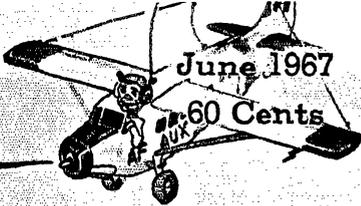


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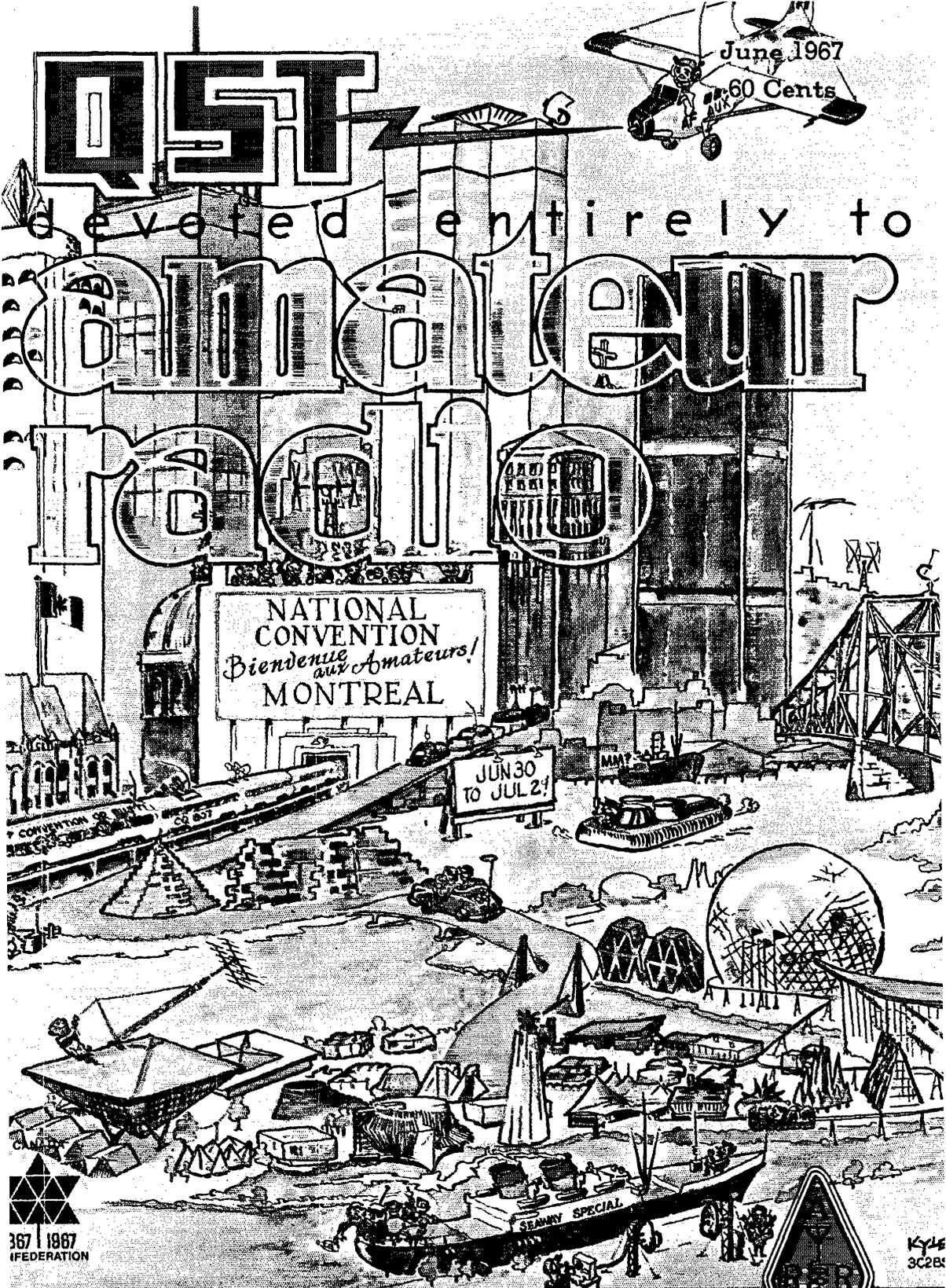
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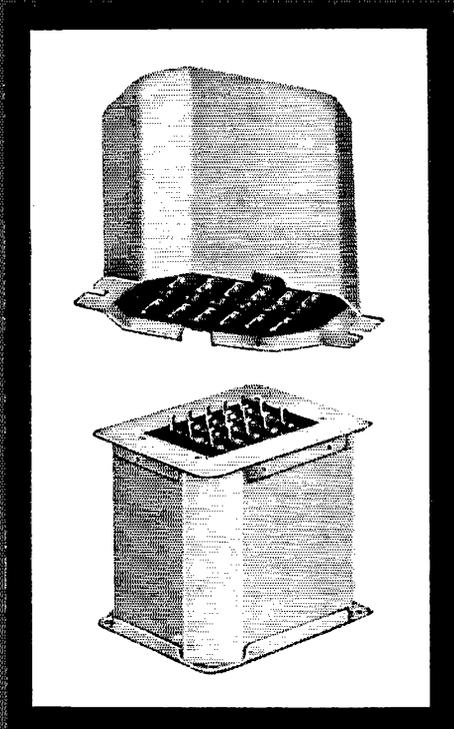


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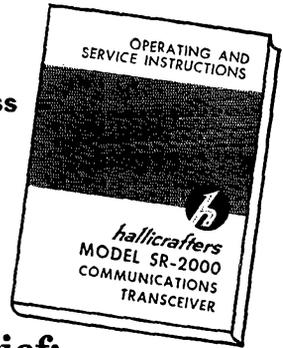
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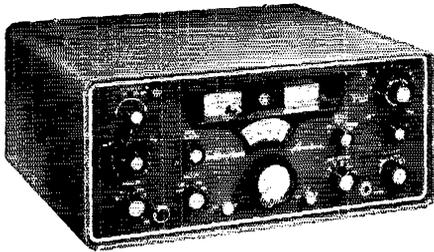
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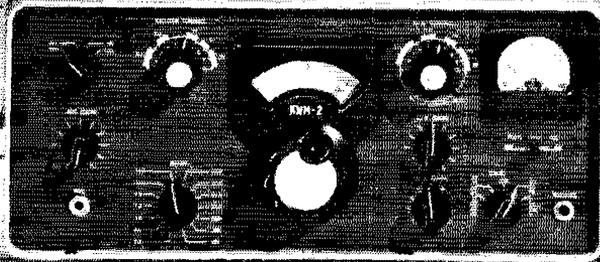


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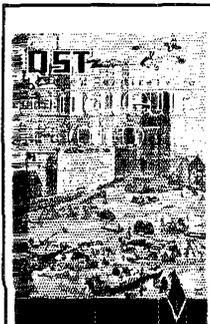
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Applied Science and Technology
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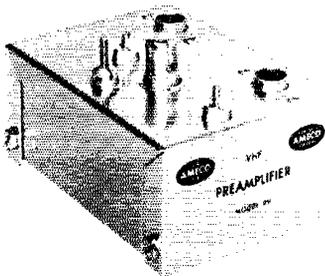
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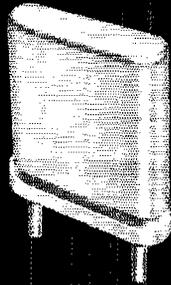
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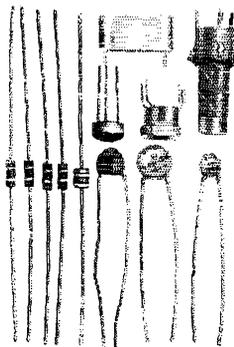
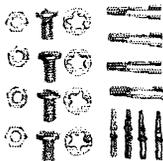
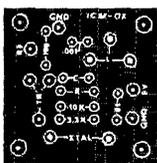
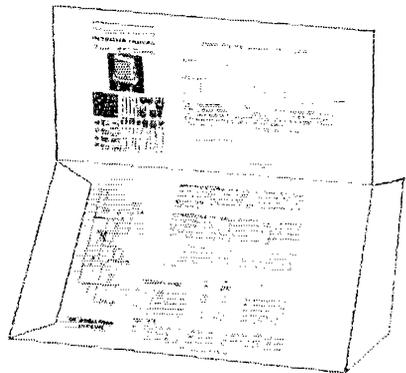
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Vice-Director: Bigelow Green W1EAE
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"It Seems to Us..."

COURTESY

The Amateur is Gentlemanly . . . he never knowingly uses the air for his own amusement in such a way as to lessen the pleasure of others . . . his operating practice is clean and regular
— From the Amateur's Code.

AFTER a considerable amount of operating and listening the past few months, we've wished there were some way to insert a mirror on this page so that we could all see ourselves and take a hard look at our own operating habits. Maybe that wouldn't be too useful, because it's probably true that we never see ourselves as others see us. But let's try to hold up a verbal mirror, if we can, to point out some of our foibles, particularly in the area of courtesy — or lack of it.

There is something strange about a high-powered motor car or a high-powered amateur transmitter — put a man behind the controls and it often changes his personality. A fellow may be the sort who will walk very sedately down the sidewalk, neither jostling nor shoving — yet put him behind the wheel of an auto and he'll want to pass everyone in front of him and will demand the right of way at every intersection. Oh, not us, of course — it's always the other guy.

The same thing happens in amateur radio. How many of your friends do you know who, if they walked into a crowded room, would not consider bellowing at the top of their voices, demanding to be heard, interrupting other conversations? Yet, put these same fellows behind the controls of a kilowatt, and they'll jostle to be the first in line to work some foreign station, they'll barge onto a frequency and begin calling CQ without waiting to see whether the channel is in use, and they'll almost totally ignore what anyone else is doing.

Is it lack of courtesy? Is it plain stupidity? Or is it too much competitiveness? Perhaps a little of each, topped off by a generous helping of awareness. It sticks in our mind that competition is a pretty potent force amongst hams, even as it is among nations. Whether we'll admit it or not, each one of us would like to be "first" in something. That's why we build better antenna systems. That's why we build better transmitters and receivers. That's why we enter contests. That's why we struggle to work a few more countries and get another sticker for that DXCC certificate. That's why some of us go on DXpeditions.

But there must be moderation in all things. Your competitive spirit drives you to build

a better transmitter, and this is fine so long as you do not go so far as to violate the power limit. Your competitive spirit drives you on to higher and higher DXCC totals, and this is fine except that some of us have lost our sense of values and have submitted forged cards. Your competitive spirit urges you to win an operating contest but some of us have gotten carried away and have padded our logs in order to get a higher score.

Fortunately, these are extreme cases, the agonies of "super" competition suffered by a comparatively small number. However, all of us are guilty of trying a little too hard at one time or another. Oh, sure, we don't all do this everyday — perhaps it would be better if we did, because then we could have a "national lid day" in which everyone would get his bum and discourteous operating out of his system, and the rest of the time we could be more considerate of each other. The way it goes now, a few of us are thoughtless each day and so there is a constant level of discourteous operating practices noted on the air.

Let's hold up that mirror. What do we see? Before you call a CQ, do you check to see whether the frequency is already in use? If you're calling a DX station, do you follow his instructions, or do you simply blast away, hoping to snare him by brute force? Is your transmitter adjusted so that you have neither clicks nor splatter to spoil the operating enjoyment of your neighbors (and those "neighbors" may be a thousand miles away!)? Do you wait before two fellows are entirely through their QSO before you jump in?

Those are just a few of the not-so-good practices that you see if you look closely enough into that mirror. But what good is this brief glance going to do? Not much! You'll read this, you'll realize that these faults belong to the "other fellow," not to you, and you'll promptly forget about the whole thing.

How are we going to solve this? One suggestion is that each club ought to have some kind of a committee, as in the days of the old "vigilantes," which would tactfully advise any of its members who were thought to be violating some rule of operating courtesy. Would it work? Most of us, probably, would not be willing or able to either take or give this kind of advice in person.

Do you have a suggestion as to how we can achieve better habits of operating courtesy? Sharpen your pencils. We'll give an ARRL *Operating Manual* for each of the five best answers received by the end of June. 

League Lines . . .

By now you've heard about the Stanford Report, "Amateur Radio--An International Resource." A digest of the report begins on page 58. There's nothing really startling in the report, but lots of things it's good to have someone else say about us!

Are you ready? Here we go with the June V.h.f. party (June 10-11; page 63); Amateur Radio Week (June 18-24; last month's League Lines); Field Day (June 24-25; page 64) and the National Convention (June 30, July 1-2; page 52).

In mid-April we got a badly-garbled radiogram asking about an order from Alaska--call sign doesn't check, no first name, no Zip code, no city--woe is us! Amateur traffic-handling is generally good, but there are exceptions. If you don't receive an answer from Hq. to one of your radiograms, please follow up by mail.

One of the strongest reasons for having a League is as an information exchange. If you know something your brother hams could benefit by--the Government attitude toward amateur radio at a Caribbean winter resort, a low-cost source of supply for parts amateurs need in building, a gimmick or gadget, hint or kink to make operation easier--how's for sending it along to League Headquarters?

On an international regulatory basis, the cycle-per-second is "in"--at least until after the next Plenipotentiary Conference of the International Telecommunications Union, since the last such conference ruled that ITU publications in English and Spanish would use c.p.s. and "ciclos por segundo" respectively (French-language ITU publications do use Hertz and its multiples). The Canadian view on c.p.s. is substantially the same.

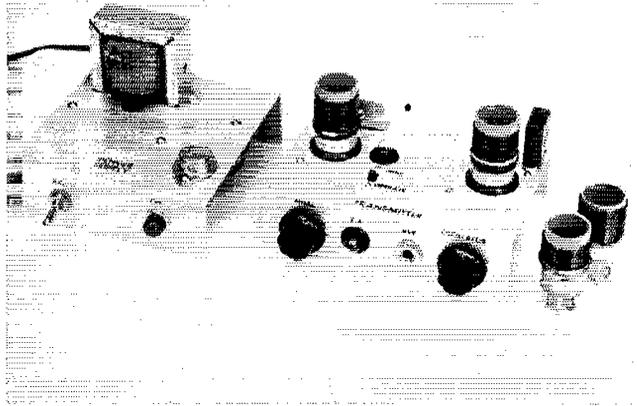
Don't miss "Happenings of the Month" page 82 this issue--FCC has announced proposed rulemaking which would legalize two common operating habits, tailending and saying ". . . portable Four." It's called Docket 17377, and comment deadline is June 30.

Hot dope on this year's Board Meeting is on page 85. The full story, of course, will be in the July issue.

International travelers--if you want to make contacts with amateurs in countries you're visiting, ask the Headquarters for the addresses of the IARU societies in the appropriate countries. Some of them have special weekly events for visitors.

A reminder to sponsors of hamfests, etc.--normal deadline for QST copy is the 18th of the second month previous, i.e., June 18 for the August issue. Every month a few items arrive just too late.

Top-chassis layout of the transmitter and power supply. The oscillator stage is at the right of the transmitter chassis, the tune-operate switch is at the top-center of the chassis, and the p.a. stage is at the left. The heat sink for Q_2 is visible at the far left corner of the transmitter chassis—just behind the p.a. coil.



A Transistor 5-Watt For 80 And 40

Low-Cost Solid-State C.W. for the QRP Man

BY DOUG DE MAW,* WICER

SURPRISING distances can be spanned with low-power c.w., and the 80- and 40-meter bands can provide good results from QRP equipment. Perhaps you are the kind of operator that seeks respite from the bedlam of the phone bands, becoming somewhat of a "one nighter" in the c.w. segments from time to time. Or maybe you are a confirmed c.w. operator and get a kick out of doing things the hard way. Whatever the motive, the little "fly-power" rig described here is not only novel but practical.

Although the transmitter is designed for operation from a 28-volt d.c. source, it will deliver enough output when operated from a 12-volt car battery to give you plenty of contacts a goodly distance away. This makes it useful for camping or for other portable work where the car battery is the only power supply available.

The R.F. Circuit

In the circuit of Fig. 1, Q_1 serves as a modified Pierce oscillator with the crystal Y_1 connected between its base and collector. A 1000-pf. silvermica capacitor is used between the base of Q_1 and

ground to regulate feedback. The d.c. supply lead is broken at J_1 for keying, and a 100-ohm resistor and 10- μ f. capacitor form a shaping network to give a click-free c.w. signal.

Q_1 and Q_2 are 5-watt n.p.n. transistors selected because of their low cost (\$1.41 each) and reasonably-high upper-frequency limit ($f_T=100$ Mc.). Many other types could be made to work in the circuit, probably with greater output and better efficiency. However, the 2N2102s do a fine job here even though the efficiency falls off slightly at 40 meters.

Equal outputs on both 80 and 40 meters no doubt could be obtained if u.h.f.-type transistors were used, but these are far more costly than the 2N2102s. Among the "hotter" transistors are the 2N3553, 40280, 40290, 2N3118, and others. If the builder is not experienced with transistor circuit design, it would be best to stick to the 2N2102s. Other types would require different bias resistor values, different driving-power levels, and different impedance-matching taps on the tuned circuits. Also, the "hotter" transistors might cause circuit instability, which is sometimes hard to cure in transistor rigs.

L_1L_2 is a plug-in coil assembly wound for a good impedance match between the collector of Q_1 and the base of Q_2 . A 33-ohm resistor and 0.01- μ f. capacitor are connected between the cold end of L_2 and ground. The resistor permits Q_2 to be driven farther into the class-C bias region than would be possible without it, adding somewhat to the efficiency of the stage. Depending on the transistor used, the value of the base-leak resistor could be something other than 33 ohms for best efficiency. Ordinarily, the value will be somewhere between 10 and 100 ohms. If the builder wishes he can use a 100-ohm potentiometer in

* Assistant Technical Editor.

Most things are "more easily said than done," or so the saying goes. This little two-transistor rig has so few parts in it that one could almost say "it's more easily done than said." There is nothing tricky about the circuit, so even an inexperienced builder should be able to get the transmitter assembled and operating without difficulty.

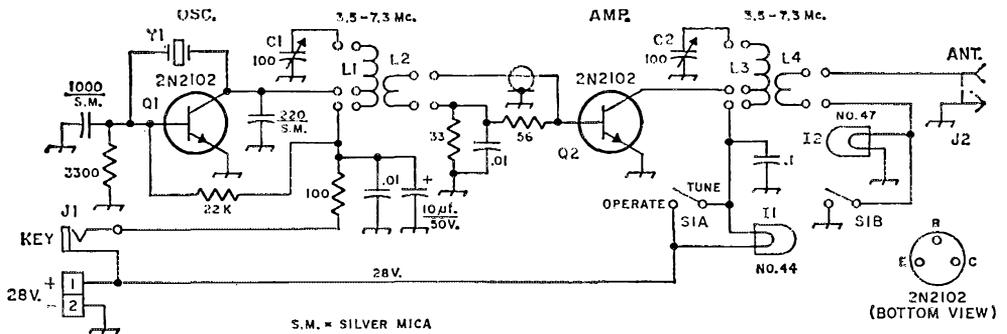


Fig. 1— Schematic diagram of the two-transistor transmitter. Except as indicated, decimal-value capacitances are in μ f. others are in pf. Polarized capacitors are electrolytic; other fixed capacitors are disk ceramic. Resistances are in ohms ($K = 1000$). Resistors are $\frac{1}{2}$ -watt composition.

- C_1, C_2 —100-pf. miniature variable (Millen 20100).
- I_1 —250-ma. pilot lamp.
- I_2 —150-ma. pilot lamp.
- J_1 —Open-circuit jack.
- J_2 —Phono connector.
- L_1 —80 meters = 36 turns No. 24 enam. on 1-inch dia. form, close-wound. Tap $15\frac{3}{4}$ turns from C_1 end.
- 40 meters = 18 turns No. 20 enam. close-wound on 1-inch dia. form. Tap at $5\frac{3}{4}$ turns from C_1 end.
- L_2 —80 meters = 6 turns No. 24 enam. close-wound over cold end of L_1 .

- 40 meters = 4 turns No. 20 enam. close-wound over cold end of L_1 .
- L_3 —80 meters = 36 turns No. 24 enam. close-wound on 1-inch dia. form. Tap 12 turns from cold end.
- 40 meters = 18 turns No. 20 enam. wire, close-wound on 1-inch dia. form. Tap 6 turns from cold end.
- L_4 —80 meters = 5 turns No. 24-enam., close-wound over cold end of L_3 .
- 40 meters = 4 turns No. 20-enam., close-wound over cold end of L_3 .
- S_1 —D.p.s.t. slide switch.
- Y_1 —3.5- or 7.0-Mc. fundamental-cut crystal.

place of the fixed resistor and adjust it for optimum transmitter output.

A 56-ohm resistor is shown bridged across the base winding, L_2 . This resistor was added to "load" the input circuit of Q_2 when a slight amount of instability was noted on 40 meters.

The resistor cured the problem, but it may not be necessary to use it in other models. It can be eliminated if there is no instability.

The collector of Q_2 is tapped down on L_3 , a plug-in coil, to provide a suitable impedance match to the antenna circuit, thus assuring maximum power transfer. L_4 is wound to match 50 ohms, but will work into a 75-ohm termination too. To use the transmitter with random-wire antennas, or feed lines of higher impedance than 75 ohms, a transmatch can be employed.¹

A 250-ma. pilot lamp, I_1 , is connected in series with the d.c. collector lead to Q_2 , serving not only as a fuse but as a current indicator. Because the bulb causes a voltage drop of approximately 10 volts (key down) it limits the power input to Q_2 during tuneup. The bulb is shorted out by S_{1A} in normal operation. A No. 47 bulb, I_2 , in series with the ground return side of L_4 serves as an r.f. output indicator for tuneup, and is shorted out

¹ See *The Radio Amateur's Handbook*, antenna chapter, for examples of transmatch construction and use.

Underside of the transmitter chassis. The oscillator circuit is at the right. The p.a. stage is at the left. Connections to I_1 and I_2 are soldered directly to the bases of the bulb:

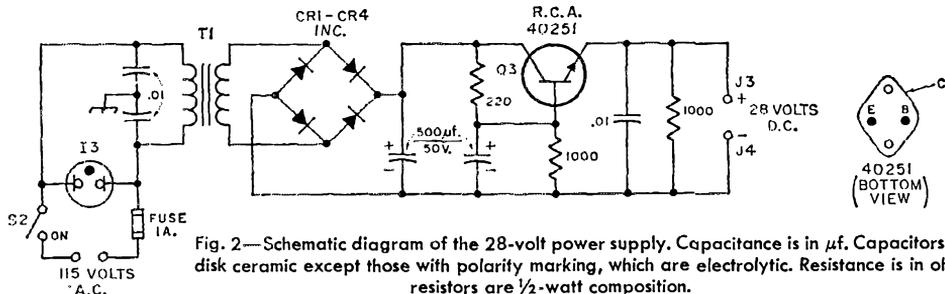


Fig. 2—Schematic diagram of the 28-volt power supply. Capacitance is in μf . Capacitors are disk ceramic except those with polarity marking, which are electrolytic. Resistance is in ohms; resistors are $\frac{1}{2}$ -watt composition.

CR1-CR4, inc.—750-ma. 50-p.i.v. top-hat rectifiers.
 I_x—Neon panel-lamp assembly with built-in dropping resistor.

J₃, J₄—Insulated banana jack, one red (positive) and by S_{1B} for normal operation. It lights to full brilliance when the transmitter is working into a proper load.

Power Supply Circuit

The power supply circuit of Fig. 2 takes advantage of the "electronic-filtering" concept described in other *QST* articles.^{2,3} Although at first glance the circuit may look like that of a regulated power supply, it isn't. For good d.c. regulation, Q₃ would need a voltage reference between its base and the negative side of the supply. However, the circuit offers some regulation and performs far better in that respect than would be the case if the operating voltage were taken directly from the bridge rectifier and filter capacitor.

The regulation is sufficient for the transmitter of Fig. 1. From no load to full-load current of about 250 ma. the voltage drop is approximately four volts—from 28 volts to 24 volts. Better regulation could be had by reducing the value of the 220-ohm resistor between the collector and base of Q₃, but this would increase the ripple in the output of the supply. The values given represent a good compromise. The r.f. output of the transmitter is free of noticeable a.c. ripple when operated from this power supply.

Assembling the Equipment

Home-made open-end aluminum chassis are used for both the power supply and the transmitter. The transmitter is built on a base which measures 1 × 4 × 5 inches. A Bud CB-1620 would be a suitable substitute. The power supply chassis measures 1 × 5 × 5 inches; a Bud CB-1620 would work nicely there. A single chassis could contain the entire lash-up. If the equipment is built into a cabinet, allowance should be made for good ventilation so Q₂ will not run too warm.

A heat sink is used to cool Q₂, and details of the author's home-made model are given in Fig. 3. The main body of the heat sink is a piece of aluminum angle, available from most hardware stores. The transistor is press-fit into a hole bored in the angle stock. A thin coating of silicone grease can be spread over the case of the transis-

tor to provide more efficient heat transfer to the heat sink.⁴

The complete transistor heat-sink assembly is electrically isolated from the main chassis of the transmitter by means of insulating washers. Small rubber grommets (two) will work equally as well. No need to worry about the dielectric quality of the insulating material if rubber or fiber is used. At 80 and 40 meters there will be no measurable r.f. loss because the collector of Q₂ is operating at low impedance. Under normal conditions, the heat sink does not get hot enough to cause deterioration of rubber grommets if they are used.

Pilot lamps I₁ and I₂ are held in place by inserting them into $\frac{3}{8}$ -inch-diameter rubber grommets, as shown in the photos. The connections to the bulbs are soldered directly to their bases.

Transistor Q₃ is insulated from the power-supply chassis by a mica spacer and two nylon washers. The mounting hardware is furnished with the transistor. A thin layer of silicone grease is used between the transistor and the mica spacer, and between the spacer and the chassis. The chassis provides sufficient surface area to perform well as a heat sink for Q₃.

Winding the Coils

The coils are hand-wound on Millen 45005 mica-filled forms.⁵ Small-diameter holes are drilled in the forms to allow the ends of the windings to be passed through to the inside and then down into the base pins, where they are soldered in place. The ends of the windings should be brought into the coil forms directly over the base pins in which the wires will be soldered; this will assure the shortest possible leads and will prevent the wires from crossing over one another inside the coil form. The main windings are wound first. The secondary windings, L₂ and L₄, are wound over the cold ends of their respective primary windings to assure tight coupling—necessary in this circuit for optimum power transfer. A single layer of masking tape is used between the

⁴ Silicone grease is generally available from electronics supply houses for approximately \$2.00 per tube. It is a worthwhile investment for those who experiment with power transistors.

⁵ The Millen coil forms listed here, and other single-tot Millen components, can be purchased directly from the manufacturer, the James Millen Mfg. Co., Inc., 150 Exchange Street, Malden, Mass.

²"A Transistor Power Supply", *QST*, June 1962.

³"Galeski, The Imp TR", *QST*, Dec. 1961, page 10.

primary and secondary windings to prevent the possibility of short circuiting. The completed coils can be coated with coil cement to hold the turns firmly in place.

Firing Up

With the power supply connected to the transmitter, a dummy load connected to I_2 , and a crystal plugged in at Y_1 , apply power and key the transmitter. With S_1 in the TUNE position, adjust C_1 and C_2 for maximum brightness of I_2 . Normally, this point will *not* occur when the collector current is at its absolute dip (minimum value of current). While tuning C_2 , watch for a point at which I_2 shows maximum brightness with the least amount of brightness at I_1 . Get as close as possible to the minimum-current condition at I_1 without sacrificing lamp brilliance at I_2 . In other words, do not let Q_2 draw any more current than is necessary for maximum r.f. output. If the circuit is performing properly, Q_2 will draw between 200 and 225 ma. after tuneup. At this current, I_1 will be lit to normal brightness, or nearly so.

The next step is to adjust C_1 while monitoring the c.w. signal from the transmitter. It should be possible to secure a clickless, chirp-free note. S_1 should be in the OPERATE position for this test and the r.f. gain in the receiver should be retarded until the c.w. signal is coming in

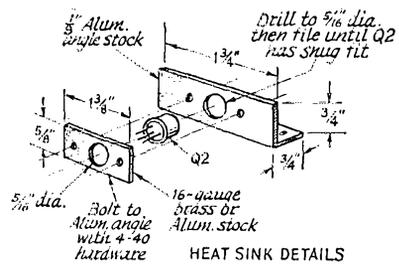


Fig. 3—Layout and assembly details of the homemade heat sink for Q_2 . The completed assembly is insulated from the main chassis of the transmitter by using insulating washers or rubber grommets (see text).

at 80 or less. Also, the receiver's a.g.c. should be disabled for this check.

Following these adjustments, the transmitter can be put into service. Tuneup into an antenna system should be done in the same manner as into the dummy load. I_2 can again be used during adjustment to indicate maximum transmitter output. S_1 should always be in the TUNE position while the transmitter is being tuned up.

Some Final Comments

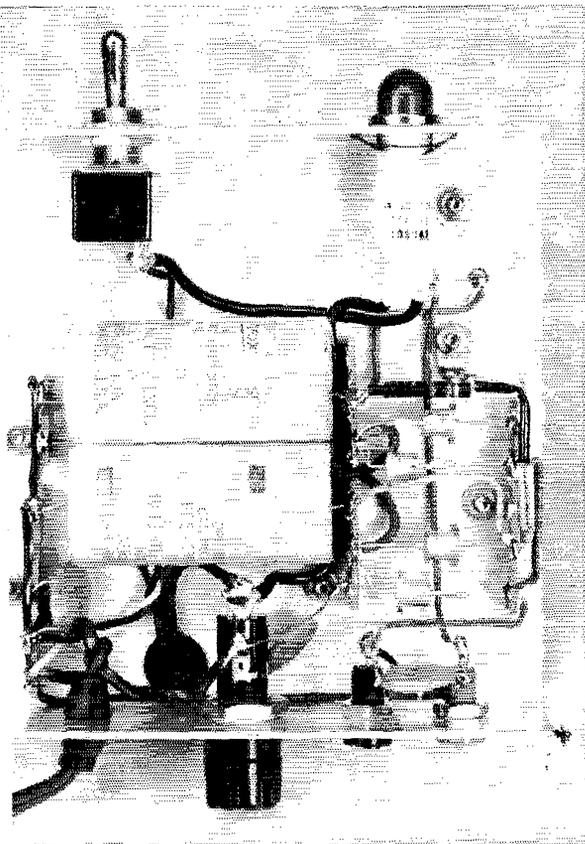
The transmitter was tried with a 12-volt power supply and it fired up without difficulty. The power output was a bit less than one-half the amount available with the 28-volt supply. (Output at 28 volts was 3.2 watts on 80 and 2.6 watts on 40.) In fact, the circuit performed satisfactorily at 6 volts, but the power output was considerably less than one watt.

A set of coils was wound for the 160-meter band and the transmitter was given the "smoke" test, and although the efficiency seemed to be good and the oscillator worked well, the amplifier stage was unstable. This was probably caused by the higher gain of Q_2 at the lower operating frequency; also, the bypass capacitances are not large enough to be effective at 1.8 Mc. No doubt the transmitter could be made to work satisfactorily on 160, but the author did not experiment further along those lines.

This transmitter is not practical for use on frequencies above 40 meters. The limiting factor here is the transistor type. With v.h.f. power transistors in the circuit, 20-meter operation should be possible. However, this was not tried.

Because the transmitter and power supply are of simple design, the layout is without complexity. The builder should have no difficulty if he uses the photos as a guide when laying out the chassis.

QST



A look into the underside of the power supply. The silicon rectifiers are mounted between two insulated terminal strips (right). The filter capacitors are installed in a similar fashion.

SINCE the advent of the electronic keyer, numerous designs have appeared, perhaps the most popular of which has been the "9TO" keyer. Its popularity is certainly not because of its simplicity, but rather due to its ease of operation, and its freedom from the ills that plague some other keyers. In the hands of a practiced operator, it is capable of producing superb c.w.

After using one of these keyers for several years, I began to feel that a dot memory would be a worthwhile addition to the basic design. Anyone who has used an electronic keyer knows whereof I speak. After a few hours of operating, especially where speed changes were frequent, I would begin to lose my sense of timing, and start sending ahead of the keyer, the most aggravating result being the loss of a dot between two dashes, or at the end of a series of dashes. Upon deciding that a dot memory would go a long way toward improved sending, it was decided that none of the original features of the 9TO should be lost, and a design was started with this in mind.

Circuit Operation

After considerable thought and several days at the workbench, the circuit shown in Fig. 1 evolved. At first glance it may seem a bit elaborate, but those familiar with the basic 9TO keyer will note that only one tube and a few small components have been added.

Understanding the circuit is not essential to building and using the Mark II. However, a discussion is presented here for those who like to know "what makes it tick," and for those who may encounter difficulty in placing the keyer in operation. If your multivibrator theory is a bit rusty, it might be advisable to review it before delving into the circuit description.

V_1 , the dot generator, is a free-running multivibrator with two outputs. When switch tube V_{2A} is in its "on" state, V_1 begins its flip-flop action, supplying mark/space pulses to keyer tube V_{4A} , and trigger pulses to dash generator V_2 . Dash generator V_2 is controlled by switch tube V_{2B} , as well as by trigger pulses from V_1 . This generator consists of a bistable multivibrator whose output is also fed to V_{4A} . Thus V_{4A} may be controlled by V_1 , V_2 , or both, depending on whether dots or dashes have been selected by the operator. To avoid confusion, it may be well to point out that V_2 does not generate a complete dash. Its output merely serves to "blot out" the space between two dots, which results in a dash of the correct length.

The dot-generator control switch V_{2A} can be controlled by any one of four inputs, one of which is the dot lever. Since both V_1 and V_2 must be turned on to generate a dash, V_{2A} receives its second input from the dash AND gate V_{4B} , via CR_1 . The third input is from the dot-storage multivibrator V_5 , while input four consists of feedback from V_1 , which insures self-completing dots.

* Bldg. 118, NAS Willow Grove, Penna. 19090.

The 9TO Mark II Keyer

*Improved Version
of a Popular Design*

BY A. F. LUTZ,* W9WJB/3.



The "9TO" keyer as modified by W9WJB. The cabinet is a homebrew job.

Switch V_{2B} is controlled by two inputs, one of which is obtained from the dash lever, via *and* gate V_{4B} , while the other is feedback from dash generator V_2 , which insures self-completing dashes.

The dot-storage stage, V_5 , consists of a bistable multivibrator which has two inputs, one being the

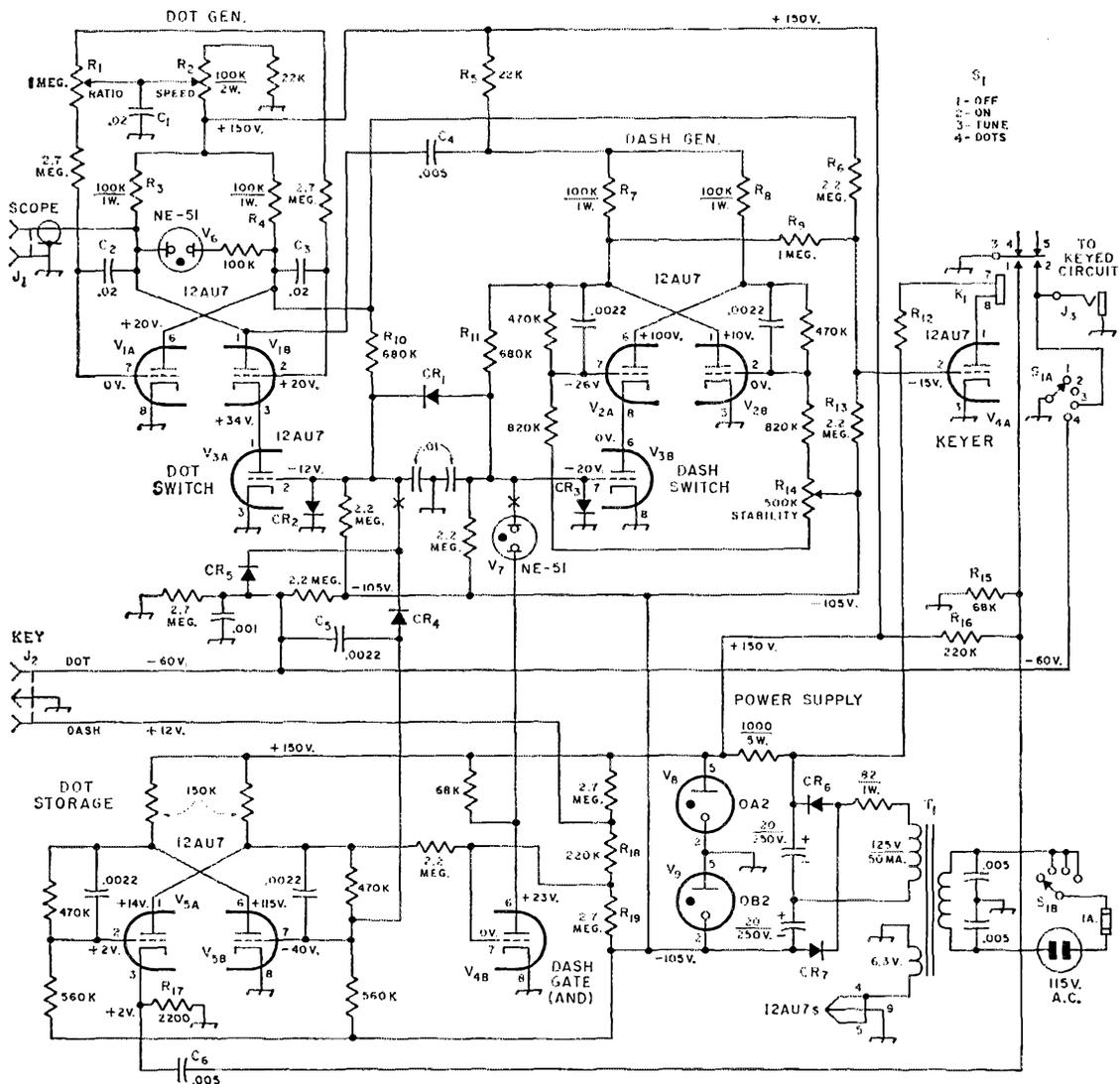


Fig. 1—Circuit of the Mark II 9TO electronic keyer. Capacitances are in μf .; resistances are in ohms ($\text{K} = 1000$), unless indicated otherwise. C_1 , C_2 and C_3 are 200-volt paper. Polarized capacitors are electrolytic. All other capacitors are 500-volt disk ceramic. Fixed resistors are $\frac{1}{2}$ -watt unless indicated otherwise. R_1 , R_2 and R_{14} are linear controls. Other component designators, unless listed below, are for text-reference purposes.

CR_1 – CR_5 , incl.—IN116 or IN636.

CR_6 , CR_7 —400 p.i.v., 50 ma. or more (IN2484 used).

J_1 —BNC chassis-mounting receptacle (Amphenol 5575).

J_2 —2-circuit female receptacle (Amphenol 80-PC2F).

J_3 —Open-circuit headphone jack.

K_1 —S.p.d.t. relay, 4000-ohm coil, two independent mercury-wetted stationary contacts (Clare HGP

1002, or Potter & Brumfield JM1-119-11). Also see text and Fig. 3.

R_{12} —1000 to 27000 ohms, see text.

S_1 —Single-section double-pole rotary switch, four (or more) positions.

T_1 —Power transformer: 125 volts, 50 ma.; 6.3 volts, 2 amp. (Stancor PA-8421, or similar).

dot lever, and the other consisting of reset pulses from relay K_1 . *AND* gate V_{4B} is controlled by inputs from the dash lever, and memory multivibrator V_5 . The dot memory must be clear, as well as the dash lever closed, before V_{3B} can receive dash information. This prevents overriding the dot memory by premature closure of the dash lever.

An additional advantage of this circuit is that it permits use of a dual-lever key, allowing the operator to produce letters such as K, C and Y, by simply holding the dash lever closed and inserting the dots as soon as the preceding dash has started. This lessens operator fatigue by reducing the wrist motion required to produce a given character.

For a more detailed examination of the circuitry, let's see what happens when the operator "sends ahead" of the keyer in trying to send the letter R. Referring to Figs. 1 and 2, at time T_1 , the dot lever closes, removing the cutoff bias from the V_{3A} grid via CR_6 . V_{3A} starts to conduct, in turn permitting V_{1B} to conduct, driving V_{1A} into cutoff. V_1 is now in its mark state. As V_{1A} goes into cutoff, its plate voltage rises, causing the junction of R_6/R_{13} to become less negative, in turn allowing V_{4A} to conduct. Conduction in V_{4A} allows K_1 to close, simultaneously keying the transmitter, and triggering a reset pulse to dot memory V_5 .

To simplify matters, let's ignore what's happening in the dot memory until the final dot when, in this example, the memory comes into play. As indicated by the dot-lever waveform in Fig. 2, the lever closure was too short for a full-length dot. The circuitry ignores this because the V_{1A} plate-voltage increase is fed back to the grid of V_{3A} via R_{10} , cancelling the bias that would normally appear with the dot lever open. V_{1B} continues to conduct until, at time T_3 , V_{1A} starts to conduct, driving V_{1B} into cutoff. As V_{1A} conducts, its plate voltage returns to a very low value, allowing V_{3A} and V_{4A} to return to cutoff, signalling the end of the first dot in the R. V_1 is now in its space state.

Now let's see how the dash is produced, keeping in mind that stage V_2 does not generate an entire dash, but fills in the space between two dots. Since the operator is "sending ahead" of the keyer, he closes the dash lever at T_4 . No dot is being stored in V_5 at this time, so closure of the dash lever causes the junction of R_{13}/R_{19} to become sufficiently negative to cut V_{4B} off, thereby allowing neon bulb V_7 to ignite. With V_7 in conduction, the V_{3B} grid goes to ground potential, allowing V_{3B} to go into conduction, in turn permitting V_2 to become operational. With the V_{3B} grid at ground potential, CR_1 conducts, removing grid bias from V_{3A} , and turning on V_1 . Since capacitor C_3 is still discharging, V_{1B} is held in cutoff until a space equal to the length of a dot is produced (T_5).

At T_5 , C_3 has discharged sufficiently to allow V_{1B} to conduct, driving V_{1A} into cutoff. V_1 is now in its mark state, causing V_{4A} to conduct and close K_1 , beginning the dash. As V_1 reverses its state at T_5 , the sudden decrease in the V_{1B} plate voltage is differentiated by C_4/R_5 into a sharp negative pulse, which is applied to dash generator V_2 , driving V_{2B} into cutoff which, in turn, causes V_{2A} to go into conduction. With V_{2B} in cutoff, its plate voltage rises to a high value. This increase is coupled to V_{4A} via R_9 , helping to hold V_{4A} in conduction.

At T_6 , V_1 again switches from mark to space, surrendering control of V_{4A} to V_2 .

At T_7 , the operator has prematurely released the dash lever, since the dash has not yet reached its proper length. This does not result in a short dash, however, because the high plate voltage of V_{2B} keeps everything "as is" by as-

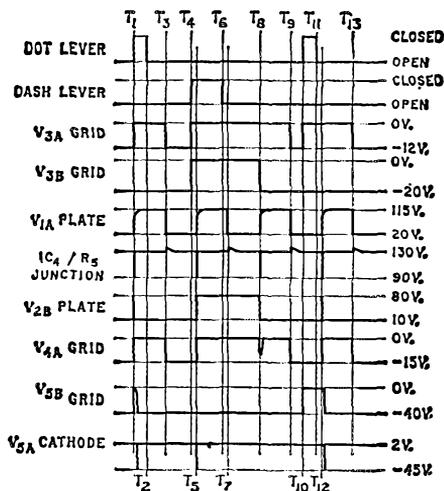


Fig. 2—Waveforms at various points in the Mark II circuit. The keyed output waveform to the transmitter is the same as at the V_{4A} grid, except that the relay washes out the slight dip in the dash.

suming control of V_{3B} and V_{3A} via R_{11} . Consequently, V_1 continues to cycle.

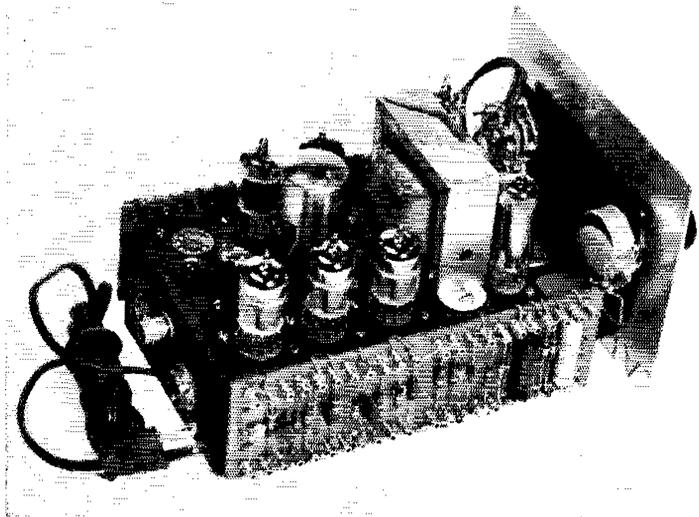
At T_3 , V_1 returns to mark, simultaneously assuming control of V_{4A} , and reversing the state of V_2 with another trigger pulse. V_2 now relinquishes complete control of V_{4A} to V_1 , and the dash continues. V_2 also gives up control of V_{3B} at this time, while V_1 has again assumed control of V_{3A} .

At T_9 , V_1 returns to its space state, allowing both V_{4A} and V_{3A} to return to cutoff, ending the dash, and returning complete control of all circuits to the operator.

Between T_{10} and T_{11} , the operator is away ahead of the circuitry as he closes the dot lever, trying to produce the final dot. V_1 is still in its space state and, until C_3 discharges, V_1 cannot go into mark.

Opening the dot lever at T_{11} in the ordinary 9TO keyer would result in a missed dot. Let's return to T_{10} and see how the dot memory handles the situation. When the dot lever closes, C_5 discharges very rapidly, causing a positive pulse to appear on the V_{5B} grid, driving V_{5B} into conduction, and V_{5A} into cutoff. V_5 is now storing the dot. The V_{5B} grid is now at ground potential; therefore control of V_{3A} is assumed by V_5 , via CR_4 . V_5 remains in this state until time T_{12} , when V_1 returns to mark, turning on V_{4A} and starting the final dot. As K_1 closes, it allows C_6 to discharge very rapidly through R_{17} , clearing the dot memory by returning V_{5A} to conduction, and V_{5B} to cutoff. V_{3A} is now held in conduction, by feedback from V_1 , until T_{13} , at which time the dot ends, and complete control of V_{3A} returns to the operator. It will be noted that it is possible to store a dot any time after the beginning of a dash, which gives the operator considerable relief from his timing responsibilities.

Most of the small components are accessible on terminal boards mounted along either side of the chassis. This construction also avoids the crowding of components under the 2 × 4 × 5-inch chassis.



To finish the circuit analysis, let's examine V_{4B} in closer detail. With a dot in storage, the V_{5A} plate voltage is at a high value, and this is used to overcome the bias applied to the V_{4B} grid via R_{19} . Closure of the dash lever cannot raise the bias on V_{4B} sufficiently to cut it off until the V_{5A} plate voltage drops to a low value, which occurs when a dot is no longer in storage. As noted previously, this prevents overriding the dot memory by premature closure of the dash lever, and the subsequent loss of a stored dot.

Power Supply

The power supply is quite straightforward. It consists of a voltage doubler whose output is regulated by V_8 and V_9 . Connecting the junction of the regulators to ground results in regulated B-plus and B-minus voltages, making the unit immune to normal line-voltage fluctuations.

Components and Construction

Since the circuit stability of the Mark II is not dependent on component placement, the

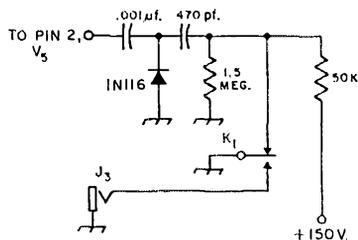


Fig. 3—Alternate reset circuit for s.p.d.t. relays. When this arrangement is used, Pin 3 of V_5 (Fig. 1) should be grounded, and R_{15} , R_{16} , R_{17} and C_8 omitted. Resistances are in ohms ($K=1000$), unless indicated otherwise. Capacitor is disk ceramic; resistors are 1/2-watt. J_3 refers to Fig. 1. A relay with mercury-wetted contacts, such as the W.E. 276G should be used.

builder is free to use his own ideas in mechanical layout, and no detailed construction procedure will be given here. The author's unit was constructed on a standard 2 × 4 × 5-inch chassis, which is housed in a homemade cabinet. Most of the small components were mounted on surplus terminal boards fastened to the sides of the chassis to reduce crowding underneath the chassis. The power-supply components were mounted underneath the power transformer, on a separate terminal board.

Relay K_1 was submounted to reduce the overall height of the unit. It should be pointed out that relays employing mercury-wetted contacts cannot be mounted in random positions. The relay shown must be mounted vertically, base down. Care should be used in handling these relays, since they are rather delicate and won't tolerate a drop from the workbench to the shop floor. The relay used in the original just happened to be on hand, and I used one of the two normally-open contacts to reset the memory. For those who may have other relays on hand, an alternate reset circuit is shown in Fig. 3. This modification was tried and found to perform as well as the original. Initially, an attempt was made to obtain the reset pulse from the plate of V_{4A} , but this approach failed because, with this arrangement, V_5 receives both set and reset pulses simultaneously, resulting in double dots and other weird phenomena. Closure time of K_1 provides sufficient separation between the set and reset pulses to assure stable operation of the memory.

A small bracket was fabricated to hold the front panel to the chassis, and R_1 and R_{14} were mounted on this bracket, as may be seen in the photograph. These two controls require only initial adjustment and are of the screwdriver-adjusted variety.

The third control on this bracket, along with the empty tube socket at the rear of the chassis, was installed for use in a receiver-muting circuit to be used at a later date.

Like most electronic keyers, the Mark II will have a fit if subjected to large amounts of r.f. Bypassing the a.c. line to ground where it enters the chassis, and the use of shielded leads to the paddle and transmitter keying circuit, resulted in complete stability when used with a kilowatt transmitter.

Jack J_1 was installed to provide a convenient sync take-off point for an oscilloscope, as shown in Fig. 4.

Resistors R_3/R_4 and R_7/R_8 are matched pairs. These may be obtained by purchasing 5-per-cent types, or by securing seven or eight of the 10-per-cent variety, and matching them with an ohmmeter.

Originally, 5963-type tubes were used in all circuits. These are special computer types, and were used because I happened to have a cigar box full of used ones. Type 12AU7s were tried with no noticeable deterioration in performance. Tube selection for the various circuits was found to be unnecessary. Several tubes were tried in each socket, in an attempt to detect any latent circuit deficiencies, with no success.

The diodes used came out of a surplus assortment, and were unidentifiable. Type 1N116s or 1N636s should prove to be satisfactory substitutes.

Adjustment

Adjustment of the Mark II may be accomplished by connecting it to the station transmitter, and monitoring the keying on a receiver. (Please, gang, use a dummy load on the rig when testing!) Regulator tubes V_8 and V_9 should light the moment power is applied, indicating that all is well with the power supply. After allowing a minute for warm-up, close the dot lever while watching V_6 . V_6 should flicker, and a string of dots should be heard from the receiver. Closing the dash lever should result in a string of dashes. If you get dots instead, adjust R_{14} until they turn into dashes.

Next, with the speed control set at minimum, flick the dash lever as quickly as possible and see if you get full-length dashes. If some dashes come out short, further adjustment of R_{14} is indicated. The correct setting of R_{14} is not at all critical, and should be found with ease.

Now try a few Vs. If the dots sound too heavy, or if they are too short, adjust R_1 , the ratio control, until they sound right. The perfectionist may connect an oscilloscope, as shown in Fig. 4, and adjust for a perfect mark/space ratio. If it is not possible to achieve the correct mark/space ratio by adjustment of R_1 , it may be necessary to add resistance in series with the coil of K_1 . The amount required will depend on the relay used, and should fall between 1000 ohms and 27,000 ohms.

Next, with the speed control set at minimum, try a 30-w.p.m. N. You should get an N at

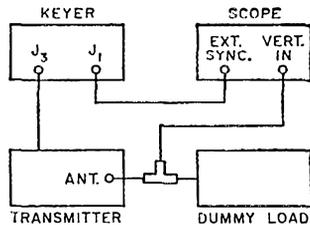


Fig. 4—Oscilloscope connections for mark/space adjustment. R_1 (Fig. 1) should be set so that spaces between dots are equal to dot length. This setup is also useful for adjusting keying wave-shaping circuits in the transmitter.

about 5 w.p.m. Next, try a K or C, with the dash lever held closed throughout the letter, and flicking in the dot as soon as its preceding dash begins. If the letter comes out correctly, you may ignore the next section, and start enjoying the fruits of your labor.

Troubleshooting

If you run into problems, the following procedure will help you isolate them in a minimum of time. Breaking the circuit at the points marked X in Fig. 1, and connecting the paddle across CR_1 (center grounded), allows the dot and dash generators to be checked for proper operation without possible complications caused by failure of the dot memory and/or the gate circuitry. If difficulty is encountered in producing dots, the V_{1B} , V_{3A} and V_{4A} circuitry should be carefully checked. If the dashes are erratic, or non-existent, a check of the V_{3B} and V_2 circuits is indicated.

The dot memory may be checked by connecting a voltmeter to Pin 6 of V_5 . Momentarily grounding Pin 7 of V_5 should cause the plate voltage to drop to less than 20 volts. Momentarily grounding the junction of R_{15}/R_{16} should cause the voltage to jump back to about 120 volts. Grounding the dot-lever line should cause the reading to drop to 20 volts or less.

The AND gate may be checked by grounding Pin 1 of V_5 and the grid side of V_7 . Grounding the dash-lever line should then cause V_7 to ignite.

All voltages shown in Fig. 1 were measured with a v.t.v.m. with the paddles open, no dot in storage and S_1 in Position 2. All waveforms (Fig. 2) were taken with a d.c. scope using a low-C probe.

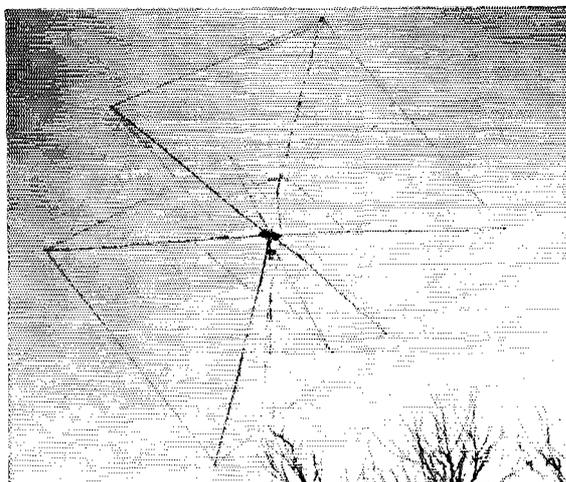
After using the Mark-II in several contests, as well as for ordinary contacts, I feel well rewarded for the effort expended in its design and construction. The original design objective was met in that the keyer handles exactly like the original, with the exception that it is noticeably easier to "program," especially after a few "brown 807s."

I am sure you will find the Mark II, as I have, to be your key to better c.w.

QST

Compact

40-Meter Beam



Stub-Loaded Loops

in a Two-Element Array

The Yee Beam is a compact two-element antenna using one loop as a driven element and the other as a parasitic reflector. This 40-meter beam uses an equivalent boom length of approximately 15 feet and the distance is 30 feet between opposite points on the loops.

BY THEODORE S. H. YEE,* K6IBJ

THE antenna described in this article is the result of investigating foreshortened elements for use in parasitically excited arrays. The particular object was to provide a 40-meter beam that would not require the large real estate under a full-size parasitic array and would be of sufficiently light weight to allow the use of a small TV-type rotator and a simple mast.

Beginning nearly three years ago, various arrangements of a square loop antenna having a total conductor length of approximately one wavelength were studied. This length was chosen because it was desired to have maximum radiation perpendicular to the plane of the loop so as to be amenable to parasitic operation. The maximum length of a side was set at $\frac{1}{8}$ wavelength, with the remaining conductor length folded into stubs to preserve resonance. Many stub configurations were tried, and in the course of the experiments it was discovered that mutual effects between the stubs could be used to tune the loop. This proved to be the key to the ultimate design.

As shown in Fig. 1, two stubs are formed by folding the low-current portions of the conductor so the ends overlap. Tuning of the loop can be

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The 7-Mc. Yee beam is small enough to be practical for you if your antenna space will accommodate a 20-meter Yagi. It features a novel method of loop tuning along with simple construction and low cost.

varied by changing the spacing between the overlapped portions or by changing the angle between them. The construction can perhaps be visualized better from Fig. 2, which shows the evolution of the loop from a half-wave folded dipole.

The impedance of this loop was about 160 ohms, as indicated by about a 3:1 s.w.r. when the loop was fed directly with a 52-ohm coax line. The radiation pattern was essentially a figure 8 with very deep nulls at the ends and maximum radiation perpendicular to the plane of the loop. On-the-air tests showed that it compared very favorably with a half-wave dipole; signal reports with the two antennas were essentially the same.

Two of these loops, one as a driven element and one as a parasitic reflector, are used in the 40-meter beam now in use at K6IBJ. The overall dimensions are shown in Fig. 3.

40-Meter Beam Design

To allow for the use of a center spider plate and radial supporting arms (see photograph), the stubs are not folded in the plane of the loop but are at an angle dictated by the desired spacing between two elements. After a review of *The ARRL Antenna Book* and other references, it appeared that a spacing of 0.11 wavelength provided the best gain for a two-element parasitic beam. This spacing required an angle of 30 degrees between the radial arms and the planes of the loops. The stubs, carried by the radial arms, will intersect each other at approximately the center of the beam. Overlap the ends and provide 1 to 2 inches of spacing between the overlapped ends. The amount of overlap and spacing are varied to tune the elements to the desired frequency.

The requirement was for a lightweight antenna of readily available materials that would need no special tools or welding for constructing the parts and assembling them into an integrated structure. The actual weight is 35 pounds.

The center spider is made from $\frac{1}{4} \times 8 \times 16$ -inch aluminum plates. The pieces are fastened together with aluminum angle (not shown). High-strength aluminum, preferably T-6, should be used because all of the structural loads and moments due to weight and wind forces are borne by the center plate. If high-strength aluminum is not available, increase the thickness or even use mild steel plates. Reinforcement with gussets may also be used to assure structural integrity of the center plate. Mounting the center plate directly to the AR-22 rotator reduced the wind strain on the rotator, thus allowing the small TV-type rotator to be used.

Radial-arm segments of $1 \times 1\frac{1}{2}$ -inch high-strength (T-6) angle aluminum are bolted to the center plate. Each arm is $3\frac{1}{2}$ feet long and is positioned at 60 degrees from the beam center line. The remaining part of each radial arm is a 12-foot bamboo pole, providing an overall arm length of 15 feet. The bamboo is attached to the aluminum segment by overlapping the ends 6 inches and using two $1\frac{1}{2}$ -inch hose clamps to secure the joint. Stainless steel clamps were used because they are corrosion resistant and were readily available from the local auto-parts discount store. The bamboo came from the local lumber yard. Each bamboo was friction taped between the knuckle joints to prevent splitting. Three coats of a durable exterior varnish were thereafter applied for protection against the weather.

The reinforced bamboos have been exposed to the Southern California climate for over $2\frac{1}{2}$ years, and except for a few varnish peelings from handling, they appear to be as good as new. Nevertheless, realizing that the bamboo arms have limited life and that replacement is inevitable, the design affords flexibility for replacing one or all of the arms with similar new ones or with fiber-glass rods. Also, the split-arm arrangement allows for easy handling and assembly.

The loop portion of each element is made of No. 14 copper wire. Each linear loading stub is approximately $14\frac{1}{2}$ feet long, with about 2 feet of overlap. Lengths are not critical because each element is tuned by varying the overlap at the ends. However, to provide a reference design, it is suggested that both the radiator and reflector elements be made identical except for the overlap. Allow at least 3 inches more overlap on the reflector than on the radiator and maintain the same spacing.

Ordinary antenna strain insulators were used at each radial-arm end to provide insulated junctions for the loop segments and also for connection of the stubs. (The insulators could be eliminated, since the bamboo itself provides adequate insulation.) The insulators were lashed to the bamboo ends with wire, and were mounted perpendicular to the bamboo so that both eyes

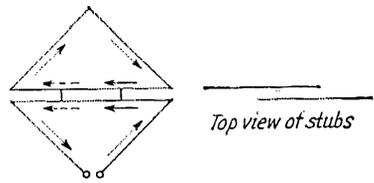


Fig. 1—Electrical configuration of the loop. Dashed arrows indicate current direction in left-hand stub when direction of current in right-hand stub and loop is as shown, by solid arrows.

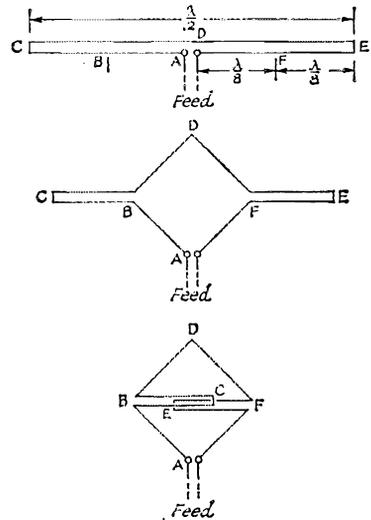


Fig. 2—Evolution of loop and stubs from a folded dipole.

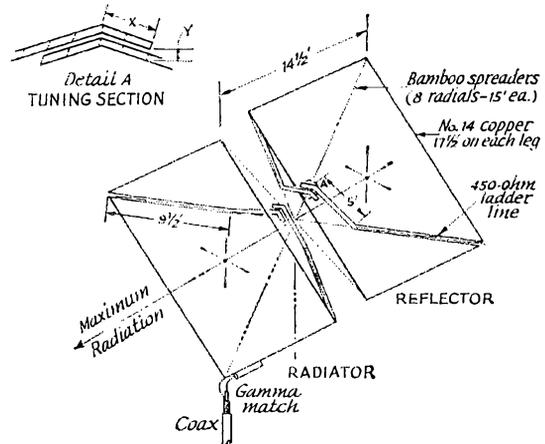


Fig. 3—Dimensions of the 40-meter beam. In detail A, dimensions X and Y can be varied according to power-handling requirements. Increase Y for high power and adjust X to maintain resonance.

were approximately equidistant from the arm.

The linear loading-stub construction is shown in Fig. 5. Television-type 450-ohm ladder line is used for most of the stub. The overlap section will be explained below. The ladder line is fastened by lashing every other insulating spreader to the bamboo. Any open-wire line can

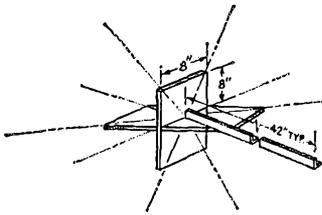


Fig. 4—Center support for the beam. Square plates are high-strength aluminum. Angle supports, of similar material, are for anchoring bamboo arms.

be used; the spacing between wires is not critical as the currents are in phase. For low-power applications, the builder may even use regular 300-ohm twin line. In addition, orientation of the stub is not critical, and a nominal amount of twist can be allowed.

Tuning Section

Originally, the ladder-line stubs were taped together at the insulators in the overlapped section, which was two feet long. The last three inches of each end were turned 90 degrees from the line, and the coupling increased as the angle between the 3-inch sections was made smaller. This arrangement worked fairly satisfactorily until one day it was noted that the s.w.r. had increased and loading was difficult. Besides, the picture machine in the living room detected something other than the desired television signal. The tuning section, upon inspection, was a charred mess. A new tuning section of similar ladder line was made, except that the spacing was increased to at least $\frac{1}{2}$ inch and the wires of the tuning section were wrapped with black plastic tape. The problem was solved for the moment, for the low power input of 200 watts p.e.p.

Recently, a 1200-watt p.e.p. linear was added. The antenna loaded and behaved normally for about a half hour of operation. Then it happened: the familiar burnout occurred. Needless to say, that experience led to the conclusion that a special tuning section must be designed.

The present design, Fig. 6, uses spacers made from $\frac{1}{4}$ -inch center-to-center perforated phenolic plates easily obtainable at the local electronic parts outlet. Each spacer is made in the form of the letter I to allow for a stub spacing of one inch to match the 450-ohm ladder line and to allow for a spacing of $1\frac{1}{4}$ inches between stubs. The I form was chosen because it provides a long leakage path. The ends of the stubs are at near maximum r.f. voltage and burn out of the insulators can occur if the insulators are contaminated with a conducting film. For higher power level it would be advisable to use better insulators (porcelain) and allow more distance between the stubs and compensate for resonance by increasing the amount of overlap. Use plastic electrical tape around the wires to provide additional insulation.

Assembly

Assembly of the beam depends on each particular installation. In the author's case, a

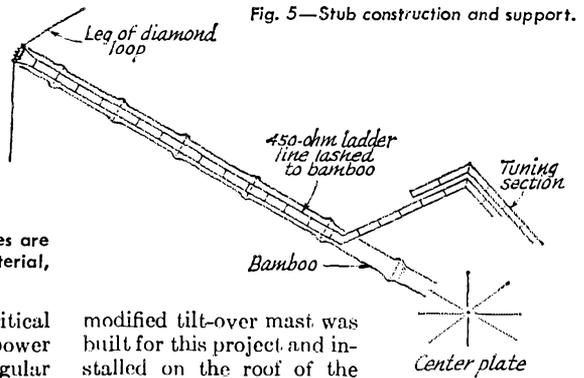


Fig. 5—Stub construction and support.

modified tilt-over mast was built for this project and installed on the roof of the house to provide an overall height of 45 feet from the centerpiece to ground.

First, the centerpiece and its eight arm segments should be assembled on the ground. Then attach the rotator to the centerpiece. Next, install the loop wire on the appropriate bamboo radial arms. The stub sections should be pre-installed on their respective radials.

Mount the centerpiece and rotator on the mast while in the down position. Individual radials can now be attached to their arm segments by appropriate positioning of the rotator and varying the tilted section of the mast. Install nylon guys between the radiator and reflector radials for support. Tighten these nylon guys as necessary until the loop elements are taut. Last, attach the gamma match to the radiator element and connect the coax feed line.

The author does not intend to mislead the reader by saying that the assembly and installation are simple. The fact is that this and similar-type antennas are cumbersome and do not lend themselves to convenience of installation. However, once installed, it seems easy. This beam has been disassembled several times and raised and lowered over a hundred times in the course of evaluating horizontal and vertical polarization, configuration, tuning, and so on.

Tuning

The tuning procedures are basically the same as with any parasitic array. Elements are first tuned to the desired frequency with a grid-dip oscillator. Couple the g.d.o. to the element by inserting a two- or three-turn pickup coil at the feed point for the radiator and at a similar

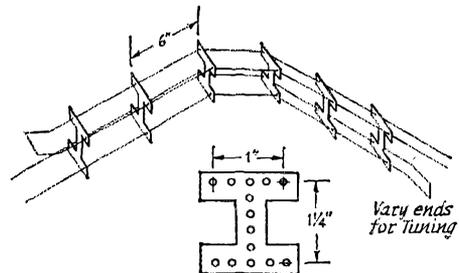


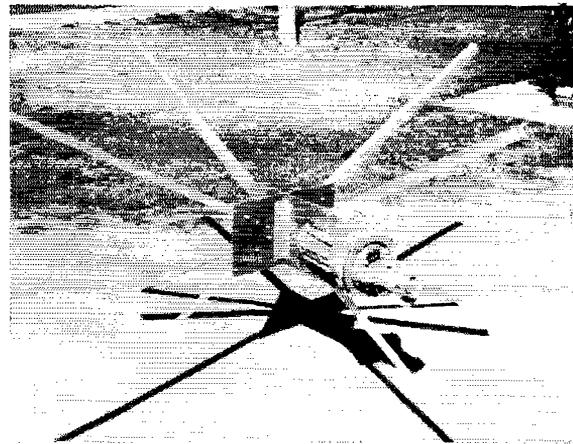
Fig. 6—Tuning section construction using insulators made from perforated phenolic board.

(current maximum) point on the reflector. Vary the g.d.o. to determine the "as built" resonant frequency. Increase the amount of overlap and decrease the spacing (angle) of the stub end to lower the resonant frequency; conversely, decrease the overlap and increase the spacing of the stub end to raise the frequency. In this case, a center frequency of 7225 kc. was chosen so the s.w.r. would be minimized over the s.s.b. portion of the 40-meter band. The radiator therefore was tuned to 7225 kc., and the reflector was tuned about 7 percent lower, or to 6750 kc.

The driven element by itself measured approximately 140 ohms. The feed-point impedance of the entire beam could not be measured accurately because of the lack of proper equipment, but it was estimated to be less than 50 ohms. Measurements with a half-wave line between the feed point and antenna bridge showed values between 22 and 27 ohms. Consequently, a gamma section was chosen for matching the 52-ohm coax line to the antenna. The gamma match uses a 200-pf. variable capacitor and a 73-inch gamma section spaced 4 inches from the radiator element.

After the preliminary tuning, adjust the gamma match for minimum s.w.r. Normal procedures for tuning the gamma match should be followed. If warranted, the tuning section may be varied along with the gamma match to obtain a proper match at the desired frequency.

Plots of s.w.r. vs. frequency should be made during the tune-up to aid in evaluating each adjustment. The final s.w.r. curve for the author's



Center plate and rotator mounting. The assembly is on its side in this view, with the ground parallel to the plane of the loop when mounted on the bamboo arms.

made without a calibrated antenna range and appropriate instrumentation. As with most amateurs, judgment of performance was based on on-the-air checks. Comparisons with commercially-available 2-element beams show that the gains were comparable. Signal-strength readings were nearly equal on an overall basis.

The beam has exhibited directional characteristics on the 20-, 15- and 10-meter bands, although the s.w.r. was high on these bands. However, several contacts have been made with fair reports.

Although it is difficult to make definite claims for the beam, the author can attest to its behavior on 40 meters. The basic principle that enables the shortened elements to resonate is the use of antenna end effects by inductive coupling. Application of this principle yields many advantages: The physical span can be reduced to at least 0.2 wavelength; the antenna may be either horizontally or vertically polarized and requires no special loading coils or special matching network, and it may be built with readily-available materials at a reasonable cost.

A single element with the stubs folded into the plane of the loop will make a good rotatable antenna of reasonable size. Advantage of the single element over the quarter-wave vertical is that it is directional and comparatively less sensitive to man-made noise.

The author wishes to thank all of the amateurs with whom this antenna concept has been discussed — their interest, data, and opinions have all contributed to the success of this project. The useful hints and kinks on construction and aid in tests from W6AV, W3BMS, W6CKC/6, WB6DJZ, KH6EDR, WB6EJH, WB6DXU, ex-KH6FIZ, KL7FLP, WB6GBX, K6GN, WB6HGT, KH6HP, K6HQD, K6LCW, W9LR, W6CYB, W6MFI, WB6MOS, K4TMN, WA6VGJ, WA6YAL, W6YTA, and many others also are gratefully acknowledged. Special thanks go to P. McCall for the typing and finally, to my NYL Clara for her patience, general help and encouragement.

QST

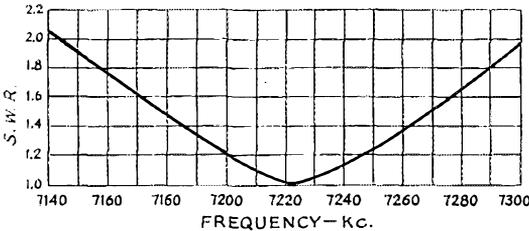


Fig. 7—Standing-wave ratio vs. frequency for the K6IBJ beam matched to 50-ohm coax line at 7225 kc.

beam is shown in Fig. 7. The bandwidth is about 150 kc. at the 2:1 s.w.r. points, sufficient to cover the phone portion of the 40-meter band. This relatively-narrow bandwidth was expected. If desired, the bandwidth can be increased by increasing the element spacing up to $\frac{1}{4}$ wavelength. The bandwidth measured was with the gamma match adjusted at 7225 kc.

For horizontal polarization, the feed point can be either at the bottom or top of the diamond. For vertical polarization, rotate the antenna 90 degrees with the feed point at either side of the diamond. It was difficult to assess the front-to-back ratio with vertical polarization, because of the proximity of another mast, guy wires, and trees. Also, as expected, the noise level in reception was higher than with horizontal polarization.

Performance

Accurate performance measurements cannot be

Isolated contacts over distances up to 1400 miles have been made on 144 Mc. as a result of propagation via the *E* region of the ionosphere for at least 17 years, yet the vast majority of 2-meter men are unaware of the potential of this mode for DX work. W4WNH, long-time observer of the sporadic-*E* scene, here summarizes amateur experience in working 2-meter *E*s DX, and gives some pointers on making the most of opportunities when they arise. With the best days of the year for sporadic-*E* skip just coming up, in June and July, his message is most timely.

Working 2-Meter E-Layer DX

Tips on Exploiting One of the Rarer 2-Meter DX Modes

BY SHELBY ENNIS, W4WNH*

MOST amateurs who operate on 28 and 50 Mc. are familiar with the effects of sporadic ionization of the *E* region of the ionosphere, even if they do not understand the phenomenon. Occupants of lower bands tend to think of ionospheric propagation in terms of the *F*₂ layer, and often do not realize that much of their shorter-distance communication takes place via the *E* layer. TV DX enthusiasts know *E* skip well, and in recent years, CB-ers have come to recognize it. Users of commercial channels between 30 and 50 Mc. are familiar with it, though mainly through its nuisance value.

Most 2-meter men give *E*_s little attention, probably thinking that openings are so rare and so limited in duration and geographical extent that they afford almost no chance for interesting work. This is unfortunate, for examination of the record indicates many opportunities may have been missed because nobody was trying in the right places, by the right methods, at the right times.

Background

Like many other modes of propagation, sporadic-*E* skip was discovered by amateurs. Probably 10-meter men caught it first, but they *expected* DX on their band, and were not too surprised to hear skip signals in the early-summer months. A few wondered at the shortness of the skip, compared with that normally encountered on 20, but that was about as far as they thought about it. The real furor came when skip was first observed on the 5-meter band, as 1000-mile DX was the last thing that users of this band expected to hear.¹ Sporadic-*E* skip quickly became a favorite 5-meter sport, and it remains so today on 6. If you spend much time on 6, you've probably heard or worked some in the past few days, and you're looking forward to more in June.

But what about 2 meters? Almost nobody expected ionospheric skip on this band, and there

was an early tendency to label most long-distance work on 2 as tropospheric in origin. Looking back over accounts in *QST* today, however, we see more than a chance that some of the early "heard" reports were the result of ionospheric, rather than tropospheric, propagation. One example: On the night of June 14, 1949, W4QN, Orlando, Florida, and W5JLY, San Antonio, Texas, were in QSO on 50 Mc. Signals were very strong and steady, so W5JLY fired up on 144. He was heard across the Gulf immediately, but signals faded before W4QN could make the switch, so a new 2-meter DX record was missed. But note that this was during a phenomenal 6-meter skip session.²

The first two-way *E*_s QSO on 144 Mc. may have been the 1200-mile record set by W8WXV, Shiloh, Ohio, and W5VY, San Antonio, June 24, 1950.³ This was around 1015 EST, when a sporadic-*E* opening was raging over most of the country on 50 Mc. A year later the 2-meter record was extended to 1400 miles, June 10, 1951, between 1900 and 1930 CST, when W5QNL, Texarkana, Texas, worked W6ZL, Glendale, Cal. Several Louisiana and Texas stations worked into the Los Angeles area during this period. Again, multiple-hop *E*_s was prevalent on 50 Mc., and the W5s were plagued by violent thunderstorms.⁴

Up to about 1961, it was said that there had been "perhaps 20 instances of DX work on two meters that fell into known sporadic-*E* patterns."⁵ In the years since the number of instances of *E*_s on 144 Mc. has at least doubled. There have been several small openings, and at least two large ones, and 144-Mc. *E*_s contacts have been made in Europe, as well as in North America. July 4, 1965, saw the band open over much of Europe for about two hours, with the best reported DX being EI2W working YU1EXY, just under 1400 miles. This session involved at least 14 European countries!⁶

One of the longest 2-meter openings on record, July 10, 1961, lasted some four hours. The exact number of stations involved is not known, but it

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¹ For this and subsequent references, see bibliography at the end of this article.

cloud dissipates, or moves out of range of available stations. At other times the cloud appears to remain substantially intact for several hours. It does not remain stationary, however. It will often drift in a westerly direction, though this may vary in different parts of the world. Amateur reports collected by Project RASO, and by ARRL during the IGY provided much information on the movement, sizes and shapes of clouds.¹⁰ It must be emphasized that in most scientific studies of E_s , frequencies in the h.f. region have been used. Therefore some of the results will be at variance with the observations of amateurs operating in the v.h.f. bands, due to frequency differences and also to the variation of E_s patterns over the world. The frequency dependence of E_s is not well understood, and it may not exhibit a linear frequency relationship. What happens in the h.f. region may not hold true for the v.h.f. bands in every case. Keep this in mind!

As the intensity of ionization builds in a cloud, for some reason a portion of it may become more dense than the remainder. Greatest density is not necessarily at the center. Since it is only this small dense portion that would reflect a 2-meter signal, this fact is important in predicting a 2-meter opening from observation of frequencies known to be open.⁵

As ionization density increases and the maximum usable frequency rises, the skip distance on a given frequency shortens. Since the earliest days of DX on 5 meters, v.h.f. operators have watched for short skip on 10 to know when 5 or 6 would be open. Accordingly, if there is extremely short skip on 6, 2 may be open — but the densest portion of the E_s cloud must be near the midpoint of an 800 to 1400-mile path. Thus, if you are hearing E -layer signals on 50 Mc. from distances under 400 miles, the 144-Mc. band *may* be open, but not necessarily from your location.^{1,5} A better situation, for you, would be hearing 50-Mc. stations 500 to 600 miles away working very short skip. This is a pretty good indication that ionization density at *their* midpoint is great enough so that you may be at one end of a 2-meter opening. See Fig. 2. Strength and steadiness of 6-meter signals from the middle distances can be misleading. Usually signals are strongest near the m.u.f.; relatively weak or erratic close-in signals may be a better clue.

The geographical area covered at each end of a 2-meter path may be very small, due to the small size of the densest portion of the E_s cloud. As the cloud drifts the areas affected change rapidly, and signals may appear, build up to high levels, and then disappear, in a short time. Alertness can be all-important!

Causes

Sporadic- E propagation has been observed for more than thirty years, but its causes are still not completely understood. The mode itself is not even well defined. It is almost certain that several different physical phenomena are lumped together under the general heading of sporadic- E . It is believed by some that the equatorial electrojet

(a concentration of electric current similar to that found in the auroral regions) causes the formation of E clouds in the vicinity of the geomagnetic equator, and the equatorial type of E_s is apparently distinct from temperate-latitude types.¹⁰ In the auroral zones the incoming particle bombardment may be influential in the development of E_s , and amateurs have noted that E_s and auroras have occurred within a day of each other, or even simultaneously. Remember, these are not final statements, and many conclusions drawn from past experience are still open to question.

It is even less definite what causes temperate-latitude E_s , but this type is of greatest interest to most amateurs. Solar radiation may contribute to the general level of ionization, but it does not explain the sudden appearance of high-density E_s clouds. There seems to be no clear correlation between temperate-latitude E_s and the sunspot cycle. Another probable source is the retention of ionization caused by meteors. K7ICW has found that a small 6-meter opening may follow the peak of a meteor shower by about 12 hours. Again, this is not a full explanation.

Many other associations have been suggested, such as with thunderstorms, changes in barometric pressure,¹¹ and movements of air masses. Some amateurs have noted a possible sequence with periods of pronounced inversions, and the appearance of cirrus clouds.¹² It has been thought by many observant amateurs that there is a closer relationship between weather phenomena and E_s than has been exposed by scientific studies, until quite recently.

Several current theories to explain mid-latitude E_s suggest that it is a meteorological phenomenon and is to be explained on a terrestrial basis. In short, they contend that ionization is produced by several agencies (e.g., radiation, meteors), but this is insufficient to reflect radio waves in the manner observed. A mechanism is needed to rearrange the pre-existing ionization. This is found in shear winds which are known to exist at the same height as E_s clouds. The horizontal shear winds cause a vertical drift of charged particles, which gives rise to the formation of thin layers of ionization. A thick cloud may occasionally be formed by deionization from the upper ionosphere. One suggested assisting mechanism is the horizontal component of the earth's magnetic field. Another is the lunar tidal variations in the ionosphere.¹⁰ Remember, these are only theories.

Why is it so difficult to determine the causes of E_s ? It appears that there may be many situations that can, singly or in combination, force the electron density high enough to produce E_s clouds. Several phenomena may have been lumped together under the name sporadic- E , which actually are quite different. Much more observation and study may be required before more definite correlations can be established. It is quite possible that amateur observations could contribute to progress in this area, if we will pay close attention and record observations of E_s phenomena in detail. There remains yet a tremendous amount to be learned in this field.

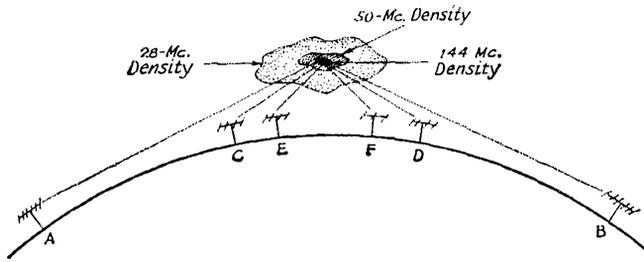


Fig. 2—Comparison of typical skip distances on 28, 50 and 144 Mc., resulting from high-density ionization of the E region. The 2-meter path, A-B, might be around 1200 miles. The 6-meter skip distance from the same ionization patch might be 400 miles or less. The 10-meter propagation might be from 200 miles to essentially local, under these conditions. Longer skip may be heard on the two lower frequency bands, as well, because of the larger areas of ionization capable of reflecting these signals.

Catching Openings

Since little is known definitely about the causes of E_s , obviously it is not possible to predict its occurrence precisely at present. But it should be possible to determine if the band is likely to be open, since many of the characteristics of E_s are known. The simplest method is to watch for ionization buildup by monitoring lower frequencies. The 10-meter band and Citizen's Band can be useful. In the amateur band not much may be heard in less-populated areas until the band opens, but on the CB frequencies a sudden increase in the number and strength of heterodynes is a good clue. Regular monitoring just above 50.1 Mc. is a good bet. Activity is well distributed on 6, and a good many sharp operators are likely to show up on the band during the DX season, at least, almost as soon as things start to happen.

The "critical frequency" at the midpoint of the path is the important consideration. This is the highest frequency at which a reflection would be obtained by vertical sounding. It is not as exact a term when used concerning E_s as in referring to other layers, but it may be used approximately here. For a 2-meter opening, the critical frequency should be near 30 Mc. If the 10-meter band shows substantially no skip zone, and 50-Mc. skip is under 300 miles, the chances of a 2-meter reflection are good.

But 28 and 50 Mc. are a long way from 144. They provide good early warnings, but the family TV set has been more useful to many operators, including the writer. With TV stations operating everywhere, ionization buildup can be monitored readily on Channel 2, then on progressively higher channels, until occasionally DX may be seen as high as Channel 6. The upper frequency limit of E_s is not known, and it is possible that even the high channels have been propagated via E_s .¹³ If skip signals are seen on Channels 5 and 6, the 2-meter band may be next. At least the TV signals give some good clues.¹⁴

The commercial channels between 30 and 50 Mc. are almost universally occupied, and provide good information on propagation conditions. W0MOX has found that a sensitive tuner and a moderate antenna for the f.m. broadcast band are useful for observing tropospheric conditions, meteor activity and aurora, as well as E_s . The f.m. band is a good indicator, as it is the highest frequency where there is wide-spread broad-

casting with high power and high-gain antennas, short of the TV channels from 7 up. Because of differences in location, equipment, population density and other factors, what works well for one person may not be best or most convenient for another. Try all the ideas, and use whatever monitoring methods work out best—but *monitor!* And *transmit!*—remember that an opening may last only a few minutes. You must be on 144 Mc. making a noise at the right time!

These times may not always be convenient. E_s often peaks before noon and around 1700 local time. Check conditions when you get home. Beacon transmissions on known frequencies, as is done increasingly in Europe, can be very helpful. W4GJO, Sarasota, Fla., emphasizes the need for more random activity on 2, especially at odd hours, if we are to make the most effective use of E_s .¹⁵ Grid has worked W5SFW, Amarillo, Texas, via 144-Mc. E_s . W0IC has suggested sounding techniques, such as have been used on lower frequencies.¹⁶ This might require special FCC authorization. Low-band liaison and alerting frequencies are useful. Increasingly v.h.f. operators are meeting on lower bands for such purposes. The Central V.h.f. Net meets on or near 3810 kc. at 0330 GMT Mondays and the Western Net at 0500. By the time this appears in print there should be an Eastern Net running.

Under borderline conditions it may require high power and large antennas to establish contact on 144 Mc. via E_s . But once the m.u.f. reaches a given frequency signal levels rise rapidly and simple gear may work. E_s DX has been worked time and again on 50 Mc. with a fraction of a watt. On 144, even small stations, mobiles, f.m. nets and those using repeaters should not be ruled out. Since repeaters and f.m. nets are on certain standard frequencies, readily monitored, these stations can become increasingly useful for monitoring purposes, as their numbers and geographical distribution increase.

In a part of the country where tropospheric openings are not common, wide-band recordings are being made in the 2-meter region. In many cases they show activity at times when E_s is to be expected, and tropospheric propagation would not be. These recordings seem to indicate that E_s is much more common in the 144-Mc. band than most of us realize. Most reception seems to be for durations of 3 to 5 minutes.

Some Final Thoughts

Does double-hop E_s ever occur on 2? Reports of reception or two-way work on 144 Mc. beyond 1400 miles are rare and not well substantiated. Communication via E_s , beyond single-hop distances would appear highly unlikely, though probably not impossible. Combinations of propagation modes may account for some of the few instances reported.¹⁷ Incontrovertible evidence of 144-Mc. propagation beyond 1400 miles would be welcomed by the writer and by ARRL. Do not misunderstand: it is not easy to build up your states total by E_s work on 144 Mc., simply because the band is not open often, or for very long, ordinarily. It may be open more often than we have thought, however.

If the E_s clouds are not in the right places, and at sufficient density, a kilowatt and a big beam will not turn the trick. At other times, when conditions are optimum, even low power may do. The main ingredient is *interest*. Interest enough to watch for the right signs on lower frequencies, and to make noise on 144 Mc. whenever conditions appear favorable. When you hear or work the "impossible" please report it. Perhaps with sufficient data we will then find correlations with other phenomena, and help to explain mechanisms that provide the energy for ionization.

Amateurs have long noted the coincidence between modes of propagation and seemingly unrelated phenomena — some things as yet neither proved nor disproved. By running into things that may have escaped those who work with a more scientific approach, we have made many contributions to v.h.f. wave propagation knowledge in the past.¹² Every real v.h.f. enthusiast should try everything he possibly can, to work out beyond "normal" distances. Work with earth current recording, spectrum analyzers, recorders for the earth's magnetic field, and the like, would be in order.

Much has been written concerning E_s on the frequencies above 50 Mc. It is recommended that anyone interested in the subject examine the articles in the following bibliography. Many interesting and perplexing details will be found in them: details too numerous for a discussion such as this. It may come as a surprise to some to see how much was turned up by v.h.f. enthusiasts 30 years or more ago.¹⁸

In conclusion, the author would like to thank the many people whose observations, reports and articles have added to our knowledge of these phenomena, especially those who provided recent data in their correspondence. Special thanks are due W1HDQ, W4AWS, W4HJQ, K7ICW and W0MOX for their help in the preparation of this article. QST

- ¹ Tilton, "The Radio Amateur's V.h.f. Manual," ARRL, 1965, pp. 9, 18, 19.
- ² Tilton, "World Above 50 Mc.," Aug., 1949, QST, p. 36.
- ³ Same, Aug., 1950, QST, p. 39.
- ⁴ Same, Aug., 1951, QST, p. 57.
- ⁵ Kyle, "E-Skip on 2," V.h.f. Horizons, Jan., 1963, pp. 14-16, 33. Also "E-Skip on 2, Second Verse," V.h.f. Horizons, April, 1963, pp. 10-12.
- ⁶ Lambeth, "Four Metres and Down," RSGB Bulletin, Aug., 1965, pp. 527-528, and Sept., 1965, p. 590.
- ⁷ Harris, "World Above 50 Mc.," Sept., 1961, QST, p. 64.
- ⁸ Ennis, "144-Mc. Sporadic-E Opening," VHFER, May-June, 1966, p. 5.
- ⁹ Davies, "Ionospheric Radio Propagation," NBS monograph 80, 1965, pp. 150-153, 183.
- ¹⁰ Smith and Matsushita, "Ionospheric Sporadic-E," Pergamon Press, N. Y., 1962. Many references.
- ¹¹ Jacobs, "Notes on Sporadic-E Propagation," CQ, June, 1962, p. 60.
- ¹² Tilton, "V.h.f.: Why — How — When," Feb., 1951, QST, p. 48. Also July, 1953, QST, p. 56.
- ¹³ Cooper, "Sporadic-E Skip on 200 Mc.?" Nov., 1958, QST, p. 33.
- ¹⁴ Grai, "Using TV Signals in V.h.f. Propagation Studies," Feb., 1958, QST, p. 22.
- ¹⁵ Gridley, "Two-Meter E Skip," VHFER July-Aug., 1966, p. 15.
- ¹⁶ Villard and Peterson, "Instantaneous Prediction of Radio Transmission Paths," March, 1952, QST, p. 11.
- ¹⁷ Harris, "World Above 50 Mc.," Sept., 1966, QST, p. 96.
- ¹⁸ Pierce, "Interpreting 50-Mc. DX," Sept., 1938, QST, p. 23. Most late-summer issues of QST from 1935 on have interesting summaries of v.h.f. DX.

Strays

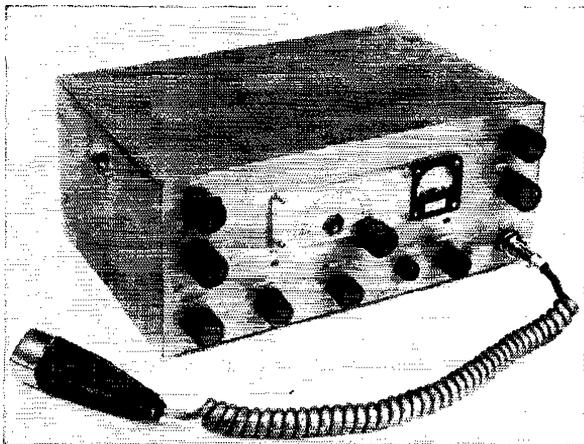
"A Complete Two-Band Station for the V. H. F. Beginner" — a reprint of four articles that appeared in July, August, September, and October, 1961 QSTs — is still available for 50¢ (no stamps, please) from the ARRL, 225 Main Street, Newington, Connecticut 06111.

.....
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.

Shown with their unusual wedding cake are Jay, WB6HRS and his new XYL. The cake which is inscribed "QST, A marriage devoted exclusively to the radio amateur," was presented to Jay and Judy by some friends they met through, of all things, six-meter TV!!



The 75-meter transceiver described here is relatively simple and inexpensive to build and adjust. It has been duplicated by several hams in the Delta area with marked success.



This model of W5TAB's 75-meter transceiver was constructed by W5RQJ. The dial is homemade, but may be replaced by a conventional type. At the left-hand end of the panel are the loading and tuning controls of the pi-network output circuit; at the right-hand end are controls for receiver and transmitter audio. Along the bottom, from left to right are receiver r.f. trimmer, mobile power relay switch, buffer tuning control, and modulator balance control.

A 50-Watt P.E.P. Output Transceiver for 75

Filter Unit for Fixed or Mobile Use

BY KENNER E. DAY*, W5TAB

THE increasing popularity of transceiver operation, and the cost of commercial gear now on the market, prompted the author to design a single-band unit (75 meters) that could be built by the average ham with some building experience, yet would not require intricate alignment procedures, or elaborate test equipment not usually available to amateurs. Other design targets were the use of readily-available components, and lowest possible cost commensurate with adequate performance in both fixed-station and mobile operation.

Although some of the circuitry to be discussed is unorthodox, on-the-air testing of several of these transceivers has proved that the design is thoroughly practical. Commonly-available tube types are used, and a simple sideband filter using surplus crystals provides good suppression in the transmit mode, and a fairly narrow passband for reception. Only four crystals are needed in all.

Circuit Principles

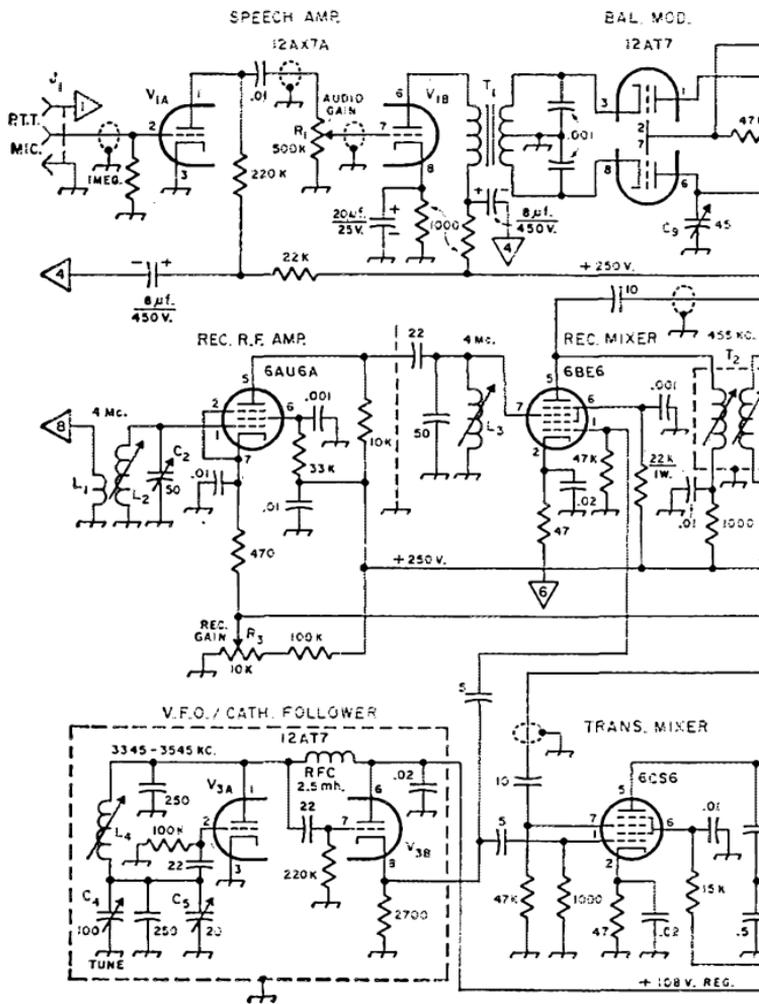
The complete wiring diagram of the transmitter (save for the heater wiring shown in Fig. 2) appears in Fig. 1. Several features were taken from an earlier *QST* article by K5BUQ,¹ so any similarity is *not* coincidental. When receiving, the incoming 4-Mc. signal is amplified in the 6AU6A r.f. stage, and then combined in the 6BE6 re-

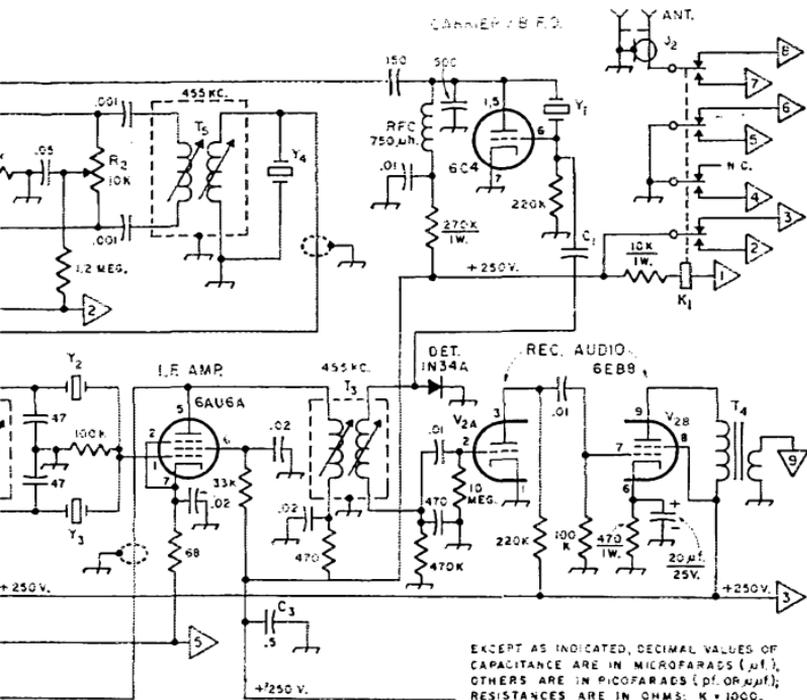
ceiver mixer with a 3545-ke. signal from the v.f.o. to produce a signal at 455 kc. in the output of the mixer. This signal is fed through the selective crystal filter (Y_2Y_3) to a single i.f. stage using another 6AU6A. The amplified 455-ke. signal is coupled into the 1N34A diode detector where it is combined with the signal from the 455-ke. crystal-controlled 6C4 b.f.o. to produce audio output. The audio signal is amplified in the triode section of the 6EB8, and brought up to speaker level in the pentode section of the same tube. The r.f. gain control, R_3 , which is applied to the r.f. and i.f. stages, provides smooth control of audio output, so a separate audio gain control was not deemed necessary.

When transmitting, the crystal-controlled b.f.o. serves as the carrier generator at 455 kc. The oscillator signal is fed to a balanced modulator using a 12AT7. When the output circuit is adjusted for balance by potentiometer R_2 , the carrier is suppressed. The application of audio from the speech amplifier results in a double-sideband suppressed-carrier signal at 455 kc. which is fed to a crystal filter consisting of T_5 , Y_4 , T_2 , Y_2 and Y_3 . (The 6BE6 receiver mixer is not active on transmit.) The filter attenuates the upper sideband by 20 to 30 db. The remaining lower-sideband signal is amplified in the i.f. stage, and passed along to the transmitter mixer, a 6CS6. Here it is combined with the 3545-ke. signal from the v.f.o. to produce mixer output at 4 Mc. — the same frequency as the receiving section.

* 104 North Second St., Rolling Fork, Miss. 39159.

¹ Taylor, "A 75-Meter S.S.B. Transceiver," *QST*, April, 1961.





EXCEPT AS INDICATED, DECIMAL VALUES OF CAPACITANCE ARE IN MICROFARADS (μ F.), OTHERS ARE IN PICOFARADS (pf. OR μ PF.); RESISTANCES ARE IN OHMS; K = 1000.

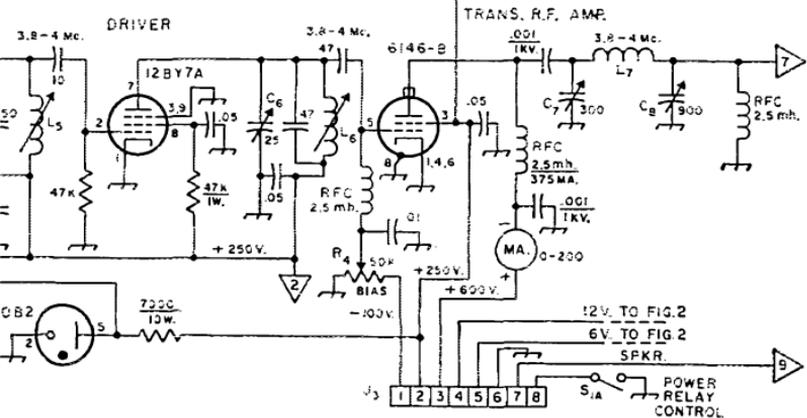


Fig. 1—Circuit of the 75-meter transmitter. Fixed capacitors of decimal value, unless listed below or indicated otherwise in the diagram, are disk ceramic and, unless indicated otherwise, are 500-volt. Others are silver mica or NFO ceramic, 500-volt, except where polarity indicates electrolytic. Unless indicated otherwise, resistors are 1/2-watt.

- C₁—"Gimmick" capacitor made by twisting two short lengths of insulated wire together.
- C₂—Air trimmer (Hammarlund APC-50-B).
- C₃—Mylar capacitor.
- C₄—Widjet air variable (Johnson 167-11, or similar).
- C₅—Miniature air trimmer (Johnson 160-110).
- C₆—Air trimmer (Hammarlund APC-25-B, or similar).
- C₇—Air variable (Millen 19325, or similar; see text).
- C₈—Three-section broadcast-band i.r.f. variable capacitor, sections in parallel.
- C₉—7-45-pf. ceramic trimmer.
- J₁—Three-circuit microphone connector.
- J₂—Chassis-mounting coaxial receptacle.
- J₃—8-contact chassis-mounting male connector (Cinch-Jones).
- K₁—Four-pole double-throw relay, 110 volts, d.c. (Potter & Brumfield KL17D, or similar).
- L₁—10 turns No. 30 enameled, wound over ground end of L₂.
- L₂, L₃, L₄, L₅—35 turns No. 30 enameled, wound on 3/8-inch ceramic iron-slug form.
- L₆—28 turns No. 26 enameled on 3/8-inch ceramic iron-slug form, wound tightly and doped.
- L₇—24 turns No. 22 enameled on 3/8-inch ceramic form (surplus form).
- R₁—Audio-taper control.
- R₂, R₃, R₄—Linear control.
- S₁—D.p.s.t. rotary switch (see Fig. 2 for second section).
- T₁—Interstage audio transformer, single plate to p.p. grids (Stancor A-63-C).
- T₂, T₃—Miniature 455-kc. i.f. input transformer (Miller 12-C1).
- T₄—Miniature 455-kc. i.f. output transformer (Miller 12-C2).
- T₅—Audio output transformer, 5000 ohms to voice coil.
- Y₁, Y₂, Y₃—455-kc. crystal (see text).
- Y₃—453.148-kc. crystal (see text).

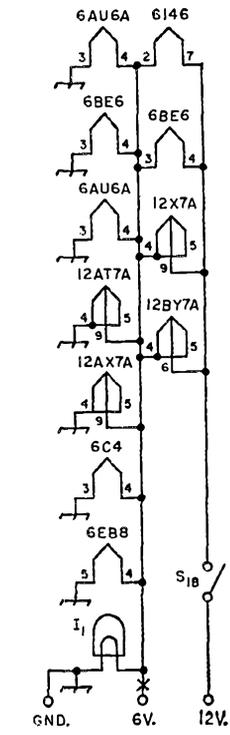


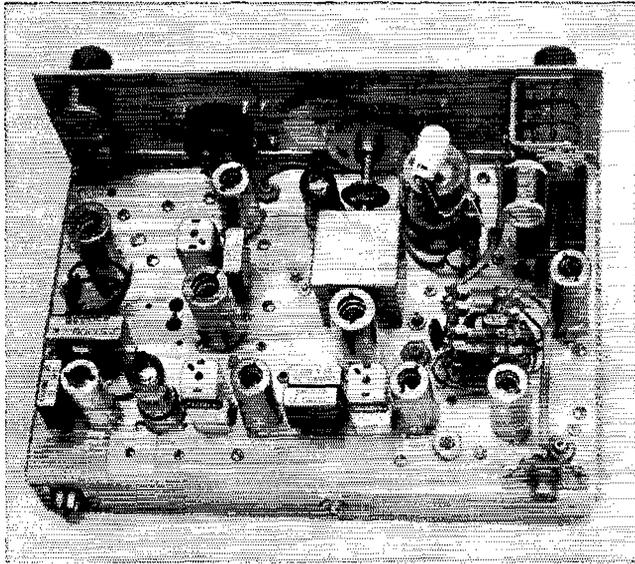
Fig. 2—Heater wiring diagram for either 6- or 12-volt operation. I₁ is a No. 47 6.3-volt 0.15-ampere pilot bulb. For 12-volt operation, the 12-volt terminal should be connected to Pin 4 of the plug for J₃, Fig. 1, Gnd. to Pin 6, no connection to the 6-volt terminal. For 6-volt operation, S_{1B} should be transferred to the 6-volt line at X, the 6-volt terminal should be connected to Pin 5, the 12-volt terminal and Gnd. to Pin 6.

The 4-Mc. l.s.b. signal is amplified in the 12BY7A stage which drives the 6146 final amplifier. A pi-section output circuit provides a match to a low-impedance load.

Control Circuit

Reviewing the foregoing, it will be seen that three stages are common to the receiving and transmitting sections. These are the v.f.o., the b.f.o./carrier oscillator, and the i.f. amplifier with its crystal filter. Other stages are switched in and out, as necessary, by the four-pole double-throw relay, K₁, which also switches the antenna. On receive, 250 volts is applied to the r.f. amplifier, r.f. gain control, receiving mixer, detector, and receiving audio. (The mixer is switched in the cathode circuit by a separate relay pole to avoid diode mixing in the receiver mixer while transmitting.) In addition, another pole of the relay disconnects the two 8-pf. bypass capacitors in the speech amplifier. This was found to be necessary to avoid audio oscillation in the speech amplifier which occurred as the capacitor discharged after removal of voltage from the amplifier when switching from transmit back to receive.

When transmitting, voltage is removed from the stages mentioned above, and applied to the balanced modulator, the speech amplifier, transmitter mixer, and driver stage. The cathode resistor of the i.f. amplifier is switched to ground to remove it from the influence of the r.f. gain control and place it at full gain on transmit. (This switching also grounds the cathode resistor of the r.f. stage, of course, but since plate voltage has been removed from this stage, complications that



Lined up along the rear edge of the chassis, from right to left, are the 6AU6 receiver r.f.-amplifier tube, 6BE6 receiver mixer tube, T_2 , Y_2 and Y_3 , the 6AU6A i.f. tube, T_3 , the 6EB8 receiving-audio tube, 6C4 carrier/b.f.o., and Y_1 . L_1/L_2 is to the right of output connector, and L_3 to the left. The 12AT7 v.f.o. tube is immediately to the rear of the box shielding the v.f.o. tuning capacitor, C_4 . The adjusting screw of L_4 and the screwdriver shaft of trimmer C_5 are discernible to the right of the 12AT7. The tube above and to the left of the box is the 12BY7A driver. L_6 is mounted between the box and the panel, and cannot be seen. Grouped at the upper left are the 12AX7 transmitting audio tube (above T_1), the 6CS6 transmitting mixer (below the meter), T_5 and Y_4 , and the 12AT7 balanced-modulator tube. L_5 is to the right of the meter. At the upper right are the 6146 and components of the pi network. L_7 is mounted on the output capacitor C_8 . The tube to the right of the changeover relay is the OB2 regulator. On the rear apron are the power connector, J_3 , and the shaft of the bias control, R_4 .

might arise from this source are avoided.) Power to the final is not switched.

One side of the relay coil is connected to the 250-volt line through a 10,000-ohm series resistor. The coil circuit is completed to ground through the p.t.t. switch at the microphone.

The V.F.O.

A variation of the Vackar circuit, first noted in *QST* several years ago, is used in this important part of the transceiver. This circuit is easily adjusted, and provides constant output and adequate drive through very small coupling capacitances, with a plate voltage of only 108 volts. This voltage is regulated by an OB2 fed from the 250-volt supply through a 7000-ohm resistor. One section of a 12AT7 (V_{3A}) is used in the oscillator, while the other section (V_{3B}) is in a cathode follower driven by the oscillator. The latter serves to isolate the v.f.o. from the two mixers which it feeds. With this configuration, frequency shift is a matter of only a few cycles, comparing very favorably in this respect to commercial gear. No v.f.o. temperature compensation is included; drift is nominal after a thorough warm-up.

Crystals

By now, the reader may be wondering about the crystals. The author used surplus crystals in the 455-kc. range. The low-numbered FT-241 crystals, from Channel 38 to about Channel 75, are in a range that can be tuned to with ordinary $\frac{3}{4}$ -inch 455-kc. i.f. transformers. Two Channel 45

crystals (Y_2 and Y_4), and one Channel 44 crystal (Y_3) are used in the filter. These crystals are fairly close to 455 Kc. and Y_3 differs from the other two by about 1852 cycles. Using a Channel 45 crystal at Y_1 in the b.f.o./carrier oscillator, and tuning as described presently, lower-sideband output will be produced. For those unable to obtain the surplus crystals, Texas Crystals, Fort Meyer, Florida, advertises crystals in the 455-kc. range, 25-cycle tolerance, in FT-241 holders for \$1.75 each. Three crystals of the same frequency are needed — two for the filter and one for the b.f.o. The additional crystal for the filter should be approximately 1800 to 2000 cycles lower in frequency.

Construction and Adjustment

The author has constructed several of these transceivers, and they have taken various physical forms. However, an 8 × 12 × 2-inch chassis provides enough space to avoid crowding of components if the layout shown in the photos is followed reasonably closely. A panel 5½ inches high will provide clearance for the 6146 without submounting the socket. The dial is home-brew. The gearing was salvaged from old Command-set mechanisms. However, a National 5-to-1-ratio planetary-drive dial, or any similar conventional dial, may be used.

Careful orientation of the tube sockets will furnish convenient tie points for resistors and bypass capacitors and hold wiring between stages to a minimum. Low-potential wiring can be run

around the edges of the chassis in bends and corners for neater appearance. As indicated in the diagram, shielded wire should be used for the connections to the microphone jack and gain control in the speech amplifier, for the balanced-modulator output connection, and in the coupling line between the i.f. amplifier and the transmitter mixer. Shielded wire is also preferable for heater circuits and other low-potential wiring.

The transceiver can be built a stage or section at a time, testing each as it is completed. It is suggested that the v.f.o. be constructed first, using short leads. The tuning capacitor, C_4 , is placed above the chassis in a shielding box, with a connecting wire running through a small hole to the coil, which is enclosed in a second shielding box on the underside of the chassis. Coil turns may have to be pruned, and capacitance juggled, to achieve the proper 200-kc. tuning range for the v.f.o. Assuming that the carrier-oscillator crystal is for Channel 45 (about 455 kc.), the upper limit of the v.f.o. range would be 3545 kc. to tune the transceiver to 4000 kc. The lower end of the range would be 3345 kc., to tune the transceiver to 3800 kc. Keeping the v.f.o. frequency on the lower side of the incoming signal seems to result in less drift than when the v.f.o. is tuned to the upper side. Listening on a receiver while adjusting the v.f.o. will assist the builder in getting the circuit into the proper tuning range.

After the v.f.o. is working, the receiver section can be constructed. To align the i.f. amplifier stage, couple output from a modulated signal generator to the receiver mixer stage with all four crystals in place. Tune the signal generator exactly to the frequency of the b.f.o. crystal. Remove this crystal, and peak i.f. transformers T_2 and T_3 for maximum audio output. Replace the b.f.o. crystal. Final alignment of the crystal-

filter and i.f. stage can be done after construction of the transmitter stages.

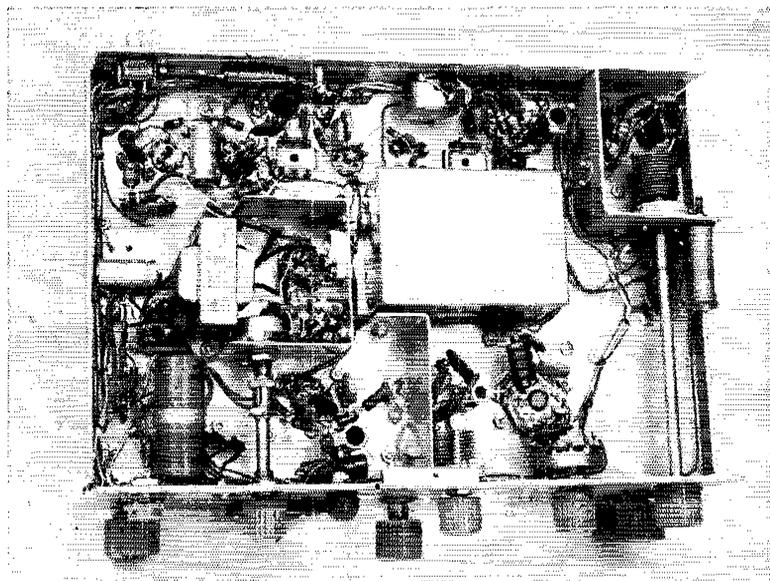
Now peak the receiver mixer coil, L_3 , at 3900 kc. (A grid-dip oscillator will be helpful in rough tuning of circuits in the transmitter as well as in the receiver section.) The r.f. stage is rough-tuned by the slug of L_1L_2 , and the circuit is peaked by the 50-pf. trimmer, C_2 , which should be mounted on the panel.

After the receiving section is working, the transmitter section should be checked out. Peak the transmitter mixer coil, L_5 , at 3900 kc. In operation, the output of the mixer will fall off some at either end of the band, but should still be adequate for full drive to the final. Peak L_6 at 3900 kc. with C_6 set at mid capacitance. It will be noticed that part of the tuning capacitance in this stage is fixed to confine the tuning range to the vicinity of 4 Mc., thus avoiding the possibility of tuning to some other response in the output of the mixer. Those more mechanically able could gang-tune the mixer and driver stages by adding a small variable capacitor across the mixer coil, and coupling its shaft to that of the driver tuning capacitor, C_6 , to obtain full output across the band.

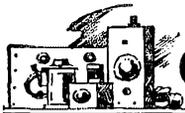
No special constructional precautions are necessary in the driver and final stages, except that a shield should be placed across the 12BY7A socket. Pins 3 and 9 of this tube are grounded, and the shield can be placed across these two pins when the socket is properly oriented on the chassis. The relay should be mounted on the chassis reasonably close to the pi-network components, since one pole of the relay switches the antenna.

The biasing control, R_4 should be set for a final-amplifier idling current of 25 to 30 ma.

(Continued on page 148)



Grouped at left center are T_1 , R_2 and C_3 , the latter two mounted on a shielding bracket. L_5 is below the bracket. To the right is the box shielding the coil and other components of the v.f.o./cathode follower. Below the box are L_8 and driver tuning capacitor, C_6 . L_1/L_2 and C_2 are in the shielding compartment in the upper right-hand corner, and L_3 is to the immediate left.



50-Mc. One Watter

An Experimental Solid-State R.F. Strip

THE superregenerative receiver in the compact 6-meter station pictured on the front cover of July 1966 *QST* was described in that issue, but the transmitter was omitted because it was an experimental model. Since then we have received a number of letters asking for information on the unit.

Four transistors are used in the circuit of Fig. 1. For c.w. operation 2N706As will work nicely in the first three stages; because the supply voltage is only 12 volts d.c., the 2N706As will be well within their maximum ratings. However, if modulation is applied to the transmitter the buffer stage, Q_3 , will no doubt be modulated along with the final amplifier, Q_4 . If so, the 2N706A will have to be replaced by a unit with a maximum collector rating of at least 48 volts¹.

The oscillator uses 8-Mc. fundamental crystals, but 25-Mc. overtone crystals were tried in the circuit and worked satisfactorily. The 8-Mc. crystals provided a more stable c.w. note, however. Output from Q_1 is link-coupled into the base of Q_2 , a doubler. A 1N34A diode, CR_1 , is used to stabilize the base bias of that stage and prevent damaging Q_2 . Link coupling is used to supply 50-Mc. drive to the base of Q_3 , a class C buffer stage. Q_4 , also operating as a class C amplifier, is the final amplifier. A base bias resistor, R_1 , is in the return lead of L_6 to help establish class C conditions for Q_4 . In actual use, the operation of

such a stage, not having external bias applied, is more likely to resemble class-B than class-C conditions. The drive-developed bias across R_1 will aid in securing the desired class-C operation.

Because the input impedances of Q_2 , Q_3 , and Q_4 are quite low, link coupling is used to supply energy to each of these transistors. The output impedance of Q_4 is also quite low, so some form of impedance matching is required in the output circuit. By tapping the collector down on L_7 , as shown in the diagram, a good match can be had. The output circuit is designed to match into 50- or 75-ohm loads.

Decoupling networks are used in the d.c. supply leads of Q_2 , Q_3 , and Q_4 . This prevents interstage coupling through the 12-volt bus. Shield plates are mounted between Q_2 and Q_3 , and between Q_3 and Q_4 (Fig. 1) to prevent stray coupling between the tuned circuits. These measures permit stable operation, without neutralization.

Operation

As shown in Fig. 2, there are three terminals to which +12 volts can be connected. Terminal 4 is the ground connection for the -12-volt power supply lead. For c.w. operation, terminals 1 and 2 should be connected together at the transmitter, and a lead can be run from terminal 1 through an on-off switch to the positive terminal of the power supply. The key should be connected between terminal 1 and terminal 3 so the voltage to Q_1 and Q_2 will be turned on and off by the key. Q_3 and Q_4 will not conduct while the key is open, hence their voltage can be left on all the time.

L_1 should be adjusted for the best-sounding c.w. note while monitoring the signal with a receiver.

¹ During the modulation cycle, the collect-voltage can rise to four times the supply voltage. A 2N3512 is suitable for a.m. use.

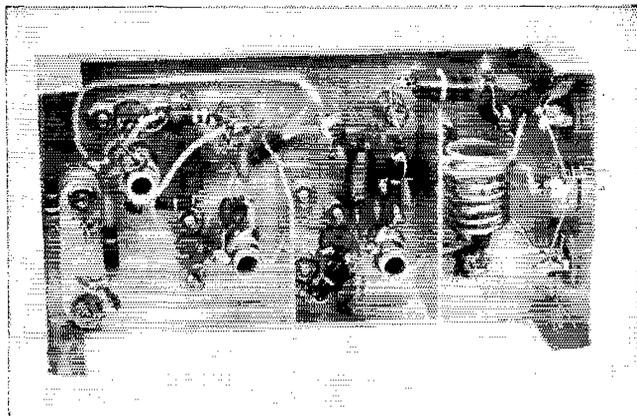


Fig. 1—Looking into the bottom of the $5\frac{1}{4} \times 3 \times 2\frac{1}{8}$ MiniBox chassis. The oscillator is at the left, the doubler and buffer stages are at the center, and the final amplifier stage is at the right. Three single-terminal tie points at upper-center are used for making the 12-volt connections to the various stages.

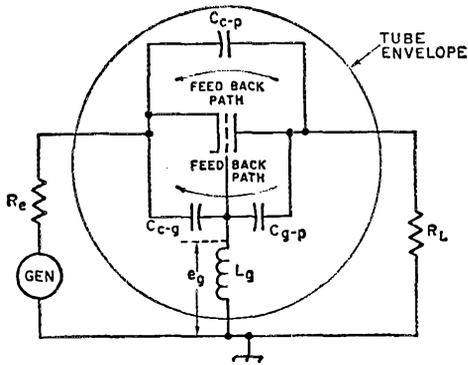


Fig. 2—Distributed constants of cathode-driven tube. Cathode-to-plate (C_{c-p}), cathode-to-grid (C_{c-g}) and grid-to-plate (C_{g-p}) capacitances, together with grid-lead inductance (L_g) make up feedback paths that must be neutralized for proper operation of the cathode-driven amplifier. Two feedback paths enter the picture: the direct path from plate to cathode via C_{c-p} , and a more devious path via series capacitors C_{c-g} and C_{g-p} .

erating in series to deliver power to the load, R_L . The delivered power is the sum of converted drive power and amplifier power, less any power from the driver required by the amplifier grid circuit. A parallel-tuned circuit is used in the cathode of the amplifier to enhance the regulation of the driver stage, to complete the plate circuit r.f. return path to the cathode, and to provide proper driver termination over the operating cycle.⁴

As the cathode-driven amplifier is effectively in series with the driver stage, the output current passes through the load resistance of the driver (R_e), causing a voltage drop across that resistance which opposes the original driving voltage. This indicates that inverse feedback is inherent in the cathode-driven amplifier to some degree if the driver has appreciable load resistance.⁵

Neutralization

The familiar cathode-driven amplifier used in h.f. amateur service is usually not neutralized. That is to say, no external neutralizing circuit is built into the amplifier. This omission has led to the general belief that the "grounded grid acts as a shield" and neutralization is not necessary in any and all cathode-driven amplifiers. The accepted proof of this belief is the fact that most h.f. amplifiers, in most instances, will not oscillate in use. Operation of an unneutralized cathode-driven amplifier in the upper portion of the h.f. spectrum, however, may provide unpleasant surprises. Many amateurs have found to their chagrin that such an amplifier is often a tricky "beast" to tame at 10 and 6 meters.

The reason for the unwanted instability is simple. Wires and leads represent finite induc-

tances, and their position relative to each other and to other circuit components represents capacitance; both these quantities may have an effect upon amplifier performance. Vacuum tubes have these distributed constants within their envelopes in the form of interelectrode capacitances and lead inductance.

Voltage feedback from output to input through the distributed constants of the tube has a deleterious effect on amplifier performance. The magnitude, phase and rate of change with respect to frequency of this feedback determine the dynamic stability of the amplifier, and control of feedback is termed *neutralization*. The purpose of neutralization of any amplifier, regardless of circuitry, is to make the input and output circuits independent of each other with respect to voltage feedback and the resulting reactive currents.⁶ When a cathode-driven amplifier is operated at the higher frequencies, the internal capacitances and the inductance of the grid structure of the tube contribute to the degree of feedback (Fig. 2). To achieve stability, the various feedback paths through the distributed constants inherent in the tube structure must be balanced out, or nulled, in some fashion by neutralization techniques. Proper neutralization may be defined as the state in which, when plate and cathode tank

⁶ In fact, the cathode voltage is dependent to a degree upon the output voltage, as the input and output circuits are in series.

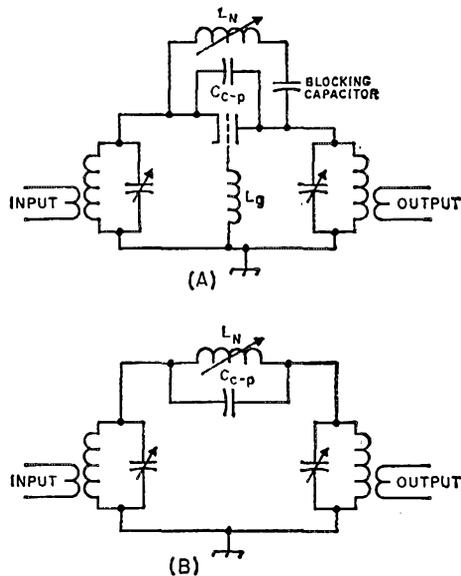
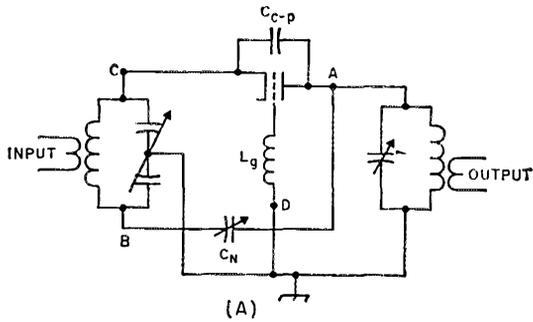


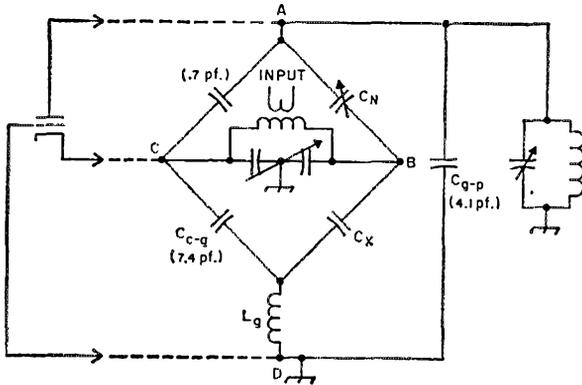
Fig. 3—A—Cathode-plate inductive neutralization. Capacitive feedback path between cathode and plate via C_{c-p} may be neutralized by making the capacitance part of a parallel-resonant circuit tuned to the operating frequency by the addition of L_N . A blocking capacitor is used to remove the d.c. plate voltage from the coil. Neutralization is frequency sensitive. B—Equivalent circuit; high-impedance parallel-resonant circuit nullifies feedback path between input and output circuits via plate-to-cathode capacitance.

⁴ C. E. Strong, "The Inverted Amplifier," *Electrical Communication* (England), Volume 19, No. 3, 1941.

⁵ J. J. Muller, "Cathode Excited Linear Amplifiers," *Electrical Communication* (England), Volume 23, September, 1946.



(A)



(B)

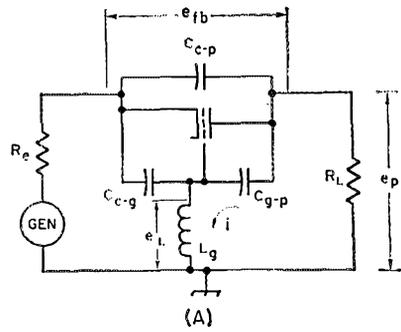
Fig. 4-A—Cathode-plate bridge neutralization. Balanced input provides equal out-of-phase voltages at points B and C. When C_N is equal to C_{c-p} , equal out-of-phase voltages will cancel each other at point A and feedback path via C_{c-p} is neutralized. B—Neutralization circuit redrawn in bridge form, with typical capacitance values for 3-400Z triode shown in parentheses. Bridge is balanced except for capacitance C_x , representing residual capacitance to ground at point B. If the balanced input circuit is high-C in comparison to interelectrode capacitances of tube, capacitances C_{c-g} and C_x are swamped out and bridge may be considered to be balanced.

circuits are resonant, maximum cathode voltage, minimum plate current, and maximum power output occur. This definition implies that the input and output circuits are independent of each other with respect to common reactive currents, and that tuning of the circuits reveals no interaction.

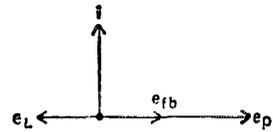
As the grid of the tube is at nominal ground potential in a cathode-driven amplifier, it appears that this element may act as a screen, or shield, between the output and input circuits and that instability or oscillation due to feedback paths through the interelectrode capacitances of the tube may be avoided, or reduced to negligible values. At the lower frequencies, particularly with respect to well-shielded, low-gain tubes, this belief may be true. However, in the higher-frequency region the practical tube (i.e., the tube that can be built) departs to an important degree from this simplified concept.

Neutralizing the Cathode-Driven Amplifier

Stable operation of the cathode-driven amplifier often requires some form of neutralization



(A)



(B)

Fig. 5-A—Three-terminal representation of cathode-driven tube. See text for explanation. B—Vector representation of feedback voltages in cathode-driven tube.

when the frequency of operation approaches the upper reaches of the h.f. spectrum. Complete circuit stability requires neutralization of *two* feedback paths, for which separate techniques are required.

The first feedback path involves the cathode-to-plate capacitance, C_{c-p} . Although the capacitance involved is small, the path is critical and requires neutralization. Neutralization may be accomplished either by a shunt inductance (Fig. 3) or by a balanced capacitive bridge circuit (Fig. 4). The first technique consists of connecting a reactance from plate to cathode of such magnitude as to transmit back to the cathode circuit a current equal in value but opposite in phase to the current passing through the cathode-to-plate capacitance. The bridge technique is a version of the well-known capacitance neutralizing circuit used in conventional grid-driven amplifiers to balance out the effects of grid-plate capacitance. The balanced input circuit provides equal out-of-phase voltages to which the cathode of the tube and the neutralizing capacitor are coupled. As the value of the neutralizing capacitor is equal to the cathode-to-plate capacitance of the tube, the voltages are balanced at the junction of the two capacitances, which is the plate termination of the cathode-driven tube. Both capacitances are usually quite small, and the effect of series lead inductance in the bridge circuit is relatively unimportant. Consequently a reasonable bridge balance over a wide frequency range may be obtained with a single setting of the neutralizing capacitance.

The shunt-inductance neutralizing circuit of Fig. 3, on the other hand, has the disadvantage of requiring adjustment for each working frequency, as the external inductance and cathode-to-plate feed-through capacitance form a frequency-sensitive parallel-resonant circuit at the operating frequency.

Either neutralizing circuit may be properly balanced⁷ even though the grid of the tube may not be at actual ground potential because of internal grid inductance, L_g . Intrastage feedback resulting from this inductance requires a separate, unique solution, apart from the neutralizing technique just discussed.

Grid-Inductance Neutralization

The second feedback path in the cathode-driven stage includes the grid-to-plate capacitance, the cathode-to-grid capacitance and the series grid inductance, L_g , as shown in Fig. 2. The grid inductance represents the sum of all possible feedback paths through the grid structure, plus the actual series inductance of the grid structure. In practical tubes, there is no possibility of avoiding all inductance in the path between the active grid element of the tube and ground. This path exists because the grid is not a solid, intercepting structure. After all, openings must exist to permit electrons to pass from the cathode to the plate! Capacitance leakage can exist between the cathode and the plate through these openings. In addition, Maxwell's equations state that changing electric and magnetic fields propagate each other through space. In the

⁷ With physically large tubes having appreciable series input inductance, in-phase neutralization is often required. This may be achieved by adding external cathode-to-plate capacitance, or by detuning the shunt inductor from the condition of parallel resonance.

vicinity of the real grid structure, the electric field about the "input" side of the structure gives rise to currents flowing in the structure which, in turn, cause an electric field to exist about the "output" side of the structure. In addition, electromagnetic coupling through the interleaved grid structure is also observed⁸.

These spurious coupling paths result in an apparent r.f. leakage through the cathode-to-grid and grid-to-plate capacitances that is often many times greater than that predicted by actual measurement of the internal capacitances. A simplified picture of this complex path may be seen as an inductance in series with the grid-to-ground path, common to both input and output circuits (Fig. 2). If this path is not neutralized, a voltage e_g appears on the grid of the tube which either increases or decreases the driving voltage, depending upon the value of internal capacitances and grid inductance. With sufficient spurious grid voltage, the cathode-driven stage may oscillate, or be unstable, even though the cathode-to-plate feedback path discussed earlier is completely neutralized.

The voltage e_g on the so-called "grounded grid" is determined by a complex action between the total cathode-to-plate capacitance and a separate low- Q circuit composed of a capacitive voltage divider (C_{c-g} and C_{g-p} in series) together with the grid inductance, L_g . A certain frequency at which these two feedback paths nullify each other is termed the *self-neutralizing frequency* (f_1) of the tube. This frequency usually occurs in the lower portion of the v.h.f. spectrum with small transmitting tubes. All the elements comprising the neutralizing circuit are *within the tube*. However, connecting the tube into the circuit by wiring or socketing will alter this frequency.

The self-neutralizing phenomenon comes about because of a frequency-sensitive voltage balance that takes place within this network, Fig. 5A, and which may be explained by a simple vector diagram, Fig. 5B. The r.f. plate voltage (e_p) causes a current (i) to flow through C_{g-p} and L_g . If the reactance of L_g is small in comparison with the reactance of C_{g-p} (as would be the case below the self-neutralizing frequency), the current i will lead the plate voltage e_p by 90 degrees. In flowing through L_g this current will develop a grid voltage (e_L) which is 180 degrees out of phase with e_p , and with the voltage e_b fed back to the cathode via C_{c-p} and series-connected C_{c-g} and C_{g-p} .

At some frequency the voltage e_L developed across L_g will just equal the voltage fed back through the interelectrode capacitances (e_b). The frequency at which e_L is equal to e_b is the self-neutralizing frequency. At this frequency a cancellation of feedback voltages occurs and the complex feedback path is nullified, or "neutralized." (A second, somewhat higher, frequency at

⁸ Feedback admittance also is enhanced by the self-inductance of the grid wires, which provides common coupling between input and output circuits. The inductive coupling may partially compensate for the feedback through the cathode-to-plate capacitance. (See Bibliography, item 3.)

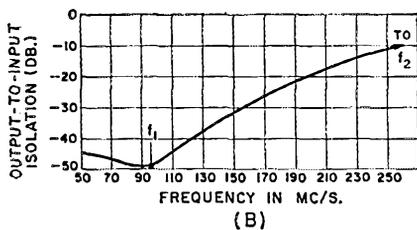
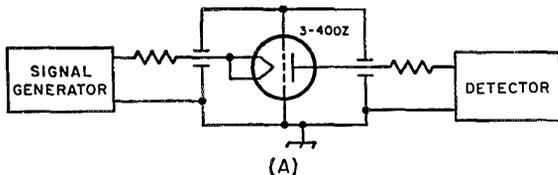


Fig. 6-A—The self-neutralizing frequency of a cathode-driven triode may be measured by observing the transmission properties of the cold tube when treated as a three-terminal network. B—Typical plot of intrastage isolation of 3-400Z triode mounted in test fixture. Self-neutralizing frequency of tube is about 100 megacycles.

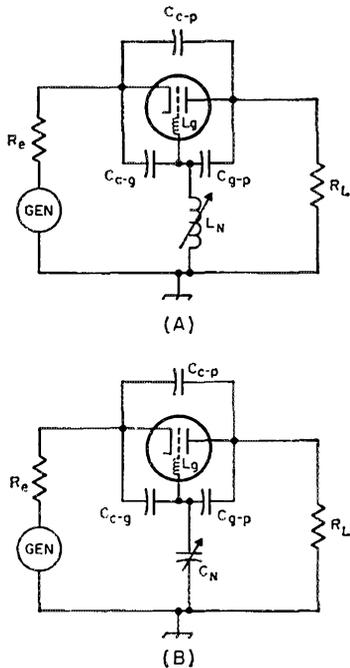


Fig. 7-A—The point of self-neutralization may be shifted lower in frequency by the addition of an inductance (L_N) in series with the grid-to-ground termination of the tube. B—The point of self-neutralization may be shifted higher in frequency by the addition of a capacitor (C_N) instead of an inductor.

which the complex grid configuration is in a series-resonant state with respect to intrastage isolation is called the *grid series-resonant frequency* (f_2) of the tube.)⁹

The Self-Neutralizing Characteristic Curve

The self-neutralizing characteristic of a cathode-driven triode may be determined by treating the tube as a passive three-terminal network and measuring transmission as a function of frequency. The tube is placed in a test fixture which is contrived to insure that the frequency measured is dependent on the tube and socket only (Fig. 6). A signal is applied to the "cold" tube through an appropriate attenuator and a detector is used to measure the transmission voltage through the tube. Investigation over a range of frequencies will produce a typical plot such as shown in Fig. 6B. The point of maximum isolation is the self-neutralizing frequency, f_1 . Measurements are not quantitative, as nothing is known about the impedance of the input or output circuits. The relative isolation with respect to frequency, however, is the interesting parameter.

The self-neutralizing frequency (a broad null of several hundred kilocycles) may be moved

⁹ "Care and Feeding of Power Grid Tubes", application bulletin No. 13, EIMAC, a Division of Varian, San Carlos, Calif.

about by manipulation of the external grid-to-ground circuitry of the tube, or by changing the capacitive feedback path. Or, if desired, a secondary point of neutralization may be created, as described later. If the desired frequency of operation is above the self-neutralizing frequency the voltage developed on the "grounded grid" will be too great and the series grid inductance, L_N , must be reduced, or the feedback path adjusted to establish self-neutralization. If the operating frequency lies below the self-neutralizing frequency, the voltage on the "grounded grid" will be insufficient to cancel the feedback voltage and the series grid inductance must be increased.

The portion of the plot around the point f_1 has been experimentally verified by observing the intrastage leakage (transmission) properties of a 3-400Z zero-bias triode mounted in an SK-510 socket and fixed in a partition in an r.f.-tight enclosure. Observation was over the range of 50 to 250 megacycles, and the self-neutralizing frequency was seen to be in the neighborhood of 100 megacycles (Fig. 6B). Above this frequency, the intrastage isolation gradually deteriorated as the series-resonance frequency, f_2 , of the grid element was approached. Near the latter frequency, tube operation is impractical, being further complicated by transit-time effects and other v.h.f. phenomena.

The Self-Neutralizing Frequency

The self-neutralizing frequency of a cathode-driven triode depends to a large degree upon the size of the tube, the interelectrode capacitances, the physical configuration of the grid structure and the inductance of the grid leads and terminals. Below this frequency, the tube can be neutralized by the addition of a small inductor (L_N , Fig. 7) in the grid-to-ground path. Above this frequency, neutralization may be achieved by reducing the reactance of the path by the addition of a suitable series capacitance, C_N . To demonstrate this a variable capacitor was placed in series with one grid terminal of the 3-400Z mounted in the test fixture. At any frequency between f_1 and 250 megacycles the shape of the plot could be altered by adjustment of the capacitor, providing a neutralizing "null," Fig. 8, in the curve of about the same amplitude as observed at the lower frequencies. The Q of the neutralizing circuit (one grid lead plus the capacitor) was considerably higher than the Q of the grid system, and the neutralizing adjustment proved to be rather frequency-sensitive. The original self-neutralizing frequency (f_1) was little altered by the addition of the auxiliary circuit.

A second test conducted on a larger tube (the 3X2500A3, a 2.5-kw. low- μ triode) showed that it could be neutralized on the lower-frequency side of the self-neutralizing frequency f_1 by the addition of a suitable inductor between the grid terminal and ground. Both techniques are shown in Fig. 7.

It should be noted that intrastage self-neutrali-

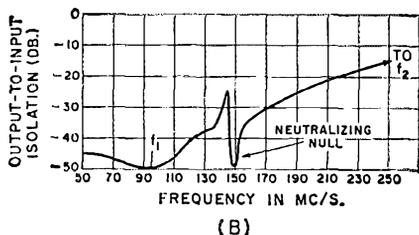
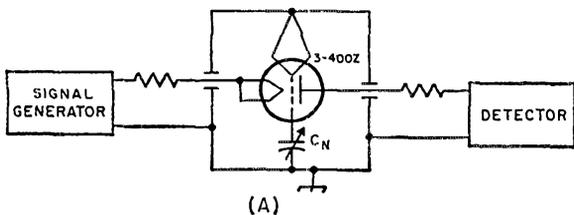


Fig. 8-A—The 3-400Z may achieve neutralization over a wide v.h.f. range by the addition of a series capacitor in one grid lead. Neutralization adjustment is frequency sensitive and must be peaked for maximum intrastage isolation of the operating frequency. B—Plot of intrastage isolation of 3-400Z, showing neutralizing null added by the series grid capacitor, Null may be moved about between f_1 and f_2 . A similar neutralizing effect may be obtained at frequencies lower than f_1 by the circuit shown in Fig. 7-A.

zation and cathode-plate neutralization are interlocked. In the lower portion of the v.h.f. spectrum only one technique may be necessary to achieve a satisfactory degree of neutralization, at least as far as amplifier stability goes. At 6 meters, for example, either system will completely stabilize many amplifiers in most situations. At higher frequencies such is not the case, and both feedback circuits may require attention and manipulation to allow the amplifier in question to be properly neutralized.

General Remarks

Conclusions to be drawn as to the degree of intrastage isolation, or as to the requirement for neutralization in a cathode-driven amplifier, tend to be clouded unless backed by measurements made on the equipment, just as is the case with grid-driven amplifiers. In the latter instance, neutralization of the circuit is almost taken for granted. Not so with cathode-driven amplifiers, as adequate isolation and stability have often been achieved at the lower frequencies even with tubes that were not designed for this purpose. It is unwise to jump to the general conclusion that this special situation exists in all cases.

At the lower frequencies, particularly with well-shielded, low-capacitance tubes, neutralization may not be necessary, and this permits the circuit designer to make use of circuit techniques and practices that afford variation of power gain, converted drive power, and degree of inverse feedback to the cathode driven amplifier. Specifically, these parameters may be varied to meet the demands of the system or to adjust the converted drive power requirement of the amplifier to match the available drive power of the exciter. These circuit schemes, however, should not be confused with the separate problems of amplifier neutralization, discussed in this article.

A future article will discuss *super-cathode-driven* and *semi-cathode-driven* circuits. The authors wish to thank W. H. McAulay, W6KMM, and

R. I. Sutherland, W6UOV, for their help and suggestions in preparation of this article. **QST**

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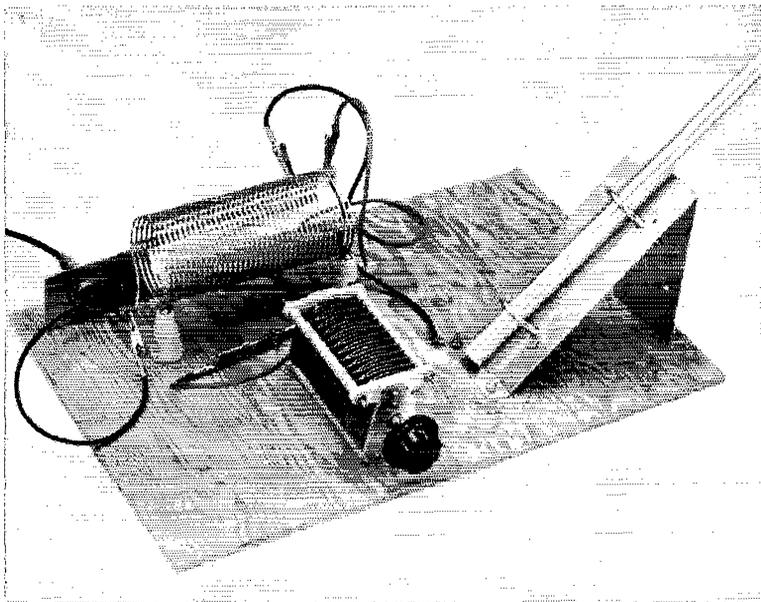
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**SWITCH
TO SAFETY!**



• *Beginner and Novice*

A Windowsill Semivertical



And Other Antenna Ideas For Apartment Dwellers

BY LEWIS G. McCOY,* WIICP

IT is apparent from our mail that a large number of newcomers — and for that matter, old timers — live in apartments or housing developments that have antenna restrictions. A typical question is “What type of indoor antenna can one use in an apartment building that is constructed of concrete and steel?” Or, lacking permission to install an outdoor antenna on the roof, what can one do? This article will treat the problem and present some answers to a rather sticky situation.

Recently, an article appeared in *QST* describing an antenna system for a “traveling man”¹ — an antenna that could be mounted on a windowsill, was easily erected or dismantled, and took up a minimum of traveling space. The only difficulty is that some of the parts used in the system are hard to come by. Fig. 1 and the photographs show a similar system which can be made from easily obtainable parts.

Indoor Antennas

Let's make one point clear at the outset: Indoor antennas in a steel and concrete building are very inefficient. It is possible to get r.f.

power into the antenna, but usually the building tends to block any useful radiation. On the other hand, many amateurs have experienced good, if not excellent, results using an indoor antenna in a frame building. Even so, it should be made clear that in most cases a relatively poor outdoor antenna will outperform an indoor antenna. The problem boils down to how to get an outdoor antenna when the landlord says you can't put one on the roof. If you have access to a window, and most people do, there are several possibilities for getting a “wire” outside.

The Windowsill Semivertical

One such possibility is the antenna shown in the photographs. This system consists of a transmatch and a radiator, the radiating element being approximately 12 feet of Reynolds aluminum tubing. It can be mounted on a windowsill and easily broken down for storage when not in use. We call the aluminum tubing a semivertical because it is mounted at approximately a 45-degree angle from the window.

The transmatch components and the bracket that supports the aluminum tubing are mounted on a 12 × 18-inch piece of plywood. The unit shown was mounted on 1/4-inch stock and while it worked out OK, it is recommended that

* Novice Editor.

¹ Santangelo, “An Antenna For The Traveling Man,” *QST*, April, 1967.

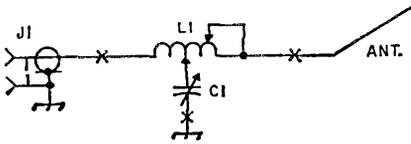


Fig. 1—Circuit diagram of the transmatch for random length wires.

- C₁—100-pf. variable; see text (E. F. Johnson 154-14 or similar).
- L₁—36 turns No. 14, 2½ inches diam., 8 turns per inch (Polycoils 1775, B.&W. 3906-1, Air-Dux 2008T).
- J₁—Coax chassis receptacle (SO-239).

½-inch plywood be used because it would be a stronger support.

A piece of aluminum, 3 × 15 inches, is required for the radiator support bracket. This is bent up as shown in Fig. 2 and mounted on one end of the plywood piece. Two 1½-inch U bolts are mounted on the bracket to hold the end of the aluminum tubing when the antenna is in use. Enough space should be left on the plywood between the bracket and the coil/capacitor combination to permit the window to be closed. We allowed 1½ inches as this was slightly more than the width of the window sash, which was wood in our case. If your window sash is metal, the lead from the bracket to the end of L₁ should be insulated to prevent shorting to the window sash.

You may have to use your ingenuity in coming up with a method for supporting the plywood on the windowsill. In our case, the windowsill protruded into the room about two inches, so an 18-inch length of 1 × 2 wood and two nuts and bolts were used to clamp the system to the sill. This held the assembly securely enough, but the ½-inch thick plywood was slightly "bouncy." That's why thicker plywood is recommended.

All interconnections on the transmatch were made with clip leads because, as you'll see under tune-up procedures, there are many possible combinations for setting up the circuit and the use of clips makes the job simpler. Both the coil, L₁, and the capacitor, C₁, are mounted on 1-inch stand-off insulators. A coax fitting, for connecting to the transmitter, is mounted on a small aluminum bracket at one corner of the plywood.

The vertical radiator element is made from one 8-foot length of type 8A and one 6-foot length of type 185 Reynolds Do-It-Yourself aluminum tubing. These two lengths are cut in half to make a storage package with a maximum length of 4 feet. The antenna is made as shown in Fig. 2. Hose clamps are used to clamp the sections together. The ends of the tubing where the clamps are used should be cut back about 3 inches with a hacksaw to permit the clamp to compress the tubing when tightened. These 1-inch clamps are available at any hardware store.

With this type of antenna and transmatch, it is possible to develop some rather high r.f. voltages, even at 75 watts input. While these

voltages are not dangerous they can cause a nasty r.f. burn, so be sure to use an insulated knob (no metal skirts) on the rotor of C₁. Don't touch any of the metal parts on the transmatch when the system is working.

Because of the high r.f. voltages, receiver type-plate spacing for C₁ is not recommended. To be on the safe side, minimum spacing should be on the order of 0.050 inch. The capacitor we used had spacing of 0.125 inch, and at power levels up to 300 watts no arcing was experienced. While a maximum capacitance of 100 pf. is specified in Fig. 1, any value of from 75 pf. to 200 pf. could be used. Many capacitors that fit this category can be found in surplus at bargain prices.

Tune-Up Procedure

Up to this point, we've only discussed the aluminum tubing as a radiator. However, the transmatch can be used with random-length wires for the antenna. The author's daughter lives in an apartment building on Long Island so we had a chance to test various setups using the transmatch. One antenna was about 60 feet of No. 28 enameled wire suspended from the 20th floor. (For all practical purposes, No. 28 wire is invisible except when one is within a few feet of it.) A small weight was put on one end of the wire and the wire dropped down the side of the building. The other end was attached to the end of L₁ and the transmatch adjusted for a match. The side of the building we were on faced north, providing a clear shot north with some coverage to the east and west. With about 75 watts input, on 80, 40 and 20 meters, contacts were made in some 30 states over a two-day period. The wire antenna brought better reports than the semi-vertical from all areas, but the vertical did give a good account of itself. Poorest performance was to the south, where the building was in the way. A 40-foot wire was strung up inside the apartment, but only a few local stations were contacted, and those just barely.

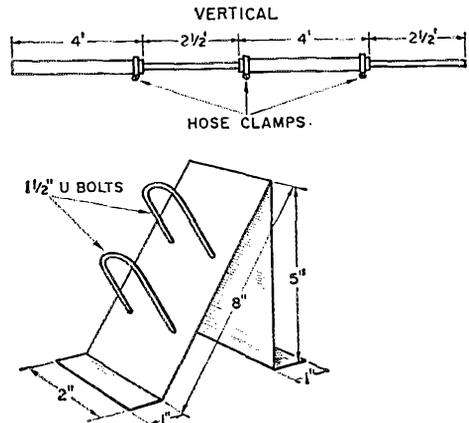


Fig. 2—Top, the vertical radiating element. Bottom, details for making the mounting bracket for the vertical.

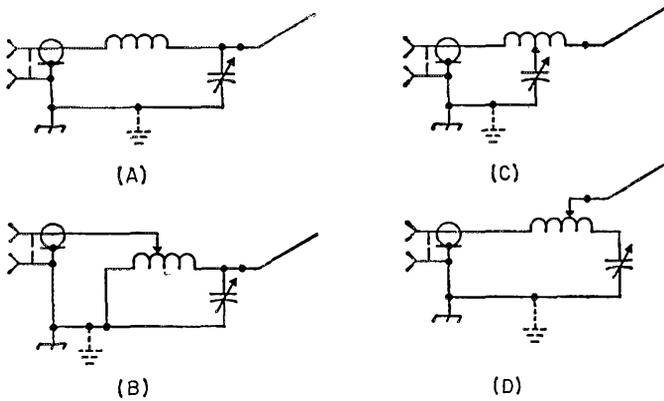


Fig. 3—Four possible configurations for setting up the transmatch to achieve a match.

In setting up the system, a reflectometer such as Monimatch² or Varimatch³ is needed between the transmatch and transmitter to show when the former is correctly adjusted. It is impossible to tell you the *exact* settings of C_1 or where the tap on L_1 should be placed, simply because each installation will be different. This difference usually will be in the ground connection. For example, you may be on the 20th story of an apartment building, and for a ground connection you run a lead to a water pipe. There is no way of knowing where this water pipe reaches actual ground, but nevertheless the water pipe is part of the antenna system. On the other hand, there may be no water pipe or anything that resembles a "normal" ground connection at hand. However, there *is* a ground return — through the a.c. lines. If you can make a good ground connection, fine and dandy. However, don't worry about it; the antenna system will still work without one. The only thing is, we cannot predict what arrangement will be necessary with the transmatch for proper tune-up. You'll have to experiment.

While the adjustment for a given band may be time-consuming for the initial setup, the procedure is quite simple. We suggest you start out with a hookup as shown in Fig. 3, at C. Connect the reflectometer in the coax line between the rig and the transmatch and feed enough power through the system to get a full-scale meter reading in the forward position. Next, switch the reflectometer to read reflected power. Tap the stator of C_1 on either end of L_1 . The rotor end should be connected to the metal bracket holding J_1 . If you have an earth ground, it too should be connected to the bracket holding J_1 . Tune C_1 through its range while looking for a dip in the reflectometer reflected reading. If you don't get a dip, move the stator clip down the coil a couple of turns and try again. At some point along the coil, you should be able to get the reflected reading down to zero. When you have this condition — and on some bands it may mean moving the tap across a fraction of one of the turns — the system is correctly adjusted.

Make a note of the settings so you can return to them, move to the next band, and repeat the adjustments. A chart can be made up with the correct settings for each band, and changing bands then becomes simple and fast. In some instances you may have to try the configurations shown at A, B, or D in Fig. 3. However, you should be able to achieve a complete match with almost any antenna (random wire length) you can come up with.

Other Useful Information

Possibilities for antennas where they are not permitted are really up to your own ingenuity. One ham we know had only one window, and that opened on an air shaft. At first glance it would have appeared impossible to get any useful type of antenna outside. However, there was a metal downspout near the window, so he attached a wire to it, used a transmatch similar to the one described here, and ended up with a pretty fair antenna system.

Another attached a wire to the metal screen on his window and used that as an antenna — maybe not the best in the world, but it worked.

Keep in mind that almost any piece of metal, even if grounded, will radiate r.f. With the transmatch described here you should be able to use that piece of metal for an antenna.

One problem with that 60-foot length of wire suspended from the 20th floor was that the wind would blow it around. This changed the loading on the final amplifier of the transmitter. However, the change wasn't radical enough to keep us from making contacts. Probably a little more weight on the end of the wire would have helped, but we were afraid the weight might crack a window several floors below!

As to wire size, hams have used wires as fine as No. 36 for runs up to 100 feet, using rubber bands for end insulators. The main trouble with wire that fine is that birds cannot see it and they fly into the wire and break it. We have found that No. 28 Nylclad copper wire is fairly strong and is hard to see from a few feet away. After all, you can always string the antenna out at night!

QST

² Monimatch, *Understanding Amateur Radio*, page 209.

³ De Maw, "The Varimatch," *QST*, May, 1966.

An Audio Filter For Speech Reception

BY J. H. ELLISON,* W6AOI

Because some receivers have broad skirt selectivity in their i.f. passbands, certain forms of QRM exist needlessly. The addition of a selective audio filter can often help to eliminate high- or low-pitched audio frequencies that interfere with a.m. and s.s.b. reception. The author describes such a filter. It can be connected in series with the speaker voice-coil lead, making it unnecessary to modify the circuit of the receiver.

THE advent of s.s.b. in amateur radio has provided us with greater use of our crowded bands. It has also been responsible for the development of moderately-priced, compact, high-power equipment whose potential for creating QRM can be truly awesome. The manufacturer can sell you equipment that has the latest technological developments, but he cannot sell you the technical competence that is essential for proper operation of the equipment. Incorrect operating procedures can cause unnecessary interference, adding further to the QRM problem.

While we cannot completely prevent adjacent-channel signals and other types of interference from entering the receiver, it is possible to prevent a considerable portion of it from entering our ears and causing mental fatigue.

Efforts are usually made to confine the speech range in transmitter audio systems to the 300-to

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3000-c.p.s. range. Actually, this range could be reduced to 500 to 2500 c.p.s. without impairing the signal readability. Since the range of frequencies from about 2500 c.p.s., up, are particularly fatiguing when in the form of QRM (and this range also embraces much of the man-made and natural noise) it would seem desirable to reduce or eliminate as much of this interference as possible. In keeping with the foregoing, the simple filter described here is inexpensive to build, but is quite effective.

Design Data

An m -derived pi-section filter is used in the circuit of Fig. 1. This type of filter has a minimum number of components. The parts are readily available and common values are used. The parameters in question are: (1) the input and output impedances of the filter, (2) the highest frequency to be passed without attenuation, f_c , (3) the value of m to be used in the design.¹ A value of 0.6 was chosen for m because it gives a nearly constant filter impedance throughout the passband, and because it gives a rapid rate of attenuation above the passband. The value of m also determines the ratio between the cutoff frequency, f_c , and the frequency of maximum attenuation, f_{∞} .² A high-frequency cutoff of 2100 c.p.s. was chosen. This results in a maximum-attenuation frequency of 2630 c.p.s. (There was some Monday-morning quarterbacking connected with this choice. It was not purely arbitrary!)

¹ Landee, Davis, and Albrecht, *Electronic Designers' Handbook*, McGraw-Hill Publications, Chapter 16.

² For additional information on basic filter design see *The ARRL Radio Amateur's Handbook*, Chapter 2. Editor.

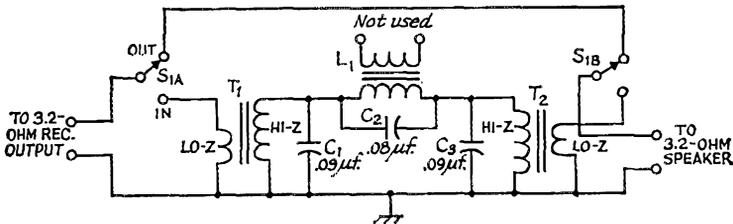


Fig. 1—Schematic of the audio filter. Capacitors can be disk ceramic, paper, or mylar. If a dual-winding surplus 88-mh. toroid is used at L_1 , only one of the windings will be needed to provide the required 44 mh. of inductance. The remaining winding will be unused as shown.

C_1 — C_3 , inc.—Combinations of smaller-value capacitors, parallel connected, as discussed in footnote 3.
 L_1 —44-mh. High-Q inductor. (One half of a surplus split-winding 88-Mh. toroid. See QST classified ads

for sources of supply.)
 S_1 —D.p.d.t. toggle or slide switch.
 T_1 , T_2 —Small 500-ohm-to-voice coil audio transformer. (Stancor 8101 suitable.)

Table 1

Freq. (c.p.s.)	Decibels
100	-3
200-1600	0
1700	-1
2000	-2
2100	-3
2200	-4.5
2300	-7.5
2400	-13
2500	-22
2600	-32
2700	-30
2800	-24
2900	-20
3000	-20
4000	-15

Relative response of the filter expressed in decibels

The next item was the selection of the filter's input and output impedances. Filter design formulas show that the component values depend on the cutoff frequency, which was already decided upon, and the terminating impedances of the unit. A few try-it-for-size attempts indicated a terminal impedance of approximately 500 ohms.

Although the filter could be installed in the receiver cabinet, it is usually more convenient to place it in the loud-speaker enclosure. Some receivers have a 500-ohm output connection. Others have a 3.2 or 6-8 ohm output impedance. If your receiver is of the latter type, the 500-ohm filter impedance will have to be matched to the low- Z voice-coil line. There are several transformers available that will do the job. The author used two Stancor A-8101 units, with tapped secondaries, for matching to the 500-ohm filter impedance, as shown in Fig. 1. If your receiver already has a 500-ohm output terminal, you will not need the input transformer, T_1 .

Building and Testing

The entire filter is built on a 3- by 6-inch piece of insulating board, with room to spare. The toroid is mounted on the board by lacing it in place with string. Solder lugs are bolted to the insulating board and are used as tie points for the components. If the filter is to become a permanent fixture in the speaker line, S_1 can be eliminated. If S_1 is used, it can be mounted on the side of the speaker case for easy accessibility, or it can be attached to the circuit board with the rest of the components. The unit can be wired directly to the speaker and the output terminals of the receiver, or input and output jacks can be mounted on the board to permit removing the filter from the line, easily, should the occasion arise.

If precise tuning of the filter is desired L_1 and C_2 can be resonated by connecting an audio generator to the network, loosely coupled through a 5600-ohm resistor, and attaching a v.t.v.m. in parallel with the tuned circuit. With the audio generator tuned to 2630 c.p.s., L_1 and C_2 are tuned for maximum output (as indicated on the v.t.v.m.) by trying several 0.08- μ f capacitor combinations³ at C_2 and selecting the one that gives the greatest peak output. Alternatively, the circuit can be peaked by stripping turns from L_1 , a few at a time, and watching the v.t.v.m. for a peak reading. It may be necessary to add a few turns of wire to the toroid, rather than removing them. This will depend on the actual value of C_2 . This system of tuning resulted in a final setting of plus or minus 25 c.p.s. of the target frequency.

The completed assembly was bench-tested by connecting a 500-ohm signal source to T_1 and

³ It will be necessary to combine standard-value capacitors in parallel to secure the 0.08-, and 0.09- μ f values indicated in Fig. 1. A 0.05- μ f. and a 0.03- μ f. unit can be combined to secure the required 0.08- μ f. value. This same combination, plus a 0.01- μ f. capacitor — also in parallel — will result in the 0.09- μ f. value. Disk ceramic capacitors should be suitable for this application. — Editor

measuring the voltage across the 500-ohm winding of T_2 with a v.t.v.m. When this was done, the secondary winding of T_2 was terminated with a resistance that was equal to the speaker impedance. The filter was swept with a Heath audio generator, using the 1-volt range. The audio response in decibels is given in Table 1.

Performance

The filter was installed with a switch, as shown in Fig. 1, so that it could be cut in and out rapidly while judging its effectiveness. At first it seemed that an s.s.b. signal sounded exactly the same whether the filter was in or out of the circuit. It was as though the filter was not working. Then, when tuning off to the side of the signal that raised the pitch of the voice frequencies, it was immediately noted that the higher frequencies were being muted by the filter. A test of the filter in a QRM-filled part of the 20-meter phone band resulted in convincing evidence of the unit's worth.

Since the filter has essentially zero attenuation in its passband, it is obvious that the interfering frequencies that fall within the passband will still be there.⁴ However, the higher-pitched frequencies variously described as "a rusty nail being pulled from a hardwood board," or as "a buzz saw going through a pine knot", are either eliminated or muted to tolerable levels. This permits better copy with less annoyance.

This filter is not a cure-all, but in our amateur radio zoo it does seem to make the macaw and monkey cages a little more remote. The fact that its use does not require modification of the receiver should make it attractive. 

⁴ It should be pointed out that the usefulness of this audio filter will depend upon the i.f. selectivity of the receiver with which it is used. The wider the i.f. passband, the more beneficial the filter will be. I.f. filters with medium or poor skirt selectivity result in a passband that can be aided by an audio filter of this type, provided the attenuation in the transition range along the skirt does not eat into the passband of the receiver too much. — Editor

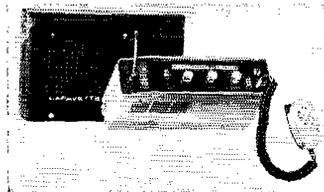


Recent Equipment



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

The Lafayette HA-144 Transistor Transceiver



OVER the years, whenever *QST* has run descriptions of self-contained 50-Mc. portable rigs, we have always been deluged with requests for a 144-Mc. version. This despite warnings that a 2-meter model is markedly more difficult to build, and more expensive to operate, than equipment of comparable performance for the lower band. It may be that Lafayette went through the same experience, following the introduction of their 50-Mc. HA-650 transistor portable, reviewed in March, 1966, *QST*. Now they have the HA-144, a package that looks very much like the HA-650, and comes close to duplicating the latter's performance.

The designer appears to have encountered the same problems along the way, too, though transistors help to bring the self-contained 2-meter portable rig into the realm of practicality. Still, engineering the HA-144 took a lot more doing than its 50-Mc. predecessor. It costs 1.6 times as much, loads the batteries more heavily, and doesn't receive quite so well. Still it is an attractive-performing convenient 2-meter box, that should make mountain-topping beyond the range of car batteries an enjoyable and not-too-expen-

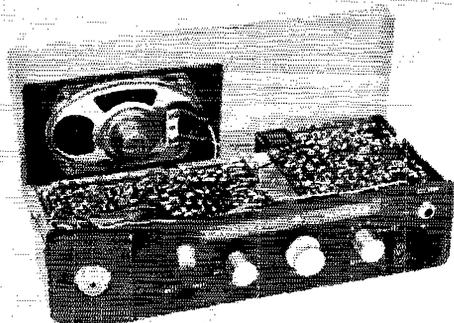
sive pursuit for spring and summer weekends.

The HA-650 and the HA-144 look much alike, but the resemblance is only superficial. The transmitter r.f. portion of the 2-meter transceiver has 7 transistors; the 6-meter only 4. The 2-meter receiver is a double-conversion job, with a 10.7-Mc. crystal filter and two stages of i.f. amplification at that frequency, while the 6-meter one was good enough with single conversion and a 1650-k.c. i.f. Two helpful innovations are included in the 2-meter design: there is an external crystal position on the panel, permitting quick change of the crystal therein, in addition to the five crystal sockets inside the box; and the receiver 8-meter doubles as a battery-voltage indicator.

The double-conversion receiver is interesting, in that the tunable oscillator is way down at 31.1 to 35.1 Mc. Output of the first mixer is thus at 112.9 Mc. This goes directly to a second mixer, where the injection is crystal-controlled at 102.2 Mc., giving a second i.f. of 10.7 Mc. Injection is developed by a crystal oscillator on 51.1 Mc., and a following diode doubler.

Like the HA-650, the HA-144 has an a.g.c. characteristic such that the receiver is essentially squelched until a signal is tuned in. Only a very faint hiss is heard with the audio at maximum, with no signal; in tuning across the band signals pop out of nowhere, with plenty of audio output. Receiver sensitivity is adequate for use with a transmitter that delivers only about one watt to the antenna.

Transmitter power output depends on battery voltage. The unit tested came equipped with 10 Mallory Dura-Cells, the alkaline equivalent of the "D" cell of the carbon-zinc variety. These deliver around 10 volts under the transmitter load of 300 ma., unmodulated, and at this level the transmitter output is about 1 watt. Interestingly, it varied only between 0.8 and 1 watt, without retuning, plugging in 8-Mc. crystals that moved the operating frequency all across the band, from 144.1 to 147.6 Mc. Using a Centralab 12-volt battery pack of the rechargeable type the output was 1.25 watts. On the car battery, output may run as high as 1.75 watts.



Interior of the HA-144 2-meter transistor transceiver. The entire rig is of printed-circuit design, so not much is seen from this side. The oval speaker, rear, is mounted to the bottom cover of the case. With the assembled unit in this position on a flat surface, audio quality from the speaker is somewhat impaired.

It is always interesting to see how amplitude modulation is achieved in transistor rigs. The HA-144 merely applies the audio power from the class-B modulator to the driver and amplifier transistors. The output stage uses two transistors in parallel, with a pi-network tank circuit. Operating conditions are not unlike those of the writer's 50-Mc. transistor rig, described in February and March *QST*.

Overall transmitter efficiency is good enough to make battery operation reasonably economical. The 300-ma. drain quoted above is the total drain until you speak into the microphone, but the current swings up to nearly 500 ma. on audio peaks. Nearly 30 percent efficiency, unmodulated, is pretty good for a 2-meter rig! Receiving drain is around 100 ma.

When operating on the self-contained batteries the power circuit does not include the dial light. This comes on when an external battery is plugged in. This cable is supplied with the HA-144. If we were going to use the rig very long, we'd rehash the circuit to make the light available at all times, perhaps with a switch to cut it off in daylight work. Operation in the dark without it is a fumbling business, and the drain is only about 30 ma. higher with the lamp lighted.

The case supplied with the HA-144 appears to be of a quality that will take the battering encountered in mountaintop portable work better than the one supplied with the HA-650. There is a shoulder sling, and a pocket for protecting the microphone. The antenna supplied is an 18-inch telescoping whip that is only about 5 inches long when collapsed. It is of unusual design, in that a soft plastic push-on socket takes the place of the usual PL-259 screw-on fitting.

Don't expect to do too much with that whip, however. With this kind of power (or any power, for that matter, on 2!) you can use more antenna. Portable beams are easy to make. Take one with you on your first hike with the HA-144. It will make the expedition vastly more rewarding.

— W1HDQ

Lafayette HA-144 2-Meter Portable Transceiver

Height: 5½ inches.

Width: 9½ inches.

Depth: 2¼ inches.

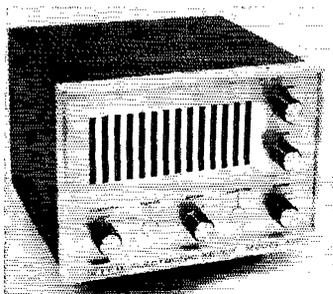
Weight: 9 pounds, with batteries.

Power Requirements: 11 to 16 volts, d.c., 550 ma., from internal "D" cells or external source. A.c. supply, Model HB-501, available.

Price Class: \$190.

Manufacturer: Lafayette Radio Electronics Corporation, 111 Jericho Turnpike, Syosset, L.I., N. Y. 11791.

Next Month



Eco 717 Electronic Keyer Kit

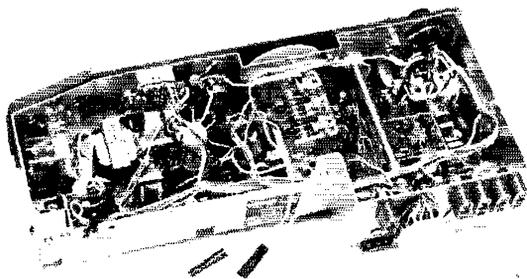
Strays

Feedback

The Army issue callsigns for MARS, listed in the article "Life In MARS" (Part II), page 53 of *QST* for March 1967, should read:

Original Callsign Starting With	Army Designation
W	A
K	AA
WA	AD
WB	AL
WC	AC

Clarification seems necessary in the use of the "Mobile Equipment Protective Alarm," *QST*, March 1967, page 16. The author says that the designation "To Term. 3 of Draw. (A)" in Fig. 1 should be changed to read "To Transceiver Case." To clarify, terminal 3 of drawing A connects to the case of the transceiver only if the option is *not* used. With the option, it connects only to diodes CR₂ and CR₃ via point b. Terminal 3 is thus left open. Points a and b should be shorted together *unless* the option is used.



The bottom of the 2-meter transceiver is a maze of power wires and small components. The send-receive relay is in the left corner. Five crystal sockets are on the right rear wall, with the audio transistors just below. Leads in the center, foreground, are detachable from the speaker terminals.



Hints and Kinks

For the Experimenters



NOTES ON THE KNIGHT-KIT C-560

The February 1967 *QST* article on converting CB transceivers to 10 meters included data on the Knight-Kit C-560. I have converted one of these units and have additional information that may help other C-560 owners.

Fig. 1 shows the receiver tunable oscillator before modification. By replacing C_{46} with a 47-pf. NPO capacitor, the entire 10-meter phone band can be covered with the main tuning capacitor, C_{47} . Since C_{47} has a built-in vernier drive mechanism, the tuning rate is entirely satisfactory. The band is set by adjusting L_7 and the frequency span is determined by setting C_{45} .

If desired, the fixed-channel facilities of the C-560 can be used by swapping the transceiver's CB receiver crystals with the unit's CB transmitter crystals. Regardless of whether the CB transmitter crystals are used, the CB receiver crystals can be employed in the transmitter as they lie in the 28.615- to 28.905-Mc. range for CB channels 1 through 23. — *Harold S. Easley, K8TOS*

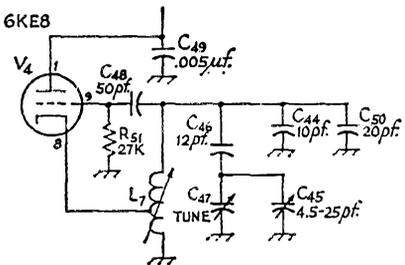


Fig. 1—Schematic diagram of the Knight-Kit C-560 tunable receiver oscillator before modification. By replacing C_{46} with a 47-pf. capacitor and retuning L_7 and C_{45} , the converted CB receiver will cover the entire 10-meter phone band.

PREVENTING WIND-WHISTLE IN HY-GAIN TRAPS

SOME owners of Hy-Gain trap vertical and trap tri-band antennas experience annoying whistling from the traps, even in a gentle breeze. This can be cured by applying masking tape over the drain holes and then, with a pencil, puncturing holes in the tape where it covers the original holes. The irregular edge of each hole will stop the "piccolo" action. — *Katashi Nose, KH6IJ*

MICA WASHERS

HAVE you ever started a new project using large power transistors or rectifiers and found that you had forgotten to get the mounting kits which include the all-important mica insulating washers? Or did you misplace or damage the washers that came in the mounting kits? Here is a hint that will solve the problem.

Check your junk-box for an old, high-voltage, mica-type transmitting capacitor. Carefully break off the hard protective coating on the capacitor. A block of mica and aluminum sheets will be revealed. Remove any clamps or connectors on the block. Notice that there is a $1/32$ - to $1/16$ -inch thick sheet of mica at each end of the block. Pry off one of the end sheets with a razor blade. Make sure that there are no aluminum plates in the end sheet. If there is a film of varnish or similar material on the surface of the sheet, clean it off with a small rag dipped in lighter fluid. Now use the razor blade to gently pry off thin wafers of any desired thickness. Typical wafers included in mounting kits are so thin that you can clearly see through them. However, most experimenters will have trouble working with a wafer this thin, so try to cut off wafers that are about as thin as, or thinner than, the thickness of a sheet of newspaper. This extra thickness won't significantly affect the transfer of heat from the transistor to the heat sink.

Drill the wafer to match the mounting holes and terminals of the transistor or rectifier to be used. Do the drilling at low speed with very little pressure. To realize the most benefit from the heat sink, be sure to apply silicone grease between the semiconductor and the washer and between the washer and the heat sink. — *"Tank" Miller, WA4UBQ*

LOW-COST TRANSISTOR AUDIO AMPLIFIER

WHERE can you get a solid-state amplifier, complete with gain control, speaker and cabinet, for under \$5.00 and besides have enough extra parts for a code-practice oscillator, test generator or other project? Six-transistor Japanese radios are selling in discount drug stores and other bargain supply houses for as low as \$3.00 apiece. The transistor receiver purchased had two transistors in the r.f.-i.f. circuit and four transistors in the audio section. Between these two portions of the set was the easily identified diode detector, which coupled to the gain control through a capacitor. Removal of the diode and a

shunting capacitor to ground (r.f. filter) gave access to the audio section via the volume control. Battery consumption was minimized by removal of the two unused transistors. If the amplifier is to be used for long periods, flashlight batteries or an a.c. power supply can easily be added. — *Irving S. Mayer, WSZEB*

VOLTAGE REGULATION FOR LARGE VARIATIONS IN LOAD CURRENT

HAVE you ever been in need of a few more milliamperes of regulated current than the maximum obtainable from a single VR tube? There are, of course, several answers to this problem. One is an electronically-regulated supply with its attendant complexity and high-current vacuum tubes or transistors. Another answer is a supply stabilized by expensive Zener diodes. A third solution, shown in Fig. 2, is

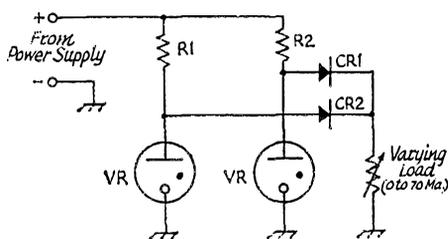


Fig. 2—Regulator circuit for loads that may vary as much as 70 ma. The VR tubes are identical. R_1 and R_2 are chosen so that 40 ma. is drawn by each VR tube under minimum-load conditions. CR_1 and CR_2 are 50 p.i.v. silicon rectifiers with a minimum current rating equal to the maximum load current divided by the number of diodes used. The supply voltage should be at least 30 to 40 percent higher than the voltage rating of the VR tubes.

relatively simple and economical. With this circuit, it is possible to handle large current variations by using parallel or series-parallel strings of VR tubes of the same current and voltage ratings.

Since no two VR tubes have exactly the same starting- and operating-voltage characteristics, they should never be connected *directly* in parallel with each other. If they are so wired, the one with the lowest starting voltage will ionize and prevent the others from operating; the tube that started to function will be forced to handle all the regulator current and possibly be destroyed. However, as shown in Fig. 2, the use in diodes, in conjunction with individual current-limiting resistors, will not let each VR tube handle more than its share of the current, since the tubes will be isolated from each other by the back-to-back connection of the diodes.

The current-limiting resistors should be chosen so that the maximum rated regulator current, usually 40 ma., is drawn by each VR tube under minimum-load conditions. The maximum net current that each VR tube can regulate will be about 35 ma., since each regulator tube has a 5 ma. minimum current requirement that must

be satisfied to sustain each tube in its conducting state. If two tubes are used, the circuit will have a regulation capability of 70 ma. As many VR tube and current-limiting resistor combinations as necessary may be paralleled to obtain the desired current regulation, as long as a separate diode is used in each branch. It may be noted that when maximum load current is being delivered from a supply containing several VR branches, one or more VR tubes may be extinguished, depending upon each regulator's keep-alive voltage. This does not apparently degrade the voltage regulating characteristics of the circuit as long as one or more VR tube remains in the conducting state. — *J. S. King, Jr., W13BOE*

SOME USES FOR PLASTIC DRINKING STRAWS

PLASTIC straws are available at most grocery stores and are found in a variety of colors. Some have heavy walls and are able to maintain their circular shapes even though subjected to considerable stress. The straws used in the applications described here cost only 25 cents for 25 straws. Results were most gratifying.

V.h.f. r.f. chokes can be hand-made at a considerable savings by slicing off sections of the straws and winding enameled wire on them. Although there are optimum values for choke inductance in the various parts of the v.h.f. spectrum, this writer has successfully used a rule-of-thumb method when winding chokes for 50 through 420 Mc. A one quarter-wave length of enameled wire, close-wound on a $\frac{1}{8}$ - to $\frac{1}{4}$ -inch form, always seemed to do the job nicely. As shown in Fig. 3, plastic straws make good coil forms for this purpose. An ice pick, or similar sharp instrument, can be used to poke tiny holes at each end of the coil form for securing the ends of the windings. A coating of Q dope can be added to the completed coil if the user wants to protect the coil against moisture. The diameter of the wire used should be sufficient to handle the current that will flow through the choke.

Another use for the plastic straws is shown in the photograph. Cut into sections, or used full length, they serve as wiring-harness guides wherever a neat job is desired. The color choice is up to the user. — *W1CER*

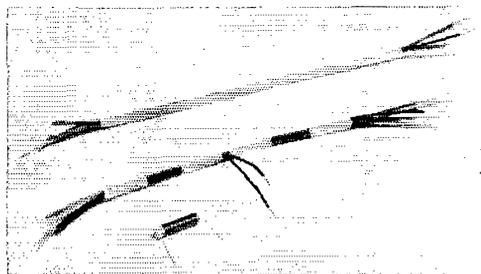
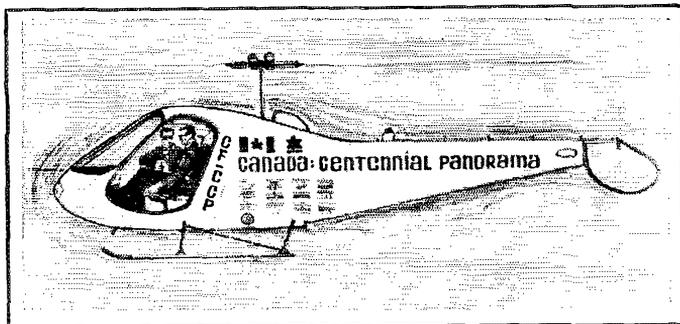


Fig. 3—The r.f. choke form and wiring-harness guides pictured above are made from inexpensive plastic drinking straws.



Centennial Helicopter Flight and Ham Radio

As most are probably aware, 1967 is Canada's 100th birthday. A project which combines the celebration with ham radio is the 100-day Centennial Helicopter Flight. The helicopter will stop at over 150 communities where it will take part in various Centennial activities. Various Provincial Premiers, members of Parliament, and other dignitaries will be taking part in many of the activities which are centered around the visit of the helicopter.

Accompanying the helicopter will be a car and a truck-mounted communications center. The communications center will carry equipment for communicating with the helicopter and car, mobile radio telephone equipment tied in with the commercial telephone system, and ham radio equipment.

The present planning is that ham gear will operate on 80 through 10 meters on c.w. and a.s.b. Standard mobile antennas will be used en route. For stops of more than a few hours, a 3-element tribander atop a crank-up tower will be used.

It is hoped that the various dignitaries and the press in the communities will originate messages to some of their counterparts across Canada. Messages will also be accepted from the public for North American points. Amateurs in the communities visited will, whenever possible, be invited to operate the station. This should be interesting to the amateurs and will provide a local flavor for press publicity.

The station will be in the various Provinces and Alaska during the following periods:

Newfoundland (3B1)	May 24 to 29
Nova Scotia (3C1)	June 1 to 2 and 6 to 8
Prince Edward Island (3C1)	June 3 to 5
New Brunswick (3C1)	June 10 to 17
Quebec (3C2)	June 20 to 30
Ontario (3C3)	June 30 to July 14
Manitoba (3C4)	July 16 to 23
Saskatchewan (3C5)	July 26 to 30
Alberta (3C6)	Aug. 1 to 3 and 6 to 8
Northwest Territories (3C8)	Aug. 3 to 5
British Columbia (3C7)	Aug. 10 to 14 and Aug. 26 to Sept. 1
Yukon Territory (3C8)	Aug. 21 to 23
Alaska (KL7)	Aug. 15 to 20

As the station will be on the air a minimum of 10 hours per day (3C7BDZ and 3C7FO operators), this is an ideal opportunity for those working on the WAVE award to get contacts with those hard-to-get Provinces.

The QSLs will be very unusual. They will actually be "First Flight Covers" and, in some cases, "First Day Covers" as well. The QSLs will be mailed along the route and everyone contacted will receive one.

The station will actually commence operation

from Michigan around the end of April when delivery of the helicopter is taken. On May 2, the helicopter takes off from the lawn of the State Capitol Building in Lansing, Mich., after ceremonies in which Governor Romney will participate. From Lansing, the helicopter and ground party will proceed through the northern and New England States to New Brunswick and on to Newfoundland where the official 100-day flight commences. A number of rare counties will be activated, so those interested should keep an ear open.

The DOT has issued the special call sign 3C7CCP. This ties in with the helicopter registration CF-CCP and a book to be published after the flight entitled *Canada: Centennial Panorama*.

Through participation in this project, amateur radio will be brought to the attention of a great many officials at all three levels of Government throughout Canada. It is hoped that the local hams in the communities visited will capitalize on this to maintain and improve the relationship between them and their community.

— James M. Smith, 3C7FO

Strays

Stolen Equipment

The following amateur radio equipment was stolen from my locked car on April 11. Swan 350 transceiver; serial No. 3-584949, Swan 14-117 mobile power supply; serial No. P-154606, Turner 350 microphone, and speaker. Robert A. Buhbe, K6TOK, 1826 Verde Place, Anaheim, California 92805.

— — — —

I would like to get in touch with . . .

. . . radio amateurs interested in bird study and plotting of migration routes of birds. WA9OBP.
 . . . any amateurs interested in an "unidentified flying objects net." WN2WSU.
 . . . anyone interested in a newsletter for teen-age radio amateurs. WN0OSO.
 . . . Lion Club members or Professional Engineers who have call letters. Floyd Fellows, 663 Washington Ave., Santa Fe, N.M., 87501.
 . . . ARRL members who operate from sail boats. Lt. Col. A. W. Runser, USAF (Ret.), 3000 Mt. Royal Boulevard, Glenshaw, Pa. 15116.



Place Bonaventure, with its penthouse hotel, under construction in downtown Montreal.

Montreal

June 30-July 2

ERNIE WELLING,* VE2YU

TAKE a look at that! We're so tickled at having the 1967 ARRL National Convention in Montreal that we've had a special place built just for the occasion — all six and a half acres of it. Place Bonaventure, the world's second largest commercial building, opened this spring and the penthouse Hotel Bonaventure will really be jumping June 30 to July 2nd when League members from all over North America and from many parts of the world gather in Canada's largest city. And gather they will. Despite the crowds that will be in Montreal this summer, the Convention Committee has accommodations for you, but don't delay any further. Mail your reservation to VE2BSX, 7401 Mount Ave., Montreal 16, right now.

If you're an old hand at the National this is the one you mustn't miss — if you haven't made the National before this is the one to start with. For the first National Convention to be held outside the United States your hosts have planned the best ever. What better time to visit Canada? — we've arranged to have the Canadian

Centennial fall July 1st, during the Convention. What better time to visit Montreal? As well as the famous French cuisine of this historic city, there is something else you should look into; it's being run by the Canadian Corporation for the 1967 World Exhibition — they call it Expo 67. The Convention gets under way at 2 P.M. on Friday, June 30 with registration in the foyer of the Hotel Bonaventure until 10 P.M. On Saturday, registration will be from 8:30 A.M. to 9 P.M. and on Sunday from 8:30 to 5:00 P.M. Those within easy reach of Montreal are urged to register on Friday if at all possible to avoid that Saturday morning rush. If you're heading for Montreal by car, listen for the talk-in station, 3C2ARC, which will be operating on the following frequencies: 3.810 (s.s.b.), 29.600 (a.m.), 50.4 (a.m.) and 145.35 (a.m.). Contact may also be made through the Montreal repeater, VE2MT located on Mount Royal, which operates on wideband f.m. Input frequency is 146.46 and output is 146.94 vertically polarized with two-way on 146.94. Don't forget, W/K operators planning to operate mobile in Canada require

*Member, Convention Committee.

clearance from the Department of Transport. The licensing procedure is quite simple and the proper forms are available from the ARRL Membership Services Department, 225 Main Street, Newington, Connecticut 06111; s.a.s.e., PLEASE.

Opening Night

Friday evening features a casual get-together in the gorgeous setting of the Hotel's roof garden. League officials and Convention Committee members and their XYLs will be on hand to provide the welcome. Rain? — it wouldn't dare, but if it does we have the Ballroom in reserve! The roof garden is a really unique affair covering 2½ acres and containing, amid the trees and flowers, waterfalls, fountains, streams and a swimming pool. The Hotel, which is the 17th, 18th and 19th floors of the massive Place Bonaventure, faces into the garden as well as out onto Montreal's skyline.

Things start with a bang — or a series of bangs — on Saturday morning as the drum rolls and fifes of "*Les Compagnies Franches de la Marine*" provide a colorful display of 18th century drill and perform the opening ceremonies in the Ballroom. Following this the League holds its annual Forum, with President Denniston and Headquarters officials in attendance. A special Forum is scheduled on Sunday morning to discuss the affairs of the League in Canada.

For the Ham

As always at the National, the radio industry serving the amateur is on display and major manufacturers will be showing the latest thing in amateur equipment from 9 A.M. to 9 P.M. on Saturday and 9 A.M. to 5 P.M. on Sunday. It's not unusual for manufacturers to unveil brand new gear at the National and this year should be no exception. Following the Forum, pay-as-you-go luncheons will be held in the restaurants overlooking the roof garden for DX and v.h.f. men and for the ladies. Saturday's technical sessions begin right after lunch and, if you choose, you can have a very busy afternoon. With the increasing number of specialized areas that amateur interest reaches these days it is hard to satisfy the old cliché of 'something for everyone' but we've tried — from traffic to satellites, from transistors to DX, with speakers well-known in the amateur radio world from industry and from League Headquarters. The hardest thing has been scheduling the sessions so that they don't conflict.

For the Gals

Meanwhile, what's been happening to the XYL's? You think they're out making you poor in some "*boutique*"? Relax OM, it's likely that on Saturday July 1 many of the stores will be closed. Window shopping should be easy as the Bonaventure complex is only a few minutes walk from St. Catherines Street and Place Ville Marie. There's also a tremendous underground promenade with all kinds of stores in Place Bonaventure itself. Then of course there is



Commodore O.C.S. Robertson (Rtd) will be the guest speaker at the Convention Banquet. Much of his career has been spent in Northern operations, both with the Royal Canadian Navy and the US Navy. He commanded a US Navy Task Force during the building of the Eastern Section of the Dew Line and has served as Naval Attache in Washington, D. C.

"Old Montreal." In the afternoon the girls can get a good look at some "*haute couture*" with a show to be held in the Ballroom by some of Montreal's leading fashion houses. An XYL Hospitality room will be open for the duration of the Convention and members of the Ladies Committee can be contacted there.

Socially

Everybody loves Saturday night — and this one you'll really go for. "*Une Soirée Canadienne-Française*" is being hosted by Radio Amateur du Quebec Inc. RAQI is the Quebec provincial amateur society and they will be holding their annual meeting during the Convention. Their gala event is this Saturday party in the Ballroom which promises to be no ordinary evening. Make up a table and enjoy the dancing from 8:30 P.M. to 2 A.M. (if you can take it!) with continuous music by an 18-piece orchestra. At intermission time a half-hour spectacle that has been applauded around the world — Canada's National Dance Ensemble, "*Les Feux Follets*."

As midnight rolls around there will probably be stealthy figures creeping away from the bar and YLs and XYLs will be looking under tables for missing partners. They will not have heard as others will, the call of the Le Wouff Hong. Whadyasay? — Le Wouff Hong? "*Mais oui, cher om — un problème existe*. It is the custom *dans la belle province* to have things *en français et en anglais*. This often means doing things twice, but when it was proposed that two Wouff Hong initiations be held, the ground most decidedly trembled. Therefore, *il est décidé* to have one *cérémonie dans le deux langues*." We don't care how many conventions you've been to, you won't have seen (or heard) anything like this — don't miss it!



Anyone who has done spadework for a convention will recognize these scenes. The 1967 National Convention Committee is composed of members of the Montreal Amateur Radio Club and Radio Amateur du Quebec, Inc.

Sunday

Out of compassion for the Saturday night revellers, programming before lunch on Sunday will be light. Sunday afternoon is fully occupied with technical sessions which continue until 5 P.M. The usual award presentations will be held in the Ballroom at that time, although others will be taking place throughout the afternoon. Included in the afternoon's program is a demonstration by the Antique Wireless Association of things (like spark) that used to be. (Highly recommended for Young Squirts.) For the XYs there are many possibilities on Sunday afternoon; for example, bus tours will be arranged for any groups wishing to see the sights. We suspect that many will find their way to the Metro (subway) station located right inside Place Bonaventure and from there it is only a short ride to Expo 67.

WHAT'S ON AT THE NATIONAL?

MARS

Joint Army-Navy-Air Force MARS
 Army MARS
 E. S. Liscombe, K4KNV
 Navy MARS
 Lieut-Comdr. R. E. Mickley
 Air Force MARS
 Major R. B. Wareing, K3AKK

Circuits, Components, and Equipment

Transistors and the Amateur	
Irv Strauber, W4KXD/K2HEA	Hammarlund
Helping the Blind Amateur	National Research Council
Jim Swail, VE3KF	
Insulated Gate FETs	
George Hanchett, Jr., W2YM	RCA
Recent Developments in Ham Gear	
Joe Shafer, K8DCE	Daystrom
*TV and Radio Interference to the Amateur	Microwave Associates
Henry H. Cross, W100P	
*Fundamentals of SSB	Canadian Marconi
Tom Watson, VE2NN	
*Technical Evaluation of Equipment	ARRL Hq.
George Grammer, W1DF	

League Affairs

ARRL Forum
 League President and Officers
 Intruder Watch
 Steve Chisholm, VE2ZM
 The Preservation of Amateur
 Frequency Allocations
 Richard Baldwin, W11KE ARRL Hq.
 *ARRL in Canada
 Messrs. Eaton, VE3CJ; Dumbrille, VE2BK;
 Huntoon, W1LVQ
 *ARRL Field Organization
 George Hart, W1NJM ARRL Hq.

Antennas and Propagation

Quad Antennas
 Bill Orr, W6SAI Eimac
 VHF Antennas — Fact & Fallacy
 Edward P. Tilton, W1HDQ ARRL Hq.
 Antennas & Transmission Lines
 Lew McCoy, W1ICP ARRL Hq.
 Sporadic E at 50 Mc.
 Mel Wilson, W1DEI/W2BDC

VHF

Amateur Radio in the Space Age	
William I. Dunkerley Jr. WA2INB/ KL7ELA; David B. Collins, K2LME; Sheldon A. Glick, WB2OHH.	East Coast VHF Society
VHF Repeaters	Canadian Motorola
H. Seibel, VE3HS	Microwave Associates
*Solid State Techniques in VHF	
F. Collins, W1FRR	
*VHF Repeater Frequencies	
Murray Epstein, VE2AUU	

TV

Amateur Television
 Bill Still, W2OJR & Charlie Coorsb, VE2AFM
Emergency Operations and Traffic
 ARPSC-EMO Discussion Session
 *NTS Slide Presentation
 George Hart, W1NJM ARRL Hq.
 *AREC Slide Presentation
 George Hart, W1NJM & Murray Epstein, VE2AUU

Satellite Communications

Satellite Tracking
 Bruce MacKimmie, VE2LU RCA Victor
 *Oscar Project
 Tom Lott, VE2AFG/W6

DX and Operating

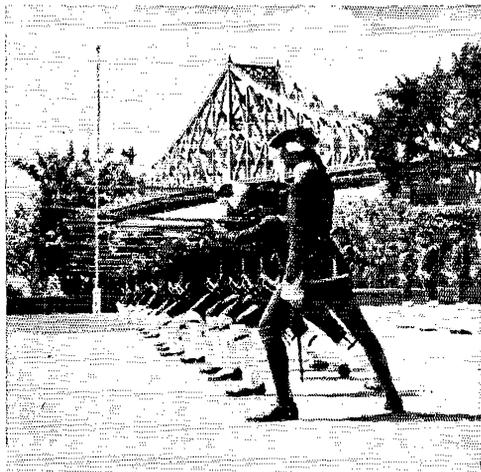
*DXCC Award	
Robert L. White, W1WPO	ARRL Hq.
*ARRL Contests	
Ellen White, W1YYM	ARRL Hq.
*DX Operating	
Larry LeKashman, W9IOP	Electro-Voice
*Sunday, July 2nd sessions. Others are Saturday, July 1st.	

The Finale

As a fitting finale to a memorable weekend the Convention Banquet will be held in the Ballroom at 7:30 P.M. A first class meal will be served and the members of RAQI are planning an unusual "picce de resistance." The after-dinner speaker, Commodore Robertson (Rtd) of the Royal Canadian Navy, is a veteran of many operations in the Arctic and the North West Passage (remember T3?). The Commodore is Deputy Director of the Arctic Institute of North America and will speak on some of the amusing aspects of exploration in the area between VES and UAØ. League officials will also speak, bringing the Convention to a close.

Reservations

And how do you get to this amateur radio event of the year? Simple. Write Doug Shaw, VE2BSX, 7401 Mount Avenue, Montreal 16, Quebec. Enclose \$4.00 per registrant if you can get your letter postmarked before June 1st -- otherwise \$6.00. The cost of registration covers all activities



"Les Compagnies Franches de la Marine" faithfully re-create the marines of 18th century New France. Members of "Les Compagnies" will perform the opening ceremonies at the Convention in the uniform and drill of pre-Napoleonic times.

at the Convention including the Saturday night dance and the Ladies Fashion Show. Banquet tickets \$10.00 per person and there is a maximum seating capacity of 1500. If they are not all sold beforehand there may be some tickets available at the door, but don't count on it. Accommodation may be the key to just how enjoyable your visit will be. The Convention Committee warns you not to come hoping to find something in downtown Montreal. You may not. Let us know your needs and we will fill them from the blocks of reservations we are holding. Details of the accommodations available was given on page 73 of April *QST* and on page 159 in May *QST*. But hurry. We will be unable to hold the downtown rooms



Entertainment at the Saturday night dance will be provided by "Les Feux Follets" (Will-o'-the-Wisps), seen here performing an Eskimo ritual dance. This well-known group and their colorful folk dances have been seen and acclaimed around the world.

too far into June as the demand this summer is high and hotels will withdraw rooms from us in sufficient time to fill them with their own guests. There will be accommodation for everyone but the later you are the further away from the Convention you may be. Send accommodation requests now to VE2BSX at the address above. The welcome mat is out and the members of the Canadian Division extend a warm invitation for you to join them at the 1967 ARRL Convention. Cu in 3C2 -- à très bientôt. **QST**

Strays

QST congratulates . . .

George MacCool, WN3CZI, on receiving his Novice license at age 79.

The Lehigh University Radio Society, for winning first place in the IEEE 1966 Vincent Bendix Award for their Oscar receiving system.

Robert M. Morris, W2LV, who received the NAB Engineering Achievement Award for 1967.

Dr. William B. Bridges, W6GEB, selected for honorable mention in Eta Kappa Nu's "Outstanding Young Electrical Engineer for 1966."

Robert A. Felsenheld, W2BCC, who received ITT honors for development of a broadband tunable antenna.

Merrill Swan, W6AEE, for receiving the Army's "Meritorious Service Award" for his efforts in connection with MARS activities.

Bert I. Gordon, K6ALP, on the release of the movie "Picture Mommy Dead" which he produced and stars his daughter, WN6OLL.

Dr. Henry L. Richter, Jr., W6VZA, who was named development manager for the new Mountain Park Research Campus of UCLA.

Amateur Radio and The Talcott Mountain Science Center

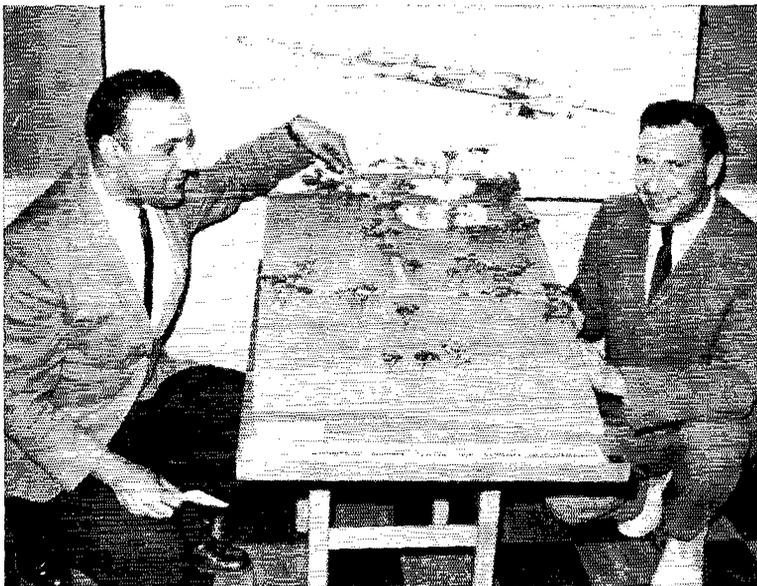
Student Involvement in the Physical Sciences an Objective of Unique New Educational Program

If it's more than a few years since you went to high school, or if there are no children in your family who are presently going through this wonderful experience, you very likely would find some surprises if you were to visit any good high school today. What with the "new math," earth science courses, well-equipped school libraries and improved teaching methods, kids are doing things in high school today that you probably never dreamed of at that age. Perhaps even more important, the speed with which they are "learning to learn" demonstrates that education techniques are more than keeping pace with the much talked-of population explosion.

Great things are being done for and with science-oriented youngsters in many ways, some of which are evident in the considerable skill and enthusiasm of the younger newcomers to amateur radio these days. An example is the "Science Center," a school-operated facility where students can see and participate in actual work in scientific fields such as astronomy, weather observation, experimental radio, satellite tracking and the like. Science Centers being established in several forward-looking communities currently include an outstanding prospect in the Talcott Mountain Science Center for Student Involvement, now being built on a rocky ridge just west of Hartford, Connecticut.

Its mountain site, its aim of presenting the physical sciences as a unified whole, and the inclusion of amateur radio experimental communication in its program all combine to make TMSC unique among Science Centers currently operating, or in the planning stages. The concept of the Center, student involvement in actual scientific projects and programs, began to take shape about two years ago, when the U. S. Army dismantled a Nike radar installation built atop the highest point of the Talcott Range that separates the Connecticut and Farmington River Valleys of Central Connecticut.

School officials of the Town of Avon, recognizing the potential of the radar site, moved quickly to obtain the facility for educational purposes. During the summer of 1966 a start was made on the project as a result of a four-month planning grant from the Federal Government. A pilot program conducted during the summer featured talks and demonstrations in the fields of astronomy, meteorology and amateur radio, at weekly sessions held in an Avon School building. Early publicity on planning for the Science Center had attracted the attention of experimentally-inclined radio amateurs of the area, including K1YON, K1IIG, W1VVK and W1HDQ, and a proposal was made whereby amateur radio would play an important role. To demonstrate ways



Donald P. LaSalle, left, Project Director of the Talcott Mountain Science Center for Student Involvement, points out salient features of the Center on a scale model to Dr. Alvin Liftig, K1IIG. An architect's drawing of the Center appears in back of the two. Dr. Liftig, as a member of the School Board of Avon, Conn., serves on the Science Center's Advisory Board. Photo courtesy of the Hartford Times.

in which hams could serve the Center's aims, the group set up a beginners' class in code and theory as part of the TMSOC Pilot Program, and it quickly became an impressive drawing card.

During the fall and winter, v.h.f. and u.h.f. enthusiasts met regularly with Donald P. LaSalle, Science Coordinator of the Avon School Department, now Project Director of TMSOC, formulating a program of cooperation between the group and school authorities of the Farmington Valley towns that were now lined up in back of the Science Center venture. These Connecticut amateurs, now formally organized as the Talcott Mountain U.h.f. Society, will shortly be heard from on the frequencies above 50 Mc., and especially on 220 Mc. and higher.

One has only to drive up to the former radar site to appreciate its potential for experimental work on the higher amateur frequencies. Though Talcott Mountain is not high, as mountains go in other sections of the country, its precipitous rise above both the Farmington and Connecticut Valleys gives it a commanding view of the surrounding countryside for many miles in all directions. At just over 900 feet elevation, it is line-of-sight to one of the largest concentrations of population of any accessible ground location in Eastern U. S. A. As a site from which to operate on 220 Mc. and higher, it should be a potent factor in promoting activity and interest.

It will also, its sponsors hope, have a strong influence on young people just coming into the age when they are likely to be attracted to amateur radio. By demonstrating the exciting possibilities of high-band experimental work, the Talcott Mountain U.h.f. Society hopes to show these new or potential hams that there is more to the game than the more publicized working of DX or chewing the fat on lower bands.

Though still only "on paper" at this writing, the Talcott Mountain Science Center has already attracted wide attention in educational circles. A Federal grant has been received for refurbishing the abandoned buildings, and for operation of the Center for the first year. Eventually the budget will be met by school departments of the cooperating Farmington Valley towns, and private institutions of the Greater Hartford area. The Talcott Mountain U.h.f. Society is contributing the time and facilities of members to the advancement of the Center's aim of student involvement. Experimental operation with emergency power has already been carried out from the site on 50, 144 and 1215 Mc. Regularly-scheduled operating periods on 432 and 1296 Mc. are in prospect, once the buildings are put in shape and power is made available. F.m. relay stations are planned for 50 and 144 Mc. Group operation in the June and September V.h.f. Parties is scheduled.

Because of the limited space available, and the strictly-controlled objectives of the Society, its membership will be kept small for the time being. Formally launched March 8, 1967, with 27 charter members, the group will accept a few more applications from interested and qualified

amateurs. Provision is being made for admission of unlicensed members on an "associate" basis, if they subscribe to the basic purposes of the founding group. Student members will be admitted at reduced rates from the schools served by the Center.

The superb location will be available for use by amateurs of the area for any noncommercial experimental project conducted in the amateur u.h.f. bands, with time allocated according to priorities assigned by the Society's Technical Committee. An Educational Committee is already working with Farmington Valley school authorities on the details of a program that will provide instruction in code and theory for students. Members will be operating portable gear on the v.h.f. and higher bands frequently during the summer, and it is hoped that power and building facilities will be in shape to permit installation of more permanent gear before winter weather sets in next fall.

The first slate of officers of the Society is as follows: President — Edward P. Tilton, W1HDQ; Vice-President — Jack Mahar, W1VVK; Secretary — Eleanor McMullen, W1RNT; Treasurer — Theodore Jansen, K1YON; Directors — Thomas McMullen, W1QVF, and Stephen Tripp, K1IIG. Once facilities atop the Talcott Ridge are in usable condition, the Society will welcome visitors who are interested in the Science Center's aims and programs. Because of the isolated nature of the site, admission to the grounds will be by appointment or invitation only. — W1HDQ

Strays



The fellas pictured above, represent a total of more than two centuries of continuous hamming. From l. to r. are W2JH with 51 years on-the-air, W2ZL, licensed 55 years, W2VC, 40 years, and W2GC, with 59 years of amateur experience. With all this experience behind them, they are still active on the bands.

For more than fifty years, the amateur service has been providing, at no cost to the general public, an emergency radio service, research and development teams, propagation study groups, market for electronics products and incubator of new personnel for the industry. Never known as blushing virgins, the amateur service has claimed these points repeatedly in documents filed by ARRL with U. S., Canadian and international communications agencies.

A couple of years ago, as part of its examination of steps to be taken for the long-term protection of amateur frequency allocations, the League commissioned Stanford Research Institute to do an independent study of the amateur service which, if it confirmed even a few of the points we have made about the usefulness of the amateur service, would be more convincing to the uncommitted than anything written by the League. Stanford enjoys a high reputation for its thorough research and careful analyses of subjects assigned to it by government bureaus and the corporate giants of industry.

Below we present more-or-less random samples from the report. There will be few surprises for the knowledgeable amateur, but all of us can feel reassured by SRI's assessment of our past contributions to the general welfare.

Amateur Radio—An International Resource

BEGINNING with the Berlin Conference of 1906 and continuing at irregular intervals since then, the nations of the world have convened worldwide conferences of the International Telecommunications Union (ITU) to discuss and agree on allocations of radio frequency spectrum to a variety of users. The ultimate purpose of this self-imposed system of regulation is to permit maximum use of the spectrum within an orderly allocation scheme that minimizes interference. However, spectrum space is limited, demands for space are increasing, and accommodation of new users is becoming more difficult. Each service that wishes to retain its allocations, and each new candidate for space, must present clear proof that the intended use will serve national and public interests. Moreover, each service must show that its proposed use of the spectrum space compares favorably with other possible uses.

At the next international conference, which may occur within three to five years, the Amateur Radio Service, like all other users of the radio frequency spectrum, may be required to justify its frequency allocations. The service has been well supported in the past at international radio conferences by the United States and a number of other countries that recognize the benefits they have derived from the service and thus perceive its value. However, this support can be expected to continue only so long as the service compares favorably with other contenders for space in its contributions to the national welfare.

The service has not received unqualified support from all countries. Despite the important part that the Amateur Radio Service has played in the technological, economic, and sociological development of many nations, many of its critics maintain that other radio services are of greater

importance and that allocations to the amateur service should be either reduced or discontinued. Most of the criticism of the service comes from countries that have need of allocations for a variety of uses, but that are unable to obtain space because other nations have exercised prior claims on the desired space. The problem is of particular concern to new and developing countries, which, having requested allocations at a relatively late date, have found that few, if any, frequencies are available to them for such communications services as point-to-point, international broadcast, and aeronautical mobile. These uses were accorded a high priority by the new nations at the last ITU conference in 1959. The problem is growing — the next international conference is expected to include approximately 123 countries, about 30 of which have appeared as new nations since the 1959 conference.

Because the delegates to international conferences must make decisions that will have far-reaching consequences and because of the increasing difficulty of their task, it is important that they have a sound understanding of the relative values of the services they are asked to support. To this end, the American Radio Relay League (ARRL) requested that Stanford Research Institute conduct an independent study that would summarize and assess the past, present, and projected contributions of the Amateur Radio Service to the national welfare.

Band Loading in Allocations to Mobile and Fixed Services. Depending on the nature of the service (use and kind of emission), mobile and fixed services are assigned specific frequencies with "guard bands" separating the allocations; that is, the individual frequency assignments are separated sufficiently to permit adjacent stations

of the same class to operate with "acceptable interference" 100 percent of the time. Co-channel assignments in this portion of the spectrum are usually made on the assumption that the stations will have omni-directional radiation patterns and specific bandwidths, depending on the type of emission. The stations are also separated geographically, taking account of their likely coverage areas and the degree of interference that can be tolerated at the receiving locations. Thus, under this allocation scheme, the number of stations that can be accommodated in a given portion of the spectrum is limited.

The Ratio of Services Performed to Spectrum Space Allocated. From the preceding descriptions of band use, it is apparent that the number of amateur stations that can operate within a band is many times the number of mobile or fixed stations that could be accommodated under existing allocation schemes for those services. Without the hindrance of specific frequency assignments, radio amateurs are free to combine frequency agility with antenna directivity so that, by judicious selection of transmit and receive times, they can accommodate large numbers of stations in relatively small portions of the spectrum. This has not been attempted in commercial use of the HF bands.

Thus, the Amateur Radio Service appears to be uniquely conservative of spectrum space—it provides the highest rate of return in functions performed per kilocycle of allocation of any existing radio service. Moreover, if an attempt were made to use other radio services to perform all of the functions on the scale currently performed by radio amateurs, under existing worldwide criteria for frequency assignment, substantially more spectrum space would be required to perform these services than is now allocated in the amateur bands.

The Effects of Reduced Allocations to the Amateur Radio Service

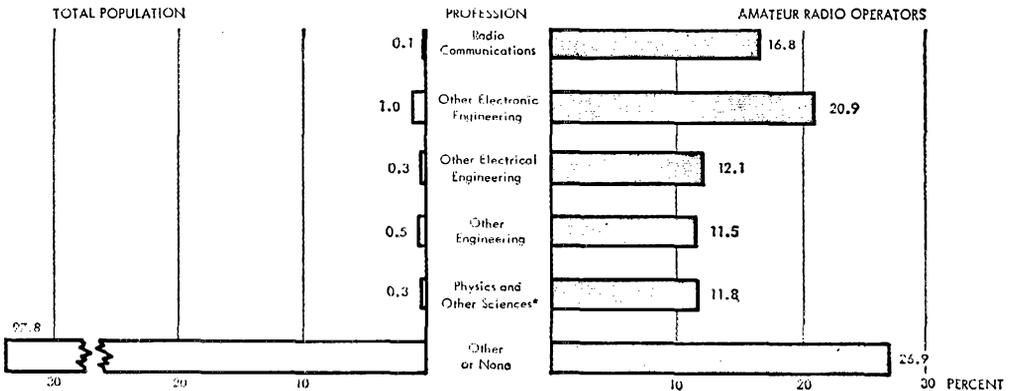
The changes in spectrum allocations and the increasing congestion have, in all likelihood, impaired the operations, technical progress, and basic appeal of the Amateur Radio Service, but the degree of this impairment cannot be determined from the available evidence. In spite of the obstacles, the amateur service has managed to achieve an overall record of innovation, growth, and development.

One thing is apparent: further reductions, or even relatively modest changes, in spectrum allocations at future radio conferences are likely to result in the reduction or loss of many of the vital functions that are now performed by radio amateurs and could change the nature of the amateur service permanently. Both broad-scale innovation and investment in equipment could be discouraged because the effort to overcome new constraints has become increasingly costly. Thus, it appears that a long term net loss to all nations might result from major changes, rather than any hoped for improvement in benefits received for spectrum space invested in other services.

Special Implications for New and Developing Countries

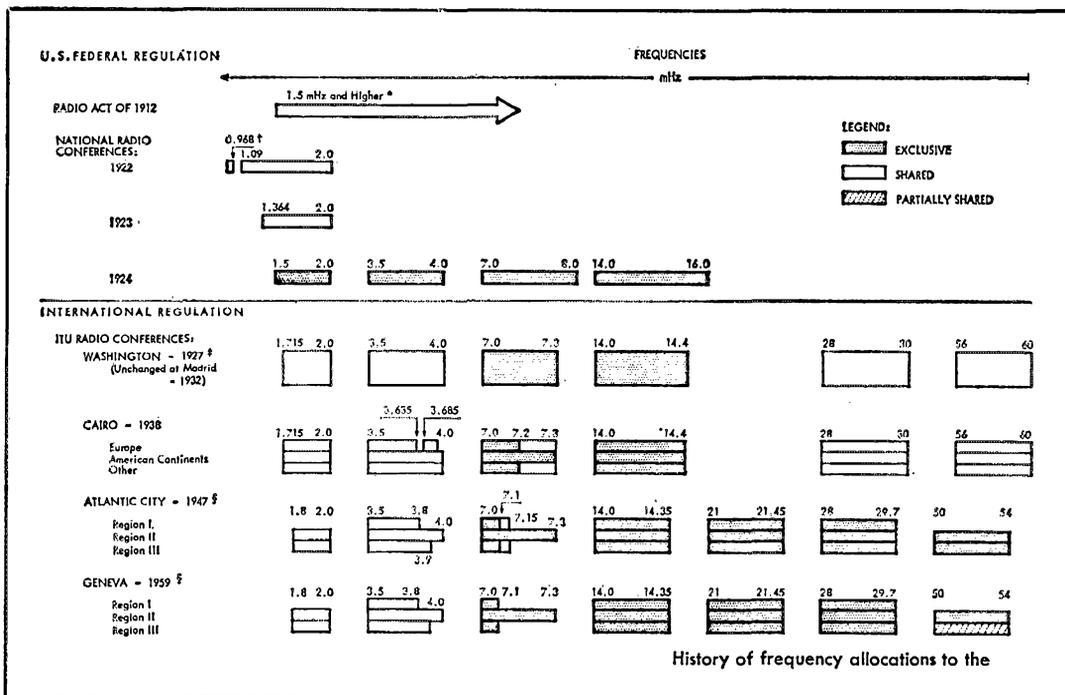
In new and developing countries, the effects of the amateur service can be even greater on a percentage basis than in technologically advanced countries, because precisely the services that can be provided by amateurs are either uneconomical or impractical to provide by other means where the technological base is small and where governmental efforts must be devoted to the more fundamental needs of the people. Aside from the traditionally agrarian nature of the economies of these countries, the generally lower level of education and technical training

DISTRIBUTION OF SCIENTIFIC AND TECHNICAL PROFESSIONS:
TOTAL POPULATION IN THE UNITED STATES (1960)
VS AMATEUR RADIO OPERATORS (1965)



*Data for total population are for 1962.

SOURCES: Questionnaire, Statistical Abstract of the United States.



in the populations has tended to impede efforts toward industrialization.

At the 1959 Geneva ITU radio conference, new nations accorded a high priority to their own need for such communications services as point-to-point, international broadcast, and aeronautical mobile, and they gave a low priority to the Amateur Radio Service. Actually, however, amateur allocations in such countries do not hinder the last preferred function, and they act in important complementary relationships with the first two. Every nation considers the projection of its political and ideological image abroad to be of great importance in today's world with its complex, rapidly changing situations. Amateur radio is a valuable adjunct to international broadcasts in this respect because international contacts between amateurs tend to be more credible. Furthermore, amateur radio can be a significant element in point-to-point internal communications in countries where the total communications plant is small and of limited diffusion.

Technological Advancement

On the basis of discussions with representatives of such nations as Malaysia and Nigeria, it is evident that these nations and others like them are eager to acquire communications and electronics expertise on the broadest possible scale. Amateur radio is uniquely suited to assist in this advancement by offering:

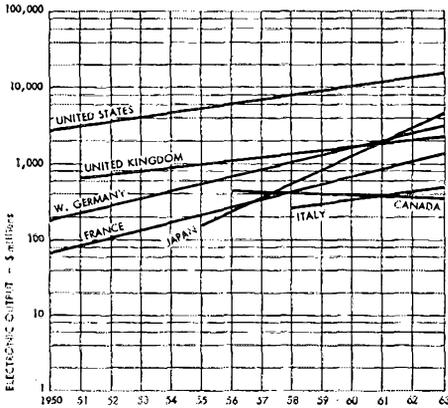
1. A broadening base of technical and engineering expertise.
2. A broadening base of expertise in communications and traffic-handling.

3. An increasing reservoir of trained technical manpower.
4. Increasing motivation for careers in communications and electronics.
5. Increasing demand for electronics and communications courses in the nation's primary, secondary, and trade schools and universities.
6. Extension of primary or secondary communications facilities into areas where no commercial facilities exist and where these might be uneconomical to provide.
7. Increasing domestic control over the construction, operation, and maintenance of the nation's communications plant.

Of particular interest to the governments of the new and developing nations (and to a degree that is not fully appreciated in the United States), today's radio amateur must be professional in his communications and electronics ability. Because of the increasingly difficult environment in which they must work, radio amateurs have always been compelled, as a group, to improve their skills. The record of technological achievement consistently shows that, in meeting the challenge, the amateur has exhibited professional expertise and resourcefulness and has in fact made many valuable contributions to technology in general and to his nation's overall communications capability in particular.

By exploiting enthusiasm for amateur radio activities and by encouraging the formulation of an amateur service, developing nations can extend their internal communications plants into isolated areas where it would be uneconomical to provide commercial or government communications. The communications thus pro-

GROWTH OF THE ELECTRONICS INDUSTRIES IN SELECTED COUNTRIES (1950 - 1963)



SOURCE: A Study of the Potential for Development of an Electronics Industry in Israel.

radio amateurs and the impetus to all phases of national development that results from their activities, makes the amateur service an especially desirable adjunct to the communications plants of new and developing countries.

The following is a listing of specific contributions made by the Amateur Radio Service. Although the contributions are closely interrelated, we have attempted to group them according to the category of their primary influence.

Technological

- Constitutes a source of new techniques and new technology in communications and electronics and stimulates the development of these in other fields.
- Provides a broad base for experimental test of theoretical predictions and for participation in large scale investigation in a variety of scientific areas.
- Provides a medium for self-training in, and improvement of, communications and electronics skills.
- Provides a medium for rapid and widespread exchange of communications, electronics, and other special knowledge and techniques.

Economic

- Advances the economy through the manufacture and sales of amateur radio equipment.
- Advances the economy indirectly through extension of amateur radio and related equipment into the professional, consumer, and government markets.
- Provides a source of trained manpower and impetus for an expanding communications and electronics manufacturing capacity.
- Appears to play a significant role in raising the general level of technological knowledge.

Sociological

The contributions made by the amateur service in this category are of two types: communications services and indirect contributions to the general

welfare. Some of the contributions in this category are unique to the amateur service; many have come to be regarded as vital.

Vital communications services

- Provides emergency communications in support of disaster relief organizations (e.g., fire, police, other public service agencies).
- Disseminates news when other communications systems have temporarily failed.
- Broadcasts warning of potential natural or other disaster.
- Provides special communications support for medical crises (e.g., searches for rare blood types) and other medical functions (e.g., the Eye Bank Network).
- Disseminates weather news.

Nonvital communications services

- Provides short, medium, and long distance point-to-point communications of a specialized nature, such as for scientific expeditions and for servicemen and other emissaries of a country abroad.
- Projects a nation's image abroad more credibly than do international broadcasts.
- Assists in the development of international understanding and goodwill through person-to-person contacts.
- Provides communications support for special community and other functions (e.g., parades, local and regional fairs, and Boy Scout jamborees).

Indirect contributions to the general welfare

- Provides incentive for scientific, engineering and technical careers.
- Provides a reservoir of trained communications and electronics specialists.
- Provides impetus for a broader and more technically sophisticated education system.
- Where commercial telecommunications are minimal, helps to bring people of isolated regions of a country together under a common national bond.
- By self-policing, lightens the administrative burden of a nation's spectrum managers.

The amateur service is exceptionally conservative of spectrum space when the ratio of services rendered per kilocycle of spectrum allocations is considered. Any other radio service, performing the same functions to the same degree, would require not only a larger commitment of public funds, but also significantly more spectrum space than is now allocated to radio amateurs.

Today, as throughout the history of amateur radio, amateurs are making major contributions to technology and to the economic and sociological welfare of the nations they serve. For this reason, the Amateur Radio Service clearly emerges as a national and international resource whose value to any nation is great. The curtailment of this resource would constitute a serious loss to all nations.

QST

V.H.F. QSO Party Announcement

June 10-11

"CQ contest" on the v.h.f. bands the weekend of June 10-11 will mark another popular ARRL V.H.F. QSO Party. This contest which gets under way at 2 P.M. (1400) your local standard (not daylight) time Saturday, June 10, and runs through 10 P.M. Sunday, June 11, is open to all amateurs in the ARRL field organization who can work 50 Mc. or above. For purposes of the contest Yukon-N.W.T. (VES) will count as a separate multiplier. Contacts count only when the contest is in progress at both ends of the QSO.

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

Reports must include your call, section, times in GMT, call and section of station worked. You're urged to do your logging in GMT (leave the operating clock on GMT for this purpose), a natural when working across time zones and a veritable necessity when cross checking is in progress at Headquarters. Postmark deadline is July 3, 1967.

Rules

1) The contest starts at 2:00 P.M. Local Standard Time, Saturday, June 10 and ends at 10:00 P.M. Local Standard Time, Sunday, June 11. All claimed contacts must fall within this period and must be on authorized amateur frequencies above 50 Mc., using permitted modes of operation. Contacts between stations in different time zones can be counted only when the contest period is in progress in both of the time zones concerned.

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

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

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

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

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

4) Foreign entries: all contacts with foreign countries (such as Mexico and the Bahamas) count for score. All foreign countries are grouped together, and a multiplier of no more than one (per band) may be claimed for contacts with all foreign stations worked. Foreign stations

may only work stations in ARRL sections for contest credit. Foreign stations will give their country name.

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

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

7) Awards: A certificate will be awarded to the high-scoring single-operator station in each ARRL section. In addition, the high-scoring multi-operator station will receive a certificate in each section from which three or more valid multiple-operator entries are received. Certificates will also be given to the top Novice in each section where three or more such licensees submit logs and to Novices in sections of less than 3 entries, who in the opinion of the Awards Committee, displayed exceptional effort. Awards Committee decisions will be final. QST

SUMMARY OF CONTACTS, V.H.F. QSO PARTY

STATION... W1AW ARRL SECTION... CONN

Freq. Band (Mc.)	(GMT) Date Time	Station Worked	Section	Record of new Sections for each band					Contact Points
				50	144	220	420	other H.F.	
50	1901	W4G7G	E FLA	1					1
	1905	K2MBA	OHIO	2					1
	1915	W4PEP	OHIO	3					1
144	2020	K1UGA	OHIO			1			1
	2001	W2TEL	ENY						1
420	2009	K6MYC	S.C.V.			2			1
	2210	W1QWJ	W MASS				1		2
220	2217	W2WKB/2	WNY				1		2
	2300	K2UYH	NNT					1	3
	2310	K2UYH	NNT			3			1

(Enter below on last sheet used)

Band	Contacts	Points	Mult.
50 Mc.	4 x1=	4	3
144 Mc.	3 x1=	3	3
220 Mc.	1 x2=	2	1
420 Mc.	1 x2=	2	1
Other	1 x3=	3	1
TOTALS	10	14	9

CLAIMED SCORE: ...14... x ...9... =126.....
(Points) (Mult.) FINAL SCORE

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

Signature Call Address

Sample log and summary form giving an example of how to score. You can obtain these log forms free by writing to ARRL Communications Dept., 225 Main Street, Newington, Conn. 06111.

1967 ARRL Field Day Rules

Annual Test for Emergency-Powered Stations, June 24-25

FIELD Day, 1967! OBJECT: For portable and mobile stations to work as many stations as possible and for home stations to work as many field stations as possible. There's more to it than that, however! This is the opportunity to show the world what the W/VE radio amateur can do in self-training to cope with operating under field conditions. Every aspect of the field day is guaranteed to improve participants—whether learning how to keep the genny running or how to get a line over a tall tree. A spirit of Field Day bonus (modified slightly from last year) is again being offered. A box elsewhere in these rules details the requirements. Are they too tough for your group? (Or, perhaps, not tough enough!)

ARRL Field Day forms are now available from the Communications Department, ARRL, 225 Main Street, Newington, Connecticut 06111.

Portable stations are reminded to be sure they comply with regulations in signing portable. C.w. stations follow their calls with a slant bar followed by the numeral of the area in which they are operating; phone stations follow their calls with their approximate geographical location. See Sec. 97.87(b), of the amateur rules for details.

To keep on good terms with ARRL and FCC, logs must be kept in GMT for cross-checking purposes, phone portables in particular must sign properly, portables must be logged as such in your entry, do *not* send your original FCC/DOT log as your entry and last (though not the least) odds are in favor of Murphy striking, so plan ahead!

All entries must be postmarked no later than July 24 for QST listing. Try and submit your FD photos along with your entry. *GL!*

Here are some examples to assist score calculations

Example 1

Assume a 25-watt rig wholly on batteries not having more than two operators (a Class B or C station, for example).

×	40 points (40 stations worked)
×	3 (power below 30 watts)
<hr/>	
	120
×	3 (all radio equipment independent of commercial mains)
<hr/>	
	360
×	1.5 (If Class B or C and everything on batteries)
<hr/>	
	540 points, the <i>claimed score</i>
+	20 (2 messages received, 2 relayed, these points added on at Hq. after examining copies attached to FD log)
<hr/>	
	560 points, the <i>final score</i>

Example 2

The Podunk Hollow Radio Club (or any non-club group of three or more licensed operators, a Class A station) portable at its FD site, operates two transmitters simultaneously. Each rig runs 75 watts input and batteries or generators furnish power.

×	425 points (425 stations worked)
×	2 (power input over 30 and under 150 watts)
<hr/>	
	850
×	3 (all gear independent of mains)
<hr/>	
	2550 points, the <i>claimed score</i>
+	500 (points added on at Hq. if complying with the spirit-of-FD bonus rules)
+	40 (4 messages received, 4 relayed, added on at Hq.)
<hr/>	
	3090 points, the <i>final score</i>

Spirit of Field Day Bonus

A 200-point bonus will be added to the final score as computed on the summary sheet for each of the following objectives met. Check the appropriate boxes and attach the required proof. *Leave the figuring to us.*

NO COMMERCIAL POWER was used for any purpose at the FD site during the 24-hour FD period. *Everything* was run off the emergency generator or by other than commercial mains, including cooking, lights, keyers, clocks, refrigeration, etc.

PUBLICITY evidence in the form of a newspaper clipping is attached to this entry describing our club effort and mentioning our club name.

MESSAGE ORIGINATION (copy) by a Class A, B or C station in *proper* form (see ARRL Operating Aid 9A in Aug. 1965 QST, or available from Hq.) is attached. It is addressed to our SCM or SEC (p. 6 QST) and includes the number of operators, club name, field location and number of AREC members. No FD message may pass through the same location twice. In the case of mobiles applying for a club mobile aggregate score, each message origination test, for credit, must be different from all others in the club.

Each on-the-air handling of messages via amateur radio during the FD period will earn 5 points to be added to the final score. A copy of each such FD radiogram with handling data must be attached. We will figure the added points you have earned.

—FD messages received.
—FD messages relayed.

FIELD DAY TIMETABLE

Time	Start	End
	June 24	June 25
GMT	2100	2100

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

Rules

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

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

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

4. Entry Classifications: All entries will be classified according to number of transmitters in simultaneous operation. They will be further classified as follows: "A," club or nonclub group portable stations; "B," unit or individual portable stations; "C," mobile stations; "D," home stations operating from emergency power; "E," stations operating from commercial power sources. Thus a club or group running three transmitters simultaneously will be in the 3A classification, or a mobile station with one transmitter will be in the 1C classification.

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

Group participation (Class A) is that portable-station work accomplished by three or more licensed operators.

Unit or individual participation (Class B) is that portable-station work accomplished by either one or two licensed operators.

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

Home station participation (Class D or E) is that work by fixed amateur stations not operating portable or mobile.

Entries must be accompanied by this summary sheet. You may obtain the summary shown here plus log forms free on request from ARRL; or you may use the very one shown here or prepare a facsimile. Attach logs of all Field Day contacts and copies of all messages received and relayed. Furnish publicity proof if applying for Spirit of Field Day bonus as well as a copy of your message origination.

A transmitter used to contact one or more stations may not subsequently be used under any other call during the Field Day period (with the exception of family stations where more than one call is assigned to one location by FCC/DOT).

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

6. Bands: Each phone and c.w. band is regarded as a separate band. A2, radio-teletype and frequency-shift keying are grouped with A1, in the bands where they are allowed. All forms of voice transmission will be grouped with A3, in the bands where they are allowed. (In Canada the respective phone bands apply).

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

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

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

9. Scoring: Each valid contact counts 1 point. (See also information on spirit of Field Day bonus.)

Multipliers:

Power: Output-stage plate input 30 watts or less; 3. Output-stage plate input between 30 and 150 watts; 2.

(Continued on page 156)

ARRL FIELD DAY SUMMARY

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

CLASS OF ENTRY (check only one)

- A. Club or group portable.
 B. Unit or individual portable.
 C. Mobile
 D. Home -- Emergency power.
 E. Home -- Commercial power.

ENTER NUMBER OF
TRANSMITTERS IN
SIMULTANEOUS OPERATION
IN THIS BOX:

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

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

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

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

POWER SOURCE (check)

- Generator. Commercial Mains. Battery. Other.

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

Bands	Nr. stns. worked	Multiplier	Score	Transmitter	Input
3.5 Mc. CW		X			
3.5 Mc. A3		X			
7 Mc. CW		X			
7 Mc. A3		X			
14 Mc. CW		X			
14 Mc. A3		X			
		X			
		X			
		X			
		X			
TOTALS			CLAIMED SCORE		

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

.....
(Date)

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

20th ARRL VHF Sweepstakes Results

COMPILED BY STANLEY H. ISRAEL,* WA2BAH

30 Years of VHF Contesting

That's no misprint! Thirty years!

On page 53 of December, 1937 *QST*, the announcement of a "56 Mc. International Contest" (sponsored by the Radio Society of Great Britain) appeared. Some of the rules employed might seem strange to us. The contest started on January 1, 1938 and ended on December 31, 1938. Everyone had to operate from his fixed-station location. The contest was open to any radio amateur in the world, licensed to operate on the 56-Mc. band. In some respects, this very first v.h.f. contest may have been way ahead of its time. For example, is the day not approaching when moonbounce and satellite techniques (along with the presently *unknown* propagation modes of the future) will render a world-wide v.h.f.-u.h.f. contest practical?

In a few months, the first three decades of v.h.f. contesting will have drawn to a close. How will future generations of v.h.f.-u.h.f.-s.h.f. contest and experimental enthusiasts judge our activities? First, let us take a brief look at the origins of our present-day affair.

*Asst. Communications Mgr., ARRL



This is **W3AC/3**, the leading station in the first ARRL v.h.f. contest, operating from his Plymouth coupe at High Point Park, New Jersey (alt. 1800 ft.). The antenna consisted of four half-waves in phase with reflectors. It was an adaptation from a design by the late Ross Hull. The transmitter ran 45 watts to a pair of 807s on 56.7 Mc.

In the September 1939 issue of *QST*, Ed Handy, W1BDI, announced a "U.h.f. Field Day and Relay" which was to take place the weekend of September 9-10, 1939. This affair was the first ARRL-sponsored v.h.f. contest and it turned out to be the grandfather of our present V.h.f. SS and QSO Party system. In this pre-W.W. II activity, operation was encouraged on the 56-60, 112-116 and 224-230 Mc. bands, then referred to as ultra high frequencies.

Compare the results of the first U.h.f. Field Day with those of the first V.h.f. Sweepstakes. There were 347 entrants from 40 ARRL sections participating in that 1948 affair! Acceptable logs in 1957 ran 837. A peak was reached in 1961 when 1563 acceptable logs were received and this year's total is 1123. But wait a minute there, fella, we're goin' in the wrong direction!

U.h.f. activity has been increasing and a developing interest in these bands as well as moonbounce and other advanced amateur work has become obvious. Discussions of v.h.f. contests, in general, will most certainly continue to take place at Headquarters and constructive comments pertaining to this matter are solicited in order to help improve the League's v.h.f. contest program.

Let's hope that the v.h.f.-u.h.f.-s.h.f. amateurs 30 years from now, in 1997, will be as proud of us for the work now being done on 50-10,000 Mc. as we, today, are of the efforts made on 56 Mc. by those first 28 ARRL v.h.f. contestants.

SCORE STANDINGS¹ of Reporting Stations in the U.H.F. Relay and F.D.

W3AC/3.....	308	W3ETA/8.....	48
W1KIK/1.....	146	W3BYE.....	34
W3BZJ.....	135	W2IQQ/2.....	34
W1HDQ.....	118	W2KDV.....	31
W1KLJ.....	111	W1AUN.....	29
W1IJ.....	100	W2ILK.....	27
W3HOH.....	93	W9VHG.....	26
W8CVQ.....	78	W8CIR/8.....	20
W8QDU.....	77	W3EUA.....	19
W3FQS.....	74	W1BDI.....	19
W3CGV.....	64	W8QQS.....	14
W8MDA.....	59	W3FJI.....	13
W8CIR.....	55	W3GGR.....	10
W1CLH.....	52	W1DCH/1.....	8

¹ Each station worked counted 1, 2, 5 or 10 points for distances up to 50, 100, 300 miles and over, respectively. One test message origination counted 10 points with a point for receiving, and 2 points for relaying onward any test message. Stations in the field multiplied the sum of all points by two.

Results of the first U.h.f. Field Day and Relay as they appeared in November, 1939 *QST*. Only 28 entries were received at ARRL Headquarters, although it was obvious by log inspection that many times that number were on the air. W1HDQ (who has participated in every v.h.f. contest ever sponsored by ARRL) says that many of these fellows are still active, although some now operate under different call signs.

HIGHLIGHTS

The weekend of Jan. 7-8, 1967 will go down as one of the best in v.h.f. contest history.

W3MFY, Trevoise, Pennsylvania using 50-432 Mc. made 647 contacts in 27 sections for 47,804 points — the highest score for one operator. Pres broke the all-time record for high-scoring single operators previously held by W3KKN who, in 1963 ran up a 31,968-666-14-ABC total. However, W3KKN still holds the all-time record for most contacts turned in by a single operator station — 6661 Not far behind W3MFY was K3IPM/3 operating portable on Bowman's Hill 35 miles Northeast of Philadelphia. Stan used 50, 144 and 220 Mc. to make 605 contacts in 25 ARRL sections for 42,350 points.

Top multi-op. score was submitted by K8MMM, manned by K8MMM and WA8OXC. These fellows ran up 517 QSOs in 35 sections to just barely slip by their neighbors at K8UQA; 46,530 to 44,896. However, K8UQA's section multiplier was 36 and it becomes the all-time record in the sections worked category, formerly held by W1HDQ who had 32 sections — single-op in 1958.

W8QOH, Ohio award winner and Great Lakes Division leader set a record which may stand for quite a while; 25 sections worked on 144 Mc. W2ORI formerly held the spot for most sections worked on 144 Mc. only, with 18 sections made in 1959.

59 stations reported activity on 220 Mc., an increase of 5 over last year. It should be noted that W3OZP operated 220 Mc. only and made 30 QSOs. 45 stations listed activity on the 420 Mc. band. Quite an increase over the 18 reported to be active last year! K2ACQ of Lockport, New York is still operating 432 Mc. only and has kept the band alive during most ARRL v.h.f. contests in recent years. W4ITU in Virginia operated 144 Mc. c.w. only and racked up 49 QSOs in 20 sections. Note to aspiring multiops: high multiop. score was made by WA2FGK in 1965 with a 53,816-868-21-ABC total. . . . One of the few records to survive after this year's aurora.

Possibly the best indication of the relative success of a v.h.f. contest would be a comparison of the total points scored by all participants. Last year, 1104 entrants made 2,807,947 points. This year, 1123 contestants polled 3,437,484. Anyone out there want to add up the remaining 8 of the last 10 years so we could make a graph? — hi.

Awards are scheduled for mid-June mailing.

Soapbox

"We at ARRL headquarters now believe that there is sufficient evidence to state categorically that an auroral disturbance may have taken place on Saturday, January 8, 1967. . . ."

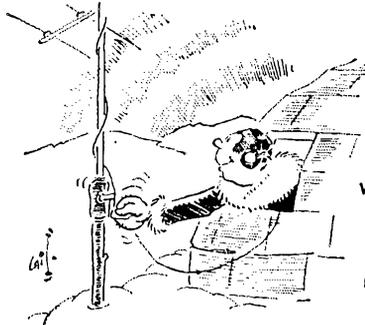
"I wish that I had been able to go on the aurora Saturday night. It was the best I had heard it. Sunday morning,

NOVICE CERTIFICATE WINNERS

WN1GAQ
WN1GFG
WN3FCN
WN3FLN

WN3GHL
WN8UOS
WN8VHG
WN9RNQ

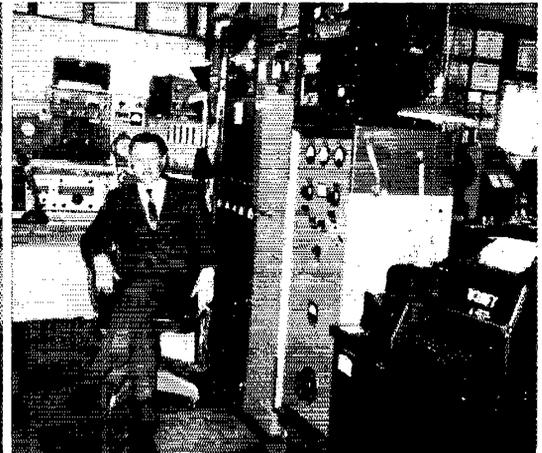
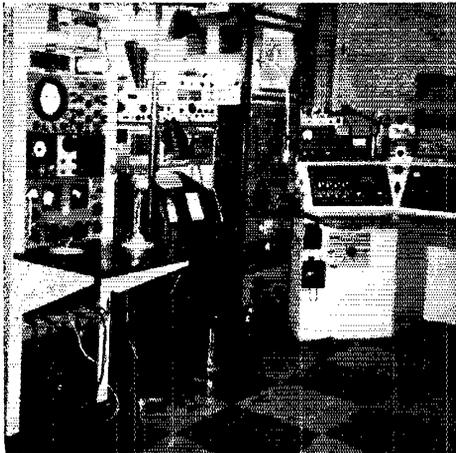
I installed a key jack, but . . . see you in the June contest." — WAIDPU (op. at K1JMQ). "The aurora made it an exciting contest, but activity still seemed to be down." — W1BUJ. "The aurora was terrific and we worked as



WHEN IN DOUBT - AIM NORTH

far south as Virginia. . . ." — WAIFUS/1. "In spite of a snow storm we operated portable at Deering, New Hampshire Saturday afternoon. When I got home, I heard an extensive aurora opening lasting until approximately 11 p.m." — WAIFSZ/1. "That aurora gave a little bit of spice to it but only worked one." — WAIGGB. "Good opening on 6 Saturday night, but too much QRM. No luck here." — W1TAU. "Aurora boosted scores for a.s.b. and c.w. operators, but very few a.m. stations were readable. Side-banders didn't need to switch receivers to a.m. during the aurora. Heard 2, 3, 4, 8, 9 and 0 call areas, but was unable to work them without sideband or c.w. 144 Mc. was unproductive this time. Local activity was high for a January contest." — K1TPK. "Lots of fun! Band very shifty. Fifteen QSOs or so on aurora c.w., 144 Mc." — K2DNR. "Aurora conditions noted all of Saturday night. The Illinois, Ohio, Michigan, W. Pa., W.N.Y., E. Mass. and W. Mass. sections were worked on a.s.b. (finished the 400-watt rig Friday night before the contest). Bands

The "shack" at W3MFY. 50 Mc.: 4-400A final running a kw. to 11 elements at 65 feet; 144 Mc.: 4X250 Brunning 350 watts into a 15-element yagi at 85 feet; 220 Mc.: 6360 running 40 watts (blower used) to an 8/8 J-slot; 432 Mc.: 5894 running 125 watts to an 8/8 J-slot. For receiving, converters feed a 75A-4, SS1-R, SP-600 and Interceptor.

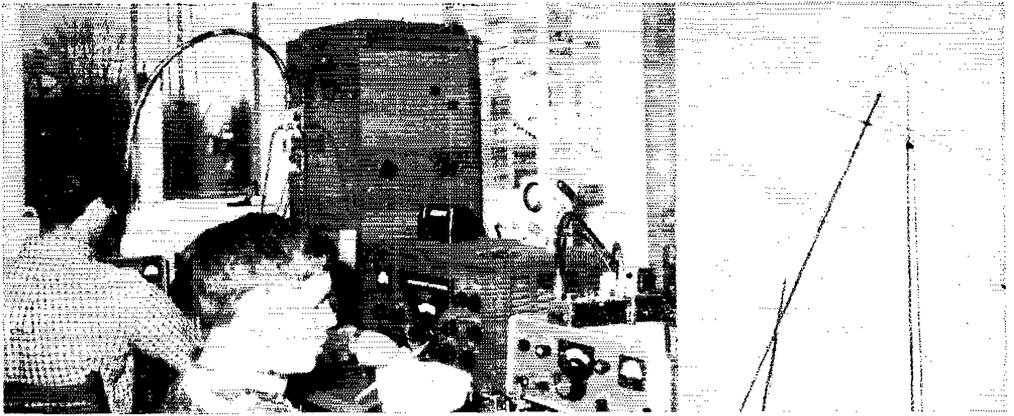


did not open for decent groundwave at any time to my knowledge. C.w. was good on 6 and 2. In general, a very good contest with the aurora conditions." — *W2EIP*. "All 72 contacts were made using s.s.b. The aurora Saturday night and Sunday morning was excellent and very easy to work with sideband. Enjoyed getting my feet wet in the contest again." — *W4EYF*. "The aurora was one of the most spectacular we've heard on the v.h.f. bands. Phone contacts were easily made, thank goodness, since we were without our c.w. capability on 6 meters (of all times). The activity really passed the night away quickly. This was one of the most rewarding contests our club has participated in. We all give 3 cheers to W2OW (our rival club) who beat us again for the umty-umpty time. W2OW — wait till next contest!" — *K2ERQ, IBM Radio Club*. "We all enjoyed the contest and feel that we are picking up skill in this, our third co-operative team effort. We are still puzzled about our poor performance during the extended aurora. Operating from one of the best v.h.f. locations in N.N.J. we have always enjoyed excellent groundwave contacts. Because of this, we ultimately made up for many of the sections we heard but did not work during the aurora. Still, it would have been nice to have added VE1, VE2, Ill., Ind., Maine and Wisconsin sections we heard and repeatedly called. Wait till next time!" — *W2GKR/2*. "If every noisy car that passed was a contact, I wouldn't have missed a QSO with the whole Hudson Division. Never heard so much noise and couldn't copy aurora signs because of it. Next year I'm heading for the hills." — *W2KLD*. "Fine aurora heard from New England and Midwest, but need s.s.b. or chirpless v.t.o. to work it." — *W2LLZ/W*. "Missed most of the Saturday night aurora as I had to work. Lost another steak dinner to K2DUR — people keep telling me that I should bet with someone else!" — *W48SOO*. "Checked 220 Mc. and

432 Mc. for aurora sigs, but none were heard." — *K2LME* (op. at *W4ZWB*). "Lost a '9' on aurora on 2 meter c.w. Stations were not consistent in using GMT and they confused their dates." — *W4ZWL*. "That aurora did wonders for the contest score; now know that I need a v.t.o." — *K2RTH/3*. "Aurora first heard 0020 GMT Jan. 8, first worked 0109 GMT, last station worked via aurora at 0742 GMT, last heard 0750 GMT Jan. 8." — *K3LYC*. "Tried to work the aurora with 600 watts to my 3-element beam on 50 Mc. but when we were hearing aurora stations, the entire central east coast was coming in just as strong. Solution: do not attempt to work a contest under crowded band conditions with a 3-element beam on top of a 1900 foot mountain. The power and height help but so does a more directional beam." — *K3ARR*. "It's always surprising how the band can open for a contest. This was the best aurora since the 50s. Had only 70 watts p.e.p., s.s.b. but have no complaints — it was a swell contest." — *W3BWU* (op. of *W43BAK*). "On 6 meters, most sections were worked by aurora although groundwave was passable and some scatter was worked to Okla., Fla., Kansas and almost Nebraska, darn it!" — *W3ZGI* (op. at *W3KWH*). "Too many fellows are refusing to tune off their transmitting frequency. The v.h.f. bands are too wide for this type of nonsense. During the aurora this was particularly bad." — *W3LUL*. "Only heard scattered signals from the 8th and 9th call areas. Several 9s called me late Saturday night but couldn't pull them through." — *K4WIIW*. "Activity on both 6 and 2 was the worst ever experienced here in Virginia. I heard many call areas Saturday night during the aurora but my 25 watts failed to break into the melee." — *K4FJW*. "Missed the aurora Saturday night by going to bed early. However, I did make contacts via 'E' backscatter. Six meters was open

CLUB SCORES

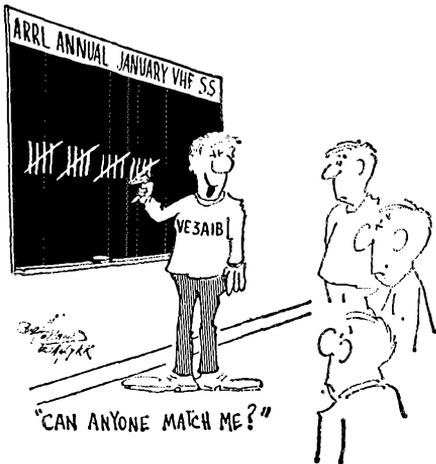
Club	Aggregate	Valid Entries	Certificate Winner	Club	Aggregate	Valid Entries	Certificate Winner
Mt. Airy V.H.F. Club (Pa.)	771,320	96	W3MFPY	Hartford County Amateur Radio Assn. (Conn.)	16,222	3	W1HDQ
South Jersey Radio Assn.	270,242	54	WA2EMB	Communications Club of New Rochelle (N. Y.)	16,150	3	.....
Rochester V.H.F. Group	245,218	105	K2YCO	Penn Wireless Assn. (Pa.)	15,275	8	K3HNP
Cleveland 50 Mc. DX Club (Ohio)	103,428	3	.....	Lawndale Chicago Boys' Club Amateur Radio Assn. (Ill.)	14,474	14	K9YHB ²
Midwest V.H.F.-U.H.F. Amateur Radio Assn. (Ill.)	90,998	37	WA9OUU	San Diego V.H.F. Club	12,859	16	W6NLO
Albany Amateur Radio Assn. (N. Y.)	77,675	49	WA2DTE	Connecticut Wireless Assn.	12,586	3	K1HTV
Greater Pittsburgh V.H.F. Society	63,474	31	K3ZVB	Ottawa Amateur Radio Club	12,200	9	VF3CFA
Mobile Sixers Radio Club (Pa.)	59,865	18	W3IZU	Scarborough Amateur Radio Club	11,900	11	3C3E2C
Hampden County Radio Assn. (Mass.)	58,841	33	K1ANF	Central Michigan Amateur Radio Club	11,778	8	W8CKK
Dayton Amateur Radio Assn.	56,393	30	WA8AKK ¹	Willimantic Radio Club (Conn.)	11,699	3	W1RJA
6 Meter Club of Chicago	51,495	20	WA9FIH	Fulton Amateur Radio Club (N. Y.)	7,418	6	K2DUR
Reading Radio Club (Pa.)	51,122	34	W3BN	Huntsville Amateur Radio Club (Ala.)	7,009	11	WA4DBQ
1200 Radio Club (Mass.)	49,186	21	W1QIB	Mid-Island Radio Club (N. Y.)	5,365	4	W2SEU
East Coast V.H.F. Society (N. J.)	42,212	12	WB2KPD	6 Meter Club of Dallas	5,263	9	K5IVB
Germentown Radio Club (Pa.)	35,340	7	WA3BKP	North Penn Amateur Radio Club (Pa.)	5,122	3	W3ZGG
Rock Creek Amateur Radio Assn. (Md.)	33,176	21	W3LUL	Irving Amateur Radio Club (Tex.)	4,066	3	.....
V.H.F. Hillbillies Amateur Radio Club (Pa.)	30,142	4	K3LNU	University of Maryland Amateur Radio Assn.	3,948	4	WA3EOP/3
Central New Jersey V.H.F. Society	27,892	10	WA2W1L	Syracuse V.H.F. Club	3,866	5	W2JVD
6 & 2 Ham Club (Ill.)	25,486	10	W9EET	Argonne Amateur Radio Club (Ill.)	3,804	3	K9HPW
Delaware 6 Meter Net	23,408	6	K3UHU	Springfield Amateur Radio Club (Ohio)	3,802	4	WA8IKN
Dutchess County V.H.F. Society (N. Y.)	22,588	6	K2DNR	Greater New Orleans Amateur Radio Club	3,264	3	WA5DXA
Gloucester County Amateur Radio Club	21,424	8	WB2RVE	Lake Success Radio Club (N. Y.)	1,674	3	W2TUK
Bergen Amateur Radio Assn. (N. J.)	20,202	11	WA2ZWB	San Fernando Valley Radio Club	1,537	6	WB6GFD
Skokie Six Meter Indians (Ill.)	18,455	11	WA9ERB	Fidelity Amateur Radio Club (R. I.)	1,368	3	WA1BJS
Hamfesters Radio Club (Ill.)	18,416	5	WA9MSZ	West Jersey Radio Amateurs (N. J.)	1,114	3	K2QIJ
Southern California V.H.F. Radio Club	17,940	10	WA6WKF	W8UU, opr.			W9AJD, opr.
Rancocas Valley Amateur Radio Assn. (N. J.)	17,312	4	WB2LWZ				



Top score in the contest was amassed at **K8MMM**, a familiar call to most 50-Mc. enthusiasts. This station was operated as a joint effort by Neil, **WA8OXC** and Tom, **K8MMM**. Their total was an almost unbelievable 46,530-517-35-AB. The six-meter transmitter (left), ran 1 kw. input to an Amperex 6076 in AB₁ linear for s.s.b. and also class C for a.m. work. The two meter station at **K8MMM** ran 125 watts with a 75A-3 and crystal converter for receiving. Antennas in the right photo show the pair of 5-element beams up 125 feet, used on 50 Mc., and the 15-element yagi up 35 feet used on 144 Mc. Tom's station certainly made an impression with ON5DS from Belgium, who visited Tom last summer. A complete description of this outstanding v.h.f. station appears in a recent issue of *CQ/QSO*, a Belgian amateur radio magazine. This interest in the 50-Mc. band on the part of Belgian amateurs is significant mainly because the Belgians do not, at present have any 50-Mc. privileges! If someday, you hear an ON5 on six meters, you can thank Tom, **K8MMM** (left) and Neil, **WA8OXC** (right).

to old Mexico so I turned the beam toward the 'hot' spot and worked 3 North Texas stations. I also worked W. Pa. on Iono-scatter." — **W5WAX**. "My first v.h.f. contest and I worked 3 new states. That aurora Saturday night sure helped the section multipliers." — **W4ASV**. "I really had a ball! The aurora opening was sure something. Many stations were good copy on a.m. I worked and confirmed 5 new states. Thanks for putting on these contests!" — **W4REOW**. "Was a great contest. The aurora really helped things out on 50 Mc. I was real glad to hear all the c.w. stations on 6." — **W4RFTA**. "The biggest aurora I ever heard comes along and I just sit back in awe to see how extensive it was. However, I did get 5 new states including Del., but not many QSOs." — **W8HQL**. "A good aurora opening hampered by an obstinate antenna rotor!" — **W8RBB**. "A good contest with the aurora opening providing the stimulus to keep more stations on the air. During the height of the opening, the first 100 kc. (of the phone portion) was all s.s.b." — **W8RPA**. "W8QOH gave me the 'ha, ha!' with his NR 91 when I had only 45. High winds damaged the antenna, so had to take it down, make repairs and put it back up after the contest started.

I got back on in time for the aurora but several of the stations worked were so excited, they Oked my message without sending theirs." — **W8WEN**. "Auroral opening here was terrific. Worked W3HC in Delaware for a new state on 144 Mc." — **W9BRN**. "Band conditions on both 6 and 2 excellent during aurora opening." — **W4JFM**. "Heard my first aurora Saturday night with stations coming in from New England to the Plain states." — **W490NY**. "Best aurora in years. Heard VE4RE and a VE3 but could not work them. Also missed Arkansas again, but one of these days!" — **W0PPP**. "Nice aurora Jan. 8. Worked more Illinois stations than Minnesota stations." — **W0RLI, Minn.** "Very mediocre contest until the aurora opened the 2-meter band Saturday evening. This condition gradually tapered off around midnight." — **VE3EVTW**. "Couldn't get U.S.A. stations to answer 3C call in aurora. Had to use VE to get answers on c.w." — **3C8FZC/VE3EZC** (Canadians holding VE licenses may substitute 3C in honor of the Canadian Centennial which began January 1, 1967 and ends December 31, 1967. VO stations may substitute 3B). "I operated from my home QTH for this contest with a new call sign (formerly VE2BZH) and a new rig on 2 meters.



"VE3AIB has been in all 20 ARRL VHF Sweepstakes contests"

DIVISION LEADERS

Single Operator		Multioperator
W3MFI	Atlantic	W2PAU
WA9OUU	Central	W9MCG
K8DTA	Dakota	.....
WA4YKN	Delta	.....
W8QOH	Great Lakes	K8MNM
WA2WZP	Hudson	W2GKR/2
W9ECV/Ø	Midwest	WAØPOY
W1MEH	New England	WA1ACD
WA7BTG	Northwestern	.....
WA6GYD	Pacific	K6JHV/6
K4SUM	Roanoke	W4GG/4
WØAJY	Rocky Mt.	K7HEN/7
K4WHW	Southeastern	K2PSX/4
WA6WKF	Southwestern	K6BPC
K5IVB	West Gulf	K5AVT/5
VE3CUA	Canadian	VE3ZZZ

A very good aurora opening was experienced in the area which accounted for most of my multipliers. — VE2BU.

"Would you believe skateboard mobile with a Lafayette HA-650?" — K3QMK/3. "Best contest — heard more people!" — K3UVH. "220 Mc. activity in the Washington D. C. area is nil. Only one station was worked with 65 watts output to a 26-element array." — WAEOP/3. "I further swear that I'm either going to get some high-powered s.s.b. gear or spend the next contest in the nearest convenient gin mill!" — K3LNZ. "No 'E' skip observed from this QTH. Groundwave was poor for most of the contest." — WA5LPT. "Love contests." — W3MOH. "It's the first time Albany High School's club station has entered a contest, but it won't be the last!" — WB2PUH (op. at W2YFN/2). "My first 6-meter experience — going to get better gear and give it a go. Very thrilling to hear W1HDQ consistently, c.w. and phone on 6 and 2." — W2GKZ. "My first contest. I never thought there could be QRM to 2 meters." — WB2YZE. "A very good contest. Six meters was just as active as 2 meters. Looking forward to another contest from the S.J.V." — W3BHIL. "Sure was a far cry from September. But I had to work this weekend. So, to be a sport, I ran 2 watts output and had a ball!" — WA4LTS. "The activity was fair. Not as good as I wanted but better than last January." — WA6GYD. "I had a wonderful time working the contest. I wish I had gotten on the air earlier." — W48JPA. "Does everyone have generator trouble?" — W5XSS/5. "I may not win, but I tried real hard!" — WA3GYT. "Biggest thrill was working

K0PWR in Minnesota with my Clegg 66'er." — WA9OFF. "This was my first contest and I hope the first of many more to come. Worked a new state in the SS." — WA8RUO. "A t.v.i. complaint kept us on 144 Mc. only Saturday night or else the score would have been much higher." — W2ATT/2. "This was our club's first contest and even though we may not have done so well, the members have learned a lot and gained experience." — WB2LZM (op. at WA2THR). "... do say thanks to my OM, WA8JYK, who climbed to the top of our 50 foot tower in snow with 35 mile an hour winds to hang a 3-element 2 meter beam under the 10-element 6 meter beam. We are looking forward to the QSO party in June." — W40PO (Ed note: we wonder if the OM is looking forward to June?). "Just let me say 'thanks' for the fine job — you can count on our continued support of the League." WA1CLR. "All operation mobile on street about a block from my home (antennas down) using halo on car and 12 volt transistor transceiver (QST, Dec. 1964)." — W100P/1. "None of us slept a wink during the contest as the contacts rolled in." — WB2QJN/2. "I had a very enjoyable time in the contest." — WA1CWG. "We all enjoyed the contest and intend to participate in more." — WA1FUS/1. "Despite low activity and high noise levels, this was the best contest yet for me." — WB8110. "I do regret hearing and working only one other Novice here in R. I." — W1N1GPG. "I called and called but heard only a few W6s and 7s. Sure wish the W7s would turn their beams during contests!" — VE7AXU.

In the tabulation on the next pages, scores are listed by ARRL divisions and sections. Unless otherwise noted, the top scorer in each section receives a certificate award. The highest-scoring Novice also receives a certificate in each section where at least three such licenses submitted valid contest logs. In sections with fewer than 3 Novice entries, a certificate will be awarded to the highest scoring Novice . . . displaying exceptional effort; asterisks denote these winners. A double asterisk denotes a headquarters staff member, ineligible for an award. Columns indicate final score, number of contacts, number of different sections worked, and the bands used. A represents 50 Mc., B 144 Mc., C 220 Mc., D 420 Mc. Multi-operator stations are shown at the end of each section tabulation.

ATLANTIC DIVISION

- Delaware*
- K3UHU 10,080-252-10-A
 W3EC 4646-101-13-AB
 W3CGV 4066-107-9-ABCD
 K3URP 2526-79-6-A
 W3BDP 2088-43-14-AB
 K3NYG 1184-37-6-AB
 K3FFD 1050-35-5-A
- Eastern Pennsylvania*
- W3MFY 47,804-647-27-ABCD
 K3IPM/3 42,350-605-25-ABC
 WA3AC 33,660-495-24-ABC
 W3LHF 27,520-430-22-ABC
 K3IUU 22,240-415-18-ABCD
 W3CL 19,632-409-14-ABC
 W3MXW 18,290-297-21-AB
 K3MTK/3 (WA3BC),
 (op.) 17,577-332-17-AB
 K3DUU 17,262-411-11-AB
 W3HFY 16,320-272-20-ABC
 W3IZU 15,714-296-17-AB
 K3AUH 15,408-321-14-ABC
 K3JJZ 14,458-391-9-ABCD
 W3CXU 14,196-273-16-AB
 WA3EFS 14,184-394-8-AB
 K2RTH/3 13,568-212-22-AB
 K3LNU 13,456-237-19-AB
 WA3BIV 12,924-359-8-ABC
 K3GAS 12,060-335-8-ABCD
 K3ZV1 12,024-334-8-AB
 W3HKZ 11,676-278-11-ABCD
 WA3CQO 11,254-331-7-ABC
 K3UJD 11,196-311-8-ABCD
 K3EOD 11,160-310-8-AB

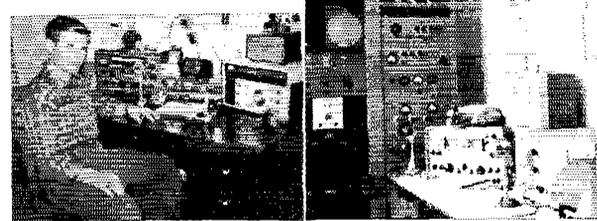
- W3CJU 10,836-301-8-ABCD
 W3HAB 10,836-301-8-AB
 K3KVS 10,412-274-9-ABC
 W3MVF 9792-272-8-ABC
 WA3EHD/3 9656-284-7-ABC
 K3UCI 9408-226-11-AB
 K3NMIN 9060-302-5-AB
 W3GFW 8576-268-6-AB
 K3GQJ 8246-217-9-ABC
 WA3EHL/3 8058-237-7-AB
 K3HSS 8032-251-6-ABC
 K3ARR 7791-185-11-ABC
 K3ZPF 7208-212-7-AB
 K3CAR 7077-169-11-A
 K3BOY 7072-221-6-AB
 W3BN 6840-190-8-AB
 W3ELL 6800-170-10-AB
 K3FYU 6732-198-7-A
 K3JMK 6681-197-7-AB
 K3LNV 6240-195-6-A
 W3BBC 6144-192-6-AB
 K3KUB 6120-170-8-AB
 W3HIX 5916-174-7-ABC
 WA3EHT/3 5880-196-5-A
 W3ETB 5760-192-5-A

- K3EPB 5850-185-5-AB
 K3ILJ 5434-143-9-AB
 K3AGR 5372-158-7-A
 W3FGQ 5310-177-5-AB
 W3SMK 5256-147-8-AB
 K3HQX 5238-146-8-AB
 K3FQP 4960-155-6-A
 K3MXM 4732-169-4-A
 K3WEU 4648-166-4-A
 K3YPL 4592-164-4-A
 K3IHP 4480-149-6-A
 K3PXT 4480-160-4-A
 W3GEC 4428-123-8-A
 W3AJF 4388-129-7-ABC
 WA3EVQ 4104-108-9-AB
 W3NSI 3990-133-5-ABC
 W3AWA 3960-133-5-A
 W3SLW 3780-126-5-A
 W3ZGG 3780-106-8-AB
 W3JSD 3752-134-4-ABC
 K3VEQ 3744-117-6-ABC
 K3OBY 3640-130-4-ABC
 WA3BKP 3600-100-8-A
 W3ISV 3540-118-5-A

- K3BCF 3536-104-7-A
 W3BRU 3444-123-4-A
 K3BHK 3434-101-7-B
 W3NGHL* 3424-107-6-B
 W3QAB 3420-114-5-ABC
 K3BNS 3390-113-5-AB
 K3MGO 3384-94-8-AB
 W3IA 3332-98-7-B
 WA3ERQ 3302-127-3-AB
 W3KKN 3198-123-3-AC
 WA3GOC 3192-114-4-A
 K3ABK 3164-113-4-AB
 K3GFG 3094-119-3-ABC
 WA3CND 3016-116-3-A
 W3HYO 2890-85-7-B
 K3TEF 2782-107-3-AB
 WA3BRV 2744-98-4-A
 K3KTY 2664-111-2-AB
 W3WED 2628-79-6-B
 K3FOC 2436-87-4-AB
 WA3ETM 2436-87-4-AB
 WA3FPK 2310-83-4-AB
 K3TPM 2290-76-5-AB
 W3FEY/3 2268-63-8-BD

- K3LNL 2240-80-4-AB
 W3IATV 2240-70-6-BC
 W3WJF 2210-85-3-AB
 WA3DPB 2160-72-5-A
 WA3BXE 2040-85-2-A
 K3YJG 1988-71-4-AB
 K3IOJ 1976-76-3-AB
 WA3BRO 1932-69-4-AB
 K3ZWO 1904-69-4-A
 K3A. 1890-63-5-A
 WA3EOR 1859-72-3-AB
 W3BAH 1848-66-4-AB
 W3ZAC 1833-71-3-AB
 WA3BHE 1800-60-5-AB
 WA3BGM 1742-67-3-A
 K3GYN 1680-56-5-A
 W3RAV 1538-64-2-AB
 W3GHI 1440-60-2-AB
 K3YIZ 1426-31-4-AB
 K3WQO 1408-84-1-AB
 K3ESL 1320-55-2-A
 WA3FYR 1300-50-3-A
 K3DLS 1274-49-3-BC
 W3GCS 1268-41-4-AB
 W3GXR 1128-47-2-BC
 W3MCCX 1080-45-2-AB
 K3SZG 1066-41-3-AB
 W3BQU 1064-38-4-AB
 W3YPT 1056-44-2-A
 WA3ET 984-42-2-B
 W3MB 968-44-1-B
 WA3GYI 924-41-2-AB
 W3KXH/3 912-38-2-A
 WA3APN 880-41-1-AB
 W3EYN 836-39-1-B
 W3MOP 780-30-3-C
 W3MPX 756-27-4-A
 W33FKM 715-28-3-B
 WA3GXU 690-41-1-AB
 K3ALK 676-26-3-AB
 WA3GTR 638-29-1-AB
 K3GQ/3 600-25-2-A
 W3MPT 600-15-10-B
 K3YNN 550-25-1-B
 K3MPT 546-21-2-A
 WA3BTE 546-21-3-A
 W3ZRR 528-22-2-B
 W3GOCY 528-21-1-B
 W3CDS 508-23-1-B
 K3EFG 494-19-3-AB
 K3EYV 484-22-1-B
 W33FXE 462-22-1-B
 WA3CND/3 456-10-2-A
 WN3GJR 440-20-1-AB
 K3ALQ/3 432-18-2-AB

Below, North Texas' **WA5OTR** with 12 watts to 5 elements on 50 Mc. managed to work K8UQA in Ohio during the contest. Wiley, WA5OTR heard XE1PY in Mexico but missed the rare foreign multiplier this time. At the right is a photo of the **XE1PY** operating position. Rusty handed out "Mexico" to three lucky contesters in North Texas: K5AVT/5, WA5BAMK and K5IVB. A view of XE1PY's 102-foot tower appeared on page 80 of January, 1966 QST.



K3CBF 418-19-1-B
 K3KBB 418-19-1-B
 K3KBL 396-18-1-A
 WA3EHD 384-16-2-A
 WN3FYL 384-16-2-B
 W3FFA 364-14-3-B
 K3RJK 386-15-1-A
 W3IXO 240-10-2-A
 WA3BPV 198-9-1-B
 K3ZFD 182-7-3-B
 K3QMK/3 154-7-1-A
 WA3DKZ 120-5-2-A
 W3EFC 110-7-1-B
 K3JQH 96-4-2-B
 K3ZDI/3 (5 oprs.)
 18,186-433-11-AB
 W3C3C (K3ZPN,
 W3SAO)
 12,636-351-8-ABC
 W38A Q1K3ZPN,
 W3SAO)
 12,600-350-8-ABC
 K3YFD (8 oprs.)
 9465-320-5-AB
 W3CLQ (K3DLS,
 W3CLQ)
 9200-230-10-AB
 K3WGW (K33 WGW
 WGW)
 5852-154-9-ABC
 WA3DMT (W33's DAIT
 PKM) 4800-150-6-A
 K3WGW (K33's WGW
 WGW)
 4164-124-8-ABC
 Md.-D.C.
 W3LHL 5350-107-15-AB
 WA3ELA 5168-136-9-AB
 WA3CBC 4009-106-9-AB
 K3FPE 3600-120-5-AB

WA2EMB 21,330-356-20-ABCD
 WA2HSP 20,940-349-20-AB
 W2AXU 20,480-320-22-ABCD
 W2REB 18,314-333-19-AB
 W2BV 16,830-255-23-B
 W2N8F 12,720-265-14-AB
 WB2NW 11,590-305-9-AB
 W2OQN 10,480-262-10-AB
 W2ZUL 9724-286-7-AB
 W2BLV 9600-150-22-B
 WB2CDP 7820-230-7-AB
 WB2RVE 7056-196-8-AB
 WB2JEP 6784-178-9-B
 W2JAV 6588-183-8-AB
 W2EWN 6477-191-7-AB
 W2LVW 6464-202-6-AB
 WB28ZK 6444-179-8-ABC
 WB2LWZ 6300-175-8-A
 WA2QZQ 5180-185-4-AB
 K3PXT/2 4370-115-9-B
 K2SQM 4360-109-10-A
 W2HWW 4248-118-8-A
 WB2MNN 4000-125-6-A
 W2VX 3944-116-7-B
 WA2EYI 3600-72-15-A
 WB2SIF 3570-105-7-AB



The operating position at WA6GYD. The station is located on Mount Hamilton (4200 feet above sea level), in the Santa Clara Valley section. Don worked 50, 144 and 220 Mc. to obtain a 7596-211-8-ABC listing, a truly outstanding score for a station on the West Coast. WA6GYD is looking for 220 Mc. skeds and has sent a good deal of information concerning activity out his way on the 1 1/4-meter band which appears in "The World Above 50 Mc." column, elsewhere in this issue.



The K2PSX/4 crew rented a cabin for the VHF SS with all the comforts of home.

Western New York
 E2YCO 14,210-245-19-ABD
 W2FDI 13,268-214-21-ABD
 K2ISP 12,064-208-19-A
 VE3CRU/W2 10,010-193-16-ABD
 WB2NFI 7550-151-15-A
 W2MPM 7436-169-12-AB
 K2CEH 6950-132-15-ABD
 WA2TEY 6720-160-11-AB
 W2UTH 5880-140-11-ABD
 WA2AJB 5550-111-15-A
 W2QY 5542-163-7-AB
 WA2KND 5508-162-7-ABD
 W2ALL 5184-108-14-ABD
 WA2GCF 5100-150-7-AB
 WB2OEU 4944-103-14-AB
 K2WW 4864-128-9-AB
 WB2MAB 4796-109-12-A
 WA2KVN 4370-115-9-AB
 K2JA 4186-161-3-AB
 WA2THS 3960-90-12-AB
 W2BPE 3900-78-15-B
 W2BOC 3840-80-14-A
 K2DUR 3800-95-10-AB
 WA2LHM 3570-106-7-AB
 WA2YPT 3344-152-1-AB
 K2RQU 3096-86-8-AB
 K2RHS 3048-127-2-A
 K2LJG 3000-60-15-B
 W2OWF 2976-92-6-AB
 W2JFL 2964-114-3-AB
 K2RZL 2816-128-1-AB
 WB2HLI 2574-117-1-AB
 WA2HWG 2288-104-1-AB
 W2RIS 2280-76-5-A
 W2ADN 2272-71-6-AB
 W2WGL 2204-36-19-B
 W2YBK 2178-99-1-AB

K3LNZ 3434-101-7-AB
 W3HB 3234-77-11-AB
 K3RWY 2262-87-3-AB
 WA3EOP/3 180-75-2-ABC
 K3GMB 1896-53-6-AB
 K3PPB 1596-57-4-AB
 W3PIH 1484-53-4-AB
 W3AIR 1480-37-10-B
 K3LFX 1404-54-3-AB
 WA3GBK 1360-40-7-B
 K3VWY 1260-45-4-A
 WA3EOQ/3 1080-36-5-B
 K3QSZ 976-37-3-AB
 W3KUH 936-36-3-B
 W3CPM 898-37-2-B
 W3RGX 720-30-2-B
 W6UQP/3 702-27-3-B
 K3ZOD 676-36-4-A
 W3MNE 588-21-4-B
 W3LWP 462-21-1-B
 W3AEA 456-19-2-B
 W3FNU 432-18-2-B
 W3BNL 330-15-1-B
 K3LZX 312-13-2-A
 WA3AJD 312-13-2-B
 WN3FCN* 240-10-2-B
 W3JEH 216-9-2-B
 W3YAG 192-8-2-B
 W3GYZ 130-6-3-B
 WN3GL 130-5-3-B
 K3SVP (K3JWH,
 W3JJJ)
 13,268-214-21-AB
 Southern New Jersey
 W2EIF 25,200-504-15-ABCD

WB2YEH 3556-127-4-A
 W2GQO 3536-104-7-AB
 WA2ON 3420-90-9-A
 WB2JGA 3280-103-6-AB
 K2DFE 3211-85-9-AB
 WB2EEH 3150-105-5-ABC
 WA2MGV 3024-108-4-AB
 WB2VFX 2856-102-4-AB
 WB2YHF 2800-100-4-AB
 W2ORA 2704-104-3-A
 K2BXP 2604-93-4-AB
 WB2OAD 2560-80-6-AB
 WB2YOU 2380-85-4-A
 WB2FOC 2210-85-3-AB
 WB2YXP 2132-82-3-B
 WA2WGB 2100-70-5-A
 W2GYB 2002-77-3-AB
 W2NSJ 1846-71-3-AB
 WA2TDI 1846-71-3-A
 W2FYS/2 1530-51-5-B
 WB2UVO 1512-63-2-B
 WB2TEN 1400-50-4-A
 WB2LZW 1352-52-3-A
 WA2SFY 1344-48-4-A

WA2SOO 2100-70-5-AB
 WA2ZNC 1584-72-1-AB
 WB2MAC 1988-71-4-A
 WB2NOG 1568-56-4-A
 WA2KMI 1848-84-1-AB
 WB2RVV 1562-71-1-AB
 WA2TJS 1804-82-1-A
 WB2JUH 1760-80-1-AB
 WA2ZYH 1738-79-1-AB
 W2VVG 1518-69-1-A
 WA2FAR 1450-65-1-A
 WB2QNB 1738-79-1-ABD
 WB2QFT 1430-65-1-A
 K2GMZ 1716-78-1-AB
 WA2YSG 1392-58-2-ABD
 K2YRZ 1712-54-6-B
 W2ICE 1364-62-1-AB
 WB2IUM 1364-62-1-A
 WB2GJL 1680-60-4-A
 K2QPC 1342-61-1-A
 WB2NXL 1650-75-1-AB
 WA2UFV 1342-61-1-A
 W2UAD 1632-68-2-B
 WB2SNA 1320-60-1-A
 WA2YRH 1628-74-1-ABD
 WB2RIY 1298-59-1-AB
 WB2DCC 1608-67-2-A
 WB2INN 1276-58-1-AB
 WB2VZH 1606-73-1-AB
 K2MGT 1144-52-1-AB



W8QOH of Cincinnati, Ohio worked 25 sections on two meters. With a final score of 12,810, Paul is the Great Lakes Division high scorer (single-op.). The rig at W8QOH ends up with the 6N2 Thunderbolt 1000-watts input class C on c.w. Paul will be active this summer (beginning with the June meteor showers) at his second station in Arkansas, W5BAU. Skeds anyone?

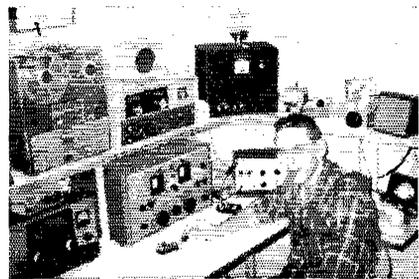
WA2GLA 1020-34-5-A
 WA2JMF 990 45-1-A
 K2YMM 846-43-1-B
 W2JVD 944-30-6-A
 K2WYS 924-42-1-A
 K2MBJ 924-42-1-A
 WA2UCG 902-41-1-B
 K2DHA 890-40-1-B
 WA2AQW 880-40-1-A
 WA2LYZ 880-40-1-A
 WA2YFM 880-40-1-A
 WA2AI 858-39-1-B
 WA2HFL 858-39-1-B
 K2AVA/2 840-35-2-AB
 W2SA 840-35-2-AB
 W2BIZ 814-37-1-AB
 W2JFD 792-36-1-A
 K2AOC/2 746-35-1-B
 K2QVC 748-34-1-A
 WA2PEX 726-33-1-AB
 K2PEY 704-32-1-ABD
 K2BRE 682-31-1-A
 K2UCI 638-29-1-A
 K2ZIF 638-29-1-AB
 W2EIV 638-29-1-AB
 K2PKK 624-26-2-AB
 WA2WBE 624-26-2-AB
 W2RHC 600-25-2-AB
 W2BKC 594-27-1-B
 WB2KWZ 594-27-1-AB
 WB2SER 572-26-1-AB
 WN2ZEO 572-26-1-AB
 WA2PWT 572-26-1-AB
 WB2YHD 506-23-1-A
 WA2YU 506-23-1-AB
 K2UXF 396-18-1-AB
 K2YMH 396-18-1-A
 WA2UTM 374-17-1-A
 WA2ZXU 374-17-1-AB
 WA2GVH 352-16-1-AB
 WB2SMD 352-16-1-AB
 W2BRD 352-16-1-AB
 W2EER 330-15-1-AB
 WR2NTE 308-14-1-AB
 W2RKC 300-25-2-AB
 K2HBY 286-13-1-A
 W2TZB 264-11-2-AB
 K2ACQ 234-9-3-D
 W2ZPL 234-9-3-B
 K2MAJ 220-10-1-A
 W2REB 220-10-1-A
 WA2ZXT 220-10-1-A
 WA2ZUG 176-9-1-A

WB2MCP 176-8-1-B
 W2OW (14 oprs.) 10,892-108-17-AB
 K2ERQ (8 oprs.) 3303-181-13-AB
 WB2VPY (19 oprs.) 4520-113-10-A
 W2TRS/2 (3V2TR) WA2YGG, WB2TFW) 3248-116-4-AB
 WN2ZEA 550-25-1-B
 WA2CEC (W2CEC, WB2VLE) 276-12-2-AB
 Western Pennsylvania
 K3ZVB 11,286-172-23-AB
 WA3BAK (WB3WU, opr.) 8100-128-15-AB
 K3FQG 2366-91-3-AB
 WA3ANO 2108-82-7-AB
 K3WNV 1890-63-5-A
 K3EDO 1846-71-3-AB
 WN3FLN* 1764-63-4-B
 K3HLC 1716-68-3-AB
 K3YXJ 1624-58-4-A
 K3NOA 1586-61-3-AB
 K3VAS 1248-52-2-AB
 K3FIW 1152-48-2-A
 K3QBI 1122-51-1-A
 W3DJM 1082-39-4-A
 WA3BE 1082-39-4-A
 K3WOD 960-40-2-A
 K3WNY 952-34-1-AB
 WA3DLY 910-35-3-A
 K3TTP 858-33-3-AB
 WA3FMU 726-34-1-A
 K3RGT 606-29-2-A
 K3TRN 672-28-2-AB
 K3AZP 638-29-1-A
 K3VYN 506-23-1-A
 WA3GHP 484-22-1-A
 W3DGP 374-17-1-A
 W3TDW 363-17-1-A
 K3THL 352-16-1-A
 K3IAVT 242-11-1-A
 WN3RYP 132-6-1-B
 K3EHR 108-5-2-A
 W3KWH (W3ZGI, WA8OVD) 16,341-210-29-AB
 K3HKK-3 (4 oprs.) 12,555-203-21-ABD
 W3WLF (2 oprs.) 44-2-1-AB

CENTRAL DIVISION

Illinois

WA9OUU 16,384-257-22-A
 W9OIT/9 8550-171-15-R
 K9RVG 6800-200-7-B
 WA9JKT 6552-182-8-AB
 WA9FIH 5264-188-4-AB
 K9ZWU 4984-178-4-ABC
 K9ZVW 4958-177-4-ABC
 WA9OZC 4808-134-8-AB
 K9YHB (WA9FJD, opr.) 4746-113-11-AB
 WA9ERB 4664-106-12-A
 W9EFT 4608-128-8-AB
 W9YFF 4420-85-16-R
 WA9BJZ 4298-154-4-AB
 WA9TMC 4256-152-4-AB
 W9VWY 4068-113-8-B
 WN9RQ 3930-131-5-B
 WA9MSZ 3752-134-4-AB
 WA9IWT 3744-117-6-AB
 WA9FXH 3724-133-4-AB
 WA9ORQ 3640-130-4-AB
 WN9SGC 3550-127-4-AB
 W9DJZ 3488-109-6-AB
 WA9CUT 3296-103-6-A
 K9BAO 3136-112-4-AB
 W9GFF 2968-106-4-AB
 W9GIM 2940-105-4-AB
 K9RIF 2788-82-7-AB
 W9ZFW 2782-107-3-AB
 K9FHM 2756-106-3-AB
 K9YJQ 2688-112-2-AB
 K9IWA 2472-103-2-B
 W9DJD 2430-81-5-B
 K9RHW 2352-84-4-AB
 WA9RSN 2352-84-4-AB
 WA9NVB 2324-83-4-AB
 WA9PVT 2250-75-5-A
 WA9JLL 2232-93-2-AB
 W9EHU/9 2106-81-3-B
 WA9TJT 1968-82-2-B
 K9DTE 1960-70-4-A
 K9ELZ 1980-70-4-A
 WA9KJ 1848-66-4-A
 WA9BXT 1800-75-2-AB
 W9CEK 1794-69-3-A
 WA9OKA 1768-68-3-A
 WN9SLD 1764-64-4-AB
 W9FVB/9 1752-73-2-A
 WA9EMD 1716-66-3-AB
 WA9HIR 1716-66-3-AB
 W9RPH 1708-61-3-AB
 WA9NVG 1708-61-3-AB
 K9RCN 1608-67-2-AB
 K9HJJ 1608-73-1-AB
 WA9RLA 1586-61-3-AB
 WA9FYB 1430-65-1-AB
 WA9PAI 1404-54-3-AB
 W9PMJ 1320-55-2-AB
 WA9JMA 1320-55-2-AB
 WN9SDA 1296-54-2-B
 WA9KUX 1276-58-1-A
 WA9KJX 1248-48-3-AB
 WA9BBZ 1224-51-2-B
 WA9KAN 1216-39-6-A
 K9SZT 1200-50-2-AB
 W9AUY 1200-50-2-AB
 K9SYA 1196-46-3-A
 K9KLA 1170-45-1-A
 WA9SEQ 1144-52-1-A
 K9QYT 1128-47-2-A
 W9AXT 1092-42-3-AB
 WA9EFG 1092-42-3-AB
 WA9GAV 1092-39-4-A
 K9BBN 1080-36-5-AB



Michigan Novice Award winner with 47 QSOs in 5 sections is **WN8VHG** of Jackson, Michigan. Brian runs a TX-62 to an 8 element beam at 58 feet. The receiving system consists of an Ameco CN-144 ahead of an HQ150.

WA9EJD/9 1034-47-1-A
 W9TOY 990-45-1-AB
 K9TBN 960-40-2-AB
 WA9QD 924-33-4-AB
 WA9NTC 924-42-1-AB
 WA9RCO 924-43-1-AB
 K9VTV 840-35-2-A
 K9IOA 832-32-3-AB
 K9DLC 792-43-3-A
 WA9IRZ 792-43-2-AB
 K9PHL 770-35-1-AB
 WA9LTP 770-35-1-AB
 K9VUR 756-27-4-AB
 W9CVX 754-29-3-AB
 WA9QOI 748-34-1-AB
 K9RKB 704-22-6-AB
 WA9IUV 606-29-2-AB
 WA9XKQ 672-28-2-AB
 K9TRU 660-30-1-A
 K9AMG 594-27-1-A
 WN9SDC 572-36-1-B
 WA9DZE 510-23-2-AB
 W9BGD 528-24-1-A
 WA9BRE (WA9VE, opr.) 528-22-2-AB
 WA9TJZ 494-19-3-AB
 WA9KYE 480-20-2-AB
 WA9NGB 462-21-1-AB
 K9VLW 458-19-2-AB
 WA9JAD 440-20-1-AB
 K9GON 432-18-2-AB
 K9GAW 418-19-1-A
 WA9AAQ 418-20-1-AB
 WA9GVF 408-17-2-A
 WA9KIO 407-19-1-AB
 W9DBJ 384-16-2-A
 WA9RIS 384-16-2-AB
 W9CMD 352-16-1-A
 WA9SEQ/9 352-16-1-A
 WA9BVH 330-15-1-A
 WA9AIS/9 308-14-1-A
 WA9HPT 308-14-1-A
 W9DI 286-13-1-AB
 K9AYR/9 220-10-1-A
 W9WTC 220-10-1-A
 WA9NPT 176-9-1-AB
 K9AYR 154-7-1-A
 WA9FIH/9 154-7-1-A
 K9GBW/9 132-6-1-A
 WA9FGK 96-4-2-AB
 WA9AIS 88-4-1-A
 WA9QHI 44-2-1-AB
 K9TTW 22-1-1-B
 W9MCG (W9's MCG KVG) 11,477-250-13-ARC
 K9MFE (K9's KZC AIF, W9NZF) 9844-214-13-AB
 WA9FXX (WA9's PXX GCO) 9812-287-8-AB
 K9JAN (7 oprs.) 8126-239-7-AB
 K9ONA/9 (K9's ZWU ZWV) 3770-145-3-ABC
 WA9LQ (WA9's LQT LUC) 1032-43-2-A

Wisconsin

WA9JFM 7560-210-8-AB
 WA9CBP 4860-135-8-A
 WA9OPF 1425-49-5-AB
 W9TQ 108-17-2-AB
 K9IFF (4 oprs.) 10,368-192-17-AB
 WA9RMV (4 oprs.) 2920-73-10-AB

DAKOTA DIVISION

Minnesota

K0DTA 2948-66-12-AB
 WA0QZC 2232-62-8-A
 W0RLI 1320-34-10-B

DELTA DIVISION

Louisiana

WA5DXA 1508-58-3-AB
 WA5OZH 1204-43-4-A
 WA5LWV 728-28-3-AB
 WA5KBH 552-23-2-AB
 WA5PWX 88-4-1-A

Mississippi

W5CKY 338-13-3-B

Tennessee

WA4YKN 4992-104-14-AB
 K4EJQ 232-9-4-B

GREAT LAKES DIVISION

Kentucky

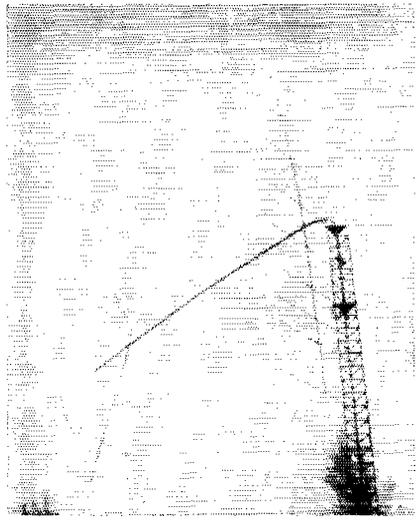
WA4AAJ 5668-109-16-A
 WA4YFK (K4MIE, opr.) 3264-102-6-A

Michigan

W8RPA 8856-123-26-A
 WA8FTA 7080-118-20-A
 W8CVG 5550-113-15-A
 WA8ASV 3738-89-11-R
 W8QO 2668-58-13-A
 W8KIC 2460-82-5-AB
 W8CVG 2360-70-7-AB
 W8HQJ 1975-40-15-B
 W8EOW 1881-50-9-A
 WN8VHG* 1410-47-5-B
 WA8MOA 1296-36-8-R
 K8WGX 1248-48-3-AB
 WA8TDY 960-40-2-B
 WA8RJE 780-26-5-AB
 WA8QBS 638-29-1-A
 W8TBR 480-15-6-B
 WA8KZY 352-16-1-AB
 W8SFS 264-12-1-AB
 WA8SIO 176-8-1-A

Indiana

W9BRN 9180-135-24-B
 WA9NJL 1180-29-10-A
 K9ULF 640-16-10-B
 WA9ONV 504-21-2-A
 K9HYV 336-14-2-AB
 W9BZN (6 oprs.) 11,160-187-20-AB
 WA9NTA (WA9's NTA) 1638-63-3-AB



The hazards of a multielement array! This was the antenna that **WA9OUU** used to work the contest and several stations on scatter. It consisted of 2 9-element 50-Mc. yagis with 36-foot booms spaced 25 feet apart with the top one at 70 feet. John's 6-meter total, 16,384-257-22-A won the Illinois section award and was high score for the Central Division. Looks like WA9OUU follows the Sam Harris rule: "If your antenna stayed up all winter, it wasn't big enough!"

WA8UW (WA's N&J
PWZ UH)
4200-105-10-A
WRRTF (K's RXP
ZZL, WBHF)
2560-61-10-AB

Ohio

W8QOH 12,810-183-25-B
WASAKA (WNUU opr.)
12,550-251-15-AB
W8MAOW 10,848-236-14-AB
W8A8HI 9840-120-31-A
W8WEN 7778-119-23-B
W8WODN 4896-144-7-AB
W8HVO 4560-120-9-AB
K8OWB 3848-118-3-AB
K8HR 3744-104-8-
ABC
K8YRN 3718-143-3-AB
W8APRB 1520-110-6-A
W8SJJ 3200-100-6-B
W8AQJQ 3016-116-3-AB
W8JRN 2940-105-4-AB
W8BLXW 2899-112-3-A
W8ASAO 2800-88-6-A
K8KTX 2400-51-14-B
K8CUD 2088-87-2-A
W8AKN 3080-80-3-AB
W88SK 2016-84-2-A
W8ATYF 2016-64-6-AB
W88BNW 2002-77-3-AB
W8MOH 1824-76-2-A
W8KSE 1540-55-4-A
K8ADI 1512-54-4-AB
W8ARDTU 1512-63-2-AB
W8ARDC 1456-56-3-A
W8RLY 1404-54-3-AB
W8NDO8 1320-55-2-B
K8GCN 1210-55-1-AB
W8NUGZ 1209-47-3-B
W88BRW 1200-50-2-A
K8CUA 1188-54-1-A
W8BTWC 1144-52-1-A
W8DVT 1080-45-2-B
K8OTS 1078-49-1-AB
W8DPW 1056-44-2-AB
W88BOB 1032-43-2-AB
W88RUO 1014-39-3-AB
K8TUTY 770-35-1-AB
W8AFZB 768-32-2-B
W8BOV 594-27-1-B
W8RHW 546-21-3-B
K8GJ 506-23-1-A
W88MYP 506-23-1-AB
W88HUB 440-20-1-B
W88HVK 408-17-2-AB
W88JL 352-16-1-B
W88JED 312-13-2-A
W88PRZ 256-13-1-A
W88VKA 216-9-2-A
W88LRE 22-1-1-A
K8MMAI (K8MIMM,
WA8OX)
46,530-517-35-AB
K8UQA (4 oprs.)
44,896-488-36-AB
W8CCI (11 oprs.)
20,181-348-19-AB
W88PLZ (10 oprs.)
4000-125-6-AB
W8ZOF (W8ZOF, W88-
HUB) 3198-123-3-AB
W8LKY (14 oprs.)
2698-71-9-AB
W8LDU (W8's AJR,
AZA, W8ARMG)
1794-41-13-AB
W88EOD (1 opr.)
850-40-1-AB
W8TO (W8's PRF,
RLM) 594-27-1-AB

W2LWU 5994-111-17-B
W2ADTE 6440-116-10-AB
W28NHF 1608-145-6-AB
W2AZSP 1480-140-6-B
W2AJWV 3465-116-5-AB
W2AYRF 3520-84-5-AB
W2AMCP 2380-70-7-AB
W2BVVQ 2380-85-4-A
W2AKUL 2272-71-6-B
W2CTH 2180-54-10-AB
K2BUF 1846-71-3-AB
K2CCH 1824-48-9-AB
W2AWSY 1820-65-4-AB
W2BVWZ 1820-65-4-AB
W2HZZZ 1768-52-7-B
W2UKPE 1760-40-12-B
W2BOZQ 1694-38-12-B
W2D8K 1612-62-3-AB
W2AOYV 1508-58-3-AB
K2KJT 1430-55-3-AB
W2ARWR 1378-53-3-A
W2AGGD 1300-50-3-AB
W2BYQU 1136-36-6-B
W2HCS 1040-40-3-AB
W2APZB 1020-30-7-A
W2BOGN 1014-39-3-A
K2ACB 988-38-3-AB
W2AGXM 988-38-3-AB
W228SM 885-31-5-B
W2BEVE 870-29-5-B
W2WVYV 810-27-5-B
W2AGUU 780-30-3-B
W2H2E 780-30-3-AB
W2ADTF 728-28-3-B
W2FPN 702-27-3-B
W2QVX 702-27-3-A
W28SWU 702-27-3-A
K2CWJ (W2TFS opr.)
650-25-3-B
W28SFN 600-25-2-A
W2AWF 572-22-3-B
W28OIM 520-20-3-A
W2EIVW 507-22-3-B
W2BPUH 462-21-1-A
W28RBG 462-21-1-A
W2H2CI 456-19-2-AB
W28JF 396-18-1-B
W28HSS 384-16-2-A
W2BYBI 384-16-2-B
W2IP 340-11-5-B
W2BEUW 312-13-2-AB
W28MHE 286-13-1-A
W28MBA 264-11-2-AB
W2BPZL 198-10-1-AB
W28BAH** 154-7-1-B
K2OZT 144-6-2-B
W28SFN 110-5-1-A
W2CJS 48-2-2-B
W28SHU 44-2-1-A
W28Z (6 oprs.)
12,555-203-21-AB
W28FXB (W28UW,
W28's NAB LSV)
10,800-180-20-B
W2ATT 986-170-19-AB
W2BVUK 2 (5 oprs.)
7728-244-6-AB
W2YPN (W28's P1H
RBN) 528-21-1-A

N.Y.C.-L.I.

W2TFC 624-24-3-B
W2TNI 602-22-4-B
W2ENB 448-16-4-B
W2VL 392-14-4-B
W2BNZG 253-12-1-B
K28YA 176-8-1-B
W2AZV 2 (4 oprs.)
4588-238-8-ABC
W28ZNG (W2's YLS
ZBJ, W28ZNG)
5642-177-6-AB
W28ZGF (W28ZQZ,
W28ZG)
5104-160-6-AB
W2ATIR (4 oprs.)
2295-77-5-A

Northern New Jersey

W2WZP 15,064-269-18-AB
W28KPI 10,120-230-12-AB
W28WIL 8610-205-11-ABD
W2AKRX 7686-183-11-AB
W28QPA 6612-174-9-B
K2LCI 5644-166-7-AB
W28WIK 5216-164-6-AB
W28KLD 3080-127-10-AB
K2AQG 2900-123-10-BD
W2AZWV 4800-120-10-AB
K2OJD 4125-83-15-BD
W28MZH 3672-108-7-AB
K2HFL 3200-80-10-A
W28SWE 3030-101-5-AB
W28LDE 2592-81-6-B
W2ADH 2352-84-4-AB
K2KJL 2196-41-18-B
W28PZB 2250-75-5-B
W2AQZ 2100-50-11-B
W2AZDA 1848-66-4-AB
W28YZE 1664-52-6-B
W2DIT 1600-50-6-B
W2ASAM 1600-50-6-B
K2PBP 1568-49-6-A
W28ZSN 1560-52-5-A
W28MJP 1344-48-4-AB
W28NIH 1344-42-6-AB
W28VLC 1176-42-4-B
W28VLC 1131-44-3-B
K2IBF 1084-38-4-B
K28HF 1050-35-5-B
W28NHT 1050-35-5-B
W2AKRX 920-31-5-A
W28CR 840-28-5-AB
W28MEE 744-31-2-B
W28UVP 598-23-3-B
W28TRA 432-18-2-BD
K2MID 392-14-1-AB
W2JVF 384-13-4-B
W280HH 358-13-3-B
W28TEA 264-11-2-B
W28WTT 144-6-2-B
W28AYA 132-6-1-A
W28IEU 44-2-1-B
W28RI 2 (8 oprs.)
25,452-455-18-AB
W28VER (K2's HHS
LME, W28NCB)
11,850-226-23-BCD
W28QJN 2 (4 oprs.)
4392-23-6-AB
W28NUW (7 oprs.)
5206-137-9-ABC
W28OOD (W28OOD,
W28TRA)
2010-87-5-B
K2JRP (K2JRP,
W28AYA)
1440-45-6-A

MIDWEST DIVISION

Iowa
W8PFP 2544-53-14-A
W88NIX 432-12-8-A
Kansas
W9ECV 3350-67-15-A
W88POY (5 oprs.)
3284-96-7-AB
Missouri
A8HKG 1836-51-8-A

K8TLM 1568-49-6-AB
W88HKP 1442-52-4-AB
W88FL 132-13-2-AB

NEW ENGLAND DIVISION

Connecticut
W1MEH 17,516-303-19-AB
W1HDD 11,780-191-21-ABD
W1RJA 11,610-215-17-AB
K1HTV 9270-155-20-B
W1ASAO 7600-200-9-B
W1WHL 7050-121-15-AB
K1YON 1728-93-13-ABC
W1AGYL 3980-100-10-AB
W1FTX 3124-72-10-AB
W1PFR 3126-92-6-AB
K1KIK 2310-77-5-AB
W1ACWG 2278-72-7-AB
W1NIGAQ 2130-71-5-B
K1A9Y 1326-51-3-B
W1NIGTJ 888-37-2-B
W1AIFTM 588-21-4-B
K1NTK 338-13-3-B
W1NIGSS 276-23-2-B
W1BGD** 192-8-2-B
W1BKC 78-3-3-B
W1HNA 11-1-1-B
K1MTPJ (5 oprs.)
8388-233-8-A
W1LUA (18 oprs.)
6000-150-10-ABC
K1MYGJ (3 oprs.)
2214-62-8-AB
W1AW** (W1's DVE
Q18) 1680-56-5-AB
Eastern Massachusetts
W1QIB 10,827-201-17-AB
K1YDC 7500-188-10-AB
W18SM 6660-111-20-AB
W1WUJ 6240-120-16-AB
K1PFW 6116-139-12-AB
K1KNI 5720-130-12-A
K1C9J 4448-130-6-ABD
K1QJQ 3456-72-14-B
W1AETC 3298-97-7-A
W1AIGB 3264-97-7-A
W1ADPX 3024-63-14-AB
W1ACLR 3000-100-5-AB
W88PWA 2835-95-5-A
K9GXS/1 2790-93-5-A
W1AEO 2580-86-5-A
K1P1V 2290-83-5-A
W1AELH/1 2450-75-5-A
W18RS 2240-70-6-AB
W1AIGV 2144-68-6-A
K1DUZ 2040-60-7-A
W1IAU 2040-58-5-AB
W1ACN 1648-51-8-A
K1M8O 1500-50-5-AB
K1N2Q 1456-56-3-A
W1AIFBQ 1428-54-4-AB
K1TRL 1144-44-3-A
W1BXL 1020-34-5-A
W1OOP/1 930-31-5-A
W1CLM 110-27-5-A
W1AELJ 700-25-4-B
W1P1J/1 (W1C1H, opr.)
630-21-5-A
W1CTR/1 572-22-3-B
W1JVL 504-18-4-AB
W1AGXW 142-17-3-A
W1VXV 66-3-1-B
W1CTR 44-2-1-B
W1CTR 22-1-1-A
W1AICD (4 oprs.)
9620-185-16-AB
K1JMK (K1PWB,
W1AIDP)
4675-138-7-AB
W1KBN (K1's OPW
RFF) 3910-115-7-AB
W1AFC/1 (W1's DWL
KCD) 2958-87-7-AB
K1UCB (K1's QGR
TRX WPT)
2400-75-6-AB
W1AF (4 oprs.)
1695-57-5-A

W1GKJ 1108-32-12-AB
New Hampshire
W1AEBV 5832-162-8-AB
K1MFP/1 4120-103-10-A
W1ALE 1764-49-8-AB
W1EAL 640-20-6-B
W1A8SZ/1 (W1A8SZ,
W1A8DV)
1292-38-7-A

Rhode Island

K1TPK 9051-116-11-AB
W1P9P 3536-104-7-AB
W1NIGF 2736-88-6-B
W1HQV 750-25-5-A
W1A8JS 660-22-5-A
W18XQ 588-21-4-B
K1NQG/1 (W1A8EJ,
opr.) 120-5-2-A

Vermont

K1RKB 1334-29-13-B
K1GYT 1230-41-5-AB
W1C1P/1 96-4-2-A

Western Massachusetts

K1ANF 6552-126-16-AB
W18TR 4800-100-14-AB
W2AQGS/1 3852-107-8-B
K1PYX 3444-82-11-A
K1RPH 3554-73-13-AB
W1QWJ 3252-80-8-BD
K1ULZ 3090-103-5-AB
W1NY 3024-84-8-AB
K1NJC 2295-77-5-AB
W5NWC/1 2244-66-7-AB
W1FAB 2100-75-4-AB
W1NDM 1596-42-9-A
W1UFP 1530-51-5-AB
W1BCI 1258-37-7-A
W1ALL 1248-52-2-B
W1G1V/1 1224-51-2-AB
W1UHP 1204-43-4-AB
W1WLE 1176-49-2-B
W28SCD/1 144-44-2-B

W1RVW 1064-38-4-BD
W1IC 1040-40-3-B
W1AIDN/1 984-41-2-B
K1CZZ 960-40-2-B
K1LJH 960-30-6-A
W1VNE 910-35-4-B
W1ESA 864-36-2-B
W1UCB 806-31-3-AB
W1A8TU (K1PMK,
opr.) 792-32-2-B
K1PMK 768-32-2-B
K1LDT 744-31-2-B
W1VNH 672-28-2-BC
K1ESN 546-21-3-A
W1MNG 504-21-2-AB
W1AIDVU 480-20-2-B
W1NDW 289-18-4-B
W1WFL 168-7-2-B
W1AECR (W1's DZB
RCR) 5911-129-13-AB
W1UWX/1 (W1's EZD
TUX) 5800-145-10-AB
W1A8VJ (4 oprs.)
1140-91-13-A
W1YK (4 oprs.)
2261-67-7-AB

NORTHWESTERN DIVISION

Alaska
K178F 330-15-1-B
Oregon
K70GK (K7ZCR, opr.)
220-10-1-AB
Washington
W487BG 1904-56-7-A
K7DBR 1740-58-5-AB
W487PC 1272-53-2-AB
W4AZU 192-8-2-BD

PACIFIC DIVISION

East Bay
K6JHV/6 (4 oprs.)
9376-293-6-AB
W86PJJ/6 (W8B's IRV
PFJ) 2595-86-5-B
Sacramento Valley
W86LFD 1568-58-4-AB
W8TEE 1120-40-4-AB
W86QCT 949-37-3-B
W86CXB 264-12-2-AB
W8BYF 6 196-7-4-A

HUDSON DIVISION

Eastern New York
W2ASPL 11,984-214-18-A
W28BAH 2** 11,961-226-17-A
W2AQV 11,388-219-16-B
K2DNR 11,098-179-21-B
W28LNA 6386-103-21-B

<i>San Francisco</i>	<i>New Mexico</i>	WA6ARC	WB6JLC	684-29-2-BC	3C3EJC	4648-101-13-BD
WA6YYM	WA5ETF 374-17-1-BC	2220-74-5-A	K7ZLJ/6	682-31-1-B	3C3DNG	3468-102-7-B
448-16-4-B	W5LXS/5 (W5's IXR)	WB6IMV	K6GLO	506-23-1-B	2112-66-6-B	VE3ATT
<i>San Joaquin Valley</i>	198-9-1-AB	1932-69-4-A	WB6EAX/6	330-30-1-AB	1776-74-2-AB	3C3CAF
K6UJG	<i>Utah</i>	WB6KIK	300-30-1-AB	K4AFS/6	297-14-1-B	1568-58-4-AB
WB6RDO	K7HEN/7 (K7's DOT)	W9DHK/6	300-30-1-AB	WB6C8P	284-12-1-B	VE3FOF
360-15-2-B	HEN) 748-34-1-AB	WB6GFD	598-23-3-A	WA6TAD	198-9-1-B	VE3CIU
WB6HIL/6	SOUTHEASTERN	WB6ZNP	492-21-1-B	<i>Santa Barbara</i>		1332-56-2-ABD
(K6GNS, WB6HIL)	DIVISION	WB6KKG	432-18-2-A	W8DHS/6		VE3AIB
3876-114-7-AB	<i>Alabama</i>	K6LDM	360-15-2-B	1092-39-4-AB		1296-54-2-B
<i>Santa Clara Valley</i>	K4WHW	WA6LMA	264-11-2-A			VE3ENJ
WA6GYD	2040-68-5-AB	216-9-2-B		WEST GULF		1224-51-2-B
7596-211-8-ABC	WA4DBQ	K6UMV	198-9-1-B	DIVISION		3C3BBC
ROANOKE	1056-44-2-A	WB6BMB	156-9-3-A	<i>Northern Texas</i>		1104-46-2-B
DIVISION	WA4RBE	WA6VEP	121-11-1-B	K5IVB	1320-55-2-A	1044-44-2-AB
<i>North Carolina</i>	912-38-2-A	WB6EVT/6	5-1-A	WA5RBP		1008-42-2-B
W4HJZ	K4TUT	WA6JOK	88-4-1-A	1118-47-2-A		VE3FOE
2024-44-13-AB	WA4EBS/4	K6BPC (K6QPH,	66-3-1-A	K5YKX	748-34-1-A	768-32-2-AB
W4GG/4 (5 oprs.)	792-33-2-A	W6PNE)	6048-168-8-AB	WA5OTR	960-40-2-A	VE3EUV
484-22-1-AB	WA4DZF	WA4KMA	6048-168-8-AB	K5YKX	748-34-1-A	VE3EIT
<i>South Carolina</i>	624-26-2-A	W4YRM	572-22-3-AB	WA5LPA	594-27-1-A	756-32-2-ABD
WA4LTS	WA4YFN	W4YFM	552-23-2-AB	W5JWJ	440-20-1-A	VE3EYV
840-28-5-A	W4YFM	W4YFM	506-23-1-A	WA5PWW	396-18-1-A	1748-17-12-B
WA4OAM	WA4VQI	WA4JSM	462-21-1-A	WA5KVM		VE3EYU
264-12-1-AB	K4EAO	K4EAO	451-21-1-AB	K5GMC	187-10-1-A	638-29-1-B
<i>Virginia</i>	K4AAO	K4KJD	288-12-2-A	K5ZAM	132-6-1-A	VE3EZY
K4SUM	K4KJD	120-5-2-A		K5ZSB	44-2-1-AB	408-17-2-B
5700-150-9-ABD	<i>Georgia</i>	1092-42-3-A	<i>Orange</i>	W5FFS	22-1-1-A	3C3GLD
W4LTU	WB4DFP/4	806-31-3-A	<i>San Diego</i>	K5AVT/5 (54 oprs.)	400-135-8-AB	230-10-1-B
2910-49-20-B	806-31-3-A	W6NLO	2640-88-5-AB	4000-135-8-AB		VE2BME/3
W4GFY	K2PSX/4 (6 oprs.)	WA6ZQU/4	2100-70-5-A	<i>Oklahoma</i>		198-9-1-A
K4FJW	1316-47-4-AB	WB6SML	1820-65-4-AB	W5WAX	448-16-4-AB	7506-139-17-AB
<i>West Virginia</i>	WA4QPL/4 (multiplier)	WB6UAN	1316-47-4-AB	CANADIAN		<i>Quebec</i>
W8AEC	1144-44-3-AB	WB6UKD	1196-46-3-AB	DIVISION		VE2BU
4368-78-18-B	<i>Western Florida</i>	WB6RPC	980-35-6-A	<i>British Columbia</i>		VE2HY
WAXFA	K4NMZ	432-18-2-B	W6AOSR	VE7AXM	22-1-1-A	2592-54-14-BD
840-30-4-B	SOUTHWESTERN	W6BNSL	888-37-2-B	<i>Manitoba</i>		VE2ALE
K8WVP	DIVISION	W6BNSL	888-37-2-B	<i>Ontario</i>		372-31-2-AB
576-18-6-AB	<i>Los Angeles</i>	W6BNSL	888-37-2-B	VE4RE	78-3-3-A	VE2RMH
ROCKY MOUNTAIN	WA6WKF	W6BNSL	888-37-2-B	VE3CUA	6510-105-21-AB	110-5-1-A
DIVISION	5792-181-6-A	W3WDX/6	768-32-2-AB	<i>Mexico</i>		WIENZ/VE2
<i>Colorado</i>						22-1-1-A
W0AJY						FOREIGN
1584-66-3-AB						<i>Mexico</i>
WA6KQK						XE1PY
154-7-1-A						66-3-1-A

Parasitics in the HBR Receiver R.F. stage

BY TED CROSBY,* W6TC

ARE you one of those who plan to build an HBR Communications Receiver in the near future? Or, are you one of those now in the process of building such a receiver? Do your plans include the installation of the low-loss No. 2102 Polar capacitor in the receiver's r.f. stage? Perhaps you are the owner of an earlier version of an HBR design, and are contemplating the substitution of the 2102 for the original 1461-BS tuning-capacitor, or perhaps the substitution already has been made. To all of you, I would have a moment or two of your time.

As discussed in "HBR Developments," October 1965 QST, the Polar 2102 three-gang capacitor is so extraordinarily good electrically that its extremely low losses in the v.h.f. range become something of a curse when combined with the short leads and high-Q coils used in a straightforward HBR tuned-r.f. stage. Such a combination tends to be the most persistent generator of u.h.f. parasitic-oscillations of the tuned grid/tuned plate variety that I've ever seen.

The parasitic-suppression methods described in the October 1965 issue were not as universally infallible as I would have liked them to be, but represented the best solution I had to offer at that time. Only quite recently did I finally come up with the following completely fool-proof arrangement:

1—Eliminate the chassis ground connection at the rear end of the Polar capacitor frame by making the rear stud chassis-mounting hole slightly oversize and installing insulating washers on top and underneath the chassis. This will break up the ground loop formed by the original double connections between the capacitor frame and chassis and eliminate possible instability at v.h.f. arising from that

source.

2—Remove the 15-ohm resistor from the grid lead of the r.f. tube and replace it with a solid No. 18 wire. The gain of the r.f. stage will be improved, especially on 10, 15 meters.

3—Discard the original RFC₁ and replace it with a completely new choke consisting of 8 turns of No. 26 enamelled wire wound on a 100-ohm ½-watt noninductive (carbon) resistor. Space-wind the coil to the length of the form, with the two ends of the winding soldered to the resistor leads at their exit points from the resistor body proper.

4—Remove the original RFC₂, throw it into your "hope-chest", and replace it with a 47-ohm ½-watt non-inductive resistor.

Mount both RFC₁ and the 47-ohm resistor directly to the r.f. stage tube-socket lugs with the shortest possible leads, being certain that the 0.02-μf. bypass capacitor in the screen circuit is connected as close as possible to the high-voltage end of the resistor.

This new parasitic-suppressor arrangement has been installed in my prototype HBR-11, 12, 13 receiver, as well as my larger "Granddaddy" model of the HBR-13C, both of which are equipped with the 2102 capacitor, with equally stable results in both cases. There was not the slightest hint of parasitic oscillation on any band in either instance. However, I now discovered that in practically every one of the L₂ mixer coils the original primary-secondary coupling was insufficient, and these couplings had to be tightened up considerably before the much-to-be-desired regenerative effect in the r.f. stage was restored. Undoubtedly the same thing will be true of every operational receiver undergoing this modification treatment. QST

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"QRZED The Frequency?"

BY JOHN G. TROSTER,* W6ISQ

QRZED, QRZED . . . haloooo QRZED-The-Frequency. W6ISQ calling."

"Hmmmmm . . . up the gain . . . hallooooo Test, testing. Halooo Thomas Edward Surprise Thomas. . . W6ISQ Testing-The-Frequency."

"Hmmmmm . . . up the a.l.c. QRZED . . . W6ISQ calling QRZEDZEDZED-The-Frequency and W6IS and a Q is Very Carefully Tuning This Frequency for any Possible QRZED . . . err call."

"W6ISQ this is W4MMMWEEEE."

"CQ CQ the W4? . . . CQ the 4? . . . W6IS and a Q."

"W6ISQ this is W4EMMM . . . ELLLL . . . EEEE."

"Thanks for answering my QRZED, OM. Sorry I had to 'CQ' ya there, but you wasn't quite exactly on the frequency I was Carefully Tuning. You're 5 by 7. Go."

"Sorry I was a shade off frequency. I've been listening to you call 'QRZ' and 'Test', but I never heard the other station. Sooooo, thought I'd break in and let you know I didn't hear anybody calling you either. Name is George."

"AWWWW nooooo George. Thanks anyway, but I *know* there wasn't nobody calling me. That's why I QRZEDDED . . . to raise somebody . . . anybody . . . for a QSO. Ahhhh, you just get your ticket OM?"

"W6ISQ-W4MLE. Ohhhh, I hadn't heard about this 'QRZED-The-Frequency' to get a QSO. Naw, I had my license a long time."

"Ahhh, George, how else can ya get a QSO if ya don't 'QRZED-The-Frequency', unless maybe ya 'break-break-break'? Maybe you're a c.w. fella?"

"W6ISQ-W4MLE. Well, I always heard you called CQ to get a QSO. Nope, I work lots of phone."

"W4MLE-W6ISQ. Then you must a been on 1296 Mc. . . . a.m. Listen old man, up here on the d.c. bands ya call 'QRZED-The-Frequency'. Maybe you only work traffic schedules, huh?"

"Then what do you use 'CQ' for? Sure I work schedules . . . traffic, rag chews, emergency."

"W4MLE-W6ISQ. I knew it. One a them Charlie Whiskey schedule fellas! So look, I'll explain. Now I don't want to get too detailed in technicals and lose ya, but please realize that when ya 'QRZED-And-Carefully-Tune-The-Frequency', it means *this* Zero beat frequency. Get it? ZED . . . ZERO beat frequency. Then, if some lid . . . sorry George . . . if some new-comer fella comes back and ain't ZEDDED . . .



ahhh zero beat, then naturally, ya gotta call 'CQ' so's he'll sign again and you can tune him in. Unnerstand?"

"I thought it was the other way around. Call 'CQ' for a QSO and 'QRZ' for 'who called'?"

"W4MLE-W6ISQ. You better dip your plate and re-load OM. That stuff went out when v.f.o.s came in. Now listen up. They invented that 'CQ' business in the real old home-built crystal control days when they had to go tuning around up and down and all over the dial to find a answer to a 'CQ'. But with all these transceivers and modern stuff, ya don't need to tune! When you *hear* the other fella, you're automatically ZEDDED . . . zero beat. So you can forget 'CQ', except if some fella ain't zero beat. Ahhhhh, you heard about transistors yet, George?"

"W6ISQ-W4MLE. Guess I'm used to crystal control operations on two meters."

"Okay, George . . . all OK. But just don't get discouraged. After ya been on the air as long as I have, you'll know all about how to QRZED and CQ and stuff. Maybe you oughta buy you one a them 'How-to-Operate' books and read up on all them call signs and Q-Signals and learn how us old-timer operators operate. Might do ya some good. Yeah! Then next time ya hear me 'QRZEDDING'-The-Frequency, you'd know how to zero beat and save me all that Testing and CQing time. Soooo, best of best seven threes and see ya on down the old log. W4MLE from W6IS and a Q . . . 'QRZED QRZED-The-Frequency-And-Very-Carefully-Tuning-This-Frequency-for any Possible Call . . . say, ahhhh . . . QSY will ya George, so's ya don't QRM the other fellas and make me call a CQ."

QST

* 45 Laurel Ave., Atherton, Calif. 94825.

AMATEUR RADIO PUBLIC SERVICE CORPS

CONDUCTED BY GEORGE HART,* WINJM

A New Date for the SET

EVER since 1946, when the first Simulated Emergency Test was conducted, we have received annual complaints about its conflicting with this and that and something else, such as the World Series, football games, Canadian Thanksgiving, and real emergencies (this is still the hurricane season on the East Coast). As the years have progressed, and particularly recently as the SET has included NTS and has thus become a bigger activity, the problems associated with the date have become more acute.

It is hard to find a weekend during which there is no other scheduled activity to detract from the SET. Assuming it is desirable to change the date (right now it seems that everybody but the undersigned considers this a "must"), when to hold it? A week earlier eliminates only one or two of the above-mentioned difficulties. A week later runs into a CD Party contest. Two weeks earlier bites into some vacations, as does any weekend during the summer. The rest of the fall season is taken up by sundry other activities, some ARRL-sponsored and some independent. Springtime might not be bad, but this conflicts with spring housecleaning and gardening.

Anyway, to make a long story short, after much consideration we have decided on a weekend in the dead of winter, January 27-28, 1968. Since this is after the turn of the year, this means there will be no SET in 1967, the first one we have missed since 1946. We urge all ARPSC members to mark their calendars for this weekend and start thinking about what kind of an exercise is practical in your locality at that time.

Down south there should be no problem (except in Louisiana, which usually has its QSO Party during that weekend!), but up north those who in the past have taken their SET outdoors are going to run into weather problems. Ear muffs and dog teams may be the order of the day. This may not sound too bad at present (it will be late May or balmy June when you read this), but the 1967(8) SET could take place in the middle of a snowstorm or during below-zero weather.

Whether or not it will be better, we shall see; we are certain that it will be different! Start planning *now* for the SET, January 27-28, 1968, and help spread the word that there will be no national SET exercise in early October this year. — WINJMI.

*Communications Manager.

Traffic Count

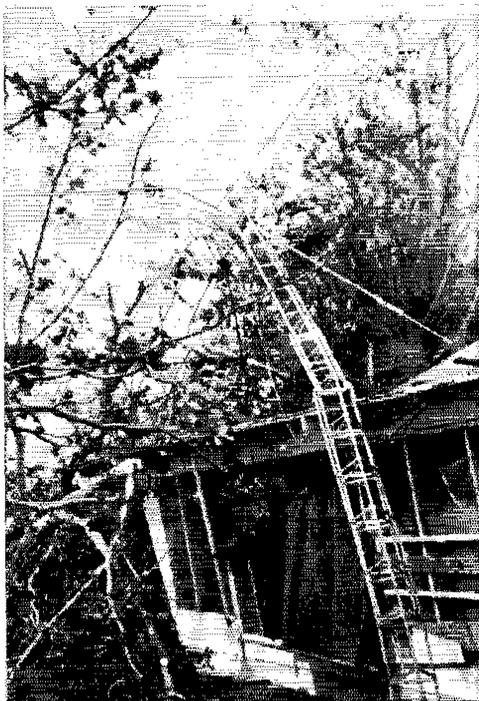
For some reason, many traffic men, including some who, it seems, should know better, are accusing others of cheating because their traffic counts "don't come out right." Some of them seem to think that if the "received" total doesn't equal the sum of relayed and delivered messages, there is something wrong with the figures.

It doesn't necessarily work out this way. The basic traffic count applies *only to messages handled by amateur radio*, except for messages that are received by amateur radio and then delivered by other means. There is nothing complicated about it. Every time you handle a message by radio, you get one message point. If it originates at your station (i.e., your station is the first one to put it on the air), you get one *origination*. If you receive it on the air from another station, you get one *received* credit. If you relay a received message to another station on the air, you get one *relayed* credit; however, if you relay it to the other station on the telephone, or in person, or some means other than amateur radio, you get *no* count for this operation. We call it a "transfer," but it does not add to your count.

The only off-the-air operation that gets a count is the *delivery*. Every message received by amateur radio that you *deliver* gives your station another count. But you cannot deliver a message to yourself; if a received message (received over the air, that is) is for you, it counts only as *received*.

What's complicated about this?

Let's take a couple of exceptional examples. A buddy of yours across town calls you on the landhorn and says



This is the result of Typhoon Sally on the beam at KG6CK. See the Diary for further details.

he received ten messages to put on the net but can't be on, will you handle them for him? You say sure, and he gives them to you on the telephone. He gets the ten credits for having received them on the air, but that's all. You get ten points for *relaying* them, but no more. If any of them happens to be for you, he gets the delivery credits, not you.

On the other hand, let's assume you find it possible (or necessary because you cannot relay) to deliver one of these messages he gave you on the telephone; that is, you telephone it to the addressee or mail it. You can't give yourself a *received* count, because you didn't receive it on the air; but you can give yourself a *delivered* count, because the message was received by amateur radio, transferred to you and you did the delivering.

You cannot deliver a message by radio. If the addressee is another amateur and you send him the message over the air, you are *relaying* it to him and he is *receiving* it. In this case there is no delivery function; the receiving operator merely looks at it, grunts and files it. Delivery is a non-radio function. All the others are radio-only functions.

One more thing. All the fuss about message-counting is of minor importance. Sure we want you to do it right, and honestly, and accurately; but the important thing is getting the traffic handled efficiently. BPL isn't "all that important." The above are some details on how to do it. There are undoubtedly loopholes. All rules have 'em. When "sharpies" make use of loopholes, we start amending the rules to close them up, and this introduces complications which serve only as an inducement for the sharpies to accept the challenge to find *more* loopholes.

Traffic counting is on the honor system. It is going to remain that way. We have bitter experience on what happens when we start setting up inspection and policing. If we can't operate on the honor system, we don't deserve to operate at all. Every traffic handler should know the rules, and every traffic handler should follow them. Any who feel the rules are unfair or illogical are welcome to argue about them and campaign to have them changed. Until or unless changes are made, let's go along. — *W1NJM*.

Diary of the AREC

On January 23 and 24, in Managua, Nicaragua, a number of U.S. citizens were held hostage. Over fifty amateur stations were in operation contacting relatives relaying information that the people held were safe.

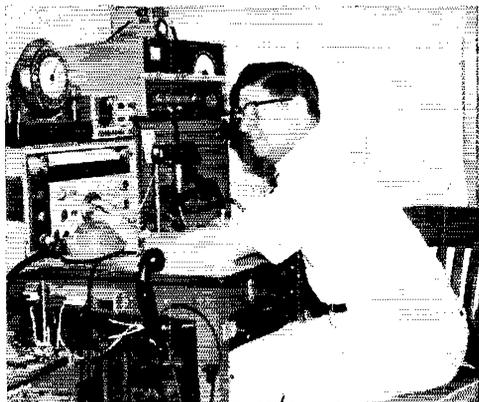
On March 1, Typhoon "Sally" hit Koror Palau, W.C.I. KG6CK was attempting to move the rig and a tree shattered the window, spraying glass and water over the operator and the rig. There was 80% home damage in the area; however, there were very few persons killed or injured. On March 4, KG6AHW and WA5GDQ donated a generator and a HW-32. The U.S.C.G. flew the equipment to the disaster area and KC6AQ installed the gear with the help of KC6CK. DJ9MVC was contacted using a damaged beam (see cut). A local net was established and a great volume of priority and emergency traffic was passed to and from Guam. Special

and relief supplies were directed via amateur radio. KG6CK and KC6AQ worked around the clock handling messages. — *W14YOK/KG6*.

On March 7 and 8, West Virginia had a widespread flood and communications emergency. Over eighty amateurs participated in the operation. It became necessary for FCC to declare 3890 kc. an emergency frequency after about thirteen hours of operation. Because of blocked telephone circuits the next day the amateurs operated for four and a half hours more. WA8LFW, near Marlinton, was the only outside contact in that area. W8ETF reported the situation to both the State Civil Defense Headquarters and the State Road Commission and then relayed emergency messages to c.d. headquarters. K8BIV and W8JZO from Weston reported severe flooding of the town from the west of the Buckhannon River. WA8EKC, WA8DKS and WA8EEL reported water from the Guyandotte River high in the streets of Logan. WA8QMD, WA8NDY and WA8WVM in Buchannon reported the problems from the waters of the Buckhannon River. W4KXH/portable in Williamson reported flooding from the Tug Fork River, bordering Kentucky. WA8HSW reported the Greenhrier River high at Ponce Springs. W8CZT reported flooding of the Little Kanawha River, from Burnsville through Glenville. K8WEY in Welch reported flooding there. W8HZA/portable in Charleston activated the c.d. emergency operations center with the help of W8VYI, W8ETF, WA8CRW, W8VIY, W8WHQ and WA8RQB were net control stations during the operation. K8TPF provided backup mobile facilities for WA8LFW in spite of blocked roads. — *W8HZA*.

On April 1, a blizzard hit the southern part of California. W6KAO called on 7255 kc. to report a snow slide on the Angles Crest route. K6KZI, acting net control of the West Coast Amateur Radio Service, received the call and notified the Division of Highways in Los Angeles. W6JCU maintained contact with the Division of Highways for three and a half hours while the plows and other rescue vehicles worked toward the site. The plows arrived after three hours and it was nearly nine hours before K6KZI got out of the mountains. At the time of rescue, the snow was up to the window of the car. The West Coast Amateur Radio Service is a daytime monitoring and service network. It is three years old and has 235 members in seven western states and Mexico. — *W6B1ZF*.

On April 5, the West Coast Amateur Radio Service was utilized again by K6VDL/portable at Pine Mountain, Calif., when a woman unexpectedly went into labor, 25 miles from medical help. Within minutes after the initial call, a doctor and ambulance were dispatched to the scene. Other amateurs who assisted were W6s DJZ ZOM PLS, K6JOY, WA6WHP and W7PCY. — *W6B1ZF*.



Here is W6WRJ, SEC for Orange, Calif. Ralph has been secretary, vice president and president of the Orange Council of Radio Clubs.



This is W7HMA, who recently was elected to the A-1 Operators Club. Ray is a consistent BPL man and participates in WSN, RN7 and PAN; plus a TCC schedule.



On Mar. 11, Jackson County, Fla., AREC members conducted a test. WA4DED is shown making a contact from the mobile radio van on the scene of a simulated disaster. The entire operation was conceived by the EC and received publicity in Northwest Florida.

On January 21, ten amateurs participated in a county-wide flood alert at Redwood City and Menlo Park, Calif. After five inches of rain had fallen, the creeks draining into the Bay were near overflow. A close watch was kept and fortunately the rain stopped, thus preventing many families from moving into shelters provided at the schools. The net was secured after nine hours and the danger was past. Officials were pleased with the amateurs who handled the situation effectively. — *W4DEF, EC.*

On February 3 and 9, Quebec amateurs supplied communications from car rally check points for two Canadian car rallies. Operations were conducted on two meters with adequate contacts up to 45 miles from the Montreal repeater. — *VE2BNL.*

On February 18 and 19, eleven Monroe County, Mich., AREC members manned radios in Red Cross vehicles. Donated clothing, furniture and appliances were collected, sorted and stored by the AREC-equipped vehicles. The items were given to 30 persons from seven homes which had burned during the rash of fires in the county. Amateurs known to have participated were W8TZZ, K8s VLT LYY WXO AMU, W1A8s EFK UHY OFA LSP HGE KYO. — *W8NDM, EC Monroe Co., Mich.*

On February 22, the first air mail night flight was re-enacted from North Platte to Omaha. Aircraft position reports were made by amateur radio over the 278-mile flight with the aircraft out of sight but briefly between points. W8SAI made the advance arrangements involving about 27 mobiles at the reporting points. The flight lasted for two hours and fifty-four minutes and could be the first time this service has been provided by hams.

On March 3, members of the Los Alamos, New Mexico, RACES group participated in a search for a lost 13-year-old boy. The search was centered on the 800-foot depths of White Rock Canyon of the Rio Grande River where the boy was reported to have been seen the previous evening. K5EJW, the Los Alamos RO, was notified of an all-out search at 0845. W5PDO, the club station, was manned by W5NDW and K5EJW. K5QIN and K5WYF set up a field site and K5RHR and W5OJM operated mobiles at the strategic points overlooking the canyon. The boy was found safe by W5OJM at 1327 and communications were maintained until 1700. — *K5QIN, RO New Mexico.*

On March 4 and 5, nine amateurs provided check point communications for the Hudson Centennial committee and National Dog Sled Races. VE2ALE had a car accident and summoned VE2BU via the Montreal repeater. The radio equipment was removed from the car and used for a relay station for the races between start and finish. The race officials were very pleased with the facilities provided by the Quebec amateurs. — *VE21LE.*



Prominent among Missouri traffic handlers and holder of a number of public service awards is W8OMM. Donna, previously held PAM, EC and OPS appointments in Missouri.

On March 10, eleven Quebec amateurs were alerted and set up a station at police headquarters. A 13-year-old diabetic (requiring daily insulin shots) had become lost and a search was started. A 40-meter link was set up with Toronto and the local repeater on 2 meters was used for approximately four hours. The boy was located in Ottawa a week later, in good condition. — *VE21LE.*

Early in March a navy officer in Detroit, discovered that he had lost his wallet at Guantanamo Bay, Cuba. He contacted the recruiting officer, who was a ham, and within half an hour KG4AA in Guantanamo Bay, initiated a search at the BOQ and the wallet was found intact. The owner's comment was, "fabulous."

On March 12, at Jonquiere Kenogami, Quebec, six amateurs provided communications aid for the Red Cross Subscription Campaign. Four mobiles and a portable station were utilized. Amateurs involved were VE2s, BAI BGZ BWF DCK DCD and MV.

On March 17 twenty-one amateurs demonstrated the communications available using a v.h.f. repeater. The establishment of contact over a forty-mile radius from the repeater impressed the police and other city officials. — *K8VZZ, EC Zone 14, Kans.*

On March 18, VE2BU was net control for a simulated emergency test on Rigaud Mountain, Quebec. Traffic was passed among eleven amateurs and the exercise lasted for about two and a half hours. — *VE2ALE*

On March 29, VE2ALE/mobile was on his way to VE2RM and came across a stalled Canadian Army Service Corps vehicle. The motor had broken down and there were no communications available at the spot. The amateur mobile then proceeded to Mount Rigaud and contacted VE2SH/mobile via the Montreal repeater and the latter relayed the message to the dispatch office. — *VE2ALE.*

On March 22 and 23, "Operation Hospital" was conducted by the Eastern Michigan 6 Meter Club and Detroit area hams. Ninety-five pieces of traffic were handled by the club station, W8ADR. Others in the exercise were W8PYM, K8s DYN IYZ JGF KYS LUY TEZ, W1A8s PII EMIN LBE TLW and BQW. — *W8MBH.*

On April 1, the Podunk Happy Duncers Net was alerted at 1630Z because of possible flooding of Fishing River near Mosby, Missouri. At the request of the Clay County C.D., the base station at Liberty, Missouri, was set up.

The communications van and two mobiles were dispatched to the Mosby area, providing communications between Mosby and the county c.d. headquarters. The upstream rains halted and the activity consisted of closing two county roads. The net was secured at 2130Z with Mosby out of danger. — WA0P/LL, EC Mosby, Mo.

On April 1, the Edison Amateur Radio Net furnished communications for the Southern California Edison Company First Annual Palm Springs Golf Classic. With a station at Convention Hall and portable or mobile stations at the six outlying golf courses, scores were relayed on 146,820 kc. to the scoreboard at the convention center. Many of the 700 golfers were surprised to learn that their scores had preceded them to the Hall by many minutes and amateur radio had done the trick. The net operated for about ten hours and involved about fifteen amateurs. — W46JXG.

Forty-two SEC reports were received for February, representing 17,190 AREC members. This is eight fewer reports and about 4000 fewer members than a year ago. Sections reporting: Del, SNJ, WNY, WPa, Ill, Ind, Wis, Ark, Tenn, Ky, Mich, Ohio, NLI, NNJ, Kans, Mo, Nebr, Conn, EM, Mont, Ore, Wash, Nev, SCV, Orange, SV, NC, Va, Colo, Utah, Ala, EFla, Ga, SD, NTex, Okla, STex, Mar, Que, Alta, BC, Sask.



Here are a few of the "wheels" at the meeting of the Southern Calif. Net on April 2. Left to right, K6IME (Mgr. SCN), K6IOV, WA6KZL, WB6BBO (RN6 Mgr.) and WB6JFO.

National Traffic System

The annual spring madness is upon us. We are referring, of course, to "daylight saving" time. This is the desire on the part of the populace to get out of work an hour earlier than they do during the winter, so they can enjoy an extra hour of daylight before darkness sets in. In order to do this, they are willing to get up an hour earlier in the morning. Only thing is, they don't want to know they are doing it. They want to kid themselves into thinking they are getting up and coming home and doing all the other things that man, a creature of habit (mostly bad), does on a regular schedule.

The difference between this year and previous years is that this year the federal government has taken a look at the situation and has decreed that from now on this annual self-delusion is mandatory unless state legislatures take specific action to retain sanity. Naturally, most of them have not done so; we understand there are only three states which have done so: Hawaii, Michigan and South Dakota. Kentucky's legislature has not had a chance to consider the matter, and so will probably remain split, as in previous years.

All other states will advance their clocks one hour on April 30 and keep them that way through October.

Now, the question is: how does this affect NTS? The answer is that it makes it a mess, as it has every summer, and we have never known quite what to do about it. For 18

years the pressure has been on to change NTS to "daylight saving" time, the argument being that most of the country changes, and doesn't majority rule? The only trouble is that this would have required section nets in many southern and midwestern states to meet at 6 p.m. locally, under pain of not being able to make their region net meetings and thus being stuck with a batch of "thru" traffic. Leaving the NTS time schedule alone seemed the lesser of two evils; it moved section nets an hour later by their clocks (but left them at the same actual time), but this seemed less of an imposition than asking others to meet an hour earlier. Besides, most of the section nets changed their time anyway, and even some of the region nets did so. With this kind of a situation we have struggled along for almost 18 years.

Now, with only four states retaining the use of "standard" (what's that?) time, the weight to change becomes overwhelming. Consequently, EFFECTIVE JUNE 1, 1967, THE ENTIRE NTS TIME SCHEDULE IS OFFICIALLY MOVED ONE HOUR EARLIER THAN THE TIMES SPECIFIED IN THE PUBLIC SERVICE MANUAL. This change remains in effect until October 30, when the NTS cycle will begin at 0000 GMT rather than 2300 Oct. 29, and we will thenceforth revert to the normal schedule.

Note that this is not a permanent change. Not yet, anyway. Many states will be using "daylight saving" time for the first time. Some of them may not like it. Until such time as all states make the changeover, we'll just have to play it by ear. On Oct. 30, we go back on the normal schedule. Next spring we'll have another look at the situation and decide then what's to be done about the "summer" operating schedule for 1968. — W1NJA.

March reports:

Net	Ses- sions	Traffic	Rate	Aver- age	Represen- tation (%)
EAN	31	2251	1.400	72.6	98.4
CAN	31	1711	1.188	55.0	100
PAN	31	1885	1.173	60.8	100
1RN	61	582	.319	9.5	94.6
2RN	62	614	.644	9.9	96.1
3RN	62	925	.623	14.9	100
4RN	62	750	.463	12.1	95.8
RN5	62	886	.413	14.2	92.6
RN6	62	1479	.858	29.8	100
RN7	31	802	.746	25.8	86.7 ¹
8RN	62	731	.457	11.8	98.5
9RN	60	795	.596	13.3	91.2
TEN	62	875	.620	14.1	87.3
ECN	28	146	.280	5.2	77.4 ¹
TWN	31	484	.484	15.6	83.9 ¹
Sections ²	2293	15,482		6.8	
TCC Eastern	124 ³	1089			
TCC Central	95 ³	945			
TCC Pacific	124 ³	1305			
Summary	3031	33,737	EAN	10.0	84.3
Record	2595	33,340		14.2	

¹ Region net representation based on one session per day.

² Section and local nets reporting (76): PTN (Me.); CPN (Conn.); RISP (R. I.); NYS NLS (N. Y.); NJN, NJPN (N.J.); MDD, MDSD (Md.-Del.); AARC, EPA, KSSN, PTTN, WPA (Pa.); AENB, D, H, M, R, S, T (Ala.); WFPN, FMTN, GN (Fla.); GN (Ga.); KYN, KTN, KRN (Ky.); NCN, NCNN, NCSSB (N.C.); SCN (S.C.); VN, VSN, VSNB (Va.); OZK, Razorback SSB (Ark.); LAN (La.); Roadrunner (N.M.); OLZ, OPEN, SSZ (Okla.); NTTN, TEX (Texas); NCN, SCN, SCS (Calif.); BUN (Utah); WSN (Wash.); M6MTN, QMN, Wolverine (Mich.); BN, OLN, OLISSBN (Ohio); WVN, WVPN (W. Va.); BEN, QIN (Ind.); SWRN (Wisc.); HNN (Colo.); OKS (Kans.); MJN, MSN, MBPN, PICON (Minn.); MON, MINN, MTTN, PHD (Mo.); ISBN (Alta.); BCEN (B.C.); MTN, MEPN (Man.); OQN, GBN (Ont.).

³ TCC functions performed, not counted as sessions.

K1WJD reports "what a traffic total!" WA2GQZ reports that 2RN is 210 months old and has had 11 different net managers and that he represents 55 months in the job. K3MVO sez hurray, another 100%. W4SHJ issued net certificates to W4s PFC PIM RWL, WB4DXX. K5IBZ plans a future RN5 bulletin on the history of RN5 using the old file as source material. WB6BBO reports that the high traffic totals and 100% representation are the result

of the top flight operators from the section nets, W6UZX earned a net certificate. K7JHA sez March turned out to be one of the top months for RN7 in past years. K7HLR is providing liaison to Mont. W9DYG reports a good month except that W9ZYK became a "silent key." Paul's real operating ability, savvy, patience and wonderful personality are a real loss to the traffic world and ham radio. W0LGG needs a South Dakota representative, but WA0HUD is relying on a temporary basis.

March TCC reports:

Area	Func-tions	% Suc-cessful	Traffic	Out-of-Net Traffic
Eastern	124	94.4	2774	1089
Central	95	95.9	1890	945
Pacific	124	94.4	2658	1305
Summary	343	94.8	7622	3339

TCC roster: Eastern Area (W3EML, Dir.) — W1s EFW EMG NJM, K1WJD, W2s GVH SEI, K2s RYH SSX, WA2s BLV UPC WBA/5, WB2OHK, W3s EML NEM,

K3s HHK MVO, WA3s EEQ EPQ, W4s DVT ZMI, K4s EOF KNP, W8CHT, K8s KMQ LGA, WA8CFJ, Central Area W9JUK, Dir.) — K4DZM, W4OGG, WA4WWT, EOF KNP, W8CHT, K8s KMQ LGA, WA8CFJ, Central Area (W4ZJY, Dir.) — K4DZM, W4OGG, WA4WWT, W5s GHP KRX, WA5JOL, W9s CXY DYH JUK QLW VAY, WA9s MIO NFS NPB OYI POZ, W0s LCN TCR YC, K0s AEM OTH/0, WA0s LAW MLE, Pacific Area (W7DZX, Dir.) — W6s FOT EMS VNQ IDY TYM HC IPW BGF, K6s AJU LRN, W7s DZX ZIW HMA AAF.

Other net reports:	Sessions	Check-ins	Traffic
North American SSB	27	1003	1011
New England Teenage	23	215	73
7290	46	1496	781
Mike Farad	58	595	330
Hit and Bounce	31	459	609
75 Interstate SSB	31	1193	668
20 Interstate SSB	22	447	2604

QST



June, 1942

More about our part in the war. There are some fifteen thousand licensed amateurs in the military service. The military needs have really only been scratched, so far. One item in K. B. Warner's editorial strikes me real hard. He says that if any hams are in the services and are driving a truck or doing similar unscientific work, they should get in touch with the League which has a channel which frequently sets such cases aright. Personally, I was our company's second best goldbricker and posthole digger and was stuck with it for the duration! WW1, that is. The League is busier than ever, practically everything being directly concerned with the war effort. Finding a bunch of c.w. operators in a hurry, finding some 400-watt transmitter, etc.

... Karl A. Kopetzky, W9QEA, shows and describes a 112-mc. Walkie-Talkie, run on dry batteries. The loudspeaker also serves as a microphone. Compared to today's Walkie-Talkies, this rig seems large and cumbersome. The output is of the order of one watt.

... Practical microwave oscillators is the subject of an article by John C. Reed, W6IOJ. He uses parallel rod linear tuning elements and acorn tubes. The circuits and construction described will hit 750 Mc. with fair stability. This is really an experimental rig and offers an opportunity for hams to learn a good deal about this sort of operation. Incidentally, about this time, this writer had a type 30 tube, with base, oscillating on 90 cm. and used quite successfully on 1 1/4 meters over a distance of ten miles, using an antenna somewhat similar to that shown on this month's cover.

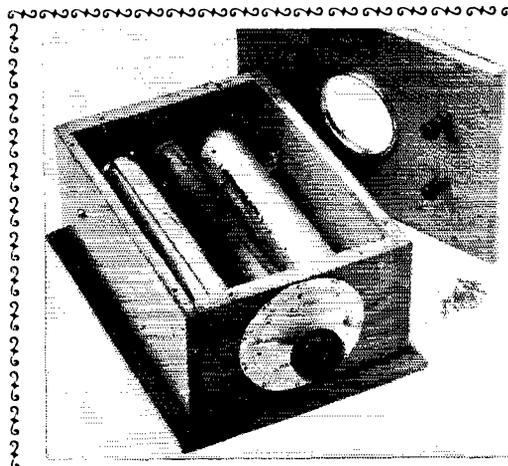
... R. B. Bourne, W1ANA, as a follow-up to last month's article on optical communication, sets forth fundamental principles of optics and describes a means for voice modulating a light beam.

... George Grammer, W1DF, starts his famous course in Radio Fundamentals. He describes a number of simple experiments which any amateur can perform, all leading to a real knowledge of the principles involved. This material is basic.

... For those interested in remote control of tuning in a transmitter, Henry E. Rice, Jr., W9YZH 1 describes a layout using a "tinker-toy" motor to drive ganged oscillator and amplifier condensers.

... Clinton B. DeSoto, W1CBD, going way back, tells about international flag codes and semaphore signalling. Some Navy signalmen are pretty adept at this. "Wiggle-waggle" back again and tell him "No."

... Ed Tilton, W1HDQ, writes of the activities of the u.h.f. gang at this time. This is a good way for the boys to keep track of each other, with no operating. — W1ANA



From the Museum of Amateur Radio

About 1912, the Electro Importing Company brought out this unusual type variable condenser. The three rollers are gear driven so that by turning the knob, the two strips of varnish coated tinfoil were wound up together, or vice-versa, on the central roller. The varnish acted as the dielectric. Due to the thinness of the varnish and the fairly large area of tinfoil, the capacitance is quite high, 0.1 mfd.

— W1ANA, Curator

Hamming on the Salt Grass Trail Ride

SINCE 1952, when a group of 4 decided to revive the cattle trail rides of pioneer days, people have come from all parts of the U.S. and other countries to take part in the Salt Grass Trail ride each year. Now, 15 years later, for three days and nights, the riders who now number in the thousands stretch out single file for a distance of a mile or more to make the trip from Brenham to Houston, Texas. The covered wagons now number 50 or more.

James L. Russell, W8BU, has made the ride for three years and each year he has provided communications using an amateur radio station in a covered wagon. Using the call K5KZS/5, the 75-meter station is in constant touch with the outside world in case of emergencies, to give estimated location of the coming night camp, and to order supplies.

W8BU's experiences make for interesting and sometimes humorous reading. Here are a few excerpts from an account of one of his trail rides.

"There were 2300 cowboys and cowgirls; many rode their horses all the way. Some were not used to riding horses, having just left the urban life, and blisters accounted for many casualties."

"We carried ten gallons of water in a can in our wagon and 500 pounds of batteries, two huge storage batteries for powering the c.w./sideband transceiver while underway. My seat was on top of the batteries. Burned a huge hole in my pants from the battery fumes and had to re-pant at a little town as we went through."

"Then the water can became untied and bounced onto the batteries. A tremendous short circuit resulted and the can disintegrated in a shower of flame and sparks and the water went all over me and the wagon. Thereafter, I put a wooden box top over the batteries."

"My job as radio operator kept me busy with emergency needs. Horses got sick, men got sick, one got kicked, one got stepped on by a horse. Extremely difficult to tune and use the rig while underway. The wagons have no springs or cushions inside. Once we went over a railroad track with the horses trotting. Everything not nailed down went overboard. Fortunately, the transceiver was mounted on pillows and tied down with a nylon rope. I set the receiver while the wagon was at rest and then drove a match-stick wedge under the knob to



Jim Russell, W8BU operated aboard this covered wagon which belonged to Bob Arnold, K5KZS.

hold it still. I asked all stations to zero beat me!"

"We slept right out in the rain or under the wagon. I had a horse who was always snapping at people, including me. When we parked the wagons in a circle for the night, we'd tie the horses to the back of the wagon. I had to get in and out of the wagon frequently for the hourly radio schedule. This darned horse would take a bite at me everytime I tried to get in or out of the wagon. I tied a piece of wire from the antenna to the tailgate. Just as the old horse got his nose up over the tailgate to refuse to let me out I just pressed the key. It even gave me a warm feeling but it gave the horse more; I could smell the hair burning on his snout! He jerked back and he never again approached the tailgate."

"See you on the trail next year." QST

NEW BOOKS

Electricity One-Seven and Electronics One-Seven, edited by Harry Mileaf and published by the Hayden Book Co., 116 West 14th St., New York, N. Y. 10011, 6 x 9 inches. Prices *Electricity One-Seven*, 976 pages, cloth binding \$12.76; *Electronics One-Seven*, 992 pages, cloth binding \$14.96.

Electricity One-Seven and *Electronics One-Seven* are two companion courses from Hayden, each available either in seven separate paperbacks or a single bound volume. As the titles imply, *Electricity One-Seven* is a course in the basics of electricity, and the companion volume *Electronics One-Seven* covers the fundamentals of electronics. *Electricity One-Seven* starts from the very beginning (the structure of matter) and progresses through the electron theory, d.c. and a.c. circuits, the use of vectors in solving a.c. problems, test equipment, power sources and generation, and electric motors. *Electronics One-Seven* covers the various types of

modulation, basic electronic circuits, vacuum tubes, semi-conductors, oscillators and detectors, and a host of miscellaneous material including such items as antennas, television receivers, r.f.c., etc.

The volumes are interesting in their bold use of diagrams and color and for the fact that only a single topic is discussed on each page. Usually, also, each topic is completed on a single page. In addition, key words for each topic are carried in italics, to facilitate the learning process. The diagrams and the text complement and reinforce each other for each topic, and nearly every page has a diagram.

Those of us who have been students fairly recently will find the treatment similar to some of the more modern and progressive text books; those of us who left school some years ago will find the treatment rather unusual and interesting. The level of explanation is not highly mathematical, being more practical than theoretical. Each section of the text is concluded with a concise summary and a series of review questions, to increase the utility of the books for self-study.

— WILKE

Happenings of the Month

TAILENDING TO BECOME LEGAL?

Finding that many of the present identification rules are excessive to normal monitoring requirements and impose an unnecessary burden upon licensees, the Federal Communications Commission has issued a Notice of Proposed Rulemaking, Docket 17377, proposing to relax the rules of Section 97.87.

By proposing that full i.d. be required only at the end of a communication, FCC reverses itself and moves to make the common practice of "tail-ending" legal in effect. The new rules if adopted will also eliminate the need for giving one's exact geographical location when operating portable or mobile, legalizing another common practice. A further change affects identification on such modes as RTTY, requiring a full voice or c.w. i.d. at the end, but deleting the RTTY i.d. requirement.

The complete text appears at the end of this department. Any interested party may file comment by June 30 and reply to others' comments before July 17, 1967. As is required by routine procedures, FCC asks for an original and 14 copies. However, it will usually consider informal comments from individuals submitted in a lesser quantity.



Governor John H. Chafee, second from right, presents the proclamation for amateur Radio Week in Rhode Island, June 18-24, to (from left) K1HMO, W1EYH and WA1FQP. The occasion is recorded by K1UXS and his camera. And say—see the Rhode Island news in Station Activities for details on how the amateurs will celebrate the week; you can take part.

FACSIMILE FOR RACES?

FCC has issued a Notice of Proposed Rulemaking Docket 17315 proposing to amend sections 97.193 (a) and 97.195 (a) so as to permit RACES stations to use 3F4 and 3A4 facsimile in the 1800-1825, 1975-2000 and 3990-4000 kc. RACES segments. The proposal would also permit use of 3F4 on RACES frequencies above 28 Mc. where A4 is already permitted.

The idea originated with the New York Civil Defense Commission in RM-964; the agency wants to be able to send radioactive fallout maps through its amateur stations if the wire lines fail.

The docket, dated March 22, carries a comment deadline of April 28 and reply comment deadline of May 15; the League has asked for extensions to May 26 and June 20 so that the matter may be discussed at its Board Meeting.

FCC PROPOSES TO MOVE WALKIE-TALKIES

FCC has proposed in Docket 17364 to amend its rules in Part 15 so as to remove unlicensed walkie-talkies from the 26.97-29.27 Mc. band and assign them, under stricter ground rules, to five channels between 49.91-49.99 Mc., on frequencies presently assigned to government radio services.

The Commission would allow seven years after adoption of the Docket for present owners of the devices to amortize their investments, and two years from adoption of the docket for manufacturers to develop and tool up for equipment to operate in the new band.

The docket calls for interested parties to file the usual original and fourteen copies on or before May 22 and replies on or before June 6. The likelihood is that this time limit, too, will have been extended before you read this; in any case, a late filing can be made with a request that the filing date be waived.

RETESTING RULE CLARIFIED

FCC has clarified its rules governing reexamination of Novice, Technician and Conditional Class licensees by deleting Section 97.35 (b) which merely warns these licensees that one of the reasons for retesting is violation of the rules.

Section 97.35 (a) remains in effect; it says in part:

"The Commission may require a licensee holding a Novice, Technician or Conditional Class of operator license to appear for a Commission-supervised license examination at a location designated by the Commission. . ."

Since it covers both spot-checking and retesting for cause, no actual change in the effect of the rules results from the deletion of paragraph (b).

MINNESOTA EASES LICENSE PLATES

Governor Harold LeVander of Minnesota on March 8 signed a bill making it legal for Minnesota amateurs to have call letter license plates on a second car, and to allow the plates even where the car is owned jointly with a non-amateur husband or wife.

The bill was introduced into the State Senate by Senator Robert Ashbach and into the House by Representative Jack Meyer, both upon request of Donald E. Lisell, KØBNS.

Tom E. Davis, WØSW

We regret to report the death, early in April, of Tom E. Davis, WØSW and formerly W9VVA, director of the Dakota Division from January 1, 1942 to January 1, 1948. Mr. Davis, who was an attorney, lived at Willmar, Minnesota. He has been, in the past, president of the Min-Dak Radio Club, n.c.s. for the Minnesota Phone Net, Phone Activities Manager, Official Phone Station, and Official Bulletin station.

CONNECTICUT AMATEUR RADIO WEEK

Connecticut amateurs have achieved what all of us wish we had from time to time — an eight-day week. Governor John Dempsey has declared the period June 18 to June 25 as "Amateur Radio Week in Connecticut." The observance coincides with the ARRL Field Day June 24-25, and was requested by the Council of Connecticut Amateur Radio Clubs through W. Stanley Lamb, W1WHQ, president.

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

In the Matter of
Revision of the Amateur Radio
station identification requirements
as set forth in Section 97.87 of the
Commission's Rules. } DOCKET NO. 17377

NOTICE OF PROPOSED RULE MAKING

By the Commission: Chairman Hyde absent.

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

2. Section 97.87 of the rules sets forth the station identification procedures and requirements for amateur radio stations. The Commission finds that many of the present requirements are excessive to normal monitoring and investigative needs and merely impose an unnecessary burden upon licensees.

3. Accordingly, the Commission proposes to revise Section 97.87 by relaxing and simplifying the station identification requirements, consistent with enforcement needs, in the following manner:

A. For basic identification, it is proposed that identification of the stations being transmitted to be required only at the end of an established telegraphy or telephony communication.

B. For regular portable and mobile operations and for mobile operations not within the United States or any foreign country, it is proposed that additional identification be required only at the end of transmissions. It is further proposed that new simplified location designators be authorized in lieu of certain present designators or location descriptions.

C. For all operations, it is proposed that the requirement for identification by emissions other than telegraphy,



During a visit to Phoenix, Southwestern Division Director John Griggs, W6KW, chats with Barry Goldwater, K7UGA.

using the International Morse Code, or telephony, using the English language, be deleted. It is further proposed that the use of standard phonetic alphabets as an aid for correct telephony identification be encouraged.

4. The specific proposed revision of Section 97.87 is set forth in the attached Appendix. Authority for this proposed revision is contained in Sections 4(i) and 303 of the Communications Act of 1934, as amended.

5. Pursuant to applicable procedures set forth in Section 1.415 of the Commission's Rules, interested persons may file comments on or before June 30, 1967, and reply comments on or before July 17, 1967. In accordance with the provisions of Section 1.419(b) of the Commission's Rules, an original and fourteen copies of all statements, briefs, and comments filed shall be furnished the Commission. All relevant and timely comments and reply comments will be considered by the Commission before final action is taken. The Commission may also take into account other relevant information before it in addition to specific comments invited by this Notice.

FEDERAL COMMUNICATIONS COMMISSION
HEN F. WAPLE Secretary

Attachment
Adopted: April 19, 1967
Released: April 20, 1967

Appendix

Part 97 of the Commission's Rules is proposed to be amended as follows:

Section 97.87 is proposed to be revised to read as follows:
Section 97.87 Station identification.

(a) An amateur station shall be identified by the transmission of its call sign at the beginning and end of each single transmission or exchange of transmissions and every ten minutes during any single transmission or exchange of transmissions of more than ten minutes duration. Additionally, at the end of an exchange of telegraphy or telephony transmissions between amateur stations, the call sign (or the generally accepted network identifier) shall be given for the station, or for at least one of the group of stations, with which communication was established.

(b) When an amateur station is operated as a portable or mobile station, the operator shall give the following additional identification at the end of each single transmission or exchange of transmissions:

(1) When identifying by telegraphy, immediately after the call sign, transmit the fraction-bar DN followed by the number of the call sign area in which the station is being operated.

(2) When identifying by telephony, immediately after the call sign, transmit the word "portable" or "mobile," as appropriate, followed by the number of the call sign area in which the station is being operated.

(c) When an amateur station is operated outside of the 10 call sign areas prescribed in Section 97.51(b) and outside of the jurisdiction of a foreign government, the operator



Merrill L. Swan, W6AEE, (center) widely thought of as "Mr. RTTY," here receives from Col. Mark Brennan the Outstanding Civilian Service Medal of the Department of the Army, with Maurice Schmitz K6GJY looking on.

shall give the following additional identification at the end of each single transmission or exchange of transmissions:

(1) When identifying by telegraphy, immediately after the call sign, transmit the fraction-bar DN followed by the designator R 1, R 2, or R 3, to show the Region (as defined by the International Radio Regulations, Geneva, 1959) in which the station is being operated.

(2) When identifying by telephony, immediately after the call sign, transmit the word "mobile" followed by the designator Region 1, Region 2, or Region 3, to show the Region (as defined by the International Radio Regulations, Geneva, 1959) in which the station is being operated.

(d) The identification required by paragraphs (a), (b), and (c) of this section shall be given on each frequency being utilized and shall be transmitted by telegraphy, using the International Morse Code, or by telephony, using the English language. The use of a nationally or internationally recognized standard phonetic alphabet as an aid for correct telephony identification is encouraged.

MINUTES OF EXECUTIVE COMMITTEE MEETING

No. 315

April 16, 1967

Pursuant to due notice, the Executive Committee of The American Radio Relay League, Inc., met at the O'Hare Inn, Des Plaines, Illinois, at 12:35 p.m., April 16, 1967. Present: President Robert W. Denniston, W0NWX, in the Chair; First Vice President W. M. Groves, W5NW; Directors Charles G. Compton, W8BUO, Gilbert L. Crossley, W3YA, Noel B. Eaton, VE3CJ, and Carl L. Smith, W8BWJ; and General Manager John Huntoon, W1LVQ. Also present were General Counsel Robert M. Booth, Jr., W3PS; Director Philip E. Haller, W9HPG; and Vice Director Edmond Metzger, W9PRN.

On motion of Mr. Compton, affiliation was unanimously GRANTED to the following societies:

Bowen High School Amateur Radio Club	Chicago, Ill.
Capeway Radio Club (of Massachusetts)	Brookline, Mass.
Chippewa Amateur Radio Club	Brecksville, Ohio
Hiaawatha Amateur Radio Club	Hiaawatha, Kansas
Kachina Radio Club	Snowflake, Ariz.
Kickonga Amateur Radio Club — Indiana	
Institute of Technology	Fort Wayne, Ind.
Lincoln High Radio Club	Lincoln, Nebr.
Montgomery Amateur Radio Club	Germanatown, Md.
North Suburban Wireless Association, Inc.	Hopkins, Minn.
Pawnee County Amateur Radio Club	Pawnee, Okla.
Pleasant Valley Community High School Radio Club	Pleasant Valley, Iowa
Ritenour Senior High School Amateur Radio Club	Overland, Mo.
West Jersey Radio Amateurs	Burlington, N. J.

On motion of Mr. Groves, unanimously VOTED to approve the holding of a Michigan State Convention in

Grand Rapids on April 22-23, 1967; a Maritime Section Convention in Moncton, N.B., on September 2-4, 1967; and a Michigan State Convention in Lansing on April 26-27, 1968.

The General Counsel reported issuance by the Internal Revenue Service of a Notice of Proposed Rule Making concerning "unrelated business income" of non-profit tax-exempt associations such as ARRL. After discussion, on motion of Mr. Compton, unanimously VOTED that the General Counsel is instructed to work with the League's tax counsel in preparing the ARRL position in answer to the Notice.

The General Counsel reported the issuance by FCC of a Notice of Proposed Rule Making to move the Part 15 unlicensed "walkie-talkie" 100-mw. units to channels in 49-50 Mc. After discussion, it was agreed that to the extent the League might wish to file comment in the docket, the matter could be discussed at the forthcoming Board meeting.

The General Manager reported an offer by T. Frank Smith, W5VA, to provide the League with a duplicate of the Heintz & Kaufman transmitter used at ARRL headquarters station W1MK in the 1920s. After discussion, on motion of Mr. Groves, unanimously VOTED to accept the offer, to express deep appreciation to Mr. Smith, and to assure him the unit will remain on display at the refurbished W1AW building.

The Committee was in recess from 1:30 to 2:00 p.m.

On motion of Mr. Crossley, after discussion, unanimously VOTED that Assistant Secretary Dwight W. Smith, W1DVE, is authorized to sign checks on League deposits on behalf of the General Manager.

On motion of Mr. Compton, unanimously VOTED that Colin C. Dumbille, VE2BK, and Wayland M. Groves, W5NW, are appointed as delegates of Canada and the U.S., respectively, to represent the League at the forthcoming triennial conference of Region II, International Amateur Radio Union, in Caracas.

The Committee then engaged in an extended discussion of matters concerning the IX Century Club. Messrs. Haller and Metzger departed from the meeting at 6:00 p.m.

There being no further business, the Committee adjourned, at 8:15 p.m.

JOHN HUNTOON
Secretary

QST

Strays

All amateurs are invited to participate in the First Annual Teenage QSO Party, June 17-18. Time: June 17 1600-2300Z, June 18 1700-2300Z. Categories: Teen phone, non-teen phone, teen c.w., non-teen c.w. Call: "CQ TEEN-TEENS". Exchange: Nr, RST, section, age or non-teen. Suggested Frequencies: 3620, 3710, 3995, 7060, 7165, 7225, 14,060, 21,125, 21,300, 28,600, and 50420 kc. Scoring: 1 point per QSO times number of sections; multiply final score by 1.5 if using 200 watts or less at all times. Awards: Certificates to the first three places per category in each section. Anyone enclosing a SASE and 5¢ with log will receive a participation certificate and list of winners. Rules: Work each station once per mode, non teens work teens, phone and c.w. separate contests, number accordingly, stations showing improper operating practices will be disqualified, multi-operator and multitransmitter stations not allowed, logs should show time, date, band, and exchanges sent and received. Send logs to Tom Kelly, WA9OMO, 4317 Maher Ave., Madison, Wisc. 53716

Feedback

"Das Softenboomer 160," August 1966 QST, p. 38, has an error in the tube-base numbering in Fig. 4. The screen grid of the 6CM6 should be numbered 1 and the control grid should be labeled 3 and 6. As shown, they are reversed.

Board Meeting Highlights

THE ARRL Board of Directors met at Hartford, Connecticut, on May 5-6, 1967, with two days of informal sessions preceding. Membership dues were raised to \$6.50 effective August 1, to cover increased costs of League operation and to permit continuance and expansion of membership services. A Life Membership was established at 20 times the new annual rate, or presently \$130, payable if desired in eight quarterly installments. Applications accepted by August 1, in accordance with procedures to be detailed in July *QST*, will result in Charter Life Memberships. A study will be made of a possible reduced initial annual membership rate for new amateurs.

The By-Laws were amended to provide for a minimum age of 21 for director candidates, and to establish the Merit & Awards Committee as a standing committee. Rejected were proposals for a four-year director term, to provide classes of affiliated clubs, to put *QST* back on the newsstands, to pay *QST* authors, and to design a standard QSL card for members. The present Executive Committee was re-elected. The Building Fund campaign will be closed as of the end of 1967. A 1969 ARRL National Convention was approved for Des Moines, Iowa, June 20-22.

The ARRL Technical Merit Award was made to W6DNG and VK3ATN for outstanding moonbounce work, and the Board provided funds for support of an amateur space communications center at or near Hq. Early implementation was urged of plans for reinstallation of the W1AW rhombic antenna for better west coast coverage.

Requests will be made of FCC to establish regulations for repeater stations, to obtain more examination points for amateurs, to provide adequate controls for non-amateur operators in RACES activities, and to implement the proposed rule-making on relaxed requirements for call sign identification but to additionally ease requirements in short contacts such as contest operation, and to ease the requirement on RTTY identification. The Board established a Frequency Allocations Study Committee to examine amateur and other usage of the spectrum.

Studies were ordered by Board Committees or Headquarters staff on Novice privileges in the 10-meter band, extra voice subbands in Puerto Rico, an outgoing QSL bureau, Technician privileges on Novice c.w. bands, recognition of continuous ARRL membership, and the scope of *QST* treatment of recent equipment. The Board rejected a proposal to revise DXCC rules, but asked a study be made of advisory committees in this and other fields. Directors proposed a service charge for issuance of WAS and DXCC certificates to non-members.

The Board thanked numerous League volunteer officials and others who have contributed to the advancement of amateur radio, and renewed travel authorizations for QSL Managers, SCMs, SECs and NTS managers.

Full minutes of the meeting will appear in July *QST*.

QST

I.A.R.U. News



INTERNATIONAL AMATEUR RADIO UNION

VK7 AMATEURS AND THE TASMANIAN FIRES

A group of amateurs in Australia's Tasmania territory played a major role in providing communication during the rash of bushfires which swept the island in March.

The *Sunday Telegraph* (Sydney, Australia) praised VK7s for staying at their rigs and reporting danger areas, new fire outbreaks, relaying instructions to otherwise isolated fire-fighters and handling welfare traffic. The article concluded with a detailed explanation on amateur radio and the functions of the *Wireless Institute of Australia* (WIA).

Earlier this year, many VK4 amateurs provided emergency communications during widespread floods in Queensland. (Tnx VK2AYT)

AGREEMENTS SIGNED BETWEEN ARGENTINA AND U.S.

Effective April 30th, reciprocal operating and third-party traffic agreements exist between Argentina and the United States. The agreements followed a considerable amount of discussion between the two governments and Argentina represents the 23rd country to reach a reciprocal agreement with the United States. Third-party traffic agreements also exist between the United States and 23 countries.

DX OPERATING NEWS

(**Bold face** indicates changes since the most recent QST listing.)

United States Reciprocal Operating Agreements currently exist *only* with: **Argentina**, Australia, Belgium, Bolivia, Canada, Colombia, Costa Rica, Dominican Republic, Ecuador, France, India, Israel, Germany, Kuwait, Luxembourg, Netherlands, Nicaragua, Paraguay, Peru, Portugal, Sierra Leone and United Kingdom. Several other foreign countries grant FCC licensees amateur radio operating privileges on a courtesy basis; write headquarters for details concerning a particular place.

Third-Party Restrictions

Messages and other communications — and then only if not important enough to justify use of the regular international communications facilities — may be handled by U. S. radio amateurs on behalf of third parties *only* with amateurs in the following countries: **Argentina**, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Greenland (XP calls only), Haiti, Honduras, Israel, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela. Permissible prefixes are: CE CM CO CP CX EL HC HH HI HK HP HR LU OA

PY TI VE VO XE XP YN YS YV ZP and 4X Canadian radio amateurs may handle these relatively unimportant third-party messages with amateurs in Bolivia, Chile, Costa Rica, El Salvador, Honduras, Israel, Mexico, Peru, U. S. and Venezuela. Permissible prefixes are: CE CP HR HK K OA TI W XE YS YV, 4X and 4Z.

DX Restrictions

United States amateur licensees are warned that international communications are limited by the following notifications of foreign countries made to the International Telecommunication Union under the provisions in Article 41 of the Geneva (1959) conference.

Cambodia, Indonesia (including West New Guinea), Thailand and Vietnam forbid radio communication between their amateur stations and amateur stations in other countries. U. S. amateurs should not work HS XU 3W8 or 8F. Canadian amateurs may not communicate with Cambodia, Indonesia, Laos, Thailand, Vietnam and Jordan. Prefixes to be avoided are HS JY XU XW8 3W8 and 8F.

CANADA SIGNS THREE RECIPROCAL AGREEMENTS

The Department of Transport, which is the Canadian licensing authority, says Canada has recently signed reciprocal operating agreements with the governments of France, Israel and the Netherlands. Several others are being negotiated and will be announced when completed.

QSL BUREAUS OF THE WORLD

For delivery of your QSLs to foreign amateurs, simply mail cards to the bureau of the proper country as listed below. Cards for territories and possessions not listed separately may be mailed to the bureau in the parent country: *e.g.*, cards for VP8s go to RSGB in Great Britain. W, K, VE and VO stations only may send foreign cards for which no bureau is listed to ARRL. See "How's DX?" for QSL information on specific stations.

For service on incoming foreign cards, see list of domestic bureaus in most QSTs, under "ARRL QSL Bureau." **Bold face listings indicate corrections or additions.**

Aden: Amateur Radio Club, Signal Squadron, RAF

Khormaksar: B.F.P.O. 69, London, England

Algeria: G. Deville, 7X2RW, 21 Blvd. Victor Hugo, Alger

Angola: L. A. R. A., P.O. Box 484, Luanda

Antarctica: KC4AA cards go to the Office of Antarctic

Programs, National Science Foundation, Washington 25,

D. C. KC4US cards go to KINAP, COMCBLANT,

USN, CBCEN, Davisville, E. Greenwich, R. I.

Argentina: R.C.A., Carlos Calvo 1424, Buenos Aires, BA

Austral/Antarctic French Lands: via Malagasy Republic

Australia: WIA, 23 Landale St., Box Hill, E. 11, Victoria

Austria: Oe. V.S.V., Box 999, Vienna 1/9

Azores: via Portugal
Bahama Islands: Bahama Amateur Radio Society, Box 913, Nassau
Bahrein: (All MP4) Ian Cable, MP4BBW, P.O. Box 425, Awali
Barbados: Amateur Radio Society of Barbados, Highgate Signal Station, Flagstaff Road, St. Michael
Belgium: U.B.A., Postbox 634, Brussels 1
Bermuda: R.S.B., P.O. Box 275, Hamilton
Bolivia: R.C.B., Casilla 2111, La Paz
Brazil: L.A.B.R.E., Caixa Postal 2353, Rio de Janeiro
British Guiana: D. E. Yong, VP3YG, Box 325, Georgetown
Bulgaria: Box 830, Sofia
Burma: B.A.R.T.S., P.O. Box 800, Rangoon
Burundi: via Congo (9Q5) QSL Bureau
Canal Zone: Ralph Harvey, KZ5RV, Box 407, Balboa
Cape Verde Island: Radio Club de Cabo Verde, CR1AA Praia, Sao Tiago
Cayman Island: via Jamaica
Ceylon: 487WP, P.O. Box 907, Colombo
Chagos: via Mauritius
Chile: Radio Club de Chile, P.O. Box 13630, Santiago
Colombia: L.C.R.A., P.O. Box 584, Bogota
Congo: (TN8) QSL Bureau, P.O. Box 2239, Brazzaville
Congo: (9Q5) U.C.A.R. QSL Bureau, B.P. 3748, Elisabethville
Cook Island: ZK1 QSL Bureau, % Radio Station Rarotonga, Rarotonga
Costa Rica: Radio Club de Costa Rica, Box 2412, San Jose
Cuba: ANRAC QSL Bureau, P.O. Box 6996, Havana
Cyprus: C.A.R.S. QSL Bureau, P.O. Box 216, Famagusta
Czechoslovakia: C.A.V., Box 69, Prague 1
Denmark: E.D.R. QSL Bureau, OZ6IHS, Ingstrup
Dominican Republic: R.C.D., P.O. Box 1157, Santo Domingo
Ecuador: Guayaquil Radio Club, P.O. Box 5757, Guayaquil
El Salvador: Club de Radio Aficionados de El Salvador, QSL Bureau, P.O. Box 517, San Salvador
Ethiopia: Kagnaw Station Amateur Radio Club, ET3USA, APO, New York, N. Y. 09843
Faeroes Islands: P.O. Box 184, Torshavn, or via Denmark
Fiji Islands: P.O. Box 184, Suva
Finland: S.R.A.L., Box 10306, Helsinki 10
Formosa: (BV1US calls only) Taiwan American Radio Club USARSCAT, Box 8, APO, San Francisco, Calif. 96263
 All other BV stations: QSL Bureau, C.R.A., Box 2007, Keelung, Taiwan, Rep. of China
France: R.E.F., Boite Postale 70, 75 Paris 12
France: (F7 only) F7 QSL Bureau, % Base MARS station APO, New York, N. Y. 09083
French Oceania: Radio Club Oceanien, P.O. Box 374, Papeete, Tahiti
Germany: (DL4 & DL5 only) MARS Radio Station. Hotrs. 93rd Sig. Bn. APO, New York, N. Y. 09016 09175
Germany: (Other than above) D.A.R.C., Box 99, 8 Munich 27
Ghana: G.A.R.S. QSL Bureau, P.O. Box 3773, Accra
Gibraltar: RAF Amateur Radio Club, New Camp, RAF
Great Britain (and British Empire): R.S.G.B. QSL Bureau, G2MI, Bromley, Kent
Greece: George Zarafis, P.O. Box 564, Athens
Greece: (SV8s only): Signal Officer, Hqtrs. JUSMAGG, APO, New York, N. Y. 09223
Greenland: via Denmark
Greenland: (KG1, OX4 and OX5 calls only): KG1A-KG1E (OX5) to MARS Director, OX5BX, APO, New York, N. Y. 09023, KG1F-GK1Z (OX4) to MARS Director, OX4FR, APO, New York, N. Y. 09121
Guam: M.A.R.C., Box 445, Agaña, USPO 96910
Guantanamo Bay: Guantanamo Amateur Radio Club, Box 55, FPO, New York, N. Y. 09593
Guatemala: C.R.A.G., P.O. Box 115, Guatemala City
Haiti: Radio Club d'Haiti, Box 943, Port-au-Prince
Honduras: Jacobo Zelaya, Jr., HRIJZ, Bo. Buenos Aires, 13 Calle 505, Tegucigalpa, D. C.
Hong Kong: Hong Kong Amateur Radio Transmitting Society, P.O. Box 541
Hungary: H.S.R.L., P.O. Box 214, Budapest 5
Iceland: Islenzkir Radio Amateur, Box 1058, Reykjavik
India: A.R.S.I. QSL Bureau, P.O. Box 534, New Delhi 1
Iran: Amateur Radio Soc. of Iran, APO, New York, N. Y. 09205
Ireland: I.R.T.S. QSL Bureau, 24 Wicklow St., Dublin 2
Israel: I.A.R.C., P.O. Box 4099, Tel-Aviv
Italy: A.R.I., Viale Vittorio Veneto 12, Milano 401
Jamaica: Mr. Lloyd Alberga, Jamaica Amateur Radio Association, 76 Arnold Rd., Kingston 5
Japan: (JA only): J.A.R.L., Box 377, Tokyo Central
Japan: (KA only): F.E.A.R.L.-M-, APO, San Francisco, Calif. 96525
Johnston Island: KJ6BZ, % MARS Stn., Det. 1, 1957 Comm. Gp., APO, San Francisco, Cal. 96305
Kenya: RSEA QSL Bureau, Box 30077, Nairobi
Korea: Korea Amateur Radio League, Central Box 162, Seoul
Korea: (HL9) HL QSL Bureau, Signal Section, USFK/EUSA, APO, San Francisco, Calif. 96301
Kuwait: Alhaf Nasir H. Khan, 9K2AN, P.O. Box 736, Kuwait, Persian Gulf
Laos: Houmphanh Saignasith, XW8AL, P.O.B. No. 46, Vientiane
Lebanon: K.A.L. QSL Bureau, P.O. Box 1217, Beirut
Liberia: Liberian Radio Amateur Ass'n., Post Box 1477, Monrovia
Libya: 5A QSL Service, Box 372, Tripoli
Liechtenstein: via Switzerland
Luxembourg: R. Schott, 35 rue Batty Weber, reh sur-Alzette
Macao: via Hong Kong
Madeira Island: via Portugal
Malagasy Republic (Madagascar): P.O. Box 587, Tananarive
Malawi: 7Q7RM, P.O. Box 472, Blantyre
Malaya: QSL Manager, M.A.R.T.S., Box 777, Kuala Lumpur
Maldives: via Alden
Malta: R. F. Galea, 9H1E, "Casa Galea," Railway Road, Birkirkara
Mariana Islands: see Guam
Marshall Islands: KX6 QSL Bureau, via KX6BU, Box 411, FPO, San Francisco, Calif. 96555
Mauritius: Paul Caloche, VQ8AD, Box 467, Port Louis
Mexico: L.M.R.E., P.O. Box 907, Mexico, D.F.
Midway Island: KM6BI, Box 14, FPO, San Francisco, Calif. 96643
Monaco: Pierre Anderhalt, 3A2CN, 49 rue Grimaldi
Mongolia: JT1KAA, Box 639, Ulan Bator
Morocco: A.A.E.M.L., P.O. Box 299 Rabat
Mozambique: I.R.E.M. QSL Bureau, P.O. Box 812, Laurencio Marques
Netherlands: V.E.R.O.N., Postbox 400, Rotterdam
Netherlands Antilles: VERONA, P.O. Box 383, Willemstad, Curacao
New Zealand: N.Z.A.R.T., P.O. Box 489, Wellington
Nicaragua: C.R.E.N. QSL Bureau, Box 925, Managua
Nigeria: NARS QSL Bureau P.O. Box 2873 Lagos
Northern Ireland: via Great Britain
Northern Rhodesia: see Zambia
Norway: N.R.R.L., P.O. Box 898, Oslo Sentrum, Oslo 1
Nyasaland: see Malawi
Okinawa: O.A.R.C., APO, San Francisco, Calif. 96331
East Pakistan: Mohd, AP5CP, Tiger Amateur Radio Club, Dacca Signals, Dacca 6
West Pakistan: Ahmed Ebrahim, AP2AD, P.O. Box 65, Lahore
Panama, Republic of: L.P.R.A., P.O. Box 1622, Panama 1
Papua: VK9 QSL Officer, P.O. Box 204, Port Moresby (or via Australia)
Paraguay: R.C.P., P.O. Box 512, Asuncion
Peru: R.C.P. Box 538, Lima
Philippine Islands: P.A.R.A. QSL Bureau, P.O. Box 4083, Manila
Poland: PZK QSL Bureau, P.O. Box 320, Warsaw 1
Portugal: R.E.P., Rua de D. Pedro V., 7-4, Lisbon
Puerto Rico: KP4YT, P.O. Box 1061, San Juan, Puerto Rico 00902
Rhodesia: R.S.S.R., P.O. Box 2377, Salisbury
Roumania: Central Radio Club, P.O. Box 95, Bucharest
Rwanda: via Congo (9Q5) QSL Bureau
Samoa (American): (Clark Browne, KS6AX, Comm. officer, Government of American Samoa, Pago Pago 96920)
Saudi Arabia: HZIAB, 7244th ABRON-COMM., APO, New York, N. Y. 09616
Scotland: via Great Britain
Senegal: Ch. Tenot, 6W8BF, P.O. Box 871, Dakar
Sierra Leone: Radio Society of Sierra Leone, P.O. Box 907, Freetown

(Continued on page 154)



Correspondence From Members -

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

TVI PREVENTION

☞ Congrats to W1MRW on his fine article, "TVI Prevention — A New Method." It's a "stunner." Why didn't we think of this before??? I built my S.C. and it worked 100%. But, within 5 minutes a neighbor was knocking down my door. Turned out he wasn't watching the same channel I'd synced to.

I would suggest our next Oscar project be a very high stationary satellite that all North American TV stations can sync to. Then we've really got this TVI business licked!!! — *R. H. Graham, VE3CGG, Ontario, Canada.*

☞ Is the article on TVI prevention intended to be an April Fool's joke or did I miss the boat back in my school days? Surely your technical staff did not analyze the paper prior to publication. Since when does one pulse modulate a transmitter with a sawtooth waveform?

How does one go about "shorting-out" the B supply without damage? Horizontal active line time is about 52 micro-seconds. H Blanking is about 11 micro-seconds. This means the transmitter would be "off" 80% of the time — a real load on the 3000 volt power supply.

Since when can we handle that kind of power with a 6C4? Its plate resistance even as a gas tube is a bit too high to pull a 3000-volt supply to ground, (unless it is a low current/high source impedance supply).

How can the spectral distribution in the transmitted signal control or affect the receiver response or selectivity? It cannot.

What does the FCC say about pulse modulating a transmitter at a 15.75 kc. rate? Sideband splatter would be quite severe.

In a populated area where more than one TV station is in operation (or is being received), interlacing with one signal will not prevent interference to the other signals.

There are techniques for carrier interlacing which would minimize interference with the signal interlaced to. But, these techniques are not for the average ham.

I assume that Mr. Marino, being a ham, knows better. He has pulled a good one on you. I only hope less experienced hams don't take it too seriously. — *Don J. Dudley, VE3BUQ, President, Videometrics, Inc., Brightwaters, New York.*

☞ I am astonished to find that you would publish an article that advocates direct violation of FCC regulations under the guise of an "ideal" way to permanently solve the TVI problem.

Ralph Marino's technique involves pulse modulation of the r.f. carrier. This mode of transmission, as you should know, is forbidden by FCC Regulations on any amateur band below 2300-2450 Mc.

Such a scheme as suggested in the article will generate sidebands of significant amplitude at multiples of 15.75 kc. on either side of the carrier frequency.

I sincerely hope no one takes the article seriously and attempts to use such a scheme to eliminate TVI, thus making himself liable to FCC citation. — *Larry D. Scott, W1DPD, Cambridge, Mass.*

☞ Mr. Scott was kind enough to send me a copy of his recent letter. I feel that a certain alarmist tendency ought to be countered.

It is apparent from his letter that without actually constructing an S.C. unit he is attempting to predict performance. Thank goodness the spirit of amateur radio rises above such procedure. In actual fact, no transmitter with an S.C. unit will have such sidebands cluttering up the signal. At least not if it is properly adjusted.

For those with technical interests it might be mentioned that this lack of spurious emission is a direct result of the superregenerative condition existing in the plate tank circuit. Any reasonable value of *Q* will eliminate the 15.75 kc. sync pulse. Indeed this sharpening effect has in most transmitters even cut slightly into the high frequency response making some treble boost necessary in the audio system.

Naturally neither *QST* nor myself are interested in running anyone afoul of the FCC, but the question really does not arise in this case. Reader Scott is probably thinking of pulse amplitude modulation (PAM) which is forbidden as he says. The S.C. unit produces triggered amplitude modulation (TAM) which is not illegal but basically the same thing that occurs when the push-to-talk button or VOX is used.

I might also mention now that these needless fears have been laid to rest that many have asked for further information regarding the phase adjust network. Details of this aspect of the S.C. unit were omitted as each installation will be different. Careful experimental work will quickly reveal the necessary values. — *Ralph A. Marino, W1MRW, Turners Falls, Mass.*

☞ I am a registered electrical engineer, have an Extra Class license, etc., and have discussed this article with several competent amateurs. It is our consensus that this article may gratify the ego of the author and fill space in your magazine but it is not amusing! I strongly object to your publication of such articles — definitely "amateur humor" of substandard quality. — *Bruce D. Mull, WØBGZ, Hoyt Lakes, Minn.*

☞ I've enjoyed reading W1MRW's article. This well-written manuscript is the finest April Fool's article I've ever read. — *Ed Berkowitz, WB2IWH, West Orange, New Jersey.*

DUES

☞ I am all for going up to \$6.00 a year for dues. I may be a new member but where else can you get a membership with services like *QST*. — *Stuart S. Wells, K5PWD, Dallas, Texas.*

¶ Don't know how you can continue to provide such service for so little money! Am member of IEEE which does nothing for its average member for much more dues. — *John R. Abbott, W6ZOL, Sherman Oaks, California.*

¶ I would gladly pay twice the amount. — *Thomas O. Sullivan, W15NPS, Dallas, Tex.*

¶ I value my ARRL membership very highly and will stay with you if you find it necessary to materially increase dues! — *Albert Ralph Honig, Jr., W8RST, Jackson, Michigan.*

¶ Increase the dues! For the good of all concerned, \$8.50 or \$10.00 a year would not be out of reason. — *Philip D. Zorian, WB2VPS, Roslyn Heights, Long Island, New York.*

¶ How can you still do it for five dollars? A raise in dues is in order. — *Vincent J. Tierney, W2GIE, New York, New York.*

REVERSING THE TREND

¶ Much has been said about the drop in the rate by which newcomers get into amateur radio. Without newcomers we are headed for eventual extinction.

Amateur radio is confronted with competing problems such as the affluent (great) society, stereo, hi-fi, color TV, citizens band, and many other similar diversions, plus fees for licensing. The pool of newcomers normally comes from those individuals with access to s.w.l. receivers. Long ago, this s.w.l. receiver could hear amateur communications with no difficulty. But since most amateurs now use sideband, reception is not an easy technique on an a.m./c.w. receiver.

It seems to me that the problem for potential newcomers could easily be solved. All that is needed to convince the manufacturers of this type of receiver, to build at a relatively low cost a receiver with product detection and a fairly effective a.v.c. circuits.

I don't believe the manufacturers would object. It would be to their long-term interest, and to the direct benefit of all of us interested in amateur radio and communications service to the public. — *Frank Cassen, W4WBK, Memphis, Tenn.*

LESS HAMS

¶ I found Mr. Hyde's comments to the QCW, as quoted in the April issue of QST, most informative. However, his remark about the disturbing downward trend in number of radio amateurs caused me some concern. It seems obvious that any current lack of interest in obtaining amateur licensing has been brought on by the creation of a test-free, virtually unrestricted citizens band, formerly known as 11 meters. From my personal observations, only a very small minority of CB operators are interested in making the transition to the amateur ranks, and with good reason. More often than not, the CBER is a communicator, rather than an experimenter or a gadgeteer. His desire to communicate is fully satisfied within the confines of his present license, legally or illegally. To put it bluntly, he has available to him, nationwide communications for a few bucks and an application form.

I am certain that there are good reasons for the existence of the Citizens' Radio Service; I agree that it is the prerogative of the FCC to authorize such utilization as it sees fit. But the simple fact remains: the Amateur Radio Service cannot continue its fine growth rate of the past 15 years against such com-

petition. It would seem to be the League's responsibility to put this point across to the proper authorities. — *R. V. Yates, W4GCB, Rock Hill, South Carolina.*

THIRD-PARTY COMMUNICATIONS

¶ Some U.S. amateur radio operators strangely interpret the rules prohibiting third party communications with certain designated countries. They think that third party communications may be conducted with persons in non-third party countries if the "third party" is sitting in the ham shack and can talk on the microphone. Other W/Ks apparently are unaware of or ignore the prohibition.

I believe that it is erroneous and most impolite for U.S. hams, temporarily operating in non-third party countries, to request or permit forbidden third-party communications, thereby abusing their courtesy operating privileges. — *Gloria M. Spears, KZ5GS/W13EQ1, Balboa, Canal Zone.*

QSLs & QTHs

¶ I would like to know why so many amateurs refuse to address QSL cards with a person's last name. Perhaps many members don't realize that some of us live in apartment houses and find it difficult if not impossible to mount our calls on the mailbox. Thus, many of our cards are forever lost in our efficient postal system. Come on boys, even my last name isn't hard to spell. — *Theodore Antanaitis, WB2TNY, Brooklyn, New York.*

FIVE YEAR RENEWALS!

¶ The FCC issues licenses for five years. Why not allow ARRL members to take out a five-year membership instead of having to renew annually at present? A considerable saving in administrative costs on each five year membership might surprise us all. — *G. T. Boyett, W15ATE, Sour Lake, Texas.*
[EDITOR'S NOTE: League members, indeed, can already renew for five or any number of years in advance. Beat the DUES RISE!]

CHANNEL 60

¶ The League Executive Committee recommended 29.6 Mc. be used as a "primary gathering spot" for converted CB gear.

As you probably know, this frequency is used extensively throughout the United States for wide band f.m. operation. Here in West Virginia there are quite a few stations on 29.6 Mc. covering the upper half of the state. Every day more and more stations are heard from all over the United States also.

Not only would the a.m. operators interfere with the w.b.f.m. operators but the w.b.f.m. operators would more severely interfere with the a.m. operators. Although it was suggested that they move to the w.b.f.m. operators but the w.b.f.m. operators 29.61, 29.62, or 29.63 Mc. after establishing contact on 29.60 Mc. this would still interfere with operations on 29.6 f.m. since quite a few of the receivers are over 40 kc. wide.

The basic idea of using converted CB gear is a very good one but the choice of frequency was poor. Best of luck in getting some activity started but you should reconsider your choice of frequencies. — *David Mitchell, W1SLMY, Morgantown, West Virginia.*

¶ I really like the idea of Channel 60. In fact, so much that I have ordered a CB rig to put on 10 meters. CU on 60. — *A. M. Fox, W5TPZ, Huntsville, Texas.*

COMING A.R.R.L. CONVENTIONS

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 2-4, 1967 — Maritime Section, Moncton, New Brunswick
September 8-10, 1967 — Southwest/Pacific Divisions, Los Angeles, Calif.
September 9, 1967 — Kentucky State, Louisville, Kentucky
October 27-29, 1967 — Ontario Province, Ottawa, Ontario

MIDWEST DIVISION CONVENTION

North Platte, Nebraska June 24 & 25

The ARRL Midwest Division Convention will be held in North Platte, Nebraska, June 24 and 25. A complete convention program is being planned for the 24th at the Holiday Inn. On the 25th the activities move to the Lincoln County Fairgrounds for the Nebraska Centennial Nationwide QSL Barbecue with enough prime Nebraska beef to feed 2000 hungry hams.

The convention is sponsored by the North Platte Amateur Radio Club. The registration fee is \$5; pre-registration, \$4.50, and tickets for the barbecue are \$1.50.

Tickets and information are available from Charles Kucera, W0FZZ, Program Chairman, 1101 South Ash Street, North Platte, Neb.

WEST VIRGINIA STATE CONVENTION

Jackson's Mill July 1 & 2

The ninth annual ARRL West Virginia State Convention will be held at Jackson's Mill on July 1 and 2. A complete convention program, including mobile judging, a hidden transmitter hunt, swap shop, and code copying contest is being planned. Also on the program is an Army-Navy Mars session, ARRL forum and initiation into the Royal Order of the Wouff Hong at midnight Saturday.

Full registration tickets for the convention including four meals and lodging are \$8.50 for adults and \$4 for children 8 and under. The tickets are available from Dorothy Morris, 1136 Morningstar Lane, Fairmont, West Virginia 26554. Or \$2 convention only tickets are available from Bill Godwin, K8TPF, R.D. 2, Elkins,

West Virginia 26241. Trailer sites may be arranged through Harley V. Cutlip, 4-H Camp, Jackson's Mill, West Virginia. See you there?

CENTRAL DIVISION CONVENTION

Milwaukee, Wisconsin July 7 & 8

The ARRL Central Division Convention, "Hamquest '67," will be held Friday evening July 7, and Saturday, July 8, at the Milwaukee Inn, 916 East St. Street, Milwaukee, Wis.

Scheduled for Friday evening is an ARRL League Officials Dinner, a DXCC meeting, a "Schlitz Circus Parade" movie, and a Wouff Hong initiation for all League members at midnight.

Saturday's program includes an all-day swap shop, MARS, RTTY, ARPSC and traffic net meetings, a laser demonstration by the Wisconsin Telephone Company, manufacturers displays, and if the incentive licensing Docket 15928 is released before the convention, a FCC official will be present to explain the docket. A separate program is being planned for the ladies, and the Saturday evening banquet features all you can eat plus the "bottomless coffee cup."

Talk-in frequencies are 3950, 3985, 50.4, 52.525 f.m. and 146.94 f.m.

General admission tickets in advance are \$2.50 and at the door, \$3.00. Banquet tickets, including a general admission are \$5.50. Due to limited seating, banquet tickets must be sold in advance. All tickets are available from the Ticket Committee, P.O. Box 5296, Milwaukee, Wis. 53204. All requests for room reservations should be made directly to the Milwaukee Inn.

Come early and see Milwaukee's Gemuetlichkeit and "A Day In Old Milwaukee" Circus Parade on July 4th.



Alberta — The Calgary CARA will host the Alberta Centennial Hamfest on July 8 and 9.

Arkansas — Because of a fire in the Crescent Hotel in Eureka Springs, the annual site of the Arkansas Hamfest, the Hamfest will not be held as previously announced.

Georgia — The Atlanta Amateur Radio Club, Inc., will hold its 39th annual Hamfest on June 3 and 4. A Saturday banquet and dance will begin at 7:30 p.m. Registration and breakfast at 8:00 a.m. on Sunday. Manufacturers displays and special interest meeting will be held at Lenox Square Mall and Auditorium through the noon hour. For further information contact John Granberry, W4YPM, 2389 Bynum Rd., N.E., Atlanta, Ga. 30319.

Illinois — The 7th Annual Streator Radio Club Pre Starved Rock Hamfest Dinner is on June 3 at 7:00 p.m. at the Grove Supper Club. Tickets \$3.50. Reservations must be in by May 21. Write Thomas Blakemore, 605 W. Stanton St., Streator, Ill. 61364.

Indiana — The eighth annual Picnic and Hamfest, sponsored by the Tri-State College ARC, Angola, Ind., will be held on Sunday, June 11, at the Steuben County 4-H Park. There will be plenty of room for a swap-shop. For more information write WA8MOG/9, Tri-State College Radio Club, W9BF, Angola, Indiana 46703.

Indiana — Don't forget the IRCC picnic at Brown Co., July 9.

Indiana — See you at the Delaware Amateur Radio Association Hamfest June 4 in Muncie at the Delaware County Fairgrounds.

Iowa — Webster City will be the host for the annual 100-meter picnic to be held June 18.

Kansas — The eighteenth annual Central Kansas ARC Hamfest will be held in Salina, Kansas, Sunday, June 11, rain or shine. Pot luck lunch, swap tables, homebrew contest, mobile hunts, activities for the XYTs and kiddies. Talk-in on 3920 kc. s.s.b. and 146.34/146.94 Mc. f.m. Registration \$1.50. Bring your own table service.

Kentucky — The Paducah ARC and the MOARKY Radio Association will hold their Annual Ham Picnic at the Noble Park Community Center, Paducah, Kentucky. It will be an all-day affair on July 9. Lunch will be served on the grounds, and bring along your swap material and equipment. Further information from H. G. Dunning, W4NBS, 3716 Alameda Drive, Paducah, Ky. 42001.

Minnesota — The Worthington ARC will sponsor a picnic at Worthington on June 4.

Missouri — The Butchers Net picnic in Shadow Rock Park, Forsyth, Mo. on June 17 and 18.

New York — The Rome Radio Club presents its 14th consecutive Ham Family Day on Sunday, June 4, at Becks Grove, ten miles west of Rome, N. Y. Features include technical talks, mobile and c.w. judging, hidden transmitter hunt on 50.6 Mc., and an afternoon of entertainment for the ladies and children. Registration starts at 12 noon with that famous chicken and steak dinner at 5 p.m. Advance adult reservations \$4.50, at the gate \$5.00, kids under 12 \$1.50, under 6 free. Send reservations to Rome Radio Club, Box 721, Rome, N. Y. 13440.

New York — June 17 is the date of the Penn-York Hamfest this year.

Nebraska — The Chadron Picnic will be held at Chadron State Park on June 4.

Nebraska — The Smoke Signal Senders Annual Pow-wow will be held at Chadron State Park on June 3 and 4.

Nebraska — The Centennial Hamfest at Seward will be held on June 18. Bring your own service and a covered dish.

North Carolina — The Charlotte Hamfest is June 10 and 11. Many activities, free barbecue on Sunday. Huge air-conditioned park center. Advance tickets \$3.75 for both days. Write Hamfest, Airport Station, Charlotte, N. C.

Ohio — The Wood County ARC announces its annual Ham-A-Rama Sunday, July 9, at the fairgrounds, Bowling Green, Ohio. Write W8PSK, 324 South Grove St., Bowling Green, Ohio 43402 for details.

Pennsylvania — The 3rd annual Somerset County ARC Hamfest will be held Sunday, June 18, from 9:00 a.m. to 6:00 p.m. near Green Gables and The Mountain Playhouse, located on Route 219, one mile North of U.S. Route 30 at Jennerstown, Pa. Unlimited parking, Green Gables restaurant, swimming and other family entertainment, equipment displays, surplus, and swap shop. Donation of \$2.00 at the door or \$1.50 in advance from club secretary, K3FQK, Box 17, Ursina, Pa.

Texas — The annual Hamfest conducted by the Panhandle Amateur Club will be held on June 24 and 25 this year at the National Guard Armory at T Anchor Blvd., right off Route 40. Talk-in on 3940 kc. For further information write Panhandle ARC, Box 5453, Amarillo, Texas 79107.

Texas — The South Texas Emergency Net is holding its annual convention on June 16, 17 and 18 at Kerrville, Texas. Those interested in more information should contact W5LVC, 638 Collingswood, Corpus Christi, Texas.

Vermont — The Vermont Phone Net celebrates its 20th anniversary on June 18 with a picnic and auction at Caledonia Fairgrounds, Lyndonville, Vt. Write W1UCL for details.

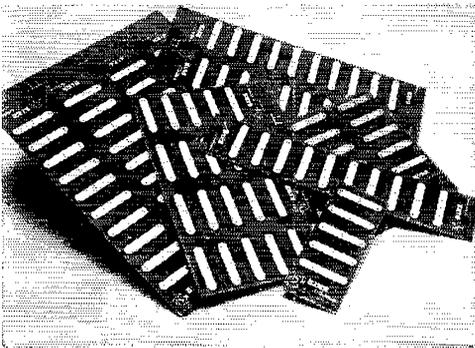
Washington — The Northwest Chapter of the Quarter Century Wireless Assn. will have their annual meeting June 10-11 at the Saharan Motor Motel, First and Post Streets, Spokane, Wash.

West Virginia — The West Virginia Radio Convention will be at Jackson Mill, July 1 and 2.

EST

● *New Apparatus* Kirk Power Supply Diode Boards

ONE of the problems of building a high-voltage power supply with strings of low-voltage diodes is how to mount the parts in a neat and orderly fashion. A simple solution can be found in the stack of boards shown in the photograph. For instance, the large etched-circuit board in the background can be used to support one string of thirty-six rectifiers in a half-wave circuit, two strings of eighteen rectifiers in a full-wave configuration, or four strings of nine diodes in a full-wave bridge. If space is unavailable for such a large board, the same circuits can be put together by using either four long narrow boards or two boards that are half as wide as the large board.



Made of epoxy glass, Kirk etched-circuit power-supply diode boards are available in many sizes in addition to those shown in the photograph. The ones pictured range in size from 1½ by 4½ inches to 7¾ by 9½ inches and can accommodate from four to thirty-six diodes. Of course, the boards can be cut to suit individual requirements. As can be seen from the size of the metallic strips, space is available for a voltage-equalizing resistor and a capacitor spike filter for each diode on the boards. However, all mounting holes must be drilled by the user, as the boards have not been pre-punched. Prices for the boards range from under \$0.60 for the smallest board shown to just under \$5.00 for the largest. The boards are sold by Kirk Electronics, 6151 Dayton-Liberty Road, Dayton, Ohio 45418.

— W1YDS

Strays

Upon completion of the Pan-American Games that will take place in Winnipeg July 27 through August 7, there will be Pan-American Paraplegic Games from August 8 to August 13. Amateur Radio Stations under the direction of VE4SD meet every Sunday at 1900Z on 14.160 Mc. to assist the participants in their athletic plans. The amateurs engaged in this operation feel it is a very worthy use of amateur radio and the paraplegics are enjoying the ability to converse with their alter-egos on the air, in settling the many problems associated with an international sports meet. So far, the schedule of events includes basketball, dart-archery, club throwing, swimming, weight-lifting, javelin, shot put, table tennis and snooker,

CONDUCTED BY BILL SMITH,* W1DVE/KØCER



The e.m.e. target as seen through a 4¼-inch reflecting telescope using a Contaflex SLR camera and Tri-X film with an ASA 400 rating. (W1CNY photo)

Space Communications — Our Future?

A STEADY diet of anything can become tiring — moonbounce, or e.m.e. (earth-moon-earth) — included. The fact remains, however, that e.m.e. is one of the more glamorous fields of v.h.f./u.h.f. experimentation at the present time. There is no doubt that space communications has a bright future on our favorite frequencies; there are discoveries to be made, systems to be developed.

At the time of this writing — and it will probably have changed by the time you read this — the latest in e.m.e. was the two contacts made on 432 Mc. between W2IMU/2 and HB9RG in Switzerland and G3LTF in England on the 15th and 16th of April respectively. Dick Turrin, W2IMU, used the 60-foot experimental commercial dish of the Crawford Hill V.h.f. Club at Colts Neck, N. J. Dick was assisted by W2JIB, K2KII, WB2ALK and Mr. Roger C. Abson.

The contacts were made on prearranged schedules that also included GM3FYB/A in Scotland, PE1PL in the Netherlands and OK2WCG in Czechoslovakia. The Scot and the Czech were not heard, but weak signals were copied from PE1PL, HB9RG and G3LTF were worked easily and the contact with G3LTF lasted 40 minutes. The Englishman has an 18-foot dish polar-mounted on his garage and runs about 450 watts output. Details of HB9RG's station are not available but he was using a dish antenna.

Similar schedules were held April 22-23 between W2FZY/2 and PE1PL, G3LTF, OZ8EME

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

and GM3FYB/A. A summary of the results of those schedules appears elsewhere in this column. The transmitter at W2IMU/W2FZY is a square cavity producing about 600-watts output.

The Crawford Hill Club expects to be quite active for the next several months on 432 and equipment is being developed to try additional experiments on 1296-Mc. Dick Turrin says the club invites participation in the program. And word is, that there may be another well-known large dish activated on 432 before long.

With some refinements, many of us have stations capable of e.m.e. except for the antenna system and its orientation. An idea of the size of an antenna needed to develop sufficient gain for e.m.e. can be had by looking through past editions of this column. Not so obvious, however, are the methods of aiming the array at the moon and keeping it there.

Vic Michael, W3SDZ, and Don Lund, WAØIQN, have written *QST* articles that aid in locating and tracking the moon. Vic's article, "Tracking the Moon — In Simple English," appeared on page 37 of the January, 1965 issue, and Don's, "How High the Moon," is on page 55 of the July, 1965 issue. Both articles are excellent reading for the would-be moonbouncer.

W3SDZ says the polar mount (also called an equatorial mount) is the best for a steerable array and that the el-az (elevation — azimuth) mount is difficult to aim and track accurately because two almost simultaneous movements are required. A polar-mounted antenna has only to track in elevation (hour angle) because the azimuth (declination) remains essentially constant, changing only about 2° in 24 hours. In other words, you can set the declination angle once each day and forget it. The hour angle is another problem. To keep your antenna on the moon, a system that moves the array at 15° per hour is necessary to follow the moon across the sky. There are various schemes for doing this, one of which was described by Francis LeBaron, W1TQZ, in *QST* for April, 1961. The problem is basically mechanical — does anyone have a good sound system that won't bankrupt the backyard moonbouncer?

If your interest in space communications is earth satellites and Project Oscar, then the articles "Space-Age Antenna Ideas" by Chuck Kunze, WØWVM, on page 11 of June, 1962 *QST* and "A Different Satellite-Tracking Antenna System" by Jim McMechan, WØPFP, and Clayton Clifford, KØKPG, page 34 of October, 1964 *QST*, should be of special interest. While there have been some problems in the DJ4ZC

Oscar V package, there is a good chance of its flight this year — and possibly another package.

Looking far into the future, Nick Marshall, W6OLO/2 and formerly technical director of the Oscar program, says another amateur space communications project is developing called NASTAR for the Nassau Satellite Tracking Amateur Radio Society. The organization hopes to put a ham transponder package on the moon during the third manned U. S. landing on the lunar surface.

Late E.m.e. Note

W2FZY/2 contacted OZ8EME (special call issued to OZ9AC) and G3LTF on April 23. OZ8EME's signal was mostly in the noise. He was running 300 watts to an 18-foot dish. G3LTF used the same equipment as during the April 16 contact. W4HHK and K9AAJ report hearing W2FZY/2 via the moon on April 22.

Artificial Aurora

NASA may be able to produce what March didn't. The government agency plans to create an artificial aurora some 60 miles over the East Coast during June in an attempt to investigate the causes of auroras. The project involves launching a small electron accelerator aboard a rocket from Wallops Island, Virginia. While the exact date has not been announced, it probably will be publicized through the newspapers and radio and television.

If successful, an artificial reflecting surface should be established that may be capable of reflecting v.h.f. signals.

In late March, three clouds of barium were released from a Wallops Island launched rocket to test an artificial ionosphere. The results of the experiments conducted by the government are not known. The test caught amateurs by surprise and although several schedules were hastily made by telephone, no two-way contacts have been reported. One of the difficulties may have been the inability to elevate the antenna towards the clouds some 150 miles above the earth's surface.

The June test should prove interesting and the 60-mile height of the artificial surface suggests contacts over *E-layer* distances. Depending upon

your location in the East, elevating the antenna may be necessary.

Vince Dawson, WØZJB

A young man from Missouri astounded the v.h.f. world 28 years ago when he worked each of the then nine U. S. call areas on 56 megacycles.

He was Vince Dawson, WØZJB, one of the true pioneers in the world above 50 Mc. In a day when selling the bands above 50 Mc. was difficult, Vince was one of the best salesmen, pitching v.h.f. on 10 meters and at hamfests and conventions throughout the Midwest.

After World War II, Vince picked up on 50 Mc. where he had left off on 56. In July, 1948, he became the first to work all states on a v.h.f. band. A special 50-Mc. WAS award was presented to him at the 1948 ARRL National Convention in Milwaukee.

By then Vince was conducting a monthly v.h.f. column in *CQ* magazine, a job he did well until the demands of his work forced him to relinquish the department. This did not mean the end of his interest in v.h.f. because in 1958 Vince won the 14th 50-Mc. endorsed WAC certificate.

His passing in March at the age of 48 has darkened that famous Kansas City shack — and left a place in the hearts of countless v.h.f. men that will not soon be filled.

— ARRL, V.h.f. Committee



Vince Dawson, WØZJB



Rhode Island is a rare state on any band. Dick Bromley, K1ABR, especially well represents the state from Cranston on 50 and 144 Mc. Dick is open for scatter schedules on both bands.

OVS and Operating News

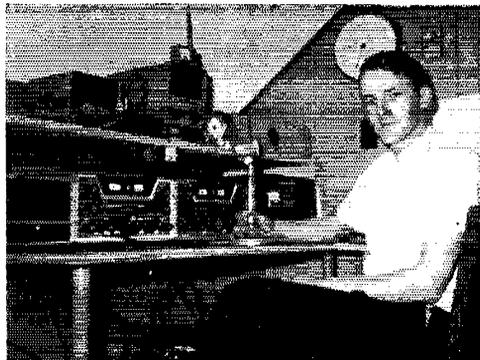
50 Mc. served up some delicious DX from our Southern latitudes into South America during past weeks. W4GJO says "it's getting to be like old times!" Grid reports working LU1DJC and LU6DLB in Argentina; OA4C, OA4PZ and OA4TF in Peru; CE3BQ and CE3QG in Chile, and Uruguay's CX6BW during April! According to Grid, many South American contacts have been made from Florida this spring. And he has information from VK8KK that the Aussie worked over 300 JAs (Japan) during one week in March. JA1AAT tells W4GJO the Japan to the Philippines path is also lively. In the Fiji Islands, VR2DK has a problem. He tells W1JYII that he is having trouble

watching channel 2 from American Samoa because of audio interference from channels 7 and 9 in Hawaii. VR2DK also has received solid TV pictures from New Zealand and Australia. There just has to be a way to get him on 50 Mc.!

Additional reports of openings to South America come from K4HQI at Commerce, Georgia. Lloyd worked CX7AG and CX6BW, both in Uruguay, on April 18 with a 5-watt transceiver! He also heard CE3BM and CX9AJ. The same day W5WAX in Muskogee, Oklahoma worked CE3QG, LU3DCA, CE4BP, NE1PY and heard CX7AG, CE6BW, OA4C, CE3BM and LU3EX. NE1PY told W5WAX that the band has missed being open into South and Central America from Mexico on only two days since February. W5ORH at Oklahoma City caught the same opening and worked CX7AG, LU3EX, CE3QG, LU3DCA, NE1PY, OA4C, CE3BM and LU3MBJ. W5SFW worked the same stations from Amarillo, Texas. VK8AUW reports the following beacons are in operation from Japan: JA4IGY, JA6IGY and JA9IGY on 50.5, and JA1IGY on 51.995. LU3EX says he has received what he believes to be the Pacific Scatter system several times this spring in Buenos Aires, Argentina.

At Jackson, California, K6EDX is keeping his eye on TV DX. Bob reports logging what he is sure was WNTV in Wellington, New Zealand on 45 Mc. in February. Bob says WNTV transmits its video on 45.25 Mc. and audio on 50.75 with 10 kw. The new channel 0 in Australia has its video on 46.26 and audio on 51.76 with 100,000 watts e.r.p. from the transmitters which are located on several mountain tops. None of the stations were on during Cycle 19 so this is the first time there has been a good "beacon" over the U. S. to South Pacific path. Bob observes the east-west paths have been better from his location than the north-south paths. There have been, however, several reports of South American DX being worked from Southern California. Another beacon source is the BBC's Channel 2 with video on 48.25 and audio on 51.75 Mc.

In Central America, Erik Roy, TI2NA, has two rigs on 50 Mc.; 500 watts on 50.077 and 80 watts



Dave Robinson, K7BBO, is one of the West Coast 50-Mc. scatter enthusiasts. He is also active on 144-Mc. scatter from his Tacoma, Washington location.

on 50.375, both a.m. Erik says six was open almost every night during March and April from his San Jose, Costa Rica location to South America. He is on six every night and on 3.815-Mc. s.s.b. Wednesday and Sunday evenings at 2100 EST to arrange skeds.

Vince Varnas, K8REG, is now at Sondrestrom, Greenland, signing ON1AA and looking state-side on six. He will be there until early January running a KWM-2 and 62S-1. He should be a good bet on aurora and *Hs* into the northeastern states and possibly *F2* this fall to anywhere. If you want to schedule him, his address is Airman Vincent J. Varnas, AF15756296, Box 648, APO New York 09121. Thanks to Ev Taylor, W7BYF, for the above information.

In England, G3LQR, G3RIK, and others, will be checking for crossband (28 to 50 and 50 to 70 Mc.) contacts this fall.

Among the stations looking for six-meter scatter schedules are K1ABR in Rhode Island, W5WAX in Oklahoma and K0GJX in South Dakota, K0GJX has recently put 500 watts of s.s.b. and 4 elements up 60 feet on the band. W6NLO, P.O. Box 267, San Marcos, California 92069 is looking for contest skeds from a portable site near the Mexican border. W7BYF and troops will be operating from Mount Rose, Nevada on 50 through 1296 during the contest and wants schedules. Write Ev Taylor, 7542 Meadowair Way, Sacramento, California.

144 Mc. continues to be exploited by moon-bouncers K6MYC, W6DNG, VK3ATN, F8DO, SV1AB and WB6KAP. Mike Staal, K6MYC, is scheduling VK3ATN and F8DO with some degree of success but no two-way contact since changing station locations. He is hearing his own echoes, however. VK3ATN has been copying good signals from WB6KAP but Vic is still trying to lick receiver problems. Bill Conkel, W6DNG, has made at least two more successful contacts with F8DO bringing the total number of two-ways with Marius to five. Foul weather in Finland has been hampering Lenna, OH1NL, in his tests with Bill. SV1AB is about to begin tests with K6MYC and W6GDO has been heard by F8DO.

Tropo conditions started to perk up with warmer weather. K2LGJ at Kenmore, New York, worked Michigan stations W8DGF, W8DDO and K8UQA, W9ZIH near Chicago and W8AEC in West Virginia



This novel 2-meter mobile antenna belongs to WA4WBF at Winter Haven, Florida. The Yagi is rotatable from driver's seat by means of an electric automobile window motor. The whole assembly can be put on, or taken off, the car in one minute.

in late March. W3GKP, Smitty at Spencerville, Maryland, made contact with Tennessee's K4EJQ and K4QIF in North Carolina on an otherwise quiet band. W7RQT at Providence, Utah, is trying aircraft scatter to W0EYE, and is trying to locate ex-K6OJO who moved to Florida. W5ORH says VP7DD in the Bahama Islands is now active and will accept schedules. VP7DD's address is Jeff Scott, % Director of Range Operations, MTORC-1, Patrick AFB, Cocoa, Fla.

At Don Mills, Ontario, VE3HW and the Toronto F.M. Association are trying to foster more f.m. activity in the area and have a repeater active. Their net meets on Monday evening at 2000 EST, 146.940.

June, July and August are good months for meteor scatter, both shower and sporadic meteors so if you have not tried this form of propagation on 144 Mc. now is the time to make some schedules. See page 78 of May QST for the dates and times of the major showers.

220 Mc. reports are few and far between this month, but those that were received are interesting. At Costa Mesa, California, Joe Burke, K6IBY, is working on an e.m.e. project and has copied his own echoes. Joe runs 600 watts into a 64-element slot array. Apparently no one has made a 220 two-way e.m.e. contact so there is another "first" waiting for those interested. Chuck Purosky, W3ARW, at Old Forge, Pennsylvania casually mentioned his 220-Mc. standings in his reply to the ARRL 220-and-up questionnaire. Chuck has worked 17 states in eight call areas and a maximum distance of 600 miles! That, gentlemen, is tops in the country. East Hartland, Connecticut, 220 faithful K1YON reports working WB2CNK on Long Island on an otherwise quiet band. Northern California has several active stations on 220; K6LEK, W6DFU, WA6GER, W6GDO, WA6TXH, K6DTR, W6BGJ, K6HOU and WA6GYD all holding out around 222.50.

Returns from the previously-mentioned questionnaire were excellent. Headquarters staffer WA2BAH/1 is going over the forms in preparation for the promised directory. There are many more stations reporting activity on 220 than expected. Most are in the 20 watt and Yagi category.



ATV station of Hal Greenlee, K4GYO, Merritt Island, Florida. He first transmitted ATV in 1963 and is regularly active with 50 watts on 420 Mc. His antenna is a 16-element collinear 70 feet high. Other Florida stations active on ATV include W4NSA, K4PDR, WA4MBM, W4TOD, K4NTD, WB4AKJ, WA4NKN and WA4BYR.



Lou Bollavia, K4PDR, has this fine ATV station in his Lutz, Florida home. Lou has two video transmitters and runs up to 125 watts output to 12-over-12 J-Beam slot 100-feet high for video transmitting and receiving. The antenna for the oral transmitter is an 11-element Yagi at 80 feet on a separate tower. Most of the gear is either homebrew or converted commercial. Lou is interested in corresponding with other ATVer's.

432 Mc. tests that date back for more than one year have finally paid off for Al Olcott, K7ICW, in Las Vegas, Nevada and Russ Robertson, W6DQJ, in Pico Rivera, California. The 225-mile path is directly over 10,000-foot Mount Baldy in Southern California. During the year-long tests, both operators noted a temperature of not less than 57° was necessary for the signals to be copied and that high winds and rain had no effect on propagation conditions. The equipment used at K7ICW was four 11-element Yagis vertically polarized (vertical was chosen because it is more widely used in Southern California than horizontal polarization) and a Parks 432-2 converter with a quarter-wave tunable cavity at the input. The transmitting end was a W1CER H4-A varactor being driven by a Hallcraft HA-2 giving 20 watts at 432, which in turn drove a W1QWJ 4CX250B final producing 300-watts output. W6DQJ ran 330 watts out of a 4CX250B into a 48-element vertically polarized collinear array. The converter was also a Parks 432-2. Neither Al or Russ used noise blankers and found that ignition, power line and radar noise to be limiting factors. Al copied Southern California radar on several occasions. A 225-mile QSO on 432 isn't particularly news along the Gulf Coast, but over that Nevada and Southern California terrain it certainly is!

At Englewood, Florida, WA4BYR, reports having worked W5LAV and W5FCD, both in Texas on s.s.b. W5WAX in Muskogee, Oklahoma is looking for 432 schedules. He has 44 elements at 40 feet. And at Pasadena, W6PUZ is doing some antenna evaluation. W1QWJ continues to run his keyer each night from Springfield, Mass. on approximately 432.000. Nearly 40 stations are active on 432.9 w.b.f.m. in Michigan and Ohio according to a fine Midwest U.h.f. Bulletin put out by Ray Newsome, K8TJP. Ray has some good information on the conversion of commercial 450-Mc. f.m. gear to 432. Some of the gear is converted very simply. From Warren, Minnesota, W0PHD reports the first 432 contact between his state and North

(Continued on page 150)



YL news and Views

CONDUCTED BY LOUISE RAMSEY MOREAU,* WB6BBO

Happy Anniversary, VE YLs

AMATEUR radio is heavy with tradition, much of which we have made ourselves as we learned by doing. More of our tradition comes from the older communications services so that almost all of our activity is colored by the past.

In their centennial year, the VEs can add more than national history when they are chatting around the world, for it was in Canada that DX operation literally began a hundred years ago when the atlantic cable overcame natural barriers between continents and the western terminus was laid at Hearts Content, in Trinity Bay. Thirty-four years later, in the old barracks at St. Johns, Newfoundland, the faint buzz of the letter "S" that Marconi heard in his "receiver" was, in truth, the birth cry of DX operation and the possibility of the world being literally at our fingertips.

*YL Editor, *QST*. Please send all news notes to WB6BBO's home address: 1036 East Boston St., Altadena, Calif. 91001.

History does not record that there were ladies actively participating in either of these milestones in communications, but it is certain that there were, and VE YLs have become the gracious heirs of the great heritage that began in Canada. These gals are wherever the communications laws permit them to operate. Some, like Gwen, VE3AYL, are almost exclusively RTTY; while others, like Jan, VE3BII, and Ivy, VE3EZI, are to be found in the top spots of YL contest operation such as YLAP, and Howdy Days. VE7ATH is up to her ears in traffic nets, from Section through Area, in NTS, with a code proficiency of 35 w.p.m. There are gals with a wall full of certificates like Margaret, VE6ABP, with her WAV, WACAN, USA/CA, DXCC, and WAC among many. When we find Jean, VO2AK, she has no doubt just fired up her rig after one of her code classes that she conducts three nights a week, or possibly returned from teaching Semaphore to the Boy Scouts. Or, we might bump into Alma, VE1MY on the Breeze Shooters Net, Alma



VE3DGG, Jean Evans



VE8HH, Vera Hines, and family.



VE1WR, Sandra Carr



VE3BII, Jan Burgess



VE3EZI, Ivy Smythe



VO1AI, Pat Barrett

holds a Public Service Awards for her service during Hurricane "Edna," and the Springfield fire, in December 1957.

On May 9, 1965, The Ontario Trilliums, (TOT), was formed, by a group of Ontario YLs, as the first YL club in Canada. There were no geographical restrictions on membership, so it expanded until now, TOT members are from six of the ten Canadian Provinces, and Districts. From a local club, TOT has become an on the air group, with meetings on both c.w. and on phone. The area covered, plus time differences makes the set up unique in organization, and the schedule of meetings looks like a net directory in itself. The meeting schedule is:

Day	Time	Frequency	Mode
Saturday	1900 GMT	3.650 Mc.	c.w.
Saturday	2100 GMT	3.770 Mc.	Phone
Saturday	1700 GMT	14.140 Mc.	Phone
Tuesday	1830 GMT	3.770 Mc.	Phone
Wednesday	0300 GMT	145.2 Mc.	Phone

All YLs from all prefix areas are welcome to join, and, with the flexible schedule of dates, bands, and times, there is something for everybody.

There is a Trillium Award that is available to OMs as well as YLs, with VE3CLP as custodian.

At present, the Canadian gals are trying to form a nation wide radio club under the sponsorship of the Trilliums. Whether this organization will be an all-Canada group expanded from TOT, or a brand new club has not yet been decided.

Another very active on the air club is the Maritime Sparkettes, organized strictly for linking the VE1 gals by radio.

We find them on any band, in any mode, and the VE ladies are, in this hundredth year of Confederation, truly worthy of the communications tradition that started in Canada a century ago.

YL Plans for Montreal

The Ladies Committee, with Georgette Daeman, XYL of VE2IJ as Chairman, is putting out the welcome mat for YL and XYL of the ARRL, June 30, July 1, and 2, at Montreal. Plans include a fashion show with many beautiful prizes, and dancing.

There is to be a special hospitality room, and at lunch time the hotel has set aside tables in the dining room, or the roof garden where the gals can gather and get better acquainted.

On Sunday, tours of the city and trips to the Expo can be arranged.

Georgette says, "Come on ladies, we assure you that you will enjoy our bilingual hospitality, and French joie de vivre."

AWTAR

The All Women Transcontinental Air Race will be July 8, through July 11, 1967. Take off city will be Atlantic City, New Jersey, and the terminal airport has been designated as the Torrance Municipal Airport, Torrance, California. Starting time 0900 EDT, July 8, and the deadline finish will be sunset Pacific Standard Time. All AWTAR Activities and traffic will be carried on 7.217 Mc.

Future YL operator?

Not sure whether this is a "first" or not. Kathleen Elizabeth Shaw, born in March this year, has K9TVN, Donita, and WA9TAF as parents. K9TRP Diane, and K9PDT, Don are her grandparents.

QST



VE3DXZ, Doris Abel



VE3BBO, Doris Cody



VE1AMS, Betty Howell



VE6API, Ruthanne Page



VE1MY, Alma Hills

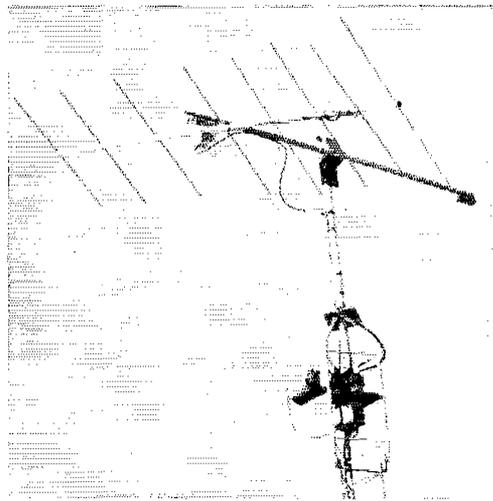


VE4ST, "Bubbles" Timlick

Strays



K2MLT recently presented two amateur stations to Father Don Murray, founder and executive secretary of Sky Ranch for Boys, Camp Crook, South Dakota. The equipment was furnished by Great Western wines in line with sponsorship of the home for deserted or delinquent boys by the liquor industry.



W3LHF sends along this photo of a satellite tracking antenna used at the Naval Air Development Center, Johnsville, Pa. The antenna is steerable in azimuth and elevation, and also has provision for adjusting the angle of its linear plane. It is interesting to note the use of a popular TV antenna rotator for elevation and angle positioning.

The antenna is used in conjunction with measuring work being done with the NASA ATS-B satellite. The satellite is parked in a stationary orbit over the Pacific Ocean and has an input near 149 Mc. and output near 136 Mc.

Dave says that these frequencies are "pleasantly close" enough to our amateur 2-meter band, that much of the available data received will be of value to amateur space communication efforts.

While Dave is now making measurements on the government satellite, he hopes to be able to communicate through the next Oscar translator satellite. (Official photograph, U.S. Navy, NADC, Johnsville, Pa.)



Jim Roper, W9JSW, news editor for WFLD television, Chicago, mans the controls of amateur radio station WA9RTP, which is permanently located in the TV station studios, while news announcer Patrick Muldowney waits for his air time cue. The ham station, operated by the Field Amateur Radio club, has several times been used as a part of WFLD's news program. It got its initiation on January 27, when it was used live on television for 10 hours to help relay emergency messages stemming from the record-breaking blizzard that swept the Chicago area.

The tie-in between the two communications media—believed to be the first of its type in the world—was conceived by Sterling C. Quinlin, station manager for WFLD; Dr. George Anast, WA9IEN and now president of Field Amateur Radio; and William Kusack, W9QEE and WFLD chief engineer. The FAR station antenna is on the 44th floor of Chicago's Kenper Insurance Building at approximately 575 feet above street level.



This is K7WJZ, club station of the Veterans Administration Domiciliary, White City, Oregon. Pictured is Bill Bailey, K7LVC. Other operators include W7NVV (trustee) and K7CKB.



How's DX?

CONDUCTED BY ROD NEWKIRK,* W9BRD

How:

"Oh, they speak a little English everywhere," concludes many a modern Marco Polo after a few sheltered weeks abroad. "Everywhere" along the tourist trail maybe. Slip off that beaten path and you're in trouble. Twenty-meter phone, the DX money slot, can supply the same illusion. Excellent English will be heard in myriad accents, enough to indicate that the so-called language barrier is a myth.

But tune further; hit the bushes. Try the SWBC ranges including 7-Mc. VOA noise. Make note how many stations are transmitting English and how many are not. You'll start to appreciate that less than 300 millions of the world's three billion inhabitants, a paltry 10 per cent, use English. English, as a matter of fact, runs far behind Mandarin Chinese among thousands of other languages and countless incompatible dialects.

The lingo on ham DX voice bands is predominantly English for good reason. The most widely circulated amateur radio literature, that of your ARRL, is accountable. As yet there is, so far as we know, no Mandarin Chinese translation. Any volunteers? Small wonder that the U.S.A. ham population dwarfs that of the rest of the globe. Something to be proud of, in an insular sense, but in view of the international compatibility required for conservation of our h.f. DX bands, this is not a happy situation.

Consider the "Gear Overseas" editorial in your March '67 QST. Aimed at preservation of amateur frequency allocations, there is concerted effort "to develop amateur radio in countries where it does not now flourish." OM, if you think QRM is heavy now, QRX for the main show. *The ultimate choice is QRM or QRT.* Our country has a quarter of a million amateurs. Even at that insufficient rate India (pop. 440 millions) could one day field half a million hams. Russia (264 millions) already has a productive hamming program. When mainland China (735 millions!) comes into electronic enlightenment there'll be the prospect of another million.

Fantasy, eh? So was a trip to the moon. But go ahead, dilute those figures as much as you wish. We're still in for the h.f. QRM of our lives. Amateur radio fortunately is blessed with a built-in barrier-smashing culture-linking communications tool that has surmounted QRM and language obstacles since the birth of the art: the International Morse Code, combined with "Q" signals and standard abbreviations. Mastering it has proved far less challenging than attaining fluency in a flock of alien tongues. Bold writing on your shack wall proclaims that ama-

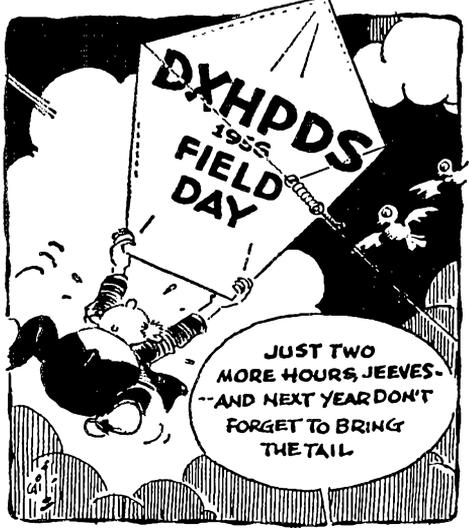
teur radiotelegraphy's greatest DX task lies directly ahead. The Voice of America, with all the multikilowatt BC channels and linguists it can muster, can never bridge the alien gulf so effectively as ham radio's QRP "73 OM".

As for gear overseas, that wall inscription is especially visible for designers and builders of amateur radio equipments. Hamdom is gratefully impressed by how complex, compact and costly our outfits can become. For too many would-be hams overseas, however, they're about as practical as Rolls-Royces in Tibet. Now, sirs, how simple, rugged and low-priced can you produce exportable 20-watt c.w. stations? Market? Eventually unlimited. It had better be.

What:

Superskip! We're beginning to have those days again, those crazy, wonderful DX days when every continent booms in simultaneously on 10, 15 and 20 meters, days on which power and antennas hardly seem to matter. Sunspots, keep it comin'! . . . We covered 14-Mc. DX doings in depth last month, so let's see what the lads are up to elsewhere along the line. . . .

15 Novice DXcitement is due for documentation. WNs 1GTH 1HEC 2YOJ 6TIF 6TQS 6UUI 9SUU and ex-WN8PJS expect colorful wallpaper from CE3s JP NL, CO6MD, CR4BA, CX1JL, a pile of DJ/1Ls, DMs 2BBE 3BE, DU7SV, EA1NA, Fs 3YP 5EP 6PD 5RK 8BQ, many Gs, GM3s JDR VAA XO, GW3FWY, HB9AHQ, III7s APO JMP, HL9US, JAs IPTX 3HCJ, KA2DJ, KG6AAV, KH6s DFW FRI, KL7s AIZ CGA FSK, KP4s AQL CPG, seven KZ5s, LA7TH, LX1AC, OA4PF, OE6FHG, OHs 1TT 2BZ 2IQ 3MF, OKs IAFN 1VK 3CCC, OZs 7HU 8E, PA6MU, PYs 1GGU 2BJH 5ASN 5BWF, SLs 5ZZO 6BH, a half dozen SMs, SPs 7BAIR 9AXV, TF2s WKB WKE, UAs 3AJ 9KZB, VK4s MU QK, VP1MW, WH6s GDA GEV, WN3GYL/KH6, WP4CSO, XEs 1BL 2CCL, YO6AW, YS2OB, YV1GQ, ZD8BUD, ZLs 1HW 2AFZ 2GH, ZS6AL and 4U1TU. . . . Down on 40 meters WNs 1GTH 2YOJ 5RAI 6TQS and 8UIP dig up GM2s BQ WS, F7T8K, H12NR, HP1XHG, K8CUV/VO1, KL7FCT, KZ5QAN, WA8MCL/RP4, WH6s GDQ



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— Reprinted from the June, 1956, QST



Radio's rugged ranks in the Thirties
 Enlisted chaps like old G5BD
 Who never sat around wringing his hands
 About contributions and countries lists
 Or griped about slow factory service
 On a chrome-trimmed Superduper-IV.
 OM G5BD, with only one good arm
 Couldn't wring his hands anyway
 And had bigger problems to lick
 Like no a.c. mains and a 10-watt limit.
 Other things he had a-plenty
 Were guts and that old ham spirit
 So G5BD worked DX—and had a ball.
 (Photo via W2GP)

and GFM among the BC splatter The freshmen make out even on 80 lately, WNs 1GTH and 6TIF capturing YV5BPJ and KL7FST respectively.

15 phone is close to a riot, Ws 1CNU 1DYE 2DY 3HNK 7VRO 8PKU 8YGR 9LNQ, Ks 5VTA 5WVC 6QPG, WAs 2LOR 3DSD 8GGN 8PKG 8QJK 9MQI 9QBM 9QXT 9SXQ, WB2s JYM LBJ MZJ NGI WHB WKR and s.w.l. P. Kilroy fighting off CE3s JD*JP, CN8s FC PF 14 hundred hours GMT, COs 1EG* (200 kc. above the low band edge), 6JC* 18, 8RA (370) 13, CPs 1DR 5EP 6PV, CRs 4BA 6AN* 6DX 6FR* 20, 6GM (331), 6HG* 6IV 7BO* 7GR* 17, 7ILJ* 17-18, 7IZ, CXs 2CN 3BBD, DK1HF, DU1AP (370) 12, EAs 6AR* 8FC 9EJ*, ELs 1C 2A 22, 2D 2F 19, 8C (410) 1, 9A, EPs 2B 3QM (320) 16-17, FG7s XE XL XX (275), FH8CE, FM7WY, FS7RT, GB2DX, GC8HT (270) 15, HA8WH (295) 14, HCs 1AF 1MF 1SX 74 22, 2WB (290), 7FD (400), HI3AMF* (278) 21, HK0AI (270) 21, HL9s TK (337) 2, US, HM5s BF BZ, HPs 1JC* 3PJ (400) 21, 6SM* 22, HRs 1KAS 2AD* 3AA (290), 6EB* (260) 2, taboo HS3NT, IS1VAZ, a dozen JAs, KAs 2DJ 0, 2DO 2JP 0, 7AB (307) 2, K6Gs AAY (323), ALV SA (420) 22, SB SF, KH6s AHL CH/KW6 (280) 10, FRT, KL7s DJI* 18, EPX FCH 18, FKO ENL OJ 10, KM6BI (30) 1, KP4s ANH ATs (350) 20, CMO (400) 22, CU, KR6s AH BF IS LS MB QW, K5s 4CE (420) 15-16, 6BT (270), KV4s CF CX Es, KW6EJ, KX6s BU DB (385) 23, DQ 20, KZ5s FY 11, SY (365) 21, LUs 3ACA* 5DNT* (260) 22, 5DJZ*, LX1B0 16, MP4s HBA* BEU BGM TBO, OAs 4J 8AE, OD5s BZ EJ (350) 19, FA, OF5LW (280) 14, OXs 3KM 21, 3ZO 4AA 17-18, 5BJ, PJs 2CR (350) 17, 3AT* 3CC 4AB 21, Pys 2PE 2TI 6BM, PZIs BX CP* (241) 18, ST2SA* (265) 19, SV0WJ 16, TFs 2WKE 18, 2WKF 2WKV 15, 3EA, TGs 8CJ 8IA 9EP, TIs 2JVL 2TIF 5WAZ* 21, 1V4AC*, TT8AB* 17, TU2s AY (280) 10, BD (307) 14, Tys 3ATB (330) 20, 5ATD 22, UA9VH, UF6FE (305) 12, UH8AE, UI8MN, UP2NV, UO2s KFG (400) 15, KSZ 16, UW9CC, VEs 3FZJ/SU 9MB, VKs 7MK 8OX 91D 9KS 9NT, VPs 1PV 2DA* 20AJ* 2GSM 2M 5RB 7TC (390), 7EE 9FR, VQ9EF, VRs 2EK (389) 10, 6TC, VSs 6AK 6BE 6EK 9AJC 9ASC, VU2CR*, WAs 4QXB/KW6 5ING/KL7 10, WB6SEW/V-VP9, XEs 1HY 2QQ, XW8AX (300) 12-13, YA5RG (307) 7, YS2RU, YU3LB (270), YV5s AGM BPG, ZC4RM, ZDs 3F/m 5R 18-19, 8CX 8SKI (320) 23, ZEs 2KL 19, 7JR, ZF1GC, a dozen ZIs, ZP5s JB RS 18, ZSs 3HT 8L (321) 20, 9C* 14, 9L (334) 20, 4U1s ITU SU, 4X4JU, 5A4TZ, 5H3JL (305) 18, 5N2s AAF 20, AAX, 5R8AS 16, 5Z4s FR JW, 7Q7s EC 19, PBD (350) 19, 7X0s AH BB*, 9G1s DY (350) 9-21, FF 18, FL* HM, 9HIAM 10, 9LIs JP* JV (394), 9M6NIG (400) 3, 9Q5s AQ* CM DL EB FV (345) 19, IA* US (346) 19, 9USBB, 9X5s CG (349) 20, MH NH, 9Y4s DS* TO* and TX, the asterisks indicating non-s.s.b.ers.

15 c.w. never had it so good according to Ws 1BGD 1CNU 1IDA 2ADP 2JIM 3DPR 3HNK 7OEB 7VCB 8PKU 8YGR 9CVZ, Ks 2QMF 3FKU 3FOP 4IEX 4UTI 5EIZ 5MHG 6VTA 9REV, WAs 2LOR 2ZEV 3DSD 4QBL 6JDT 8GGN 8MCO 8KJ 8RYC 9MQI 9NKN 9QBM 9QXT, WB2s JYM KEK RJJ UYO WKR and IER who are swamped by CE3s 3JP (90), 8CF (65) 23, CMs 1AR (18) 17, 2BA 20, CNs 2AQ 8CF, COs 2BB 0 2CO (50) 23, 2RL 5PP, CRs 3KD 1 4BA (120) 23, 5CA (66) 21, 6AI (42) 15, 6CK 10 11, 6DX 6GO 7CN (57) 14 (26) 15, 6TIs HT (80) 17, IT (102), LN, CXs 1AAC (45) 20, 1IM (77) 22, 1OP (37) 22-23, 3CO (35) 22, DKs 1HN KQJ 2AD, DMs 2ANH 2AUD (90) 17, 2BNL 3CT 3VGO 3ZU, EAs 6AM (34) 11, 6BG 8FF (53) 19, 8FJ (40) 9FO (80) 19, EIJ (10), ELs 2A 2NE (8) 18, 9C (15), 9NA, 9Ps 2BQ 3AM (76) 13, 9FVNF (80) 22, FG7s XF (35) 22, XF 23, XX (10), FL8RA, FM7WQ (37), FO8s AA (50) 7, BQ (45) 1, GD3AIM, ten HAs, HCs ITS (10) 12, 2SB,

IIIs 7APO 7JMP (37), 7MRC (90) 20, 7URC (16) 20, SXAL (20) 16, HK9AI (85) and other Colombians, HL9KB (45) 10, HM5s 1DH (22) 1, 5BZ (20) 2, 9DHI, HZ1AT (35) 9, ISIs SCB (70) 19, SEL (50) 12, a gross of JA/JHIs, JTs 1AG (20) 9, 2AA (34) 7, KA9MF, K6Gs AAY APD, thirty assorted KL16/KL7/KP4/KZ5 types, KP6BA (38), KR6s CK (37), SS (35) 23, KV4AM, LUs 1DAY 3DVV (18), 4DA 3DQ, LX1LF, MP4MAP 12-13, OAs PF 20, QN (80) 19, UO (37) 23, VE 22, OD5s AI (76) 17, EJ (13) 17, EL (45) 10, LX (85) 7, OH6NM (9) 12, OX3s AL 23, LP (5), ZO (16) 23, OYs 2YL (40) 17, 5Q (40) 20, 7ML, PJs 2CK (92), 3CC 3CJ 17, 3CF, 17, 4AE (80), PZIs CM (82) 22, CQ, a dozen Pys, ST2SA (50) 19, TA2AC (74) 16, TFs 2WJN (15) 20, 5TP (33) 12, TG9EP, UAAs 2BD (90) 14, 0DA (70), 0FF (61) 10, 0GY (62), 0, 0K6G 0KUV (23) 7, 0MQ (70) 1, 0MX (13) 7, 0RC, eight UH5s, UG6AB (105) 13, UI8MF (46), UL7s IQ KFB (35) 7, KFE (72) 11, LK PJ (52), RQ (9), XG (46), UO5AA 5, UP2PT, UO2s IQ (50) 13, KCT (90), UT7s BL EH (5), UWs 3BX 6GD 6LP 9PT (37), VE0MD (70) 21, a listful of VKs, VPs 1VR (53), 2MK 6AK (30) 22, 6PJ (22) 21, 7MW (73), 7NY, VQ8AW, VRs 2UK (20) 10, 2EK (73) 8, 6TC, VSs 6EN (10), 6FX (68) 16, 9ADF (25) 22, 9APR (53) 20, 9ASP (30) 23, WAs 1EAV/V-VP9 2TBO/KP4 WB2PX/V-PP (120), WH6GDA (150), WL7FRO 2, XEs 1YJ (95), 1ZV 2AA 2KF 2JS, XZ27Z, YJ8BW (70) 12, YO 3RO 14, 8KGF (42), 8ME (30) 15, 9HI, YVs 1DP/25 2, 1IK/5 1OB (17), 5C1Y, ZP2s AM (12) 16, AP (25) 16, ZDs 3G (70) 3, 8BUD (80) 22-23, 8DX 8J 8RB, ZEs 1JL 4J8 6JN (65) 19, 8JV, seven ZIs, eight ZSs, 4U1IT, 4X4s MA (10), QA (41) 19, VF (50) 22, VL (15), 5H3s JS KF (39) 23, KJ (50) 22, 5N2AAF, 5U7AC (30) 8, 601BG, 7X0AH (25) 14, 9GIHM (35) 16, 9HIs AE AI AK AP (52) 13, R, 9J2s IE (105) 18-19, IZ (60) 14-15, 9LIs MZ (90), TL (46) 20, 9O5s SR (13) 0, TH, 9VILK and 9Y4RA. Watch out for your laurels, 20!

10 phone hit the mailbox so hard it's almost frightening. Ws 1CNU 1DYE 2EWO 2LFL 4EEV 7VCB 8PKU 8YGR, K5s VTA 5WVC, WAs 2LOR 6IIXW 3GGN 8MCO 8QJK 9MQI 9SXQ, WB2JYM, listeners Kilroy and Smith frolic with CE3s 3CZ 298, 15, 6EP 6EZ, CN8s CS* ED FT, CRs 4E* 6ER* 12, 6Is 11, 6IV 11, 7CD* 7CZ* 7DS 7ID* 13, 9AI (580) 0, CTs 1BB 16, 1IG* (408) 17, 3As* nine CXs, DUFHF (590) 23, EA9EJ* (507) 16-20, EAs 7BA* 17, 7E SAT (720) 16, 9V 18, EL2A, EP2, 2GI 3AM (575) 16, 6F7s XL (545) 0, XX, FH8CD, FSTZ (551), GB2s 2A 5MB, GCs 2PMV (602) 15, 3UQQ* 18, 8HT 14, 8D3s FXN (590) 20, RFK (550) 15, HAs 4JR* 20, 5AM (590) 14, HCF8N (561) 21, HIs ABO 1JAB XAL, HK0AI 20, HL9s KA TI US (595) 23-22, HPs 1JC 17, 3RL, HRIs JMF (625) 14, KAS, HZIs AB (545) 16, AT, IS1VAZ (600) 17, ITIs PAI (520) 16-17, TAI, JAs galore, Ks 7UIT/9A1 (590) 14, 8VWM/KC6 (575) 23, 9QXV/GE0 (315) 18, KAs 2EB 7AB 9AM, KB6CZ (590), KCs 4U8B (605) 23-22, 6BO, KCs 4AN 6AAY 6AEU 6AQA 23, 6FAE (565) 1, 6LJ (615) 23, 6SB, a dozen or more KH6/KL7/KP4/KZ5 types, KJ6BZ (610) 23, KR6s CW (689) 0, DO IF 23, IS (630) 23, LF LL SG US (620) 23-6, K5s BV (605) 22, BD DP 21, KV4s AM CI* CX 2EV 20, KW6s EG (620), EJ (590) 23, KX6s BR BU (600) 22, DC DR (610) 22, LUs 2JAQ* 3EX (501) 22, 4DM*, MP4s BBA, BBW 10-14, TBO (550) 15, OAs JR OS (625) 14, OD5s AR* AT* BU* BZ 16, EL 14, FC (610) 15-16, OF2s BSL 540 16, BGL* OK3BEN (632) 16, OH6NI (682) 16, OX3s BX WJ, sufficient Pys, PSIBX (525) 15, 17, SL7CA (600) 15-16, SPFs 8AJK 15-16, 9ANH, SV7s 1AB 1BL 0WEE (651) 15, 9WFF 0WL (620) 14, 0WU (595) 17, TF3EA (605) 17, TGs 8CJ 9EP* 9FI, UA9NS* (600) 15, UB5s APK* BZC* DUS* 14, UC2s AOL WA* UFG ACR (580) 13-14, KAU, UI8AY, UL7s BCS* OB* UV3s AAE/B (615) 15, UI5CT* VKs 111, 8AU 9DJ 9NB 22, VPs 1IV LIENL IPV (600) 23, 2AZ 2GLE 2MK 5R8 5RS 7DR 7NI 15, 7NX* (508) 21, 9DC 9FB 11, VQ9AR (550), VSs 6Fs 6FZ 9ALV (610) 14, 9ASC (610) 14-15, VU2JN (190) 14, Ws 1VQG/KC6 (600) 22, 2NSM/CX3 23, WAsNOA/V-PP, a pack of XEs, XW8s AL (585) 1, BJ (590) 1, BS CC YAs 1VY (600) 9, 5RG, VSs 1VST* (882) 16, 2OB, YU6ZAA (685) 16, YVs in number, ZB2AM, ZC4s CN (615) 9, GB (715)

16-17, MI* MO RM, ZD8XC, ZE1s AA BR* JJ, ZF1GC, 7 dozen ZLs and ZSs including 8L (653) 0, 9B 9D (600) 11, ZPs 3AB 5JV 5LS, 4U1TU, 4WRG (546) 14, 4X4IH (560) 16, 5As 1TV (500) 11-16, 2TR 3TG 15, 5H3JR 19, 5N2s AAE AAF ABA* 9, ABF ABH, 5R8s AS (495) 18, AX, 7Q7RM (610) 18, 8R1s G P 22, 9H1AF* 9J2s DT FJ* 13, GJ* IE JC* VT VX WR, 9L1s JW TL*, 9M2PO (600) 14, 9Q5s BD by EB EP FF FY (600) 17, 8S, 9V1MY (598) 2 and 9Y4VS*, the stars twinkling for non-s.s.b. senders.

10 c.w. gets a workout when the phone tide spills over, especially on week ends, so Ws 1CNU 1DGT 1JDA 3DPR 7VCB 8PKU 9NUW, Ks 3CUI 0REV, WAs 8GCV 8MCO 9MCI 9NDV, WBs 2JYM 6ITM, G13HXV and IER collect CN8F* (60) 13, CRs 8CK (62) 17, 6GC (35) 11, 6GO 17, 6EI (48) 8, 7IZ (40) 17, CT3AS (53) 18, CXs 1JM 18, 1JW (135) 17, 2FD, EI5F, HIs 7JMP (35) 18, 8XAL (39) 15, HK0AI, HM5BZ 18, HPIBR (52) 21, HZ1AT (37) 15, two dozen JAs, K6GAAV, KH6s BSP 11, KJ6CD, KV4CI (67) 12, LUB3X (66), LZ1CW 15, MP4BBU (50) 11, OA4s KF (25) 16, PF (30) 13, UZ 17, OD5s EJ (40) 13, LX, OK5RAR (52) 18, OY3H, ST2SA (60), TA2AC 14, TF5TP (50) 17, TR8AH (72) 20-21, UA9s BG WS 14, UD6KBO (52) 14, UF6s BG (40) 9, DR (55) 15, U18s CD (58) 15, KNA (80) 11, UJ8KAA 9, UL7s FB (102) 10, JU (50) 11, JT (110) 9-10, JV (45) 9, UM8s AP (58) 15, AU (84) 11, UV9CC, VK8NO (50) 11, VO1s GX HK (120) 23-0, VP8 7DX 15, 7FJ, VR2DK (45), VS6FN (45) 15, VU2s JA MS 11-12, 2T 11, XEs 1AX (10) 16, 2AAG 2KF 16, YJ8BW 0, YS1DHA 19, YU3LB, ZB2s AM (35) 12, AP, ZC4s AK (20) 15, GB (80) 11, SS (65) 17, ZD8s BUX 15, DX (46), ZE1AS (20) 17, ZP5OG (36) ample ZLs and ZSs, 5H3s JS KJ (45) 15, 5N2AAF, 6WBDD, 6Y5BS (16) 21, 7QZLZ 16, 9H1AB (66) 11, 9J2s BC (69) 8, GJ and 9L1TL (33) 8. Summer convalescence now for 10, but fall's a-comin'!

40 c.w.'s faithful prove that lower frequencies need not sag though higher ranges bloom. Ws 1CNU 3DPR 3HMK 7VCB 8PKU 8YGR 9ZQT, Ks 2QMF 4IEX 5VTA, WAs 2HLH 4CZM 5IIS 6JDT 8MCO 8RQQ 9QXT 9SXQ, WB2LBJ and VE3GLG present such evidence as CE2DI (4) 5, CM2BA, CN8BW, CO2EL, CRs 6AI (5) 6, 6GO (7) 4, 7CI, DM3NCJ, DUTER (20) 14, E13AK (37) 6, FG7XX (31) 6, FK8AT (3) 7, FO8BQ (2) 3-4, HAs 1SB (20) 6, 4KYB (5) 8, 5KFR, HIs 7APO (11) 23, 8IBC (45) 23, 8XAL (16) 4, HK3ASJ (15) 5, HPIXHG, HR4ET (31) 6, I1IAGA, JAs and JHs to spare, K6GAAV (3) 11, KH6s BSP (6EL, KL7s AIZ CEX FSU PI (6) 6, KP4s BFF (12) 4, TIN (9) 3, KV4AM, KZ5s FX (24) 4, NG (12) 5, LZ1KPG, MP4TBO (5) 15, OAs 4BS 4CT 4PF (9) 5, 5AO, OD5s EJ RH (12) 1, FL (25) 4, OEF3S (25) 4, OH0NN (12) 5, PJ3CJ, ten Pys, TA2BM (3) 7, TGs 4AY 9HR, UA0s ER (9) 14, FM GR (7) 7-8, KFG (12) 13, KKB KKT KZB LH LK MA ND, UB8s KYB TO TR VL WJ 5, UCZWP, UD6s CE KAB (21) 4, UO5KBR (30) 4, UP2NO (20) 6, UQ2KCR (15) 6, UW3CS, lots of VKs headed by 2BRJ/VK 90, VP8 1MW (6) 6, 2KR (26) 4-5, 7AK (15) 6, WA9GVW/KP4, nine XEs, YJ8BW (8) 12, YN3KM (5) 13, gobs of YU/YV customers, ZD3G (10) 4, some ZLs and ZSs, 4U1TU (8) 2, 4X4RD, 4Z4NAB of Israel, 6Y5s BS GS (11) 5, 9L1TL (16) 5, 9Y4s DS (11) 5 and GR. **Forty** phone displays CN8s BV (72) 20, ED 23, CT11W (78) 19, several DJ/DLs, EA6BG, EI9Q, EP2GI, GB2SM, G13OQR, GW3s BOC 1, DUR 6, a few Gs, HCs 1MF 4TB, H18XAL, six HKs, I1B4F, JA2BAY 21, KAs 2DM 7AB 9MF, KB6CZ (203) 12, KH6IJ, KJ6CF 9, KL7EFA 6, KP4AMI, KW6EJ 11, LX1s BW DB, OA4s AS SO TF, OE2EL, OH2AM, OZs 5BW 5GT 9SL, a dozen Pys, PZ1CF 21-0, SM5BLA, TG9BF, T12s CAP JIC, UA3KND, U5ARTEK (45) 0, UC2AA, five VKs, VP8 1PV 9F, VQ9AR, WB4AZT/KH6, XE1S, YA5RG 22, YN3LB 6, YU3LB, ten YVs, ZL2BCG, 4Z4NAB 22 and 9Y4VT 23 for W7VCB, WAs 5IIS 9SXQ and Mr. Kilroy.

75 phone, before OM Static barged in, produced signals from CE6E, CN8s AW BB MT 1, C0s 2RA 8RA 7, CT1s DT EE SQ, DL8AC 6-7, EA4EF, EP2BQ, Gs 3OQT 7, 3PFZ 8PX 7, G16TK 7, HA5s BE FE, HB9WK, HC1TH, HPIJC, HZ1AB, K7UIT/9A1, KH6IJ, KL7EBK, KS6BV, KZ5FX, OAs 1PH 8T, OD5BZ, OH0NI 0, OX3WX, OY7s ML 8, PA6GKD, PJ2MI, TF3s EA, MA OM*, TG9E, T12s JP NA, UR2DY, VE3RTZ/SU, VO1s BD EL GN HI, VP8 1PV 2KD/OE1XA 5RS 7DL 9WB, VS6 6A1 9ALV, W1FZ/KP4, WA8NIII/VP9 23-4, YA5RG, YN4CWN, YO9CN, YU3s 3TDO 6ZAA, YV6s ANS BTS, ZC4s AK 21, RM, ZD3F, ZF1GC, ZL4LM, 3A2MJC, 4X4AS, 7X9AH, 8R1G 6 and 9H1AN,

"DXCC2" (see p. 59, April 1957 QST, et seq.) almost slipped our mind but not K4IEX's. Bob sends us the first entry in years, a photo of more than 100 QSLs from ARRL DX Century Club members in at least 100 countries. It's easier now than it used to be but K4IEX found it a fun challenge nonetheless. CC-2 No. 47, OMI

all mostly off the low edge of the Yank voice segment, some as low as 3600 kc., for WAs 3BSV 9SXQ, OM Kilroy and club observers. **Eighty** c.w. boosters Ws 1CNU ISWX 3DPR 7VCB, K5VTA, WAs 2HLH 4CZM 8MCO and WB2SEZ account for CM2BA (8) 3, DM3s WFN (5), YPD (7) 1, GW3TOW (3) 0, HAsKDKQ (5) 2, HPIXHG, HZ1AB, JAs 1CGM 1CWZ 1FFD 1LCF 1RST 1TIH 2GTZ 8CGW, KL7GAB, KP4UW (14) 2, KZ5s FX 4, TX, LX2BQ (31) 5, a half dozen OK specimens, SM6s CA (1), DHU, SP3s 7GH 9ABE, TA2BA (2), 19, UAs 2CD (1) 2, 9KAC, UB5VL (5), UC2KBC, UFG6D, U18KZA, UL7s GW JW, UV3BJ, VK1DA, VPIPV (2) 1, YN1CW (4) 3, YU3DSL, ZLs 3PX and 4IE. **One-sixty?** Not a peep.

Twenty's turn again next month, the code picture via Ws 1CNU 1DYE 2GRD 3DPR 3HMK 7OEB 7VCB 8PKU 8YGR, Ks 3MNI 4IEX 5EIZ 0REV, WAs 2KSD 4CZM 4QLP 6JDT 8GGN 9SXQ, WB2RJJ, IER, VE3GLG; the voice details courtesy Ws 1DYE 2DY 2EWO 8YGR, WAs 8GGN 9SXQ, WB2RJJ, VE2s AQI BUW, W. P. Kilroy and other informants to file. A wonderful DX spring, eh?

Where:

AFRICA—"ZS9L, except for a few months this summer while school is out, will stay in Botswana until September of '68," cheers VE4OX, Gordon's new QSL aide. "Self-addressed envelopes and International Reply Coupons for direct replies," specifies VQ8CC, "otherwise via bureaus." Steve also offers to make good on any QSLs missing for his previous activity as GMI3IBS, GMI3MBS/W0, MP4BEQ and 5A3CJ. W1DYE is told that the 9Q5 bureau is running somewhat in arrears, so QSL your R, C, contacts direct when possible. "Can't seem to get 7Q7LC to come through with logs," laments W4NJF, earlier requested by that station to manage QSLs, "Consequently I have a small bushel of cards and no way to handle them, some dating from 1965." Gay still tries for that record. "I QSL 100 per cent," declares 9J2BC in ISW1's journal, "Best QSLers by far are DJ/DLs, followed by U stations. Gs are fairly good. At the bottom of my list are ZE and ZS stations. Being so close to them even a.s.e.s have little effect." DX-MB hears that ZD7KH also is a 100-per-cent QSL enthusiast.

ASIA—"I have VU2LN's W/K logs dating since November 23, 1966, when he returned to the air," advises W20DZ. "He forwards them every two weeks. All QSLs will be acknowledged, those with self-addressed stamped envelopes first, naturally." K4EFG says WA5EFL may be of assistance in confirming QSLs with UM8s FM and PZ. S.a.s.e. will get results from 4X4Y's new QSL tender, 83MNI, but 4X4CW's cards are no longer handled by K9JR. DARC's newsy DX-MB has 8QA-SQZ as the new Maldives prefix block. Independence, you know.

OCEANIA—"VK6XX visited me for a day and expressed concern over the fact that W/Ks do not QSL very well," writes W4NJF. "The record he showed me was deplorable—about five per cent response to his 100-per-cent QSL." K2AES disclaims arrangements to handle cards for DX stations, ZCs or otherwise. New Guinea's VK0GN promises, "I'll QSL 100 per cent to all received—three IRCs for airmail, one for surface reply—and, of course, s.a.e. All others are answered via bureaus." W3CES says VK7TR's QSL records were destroyed by fire but Ray may be able to confirm some recent contacts by memory.

EUROPE—There's no geographical significance to that outburst of various numerals in Italian calls, QSL to the 11 bearing the same suffix, or via ARI. SL3ZO still has those 1962 Russian callbooks for sale, according to NNRC's Bulletin. You'll do better to QSL via Box 88, but they're interesting collector's items. K3CUI observes, "The fact that Russian and other Eastern bloc hams now use Stateside QSL managers, a practice unthinkable only a few years ago, may be another



sign of changing East-West relations." It's spotty, however — UA3AJ had to drop plans to have QSLs handled by WA8TYF. . . . "I was licensee of special station GB2USA which operated in December, 1965, at Plymouth to commemorate the 345th anniversary of the sailing of the *Mayflower*," acknowledges G3UKI. "However, the GB licensing situation here is such that different individuals and organizations may use the same call sign within a relatively narrow space of time (i.e., less than that usually taken for the flow of QSLs). Consequently I have been receiving direct QSLs and IRCs from U.S. stations for other exhibition and special stations using the call GB2USA. These have, I hope, been forwarded to what I believe is their correct destination. As it is my policy, and that of Plymouth Radio Club (G3PRC), to QSL 100 per cent immediately, I would be grateful if you explain to your readers that I hold GB2USA logs only for operation on December 10-25, 1965." Barry dispatched a complete batch of GB2USA cards January 10, 1966, but is willing to replace strays. . . . W3TX and WA90MO are told by OY7ML that OY2s AA and AW are ungood, and DL1RK knows nothing about Andorra QSL matters, PX1RK or otherwise.

SOUTH AMERICA — Regarding late Aves action, WA8GGN points out that W2GHK's YV0AA logs cover only operation in November of '63. Try RCV or YV5ANF for the latest rumble. . . . Reminder: The 4MA-4MZ block is Venezuela's (QSL via RCV) and 8Rs are former VP3s. By the way, did you know that the PX prefix belongs to Brazil? Apparently Andorra doesn't go for International Telecommunications Union officialities. While on the subject, San Marino is entitled to the 9AA-9AZ block but old-time hams there still prefer British-style M1 labels.

HEREABOUTS — NE2HHD, now W1QMM/3, offers thorough direct QSLing in response to s.a.e., otherwise via bureaus. . . . "QSLs are available for 1400 6Y5BS contacts, Canadian s.a.e. or single IRC," welcomes VE3BS, also known as ZF1BS. . . . Halp! The following italicized brethren solicit hints, tips and general encouragement concerning QSL holdouts listed: *W1OPB, FQ8AF '59; W2DY, CN8AP, CPIAS, HPIFH, IARI/MI, KS6BV, KX6FA, VPs 2AZ 2MG 3YG, ZF1EP, 9Z2FK, 9V4VT; W6AR, UA9DN, VP9FU, VRs 1S 5AB; W8PKU, ZD7IP, 9Y4RA; K7IUZ, YAINOL; W4CZM, F9VN/TC, SVICC, VK0FB; W440LP, HIBXAL '65; W46ZD, 5W1AC '65; W40NKN, 5A1TT, '65; W49NXH, PX1FR; W82RJ, ZP1CQ, Y38BW, 7Z1AB; VE2BUW, IIR2BS, VP1LL, 5Z4BM; and OK2QR*



W0TUT/mm keeps in touch with the world from these cramped radio quarters aboard the *J. E. Pillsbury*, University of Miami's Marine Lab research vessel. You'll be hearing much of Shirl during his current five-month cruise in the Caribbean and along South America's west coast.

(via W5OER), YJ8s YY ZZ of '65 'Alp? . . . Overseas colleagues in the market for Stateside QSL helpers may consult with volunteers W5OER, WA5 2QLP 9NXII 9OXO, WB5 2MZJ and 6TQS. . . . "QSLers of the Month" in quantity this time: CR7DS, CT1OI, CX3BBD, DL4 2HI3XAI 7M7 9CJ, EI3AK, EL2A, EP3AM, G3HS, GM3s IAA GMH, GW3TLW, HA5s AM KFR, HB9s ACP ST, HKs 3AQL 4JC, IIR1MN, IS1s POL VAZ, JA5 1DLN 6AD, K00XV/CE0, KC4USV, KL7DTH, KS6BV, KV4AM, KZ5MEN, LA5s SH YJ, OA4MQ, OE3OT, OH1VA, ON5GK, PA9s SNG ZAV, PY2PE, SM5TU, SP8AK, SV9s WL WU, TA2AC, TG9EP, VO1HU, VP6s 1MW 5RB, VR4CR, VS9AJC, VU2MSK, WA0FUU/VP9, W4PCPV, Y07DL, YS1RCR, YU2NEG, ZD8 3G 7KH, Z8SL, 4U1TU, 5H3JK, 5N2AAW, 5R8AS, 60s 1PF 6BW, 7X0s AH AP, 8R1G, 9G1YJ, 9H1AF, 9J2s AB and GR, plus QSL aides WA 1BPM 1EQ 4BRE 4NJF 6ZPX 9H0G 90MM, Ks 2HVN 4AMC 5GOT 6FNX, WA4UOE, WB2CKS and the hardworking ARRL QSL Bureau are highly commended in "How's" dispatches from Ws ICNU 1DYE 1OPB ISWX 2DY 6AR 8YGR, K8GQG, WA5 2HIU 3BSV 4AFH 4CZM 6JDT 8TYF 9LJZ 9NDV 9NKN 9QBW 9BSXQ 9PQF and VE2AQL. Any similar quickies you'd like to salute herein and hereby? Just flip us a slip with your tips. . . . Here are a few individual specialities that may help your worked/confirmed ratio, but bear in mind that each datum is necessarily neither "official," complete nor accurate. . . .

- CO7JB, Box 267, Ciego de Avila, Cuba
 CR61R, Dr. J. Pereira, Box 191, Novo Redondo, Angola
 CR8AH, J. Santos Leite (CR6IIE), SPM 225, Dili, Timor
 HI3XCH, Aptdo. 31, Santiago, D.R.
 HPIXTS, Box 3252, Zona 3, Panama City, R.P.
 IS1PDI, Box 25, Cagliari, Sardinia, Italy
 KR6DC, Det. 2, 2152nd Comm. Sqdn., APO, San Francisco, Calif., 96286
 KS6CL-W45FJ/KS6, G. Ordera, Dept. of Education, Pago Pago, American Samoa
 ex-MP4BEQ-5A3CJ-(GM3MBS/W0 (via VQ8CC)
 MP4MAY, c/o Box 18, Montleore, Johannesburg, Tvl., S. Afr.
 MP4QAL, P.O. Box 56, Doha, Qatar
 OA8AE, P.O. Box 2492, Lima, Peru (or direct)
 PA9CN (W/K/VE/VOs via WA1GLA
 PY8PA, C. P. 156, Sao Luiz, Maranhao, Brazil
 ZP1BX, P.O. Box 2003, Paramaribo, Surinam
 VK9GN, G. Nurkka, Box 73, Ukarumpa, Ter. of New Guinea
 VPIs PV JEM, Dr. & Mrs. G. Collins, Cayo, Br. Honduras
 VP2AP, P.O. Box 93, Antigua
 VQ8CC, S. Gibbs (GM3MBS), IAL, Ukaea Field Stn., Plaisance, Mauritius
 VS9AJC, J. Barber, 18th Fld. Sqdn., BFPO 69, London, Eng.
 W1V0G/KG6, E. Bernfeld, APO, San Francisco, Calif., 96234
 W2IEV/mm, D. Romain, USNS *Twin Falls* (T-AGM-11), FPO, New York, N.Y., 09501
 W7B0I/KH6, D. Pittman, 2204 California Av., Wahiawa, Oahu, Hawaii, 96786
 WA1EAV/VP9, V. Richardson, Box 275, Hamilton, Bermuda
 WA4QXB/KW6, M. Moore, 1957th Comm. Gp., APO, San Francisco, Calif., 96501
 XE2HHD, G. Holland, W1QMM/3, P.O. Box 158, Owings Mills, Md., 21117
 YV5BZH/6, L. Scamuzzi, Box 91, Ordaz, Venezuela
 ZD3D, C. Wiltshire, P.O. Box 10, Bathurst, Gambia
 ex-ZKIAR, T. Ferguson, 37 Te Koa Rd., Panmure E2, Auckland, N.Z.
 3V8BZ, R. Fierle, 6 Blvd. Habib Thameur, EZ Zahra, Tunisia
 4U1SU, P.O. Box 11, Geneva 20, Switzerland
 5T5K, c/o Yame Fndtn., P.O. Box 2025, Castro Valley, Calif.
 9G1DY, N. Price, Box 2949, Accra, Ghana
 9G1HM, P.O. Box 2165, Accra, Ghana
 9G1JM, P.O. Box 1639, Accra, Ghana
 9Q5US, P.O. Box 658, Kinshasa, R.C.

- | | |
|---------------------------|------------------------|
| ex-CR8AE (to CR61R) | WA6ZZD/KP6 (via K6UJW) |
| EI0BI (via EI2AW) | WA0FUU/VP9 (via W0ZRU) |
| EP2GI (via G13HXV) | ZB2BA (via G3RFH) |
| HL9TJ (via W4WSB) | ZD7KH (via K2HVN) |
| HZIAT (to G3DYY) | ZD8CX (via G8KG) |
| JT1AG (via JT1KAA) | ZP5JB (via RCP) |
| KG6s ALW AQI (via WA0PQF) | ZS9L (via VE4OX) |
| KG6SM (via W2CTN) | 3A0AE (to DL2AA) |
| OX4AA (via K8REG) | 4W1G (via HB9MQ) |
| VK7TR (via VK7CK) | 4X4YY (via K3MNI) |
| VK8AV (via K9JRR) | 5VZRO (via VE2ANK) |
| VU2LN (W/Ks via W2ODZ) | 6Y5BS-ZF1BS (to VE3BS) |
| VU2MSK (to W3MSK) | 6Y5JMA (via 6Y5RA) |
| W1SWX/KP4/KV4 (to W1SWX) | 7Q7LZ (to G3LZZ) |
| W4ZCB/QO5 (to W4ZCB) | 9A1AA (to DL2AA) |
| | ex-9Y4LZ (to G3LZZ) |

The good guys in the white hats, for these offerings, are Ws 1APU 1BGD 1CNU 1DYE 11DA 1QBQ 1SWX 2DY 2GRD 2JBL 2VOZ 3DPR 4UHC 7FC 8PKU 8YGR, Ks 3M1NJ 4EWG 4UTI 8GGQ, WAs 2ZEW 3BSV 4QLP 8GGN 8MCC 9SXQ, Wb2s JYM RJJ, VEs 2BUW 3GLG, OY7ML, W. Kilroy, Columbus Amateur Radio Association *CARAscope* (W8ZCQ), DARC's *DA-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 20, Eng.), 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), Southern California DX Club *Bulletin* (WA6GLD), Utah DX Association *Bulletin* (W7LEB) and VERON's famous *DXpress* (PA9s FX LOU TO VDV WWP). Well done, sirs.

Whence:

EUROPE—For you island-hunters there's another cutie coming up June 3rd-5th, described by E14HK: "This DXpedition is sponsored by Region 4 of the Irish Radio Transmitters' Society and will work c.w. a.m. and s.s.b. on 10 through 160 meters under the call E16BI from Here island off the southwest Irish coast in Bantry Bay. There will be special QSLs for the occasion." WA8GGN UV3BC/m is an interesting antarctic species for WA8GGN on 20 c.w. around 0700 GMT. DX gets more complicated all the time. 1M0L operated PA9CN in Holland with QSLs managed by WA1GLA. C.w. results of the '66 OZCCA test, announced by EDR (Denmark), have W4OMW, WA5MK, Ws 2ZV 8VSK 4HOS, WB2TFK, Ws 6PQW 9KXX and 3CBF scoring in that order for first side, with VO1AW, VEs 4SC and 2IL running 1-2-3 up north. The top ten Scandinavians were, in order, OZ1LO, OH8RC, SMs 7AXP 3TW, OZ2NU, OHs 3MF 3YI 6VR 7NM and LA7H, while the top non-Scandinavians in sequence were I1AA, F8OP, G3s IAR EYN, PY7AKQ, Y08DD, HB9QA, OK3CC, UB5U and UP2PT—how 'bout that Brazilian! Gee, Russian entries outnumbered the U.S.A. 104 to 9. Contacts with a prescribed number of OY stations can qualify you for the WAOY sheepskin issued by FRA (Faroes). Consult the OY6FRA gang for details. Continental callings from literature of aforementioned clubs and groups: G3ESP/LX, with G3s HCX and US aboard, should be multibanding again early this month. Ws 5L5X/LA 7RVA/LA and K7WPW/LA reportedly are the first Yank reciprocals in Norway. K6KA and frau should be audible from Athens, Vienna and other European stops before heading Statesward later this month.

ASIA—"VU2LN's 25 watts and dipole put surprising A signals into the States," observes W2DZ. "Neal is usually on 14,065 kc. but may be found lower, around noon GMT." VU2MSK (W3MSK) sent back his big sig with 100 watts and a mere ground-plane, say Ws 1XYM and 8YGR. Some twenty EPs and other dignitaries attended EP3AM's recent dinner function in Tehran. G13HXV's friend EP2GI (G13CDF) says the lads down that way are really rededicating 10 meters. You'll find a flock of KAs banging away on their annual field day over the 3rd-4th of next month. KA2DJ says 'twill be a golden opportunity for all DXers to salt away FEARL's 5-KA, 25-KA and 5-KA-Districts diplomas. WA4IKU finds UA900 cruising 20 c.w. almost nightly at 0100-0500 GMT in search of Del., La., Me., Mont., Nev., R. I. and Wyo. for you-know-what. Bill says JA3CWV concentrates on the West Indies, Japan's rarest target, at 2300-0100 GMT on 28,515 kc. 4X4YY digs for friend K3M1NJ and other Yanks almost daily at 2100 GMT around 14,075 kc. UA1CK wants to revisit JT-land more DXtensively and soon. IZ1AT (G3DYY) jumps between 14,145-kc. sideband and 21,035-kc. c.w. adroitly.

AFRICA—Good to hear ex-5A3CJ-MP4BFQ (GM3MBS) back in the battle as VQ8CC. Steve guarantees plenty of multiband output on s.s.b. and c.w. with his SB-301/304 layout at Quatre Bornes. Ex-9J2MM shifts DX shop to ZE-land according to friend W4NFF. ZD8TV's departure for England was the occasion of a March bash attended by ZD8s ARP BUD CX CW DX DS JES RB SKI and TV. Yanks outnumbered Britishers 6 to 4 (ZD8s ARP CX RB and TV hail from the U.K.) but weren't aware of it after the BBC and Cable & Wireless boys got organized. ZD8BUD writes, "When the edge was off and festivities well under way we turned on ZD8CX's transmitter and selected an innocent victim. We found K8IXB calling CQ. Larry not only worked his first ZD8; he worked ten consecutively! We compounded K8IXB's confusion at one point by telling him we weren't really on Ascension, just a bunch of bootleggers in Atlanta." Hams will be hams, especially members of ARRL (Ascension Rock Radio League). EL2AG (W4FHE) says misad-

justed and overmodulated European signals really slam into Liberia during DX contests on the north-south pipeline. Africa addenda courtesy club newslawks: It's Mali and/or the Gambia for W6KG and Iris after their successful 5T5KG sojourn. W9WNV issued his own Stateside DX bulletin in April before returning to the Indian Ocean DXpeditionary front. 3V8BZ makes all that 14,100-14,125-kc. fuss with an IX-20 and ground-plane. VQ9s BC and HB teamed up for delicious Des Roches in March. Ex-ZD7IP-ZC4IP vacations in England before another DX assignment. ZS2MI of Marion isle has a heavy escort around 2000 GMT, a.m. on 14,162 or 14,332 kc. 5VZRD, not the printer, dropped the "8" from his Togo tag. "My work in Zambia police radio is very interesting, even when traveling 500 miles over rough dirt roads to replace a blown fuse," describes 9J2BC. Ah, wilderness retreats—Kitwe now has its own TV outlet.

OCEANIA—"I'm planning a DXpedition for next February, March or April," discloses VK9GN. "Wonder what the most wanted country in the South Pacific could be. Any comments from the gang will be appreciated." VK7TR was completely burned out in the great fire which recently swept Tasmania, regrets W3CES. "Ray and his XYL escaped with their lives by racing away in the night as the fire descended on their home at 75 m.p.h. They left Hobart in April for an extended Stateside trip via England, expecting to hit New England by late August, then travel westward across the U.S.A. You'll be hearing VK7TR's melodious accent from G3LSP, Ws 1BCR 3CES and stations of other friends." Biggest kick in this year's ARRL Test was working K1G6J on 15 with a dipole draped across my bed," recounts W2JBL. Conditions are getting almost ridiculously good. W1XYM has ex-ZK1AR's Western Samoa arrival date as October 1st or thereabouts. 5W1-shunters will provide a hearty welcome, we're sure. VKOTB should have his new Japanese s.s.b. outfit uncrated in Port Moresby by now. We hear that ZL1AI expects to be good for the Kermadecs into '68. Neil was slowed by recent transformer troubles but should be a 20-meter sideband fixture ere long.

SOUTH AMERICA—Check with P.O. Box 627, Valencia, for scoop on Caciques de Venezuela, a certification available to those who capture an appropriate number of specific YVs. Some VP8 possibilities include IY, So. Shetlands (also LU2ZI, 14,090 kc. at 0800-0900 GMT); IE, 14,135-kc. a.m. at 2030 GMT on So. Georgia; JI, 14,040-kc. c.w. at 2030 or so, So. Orkneys; CW FL HJ HZ JC on 20 voice and code in the Falklands; 1N, 14,007 kc., and IU, 14,127-kc. s.s.b. at 2000-2100 in Antarctica. HC8FN is a sitting DX duck on 28,620-kc. sideband around 1630 GMT. WA6SBO launched a homespun trimaran packed with DX goodies for possible Clipperton, Cocos (TI9) and Malpelo propagation. HK3ABR and friends also threaten the latter isle.

HEREABOUTS—V1P1V, who returns to Canada in H September, scans 28,600 kc. almost daily, says WA1DJG. George's XYL, V1JEM, likes 20 and 40. VPs HB JKR LB RC and SB also pump out many British Honduras credits. 6Y5MA was a March exhibition installation at Kingston, 6Y5RA chief proprietor. "Twas too cold out in the unheated shack, so WA2KSD tackled the ARRL Test with jury-rigged low power and Windom wire. "One has to do an entirely different type of operating with QRP—listen more." Man, the copper biz must be booming. Along comes WB2MZJ/3 with three 800-ft. rhombics. And speaking of skywires, W7VCB is intrigued by the way his average signal reports have been directly proportional to the rarity of his assigned call. "In Africa I always got S9 or better, in Germany S7 or so, and back here in Seven-land I'm lucky to land a QSO—same old vertical!" WA7FUU/VP9's been checking into our E. Penna. net on 3917 kc. comments WA3BSV. Anyone nearing a net-style DXCC? Should be imminent with 10 hotting up. DX sure rolls into Puerto Rico and the V.I. exclaims W1SWX after a visit down south.

WA4CZM makes it just about unanimous: "ARRL Test was a tremendous blast this year, the most fun I've had in a long time. Conditions were good for the most part, and my rig held together all the way—five new ones for DXCC." "Completed several months operation as XE2HHD at Guaymas, Sonora," records W1QMM/3. "Really enjoyed being c.w. DX on 15 through 80 meters with my homebrew 75-watt station and 30-ft. vertical." "We've just sent in our charter to ARRL," reports W7LEB in behalf of the newly formed Utah DX Association. "Several of us are well over the 250-countries mark and we'll make sure Utah is no longer a rare state. This month we plan operational week ends in Wyoming and possibly Nevada. Anyone needing Utah can usually find us on Tuesdays, 14,240 kc. at 0400 GMT." UDXA bigwigs are W7s LEB pres., VSM veep and CYH secy-treas. Good to note Southern California DX Club's *Bulletin* back in the mailbox again.



Operating News



GEORGE HART, WINJM, Communications Manager

ELLEN WHITE, WIYYM, Deputy Comms. Mgr.

Administration: LILLIAN M. SALTER, WJZJE
Contests: STANLEY H. ISRAEL, WA2BAH

DXCC: ROBERT L. WHITE, WIWPO
Training Aids: GERALD PINARD

Public Service: WILLIAM A. OWEN, W4YAU

What about the SS Rules? Every year, between contests, we get a lot of comment and give a lot of consideration to changing the rules, based on the comment received. In the past, most rules changes have been well accepted by the contestants; we like to think this is because they were so carefully selected from the best and most appropriate of those suggested.

Generally speaking, the SS Contest rules seem to be pretty well accepted as they are. There is always a contingent who say "Let the rules alone, stop changing things all the time!" The more satisfactory the rules seem to the majority, the larger this contingent gets. Right now, we think it constitutes a very strong minority.

But most of the contestants would like to see *some* change, however minor, from year to year, to keep the contest modern and interesting and, let's face it, a little *different* each time. So here are a few proposals for you to mull over; along with comments on each:

1) Eliminate the power multiplier. Why, say the proponents of this change, invite cheating? Everybody knows that a large percentage of participants who claim the power multiplier are actually running high power, is the argument. Eliminate it, make it impossible to cheat on power and give everybody an equal chance. Well, we suppose there is a certain type of amateur who will cheat in contests, but he isn't really cheating anybody but himself, and we'd hate to admit that he is numerous. If we really thought so, we'd prefer to eliminate competition altogether. We think any question about the power

multiplier should assume that it *is* observed, and be resolved on this basis, rather than assume it is *not* observed and that contestants are cheaters.

2) Drop the phone power multiplier to 1.25, same as c.w. The argument in favor of this points out that s.a.b. does not need the same higher multiplier to compete with c.w. as was justified for a.m. (and the reason for the phone multiplier in the first place). Opponents contend, of course, that c.w. still has an edge over phone for distance-per-watt and that the different multiplier for phone should remain.

3) Change the preamble to re-include signal report in place of date of first license; in other words, return it to the way it used to be. The argument in favor of this is that a signal report is more useful to the station receiving it than the licensing date of the transmitting operator. Opponents say that signal reports, especially the way they are used in the SS, are of *nil* significance, while a licensing date is at least of some interest.

Comments? Whether or not we staffers have strong feelings on these matters, we wish to be guided by your reactions to these proposals. So all right, guide us!

CQ DX. Letter t'other day complained long and bitterly about the practice of U.S. and VE stations calling "CQ DX" every time there is any kind of band opening and often when there isn't, making it all but impossible for DX to be heard.

The League's DX Operating Code for U.S. and Canadian amateurs does not say you *shouldn't* call CQ DX, it merely says that this "is not the

OPERATING EVENTS (Dates in GMT) ARRL-IARU Societies-SCM-Affiliated Club-Operating Events

June	July	August
4-10 Rhode Island Amateur Radio Week, p. 122, this issue.	6 Qualifying Run, W6OWP	1-9 Boy Scout World Jamboree, K7WSJ, next issue.
10-11 V.H.F. QSO Party	12 Qualifying Run, WIAW	4 Qualifying Run, W6OWP
10-12 New York State QSO Party, p. 111, this issue.	8-10 CD Party (c.w.)*	5-6 YO Contest, next issue.
11 Nebraska Centennial QSO Party, p. 118, this issue.	15-17 CD Party (phone)*	12-13 WAE DX Contest, c.w.
13 Qualifying Run, WIAW	16 Minnesota QSO Party, next issue.	17 Qualifying Run, WIAW
16 Qualifying Run, W6OWP	22-23 Independence of Colombia Contest, next issue.	26-27 South Carolina QSO Party
24-25 Field Day	* League Officials and Communications Dept. Appointees, only.	

best assurance that the *rare* DX will reply." (See Operating Aid No. 5.) Even so, some DX men have argued the point, saying that there are times, quite a few of them, when calling CQ DX is the best, if not the only, way to get a reply. DX stations, they say, get tired of calling CQ all the time and prefer to call a few stations themselves once in a while. After all, why shouldn't *they* be allowed to be choosy, too?

Well, figure it out. If you're pumping a couple of gallons (p.e.p., that is) into a beam antenna and the band is wide open and full of DX stations, any one of which you would just as soon work, maybe a CQ DX is the best gimmick. Chances are good that you'll get a call. Once in a while you may even catch a rare one that way. But this in itself does not justify the cluttering up of the band with CQ DX on the part of U.S. and Canadian stations when the DX is coming through. We suppose it is natural enough for amateurs to want stations to call them, putting themselves in the role of benefactor and the calling station as the supplicant, but in the main we reaffirm the League's DX Operating Code point which advises U.S. and Canadians *not* to call CQ DX but to listen, and dig, and listen some more, until you find the station you want to work, then call him.

How can you get a copy of the DX Operating Code? Easy. Just ask for Op. Aid No. 5.—
W1NJM.

CLUB COUNCILS AND FEDERATIONS

Affiliated Council of ARCs, Inc., R. D. Mayer, W7NGW, Secy.-Treas., 6115 S.E. 13th Ave., Portland, Ore. 97202.

Central California Radio Council, W. E. Walters, W6MKE, Secy., 3315 Kirkwood Drive, San Jose, Calif. 95117.

Chicago Area Radio Club Council, Inc., Karl Kopetzky, K9AQJ, Secy., 1052 Loyola Ave., Chicago, Ill. 60626.

Council of Connecticut Amateur Radio Clubs, James W. Parker, K1VII, Secy., 17 West Main St., Niantic, Conn. 06357.

Federation of Long Island Radio Clubs, Inc., Warren Mayer, W2OUQ, Secy.-Treas., 25 Aldred Ave., Rockville Centre, L. I., New York 11570.

Hudson Amateur Radio Council, Inc., Fred J. Brunjes, K2DGI, Secy., 22 Ivy Drive, Jericho, N. Y. 11753.

Indiana Radio Club Council, Inc., Ben Moore, W9DUD, Secy., 239 So. Jefferson St., Martinsville, Ind. 46151.

L. A. Area Council of ARCs, Gene M. Kistler, WA6OKZ, Secy.-Treas., 10218-10th Ave., Inglewood, Calif. 90303.

Manitoba Assn. of ARCs, Rolly Crull, VE4RS, Secy.-Treas., 536 Beverly St., Winnipeg 2, Man., Canada.

The Radio Soc. of Ontario, Inc., Wm. Bissell, VE3CTJ, Secy., 22 Brunner Dr., Islington, Ont., Canada.

Tennessee Council of ARCs, Henry Gatlin, WA4GJW, Secy., 1006 Georgetown Pike, Cleveland, Tenn. 37311.

Tulsa Council of ARCs, Larry Russell, K5ZCJ, Secy., 11322 E. 44th Place, Tulsa, Okla. 74128.

Puget Sound Council of ARCs, H. M. Graham, K7ZEP, Secy., 12030-68th Ave., So., Seattle, Wash. 98178.

Five elected ARRL officials attended the Roanoke Division LO meeting held at Greensboro, N. C., April 8-9. Left to right are: **W4ACY**, vice director and host; **W4BNU**, SCM N. C.; **W4KFC**, director; **W8JM**, SCM W. Va.; **W45HJ**, SCM Va. **K4LNJ** was absent due to illness. **W4PED**, chairman, took the picture. About 28 attended the two-day session at which many important topics were discussed.

BRASS POUNDERS LEAGUE

Winners of BPL Certificate for Mar. Traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
K8RPI	4655	1869	1692	177	8393
W3CUL/4	159	1438	1466	19	3382
K9ONK	118	957	932	17	2024
K5TEY	111	937	411	4	1463
W1PEX	83	662	565	47	1357
W7HBA	23	692	641	14	1345
K8PFT	20	654	603	51	1328
W7BA	6	651	592	57	1308
W0LGG	17	676	565	16	1274
W7ZIW	22	610	562	48	1242
W50BD	32	543	543	0	1118
W3FML	30	590	488	11	1109
W6BHO	34	544	330	28	936
W0ZWL	1	548	6	298	853
W6RSY	119	379	253	58	809
W6GYH	44	377	366	7	794
K0YFK	29	377	3	384	793
K9IVJ	26	427	310	5	768
W6KVC	20	372	372	0	744
WA5CK	24	366	339	13	742
W6EOT	32	347	353	0	732
WA4BMC	603	123	51	49	726
W5PML	7	352	347	5	711
W6VNO	25	351	319	0	695
W0LXC	39	318	313	5	675
W74DXJ	75	251	251	0	674
K7TCY	26	330	348	41	645
WA7DXI	50	345	217	26	638
W6BGF	30	317	265	20	632
W6WPF	271	156	77	79	583
W8OPH	11	273	228	41	553
W1EPW	46	279	206	7	538
W81WF	48	239	219	23	529
W4FOE	7	257	193	71	528
W6QXY	35	244	238	6	523
WA4DYL	25	280	189	28	522
W4LLE	54	235	160	65	514
W4BEO	20	240	236	18	512
K8KMQ	70	225	206	10	511
WA3EEQ	26	241	232	7	506

More-Than-One-Operator Station

W4DFU	633	88	63	12	796
W90DD	547	18	1	8	577

BPL for 100 or more originations-plus deliveries

W8DSC 371	W3TN 120	WA9QK 105
W8BKL 250	W8NAL 118	WB6JEO 104
W8IV 220	K4TET 114	WB6UTC 104
K1PNB 186	W3VR 4 113	WA4TWD 103
WA3BLE 145	W6JXK 110	W3DPR 102
K7CTP 141	WA4AUG 109	WA8MAM 100
W4RZL 126	WA3ATQ 107	Late Report:
W6QQQ 123	WB4CTY 107	WA9HWR (Feb) 102
	K4BHY 106	

More-Than-One-Operator Station

K4CG 193	W0EEE 133	K9IU 110
W1AW 134	W0ZLN 120	

BPL medallions (see Aug. 1954, p. 54) have been awarded to the following amateurs since last month's listing: K6LRN, W6VNO, WA7DXI, WA6EDN.

The BPL is open to all amateurs in the United States, Canada and U.S. Possessions who report to their SCM a message total of 500 or a sum origination and delivery points of 100 or more for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL form.

A.R.R.L. AFFILIATED CLUB HONOR ROLL

One of the requirements for ARRL affiliation is that 51% or more of a club's membership be ARRL members. This is hardly a difficult attainment in most cases, but to make the 100% category is something else again. As the annual affiliated club questionnaires are received, we make note of those who have 100% ARRL membership and put them aside for separate honors. This includes an honorary listing in *QST* and a special certificate each year this is accomplished.

Although all questionnaires have not yet been received, we take pleasure in listing herewith those clubs which so far



have officially indicated that their members are all members of ARRL. A supplementary list will be in Dec.

Adams County Amateur Radio Society, Gettysburg, Pa.
Aeronautical Center ARC, Inc., Oklahoma City, Okla.
Amateur Communication Club of North Texas, Denton, Texas.

Amateur Radio Transmitting Society, Inc., Louisville, Ky.
Amateur VHF Institute of N. Y. Maspeth, N. Y.
Athens Amateur Radio Club, Athens, Ga.
The Brush Creek Plaza Bird Watching and VHF Society, Kansas City, Mo.

Central Kentucky ARC, Campbellsville, Ky.
Chisholm Trail Amateur Radio Club, Inc., Duncan, Okla.
Columbia Amateur Radio Club, Columbia, Miss.
Decatur Amateur Radio Club, Decatur, Ala.
Dunsmuir Amateur Radio Club, Inc., Dunsmuir, Calif.
Dutchess County VHF Society, Poughkeepsie, N. Y.
East Whittier Radio Club, Whittier, Calif.
Easton Amateur Radio Society, Easton, Md.
The Electron Club of Denver, Englewood, Colo.
Enid Amateur Radio Club, Enid, Okla.
Fountain City Radio Club, Knoxville, Tenn.
Hoot Owl Club of Southwest Louisiana, Starks, La.
IRC Amateur Radio Club, Philadelphia, Pa.
Johnson City Radio Association, Inc., Johnson City, Tenn.
Kings County Band Scanners, Brooklyn, N. Y.
Kinston Amateur Radio Society, Kinston, N. C.
Lake Success Radio Club, Great Neck, N. Y.
Lockheed Amateur Radio Club, Burbank, Calif.
Loudon County Amateur Radio Club, Lenoir City, Tenn.
Lower Columbia AR Assn., Inc., Longview, Wash.
Mason County Radio Club, Inc., Ludington, Mich.
Miami Valley AR Contest Soc., Kettering, Ohio.

Norfolk County Radio Association, East Walpole, Mass.
No. Augusta-Belvedere RC Inc., No. Augusta, S. C.
OBP #1 RC of St. Louis, Mo.
Osego Amateur Radio Club, Oneonta, N. Y.
Pawnee County Amateur Radio Club, Pawnee, Okla.
Potomac Valley Radio Club, Arlington, Va.
Radio Amateur Transmitting Society, Nashville, Tenn.
Radiations, Lancaster, N. Y.
Sarasota Amateur Radio Association, Sarasota, Fla.
Scarborough Amateur Radio Club, Don Mills, Ont., Canada
Sheridan Radio Amateur League, Sheridan, Wyo.
St. Louis ARC Inc., St. Louis, Mo.
Sub. Base Medical Research Lab, ARC, Groton, Conn.
The Tri-County Radio Association, Plainfield, N. J.

ELECTION NOTICE

To all ARRL members in the Sections listed below:

You are hereby notified that an election for Section Communications Manager is about to be held in your respective sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be received at ARRL on or before 4:30 P.M. on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, zip code and station



DX CENTURY CLUB AWARDS



Honor Roll

The DXCC Honor Roll consists of the top ten numerical totals in the DXCC. Position in the Honor Roll is determined by the first number shown. The first number represents the participant's total countries less any credits given for deleted countries. The second number shown represents the total DXCC credits given including deleted countries. All totals shown represent submission received through March 31, 1967 and are shown alphabetically by call.

G3FKM... 322/338	W6EPZ... 320/340	W4AIT... 318/340	W2LV... 316/334	W1ZW... 314/330
W5ABY... 322/338	W7AC... 320/343	W4PLL... 318/332	W2FOG... 316/334	W2AYJ... 314/332
W6AM... 322/346	W8UAS... 320/340	W4TMM... 318/339	W3GGS... 316/334	W2BJM... 314/326
W8EWS... 322/345	W0DU... 320/341	W5CKY... 318/336	W3NKM... 316/332	W2DDO... 314/331
W8JBI... 322/340	G4MUJ... 319/335	W5UKK... 318/331	W4DOS... 316/322	W2FXA... 314/326
W8KIA... 322/345	K2LWR... 319/331	W6CUO... 318/342	W4MR... 316/335	W2PFE... 314/334
W6QVZ... 321/342	E4FT... 319/325	W6DSU... 318/329	W3ARX... 316/340	W2QHL... 314/334
DL1N... 321/336	P40FX... 319/338	W7PHO... 318/335	W5IGJ... 316/333	W3LMO... 314/326
HB9J... 321/344	VK3KB... 319/341	W9HUZ... 318/337	W6BZE... 316/335	W3RNO... 314/331
HB9MO... 321/337	W1BIIH... 319/342	W9YFV... 318/341	W6YY... 316/335	W8YDU... 314/331
K6ENX... 321/337	W1JYH... 319/341	W0BMO... 318/330	W8HR... 316/338	W5CE... 314/329
CH1ER... 321/342	W2BOK... 319/335	CE3AG... 317/340	W8JMD... 316/337	W5LGG... 314/335
W4ML... 321/340	W2BXA... 319/342	K4TWF... 317/322	W9LNM... 316/338	W7GMO... 314/334
W5OK... 321/331	W2LAX... 319/335	LU6JX... 317/340	4X4DK... 316/333	W8WZ... 314/335
W7GUV... 321/343	W2IP... 319/327	W2FXN... 317/330	D16EN... 315/329	W9AMU... 314/330
W8BF... 321/341	W3KT... 319/342	W2MFS... 317/324	G2PL... 315/337	W9YSX... 314/330
W8MPW... 321/338	W4BJ... 319/330	W2PCJ... 317/333	K2BZT... 315/331	W0AJU... 314/327
W9NDA... 321/344	W4GXB... 319/339	W2RGV... 317/332	K4IGK... 315/326	W8FBF... 314/331
DL3LL... 320/335	W4OM... 319/340	W2ZGB... 317/332	R6CG... 315/328	W8PGI... 314/329
G8KS... 320/337	W4OPM... 319/333	W4ECR... 317/333	K7GCM... 315/322	W8PNO... 314/335
K6EVR... 320/336	W5KC... 319/341	W4LYV... 317/330	W1FH... 315/340	Z1IHY... 314/337
VE3CFG... 320/333	W6CYV... 319/336	W5NNK... 317/337	W1HZ... 315/332	G3HDA... 313/324
W1BAN... 320/332	W6NJU... 319/332	W5DLG... 317/337	W2HO... 315/330	1I4MU... 313/331
W1CLX... 320/342	W8DAW... 319/342	W5POA... 317/334	W2EHS... 315/319	K6VVA... 313/321
W1HX... 320/339	W8IRN... 319/336	W6GPB... 317/337	W2SAW... 315/321	K8ISC... 313/323
W1MW... 320/336	W8JIN... 319/343	W6RKP... 317/329	W3LMA... 315/336	VE7ZM... 313/336
W2AGW... 320/343	W8PQQ... 319/335	W6WQO... 317/333	W3WGH... 315/329	W1CKA... 313/322
W2JT... 320/338	W8ELA... 319/341	W6EYP... 317/330	W5KBU... 315/332	W1ME... 313/335
W2HTI... 320/334	W8NLY... 319/334	W7ENW... 317/340	W6LDD... 315/335	W2CR... 313/329
W2NUT... 320/335	W8OGL... 319/334	W7GBW... 317/341	W8HGW... 315/339	W2RDD... 313/326
W2SSC... 320/335	W8SYK... 319/336	W8GHI... 317/333	W8NGD... 315/331	W2HCG... 313/327
W2SUC... 320/336	DL3RK... 318/334	W8MLY... 317/332	W9SFR... 315/328	W2JVE... 313/330
W2WZ... 320/342	IT1FAI... 318/333	DL9OH... 316/326	W0AIIH... 315/329	W3JNN... 313/336
W2YTH... 320/337	K2IDA... 318/334	G3HCT... 316/323	DJ1BZ... 314/330	W4LVV... 313/332
W2ZX... 320/338	K4AIM... 318/331	1I4DMG... 316/331	DJ2BW... 314/330	W6HOC... 313/325
W3GAI... 320/342	ON4DM... 318/336	W1Z... 316/331	K3UPG... 314/337	W6ID... 313/331
W4LRN... 320/331	W3CTO... 318/337	W1GKK... 316/340	K4LNM... 314/327	W6KZL... 313/328
W4VPP... 320/336	W2FZY... 318/330	W2DXX... 316/321	R4RPK... 314/322	W6TZD... 313/333
W5UX... 320/334	W2OKM... 318/335	W21ZS... 316/332	W1BIL... 314/330	W8LKH... 313/332

Radiotelephone

W3RIS... 322/346	G3FKM... 318/331	W8POO... 317/333	OE1ME... 315/327	W8MPW... 314/322
W8BF... 321/341	DL1N... 317/331	W9NDA... 317/336	VK5ES... 315/334	W6QVZ... 314/328
W8GZ... 321/343	K4TJ... 317/325	DL3LL... 316/331	W2VCZ... 315/323	5Z4ER... 314/335
W2BXA... 320/341	ON4DM... 317/335	G8KS... 316/329	W8HGW... 315/336	DJ2YL... 313/327
W2ZX... 320/338	PY4TK... 317/333	W6YY... 316/335	4X4DK... 315/332	VK3AHO... 313/324
W6AM... 320/343	W1BAN... 317/328	W0JYW... 316/332	K8RJV... 314/322	W3JNN... 313/333
W7PHO... 320/337	W2HTI... 317/331	K4AIM... 315/328	1I4DMG... 314/329	W4ANE... 313/327
W2JTF... 319/332	W2TFP... 317/322		W4PDL... 314/323	W9JJP... 313/329

call of the candidate and signers should be included with the petition. It is advisable that eight or ten full-member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reasons of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

The following nominating form is suggested. (Signers should be sure to give city, street address and zip code to facilitate checking membership.)

Communications Manager, ARRL [Place and date]
225 Main St., Newington, Conn. 06111

We, the undersigned full members of the
..... ARRL Section of the
Division, hereby nominate
as candidate for Section Communications Manager for
this Section for the next two-year term of office.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— George Hart, W1NJM, Communications Manager

Section	Closing Date	SCM	Present Term Ends
Nebraska.....	June 9, 1967	Frank Allen.....	June 10, 1967
Manitoba.....	June 9, 1967	John T. Stacey....	July 1, 1967
South Dakota....	June 9, 1967	Seward P. Holt....	July 3, 1967
Western Mass....	June 9, 1967	Perry C. Noble....	Aug. 11, 1967
New Mexico.....	June 9, 1967	Bill Farley.....	Aug. 16, 1967
Kansas.....	June 9, 1967	R. M. Summers....	Aug. 18, 1967
Kentucky.....	June 9, 1967	L. F. Jeffrey.....	Aug. 20, 1967
West Virginia....	July 10, 1967	Donald B. Morris..	Aug. 18, 1967
Alaska.....	July 10, 1967	John P. Trent.....	Resigned
Virginia.....	Aug. 15, 1967	H. J. Hopkins....	Oct. 11, 1967
Oklahoma.....	Aug. 15, 1967	Daniel B. Prater..	Oct. 11, 1967
Rhode Island....	Aug. 15, 1967	John E. Johnson..	Oct. 12, 1967
Arkansas.....	Aug. 15, 1967	Don W. Whitney..	Oct. 13, 1967
Indiana.....	Aug. 15, 1967	Mrs. M. R. Kroulik	Oct. 14, 1967
Vermont.....	Aug. 15, 1967	E. R. Murray....	Oct. 17, 1967
San Diego.....	Aug. 15, 1967	Don Stansifer....	Oct. 21, 1967
Hawaii.....	Sept. 11, 1967	Lee R. Wical.....	Nov. 11, 1967

ELECTION RESULTS

In the Washington Section of the Northwest Division, Mr. William R. Watson, K7JHA, Mr. Everett E. Young, W7HMQ, and Mr. Herman F. Helgesen, W7AIB, were nominated. Mr. Watson received 447 votes, Mr. Young received 237 votes, and Mr. Helgesen, received 229 votes Mr. Watson's term of office began May 3, 1967.

In the Michigan Section of the Great Lakes Division, Mr. Ralph P. Thetreau, W8BFX, and Mr. Ivory J. Olinghouse, W8ZBT, were nominated. Mr. Thetreau received 493 votes and Mr. Olinghouse received 453 votes. Mr. Thetreau's term of office began April 26, 1967.

Section	Closing Date	SCM	Present Term Ends
Santa Barbara....	June 9, 1967	Cecil D. Hinson..	Aug. 10, 1966
Maine.....	June 9, 1967	Herbert A. Davis.	Mar. 12, 1967
Alberta.....	June 9, 1967	Harry Harold....	Apr. 10, 1967

From March 1, through March 31, 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

G6TA.....312	49RA.....118	PY4UG.....105	WA5GXT.....102	G3RWF.....100	W3ICW.....100
K2IEG.....226	VE6AET.....111	JAJJAN.....104	WA5PYL.....102	K3SWZ.....100	W4AMP.....100
VE1PL.....161	W2JAM.....111	K8YDR.....104	Z8XP.....102	K6HW/L.....100	W4KA.....100
9Q5QR.....158	KL7AIZ.....109	UA0TD.....104	JA0AZE.....101	K9IIG.....100	W4PGK.....100
JA7ARZ.....142	ZC5AL.....108	UA3KTV.....103	WA1EHL.....101	VE3PXR.....100	W5EAM.....100
DL1MD.....140	JA8KB.....107	WA9NKN.....103	UA8KAE.....101	WA2WVV/KL7	WB6QWJ.....100
UW9OU.....138	VE3EUX.....107	G3RPN.....102	UW9CF.....101	CT1CI.....100	W8GPK.....100
UA4LM.....125	H18LC.....106	WA2CFN.....102	DT1OI.....100	DJ6KA.....100	WB2NZU.....100
R3YXX.....122	W8OAR.....113	W2QIS.....102			WB2PWU.....100
G2ZR.....120	LZ1BC.....105				W9IEM.....100

Radiotelephone

LU9DAH.....222	W5PTG.....126	WA3GFE.....111	K5DZV.....108	K1BWZ.....101	WA2GCF.....100
K2IEG.....226	JA1BZI.....123	J47MA.....110	UA4CZ.....105	Y2PAC.....101	WA8PKG.....100
SM10LM.....186	Z1FIG.....123	W4NML.....108	K1EBM.....102	K8TBQ.....100	WA9NKN.....100
VE1PL.....157	ZC4RM.....122	WA4UHK.....108	VE6AET.....102	W2OEH.....100	XE1BC.....100
W4ZFE.....131	W8OAR.....113	W28JM.....107	G3NXB.....101		

Endorsements

Endorsements issued for confirmations submitted from March 1, through March 31, 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.

330	W2FSW	K4CEB	OH8SB	W4NML	W7AZG	WA8JCD	W9QWM	W2LFL
W6FOZ	W9TKV	W1IKE	SM6AEK		W9NNG		WA6CPX	W2VIR
320	280	W4HKQ	W4ZLW	180		140		W2GHW
K8RWO	SM0KV	W4ZXT	W5HTY	HB9AHA	160	G3EIX	120	WA3CGE
W2WMMG	W2FXE	W2BKO	W8NPF	K3BNS	JA4XW	G3ETU	DL1DAA	W5AKI
W7BTH	W2PXR		W0CU	K6SDR	K4KJD	K1NWE	G3LUW	W6OER
	W2PFM	240		K8DBW	K4KLR	K4GSX	K1EWL	W6AEM
	W5AI	W1SXQ	200	SP2IU	K40A	K5IIN	K1SLZ	W6BCE
310	W5E1	W2BGL	K4RCS	W1GOG	SM5BFJ	OH2PB	K9LZ	WA8OVC
W4EEE	WA6KNE	W2MD	VE2AF	W1LBA	VE3CWE	UD6BW	UA3KZO	W8SNM
	Y5BZ	ZL3AB	W1GOG	WA3ATP	W2UKP	WA2TJA	VE3OR	W9MRX
300	260	220	W2LJX	W3GJR	W4FPW	W2PKU	VE7SE	WA9CYV
SM7MS	W4HUE	K4ET	W3FTU	W4UHL	W6SUD	W3KGU	W1SE0	WA9KVA
WA2DIG	KL1GO		W4JVU	W5KGI	WA8HFN	W5NLP	W2HAZ	

Radiotelephone

330	300	260	9M2DQ	WA6KNE	W4JVU	ZL3AB	VE3EDR	W2EYB
W3KT	G3HDA	H1AA		W8GMF	W6GPB		W1FDL	W4LSK
	W2MES	PY2PC	220			160	W1SEB	W6SUD
	W2ODO	W2FXE	G3BID	200	180	CT1IK	W2HZG	
	W3DJZ		K6EC	EP3RO	K3IVI	HB9AHA	WA8HFN	120
		240	W4TUC	U1JT	W2NLC	U1BXK		K4KJD
		K4CAH	W5HTY	JA2ADH	W4LTV	I1KG	140	K7DVK
		PY3AHL	W5LZZ	K4ET	W4TRG	K3BNS	K4PSR	W8CFG
		W6EUF	WA5LOB	K6BPR	W5LGG	SM6AEK	K7YDO	W8SNM
		W2IOT	W6EPZ	WA2FQG	WA3ATP	VE3BSJ	VE3BSR	WA9CYV
		W4HUE					VE3EUV	XE1NI
310	W6BSY							
PA0FX								

RESULTS, FEBRUARY FREQUENCY MEASURING TEST

The February 10, 1967 FMT, open to all amateurs, brought entries from 321 participants who made a total of 1085 measurements. Of these 117 ARRL Official Observers submitted 347, and 204 Non-00s made 738 readings. All taking part have received individual reports of their readings. The standings accredited to the more precise in each group appear below; all listed show ability of the highest order in Frequency Measurement.

Following is a report of the standings of the FMT leaders in this test. In consideration of the minimum possible error, due to 'doppler' and unavoidable factors, we accord as of equal merit all reports where computations show $\frac{1}{10}$ ths parts per million or higher accuracy. Our direct comparisons with the umpire's readings otherwise establish this order of listing.

September QST will announce details on the next ARRL FMT open to all amateurs.

Observers	Parts/ Million	Non- Observers	Parts/ Million
W1BGW W1CMP		W1ZBKX W2FMU	
K4HDX W4NTO		W1ZKJT W4VWS	
W5FMO K5RWB		W5UJF W5YCQ	
W6GDO W8CUJ		W6NUW W6SPB	
(0 to .4)		W8LZY W8UPW	
		W0DJV (0 to .4)	
W6GQA.....5		K6MZN.....5	
W9IQI.....5		R. Ireland.....5	
W3BFF.....8		W6RCR.....7	
W4FFH.....8		WB6AAL.....9	
W6CBX.....1.0			
K0BRS.....1.0			
W8MTI.....3.8			
K9GSC.....3.8			

CODE PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Cer-

tificate. The next qualifying run from W1AW will be made June 13 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 June 16 at 0400 Greenwich Mean Time on 3590 and 7129 kc. **CAUTION!** Note that since the dates are given per Greenwich Mean Time, Code Proficiency Qualifying Runs in the United States and Canada actually fall on the evening previous to the date given. *Example:* In converting, 0130 GMT June 13 becomes 2130 EDT June 12.

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 April QST.
- June 2: *It Seems to Us*, p. 9
- June 6: *Solid-State Receiver Design* . . . p. 11
- June 12: *An Antenna for the Traveling Man*, p. 20
- June 15: *Antenna Rotators and Indicators*, p. 22
- June 20: *How To Handle TVI**, p. 41
- June 21: *TVI Prevention, a New Method**, p. 51
- Date Subject of Practice Text from *Understanding Amateur Radio*, First Edition
- June 26: *Upper and Lower Sideband*, p. 65
- June 30: *How Transmitters Work*, p. 67

*Speeds will be sent in reverse order, with highest speed first.

W1AW SCHEDULE, JUNE 1967

The ARRL Maxim Memorial Station welcomes visitors. Operating-visiting hours are Monday through Friday 11 P.M.-1 A.M. EDT, Saturday 7 P.M.-2:30 A.M. EDT and Sunday 3 P.M.-10:30 P.M. EDT. 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.

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 ⁶	21,28 ⁶	21,28 ⁶	21,28 ⁶	21,28 ⁶	.....
1900-2000	14.28	7,255	14.28	7,255	14.28	.....
2000-2100	14.1	14.28	14,095	21,28 ⁶	7.08	.....
2200-2300	21,28 ⁶	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.



Strays



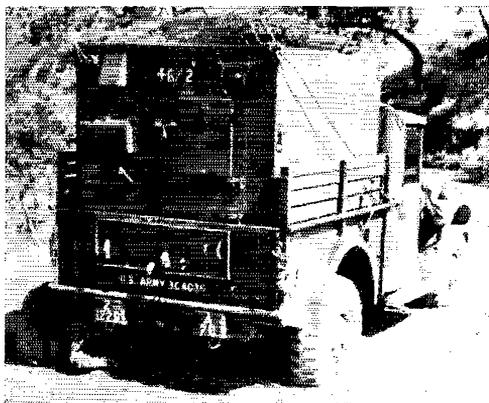
This young man, M. Paul Thomas, WA8TKW, just earned the Communication Department's WAS award #17,600, dated February 14, 1967. Paul is 11, passed his Novice test in April and the General Class exam in July of 1966. In addition to QSOing and DXing (mostly on 15), he assists the Chippewa ARC at the Brecksville VA Hospital weekly, aiding patients interested in amateur radio. Oh yes, Paul's dad is WN8VFN, and is getting help from his 6th grade son in acquiring a General Class license.



K4YRF and the Annandale Rocket Society launched a home-made rocket similar to the one above, but which contained a beacon operating in the 10-meter band. Shown in the photo is Society president, Tom McElfresh. By using the beacon transmitter, the group was able to make altitude and velocity measurements. K4YRF would like to hear from other radio amateurs who are also amateur rocketeers.



Recently, amateur radio put smiles on the faces of a group of Brazilian Air Force Academy members. The group spent a week at Eastern Michigan University as a part of a study tour of educational institutions during which time several "south of the border" contacts were made from EMU's club station, WA8HRI. Pictured are PY2HI (I.) of the Academy, and K8KJP of EMU's faculty.



Four flat tires and only one spare! That's what happened to this army truck when its v.h.f. antenna came in contact with a low high-tension wire in Korea. Watch those 160-meter mobile whips gang! (Photo courtesy SP4 Terry Klepey via WA2VSO.)

• 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. WA3DUM worked Hawaii and Poland. W3EEB worked JA and VK on 10 in the DX Contest and is looking for 2- and 6-meter gear. K3NYG expects to have a 2-meter C.D. Net going in the fall. Anyone interested get in touch. WA3DYG qualified for OO Class I and II. W3DRD is vacationing in Europe and the Middle East. W3YE and K3NHL battled it out in the DX Contest. W3RDZ does a good job as OO checking on harmonic radiation. W3BDP has been QRL out-of-town work and illness in the family. WA3HGV is on 10, 15, 20 and 40 with an indoor antenna. W3DEO won the 1st. QSO Party for Delaware Amateur and MARS stations at the Greater Wilmington Hobby Show on 6 meters handled over 50 messages. The local group had a nice exhibit which attracted considerable attention. DEPN: QNI 50. DSNM: QNI 73. Traffic: W3EEB 282, W3HC 144, WA3DYG 36, W3DKX 13, WA3CRU 10, W3HKS 10, WA3DUM 7, WA3HGV 4.

EASTERN PENNSYLVANIA—SCM, Allen R. Brumer, W3ZRQ—SEC: W3ELI. RMs: K3YVG, K3-MVO, W3EML, W3MPX. PAM: W3FGQ. EPA C.W. Traffic Net had QNI 515, QTC 461. The PTTN Training Net had QTC 273. The EPA Emergency Fone and Traffic Net had QNI 852, QTC 281. WA3EMO and K3VBA are now ORSS; K3LNU is an OVS; WA3FWT, WA3-GLI, K3MDG, W3VAP and K3YPF are OPSS. W3EU got a complete new station line-up starting with an HQ-100. W3ID is repairing antenna damage. WA3ERA is now s.s.b.-mobile. W3RLT, new Lancaster County EC, is having the usual growing pains with AREC planning. W3AXA is retiring and will now have that spare time to visit clubs et al. WA3BSV is chasing 75-meter DX with his new HW-12. WA3FWT is working 15-meter DX to Asia. W3KGN remodeled his shack. K3EUG home-brewed a 23 transistor keyer. WA3FVK received honorable mention in the Montgomery County Science Fair. WA3EXW went QRO with an ART-13 and is a new addition to the EPA c.w. nets. Lehigh U. station WA3EQ has a number of satellite-tracking projects presently in progress. With the basketball season over, WA3CTP watched his traffic count raise. The Harrisburg Radio Amateurs Club has been reactivated by W3IYN. W3JXQ and others. W3UHH will be shortly mobilizing north from Florida. Your editor just received the League's Annual Report and it seems that East Florida and Eastern Pennsylvania are tied for top place in 1968 traffic-handling. Congratulations are in order to our Florida competitors for the past eight years. My heartfelt thanks to the EPA traffickers for breaking all previous records as mentioned in our last report. My thanks and appreciation to all past and present managers and appointees. Traffic: W3EML 1109, K3MYS 421, K3MVO 342, WA3CTP 279, W3AIZ 277, WA3ATQ 235, K3YVG 182, K3PIE 179, W3MPX 176, W3AEQ 174, WA3EXW 110, W3FGQ 108, WA3FVK 103, K3RTX 103, W3KJJ 85, W3-ZRQ 82, WA3CFU 66, K3HHB 63, WA3BSV 60, WA3-FWT 60, W3RV 59, WA3ENB 57, W3VAP 57, WA3EMO 53, WA3AFI 49, W3CBH 49, W3PAF 48, K3FSV 45, WA3GLI 45, W3NNL 43, WA3AIB 40, K3WAJ 40, W3OY 38, K3HLN 33, W3AXA 31, K3MDG 28, K3KKO 27, K3KTH 27, K3POB 20, K3VBA 20, WA3EEC 19, W3JKX 15, K3WEU 8, W3BUR 7, W3ELI 7, W3RLT 6, WA3ERA 5, K3NZD 4, W3OML 3, WA3BJQ 2, W3ID 2.

MARYLAND-DISTRICT OF COLUMBIA—SCM, Carl E. Andersen, K3JYZ. SEC: W3CVE. RMs: K3-OAE, W3ZNV. PAMs: W3JZY, K3LFD, K3NCM.

Net	Freq.	Time	Days	Sess.	QTC	Are	QNI
MDD	3643	0000Z	Daily	31	387	13.6	
MDDS	3643	0130Z	Daily	31	63	5.2	
MEPN	3820	2200Z	M-W-F	20	57	19.9	
MEPN	3820	1800Z	S-S				
Nite Owl	50.150	400Z	Daily	31	8	4.7	
CVTN	145.620	0300Z	Sun.	4	17	3.5	

MSTN will start again June 15 at 2300 GMT on 50.150 Mc. and will meet daily. New appointments: WA3CEK, ORS; WA3GVH, OVS; Renewals: WIARR/3, OO. New AREC stations: WA3BIQ, W3GLJ, WA3EKP, WA3-EBF, WA3GLP. K3OAE has a planned rate improvement going on MDD with the goal a .500 rate. WA3CFK reports increased traffic with the possibility of all "A" grades in school this marking period. Two doses of flu restricted K3NCM's activity this month. BPL certificates go to W3DPR, W3TN and WA3EEQ. WA3EEQ will be leaving the Navy and MDC to return to Ohio U. to complete his MSEE in June. With the coming of EDT, W3TN reports his work will interfere with his traffic schedules and he's retired. The MDC father-and-son team, K3QDC and K3QDD again were operational from home during the Easter recess. WA3EKV is a new General Class licensee. A March ice storm eliminated the 6- and 2-meter beams at W3JZY's QTH and distorted the elements on his tri-bander. K3UWV/VO2 reports on operation from Goose Bay, Labrador, on 20 and 15 meters. W3CQS has acquired a new WRL-84 rig. W3UE is preparing his boat for some fishing/mobile schedules in the Chesapeake Bay. The YL/OM must have been a hot contest to send W3CDQ's new TR-4 to the sick bay. WA3EOP is in Washington attending school. Murphy's law is still operating on W3MCG with a citation for key clicks. W3MSK, as VU2MSK, and W3PZW, as PYTSOL, tried the other end of the DX Contest with some humorous results. W3GKP is up to 180 watts out of his H4-Mc "bread pan special." WN3GLP is now WA3GLP. General Class, with a new 14AVQ antenna and T-150A transmitter. WA3ELA has started a new club at Good Counsel High School. K3UXY's country total is at 130 but he still lacks 13 QSL cards for DXCC. Traffic: (Mar.) WA3EEQ 506, WA3CFK 231, W3TN 224, W3DPR 136, WA3EKP 115, K3JYZ 105, K3OAE 80, K3LFD 81, K3UXY 79, K3QDC 50, W3ZNV 39, W3PQT 37, WA3FRL 33, K3GZK 31, WA3EOP 27, K3LNV 27, K3QFG 27, K3-ORW 20, K3QFQ 17, W3MCG 17, W3EAS 13, WA3CCN 10, W3ECP 8, W3PIC 8, W3CQS 7, W3UE 7, K3VHS 7, WA3ECK 5, W3ATQ 4, K3QDD 3, K3NCM 2. (Feb.) K3FQF 29, WA3EKP 22, W3PQT 15, WA3FHB 11.

SOUTHERN NEW JERSEY—SCM, Edward G. Rasser, W2ZL—Asst. SCM: Charles B. Travers, W2YPZ. SEC: W2BZJ. RMs: WA2KIP, WA2BLV. PAM: W2ZL and NJPN Net Mgr. NJN reports a traffic total of 364 messages with a QNI of 503. The N.J. Phone & Emergency Net reports a total of 254 messages and a QNI of 686. WB2MOQ was high man in the Jan. CD Party, with W2ZVW coming in a close second on c.w. and top man on phone. WB2CXI checks in NJN from club station WB2URO. W2ZL attended the 42nd Annual "Cruise" of the Veteran Wireless Operators Assn. at Hotel Park-Sheraton, N.Y.C., Feb. 25. Paul Godley, of Trans-Atlantic 200-meter fame, was presented the DeForest Medal for outstanding service. W2BQ is trying out s.s.b. for the first time. W2POC skeds ex-3CO, now W5CS in Tulsa, Okla., weekly. W2EUI visited Z55JY, Z55KI and Z56TE while in South Africa. WB2QLF, NJPN Net member, keeps skeds with his dad, WB2IYO, from the Randi Expedition to Peru, the Land of the Incas, on 14,260 kc. at 0400Z daily. Listen for him using HC2RE or WB2QLF/OA4. W2ZVW is active as EAN NCS. W2-BZJ has ordered an SB-401 and is building an SB-300/200 combination. W2YPZ is the new Mercer County EC. W2CKF is active in NJN and 2RN. WB2SBD will join the USAF soon. K2BG is visiting with his daughter at Fort Bragg, N.C. WB2VFX is building a new 829B linear. W2HAZ is visiting VP7-Land, 29,600 kc, now becomes the National QSO Frequency. W3BBI/2 is the new Burlington Co. EC. Traffic: (Mar.) WB2MOQ 233, WA2-KIP 143, W2ZL 80, W2YPZ 55, W2ZUPC 38, K2SHE 37, W3BBI/2 35, W2CKF 32, W2ZVW 24, WA2DVU 10, WA2KAP 14, WB2SBD 2, W2IU 1. (Feb.) WA2KIP 136, W2ZUPC 108, WA2BLV 86, WA2KAP 12.

WESTERN NEW YORK—SCM, Charles T. Hansen, K2HUK—SEC: W2RUF. PAM: W2PVI, 1AMs; W2EZH and W2FEB. NYS C.V. 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.l.) 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 on Mon. New officers of the Elmira ARA are W2HQY, pres.; WA2URX, vice-pres.; WA2LWF, treas.; and WB2XK, secy. K2-TXB has been appointed OVS. WA2HSB has a 2.5-kw generator, WB2GAL has a Knight TR108 (6 meters) for Glens Falls AREC, WA2AWK, Onandaga County EC, has appointed W2SEL, W2ZOL and K2KTK as Asst. Ecs. W2CFP, Tomkins County EC, now has his home station on the air. K2AYQ, Glens Falls EC, reports that the AREC will provide communications for the North Creek White Water Derby. WB2ERK now has an eleven-element beam and 100 watts on 2 meters. WB2EDU/KZ5TI is now operating KZ5NG in the Canal Zone. We are sorry to report that WA2KZQ has joined Silent Keys. He was an officer and policy committee member of the NYSPTEN. W2ZIA was a recent speaker at RAWNY. New officers of RAWNY are K2VJG, pres.; W2ZIA, vice-pres.; WA2EYE, secy.; W2SSG, treas. New Directors are W2ROL, W2ZIA, W2CIL and W2PZI. The RAGS held its Fifth Annual Hamfest in Syracuse Apr. 5. The SARC held its Annual Banquet Apr. 15. The AWA held its Annual Smorgasbord Apr. 8. This editor would be happy to publicize any events your group is planning. My only request is that you give me two months lead time. The RAWNY invited area clubs to participate in its Annual Banquet held Apr. 14. K2-LGJ reports that the local 2-meter f.m. group is using T1S34 FETs in their preamplifiers. The schematic and pictorial is in the March copy of *The Link*, published by the BARRA. The preamplifier was designed by W2EUP, noise figure is 2.2 db., gain is 18 db. and overload level is 0.1 volts. GRAMS has published a roster of all active hams in its area. Traffic: (Mar.) W2NEI 467, K2KQC 335, WA2NDC 308, W2RUF 194, WB2GAL 186, W2GVII 171, WB2OYE 102, WA2HSB 93, WB2SMD 84, W2FEB 75, WA2MWF 67, K2QDT 49, W2HYM 45, W2FCG 43, K2-JRX 42, W2RQF 38, K2DNN 30, K2IMI 21, WA2IHP 20, WB2BUN 18, W2MTA 18, WB2SRU 18, W2CFP 17, WB2-QAP 16, WA2AWK 15, W2PNW 14, W2PVI 12, WA2TCZ 10, WB2UQJ 6, WA2ANE 2, WA2GLA 2, WB2VSL 1. (Feb.) W2GVH 187.

NEW YORK STATE QSO PARTY

June 10-12, 1967

The South Shore Amateur Wireless Association invites all amateurs to participate in the 1967 New York State QSO Party by contacting as many New York State amateurs as possible.

Rules: (1) *Contest Period:* 1800 GMT June 10 to 0200 GMT June 12. (2) *General Call:* On c.w. "CQ NY" or "de NY". On phone, "CQ New York State." (3) *Exchange:* QSO number, RS(T), ARRL section or New York county. (4) *Scoring:* One point per QSO. Out-of-state stations multiply by the number of New York State counties worked. N. Y. stations by the number of ARRL sections and countries. No power multiplier. A station may be worked once per band/mode. (5) *Suggested Frequencies:* 3560-70, 3900, 7060-7070, 7250, 14060-70, 14250, 21060-70, 21350, 28060-70, 29000 kc. (6) *Awards:* Certificates will be sent to the high scorer in each section, N. Y. county and country, provided a minimum score of 100 points is attained. (7) *Entry:* Logs must show GMT date/time, station worked, exchange sent and received, band, mode and total claimed score. Additionally, each entry must be accompanied by an s.a.s.e. if the log is to be considered for an award. Logs must be received no later than July 15, 1967. Send logs to the SSAWA, P. O. Box 465, Valley Stream, New York 11582.

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 K8SN, 3585 kc. Mon. through Fri. at 2330 GMT. SEC K3KMO wants to contact any ham or hams interested in emergency communications work in the following counties: Lawrence, Washington, Mercer, Mifflin, Clinton and Warren. Write him direct or via the SCM if you're interested. The South Hills Brass Pounders and Modula-

tors reports via *The Radial* the following new club officers: W3LDB, pres.; W3BWU, dir.; W3LYC, dir.; K3-AJQ, treas.; K3VNX, vice-pres.; W3QNI, dir.; W3-WFR, secy. Also, from the *Radial*—W3BWU received USA-CA-500 award, all 50 Mc. (Only the third such issued). The *Spark Gap* reports W3NWB has a new Galaxy V Mark II; W3MIW worked DK1BR, G3VOM, UB5KUM, UV3AAM, 11GT and VK3RJ on 10 meters on one week end; K3QHM is building a 2-watt 40-meter c.w. rig to use on his coffee breaks. WA3FKZ is a new General in the Pittsburgh area. W3LOS finished constructing the code typewriter that appeared in 1965 Aug. *QST* and it works very well. WA3BLE received his CP-25 certificate and also earned his first BPL certificate. Congratulations. WPA had another record month in traffic-handling, 31 sessions, 369 messages, 464 stations (Q1 plus 25 visitors during March. This is the seventh consecutive month with 400 plus stations. Traffic: (Mar.) WA3BLE 422, W3KUN 264, W3NEM 237, WA3EPQ 155, WA3AKH 149, K3SOH 140, W3LOS 84, K3PYS 83, K3-IKK 54, (W2KAT, W3NEI, WA3EPC, operators) K3-SJS 26, K3HCT 25, WA3BGE 21, K3SJS 17, W3YA 10, K3RZE 8, W3LOD 7, W4ZAU/3 4, K3TEZ 3, W3OEO 1. (Feb.) WA3AKB 71, W3IYI 16, W3LOD 7.

CENTRAL DIVISION

ILLINOIS—SCM, Edmond A. Metzger, W9PRN—SEC: W9RYU. RM: WA9GUM. PAMs: W9VWJ, WA9-CCP, W9KLB and WA9BLA (v.h.f.) Cook County EC: W9HPG. Net reports:

Net	Freq.	Times	Days	Tjr.
LEN	3940 kc.	1400Z	Sun.	9
ILN	3760 kc.	0000Z	Daily	161
NCPN	3915 kc.	1300Z	Mon-Sat.	210
NCPN	3815 kc.	1800Z	Mon-Sat.	401
III PON	3925 kc.	2300Z	Mon-Fri.	556
III PON	50.28 Mc.	0200Z	Mon. & Thurs.	12
III PON	145.5 Mc.	0200Z	M-W-F	158
TNT	145.36 Mc.	2100Z	Sun-Fri.	144

New Novices heard were WN9UHA, WN9SVS and WN9-UEM. WA9POZ was appointed Official Relay Station. WA9UEB received her Technician Class license. WA9-BLJ joined the ranks of Silent Keys. This column's sympathy is extended to her husband, WA9HLI, and her many friends in Boone County. WA9IYK reports that the MinHamfest will be held at the Boone County Fair Grounds Aug. 20. WA9BRQ is installing a new HyGain beam to bring in the hard ones. The 9RN had a traffic count of 795, according to net manager W9QLW. This will be the last notice about the Big Central Division Convention which will be held in Milwaukee July 7 and 8. Make your plans now for the exhibit and technical forums. WA9MWN has a brand-new XYL. WA9JFW is operating portable from Beloit College in Beloit, Wis. The 75-Meter Interstate Single Sideband Net handled 668 pieces of traffic during March, as reported by W9-NWK. W9IZF has a new quad antenna. The Hamsters Radio Club will hold its 33rd Annual Hamfest Sun., Aug. 13, at Santa Fe Park in Willow Springs, Ill. K9-RAS is doing net hamming with a new Heathkit SB-100. WA9RLA would like to have more check-ins on the TNT Net every evening. Check with him for details. The Motorola Amateur Radio Club toured the NBC-TV facilities in Chicago at its latest meeting. WA9UDF is a new General call on the bands. New calls in the Fulton County area are WA9RLG, WA9RLH and WA9-SIL. W9IUR was appointed Asst. EC for Champaign County by W9MITO. WA9QXT has built a keyer. W9-LNQ has returned from a fishing and mobiling trip in Arkansas. K9MSX and K9WUA were recently discharged from hospital stays. WA9SEO is the only BPL recipient for March traffic. Traffic: WA9SEO 512, K9KZB 377, WA9OTD 275, WA9IQD 241, WA9PPA 228, WA9MHU 206, W9EET 195, W9CGC 177, W9IXV 161, W9NXXG 157, WA9GUM 124, W9QDO 100, W9ELL 73, W9LDU 73, W9NSPA 73, W9EOT 66, WA9RSN 63, K9BTE 57, W9-PRN 34, W9ARL 34, WA9PB 17, K9HSK 16, W9IDY 16, WA9LDC 15, WA9FIH 8, W9LNQ 8, WA9QFT 6, K9HRC 5, WA9QXT 4, K9RAS 4, K9MITO 2, K9DQU 1, WA9HSZ 1.

INDIANA—SCM, Mrs. M. Roberta Kroulik, K9IVG—Asst. SCM: Ernest Nichols, W9YYX. SEC: WA9GKF.

Net	Freq.	Time	Mar. Tfe.	Mgr.
IFN	3910	1330Z daily	2300Z M-F	339 K9IVG
ISN	3910	0000Z daily	2130Z M-S	802 K9CRS
QIN	3656	0000Z daily		244 W9HRY

W9PMT, mgr. Hoosier V.H.F. Nets, reports Mar. traffic of 91. K9DHC, RM of RFN, reports Mar. traffic of 46. K9EFY, mgr. of IPON, reports Mar. traffic of 98. White River Valley AREC reports Mar. traffic of 20. The So. Bend AREC 6-Meter Net reports traffic of 7. W9QLW, RM for 9RN, reports Indiana was represented 100% in

Mar. QIN Honor Roll: K9HYV 30, W9BDP 27, W9QLW 25, WA9KOH 21, W9HRY, WA9RNT, K9VHY 19, WA9-KAG and K9WVJ 18, K9FZU and WA9OYI 15. New of- ficers of the Seymour ARC are W9RTH, pres.; K9DZS, vice-pres.; WA9JKW, secy.-treas. The Delaware ARC is conducting code and theory classes. W9MAM has a new tri-band beam and a trapped dipole. WA9TNQ built two cubical quads; the first one met with disaster, the second is doing fine. Don't forget the 1-RC picnic at Brown Co. July 9. K9H1S has moved to the Irland. W9KRJ has taken up skeet shooting and WA9JQN is taking fly- ing lessons. A new call heard from Kooz Lake is W9- KFT, better known as W9LBJ. The Tri-State ARC of Evansville is now using the call W9OG. W9KIB, from Columbus, is now W8DOR/W7BYF. WA9ITD is enjoy- ing a new HX-20 and WA9NJJ has a new TR-4. K9IIV is enjoying his Civil Air Patrol work. K9WGN has com- pleted his deluxe ham shack. W9HWR has a new vertical antenna. K9MAF/W2CJC will be back in Hoosier-Land this summer. *Amateur radio exists because of the service it renders.* BPL certificates went to K9IVG and K9IU. Traffic: (Mar.) K9IVG 788, W9QLW 437, W9MAM 378, W9HRY 293, K9FZX 287, W9JUK 262, K9HYV 197, K9- IU 134, WA9KAG 102, W9SNQ 93, K9CRS 74, K9FZU 73, WA9KOH 72, K9EFY 62, WA9BWT 60, W9UB 56, W9DKR 50, WA4RBQ/9 47, WA9GKF 47, WA9FDQ 46, K9VHY 45, K9KFM 43, WA9BRD 40, K9C8Y 40, WA9- LTI 40, K9RWQ 39, W9YYX 39, WA9HGI 38, WA9GNA 35, WA9RNT 34, W9FWH 31, K9WGN 28, WA9BHG 26, W9HVR 26, K9JY 26, W9LG 25, WA9LUG 25, WA9- GJZ 24, W9BUQ 23, K9ILK 23, W9PU 23, K9BSL 22, WA9MXG 20, WA9NGN 20, W9FJ 18, W9RTH 18, K9- ZLB 16, K8KNI/9 13, WA9CFT 13, W9CMT 13, W9VRQ 13, K9YFT 13, W9BZI 11, K9OXA 11, K9YXK 10, W9- HDP 9, W9CC 8, K9FUJ 8, K9QVT 8, W9DZC 7, K9- GBR 7, K9UEO 7, WA9MBT 6, W9PMT 5, W9EJW 4, WA9AXF 3, WA9DBK 2, K9IIV 2, WA9ABI 1, WA9QW 1. (Feb.) W9BZI 10.

WISCONSIN—SCM, Kenneth A. Ebnetter, K9GSC— SEC: K9ZPP. P.A.M.s: K9IMR, WA9QKP and W9NRP. RM: WA9MIO.

Net	Freq.	Time	Day	QNI	QTC	Mgr.
WIN	3662 kc.	0115Z	Daily			WA9MIO
BEN	3985 kc.	1200Z	Mon.-Sat.	325	309	W9NRP
BEN	3985 kc.	1700Z	Daily	637	181	WA9QKP
WSBN	3985 kc.	2215Z	Daily			K9IMR
SWRN	50.4 Mc.	0200Z	Mon.-Sat.	308	0	W9JZD

A net certificate was issued to WA9QQM for BEN. New appointees: W9KHH as OVS. Renewed appointments: W9NING, K9QKQ, K9UTN and WA9NBU as ECs; WA9NBU as OPS; W9RKP and W9VSO as OOs. W9- RQM is mobile on all bands with a Swan 350. CAN cer- tificates were earned by W9DND and WA9NPB. K9GDF led the OOs with 21 notices sent. BPL certificates for March were earned by W9ODD and WA9QKP. W9GOC has a new DX-60 for its Novices. WA9SAB is on the air with a GSB-100 and an SX-100. WA9OMO received a 9RN certificate. The Central Division Convention will be held in Milwaukee July 7 and 8; the WNA Picnic at Wisconsin Rapids on July 23. Hope to see all at these meetings. Traffic: (Mar.) W9ODD 577, WA9QKP 279, W9DYG 277, W9DND 180, WA9NPB 176, WA9OMO 165, W9YT 144, WA9QNI 114, K9FHI 104, WA9RAK 93, WA9NDV 80, K9GDF 74, W9DXV 65, W9AYK 49, W9- SUF 49, W9JKM 48, W9ABH 47, W9NRP 47, W9IRZ 39, WA9NVY 38, K9JMP 35, W9CBE 28, K9ITQ 27, WA9- PKM 25, WA9KFL 21, WA9NBU 16, K9GSC 13, W9IAL 9, W9GOC 8, WA9SRV 6, W9RQM 4, W9RTP 4, K9ZMS 1. (Feb.) K9OSC 38, W9RTP 27. (Jan.) W9RTP 7.

DAKOTA DIVISION

MINNESOTA—SCM, Herman R. Kopischke, Jr., W0- TCK—SEC: WA0IEF. R.M.s: W0ISJ, WA0EPX. P.A.M.s: WA0MMV, WA0JKT, WA0DWM, W0EHN. M8N meets daily on 3595 kc. at 2330Z. M8N meets Tue.-Sun. on 3595 kc. at 0000Z. Noon M8PN meets M-Sat. on 3820 kc. at 1705Z, holidays at 1400Z. Evening M8PN meets daily on 3820 kc. at 2300Z. M8TN meets Tue.-Sat. on 50.4 Mc. at 0330Z. Sun. at 0100Z. Minn. WX Net meets daily on 3830 kc. at 2330Z. It is with deep regret we report the passing of W0SW in Florida during March. The Worthington ARC will sponsor a picnic at Worthington on June 4. Check the nets for details. Other picnics coming up: July 9, the OGS Picnic at Gunn Park in Grand Rapids and the Piconet Picnic at Edge- water Park in Albert Lea. July 30, the Mankato ARC at the Blue Earth Co. Fair Grounds in Garden City. Aug. 13, the St. Cloud ARC Picnic at Wilson Park in St. Cloud. WA0KFF achieved the WAC and WAS awards in January. WA0OEF is active on 20, 15 and 10 meters, and is looking for Asia to complete his WAC. OO WA0- IAW reports sending 17 OO reminders in March. WA0- PFQ now is operating as K88AQI from Guam. Hans

will be teaching s.s.b. transmitter school for the Navy the next two years. Look for him on 10, 15 or 20 meters, c.w. and s.s.b. Don't forget the Dakota Division Con- vention at the Radisson Hotel in Minneapolis on May 26-27-28. See you there. Congrats to WA0PEY and WA0HRM, who became ORS and OPS, respectively. Appointments renewed: W0EHN as OO, WA0IAW and K0ZRD as ECs and W0UMX as OPS. Traffic: (Mar.) WA0PEY 336, WA0IAW 142, WA0PEY 97, WA0JKT 76, K0ORK 69, WA0IPU 54, W0ISJ 54, K0QB 50, WA0EDN 47, WA0QAK 47, W0TCK 43, WA0HRM 36, K0ZRD 34, K0AQT/0 32, K10IK/0 31, K0FLT 30, WA0MMV 27, WA0LVK 26, WA0PXT 26, W0ATO 24, W0OZE 22, WA0JRP 19, WA0OBD 16, W0BUO 15, W0KLG 15, W0KNR 14, W0EZZ 13, K0IGZ 11, W0- UMX 11, K0ERQ 10, WA0EFT 8, W0SZJ 6, WA0EAZ 5, WA0FFU 4, K0IKU 4, K0LWK 3, WA0KJF 2. (Feb.) WA0FUR 29, W0ATO 10, WA0FFU 6.

NORTH DAKOTA—SCM, Harold L. Sheets, W0DM —SEC: WA0AYL. OBS: K0SPH. WA0HUD informs us that there will be an International Hamfest at the Peace Garden in July. The Dakota Division Con- vention will be held in Minneapolis May 26-27-28 at the Radis- son. The 2 meter gang was all set for flood work in Grand Forks again this year but the Red River cooper- ated and stayed within its banks. WA0LZD has an HT-32 in operation on all bands. K0SPH had some rig trouble but is back on the air. K0TKK/O has been helping out as one of the NCSs. W0DM spent the Easter Holiday as a guest of W0TXQ in Detroit Lakes. He kept the big a.m. rig on the air with that nice audio. W0YEQ is back on with the Viking 2 operating week ends mostly. W0GNS took down the quad and is get- ting the 6-2 meter antennas up for the summer. He has an SB33 for the mobile and is planning a trip to the Canadian Exposition and New England. WA0BIT con- tinues on the c.w. lanes with the Valiant. K0OVE has purchased an Apache hard-top Camper. The Forx Radio Amateur Association is planning Field Day at Lake Ash- tabula. WA0HUD, along with WA0ELO, is trying for top honors in TEN activity. WA0REW is a new station at Beach. K0OVW has been chasing DX like mad on 15- and 10-meter c.w. VL Weather Net reports 392 check-ins, traffic 17. The N. Dak. PON: 8 sessions, 33 members, 150 QNI, traffic 58. Traffic: WA0HUD 235, WA0ELO 14, K0ITP 19, W0DM 10, K0SPH 10, W9- QNI/O 9, W0BHT 4.

SOUTH DAKOTA—SCM, Seward P. Holt, K0- TXW—SEC: W0SCT. RM: WA0AOY. S.s.b. net mgr.: K0BSW. K0FKK writes from Fort Gordon, Ga., that he has a new Gallax mobile and is looking for So. Dak. contacts. W0MIZ is using a new Swan 350. Watch for further notice of the c.w. net meeting daily with No. Dak. participating. The South Dakota C.W. Net now meets Mon., Wed. and Fri. on 3645 kc. at 1900 CST. Two South Dakota nets (phone nets) meet at 1830 CST, one on 3870 kc. and the other on 3987.5 kc. The South Dakota Weather Net meets at 0800 CST on 3870 kc. The So. Dak. S.S.B. Net reports 1035 QNI, 54 QTC, 141 informal for March. The So. Dak. C.W. Net reports 78 QNI, 18 QTC in 14 sessions for Mar. Traffic: W0ZWL 853, K0VYV 58, WA0PDE 54, WA0LLG 52, WA0MYS 36, WA0MWN 31, W0DVB 27, K0YGG 23, W0DJO 19, K0TNM 17, W0SCT 15, W0HOJ 5, WA0BZE 2, K0- KOY 2, W0RW 2.

DELTA DIVISION

ARKANSAS—SCM, Don W. Whitney, K5GKN—SEC: W5DTR. P.A.M.: WA5GPO. RM: W5NND. N.M.s: WA5- PPD, W5DTR, W5MJO and K5ABE. It is my unhappy duty to announce the passing of Lloyd A. Adams, K5- AYB, Brickeys, Ark. from a heart attack on Mar. 26. The fellows around 3918 kc. will surely miss his pleasant conversation. Because of a fire in the Crescent Hotel in Eureka Springs, annual site of the Arkansas Hamfest, the fest will not be held as previously announced. Good to have K5DKT back with us. His QTH is Arkadelphia. Net reports for Mar.:

Net	Freq.	Time	Day	Sex.	QTC	QNI	Time
RN	3815 kc.	0001Z	Daily	31	117	737	689 min.
AFN	3885 kc.	1200Z	Mon.-Sat.	27	23	838	1668 min.
OZK	3790 kc.	0100Z	Daily	30	98	333	694 min.
APON	3825 kc.	2130Z	Mon.-Fri.	23	185	414	668 min.

I'm happy to announce the formation of the Little Rock Amateur Radio Club with W5DTR pres.; WA5QWY, secy.-treas.; and WA5TNN, act. mgr. Traffic: W50BD 118, W5DTR 218, W5MJO 180, W5NND 154, WA5PPD 79, WA5BQI 78, WA5KEF 70, WA5TNN 57, K5TYC 42, W5YAI 24, WA5KQU 12, WA5PKO 10, WA5NMG 8, WA5OWZ 8, K5TYW 5.

LOUISIANA—SCM, J. Allen Swanson, Jr., W5PM—RM: W5CEZ, V.H.F. P.A.M.s: W5UQR, W5DXA.

Net	Freq.	Days	Time	Net Mgr.
LAN	3615	Daily	0630Z	W5GHP
LaPON	3870	Sun.	1300Z	W5KC
Delta 75	3900	Sun.	1330Z	WA5EVU

W5BUK was the La. winner in the La. QSO Party, with W5KC second and W5GZR third. WA5KLF reports the Monroe ARC is starting an intensive membership drive. Club officers are K5BLO, pres.; WA5KLF, vice-pres.; K5FUO, secy.; K5ELM, treas. A Novice Net has started operating on 3715 kc. Sun. mornings. W5EA has rig trouble. W5CEZ, with a Swan 500 in the car, is on a 4- to 6-week vacation. WA5HGK reports WA5LWK has signed up for a 2-year hitch with Uncle Sam's Navy. The NOLA Chapter of the OOT Club held its semi-annual summer party in early June, according to W5NO, secy. W5BJG's DX and night school courses have cut his LAN activities. WA5DXA has a 3-kw. generator. W5GHP, LAN Mgr., begs for some activity from the Shreveport Area. W5HIC, who was completely wiped out by Hurricane Betsy, is back on the air with a Swan 350 working DX on 7 and 14 Mc. In April Director W5LDH held a meeting on the Gulf Coast which was attended by all your elected representatives to report your thinking prior to the Annual ARRL Board Meeting. W5AXD is the new pres. of CLARC. The Rapides Parish Emergency Net did a fine job working with the Sheriff's Department in finding two lost young girls. Those who helped were W5GKT, WA5GNM, W5AJY, WA5CRF, K5OVR, K5KTV, WA5CRU, WA5EVU. The LARC had a fine meeting recently in which the Red Cross showed a film on hurricane winds. WA5ENP has a new tower. W5HXI has gone mobile. K5LRR has a new TR3. WA50IA has been tinkering with an ARC5. K5TFG will wed in June. The BRARC has a very nice monthly news sheet, *RP News*. The GNOARC recently was treated to an excellent film and narration on Antarctica and ham radio's part in morale building. The Ozone Radio Club of Slidell has established a well-rounded hurricane plan for the coming season. Director W5LDH recently presented a certificate of affiliation with the ARRL to the GARC. Traffic: W5GHP 479, W5CEZ 175, K5VJZ 105, W5PGT 86, WA5DES 73, WA5LQZ 67, K5OKR 65, W5XKR 64, WA5PWX 44, W5-BJG 15, WA5QVN 11, WA5DXA 8, WA5HGK 8, WA5-KLF 7, W5KC 5.

MISSISSIPPI—SCM, S. H. Hairston, W5EMM—SEC: W5JDF, WA5FAD now has 15- and 10-meter beams up. W5CUU now has Yagi and colinear beams on 2 meters. Congratulations to new calls W5NRXN, WA5-RDA, WA5RTD, WN5REN and WA5RFG. Meridian has a new "old timer" who has a fine DX record; K3SWW/KG6 now is portable 5. W5ODV thinks he is a fisherman. I wonder how much r.f. he used to catch that fish. There is a fine 2-meter net around with about 15 active members in North Miss. WA5CAM now is working 15 meters with a Gotham three-element beam. WA5JWD has had a ball with 2 watts on 10 meters. W5MBJ is on the air with W5ESC's rig and it sounds fine. K5MDX scored 360,000 points in the Phone DX Contest with a Drake R-4A receiver. K5TYP has a new monitor scope and will spend FD at DeSoto National Forest. K2DEM/5 has GSB-101 linear. Traffic: WA50KI 138, W5BW 33, W5EMM 16, WA5JWD 11, WA5CAM 10.

TENNESSEE—Acting SCM, Franklin Cassen, W4-WBE—SEC: K4RCT, RM: K4UWH. P.A.M.s: W4PFP, WA4EWW, WA4CGK.

Net	Freq.	Days	Time	QNI	QTC
TSSB	3980	Tu-Su.	0030Z	27	1675
TPN	3980	M-Sa.	1245	31	1019
		Sun.	1400		
RTPN	3980	M-F	1140	23	450
TN	3635	Daily	0100	62	471
			0230		215

Everyone, I am sure, joins me in extending best wishes to W4UVP in his new business career in Georgia. He did a fine job as SCM for Tennessee. Local activity in Memphis continues at a very good level with nets at 29.62 Mc., 50,500 Mc. and 145,500 Mc. f.m. New officers of the Kingsport ARC are K4SHY, pres.; WA4GEY, vice-pres.; Warren Vance, secy.-treas. WA4YDT reports a new tower and triband beam. The Delta Radio Club is now custodian of W4BS, the call of its deceased member. Daylight time, may require changes in the Z time of the nets listed above. K4PVA, WASTI and WB4DZC are newcomers to TN; K4UWH can use more to improve the service of this net. W4OGG worked 66 countries on 10 meters in the DX Contest. K4CPM and W4WBK are now on "channel 62.7" with converted "you know what" rigs. Make plans for Crossville,

July 15 and 16. More on this later. Thanks to WA4CGK and WA4GOL for their faithful continuing services as PAM and OBS, respectively. If your plans for field day include operation away from your location, read Para. 97.87 rules and regs. Traffic: W4FX 217, W4SGE 216, W4OGG 207, W4YD 162, WA4YFM 132, W4PQP 121, K4UWH 119, W4RUW 101, W4WBK 94, WA4YDT 81, W4CXY 57, WA4NEC 24, W4PFP 23, K4UMW 23, K4COT 19, W4TZB 18, W4CAT 12, WA4CGK 12, W4-TYV 11, K4MQI 10, WA4EWW 8, W4SGI 2.

GREAT LAKES DIVISION

KENTUCKY—SCM, Lawrence F. Jeffrey, WA4KFO—SEC: W4OYL. Appointments: K4KZH as OO. Endorsements: K4CC as EC, ORS and OPS; W4CMP as OO; K4CSH as OPS; K4FPW as OVS and OBS; WA4-GMA as OPS; W41SF as OVS and OPS; W4KJP as OPS; K4NYO as OO and OBS; WA4TPB as OBS.

Net	Freq.	Days	GMT	Sess.	QNI	QTC	Mgr.
KRN	3960	M-F	1130	23	469	89	K4KIS
MKPN	3960	Daily	1330	31	479	167	WA4KFO
KTN	3960	Daily	0000	31	1200	505	WA4AGH
KYN	3600	Daily	0000	47	342	570	W4BAZ
KPON	3945	Sat.	1800	No	Report		WA4AVV

New officers of the Kentuckiana Radio Club are K4-YZU, pres.; K4KGE, vice-pres.; K4KZH, secy.; K4-SAY, asst. secy.; K4FJK, WA4YEK, WB4BKQ, K4-GOU, W4WZL, K1GUD/4, board of directors. W4BAZ reports traffic down 25% from the first quarter of last year. WA4NMU is active in nets from Ft. Campbell. K4KZH reports FCATN had 11 sessions, 59 QNL, 19 QTC with WB4BKQ as a new NCS. W4JUI is trying to set up a 6-meter relay between Middletown and Cincinnati. WA4WVT has a new HA-1 keyer to help him keep the lead in traffic in Kentucky. The 1967 Louisville Ham Convention is now an official ARRL convention. Watch for details and don't miss it. The date is Sept. 9. Traffic: WA4DYL 522, WA4WWT 440, WA4VUE 202, W4BAZ 198, WA4YGH 190, K4DZM 149, K4MAN 134, K4TRT 129, WB4CIV 123, WA4KFO 121, WA4AUG 117, WA4TTE 107, W4RCE 73, W44UIH 49, W4EON 45, K4GOU 42, W4CDA 39, WB4BTM 33, W4-GHQ 29, W4YOQ 20, K4VDO 18, W4BTA 16, K4UMN 13, W4KJP 12, K4KZH 12, K4TXJ 12, K4FPW 11, WA4-BZS 7, W4OYI 5, W4JUT 4, WB4AFH 2.

MICHIGAN—SCM, Ralph P. Thetreau, W8FX—SEC: K8GOU, R.A.M.; W8ELW, K8QLL, W8EU, K8-KMQ. P.A.M.s: W8CQU, K8JED, V.H.F. P.A.M.s: W8-CVQ, W8YAN. Appointments: W8MPD, WA8TDA as ECs; W8BEZ, WA8MAM, K8WQV as ORS; WA8OXK as OBS. Net reports:

Net	Freq.	Time	Day	QNI	QTC	Sess.	Mgr.
QMN	3663	2300	Dy	986	609	62	W8ELW
WSSB	3935	0000	Dy	1050	108	31	K8VDA
PON-DAY	3860	1800	M-Sat.	592	562	27	WA8OGR
PON-CW	3645	0000	M-Sat.	186	57	27	3C3DD
U.P.N.	3920	2230	Dy	898	79	31	W8OQH
MTN	3605	0245	Dy	35	7	31	WA8QAF
MICH 6	50.7	0000	M-Sat.	350	74	27	WA8LRC
LENAWEE 2		Dy		300	48	30	W8ARAQ
B/E	3930	2230	M-Fri.	831	55	23	K8JED
M.E.N.	3930	1400	Sun.	237	11	4	K8JED
SW MICH	146.26	0100	Mon.	72	1	4	W8CVQ
HVARA 2	145.26	0030	Tue.			5	WA8VJQ
PLYM RC	50.4	0200	Thurs.			4	K8SKZ

Silent Keys: W8DAQ, W8TSG and WA8OBQ. New officers of the HVARA are WA8UNS, pres.; WA8FGK, vice-pres.; WA8LPI, secy.; WA8VJQ, treas.; K8PHA, trustee. BPLers: W8WLF, K8KMQ, W8IV, WA8MAM. The UP Hamfest will be held Aug. 5 and 6 at Manistique. WA8JCV has been in the hospital with heart trouble and K8DYI is back home, now doing fine. W8YNY (W9YIY) and W8TDA (W9WIW) had their first QSO in over 30 years. WA8VJQ now has a net on 145.7, on MCW, Thurs. at 0130Z. WN8URE is QSL Manager for the Grand Rapids ARA and Kent County. The Genesee County EC, K8YHK, has a hot emergency net going, with stations in 4 hospitals and the Red Cross and the c.d. headquarters. WA8SIQ joined the "heart club" but is doing well now. W8LPA also is doing OK. WA8TCY got away from the hospital knife sooner than expected; so did K8DSH. The 29ers Sun. Net on 29 Mc. still is running along at 0300, with K8ETU as NCS. The SEMARA runs a code and theory class every Thurs. at Cannon Memorial Bldg. from 7 P.M. to 9 P.M. The SRARS, Plymouth group, also runs a code class before each meeting, by W8-MWG, from 1915 to 1945. W8DSW sends ARRL Bulletins at 0300Z on 145.140 each Sat. night. W8CFL/KH6, now at Hickam AFB, will be on 20. The DARA's

W8MGQ editor, now has a new printed format. Easter "operation hospital" was well handled by the Michigan Six-Meter Club. W8ADR/8. Cooperating stations were K8TEZ, WA8PII, WA8EMN, K8JGF, WA8LBE, K8DYN, WA8TLV, WA8BQW, K8KYS, K8LUY, W8PYM and K8IYZ, WA8LQU, ex-WA9EDF, soon will set up 146.76 Mc. for the forthcoming Detroit area repeater. Traffic: (Mar.) W8IWF 529, K8KNQ 511, WA8OGR 467, W8ZGT 405, W8VU 220, W8HQL 200, WA8IAQ 190, K8PBA 168, W8APL 156, W8LUC 153, WA8MAM 141, WA8IML 139, W8EU 121, W8FX 77, K8YGH 74, W8ELW 67, K8JED 64, W8QOK 62, K8ZJU 55, WA8OEE 54, W8RTN 53, W8CQB 51, W8YAN 48, W8CQR 44, W8IBB 40, K8HSJ 38, W8ACW 37, K8VDA 35, W8QJH 33, WA8OKC 33, WA8LRC 29, W8REZ 28, K8GOU 26, WA8LKI 24, WA8MAM 24, K8QLL 24, WA8CZJ 22, W8HMCQ 22, W8UFS 22, K8KRX/8 20, WA8LXY 18, K8TYK 17, WA8BQP 16, K8YQC 13, W8AUF 12, W8SFW 12, W8WVL 12, WA8GTM 11, W8NOH 11, W8SCW 11, W8TBP 11, WA8KME 10, WA8PWF 7, WA8UVX 7, W8DSE 5, K8HNN 5, WA8OLD 5, W8PZT 5, WA8VMZ 5, W8HKT 4, (Feb.) WA8AXF 13.

OHIO—SCM, Wilson E. Weckel, W8AL—Asst. SCM: J. C. Erickson, W8DAE, SEC: W8OUU, RMs: W8BZX, W8DAE and K8LGB. PAMs: W8VZ and K8UBK.

Net	QNI	QTC	Seas.	Ave.
OSSB	1831	782	58	13.4%
BN		364	30	12.13%
OLN		161	30	5%

WN8VYC is a new Novice in Oxford. WA8AGV informs us K8BSH is now W1EBC. All appointees: Please look at your certificate and note the date of its last endorsement. If it wasn't endorsed in 1966, send it to me for my endorsement at once. If your certificate is not in my hands by the first of this coming July, your appointment will be cancelled. K8WVZ received his 1st-class radiotelephone license. The *Eighth Region Net Bulletin* says W8OUU, W8RYP, WA8CFJ and WA8LXM lost their antennas during recent wind and ice storms. Toledo's *Ham Shack* *Gossip* tells us W8MCA joined the Silent Keys, WN8VRE is a new Novice, WA8SVW is a new Technician, K8JXO/W8OHG is now W8LEO, WA8S10 was in the hospital after surgery, W8FYI is now WB2LEH, K8TVX is visiting in Florida, WA8FPG is recuperating after a long stay in the hospital, Toledo RC's 1967 officers are K8KYB, pres.; WA8GEL, vice-pres.; K8GOP, treas.; W8WHA, rec. secy.; K8DTL, corr. secy. W8TV is using a Viking I. The Ohio QSO Party, sponsored by the Upper Arlington RC, was won by W9OJ/J8, with W8ERD second and WA8ETX third. WA8GYT received an A-1 Operator certificate. Kettering ARC's A-O informs us WA8SKV has a new 10-meter quad. Westpark's Radiops reports W8VM was in the hospital and the club held a dinner. W8QHV spoke to the Piqua ARC about his skeds with USS *Itka* at the South Pole. Northern Ohio AR Society's new 1967 officers are K8ZDS, pres.; W8TJ, vice-pres.; WA8AIZ, secy.; K8HMMU, treas. WA8UTX received his General Class license. K8BXT reports that W8NQQ joined the Silent Keys, K8DTA has a TR-4 operating mobile, W8AGX is operating 6-meter mobile, W8HCA is building a grounded grid linear and WA8POG is studying engineering at General Motors Institute. Mt. Vernon ARC's *K8EEN Newsletter* tells us that WA8TPJ received his General Class license. K8HDO reports W8ZCV received the Worked All Ohio Counties certificate and Tusco ARC was awarded the 1966 Sweepstakes trophy given by the Ohio Council of Amateur Radio Clubs. Columbus ARA's *Carascope* informs us Mr. Richards, of Ohio Bell, spoke on "Amazing Laser" and K8EHU and his NYL vacationed on Monserrat in West Indies. Inter-City RC's *IRC News Bulletin* says the club toured the Mansfield United Telephone Building and W8ZJY is stationed at Philadelphia Naval Base. From Parma RC's *P.R.C. Bulletin* we learn that the club held an auction. We hear that the Babcock & Wilcox ARC saw a film entitled "Capacitance" and that WA8XXM received his General Class license. The Ohio Council of Amateur Radio Clubs met and awarded its 1966 Field Day cup to the Van Wert RC (W8FY). Greater Cincinnati ARA heard W8FVP's discussion of Army MARS organization and program in Ohio. Warren ARA's president received his General Class license. Springfield ARC's *Q-Five* tells us that W8LAB is feeling much better and is back to work. Thanks to the Miami County RC for sending me its bulletin called *Monitor*. When you know or hear of any amateur who has joined the Silent Keys, please notify the ARRL or your SCM. Traffic: (Mar.) W8CPH 553, WA8CFJ 314, W8NAL 311, WA8PZA 261, WA8NTA 182, WAFSX 176, W8CHI 170, W8GOE 170, W8HZX 146, W8DAE 146, W8XNQ 143, WA8PMN 134, WA8OCG 131, W8QZK 98, WA8LAM 88, WA8AUZ 81, WA8KCUW 72, W8TV 69, W8-

PMJ 68, WA8PQL 62, K8BYR 55, WA8FGD 49, WA8LOW 47, WA8QNN 47, WA8SED 42, K8LGB 38, WA8RWK 37, W8OUU 34, K8LDDG 30, W8QYR 27, W8XCN 21, K8BXT 20, W8L16, W8LAG 16, K8LFI 12, WA8TOD 12, W8WEG 11, W8DVAI 9, K8DHJ 7, W8LZE 7, WA8AJZ 6, K8HKB 6, W8GIU 5, WA8PKN 5, W8ERD 2, K8ONQ 2, (Feb.) W8PMJ 87, WA8OVC 4, (Jan.) K8HKB 2. (Dec.) K8HKB 6.

HUDSON DIVISION

EASTERN NEW YORK—SCM, George W. Tracy, W2EFU—SEC: W2KGC, RA1: WA2VYS, PAM: W2JIG. 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. Endorsements: WB2HZV and WB2QYZ as ORSS; WA2ZPD as OVS. The Albany Club showed a historical ARRL film to its members. Power tubes discussed by a representative from Amperex featured the Westchester ARA meeting in March. WA2TV is the club's FD chairman. The Schenectady Club had two meetings; one a talk by KL7OS/UA1-KAE on his experiences with a Russian Antarctic Expedition and the other by K3FOY/OX5, who spoke on the Greenland Ice Cap Project. Both meetings were well attended. An Alaskan Emergency film was the feature of the Communications Club in New Rochelle. Its *Communicator* reports that a new club has been organized in Yorktown Heights, which is offered our heartiest congratulations. WA2AUI is operating traffic from the U. S. Military Academy at West Point under the call K7UJB/2. Nice to receive the *Transmitting Tower*, newspaper of the Hudson High School ARC. The club pres., WB2VRW, reports a new net for members in the 80-meter Novice band. The club meets weekly at the school. Congrats. Your SCM wishes to express his appreciation to those who sent letters and cards of sympathy on the loss of his NYL in March. Traffic: (Mar.) WB2UHZ 223, K2SSX/2 103, WA2VYS 76, WA2SPL 63, W2EAF 55, WB2JYV 52, WB2UUD 51, W2UC 48, W2PKYA 46, K2SJM 42, WB2RBG 31, W2ANV 18, W2PKY 12, WB2FYZ 12, WB2FXB 11, K2HNW 10, WA2ZPD 9, WA2HGB 6, WB2SHU 3. (Feb.) K2SSX/2 156.

NEW YORK CITY AND LONG ISLAND—SCM, Blaine S. Johnson, K2LDB—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 FSSm	WB2RQF — PAM
NLIPN	3932 kc.	1600 Daily	WB2SLH — PAM
NLS (Slo)	3715 kc.	1845 Nightly	WB2UQP — RM

WB2QIL and WB2UGP have been appointed OPSs. WB2EMJ, the Bard of Patchogue, still is trying to lure WB2DXM and WB2RBA, the Dynamic Duo, into local show biz. It is rumored that W2GPT has a spanking new type mobile. WB2PTS tried DXing and found himself in the Middle East. Remember the NYS QSO Party will be held June 10-12, says K2UPT. WB2QIL is using telephone wire for the 80-meter antenna. WA2JZX reports that WA2PQX is operating from Arlington, Va., while stationed at the Pentagon. W2DBQ thinks he's about to make WAS. K2UBG took an Easter jaunt to Georgia to visit his daughter and met WA4EJU, who originates the daughter's traffic. WB2NGZ recently added a Model 100 printer to the station. WB4PN/2 is leaving the Navy and returning to Jacksonville. He sends best regards to all his friends in the section and we wish him well. WA2UWJ is busy thinking up new exercises for the Queens 6-Meter AREC/RACES group. WB2TWH and WB2WDX recently visited the 4U1TU station. April 1967 marked the 50th anniversary of the licensing of W2PF. How about that! K2UAT is running a B&W 6100 nowadays. WB2UQP is helping to start a radio club at Great Neck North Senior H.S. WB2DXM chums with WB2EGU. WB2FAJ chums with Lafayette. WB2SRN is looking to chum with the Coast Guard. WB2TZX and WB2UYU received Section Net certificates from the New York City-Long Island Phone Net. WB2DIN, WB2MZE, WB2PUW and WB2UNJ have been putting in stints at net control of the NLIVHF Net. The manager says they do an excellent job, but that is only part of what it takes to develop good traffic men. Why not join up and see what else there is to the traffic game? WB2RQF was out of business when half the Globe HyBander shorted out, but then WB2ICR loaned his so WB2RQF could keep his NCS skeds. Listen. Field Day is just around the corner so firm up all your plans and get the crews all hepped up for a week end of hot operating. *Club Officers Please Note:* You can send your Field Day message to K2LDB who will be operating at W2YKQ, Upper Brookville, L.L.

(Continued on page 116)

Technical Notes from RAYTHEON

A SOUNDER RECORDER

For many years the Raytheon Company has designed and manufactured precision underwater sounding and ranging equipment for exacting military and commercial applications. Depth sounders and recorders for these services were—and are—necessarily heavy-duty and costly. However, advances in technology—notably in semiconductors and in constant speed battery operated motors have been used to advantage to simplify designs and to reduce manufacturing costs. Result—moderate priced depth sounding equipment for even the smallest pleasure boat (and the humble skiff is not excepted).

The engineers at Raytheon Marine Products Operation worked diligently on designs that would completely eliminate certain electro-mechanical problems that had plagued the small depth sounder since its very inception. They were highly successful in their efforts.

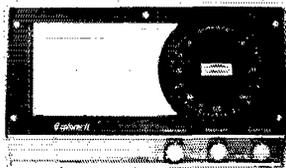
Most pleasure boat sounders use "flashing light" type indicators involving a sensitive neon bulb mounted on a counterbalanced arm (or disc) which is rotated by a constant speed motor. To explain operation: A series of ultrasonic pulses are emitted by a piezo-electric type transducer located just below the waterline. These pulses are reflected off the ocean, lake or river bottom and energize the same transducer during the non-transmit interval. The returned pulse (now highly amplified) causes the neon bulb to flash at some angular position in its rotation. The time required for the initial pulse to make its round trip is translated into feet or fathoms and serves as an accurate indication of depth. A calibrated circular scale provides depth readout. Obviously, the spinning neon bulb must maintain electrical contact with the pulse-supply source. For years this was done by slip rings—always a potential troublemaker. Raytheon engineers worked out (and patented) an inductive coupling system which eliminated slip rings entirely. But as it turned out, these people were just getting warmed up!

In operation the sonic pulse is transmitted precisely as the rotating neon bulb reaches 12 o'clock (zero depth) on the calibrated scale. "Firing" was controlled formerly by troublesome, cam-operated breaker points. Raytheon engineers secured a tiny magnet to the rotating disc and fixed an inductor at the desired fir-

ing point. As the PM passed over the inductor it induced a voltage which keyed the normally cut-off, pulse producing oscillator. Gone, contacts, adjustments.

The Raytheon Model 725B combines a flashing light sounder with a chart recorder, mounts flexible stylii on the rotating disc to act as electronic "pens" and moves a calibrated chart paper past a reference point using the drive motor and a gear train to supply the necessary "pull." The rotating stylii provide a continuous top-to-bottom "scan" of the slow moving paper (24"/hour).

Stylii are paralleled with the neon, are pulsed when it flashes. Chart paper is sensitized so that a permanent mark appears whenever a pulse from the scanning stylus passes through its surface; a series of such marks forming a continuous line conforming to contour and depth of bottom on calibrated scale.



"725B" scores another "first" by providing three recorder depth ranges—automatically and without switching!

Three stylii are mounted 90° apart on a rotating disc. Initially, one stylus enters the graph paper at the top, scans and disappears past the bottom just as the second stylus enters the top; this phase being repeated by the third stylus. All three stylii "fire" simultaneously but only one energized stylus will be in contact with the paper at any given time because 90° spacing on the disc just equals the paper height. Echo pulses are timed with disc rotation so when the first stylus has indicated depth to 80 feet (the calibrated line at the bottom of the paper), the second stylus will take over and start recording the second phase of 80-160'. The third stylus follows to complete the 160-240' range of the recorder. Simple.

No one is perfect. That's why a spare neon bulb and extra stylii are supplied in a neat little plastic tube mounted inside the sounder/recorder.

RAYTHEON COMPANY
Marine Products Operation
213 East Grand Ave.,
South San Francisco, Calif. 94080



EXCELLENCE IN ELECTRONICS

(Continued from page 114)

N.Y. WB2UKA now has his commercial class phone license and is working part time at WGSML. WB2LQG is chief engineer at the same station. WA2SYU lost his business because of a highway right-of-way condemnation so he's going to Florida. WB2TDLK works 6 and 2 c.w. for the practice. K2GNC, W2HAE, W2PCJ and K2ZYR all have new Drake K4As. According to W2-HAE, it took 30 years to work his first JA, but during the last year he's racked up more than 100 of them. WB2PTS urges more stations to join NLI to help relay some of the traffic. In particular, stations are needed in Central Suffolk and in such villages as Syosset, Un-
iondale, Baldwin, New York and Great South Bay. Traffic: WA2UWA 495, WB2PTS 272, WB2RBA 173, K2-UBG 152, WB2UQP 142, K2UAT 133, WB2TZX 130, WB2RQF 95, WA2LJS 90, WB2HLX 73, WB2QLL 57, W2GKZ 54, W2EAW 50, W2EC 46, W2UJN 35, WB2AEK 34, WB2HYK 34, WA2UWJ 30, WB2DVK 26, WB2DXM 25, WB2UGP 21, WB2JJW 20, W2DBQ 13, W2GP 13, WB2TWH 11, WA2JZX 9, WB2NGZ 9, WB2UIV 8, W2-PF 7, WB2EUH 6, WA2RUI 4, WB2SIZ 4.

NORTHERN NEW JERSEY—SCM, Louis J. Amoro-
soso, W2LQP—Asst. SCM: Edward F. Erickson, W2-
CVW. SEC: K2ZFL. ARPS 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 a.m.	W2ZI	—PAM
NJ 6	51,150 kc.	M-W-Sat.	11:00 p.m.	K2VNL	—PAM
NJ 2	146,700 kc.	Tue.-Sat.	10:00 p.m.	K2TPZ	—Mtr.
NJ P.O.	3900 kc.	Sun.	6:00 p.m.	WA2TEK	—Mgr.

All times shown are local in effect. AREC net skeds are available from 8EC K2ZFL. New appointment: WB2-UCO as OBS. His sked will be Sun., Mon., and Wed. on 145.4 Mc. at 2200 local time. Endorsement: WA2-GQZ as RA for 2RN and as ORS. WB2QJ1 completed his 160-meter c.w. rig and is now building a GG 311A half-kw. linear for h.t. W2HBH has 5 students in his Novice code and theory classes. K2ZFL is building a 2-meter converter for his HQ-170. SCM W2LQP spoke at a TCRA meeting in Plainfield. We are available for a talk at any of the clubs in the section. WA2ASM, the EC of Plainfield, has been appointed asst. com-
munications officer in his local c.d. organization. WB2-WWH has a new 20-meter dipole up for c.w. The KB weather got WA2SRQ and WA2UOO out mobilizing on 10 meters. WA2SRK reports he is moving to Allendale. WB2SEZ is working DX on the low end of 80. WA2KZF added a new Clegg Interceptor and an all-band con-
verter to his station. W2CVW is building a suitcase transmitter. WB2UFV now reports into 3 traffic nets. WB2OHK passed the Amateur Extra Class exam. WB2-
LYO has his 2-meter EC net on 4 nights a week. WB2-
WIK worked into Ohio on 2 meters during a recent band opening. WA2ASM put up new antennas for both 10- and 75-meter phone. WB2VLC is now General Class and plans to operate on 10 meters. WA2CCF's DXCC totals are now 114/132 and WB2QGB has 105/150. WN2-ZKZ is now General Class. WB2KGC visited 11W1 while in Europe. WB2VFT repaired his SR-150 and is on again. WA2SRQ will attend Cornell U next fall. WB2TEA moved to a new QTH. WB2NHT has his closed circuit TV camera built and ready for his school science project. WB2RKK scored over 35,000 points in the ARRL DX Test. New father-and-son teams: WN2-
ADM and WB2JWB, WN2ADO and WB2NII. WB2RUM got a Swan 350 at the recent s.s.b. show in N.Y.C. Your SCM will be on the 75-meter and 80-meter traffic nets for Field Day traffic. Relays are available on all bands. Traffic: (Mar.) WB2RKK 324, W2UFV 274, WB2WWH 145, WA2TEK 87, WB2LYO 75, WA2TBS 74, K2VNL 67, K2EQH 44, WB2JWB 53, W2TAF 53, WB2WNH 48, WB2OHK 45, WA2SRK 42, W2LQP 41, WB2WIK 37, W2TFM 36, WA2KZF 29, WB2SHZ 25, WB2SJH 23, WB2IIR 23, WA2SRQ 22, WB2NZU 19, W2CVW 18, K2ZFI 18, WN2YPO 17, W2PEV 16, WA2ASM 15, K2-JTU 13, K2MFX 9, WB2QJ1 8, WB2VRK 8, WB2PXO 7, WA2CCF 3, W2EWZ 1, WB2SKD 1. (Feb.) WB2SEZ 14, W2CVW 34, WB2JWB 31, WA2ASM 9, WN2YPO 8, WB2QGB 4, W2EWZ 2. (Jan.) WA2SRQ 8. (Dec.) WA2-SRQ 8.

MIDWEST DIVISION

IOWA—SCM, Owen G. Hill, W0BDZ—Asst. SCM: Bertha V. Willis. W0LGG. SEC: KOBRE. PAM: WONGS. RMs: W0TUI, W0SCA. W0POY, long-time Sioux City amateur, is now a Silent Key. Webster City will be the host for the annual 160-Meter Picnic to be held June 18. WA0EYG, KOYLO and W0DDY are getting their rigs ready for 146.940-Mc. w.b.f.m. W0PPP reports that March was a quiet month on 50 Mc. KOJTP was on the H2P for three months during the late winter and

spring. W0DRE turned in a good OO report, as always. More activity reports would be appreciated, and they should be in this office by the 5th of the month to meet the deadline. There still are several outstanding certificates that need endorsing. The Iowa 160-Meter Net reports QNI 846, QTC 15 in 15 sessions. The Iowa 75-Meter Phone Net reports QNI 1412, QTC 198 in 27 sessions. Thanks to KOJTDG for the 160 report and WONGS for the report on 75-meter net activity. Traffic: (Mar.) W0LGG 1274, W0LXC 675, W0CZ 133, WA0DYV 37, WA0JUT 31, KOZCQ 27, W0BRE 26, W0LWJ 22, W0-
YLS 17, WA0JEG 15, WA0AFY 13, WA0PUJ 12, KO-TFT 12, KOJDO 10, KOJDB 5, WA0DUB 4, WONGS 4, WA0QQB 4, WA0MIT 3, KOQKD 3, WA0HWK 2. (Feb.) WA0JEG 26, WA0PNN 8.

KANSAS—SCM, Robert M. Summers, KOBXF—
SEC: KOEMB. PAM: KOJMF. RM: WA0MLE. V.H.F. PAMS: WA0CCW, W0HJH, WA0KSK, WA0LSH. WX Net Mgr.: WA0LLC. W0ZBJ is a Silent Key; also WORXD/ZL4BX. W0KKEF is resigning as State Radio Officer of RACES. The Six-Meter Net is on at 7 p.m., 50.25 Mc. Mon. and Fri., reports WA0LSH. The Salina Club is planning on showing off the new club shirts at the hamfest this year. W0INW underwent surgery Mar. 8. Officers of the Chippewa ARC are WA0LXI, pres.; W0OZY, vice-pres.; W0OZZ, 2nd vice-pres.; KO-OHF, secy.-treas.; W0WVI, repertory/advertising mgr. W0LXA, net mgr. Kansas Post Office Net, reports for the net which meets Sun. at 0830 CST on 3865 kc. Asst. Net Mgr. is W0UHL and ACSs are W0LXA, W0UHL, W0GUR. If further information is desired contact W0-LXA, R.R. 2, Box 140, Salina, Kans. 67401. The ham operators bowling team in Wichita, comprised of W0-LNZ, KOZFW, KOAMJ, W0RCS and KOBXP, placed 3rd in the City Tournament, Zone V.H.F. AREC nets: Coffeyville ARC 2 meters, QNI 33; Zone 7, 2 meters, QNI 32; Harvey Co., 2 meters, QNI 26; Zone 11 2 meters, QNI 72, QTC 16; NCK V.H.F. Soc., 2 meters QNI 89, QTC 17; Zone 15 6-Meter Net, QNI 15, QTC 9. AREC nets: Zone 7, 75-meters, QNI 50, QTC 1; Zone 9, 10 meters QNI 21, QTC 0; Zone 11, 75 meters QNI 120, QTC 6; Zone 13, 75 meters QNI 67, QTC 0; Zone 15, 75 meters QNI 70, QTC 4. Kans. EC Net, QNI 63.

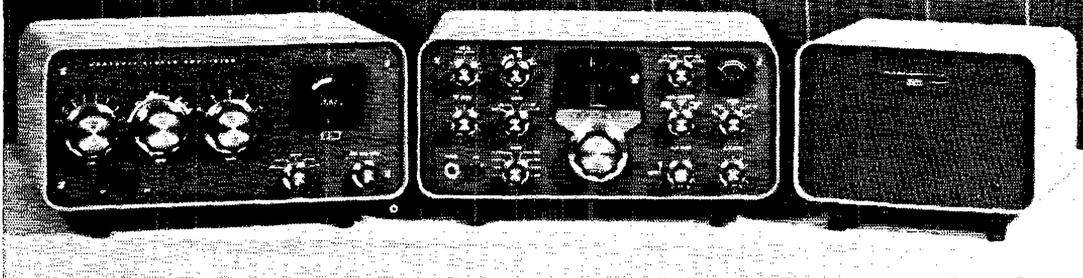
KPN	3920 Sun.	0800 CST	M-W-F 0645 CST	QNI 281	QTC 28
QKS	3610 Daily	0100 GMT		QNI 293	QTC 227
QKN	3735 Sun.	2200 GMT		QNI 18	QTC 5
KSBN	3920 M-Sat.	0030 GMT		QNI 790	QTC 174
Kans WX Net	3920 Daily	0001 GMT		QNI 851	QTC 37

Traffic: WA0MLE 279, KOJMF 194, W0INW 171, KO-GZP 146, W0QQQ 125, KOARI 123, KOEMB 107, WA0-LLC 82, KOCHI 80, WA0VX 77, KOBXF 59, WA0-
CCW 54, W0CVJ 51, W0RJI 48, KOJDD 44, KOJPE 37, WA0JOG 32, WA0JJ 23, WA0KQD 19, KOJGI 18, KOKED 18, WA0KDJ 2, W0WFD 2.

MISSOURI—SCM, Alfred E. Schwaneke, W0TPK
—SEC: W0BUL. KOGYK was appointed ORS. Appointments renewed: KOGYK as OPS, W0OOD as RA, W0TPK as OPS/ORS, KOYGR as ORS/OVS, KOYIP as ORS, W0ZLN as OPS/ORS. New officers of the Mo. U. ARC (W0ZLN) are WA0OSR, pres.; KOBNK, vice-pres.; and Nov. aspirant Cheryl Clark, secy.-treas. Operator of the month for IIBN was KO-GZP. WN0RAC is a new Novice as a result of code and theory classes at Oak Park H.S. ARC, assisted by WA0HR, WA0JEE, WA0OMN, WA0MOC have built 432-Mc. walkie-talkies. New on MON are WA0QA and WA0QB. WA0QA was WN0NTB and received his Gen. Cl. license in Jan. KOMER worked WAC in a few hours after getting a new Galaxy V-II. I am sorry to report that W0ZJB has joined the Silent Keys. Vince was a pre-war pioneer on v.h.f. in K.C. W0OOD reports W0KKT and WA0QBF are new on MNN. KO-LPH received a BPL medalion. WA0ITU reports that the Jackson Co. RACES worked a booth at the K.C. Home Show. W0GQR held a county-wide RACES-
CB e.d. drill. Notice to affiliated clubs for FD: Do not forget to send a radiogram of the highest single-band score to the SCM to obtain the SCM FD Award certificate. WA0NU1 is getting married May 20. W0TPK is getting married June 10. Net reports:

Net	Freq.	Time	Days	Sess.	QNI	QTC	Mgr.
MEN	3885	2330Z	M-W-F	14	205	45	WBUL
MON	3685	0100Z	Daily	31	245	263	W0TDR
MNN	7063	1900Z	M-Sat.	25	87	37	W0UUD
MoSSB	3963	2400Z	M-Sat.	25	570	182	K0TDB
MoPON	3810	2100Z	M-F	24	232	212	W0HVJ
MTTN	3940	2300Z	M-F	21	252	63	WA0EML
QMO	3580	2200Z	Sun.	4	14	22	WA0FKD
PHD	50.4	0130	Tue., (GMT)	1	85	3	WA0FLL
HBN	7280	1805Z	M-F	23	737	232	WA0BHG

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The following related accessories also will be available factory assembled or in kit form: HP-13 DC Power Supply (for mobile operation of the SB-101), HP-23 AC Power Supply (for fixed station operation of the SB-101), and SB-600 Communications Speaker (matches appearance of SB line and has space for installing the HP-23 AC power supply).

SB-101 80-10 Meter SSB Transceiver
 • 180 watts PEP, 170 watts CW • Switch select Upper or Lower sideband or CW • CW sidetone • PTT or VOX • Linear Master Oscillator with 1 kHz dial calibration (resettable to 200 Hz) • Provision for switch selection of optional SBA-300-2 CW filter • Provision for external LMO • Separate CW offset carrier crystal • 100 kHz calibrator
Assembled SBW-101, 23 lbs., write for terms \$540.00
Kit SB-101, 23 lbs. \$360.00

SB-200 80-10 Meter KW Linear Amplifier
 • 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
Kit SB-200, 41 lbs. \$220.00

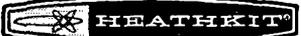
SB-600 Communications Speaker
 • Styled to match SB series • For fixed station use • 8 ohm speaker with shaped 300-3000 Hz response • Has space for HP-23 power supply
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Kit SB-600, 5 lbs. \$17.95

HP-13 Solid-State Mobile Power Supply
 • 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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Traffic: (Mar.) KOONK 2024, WOTDR 345, KOAEM 235, WOFEE 203, WOZLN 145, WOODN 138, WOHVJ 123, WAOJH 102, KOYGR 102, KORPH 63, WAO-FND 54, KOVVE/O 48, WQZBR 46, WAOELM 38, WADJAV 35, WAOLYE 30, WAOFKD 29, WAOQQA 27, KOTCB 24, KOGOR 18, WAOHQK 17, KOORB 14, WOGQR 12, WAOLQG 11, WOGBJ 8, WAOIHV 8, WAOITU 7, KOYIP 6, WAOPLL 5, WAOXOK/O 5, KOLGZ 2. (Feb.) WAOQQA 27.

NEBRASKA—SCM, Frank Allen, WOGGP—SEC; KOOAL. Appointments: KOPXX, WAOQMZ as EC's. Net reports: Dead End Net, WAOACX, QNI 374, QTC 60, Nebr. AREC Phone Net, WQIRZ, QNI 161, QTC 10, 100-Meter Wx Net, WAOCBJ, QNI 572, QTC 4. This net has closed for the summer. Nebr. Morning Phone Net, WAOJUF, QNI 1085, QTC 69, Nebr. AREC C.W. Net, WAOEEI, QNI 7, QTC 1, West Nebr. Phone Net, WONIK, QNI 750, QTC 25, WX QTC 174, Nebr. Storm Net, WAOKGD, 1st sessions QNI 1237, QTC 108; 2nd session, QNI 1055, QTC 78, Nebr. Emer. Phone Net, WAOGHZ, QNI 1922, QTC 39, Nebr. C.W. Net, WAOGHZ, 1st sessions, QNI 73, QTC 62; 2nd session, QNI 124. The Centennial Hamfest at Seward will be held June 18. Bring your own service and a covered dish. The Chadron Picnic will be held June 4; the Smoke Signal Senders, at Chadron June 3-4. The Midwest Division Convention will be held at North Platte, June 24-25. WOPZZ is in charge of arrangements. Traffic: (Mar.) WAOGHZ 349, WOLOD 234, WONIK 121, WAOLOY 107, WAOHWR 77, WAOORO 77, KOKJP 72, WAOBOK 59, KOUWK 51, WAOJZL 50, KOJFN 47, WAOIBL 38, WOGGP 35, WOVEA 33, KOPTK 30, KOQVN 30, WOPFY 27, WAOGAT 27, WOGEG 26, KOQKW 25, KORRI 25, WQAGK 23, WQEWZ 22, KOIXY 22, WAOKGD 20, WAOIXF 19, KOJFT 17, KOHNT 17, WAOQHO 17, WAOEEI 15, WAOJGJ 14, WAOJUF 14, WAOPOC 14, WAOIKG 10, WOHTA 8, KOODF 8, WQWHY 7, WAOCBJ 6, WAOIXD 6, WAOIJO 5, WOHOP 4, WAOQLRP 4, WQWZR 4, KODGW 3, WAO-LRO 3, WQVFR 3, WOPFY 2, WQFTO 2, WOHOE 2, WAOKHE 2, WQRAM 2, WQEQG 1, WAOHSX 1. (Feb.) WAOHWR 159.

NEBRASKA CENTENNIAL QSO PARTY

June 11, 1967

This is a special QSO party in celebration of Nebraska's 100th birthday, sponsored by the Nebraska Centennial Commission and the Lincoln Amateur Radio Club. Separate awards for phone and c.w. Stations may be worked once on each band. Exchange QSO number, RS(T) and QTH. (County for Nebraska stations, state, province or country for all others.) Nebraska stations score 1 point for each out-of-state QSO, multiplied by the number of states, provinces or foreign countries worked. Out-of-state stations count 1 point for each Nebraska QSO multiplied by the number of different Nebraska counties worked. Suggested frequencies: 1815, 3525, 3982, 7025, 7225, 14,070, 14,290, 21,070, 21,400, 28,065 and 28,650. Awards: A bronze centennial medallion to the top five for each mode in Nebraska, certificates to the top ten scorers for each mode, certificates to the top scorer in each county for each mode, special awards for Novices and VHF. For non-Nebraska stations, a bronze centennial medallion to the top scorer in each call district, province or country for each mode. Certificates to the top three scorers in each state, province or country for each mode. Special awards for Novices and VHF. The mailing deadline for logs is July 11, 1967. Please note that only logs submitted in GMT will be accepted for awards. Mail entries to the Nebraska Centennial Commission, Lincoln Hotel, Lincoln, Nebraska 68501.

NEW ENGLAND DIVISION

CONNECTICUT—SCM, John McNassor, WIGVT—SEC: WIPRT. RM: WIZFM, PAM: W1YBH. Net reports for Mar.:

Net	Freq.	Days	Time	Sex.	QNI	QTC
CN	3640	Daily	18:45	31	422	417
CPN	3880	M-S	18:00	31	504	221

High QNI: CN—WIZFM, WIKUO, WIBKC, WB2PFT/1, WICTL, CPN—W1EEJ and WIGVT 30, W1YBH 27.

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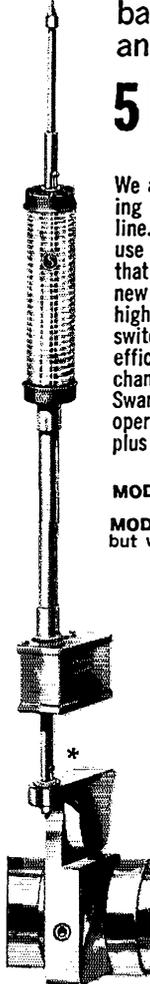


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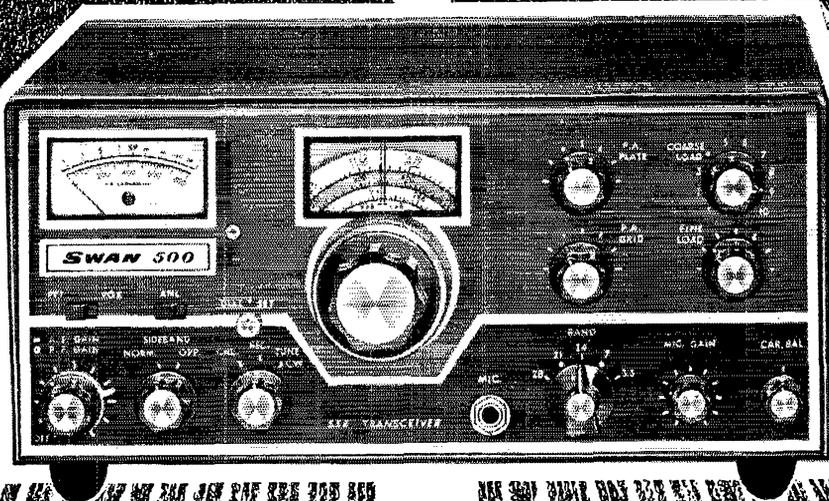
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Frequency coverage of the five bands is complete: 3.5-4.0 mc, 7.0-7.5 mc, 13.85-14.35 mc, 21-21.5 mc, 28-29.7 mc. (In addition, the 500 covers Mars frequencies with the 405X accessory crystal oscillator.)

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- Full Coverage External VFO, Model 410 \$ 95
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W1MPW and K1OQG 24, K1RWF 21, W1YU 20, W1CTB, W1LUH and K1SRT 19, K1DGK 18, WA1GBA and K1MBA 17. SEC W1PRT rates Statewide EC as top priority—perhaps converted CB/10 meter rigs could help if we make use of 29.6—monitor “Channel 80.” The 14th Annual CN-CPN Dinner Meeting was well attended and enjoyed by all. Thanks to W1YBH for the complete arrangements and to the MC, W1EFW. Nutmeg v.h.f. traffic nets are on nightly at 9 P.M. on 145.98 and 50.6 Mc. Danbury CARA News notes about 2 months process time on requests for reciprocal operating permits re/ W1XXX/VE3 (Expo ‘67). The Hartford CARA has a code and theory class at ARRL Thurs. at 7 P.M. The Southington ARA toured the CONVEX installation and will promote amateur radio at the local Progress Expo with a complete station including R/TTY and TV. W1BDI has a new v.h.f. transmitter and is busy with a long list of radio and photo projects. W1BGD has gone back to college, DXCC 241/217. K1UDD has a new transmitter and is active on phone now. W1CHR hopes to operate M/M on 2. W1ECH prefers the new two-element quad to the old three-element tribander. Congratulations to: W1EFW on Mar. BPL; WA1GTS on dropping the “N”; W1ADW for so much information in the CARA Newsletter; W1KAA for public service work in the Sister Cities International Program; Conn. Council for work providing Conn. Amateur Radio Week June 18-24; K1KSG for contacting all Hartford amateurs to help the AREC program. I hope all clubs and individuals will take an active part in Field Day operations. Traffic: (Mar.) W1EFW 538, W1AW 295, K1UDD 155, K1RQO 132, K1LMS 121, WA1FNJ 107, WB2PFT/1 97, K1RWF 91, W1KAM 90, WA1CYV 71, W1YBH 71, W1GVT 70, W1MPW 65, W1BKC 64, K1OQG 61, WA1HEW 51, W1BDI 48, K1SXF 46, W1CTI 38, W1YU 35, W1KUO 32, K1SRF 23, W1QV 14, K1MBA 13, W1BNB 12, WA1DUV 12, W1CUH 11, K1YGS 11, W1AGJ 10, K1PJQ 8, W1BK1 7, W1CHR 7, WA1DEM 6, W1BHV 3, W1ZL 2, W1BGD 1. (Feb.) W1ZL 4.

EASTERN MASSACHUSETTS—SCM, Frank I. Baker, Jr., W1ALP-W1AOG, our SEC, received reports from these ECs: WA1BZJ, W1s QMN, LVK, K1s ERO, DZG, PNB, W1HNI and W1FEC are Silent Keys. New appointments: K1MPD Reading, WA1FXH Newburyport as ECs; W1MFM as EC for the Six-Meter Mobile Club of Mass.; WA1s GXC and FKQ as OBSS; WA1GXC as ORS, W1PEX and K1PNB made the BPL. W1GFT passed the General Class exam. EM2MN had 23 sessions, 182 QNIs, 238 traffic, 6-Meter Crossband Net had 22 sessions, 260 QNIs 20 traffic. WA1DGH has DXCC and WAS, K1ZMQ is on 6. WIIME has a new YL in his family, WA1FTK is W1AJ’s son. W1HKG’s rig was stolen from his car. K1YUB has a vertical antenna on 15. W1FWS and wife went to Florida and Texas. W1AF has three separate operating stations and will add one more, writes K1PAM, pres. of Harvard Wireless Club. W1IPZ is active on 15 and on 6 for the summer. WA1CSD has a Globe Scout Deluxe and RME-152A and is on 8. Whitman RACES holds training meetings once a month. K1ZLI, ex-W1BKM is on 2 and 8. The South Shore Club heard a talk by Mr. Eacobacci, of the Patriot Ledger on “What it takes to print a paper.” Our sympathy to W1HKG on the death of his mother. W1THT holds code classes for his neighbors. The Quannapowitt RA had a speaker and movies from Raytheon on “Sparrow & Hawk Missiles.” W1OJM still is busy with traffic from the servicemen. New officers of the Townsend Club are K1YSJ, vice-pres.; WA1ECY, secy.; K1PNB, pres./trustee. The club meets the 2nd Mon. and 4th Fri. in Spaulding School. WA1EYY is on many nets, K1CLM is handling traffic again. NETN now meets Sat. and Sun. on 3885 kc. at 2100. WA1HBB is now on the air. WA1GXC has a BW-5100 on 10-meter phone. WA1HEO is on the low bands through assists from WA1s DEC and DRO. WA1CUEH is on 2. Hingham ARC elected WA1EVL, pres.; WA1CLH, vice-pres.; W1ZXG, secy.-treas.; W1MID, trustee; W1AYG, W1KP, K1CBB, steering comm. Meetings are held the 1st Thurs. of the month at the Town Hall. W1ZSS is feeling better. WA6CQF visited W1ALP. Norfolk County RA elected W1HTR, pres.; W1NOV, vice-pres.; W1PNE, treas.; W1JJQ, secy. W1NHL has a 20-w.p.f. sticker. The FEEP Bagchew Net meets on 50.2 Mc. Sun. at 2000. WA1BFD is remodeling the shack. K1TCE, secy. of the King Phillip ARC, reports the club is getting new members. W1HJ now is in Cambridge on the 40 and 80-c.w. and traffic net. W1ALT says he has 33 QSLs from the 1966 National Convention talk-in station W1EL/1. Send a QST, if you want them. W1TTD is on 6 and 15 and helping the Bedford HSARC and Boy Scout Troop. K1ZRO spoke at the Middlesex ARC on “Aeronautical Radio.” W1LMU says the Newton c.d. building programs are going full tilt. W1MINK lost his antenna and is putting an SB-200 together. W1BFB had a heart attack. K9AQP/1 still is working on the v.h.f.

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250 kW tetrode now ready for tomorrow's super-power transmitters

The EIMAC 4CV250,000C is the world's highest power tetrode. It is designed for service in super-power broadcast transmitters, and was developed on the foundation of technology which produced its "little brother," the hundred-kilowatt 4CV100,000C, now used by the USIA. The giant new vapor-cooled tube combines high power gain with long life. Vapor cooling is accepted as an efficient and economical method of cooling in advanced broadcast systems. As EIMAC's latest addition to its line of power tetrodes, the 4CV250,000C is ideally suited for service as an audio modulator, a pulse modulator, or a regulator, and as an rf amplifier in linear accelerators. Ready now for the super-power transmitters of the future, this 250 kW tetrode is another example of how EIMAC's experience in power tube technology paves the way for the developments of tomorrow. For a power tube to fit your needs—big or small—write Product Manager, Power Grid Tubes, or contact your nearest EIMAC distributor.

TYPICAL OPERATION

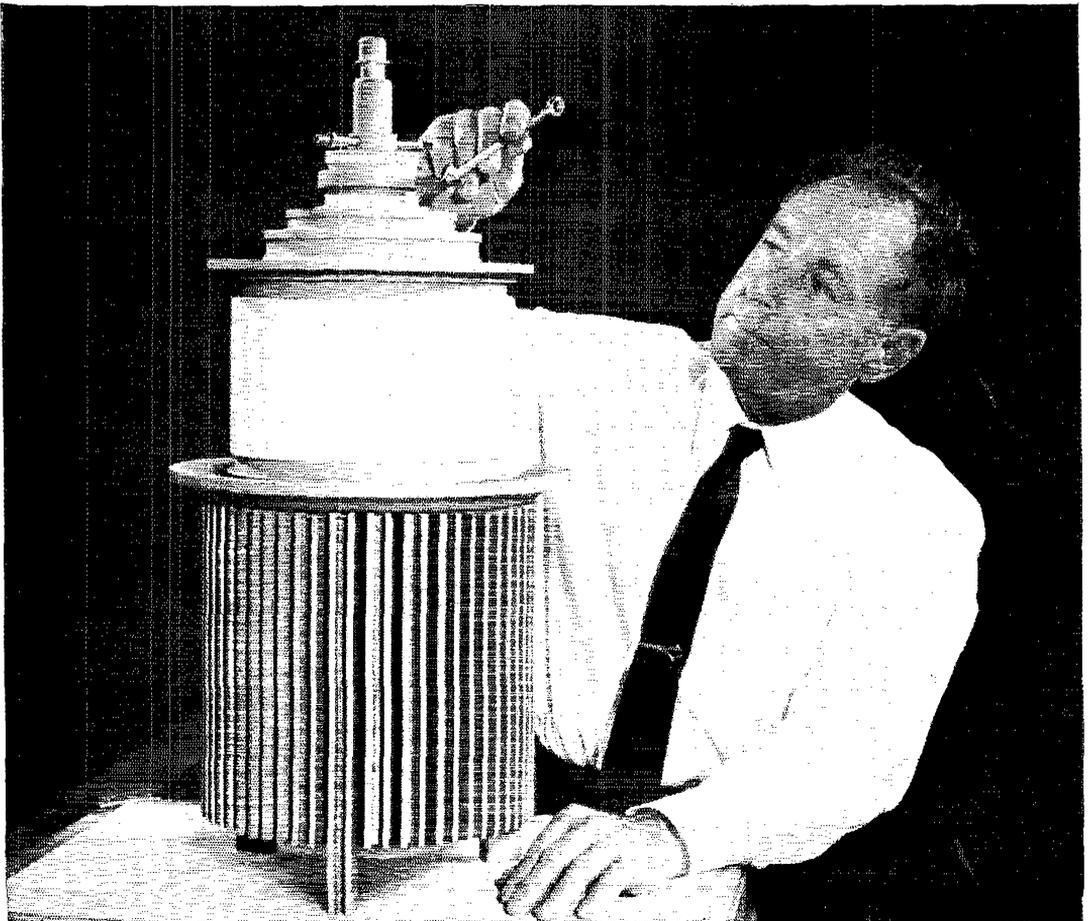
(as a Plate-Modulated Power Amplifier
at Frequencies below 30 MHz)

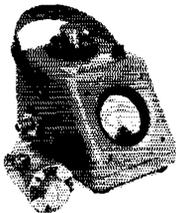
DC Plate Voltage.....	14 kV
DC Screen Voltage.....	800 V
Peak AF Screen Voltage (for 100% Modulation).....	800 V
DC Grid Voltage.....	-800 V
DC Plate Current.....	.29 Amps
DC Screen Current.....	3.6 Amps
DC Grid Current.....	1.8 Amps
Peak RF Grid Voltage.....	1200 V
Grid Driving Power.....	2.5 kW
Plate Output Power.....	292 kW

EIMAC

Division of Varian

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Ten plug-in elements

Ranges of 2 to 1000 MHz, 100 mw to 5000 w

Each plug-in covers four power ranges

Direct read-out of VSWR

Supplied with quick-changing "Twist-Off" connectors

Easily recalibrated in the field

Connect Sierra's Model 164B In-Line R-F Wattmeter directly into your transmission line. Read power delivered to or reflected from the load by a simple twist of the selector knob. No need to reverse r-f connections. Read VSWR directly on Model 164B's calibrated meter.

Each plug-in has four power ranges with selector-switch control. No need to change elements. A simple screwdriver adjustment calibrates plug-ins with factory precision.

Model 164B accepts eight interchangeable Sierra "Twist-Off" connectors. Rugged, compact construction (7½ lbs. with plug-in) makes it ideal for the field. Price, in standard FMN configuration, is \$95.00. Plug-ins range from \$75.00 to \$125.00.

For FREE 1967 Sierra "Power Generation and Measurement Equipment" catalog, mail card or coupon today.

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Sierra Electronic Operation
Menlo Park, California • 94025

Sierra Electronic Operation, 3885 Bohannon Drive, Menlo Park, California 94025

Please rush complete data on Model 164B In-Line Power Monitor and plug-in elements (including prices and ordering information).

Please send FREE 1967 "Power Generation and Measurement Equipment" catalog.

Name _____

Address _____

City _____ State _____ Zip _____

transistor s.s.b. exciter. K1FFE is on 2 s.s.b. K1FJM is building a converter for 6 and 2. W1HCB is on 80 c.w. Appointments endorsed: W1UIR as PAM, OPS, OBS; K1VPJ as OVS; K1YKT, W1s KBN and FJJ as ORSs; W1s DBY, RM MNK, IPZ, HRY, PST as EGs; W1HXX as OO; W1CAS as OBS. W1HJJ is a new OKs, W1NF is in the hospital. New officers of W1Mx: K3ZLR, pres.; W2QHQ, treas.; WA2TG, stn. mgr.; K3RLO, secy.; W1DVH, act. mgr. W1TNK has a Swan 350, Traffic: (Mar.) W1PEX 1357, W1OJM 307, K1PNB 305, W1EMG 222, W1DOM 173, W1AEVY 167, W1OFK 165, W1EUEU 164, W1AEY 141, W1AECY 133, K1CLM 127, K1YZB 98, W1CTR 84, W1UIR 55, W1AFKQ 52, W1CT 49, W1DAL 48, W1AEPN 47, K1VPJ 42, W1AOG 40, W1AGXC 40, W1ADPX 37, K1VOK 33, W1ADEC 24, W1AFSI 24, W1JDP 23, W1FJI 22, W1HJJ 21, W1AED 18, W1GCF/1 18, W1BGW 12, W1Mx 12, K1OKE 12, K1ZGH 12, W1TNK 11, K1ETT 9, K1LCO 9, W1A-DJC 3, W1DLT 3, W1AECY 2. (Feb.) K1OWM 3.

MAINE—SCM, Herbert A. Davis, K1DYG—RM: W1BJG. PAM: K1WQL. Traffic nets: Sea Gull Net, Mon. through Sat. at 1700 to 1800 on 3940 kc. Pine Tree Net, daily at 1900 on 3596-kc. c.w. The PAWA held its annual banquet May 13 at Holiday Inn. The club will be active on Field Day. K1NCI is back from the Army and active. The U. of M. Club is active with about 20 members. W1VST is working 40 meters with a Swan 350 s.s.b. W1HGO is a new Novice on the air. The winners of the Maine QSO Party were, first place K1GAX; second W1UOT; third W1EIO, all on c.w. Honorable mention goes to W2ZV, who also did a real nice job. The news from Duff is that the PTN is going fine with the few regular members, and a perfect record on 1RN. There is need of more members just to be with the net. Traffic: K1TAK 140, W1GU 24.

RHODE ISLAND—SCM, John E. Johnson, K1AAV—SEC: K1LH, PAM: W1TXL, RM: W1BTU, V.H.F. PAM: K1TPK. Appointment: W1EEJ as OPS. The Newport County RC reports that K1CKZ, K1YOR and K9ABM were made full members. A Field Day committee consisting of W1BLC, W1JFF, W1ACSO and W1AUL was appointed. Richard Meyer is a new club member. The Fidelity ARC, K1NQG, was active in the c.w. portion in the DX Competition. The club also is planning its activities for Field Day. The W1AQ Club of Rumford reports that its president, W1FNH, has all committees working for R.I. Amateur Radio Week and for Field Day. All members of the club will operate the club station and their individual stations during R.I. Amateur Radio Week, June 4 through 10. K1HMO and K1UXS are representing the club on the Amateur Radio Week Committee. W1BTU would like all R.I. hams interested in c.w. to contact him for ORS information and net schedules for c.w. K1TPK

Rhode Island Amateur Radio Week

June 4-10, 1967

The amateur radio clubs of Rhode Island invite all amateurs to participate in the second R.I. Amateur Radio Week Achievement Award. Operating times are from 0001 GMT June 4 to 2400 GMT June 10. Awards: All stations outside R.I., Mass., and Conn. are required to contact 3 different R.I. stations. Mass. and Conn. amateurs must contact 5 different R.I. stations and R.I. amateurs must contact 10 different R.I. stations. DX stations, including KH6 and KL7, are required to contact 1 R.I. station during this period. Any band or mode may be used. All amateurs who submit logs meeting the above minimum requirements will receive a certificate signed by the governor. Any station contacting the official R.I. Amateur Radio Week station, K1RI, will receive a QSL card commemorating this event.

The general call will be CQ RI on c.w. and calling any Rhode Island station on phone. Rhode Island amateurs will identify themselves by signing DE W1XXX RI on c.w. and this is W1XXX in Rhode Island on phone. All contestants will exchange a signal report, their county and state. Logs must indicate the date, time and band on which the contact was made.

Suggested frequencies: 3600, 3720, 3850, 7030, 7170, 7250, 14050, 14250, 21150, 21320, 28650, 29000 kc, 50.2, 50.7 and 145-147 mc.

Logs should be postmarked no later than June 30, 1967 and sent to: W1YRC, 2 Rocky Crest Road, Cumberland, R.I. A self-addressed stamped envelope should be enclosed for the return of your certificate.

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NEW IMPROVED THD-471

GUYED TOWER

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rotator, 2" mast,
Tri-Band Beam

Choose from 8 mod-
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tions, 4 with 10 ft.
sections — all hot-
dipped galvanized,
inside and out, *after*
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GET THESE FEATURES

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- Easy to Erect
- Cranks up & down
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- Aircraft raising cable
- Ball-bearing pulleys
- Precision formed guides
- Hinged base plate

PRICES START AT
\$13825

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Iri-Ex TOWER CORPORATION

7182 RASMUSSEN AVE., VISALIA, CALIF.

would like to have more participation on the RISP
which meets at 50.6 Mc. at 1830 EDST daily. RISP
report: 31 sessions, 468 QNT, 132 traffic. Traffic: WA1-
EEJ 271, W1YKQ 183, W1TXL 143, W1BTV 91, K1VYC
62, K1TPK 35, WA1CSO 26, K1JSG/W1FVY 6, K1NQG 2.

VERMONT—SCM, E. Reginald Murray, K1MPN—
SEC: W1VSA. RM: K1UZZ. The Trading Post
Net has disbanded til Dec. We welcome new Nov-
ices W1IKHZ (Putney), W1IHLA (Putney), W1IHKX
(Winooski), W1IHKX (Winooski) and W1IHN (Bar-
ton). The Vt. Fone Net celebrates its 20th anniversary
June 18 with a picnic and auction at Caledonia Fair-
grounds, Lyndonville, Vt. W1UCL has details. Inter-
Field Day will be held Aug. 13, Cliffside Country Club,
Burlington, Bob Hall, W1DQO, chmn. Sorry to report
that W1FN is in the hospital. Traffic: K1BQB 396,
K1UZZ 55, K1LLJ 31, K1MPN 29, W1FRT 24, W1IDM
21, W1AGUV 15, W1GYS 9.

WESTERN MASSACHUSETTS—SCM, Percy C.
Noble, W1BVR—C.W. RM: W1DWA. Not very many
reports were received here this month. Must be that all
our West. Mass. hams are so active on the air that they
can't have time to drop us a line. Or maybe—
well—! W1YK, the Worcester Tech. station, is expected
to be on WMN about three times weekly now during
the time college is in session. Our C.W. RM, W1DWA,
received C-P 30 on Mar. 1. Congrats. W1ZPB has sold
all his s.s.b. gear and once again is very happy on
c.w. with his DX-100. The same goes for ole W1BVR,
except that he is now using a Valiant. W1QWJ, W1STR
and K1RPB put on a v.h.t.-u.h.t. home-brew equipment
program at the Swampscott Convention. This program
as a feature of the Hampden County Radio Association.
C.W. RM W1DWA reports the following activity of
WMN: 120 messages handled during March with the
following in attendance 10 or more times: W1DVV,
W1AFJW, K1IJV, W1DWA, W1ZPB and W1BVR. Traffic:
W1DWA 126, W1BVR 71, W1AFJW 67, W1DVV 63, W1-
EOB 52, W1ZPB 32, K1IJV 30, W1YK 14.

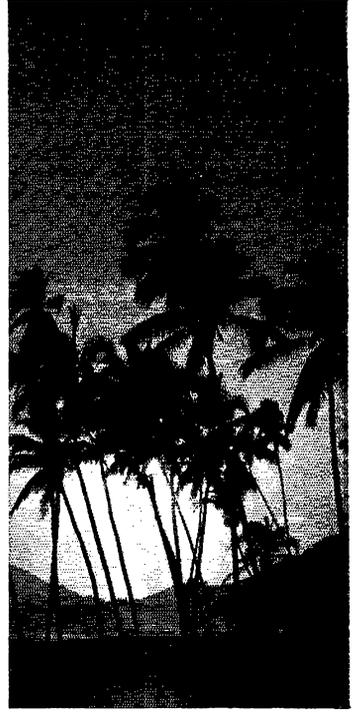
NORTHWESTERN DIVISION

ALASKA—SCM, John P. Trent, KL7DG—We regret
to report that KL7GO was killed in a take-off accident
of his Harvey Flying Service aircraft at Kodiak in
March. New ticket holders from NARC classes, under
KL7FDG include W17GCT (12 years old) and W17GCQ
(84 years young). W17FPM has ordered a Swan 500.
W17GCR, W17GCS, W17GCP, W17GCG, W17GCT and
W17GCU are graduates from NARC classes. The Alaska
Centennial State Hamfest with KL7AA is being planned
for the first week in July by the Anchorage ARC, with
KL7EBK and KL7CUK doing the lion's share of con-
vention preparation. KL7FKO passes CAP traffic be-
yond Alaska points on 15 and 20 s.s.b. KL7FNX has a
new SB-101. KL7FON has gone QRO with an Invader
2000. WB6TUA now is signing KL7GCK. KL7FPX has
been operating mobile from Anchorage drive-in movies
on 2 meters. KL7FDM has a new beam and tower.
W17FSY passed the General Class exam. KL7BZO is
QRL studying for the Extra Class. KL7NR is Alaska
Centennial Novice Radio station at Room 303, Com-
munity Center, Anchorage with a Ranger on the Novice
bands for visitors. W17GCG is well into the SB-301
building project. KL7GAC is active at Annette Coast
Guard with an HW-22 on 40. KL7TI sold his Ranger to
KL7DG. KL7GBA expects to join Navy MARS with
KL7GAC. KL7AIZ. Adak is active on 40. KL7DG has
run 753 miles of 1644 miles down the Alaska Highway
(equivalent distance). KL7FID and XYL KL7FIE are
leaving Chistochina for a new QTH at Petersburg.
KL7DFW is applying for AREC activity in Juneau.
The Juneau Net meets on 3850 kc. every Mon. at 0230
GMT (Tue.). KL7AIZ handles Alaskan traffic on 7055
kc. at 0330 GMT with W7KZ and W7UU. The "HARK-
NARC" contest between Honolulu, Alaska and Hawaii
will be held by the Northland ARC June 24-25. W1JLV/
KL7 is active from Elmendorf AFB on the AREC pro-
gram. Your SCM regrettably announces his resignation
from the SCM post.

IDAHO—SCM, Donald A. Crisp, W7ZNN—The
FARM Net convenes at 0200 GMT on 3935 kc. Mon.
through Fri. W7ZNN was elected manager and K7OQZ
net control of the FARM Net. Asst. net control sta-
tions are K7ZSW, W7VEX, W7JHM and W7FEWV. A
big thanks and well done to the retiring officers. W7YRX
moved to Lewiston from Spokane. Your SCM has moved.
The new address is 3408 8th St. E, Lewiston 83501.
W7GYI is a new ham in Lewiston. K7OAB is re-
building an SB-10. Clubs, register your address and
officers with your SCM for possible future visitations.
FARM Net report for Mar.: 19 sessions, 70 traffic han-
dled, 595 check-ins. Traffic: K7OQZ 56, W7GGV 22,
K7OAB 15, W7FEWV 6, W7ZNN 5.

CQ...CQ...CQ...

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Choose your location from an extensive variety of solid growth assignments with one of America's foremost growing companies. Field engineers familiar with maintenance, installation, training, publication of handbooks and operating manuals, and engineering writing are needed in the following exciting fields:

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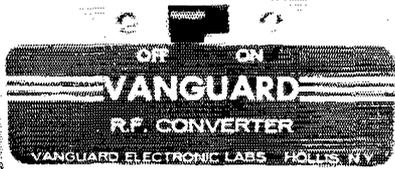


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Priced from only **\$14.95** to **\$39.95**

**OVER 5000 FREQUENCY COMBINATIONS FROM
.45 Mc. to 475 Mc. AVAILABLE FROM STOCK.**

MANY NEW MODELS TO CHOOSE FROM OFFERING A TOTAL OF THE FOLLOWING: Crystal control, variable tuning, UHF epitaxial transistors, FET transistors, noise figures as low as 2.0 db, full wave varactor diode transistor protection, sensitivity better than 2/10 microvolt, fully shielded oscillators and band-pass filters to eliminate spurious frequencies, zener diode voltage regulation, 6 to 12 volts positive or negative ground, slug tuned coils, double tuned R.F. stages, tuned mixer stages, wide band I.F. amplifiers. All this plus the highest quality components carefully assembled, tested, and guaranteed.

We have exactly what you want at a lower price and better quality than you can obtain elsewhere. See our new multiple oscillator converters for monitoring two or more frequencies simultaneously!

24-hour special delivery service available on many models. Send for your free 1967 converter catalog.

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196-23 Jamaica Ave. Dept. S-6 Hollis, N.Y. 11423

MONTANA—SCM, Joseph A. D'Arcy, W7TYN—
SEC: W7RZY.

Montana Traffic Net	3910 kc.	1800 MST	M-F
Montan RACES	3996.5 kc.	0900 MST	Sun.
Montana PON	3885 kc.	0900 MST	Sun.
Great Falls AREC	3910 kc.	0930 MST	Sun.

The Butte and Anaconda Amateur Radio Clubs participated in a joint exercise with the United States Army Special Forces in Operation Westward Ho. This event was a full-size counter insurgent operation with the amateurs of the area acting as the communication agency for the forces. The following amateurs took part in the exercise: W7TCQ, K7SIK, W7BKB, W7CJN, W7TUIO, K7OEK, W7EQP, W7WVL, W7OIO, W7FSP, K7NIRZ, WA7FOB, WA7FLG, K7THR, K4QKA, W7HLI received the Ham of the Year Award for the Yellowstone Radio Club. WA7DBA is building a final. W7LZY has a new NC-200 on the air. WN7FXS is active on 80 c.w. WA7AEX will have a new SB-101 on soon. K7EGJ has been remodeling his ham shack. Don't forget the Glacier Hamfest. Please keep the news of you and your clubs' activity coming. Traffic: K7EGJ 50, K7PWY 32, W7FL 14, K7SIK 8.

OREGON—SCM, Everett H. France, W7AJN—RM:
W7ZFH. Section nets inviting your participation:

OSN 0200	GMT 3585 kc.	T-S	W7ZFH	NTS
BSN 2000-0130	GMT 3825 kc.	Daily	K7IFG	NTS
AREC 0300	GMT 3875 kc.	Daily	WA7AHW	NTS

New appointees: WA7BYP as ORS; WA7EES and WA7DVK as OPSs. WA7AHW, AREC mgr. reports sessions 31, maximum number of counties 15, total attendance 581, QSTs 3, contacts 65. W7ZFH reports for OSN: Feb., sessions 20, total attendance 114, traffic 73; Mar., sessions 23, total attendance 121, traffic 65. K7IFG reports for BSN: Feb., Noon, sessions 26, total attendance 332, traffic 101, contacts 49; evening, sessions 26, total attendance 555, traffic 65, contacts 107; total for month, sessions 52, attendance 887, traffic 166, contacts 156. K7PMB is on 2-meter f.m. and also is building a 10-15 beam. WA7DWI and WA7DWK are officers in the Morrow County Civil Defense. WA7CPI is very active on 5 nets. WA7DOX/WA7GLP, newly-appointed OPS, is active on the air from college and home stations. WN7GFS is active on the Northwest Slow Net and Code Practice Net and sends in his first traffic report. Traffic: (Mar.) W7WHY 348, K7RQZ 240, K7IWD 160, W7ZB 124, K7WWR 45, WA7CPI 30, WA7BYP 37, W7ZFH 35, WN7GFS 25, WA7GLP 21, WA7EES 12, WA7DWK 11, W7DEM 10, WA7DOX 10. (Feb.) K7IFG 112, WA7EES 8.

WASHINGTON—SCM, Everett E. Young, W7HMJ
—SEC: W7UWT. RM: W7OEB. PAM: W7LEC.

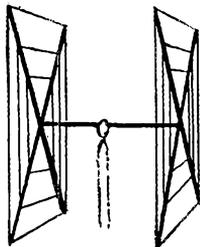
WSN Daily	3535	0200Z	QNI	325	QTC	633	Sess. 31
WARTS Ex. Sun.	3970	0200Z	QNI	1216	QTC	192	Sess. 27
NTN Daily	3970	2130Z	QNI	1110	QTC	715	Sess. 31
NSN Ex. Sun.	3700	0130Z	QNI	484	QTC	181	Sess. 27

K7TCY is back on the traffic nets after a virus bug bite. WA7DXI was heard chasing DX while making the BPL. W7PI plowed his garden, pruned his trees and was ready for spring, then the rig blew up. KL7CAH is NCS for the Sourdough Net at 0400Z weekdays on 3892. K7VNB has a new TH8DX on the mount. OHS W7GVC reports 11 stations assisted with the Pigeon Race in the Walla Walla Valley ARC program to help crippled children.—\$860.00 was raised. W7JIL, K7OPW, K7CDI and W7NNH are heard on 21 Mc. along with some exotic calls. RM W7OEB mailed KS4CC, UJ8AC and UH8DC among some 120 DX QSOs. WN7GCW/GCV is using a 40-ft. tower with a 20-Mc. squarier. K7PYF, W7APK, K7OFW, K7VNV, WA7EAQ and W7OEB keep 2 meters hot in the Richland area. K7PYO has a DL6 call and is active. W7UMJ is counting some rare ones on 21 Mc. W7AXT snagged his first UA—OH—G8 on 2 Mc. K7CHH/7 also is after 'em on 21 Mc. W7OS is heard on 2 with a 5V. W7IKG lost his 20-meter beam in a high wind. WBTV skeds Antartica regularly. The Puget Sound Council of Amateur Radio Clubs' Trophy has been located at the home of the Northwest Amateur Radio Communications system, Olympia. The gang plans to have it on display at its 5th Annual V.H.F. Camp-out July 15-16. K7CYZ reports the Loggers Contest (Radio Club of Tacoma) was a highly successful affair. The manager suggests well-publicized frequencies for future events. Our PAM, W7LEC, cracked up the Opel for the second time in a month. He had no serious injuries. K7MCA, Northwest Slo-speed, Net mgr., asks for ARRL affiliation. Our Washington section is deeply saddened by the death of three of our fraternity brothers: William E. Howell, W7AF, Bellingham; Henning Jurgensen, K7INY, Seattle; Arthur E. Paul, W7EVW, Fox Island. Traffic: W7HMA 1345, W7BA 1306, W7ZIW 1242, K7TCY 645, WA7DXI 638, K7CTP 439, W7DZX 349, W7PI 209, W7BTB 159, W7KZ 132, W7IEU 85, W7HMJ 58, W7MCW 52, K7VNB 44, W7AIB 26, W7GVC 18, W7OEB 9, W7APS 8, W7WHV 7, W7AXT 4.

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 fool-proof 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' x 1 1/4" 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' x 1" OD aluminum 'hi-strength' alloy tubing, with telescoping 7/8" 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.

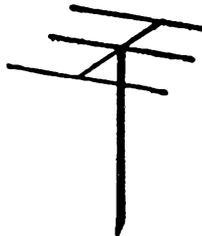
Now check these startling prices — note that they are *much lower* than even the bamboo-type:

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)

How to order: Send check or money order. We ship immediately upon receipt of order by railway express, shipping charges collect.

BEAMS The first morning I put up my 3 element Gotham beam (20 ft) I worked YO4CT, ON5LAV, 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; 3/8" 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 E1 20	\$16	4 E1 10	\$18
3 E1 20	22*	7 E1 10	32*
4 E1 20	32*	4 E1 6	15
2 E1 15	12	8 E1 6	28*
3 E1 15	16	12 E1 2	25*
4 E1 15	25*		
5 E1 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, K1MNV, 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, KP4AOL, SM5BGK, G2AOB, YV5CLK, OZ4H, and over a thousand other stations!

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PACIFIC DIVISION

EAST BAY—SCM, Richard Wilson, K6LRN—W6EY is taking an extended trip around the U.S. His latest card comes from Florida where he is visiting for a while and then will be off to New York to see daughter and family. He has been working mobile, mostly skeds with W6CBX. WA6RRH has been sending Official Bulletins on the BARN and would like it known that the Bay Area Radioteletype Net meets Wed. and Fri. on 145.92 at 8 P.M. local time. If you have a.f.s.k. gear you ought to give it a whirl. I guarantee you'll meet some fine guys. WB6QNE got his 35-w.p.m. code certificate and a t.o. keyer. WB6QNE, W6IPW, W6IDY, WB6FHH, W6-UZX and WA6JKB all QNI NCN and are handling a lot of traffic. WB6FHH got VQ9, FW8, CTI and VK9 in the DX Test. W6CBF has been housecleaning; sold his old tower and is getting a new one. K6LRN still is QRL assembling a sailboat between rainstorms. Again this report is short. There doesn't seem to be much activity in the section although every now and then I hear rumors of activity on the repeaters and in various clubs. Could someone drop me a line or a radiogram and confirm or deny some of these wild reports? Are any clubs planning for Field Day yet? Please send all activity reports and club bulletins to Dick Wilson, SCM East Bay, 107 Cordova Way, Concord 94521, by the 6th of the month.

NCN	0300Z	3.630 Mc.	Daily
BARN	8 PM	145.92 Mc.	Wed. & Fri.

Traffic: (Mar.) W6IDY 305, W6IPW 237, W6UZX 161, K6LRN 87, WA6RRH 11, WB6FHH 10, WB6QNE 4. (Feb.) WB6FHH 17.

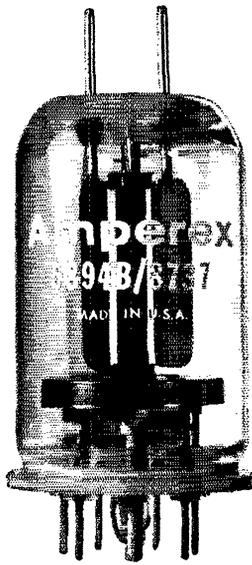
HAWAII—SCM, Lee R. Wical, KH6BZF—SEC: K6FWZ/KH6. PAM: WOPAN/KH6. V.H.F. PAM: KH6EEM. RM: WB6HXO/KH6. OOs: KH6BZF, KH6EEM. OPs: WB6HXO/KH6, KH6BZF, KH6UL, KH6-FRO. OVSs: KH6FKB, KH6EEM. OBSs: WOPAN/KH6, KH6BZF, KH6CPW. ORSs: WB6HXO/KH6, WOPAN/KH6. QSL Mgr.: KH6DQ.

Net	Freq. (Mc.)	Time (GMT)	Days
League Appointees	7.290	0700Z	Wed.
Friendly Net	7.290	2030Z	M-F

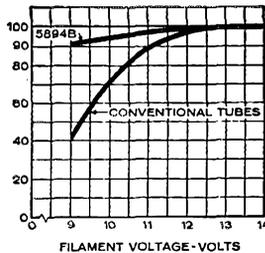
K8QKB dropped into Hawaii and I picked him up near the airport. After supper we talked about the classroom days and our mutual friend K8QKJ, who is one of the chiefs at U. of W. Virginia's educational TV station. KH6GAY has just returned from JA-Land. KH6OR, chief engineer at NAVSEITA-PAC, Pearl Harbor, recently presented a "thrilling and chilling" first-hand view of C-E activities in Antarctica to the Hawaii section of the IEEE. KH6BZF, KH6PRO, WOPAN/KH6 and KH6GDR have been active on 10 meters working ZS4, G, OH1, 9J2 and ZE1 long path over the South Pole. WOPAN/KH6 received his QSL from UA0JG, Juri Gregarin. WA6ZZD/KP6 has reactivated Palmyra Island. WA4YOK/KG6 reports the Pacific Interisland Net is doing well. KH6EDR worked TU2BD on 20 meters recently. Don't forget to request your FD forms, sheets and cross-check lists. KH6FBJ/3 passes his Alohas to all the gang from Maryland. Mahalo for the contributions. Keep the cards coming. See page 6 for the address. Traffic: (Mar.) KG6AQG 34, KH6BZF 22, WA4YOK/KG6 17, WOPAN/KH6 1, KH6FKB 1, KH6-FRO 1, KH6GDR 1. (Feb.) WOPAN/KH6 3.

NEVADA—SCM, Leonard M. Norman, W7PBV—SEC: WA7BEU. QCWA members in Nevada are WA7-AEL, W7CMV, W7CSB, K7QWZ, W7VIU, W7YKC, W7YRY and W7ZFN. W7CSB is forming a Nevada chapter of the QCWA. Give Mac a call if you are interested. WA7CFS and his XYL are home after a month's vacation in the east. W7YKN reports no activity in the Reno area. W7YRY still has QRM from the power lines. K7RBM is teaching night school at USNTC, San Diego. W7AKE reports about 35 now are active on 2-meter f.m. Repeater receives on 146.94 Mc. and transmits on 147.5 Mc. W7AAF is active on NCN and TCC. W7TVP is going mobile and will schedule anyone needing Nevada DX or stateside. K7RKH built some H.B. 1296 Mc. W7BIF acquired a 2nd-class FCC License. W7NSCA and W7NSCB took the Tech. Class exams. W7DIM, WA7DUF, W7FJN, WA7GIV, K7USR and W7YIC. The flying 2-meter f.m. group made a trip into Arizona maintaining positive communications via the repeater. K7ICW is active on 2-meter f.m. WA7-BEU, W7BIF and W7PBV, pictured with Nevada's Governor Paul Laxalt, received publicity in the Southern California Edison Company's magazine. Traffic: W7AKE 148, K7OHX 15, WA7CFS 9, WA7BEU 8, W7BIF 8, W7-PBV 4, W7YKN 2.

SACRAMENTO VALLEY—SCM, John F. Minke, III, WA6JDT—SEC: WB6BWB. ECs: WB6MXD, K6RHW, W6SMU, WA6TQJ. RM: W6LNZ, K6YZU, in Dunsuir.



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*PTTS: Push-To-Talk Service; for vehicular communications systems. Maximum duty cycle: 1 minute ON/4 minutes OFF.

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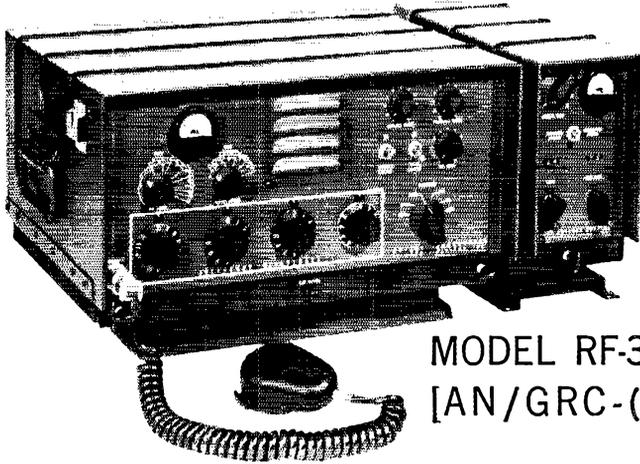
has been appointed ORS and is an active member of NCN. A Section Net certificate goes to WB6RSY, of Redding, for his participation in NCN. The Baylark Convention in the Bay Area was attended by 11 members of the Chirps. Old Timer's Night was the theme for the Apr. meeting of the RAMS; the earliest amateur licensee attending was W6CKA, who received his ticket in 1922. W6VUZ, OPS/ORS, has moved to Los Molinos in Tehama Co. OBS W6NKR is real pleased with his DX results upon moving to Sacramento from the L.A. section. Marion worked 104 different countries with a score of 390,661 in the ARRL DX Contest on e.w. WB6MPP has a new 55-ft. crank-up tower. Neighbor W6VBB is now WB6VBB with a General Class ticket. WB6RSY has been appointed 6th Area representative for the QRP Club. Oroville ARS is holding code and theory classes every Tue. and Thurs. for beginners. W6GDO received a second call of W6GDD. WB6MZX is now on 2-meter RTTY n.l.s.k. WA6JDT finally worked the South Pole on 21-M.c.s.b. Traffic: (Mar.) WB6RSY 90, W6LNZ 35, K6YZU 55, WB6MAE 34, K6IKV 34, WB6BWB 14, WB6EAG 13, WA6JDT 5, W6NKR 5, W6VUZ 1. (Feb.) K6IKV 20, W6NKR 7.

SAN FRANCISCO—SCM, Hugh Cassidy, WA6AUD W6KUF lost his vertical during the winter storms and is mainly mobile now. The Marin Club started 75- and 2-meter hunts to welcome the spring season. WB6PVV is active on s.s.b. with a Swan 350 and finding 10 meters open in mid-day. WA6JUV continues to be the most consistent of OVS appointees in reporting. W6UDL hopes to be active when his most peculiar working hours stabilize. Heard in the UX phone portion were W6PTS, WB6UJO and W6CYO. WA6ALK finds her Clegg 22er plus a ground plane effective. WA6NDZ, one of the few F4 operators hereabouts, reports that being engineer on several projects has limited his activities. W6KVV made the BPL again in March with a total of 744 pieces of traffic. W6WLW reports that a stronger signal has brought additional duties with RN6. A fine turnout of clubs from the section were seen at the Pacific Division meeting in Oakland on Apr. 5. Plans already are being made by some to attend the joint Pacific/Southwestern Divisions Convention in Los Angeles Sept. 8-9-10. K6-RAO spoke on mobile antennas at the April San Francisco Radio Club meeting. WB6AIS had another turn in the hospital and hopes this will be the last one. WB6RFJ is looking for a linear after hearing what is coming in on the higher frequencies. W6CLS has taken over the Amateur Radio Supply in San Rafael. K6OJO held a reception for ZS6AR visiting in the Bay Area. Ex-W6AB has a new call and is back on the air—with a TH6 on a tower it does not look like he is just going to rag-chew. Traffic: W6KVV 744, W6JXK 273, W6WLW 215, WA6AUD 18, WB6PVV 18, WB6PDP 14, K6TZN 13, WA6BHZ 4, W6CYO 3.

SAN JOAQUIN VALLEY—SCM, Ralph Saroyan, W6JPU—I am going to divert from the normal and explain something that may clear up any misunderstanding regarding sending in your reports and activities for this column. I am writing this in April of '67, reporting activities that happened in Mar. '67, and all this will be printed in the June '67 issue of QST. Did you get the picture? It takes two months for this column to appear in QST from the time I send it in, which is always by the 6th of the month. So, if I receive a report later than the 6th of the month, it is delayed another month. Example: If I receive a report after the 6th of the month that report will appear 3 months later in QST. So, please get in your reports before the 6th of each month. W6-KTW has a Hunter amplifier and is working DX. WA6-YXJ is on 75-meter s.s.b. K6SEV and K6OFR are active in Navy MARS. K6QPE is going mobile. W6HYZ is mobile MNI. W6SMS is looking into s.s.b. equipment. WB6NCJ is going to college and does not have much time for DX. WB6ZGQ is mobile on 75 and 40. WA6WXP was heard in the DX Contest. WB6AN is mobile with an SBE-34. WA6SCE is ORS in Bakersfield. WB6TFU is mobile on 20-40-80 s.s.b. W6VPV was a recent visitor in Fresno. WA6SCE is teaching code and theory at Foothill High School. W6TF and WB6MRW donated some fine equipment to the Foothill High School. W68AI is back on the air. Traffic: (Mar.) W6ADB 247, WB6HYA 191, WA6SCE 78. (Feb.) WB6PCQ 233.

SANTA CLARA VALLEY—SCM, Jean A. Gmelin, W6ZRJ—Asst. SCM: Ed Turner, W6NVO. SEC: W6-VZE. RM: W6QMO. Your SCM and Division Director. W6HC, attended a meeting of the South County Amateur Radio Society, one of the more active clubs in the section. Ham radio regulations were discussed and a representative of the FCC presented general Commission viewpoints on amateur radio activities. K6HGV is active in MARS work. W6MIG reports that there is a new radio club starting in San Carlos. The group meets the 1st and 3rd Thurs. in the basement of the San Carlos City Hall. All interested amateurs and others are invited

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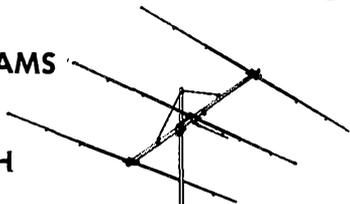
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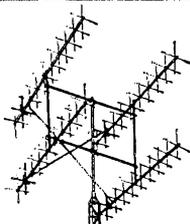
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to attend. W6HC reported that most clubs in the section were getting ready for the Pacific Division Director's meeting which was held in Oakland in April. W6PLS sent in very fine minutes for the SEC meeting held in Feb. Gene is active in DX work and reports seven new countries. K6GK is active on NCN. W6ACW built a garage ham shack and is now active on NCN and Navy MARS. W6AUC keeps regular schedules with his brother, W4EXV, and has been active as OO as well as on several nets. W6ASH was busy with State MARS job and Oscar work. W6OII was active in the CD Party. The March meeting of the SCCARA featured W6SCR on RTTY. The group meets the 2nd Mon. at the San Jose Red Cross Chapter House. W6RFF is active on NCN. W6EMS makes schedules on PAN and TCC as well as working NCN. The Mar. meeting of the PAARA featured W6HHN, who gave a talk on power supplies. The club meets the 1st Fri. of the month in the Menlo Park Council Chambers. Speaker for the West Valley Club was W6ZRI, who gave a talk on the ARRL and amateur history. West Valley meets the 1st Wed. and 3rd Thurs. at Cambrian School in Campbell. W6YBV is active on NCN, RN6 and PAN. W6DEF has been active with the NCN Slow Speed Net as well as in EC work. K6YK is NCN NCS for Sat. The Santa Cruz Radio Club *Bulletin* featured a fine editorial on amateur radio and the ARRL, pointing out that the League is the only amateur radio organization that amateurs support regularly but that half the amateurs do not belong to any group. Congratulations to W6AUDE on a fine *Bulletin*. The Poot-hills Club was busy making plans for a homebrew contest. The club meets the 1st Fri. at the Mountain View Central Fire Station. The NCN Slow Speed Net meets daily at 0200Z on 3635 kc., speeds around 10 w.p.m. W6ZRI code practice is at 10, 15 and 20 w.p.m. on 3590 kc. 0330Z GMT, Tue. through Thurs. Text sent includes bulletins and director's information. Traffic: (Mar.) W6RSY 809, W6EMS 380, W6YBV 348, W6DEF 114, W6HC 88, W6PLS 44, K6GK 35, W6ACW 20, W6ZRI 19, W6AUC 17, W6ASH 12, W6OII 12, W6RFF 10, K6HG 8. (Feb.) W6EMS 158.

ROANOKE DIVISION

NORTH CAROLINA—SCM, Barnett S. Dodd, W4BNU—Asst. SCM: James O. Bullnett, W44FJM, RM: K4CVZ, PAMs: W4AJT and W4LWE, V.H.F. PAM: W4HJZ, W4CJD is the proud owner of a brand-new Extra Class certificate. W4IRE and W4AUNO are now operative on 80 RTTY. Here is a direct quote from K4ZKQ: "Who says hams don't have a heart? I just completed my third gallon of blood donations through the Red Cross Blood-mobile." WB4DVO now has complete break-in for c.w. operation. W4AJT says the Greensboro Radio Club is now holding code classes for Novice through Extra Class speeds. WN4EQW says he is enjoying handling some traffic on the N.C. Novice Net. W4VON has completed the HB-65 receiver and says it works fine on 80 and 40, but needs some taming down on 20, 15 and 10. K4EOF is now a TCC CAN function.

Traffic: (Mar.) WB4BGL 371, W4FVN 201, W4LWZ 191, K4EOF 118, W4ACFN 105, W4RWL 103, W4IRE 92, W4AZLK 68, W44VN 52, W44FJM 51, K4CWZ 43, W4BNU 23, WB4DVO 20, K4ZKQ 20, WN4DWN 16, W4OSG 12, W44TV 12, W4AJT 10, K4TTN 6, W4ACY 5, WB4BXQ 2, W4AUNO 2. (Feb.) K4EOF 314.

SOUTH CAROLINA—SCM, Clark M. Hubbard, K4LNLJ—SEC: W44EJ, Asst. SECs: W4WQM, W44EFP, RM: K4LND, PAM: K4WQA.

SCN 3795 kc. Daily 0000Z/0300Z March Tfc. 197
SCSSBN 3915 kc. Daily 0000Z March Tfc. 231

We still are looking for more stations like WB4BZA and W4VFO checking in the SCN. More clubs should appoint regular ORS for both nets. Regional liaison stations W4NTO, W4PED, K4LND, W44APD, WB4DXX and W5OHO/4 need help from the s.s.b. net and clubs. The c.w. net has made excellent growth in station activity. WB4DXX is doing an excellent job as NCS and ORS. W44UYT checks in regularly with the NE RTTY Net. Traffic: W4WQM 131, WB4BZA 129, W44APD 123, K4LND 114, WB4DXX 106, W4JA 41, W4FVV 35, W4NTO 34, W44VZQ 32, K4LNLJ 30, W4HMR 29, W4PED 27, W44CF 11, W44UYT 6.

VIRGINIA—SCM, H. J. Hopkins, W4SHJ—SEC: K4LMB, PAM: W4OKN, RMs: K4LJK, W44EUL, A very valuable and esteemed Tidewater Club member, Ralph Williams, K4YLQ, passed away. He will be missed. Two Richmond clubs hosted a meeting which W4KFC, K4LMB, W4OKN and W4SHJ attended along with local members. A very successful Division LO meeting was held in Greensboro, N.C. Virginia was represented by W44EUL, W4KFC, K4LMB, W4NJC, W44PBG, W4SHJ and W4ZM, WB4DHT has CP-25 and is working on a big linear. W4MUJ and WB4DRB are

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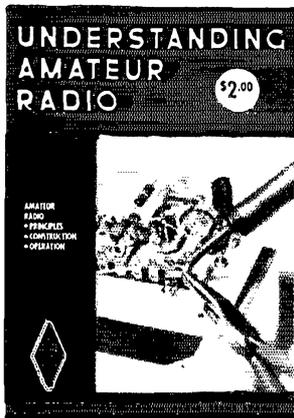
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new ORS appointees. Uncooperative neighbors keep WA2-UFI/4 off the air. Reports indicate excellent band openings and DX on 10 and 15 meters. Form 1 cards for reporting of traffic and activities to the SCM are available from the Communications Department, ARRL Hq. in Newington. The gathering place for all Virginia amateurs, especially during time of need or emergency, is one or more of the section net frequencies. They are listed below with GMT times of daily regular sessions.

3680	2330, 2400 and 0315
3835	2100
3935	2300 and 0300

At this writing, no deviation from the times indicated was planned for summer time. Traffic: WA4DXJ #74, K4CG 228, W4DVT 220, W4SZT 189, K4KNP 181, WA4-EUL 152, W4BWF 146, W4RHA 142, WB4DHT 94, W4ZM 91, W4NLC 88, K4ITV 69, W4OKN 51, K4FSS 42, WB4-DRB 40, W4IUIJ 39, W44PBG 28, WB4BXT 27, W44-DAI 26, W4SHJ 26, W4BZE 25, W44SZI 20, K4LMB 14, W4TE 14, K4IXF 13, K4NLC 11, W4WQG 11, W4-SQQ 10, W4KFC 8, W4MK 8, W4KRY 7, W44QC 6, W4LK 4, W4JUC 2, W4PTR 2, W4YZC 2, W4OP 1, W4ZMT 1.

WEST VIRGINIA—SCM, Donald B. Morris, W8JM—SEC: W8SSA, PAMs: K8CHW, W8LYD, RMs: W8LZA, K8TPF, W8LMF, C.W. Net Mgr.: W8HZA, Phone Mgr.: W8ARQB.

My sympathies to the family and friends of W8ORT/W8HZH, who passed away in March. New officers of the W.V.L. ARC are W48KQX, pres.; W48FMA, vice-pres.; W48EBW, sec.; K8UDN, treas.; W48FKB/8, stn. mgr. Active at Buckannon during the flood were W48QND, W8LD, W8WVM, W8ANDY. I attended the LO meeting at Greensboro, N.C., called by Director Clark. The ARRL appointees' meeting at S. Charleston was well attended with good discussions on the improvement of net operations. K8MYU, K8TPF, W48POS, W8CKX and W48PNF are very faithful in WVN and also enjoy the CD Parties. New ECs: W48SLG, McDowell County; W48ART, Wetzel County. The Central W. Va. Chapter of the QCWVA held a Dinner Meeting in Fairmont. Don't forget the 9th Annual ARRL W. Va. State Convention, Jackson's Mill, July 1 and 2. Director Clark, W4KFC, will be there. See you at the Mill. Traffic: W48PNF 255, W48POS 145, K8TPF 120, W8-HZA 87, W8CKX 49, W8IMX 38, W48RPB 30, W48QND 28, K8BIT 20, K8MQB 14, W48QZO 14, K8MYU 9, W8JM 8, W48FKB 5, W48KCO 5, K8CHV 4, W48-BSE/8 3, W8CUL 2, W8CZT 3, W48LFW 3, W8ANDY 3, K8QEW 2, W48AX 2, W48MY 2, W48MRK 2, K8OQL 2, W8QEC 2, W48AEN 1, W48CKN 1, W8DFU 1, W48FIE 1, W48LAL 1, W48PWM 1, K8QYG 1, K8SOR 1, W8WEJ 1.

ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Richard A. Hoppe, K0FDH—Ast. SCM: A. Hankinson, W40NQL, SEC: W0SLV, PAM: W0CXV, RAL: W4OLCM. Statistical competition between nets is getting keen. The Columbine Net leads all others in a total QNT of 1197 for the month, but CCN leads in QTC with 284 and a QNT of 187. Congratulations to K0YFK on his splendid work and long overdue recognition in receiving BPL for his efforts on the Colorado Weather Net. Your SCM and SEC were treated to the hospitality of two radio clubs in March—the Pikes Peak Amateur Radio Association in Colorado Springs, and the Hewlett-Packard Radio Club at Loveland. The Colorado Springs Club has established radio facilities in the local Red Cross Building and enjoys a degree of rapport with local Red Cross officials that is certainly admirable. A special welcome to the Hewlett-Packard Club on its recent formation and best of luck in its efforts to affiliate with ARRL. This club could be of value to all of us since it plans to emphasize improving the state of the art. Traffic: K0YFK 793, W4OLCM 173, W40MNL 121, K0CNU 94, W40JEV 82, K0ZSQ 82, K0DCW 67, K0ZIJ 62, W0BWJ 38, W40JTB 34, K0SPR 32, K0TV 28, K0-DXF 27, W0PGX 27, K0ECR 11, W0LEK 9.

NEW MEXICO—SCM, Bill Farley, W45FLG—SEC: W45ALL, PAM: W45MXX. A new OPS is W45BLI. Your SCM had a very good meeting with the club station at the New Mexico Institute of Mining and Technology. The station would like to get on the v.h.f. bands for some experimenting and needs a small rotor. If you can help, write to the college. The club station at SAC peak is now in operation with the call W45DOP and can meet schedules on 2, 6 and 432. If you are interested in setting up something with this station, contact your SCM. W45OIP is now stationed at Holloman AFB and is adding to the hamming from that area. Would you like to run for the office of SCM? Remember the deadline for filing petitions is drawing near. See QST for information. The SCM recently made speeches

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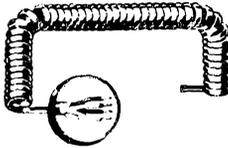
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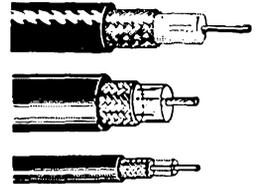
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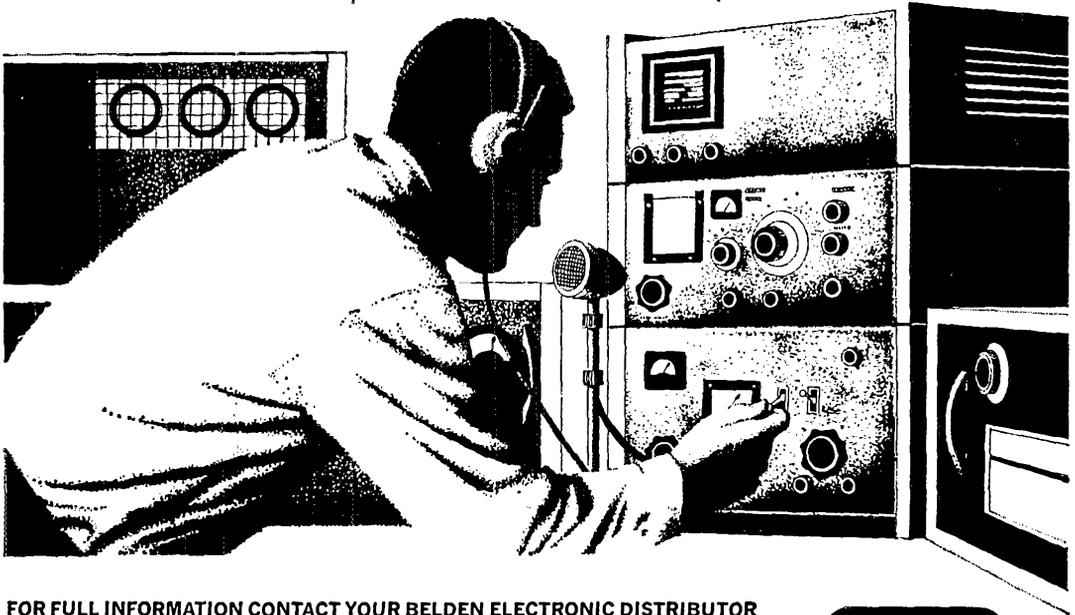
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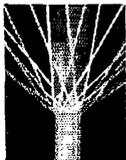
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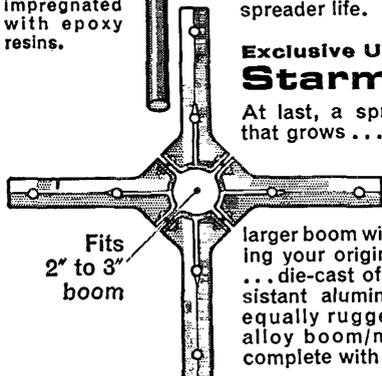
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at three civic clubs in Alamogordo and several around the state. All seemed to be interested in the amateur and what he can do for them. Help us with the traffic for the state by checking into the Breakfast Club Net and the Roadrunner Net. Both meet on 3,838 at 1330Z and 0100Z. The Southwestern Phone Net at 1830Z on 7225 kc. has been meeting lately but could stand some net control stations. Traffic: W8BZY/5 224, WA5FLG 117, WA5RBU 101, WA5FJK 48, WA5MCCX 11, WA5JNC 6.

UTAH—SCM, Gerald F. Warner, W7VSS—SEC: W7WKF, RAI: W7OXC. Section nets: W7OXC reports another month of increasing traffic load on BUN. Utah DXers are invited to drop W7LEB a line for information on the newly-organized Utah DX Association. Officers are W7LEB, pres.; W7VSM, vice-pres.; W7CYH, secy. ECs are needed in all but the Utah, Salt Lake, Davis and Weber County areas. Anyone interested in an EC post should contact our SEC, W7WKF. Most Utah clubs are busy setting ready for Field Day. This year's battle for the UCARC Field Day trophy should be the best yet. New appointment: K7SLX as OPS. Traffic: W7OHR 272, W7LQE 215, W7OXC 174, K7SLX 68, W7VTJ 44, WA7BME 43, K7ERR 28.

WYOMING—SCM, Wayne M. Moore, W7CQL—SEC: W7YWE, RAI: WA7CLF, PAMs: W7TZK, K7SLM. OBSs: W7TZK, K7SLM. Nets: Pony Express, Sun, at 0830 on 3920; YO, daily at 1830 on 3610; Jackalope, Mon. through Sat., at 1215 on 7255. All net listings are for local time. Note that the Jackalope Net has moved to 40 meters because of conditions. I hope that all Field Day preparations are about complete by now. Remember to send me the information on your Field Day activities in order to be eligible for the trophy. The Cheyenne Club has 22 students in its code and theory classes and we hear they are doing very well. K7AFO enjoyed a couple of weeks in California early this spring. K7SLM enjoyed a vacation in Idaho during April. The Casper Club has succeeded in getting several new hams on the air because of the last code and theory classes. Traffic: K7ITH 109, W7TZK 71, K7QJW 42, WA7BPO 30, K7VWA 23, K7SLM 22, W7HLA 15, K7-AHO 4, WA7BYG 4, WA7CGG 4, WA7BFV 2.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Edward L. Stone, K4WHW—SEC: W4EPI, PAMs: WA4EEC, WA4EEE, RAI: WA4EXA. V.h.f.ers, Field Day operators, don't forget this is your big month, with both the V.H.F. QSO Party and FD scheduled. WA4GNK is having a ball with his new quad. K4RCE operated his station from Florence State College during the Annual Spring Fling. The North Alabama DX Club is booming with activity and looking for new members. If you are interested in DX, why not join up with this fine group. Contact is Stewart Brummett, WA4WAO, vice-chairman, 1815 Forney Dr. N.W., Huntsville, Ala. 35805. Hat's off to the AEND and AENT, our fine c.w. training net and teenage net, for their excellent operation and growth during the past few months. WA4UXC would like to have you check in daily on 3725 at 2930 CST. This is the opportunity to learn c.w. net procedure and become proficient in c.w. operation. AENM, s.s.b. net, is setting the pace with increased QNI and traffic under the fine leadership of WA4EEC. Traffic: WA4EXB 157, WB4DCR 147, WA4UXC 125, WB4DIN 114, WA4EXA 98, K4AOZ 37, W4FVY 85, WB4APL 71, WB4BLX 65, K4WHW 49, K4HJX 35, WB4EKK 34, WA4FYO 30, WA4PIZ 30, K4BSK 27, K4NUW 25, WA4NITG 24, WB4ACJ 23, WA4OCM 21, WA4EEC 16, WA4GNK 16, K4KJD 14, WA4VQI 12, K4TUT 9, WA4ZDW 8, WA4JSM 7, W4YRM 7, WB4CLK 6, WA4OCL 5, WA4HUO 4, W4FPI 3, K4RCE 3, K4NJJ 2, K4UUC 2, W4YPC 2.

CANAL ZONE—SCM, Mrs. Lillian C. Smith, KZ5TT—Asst. SCM, Russell Oberholzer, KZ5OB. SEC: KZ5MV, RAI: KZ5FX. The Crossroads Amateur Radio Club held a farewell party for KZ5BC and his NYL, who will depart in May. K4DI, from Miami, was a guest at the Canal Zone Amateur Radio Association meeting and gave some interesting highlights on real "old-time" amateur radio. A tip from KZ5FX: "For 80 meters, a beam should have a high front to static ratio!" New KZ5s: Generals—KZ5OA, KZ5BY, KZ5DD, KZ5DO, KZ5JI, KZ5TN, KZ5UT. Novice—KZ5BRN. Departures during the month: KZ5BI, KZ5CJ, KZ5HJ. Traffic: KZ5OA 106, KZ5FN 69, KZ5AD 51, KZ5OB 15, KZ5FX 8.

EASTERN FLORIDA—SCM, Jesse H. Morris, W4MYB—SEC: WALYT, Asst. SEC: W4FP, RAI C.W.: W4ILE, RAI RTTY: W4RWM, PAM S.S.B.: W4OGX, PAM 40M: W4SDR, PAM 75M: W4TUB, V.H.F. PAM: WA4BMC. K4DSN reports that he has made DXCC in

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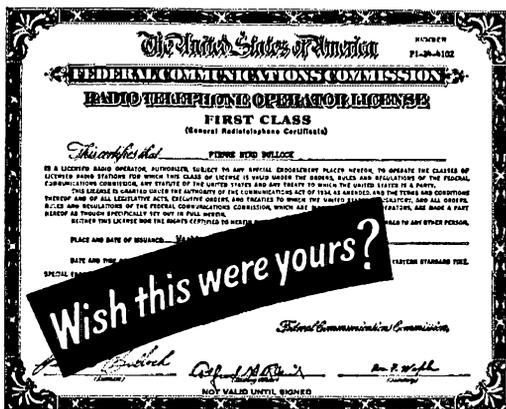
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five months since returning to the bands. K4SJH will take an extended vacation across the nation with his XYL in May and June. All you DXers had better pay close attention to 10 meters because not only has the band been open but there has been lots of activity on that long-neglected band. V.h.f. activity has started to pick up around the state. The University of Florida held an Engineering Fair recently and W4DFU was there to collect the traffic. The Florida League Appointee Net has been reactivated on Fri. of each week on 3950 kc. at 0100Z. All League appointees in Florida are invited to check in and find out what is going on. Traffic: (Mar.) W3CUL/4 3382, W4DFU 796, W44SCK 742, W44BMC 726, W4LE 514, K4EHY 491, W44NEV 336, W44TWD 360, W44AIW 320, K48NE/4 282, W3VR/4 226, W44FGH 164, W4FP 160, W44NBT 147, W44JH 141, W4BJD 121, W4BD4D 109, W44ZEV 106, W4SDR 103, W44MRK 96, K4KDN 91, K4SJH 89, W4BDS 81, W44HDH 77, W4ADEL 68, K4QCG 68, W4VDC 68, W4SMK 66, W4DVO 65, K4MTP 65, W4MVB 65, W4NGR 63, W4OGX 61, W44AJV 60, K4BY 58, W4EHW 57, W4YPN 57, W4HDHB 56, W4NUH 56, W44YII 55, K4DAN 47, W44JH 44, W4AKB 43, W44CTQ 39, K4-ILB 39, W4BKC 37, W44AO 37, W44HPL 33, K4COO 33, W44VME 31, W44WOW 30, W44VE 29, K4ENW 28, K4DSN 26, W4EDZ 26, K4CBV 24, W44WZZ 24, W44CJV 22, K4LPS 21, W4TJM 21, W4VPQ 21, W4-FZV 19, W44AHA 18, W4GUJ 17, W4GM 15, W4QBY 15, W4CBE 14, K4EBE 14, W4CWI 12, W44YIH 12, K4IEY 9, W44QLZ 8, W44TJS 8, W4ZAK 8, W44MOL 7, W44PWF 5, W44LRW 4, W44HA 2, W44PNZ 1. (Feb.) W44AJV 89, W44LRW 36, K4DSN 27.

GEORGIA—SCM, Howard L. Schonher, W4RZL—Asst. SCM: James W. Parker, Sr., W4KGP. SEC: W4-DDY. RM: W4CZN. PAMS: K4PKK, W44WDE. W4LRR continues to modify and update his v.h.f. gear. K4HQI is president of the Athens V.H.F. Society. 6-meter activity is excellent in the section but with few openings. 2-meter interest continues to increase rapidly with new stations every month. W4APC/DL6KS still is trying to work into the Columbus area from DL5. W44FMQ is on 2 meters and W4FEW is operating 2-meter RTTY. W44NEJ is enjoying 15-meter DX. W44WDE reports the teenage net will move to 40 meters soon. W4FQX has a new Swan 500 for mobile. W44COD completed a year of operation. W44MZI is DXing on 10 with a dipole. The Atlanta Hamfest will be held June 2 and 3. Nick has planned an especially fine program for this year all in one area. Plan to attend both the Sat. and Sun. programs. Traffic: W4FOE 528, W4RZL 244, W4CZN 136, W44RAY 105, W4FIM 90, W44APL 71, W4FDN 60, W4DDY 56, K4B4I 54, K4AHO 42, W44WDE 28, W4FQX 22, W44YP 13, W44COD 12, W44MZI 7, K4TKX 2.

WESTERN FLORIDA—SCM, Frank M. Butler, Jr., W4RKH—SEC: W4MLE. PAM: W4IKB. RM: W4BVE. Section net reports: Please note the move of WFPN to 3957 kc. Tallahassee: W44EQQ built an inverted "V" for 15 meters out of thin wall conduit. Marianna: The Jackson County SET was a big success. Active were W44ED, W4IRO, W44AMJ, W44SIB, K4UNT and W4KCA. The Jackson County Emergency net now meets Fri. at 7 p.m. on 3950 kc. Chipley: W44FLK, ex-W43GHI, received his new call and will be on 2 meters soon. Washington County C.D. now has its own emergency van. Panama City: The PCARO V.H.F. Net meets Tue. at 8 p.m. on 145.2 Mc. The Field Day committee is composed of W44FIJ, W44IMC and W44ZGI. W4YUT is active on 2 meters. Ft. Walton: EARS station W4SRX, manned by W45OIF, recently played a part in the rescue of HC9EP and crew aboard a raft in the Pacific Ocean. Milton: Whiting Field ARC, W4POY, has a new p.p. 4-400A linear. The club meets the first Tue. of each month. K5IUA is a new ham in town. WOPPA/4 has a tri-band quad up. Pensacola: W44XP renewed RM and ORS appointments. The PARC still is looking for a suitable meeting place. W44ECY, Corry Field, has been appointed OBS for 20 meters. Traffic: K4VY 377, W4BVE 305, W4IKB 80, W44DFM 72, W44JIM 60, W2TPV/4 55, W44EQQ 37, W44FIJ 27.

SOUTHWESTERN DIVISION

ARIZONA—SCM, Floyd C. Colvar, W7FKK—SEC: K7NLY. PAM: W7CAF. RM: K7NHL. TWAI meets on 3570 kc. at 0300Z: Copper State Net on 3878 kc. at 0200Z; Az PON on 3845 kc. 2230Z on Sun. Net skeds are to remind you we need more representation from all parts of Az. It is with deep regret that we report W7-NEL as a Silent Key. The Worked All Arizona Counties Award still is available—details from the SCM. W7SDU reports a fine DX total of 263 countries confirmed. The new ARRL Operating Manual is now available from ARRL. This manual should be a "must" for all sta-

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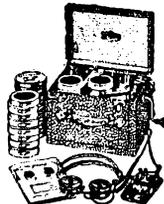
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tions. It completely covers all phases of amateur oper-
ating and is an asset to any station. You couldn't spend
a dollar more wisely. We were pleased to have the
ARRL Director of the Southwestern Division, John
Griggs, W6KW, and his XYL, Roxanna, K6ELO, visit
the Phoenix area to meet the amateurs in this section.
John spoke at a well-attended special meeting of the
Arizona Amateur Radio Club. A big thank you to
K7VOR for making the arrangements, W7WUB/7 has
his 25-w.p.m. sticker; also 89 countries. Yours truly,
W7FKK, celebrated thirty years of ham radio May 15.
Traffic: K7NHL 362, W7FKK 17, K7RUR 4.

LOS ANGELES—SCM, H. G. Garman, W6BHG—
Asst. SCM/SEC: W.R. Calkins, W1KUX/8, RM's: W6-
BHG, W6QAE, W6BBO, PAM's: W6MLZ, W6ORS,
EC's: W6LYQ, W6MLZ, W6ATYR, W6WJT, BFLers
for Mar.: K6EPT, W6DSC, W6GYH, W6WPF, W6-
BBO, W6BKL and W6QXY. W6WPF reports a new
deal: Airforce MARS works liaison with Navy MARS,
both operating either assigned frequencies, Army MARS
transmits on its own assigned frequencies while Airforce
and Navy MARS transmits on their own assigned
frequencies, thus very good liaison between all three
services, working quite well on 2 meters. W6BQXY
has added 2-meter traffic nets to her schedules. W6-
KIL has worked 208 countries with 180 confirmed.
K6IOV soon will be heard s.s.b. on the low bands; he
has a new sideband exciter. K5ANS/6 is busy with
RTTY transmissions of Official Bulletins and c.w.
traffic nets. W6OLD wants an ARRL appointment
for DXers; believes it would improve the quality of
DX operators. W6MLZ reports that on Apr. 1 K6KLN
and W6KAO were mobile on Highway 2 about 3 miles
east of the tunnel near Highway 39 when an avalanche
came down on them and several other cars and buried
one car. WESCARS Net handled the communications;
7 hours 38 minutes later snow plows dug them out—
all safe. W6TXJ lost his 20-40-meter quad in a wind
storm—metal fatigue. W6OUD is very happy with the
new rig and working lots of DX. W6RCV has a four-
element Hornet on a new 54-ft. tower. W6BPI is busy
with school studies. W6PUZ vacationed in KH6-Land.
W6QWJ is sporting a 55-ft. crank-up tower, made
DXCC with 103 countries and received his 20-w.p.m.
sticker. W6GIB is preparing for the June V.I.L.F.
QSO Party and Field Day. SCN now has a second
session to help new amateurs in traffic-handling. Oper-
ating speed on the net frequency is 13 w.p.m. maximum;
off frequency operating speed is up to the individuals.
Support your section level nets: SCN, daily at 0300Z
and 0530Z on 3600 kc.; SCS, daily at 0230Z and 2000Z
on 50,400 kc. Traffic: (Mar.) K6EPT 1328, W6BBO
936, W6GYH 794, W6WPF 583, W6BQXY 523, W6DSC
458, W6MLF 441, W6BKL 418, K6CDW 329, W6TMC
306, W6QAE 304, K6IOV 224, K5ANS/6 221, W6CLD
167, W6WKF 137, W6RHG 70, W6FD 68, W6OEO 68,
W6KZI 66, W6RTV 61, W6OLD 61, W6GGL 57,
W6BQMF 47, W6HUJ 43, W6MLZ 37, K6ASK 36, W6PCP
26, W6AEL 23, W6AM 22, W6TXJ 18, W6TWS 16,
W6KKG 10, W6BSC 10, W6OUD 8, W6USY 5,
W6MPF 4, W6TN 4, W6XC 3, W6DGH 3, W6DQX
2, K6EA 2, W6RS 2, W6RCV 2, W6BUPH 1. (Feb.)
W6QAE 267, W6TXJ 56, W6MLZ 15, W6WJT 7.

ORANGE—SCM, Roy R. Maxson, W6DEY—Monthly
meetings: Orange County DX Century Club, 8 p.m.
Greenbriar Inn, Garden Grove, 2nd Tue., W6CWD,
secy. Newport ARS Inc., 2nd and 4th Fri. 8 p.m. New-
port Recreation Bldg., 1714 W. Balboa Blvd., W6WYH,
pres. Fullerton RC Inc., 3rd Tue. 8 p.m. Recreation
Bldg., Hillcrest Park, W6WSM, pres. Anaheim ARA,
Inc., 4th Mon. 7:30 p.m., Keystone S&L Bldg., 555 N.
Euclid, K6JBG, pres. Orange County ARC, Inc., 3rd
Fri. 7:30 p.m., Lincoln S&L Bldg., 17th and Bristol,
Santa Ana, W6GPK secy. SEC W6WRJ advises use of
a new AREC C.W. Section Net, 3730 at 0930 a.m. Sun.,
W6BNX EC. The new frequency of the Riverside Des-
ert Area AREC Net, Thurs. 1900, is 146.01, per EC
W6ATG. SCN, sessions 31, QTC 1225, per K6IME,
net mgr. W6UTC wants radio chess games around
3950 at 0100Z. W6FB has registered RTTY capability
with the EC. Would appreciate it if others having
RTTY would advise the SEC or SCM. 246 Net, 145.08
Mc. at 1830, 611 check-ins, 113 QTC, per K6DLY. Traf-
fic: (Mar.) W6JFO 379, W6BRJX 259, W6AROF 212,
W6UTC 203, K6IME 129, W6TIF 54, W6KVA 46,
W6WRJ 31, W6AQM 18, W6FB 4, W6NGE 3. (Feb.)
W6BRJX 53.

SAN DIEGO—SCM, Don Stansifer, W6LRU/W6VUI
—The SEC, W6SK, reported 133 AREC members as
of Apr. 1. AREC appointees follow: Asst. SEC: W6-
VNM, North County EC: W6NDL, San Diego City
EC: K6KX, Eastern EC: W6KSA, 80-meter c.w. EC:
W6BGF, 2-meter a.m. EC: W6ATD, 2-meter f.m.
EC: W6GOSB, 10-meter EC: W6ATWF, 6-meter EC:



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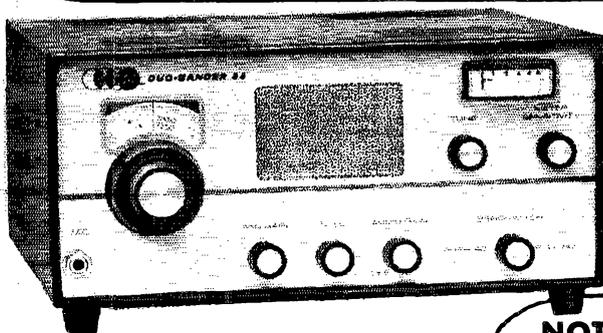
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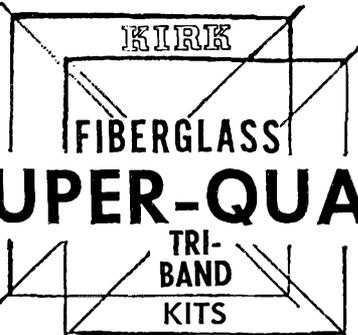
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WB6NYL. A new club member of the V.H.F. Club is WB6ODR. Six-meter EC WB6NYL was the featured speaker at the Apr. V.H.F. Club meeting. W6YSP aided in the search and rescue of two college students in Baja, Calif., with communications. WB6TTV is a new member of the North Shores Club and active on the Post Office Net. W6YKF and his XYL have a new Travelall to pull their trailer. The North Shores had a brunch at Vacation Village in Apr. that was enjoyed by those in attendance. The Apr. meeting of the San Diego DX Club was held at the home of W6CAE. Remember that June is Field Day month. Please address mail to your SCM from June 20 to Sept. 1 only to Route 3, Box 47, Bishop, Cal. 93514. Traffic: K6BPI 8393, W6EOT 732, W6VNG 695, W6BGF 632, W6LRU 50.

SANTA BARBARA—SCM, Cecil D. Hinson, WA6-OKN—SEC: WB6NDP. A code and theory class has been organized by the Northrup-Ventura Radio Club. Meetings are held each Thurs. night and those interested should contact Bob Tracy, of the Northrup Corp. in Newbury Park. WA6VKW is now mobile on 2 meters. WB6UOD has been in the shack only once recently in the last several months but his son WB6UHE keeps the rig hot on 7265. Santa Barbara has a UFO group which is being provided with communications by the Santa Barbara ARC. The Simi Valley ARC held a successful "swap meet" recently wherein a lot of equipment changed hands. WB6DRY has returned from KH6-Land where he seems to have been on the air day and night. Traffic: WB6UHE 2.

WEST GULF DIVISION

NORTHERN TEXAS—SCM, L. L. Harbin, W5BNG—Asst. SCM: E. C. Pool, W5NFO. SEC: W5PYI. PAM: W5BOO. RM: W5LRL. Much to my regret I missed the Midland St. Patrick's Day Hamfest. For some unknown reason the notice of the date went astray and I did not know about the date of the meeting until it was too late for me to attend. According to reports this was about the best; 250 attended the meeting Sat. night and more than 400 registered for the meeting Sun. A 2-hour RACES and MARS meeting was the highlight of the hamfest. The Dallas ARC has come up with a new idea in club notices, using a computer to address meeting notices and this computer also prints the notice of the meeting on the opposite side of the card at the rate of 450 lines per minute. This seems too slow so the club is going to get a computer that will print 1100 lines per minute. The CB Club of Arlington decided to disband, sold its emergency equipment and donated the proceeds to needy families. Many of the CB Club members have joined the Novice class started by the Arlington AC Mar. 7. The Brownfield ARC has a 6- and 2-meter net and holds weekly drills in preparation for the tornado season as well as getting all emergency equipment in order. The KC Club of Ft. Worth has started preparations for Field Day. Officers of the KC Club are K5PAW, pres.; WA5JLJ, vice-pres.; W5TOO, secy.; WA5GUB and WA5HJW, a husband-and wife-team; WA5IKY, treas. Traffic: K5DBJ 159, W5PBN 100, WA5EVS 51, WA5RAN 27, W5PXT 26.

OKLAHOMA—SCM, Daniel B. Prater, K5CAY—Asst. SCM: Sam Whitley, W5WAX. SEC: K5ZCJ. RM: W5-QMJ. PAM-75: W5PML. PAM-6 meters: K5VFR. PAM 2-meters: WA5LBI. Glad to report that W5HKK is back with the same strong signal on 2 meters. Also, he is the proud owner of a new R-4A and T-4X. The Pawnee County ARC holds code classes every Sat. and started theory classes in mid-April. W5EHC was elected City Councilman for Warr Acres. WA5KNR is mobile with a Swan 240. Net reports: OLZ, 26 sessions, QNI 111, QTC 142, SSZ: 24 sessions, QNI 101, QTC 176, OPEN, 4 sessions, QNI 218, QTC 14, STFN, 23 sessions, QNI 540, QTC 101. Traffic: K5TEY 1463, W5PML 711, W5QMJ 116, WA5KNR/5 79, W5MFX 64, W5WAX 57, K5JGZ 40, W8YDA/5 24, WA5KZA 17, K5WPP 11, WA5LWD 7, K5OCX 6, WA5MDN 3.

SOUTHERN TEXAS—SCM, G. D. Jerry Sears, W5AIR—SEC: K5QQG. PAM: W5KLV. RM: W5EZY. The TEX Traffic Net, WA5KMY mgr., is picking up. Come on, you guys, get your feet wet in the C.W. Net at 1900 and 2200 local time nightly. Your area is needed. K5HZR says Houston stations are as scarce as hen's teeth. They are needed on 7250 kc. Mon. through Fri. at 0900-1100 and 1300 to 1500 local time. KM W5FZY has been commuting from San Antonio to Washington, D.C., about once a week and says its plays heck with hamming. K5HMF is putting a new TCS-12 on the air for emergency work and also has started a "Boy Scouts" code class. We expect several new Novices in the future. WA5BQ is working on a new antenna and "big rig." EC W5TFW visited Houston for the dedica-



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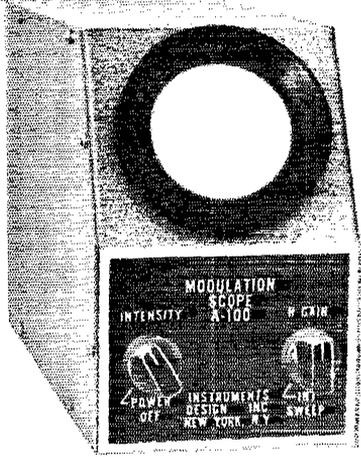
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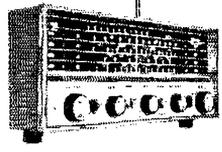
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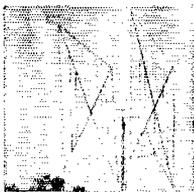
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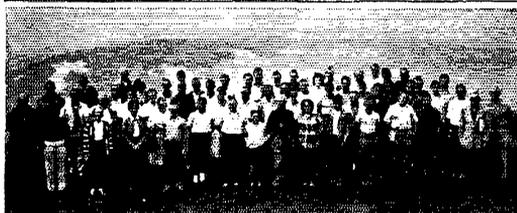


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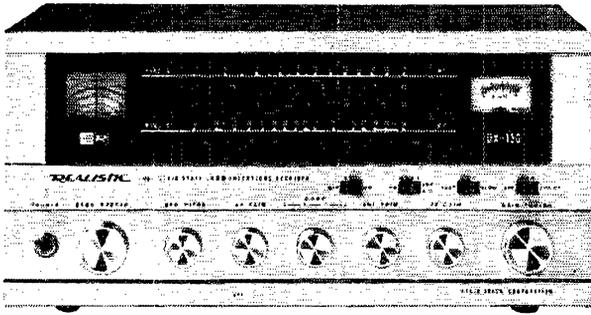
tion of the new HARC building and says they are making Field Day plans now. WA5QKE is working plenty of DX with new Galaxy and an MK-2. K5WYN is getting traffic from K5EFH on 2 meters. EC WA5-NHL lists local nets as follows: Huntsville ARC Net, 7250 kc. 1915S Thurs.; Huntsville/Walker County AREC, 3885 kc. 1st & 3rd Sun. 1600S; Huntsville Novice C.W., 7190 kc. last Sun. of each month at 1430S. W5KR has a new ride-on mower. Anyone with ideas for a mobile unit? W5PUV advises that new officers of the Corpus Christi ARC are WA5AUB, pres.; W5HQR, vice-pres.; Tracy Warren, secy.; WA5PUQ, treas.; W5LMU, dir.; WA5LGB, dir.; W5AQK, dir.; W5-PUV, publicity. W5KXQ recently was acquitted on complaint by the City of Pearland for failure to obtain a permit to erect a tower and connect coax. He ran and won the City Council race. Congratulations, Councilman W5KXQ. K5HZR advises that progress is being made on plans for the 1968 National ARRL Convention. Make your plans now for 1968. The San Antonio gang will make you glad you attended. See you there in 1968. Traffic: W5OSZ 356, K5HZR 256, K5HMF 94, W5ABQ 81, WA5LNV 73, W5BGE 63, WA5QKE 55, W5AQN 24, W5EZY 20, W5KLV 18, WA5IQL 15, W5-TFW 12, K2EIU/5 4, K5WYN 4.

CANADIAN DIVISION

ALBERTA—SCM, Harry Harold, VE6TG—SEC: VE6FK. PAM APN: VE6ADS. PAM ABSN: VE6ALQ. ECs: VE6SA, VE6SS, VE6AFG, VE6PL, VE6XC. ORSs: VE6BR, VE6ATH, VE6ATG. OPSs: VE6HM, VE6SS, VE6ADS. OOs: VE6HM, VE6TY, VE6AKV. OBSs: VE6HM, VE6AIF. Our SEC reports that the AREC is doing very well these days, and that there is lots of activity on 2 meters with the repeater station with the Calgary gang. VE6ATH is doing very well with relays. VE6XC returns to work every night after checking the nets. VE6AO is heard quite regularly checking the nets. Our PAM ASBN is offering a Centennial prize for the most originated messages for the year. Are you ready for the Centennial Alberta Hamfest to be held in Calgary July 8, 9? VE6OW sneaked out of Infsail and is now living in Penhold. The Vulcan Club still is busy with classes and most of the older members are getting their Advanced tickets. The SARC now holds regular monthly meetings and looks like it could be a strong club to be determined fellows at the helm. Traffic: VE6ATH 240, VE6HM 46, VE6FK 33, VE6XC 20, VE6ADK 7, VE6PL 7, VE6SS 6, VE6APO 5, VE6WN 4, VE6YW 4, VE6AAI 2, VE6AFQ 2.

BRITISH COLUMBIA—SCM, H. E. Savage, VE7FB —The East Kootenay monthly letter shows 22 in attendance at the Mar. meeting. VE7AC received his package of 165 1X cards from the QSL Bureau. VE7-BJL, 1926; VE4BR, 1937; VE3ASX 1946; VE3BO, 87 years young and active. VE7BTF, with 18 watts, has applied for his WAC. The Chilliwack ARC code and theory class members are looking good. Columbia ARC is a real active club and prints a good news letter. North and West ARC's officers are VE7EQ, pres.; VE7MQ, vice-pres.; VE7BTW, secy. VE7AIO is NCS for the net on 28,900 kc. at 1800 GMT. VE7AKG has a new HT9 and anyone who drops in during week ends may have a conducted tour of the Pulp and Paper Mill at Crofton. Duncan's new members are VE7AIG, VE7FM, VE7BSV, VE7BZ, VE6AJQ, VE7BNR, and VE7JG. FD plans are really hot. VE7AKE is trying s.s.b. on 2 meters. VE7AOF's tower blew down. VE7-BOR—a boy and all is well. VE7BUV's provisional license is now confirmed. Plans for the British Columbia ARA Picnic in Aug. are going well. VE7BQA's 60 watts is homebrewed to 150 watts and he is active on BCEN. VE7WS's Zero Beat magazine is a good paper. VE7BLO reports 15 meters is real active. RM VE7BLS reports BCEN check-ins are improving, but more are needed. Come on down to 3650 kc. at 0300 GMT. More and more calls are appearing fixed and mobile on 147.33 Mc.; most of B.C. is now on the same frequency. Many thanks to all those that helped with the "Pony Express Ride" in British Columbia. Traffic: VE7ASY 106, VE7BLO 67, VE7DH 28, VE7BQA 20, VE7AC 18, VE7BLS 18, VE7Q 16, VE7BOQ 3.

MANITOBA—SCM, John Thomas Stacey, VE4JT—SEC: VE4JC. ECs: VE4EO, VE4HB, VE4HF, VE4IW, VE4JT, VE4LG, VE4LU, VE4NW. Asst. EC: VE4SC. PAM: VE4EX. OPS: VE4EF. RM: VE4EI. ORSs: VE4-LG, VE4LI, VE4NE, OBS: VE4QJ. OVSs: VE4HI, VE4RE. Nets: C.W. MTN, 3635 daily at 0100Z; phone, 3760 daily at 1900 CST. To round out our section appointees we need two OOs, one for v.h.f., and a PAM v.h.f. Two more OPSs could be used. If interested in any appointment, please drop me a line. The MAARC is sponsoring the centennial Mid-continent Hamfest to



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be held in Winnipeg Sept. 2 and 3. Contact VE4GL or VE4UK for details. Brandon ARC is issuing the "Wheat City Award." North American stations need five contacts with Brandon amateurs, the rest of the world only three. Use any band and mode, contacts from Jan. 1/67 on count. Send QSO details to the club. VE-4RW and VE4EL have ten phone endorsements. Net summaries: Phone sessions 31, QNI 545, QTC 30; c.w. sessions 31, QNI 174, QTC 132, with 98% on TEN representation. VE4LG has been issued a CAN certificate. Traffic: (Mar.) VE4IG 110, VE4EI 103, VE4JT 90, VE4NE 58, VE4RW 52, VE4XN 35, VE4EF 14, VE4QJ 14, VE4NW 12, VE4GN 8, VE4CR 4, VE4GB 4, VE4TM 4, VE4EX 1, VE4PW 1. (Feb.) VE4TM 13.

MARITIME—SCM, J. Harley Grimmer, VE1MX—Asst. SCM: R. P. Thorne, VO1EL. SEC: VE1HJ, VE1AOP and VE1OZ operated from VEONP. HMCS *Margaree*, recently while on a cruise in the Caribbean. VE1ZX was heard operating VEONC, HMCS *Columbia*, en route to the West Coast for re-fit. VE1AQI was active in the YL/OM Contest on c.w. and phone. VE1OZ and VE1AQI are leaving for Ottawa and will be signing VE3 calls this fall. VE1AOT is providing instruction for aspiring hams at the N.S. School for Boys ARC, VE1AGF. He also is converting an ARC-3 for 2 meters. VE1ADH is putting the finishing touches to a new receiver using FETs. Deepest sympathy is extended to the family of VO1GF, who passed away suddenly. VO1HI, VE1GW, VO1EL, VO1FX and VO1FO are active on 2-meter i.m. (*Thanks SONRA News*). There still are many appointments waiting to be filled. Take a chance, apply for one and discover a whole new approach to amateur radio. Traffic: VE1AMR 12, VE1OM 10, VE1AAX 5, VE1MX 1.

ONTARIO—SCM, Richard W. Roberts, VE3NG—VE3BGK is to be complimented on his issuance of the s.s.b. directory. We regret to report the passing of VE3AEL, of Wellington, VE3YN, of Toronto, will take up residence at Sharbot Lake in the fall. VE3BQ has been reinstated as OVS after an absence of twenty years. The R.S.O. of Ontario is to be complimented on its program of assisting the CNIB, future operators in Ontario. I am sure that our sightless brothers will do their part to uphold the traditions of amateur radio. The Cornwall Club announces that government QSL cards are available once again. The Trilliums are getting ready for the ARRL Field Day. Look out, lads, they may take a trophy this year. With the new Rusty Brennan Award for Field Day they have the urge. Congrats to VE3CTY, who now has his Class AA. The RTTY (green key) boys and girls are going great guns, thanks to VE3GK and his fine crew. VE3DXZ, Dot Abel, was feted in the local paper in Azapulco for catching a 9-ft. 6-inch sailfish. Let's try to increase our ham operator numbers by instituting an Apprentice or Novice license. Perhaps the RSO and the national organization, the ARRL, will come up with the formula. The Windsor Amateur Radio Club with the Windsor Centennial Committee, is issuing a local Centennial Award to any amateur contacting 10 club members (North American continent as per ARRL) and 5 club members for all other continents. Send log entry to G.N. Muscat, 303GNNI, 3914 Casgrain Drive, Windsor, Ont., Canada, signed by two other hams or by one club's executive. Traffic: VE3CYR 129, VE3DPO 127, VE3GCE 117, VE3ATI 82, VE3GI 70, VE3EBC 50, VE3NG 43, VE3BLZ 41, VE3BZY 33, VE3BQL 27, VE3WV 27, VE3EAM 26, VE3BBQ 25, VE3DBG 25, VE3AFA 22, VE3BUR 21, VE3EEL 19, VE3AWE 15, VE3EAW 15, VE3FGV 15, VE3ETM 11.

QUEBEC—SCM, J. W. Ihey, VE2OJ—SEC: VE2ALE, RM: VE2DR. PAMs: VE2BWL/h.f., VE2AGQ/v.h.f. New appointees are VE2BWL and VE2AGQ as PAMs. These two, along with VE2DR as RM, should show us the way to many good ORSS and OPSs in the next few months. VE2BAI has forwarded a very good report of a very active v.h.f. net operating in his area on 145.26 Mc. Remember that nets are not appointed to NTS, they do it on their own by their ability to handle traffic, regular liaison with other nets and above all regular reporting each month. We need more ORS, OVS and OPS appointees. The Quebec AREC Net now meets on 7160 kc. at 1600Z Sun. This recent change has been brought about by the very poor band conditions on 3780 kc. at that time of day. A very interesting SET was performed by the 2-meter gang of Montreal and Valleyfield on Mar. 18. Thanks to a few of the old reliables with their fixed or mobiles, a number of interesting points regarding AREC were solved for use in future exercises. A new appointee is VE2HW to OVS. Don is very active on the 432- and 1296-Mc. bands. Traffic: VE2BRD 116, VE2DR 111, VE2AJD 67, VE2BWL 54, VE2BVS 50, VE2AGQ 46, VE2DCW 41, VE2ALI 37, VE2OJ 30, VE2EC 21, VE2AZQ 3.

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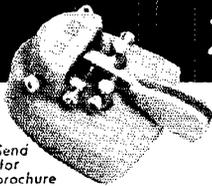
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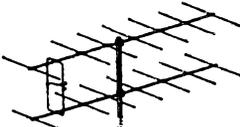
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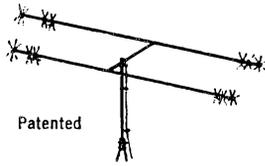
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A 50-Watt P.E.P. Transceiver

(Continued from page 35)

If the transceiver has been constructed in sections, as suggested, proper alignment of the filter system, consisting of the three filter crystals and three i.f. transformers, can now best be done by feeding a sine-wave audio signal at low level, 1000 to 2000 cycles, into the microphone input, and observing the output wave form on a scope. This test set-up is covered under, "Testing an S.S.B. Exciter," in the A.R.R.L. *Radio Amateur's Handbook*. A little careful twisting on the i.f. transformer slugs will produce the proper pattern on the scope, indicating when the pass band of the filter is adjusted for maximum suppression of the unwanted sideband, and the carrier. Additional information on filter alignment will be found in *Single Sideband for the Radio Amateur*.

In actual operation, transmitter adjustment is very simple. Press the push-to-talk switch. Set the v.f.o. to frequency, turn the carrier-balance control to one side, tune the final for maximum output, then adjust R_2 and C_9 for minimum final-amplifier idling current. If C_9 has no effect when connected to one plate of the 12AT7, it should be transferred to the other plate. That's all there is to it. I use a field-strength meter when tuning the final, but the plate-current dip is a fairly satisfactory indicator. During adjustment with the scope, the proper setting of the gain control to prevent overdrive and splatter should be determined.

Power Supply

For home-station operation, the author uses a small bench power supply delivering 600 volts at 150 ma., 250 volts at 75 ma., and 100 volts of bias. The Heath HP-10 supply is used for mobile work. The heater wiring diagram of Fig. 2 provides for either 6- or 12-volt operation.

Careful placement of small parts and wiring should enable the builder to construct a transceiver that will look neat, and perform satisfactorily in both fixed and mobile service. In mobile operation, good communication over distances from 100 to 300 miles is not uncommon. For points not covered here, it is suggested that prospective builders refer to the article by K5BUQ.

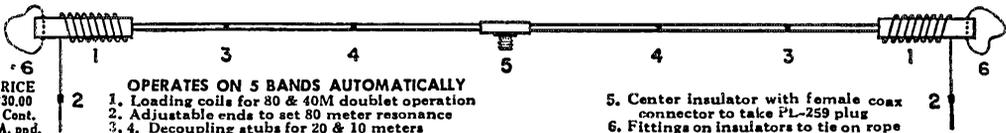
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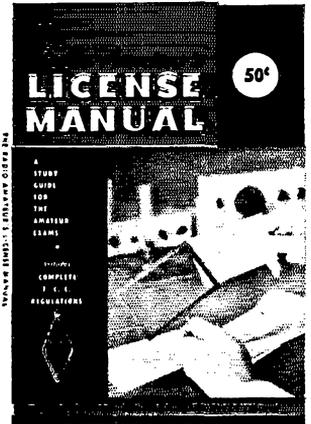
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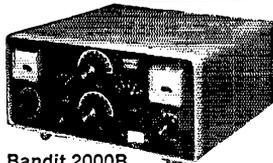
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Model 8902-B pre-tuned 455 kHz IF strip provides excellent gain (55 db), and can be fed directly from a converter without having to buy a matching transformer. No alignment is required. The 2 transistor amplifiers and diode detector are capable of driving earphones.

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50	5¢	600	19¢
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400 mc NPN SILICON **5 for \$1**

2N706 Watts | V_b | H_{fe} | m_a

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200	12¢	1000	51¢
400	16¢	1200	69¢

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HALF WATT.....29
 1-WATT.....45
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Volts	Volts	Volts	Volts
5.4	18	43	82
6.4	20	47	91
8.0	22	51	120
9.1	24	58	130
10	27	62	150
12	30	68	160
13	33	75	180

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PIV	Sale	PIV	Sale	PIV	Sale
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3		7¢	11¢	17¢
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AMPS	400 PIV	600 PIV	800 PIV	1000 PIV
3		31¢	40¢	59¢
15		1.35	1.59	1.79
45		1.59	2.50	2.95

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The World Above 50 Mc.

(Continued from page 98)

Dakota. Wally worked KSCLA.0 but didn't mention the North Dakota station's location. The contact was on f.m.

W5ORH at Oklahoma City reports several Australian stations are preparing for e.m.e. including VK2s AAK, HO, ZCF and ZRU. Dish antennas will be used.

Previously-mentioned TI2NA is making plans for a 432 e.m.e. effort. Erik says he now has 100 watts output on the band and is in the process of building a K2CBA final to produce about 600 watts out. He is working on an array of 208 elements.

RECORDS

Two-Way Work

50 Mc.: LU3EX — JA6FR
 12,000 Miles — March 21, 1956
 114 Mc.: W6NLZ-KH6UK
 2540 Miles — July 8, 1957
 220 Mc.: W6NLZ — KH6UK
 2510 Miles — June 22, 1959
 120 Mc.: W5LUU — WA4KFW
 1150 Miles — April 13, 1965
 1215 Mc.: W6DOJ/6 — K6AXN/6
 400 Miles — June 11, 1959
 2300 Mc.: W1E1F/1 — W2BVU/1
 170 Miles — July 13, 1963
 3300 Mc.: W6IFE/6 — W6VIX/6
 190 Miles — June 9, 1956
 5650 Mc.: WA6KKK/6 — WB6JZY/6
 179 Miles — October 15, 1966
 10,000 Mc.: W7JIP/7 — W7LHL/7
 265 Miles — July 31, 1960
 21,000 Mc.: W2UKL/2 — WA2VWI/2
 27 Miles — Oct. 24, 1964
 Above 30,000 Mc.: W6NSV/6 — K6YYF/6
 500 Feet — July 17, 1959

MOONBOUNCE RECORDS

Two-Way Work

114 Mc.: VK3ATN — K2MWA/2
 10417 Miles — Nov. 28, 1966
 120 Mc.: W1BU — KH6UK
 5092 Miles — July 31, 1964
 1215 Mc.: W1BU — KH6UK
 5092 Miles — August 9, 1962

1296 Mc. and up news is thin as usual. WA4BYR at Englewood, Florida and K4NTD in Oakwood, Florida are running 1296 skeds with about 4 watts each over a 125 mile path with hardly a miss. WA4BYR says a 1296 record would be "duck soup" if someone would get on the band in Texas so he could work him. The Florida-to-Texas path across the Gulf is capable of producing some terrific ducting signals. At Holliston, Mass. K1FFE is continuing his 2415-Mc pulse tests with K1JIX in Harvard, Mass.

There are several assaults on 1296 being planned for the June contest on both coasts so there should be some interesting results to report. How about it — with pictures?



What's the best antenna heading to hear a 6W8?
 What time is it in Zanzibar?
 How many IRC's for a letter from a ZP?
 Are the Dodecanese in Asia?
 Is a ZE in DX Zone 38?
 What's the address of the
 Venezuela QSL Bureau?

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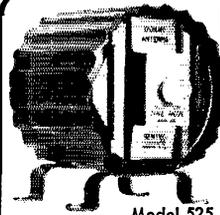
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VSWR (max)	1.05	1.1	1.05	1.05	1.1	1.05	1.05
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W1HNI, Edward R. McDonough, Dorchester, Mass.

ex-W1IIS, Harry L. Sawyer, Wollaston, Mass.
W1I2G, Walter S. Pond, Waterbury, Conn.

W1MKM, Paul C. Estey, Brattleboro, Vt.
K1OMR, Jack H. Derrah, Milford, Conn.

W1ZSS, Norman E. Froggatt, Wollaston, Mass.
W2CQC, Saul Kron, Bloomfield, N. J.

K2DLI, Stanley I. Spencer, Ft. Plain, N. Y.
W2KJR, B. Harold Christenson, Brielle, N. J.

WA2KZQ, T. Worth Hull, Gouverneur, N. Y.
W2NFB, Raymond I. Austin, Staten Island, N. Y.

WB2NOT, Arthur Prackelt, Floral Park, N. Y.
ex-2SF, Allan Kollock, Bellaire, L. I., N. Y.

W3AFW, Leroy W. Johnson, Drums, Pa.
W3LUK, Gustave E. Sadlon, Butler, Pa.

W3RGG, Daniel Rosenthal, Philadelphia, Pa.
K3UID, C. Paul Haller, Towson, Md.

K3WLH, Robert O. Derrick, Millmont, Pa.
W4AIJ, Robert W. Elton, Jacksonville, Fla.

K4BDN, Robert C. Davis, Paducah, Ky.
W4CQE, Elmer H. Gardner, Aiken, S. C.

K4DL, Paul K. Trautwein, Clearwater, Fla.
WA4GXR, William P. Roark, Franklin, Ky.

WA4NDL, Robert F. Kerr, Louisville, Ky.
W4OQK, Angelo H. Biviano, Clayton, N. C.

K4RRC, Leo H. Archambault, Bradenton, Fla.
WA4SVE, Charles H. Brown, Miami, Fla.

W5BJ, Roy W. Layton, Tyler, Texas
WA5DGE, Noble F. Wynn, Jr., Lawton, Okla.

WA5EIH, Lawrence Lilly, Gonzales, Tex.
K5GAY, Hayes J. Bell, Beaumont, Tex.

W6ED, Arno C. Dorau, Alhambra, Calif.
W6HMW, Hinmen E. Bostrom, Northridge, Calif.

K6LKK, James A. Zachritz, Hayward, Calif.
W6MEK, Frank G. Valentich, Castro Valley, Calif.

K6SNL, Clyde W. Rudy, Half Moon Bay, Calif.
K6UAN, Wilfred M. LaFond, Sacramento, Calif.

W7AF, William E. Howell, Bellingham, Wash.
W7BHN, Stuart L. Dunkle, Salt Lake City, Utah

K7DXX, Walter E. Frank, Globe, Ariz.
WN7FJP, Theodore R. Parks, Salem, Ore.

W7NEL, Norman A. VanHouten, Phoenix, Ariz.
W8DAQ, Harold P. Kenyon, Muskegon Heights, Mich.

W8FK, Conrad S. Fritschel, Columbus, Ohio
W8HZZ/W8ORT, A. W. Bob Hanes, Nitro, W. Va.

W8MXF, Joseph E. Juda, Cleveland, Ohio
W8RES, Charles Hohl, Huron, Ohio

W8TAP, Ivan C. Thompson, Beckley, W. Va.
W8TSG, William Herr, Sr., Almont, Mich.

W8TTL, Aurrell Jones, Cleveland, Ohio
K8YAN, Edgar A. Nash, Manchester, Mich.

WA9AJI, Robert A. Bromberg, Chicago, Ill.
WA9BLJ, Ruth Bonnds, Belvidere, Ill.

W9COS, Bernard H. Shallow, Logansport, Ind.
W9ET, Theodore S. Cliff, Indianapolis, Ind.

K9EUIH, Charles J. Salmans, Aurora, Ill.
W9FYE, Myron V. Cochran, Arlington Heights, Ill.

W9GLG, U. Oden Etchison, Alexandria, Ind.
K9JZR, John Donovan, Chicago, Ill.

W9LJ, Glenn Imler, Gary, Ind.
W9PIQ, William J. Knisely, Garrett, Ind.

ex-W9RA, George E. Joyce, Chicago, Ill.
K9UZB, Frederick Bounds, Belvidere, Ill.

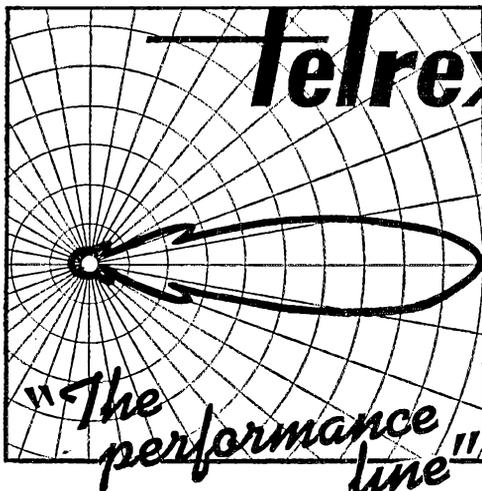
K0GEJ, Emmett A. Childress Jr., Creve Coeur, Mo.
W0SW, Tom E. Davis, Willmar, Minn.

K0YVE, Einar A. Olson, Fergus Falls, Minn.
W0ZJB, George Vince Dawson, N. Kansas City, Mo.

HC1EL, Renato, Espinoza, Quito, Ecuador
TF3MB, Magnus Blondal, Reykjavik, Iceland

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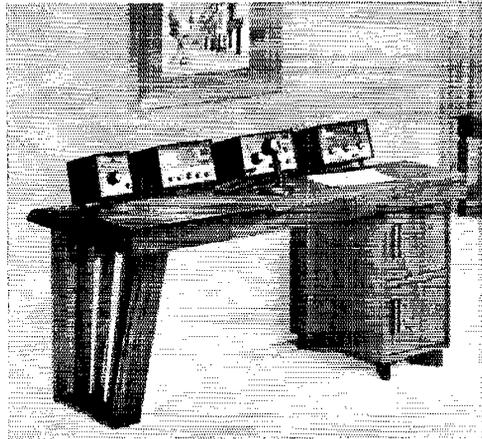


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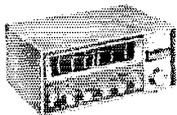
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IARU News

(Continued from page 85)

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- South Africa:* S.A.R.L., P.O. Box 3037, Cape Town
- Spain:* U.R.E., P.O. Box 220, Madrid
- St. Vincent:* QSL Bureau, P.O. Box 142, St. Vincent, West Indies
- Surinam:* QSL Manager (PZ1AR), Surinam Amateur Radio League, P.O. Box 240, Paramaribo
- Swan Island:* Swan Island, West Indies via Tampa, Florida
- Sweden:* Sveriges Sandare Amatörer, FACK, Enskede 7
- Switzerland:* U.S.K.A., 6233 Buron/LU
- Syria:* P.O. Box 35, Damascus
- Tanzania:* RSEA, P.O. Box 2387, Dar es Salaam
- Trinidad and Tobago:* Les. A. Thomas, 9X4LT, Los-Iros Road, Erin, South Trinidad
- Turks and Caicos Islands:* via Jamaica
- Uganda:* R.S.E.A., QSL Bureau, P.O. Box 3433, Kampala
- Uruguay:* R.C.U., P.O. Box 37, Montevideo
- U.S.S.R.:* Central Radio Club, Box 88, Moscow
- Vatican:* HV1CN, Domenico Petti, Radio Station, Vatican City
- Venezuela:* R.C.V., P.O. Box 2285, Caracas
- Virgin Islands:* Graciano Belardo, KV4CF, P.O. Box 572, Christiansted, St. Croix, V.I. 00820
- Wake Island:* Jack A. Chalk, KW6EJ, P.O. Box 415, Wake Island 91930
- Wales:* via Great Britain
- West Pakistan:* Lahore Amateur Radio Society, P.O. Box 65, Lahore
- Yugoslavia:* S.R.J., P.O. Box 48, Belgrade
- Zambia:* Radio Society of Zambia, P.O. Box 332, Kitwe

A.R.R.L. QSL Bureau

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions and Canada of those QSL cards which arrive from amateur stations in other parts of the world. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4½ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner. Changes are shown in heavy type.

- Cards for stations in the United States and Canada should be sent to the proper call area bureau listed below.
- W1, K1, WA1, WN1 — Providence Radio Ass'n., W1OP, Box 2903, Providence, Rhode Island 02908.
- W2, K2, WA2, WB2, WN2 — North Jersey DX Assn., P.O. Box 505, Ridgewood, New Jersey 07451.
- W3, K3, WA3, WN3 — Jesse Bieberman, W3KT, RD 1, Valley Hill Rd., Malvern, Pennsylvania 19355.
- W4, K4 — F.A.R.C. — W4AM, P.O. Box 13, Chattanooga, Tennessee 37401.
- WA4, WB4, WN4 — Richard Tesar, WA4WIP, 2666 Browning St., Sarasota, Florida 33577.
- W5, K5, WA5, WN5 — Hurley O. Saxon, K5QVH, P.O. Box 9915, El Paso, Texas 79989.
- W6, K6, WA6, WB6, WN6 — San Diego DX Club, Box 6029, San Diego, California 92106.
- W7, K7, WA7, WN7 — Willamette Valley DX Club, Inc., P.O. Box 555, Portland, Oregon 97207.
- W8, K8, WA8, WN8 — Paul R. Hubbard, W8OCXY, 921 Market St., Zanesville, Ohio 43701.
- W9, K9, WA9, WN9 — Ray P. Birren, W9MSG, Box 519, Elmhurst, Illinois 60126.
- W0, K0, WA0, WN0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minnesota 55921.
- VE1, 3C1 — L. J. Fader, VE1FQ, P.O. Box 663, Halifax, N.S.
- VE2, 3C2 — John Ravenscroft, VE2NV, 135 Thorncrest Ave., Dorval, Quebec.
- VE3, 3C3 — R. H. Buckley, VE3UW, 20 Almont Road, Downview, Ontario.
- VE4, 3C4 — D. E. McVittie, VE4OX, 647 Academy Road, Winnipeg 9, Manitoba.
- VE5, 3C5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Saskatchewan.
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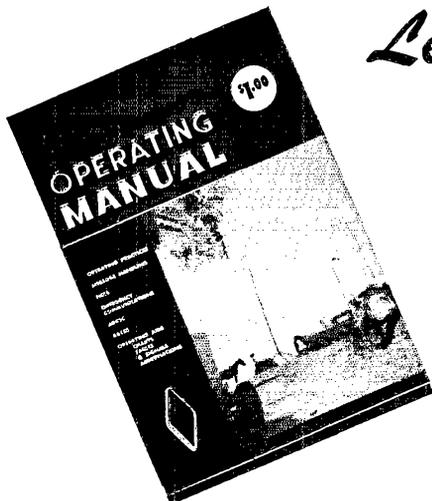
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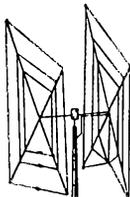
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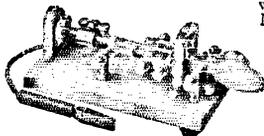
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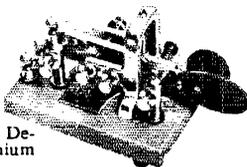
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VE8, 3C8 — George T. Kondo, VE8 ARRL QSL Bureau of Department of Transport, Norman Wells, N.W.T. VO1, 3B1 — Ernest Ash, VO1AA, P.O. Box 6, St. John's, Newf.

VO2, 3B2 — Goose Bay Amateur Radio Club, P.O. Box 232, Goose Bay, Labrador.

KH6, WI6 — John H. Oka, KH6DQ, P.O. Box 101, Aiea, Oahu, Hawaii 96701.

KL7, WL7 — Alaska QSL Bureau, Star Route C, Wasilla, Alaska 99687.

SWL — Leroy Waite, 39 Hanum St., Ballston Spa, New York 12020.

*These bureaus prefer 5 x 8 inch manila envelopes.

KENYA RELEASES LICENSES

The Government of Kenya has just began approving new amateur licenses for the first time in a number of years. Among the first to be approved was a license for Jerry Plemmons, WA6PKN. Negotiations between the government and the Radio Society of East Africa had been in progress for more than three years. Licensing information is available from Jerry Plemmons, WA6PKN, P.O. Box 14661, Nairobi, Kenya. 5Z4 amateurs are allowed 150 watts d.c. input. QST

1967 ARRL Field Day Rules

(Continued from page 65)

(Example: 60 watts p.e.p., s.s.b. rates as 30 watts.) The plate input of a grounded-grid amplifier is its plate input plus the plate input to the driver stage.

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

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

Multipliers do not apply to Class D and E entries.

Claimed Score: The final score equals the total "points" times the "power multiplier" times the "independence-of-mains" multiplier (times the "battery power" multiplier, if applicable.) Where different multipliers apply during the Field Day period, points are determined by the multiplier in effect at the time the points were earned.

10. Club Aggregate-Mobile Scores: Entries under Class C may be combined to form a "Club Aggregate-Mobile Score." The club name must be noted on the individual reports, and the club secretary must submit a claimed aggregate score. Credits to the extent supported by the reports submitted to ARRL will be allowed. Only bona fide members of the club, residing in the local club territory, may contribute to the aggregate-mobile club listing.

11. Reporting: Mail reports or entries on or before July 21. Reports must show starting and ending time of FT) operating period, bands used, dates and contact times in GMT, calls of stations worked, signal reports sent and received, and ARRL sections or locations of stations worked. Reports must also show power inputs and sources of power, number of transmitters in simultaneous operation, location of station, number of persons participating, class of entry, and score computations. QST

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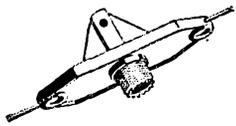
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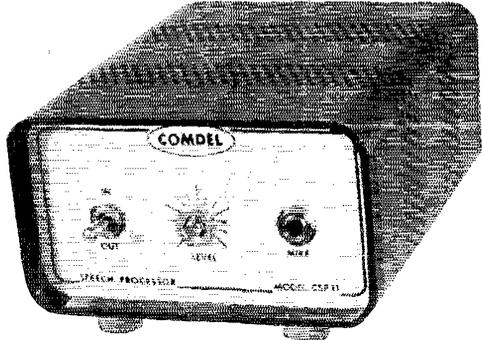
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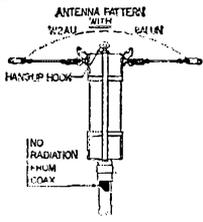
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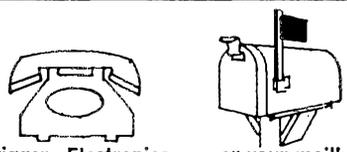
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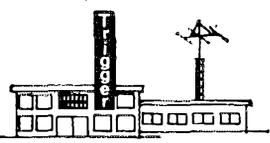
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OSL, SWL, cards that are different. Quality card stock. Samples 10¢. Home Print, 2416 Elmo Ave., Hamilton, Ohio.

SAMCO, Crafted OSLS. Reserve your samples now! Only 1000 orders will be accepted on current sample issue. All OSLS \$9.00 post/500. Samples 10¢ (Ham band only). Samco, Crafted OSLS, Box 203, Wyanantskill, N.Y. 12194.

RUBBER Stamps. 3-line address \$1.50. J. P. Maguire Company, 448 Proctor Avenue, Revere, Massachusetts 02151.

OSLS-SWL-WPE, Samples, 10¢. Gates Print, 317—11th Ave., Juniata, Altoona, Penna. 16601.

WANTED: Drake 2-B, calibrator, 2-BO, "O" multiplier. Also want LF converter. WASMKB, 725 Pennsylvania, Joplin, Missouri 64801.

HAMFEST, Charlotte, N.C. Two big days, June 10th and 11th. Many activities, free barbecue on Sunday. Huge air-conditioned Park Center. Advance tickets \$3.75 for both days. Write: Hamfest, Airport Station, Charlotte, N.C. 28208.

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, Oalesby, Illinois 61348 or see Hamfest Calendar in May QST.

CAPE Kennedy Hamfest sponsored by the Platinum Coast Amateur Radio Society, 2nd annual hamfest at the Civic Auditorium, Melbourne, Florida. Home-making and flower shows. Swap tables and ham equipment auction. The 1966 hamfest Giveaways every hour. Fun for the XYL kiddies and the OM himself. For info write P.O. Box 1004, Melbourne, Florida 32901.

MISSISSIPPI HamFest July 23, State Fairgrounds, Jackson, Mississippi. "Ham-Feast" Saturday 7:00 PM Millsaps College Student Center. Fun galore. For information write: Box 8371.

OLD Old Timers Club now over 650 members with verified 2-way contacts before 1926. Life membership \$15.00. Bi-monthly "Spark Gap Timers" \$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 Rita, 91st and Wolf Roads, 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 Purtock, WA9MRE, 2916 West Marquette Road, Chicago, Illinois 60629.

"SAROC" Sahara Amateur Radio Operators Convention 4-7 January, Third Annual Fun Convention hosted by the Southern Nevada Amateur Radio Club. Designed for exhibitors and participants at Hotel Sahara, Las Vegas, Nevada. MARS seminar. Army Airforce and Navy representatives. Ladies' luncheon with crazy hat contest, hat should convey amateur radio theme. Plus fabulous entertainment only "Las Vegas" can present. Registration fee includes three cocktail parties. Hotel Sahara Show, Hunt Breakfast, technical sessions, admission to leading manufacturers and sales exhibits. Advance registration closes one January. QSP OSLS with zip and telephone number for details to Southern Nevada Amateur Radio Club, Box 73, Boulder City, Nevada 89005.

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.

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., W5LO, 722 So. 30th, Muskogee, Okla.

ESTERLINE-Annus chart recorders wanted. Model AW preferred, but will consider others. For private use. State price, condition in letter. Louis Breyfogel, W0M0X, Box 17, Boulder, Colo. 80302.

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. 17122.

WANTED: RTTY converter. Prefer Twin City TU, K8GKR, RR #1, Harrod, Ohio 45850.

CANADIANS: Best used gear list in Canada. Free Etco, c/o Mary, VE2ANN, Box 744, Montreal 3.

CANADIANS: For Sale: HW-12 with Dynalab Tri-band conversion A.C. supply. \$150.00. G. G. linear pr 813's and p/s \$100; Heath HX-11 and V.F.O. \$50.00. VESFBM, Ron. 633-4449. 44 Dehaviland St., Downsview, Ont., Canada.

DRAKE 2B with Knight kit crystal calibrator in mint condition. Used less than 30 hours. \$175.00. Jig Donald Stewart, KING, 240 Harmon Avenue, Panama City, Florida 32401.

WANTED: Tubes and all aircraft and ground radios. Units like 17L, 51X, 61E or S, 83R, R30, 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. Lavery, 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.

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. RC-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. Elmer Buchanan, W6WVC, 1067 Mancana Blvd., Oakland, Calif. 94610.

TOOOBES: 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. Catalogs 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 5-700.

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 Ed.; How to Become a Radio Amateur, Edition 10 and 12; The Radio Amateur's License Manual, Edition 7, 10, 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 uncase, 5/\$2.50. Postpaid. Humphrey, WA6FKN, Box 34, Dixon, Calif.

SELL: CO, 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.

WANTED: BC-348, BC-224, BC-375. Please state condition and price. Charles Lee, 69 Madison St., New York, N. Y. 10002.

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. Fults, K4NKI, 3021 Hereford Road, Roanoke, Va. 24018 on weekends.

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.

SSB: GSB-100, \$175.00; HQ-170, \$175.00. Both in perfect condition. Must sell. WASAME, 230-53rd S.W., Albuquerque, N.M. 87105.

TWO Meter Transceiver package. Heath HW-20. VFO, 10 watts, fixed mobile power. Almost unused, best offer. KIYYE, 49 Rivercrest, Hanover, N.H. 03755.

SELL Precision built TMC VFO 2-64 Mc. \$250.00, or reasonable offer. Robert Ireland, Pleasant Valley, N.Y. 12569.

FOR Sale: 30L-1, \$350.00. W0HWE, Fred Oster, 1133 27th St. N.E., Cedar Rapids, Iowa 52402.

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 for only \$3.98. General Class, 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.

RTTY Channel filters, octal mounted, specify frequency, \$5.95 pair, 88 mh toroids, uncase, 5/\$2.50. Herman Zachry, WA6JGI, 3232 Selby Avenue, Los Angeles, California 90034.

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.

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, not shower every 2nd, 2nd, 139 questions of the 297 in the Lake Shore Camp Sites. Literature, Al Q. Livingstone, W2OPN, 12-01 Ellis Ave., Fair Lawn, N.J.

HALLICRAFTERS HT-45 linear 2 kw. Exclnt condx, \$275.00. W3CEX, tel: 301-761-7119, Balto, Md.

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 excit 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.

RANGER I, in perf. condx, \$115.00 plus shipping. Walt, W2JZE, 1414 Flagg Ave., Utica, N.Y. 13502.

SELL: SX-111, \$125.00. In excellent condition. Will deliver within 200 miles. K9OYB, 305 N. Seminole Circle, Ft. Wayne, Indiana 46807.

PL-172 with PL-184A air socket and chimney, new, \$60.00; also new, 4CX350, 10-100 each. Philip Sienkewicz, Box 1226, Rochester, N.Y.

EXCELLENT Twoer with squelch, \$35.00; G-E 2M FM portable, \$80; Sixer, \$25.00; Eico 1020 p/s, \$13.00; Warkim 125W transverter, \$22.00; Knight P-2 SWR bridge, \$10.00; Heath resistance and condenser box, \$3.50 ea. 1. Tex earprones w/mike, \$8.00; surplus 2M, trans, w/6360 final, \$10.00; Heath telephone amp., \$8.00; 1l ea. 2 M collapsible beam, \$10.00; 2M squalo, \$5.00; Mastercrafters 24 hr. clock, \$5.00. WB2LGG, 5 Bohling Rd., New Hartford, N.Y. 13413.

DXERS/S/ Line Owners: Stop bandswitch changing when working DX on 20. New xtals installed in 60 seconds, Just \$10.95 postpaid. VCZ Sales, 5 Pinetree Road, Ramsey, N.J. 07466.

WANTED: Military, Commercial, Surplus, Airborne, Ground, Transmitters, Receivers, Test sets, Accessories, Specially Collins. We pay cash and freight. Ritco Electronics, Box 136, Annandale, Virginia 22003. Tel: (703)-560-5480 collect.

COMPLETE Stromberg Carlson radio paging system. 3RB Encoder, 327B transmitter, 11 TR-300 pocket receivers. Excellent condition. Make offer. Tony Wheeler, K9BBA, Mobil-Land #216, Bloomington, Illinois 61701. Tel: (309)-823-5483.

SELL: SX-99, AGC/Product detector unit, Q-multiplier, \$110.00; HG-10 VFO, p/s, \$35.00; T-60, \$35.00. Portable mill, \$35.00. Looking for Drake 2B or 2C. WB2GBR, Carl, 29 Elmwood Road, Florham Park, New Jersey 07932.

WANT: Will buy any or all test equipment used in ARRL book "Course in Radio Fundamentals". Any condition accepted, all letters answered. Leon Fernald, Box 789, Christianton, St. Croix, Virgin Islands 00820.

FOR Sale: Hammarlund HQ-150 receiver, \$110.00; Heath DX-100 transmitter, \$75.00; Hy-Gain Tri-band beam tower, and Ham-M rotor, \$100.00. All above, plus extras for \$250.00. K3ALU, 32 Flamingo Road, Levittown, Penna. 19056.

FOR Sale: Complete SSB mobile rig. Hallicrafters SR-160 with 12-volt DC supply (PS-150) 20M antenna, PIT microphone speaker, mounting rack, complete with cables and manual. All like new, \$275.00. H. Stutske, W6ACB, 1031 S. Wooster St., Los Angeles, Calif. 90035.

SWAN 350, 117v, AC pwr. supply, xtal clibr. latest factory mods. by Swan Co. One year old, like new condx. Original cartons. \$395.00. P.O.b. W6MCS, Rte. 1, Box 666, Arroyo Grande, Calif. 93420.

SALE: B & K 500 tubetester, \$15.00; teletest CT355 capacitester, \$10.00; Eico 250 a.c. VTVM and ampl. \$30.00; Ameco Senior code course, \$5.00; Shure 420 microphone \$10.00 KCX reverb, \$10.00; G-E pri light meter (trade?) \$5.00. Witmer, 3122 N. Harding, Chicago, Ill. 60618.

SELL Or trade Collins 30L-1, Precon HE-73. WB6BLF, 1036 Carol Lane, Lafayette, Cal. 94549.

WANTED: Marauder transmitter, Heath. Will pay good price depending on condx. Call after 6:00 or write Judd Goodman, WB2VOC, Hillwood Lane, Plainview, N.Y. 11803. Tel: (516) WE 5-5726.

AUTRONIC Electronic keyer and Autronic key, \$40.00; Johnson Matchbox, 250-23, 215 watts, directional coupler and indicator, \$40.00; Astatic D-104 mike with stand \$10.00. Excellent condx. Max H. Kearns, K7WSW, 700 Savage Creek Road, Grants Pass, Oregon 97526.

TRANSMITTER: Heathkit SB-400, excellent condition, \$290.00. New GD-104 microphone w/PTT stand, \$23.00. Mike Tortorella, WA2TGL, 2805 Pond Place, Bronx, N.Y. 10458.

HT-32B, absolutely perfect, \$600.00. SX-101A, in good condx, \$275. Mike Watts, Room 530, 601 S. Howes, Fort Collins, Colorado 80521.

NCL-2000 wanted: Polycrom 6-meter transceiver for sale. Used 10 hours. \$150.00. Joe Birenbaum, K1QFN, 873 Montauk Ave., New London, Conn. 06320.

COLLINS 75A-1 receiver recently reconditioned by World Radio Labs. In excellent condition. Asking \$150.00. W2NSV, Larry Shulman, 215-05 29th Ave., Bayside, L.I., N.Y. 11360. Tel: (212)-BA 5-2025.

CHICAGO Area hams: HQ-170C with speaker for sale: \$185.00. In exlnt condx. W9MRJ, 109 Maple Ave., Highwood, Illinois 60040. Phone 432-3618 after 6 PM.

SELL: Mint HQ-110, Lafayette speaker, \$130.00. Knight T-150, JT-30, \$70.00. Both for \$190.00. Will ship. WA1ELX, 65 Eagle Road, Worcester, Mass. 01605.

COLLINS 32S-1 with 110 pwr., \$300; 75S-1 (both converted for RTTY-Rec. & trans.) \$200.00; 30-S-1, mint cont., \$700; RTTY mod 15 with converter and pwr. automatic carriage ret. \$100. Total, \$1300.00. Should appreciate. Sell only as package for \$1200. Save \$100. C. A. Traverse, K3UHP 515 Colu-ge Ave., Alva, Okla. 73717.

REBUILT Generators produce 110 VAC 250 watts. Use with lawn mower and have an inexpensive 60 cycle power plant, \$29.95. Guaranteed. Dixon, 1535 Progress St., Florence, S.C. 29501.

GLOBE Champion 300A, excellent, with manual: \$125.00; Globe LA-1 300 watt GG linear with internal fan cooling and outdoor HV power supply, \$90.00. Cannot ship, but will deliver within 150 miles radius. W3LIE, RD #1, Box 291, West Middlesex, Penna. 16159.

SELL: Five band SSB-CW station: transmitter; Heath HX-20 with HP-20 power supply, \$128.00. Receiver, Monawk KX-1, \$19.00. Also \$130.00. 650 dynamic transconductance tube and transistor tester, \$69.00. WB6KAH, 2911 West 134 Place, Gardena, Calif. 90249.

THOR VI: excellent 6-meter transceiver by Clegg. Guaranteed perfect condition, not a scratch. Have lost interest in VHF, need money for HF linear. \$200 complete. James Lunt, WA3AUF, 8434 Ardleigh St., Philadelphia, Penna. 19118.

KWM-2, PM-2, perfect, \$850.00. E. P. Simon, 850 Richmond Road, East Meadow, N.Y. 11554.

WANTED: Type F-455-J mechanical filter for Collins 75A-4. Any frequency between 2.1 and 2.8 Kc. State price and condition. John K4AXV, 4148 Sandwood Dr., Columbia, S.C. 29206.

CHEAP: SX-110, \$70.00; Eico 720, \$45.00. Both electrically and physically perfect. Manuals for each. I'll ship. K3MTG, Mt. Vernon St., Oxford, Penna.

INTERESTING Sample copy free! Write: "The Ham Trader," Sycamore, Illinois 60178.

SB-100 with P-23, built in January, \$350.00. RME VHF-126 tunable converter, \$100.00. Lanny Aldrich, K1LEC, RFD 1, Springfield, Vt. 05156.

SELL: SX-101A, R-48 matching speaker, Challenger xtr, VFO, and pwr. supply. In excellent condx. \$300. K3SID W. Main St., Galeton, Penna. 16922.

HENRY 2 K like new. Want to trade for mint KWM-2, etc., or S/Line, or SR-2000. WA4LXX, 251 Collier Ave., Nashville, Tenn. 37211.

DRAKE 2B. Mint cond. manual included: \$175.00. Will ship. WA6RXB, 837 Opal Dr., Apt. #1, San Jose, Calif. 95117.

SELL: Johnson Valiant II, factory-wired, \$225.00. W9OPL, 9513 N. Karlov, Skokie, Illinois 60076. Tel. OR 4-5848.

COLLINS 312-B4 serial #1161, never used, \$125.00. Paul Freeland, WSZVB, 1604 Markwell, Oklahoma City, Okla. 73127.

SELLING Heathkit Marauder, HX-10. Excellent condition. \$275.00. WB2HYK, 216-69 8th Avenue, Bayside, L.I., N.Y. 11364.

SELL: Hallcrafters SX-101A, \$160.00; HT-32A, \$270.00. Both in excellent condition, will deliver within 150 miles radius. Willing to make special consideration on package deal. Richard Rozny, K1QKQ, 141 North Ave., Westport, Conn. 06880. Tel: (203)-227-4721.

WANTED: 75S-1, Philadelphia and N.J. Areas only. Julio, 1123 Upsal St., Philly, Penna. 19150.

WANTED: Gonset Communicator IV for 1 1/4 meters, model 3351. Bill Barry, Box 609, Lebanon, Tennessee 37087.

NOVICE Station: HE-30 with speaker, Eico 723, HE-73 pre-con. Dow-Key DK6OG2C with connectors, six crystals, complete for \$125.00. HE-55 squeel, \$8.00. Homebrew 15 meter rotatable dipole, TR-10 rotor with cable, \$20.00. Ed Jacobson, 807 Baldwin Drive, Westbury, L.I., N.Y. 11590. Tel: (516)ED4-4863.

NYC Area, NCX-3 and HP-23 AC, PS, \$200 cash and carry. Tel: (212)-564-1557.

QSTs for sale: June 1947 through 1966, 13 issues missing. Will accept best offer. R. J. Cutting, W2KG1, 128 Browers Lane, Roslyn Heights, N.Y. 11577.

SELL: HW-12A, \$85.00; HP-13, \$40.00; HP-23, \$30.00; HW-29, \$30.00; all perfect. Will trade. Want: 300 watt mobile power supply; general coverage receiver. K4MNB, Kenneth Bentz, 300 McCauley St., Chapel Hill, North Carolina 27514.

FIRE Retardant paint for your shack. Details, Leonard Poole, W4RKE, 42 Wood St., Herndon, Virginia 22070.

WANTED: B&W 51SB-B, clean, gud condx. Write Ed Stewart, W3SCF, Box 303, Valley Forge, Penna. 19481.

HEATH Shawnee 6-meter mobile. Fixed transceiver complete. Nuistor preamp added. Rich, WA2CSE, 55 Bulson Road, Rockville Centre, N.Y. 11570. Tel: (516)-678-1523.

FOR Sale: Heathkit Six meter Shawnee completely assembled, tested, operational, never used since new, \$180.00. W. H. Driess, Rd #3, Box 8, Honesdale, Penna. Tel: (717)-253-3867.

FOR Sale: Like new Ranger II, 6 through 160 meters. Will ship postpaid in original carton with manual: \$175.00. Orrin G. McKinney, Jr., 403 So. Jefferson St., Lewisburg, W. Va. 24901.

FOR Sale: Centimes 432 xmt and power Tecraft 220 station. SS1-R mint, best offer. Also 6 and 2 Thunderbolt, mint, wanted. #13 or #113 or R-390 mint, also HBR11 or 16 or other fancy HB revr, Electrocom RTTY converter, or CV89. Joe Szabat, 228 Plummer, Oil City, Penna. 16301.

NATIONAL NC-98 receiver, factory checked and aligned in February 1967. \$49.95. You pay R&A charge. W. J. Fernan, 499 Wolfel Ave., St. Marys, Penna. 15857.

VIKING "500" transmitter, complete with power supply modulator; in excellent condition. Originally sold for \$949.50. Will sacrifice for \$275.00 or best offer. Coils for National HRO-60, "AD" and "AC", best offer. Michael Spasato, K1NEK, 64 Northboro St., Worcester, Mass. 01604.

WANTED: NCX-5. Send particulars and price. All inquiries answered. Have Eico 753, all latest factory modifications. Glad to send. \$175.00. Ranger I, factory-wired, PTT, \$75.00. Dean Stw, KH6LKD/1, #D3, 386 Prospect St., New Haven, Conn. 06511. Tel: (203)-562-7194.

NOVICE Station: Lafayette HA-225 revr, \$75.00; Heath DX-20, \$30.00. Together, \$90.00. Phone or write, Arthur Malatzky, WB2WJF, 83-19 141 St., Jamaica, L.I., N.Y. 11435. Tel: (212) V1-9-7568.

SELL: Plastic Electrical tape, 66 ft., #1.12. Brass threaded rods, bolts, screws, hex nuts. Brass washers, 1/4", \$1.60. Assortments, \$1.70. Include postage. Walt, W8BLR, 29716 Briarbank, Southfield, Michigan 48075.

WANTED: Johnson linear amplifier model 6N2 in operating condition. Harry B. Dunlap, W6ZNM, 93 Sequoia Way, San Francisco, Calif. 94127.

HA-14 Heath Compact linear with AC and DC supplies, \$200.00 or will trade for VX-501 VFO for NCX-5. WA2FSD, Marty, tel: (516)-HU2-7857.

HT-37 mint condx, \$200.00; NC-303 extra clean, with calibrator, \$200. Will ship. Bob Stockwell, W5PUP, 2722 Quebec Dr., Little Rock, Ark. 72204.

COLLINS 32V-2, \$165.00; 75A-2, \$180.00. Both in fine condx. Sell with no net ship. Harvey Wells, TBS-50C and Hallcrafters SP-44, best offer. WB2FJ, RFD 180, Roslyn, L.I., N.Y. 11576.

SWAN 350, Adaptor 2Z external VFO #10, power supply 23 OXC, immaculate, 3 months old: \$520.00. K7SPH, Box 4099, Tucson, Arizona 85717. Tel: 296-6466 evenings.

STATION For sale: Swan 240, TCU, EV-729 SR mike w/stand; HB AC supply. In exlnt condx. Never mobile. All manuals. \$225.00. Will ship collect. WA8MVT, South Shore, Storm Lake, Iowa.

HAMMARLUND HQ-170 AC-VHF, like new, late serial number with speaker and manual: \$275.00. Elmec AF-67 transmitter with 110 volt power supply, \$50.00. AR-22 rotator, \$25.00. 75 feet RG-8/U polyvoam coax, never used, \$8.00; low-pass filter, \$5.00. Four element 10-meter Gotham beam, never used, \$15.00.

Three antique broadcast receivers, namely, Stutz, Fred Eisemann and Lafayette to best offer. Peter Stutz, W2BAO, 1035 Old Post Road, Mamaroneck, N.Y. 10543.

KWS-1, like new condx, \$600. WA1BJY, 4 Hilton Dr., East Hartford, Conn. 06118. Tel: 568-5925.

HW-12 Heathkit transceiver, \$100.00; Heathkit HO-10 monitor scope, \$60.00. Both perfect, no scratches. Jim Johnson, WB2INO, 32 Hadley Lane, Willingboro, New Jersey 08046. Phone: (609)-871-1276.

RITTY-2M Gear, New Model 40 typing reperit; used Model 15 send/receive with table; Motorola taxicab transmitter and receiver converted to 2 meters; Icarat 2 meter converter; NC-173 receiver with speaker. Make offer, whole or in part. Richard Brown, 8802 Hunting Lane, Laurel, Maryland 20810.

FOR Sale: NCX-3 with AC power supply, \$250.00; Hy-Gain Triband Minibeam with Ham-M rotor, \$100.00; Heath Monitor scope, \$50.00. W1WAZ, P.O. Box 14, Stonington, Conn. 06478. 99'er Six meter trans, Telrex 6-meter beam, squalo. Globe VFO. Make offer. Tel: (914)-245-4120.

FOR Sale: NCL-200 with two new spare final tubes, \$400.00; t.o.b. Cleveland, Ohio, Mitchell Kohn, W8OAR, 3915 Grosvenor, South Euclid, Ohio 44118.

JOHNSON Navigator 40 c.w. transmitter, VFO & xtal, Outstanding keying. Included coax relay and lo-pass filter, \$65.00. Gonset G-63 receiver, like new. Ham bands only 80-6, Exciter for c.w. \$75.00. W7GSB/6, Ralph B. Houser, Jr., W7GSB/6, 1984 Wayne Ave., San Leandro, Calif. 94577.

WANTED: Good receiver. Make offer. WA3FRH, Route 5, Chambersburg, Penna. 17201.

SB-100, HP-23, perfect, never mobilized, \$375.00 or best offer. W9JDX, Cary, Illinois 312-639-7565.

ESTATE sale, Daniel Rosenthal, ex-W3RKG, 8421 Temple Rd., Philly, Penna. 19150: APNS - gov't surplus revr; home-made transmitter 3 to 30 m.c., linear amplifier (home-made); crystal calibrator (home-made); VFO (home-made); home-made power supply w/cabinet; spark signal tracer; Voice of Music turntable; Simpson VOM; Barker & Williamson wrid dip oscillator, variety transformer. Any first reasonable offer accepted. Mrs. D. Rosenthal.

FOR Sale: Vibroplex Original bug, \$18.00; Vibroplex Champion bug, \$12.00; Dietzgen 10" vector Log Log slide-rule, \$22.00. Dietzgen's Log Log decadic metric slide rule, \$7.00. All new in original cartons. 000 ohm 1/2 watt Knight VOM, \$8.00. William Ray, Jr., K1P01, 36 Cortland St., West Hartford, Conn. 06110.

TR4-AC4 positively in new condition: \$255.00. First certified check. K9TKB.

MOHAWK Receiver, \$145.00; Cheyenne xmt, \$40.00; SB-10 \$55.00; Eico 753 with 751, \$225.00. Waters compreamp, \$18.00. Also list available. W2FNT, 18 Hillcrest Ter., Linden, N.J. 07036. Tel: (201)-486-6917.

WANT: Teletype Model 12. Swap my Simpson 260 VOM. K1VTW, Box 283, Saxtonville, Mass. 01706.

FOR Sale: HT-37 Exciter, very clean, \$215.00. W9MRX, 173 E. Burlington St., Riverside, Ill. 60546.

JOHNSON Viking II, in perfect condition: \$69.00. VFO #122, perfect, \$15.00. Al Livingston, W2OPN, Livingstone Lodge, Enfield, New Hampshire 03748.

COLLINS 75A-2 and DX-100. Make an offer. Will deliver within 500 miles. Bill, W0ECU, 6738 Sausbury, Arvada, Colorado 80002.

300 QSTs 170 CO, period 1934-1961. Some missing copies. Best cash offer. Fred Norton, General Delivery, Muskegon, Michigan QST: 439 issues: 1925-1965; CO 197 issues, 1947-1965. Best offer: W0MFS, 340 43rd St., Des Moines, Iowa 50312.

COLLINS 75A-2, \$190.00. Immaculate T-150A, \$65.00. Want: H-W-32 or homebrew transceiver, Working or? WA7DXQ, Box 7668, Phoenix, Ariz. 85016.

SELL: Elements, coils and hardware for beam antennas 40 thru 100 for \$20.00's. Coleman, 8 Common St., Waltham, Mass. 02154. Tel: (617)-891-4791.

DRAKE 2B, 2BQ, \$200.00; DX-40, \$40.00; manuals, DK-60 re-lax, \$10.00; top condition, \$240.00 takes all. Mel, WN8TJY, 1846 Ruskin Road, Dayton, Ohio 45406. Tel: (513)-277-1538.

GALAXY V AC and mobile supplies. Speaker console; microphone, Hustler, 2 resonators. \$425.00 or best reasonable offer. Paul Gough, 18 Eliot Ave., West Newton, Mass. 02165. Tel: (617)-527-6599.

SELL: Tape recording outfit: Webeor Compact, hand mike, cord, empty 5" reel, reel locks, manual. Good condition. \$62.00. Rod Vlach, WA0QMP, Benson, Minnesota 56215.

National NCX-3, perfect condition; SSB, AM/CW 200 watts, 80-40-20. Home brew (professionally built) AC power supply, \$185.00. F.o.b. K31BQ, 1239 Wheatstheat, Abington, Penna. 19001.

HC-610-E, with BC-614 speech amplifier, B&W KW coils, tuning units, Collins 310-B exciter, manuals, for sale: \$275.00. Weldon Butler, W5JL, 2606 W. Storey, Midland, Texas 79701.

SALE cheap, 10 cents per copy: QST 1962 thru 1966; CQ 1962 thru 1966; 75, 1961 thru 1966. Ship f.o.b. Write K4AW, 132 Rutledge Dr., Hendersonville, N.C. 28739.

FOR Sale: Knight kit KG-2000 lab scope. Triggered sweep, DC to 5 Mc response, X10 probe incl, \$150.00. Sheldon Brown, K1MYA, 8 Blue Hill Ave., Nashua, New Hampshire 03060.

EICO 753: Excellent condition, factory aligned, solid state VFO, excellent rig for SSB beginner; \$180.00. Money-order please. WA4YPM/3, 3100 Santa Fe, Apt. 23, Corpus Christi, Texas 78404.

SELL Heath Cheyenne MT-1 transmitter, 80-10 mtr., VFO, CW, fone, 60 watts. Included are H.B., AC power supply and PTT mike. Price: \$50.00. Lindsley Colclough, Hillsdale, New York 12529.

FREE Antenna, 14-AV-S, to buyer of complete rig: Eico 720, \$50.00; 730, \$35.00; Knight R-100 with S-meter, Crystal Calibrator, speaker, \$60.00. All are in gud cond. Joe Varga, WA2NVR, 419 Florence Ave., Maple Shade, N.J. 08052.

CASH Rewards for information leading to purchase of facsimile equipment manufactured by Electronic Communications Co. "Electronic Messenger." Western Union "Intrafax". Also spare parts, accessories. Newsome Electronics, 2670 Pinetree, Trenton, Michigan 48183.

FOR Sale: Paneled hamhack, 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: (56)-344-3135. Marc Felt, W2GYQ, 50 Prince Lane, Westbury, L.I., N.Y. 11590.

NEW Unused; Henry 2 KD-2 linear, complete, \$580.00; Eimac 3-400Z tubes, \$25.00; Swan 500, \$385.00; Swan 117X, \$77.00; TR-4, \$460.00; T4-X, \$315.00; Heathkits: SB-10X, \$310.00; SB-200, \$195.00. Are automobile trade-ins. All are factory-sealed cartons. Don Payne, W4HKQ, Box 325, Springfield, Tenn. 37172.

WANTED: Complete information relative to the modification of Collins 75A-1 receiver. Also comments regarding performance after modification. Jerry Wood, W8CJY, Digital Systems Lab, Case Inst. of Technology, University Circle, Cleveland, Ohio 44106.

APACHE TX-1, \$90.00; SB-10, \$65.00, all excellent. WB2-RJL, 52 Further Lane, Riverhead, N.Y. 11901.

COLLINS 75A-4 and Hammarlund HQ-170-AC receivers. Both like new condx, \$425.00 and \$275.00 or best offer. All inquiries answered. WA4AUF, 215 Shea St., Portsmouth, Virginia 23701.

VIKING Adventurer transmitter, HA-230 communications receiver—sell or trade for best offer. John, K4OAC, 3605 Rogero Road, Jacksonville, Fla. 32211.

APACHE, perfect, \$100.00 F.o.b. Want: Heath 12V PS for Twoer, Carl Metzler, WA2WSH, 2303 Wilson, Bronx, N.Y. 10469.

SWAP: Marine RCA transceiver for transmitter T-150A, mobile rig or what have you. W1FVU, 100 Northview Dr., South Windsor, Conn. 06074.

DX-60A. Superb condition. A steal at \$55.00. Will ship reasonable distance. Richard Gelber, WB2WOL, 350 First Ave., New York, N.Y. 10101.

SELL: RCA, Model CMV-1D, high-band, 12 volt, \$20.00. License-Neville alternator, 12 volt, 53 amp., \$20.00. G. J. Evans, K2SLI, 17 George St., Freehold, N.J. 07728.

NOVICE: Complete station, Eico 720, 40 and 15 meter crystals and SX-110. Mint condition. Both with manuals, \$150. WB2UNZ, 3369 Milburn Ave., Baldwin, N.Y. 11510. Tel: (516)-BA-3-3219.

QSTs 1932 thru 1935, except January 1933; June 1939 thru 1966. CQ August 1951 thru 1966. Make offer. You pay shipping. W2EHN, 214 Lawrence Ave., North Plainfield, N.J. 07063.

SELL: S-53A, \$25.00; HD-11 Q-multiplier, \$5.00; Globe Chief 90A, \$20.00, all for \$45.00. Arthur Reidel, WB2YLT, 1559 East 29th St., Brooklyn, N.Y. 11229. Tel: (212)-CL2-0700.

DRAKE TR-4 transceiver, RV4VFO, speaker, AC power supply, complete, in almost new condition, little used. Paid over \$750.00. Selling for \$600 as a package. Bert Griffin, W2MJA, 131 Hillcrest Dr., Wayne, N.J. 07470. Phone 694-2281.

FOR Sale: Make offer! National CRU oscilloscope, 1 Model EX, signal shifter, 1 RCA W-97A, volt-ohmyst with vacuum tube voltmeter, E. S. Crane, W2EF, 58 Patterson Ave., Hempstead, L.I., N.Y. 11551. Phone (516)-1V9-7711.

QSTs and other ham and electronics publications to 1912. Long SASE for list. VE4BU, 134 Renfrew, Winnipeg 9, Man., Canada.

SELL: HT-40 xmt, \$45.00; National NC-57 rcvr, \$40.00; Lafayette HE-74 self-powered VFO, \$25.00. All in exlnt cond and factory-wired. WA1EUJ, 21 Charleston Ave., Manchester, N.H. 03102.

SR-160 with PS-1512DC, mobile mounting kit and manual, 8 months old, like new condx, \$310.00 or your best offer. Walter Nickless, W8HXZ, 4887 Pamela, Grand Rapids, Mich. 49508.

COLLINS PTO, 70E-24 for 75A-4, new \$49.00; 70E-23 for KWS-1, new \$39. Richard E. Mann, 430 Wilmot Rd., Deerfield, Ill. 60615.

SELL: HQ-110A, mint, \$150.00. Want: Linear amplifier, preferably Heathkit. WB2TIK, 2 Norman Court, Glen Cove, L.I., N.Y. 11542.

WANTED: SB-10 in perf condx, manual, cables. A. Zimany, 103 E. 86th St., N.Y., N.Y. 10028.

EXCELLENT GSB-201 linear, \$190.00; Apache, \$90.00, post-paid. K0ALL, Box 721, Fargo, N.D. 58103.

WANTED: Poly Com 66, HA-250 linear. WA2COO.

HENRY 2K, excellent condition, Serial No. 540. First bid over \$450.00 will take it. Hans D. Sylten, WB4BM V, 1651 N E 56th Court, Fort Lauderdale, Fla. 33308.

SELL: Galaxy V, excellent condition, \$285.00. Deal includes AC power supply, calibrator, mike, speaker. Kenneth Bentz, 300 McCauley St., Chapel Hill, North Carolina 27514. Phone (919)-9293536.

WIDOW of WITVU offers for sale 20A exciter, \$95; HQ-129X, \$50, Viking II and VFO, \$65.00. Vibroplex \$7.00. Preter pick-up sales. Mrs. Herbert E. Merrill, Sr., Phoenixville, P.O. Chaplin, Conn. 06235. Phone (a.c.)203-928-9131.

TR-4, \$480.00; AC-4, \$83.00; DC-3, \$123.00; R-4A, \$330.00; T4-X, \$330.00; MS-4, \$17.50; RV-4, \$83; factory sealed boxes, warranted, sell separately. Mel Palmer, K4LGR, Box 10021, Greensboro, N.C. 27404.

CRYSTALS: C-W Crystals will be closed for annual vacation from June 1 to July 24. Wishing a good summer and thanking you for your many orders since 1933, we are vty C-W Crystals, Marshfield, Missouri 65706.

ANNIVERSARY Special: Our 17th year in business, 1000 PIV at 1.5 amps epoxy diodes, 10 for \$3.75 postpaid USA. Fully warranted. East Coast Electronics, 123 St. Boniface Rd., Buffalo, N.Y. 14225.

HALLICRAFTERS HT-37 transmitter, \$245.00; Drake 2-B and 2B-Q and calibrator receiver, \$195.00. This equipment has less than 30 hours use and has manuals. Send certified check and I will crate and ship. Frank DeVito, WB2FIS, 730 Breakers Ave., Absecon, N.J. 08201.

FOR Sale: mint condition Collins MPI power supply, 351 D mobile mount, \$200.00. Claude M. Phillips, 444 Hammond Ave., San Antonio, Texas 78210.

WANTED: 7553B or KWM-2 with AC p/s. Specify condition, price and serial number. James Kalasky, 738 Truesdale Rd., Youngstown, Ohio 44511.

WANT Bird Thru-line wattmeter, Model 43, with 100-250 and 200-500 plug-in elements. Bill Smith, W1DVE, 125 Main St., Newington, Conn. 06111.

TOWER for sale: Crank-up, tilt-over, E-Z Way RSB-40G and TOBA (tilt-over building attachment). Heavy duty, 41 ft. galvanized gud condx. Lance Johnson, K1MET, 27 Francis Dr., Newington, Conn. 06111. Tel: 666-0325.

SR-46, \$99.00; SX-110, \$60.00; DK-MP-10 inverter, \$22.00; 6M halo, mount, mast, \$8.00; DK-60-G2C, 115 VAC, \$10.00; mtr. for list, all in exlnt condx. K9YWQ, 211 West Hintz, Arlington Heights, Ill. 60004.

VIKING 500, in exlnt condx. Will ship c.o.d. \$285.00. K4-KHE, Tel: (502) 586-5062.

FOR Sale: Homebrew 6-meter rig, Eico 666 tester, 1060 supply, 344 signal generator, 950B bridge, 6000V C-Comair 6 & 2 Matchbox with SWR, HA-6 transverter and p/s. WA8FWR, Bob Sprigg, 4504 Ridgedale Dr., Akron, Ohio 44319. Phone 896-1401.

SELL: SB-110, \$230.00; Hp-23, \$35.00; xtal calibrator, \$7.00; NC-188, \$50.00; Apache, \$90.00. Ed Gray, K3EVT, 4925 Brownfield Rd., Lubbock, Texas 79407.

75-A-3 with 2 filters, Heath Marauder for sale. Best offer takes the complete station. WB2VZM, David Sachs, 2279 E. 22nd St., Brooklyn, N.Y. 11229. Phone: (212)-SH3-5636.

SELL: SX-100, \$120.00; Johnson Navigator, \$65.00; PS-150-12 D.C. supply, \$60.00; Hustler antenna with 75, 40, 20 M. coils, \$14.00. All perfect. Ross Randolph, KIATS 92 Savage Hill Road, Berlin, Conn. 06037.

SELL: Collins 75A-4, \$385.00; KWM-1 AC power, \$325.00; Thunderbolt 6NZ, \$375.00; Gonset Sidewinder 2 meters, \$275.00; Olson transisto in TV camera, new, Needs repair, \$100.00. Wanted: Collins 6ZS-1, W9JCE, 370 Aspen Lane, Highland Park, Illinois 60035.

DRAKE R-4 rcvr. Have extra one. Perfect. Will ship in original factory carton with manual; first certified check for \$250. Also, Raytheon mobile marine band transceiver with xtals and built-in broadcast rcvr. Make offer. Six new 813's, \$8.00 each. Used 4-250, \$5.00. Don Foster, W5TLL, 4565 East 38 Placc, Tulsa, Oklahoma 74135.

GENERAL Radio, radio frequency bridge 516B, \$80.00; Dumont 5 in scope for rack mounting 5185A cut-out patch panel, \$60.00 plus postage. HQ129X, less cabinet, \$40.00 plus postage. Roache Canterbury, Conn. 06331.

FOR Sale: Harvey-Wells TBS 50 xmt, 80 thru 2 meter phone/c.w. Less power supply, \$40.00; home-made power supply for TBS-50, \$10.00; Viking Model 122 VFO, \$20.00; Halli-crafters S38-C rcvr, \$20.00. All in gud wkg condx. Freight collect. Charles Arwood, W5VZM, 511 Laughrun Dr., Forest City, Ark. 72335.

SUMMER Sale! HT-37 (new, boxed), \$345.00; HT-44, \$240.00; SW-250, \$255.00; SW-120-w 75 added, \$139.00; SW-240, late sq. mtr., \$219.00; 2A, \$139.00; R-4, \$249.00; HW-12, \$89.00; Ulica, 650 with VFO, \$95.00; SB-10, \$55.00 and G-76 with a.c. \$178.00. Free list. Howard Radio, Box 1269, Abilene, Texas 79604.

FREE Exciting list of tubes, capacitors, coils, equipment. Selling all for college. John Kanbergs, 559 Rocky Way, Redwood City, Calif. 94062.

SELL: SB-10 with regulated power supply, \$55.00. HQ-129X w/spkr, \$60.00; TBS-50D with sply and VFO, \$30.00. Shipped collect. Hob, KSLIW, R2, Box 124, Sherman, Texas 75090.

FOR Sale or trade: 5890B Dumont freq. meter and Motorola 2-way radio course. 11 channels with xtals and manual. Lindbergh Holden, K4HZR, Whiteville, N. C. 28472.

TWO New 432 Mc coaxial 4X250B amplifiers, 300W+ and working, \$50.00 each. Details for stamp. WAAP1, Box 4095, Arlington, Virginia, 22204.

MUST Sell: Hammarlund HQ-145C. \$90.00; Vibroplex Presentation, \$25.00. Also HG-10 VFO. Write: WASBQ1, 1201 Hester, Jonesboro, Ark. 72401.

ATTENTION arc welders! Extremely heavy-duty amplifier parts for sale. Plate trans. filament trans. meters, counter dials, right-angle drives, B&W tank coil, oil filled filter caps, vacuum variables, blowers, chokes, high voltage caps, solid state rectifying unit, variacs, 110VAC and 220VAC, bias supply—250 DDC at 300 Ma., RG17AU five position ant. switch, 4-1000s, sockets, chimneys. First come, first served. Hurry! Write for complete list and prices. John Williams, 103 Midland St., Greenville, S.C. 29607.

SELL Hallcrafters SR-500 Toronado, plus P500DC power supply. Both unused, new in carton. SR-500 for \$295.00; P500DC for \$95.00; together, \$375.00. Also sell G-36 Paco Color Bar dot generator kit, new, in carton, never built. Paid \$120.00 but will sell for \$60.00. Precision E200C signal marking generator, wired, not kit, new, in carton, paid \$110.00 but will sell for \$60.00. Wanted: good communications receiver. Webster Intercom, Gonset 3156 Aircraft receiver, good stereo amp, Jack Farrell 2252 Dixie Hwy, Pontiac, Michigan 48055.

COUNSELLOR: Penna. brother-sister camp seeks ham radio man with General license. David Blumstein, 1410 East 24th St., Brooklyn, N.Y. 11210.

ELECTRONIC Circuits designed to your specifications. \$5.00 analysis fee. Atomic Electronics, Box 4, 1323 N. Sunshine Way, Anaheim, Calif. 92806.

FOR Sale: Johnson Valiant II, 275-watt, 160-10 meters best offer over \$400. BC-221F, \$60; Fico 710 grid dip meter, \$25.00. KIQNF, 41 No. Quaker Lane, W. Hartford, Conn. 06119.

WANTED: Collins 30K-1 transmitter with 310A exciter and manual. VEB3NV, 555 Princess St., Woodstock, Ont. Canada.

COLLINS KWM-2, 516F2 AC supply, 312B4 station control, 30L1 kw amplifier, cables. Equipment is brand new condition. Price: \$1200.00. WGLGS, Don Hundley, 1832 Spera Lane, Norristown, Penna. 19401. Telephone: (215)-275-0672 or Wash., D.C. 546-8495.

WANTED: Horizontal output transformer for RCA 21CT662, chassis CTC4; B&W FC-30; Eimac chimney SK506; medium duty rotor. State price, condition, or swapping requirements. WA4WFE, 2815 Ambergate Road, Winter Park, Florida 32789.

FOR Sale: Transcom SBT 3 transceiver, mic, AC and DC supplies, mint, 10 hours use, \$350.00. WA8GVK, 720 Oakmere, N. Muskegon, Michigan 49445.

CLEGG 99'er, \$85.00; Lafayette HE-89 VFO, \$15.00. Will sell individually or together. J. P. Bowker, K1FZE, 109 Anawan Ave., W. Roxbury, Mass. 02132. Tel: (617)-325-8428.

BEAM—20 meter Telrex Super Deluxe with balun. Like-new condition. DXers dream. Low SWR, \$75.00. K2YEQ, 57 Melbury Rd., Babylon, L.I., N.Y. 11702. MOHAWK 9-6338.

WANTED: One of the following: 180A SX-117, SX-122 in mint condition, in trade for Browning lightweight automatic 28" model. Vent. barrel. Guaranteed brand new, never out of factory carton. J. H. Stroup, Holmes, Iowa 50547.

COUNTY Hunters! Expedition to Webster County, West Virginia on June 24-27, 1967. Listen for WA8PME/8 on c.w. 7.03 Omhz, CHN 7.035 Mhz, 3.560 Omhz. Phone: 3.970mhz. On around the clock.

MOHAWK Receiver, in excelnt condx, with manuals. Trimmers, speaker. Make offer. W21YR.

FREQUENCY Counter for sale, photo 25¢. W6VEP, Box 11714, Palo Alto, Calif. 94306.

COLLINS: 75S-1, 32S-1, and a/c power supply, \$675.00; new KWM-2 with factory noise blanker, a/c power supply, DC power supply, mobile mount. Less than 1 year old. \$1,075.00; Millen 1 Kw Matchbox type 92200, \$85.00; Model 19 teletype, \$100.00. Robert Winter, WA8LNO, 5392 Antoinette Dr., Flint, Michigan 48507.

WRL's used gear prices save you money! These prices without trades: Thor 6 & AC, \$249.95; SR-150, \$339.95; HW-12, \$99.95; 753, \$149.95; Galaxy V, \$299.95; King 500, \$299.95; Ranger 1, \$94.95; HT-37, \$219.95; HX-10, \$229.00; HX-50, \$239.95; SX-400, \$89.95; HQ-170A-VHF, \$299.95; HQ-110, \$139.95; NC-300, \$149.95. Hundreds more—free list. WRL, Box 919, Council Bluffs, Iowa 51501.

CQ's Sept.-Dec. 1964, 15¢ ea; CQ Jan.-June 1965, 20¢ ea. Complete 1966 CQ except July-August, 20¢ ea. Complete 1966 QST except October, 25¢ ea. Jan.-Apr. 1967 OST-CQ, 30¢ ea. Standard Model Vibroplex, perf. condx and appearance: \$10.00, W2JBL.

HOSS-TRADER Ed Moory offers limited supply of equipment opened displayed and demonstrated at various hamfests: SB-34, \$319.00; NCX-5, \$449.00; NCL-2000, \$495.00; Galaxy V MK II, \$339.00; TR-4, \$495.00; T4-X, \$349.00; R4-A, \$345.00. Package deal: New Ham Used Classic 500, \$389.00; Ham-M rotor, \$209.00; special Robin 50 ft. foldover tower, prepaid, \$189.00. "The Hoss needs hay for his ponies. Cash talks at our stable." Write us for special quotes. Recent special quantity purchase on new Collins gear allows us to pass this saving on to the amateur: New KWM-2, \$950.00; new 32S-3, \$649.00; 75S-3B, \$659.00; 801-1, \$459.00. One to a customer: new 516F2, \$629.00; Iced Swiss, \$50; \$389.00; Ham-M rotor, \$89.95. Ed Moory Wholesale Radio Co., Box 506, DeWitt, Arkansas 72042. Tel: (a.c.) 501-946-2820.

WANTED: SB-200 and Heath Warrior amplifiers, one each state, lowest price and condition in first letter. Will sell BC-221 original book with built-in AC supply, excellent. No scratches, \$50.00. Collins 75A-4 6 kc. filter, \$25.00. Bill Smitherman, WA4YFL, Rt. 2, East Bend, N.C. 27018.

WANTED: WRL Globe Chief transmitter, W1BB.

SELL: Complete station, Marauder, SX-101A, mike, TB-500, rotor, 40-80 antenna, manuals, 24-hour clock, etc. Like new, operated less than 4 months. Overseas last 3 years. Checked out in perfect condx after return from storage. \$450.00. Shreve, WA4EVP, Box 51, Garrett Park, Md. 20766.

ALL Used less than 50 hours: Drake 2B, 2BQ with xtal calibrator—\$225.00; Knight 1150, \$60; Turner 454C mike, \$10.00; Johnson 1000 watt 720 low pass filter, \$10.00 WB6FFX, David Clark, 451 Arnold, Gilroy, Calif. 95020.

NCX-3, perfect, like-new, \$185.00, with 110V power supply, \$255.00. Swan 140 with 12V supply, \$140. Very sud condx. Art Kendall, WB2VXN, 37 Passaic Ave., Livingston, N.J. 07039. Tel: (201)-992-6391.

SELL QST's 1927-1958. Single lot. No break-ups. You pay exp. W6WNI, 3604 Middlefield Way, Redwood City, Calif. 94062.

GOING Into service. Must sacrifice: Eico 753 SSB, Tri-Bander kit, \$129.95; Eico 751 AC power supply kit, \$49.95. Both in original factory-sealed cartons. Will ship freight prepaid. Write: G. Kirby, 85-14 66th Rd., Forest Hills, L.I., N.Y. 11375.

WANTED: Full time sales representative needed to sell a quality line of nationally known 2-way radio equipment in the North Central and Mid-Western areas of the country. Salary, Commission, plus expenses, liberal company benefits. Ideal opportunity for ham or CB'er with a knack for selling. Must be willing to travel. Reply: Mr. Warren Whittel, P.O. Box 536, Baltimore, Md. 21203.

ROTATOR, Prop pitch, modified gears with custom cover and selsyn transmitter, \$30.00. F.o.b. W9MTU, Box 2248, Anderson, Indiana 46011.

MATCHING Pair of RCA receivers, CRV-46147 (.5-4 Mo.) and (CRV-46148 (4-27 Mc) in four bands each. Each has 15 tubes and 2 db meters. Exclnt c.w. and SSB reception. In new condx, complete with power supply, external speaker and other accessories, \$350.00. Mike Sbyne, Box 1088, Alamogordo, New Mexico 88310.

COLLINS S/Line: 32S-3 trans, 516F-2 pwr.sply., 312B-4 control unit; 753-S rec. 30L-1 amp. DL-1. All cables and manuals. Clean and in mint condx. W2BAA, 22-12-128 St., College Point, N. Y. 11356. Tel: (212)-FL-9-4009.

WANTED: 20A or 10B with or without v.f.o. State price and condition. W1CNY, 228 Hickory Hill Lane, Newington, Conn. 06111.

HI-PWR DXERS Dream: R4A, AC3, SWR mt, dummy load, T4X driving Collins 30S-1 digital clock, console, Turner plus two mike. All immaculate with manuals, \$599 World Wide best offer over \$1200. Also 1H-4 Thunderbird beam and Ham-M rotor with 30 ft. tilt-over pole \$145.00 firm. Fradley torcs sale, Ralph Thomas, WH6PCZ, 7335 Santa Monica Blvd., Los Angeles, Calif. 90046. Tel: HO-9635.

DRAKE 2B, crystal calibration, factory instruction book, original packing containers, Excellent selectivity. Like new, \$170. F.o.b. Sam Levine, 28 Winthrop Avenue, Birmingham, Alabama 35213.

WANTED: C-78410 receiver. Type Selsyn. W5CPC, Box 422, Enid, Okla. 73701.

GALAXY V, AC-35 and speaker console, mint condition, with manuals. Used 9 months, \$365.00. F.o.b. Joe Meixner, WA8QEV, 2401 Morningstar Ct., Kettering, Ohio 45420.

QSTs: 1930 to 1966, few broken years. 10 QST Binders. Swap for anything I can use. Ray Warner, W7JU, 539 Birch St., Boulder City, Nev. 89005.

BEST Offer: HQ-180, Valiant, 6N2, VFO, converters, Shawnee Transceiver, multiphase exciter, various test equipment, 343 Maple St., Brooklyn, N.Y. 11225. Frank Blechl, K2POP.

E-Z Way Tower, 40 ft. crank-up and crank-over. Free standing. Gnd condx. \$95.00. Chicago suburb. TE-4-0206. K9AGA.

ESTATE OF W2KN: For sale: 1-10 meter transmitter. Will sell for any offer over \$50.00. Tel: (a.c.) 914-WO-1-8027. Adey, Eastchester, N.Y. 10709.

SELL: Complete station, 80-6, SX-140 rcvr, HT-40 xmtr and HA-5 VFO, \$200. Will sell separately. W3JEE, 237 Duncan Ave., Wilmington, Del. 19803.

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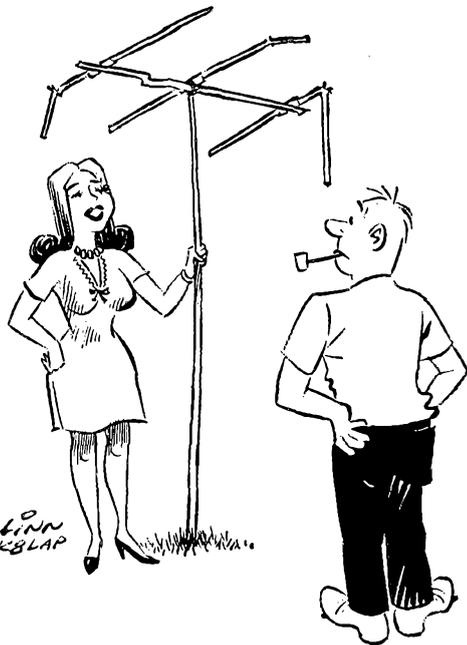
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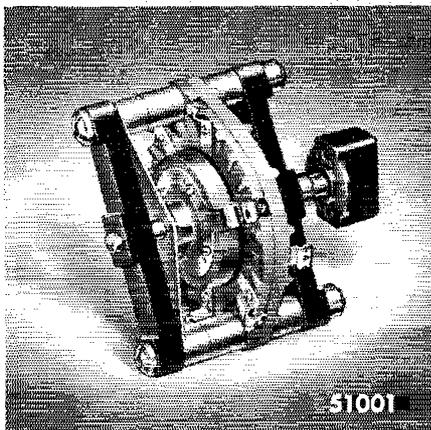
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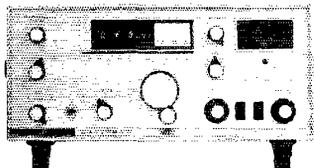
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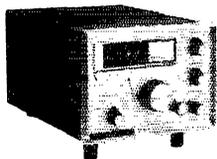


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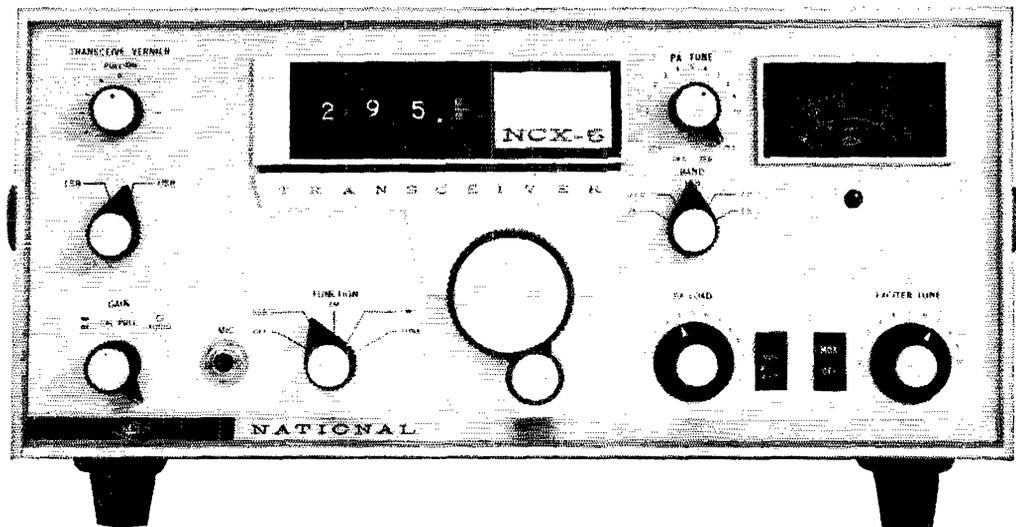
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