The 6-Meter Crossband Net had 20 sessions, 258 QNIs, 14 traffic. W1HIL is trying to get on 220 and 440 Mc. WA1DJC wants to hear from other school clubs. W1AAR keeps nightly skeds to Worcester and Westboro on 2. WA1DIT is control up there. EM2-MN had 21 sessions, 158 QNIs, 215 traffic. EMNN had 95 QNIs, 46 traffic, 12 sessions. W1NF keeps skeds with W3OY and W2JB on 3560 kc. K6YRF, ex-W1DHX, is on 15 and 20. EMN Jan. report shows 31 sessions, 253 QNIs, 288 traffic. WA1AZR has WAC and WAS. The South Shore Club held a meeting and had W1DXQ, Quincy C.D. Director. WA4JYB/1 is at MIT. WA1AIF sends code at 5 w.p.m. on 3810 kc. Tue. and Wed. at 7:30 P.M. W1THT lost both of his parents. K1LZV has a three-element beam on 10 at the new QTH. K1OVA is s.s.b. with a new National 200. WA1EFN is back on 2 with a Communicator. K1ESG lost his antenna in a storm. K1VOK lost his 2- and 10-meter beam. WA1FSI says she has been EMN's 1RN twice. WA1FKQ says the New England Teenage Net now meets Mon. through Fri. at 2100Z on 3880. WA1DEC-DED spent some time on Grand Bahama Island. K1ETT has a Swan 350. WA1-GXC and WA1DWZ are active in our c.w. nets. WA1DLT has the DX bug again. W1AOG had a nice time in Florida and attended a Tamiami RC meeting. New stations in our EMNN on 3733: K1NGQ, WA1s BGM, GXK, WN1s HES, GPU. Townsend RC meets the 2nd and 4th Fri. W1HKG was in and out of the hospital. Appointments endorsed: W1AOG, K1BTF as OVSs; W1AOG, W1AAR, W1BB as OPSs; W1BB as ORS; W1HKG as EC; W1NF as OO; W1OFK as OBS. Our New England States Emergency Phone Net on 3870 kc. meets Sun. at 0900. K1RNZ is on many bands. W1AEC handles traffic on 80 through 6. W1UOH is home after a stay in the hospital. WA1HDU, the XYL of W1EYU, is on 6. The Capeway RC has applied for ARRL affiliation. WA1EZB is on 2. New officers of the Massasoit ARA are W1WLZ, pres.; W1ECK, vice-pres.; W1LJH, treas.; W1KGU, secy.; K1AWP, WA1EBG, W1GLF, W1ULJ, planning board. The club meets the 3rd Tue. at G.A.R. Hall in Hanson. W1HBB had a heart attack. Middlesex ARC had a "Homebrew Contest." Wellesley ARS had W1KRD talk on "Impedance Matching." K1NDA, mobile on 75, put out an emergency call on Route 128 for a bad accident, which was answered by W1DBE, and the police came within 5 minutes. The Newton C.D. Club's officers are W1CFU, pres.; W1-RNG, secy.; W1LMU, treas. WA5IOP/1 is on 2 with 829B linear. WA1DPX/WA1HDQ was up in Vt. with 6- and 2-meter gear for the QSO Party. WA1HBB is WA1EFN's call for Peaks Island, Me. W1ELP lost tow-



AN INTERFACE BETWEEN TELEGRAPH CIRCUITS



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ers and beam in a storm. WA1FBH has a new transceiver for 6. W1CFU is on 80 c.w. W1LMU is working on transistor converters for 6. K1ZGH is pres. of the Mass. Chapter NAHC. W1ITW is active on 10. The Yankee RC had a talk by Lt. Cmdr. Charles Callahan of the Navy on trouble shooting and recovery problems in Electronic Communications. WA1HFV is at Clark Air Base in the Philippines. Traffic: (Feb.) W1PEX 2121, W1DOM 322, W1OJM 235, W1EMG 227, K1PNB 198, W1OFK 173, WA1EVY 92, WA1DPX 88, K1YZB 82, WA1EYY 81, W1UIR 79, W1CTR 57, K1WJD 49, WA1EUU 46, W6JCF/1 45, WA1EFN 43, K1VPJ 41, W1FJI 34, W1SIV 34, K1ESG 32, K1VOK 29, WA1FSI 27, K1LCQ 25, W1CT 20, WA1FKQ 19, W1MX 17, W1DAL 15, WA1DEC 14, K1ETT 13, WA1GXC 13, K1GKA 12, WA1DED 10, K1OKE 10, K1ZGH 9, WA1DWZ 6, WA1DLT 5, W1AOG 3, K1CLM 3. (Jan.) K1PNB 235, WA1EUU 49, W6JCF/1 31, K1OKE 11, WA1CDI 2.

MAINE—SCM, Herbert A. Davis, K1DYG—SEC: K1QIG. PAMs: K1WQI, K1ZVN. RM: K1TZH. Traffic nets; Sea Gull Net, Mon. through Sat. on 3940 kc. at 1700 to 1800 and 2000 to 2100. Pine Tree Net, daily on 3596-kc. c.w. at 1900. K1TZH is resigning as RM after doing a real nice job. All the fellows will miss him. W1BJG is taking over the RM job. He has been very active and will do a nice job and all of the fellows are behind him. The news from K1JKT: The PAWA had 32 at the open house. The club will have a new s.s.b. station and check into the SGN. K1RQE has worked 282 countries. K1MTJ is working on a research vessel in the Pacific, the banquet will be held May 13 at the Holiday Inn. Many thanks to all who participated in the Maine QSO Party, looks like c.w. again. The club station at the University, W1YA, is active with 20 members, reports K1UXZ, has an NCX-3 and a new antenna and provides message service for students. Traffic: W1NND 52, K1WQI 47, W1GU 33, W1YA 10.

NEW HAMPSHIRE—SCM, Robert C. Mitchell, W1SWX/K1DSA—SEC: K1YSD. PAM: K1APQ. RM: Open.

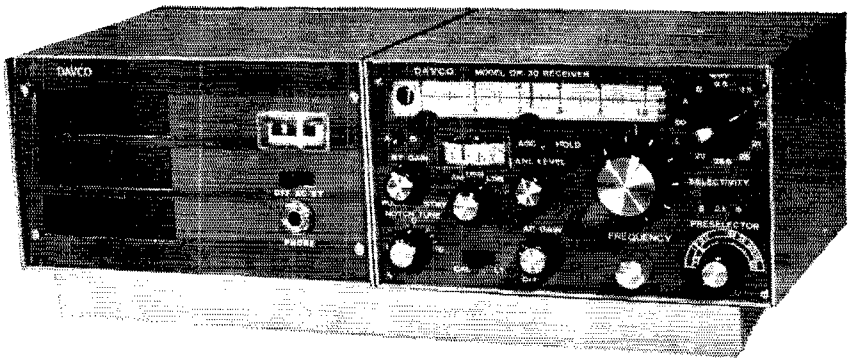
Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*	*Mgr.*
GSPN	3842	2300Z	M to F		692	75	K1APQ
GSPN	3842	1330Z	Sun.	—	—	—	K1APQ
VTNHN	3685	2230Z	M to F	No net report			K1UZG
NHPON	50.82	2400Z	M to F	No net report			K1BGI
MVAREC	50.82	0100Z	Mon.	4	37	1	K1DWK
NHEPN	3842	2230Z	Sat.	4	85	6	K1YSD

Greetings from sunny Puerto Rico. Congratulations to all who put in so much time in the 1966 SET. New hams: WN1HGL Franklin, WA1HHR Hudson and WA1HIU Ossippee. K1PQV and W1MHX received 1RN certificates from W1EFW. We welcome Phillips Exeter Academy as an ARRL affiliated club. K1PQV has a new 40-meter rig. WA1DAO is on 20 with a new antenna. W1PYM is home from California. WA1FSZ is building a 6-meter transceiver. WA1DKD is looking for others to check into the 146.7 Net Sun. at 0900 local time. W1BYS vacationed in W4-Land. Traffic: (Feb.) W1MHX 28, K1YSD 25, K1PQV 21, W1ALE 17, K1MNK 17, WA1DAO 7. (Jan.) K1YSD 25.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: K1LII. RM: W1BTV. PAM: W1TXL. V.H.F. PAM: K1TPK. Endorsements: W1BTV as RM, OO and EC. The NCRC of Newport reports that it will begin a course in radio for beginners. Persons interested in enrolling in the course should contact club members or WA1FFL for details. WA1HJM, of the club, is back on the air. The W1AQ Club of Rumford issued the following WRI certificates: No. 94 to W4OWE, No. 95 to K2VGR, No. 96 to W2BWW and No. 97 to K8KPM. The Fidelity ARC was active in the recent DX Competition. Among those participating in the phone portion were W1SXQ and WA1s EEJ, FGB, GGD and BOP. Operating the c.w. portion were WA1GGD and WA1BOP. The club has several new members who are studying for their Novice Class exam. Plans to hold R.I. Amateur Radio Week from June 4 through 10 are now being worked on by a committee and rules for obtaining a certificate will be supplied later. Are all appointment endorsements up to date? If not, be sure to send your certificates to be endorsed to the SCM. Traffic: WA1EEJ 173, W1TXL 170, W1YKQ 112, W1BTV 52, K1TPK 45, K1VYC 37, WA1CSO 28, K1VPK 17, K1CPL 15.

VERMONT—SCM, E. Reginald Murray, K1MPN—SEC: W1VSA. RM: K1UZG. Feb. net reports.

Net	*Freq.*	*Time*	*Days*	*QNI*	*QTC*	*NCS*
Gr. Mt.	3855	2230Z	M-S	513	19	W1VMC
Vt. Fone	3855	1400Z	Sun.	185	—	W1UCL
VTNH	3685	2330Z	M-F	84	38	K1UZG
VTCD	3990½	1500Z	Sun.	33	2	W1AD
VTSB	3909	2230Z	M-S	720	46	W1CBW
		1330Z	Sun.			



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Power requirements: 12 volts DC @ 300 ma. maximum.

Price: from factory **$389.50**

DR-30-S: Complete regulated power supply for operation of DR-30 from 110/230 volts 50/60 cps, plus battery holder for 9 D-size cells for portable operation; speaker, earphone jack. (Illustrated above) **$39.50**

The DR-30 is fully compatible with any transmitter. At a cost equivalent to an accessory PTO, the DR-30 gives the transceiver-equipped station an unequalled receiving capability. It is the appropriate nucleus for any amateur station.

DAVCO receivers for telemetry, radio astronomy, WWV, SWL's and other special applications are available from stock or can be provided to your specifications. Your inquiry, detailing your requirements, is invited.

Send us your card for an information package containing evaluations of the DR-30 by the staffs of **CQ** (December 1966), **QST** (January 1967) and **73** (May 1965), an 8 page technical brochure and a complete schematic. DAVCO products are available direct from the factory.

DAVCO ELECTRONICS, INC.
P. O. Box 2677
2024 South Monroe Street
Tallahassee, Florida 32304

The Trading Post Net had 85 check-ins in Feb. WA1GUV was appointed ORS. Welcome to new Novice WN1HJI (S. Burlington). Looks like the 1967 Vt. QSO Party was the best ever. Don't forget to change your clocks for DST. Traffic: (Feb.) K1BQB 364, K1UZG 45, K1LLJ 26, W1FRT 18, K1MPN 16, WA1GUV 15. (Jan.) K1SLU 4.

WESTERN MASSACHUSETTS—SCM, Percy C. Noble, W1BVR—SEC: K1IJU. C.W. RM: W1DWA. The West. Mass. C.W. Traffic Net handled 146 messages during February with the following in attendance 10 or more times: WA1FJW, W1DVW, K1IJV, W1DWA and WB2SCD/1. Any West. Mass. c.w. operator is welcome on this net (3560 kc. nightly at 7:00 P.M.). Officers of the Worcester Tech. Radio Club are K1TVF, pres.; K1VQG, vice-pres.; Arnold Schwartz, secy.; K1THQ, chief opr.; WB2FPG, news editor. The club now has a new Heath SB-301 and SB-401. K1ZQB presented three technical films at the Feb. meeting of the Valley Amateur Radio Club. WA1DCH is very active with a Swan 350. WA1GAB has a new National 200 s.s.b. rig. WA1FVN is now a General. Congrats. Members of the Hampden County Radio Assn. again are reserving a bus for the trip to Swampscott. The Hampden County Radio Assn. now has a paid-up membership of approximately 100. We understand that Berkshire County is having difficulty with both its clubs. Seems that no one is willing to run for any of the offices. Come on, some of you birds! Can't let that happen!! You've got some mighty fine guys up there. Let's get organized! K1PES is on with s.s.b. with a complete Drake job. K1TVX also is on s.s.b. with an EICO 753. Old W1BVR is old-fashioned enough to still be pounding the Vibroplex (and by listening on the bands, he ain't alone). W1DVW has a new electronic keyer and is doing swell with it. Traffic: W1DWA 146, WA1FJW 120, W1DVW 82, K1IJV 79, W1EOB 72, W1BVR 61, WN1GJM 44, WB2SCD/1 14.

NORTHWESTERN DIVISION

IDAHO—SCM, Donald A. Crisp, W7ZNN—The FARM Net convenes at 0200 GMT on 3935 kc. Mon. through Fri. WA7BDD is interested in starting a c.w. traffic net for Idaho. The Idaho Falls Eagle Rock Club held a hidden transmitter hunt and is planning an open house at the CD Center. Congratulations to the Lewiston-Clarkston Club on its League affiliation. WA7CJE worked at JA on QRP power. WA7EWV has been appointed Nez Perce County RACES officer and EC. Applications for local Emergency Coordinators are solicited. Contact your SCM. FARM Net report for Feb.: 19 sessions, 634 check-ins, 114 traffic handled. Traffic: WA7ETO 76, W7GGV 41, K7OQZ 30, K7OAB 16, K7THX 13, WA7EWV 10, W7ZNN 9.

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—Asst. SCM/SEC: Harry Roylance, W7RXY. Nets active in Mont.

Montana Traffic	3910 kc.	1800 MST	M-F
Montana PON	3885 kc.	0815 MST	Sun.
Montana RACES	3996.5 kc.	0900 MST	1-3 Sun.
Great Falls AREC	3910 kc.	0930 MST	Sun.
Billings AREC	3895 kc.	0915 MST	Sun.
Missourla Area Emergency	3890 kc.	0900 MST	Sun.

WA7DBA is going into the Navy in May. K7LDZ made the BPL in Feb. When in Billings the 10-meter monitor frequency is 28.685 Mc. K7VSS is now on 2 meters. If you have items of interest for a very fine ham newspaper write Box 313, the Yellowstone Amateur Radio Club paper. WN7GUR is a new call in the Bozeman Area. K7EVS has moved from Butte to Bozeman. WA7CAC is getting a new Henry 2K linear. WA7DLW, WA7GHW, WN7GUR and K7KOK have worked up a communications system for the Bozeman Emergency Ski Corp. Remember the hamfest at Apgar. Preregistration, Box 111, Columbia Falls, Mont. Mont. PON traffic: 28. Traffic: K7LDZ 363, K7EGJ 94, K7PWY 46, W7FL 23, W7FIS 1.

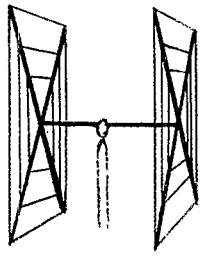
OREGON—SCM, Everett H. France, W7AJN—SEC: W7AJN. RM: W7ZFH. WA7AHW, manager of the Oregon AREC Net reports sessions 28, max. no. counties 14, total attendance 551. QSTs 11, traffic 8, contacts 58. Also the net is gradually growing. W7DEM reports for the Grants Pass area, K7RDP is the new pres. of the Southern Oregon Radio Club with WA7ADW, vice-pres.; W7DEM, secy.-treas. W7OPH is now Communications officer for Josephene County Civil Defense and W7ADF is the Radio Officer. WA7ADY is in the Navy and keeps in touch with the gang. K7YNO now is using a Swan 350. WA7FHX is on with a Heath SB-100. WN7FTU and WN7FWI are new Novices, also WN7GVV. WN7GKD is on 2 meters with a Heath Twoer and on 80 with a DX-60. WN7GKC is on with similar rigs. K7IFG, mgr. of the BSN Net, reports for Jan.

GOTHAM'S AMAZING ANTENNA BREAKTHRU!!

How did Gotham drastically cut antenna prices? Mass purchases, mass production, product specialization, and 15 years of antenna manufacturing experience. The result: The kind of antennas you want, at the right price! In QST since '53.

QUADS

Worked 42 countries in two weeks with my Gotham Quad and only 75 watts . . . W3AZR



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: Steel 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.

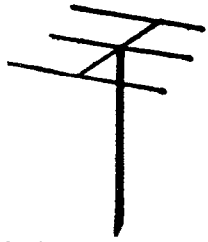
Now check these startling prices — note that they are *much lower* than even the bamboo-type:

10-15-20 CUBICAL QUAD	$35.00
10-15 CUBICAL QUAD	30.00
15-20 CUBICAL QUAD	32.00
TWENTY METER CUBICAL QUAD	25.00
FIFTEEN METER CUBICAL QUAD	24.00
TEN METER CUBICAL QUAD	23.00

(all use single coax feedline)

BEAMS

The first morning I put up my 3 element Gotham beam (20 ft) I worked YO4CT, ON5LW, SP9ADQ, and 4U1ITU. THAT ANTENNA WORKS! WN4DYN



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	$16	4 El 10	$18
3 El 20	22*	7 El 10	32*
4 El 20	32*	4 El 6	15
2 El 15	12	8 El 6	28*
3 El 15	16	12 El 2	25*
4 El 15	25*		
5 El 15	28*		

*20′ boom

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, T12FGS, W5KYJ, W1WOZ, W2ODH, WA3DJT, WB2FCB, W2YHH, VE3FOB, WA8CZE, K1SYB, K2RDJ, K1MVV, K8HGY, K3UTL, W8QJC, WA2LVE, YS1MAM, WA8ATS, K2PGS, W2QJP, W4JWJ, K2PSK, WA8CGA, WB2KWY, W2IWJ, VE3KT. Moral: It's the antenna that counts!

FLASH! Switched to 15 c.w. and worked KZ5IKN, KZ5OWN, HC1LC, PY5ASN, FG7XT, XE2I, KP4AQL, 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 check or money order. We ship immediately upon receipt of order by railway express, shipping charges collect.

GOTHAM, 1805 Purdy Ave, Miami Beach, Fla. 33139

sessions 62, total attendance 945, traffic 173, traffic average 2.79. WA7CPI is active on 7 nets. W7WHY and WA7DYP are active and very busy on RN7 and PAN. Traffic: (Feb.) K7IWD 207, W7WHY 150, WA7BYP 119, W7ZB 58, W7ZFH 30, WA7CPI 17, WA7GLP 17, W7DEM 10. (Jan.) K7IFG 114, W7WHY 97, K7WWR 15, W7DEM 9.

WASHINGTON—SCM, Everett E. Young, W7HMQ —SEC: W7UWT. RM: W7OEB. PAM: W7LEC. Net reports.

WSN	Daily	3535	0200Z	QNI	322	QTC	553	Sess.28
NTN	Daily	3970	2130	QNI	1064	QTC	616	Sess.28
WARTS	Ex-Sun	3970	0200	QNI	1005	QTC	71	Sess.24
NSN	Daily	3700	0130	QNI	409	QTC	134	Sess.28

W7DER has a real fine program going for the Lower Columbia ARC and club activities are gaining momentum for FD. W7AZI, prexy of the Radio Club of Tacoma, is busy with club projects and had the gang to the F.A.A. Center in Auburn. The new prexy of the Tacoma Amateur Radio Society is WA7CSF. New officers of the Valley Amateur Radio Club of Puyallup are W7DNU, pres.; W7TYI, vice-pres.; W7JJK, secy.; K7LVS, treas. New officers of the Puget Sound Council of ARCs are W7HMJ, pres.; W7JBZ, vice-pres.; K7ZEP, secy.; W7-KLO, treas. W7DZX reports help for skeds now is available and he has time to put up a new antenna and a ground plane for higher frequencies. Arabville news: A new Novice is WN7GWL. WA7GVN has a new 350. W7BJP now is s.s.b. with an SB-10. K7VVC is back from Okinawa. K7NZO now is home in Bremerton. KL7BBL, Mountain Village, had an eye-ball with W7-BTB, and along with W7OS soon will be heard on s.s.b. W7UU now is a QCWA member. W7AIB, WSN Mgr. and ORS, expects WSN to get past the season on the present sked. Attention, all hands: The ARAB will hold its 33rd Annual Hamfest May 20, same place. W7MCW, Kitsap County EC, monitors 50.380 Mc. daily, also QSOed VQ9EF, where his daughter and family are on duty. W7IEU, ORS, is back to light work following a heart attack. W7GYF, ORS, worked VK2BRJ/9, KS6CK, AU1ITU, HC1MF and VR4CR, while moving gear into the bedroom making way for a 2nd harmonic. W7AXT claims low ham on traffic. The Richland ARC now has five ARC-1 on 145.65 Mc. along with two Heath Twoers. K7VNV, K7NEW, K7TGH, W7NC and OEB are keeping 52.525 Mc. hot. W7JII has new gear and beam. K7CDI continues fighting RTTY bugs. W7EVW is recovering at home after a month in the hospital. W7HMA suggests a "WSN/2" as liaison to RN7 and PAN and return traffic. WA7EMM telephone relays W7-ACF/MM in the Mississippi River to North Carolina. K7CHH handles OBS from the Richland area. Traffic: W7BA 1416, W7HMA 857, W7ZIW 783, K7TCY 703, WA7DXI 525, W7DZX 374, W7JEY 344, W7PI 247, W7KZ 216, W7BTB 150, K7JHA 82, WA7CFN 70, W7AIB 65, W7MCW 56, W7HMQ 36, W7APS 28, W7IEU 26, W7GVC 21, W7OEB 20, W7GYF 17, WA7CXD 8, W7-AXT 3, W7WHV 2.

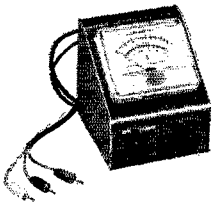
PACIFIC DIVISION

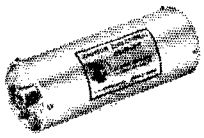
EAST BAY—SCM, Richard Wilson, K6LRN—Appointments as of Mar. 1: WA6RRH as V.H.F. PAM, K6TFT as EC for Solano/Napa Counties, the only EC we have. WB6IBU, W6DUB, W6UB/WA6NEL and W6-LGW as OBSs. W6IPW, W6IDY, WB6FHH, W6TYM and W6YKS as ORSs. WB6SAJ, WA6RRH and W6YKS as OVSs. K6LRN, W6TYM, W6OJW, W6CBF and W6-EY as OOs. As you can see there is plenty of room for new appointees. Just drop me a line at 107 Cordova Way, Concord, Ca. 94521, phone 415MU 55225, or corner me at a radio club meeting. WB6QPN suffered a heart attack on Feb. 9. The Mt. Diablo ARC held a breakfast on Feb. 22. W6LGW and WB6CBW attended the Sahara Hamfest. WA6QVS is a new AREC member. WN6SCM is now WB6SCM and is temporarily located at Santa Cruz where he is a member of the Soquel HS RC. W6OJW worked a few new ones in the ARRL DX Test. WB6EUM is rack-mounting all his gear so he will have room to get in his shack. W6BSW is NCS for the Western Public Service System Net on 3870 kc. at 1930 PST. K6CFY is general chairman for the GBA Hamfest. WB6FHH managed to roll up 52K points in the Jan. CD test. W6DVY is home from the hospital where he underwent open heart surgery and is reported to be doing fine. Vice-Dir. W6ZF is undergoing treatment for an ulcer and should be returning to work any day now. WØJHY is living in San Pablo and is stationed at Treasure Island as Navy MARS Director 12 ND and is the trustee for K6USN. K6LRN is attempting to assemble a sailboat. The NCN is using 3.630 as an alternate frequency because of QRM for TV horiz. oscillators; same time 0300Z. Please send in your Form 1 or some sort of monthly reports to me by the 4th or 5th of each month. Reports have been rather scarce and

For the most dependable line of amateur station accessories, specify JOHNSON

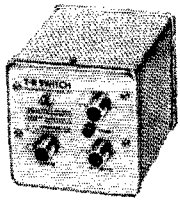
MATCHBOX—Matches transmitter output impedance to balanced or unbalanced line. Provides unbalanced impedance match to receiver. Completely bandswitching, 80 thru 10 meters—no plug-in coils.
275 WATT MATCHBOX (750 WATTS PEP)
Cat. No. 250-23-3
With directional coupler and indicator.....$94.95
Cat. No. 250-23-1
Less directional coupler and indicator.....$64.95
KILOWATT MATCHBOX (3KW PEP)
Cat. No. 250-30-3
With directional coupler and indicator....$154.50

LOW PASS FILTER—Wired, pre-tuned. Handles more than 1KW RF—75 db or more attenuation of harmonics and spurious frequencies above 54 MHz.
Cat. No. 250-20
52 ohms, wired and pre-tuned.....$14.95
Cat. No. 250-35
72 ohms, wired and pre-tuned.....$14.95



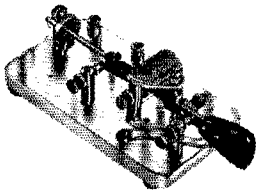


DIRECTIONAL COUPLER AND INDICATOR—Provides continuous reading of SWR and relative power in transmission line. May be permanently installed in 52 ohm transmission line. Handles full legal power.
Cat. No. 250-37
Directional Coupler, wired and tested.....$11.75
Cat. No. 250-38
Indicator, wired and tested.....$25.00

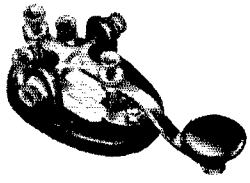


T-R SWITCH—High-efficiency electronic antenna switch. Double-gated circuitry with 6BL7 dual triode for receiver isolation. Rated at 4KW peak power. 3 to 30 MHz.
Cat. No. 250-39
T-R Switch wired and tested with tube....$29.95

ANTENNA METER—Measures SWR as high as 10:1 on all bands, 80 through 10 meters. Maximum power capacity—500 watts. For proper operation, requires approx. 25 watts drive at 3.5 MHz and approx. 2 watts drive at 28 MHz without power loss. Size 4½" x 2¾" x 2 1/16". 50 ohm impedance only.
Cat. No. 250-849.....$14.95



DELUXE SEMI-AUTOMATIC KEY—Adjustable from lowest to highest speed... smooth easy action... 5 adjustments... separate height adjustment for paddles. All parts heavily chrome plated.
Cat. No. 114-500
⅛" contacts,
black wrinkle base.....$20.30
Cat. No. 114-501
¼" contacts,
polished chrome base..$25.50



STANDARD KEY—Heavy die cast base... adjustable bearings... "Cushion-contact" offers smooth keying action. ⅛" coin silver contacts.
Cat. No. 114-310
Black Wrinkle
no switch.....$3.50
Cat. No. 114-310-3
Black wrinkle
with switch.....$4.25
Cat. No. 114-311
Chrome plated,
no switch.....$5.50
Cat. No. 114-311-3
Chrome plated
with switch.....$6.50

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this activity report has been short because of this. Traffic: (Feb.) W6IDY 349, W6IPW 269, K6LRN 22. (Jan.) W6IPW 141, W6TYM 118, K6LRN 96, WB6FHH 19, W6ZF 7, WB6QNE 6.

HAWAII—SCM, Lee R. Wical, KH6BZF—SEC: K6EWZ/KH6. PAM: WØPAN/KH6. V.H.F. PAM: KH6EEM. RM: WB6HXO/KH6. OOs: KH6BZF, KH6EEM. OPSs: WB6HXO/KH6, KH6BZF, KH6UL. KH6FRO. OVSs: KH6FKB. KH6BAS. KH6EEM. OBSs: WØPAN/KH6. KH6BZF. KH6CPW. ORSs: WB6HXO/KH6. WØPAN/KH6. QSL Mgr.: KH6DQ.

Net	*Freq. (Mc.)*	*Time (GMT)*	*Days*
League Appointees	7.290	0700Z	Wed
Friendly Net	7.290	2030Z	M-F

K6EWZ/KH6, our new SEC, brings with him a vast background of experience and knowledge. Meade's previous calls were W2JQU, TA3MP, K4LWL and KL7DIR. WB6HXO/KH6 is our newly-appointed RM. Let's give these two leaders all the Hawaiian *"kokua"* we can. KH6FMD is home from KR6- and XV5-Land. KH6ANM is back on after a short absence. KH6BJ earned another endorsement to his DXCC certificate. The boys at KG6SA, Saipan, are on quite regularly. K7ZOK QSOed with KH6BZF one week before coming to Honolulu. K7ZOK and his XYL were here celebrating their 25th wedding anniversary. W7BQI/AM/KH6 sports two whips on the back of that green station wagon. KH6FKB is operating nightly on 146.9 Mc. as well as building a 6-meter converter. KH6GEP is up on frequency too. KG6ALV is back on the air. KG6AQG Steve runs a 32S-1, Henry HK, 75S-1 into a three-element 20-meter monobeam. KH6DQW did very well in the recent ARRL Frequency Measuring Test. K6CAA/KH6, on the island of Kauai, has been active. The Honolulu ARC meets the 3rd Mon. of each month at 1930 in Bldg. #22, Fort Ruger, Honolulu. KH6FON was on working c.w. during the 1967 DX Test. KH6CG returned from a business trip to the Far East. KH6BB was out in KA/JA-Land. KH6IJ will return to Japan this summer and probably will get KA2IJ back. Hawaii's return to DX status for the 1967 DX Test went well with the "contesters" here in KH6-Land. KH6EPW will head up the winning Field Day team again this year for the Honolulu ARC. Traffic: (Feb.) KG6ALV 241, KH6EOQ 47, KG6AQG 19, KH6BZF 12. (Jan.) KG6AQG 19.

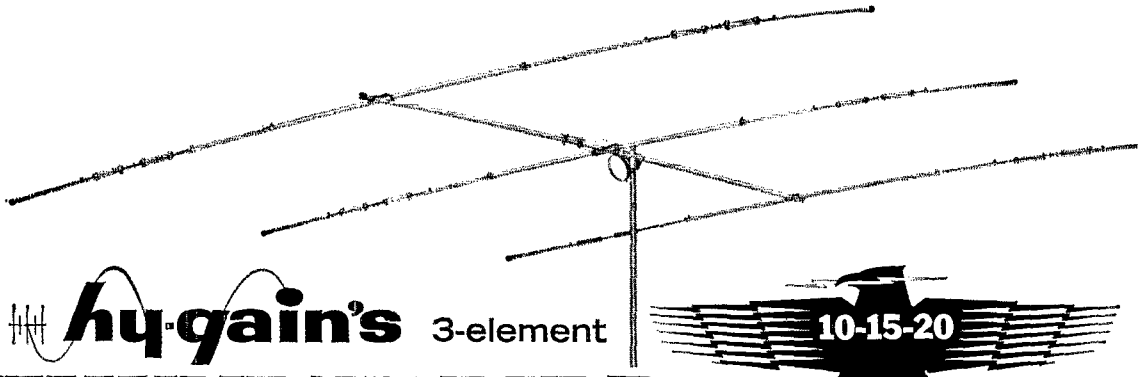
NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU/W6EBS. WN7GVX and WN7GXK are active on 3721 kc. looking for DX. W7YRY is QRMed by powerline interference. WA7BEU's and KL7DFU's weekly schedule for the past ten years on c.w. has kept up with the state of the art by going RTTY. W7EBP is running mobile telephone now. K7ZOK and his XYL have been vacationing in KH6-Land. W7PBV and W7EBP attended a communications meeting at Fort MacArthur. K7OLQ and family visited in Las Vegas. The 2-Meter f.m. group has secured a site for its repeater. W7PBV was introduced to the Nevada State Legislature, where he met K7CUF and K7AGZ. W7SRM is the new Reno Area EC. At the Las Vegas ARC special dinner meeting several present were presented PSA certificates. W7BIF provided communications for the BSA camp out at Death Valley. WA7CFS is vacationing back east. W7DNX, WA7EKN, K7VYT and W7YKN provided emergency communications between the sheriff's office and a serious bus accident. K7OHX and K7ZQV were issued section net certificates for NCN. Traffic: K7OHX 15, W7PBV 4, WA7BEU 3.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—SEC: WB6BWB. ECs: WB6MXD, K6RHW, W6SMU, WA6TQJ. RM: W6LNZ.

Net	*Freq.*	*Time*	*Days*	*Mgr.*
NCN	3635	0300Z	Daily	WB6HVA
NCN (Slo-speed)	3635	0530Z	Daily	WB6HVA
SCEN	146.28	0400Z	Wed.	K6IKV
Yolo Co. C.D.	146.95	0200Z	Wed.	WA6TQJ

WB6RSY, a newcomer to NCN, is NCS Fri. evenings for both sessions. W6LNZ finally made the BPL with 25 originations plus 77 deliveries. K6ZFI is now RTTY 59 through 10 meters and has been copying W1AW bulletins on 14.095 Mc. The Nevada Co. ARC is conducting a membership drive. W6AF reports that most of the Oroville fellows are on 75-meter s.s.b. New officers of the Nevada Co. ARC are WA6FWV, pres.; WA6NRD, vice-pres.; WB6RVT, secy.-treas.; WB6JGK, sgt. at arms. New officers of the GEARS are W6SYX, pres.; WB6MTS, vice-pres.; WA6SCJ, secy.; WB6JXU, treas. W6ICO and K6ZNL handled many messages out of Quincy and Portola during the bad January storm which cut off telephone service. WB6DPY is having a ball working South America on 20 meters with his new Swan. W6CKV is going mobile on 1920 kc. in his boat on Lake

So good it defies comparison...



hy-gain's 3-element

10-15-20

THUNDERBIRD

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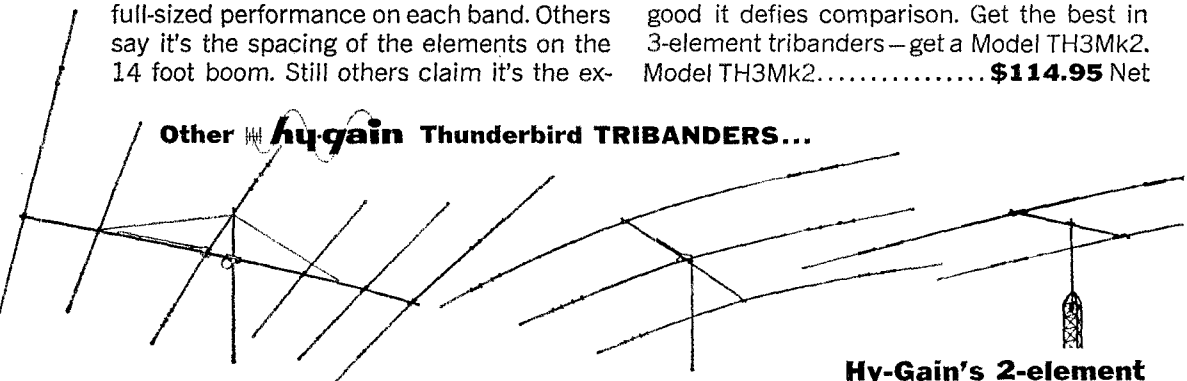

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Almanor, Traffic: W6LNZ 186, WB6RSY 82, WB6MAE 32, WA6TQJ 15.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD —WB6GVI has gone to 160 meters with a TCS-12 and a lot of hope. W6CWR is working RTTY on 2 meters in the Santa Rosa Area. W6CYO spent another tour in the hospital during Feb. and is home again taking after DX easily. W6EAJ finds activity limited by his chief engineer duties at three broadcast stations but still finds some time for the 160-meter band. The Marin Radio Club changed its meeting night to the 1st Fri. but no change in location. K6TWJ continues to be a steady outlet for traffic on the Golden Bear Net from San Francisco. W6OPL is back on the air after almost two years lay-off. W6WLV improved his signals after sorting through a sack of 1625s and coming up with a few good ones. Hal is a high traffic man from the section on the Northern California Net. WB6JQP is en route to the Far East on a merchant ship and operating maritime mobile. W6BIP swept both phone and c.w. awards for the section in the 1966 Sweepstakes. W6KVQ just missed BPL in Feb. but promises to make it several times this year. Several of the clubs attended the Pacific Division Director's meeting in Oakland Apr. 15. The K6GWE Repeater Group held a breakfast in San Rafael on Feb. 26 with a large turnout. W6PTS has joined the pile-ups on 20 meters and expects to have his DXCC in a month or so. W6SG, in Red Cross Headquarters in San Rafael, is running a 2-meter emergency check on Sun. mornings just after the regular check-in. WB6PQE is the net control. WB6UJO has a SB-34 and plans to put up a beam and is another working DX from Marin. The Tamalpais Radio Club is getting more check-ins with its Wed. night 2-meter check-in on 146.65 Mc. Traffic: (Feb.) W6KVQ 467, W6JXK 148, K6JWJ 29, WA6AUD 11, K6TZN 10, WB6-GVI 5, WB6OGF 4. (Jan.) K6TWJ 18.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—WB6TFU is the new EC for Fresno County. If you want to help, please contact Don. The 25th Anniversary Fresno Amateur Radio Club's Annual Hamfest will be held the second week of May at the Hacienda Motel. See you there. WB6RMZ is using an SB-200, 300 and 400 on 20 with a TH6 beam and is active on 20 s.s.b. WA6ZGQ and WA6FFJ are experimenting with ATV and report the usual bugs. K6EYE, W6JPU, W6-KFQ, WA6BVZ, WA6IHO and W6TSQ all spent a week end at K6CKN's beach house and a good time was had by all. They even put up an antenna for K6CKN to be used with his SB-34. WA6JZP has a Utica 6-meter rig. WA6STB also has a Utica rig. WB6PCQ received her A-1 operator certificate. K6SEV, is active in Navy MARS. W6QFR is active on his yacht, on 80 and 40 s.s.b. W6ILR and W6PIX are being heard on 2-meter f.m. Those assisting in the Mother's March of Dimes on 2 and 6 meters were WB6JPU, WB6SDZ, WB6STB, WB6EYC, W6YEP, WB6KUO, WA6JZP, WA6PRU, WB6MCG, WB6TFU and WB6NFZ. W6ARE and WA6-CUZ attended the NC Amateur Relay Council. W6EYO has a new Hornet TB-1000 with a 30L1 pushing it. The Delta Amateur Radio Club in Stockton is in its 10th year and growing every year. W6COB is pres. W6DNG made a moonbounce QSO with France. Traffic: (Feb.) W6ADB 370, WB6HVA 283, W6ARE 36, W6SCE 28, W6ILR 19, W6ZKH 6, W6PIX 4, WA6RTI 4. (Jan.) W6SCE 110.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM, Ed Turner, W6NYO, SEC: W6VZE, RM: W6QMO. Our Santa Clara Valley SEC, W6VZE, held a section-wide EC meeting in Morgan Hill late in Feb. with about 60% ECs attending. Much ground was covered at this meeting, and plans will be made for emergency operatons in the section for the next few months. Your SCM and the Division Director attended a very fine meeting of the Foothills Amateur Radio Society chaired by K6GJ. The main speaker was W6HC, who talked about antennas. The main feature of the Feb. PAARA meeting was a movie on the Alaskan Earthquake. The Santa Cruz Club made plans for the Mar. meeting which featured commercial gear. K6BDK, EC for Santa Cruz, gave a special message to the club on emergency work. W6SAW now has a TX-62 for 2 meters. W6YHM is now on s.s.b. W6QMO is back active on NCN. W6OII works MTN and SJVN. K6GK is very active on NCN and handling the San Jose area traffic. W6MMG reports that he has rebuilt his shack. WB6HZZ is active on WCARS and the Astro Net and now has a second call, WB6UXP. W6ASH is active as OO and took part in the LO Party. Walt is working with the Palo Alto area as EC. K6YKG is active in CD Parties. WB6NXK is working MARS and finally made WAC. Jim is very QRL with school work. WB6IZF works several emergency nets and reports that he has been working out well with a "backpacking rig" on hik-

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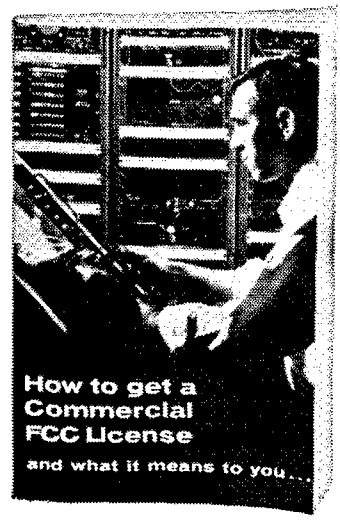

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ing trips. Ed reports no 6-meter openings but that 2 is working out well with the repeater. W6AUC is busy with OO work. W6PLS is QRL with DX operation as well as QCWA work. Gene also finds time to work as EC for Half Moon Bay. W6HC is having very good schedules with W1NJM on his TCC schedule. Harry now is running a kw. W6DEF is active on NCN and working as EC for Redwood City. W6RSY is active on NTS and made the BPL. W6YBV reports on his Form 1 card, that "Spring in Santa Clara Valley is wonderful." Traffic: (Feb.) W6RSY 714, W6YBV 376, W6DEF 102, W6HC 75, K6GK 70, W6PLS 36, W6OII 26, W6AUC 14, WB6IZF 12, W6ASH 10, WB6NXK 7, W6ZRJ 6, WB6HZZ 5. (Jan.) K6GK 30, W6OII 19, W6QMO 16, W6YHM 5, W6SAW 3.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: James O. Pullman, WA4FJM. SEC: W4MFK. RM: K4CWZ. PAMs: W4AJT and WA4LWE. V.H.F. PAM: W4HJZ. W4NAP is trying to get a county AREC net organized on 6 meters. WA4LXW is on the air with a DX-100 and an NC-190. WA4NUO says he is having lots of fun with his new RTTY setup. WA4KWC says the Buncombe County ARC code and theory classes have an average attendance of thirty. WB4BGL has started the North Carolina Novice Net and reports the first month was fairly good. WA4GMC is the new manager of the Tar Heel Emergency Net. Sixteen-year-old WB4DVO received his General Class License in Dec. and is building an EICO 153. K4PTB is now back on the air from his new QTH of Rockingham. The NCN recently held its winter SET which was well attended.

Net	*Time*	*Freq.*	*Days*	*QTC*	*Mgr.*
NCN (E)	2330Z	3573 kc.	Daily	277	K4CWZ
THEN	0030Z	3865 kc.	Daily	160	WA4GMC
NCN (L)	0300Z	3573 kc.	Daily	92	WA4ANH
SSBN	0030Z	3938 kc.	Daily	49	WA4LWE
NOVICE	2200Z	3710 kc.	M-W-F-S	12	WB4BGL

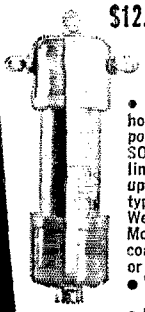
Traffic: W4EVN 392, W4HJS 323, WB4BGL 186, W4IRE 172, W4LWZ 150, W4RWL 132, WA4ZLK 100, WA4VNV 62, K4CWZ 58, W4BNU 46, WA4FJM 43, WA4CFN 40, W4AJT 36, K4EO 36, WA4VTV 24, WA4ANH 14, W4CJD 12, K4ZKQ 12, W4NAP 10, WN4CVM 6, WA4KWC 6, WA4UVH 6, WB4DVO 2, K4TTN 2, WA4NUO 1.

SOUTH CAROLINA—SCM, Clark M. Hubbard, K4LNJ—SEC: WA4ECJ. Asst. SECs: W4WQM and WA4EFP. RM: K4LND. PAM: WA4RUB.

SCN C.W. Net	3795 kc.	Daily	0000Z/0300Z	Feb. tfc.	160
SCSSBN	3915 kc.	Daily	0000Z	Feb. tfc.	148

An excellent section meeting was held at the ETV Center in Columbia with over 45 attending. S.S.B. Net, C.W. Net, and AREC meetings were held. The afternoon meeting was a general meeting discussing reactivating the state radio council. May 6 is the date for the single sideband supper at the Coach House in Greenville. The Annual Hamfest at Greenville will be held May 7 at Cleveland Park Recreation Center. A section meeting will be held during these two dates as was held in Columbia. Congratulations to the Clemson University Radio Club which is being reactivated. WA4APD has been appointed net manager of the SCN C.W. Net. WA4HFA was awarded an SCN certificate. WB4DXX was appointed ORS. The Anderson Radio Club is having good attendance on the 2- and 10-meter nets. Traffic: K4LND 142, WB4BZA 112, W5OHO/4 107, WB4DXX 75, WA4APD 73, W4WQM 51, W4JA 41, K4LNJ 30, W4NTO 30, W4PED 17, W4FVV 16.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: K4LMB. RMs: WA4EUL and K4LJK. PAM: W4OKN. Club president W4IPA announces that there will be a Tidewater Hamfest this year in August. Honor student WA4UMX has been off the air somewhat while working on science projects; he has been accepted by three engineering colleges and has received a substantial scholarship. W4BZE worked 200 Novices in the Roundup but very few from Virginia. The antennas of W4YZC, K4ORQ and others were the victims of strong Feb. winds. The Virginia Beach Club and other mobile units will support the Tidewater drive for tetanus innoculations. W4QDY is working on a 3-band beam for the newly-erected tower. Past SCMs still active in Virginia include W4QDY, W4KX, W4KFC, W4JHK and WA4SUE (W3-UCR of MDC). K4BAV is off in the Army but OM W4JXD carries on. VN and VSN members with sideband equipment are needed to check in to the VSBN. Don't forget Field Day this year. See you all at the Roanoke Hamfest. Traffic: (Feb.) WA4DXJ 1035, K4CG 251, W4DVT 208, W4SZT 205, W4NLC 176, WA4EUL 142, WB4EAE 137, K4LJK 109, K4FSS 93, W4BWF 87, WB4DHT 74, W4ZM 74, WA4TNS 36, WA4URN 33, WB4DRB 29, K4ITV 26, K4MLC 25, W4MUJ 24, W4SHJ 24, W4OKN 23, WB4BXT 21, W4BZE 20, WA4PBG 19,



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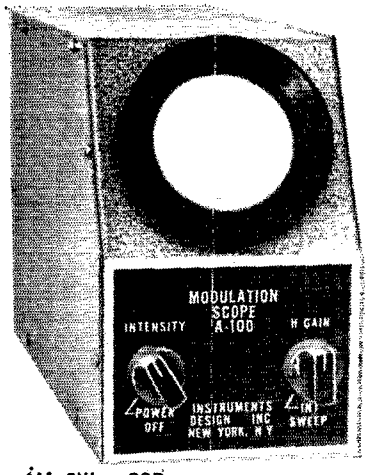

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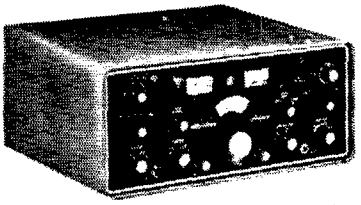

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K4KNP 17, WA4SZI 17, K4MXF 16, K4LMB 14, W4KFC 9, WA4DAI 8, W4TE 6, W4OP 3, W4KX 2, WA4QOC 1, WA4UMX 1, K4VCY 1. (Jan.) W4BZE 38, K4MLC 27, WA4UMX 18, W4OWE 1.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA. PAMs: K8CHW, W8IYD. RMs: W8HZA, K8TP, W8LMF. Phone Net Mgr.: WA8RQB. C.W. Net Mgr.: W8HZA. Nets meet on 3570, 3890, 3905, 29.6 and several v.h.f. frequencies. The following stations have received C.W. Net certificates: W8CKX, W8HZA, W8IMX, W8JUE, WA8NDY, WA8POS, WA8PXF, K8QQS, W8SQO, K8CNB, K8HID, K8TPF. The Tri-State Radio Club, in the Weirton area, has net operation on 146.880 weekly. WVN(PON) reports 13 sessions, 194 stations, 55 messages. WN8TQD worked 233 stations in 51 sections during the Novice Roundup. WVN (C.W.) with 28 sessions handled 148 messages. WA3FKB/8 has been chosen pres. of the Monogalia Wireless Assn. WVN (Phone) in 20 sessions with 520 stations handled 103 messages. K8MYU is quite active from the new QTH in Fairmont. Remember the West Va. State Convention, Jackson's Mill, July 1 and 2. Our Division Director, W4KFC, will be there. Many West Va. amateurs were quite active in the March floods in the state. Traffic: K8TPF 169. WA8POS 140, WA8PXF 122, WA8SQO 104, W8HZA 70, W8CKX 52, W8IMX 43, WA8QND 30, WA8RQB 27, K8BIT 25, WA8QZO 22, K8MYU 12, K8HID 11, K8MQB 10, WA8IMY 9, W8AY 8, K8CHW 6, WA3FKB/8 4, W8JM 4, WA8MRK 4, WA8BSE 2, WA8NDY 2, WA8RHT 2, W8WEJ 2, K8ZDY 2, WA8ANS 1, WA8LFW 1, W8MLX 1, WA8OVM 1, K8SOR 1, W8VYI 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Richard Hoppe, KØFDH—Net activity continues to hum busily with KØDCW reporting a QNI of 390 and QTC of 76 for the Colorado High Noon Net. Congratulations to WAØLCM on his appointment as RM. He reports 269 QNI with QTC of 227 for the Colorado Code Net under his management. The Columbine Net handled 352 messages with a QNI of 1164 in the period of Jan. 21 through Mar. 20. KØHRZ, manager of the Colorado Post Office Net, lists 21 QTC with 68 QNI for 8 sessions. WAØERA, the new net manager of the Colorado Emergency Phone Net, reports 40 messages handled with 116 QNI for his Sun. Morning Net. KØZSQ continues a fine job as manager of the Colorado Weather Net. Begun 11 years ago at the request of the Weather Bureau, the net is now averaging 1400 individual weather reports a month. These reports are distributed by local radio and television, State Patrol, aviation bureaus and AP circuits. Traffic: KØFDH 224, WØSIN 92, WAØMNL 62, KØZSQ 52, WAØLCM 48, KØCNV 45, KØZIJ 45, KØDCW 39, WAØJTB 36, WØQKR 30, KØYFK 28, KØSPR 27, WAØNBZ 14, KØECR 8, WØLEK 8, WAØNQL 7, WØBWJ 6, WØCBI 5.

NEW MEXICO—SCM, Bill Farley, WA5FLG—SEC: W5ALL. PAM: WA5MCX. Congratulations to the following new OPSs: W5GD, W5HJ, W5SA, W5BWV, W5DMG, W5NUI, WA5FJK, WA5MIY, WA5JNC. Please check with WA5MCX, our PAM, for the 3.838 nets about the new rules for the nets. If you miss two weeks straight you probably will be dropped from the roster. We seem to have run into a snag on the operation of a c.w. net on 3.737. We need net controls very badly before we can get going. Congratulations to WA5APS and his XYL on the new baby girl. Looks like the bunch at Los Alamos has graduated some new Novices. W5UBW has a new Swan 400 and claims to really be working the rare ones on 15 meters. Remember, when you are mobile you must give your exact location and when portable you also must give your location. Why not convert that piece of CB gear to 10 meters and join the White Sands Amateur Club on 29.6. They have been having a lot of fun up there. WA5FLG has worked all states with his Heath GW 10 conversion. Everyone is looking forward to the hamfests that will be taking place around the state. Among them are Las Cruces and El Paso. If you have the time and the patience you might ask W5PTQ what he was doing on 10 meters the other morning at 9:30. It makes a very interesting *tale*. Traffic: W8BZY/5 172, W5UBW 57, WA5FLG 44, WA5RBU 20, W5DMG 17, K5HTS 10, WA5BLI 8, WA5JNC 6, WA5MIY 5, W5PNY 1.

UTAH—SCM, Gerald F. Warner, W7VSS—SEC: W7WKF. RM: W7OCX. Section nets: BUN, daily 7272 kc., 1930Z. UARN, Sat.-Sun. 3987.5 kc. 1500Z. URN, daily except Sun. 146.2-146.8 Mc. 0130Z. New officers of the Utah Council of Amateur Radio Clubs are K7JLF, pres.; K7SAI, secy.-treas. The Ogden ARC has started a beginners' code and theory class. For details, contact W7WQC. A new club has been organized in the Vernal area, called the Uintah Basin ARC. K7SLX is the activity chairman. K7RGY and K7HCP are now on 20-

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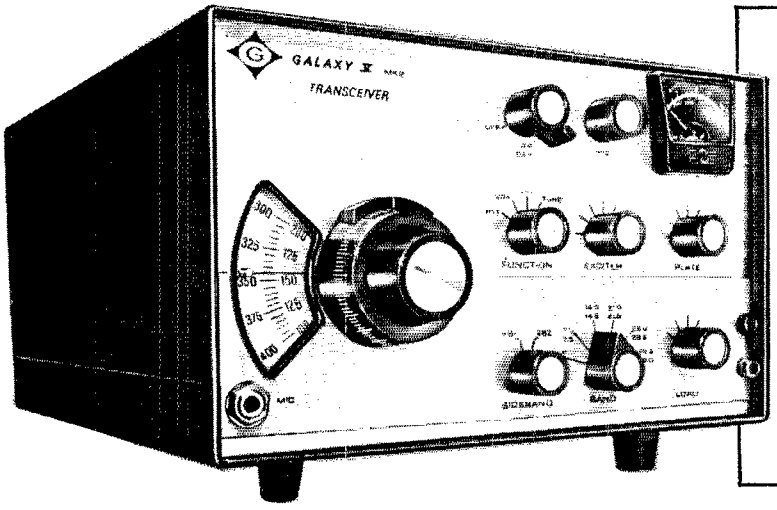

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meter RTTY. W7OCX reports higher traffic levels on BUN. WN7FSB passed the General Class exam. Public-minded amateurs in Utah are urged to participate in any of the above-listed section nets. They need your help. K7CLS is attending school in Florida. Traffic: W7OHR 183, W7OCX 118, W7LQE 59, WA7BME 42, W7VTJ 35, W7VSS 15, K7EZR 13, W7RQT 6, WA7ADK 4.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE. RM: WA7CLF. PAMS: W7TZK, K7SLM. OBSs: W7TZK, K7SLM, K7ZHT. Nets: Pony Express, Sun. at 0830 on 3920; YO, daily at 1830 on 3610; Jackalope, Mon. through Sat. at 1215 on 3920. W7DXV has been a ham and ARRL member for over 50 years. I believe Hal, at 83, is the oldest ham in the state and very active also. Another club in the state is the CY Junior High School of Casper with the call WA7GWS. Wyoming again has a weather net. Check in on 3920 at 0700 Mon. through Sat. This is a RACES net and anyone desiring more information should contact K7NQX. K7AHO vacationed in the California sun in Feb. Now is the time to think about winning the Field Day trophy. Get that spot picked out and correct the things that went wrong last year so you will have room for new experiences. Traffic: WA7CLF 86, K7ITH 70, W7TZK 61, W7GSQ 24, WA7BPO 16, K7POX 16, WA7DNZ 14, W7YWW 13, K7OVD 11, K7VWA 11, K7SLM 10, W7HLA 3, W7BKI 2, W7BXS 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Edward L. Stone, K4WHW—SEC: W4FPI. PAMs: WA4EEC, WA4EEE. RM: WA4EXA. We still have plenty of room for additional members on all nets. WB4EKK and WB4ALN were both among the top winners in the Science Fair competition with their v.h.f. gear constructed for the project. K4PXR, K4HJX, WA4ZDW and WA4EXB have new s.s.b. gear. K4WHW, W4HFU and W4YFN have joined the 2-meter f.m. group. The Muscle Shoals group is holding 6-meter transmitter hunts. Don't forget the B'Hamfest Apr. 29, 30. Feb. Net activity:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*Ave. Tfc.*	*Ave. QNI*
AENB	3575	0100) 0400)	Daily	56	2.0	3.8
AEND	3725	2330	Daily	25	2.2	6.6
AENP	3955	1200	Daily	No report		
AENH	50.7	0200	Sun/Tue.	8	3.87	18.1
AENM	3965	0000	Daily	28	7.32	57.2
AENO	50.55	0115	T/T/S	13	2.47	22
AENR	50.52	0115	W/F	8	.37	14.75
AENT	3970	2230	Daily	32	2.21	9.12

If you are not signed up with AREC, contact your area EC or SEC. Traffic: K4HJX 210, K4NUW 203, W4FVY 162, WB4JDIN 134, WA4EXA 125, WA4UXC 99, K4BSK 97, K4AOZ 86, WB4DCR 76, K4WHW 69, WA4PIZ 59, WB4EKK 54, WA4EXB 54, WA4OCM 49, WB4ACJ 39, WA4FYO 30, WA4MTG 29, WA4ROP 29, WA4EEC 19, WB4BLX 18, WA4GNG 16, WA4ZDW 13, WA4HUO 11, W4DGH 10, W4FPI 10, WN4DIM 7, WA4OCL 6, WA4VKT 6, WA4VQI 6, WB4EKJ 5, K4TUT 5, K4UUC 5, K4AJF 4, WA4DBQ 4, K4HJM 3, WA4WLD 3, WA4JSM 2, K4KJD 2, K4NJY 2, WA4WGF 2, W4YRM 2, W4NML 1.

CANAL ZONE—SCM, Mrs. Lillian C. Smith, KZ5TT—Asst. SCM: Russell Oberholtzer, KZ5OB. SEC: KZ5MV. The visit of W4LVV, Director Southeastern Division (which was a "first" for the section—we never had a Director visit us before) was highlighted by a cocktail buffet in his honor which was attended by most of the active amateurs of the Canal Zone. Chuck got in several hours in the DX Test as KZ5LV. KZ5AD is back on the air after surgery in New Orleans. KZ5SS and KZ5SN will be on the air with new Japanese gear from their new QTH in La Boca; they had W8QFQ as a guest during the month. New calls are Generals KZ5GU, KZ5HL, KZ5JS, KZ5OG, KZ5WH. KZ5GH is retiring to Harlingen, Texas. Traffic: KZ5OB 30, KZ5OA 24, KZ5FX 9.

EASTERN FLORIDA—SCM, Jesse H. Morris, W4MVB—SEC: W4IYT. Asst. SEC: W4FP. RM C.W.: W4ILE. RM RTTY: W4RWM. PAM S.S.B.: W4OGX. PAM 40M: W4SDR. PAM 75M; W4TUB. V.H.F. PAM: WA4BMC. I'm sure everyone is aware that a familiar face is missing from this space this month. K4SJH has "retired" to being Vice-Director of the Southeastern Division. I'm sure you all will join me in good wishes to Ham. W4FP has agreed to assist W4IYT so Andy has agreed to "stay around" for another year or so. I received a nice letter from a Floridian a long way from home in Hawaii. W4EXM tells me of his plans to retire in Clearwater. K9KJT, EC Milwaukee Co., was a recent visitor in Duval Co. W4GUJ was host for an evening and these two ECs swapped information about their

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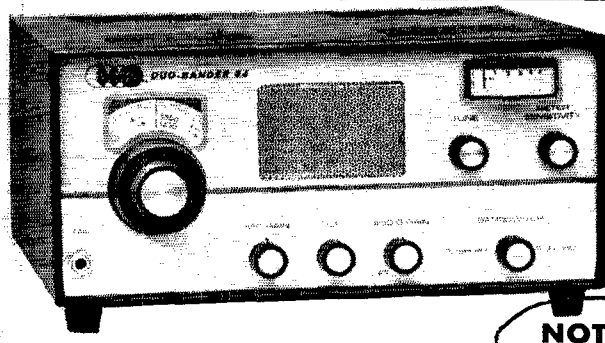

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operations. W4OGX advises that 147.3-Mc. f.m. is monitored 24 hours a day in Charlotte County and that the members of the net take turns on the tri-weekly net as NCS. W4DVO reports that the Tampa ARC originated 3625 messages from W4DUG|4 at the Florida State Fair. Traffic: (Feb.) W3CUL/4 5961, W4DUG/4 3625, WB4AIW 744, WA4SCK 719, WA4IJH 697, W4ILE 421, WA4NEV 404, WA4BMC 350, W3VR/4 308, WA4NBT 236, WA4FGH 157, W4FPC 154, W4BJD 144, K4SJH 136, WA4YII 111, WA4TWD 103, W4SDR 102, W4AKB 97, W4FP 97, W4DFU 90, K4EHY 87, WB4DSP 82, K4COO 68, K4KDN 68, WA4HDH 57, W4OGX 55, W4SMK 53, W4YPX 50, W4EHW 47, W4IAD 47, W4WVL 46, WB4DDO 41, WA4LQE 41, WA4WEB 40, W4KRC 39, K4ILB 36, WB4BPL 34, K4DAX 34, W4DVO 33, K4ENW 33, WA4MRK 33, WA4OHO 32, W4GUJ 31, WA4ZEV 30, W4GM 27, W4NGR 27, W4VDC 27, WA4DEL 23, WA4CIQ 22, WA4WZZ 18, K4LPS 17, WA4WOW 17, W4TRS 14, W4BKC 12, W4MVB 12, WA4VME 12, W4NUH 11, W4TJM 11, K8LNE/4 11, WA4DYJ 10, W4IE 10, W4IYT 9, K4MTP 8, W4VPQ 7, W4CBE 6, WA4YRU 6, WN4DHB 4, K4EBE 4, WA4EYY 4, K4IEX 4, WA4MOL 3. (Jan.) W4VWL 28, W4DFU 22, K4ENW 21, K4IEX 5, WA4PWF 2, W4LVV 1.

GEORGIA—SCM, Howard L. Schonher, W4RZL—Asst. SCM: James W. Parker, Sr., W4KGP. SEC: W4DDY. RM: W4CZN. PAMs: K4PKK, WA4WDE. New officers of the Athens V.H.F. Society are K4HQI, pres.; WA4TOX, vice-pres.; K4TQU, secy.-treas. They have set a goal of better public relations and more 2-meter activity. W4LRR worked K4SZG (172 miles on 2). K4HQI reports Feb. was a quiet month on v.h.f. in N.E. Georgia; looking for spring skip.

Net	*Freq.*	*Time (GMT)*	*Sess.*	*QNI*	*QTC*
GSSB	3975	2330 Dy.	28	891	96
GSN	3595	0000 & 0100 Dy.	56	481	195
GTN	3718	2200 Dy.	26	126	59
GTAN	3855	2130 Wed. 1600 Sat.	8	57	16

Because of a delay in communications the Ga. S.S.B. Net report for Jan. was omitted. (QNI 830, QTC 38.) K4AJF transferred to Atlanta. Alabama's loss will be our gain. Welcome to the Georgia section, Bill. All c.w. stations, please QNI GSN and/or GTN. We need your

GEORGIA QSO PARTY

May 13-15

All amateurs are invited to participate in the 6th Georgia QSO Party, sponsored by the Columbus Amateur Radio Club, Inc.

Rules: (1) *Time:* 2300 GMT Saturday, May 13 to 0500 GMT Monday May 15. Any or all of the 30 hour period may be utilized. (2) All emissions and bands may be used. A station may be contacted on C.W. and phone on each band. C.W. and phone contacts count together for one score. (3) *General Call:* "CQ GA" on c.w. and Ga. stations will identify by signing "DE Ga (call) K." (4) *Exchange:* QSO number, RS(T), and county, state, province or country. (5) Logs should show date, time of contact, stations worked, exchanges sent and received, band used and type of emission. (6) *Scoring:* Count two points for each completed contact, one for each report received and sent. For final score, Ga. Stations multiply QSO points by the total number of different states or provinces. Ga-to-Ga. contacts count for QSO points and the Ga. multiplier. Outside stations multiply QSO points by different Ga. counties. (7) *Awards:* Certificates to the highest scoring station in each state, province, country and Ga. county. 2nd and 3rd place awards will be issued if in the opinion of the contest committee the number of entries warrants it. Special plaques will be awarded to the Georgia stations submitting the highest s.s.b. score and the highest aggregate score. Plaques will be presented also to the highest scoring non-Georgia entry and to the Georgia club submitting the highest aggregate score. (8) *Suggested frequencies:* 1810 3590 3995 7060 7260 14060 14230 21060 21280 28060 28600 kc. SSB 3975 7230 14290 21410 and 28600. Novices try 3718 7175 and 21110. (9) Entries should include a signed statement that all contest rules have been observed. Contest logs postmarked no later than June 15, 1967, and should be sent to CARC, John T. Laney III, K4BAI, 3500 14th Avenue, Columbus, Georgia 31904.

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22 Dual VFO Adaptor for 350 & 400		25.00
100kc Calibrator kit for 350		19.50
500kc Calibrator kit for 250		19.50
RC-2 Remote Control kit for 400		25.00
45 Swantenna – Manual		65.00
55 Swantenna – Remote Control		95.00
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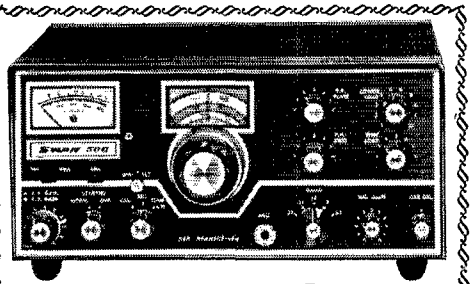

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participation and I think you will enjoy the nets. We need reports of other nets operating in the section for listing. Both l.f. and v.h.f. nets drop me a card. Traffic: W4FOE 291, W4CZN 193, W4PIM 106, W4FDN 80, K4ANO 72, W4DDY 58, W4RZL 58, K4BAI 52, K4AHO 48, WA4RAV 47, WB4AYP 41, WA4VVF 34, WB4COD 19, WA4WDE 16, WA4LLI 9, WA4JES 7.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE. PAM: W4IKB. RM: W4BVE. Section net reports:

Net	*Freq.*	*Time*	*Days*	*Sess.*	*QNI*	*QTC*
WFPN	3950 kc.	2300Z	Daily	28	577	129
QFN	3651 kc.	2330/0300Z	Daily	56	—	—

Tallahassee: The March meeting of the TARC featured a talk by LA2AD. WA4EOQ renewed as OPS. W4MLE is our only active OO. Madison: WA4GHE has relieved W4PBO as EC. Panama City: WA4FIJ has an APX-6 on 1225 Mc. W4FOX reports 60% success in 2-meter skeds with Clearwater, a 250-mile hop. WA4ZGI is putting base station and mobile unit on 146.94-Mc. f.m. Defuniak: W4COD has a homebrew s.s.b. rig on 2 meters. Fort Walton: W4ZGS is on the night shift, but WA4VSI keeps activity going on 145.2 Mc! The EARS Club's operating room is taking shape after several week end work parties. W4BVE is now fully operational on RTTY, and checks into the FATT Net. W2TPV's XYL passed the Tech. Class test, and also gave him a new jr. operator in Feb.! Milton: WB4CZT and WB4CZU received General Class tickets. Pensacola: W4NOG is having trouble getting the tri-band beam tuned up. K4NMZ is building a 2-meter s.s.b. transverter and linear. WA4IZM uses the HW-12 mobile to keep in touch with the office while in the Eglin area. Traffic:c K4VFY 685, W4BVE 185, W2TPV/4 116, K4BSS/4 112, WA4EOQ 50, WA4FIJ 37, W4IKB 26, WA4JIM 26, K4NMZ 14.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colyar, W7FKK—SEC: K7NIY. PAM: W7CAF. RM: K7NHL. New officers of the Scottsdale Amateur Radio Club are W7BBW, pres.; K7RJD, vice-pres.; K7UHE, secy.; W7AVX, treas.; K7QWR, member-at-large. W7CIC is building a 4-1000A linear. A new call in the Phoenix area is WA7-DTX. Harold is no newcomer to amateur radio; he is a member of the Old Timers Club and was first licensed in 1924 with the call 8BHC. WA7CSM has erected a new Hornet beam. We want to welcome OO K7OIX back after his illness. K7YXP, K7VXS and WA7CRI are holding code and theory classes for the blind. Classes are held Wed. at 7:30 P.M. at the Tucson Association for the Blind. As he has in years past, W7CS made the gavel which was presented to the incoming president of the Arizona Amateur Radio Club. A fine v.h.f. activity report was received from K7NII. Traffic: K7NHL 341, W7FKK 14, K7RUR 10, WN7FQY 1.

LOS ANGELES—SCM, H. G. Garman, W6BHG—Asst. SCM/SEC: W. R. Calkins, W1KUX/6. RMs: W6BHG, W6QAE, WB6BBO. PAMs: W6MLZ, W6ORS. ECs: W6LVQ, W6MLZ, WA6TYR, WA6WJT. OOs: K6CYG, W6IBD, K6KA, W6LDA, W6PCP, W6PUZ, W6RW, WA6WOY, WA6YKP. OBSs: W6BHG, W6CXC, K6EPT, WB6KGK, K6MYK, WA6NLG, WB6OFG, WB6QEL, W6RCV, WA6WKF. OPSs: W6AM, K6ASK, WB6BBO, W6BHG, W6BTV, W6CXC, K6EPT, WB6GGL, K6IOV, W1KUX/6, W6LVQ, W6MLZ, WA6OKZ, W6ORS, W6QAE, W6SRE, W6TN, W6TXJ, WA6TYR, WA6UCR, WA6WJT. ORSs: WB6AEL, W6AM, WB6BBO, W6BHG, K6CDW, W6DGH, W6DQX, W6DSC, K6EA, K6EPT, W6FD, W6GYH, W6HUJ, K6IOV, WB6KIL, WA6KZI, W6MLF, W6MLZ, WB6MSU, W6OEO, WB6OLD, WB6OUD, W6QAE, WB6QMF, WB6TMC, W6TN, W6USY, W6WPF, K5ANS/6. OVSs: K6BPC, WB6GGL, WB6GHB, WB6IOM, WB6KGK, WB6MPF, W6ORS, W6PUZ, W6TXJ, K6UMV, WB6UPH, WA6WKF. BPLers for Feb.: K6EPT, K6IOV, W6DSC, W6GYH, W6WPF, WB6BBO, WB6QXY. K6IOV is experimenting with a 2-meter antenna system for better results. W6WPF reports Navy MARS will have direct circuit with Antarctica from San Diego or Camp Pendleton as soon as details have been worked out. WB6QXY is working 2- and 6-meter traffic nets; also advises a 26-page California Routing Guide is now available for a nominal donation. K5ANS/6 has moved here from Texas. W6BTV finally has his 4-1000 on the air. WB6KIL has worked 200 countries. WB6TMC has the new 80-meter antenna working fine. WB6QMF has the *new* inverted "L" for 80 meters working great. W6AM mobile station is 500-watt c.w. and 1000 p.e.p. on s.s.b., with 3 v.f.o.s assuring flexibility in channel spotting. W6TN reports heavy QRM AREC frequencies 3568 and 3862 kc. WB6OUD has a new Galaxy 5 transceiver and 80-meter loading coil for 14-AVQ. K6-

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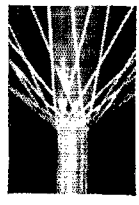

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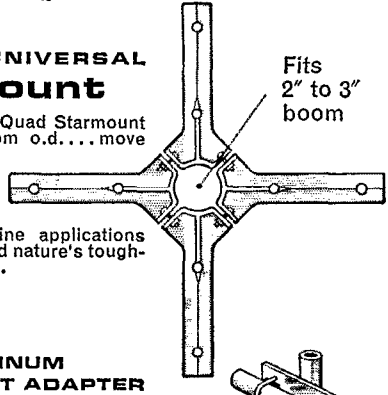

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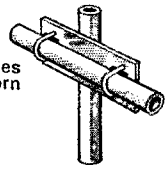

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EA is preparing for a trip back to Q-Land. K6KA has departed on a round-the-world tour and will be operating UI8KAA/K6KA and UI8KBA/K6KA. W6ORS left for a tour of the Eastern Seaboard. WB6GHB is making preparation for the June V.H.F. QSO Party and Field Day. W1KUX reports AREC very successful adding credits to the ARRL Blood Bank (a Los Angeles section activity). W6PUZ is making a vacation trip to KH6-Land. W6RCV has completed installation of a 54-ft. free-standing tower with a four-element beam at the top for the 20-15-10-Mc. bands. W6SD reports 1967 officers are K6PXD, pres.; WB6BXJ, vice-pres.; W6UEI, secy.; WA6KOE, treas.; WA6AYM, program; WB6INL, tech.; WB6GFD, membership. *Support your section level nets:* SCN, daily 0300Z on 3600 kc.; SCS, daily 0230Z and 2000Z on 50,400 kc. Traffic: (Feb.) K6EPT 1587, W6GYH 1073, K6IOV 842, WB6BBO 715, W6WPF 563, WB6QXY 512, WA6WKF 351, W6DSC 306, W6MLF 306, K6CDW 226, K5ANS/6 169, W6BTV 153, WB6CLD 142, W6FD 119, WB6KIL 119, WB6TMC 77, K6ASK 64, WB6OLD 44, W6BHG 43, W6OEO 42, WA6TYR 37, WB6QMF 34, WB6GGL 28, WA6TWS 27, W6AM 22, WB6KGK 14, WA6KZI 12, K6UMV 11, W6TN 10, W6HUJ 9, W6PCP 8, WB6AEL 6, W6USY 5, W6DGH 4, W6CXC 3, WB6OUD 3, WB6SLG 3, K6EA 2, K6KA 2, W6ORS 2, WB6UPH 2, W6DQX 1. (Jan.) WB6CLD 154, W6AM 10, W6FJU 6.

ORANGE—SCM, Roy R. Maxson, W6DEY—K6DLY advises the 246 Net for Jan. had 583 check-ins, 142 traffic. WB6JFO for SoCalSix lists 56 sessions, 662 traffic for Feb. WB6LCO has a 60-watt f.m. rig on 146.94 Mc. WA6YWS now has a Galaxy V with c.w. break-in operation and Com. IV for 2 and G-76 low-band mobile. WA6OQM has a five-element beam on 6 and hopes to have the 10-15-20 quad up shortly for DX. WB6UTC says the Calif. Novice Net now is on 3740 week ends at 0100 GMT. K6HIJ presented amateur microwave techniques at the Feb. meeting of the Barstow ARC. WA6KVA has full RTTY capability now, is liaison AF MARS to Redlands C.D. and mobile 6 and 2. W6FB says the c.d. nets are operating in good shape under WA6TAG and others. W6BAM is busy with OO activities. K6RBB broke down in Yosemite Park. He found a car with four teenagers stranded and sent out a distress call on 40-meter s.s.b. W6VVU and K6IQ picked it up and K6IQ using ZEnith 1-2000 to the Highway Patrol effected a rescue with the Park Rangers and the H.P. Total time from distress call to rescue was 25 minutes. Traffic: WB6JFO 302, WA6OQM 141, WA6ROF 136, WA6KVA 66, K6IME 64, WB6UTC 56, WB6RJX 53, W6WRJ 28, KØYVN/6 7, WB6LCO 6, WA6TAG 5, WA6YWS 1.

SAN DIEGO—SCM, Don Stansifer, W6LRU/WA6VUI—The Palomar Club enjoyed a talk on "Laser Light" at its late Feb. meeting. Its Mar. meeting included an exhibit of old-time radio gear. W6LKC, in Fallbrook, made WAC in a few hours on 10 meters. WB4DBV is now on in the area and active on 2 meters. Nice to welcome W6NDH, in Vista, back into traffic-handling. He is active on SCN and SDSN. W6BKZ was elected chairman of the San Diego QCWA group. 1967 officers for the SOBARS are WA6TAD, pres.; WA6DDD, vice-pres.; WB6DRX, secy.; WB6TTW, treas. The SDVHF Club meeting in March featured a speaker from the Western Standards Lab at the Naval Air Station, North Island. The v.h.f. club has two new members, WB6TYM and WA6JVW. WB6NMT and WA6OSB continue their excellent v.h.f. work as OVSs. Local AREC/ARPSC members played an important part with communications in late Feb. when two mountain-climbing young people were lost in Lower California. WA6TAD plans an Alaskan vacation in Sept. V.h.f. stations remember the June V.H.F. QSO Party. Traffic: K6BPI 8489, W6EOT 531, W6VNQ 417, W6BGF 378, W6LRU 50, W6NDH 37, WA6TAD 12, WB6NMT 5, WB4DBV/6 4.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6OKN—SEC: WB6DRY. The Simi Valley ARC held a c.d. exercise during Feb. and deployed mobiles to 3 cities in Ventura Co. WB6DRY is on TDY in KH6-Land and checks in daily using his WØSYN/KH6 call, mornings on 3895 kc. and evenings on 14.3 Mc. WB6NPJ sends along a letter from Viet Nam. WB6JVR has a new sixteen-element colinear for use when he calls the roll on the 2-meter net in Lompoc. WA6UUA calls the roll on 10 meters Mon. at 1930, also from the Lompoc area. An old friend, K6CVR, is heading for the North Pole and will operate from an ice flow during March. K6SJC is whomping up a 4CX1000A for 2 meters. K6LFQ has his new Drake station on the air. WB6UHE put together his SB-100 and checks in with the West Coast Amateur Radio Service on 7225. Traffic: WB6UHE 4.

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WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI. PAM: W5BOO. RM: W5LR. Many of you have probably heard my announcement on the air that the Annual Directors' Meeting will be held in May and that you should write to your Director about any suggestions or complaints you may have. This is the only way your Director can know what you want. By the time you read this it may not be too late for you to get your comments to W5QKF. I had the pleasure of attending the Annual Lawton Hamfest Feb. 11-12 and I can assure you that if you have never attended one of these hamfests, you have missed a good time. I was extended the courtesy of speaking to the group at the dinner Sat. night as well as the general assembly on Sun. The Lawton ARC has had plenty of experience and knows how to show you a good time. Don't miss the next one. The time for the Dallas Hamboree has been set for Aug. 5. As usual the Dallas ARC promises this will be the best ever. Here is a tip to the traffic-handlers: If you originate a message it counts as one, if you receive a message and deliver it, or relay it to another station, it counts as two messages handled. I get many reports that I must try to understand what is meant. Please request station activity report forms which are self-explanatory. I want to give credit where credit is due. Traffic: K5DBJ 175, W5PBN 61, WA5EVS 55, W5DNR 51, WA5AGH 46, W5PXT 41, WA5RAN 17, W5LR 15.

OKLAHOMA—SCM, Daniel B. Prater, K5CAY—Asst. SCM: Sam Whitlev, W5WAX. SEC: K5ZCJ. RM: W5QMJ. PAM-75: W5PML. PAM-6 meters: K5VFR. PAM 2 meters: WA5LBI. The Lawton-Fort Sill Hamfest was a big success with nearly 300 people present. The sponsors are to be congratulated on their fine program and facilities. Civil Defense Communications Center at Oklahoma City has received its new call WA5DOA, with Charley Farris as trustee. Charley plans to have the station on 24 hours a day in the near future. The Pottawatomie County Weather Warning Net is set up for 145.1 Mc. with K5LUJ at the helm. WA5MAH reports the Tulsa group on 145.08 Mc. has started on m.c.w. code transmission. I was happy to see W5NBI's application for ORS. WA5AOB, Oklahoma County EC, is doing a fine job of organizing the AREC nets with K5SKA as RO for RACES. WA5ORG passed the General Class exam. WA5JHB and family all have amateur calls. YF Rosalie is WA5LZD, son Gary is WA5FVN and daughter Dianna is WA5LVQ. WA5OUD has a new 200-V on the air now. Garfield County has changed AREC net time to 0900 CST Sun. on 146.869 Mc. OPEN: QNI 222, QTC 16. OLZ: 20 sessions, QTC 30. STFN: QNI 581, QTC 90. Traffic: K5TEY 1248, W5NBI 95, W5FEC 56, W5QMJ 40, K5JGZ 30, W5MIFX 25, WA5KNR 19, W5DRZ 14, WA5KZA 13, W5FKL 12, K5WPP 12, WA5BXX 10, K5JGZ 9, WA5MIDN 6, WA5MAH 5, W5EHC 4, WA5NTI 2.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5QQG. PAM: W5KLV. RM: W5EZY. *W5ES Bulletin* advises the El Paso Club code class is down to the serious ones, now approximately 16. Five have passed the Novice test. Congratulations to WN5HRR, WN5RGR, WN5RJF, WN5ROD and WN5ROC. EC W5TFW and the club are working on getting more 2-meter f.m. rigs on the air in the Port Arthur area. K5WYN is QRL telephone relaying. W5AC, at Texas A. & M. University is a new OPS/ORS and says the club operated in the DX Contest. K5WIC reports for W5AC but doesn't seem to have much time on his own station. WA5QKE now is on the air with a Galaxy 5 and K2. WA5AUA is working on antennas as well as helping get out a nice bulletin for the Corpus Club. W5ABQ reports plans to reactivate W5AFZ at Mico, Tex., on Medina Lake. If he does we understand W5AFZ will be the only station in Medina County. EC W5DAA reports the Kingsville ARC now has a Collins KWS1 and a 75A-4. W5DAA has a new Drake T4X with a KW 572-B amplifier. WA5CQD has a new double stack five-element 6-meter beam up 55 feet. The Eyebank Net was busy. K5GJQ advises 11 eye requests were filled in one day with 53 delivered for Feb., making a total of 1683 for the past four years. Good work, fellows. WA5QVJ, formerly, WA1FFY, is now a resident of El Paso. Welcome to South Texas, WA5QVJ, and we'll be looking for you on 2 and 6 meters. Traffic: W5AC 219, WA5QKE 150, K5HZR 139, WA5MXY 122, W5EZY 89, W5AIR 52, K5HMF 51, W5ABQ 50, W5BGE 37, W5AQN 30, WA5IQL 27, K5WIC/M 10, W5TFW 7, W5KLV 3, K5WYN 2.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harrold, VE6TG—SEC: VE6FK. PAM APN: VE6ADS. PAM ASBN: VE6ALQ. ECs: VE6SA, VE6SS, VE6XC, VE6AFQ, VE6PL.

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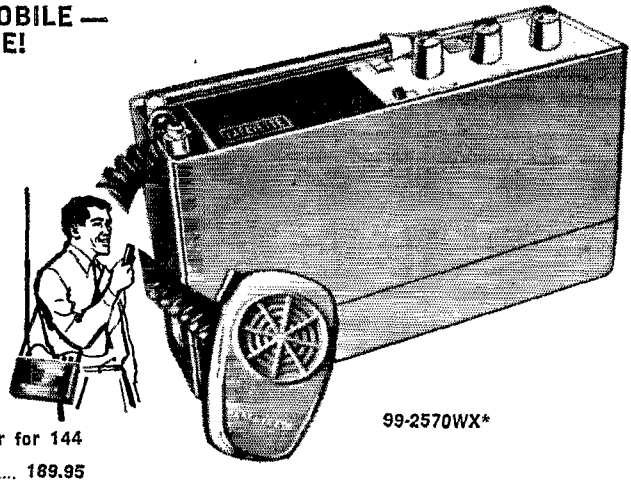

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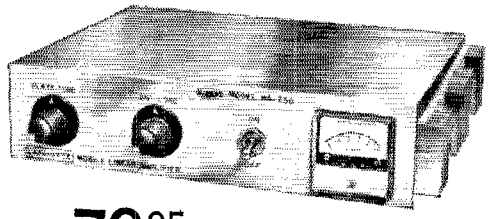

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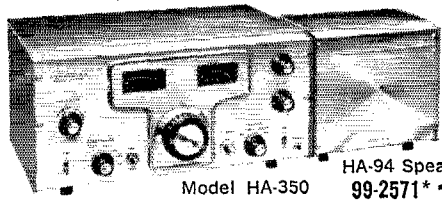

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ORSs: VE6BR, VE6ATG. OPSs: VE6HM, VE6SS, VE6ADS. OOs: VE6HM, VE6TY, VE6AKV. OBSs: VE6HM, VE6AIF. Our SEC reports that things are running fairly well these days. VE6ADS is having troubles so VE6SS has taken over APN for him. VE6ABS and VE6CO are busy taking the bugs from their homemade s.s.b. rigs. VE6TG is trying to find Gravel Gertie in his rig with not much luck so far. VE6ATG was heard burning the midnight oil quite often. VE6AFQ is busy working some DX. The Calgary gang is working hard to make Alberta Expo 67 Hamfest the biggest ever. Make it a date to be there July 8 and 9. Also don't forget the Glacier-International Hamfest to be held at Apgar July 22 and 23. The SARC in Lethbridge is looking for old and new members since it has reorganized. Come along, fellows, and join the crowd. ASBN is giving an award for Expo 67 so get your feet wet, fellows, and see what it is all about. Traffic: VE6ATH 78, VE6HM 45, VE6FK 34, VE6XC 33, VE6BR 22, VE6PL 20, VE6AET 11, VE6SS 11, VE6PZ 10, VE6AOO 8, VE6ADK 6, VE6YW 5, VE6AFQ 4, VE6APO 4, VE6WN 3, VE6AAI 2, VE6AUA 2, VE6FV 1, VE6UK 1.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB—The new RM for BCEN is VE7BLS, of Parksville. Net manager is VE7ASY, Williams Lake. Check-ins for BCEN is increasing, the time is 0300 GMT. VE7BBG and his XYL have a new daughter. VE7BQA is now an ORS. The North and West ARC sent its first Centennial certificate to a YL, VE6AKE. VE7TS gave the club a talk on transistors. VE7AC checked from California. VE7BLO is chasing WAS/YL. The East Kootenay ARC 2-Meter Net starts Feb. 19 at 1800 MST. The Northern Net meets Wed. and Sun. from 0300 to 0330 GMT on 3785 kc. VE7BLS runs the DX60-HQ-110A into a long wire. The Haney ARC has moved into the new civil defense building. The BCARA Centennial Picnic will be held in Queen's Park, New Westminster, Aug. 13. VE7JM is proving 2 meters works out of the Fraser Valley. VE7BCV visited the lower mainland and Vancouver Island. The Vancouver ARC holds hidden transmitter hunts every 3rd Sun. VE7PF's house is progressing with construction of a tower with pipe ducts built into the foundations. VE7AKE, Calvert Island, has made 2-meter ccontacts. The Kamloops ARC Net meets on 3785 kc. Thurs. at 1900 PST and is issuing a Centennial certificate. This year the International Okangon Hamfest will be in B.C., date to be announced. Traffic: (Feb.) VE7BHH 108, VE7ASY 103, VE7BLO 34, VE7APF 31, VE7BQA 20, VE7BLS 18, VE7DH 15, VE7AMW 10, VE7SE 5. (Jan.) VE7BLS 23, VE7BQA 20.

MANITOBA—SCM, John Thomas Stacey, VE4JT—The Dauphin ARC again is active, meeting the last Mon. of each month. VE4EF still is shaky from his accident on the farm and reports some good DX contacts on 10, 15 and 20. VE4JW is working in Winnipeg but gets in some week-end operating with his homebrew 600 watts, dipole and 75A-1. The St. John's College Snowshoe Race was well covered with 2-, 6- and 75-meter rigs with VE4HI, assisted by VE4EI, VE4UB, VE4UX, VE4QX and VE4HC, handling the v.h.f. link. VE4SJC, with VE4SD, assisted by VE4HB, VE4HC and VE4JC held the fort on 75. Mobiles were provided by VE4LI, VE4HK, VE4QL, VE4LK, VE4MP, VE4LA, VE4OL, VE4DW and VE4LU. Rumor has it that VE-4LI still is looking for checkpoint Romeo. VE4FW is trying his hand at v.h.f. receiver construction. VE4AO is G-Land bound for the holidays and an eyeball with G5CP. VE4EI is rounding up gear for RTTY. VE4LG is a regular NCS on Tenth region. Both nets had fine reports: Phone Net, sessions 28, QNI 479 and QTC 11; C.W. Net, sessions 28, QNI 178, QTC 158, 93% representation on TEN. Traffic: VE4JT 154, VE4LG 144, VE4EI 96, VE4RW 55, VE4NE 41, VE4EF 17, VE4SC 5, VE4-XN 5, VE4DL 4, VE4GN 4, VE4NW 2, VE4DQ 1, VE4NV 1.

MARITIME—SCM, J. Harley Grimmer, VE1MX—Asst. SCM: R. P. Thorne, VO1EI. SEC: VE1HJ. Your SCM, VE1DB and XYLs spent a very enjoyable two weeks in Antigua at VP2AZ's hotel. VE1RT is hospitalized again and we all wish him a speedy recovery. Our deepest sympathy is extended to the family of VE1PA, who passed away recently. Congratulations to VE1-AMR, who recently obtained his WANS certificate. VE1ABS now has his DX-40 back in operation and expects to be on 80 soon. VO1FX reminds those of us who operate s.s.b. that D.O.T. regs require that the termination of each transmission be identified by the call of the transmitting station. FCC regs do not apply in Canada. VO1AW won certificates for his operation in the Helvetia 22, PACC and Connecticut QSO Party. VO1AO now has his homebrew rig back on the air and VO1AQ has new Heath equipment. VO1GN, Memorial University of Newfoundland ARC, should be active

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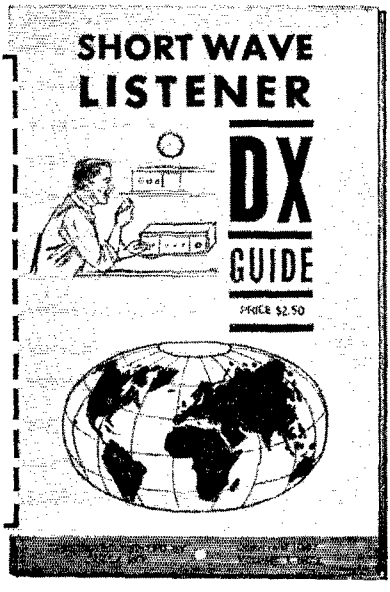

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shortly with an SB-301 and an SB-401. From the advance information received from the Moncton Area ARC it looks like this year's hamfest is shaping up well. Traffic: (Feb.) VE1RT 122, VE1AMR 19, VE1ARB 8, VE1AAX 7. (Jan.) VO1FX 12, VE1ABS 4, VO1AW 3, VE0MD 3.

ONTARIO—SCM, Richard W. Roberts, VE3NG—Your SCM was guest at the Sudbury & District ARC's much enjoyed Ladies Nite. The Ottawa Valley Mobile ARC is printing a club history. The Skywide ARC of Toronto operated a booth provided by the SCM at the Canadian National Sportsman Show in Toronto. Bill Bissell, the club prexy was in charge. This is the twentieth year that your SCM has had a group in this booth. VE3DMU, in Ottawa, has returned from still another course. The Chatham ARC is go-go again. Good luck and let's hear from you. The Ottawa Club is in second gear re the Ontario Division Convention and is getting out a real smashing program. From the grapevine we hear the CB millions in Ontario are trying to snaffle the balance of the 11-meter band. The RTTY boys do a very fine job of passing traffic. Congrats to Sid Burnett on his fine effort of organization. Received nice bulletins from Waterloo and from the Renfrew ARC. More and more stations are going s.s.b. It may be that a third-party traffic net may blossom soon. The wonderful and exotic Chicken Junction Net cannot possibly handle formal traffic along with its normal, "whatever they do," so it is conceivable that the Ontario Phone Net on 3770 kc. may take a swing at it. Traffic: VE3CYR 156, VE3ATI 100, VE3DPO 100, VE3NG 95, VE3BZB 78, VE3EBC 76, VE3GCE 69, VE3GI 68, VE3AWE 47, VE3BUR 44, BE3FHV 33, VE3EAM 25, VE3WW 25, VE3FGV 24, VE3EXW 21, VE3EZY 19, VE3EHL 17, VE3ETM 17, VE3DV 15, VE3AFA 14, VE3BQL 14, VE3BWM 12, VE3DBG 8, VE3VD 7.

QUEBEC—SCM, J. W. Ibey, VE2OJ—SEC: VE2ALE. RM: VE2DR. PAM H.F.: VE2BWL. A very complete report of all the known nets operating in the section comes from VE2BWL, who is making a study of traffic-handling. It is not impossible that all these nets may be tied together to make for better traffic gathering and to support in case of an emergency. The growing use of the repeaters locally also is making the v.h.f. nets into a more tangible relay system. In this respect VE2AGQ will be PAM-V.H.F. and will make use of the traffic experience he has had for many years. The Trans-Canada Net has a busy time each Sun. with good representation from all sections. VE2ARX and VE2AMA, of Trois Rivieres, constantly monitor the 2-meter band. Two clubs newly-ARRL-affiliated are the Young Amateurs of Quebec with VE2BHH as secy.; and the Amateur Radio Club of McGill University with VE2BQO, pres.; VE2BSF, vice-pres.; VE2BOW, treas.; P. Visintini, secy. VE2BRD has taken the job as net manager of RTQ and has written a very explanatory newsletter to help in the re-organizing. RTQ is an up-and-coming local net but needs all the traffic you can feed it to keep up interest. VE2BNL did a fine piece of organizing the v.h.f. ang for two car rallies. Our sincere sympathy goes out to VE2BG in his bereavement. Do not forget the ARRL National Convention to be held June 30, July 1 and July 2. Traffic: VE2DR 88, VE2BRD 67, VE20J 58, VE2BVY 45, VE2UN 31, VE2BWL 28, VE2DCW 19, VE2AZQ 16, VE2EC 12, VE2ALE 8, VE2CP 5. QST

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MOTOROLA SINGLE SIDEBAND 2-WAY RADIO

135

Solid State Receiver

(Continued from page 27)

variable resistor, R_{66}, in the output divider should be adjusted for an output of about 12 volts. The voltage is not very critical so long as it is well regulated. A current of 150 ma. is available from the supply.

Conclusion

In general, the original objectives have been fully achieved. The HBR-TR is simple to construct, but offers performance completely compatible with the modern operating practices on today's ham bands.

The authors, like most serious experimenters, never manage to complete a project. Indeed, the original prototypes of the HBR-TR are in a continual state of evolution, and probably will be for years to come. Possible changes in the "Mark II" models might be switchable filters to change selectivity, a linear master oscillator with crystal oscillators and mixers to provide the proper injection frequencies, and the inclusion of 6 meters. More front-end experimentation is being done, and some day the HBR-TR will be "the ultimate receiver."

Acknowledgements

There are several amateurs who contributed significantly to this project through their suggestions, or with aid in construction. The authors would like to thank K6OPO, K6DMW, and WA6EED. Very special thanks indeed go to Dick Segerstrom, W6CQI, whose suggestions, criticisms and encouragement have been a major motivation for the project. Finally, we would like to acknowledge the infinite patience shown by our wives, who, by now are quite tired of "that receiver project." QST

YL News and Views

(Continued from page 73)

she and the OM moved to Indiana, she continued her busy traffic schedules, with membership in the many nets, as well as membership in radio clubs, QCWA, and HAWKS. She joined MARS, Fifth Army in 1955 where her activity as procedure director, and editor of the Indiana MARS bulletin, and dedicated activity brought her the appointment of State Director of Indiana MARS. Under Thelma's leadership, Indiana MARS increased from a plus fifty percent to one hundred percent, and, in 1966, her efforts were rewarded with the Certificate of Merit and Service. This award was presented to her by Col. W. E. Smithson, Chief of Communications of United States Fifth Army. Thelma is the first civilian to receive such an award.

The Zimmermans are an all-licensed family. OM, Henry is W9EQO, their daughter holds the call WA9QOQ and is married to WA9QOR.

On January 1, 1967, Thelma retired as State Director because of ill health, and orders from her doctor that she relax and rest. She is still permitted to work in her favorite MARS activities but not on a grand scale. QST

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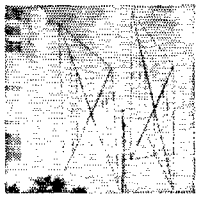

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The 20-Minute Portable Quad

(Continued from page 18)

it was consistently an S unit below the writer's 42-foot-high four-element quad, and at least as far below a neighbor's optimum-spaced four-element Yagi. But it has always gotten reports about three S units better than a reference dipole, and it has proven itself to be in the same league with the popular triband Yagis at about twice its height. And remember that such antennas usually represent about 20 times the cash outlay of this quad, when you count a suitable mast and the least expensive rotator.

We used the portable quad with a TR-3 transceiver at about a dozen locations during our 12,500-mile trip, and the results were sometimes incredible. At one location in Nova Scotia, our destination, we received numerous "strongest on the band" reports and had to fish call signs out of pile-ups as much as 20 stations deep.

A Bit of Advice

If an antenna similar to this one is used at a fixed station, the bamboo and exposed wood should be treated to resist weathering. Also, a 30- or 40-foot mast and a rotator wouldn't hurt anything, and a more secure guying system could be developed (although the writer's quad stayed put through a 60-mile-an-hour storm at an exposed location on the Atlantic coastline).

Finally, if you plan to use a portable quad on a vacation, plan your itinerary carefully. You'll want to operate from a.c. at motels when possible, because otherwise you're almost certain to run the car battery down in the middle of nowhere.

However, motels pose certain problems. For one thing, not all motel owners favor cubical quads in their courtyards, especially if you ask their permission after you have already agreed to rent the place. But surprisingly, many motel owners will agree to the quad if asked before a rental agreement is reached.

Above all, avoid motels with television in every room. Maybe your rig is clean, but you can never convince a motel owner — or the other guests — of this. And you certainly can't hide your identity when you've got a cubical quad set up.

When you take a cubical quad on your vacation, you must expect to be conspicuous, not only on the air but to everyone for acres around. QST

18th Armed Forces Day

(Continued from page 16)

the major portion of the time allotted for military to amateur crossband contacts. The call sign NPGAM will be utilized from the aircraft.

AIR (Air	3347	RTTY	3.5 — 3.8
Force Radio	3397.5	c.w.	3.5 — 3.8
Wash., D.C.)	4025	s.s.b.	3.8 — 4.0
	6997.5	c.w.	7.0 — 7.2
	7305	s.s.b.	7.2 — 7.3
	7315	RTTY	7.0 — 7.2
	7458.5	c.w. (Novice only)	7.15 — 7.2

(Continued on page 140)

13995	c.w.	14.0 — 14.2
14397	s.s.b.	14.2 — 14.35
20928	s.s.b.	21.35 — 21.45
20994	c.w.	21.0 — 21.1

C.w. Receiving Contest

A c.w. receiving contest will be conducted for any person capable of copying International Morse Code at 25 words per minute. The c.w. broadcast will consist of a special Armed Forces Day message from the Secretary of Defense addressed to all radio amateurs and other participants. The schedule for this broadcast is as follows:

Time	*Transmitting Station*	*Frequencies (Kc.)*
20 May 1967	WAR — Army	3345, 6992.5, 1440
210300 GMT	NSS — Navy	3397.5, 4015, 7301,
(202300		14480
EDST)	NPG — Navy	4005, 4016.5, 7375,
(201900		13975.5
PST)	AIR — Air Force	3397.5, 7315
	A6USA — Army Radio San Francisco	6997.5
	AG6EA — McClellan AFB California	4580, 7332

RTTY Receiving Contest

A radioteletypewriter RTTY receiving contest will be conducted for any individual amateur or station possessing the required equipment. This is a test of the operator's technical skill in aligning and adjusting his equipment, and serves to demonstrate the growing number of amateurs becoming skilled in this method of rapid communications. The RTTY broadcast will consist of a special Armed Forces Day message from the Secretary of Defense to all radioteletypewriter enthusiasts. The message will be transmitted at 60 words per minute in accordance with the following schedule:

Time	*Transmitting Station*	*Frequencies (Kc.)*
20 May 1967	WAR — Army	3347· 6992.5, 14405
210335 GMT	NSS — Navy	4012.5, 7380
(202335	NPG — Navy	4001.5
EDST)		
(202135 CST)	AIR — Air Force	3397.5, 7315
(201935 PST)	A6USA — Army Radio San Francisco	6997.5
	A5USA — Army Radio Fort Houston, Texas	4025
	AG6EA — McClellan AFB California	4580, 7332
	AG311Q — Scott AFB Illinois	4590, 7540

Submission of Competition Entries

Transcriptions should be submitted "as received." No attempt should be made to correct possible transmission errors.

Time, frequency and call sign of the station copied as well as the name, call sign (if any) and address of the individual submitting the entry must be indicated on the page containing the text. Each year a large number of perfect copies are received with insufficient information, thereby precluding the issuance of a certificate.

Completed entries should be submitted to the Armed Forces Day Contest, Room 5A522, The Pentagon, Washington, D. C. 20315 and postmarked no later than 31 May 1967. QST

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The World Above 50 Mc.

(Continued from page 18)

Dr. Brian G. Marsden, engaged in the study of comets at the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, has revised the chart from the most current information available. Dr. Marsden says, ". . . the original list contains several rather spurious entries. To decide whether one really has an annual stream of meteors is a very difficult task and the number of well-established streams is relatively small. I think you would be much better off concentrating on these than in putting in a great effort on the other occasions, when the reported streams are so uncertain."

Our thanks to Dr. Marsden; I know many of you are looking for this information. QST

Don't Lose Your Mobile Rig

(Continued from page 55)

Marcogram: As you know, Mr. X, this interview is for a Ham Club bulletin; and I'm sure by now, many readers are thoroughly alarmed. What precautions can you advise?

Mr. X: Lots of insurance.

Marcogram: Any others?

Mr. X: Yes. Don't park on a dark side street, especially in a strange neighborhood. Roll all windows up firmly as far as they will go, and lock all doors. It might be good to add that if you have a gasoline credit card, make sure it is in your wallet, not in the glove compartment. These cards are worth $100 on the market, and it is the first thing I look for. Most thefts from cars occur after dark and on dimly lit streets. If you are to be gone for a long while, it is worth your while to remove the radio and lock it in the trunk of your car. Incidentally, if you can install one of those auto burglar alarms, do so. I'm sure you hams can figure them out and this is an added safety. There is one out which has a siren — and, brother, what a noise it makes! No car-man would stick around long after that baby goes off!

Marcogram: Are these sirens immune to the impressioning you use?

Mr. X: No. However, less than 5 percent of the active car-men use impressioning. They rely on the snake and a knife. There are some alarms that have a hidden switch. This is the best policy; but if a car-man sees a person activating a hidden switch, that's it.

Marcogram: Well, Mr. X, I'm sure you have enlightened many of the readers, and on their behalf I would like to thank you for a very interesting, interview. QST

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.

ARPSC

(Continued from page 64)

—•••—

March 10: A sailor nearly cut one of his fingers off in the middle of the Atlantic on weather station Delta, and no doctor aboard. Medical advice was obtained on 20 meters from K4CG by the ship's amateur station K1HCG/MM.

—•••—

March 11: K4DI and TI8M were rag chewing on 14,240 kc. when YV3BD broke in saying that a 5-year-old boy had been bitten by a deadly coral snake and would soon die unless he received antidote serum. TI8M helped with the language barrier. W4DVW of Miami was contacted and after several hours of phone and radio calls a military plane left Langley Field, Va. for Miami. A surgeon and the serum left Miami and were met at Caracus Venezuela by a helicopter. They were immediately flown to the sick child. The next day YV3BD and K4DI reported the boy alive with expectation to recover. The surgeon's wife was then advised of the return of her husband to Miami. The Venezuelan hams expressed their appreciation for the help given — *K4DI.*

—•••—

Forty-Three SEC reports were received for January representing 17,389 AREC members. This is four less reports and about 2000 less AREC members than a year ago. The following sections reported: E.Pa, Del, SNJ, WNY, WPa, Ill, SDak, Ark, Ky, Mich, Ohio, NLI, NNJ, Kans, Mo, Nebr, Conn, Me, EMass, NH, Mont, Ore, Wash, Nev, SCV, NC, Va, Colo, Utah, Ala, EFla, Ga, La, Orange, SDgo, Okla, STex, Mar, Que, Ont, Alta, BC, Sask.

We Goofed

In the Simulated Emergency Test writeup in February *QST* we made the following mistakes and/or omissions, and we wish to apologize for these discrepancies:

(1) The combined Eastern Pennsylvania-Penna. Traffic Training Net (EPA-PTTN) report was omitted. This group operated 11.7 hours, handled 258 messages total. K3YVG and W3CBH submitted the report. So you can add their 1,189 points to the NTS point total.

(2) In the section listing of SET reports (p. 14, Feb. *QST*), three reports were credited to Santa Clara Valley which should have been credited to Sacramento Valley, namely Del Norte Co. (WB6MXD), Nevada Co. (K6RHW) and Yolo Co. (WA6TQJ). Although the point difference is zero, since no points were turned in by these three, the respective standings of these two sections would be somewhat changed since number of reports is a factor.

(3) The SEC for New Hampshire submitted a composite report for all his ECs which never received any recognition in the writeup. We still don't know what happened to this.

Sorry, Fellas! QST

HOW'S DX?

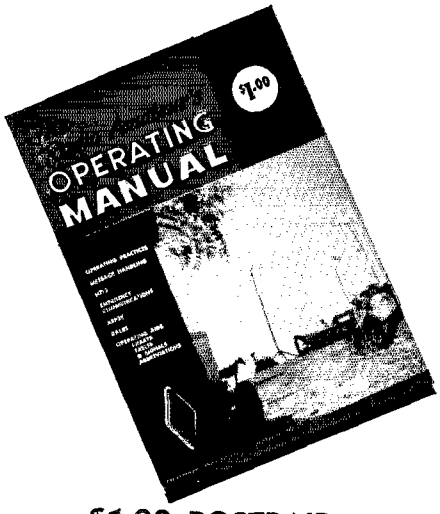
(Continued from page 88)

volts, is 35 miles away, so my truck's 12-volt d.c. system is in local demand. Radio Botswana's chief engineer is a good friend who makes his workshop available. There are, of course, other rare countries within DXpedition distance." Trouble is, K7GTC has no radio gear, hence no QSOs. Anyone inclined to help a soon-to-be ZS9 start radiating can write Pete Wood, P.O. Box 57, Malepolole, Botswana, to start the ball rolling . . . . . W3HNK's pal ZE4JS keeps workable week days on 21,030 kc., 2030-2130 GMT . . . . . W3JZJ/9's 13-year Canaries jinx was licked by EA8FE . . . . . WA2LOR says Rio de Oro's EA9EJ is very big on 28,507 kc. at 2000 GMT with forty watts of a.m. and a quad . . . . . Africa scoop via many an aforementioned club and group: 5X5s AU FS and JK manage to keep Uganda around. . . . FR7ZL, speaking only French and preferring the key, may show from Tromelin, Glorieuses, Europa and Juan de Nova sporadically. . . . Wandering W6s KG and DOD have been employing 14,020, 14,198, 21,048, 21,328 and 28,050 kc. on their tour of Africa which started with 6W8CD and 5T5 emanations. . . . FB8ZZ, with straight a.m. around 14,140 kc. at 1700-1900 GMT, copies sideband with no sweat. . . . HK1QQ/TJ8 tried his 14,025-kc. c.w. luck as TT8QQ in March. TL8 TN8 TR8 and other fun may follow. . . . ZS2MI puts rare Marion isle back in the DX picture on a.m. or c.w., 14,170-14,190 kc., 1800-1900 GMT.

ASIA — VS9ASP's gang concentrates on North America c.w. QSOs around 14,005-14,025 kc. at 2030-0200 GMT, 21,010-21,025 at 1600-2000. Senior operator Don writes, "To make the maximum number of contacts, all stations are asked to keep as brief as possible. Work us just once per band unless circumstances are unusual. We are interested in giving the VS9A prefix the widest possible circulation before the South Arabian Federation gains its independence early next year." . . . . . The three-month global trot of K6KA and XYL WA6VEJ should have them in Samarkand or Tashkent by now, possibly visiting UI8s KAA and KBA. Thereafter should come stops at YAIs FV or HD, EP2BQ, OD5EL, YK1AA and SU1IM to round out the month. In June they'll return via 5X5AU, SV0s WL WU and other European points. Watch for the Conklins on 7004, 7094, 7194, 14,004, 14,044, 14,104, 14,194, 21,044, 21,404 and 28,544 kc. . . . . K9TZH, in response to s.a.s.e., can supply specs on the work-five-HL9s Kimchiti certification . . . . . KA2DJ of FEARL gives ample advance notice of the KAs Field Day, 0900 GMT, July 3rd, to 1500 the 4th. "KAs will be competing with each other for world-wide contacts, so it will be an excellent opportunity to qualify for FEARL's 5-KA, 25-KA and 5-Ka-Districts certifications." We'll schedule a timely reminder for two months hence . . . . . K2KTK finds former VS9OSC op Colin now manning VS9MB . . . . . W7VCB would like the JA swarm to fan out a bit on 40's low edge . . . . . Far East addenda via the clubs press: JT1s AG and AQ flit about 7010 and 14,040 kc. of a morning. . . . One AP5NO, said to be a former DL, is noted on 20 s.s.b. . . . UA0KIP, 14,017 kc. at 1400 GMT, can feed you rare Wrangel island. . . . New Far East Auxiliary Radio League officials: KA2s VT, pres.; SF, v.p.; DJ, secy.; QX, treas.; EB, gen. mgr.; LS, QSL mgr.; DL, awards mgr.; and LL, *News* ed. New or renewed memberships are held by KA2s AA (WB6JER), HD (W3WZN), HT (K9UAH), MB (WB4CMB), MH (Mrs. WB6JER), OM (K6ASX), QX (WB6ASG), SF (WA4MWC) and TS (W4BUA).

SOUTH AMERICA — "Happy to report success on my second annual international 160-meter DXpedition," writes top-band fan W0VXO. "After enjoying Rio's carnival I managed to work four Ws from PY1NFC to begin a week of island-hopping that yielded nine new 1.8-Mc. countries. Two of these brought W1BB's total to 97 on 160. Calls used included W0VXO/OA4, OA4O, FG7XL, VP2s AZ KY and MK. I tried to prove that DX contacts on 160 are possible any time in the year. The Brazil path had winter on one end, summer on the other, with modest power and simple wire antennas. When DXers get tired of screaming on 20 they might try for DXCC on 1.8 Mc. with fifty watts and a dipole." . . . . . YV3KX, home in Barquisemeto only on week ends, works mobile-style DX from Caracas during the week . . . . . W0TUT/mm expects to fire up his SR-150 and vertical in the HC-HC8-OA region this spring aboard U. of Miami's floating lab *Pillsbury* . . . . . ARRL's W1DVE, stopping at the WAC Desk, was asked which continent KC4USN represents down at the pole. Anybody know where he usually sets his chair?

HEREABOUTS — W6PEU/KS4 becomes KS4CE on Swan with a KWM-2 and 15-meter dipole. XYL K6QPG informs, "We keep skeds around 21,420 kc. near 1530 GMT almost daily, excluding week ends. He also works 10 and 20 but operating time is limited. KS4CE is usually good for a QRZ after our QSOs." . . . . . "After QRT in March, Merle of OX5AN will visit Stateside and then head for VQ9-land," divulges K1QGC . . . . . W7VCB wonders if the Spanish-speaking phone gang can give greater clearance to 40's low c.w. edge. Ken's getting good DX results with a half-wave 7-Mc. vertical of birdcage construction . . . . . "I've been DXing off and on since 1947 but I've never heard such c.w. antics as lately," protests W1PSY. "The recent 14-Mc. pile-ups on WA2DJJ/3V8 are just part of the game, but the lids deliberately QRMing him with Vs, dits, etc., etc., should choose another hobby." *If* they can find one sufficiently immature for their juvenile approach, Carl . . . . . WN2VRK, now WB2VRK, closed his Novice DX books at 31/20 countries worked/confirmed on all continents, and four states shy of WAS. Tony says neighbor WN2YOI is showing New Jersey Generals how to nab 21-Mc. DX . . . . . K1NHR's Vermont QSOs are heartily welcomed by the 20-c.w. overseas bunch . . . . . WA2OJD dropped in on PJ3CC in late March to pump out contacts on 80 through 10 by mike and key . . . . . "Please *don't* keep spreading the good word about 28 Mc.!" begs WA9MQI, hoping to save a larger share of 10-meter goodies now crashing through . . . . . Ws 3HCW and 9WR qualified for DX Club of Puerto Rico's 8X8X8 diploma . . . . . W9WNV took time out from Indian Ocean DXcitement in March for a Stateside stay with K1IMP and visits to ARRL Hq. . . . . Commercial retreat from pure s.s.b.? W2KGO, quoted in FEARL *News*, says Mutual Broadcasting System avoids Donald Ducking in its shipboard space-flight coverage by reverting to double-sideband with AFC-locking pilot carrier. Next stop old a.m.? QST



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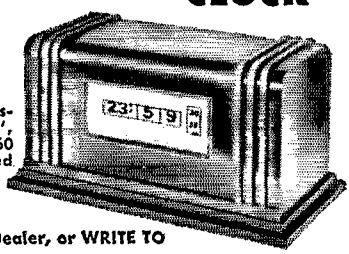

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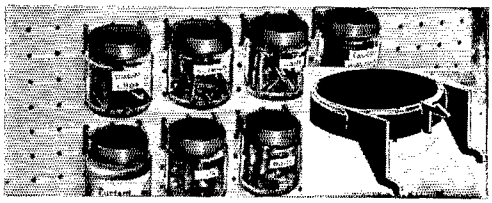

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SX100	179	NCX5	429	KNIGHT VFO	27
SX110	87	NCXA AC SUPPLY	79	SWR BRIDGE	12
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(1) Advertising shall pertain to products and services which are related to amateur radio.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others. No Box Reply Service can be maintained in these columns nor may commercial type copy be signed solely with amateur call letters. Ham-ads signed only with a box number without identifying signature cannot be accepted.

(3) The Ham-Ad rate is 35¢ per word, except as noted in paragraph (6) below.

(4) **Remittance in full must accompany copy, since Ham-Ads are not carried on our books. No cash or contract discount or agency commission will be allowed.**

(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) **A special rate of 10¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature.** Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, takes the 10¢ rate. Address and signatures are charged for, except there is **no charge for zipcode, which is essential you furnish. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising so classified takes the 35¢ rate.** Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) **Because error is more easily avoided, it is requested copy, signature and address be printed plainly on one side of paper only. Typewritten copy preferred but handwritten signature must accompany all authorized insertions. No checking-copies can be supplied.**

(8) **No advertiser may use more than 100 words in any one advertisement, nor more than one ad in one issue.**

(9) Due to the tightness of production schedules, cancellation of a Ham-Ad already accepted cannot be guaranteed beyond the deadline noted in paragraph (5) above.

Having made no investigation of the advertisers in the classified columns except those obviously commercial in character, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

ROCHESTER, N.Y. is again Headquarters on Saturday, May 13 for one of the largest hamfests in the East. Full day of dual programming covering all phases of amateur radio plus huge surplus equipment sale. See Hamfest Column for more information.

INVITATION: New York Radio Club cordially invites New York City area hams and SWLs to its regular monthly meetings. Second Monday of each month at George Washington Hotel, 23rd St. and Lexington Ave., promptly at 8 P.M. All are welcome. W2AIT, New York Radio Club.

HAMFEST: Sunday June 4. Save this date for Annual Starved Rock Radio Club Hamfest at Ottawa, Illinois. Write G. E. Keith, RFD 1, Box 171, Oglesby, Illinois 61348 or see Hamfest Calendar in May QST.

OLD Old Timers Club now over 650 members with verified 2-way contacts before 1926. Life membership $15.00. Bi-monthly "Spark Gap Times" $2.50 annually. Roster free to members. Write Secretary, W5VA, Box 840, Corpus Christi, Texas 78403.

HAMFESTERS Radio Club, Chicago, Illinois, proudly announces its 33rd Annual Midwestern Hamfest, Sunday, August 13th at Santa Fe Park, 91st and Wolf Road, Willow Springs, Illinois, near Chicago. The Hamfest features manufacturer and distributor exhibits, swappers row, awards and a variety of activities for all. This year Hamfesters salutes the "Armed Forces." Also displays by the military. For complete details and map of the location, write: Gregory Purtook, WA9MRE, 2916 West Marquette Road, Chicago, Illinois 60629.

SCARC Hamfest June 18th 0900-1800 near Mountain Playhouse Route 219, mile north Jennerstown. Entertainment, restaurant, displays. Further information K3PQK, Box 17, Ursina, Penna.

"HAM-JAMBOREE" at WRL, May 20th, 1967, 8 AM to 5 PM, CDT. Manufacturers displaying include Swan, Galaxy, Gonset, Waters, Collins, National, and more. Prizes include at least three transceivers, (i.e.; Swan 500, Gonset GSB6, NC-200, etc.), plus many more. No cost involved. Special prices on many items. Visit WRL at 3415 W. Broadway, Council Bluffs, Iowa.

"SAROC" Thanks all participants and exhibitors for a wonderful fun-convention. Stellar Industries, EG & G., Southern California Edison Company, Brad Thompson Industries, Mission Ham Supplies, California Highway Patrol, Henry Radio, Tristao Towers, Weatherbee Electronics Center, Swan, Tri-Ex Towers, Collins, Hallicrafters, Hy-Gain, Radio Products, Linear Systems, Hotel Sahara, MARS, Raytheon, Superior Engraving, United States Airforce, WCARS-7255, W6SAI, 1968 "Saroc" at Hotel Sahara, Las Vegas, Nevada, World Entertainment Capitol. January 4-7. QSP, QSL-card, zip and telephone number for details to Southern Nevada Amateur Radio Club, Box 73, Boulder City, Nevada 89005.

7TH ANNUAL Streator Radio Club Pre Starved Rock Hamfest Dinner on June 3rd, at 7:00 P.M. at the Grove Supper Club. Tickets $3.50 ea. Reservations must be in by May 21, 1967. Write Thomas Blakemore, 605 W. Stanton St., Streator, Illinois 61364.

MOTOROLA used FM communication equipment bought and sold. W5BCO, Ralph Hicks, 813B No. Federal Hiway, Fort Lauderdale, Florida.

WANT Callbooks, catalogs, magazines, pre-1920 for historical library. W4AA, Wayne Nelson, Concord, N.C. 28025.

QSLS? Largest variety samples 25¢. Deluxe, 35¢. Sakkers, W8DED, Box 218, Holland, Michigan 49423. (Religious card samples 25¢).

QSLS w/your photo, 1 color: 500—$8.50; 1000—$12.00. Sample 10¢. 2-color 500, $10.50, 1000, $14.00. Send check or money-order to Modern Graphics, 11604 Seminole Blvd., Largo, Florida 33540.

QSLS's, samples 20¢. QSL Press, Box 281, Oak Park, Ill. 60303.

QSLS "Brownie" W3CJI. 3111 Lehigh, Allentown, Penna. Samples 10¢. Catalog 25¢.

C. FRITZ—QSLs that you're proud to send, bring greater returns! Samples 25¢ deductible. Box 1684, Scottsdale, Arizona 85252 (formerly Joliet, Illinois).

QSLS: Moyers Printing, 846 Rising Sun, Telford, Penna. Samples, stamped envelope.

QSLS-SMS. Samples 10¢. Malgo Press, Box 373, M.O., Toledo, Ohio 43601.

DELUXE QSLS Petty, W2HAZ, P.O. Box 5237, Trenton, N.J. 08638. Samples, 10¢.

QSLS. See our new "Eye-Binder" cards. Extra high visibility. Samples, 5¢. Dick, W8VXK, 1944 N.M. 18, Gladwin, Mich.

10¢ Brings free samples. Harry R. Sims, 3227 Missouri Ave., St. Louis, Mo. 63118.

QSL Specialists. Distinctive Samples, 15¢. DRJ Studios, 2114 N. Lavergne Ave., Chicago, Illinois 60639.

CREATIVE QSL Cards. 25¢ for catalog, samples, 50¢ coupon. Personal attention. Imaginative new designs. Wilkins Printing, Box 787-1, Atascadero, California 93422.

RUBBER Stamps $1.15 includes tax and postage. Clints' Radio W2UDO, 32 Cumberland Ave., Verona, N.J. 07044.

SUPERIOR QSLS, samples 10¢. Hamsco, Box 773, Hobbs, New Mexico.

QSLS, finest, YLRL's, OMs, samples 10¢. W2DJH Press, Warrensburg, N.Y. 12885.

QSLS, SWLS, XYL-OMS (sample assortment approximately 9¢) covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fabulous, DX-attracting, prototypal snazy, unparagoned cards (Wow!) Rogers KØAAB, 961 Arcade St., St. Paul 6, Minn.

3-D QSL cards add prestige with spectacularly different glittering colors and raised designs. Samples 25¢ (refundable), 3-D QSL Co., Monson 2, Mass.

QSL, SWLS, WPE. Samples 10¢ in adv. Nicholas & Son Printery, P.O. Box 11184, Phoenix 17, Ariz.

QSLS 300 for $4.35. Samples 10¢. W9SKR, George Vesely Rte. #1, 100 Wilson Road, Ingleside, Ill. 60041.

QSLS 3-color glossy 100, $4.50. Rutgers Vari-Typing Service. Free samples, Thomas St., Riegel Ridge, Milford, N.J.

BLUE On white glossy QSL's, 100; $3.00. Don, W1LMS, Sheehan Press, 23 West St., Stoneham, Mass. 02180.

QSLS-100 3-color glossy $3.00; silver globe on front, report form on back. Free samples. Rusprint, Box 7575, Kansas City, Mo. 64116.

QSLS stamp and call brings samples. Eddie Scott, W3CSX, Fairplay, Md.

ORIGINAL EZ-IN double holders display 20 cards each in plastic, 3 for $1.00 or 10 for $3.00 prepaid and guaranteed. Free sample to dealers or clubs. Tepabco, John K4MNT, Box 198T, Gallatin, Tenn. 37066.

RUBBER Stamps, 3-line address $1.50. J. P. Maguire Company, 448 Proctor Avenue, Revere, Massachusetts 02151.

QSLS Glossy coated, 3 and 4 colors, 100-$2.00. Samples dime. Bob Garra, Lehighton, Penna.

QSL'S: Quality with service. Samples free. R. A. Larson Press, Box 45, Fairport, N.Y. 14450.

QSLS, 30 sharp samples, Catalog, 10¢. Filmcrafters, Box 304X, Martins Ferry, Ohio 43935.

COLORFUL QSLS. Samples 10¢ or SASE. K8LNL Print, 510 Riddle Rd., Cincinnati, Ohio 45220.

BEST Quality rubber stamp or 1000 address labels, $1.25 postpaid. Joe Harms, 905 Fernald, Edgewater, Fla. 32032.

QSL's, Free samples, attractive designs. Fast return. W7IIZ Press, Box 2387, Eugene, Ore. 97402.

QSLS. Kromkote glossy 2 & 3 colors, attractive, distinctive, different. Choice of colors. 100—$3.00 up. Samples 15¢. Agent for Call-D-Cals. K2VOB Press, 31 Argyle Terrace, Irvington, New Jersey 07111.

QSLS. Fast service. Free samples, Bolles, W5OWC, Box 9363, Austin, Texas.

21 QSLS samples free. Ace Printing, 3298 Fulton Road, Cleveland, Ohio 4410

QSL cards. Free samples. Send stamped envelope to George WA4QKD, Box 282, Vaparaiso, Fla. 32580.

PICTURE QSL Cards for your shack, etc. Made from your photograph. 1000 $14.50. Also unusual non-picture designs. Samples 20¢. Raum's, 4154 Fifth St., Philadelphia, Penna. 19140.

QSLS. Radio Press, Box 17112, San Diego, Calif. 92117.

HUNDRED QSLS, $1.00. Samples, dime. Holland, R 3, Box 649, Duluth, Minn. 55803.

QSLS-SWL-WPE. Samples 10¢. Gates Print, 317-11th Ave., Juniata, Altoona, Penna. 16601.

QSLS, Your personal combination from large selection, glossy, reds, blacks, Calypso, Pinecraft, etc. Silver, gold, rainbow inks. Many card styles, types, cuts, photos. Fast service. Samples 25¢. Ray, K7HLR, Box 1176, Twin Falls, Idaho 83301.

PICTURE Of yourself, rig, etc., on QSLs made from your photograph. 250—$7.50; 1000—$14.00 postpaid. Samples free. Picture Cards, 129 Copeland, LaCrosse, Wis. 54601.

CRAZY QSLS. No two alike. Samples 10¢, or S.A.S.E. WA8-NYB Print, 645 Reynard, Cincinnati, Ohio 45231.

AN S.B. -10 single sideband converter for DX-60 transmitter, also conversion manual. I. Lightbody, VE3FEQ.

CANADIANS: Best used gear list in Canada. Free. Etco, c/o Mary, VE2ANN, Box 744, Montreal 3.

SALE: Mohawk RX-1 $275; DX-60, $80; Geloso VFO and driver $25.00; Twoer, $45.00; Rotor $15.00. Parts for HBR-16 receiver with mechanical work completed, $150.00. Parts for HBR-16 receiver with mechanical work completed, $150.00. Best offer accepted. Ross Lunan, 56 Parkdale Ave., Pointe Claire, Quebec, Canada.

CANADIANS: Heathkit SB-300, SB-400, with AM/CW filters, $675.00. Hallicrafters HA-1 Keyer, $75.00. Ian Kerr, VE2-BMK, 225-91 Ave., Chomedey, Que., Canada. 681-3447.

WANTED: Tubes and all aircraft and ground radios. Units like 17L, 51X, 618T or S, R388, R390, GRC. Any 51 series Collins unit. Particularly Collins or Bendix units for any use whatsoever. Test equipment, everything. URM, ARM, GRM, etc. Immediate cash topping all offers regardless. 22 years of fair dealing. Ted Dames Co., 308 Hickory St., Arlington, New Jersey 07032.

SELL, swap and buy ancient radio set and parts magazines. Laverty, 118 N. Wycomb, Landsdowne, Penna.

WANTED: Military and commercial laboratory test equipment. Electronicraft, Box 13, Binghamton, N.Y. 13902.

SAVE On all makes of new and used ham equipment. Write or call Bob Grimes, 89 Aspen Road, Swampscott, Massachusetts: 617-598-2530 for the gear u want at the prices u want to pay.

TUBES Wanted. All types higher prices paid. Write or phone Ceco Communications, 120 West 18th St., N.Y. 11, N.Y. Tel: 242-7359.

COMPLETE 6-Meter Station: Thor-6 and AC supply, in mint condition. 5-el. Telrex, CDR-22 rotor and Clegg lowpass filter for $335.00. Also Eico 720 and HG-10 VFO and spare 6146, and HR-20 with supply for $149.00. WB2IEC. Tel: (201)-939-2824.

DUMMY Loads, 1 KW, all-band, kit, $7.95; wired, $12.95. Ham Kits, P.O. Box 175, Cranford, N.J.

WANTED: 2 to 12 304TL tubes. Callanan, W9AU. 118 S. Clinton, Chicago 6, Ill.

TOPPING All offers for any piece of aircraft or ground radios, tubes or test equipment. In a hurry? Cash-in-advance arranged. Turn those unused units into money. Air Ground Electronics, 64 Grand Place, Kearny, N.J.

MANUALS for surplus electronics. List 10¢. S. Consalvo, 4905 Roanne Drive, Washington, D.C. 20021.

WANTED: Collins Parts, BC-610, GRC-2, Antodyne, Bethpage, L.I., N.Y.

TELETYPE: Buy 28s, sell parts. W4NYF, Schmidt.

MICHIGAN Hams! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP. Purchase Radio Supply, 37 E. Hoover St., Ann Arbor, Michigan. Tel. NOrmandy 8-8262.

WE Buy all types of tubes for cash, especially Eimac, subject to our test. Maritime International Co., Box 516, Hempstead, N.Y.

RTTY Gear for sale. List issued monthly. 88 or 44 mhy toroids, five for $1.75 postpaid. Elliott Buchanan, W6VVC, 1067 Mancana Blvd., Oakland, Calif. 94610.

TOOOOBES: 6146B, $4.00; 6CW4, $1.40; 417A, $3.95; 6360, $3.45; 6146, $2.55; 5894; $15.50. All new, boxed guaranteed. No pulls, seconds or JAN. Catalog of many other types, free. Vanbar Distr., Box 44Z, Stirling, N.J. 07980.

CASH Paid for your unused Tubes, and good Ham and Commercial Equipment. Send list to Barry, W2LNI, Barry Electronics, 512 Broadway, NYC 10012. Call 212-WAlker 5-7000.

WANTED: Tubes, all types, write or phone Bill Salerno, W2ONV, 243 Harrison Avenue, Garfield, N.J., Tel: GArfield Area code 201-773-3320.

WANTED: For personal collection; QST, May 1916; Learning the Radiotelegraph Code 4th Edt.; How to Become a Radio Amateur, Edition 10 and 12; The Radio Amateur's License Manual, Edition 7, 11, 12, and 15. WICUT, 18 Mohawk Dr., Unionville, Conn. 06085.

HAM Discount House Latest amateur equipment. Factory sealed cartons. Send self-addressed stamped envelope for lowest quotation on your needs. H D H Sales Co., 170 Lockwood Ave., Stamford, Conn. 06902.

STAINLESS Steel Hardware. Small quantities. Send SASE for list. Arlington Stainless, Section B, Box 2641, Baltimore, Md. 21215.

ESTATE Liquidation offers. Big list. Parad Engineering Service, 284 Rte. 10, Dover, N.J. 07801.

WANTED: Model #28 Teletype equipment. R-388, R-390A. Cash or trade for new amateur equipment. Alltronics-Howard Co., Box 19, Boston, Mass. 02101.

CINE special, other professional 16 or 35mm cameras or lenses, video recorders wanted for cash or trade. Ted, W2KUW, 64 Grand Place, Arlington, New Jersey.

TOROIDS, 88 mh uncased, 5/$2.50. Postpaid. Humphrey, WA6FKN, Box 34, Dixon, Calif.

SELL: CQ, QST. Handbooks, old radio magazines, any quantity. Buy: Old radio gear and publications. Erv Rasmussen, 164 Lowell, Redwood City, Calif.

NOVICE Crystals, all bands, $1.30 each. Free list. Nat Stinnette, Umatilla, Fla. 32784.

FREE Catalog. Loads of electronic Bargains. R. W. Electronics, Inc., 2244 South Michigan Ave., Chicago, Illinois 60616.

HT-44 w/PS-150 AC, $250.00; SX-117 w/HA-10 transceiver cables, $200.00; HA-6 w/PS-26, cables, crystals, $150.00. All like new. Seneca needs work, $70.00. All w/manuals. Richard Busteed, K3TYD/2, 44 Thomas St. Rear, Bloomfield, N.J. 07003.

WANTED: BC-348, BC-224, BC-375. Please state condition and price. Charles Lee, 69 Madison St., New York, N. Y. 10002.

HAM Radio Counselor, male, for co-ed camp in the Berkshires, Massachusetts. Able to instruct campers in fundamentals of ham radio. Fully equipped ham radio station. Write to Robert Kinoy, Camp Taconic, 451 West End Ave., New York, N.Y. 10024.

GONSET G50 6-meter rig, in excellent condition, $175.00, plus shipping. K9ADY, 10748 So., Ridgeway, Chicago, Ill. 60655.

SWAN 250SSB 6M transceiver, with Swan power supply 117V and factory installed crystal calibr. and all factory installed mods: $295.00. Also TR20-50 Tecraft 6M transmitter with power supply, $40.00; NC-300, all-band receiver, built-in crystal calibr. and 6M converter, all in topnotch condition, best offer. WA2GAW, Box 538, Teaneck, N.J. 07666. Phone: (201)-836-7000.

SELLING Poly-Comm 2C, stacked 7 element beams, with coax. Squalo and mast, $200. WB2MMK, tel: 212-F17-3855.

CLIFF-DWELLER Model CD-40, brand new, $49.00. W5WM, Rt. 2, Box 127H, Lake Charles, La.

WANTED: 136A1 blanker and F455Q5 filter. .5kc for 75S-1 Collins. WB6PDN, 7800 Brentwood Drive, Stockton, Cal. 95207.

COLLINS 75S-3 receiver in excellent condition, like-new. $400.00. WA3FZX, Box 11, Glenside, Penna. Tel: (215)-884-6287.

SELL: Eimac 4X250B tubes. Guaranteed gud condx, $6.50 each. $10.00 paid repair in U.S.A. Send check or m.o. Everett Stidham, Jr., W5LQ, 722 So. 30th, Muskogee, Okla.

VIKING 500, SX-73, CCVT, FM 2-way gear. Cleaning house. No junk! Send SASE for list. A. Carmody, K2BZC, 260 Jefferson Ave., Fairport, N.Y. 14450.

FOR Sale: In excellent condition: Drake Model 2-B receiver Drake Model 2-BQ "Q" Multiplier; Johnson Viking Adventurer transmitter with key and 40M-80M crystals. All for $350.00. Will sell separately. Write Wayne Banks, 1207 Loch Lomand, Ct., Richmond, Va. 23221.

BILL Ogg at Evansville Amateur Radio Supply, 1306 Division, Evansville, Indiana says check these Spring Bonus Savings! Bonus #1) A free, matching, AC-Supply with the purchase of a Swan-350 or Galaxy MK II at $420.00 each. Bonus #2) A free, matching AC-supply plus a MS-4 speaker, and a D-104 with the purchase of a Drake TR-4 at $599.00 or a T4-X, R4-A combo at $799. We pre-pay most shipping charges. Send us a stamped envelope for a deal you've been looking for.

ESTERLINE-Angus chart recorders wanted. Model AW preferred, but will consider others. For private use. State price, condition in letter. Louis Breyfogle, WØMOX, Box 17, Boulder, Colo. 80302.

FOR SALE: Heathkit Mono-Bander adapted with Dynalab for 80-40-20 meter operation. Excellent condition. Best offer over $100.00. Marc Armstrong, 1809 Sena, Denton, Texas 76201.

CRYSTAL Filters, 10.7 Mccenter freq., 40 Kc. bandwidth, six section, herm. sealed. Ideal for VHF. Have several. $3.00 each, ppd USA. W6MGI, 1736 Ridgeview Dr., San Diego, Calif. 92105.

JENNINGS Vacuum variable capacitor, 20-800 mmf. at 5 kv. $32.50. Philip Sienkiewicz, Box 1026, Rochester, N.Y.

W1DY's HT-37, in mint condx, inside and out. Factory supplied break-in c.w. A stable, reliable rig at a "quick sale" price of $195.00 if you test it and pick it up here. Art Haynes, Harwich, Cape Cod, Mass. Tel: 432-0169.

COLLINS 75A4 receiver with 3 kc. and 6 kc. mechanical filters, $330. B&W 5100B transmitter with SB-10 sideband adapter, both $140.00. Also miscellaneous test equipment and junk box parts on cash and carry basis. Owner going into military service. Jim Duffey, K9YZQ, 1407 Main, Alton, Illinois 62002.

COLLINS Autotune ART-13 xmtter, converted, working, with supply: $55.00; 12V-30W outp RCA xcvr, 160-40. Easily converted 160-6, $40.00. Make trade offer for either or both. Homebrew 600W xmtr, Foundation and supply with Meissner VFO, $40.00. Dave Weintraub, WB2RSC, 29 Wyman Ave., Huntington Sta., N.Y. 11746.

FOR Sale: SB-101 and SB-200. Wanted kits to wire, Heath preferred. 12% of cost, some in stock. Professionally wired. Lan Richter, K3SUN, 131 Florence Drive, Harrisburg, Penna. 17112.

TR-4, $480.00; AC-4, $83.00: R4-A, $330.00; T4-X, $330.00. Factory sealed boxes. Sell separately. Mel Palmer, K4LGR, Box 10021, Greensboro, North Carolina 27404.

QST Vol. 7-19, complete August 1923—Dec. 1935, library book bound six issues per book, covers missing on some early issues prior to binding, $25.00 F.o.b. approximately 75 lbs. QST Vol. 20-44, perfect 1936-1960, $70.00. F.o.b. approximately 150 lbs. K4GSS, 100 Towler Drive, Hampton, Va. 23366.

STOLEN Transceivers: See this column in last month's issue of QST. A rash of amateur equipment thefts took place in New York City during the winter. Leading service centers also victimized. Do let's cooperate and watch the serial number of any transceiver or linear offered you at exceptional bargain. Ask to see owner's bill of sale from dealer before you buy or trade. Your own gear may be next. W2ZC.

TELREX, A.P., N.J. 07712—offers PL-67 tech. data, description, price-list, quality engineered antenna systems, Feed-Thru Rotators, "baluns," Mono-Poles, 5 band I.V. kits.

COLLECTORS: QSTs complete, 1922-1952. Many CQs, many large and small radio manuals, ARRL Handbooks, etc. Prefer to sell as a lot, but will break up individually. A Heller, R.D. #2, Norwich, New York 13815.

SELL: DX-60 (modified to 120 w.), $55.00; HG-10, $25.00; Gotham Triband beam, $50.00; heavy duty rotator, $25.00. Want: 2M or 6M FM rcvr. WA4CHM.

DRAKE TR-3, RV-3, DC-3, excellent condition, $500.00. 75A-4, serial No. 4581, best offer. W3ECR. 135 White Oak Drive, Lancaster, Penna. 17601.

DRAKE 2-B, 2AC, and 2-BQ, $189.00; Eico 720 xmtr and 722 VFO, $65.00, with manuals. WB6STA, George Loetz, 1441 Kerrick, Lancaster, Cal. 93534. Tel: (805)-WH2-9434.

GONSET: G-50, 50-watt input 6 meter transceiver. In perfect condition, includes built-in new Vista pre-amp for improved receiving. $175.00. Marilyn, WA1FNG, 12 Creswell Rd., Worcester, Mass. Phone 754-0931.

TRADE Or sell for tower, a model 19 teletype with converter AN/FGC-1C, both in excelnt condx: $300.00. Will deliver up to 100 miles radius. WA2GYC, 671 Bryant St., Westbury, L.I., N.Y. 11590.

LASER Helium neon gas laser with 450 watt d.c. power supply, professional optical bench, and quartz dielectric mirrors in hemi-concentric cavity. Single-mode TemCo output 12 milliwatts. Multimode output 25 milliwatts, both at 6328 angstroms. Professionally blown Pyrex tube with quartz windows. Shipping OK. $375.00. Claude Finn, 13958 Runnymede St., Van Nuys, Calif. 91405.

FOR Sale: Horseshoe style operating desk, will fit a corner. Room for 2 table racks, receiver, desk space and lower cabinets. Full particulars upon request. D. M. Eller, 14 Freedom Dr., Collinsville, Conn. 06022.

FOR Sale: Best offer: SX-117, MK-10 tuner and SP Johnson Thunderbolt linear. Johnson Viking II, John Voss, W9PMJ, 3008 So. Laramie Ave., Cicero, Ill. 60650. Phone: (312)-652-9036.

SELLING: Perfect 75A-4 #3882, Collins realigned and updated with 136C-1 noise blanker, vernier knob, .8, 3.1, 6 kc filters $495.00. W7BIF, 107 Wyoming, Boulder City, Nevada 89005.

VACUUM Variable capacitors, Jennings UCS 10-300 mmfd. 7.5 5 Kv. complete with gear drive train, mounting bracket, brand new, $27.50 postpaid-insured. Supply limited, satisfaction guaranteed. Bill Slep Company, Drawer 178Q, Ellenton, Florida 33532. Phone (813)-722-1843.

FOR Sale: Viking Valiant II, excint condx, $200.00; Eico 720-730 Globe V10, VFO. All for $100. Will deliver within 50 miles. Write or phone Al Harriman, 123 Barren Rd., Newtown Square, Penna. 19073. Tel: (215)-EL-6-6083.

HALLICRAFTERS SR-160 with D.C. supply. Mic, mobile whip with 20 meter resonator. All cables for mobile installation: $300.00. Morton Toovell, WB2BZV, 107-10 Shore Front Pkwy, Rockaway Park, New York 11694.

WANTED: RTTY converter. Prefer Twin City TU. K8GKR, RR #1, Harrod, Ohio 45850.

SELL: Complete station: HQ-140XH, DX-100, Heath SWR bridge, Heath Q-mulitplier, Heath capaci-tester, TA-33 Jr beam, HR-22 rotor, Bud TVI filter and necessary relays. Bill Little, WA40WR, 2007 Montaigne Dr., Richmond, Virginia 23235.

SELL: BC-221 frequency Meter, complete, $50.00, plus shipping. W2GWT, 105 Indian Pines, Penn Yan, N.Y. 14527.

TRADE For Tubes: Power company test instruments, collectors. Items dating back to 1900. WØCV, 715 West Chestnut St., Junction City, Kansas 66441.

COLLINS 75A-4 receiver #556 updated by factory. Little use and mint condition for best cash offer. Owen Barton, W9IW, New Haven, Indiana 46774.

SELL: SR-46 with HA-26 VFO and mobile kit. $175.00. WA9HRN c/o 1120 Rhoads Hall, Indiana State University, Terre Haute, Indiana 47809.

POLYCOMM Six Transceiver, $120.00; Ameco SWR bridge and meter, $10.00; D-104 microphone, $10.00. Joe Kohn, WA2KOW, 25 Park Place, Great Neck, L.I. N.Y. 11021.

NATIONAL 200 and AC-200 PS, sealed cartons, $390.00. F.O.B. Buying house. Al, W6EPO, 594 Alderson St., El Cajon, Calif. 92020.

BUY or borrow to reproduce, Instruction Manuals for Morrow MB-6, MB-565, RTV-630. W7AOQ, 2723 Vangiesen, Richland, Washington 99352.

SBE-34, used two months, $300.00. D. Amos, 5502 Cedarburg, Houston, Texas, 77048. Tel: (713)-734-4433.

FOR Sale: Instructograph with 16 tapes, $22.50; Cliff Dweller antenna with two extra tips, $60.00; Western Union teleprinter, Model 102: $25.00. Clark W3HZ.

EXCELLENT NCX-3 and NCX-A, $250.00. DL5NI. John Brooks, 36AE CMR 584, NY, APO 09132.

EICO 753 (solid VFO): 751 AC supply, D-104 mike, $270.00. George Wessner, K2LEZ, 111 Cameron Ave., Merrick, L.I., N.Y. 11566. Tel: (212)-FR8-5272.

FLDICO 100F for sale, original cost $795.00. Built-in 1-inch scope, with new spare 5894, $250.00. Spiro, W2SUC, 3239 Corsa Ave., Brx, N.Y.C. 10069.

WANTED: Drake TR-3 or TR-4 with AC supply. Will consider Swan 350 with AC-117-XC. Must be in mint condition and a barga'n. Airmail details K6LN, 1051 Villa View, Los Angeles, Calif. 90272.

HOMEBREW Station 80 thru 10, $450.00 complete or separate. HBR-16 rcvr. $125.00; xmttr, $100.00 (not finished); KW final, $100.00, 0 to 4 Kv at 1/2 a. power supply, $150.00; 5 ft. rack, $10.00. Make offer. K3YBA, Tel: (717)-464-3143, 327 Edgemont Dr., Willow Street, Lanc. Co., Penna. 17584.

FOR Sale: HT-44 and HQ-170, both in perfect condition. $250.00 each. K3TUF, 1815 Vankirk St., Phila., Penna. 19149. Phone: 743-8090.

VALIANT, Will work schedule. $125.00. Bill Wood, WA5FON, Henrietta, Texas 76365.

14 Month old HQ-180AC, DX-100B wid SB-10. Space needed. Going transceive. Delivered package $450.00. WA3ERA.

SWAN 350, 117XC power supply, mint latest model. Want ham bands rcvr in trade, Drake 2-B preferred. Make offer. Will deliver within 200 miles. Jim Simmons, Robinson's Trailer Court, U. S. Route 50 East, Athens, Ohio 45701.

COLLINS KWM-2 with 516F-2 AC supply, excellent condition, barely used, 3 years old. Best offer over $600 takes both, delivered within 200 miles. Tom Talpey, WB2NAS, 10 Grove Rd., Basking Ridge, N.J. 07920.

SELL: Drake 2B with 2BQ, excint condx, $185.00. Dave Johnston, 1310 Ann Arbor, Michigan 48103.

SELL: HT-37, SX-111, Knight SWR, Turner mike, Mosley RV-4 and Hornet Beam Antennas, 45' crank-up tower. Each excellent condition. Sacrifice all $525.00. WAOLKE, 4024 W. 74th St., Shawnee Mission, Kans., 66208.

FOR Sale: Clegg 99er with ATR inverter and 4 ring halo, $110.00. Will sell separate. K2AHQ, 23 Morris Dr., NYC, 10956. Tel: (914)-634-4778.

NCX-3, NCX-A, 3-el. 20-mtr. Cush Craft, Electronic keyer, Vibro-Keyer, mic, etc. $325.00. K1VVC, 24 Brewster Road, Waltham, Mass. 02154. Tel: 893-2257.

RME-6900, $140.00: HQ-110, $95.00; modified BC-348 with supply, $45.00. John Thompson, 104 Dana Road, Natchez, Mississippi 39120.

HEATH SB-10, excint condx. Working well. $79.00. Postpaid. K1DUN, Box 2, Salisbury, N.H. 03268.

TWO Eimac 4-400A with chimneys and sockets. New, $65.00 or will trade for Heath SB-610. W. W. Magruder, 542 South Erie, Wichita, Kans. 67211. WØPGL.

FOR Sale: Heathkit Apache, in excint condx: $125.00. Bob Aberle, W2OPP, 33 Falcon Drive, Hauppauge, N.Y. 11787.

DRAKE 2B, 2BQ, and xtal calibr. Perfect. Used very little. First $185.00 takes all. U pay shipping. K1OHZ/2.

EXCELLENT NC-1830 with matching spkr, $140.00. Ten Instructograph tapes with player, no oscillator, $12.00. Candler code course, $8.00. General Stereo headset $15.00. Send for list of books and misc. Oliver F. Nash, W4JGB, 1012 9th, Carrollton, Kentucky 41008.

SALE: Elmac AF-67 all-band trans-citer PS-2V p/s compact 60 watts AM/NBFM/CW, $100.00; HT-44 with PS-150, like new, $250.00. Globe Champion 300-A 350-watts, c.w. 275 AM, 500 P.E.P. SSB, $120.00. John Elrod, W3NVD, 10933 Riverview Road, Washington, D.C. 20022.

SSB: GSB-100, $175.00; HQ-170, $175.00. Both in perfect condition. Must sell. WA5AME, 230-53rd S.W., Albuquerque, N.M. 87105.

KNIGHT R-100A with S-meter, $70.00; Lafayette Precon, $30.00. WB2AXH, Tel: WE-1-8779.

WANT: DK-60-G2C or DK-60-G, 110 volt relay. Sell: QFI Q-multiplier, $7.00; Western 10, 15, 20 meter trap dipole with 90 ft. RG-59U, $15.00; Nutone 2031-B AM radio intercom with 4 remote speakers, new, $65.00. Orville Braaten, WØNYI, Morris, Minn. 56267.

TOROIDS: 88 mhy, center-tapped, unpotted, new postal rates necessitate 5/$1.50 ppd. 14 TEE-Dee, $35.00 (with sync motor). 11/16" tape, $3/box. Paper, $5.50/case. New Johnson Matchbox (250w, with SWR), $65.00; HQ-140AX, $125.00; HQ-100AC, $110.00; Geloso 2-meter VFO, $15.00; 73 and other mags, $3/year. Stamp for list. Van, W2DLT, 302Z Passaic, Stirling, N.J 07980.

WANTED: P&H AC power pack PS-1000 for P&H LA-500M linear. Write offer to Tomas Pereira, YN1TP, P.O. Box 634, Managua, Nicaragua.

SELL Best offer: 75S-1, 32S-1, HT-33A, Fischer FM-200B, FM tuner, Fischer X-101B, dual channel amplifier Ampex tape recorder, F-4450, condition of above like new. Constant voltage transformer 1 kw 50 cycle, 45 volt 30 ampere voltage regulated supply, 1000 feet copper clad steel wire, 3/16 in. diameter. Wanted: Instruction manual GRC-27. W2LXD, 1381 Richmond Court, East Meadow, N.Y. 11554.

GOING Complete S/Line, have excellent KWM-2 with Waters rejection tuning and 516F2 A.C. supply for $765.00. WA2LIM. Tel: (212)-428-6133.

FOR Sale: Collins 75S-1 500 cycle crystal filter, $275.00; 32S-1 with supply, $495.00, 30L-1, $350.00; Hallicrafters SX-42 $50.00; WRL SB-175 transmitter, $85.00. All equipment priced to sell, and in excint condx! Wayne Grove, K9SLQ, P.O. Box 173, Bluffton, Indiana 46714. Phone: (129)-824-3198.

QSL, SWL, cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio.

WANTED: HRO-60 coils. Give type and price. WØOFM/5. Ronald McKnight, 2711 Kathryn S E, Albuquerque, N.M.

FOR Sale: HW-32, in excint condx, with AC power supply, $100. Bob Mulligan, W2YOG, 53 Indian Road, Wayne, N.J. 07470. Tel. (201)-839-2712.

NOVICES! Sell: Heathkit GR-64 receiver with GD-125 Q-multiplier. Assembled, like new condx, $50.00. Mark Franz, 4601 Page Drive, Metairie, Louisiana 70003.

SELL: Swan 350, AC power supply, VOX, Monitor 'scope. New condx. Trade for a 1st class receiver. General Radio Strobotac. E. A. DeCobert, 609 Henrietta St., Gillespie, Ill. 62033.

WANTED: HRO-60 coils. WA6WTT, 5169 Judy Lynn, Memphis, Tenn. 38118.

SSB, Jr. Exciter 80M, 5-watt homebrewed 9" w. 6" D by 6" high. No cabinet, no supply. G-E Ham News 1950. Works FB. Trade for old receiver. Blair, W4ZEQ, 281 Alexander Ave., Spartanburg, S.C. 29301.

SELL: Collins 75A-4 Serial No. 3063, with manual, in excellent condition/speaker; HT-32 transmitter; Electro-Voice 630 microphone; homebrew amplifier 4-811A in parallel, grounded grid, built-in power supply, 10-15-20 meters. Pick up and take all for $800.00. Will entertain offers for each or all. B. F. Fulton, K4NKI, 3021 Hereford Road, Roanoke, Va. 24018 on weekends.

FOR Sale: Drake 2B, speaker Q-multiplier crystal calibrator, complete 10 meter and WWV crystals. Excellent condition. $200.00. Roger Pauba, 3517 South 108th St., Omaha, Nebraska 68144.

QSTS going back to 1928 from estate of W2DW, in good condition. Would prefer to sell as lot, but will consider breaking up the run. Write Mrs. Jean C. De Meyer, 168 Cypress Lane, Westbury, L.I., N.Y. 11590.

20A, QT-1, 458 VFO, LA-1 Globe linear, Drake 2A, 2AQ, 2AC, manuals, and A T-R switch. All in good condition! $250.00 or your best offer. K5YZK, 113 N. Penn., Drumright, Oklahoma 74030.

SACRIFICE, one owner: HQ-170. Mint condition, original carton, manual. $175.00. Bill Snyder, W4WG, Clarksville, Va. 23927.

WANTED: RME-69 ham receiver in good operating condition. Untouched black cracke finish. Write, stating price. Edward G. Mort, W8LHH, 44101 Harmony Lane, Belleville, Mich. 48111.

VIETNAM Bound. Swan 350 with p/s, $320, DC p/s, $50. Lt j.g. Roger Cooper, 1750 Coronado #16, Long Beach, 8477815. Calif. 90804.

WANTED: Drake 2-B, calibrator, 2-BQ, "Q" multiplier. Also want LF converter. WA5MKB, 725 Pennsylvania, Joplin, Missouri 64801.

HAM TV—RCA Vidicon 7735A, $15.00; GEC 7325 for test, $7.00; Toshiba 7038, like new, $35.00. TV camera, complete, $175.00; 15.75 kc. crystal, $14.00. WB2GKF, Stan Nazimek, 506 Mt. Prospect Ave., Clifton, New Jersey 07012.

VIKING II, exceptional, with 122VFO and lo-pass filter, $110.00. Hallicrafters SX-117, like new. $250.00. All manuals. Certified check. Southern California package deal, 14AVS free, you pick up. Virgil Owen, K6GFS, 3701 Cedarbend Dr., La Crescenta, Calif. 91214.

BACK QSTs for sale. September, October, November, December 1921; 1922 through 1962 except June, July 1924; April, May 1939; June, July 1949; August 1955; July 1957; October, November, December 1960. The following single copies: April 1922, August 1923, June, November, December 1943; January, February 1944. All are in excellent condition. Please make offer on complete list or item interested in. Chas. T. Miser, Box 63, Garrett, Indiana 46738.

LOG Books for hams. Personalized. Your call letters printed on Bristol Cover. Over 100 entries per book. Minimum order $1.00 for 2 books. Postage and Handling, 25¢. Money-order or cash only. Telford Press, 358 S. Washington St., Telford, Penna. 18969.

3RD Edition ARRL Handbook, excellent condition, 10th edition good condition, 1936 Radio Handbook very good condition. Will trade for old Callbooks or 5th Edition ARRL Handbook or QSTs prior to May, 1920. W6IBD, 780 So. Grand Ave., Pasadena, Calif. 91105.

HALLICRAFTERS HT-44/ACPS, very good condition, $275.00; Heathkit Twoer, front panel crystal switching, $26.00. Stephen Wiener, WB2UJB, (516)-333-9580.

GOING Complete S/Line, have excellent KWM-2 with Waters rejection tuning and 516 f2 A.C. supply for $750, also like new TR-4 with unused DC-3 and homebrew AC for $550. New EV-719 mic, $12.00. New Shure 5783, $35.00. WA2LIM (212)-428-6133.

SWAN 240, 117B, A.C. P/S, also Topaz SW-12A DC-DC. Asking $250.00. BC-312, mint condx, $75.00. WA2EFO, 14 Washburn Rd., Mt. Kisco, N.Y. 10549. Tel: (914)-666-3486.

WANTED: Swan 350 or Drake TR-4, etc. Will trade over $500.00 worth of Lionel train H.O. gauge track trains, switches, accessories, heavy-duty console transformer. Many extras. F. E. Coble, 251 Collier Ave., Nashville, Tenn. 37211.

SWAN 350, AC supply; Astatic 10-C mike; MARS SWR bridge, Vibroplex Blue Racter, Johnson filter, plus many extras. All in mint condx, original cartons. Complete station, $425.00. S. Davis 99-31 64th Ave., Forest Hills, L.I., N.Y. 11374. Tel: (212)-275-3418.

COLLEGE Expenses, must sell complete station. Late Ranger I, $100; Johnson T-R switch, $15.00; Vibroplex Champion, $15.00; WRL MM-100 antenna tuner, $9.00. All excint condx, manuals. Lafayette HA-230 receiver, fair, $39.00. Pay shipping to within 300 miles. Beyond, you pay. Blair Bates, WA3-BSV, 532 Locust, Hazleton, Penna. 18201.

NCX-3, HP-23, 14AVQ, Knight SWR, Turner 454C, extras: $225.00. Joe Martorelli, WA2TCE, 737 Asbury St., New Milford, New Jersey 07646.

COLLINS Mechanical filter 3.1 kc. for 500 kc., IF., type F-500 (F) or (B)—31. Also anemometer windspeed indicator. C. F. Albertoni, K8JBE, 1410 Brookwood Drive, Suffield, Ohio 44261.

WANTED: Carrier level indicator meter for pre-war RME Model 69, 70 Communications receiver. Pictorial layout, operating manual, schematic. Ray Fischer, Box 234, Charleroi, Penna. 15022.

SACRIFICE: Heath HW-12, $99, mobile supply, $40. Both $135. A-1 condition. WA9GJA, 900 Boston, Marion, Illinois 62959.

SELL: Swan 350 and AC supply. Full 10-meter coverage. $350.00. Please inquire. WA9GJY, 310 Oglesby, Urbana, Illinois 61801.

SELL Or Trade: Heath SQ-1 generator, $15.00; Heath VTVM, $20.00; RCA 167-A OSC. $25.00; Precision ES500A 'scope, $25.00; Ranger I xmtr, $120.00; CDA-5 Decade capacitor, $8.00; new Dow-Key DK-60G-G2C relay, $12.00; New Morriss coil winder, $5.00; Hallicrafters R-46 speaker, $10.00. Want: Complete mobile Drake TR-4 or Galaxy MK II units. Perry Vlahos, 1733 Eleventh St., Langley AFB, Va. 23365.

APACHE and Mohawk, in excelnt condx: $250.00 pair or separately. Make offer. J. Craig, W6VNH, #6 Muir Way, Berkeley, Calif. 94708.

DRAKE 2B with Knight kit crystal calibrator in mint condition. Used less than 30 hours. $175.00. Lt jg Donald Stewart, K1ING, 240 Harmon Avenue, Panama City, Florida 32401.

FOR Sale: QSTs! 1932-1945 with some issues in run missing. 1946-1965 complete. Make me an offer for all or part. Also HQ-170C, $185.00 and Elmac AF-67, $35.00. W9DOW, Erwin H. Peters, Sharon, Wisconsin 53585.

HALLICRAFTERS SR-150 transceiver, P-150 AC supply, P-150 DC supply; MR-150, mount, 333 Turner mic, Hustler mast, with 75, 40, and 15. Resonators: used two weeks, mobile, mint condx, cost me over $950.00 new. Will ship, prepaid stateside $550.00. Sidney Waters, K8TLR. Tel: (313)-453-6581.

WANTED: New England Radio Counselor to teach and operate W1MYM, Maine Senior Boys Camp. Minimum 19. General Class ticket, plus one year of college. Write: Camp Androscoggin, Wayne, Maine 04284. A. B. Dmitrieff.

TUBES, Diodes and Transistors wanted. Astral Electronics Corp., 150 Miller St., Elizabeth, N.J. 07207.

ALL New, with warranty cards: Johnson 6N2 Converter 26-30 mc., list $89.95—$45.00; Hallicrafters SX-140, list $125.00—$75.00; Hy-Gain SWL short wave indoor antenna knob controls. List $14.75.—$9.00; Ameco Nuvistor preamp 144 mc. List $13.95—$9.00; Vibroplex Blue Racer chrome with case, list $36.70—$23.50. Telex Headphones with boom mike, list $32.00—$16.00; Koss stereo headphones, list $25.00—$12.50. Include transportation charges. Phil Zarch, WB2ASR, 2728 Kings Highway, Brooklyn, N.Y. 11229.

SELL: New Knight R100A receiver with speaker, calibrator, spare tubes. $60.00. KØALL, Box 721, Fargo, N.D. 58103.

FOR Sale or will trade for boat or camping trailer: 32S-3, #10030; 516F2; 75s-1 with 500 cps filter and Waters Q-multiplier. Gene Chenette, WØLNE/3, 563 Benner Road, Allentown, Penna. 18104. Phone: 215-395-5179.

HALLICRAFTERS S-120, like new condx. $35.00. Trade? WA3DYW. 1021 Nora Drive, Silver Spring, Md. 20904.

SELL: HT-32, $195.00. In excellent condition, modification and updated by factory. T. Snedden, W9ILW, 785 Euclid Avenue, Glen Ellyn, Illinois 60137.

SELL: Eico 753 transceiver with solid-state supply. Factory checked, clean and all modifications plus solid-state VFO. $225.00. D. E. Logan, WB2FBF. Tel: (914)-NA3-7030.

HX-10, $190.00. SB-300 with all filters, $185.00; HW-32, $75.00; homebrew k.w. linear, $60.00; HX-20, HR-20, HP-23 package, $200.00 all units perfect. WA2GVJ, Whitney Point, N.Y. 13862.

VALIANT II FW purchased new Allied 1963, SSB adapter purchased new Hatry 1964. Very low operating hours. Illness. D-104 PTT stand, Mike switching panel. $400.00 certified check. Ship collect. W1KZQ, Box 686, Baltic, Conn. 06330.

FOR Sale: Paneled hamshack, rig, beam, workshop included with purchase of my spacious eight room ranch. Ideal suburban location. Am offering first to ham fraternity because non-ham family would not appreciate amateur features. This home has all extras and is priced right at $25,000. Can also sell furnished if interested. Phone (516)-334-5135. Marc Felt, W2GYQ, 50 Prince Lane, Westbury, L.I., N.Y. 11590.

D-104 mike, G-stand, $275.00 with Eico 753, solid state VFO, A.C. supply, factory aligned. Collins 75A-4, .5, 2.1, 3.1 filters vernier dial and HO-13 ham-scan, $395.00. E. P. Jenkins, Farmington, West Virginia 26571.

COLLEGE: Must sell, 4 months old NCX-3, power supply, and 40-80 meter dipole ant., $375.00. Steve, K9YTL, 5930 W. 38th, Apt. #7, Indianapolis, Indiana 46254.

FOR Sale: Perfect SB-300, all three filters. Have new transceiver, must sell: $250.00. Rev. Douglas R. Trottier, WA1-CPQ, 71 McGrath St., Laconia, N.H. 03246. Tel: (603)-524-2278.

VIKING Valiant, $170.00; HRO-50 with crystal calibrator and 5 coils, $125.00. Central Electronics 10B exciter, $45.00. Make offer for all three. Albert Thomson, W8DTI, 2645 Forest Grove, S.W., Wyoming, Michigan 49509.

T-O (HA-1) Keyer, paddle (homebrew), $20.00. Superex ham earphones, new, $15.00. 20/15M quad and AR-22 rotor, $50.00. Free list of other bargains. John Kanbergs, WB6LEI, 559 Rocky Way, Redwood City, Calif. 94062.

ESTATE of W2KN: For sale 1-10 meter transmitter. Will sell for any offer over $50.00. Tel: (914)-WO-1-8027. Adey, Eastchester, N.Y. 10709.

WRITE, Phone or visit us for the best deal on new or reconditioned Collins, Drake, Swan, National, CDR, Galaxy, Gonset, Hallicrafters, Hammarlund, Hy-Gain, Johnson, Millen, Mosley, SBE, Henry Linear, and most other equipment. We try to give you the best service, best price, best payment terms, best trade-in. Write us for the price lists. Your inquiries invited. Henry Radio, Butler, Mo. 64730.

INCENTIVE Licensing? You need Posi-Check, Amateur Extra and General Class FCC type exams, complete in detail and style, even to IBM type answer sheets. A very good aid to learning and a Must in preparation for FCC Amateur exams. General Posi-Check consists of 297 questions and explained answers for only $2.98. Extra Class, 115 questions and diagrams with explained answers, $2.00, 139 questions of the 297 in the General Posi-Check apply directly to Extra Class also. Get both for only $4.50 postpaid. Posi-Check, P.O. Box 3564, Urbandale Station, Des Moines, Iowa 50322.

BC-348, $30.00; Ameco two converter, $25.00; SIX converter, $8.00; 12 volt car radio, $7.00; Kay electric guitar (trade?) $35.00. WA5QWK, 404 Second St., Littlefield, Texas 79339.

SELL: HW-32A with power supply/speaker and mike, $140.00. Bandit 2000A linear, $195.00; Heath SWR bridge, $10.00. All in excellent condition. A. Woolfries, WØDSP, Box 532, Bettendorf, Iowa 52722.

WANTED: All equipment for 80 thru 10 station. Linear 2.0 kc. P.E.P. Prefer Collins, National, Heath, Hallicrafters. Also 6 and 2 transceivers. Need Tri-Band beams plus tower. Minimum fifty feet. Write/Phone full particulars. Donald Rogers, 2080 Madelaine Court, Los Altos, Calif. 94022. Tel: (415)-9686717.

SELL Precision built TMC VFO 2-64 Mc, $250.00, or reasonable offer. Robert Ireland, Pleasant Valley, N.Y. 12569.

TWO Meter Transceiver package. Heath HW-20. VFO, 10 watts, fixed mobile power. Almost unused, best offer. K1YYE, 49 Rivercrest, Hanover, N.H. 03755.

SELL: Valiant, perfect. $195.00. QSTs 1930 through 1949, $80.00. 3 aluminum chassis 17 x 12 x 3, $9.00. 17 x 13 x 3, $9.00. 4 Gray aluminum panels, 12¼", $12.00, plus shipping. W2CTO, Ehrler, 30 Linden St., Malverne, L.I., N.Y. 11565.

KWM-2, complete with mike; Heathkit AC supply and speaker. $660.00. Hoyt Hinshaw, W4DFQ, 6116 Archdale Dr., Greensboro, N.C. 27410. Phone 292-6194.

SHAWNEE. Heath HW-10, 6 mtr, 20W, trans./rcvr with halo, $140.00; All perfect, WA2NDJ, 76-13 251 St., Bellerose, N.Y. 11426.

ADVENTURER. Screen modulator: ARC-5 7 Mc. VFO, power supply. Good condition. Make offer. K. Meyers, 5702 Edmondson Ave., Baltimore, Md. 21228.

SELL Globe DSB-100, $50.00; Knight VFO, $15.00; 115 VAC coax relay, $5.00. JT-30 mike, $5.00. Alfred Tuhy, Linton, N.D. 58552.

HEATH SB-100 transceiver, professionally wired and aligned, used four months. Like new. $375.00. WA8IBO, 1807 Long Point, Pontiac, Michigan 48053.

SELL: College bound. SX-111 Hallicrafters, excellent condition, $150.00. WB2SXQ, Robert Terentz, 23 Southfield Rd., Metuchen, N.J. 08840.

SELL: Collins 32V-1, excellent, $80.00. Extra final. C. B. Story, 1713 Highland, Helena, Montana.

AMATEUR Paradise Vacation. Livingstone Lodge, Mascoma Lake, Enfield, N.H. Cosy cabin for two weekly, $50.00. Swimming, Fishing, Boats, Sports, ham radio, Dartmouth Golf, tennis, hot showers, fireplaces, light-housekeeping, children half. Lake Shore Camp Sites. Literature, Al Q. Livingstone, W2QPN, 12-01 Ellis Ave., Fair Lawn, N.J.

FOR Sale: Nutronics rotatable 10-40, $75.00 dipole with 120 ft. motor wire, like new, for $65.00. W9CKF, phone: (812)-59857 after 6 PM. 2922 Muensterman, Evansville, Ind. 47712.

EICO 753 transceiver, 751 p/s, $175.00. W. N. McKenzie, Rt #1, Box 120, Cary, N.C. 27511.

DRAFTED. Must sell SB-34 with 12 and 115 volt power supply, only 2 months old. Asking $275.00. WA5PEA, John Chadbourne, 1617B South 7th, Blytheville, Ark. 72315. Tel: (501)-LE-25614.

FOR sale: Complete station, Johnson Invader 200 watt SSB, Collins receiver 55 ft. tower, 3-el. beam with three bedroom two-bath CBS home on one acre in South Miami near all facilities. W4IVN, 9400 SW 94th Court, Miami, Florida 33156.

FOR Sale: HT-32A transmitter, $300; HQ-170-A receiver, $250.00. Also TA-33 beam and Ham-M rotor with control box. All in excellent condition. WA2RUB, 311 Blackheath, Long Beach, N.Y. 11561. Tel: (516)-GE-1-3565.

FOR Sale: Heath DX-40, $35.00; VFI/VFO, $14.00; Hallicrafters S-72, $10.00; Hallicrafters S-38E, $30.00. Instructograph for sale, $35.00, and ten tapes. George Peck, Jr., 204 No. Boyd, Caldwell, Kansas 67022.

COLLINS: Tired of cross modulation, poor sensitivity and undesirable front end responses? Try a VCZ front end. 75-A-4, $69.95; 75-S series $34.95. Specialists in fine used gear. VCZ Sales, 5 Pinetree Road, Ramsey, N.J. 07446. Tel: (201)-327-9494.

COUNSELOR: Top Maine boys' summer camp needs Radio Ham. State age, experience, education. Address: Maurice Steinberg, 1 Clearland Ave., Carle Place, N.Y. 11515.

CRYSTALS Airmailed: SSB, Nets, MARS, Novice, Marine, etc. Custom finished etch stabilized FT-243 .01% any kilocycle or fraction, 3500 to 8600 kilocycles $1.90, (five or more this range, $1.75 each). Nets: Ten or more same frequency $1.40, 1700 to 3499 and 8601 to 20,000 $2.75. Overtones supplied above 10,000, 10,000 to 13,500 fundamentals $2.95. Add 50¢ each for .005%. HC-6/u metal miniatures above 2000 add 75¢ each. Inquire regarding ARRL builders crystals from QST, "Handbook", SSB Handbook, and other construction articles. Inquire. Write for order-bulletin. Crystals since 1933. Airmail 10¢/crystal, surface 5¢. C-W Crystals, Marshfield, Missouri 65706.

SALE: BC-610E xmtr, 2-18 MHZ 1/2 k.w. speech amp., ant. tuning unit, spares, manuals, over 200 LBs. You pick up, best offer. W3IDQ, I. Brager, 1770 Hillside Rd., Southampton, Penna. 18966 (nr Philly).

EICO 753, 751 p.s., factory aligned. Make offer. Pat Garner, 208 Little Farms, New Orleans, Louisiana 70123.

HEATH SB-300 with filters, $250.00; SB-400, $295.00; tabletop k.w. linear, $125.00. Others. Shideler, 2812 Tenth, Arcadia, Calif. 91006.

SELL Or trade: CV253/ALR-RDO-3" Panadaptor combination, 38-1000 mc AM/FM. 2-8 Mc. fixed freq. receiver Aireon 5772. Looking for CW/SSB exciter or transmitter. WØDNW, 2801 Wright Ave., North Platte, Nebr. 69101. Wanted: 500 Kc. mech. filters for 51J4.

WANTED: 80-10 SSB transceiver in need of reconditioning or worse; will buy cheap. Send info and price. Jim, K8MBC/4, 122 Graham Ave., Lexington, Ky. 40506.

VIKING 500 for sale, like new, engineer owned. Includes new 4-250A, 2-811, 2-866A tubes. Will deliver free within 50 mile radius. First certified check gets it. Firm $375.00. K1KON, 3 Beechwood Rd., Norwalk, Conn. 06854.

JOHNSON Navigator, factory-wired. Will guarantee excellent condition. $70. K1YY C, 14 Tonetta Circle, Norwalk, Conn. 06855.

WANTED: Closed circuit TV camera. Drake RV-3. Many items or parts to swap. Williams, 611 Cedar Lane, Teaneck, N.J. 07666.

URGENTLY Needed: Commercially made Vidicon yoke/focus coil assembly. K7CQY.

DRAKE TR-4—RV4—MS4—AC3. Mint condx. Bargain. Steve Beck, W2CE, Tel: 516-FR9-0415.

WANTED: Gonset G-66 or G-66B receiver with model 3069-12-115 volt power supply. T. Kirkpatrick, 728 Rhode Island No., Mpls., Minn. 55427.

SELL: HT-37, SX-100, CE-20A and KW linear. Ted Marks, WA2FOG. Tel: (212)-771-5852.

SELL. Mint condition: HQ-170C, matching speaker, $200.00. Benson, 14 Reservoir, Westwood, Mass. 02090.

WANTED: Johnson Matchbox 275 w., good condition. WAØ-HDF, 2025 South Maple, Sioux City, Iowa 51106.

WANTED: Cash for Ham-M rotor. W4HUE, 4108 SW 5th St., Fort Lauderdale, Fla. 33314.

SELL: Collins R388 rcvr. In gud condx. Make offer. Don Graf, W7ANV, 2949 S. E. Boyd, Milwaukie, Oregon 97202.

RTTY: Model 14 typing reperf, $35.00; Model 14 TD, $20.00. Want to buy Messenger III CB. K5AON, 10610 Royalwood Dr., Dallas, Texas 75238.

MINT: NC-270 with speaker, $125.00; DX-100, very gud condx, best offer. K3CEW, 238 Duncan Ave., Wilmington, Del. 19803.

VIKING II With HT-18 VFO, in excellent condition. What am I offered? W1NFG, 600 Mt. Carmel Ave., Hamden, Conn. 06518.

SWAN 500, 117XC AC supply (Swan part), new unopened factory cartons with warranty: $488.00. Drake T4-X, $322; AC-3, $65.00, both new, unopened factory cartons with warranty cards. HQ-170 clock, manual, mint condx, $120.00. Don Payne, W4HKQ, Box 525, Springfield, Tenn. 37172.

FOR Sale: RME-6900, $185.00; Heath HW-10, 6 mtr. $155, factory aligned. Both perfect. Gonset Super-Six converter, $28.00. Excellent. Thomas Kelsey, WA4UXD, Ivy, Virginia 22945.

GONSET Communicator III 6 meters, $98.00; Hammarlund HK-1B keyer, $19.00. Excellent condition. R. E. Brenizer, RD #1, Lewisberry, Penna. 17339.

FOR Sale: Eico 753 transceiver with AC power supply and 18 High Tower antenna. $400.00. Excellent condx. W9JEP, 4919 Camden Road, Madison, Wisconsin 53716. Tel: 222-4042.

COLLINS VFO's, 70E-24 for 75A-4, new, $49.00: 70E-23 for KWS-1, new, $39.00: Hunter Bandit 2000B factory-wired, like new, $300.00. Richard E. Mann, 430 Wilmot Rd., Deerfield, Illinois 60615.

SX-99. Excellent condition. $65.00; beautiful homebrew Viking II, all features, with factory VFO. $65.00; BC-455 6-9 Mc. receiver, $10.00. Charles Yingling, 116 Remsen Street, Brooklyn, N.Y. 11201. Phone (212): 858-1653.

HEATH Regulated power supply 1P-20. $48.00: Harmonic distortion meter IM-12, $35.00: Analog computer EC-1, $120.00: TV alignment generator TS-4A, $47.00: Paco scope S-55, $65.00. W6YZW, G. Burge, 228 No. Glenroy, Los Angeles, Calif. 90049.

SWAN-175/Spkr, mike and 20 mtr. conversion, $100. Ship collect. T. W. Colby, 1503 Robinhood Drive, Pearisburg, Va. 24134.

CERTIFICATE Will be issued by Henry Ford Museum to any station that works the Motor City Radio Club station W8MRM during the 24 hours prior to the Old Timers Night Banquet. Work W8MRM on May 6 (GMT) on or near 3,663 (even hours), 3,900, 7,070 (odd hours), 14,300, 50,178, 145,350 (even hours), or 146.94 (odd hours) Mc. QSL for certificate. Floyd Timmons, WA8IML, Sec'y., Motor City Radio Club, Greenfield Village, Dearborn, Mich.

TRANSMITTER-Receivers repaired, kits wired, custom-building, alignment calibration product detectors added. J-J Electronics, Windham Road, Canterbury, Conn.

WANTED: One Gonset Model 500W RF linear amplifier in unmodified good working order and appearance. W5PJS, 127 Patton, Shreveport, Louisiana 71105.

WANTED: Test equipment by Hewlett-Packard, Tektronix, General Radio, Kinntel, and others. Also military test sets, Tucker Electronics, Box 1050, Garland, Texas 75040.

HOWARD Specials: HT-37 (new, boxed), $345.00: HT-44, $240.00; SW-250, $255.00; SW-175, $129.00: SW-120/w 75 added, $139.00: HW-12, $89.00; Heath Twoer, $32.50; Utica 650/v.f.o., $95.00; Valiant $89.00: SB-10, $55.00. Free list. Howard Radio, Box 1269, Abilene, Texas 79604.

SIGNAL Generator Eico 315, new condx. Reasonable. WB2-OOK, 1129 Astor Ave., Bronx, N.Y. 10469.

HEATHKIT HM-11 SWR bridge, $9.00. Lafayette Dynamic microphone, $9.00. WA1DXA, William Marchand, RFD, Ash Pohtag Rd., Norfolk, Conn. 06058.

PRINTING Press for sale: 8 x 12 C&P, excellent for QSL printing. Write W8QJC, 562 Pinecrest Dr., Holland, Mich. 49423.

FOR Sale: Parabolid microphone mounts for field recordings. One commercial large spun aluminum long focus. Three Fiberglass short focus form portable if stung. Used excellent. 500 watt modulator, $65.00. Surplus BC units including pair 645, Ant. tuning unit 1001-A. Modified TU-75A six-meter, de Forest honeycombs, Tubes 4E27, 4-250A, 3E29, 872A, 304TH. Send stamped envelope. Carl Frank, WØCOS, R #1, Rochester, Minn. 55901.

LAFAYETTE HA-410. 10 meter transceiver, excellent condition, $95.00. W. Ralson, 67 Forest Street, Stamford, Conn. 06902. Tel (203)-762-4460.

BC-221Q freq. meter, A.C. pwr. With manual. Good condx. $65.00. W1LCT, 267 Center St., Bath, Maine 04530.

WANTED: Collins 75A-1, J. Coda, 9130 S. Hoyne, Chicago, Ill. 60620. Tel: A/C 312-779-6076.

HT-32B, $325.00: SX-115, $325.00; GSB-201, $250.00, like new. Other equipment. List on request. W4MVC, 10 Carten, Asheville, No. Carolina 28804.

COLLINS KWS-1, #1470, 75A-4, #5146 with vernier tuning dial, 3.1 Kc filter, Collins wattmeter, $1150. Harry C. Quear, WA9FTT, Box 391, Arcadia, Indiana 46030.

CLEGG 99'er, 6-meter transceiver, excellent condition, $75.00. Kellersman, Stony Brook Road, Darien, Connecticut.

RTTY Channel filters, octal mounted, specify frequency, $5.95 pair. 88 m.h. toroids, uncased, 5/$2.50. Herman Zachry, WA6-JGI, 3232 Selby Avenue, Los Angeles, California 90034.

WANTED: SB-10. K2LOB, Eagle Ridge Drive, West Orange, N.J. 07052.

SX-115 Rcvr in excint condx. First certified check for $325.00 takes it. Will ship insured. George K9ERP, 1050 E. Anderson Dr., Palatine, Illinois 60067.

SELL: Kilowatt, pair 4-125A's with 3000 VDC at one ampere supply, variable inductor, fully metered, etc. Asking $100. K9YNG, Joseph Johnson, 300 North Walnut, Clinton, Illinois.

62S-1 Collins, new, 5 hours use, will be checked out by Collins service center before sale. $600.00. Guaranteed delivery in perfect condition. K3WQB, Tel: (301)-262-3049, Bowie, Md. 20715.

SELL: Eico 720, $75.00; Eico 730, $60.00. Both factory wired, like new condx. National NC-109, $90.00. VF-1 VFO and power supply, $15.00. Frank Heuslein, WA2PND, Cold Spring Harbor, N.Y. Phone MY2-7604.

BEST Offer accepted. Radio Industries Mark II Loudenboomer 3-400Z linear, Deluxe 2Kw power supply in 4 ft. cabinet, over $700 in parts alone. Hornet T-1000-4 four-element Triband beam. D. Angel, K1RYT, Overlook Drive, Ridgefield, Connecticut 06877.

FOR Sale: 14AVQ, LC8OQ, 10-80Ms, still in carton, $27.50; 2M station: BC-312 rcvr with power supply; Tecraft converter, Nuvistor preamp, 10 watts AM/CW transmitter, 8-el. Telrex beam, $100. You pay shipping. S. Kaftan, 65 E. 52nd St., Brooklyn 3, N.Y. HY3-5773.

SELL: 75A4 excellent condition 1.5 3.1 filters, $395.00. HT-32A A-1 condx, $245.00. Heath Pawnee 2M transceiver professional wired. Like-new condition, $195.00. 1 Kw linear amplifier (813s) including power supply, $125.00. 40-foot self-supporting tower, AR-22 rotator, TA-33 beam, $150.00. W9-KAQ, ex-W2ZGB, 2 South 145 Burning Trail, Wheaton, Ill. Phone (312)-653-1875.

FOR 10 meters or CB. Heathkit GW-14 transistorized transceiver with GWA-14-1 AC power supply. Channels 6 and 9, $50. GW-52A one-watt handheld transceiver, Channel 6, $35. GW-31A 100 MW handheld transceiver, Channel 6, $9. All excellent condition with manuals. K8BLL, Box 256, Rte 2, Stevensville, Michigan 49127.

SELL: 75A-4 with Collins improvements, $350.00; Viking Valiant, excint condx, $175.00; Heath linearity Pattern Generator, $15.00; Heath television alignment generator, $25.00. W1KBL, 62 Tyler St., Attleboro, Mass. 02703.

FOR Sale: Heathkit DX-60, $50.00; HG-10 VFO, $25.00. Both are in excint condition with manuals. Richard Kuonen, K9PHJ, Rte. 4, Crawfordsville, Indiana 47933.

FOR Sale: Collins Model DL-1, $45.00; Collins Model 302C-3 wattmeter, $65.00; Heath Twoer w/Ameco preamp, $45.00; Heath GP-11, $10.00. WB2GYS, 15 Partridge Lane, New Shrewsbury, N.J. 07724.

HALLICRAFTERS HT-32B, like new, $280.00; teletype Model 19, fine shape, $95.00; Model 15 with table, $75.00. Both Bell units with sync, motors, no shipping, sry. New TT63A, $25.00. GSB-201 linear, $140.00; 'scope HO-10, $45.00; Hy-Gain 18HT vertical, $50.00. WA6VBO, Redlands, Calif. tel: (714)-792-037.

HEATH transmitter, Apache TX01 and SB-10 adaptor, both expertly wired, in mint condition. Sell both for $190.00. K2ZIJ, RD #1, Pulaski, N.Y. 13142.

VIKING II with 122 VFO, mint condx; recently replaced all tubes, $85.00. f.o.b. A. Pike, W1MYA, 758 Nott St., Wethersfield, Conn. 06109. Tel: 529-2065.

FREQUENCY Counter for sale, photo 25¢. W6VEP, Box 11714, Palo Alto, Calif. 94306.

WANTED: Manual for synchroscope BC-1 made by Douglas Laboratories. Warren Fox, WB2IGC, 423 Van Sant, Linwood, N.J. 08221.

"HOSS-TRADER" Ed Moory offers 2 each of the following opened displayed demonstrated equipment with factory warranty: SB-34, $349.50; Swan 350, $348.00; NCX-5, $459.00; NCL-2000, $549.00; Swan 500, $410.00; Galaxy V, Mk II, $349.00; TR-4, $495.00. T4-X, $335.00; 2-C, $195.00; R-4A, $339.00; KWM-2, $995.00; 32S-3, $739.00; 30L-1, $449.00. Package deal, new classic 33 beam and Ham-M rotator demo: $209.00; special Rohn 50 ft. fold-over tower, $189.00 prepaid; Swan Mark I linear demo, $395.00; Reconditioned gear: 2-A, $149.95; KWM-2, $695.00; TR-3, $369.00; SB-34, $319.00; Swan 350, $309.00; Swan 240, $159.00; TA-33 beam perfect, $89.00; Ham-M rotator, $85.00; S12B04, $149.00; Classic 33, $95.00. Ed Moory Wholesale Radio Co., Ed, W5BDR, DeWitt, Arkansas 72042. Box 506, phone a/c (501)-946-2820.

BASEBALL And Football gum and cigarette cards. I have singles and sets available from present back to 1900. Am looking to trade for new or excint condx used rcvr, transmitter, linear or transceiver. Will give good trade in cards. K2ZHH, Dick Gelman, 2196 Smith St., Merrick, N.Y. Tel: (516)-FR-8-0063.

VIKING 500, new condition, 4 extra 4-250A. K4AOZ, 572 Park Ave., Birmingham, Ala. 35226.

WANTED: Coil, final for Johnson, Challenger transmitter, serial No. 44620 or its equivalent. Bands 80-10 in gud condx, write or call Frank Radio, WA2GKA, 748-7473-243 Senator St., Brooklyn, N.Y. 11220.

WANTED: Silver Marshall sets, early Scott, National, Hammarlund all wave sets. John Caperton, 516 Country Lane, Louisville, Ky. 40207.

WANTED: HQ-129X bandspread condenser. Dale L. Martin, W7LOG, 15318 S.E. 22 St., Bellevue, Washington 98004.

WANTED: NC-190, SW-4, HO-180 in FB condition. Wm. Snyder, 2021 N. Central, Phoenix, Ariz. 85004.

HEATH DX-100 with improved loading and grid blocked keying modifications, $85.00. National HRO-60 with optional AC coil and HD-11 Q-multiplier, $225. WB2RBT, Nehercrest Lane, Orchard Park, N.Y. 14127.

HUSTLER 4BTV trap vertical, 1 kw. rating, 40-10 meters, self-supporting, $21.00. KØAHO, 1605 West Lincolnway, Marshalltown, Iowa 50158.

HUNTER Bandit 2000B $300, Drake DC-3, $80.00. Drake AC-3, $60.00 Ameco 6 and 2, $110.00. WAØFOV, 5366 Kimberly Road, Hopkins, Minnesota 55343.

SELLING Out: SB-400, SP-600JX, stamp for list. W3CNS, 21 Terrace Lane, Elizabethtown, Penna. 17022.

SELL: BC-221-P AC and book, $60.00; SX-100 and spkr, $125.00; DX-60 and HG10, $65. F.o.b. W9JOX, Box 65, Avoca, Wis. 53506.

FOR Sale: Collins KWS-1 with 75A-4, on air now, both A-1 condx. Will not ship, sry. Price: $1150.00. Firm. Al Varney, WA1HNV, 66 Autumn St. Ext., Rochester, N.H. 03867.

HALLICRAFTERS HT-45 linear 2 kw. Excint condx, $275.00 W3CEX, tel: 301-761-7119 Balto, Md.

DC-3 mobile power supply for Drake TR-3. Mint condx: $100. R. C. Miller, WA4ESG, 7503 S. Indian River Dr., Fort Pierce, Fla. 33450.

Index of Advertisers

16th NATIONAL A.R.R.L. CONVENTION

June 30th, July 1st - 2nd - 1967

Montreal, Canada

The MONTREAL AMATEUR RADIO CLUB, Inc. invites you to the 1967 ARRL National Convention being held in Montreal's newest hotel—the Bonaventure.

Enjoy English and French Canadian hospitality with a feature packed convention and take in EXPO 67—all during one never to be forgotten weekend.

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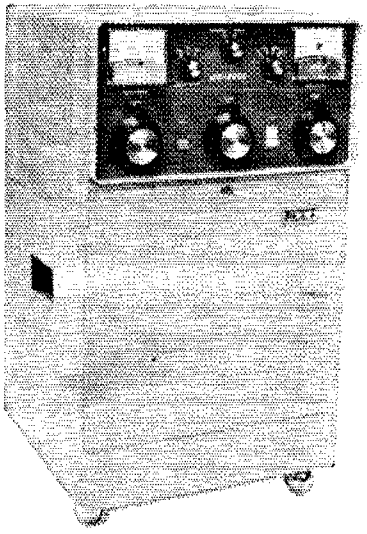

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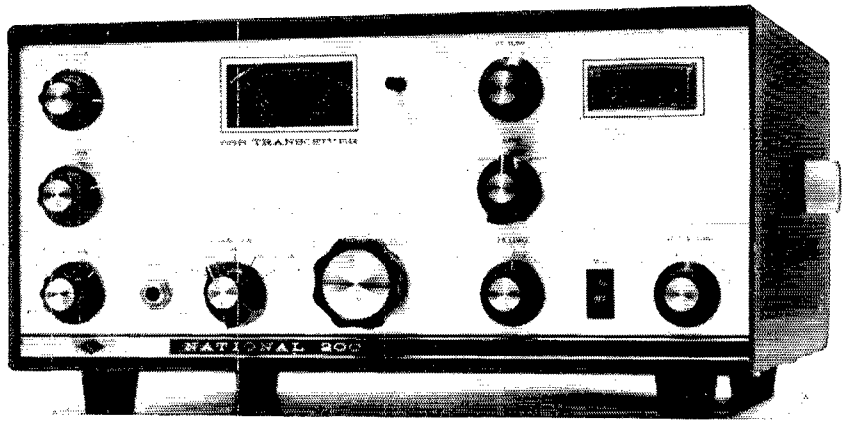

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