

August, 1954

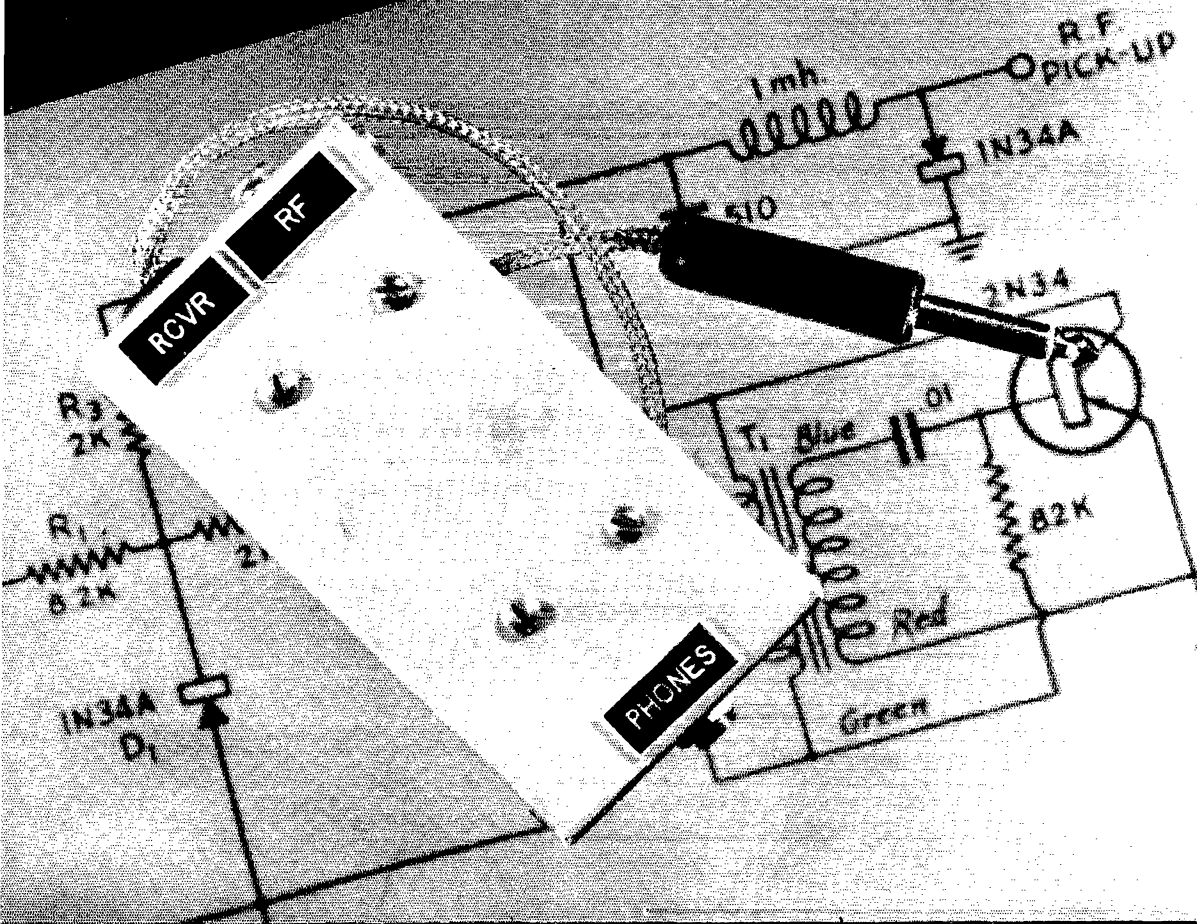
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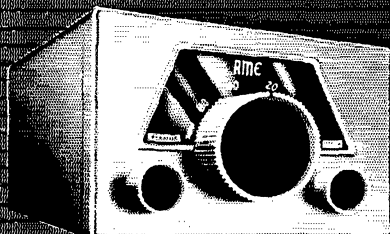
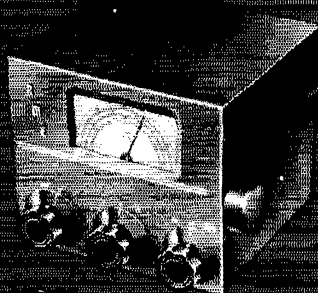
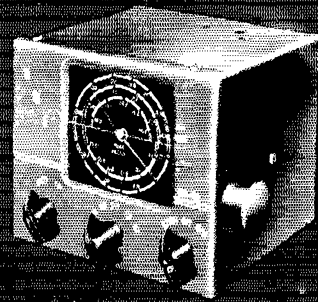
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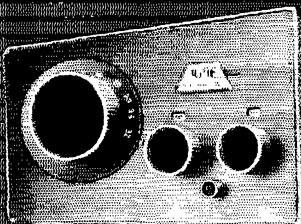
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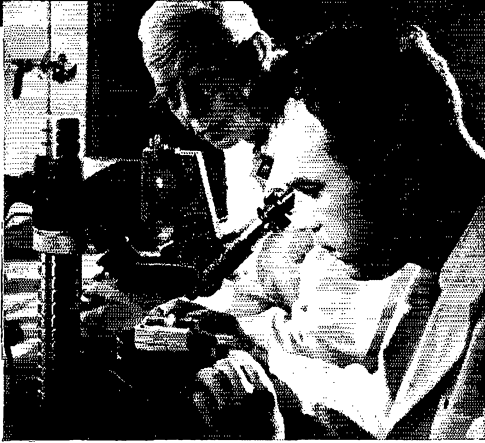
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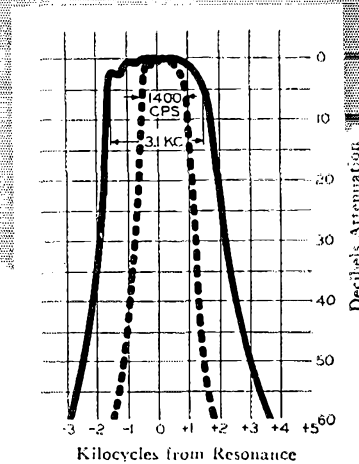
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150 ohms, balanced or unbalanced. A phone jack and 4 ohm and 500 ohm audio output terminals are provided. Sockets and front-panel controls are included for the 8R-1 100 kc crystal calibrator and 148C-1 NBFM adaptor which are available as optional accessories. The following controls are on the 75A-3 front panel: tuning, zero set, bandswitch, RF gain, audio gain, BFO pitch, CW limiter, antenna trimmer, crystal selectivity, crystal phasing, mechanical filter selector, CW-AM-FM switch, noise-limiter calibrate switch, on-off-standby switch. The 75A-3 operates from a 115 volt 50/60 cycle ac power source. Cabinet dimensions are: 21 $\frac{1}{2}$ " wide, 12 $\frac{3}{4}$ " high, and 13 $\frac{1}{8}$ " deep. The 19" panel fits a standard relay rack. The 75A-3 weighs approximately 50 pounds.

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AUGUST 1954
VOLUME XXXVIII • NUMBER 8

PUBLISHED, MONTHLY, AS ITS OFFICIAL ORGAN, BY THE AMERICAN RADIO RELAY LEAGUE, INC., AT WEST HARTFORD, CONN., U. S. A.; OFFICIAL ORGAN OF THE INTERNATIONAL AMATEUR RADIO UNION

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Subscription rate in United States and Possessions, \$4.00 per year, postpaid; \$4.25 in the Dominion of Canada, \$5.00 in all other countries. Single copies, 40 cents. Foreign remittances should be by international postal or express money order or bank draft negotiable in the U. S. and for an equivalent amount in U. S. funds.

Entered as second-class matter May 29, 1919, at the post office at Hartford, Connecticut, under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1102, Act of October 3, 1917, authorized September 9, 1922. Additional entry at Concord, N. H., authorized February 21, 1929, under the Act of February 28, 1925.

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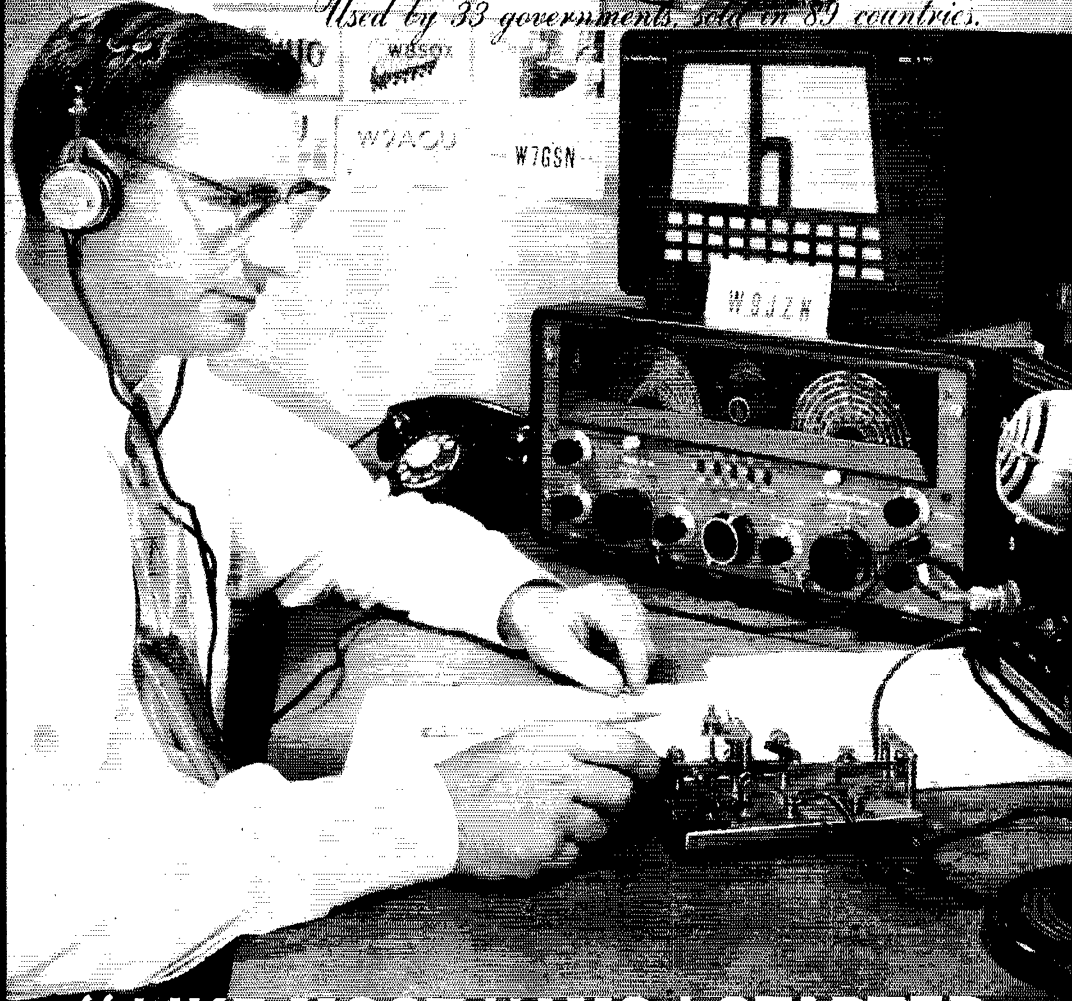
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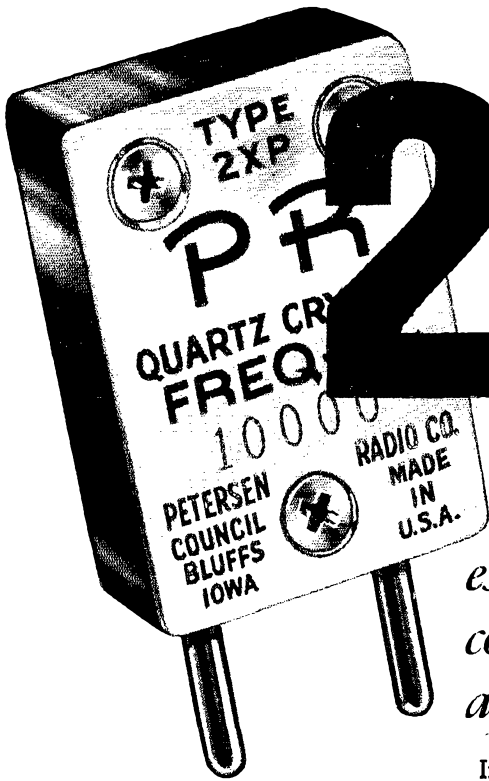
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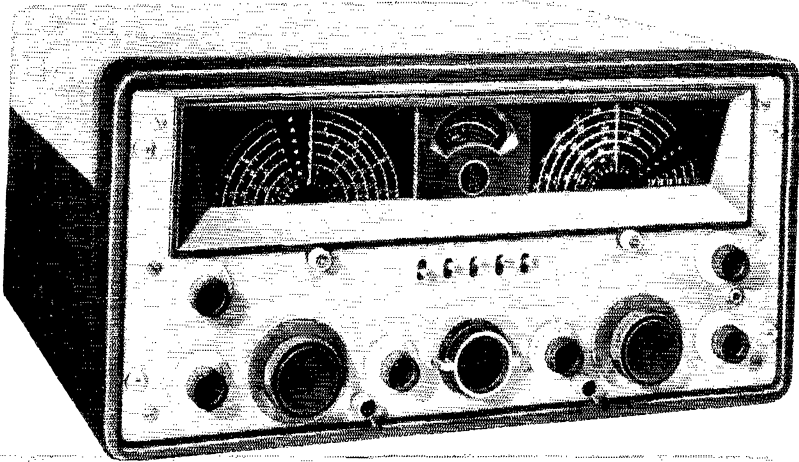
Section Communications Managers of the ARRL Communications Department

Reports Invited. All amateurs, especially League members, are invited to report station activities on the first of each month (or preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in QST. All ARRL Field Organization appointments are now available to qualified League members. These include ORS, OES, OPS, OO and OBS. Also, where vacancies exist SCMs desire applications for SEC, EC, RM and PAM. In addition to station and leadership appointments for Members, all amateurs in the United States and Canada are invited to join the Amateur Radio Emergency Corps (ask for Form 7).

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

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

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

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New England Division

PERCY C. NOBLE W1BVR
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Vice-Director: Frank L. Baker, Jr. W1ALP
91 Atlantic St., North Quincy 71, Mass.

Northwestern Division

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Vice-Director: Karl W. Weingarten W7BG
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Pacific Division

RAY H. CORNELL W6JZ
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Roanoke Division

P. LANIER ANDERSON, JR. W4MWH
428 Maple Lane, Danville, Va.

Vice-Director: Gus M. Browning W4BPD
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Rocky Mountain Division

CLAUDE M. MAER, JR. WØIC
740 Lafayette St., Denver, Colo.

Vice-Director:

Southeastern Division

JAMES P. BORN, JR. W4ZD
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Vice-Director: Randall E. Smith W4DQA
902 Plaza Court, Orlando, Fla.

Southwestern Division

JOHN R. GRIGGS W6KW
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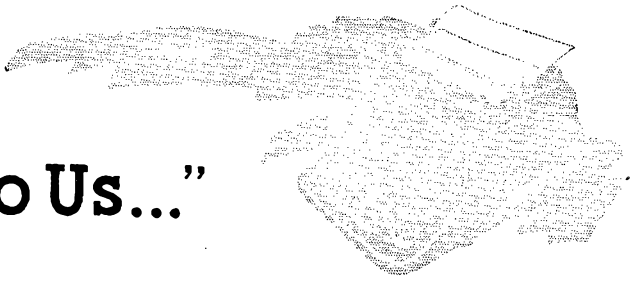
Vice-Director: Walter R. Joos W8EKM
1315 N. Overhill Drive, Inglewood 3, Calif.

West Gulf Division

A. DAVID MIDDLETON W5CA
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Vice-Director: Carl C. Drumeller W5EHC
5824 N.W. 58th St., Oklahoma City 12, Okla.

"It Seems to Us..."



ITV

Except for the most recent newcomers to amateur radio, we don't have to explain that "ITV" is the ham term for interference to our communications from TV receiver radiation. It is a term that connotes the gol' darndest noise background of birdies and hash we've ever heard, most disruptive in the 80-meter band but still troublesome on higher frequencies. It isn't from power lines nor household appliances nor neon signs, bad as they often are; it's from TV receivers . . . not all TV receivers but, to put it bluntly, and more correctly, from *lousy* TV receivers, sets turned out by manufacturers who know better.

The problem is not new, nor is it limited to amateurs. TV receiver radiation has busted up aeronautical circuits and raised hob with other services as well. A.m. broadcast receivers near poor TV sets are rendered practically useless by harmonic radiation from sweep circuits. It is and has been a major problem of great concern to FCC; the Commission has held engineering conferences on the subject, and Commissioners have warned industry that they must lick the problem by cleaning their own house — or else. As the latest in its series of efforts to protect the various U. S. communications services from disruption by substandard TV receivers, the Commission has now issued a Notice of Proposed Rule Making with some real teeth in it. (Final comment date is August 16th.)

First, some definitions:

Restricted radiation devices: those which radiate radio frequency energy and are specifically designed to generate radio frequency energy (excluding licensed emissions). Examples: remote control gadgets, TV receivers.

Harmful interference: any radiation or any induction which endangers the function of a radio-navigation service or of a safety service or obstructs or repeatedly interrupts a radio service . . .

The Commission in its proposal then lists several tables of engineering figures setting limits on maximum power and maximum field intensity for restricted radiation devices (e.g., TV receivers). These figures are based on recommendations of a special industry committee set up by RETMA, which has been cooperating in the effort to get its member compa-

nies to tackle the receiver radiation problem with more vigor. The proposed limits are far from those necessary to ensure protection of other services in all cases, but represent, apparently, the "best" performance the industry thinks it can accomplish. The problem has not been technical; engineering talent in the industry can achieve a considerably greater reduction of spurious radiation. The problem has been to convince their top brass that the consuming public will spend an extra dollar or two to cover the additional production costs. The Commission is now proposing, in effect, to take the matter out of their hands and make elimination (or rather, reduction) of spurious radiation an essential ingredient of future receivers, required by regulation.

There is, in fact, a proposed requirement that receivers be certified as meeting the standards. And the Commission asks for itself authority to enter premises and inspect receivers to ascertain that they do comply with the proposed rules.

From our standpoint, the real meat of the proposal is embodied in the following section:

No incidental or restricted radiation device, irrespective of whether it otherwise operates in accordance with the provisions hereof, shall be operated in a manner which causes harmful interference to any licensed radio service. Where harmful interference is in fact caused by the operation of any such device, its operation must cease immediately until the condition responsible for such interference has been eliminated.

Applied to practice, this says that if your neighbor's TV set puts birdies all over the 80-meter band to the extent your operating is repeatedly obstructed or disrupted, FCC proposes to instruct the owner to keep the thing turned off until steps are taken to eliminate the interference.

In recent years we hams (and other communications services) have been forced — and properly so — to clean up spurious emissions from our transmitters. This was necessary to meet the current requirements of living successfully with television broadcasting in a crowded spectrum. The Commission proposes to try the shoe on the other foot. Let the manufacturers of television receivers now put forth an equal effort to get their own houses in order.

Twenty-Five Watts Under the Dash

A Compact Multiband Mobile Rig of Good Design

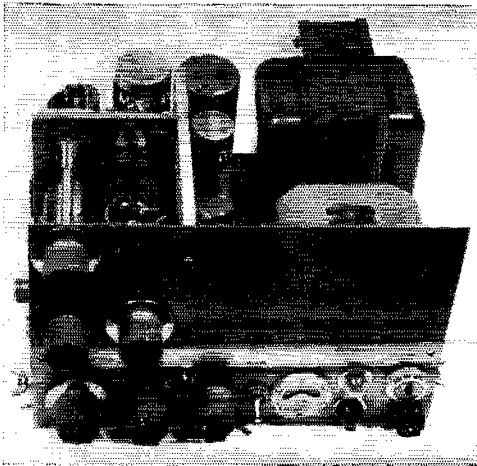
BY JEFFERSON P. LAMB,* W6WWM

NEVER in the history of amateur radio has mobile operation been as popular as it is today. It is a rare instant when one cannot find some mobile activity on every band from 75 through 10. The demand for mobile equipment no doubt was accelerated when TVI first appeared to be such a nasty problem both from a technical and community-relations viewpoint. Today, however, the demand is based on the enjoyment realized while motoring away from home on evenings, week ends, and vacations.

From a strictly cost standpoint there is hardly any reason at all why one should want to build a mobile transmitter. There are many excellent and versatile commercial products on the market which can be bought for a price very comparable to the cost of new components alone, not to mention time and headaches. The radio amateur,

of tune-up and band change, with all knobs and meters in front of the operator, is of tremendous advantage. This type of transmitter must be sufficiently compact to fit under the dash of the family car without obstructing sitting space. The compactness in most cases is achieved by use of modern miniature components, and by placing the vibrator supply or dynamotor elsewhere.

The transmitter described in this article is complete within itself, containing all power-supply and push-to-talk circuitry. Only the proper crystal, mike, antenna, and a lead from the car battery are required. External wire consists of only the antenna and battery leads, which greatly reduces the installation problem. In most modern cars it is possible to mount the transmitter by brackets made to fit the front and rear radio-mounting bolts, thus no extra holes need be drilled in the car. In our case (1949 Mercury) the only holes drilled were to mount the antenna. These can usually be covered by a replacement back-up light when the car is traded in. The antenna and battery lines may usually be fed through existing holes in the firewall which are used to pass wiring from engine side to dash. The use of high-efficiency circuitry for transmitter, modulator, and power supply permitted a compact but not inaccessible transmitter which is 6 inches high, 9 inches wide and 7 inches deep.



A compact 25-watt multiband mobile transmitter, including power supply. The panel space is only 6 by 9 inches. Along the left-hand edge, from top to bottom, are controls for the oscillator tank condenser, C_0 , the bandswitch, S_1 , and the output-capacitance selector, S_2 . Immediately to the right are controls for the amplifier tank capacitor, C_{13} , above, and variable output condenser, C_{17} . Next, along the bottom of the panel are the microphone jack, excitation control, R_1 , meter switch, S_3 , the meter, indicator lamps, S_4 , and the fuse.

however, is probably the greatest believer in individualized equipment and the large amount of pride which results after the job is successfully completed.

The convenience and popularity of the under-dash type of transmitter is attested by the many such commercial designs in existence. The case

* 425 W. Almaraz St., Monterey Park, Calif.

¹ Chambers, "Crystal-Controlled Oscillators," *QST*, March, 1950.

Oscillator

The oscillator uses a 5763 in a grid-plate circuit. The screen voltage is adjustable by potentiometer R_1 to provide correct drive to the 2E26 final. The input to the 5763 will run from about 1 watt for a 3.5-Mc. crystal working straight through to about 8 watts for the worst case of a 7-Mc. crystal quadrupling to 28 Mc. In all cases the input may be adjusted to the minimum necessary to drive the final. The 5763 is adequate to handle the range of various combinations of crystals which may be required to operate the oscillator from straight-through to quadrupling functions over the various bands. An article in *QST*¹ covering adjustments and optimum operating points was found very helpful.

The oscillator is fed from the common 400-v. d.c. supply through resistor R_2 and by-passed with capacitor C_{5A} . This RC network forms a time constant which avoids frequency modulation of the oscillator, which frequently occurs when using a common power supply. This is particularly true in mobile systems where regulation of the low-voltage generator-battery combination is poor at best.

Some preliminary tests have substantiated that it is entirely practicable to use the oscillator

as a Clapp VFO by providing a remote tuning box as outlined in earlier *QST* articles.^{2,3,4} The Clapp circuit may be designed so that variations in the tube characteristics play little part in determining the stability. A handwired remote circuit containing the required divider capacitors and series *LC* tuning circuit was connected to the oscillator. A change of a very few cycles was observed, when listening with the b.f.o. on, as the screen potentiometer was varied. This certainly indicates the practicability of this circuit for mobile use. No time has been available to build the complete remote unit, but the grid socket used allows either a crystal or the three-lead remote circuit to be plugged in.

Final Amplifier

The heart of this transmitter is the band-switching pi-network final amplifier. Grid and anode bandswitches are ganged and cover the 75-, 40-, 20-, 15-, 11-10-meter bands. The grid tank is conventional and made very low-*C* to obtain high oscillator efficiency.¹ The grid coils consist of two B & W Miniductors in series and tapped to cover the various bands.

In the pi-section output circuit, values of inductance and capacitance have been chosen to assure coupling to loads in the vicinity of 50 ohms, and to compensate for reasonable amounts of reactance. To provide a minimum of readjustment when changing bands, a 100- μ f. variable is padded with fixed miniature 1000-volt d.c. mica capacitors switched in for the 20-, 40-, and 75-meter bands. If the coils are tapped as shown, very little readjustment of grid condenser C_9 , and plate condenser C_{13} is necessary when bands are changed. L_3 is tapped to cover all bands mentioned.

Adequate control over loading is accomplished by providing a 10-position progressively-shorting capacitor deck, S_2 , working in conjunction with a fine-adjustment variable, C_{17} . This loading deck will avoid the use of outboard capacitors hanging from the transmitter, requiring change for each band. There is no need to fear the many capacitors. They are very small in size and can all be easily mounted across the contacts of the miniature ceramic deck. The voltage and current rating is adequate for the power handled.

The 1-inch 1-ma. meter is switched by a d.p.d.t. toggle, S_3 , to read either grid or plate current. The multiplier resistors, R_6 and R_7 , give full-scale meter readings of 100 and 5 ma., respectively, and may be made from stock resistance wire.

Modulator

The 1635 Class B modulator was chosen for its low resting plate current and high plate output rating. Even with 400 v. d.c. on the plate, the maximum dissipation rating is not exceeded. Though not evident from the diagram, high-level

² Long, "Cutting Down VFO Drift," *QST*, August, 1952.

³ Mix, "Simple Remote Tuning for the VFO," *QST*, January, 1953.

⁴ Cassey, "The Clapp Oscillator — and How!," *QST*, February, 1953.

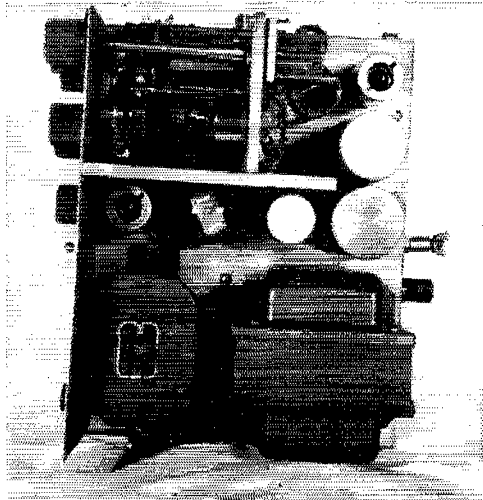
⁵ Bruene, "High-Level Clipping and Filtering," *QST*, November, 1951.

• Here is a bandswitching mobile rig covering all of the lower-frequency bands, has provision for either crystal or VFO operation, pi-section output to feed coax line, and incorporates speech clipping in the audio. Since a vibrator power supply is included, only battery and antenna connections have to be made, greatly simplifying installation.

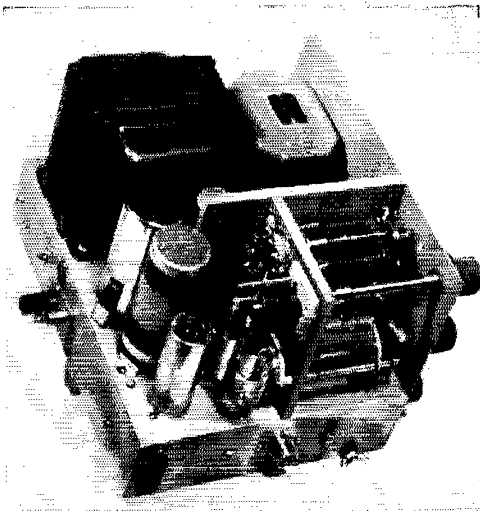
speech clipping is used. The method described by Bruene⁵ is used here. The sine-wave output of the modulator is limited to 13 watts (100-percent modulation) by raising the plate-to-plate load impedance until this occurs. A value of 17K to 18K ohms was found to be optimum. The sine-wave output will increase to 13 watts, and from there on the output will flatten off into a nearly-square wave, but not increase in amplitude with increased drive.

An elaborate filter to get rid of the resultant splatter was not found necessary. Capacitors C_{11} and C_{12} , which perform the functions of r.f. bypass and coupling, were made large enough also to suppress the splatter without affecting intelligibility.

The 1635 Class B modulator requires a driver with good regulation and some power output in order to obtain good clipping characteristics. Tubes such as the 12AX7 and 12AU7 have too high a plate resistance and insufficient power output. On the other hand, the drain of power tubes such as the 6S4 or 6AQ5 is high, and output exceeds the requirements. The 12BH7 was ideally suited to this application. Actually, it is just a huskier 12AU7 with somewhat lower plate resistance and a somewhat higher dissipation rating (3.5 watts per section). This tube is connected as a cascaded feed-back amplifier-driver which



This top view shows power and modulation transformers below, audio tubes, C_6 , and the vibrator at the center, and the r.f. section above with the 2E26 mounted horizontally. The 5763 and C_8 are in the upper right-hand corner.



This view shows the mounting of the 2E26 socket on the subpanel. On the rear edge of the chassis are battery and ground terminals, and a connector for a receiver-muting circuit.

is capable of delivering good waveform at good regulation to the grids of the 1635 modulator. The wave envelope observed on a scope at the output of the transmitter is a sine wave right up to the 100-per-cent modulation level, when further drive results in a square-wave output which is free from spikes and ringing.

Though the driver and modulator are operated near maximum ratings, they are not strained in this service. The efficiency of the modulator actually increases under square-wave output and dissipation rating is not exceeded. Cathode current of the driver is used to furnish microphone voltage. The plate supply is generally more free from vibrator and auto-electric-system hash than the filament supply, and therefore serves as a better carbon-mike polarizing source.

The characteristics of the microphone transformer and choice of coupling components result in a bass frequency response of 6-db. loss per octave below 1 kc. down to about 200 c.p.s. This has long been recognized as the ideal curve for maximum intelligibility. Below 200 c.p.s., the drop increases and large rejection occurs at the power-supply-ripple and hash frequencies.

No audio gain control was found necessary. Normal close talking produced 100-per-cent modulation with peaks clipped. Talking a little louder produced the desired heavy clipping of the output.

Power Supply

The vibrator power supply when carefully adjusted is far more efficient than a dynamotor supply and is ideally suited to small transmitter applications. The use of selenium rectifiers results in less series drop than any tube available for this service, besides not requiring a filament supply. These rectifiers are well worth the slight added cost over a tube-rectifier system. The

recommended power transformer has a 115-v. a.c. winding (not shown in the diagram), and hence the entire transmitter may be operated from the power line with a 6.3-v. a.c. filament transformer feeding the filaments. If it is desired to operate in this manner other than for test purposes only, the relay coils or circuits may be modified to operate on either d.c. or a.c.

The buffer condenser, C_{34} , must be matched to the power transformer and vibrator, or loss of efficiency and shorter vibrator life will result. This value is that which results in maximum ratio of supply output to battery drain.

Pilot lamp No. 47, fitted with a red jewel, is the filaments-on indicator. Pilot lamp, No. 44, fitted with a plain jewel, is in series with the B+ line and hence will show increases in brilliancy with modulation, besides serving as a B+ fuse.

Filters are provided in both filament and B+ lines to prevent generator and vibrator hash from reaching the modulated output of the transmitter. Only two relays are necessary. One is used to switch the antenna from transmitter to receiver, while the other is a heavy-contact model used to switch the transmitter and receiver vibrator primary circuits. Both relays are operated from the microphone push-to-talk circuit.

The replacement auto ignition key, S_4 , prevents accidental turn-ons, and discourages vandalism.

Construction

The entire transmitter and power supply is mounted on a standard $7 \times 9 \times 2$ -inch aluminum chassis. The front panel is 16-gauge aluminum, 4 by 9 inches, and mounted above the front of the chassis. A polished brass marker-strip plate attached to the panel overlaps the gap between chassis and panel. After all holes are drilled, the aluminum parts are sandblasted and lacquered, resulting in a very pleasing finished product.

A shielding and support bracket, made from $\frac{1}{4}$ -inch aluminum, is used to mount all parts of the final amplifier except the antenna-loading circuit. The 2E26 is mounted horizontally at the top of the support plate so that its heat may be readily carried, by upward convection, away from the delicate coils. All grid-circuit components, including the coil, S_1 , C_8 , C_9 , and R_3 , are mounted on one side of the plate. Components R_5 and C_{10} are also on the grid side of the plate nearest the tube socket. It is extremely important that pin connections 1, 4, 6, and 8 be *individually* grounded

Pi-Section Values		
Band	C_{13}	L_3 *
10-11	50 μ f.	0.6 μ h.
11	57 μ f.	0.6 μ h.
15	50 μ f.	1.13 μ h.
20	70 μ f.	1.77 μ h.
40	150 μ f.	3.3 μ h.
80	250 μ f.	6.6 μ h.

* Taps on L_3 are set to give this inductance.

Coil Dimensions					
Coil *	L_{μ} .	Diam.	Length	Tap **	Turns
L_1	2.2	$\frac{3}{4}$ in.	$\frac{7}{8}$ in.	5, 7 $\frac{1}{2}$	14
L_2	32.2	1 in.	1 $\frac{3}{8}$ in.	18	45
L_3	6.6	1 in.	1 $\frac{1}{4}$ in.	4, 6 $\frac{3}{4}$, 8, 12 $\frac{3}{4}$	21 $\frac{1}{2}$

* B & W Miniductors 3011 for L_1 , 3016 for L_2 , and 3015 for L_3 .

** Turns from grid end of L_1 , from 20-meter-tap end of L_2 , and plate end of L_3 . The 20-meter tap is between L_1 and L_2 .

to the plate at the nearest possible point. By no means may these pins be hooked together and then grounded. The 2E26 is a very stable performer if precautions are taken not to introduce excessive cathode- or screen-lead inductance. The disk screen by-pass should be mounted with very short leads.

The pi-tank components are mounted on the other side of the plate. The tank coil is supported at one end by the leads going to S_{1B} , and at the other end by cementing to an insulated strip spanning the switch-mounting studs. The wafers of S_1 are miniature 6-p.d.t. ceramic decks. S_{1A} uses only one half of the deck, the contacts of the other half serve as handy tie points. A standard index-and-mounting assembly, along with all necessary hardware to mount the miniature decks (and some to spare), is obtainable from Centralab.

The switch assembly and tank condenser C_{13} are supported by a small upright piece of $\frac{1}{4}$ -inch aluminum. The tank mica padders, C_{14} , C_{15} , and C_{16} , are wired directly onto the contacts of S_{1B} , as they occupy very little space. The shunt-feed components, RFC_1 , C_{11} , and C_{12} , are mounted on miniature stand-offs screwed into the condenser- and switch-shaft mounting plate.

L_4 , wound on R_4 , is wired between the plate clip and a terminal supporting one end of RFC_1 .

The circuit diagram appears complicated but, as can be seen, the final layout is one of extreme simplicity. The loading deck consists of nine miniature silvered-mica condensers mounted directly across the switch deck. The switch is a progressively-shortening type, also of the new miniature-ceramic design. The loading deck, with C_{17} , the antenna relay, and antenna connectors, are all grouped in the front corner of the chassis, directly under the final.

The speech amplifier and modulator occupy the center of the chassis, to one side of the final shield and support plate. The microphone and driver transformers are mounted under the chassis to facilitate wiring and to remove them from possibly strong r.f. fields. Small parts are mounted point-to-point across the sockets which are of the type that have a ground ring with four lugs. Connections within the speech amplifier and driver should be kept short to avoid r.f. pickup very often troublesome in such compact assemblies.

All parts for the oscillator are grouped under

the 5763 socket located just back of the final amplifier. The 4-pin Jones plug shown has $\frac{1}{4}$ -inch-spaced contacts, and permits entry of a crystal or the socket carrying the remote-VFO conductors.

The selenium rectifiers are mounted on a long screw supported by the side of the chassis at one end and a small bracket at the other end. These rectifiers are located directly under the power transformer.

Choke L_5 is mounted on the chassis back apron, as is the power relay, the battery terminal, and a socket for the receiver vibrator leads. The electrolytics are mounted in plug-in sockets rather than to the usual chassis plate, thus providing for easy replacement. A pair of phosphor-bronze grounding clips was made for the vibrator as space did not allow the usually rather-bulky grip socket.

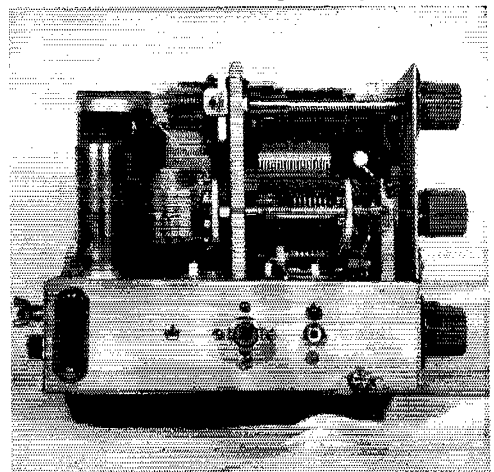
The two pilot lamps, ignition-key switch, fuse, 1-inch meter, meter switch, mike connector, as well as the loading deck and condenser, all mount on the front chassis apron.

The front panel is mounted by two screws bolted into tapped holes in the final shield upright, and a small bracket located in the inside left corner attached to the screw mounting the modulation transformer.

Construction and serviceability is much easier with this type of construction, and when observed from the front, no one would suspect that the panel does not cover the front chassis apron, except by careful examination.

Operational Check

A noninductive dummy load of anything between 10 and 50 ohms, or a small light bulb, should be connected across the antenna terminals. With a 3.5- to 4-Mc. crystal, adequate drive to the final will be obtained with R_1 advanced about quarter way from minimum. The final may now be readily loaded by decreasing antenna loading-capacitance and re-resonating C_{13} for plate-current



S_1 , with L_1 and L_2 attached to the rear wafer, C_9 , and the 2E26 socket, are mounted on a subpanel. C_{13} can be seen behind the switch. Below are the crystal-VFO socket, coax output connector and receiver jack (RCA 'phono type).

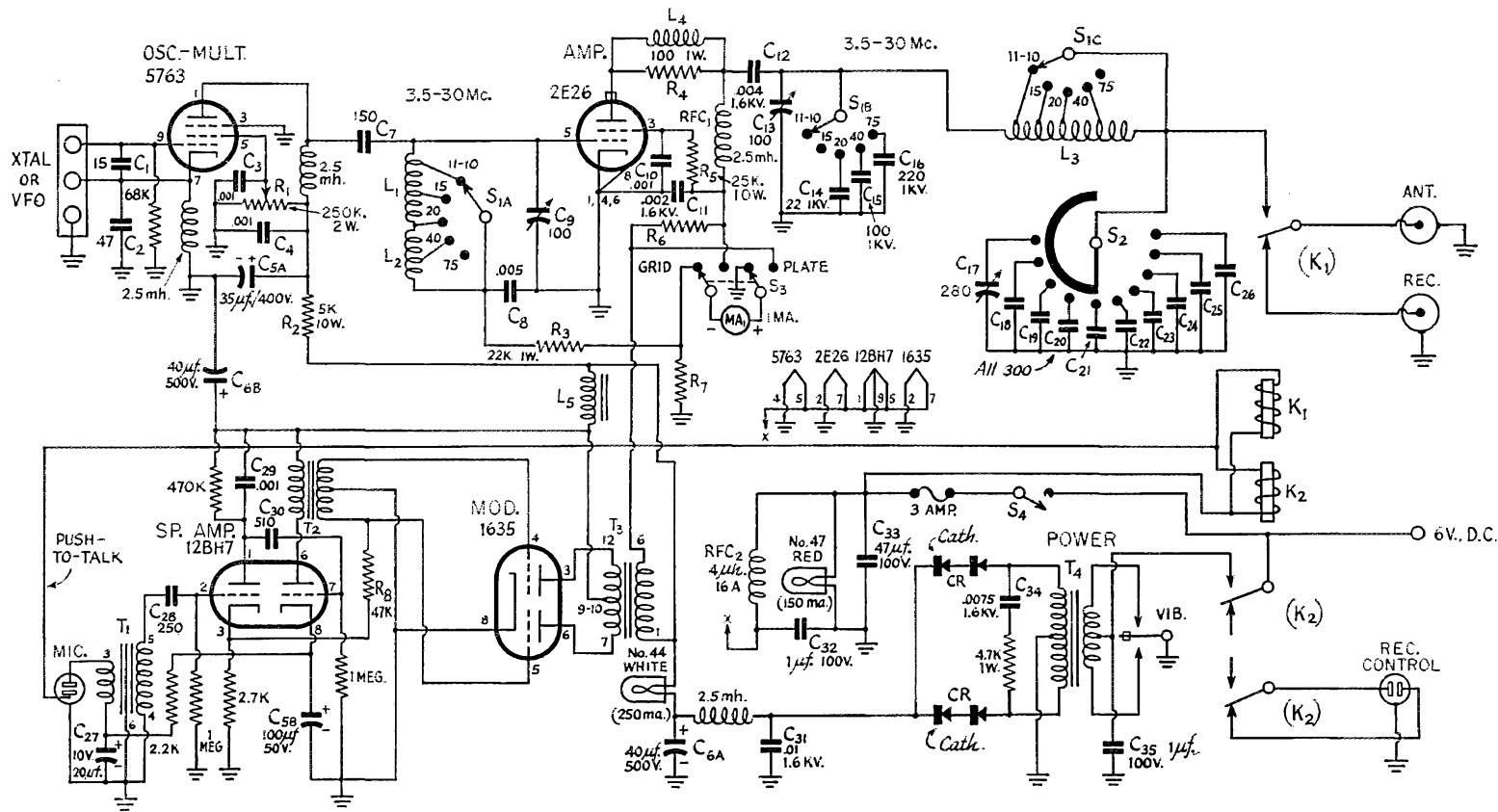


Fig. 1 — Circuit of W6WWM's mobile transmitter. Capacitor values less than 0.001- μ f. are in μ f. Unrated resistors are $\frac{1}{2}$ watt.

C₁, C₂, C₇, C₁₈, C₁₉, C₂₀, C₂₁, C₂₂, C₂₃, C₂₄, C₂₅, C₂₆, C₂₈, C₃₀ — GM-15 miniature postage-stamp silvered mica.

C₃, C₄, C₈, C₁₀, C₂₉ — Disk ceramic.

C₅ — Dual electrolytic (Mallory FP-229).

C₆ — Dual electrolytic (Mallory FP-288).

C₉ — Hammarlund HF-100.

C₁₁, C₁₂, C₃₁, C₃₄ — VCM-20, 1600-volt disk ceramic.

C₁₃ — National ST-100.

C₁₄, C₁₅, C₁₆ — 1000-volt mica.

C₁₇ — Hammarlund HFD-140 (sections in parallel).

C₂₇ — Electrolytic.

C₃₂, C₃₅ — Astron AQ-1-1M.

C₃₃ — Astron AQ-1-47.

L₁, L₂, L₃ — See coil table.

L₄ — 4 turns No. 16 on R₄.

L₅ — 8 hy., 75 ma. (Stancor C-1355).

CR — Dual-section selenium rectifier, 160 volts r.m.s. per section, 100 ma. (Federal 1008A).

K₁ — 6-volt s.p.d.t. relay (Potter Brumfield KR5D).

K₂ — 6-volt d.p.d.t. relay (Advance 964B).

MA₁ — M. B. Mfg. Co.

RFC₂ — Miller 5221.

S₁ — Miniature ceramic rotary: 2 circuits, 6 positions. See text. (Centralab PA-2002 wafers, 3 required.)

S₂ — Miniature ceramic rotary, progressively shorting (Centralab PA-2042 wafer).

S₃ — Toggle.

S₄ — Replacement auto-ignition key switch.

T₁ — Microphone transformer: 50 to 250K ohms, 300 to 3000 c.p.s. (Triad JAF-2).

T₂ — Interstage transformer: 1.33:1 pri. to ½ sec. (Triad A-83X).

T₃ — Modulation transformer: 18,000 to 6300 ohms (UTC S-19).

T₄ — Vibrator power transformer: 350-0-350 volts, 135 ma. (Stancor P-6166).

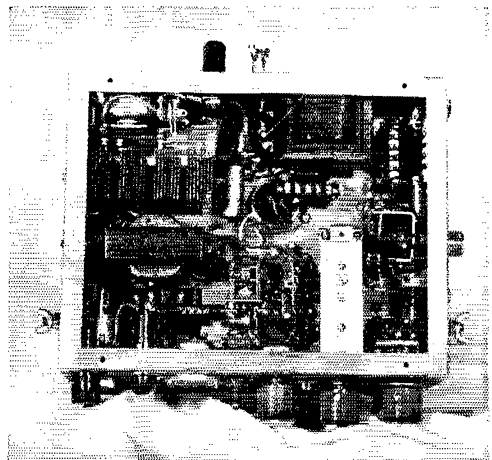
VIB — Vibrator: 115 c.p.s., 6 v. d.c., 10 amp. (Radiart 5515).

dip. C₁₃ will be about half out for load values of 10 to about 50 ohms that are nonreactive, on every band. Under these conditions, tank Q will be 10 to 12. A large amount of reactance will result in a different setting of C₁₃, with some change in Q. Under normal conditions, large amounts of reactance will only occur on 75 and 40 when attempting to operate too far removed from the antenna resonant frequency. A 7-Mc. crystal plugged into the oscillator will permit checks to be made for operation on all other remaining bands. Adequate drive to the final operating on 28 Mc. should be obtained from a normally active 7-Mc. crystal with R₁ set at about three quarters of maximum.

The suppressor, L₄, and R₄, eliminated a 200-odd-Mc. parasitic oscillation so common to these tubes. No regeneration could be observed on any band, hence no neutralization was considered to be necessary.

If the components shown are used for the speech amplifier and modulator, only a functional check need be made. If the feed-back resistor R₃ is connected to the wrong grid, oscillation will result. The proper connection must be determined by trial. If substitutes are made for any of the transformers it is recommended that a 'scope be hooked up to observe the modulation envelope, and the system adjusted as outlined by Bruene⁵.

When using the 110-v. a.c. winding and a filament transformer for checking, plate voltage will be about 400 v. d.c. Installed in the car, plate



Bottom view of the 25-watt multiband rig. The antenna change-over relay is immediately behind the coax connector to the right. The light strip to the left of the relay is the ceramic base of C₁₇. The power relay is in the upper left-hand corner, above the selenium rectifiers and the filter choke, L₅. The audio transformer, T₂, is fastened against the rear edge of the chassis. The mike transformer is to the left of the audio-tube sockets.

voltage will be about 370 v. d.c. with the motor turned off. With the motor on, voltage will be 400 v. d.c., or somewhat over, depending upon the car's regulation system. The full input of 5 watts ICAS is obtainable in all cases.

Closing Comments

The transmitter described is admittedly one of those "up-to-the-hilt" designs where tube ratings are pressed to the maximum recommended limit. However, no apology is being made for such a design. On the contrary, the writer takes certain pride in deviating from the approach of, "Oh, let's add another stage," to seeing what one can actually get out of four little jugs in intermittent amateur mobile 'phone.

In conclusion, I would like to mention that the photographs were made by Ace Dorau, W6ED.

Strays

W1WPR read in his local paper of a hi-fi outfit that has "a three-way speaker and is supposed to tickle the ear up to 17,000 db." That's really being tickled to death.

W7FOU (also W5FOU/7) operated in Nevada for nine months before becoming W4FYG. During that period he worked and confirmed 46 states. One of the two states he couldn't raise: Nevada.

Perhaps the purest material in existence is the germanium turned out by Bell Telephone Laboratories. The impurity content has been established at one part in ten billion — equivalent to a pinch of salt in 35 freight cars of sugar. — *Ohmite News*

A Civil Defense Control-Station Transmitter

PART I—*Pretuned Operation on Selected Channels in Three Bands*

BY PHILIP S. RAND,* WIBDM

THE transmitter to be described was built to serve the needs of the Civil Defense Net Control Station in Connecticut's Area I. It will be seen to be somewhat more complex, and more conservatively designed than most rigs built for ordinary ham use. The nature of c.d. work being what it is, these characteristics are necessary if communication is to be carried on reliably under all conditions encountered in this rather specialized field.

The objective in mind was a station that could be switched instantly to any one of four assigned frequencies in each of three bands, 50, 28 and 144 Mc. The r.f. units for the three bands are quite similar, so the detailed description is confined to the 50-Mc. portion shown in the accompanying photographs. This, together with detailed information on interference-prevention measures, will follow in a later issue.

General Requirements

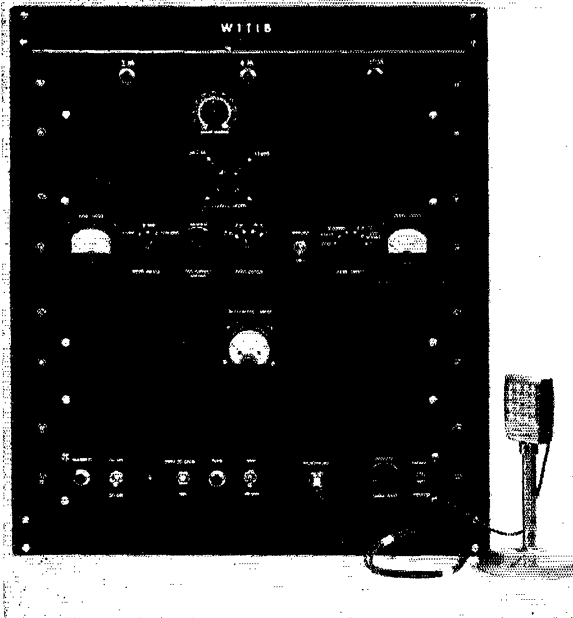
Area I in Connecticut consists of 22 towns and cities in the southwestern part of the state, most of which have their own local organizations and RACES groups. A representative local group con-

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• If you've done any extensive work in the civilian defense communications field, you've probably found that gear that is satisfactory for your own hamming leaves quite a bit to be desired when it is pressed into c.d. service. Here is a control station transmitter that was designed with the special requirements of that application in mind. Designed for heavy duty in the hands of inexperienced personnel, it provides output on any of four net frequencies without retuning adjustments of any kind.

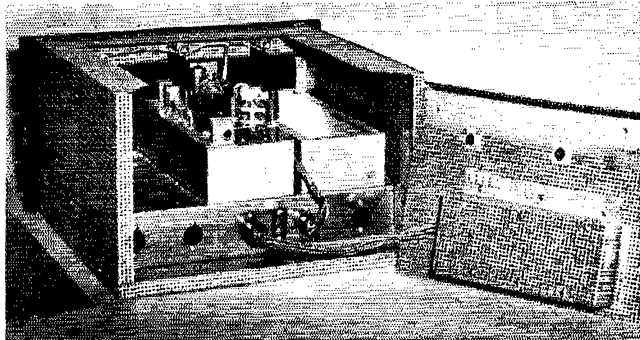
sists of a net control station, an alternate, several fixed stations at key points, a fleet of mobile units, and a number of hand-carried battery portables. All these stations are equipped for emergency-power operation. The flow of traffic is as follows: the portables relay radiation readings and disaster information from the scene via their respective mobile units to the local net control. The local C.D. Director then compiles this information and radios his report and requests for mutual aid to the Area I Director on 50 Mc. The Area Director, in turn, communicates with the State Director and also radios requests on 144 and 28 Mc. for mutual aid to cities and towns surrounding the stricken city.

From this brief description it is obvious that a single net on one band would not be able to handle the flow of traffic, especially if the incident involved several towns. This was borne out in practice



The c.d. control station transmitter used at WITIB. Upper portion of the rack has 50-Mc. r.f. section installed, with provision for similar r.f. heads for 28 and 144 Mc. Any of four frequencies within a band can be selected at will without retuning. Power supplies and modulator occupy lower panel.

Rear view of the r.f. portion of the c.d. transmitter, showing the 50-Mc. r.f. section in place. Power cabling from the main chassis passes through a shielded TVI filter compartment on the rear wall of the cabinet.



drills. Furthermore, it is important that all radio circuits be capable of simultaneous operation with a minimum of interference. For example, Area 1 must be able to send and receive traffic to and from at least three towns simultaneously, and at the same time have at least two circuits putting traffic into State Control. Local nets in cities and towns must also be able to operate simultaneously with the area net.

To put the above plan into operation it was necessary to utilize not only the 2-, 6- and 10-meter bands, but also other radio services such as the Disaster Service, Special Emergency Service, Forestry Service, the State Police Radio Service and CAP. This requires as many as eight radio transmitters operating in close proximity to each other. It can be seen that this poses a major problem of mutual interference between circuits. Transmitters and receivers must be well shielded, and installed with liberal use of coax fittings and both high-pass and low-pass filters, to keep spurious radiations and responses of both under control.

In addition, the equipment must be designed so that it can be operated by unskilled personnel. The number of amateurs is just not enough to go around, and in most RACES groups they will be outnumbered at least 3 to 1 by operators holding only FCC Restricted Operator Permits. The transmitter should be capable of rapid switching to any one of several net frequencies in the three bands, with no retuning adjustments. Large factors of safety are thus called for, and design techniques far more conservative than those employed in routine amateur work must be employed, in order to assure trouble-free operation at all times.

Station Details

The 50-Mc. portion of the station set-up is shown in block-diagram form in Fig. 1. The coaxial line from the 50-Mc. antenna is brought to a low-pass filter before being fed to the antenna switching relay. This prevents interference from other transmitters operating higher than the 50-Mc. band, as well as confining the radiation from the transmitter to the operating frequency only. The receiver line is also protected by a high-pass filter, to cut out potential interference from lower frequencies in use close by.

Coaxial line from the antenna relay is brought into the main r.f. compartment of the transmit-

ter, the upper panel in the front-view photograph. This unit, shown with its back cover removed in the second photograph, will ultimately contain three separate r.f. sections for 50, 144 and 28 Mc. These individual units plug into a large chassis containing all the necessary meters, switching and cabling. Output from the main chassis is brought through coaxial line to the back wall of the shielding enclosure. Power for the r.f. units is fed through a shielded TVI filter on the back wall of the enclosure, from a power supply and modulator deck that occupies the lower portion of the desk-type rack.

The desired band is selected by the band-switch, which applies heater voltage to the selected r.f. subchassis. All other voltages are left permanently connected to the three units through the paralleled connections of the sockets on the rear of the main r.f. chassis. In this way the grid and plate meters read the currents of the corresponding

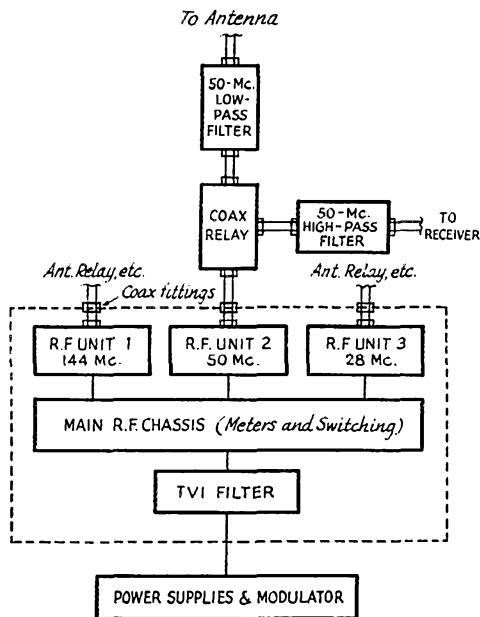


Fig. 1 — Block diagram of the 50-Mc. portion of the c.d. control station. Note use of filters to prevent various forms of interference. Portion within the dotted lines is inside the r.f. section shielding enclosure. Double connecting lines indicate coax; single lines, power cabling.

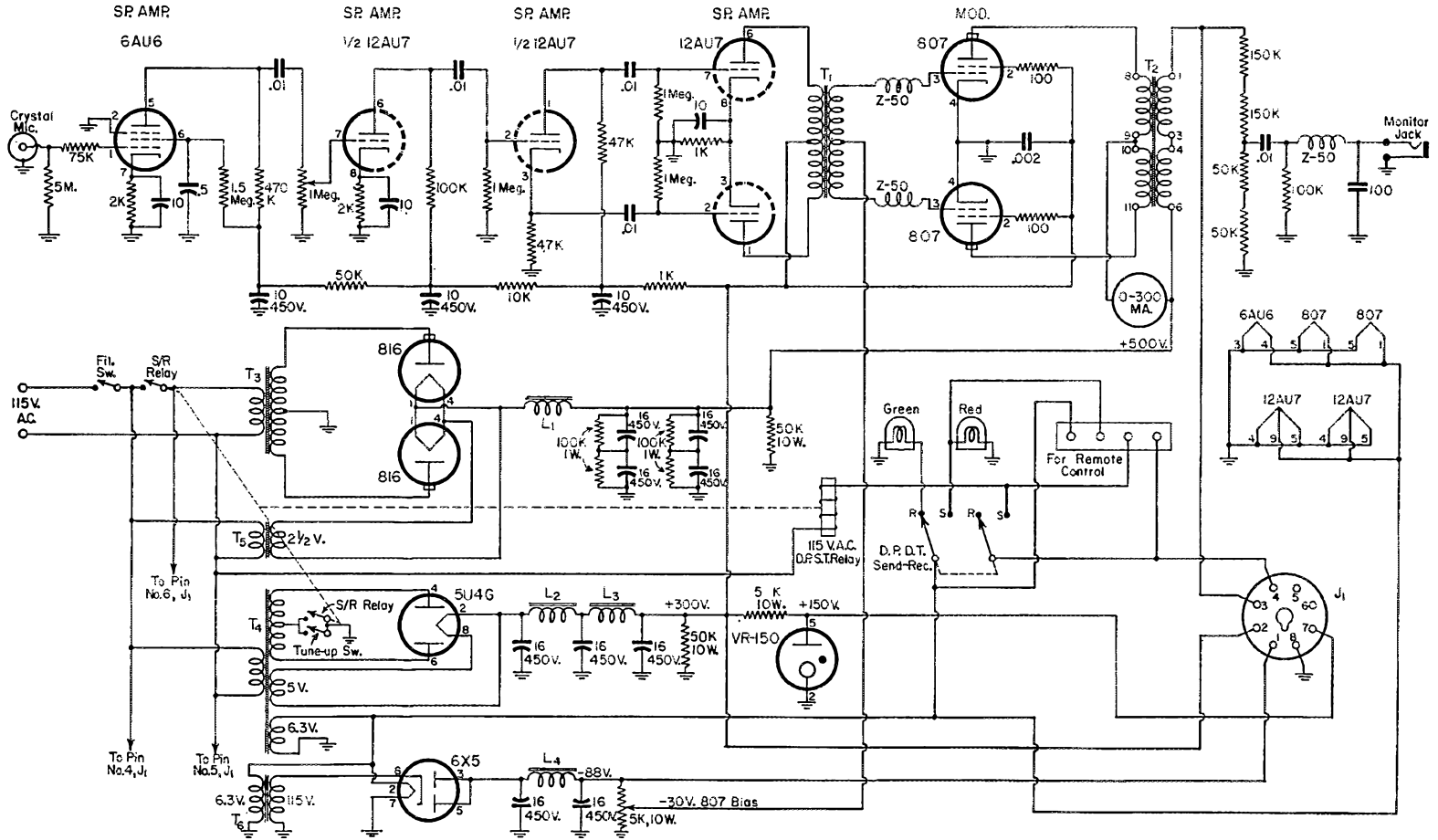


Fig. 2 — Wiring diagram of the speech amplifier and power supplies for the c.d. control station.

- J₁ — 8-pin female chassis fitting.
- L₁ — 3.7-hy. 200-ma. filter choke (Chicago Transformer Co. TR-4200).
- L₂, L₃ — 8-hy. 120-ma. (Chicago R-8120).
- L₄ — 8-hy. 85-ma. (Chicago R-885).
- T₁ — P.p. plates to p.p. grids, Class AB₂ driver transformer (Chicago IN-15).
- T₂ — 60-watt modulation transformer (UTC Varimatch, type CVM-2).
- T₃ — Power transformer, 500 v. d.c., at 250 ma. (Chicago P-45).
- T₄ — Power transformer, 300 v. d.c., at 145 ma., 5 v. a.c. at 3 amp., 6.3 v. a.c. at 5 amp. (Chicago PH-145).
- T₅ — Filament transformer, 2½ v. 6 amp., 2000-v. insulation (Chicago FO-26).
- T₆ — Filament transformer, 6.3 v. 3 amp. (Chicago FO-63).

circuits in each of the three r.f. sections, regardless of which band is in use. Details of construction of the r.f. chassis will be given in a subsequent issue.

Start with the Power Supply

In building this transmitter, it is well to start with the power supply and modulator chassis. After this unit is completed, the main r.f. chassis and metering and switching circuits should be assembled. Following this procedure will provide complete testing facilities for the r.f. sections, to be built as the final part of the project.

Arrangement of parts in the power supply and modulator is not particularly critical. The rear-view photograph shows the power supply components at the right, with the speech amplifier and modulator occupying about one-third of the chassis on the left side. The power supplies deliver 500 volts for the modulator and final amplifier plates; 300 volts for the speech amplifier, r.f. exciter, and the screens of the modulator and final; and 88 volts bias with voltage-dividing networks for the various r.f. stages.

The send-receive switch is wired to a terminal strip on the back of the chassis so that the rig can be controlled from a remote position if desired. In the transmit position this switch energizes a 115-volt a.c. relay which applies a.c. to the primary of the 500-volt supply and grounds the center tap on the secondary of the low-voltage supply. The relay contacts in the low-voltage center tap are paralleled by a toggle switch, so that

the exciter may be turned on separately for spotting the net frequency on the receiver.

A VR-150 regulates the voltage on the oscillator plate and final screen. The latter is allowed to follow the modulation by means of an audio choke connected in the screen supply line on the main r.f. chassis. The bias system utilizes a 6X5 rectifier supplied by a 6-volt filament transformer connected backwards, with separate voltage dividers for each stage that receives bias.

Speech Amplifier and Modulator

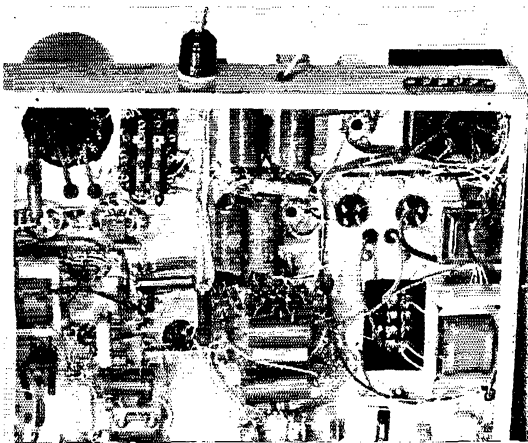
The modulator is a pair of 807s Class AB₂, driven by a 12AU7 dual triode connected in push-pull, transformer coupled. A 6AU6 working into a 12AU7 combined speech amplifier and phase inverter completes the speech line-up. Note the r.f. chokes in the modulator grid leads and the carbon resistors in the screen leads. These prevent audio parasitics that might otherwise cause trouble, not only on the air, but in other equipment operating near-by.

A BCI-type of interference was cleared up by putting a 75,000-ohm resistor in the 6AU6 grid lead, as shown in the schematic, Fig. 2. The interference showed up whenever other transmitters in the room were on the air. R.f. from the other transmitters was picked up by the 6-meter microphone, their audio appearing on the 50-Mc. carrier. The same treatment was needed on all other speech amplifiers in the room.

The modulator has its own plate meter, which is left in the circuit at all times, allowing the Radio Officer to tell at a glance if the rig is being modulated correctly. This is important when many different operators with varying voice levels operate the equipment. A monitoring jack connected to a voltage divider across the secondary of the modulation transformer provides a convenient check on the audio system. In actual use, a shielded cable takes audio from each transmitter and receiver to the Radio Officer's desk, where a selector switch allows him to monitor both the received and transmitted signals of four radio circuits. A small isolation amplifier is used at this position. It consists of four 12AT7s, each with a screwdriver-adjusted gain control in its grid circuit, a 4-position switch, a master volume control, a 'phone jack and a small power

(Continued on page 110)

Left: Bottom view of the modulator and power supply. Right: Top rear view of the power supply and modulator chassis. Modulator and speech amplifier components are at the left.



How To Tune a Single-Sideband Signal

A Real-Life Drama in One Act

(The story you are about to read could be true. Not even the facts have been changed to protect the innocent.)

This is an amateur band. 75 meters. I work here. I'm a ham. . . .

It was Saturday, April 31st. It was raining in Los Angeles. We were working the day watch on the Drag Net. My partner is Bill Jones. The NC is Colonel Culpepper. My name's Windy. A mysterious signal has been reported at the high end. My job: tune it in.

— . . . —

It was 3:27 P.M. when I checked in on 3840.

"Hello, Bill. Any leads?"

"Nothing much. The NC says it may be some kind of 'phone. Kicks the S-meter around. Doesn't stay on very long. No known language being used."

"Uh huh. Stand by. I'll take a listen."

The NC broke in. "Be careful, Windy. It may be incompatible."

"Yeah." I tuned down to the high end and cruised around. At 3985 I heard something like splatter and tracked it over to 4010. The S-meter kicked. By rocking the dial I found the biggest kicks came at 3997. I tried it again. Same thing. I checked in on 3840.

"Rough, Bill. Real rough. Who'd wanna do a thing like that? Seems to peak at 3997."

"Yeah. Where do we go from here?"

"You get the Stats office to run an MO?"

"Yeah. One possible. They said it could be a controlled-carrier job."

"No. I've heard them. They kick the meter but you can copy them. I'm gonna try it again, with the a.v.c. off."

"You kidding? How can you tune it? No S-meter."

"Did it once as a rookie. Kill the a.v.c. and back off the sensitivity. Hafta run up the volume. Cutting the sensitivity prevents overloading the receiver."

It was 3:32 P.M. when I got back to 3995. I cruised around again. The signal was there. It still peaked at 3997. Running the volume full on and backing the sensitivity down, the signal covered 3993 to 4001. But it wasn't copy. I put some on tape and checked back on 3840.

"No go, Bill. It's not as broad that way, but it's not copy. Recorded it this time. Tape's on the way to the lab."

"You try playing the tape back fast?"

"Yeah. Nothing."

"How about backwards?"

"Still nothing."

3:50 P.M. Lab reported NO KNOWN LANGUAGE. NOT CODED OR INVERTED SPEECH. MIGHT BE SINGLE SIDEBAND.

I reported to the NC.

"Good work, Windy. That's the first lead we've had. Get right on it."

I called Bill on the landline. "You hear that, Bill?"

"Uh huh."

"What are single sidebands?"

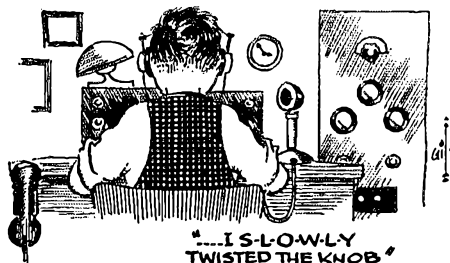
"Beats me. Seems I heard something about them once. Something about a b.f.o."

"You're dit daffy. Who needs a b.f.o. for 'phone? That's for c.w."

"Yeah. Guess I'm wrong."

"But we gotta do something. I'll try it. Cover me on 3840."

I tuned down to 3997, a.v.c. off, sensitivity low, and volume high. There was the signal. I found the b.f.o. switch and turned it on. The signal changed character but I couldn't understand it. I twisted the b.f.o. knob back and forth. The character changed. I braced myself and tried turning the b.f.o. knob slowly. The signal stopped. I withdrew my hand from the b.f.o. knob and the signal came on again. "Gotta be more careful." Again I s-l-o-w-l-y twisted the knob. The signal



started to sound human, although high-pitched. I turned the knob a little more, and the human voice became low-pitched. Holding my breath, I turned the knob back a hair, and the voice sounded human and natural. I had done it! I increased the sensitivity control. The signal got louder and then it munched up. I backed off the sensitivity control and the voice cleared up. I turned the tuning knob. The voice disappeared, and the garbled signal returned. I tried turning the tuning knob slowly, and I found a setting where the voice came back in. I lit a cigarette and went back to 3840.

"Chief?"

"Yeah, Windy."

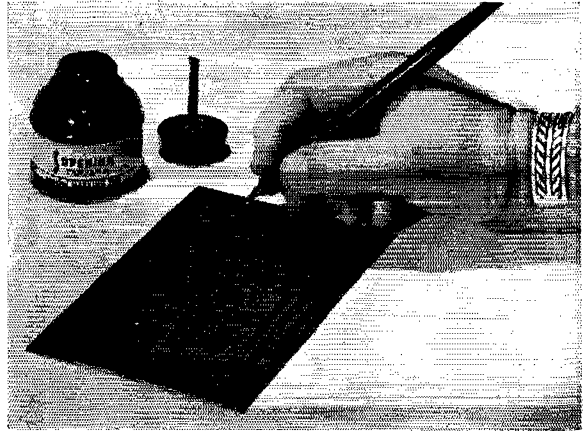
"We got it. It was single sideband. The language is English."

"Good work. Is it compatible?"

"That's up to the jury, Chief. My job was to tune it in."

(Continued on page 110)

◆
Hand-inking a card to make
"resist" patterns.
◆



Etched Circuitry for the Ham—Now!

BY A. DAVID MIDDLETON,* W5CA, AND T. F. MARSHALL,* W5RFF

◆
• Etched circuitry is already an established versatile tool of production-minded industry, which has taken advantage of it to build better TV sets, clock radios, and light-weight portable and hand-carried communication gear as well as laboratory test equipment. Here is a simple method of applying the technique to ham gear.
◆

“WHY not drop in and see my etchings?” This may be a familiar saying in many hamshacks from now on, because you, too, can have etchings of value and interest to any amateur—etchings of *electronic circuitry*, that is! Etched circuitry is simple, easy and inexpensive, not to mention being more compact and sturdy than conventional wiring.

Until recently such techniques were used only in laboratories or production plants, but due to the rapid spread of informative data, availability of material and components, and a widening field of adaptability, etched circuitry can now be

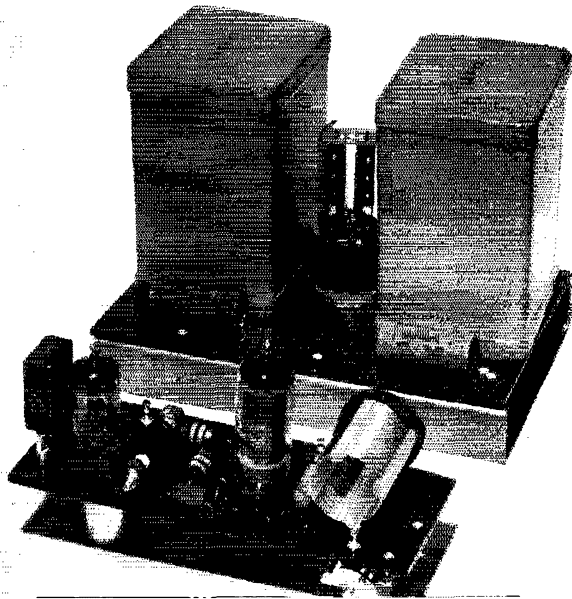
* © Sandia Corporation, Albuquerque, N. M.

◆
A low-power transmitter and power supply illustrating an application of etched circuitry. (The metal supporting pillar beneath the 6C4 tube is not part of the transmitter.) The size of the card is 2 3/4 by 6 inches.
◆

used as a tool by the amateur. Using inexpensive materials readily available, any amateur can lay out and fabricate electronic assemblies employing etched circuitry as the means of connecting components without the use of old-fashioned wiring.

Etched circuitry may employ any of several techniques, each of which results in the desired end product—a grid of thin copper lines connecting the various *physical* (not printed) components of conventional types that make up the electrical circuit. Another common name for etched circuitry is “printed circuits,” but since this also implies printed *components* it is not favored in the field.

In the system herein described, a laminated material (a phenolic base of 1/16-inch XXX-P grade was used for this equipment) was bonded, by the manufacturer, to a sheet of copper foil 3.5 mils thick. A pattern of the desired circuit was placed on the foil with a “resist” ink. Then the



copper not protected by the "resist" was etched off using a ferric chloride (FeCl_3) solution, leaving the copper grid for use in connecting the components. Holes were drilled through the laminate base and the foil. Components were then

of precision or high production units are eliminated. This simple technique requires only a pen and pen point, an ink, and an etching solution to produce usable etched wiring plates or "cards" entirely suitable for ham electronic gear.

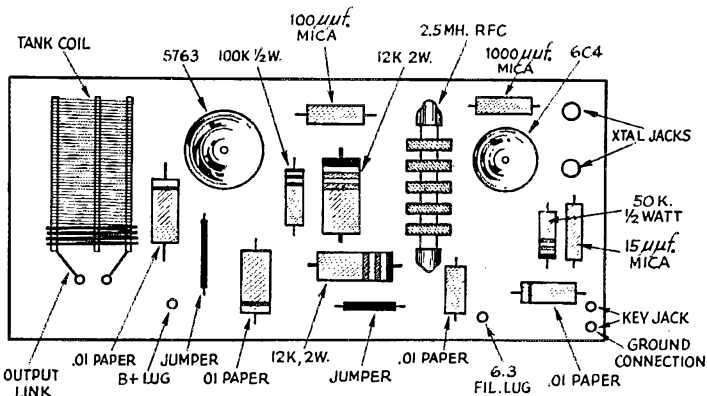


Fig. 1 — Top pictorial view of component placement layout. This should be drawn on semitransparent paper so wiring layout can be added to the underside of the drawing.

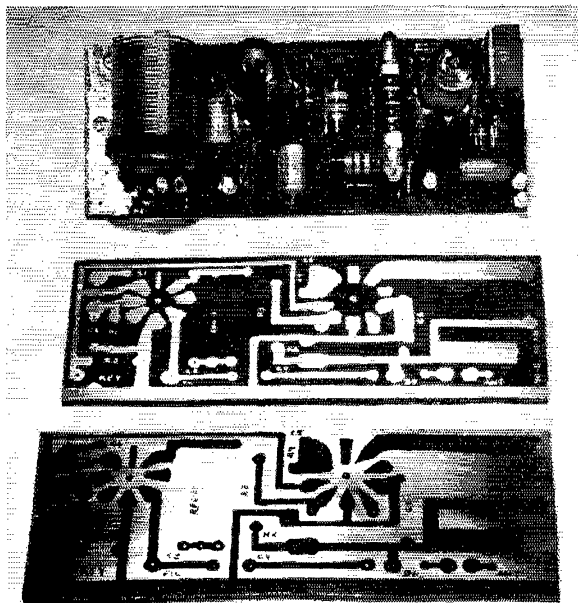
placed in position on the unclad side of the laminate and the leads inserted in the drilled holes. The leads were cut off (about $\frac{1}{8}$ inch over-flush) and bent over to form a mechanical connection; then each lead was soldered.

This, in general, is the technique developed by S. F. Danko, W2SGG, and S. J. Lanzalotti, W2DVX, of Squier Signal Laboratories at Fort Monmouth, N. J. Named by them "Auto-Semby" because of the adaptability with which this technique may be employed in automatic assembly of electronic equipment, this method of fabrication is a natural for ham use. Here is a simple technique heretofore used only in experimental laboratories wherein the photoengraving steps normally required in fabrication

Procedure Step-by-Step

Here are the steps required in the order taken:

- 1) You need a *completely-designed* circuit in which the type, quantity, size and value of all components is established.
- 2) Make a pencil drawing (it will probably take several) showing the physical layout of all components. The first drawings need not be exact but are successively followed by drawings in which all dimensions *are* exactly shown, particularly where the leads will connect to the wiring grid. (See Fig. 1.)
- 3) Make a drawing of the wiring side of the etched card, remembering that the components



Upper: Top view of 6C4-5763 c.w. transmitter. Middle: Etched card ready for drilling, assembly and soldering. Lower: Inked card ready for etching in ferric chloride.

are on the *other* side of the card. (See Fig. 2.) Tube sockets, for example, will be laid out in the normal manner just as in a metal chassis with pin numbers in a clockwise direction. All wire leads terminate in "eyes" (Figs. 2 and 3) through which component leads extend and where they are soldered. The hole in the "eye" is about $\frac{1}{32}$ inch and receives only one lead per hole.

4) In case of layout interference between leads, or components, or both, "jumpers" (considered as a "component") are used (Fig. 2). A well designed layout will resemble a pictorial wiring diagram. A simple layout is best. Every effort should be made to keep r.f. leads short. All lines should be direct as possible. Leads should be at

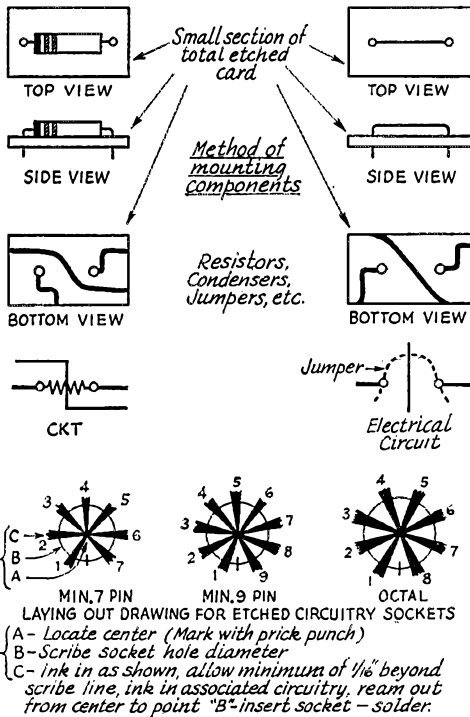


Fig. 2—Samples of layout techniques such as jumpers, crossovers, eyes and components.

least $\frac{1}{32}$ inch wide and separated at least $\frac{1}{16}$ inch for voltages up to 350 d.c. Lines $\frac{1}{16}$ inch wide will be heavy enough for normal ham circuit currents, including filaments.

5) The final penciled layout drawing is placed on the foil surface with a piece of pencil carbon paper between the foil and drawing paper. *Fasten the drawing to the laminate with Scotch Tape to prevent slippage!* This is important as errors will result if the drawing moves, even slightly.

6) Trace out all the connecting lines so that they are transferred by the carbon paper to the foil. With a sharp prick punch locate each "eye" hole in the laminate. Make a healthy hole so that the marks can be easily found. Check and recheck the lines and eyes to see that *all* were transferred.

7) Use Superior Marking Ink, Trojan grade, or equivalent, made by Superior Marking Company, Chicago, and a regular school-type medium-width pen point (about $\frac{1}{32}$ -inch nib) to draw the lines and eyes. Practice will be necessary to make neat, straight lines and proper

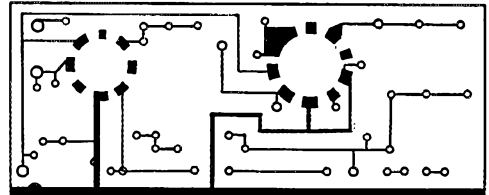


Fig. 3—Wiring layout made in pencil before transferring to foil. Note eyes, socket layout and connecting lines.

circles of the eyes. The ink may be erased with a damp cloth or a rubber eraser. It is not possible to describe just how to draw on copper with this ink and pen because each person develops his own technique. Practice and patience will result in a good drawing if properly done.

8) Check the inked drawing for errors or omissions as all inked surfaces will remain exactly as they are after etching. The card is now ready for etching.

9) Required materials for etching are as follows:

a) A glass, Pyrex, enamel, or china bowl, dish or pan large enough to submerge the card in liquid with the vessel only half full.

b) Pair of rubber gloves.

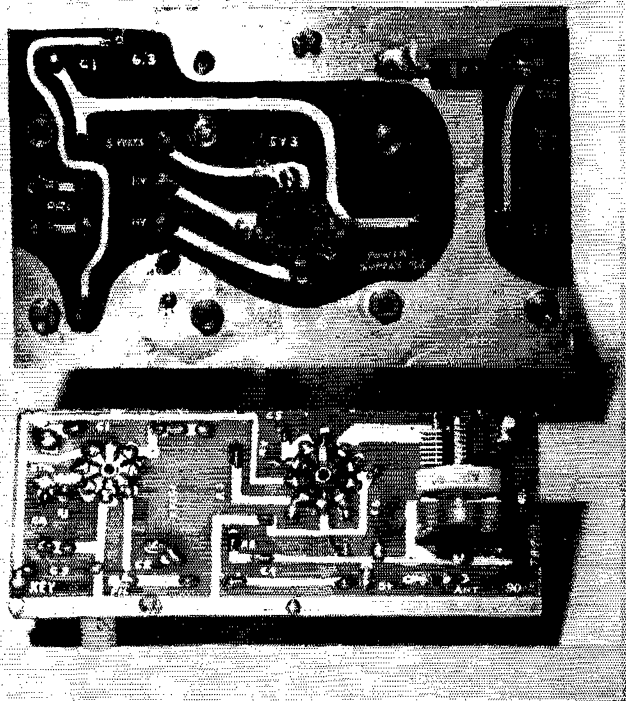
c) Ferric chloride ($FeCl_3$) lumps or powder obtainable at a drugstore or industrial chemical supply house. A pound will etch a lot of cards. Pulverize the ferric chloride and mix it with an equal weight of hot water. Possibly you may obtain liquid ferric chloride (42° Baume) from a local engraver's supply house. Warm it before use. Ferric chloride is a fairly harmless acid but will stain your hands or clothes; thus the use of rubber gloves and an old shirt is recommended. Splashed $FeCl_3$ should be quickly washed from the skin or it will sting and stain.

10) Grasp the card firmly with a rubber-gloved hand, then plunge the card in and out of the warm (120° F.) etching solution. Continue to agitate the liquid, using the card as a paddle, for several minutes, until all the unwanted copper is etched off. The hand-drawn pattern which was protected by the ink "resist" will be the only part remaining.

11) Wash off the card thoroughly and clean off the "resist" ink with fine steel wool or scouring powder.

12) The card with its etched grid is now ready for drilling and assembly. If available, a silver plating solution can be used to coat the copper grid but this is not essential.

13) Using a No. 60 drill, make all necessary component lead holes. All other holes, such as mounting holes for pots, sockets, and trans-



Wiring view of the transmitter and power supply. Component identification is provided on the etched cards. Note the straightforward leads and simplicity of wiring.

solderable leads at right angles to a flat side or connecting face of a component so that these leads may be "plugged" through the card and soldered in place.

References

Many excellent articles on etched (or printed) circuits have appeared in a wide variety of technical magazines during recent months. Such a bibliography is too voluminous to be included in this article. However, the piece by Lanzalotti and French, that appeared in *Radio & Television News* in October, 1952, is of importance and significance to any amateur interested in applying this technique.

Another useful article is "The Design and Layout of Printed Circuit Patterns," by S. J. Lanzalotti and S. G. Bassler (of SCEL) in *Radio & Television News*, November, 1952.

The "Printed Circuit Handbook — The Utilization of Pre-Fabricated Wiring," prepared by W. J. McGinley and A. E. Stones of the Methode Mfg. Corp., 2021 W. Churchill St., Chicago, is the most thorough such work available to date. This "Handbook," written for the semitechnical field, contains many suggestions and ideas on layout, design, processing and fabrication of etched cards.¹

Tele-Tech Magazine, December, 1953, published several timely articles on etched circuitry fabrication and technique application.

The future of etched circuitry is wide open for the radio amateur as well as the professional engineer. Etched-circuitry "know-how" will enhance the versatility of the radio amateur who makes his living in any of the ever-expanding fields of electronics. This is especially true for the radio repairman, for background in these techniques will enable him to service more readily the increasing number of commercial radios to be found with this method of wiring incorporated.

To date the amateur has made little use of this fascinating new technique of assembly. It offers a challenge to every amateur in applying it in his experimentation and construction of his gear.

formers, should be drilled and/or reamed out at this time. The copper foil is very thin and extreme care must be taken to prevent it from tearing while drilling or reaming.

14) Push the component leads through the laminate and the foil. Cut off the protruding leads, leaving about $\frac{1}{8}$ inch; bend these over and solder using a light-weight (25- to 75-watt) iron. Excess heat will cause the foil to "lift," and then you really are in trouble! Use as little heat and solder (rosin-core, naturally) as possible. Avoid "bridging" the gaps between lines or eyes.

15) After soldering components in place remove excess rosin with service solvent or "carbon tet" to clean the surface of the card.

The assembled unit is now ready for test and use. The card may be mounted in a cutout in a regular chassis or on stand-offs or brackets as desired by the builder.

An example of this simple method of fabricating etched circuitry assemblies is shown in the photographs. A transmitter consisting of 6C4 Pierce oscillator and a 5763 output stage is shown with its power supply, both units utilizing hand-drawn etched wiring cards instead of conventional old-fashioned wiring. The transformers are standard replacement-type units encased to provide pin terminals suitable for etched circuitry.

Many components in their current form are not readily adaptable for etched wiring. However, ham ingenuity can overcome the lack of suitable terminals. More components are constantly being added to the list of those already specifically designed for etched circuitry. The basic idea in this new "pin termination" is to provide a set of

¹ Available from Methode at a cost of \$1.00 forwarded with the order.

The "Paratone"—An R.F.-Powered Monitor for Break-in

Germanium Diodes and a Transistor in a Modern Monitor

BY DONALD KLEIN,* WIGKR, AND WILLIAM SLUSHER,* WIZYX

• Remember the "Monitone," the gadget that acted as transmitter monitor and receiver switch? Here it is with modern circuitry involving a transistor and two germanium diodes. It's compact, and it requires no power supply.

AFTER completing the original transistorized monitor,¹ it seemed logical to attempt the development of a monitor suitable for break-in operation: a "Monitone"² using only semi-conductor devices. From our efforts a self-powered monitor with electronic audio switching finally evolved. Rather than just present a circuit description of that design, we wish this article to serve an additional purpose. Transistor literature has been appearing in an increasing volume in the various technical journals during the past few months. However, despite the wealth of information that is available, much has been of too advanced a nature for the beginner to gain a good understanding of semiconductor circuits. An evolutionary process by which the "Paratone"³ came into being is described, in order to present a new approach to the problem of semiconductor circuit design and provide a general example of electronic circuit development.

Theory

The functions of the monitor are outlined in Fig. 1. Audio signals from the receiver are passed into an electronic switch that will remain closed

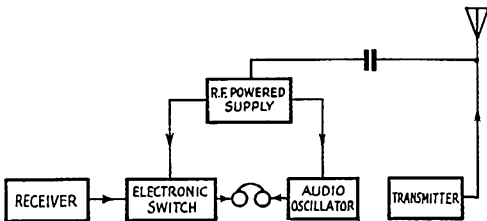


Fig. 1—Block diagram of a monitor provided with electronic audio switching. The r.f.-powered supply controls the receiver output and the audio oscillator.

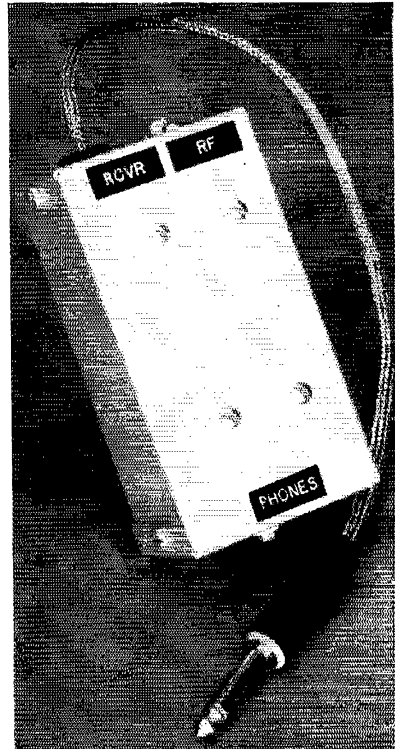
* % Sylvania Electric Products, Inc., Electronics Division, 100 Sylvan Road, Woburn, Mass.

¹ Klein and Slusher, "A Transistor Self-Powered C.W. Monitor," *QST*, January, 1954.

² Chambers, "The Monitone—Model 1951B," *QST*, May, 1951.

³ Paratone—a name coined to describe the entire monitor circuit. It is a combination of the words "parasite," suggestive of the r.f.-powered feature, and "tone," descriptive of the audio output of the unit.

as long as the transmitter is not generating r.f. power. The audio signals are fed through the switch to the headphones. The output of an audio oscillator, which is powered only when the transmitter is "on," is also fed to the headphones. The operation of the audio switch and audio oscillator is controlled by a d.c. power supply. The supply is energized by a small amount of r.f.



The "Paratone" is a self-contained device that does the work of the Monitone and requires no power supply of any kind.

"borrowed" from the output of the transmitter and rectified. Operation of the monitor can be summarized as follows:

Receive Condition —

- 1) R.f.-powered d.c. supply not energized;
- 2) Electronic switch closed — output from receiver sent to the headphones;
- 3) Audio oscillator silent.

Transmit Condition —

- 1) R.f.-powered d.c. supply energized;
- 2) Electronic switch open — no signal sent from receiver to the headphones;

3) Audio oscillator activated — oscillator signal heard in the headphones.

Despite its important role, the r.f.-powered supply is not very complicated, as can be seen by Fig. 2. The output of the half-wave rectifier is

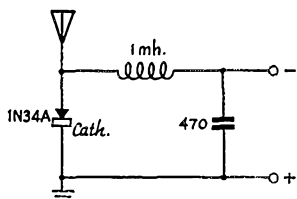


Fig. 2 — The r.f.-powered d.c. supply is a simple half-wave rectifier using a germanium diode.

filtered through a simple network consisting of a choke and condenser. The necessary r.f. power is obtained by loosely coupling, generally somewhere along the transmission line, to the output of the transmitter.

The Oscillator

The transistor oscillator described in the original article¹ could serve equally well in the present application. However, since that time several other new circuits have been built and tested by the authors, and they should be of interest. One uses a point-contact 2N32 transistor in an extremely simple circuit (Fig. 3) that requires only two resistors and a single condenser. The large resistance in the base of the 2N32 in conjunction with the emitter RC circuit forms a relaxation oscillator. The signal at the emitter is a sawtooth wave abundant in harmonics, making it ideal for monitoring purposes. A sinusoidal wave containing no harmonics quickly causes fatigue to the operator and results in the "hearing" of signals long after the operating period is over. Because of the small number of parts involved, the circuit lends itself to very compact construction. Little more need be said about this circuit except that it works well and seems even closer to a "Sutter's Ideal"¹ than the original oscillator.

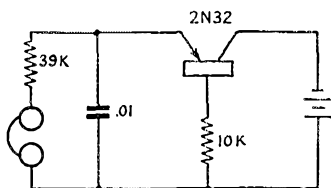


Fig. 3 — A point-contact transistor provides a convenient means for generating an audio tone. The signal has a sawtooth waveform.

An oscillator has also been developed to use the more readily available and less expensive junction-type transistor. Fig. 4 shows two audio oscillators that bear a striking similarity, despite the fact that one incorporates a vacuum tube while the other employs a *p-n-p* transistor of the 2N34 type. The difference between the two circuits is only the reversal of the applied polarities

and the location of the grid and base return resistors. If a 2N35 *n-p-n* transistor had been used, even the emitter (cathode) and collector (plate) voltage polarities would have been identical with those of a vacuum tube. Otherwise, the vacuum-tube and transistor circuits are identical, so if the operation of the former is understood the operation of the latter follows. Unlike the point-contact transistor and like the vacuum tube, the junction-type oscillator must be supplied with external feed-back, hence the transformer.

Still a third type of oscillator was tried during the course of our investigation. Although it does not employ a transistor, it is mentioned because of its simplicity and because its power requirements are similar to those of a transistor oscil-

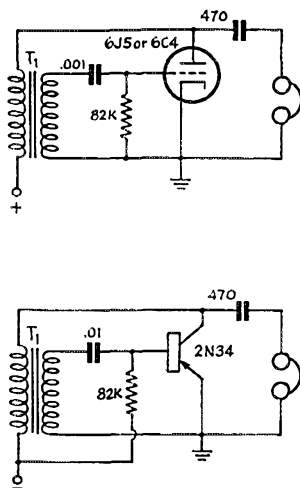


Fig. 4 — The similarity in application of junction transistors and vacuum-tube triodes is shown in these audio-oscillator circuits. T_1 is a 3:1 audio transformer.

lator. A neon bulb in a relaxation circuit has long been used as a code-practice oscillator. This type of oscillator depends upon the slow charging rate of a condenser through a series resistor followed by a rapid discharge through a neon bulb connected in parallel with the condenser. When the potential across the terminals of the bulb has reached the ionization potential (usually about 90 volts) it conducts and thereby discharges the condenser until the bulb is extinguished (usually about 75 volts). The rapid charge and discharge of the condenser causes an audio signal in the headphones.

Since the power requirements are about $\frac{1}{2}$ of a watt, almost any transmitter will be capable of supplying such an oscillator via a pair of germanium diodes in a voltage-doubling circuit. The one inherent disadvantage of this type of oscillator, compared to the transistor oscillators, is that it can be operated only over a very limited range of voltages. If the d.c. supply voltage is too low the neon bulb will not ignite; if it is too high the frequency of the output will be inaudible. When changing bands it will be necessary to adjust the d.c. voltage to the circuit within a nar-

row range. This can be accomplished by varying the r.f. coupling either by physically manipulating the antenna probe or by placing a variable

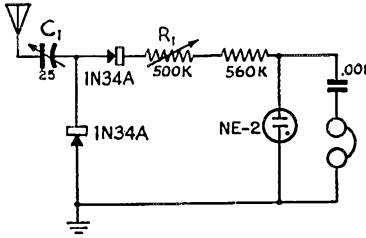


Fig. 5 — A neon-bulb oscillator circuit can be used in an r.f.-powered monitor. Variables C_1 and R_1 are used to provide control over a wide range of operating conditions, but they are not essential. See text.

condenser (say, about 25 $\mu\text{f.}$) in series with it. Another method would be to add a variable resistor in series with the fixed resistor, as shown in Fig. 5.

The Switch

Now let us turn our attention to the design of the electronic switch. Since the junction transistor is comparable to a vacuum triode, as already shown, it was no problem to design a suitable transistorized circuit. Both of the audio amplifiers shown in Fig. 6 are provided with a means for applying cut-off bias, which makes it possible to

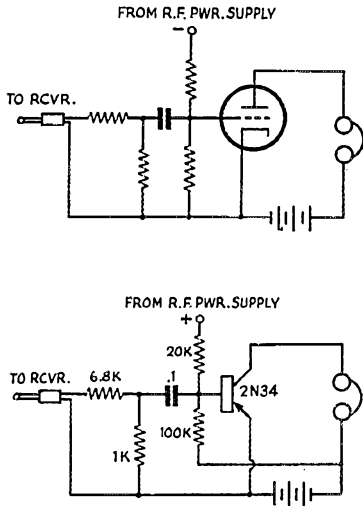


Fig. 6 — Two audio amplifiers for use as electronic switches.

“open the switch.” The circuit for the transistor is based upon a $p-n-p$ type, hence cut-off is achieved by positive bias on the base. Aside from the differences in polarity, the two amplifiers are otherwise quite alike in operation. The input circuits were tapped down on a resistive voltage divider, since no gain was needed. The amplifiers will pass the audio output of the receiver along to the headphones until the signal is blocked by cut-off bias derived from an r.f.

source. It is as simple as that. The transistorized amplifier requires no filament power and only a modest $B+$ voltage is needed. To operate the amplifier, the authors originally used a germanium diode half-wave rectifier powered from the filament supply of the receiver. It worked very satisfactorily. However, since the power demand was so slight (about 0.4 ma. at 3 volts) batteries were substituted in later models. Penlite cells were found ideal, although mercury cells could well be used because of their smaller size and constant-voltage characteristics.

When the monitor had been in operation for a short while the circuitry was reviewed with a critical eye for further simplification. Why design a high-gain amplifier and then go to the trouble of decreasing the input signal to arrive at a satisfactory level of output? If the aim of the stage was only to act as a switch and have a gain of about unity, a cathode follower would be a more logical circuit.

Following the principles of similarity discussed earlier, a transistor version of a cathode follower

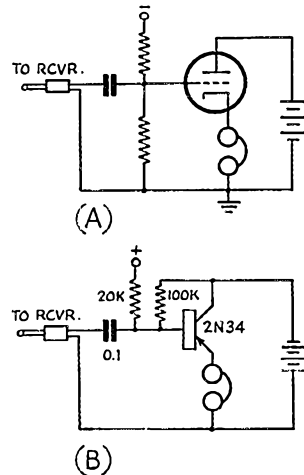


Fig. 7 — The cathode follower (A) and the emitter follower (B) are similar. Both circuits are arranged to be used as electronic audio switches.

— “the emitter follower” — was built (Fig. 7). With this circuit the signal from the receiver was attenuated by only 0.2 db. with the switch “closed” and was reduced by 40 db. when the switch was “open.” The exceptionally high gain in the “closed” condition was due to the amazing transconductance obtainable from a junction transistor with suitable supply voltages. Transconductances above 10,000 micromhos, which are found in junction transistors, are not available in most vacuum tubes.

There was yet another portion of the monitor that could be simplified. The oscillators used either point-contact or junction transistors, but in both cases they were of the $p-n-p$ type. This necessitated two r.f.-powered d.c. supplies, since opposite polarities were needed to power the oscillator and to provide cut-off bias. By rearranging the oscillator circuits, as shown in

Fig. 8, only a single r.f. supply was required for the entire monitor.

At this point we should have been satisfied with the existing circuits, but we weren't. These monitors were self-contained, but they were not truly self-powered. Also, the second transistor needed for the audio stage increased the cost of the units. If the audio stage were needed only as a switch and not to supply any amplification, perhaps it would be possible to eliminate the transistor from this circuit. This indeed became possible when we turned to the germanium diode.

A germanium diode conducts much more readily in one direction than in the other, hence its application as a rectifier. This unidirectional conduction also makes it possible to use the diode in switching circuits, as is done in many modern high-speed computers. Actually, it is not a perfect switch but might be compared to a variable resistor. When conducting, it appears as a low resistance of about 100 ohms. With a reverse polarity applied, the resistance of the diode is increased to approximately a megohm.

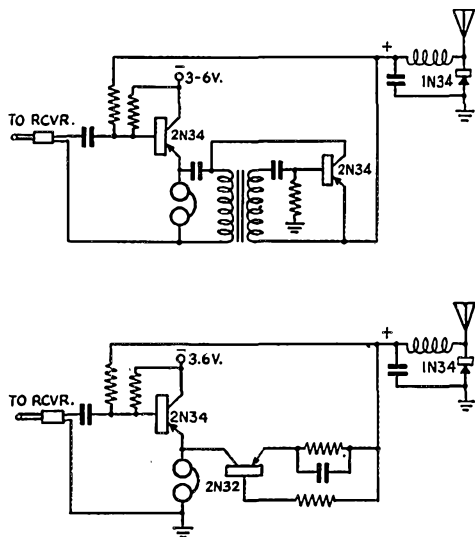


Fig. 8 — Two examples of how the emitter-follower amplifier can be coupled to a transistor audio oscillator. The monitors are only rearrangements of the amplifier and oscillators already shown in Figs. 3, 4 and 7.

This certainly is more than adequate for the present switching application.

The circuit that finally evolved from our early experiments with germanium diode switches is shown in Fig. 9. The diode, D_1 , serves as the switch. It is normally biased in the forward direction and therefore appears as a low resistance in series with the audio output from the receiver. When the r.f.-powered d.c. supply is activated, the bias is reversed, and the diode effectively appears as a very large resistance in the audio path. The resistance of the diode and that of the headphones form a voltage divider for the input signal. When the resistance of the

diode is low (biased in the forward direction) essentially the full audio input voltage appears across the headphones. With the reverse bias the resistance of the diode is increased to such a large value that only a small fraction of the signal reaches the headphones. On average-strength audio signals there was between 30 and 35 db. of attenuation when the switch was "opened." When conducting in the forward

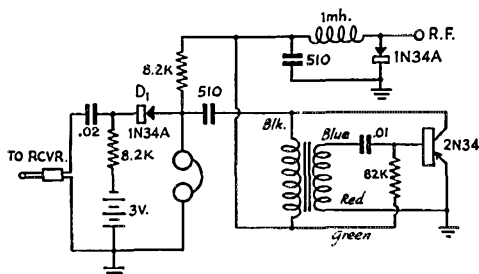


Fig. 9 — A monitor with a biased germanium diode used as an electronic audio switch.

direction the battery drain was about 0.2 ma. at a 3-volt bias level. This circuit has proved to be as effective as the transistorized switch and, of course, is much less expensive to construct. Still, there remained one final challenge — would it be possible to do away with the batteries entirely? At the present stage of development this was just an academic problem, since the batteries required for the monitor were inexpensive, small, and would serve for a lengthy period before replacement.

Fig. 10 presents the final development of the monitor circuit, which we call the "Paratone." The diode, D_1 , in this circuit also serves as a switch, but here it is operated in shunt with the headphones rather than in series as in the previous circuit.

The detailed operation of the switching circuit is outlined in Fig. 11. Condenser C_1 is charged

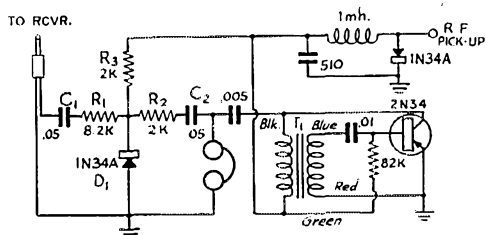


Fig. 10 — The Paratone — a self-powered automatic e.w. monitor. High-impedance headphones are required. T_1 —3:1 audio transformer. See text.

rapidly by the diode to the peak of the audio signal from the receiver. Condenser C_2 prevents the flow of d.c. through the diode, and the diode remains self-biased in a blocking direction. In this condition, the audio from the receiver passes through $C_1R_1R_2C_2$ to the headphones. The resistors R_1 and R_2 introduce some audio attenuation, but this is small and not troublesome since most receivers have ample gain.

Some audio losses can also be expected through R_3 (Fig. 10) since this resistor does not fully isolate the circuit from the loading effect of the power-supply diode. Although not necessary for practical operation, an audio choke in series with R_3 would prevent this loss.

The diode D_1 is made conductive by a forward current through resistor R_3 from the r.f. power supply. When conductive, the resistance of the diode becomes very small and this resistance, together with R_1 , forms a voltage divider across the input which greatly attenuates the audio signal. This effectively isolates the output of the receiver from the headphones as shown schematically in Figs. 11C and 11D. The resistor R_2 is necessary to prevent the shorting of the headphones through the condenser when the diode is in the conducting condition. Without this resistor the signal from the audio oscillator would be drastically reduced.

Construction

The Paratone was built into a $4 \times 2 \frac{1}{2} \times 1 \frac{3}{8}$ -inch aluminum utility box (Bud CW-3002). The majority of the weight and bulk of the unit was centered in the audio transformer. The transformer used was a 3:1 audio interstage type with a 10,000-ohm primary (Merit A-2910). Although these values of transformer impedance are very different from the impedances of the junction transistor, no difficulty was observed in the operation of the oscillator. With different transformers it may be necessary to vary the values of the 0.01- μ f. emitter blocking condenser, to arrive at a suitable audio output frequency.

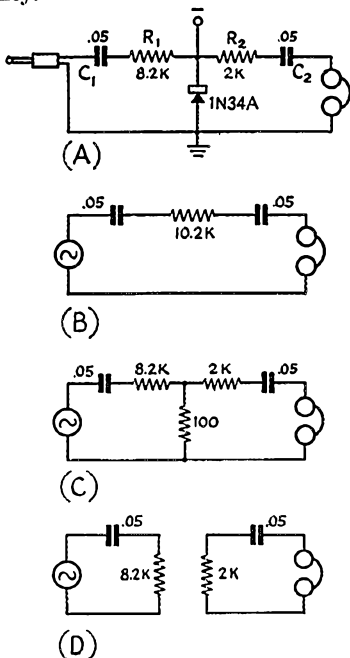
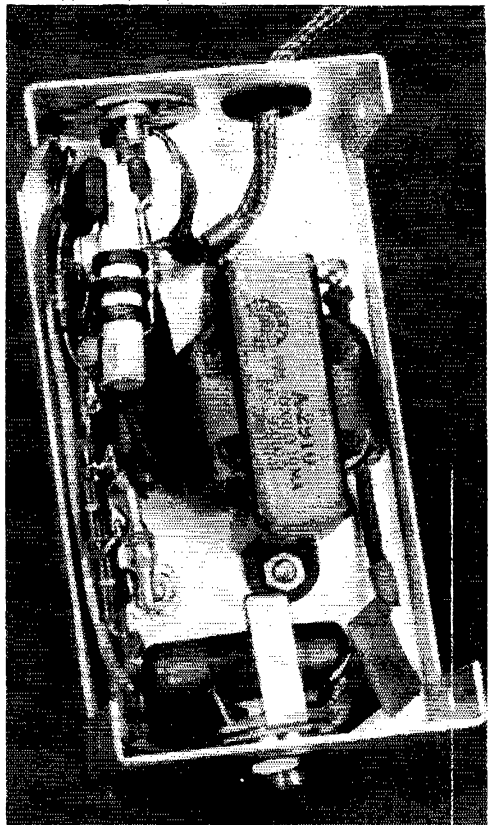


Fig. 11 — The diode switching circuit (A) and its equivalents in the cut-off (B) and forward-biased (C and D) conditions.



In this view, the transistor can be seen at the upper left, just to the left of the upper end of the r.f. choke. One germanium diode is partly hidden by the r.f. choke and the other germanium diode is at the lower left.

If one of the new subminiature transformers had been used, the size of the monitor could have been further reduced. This type of transformer was ruled out because, for many, its cost would be prohibitive. However, if one neglected cost as a factor, a better choice for a compact monitor would be the point-contact transistor oscillator (Fig. 3) which does not require any transformer.

The placement of parts is not critical. Leads in the r.f. power supply should be made short. When soldering a transistor or germanium diode into place, the lead of the semiconductor device should be grasped with pliers to help conduct away the heat.

Some who operate their transmitters from a remote location may find it inconvenient to run a long r.f. line to the monitor at the operating position. In this case it is entirely feasible to have just the r.f. power supply located at the transmitter. Much less r.f. power should be required than would be necessary if a twenty- to thirty-foot r.f. link were used. This also would be a good means of coupling for those pessimists who are more concerned with r.f. in the antenna than that which appears in the shack. Because

(Continued on page 112)

The "Connecticut Kilowatt"

Parallel High-Power Beam Tubes with Pi-Section Tank

BY ROBERT M. RESCONSIN,* W1TRF

I GUESS it's about every ham's dream some day to have a real lazy-man's transmitter. One that can be put on any band with no coil changing and with a minimum amount of controls. Especially the high-power man, who has dangerous voltages to contend with when changing coils. Also, of course, as almost everyone is TVI-conscious now, changing coils can become a task if all kinds of shields have to be removed to get at the blasted things. So, if a fellow is going to build a kilowatt these days, he has certain goals that have to be met. Among these are:

- a) the transmitter must be completely enclosed,
- b) be band-changing without coil-changing,
- c) be neutralized cold and free from parasitics,
- d) all outgoing leads must be filtered for harmonic reduction,
- e) must use low-drive tubes.

Now this isn't as impossible as it sounds. With careful planning, it can be worked out very nicely. Of course, at a fast glance one might say, "True, but this thing is going to cost a mint." Actually, the cost of this amplifier is probably less than that of one using plug-in coils.

Description

The circuit diagram is shown in Fig. 1. The amplifier is a single-ended affair using either 4-125As or 4-250As in parallel. The grid cir-

* 215 Main St., Rocky Hill, Conn.

• Here is a neatly-designed rig for the high-power boys. Built around a pair of 4-125As (and adaptable to 4-250As), it dispenses with coil changing or switching by the use of a multiband tuner in the grid circuit and a continuously-variable pi-section tank in the output circuit.

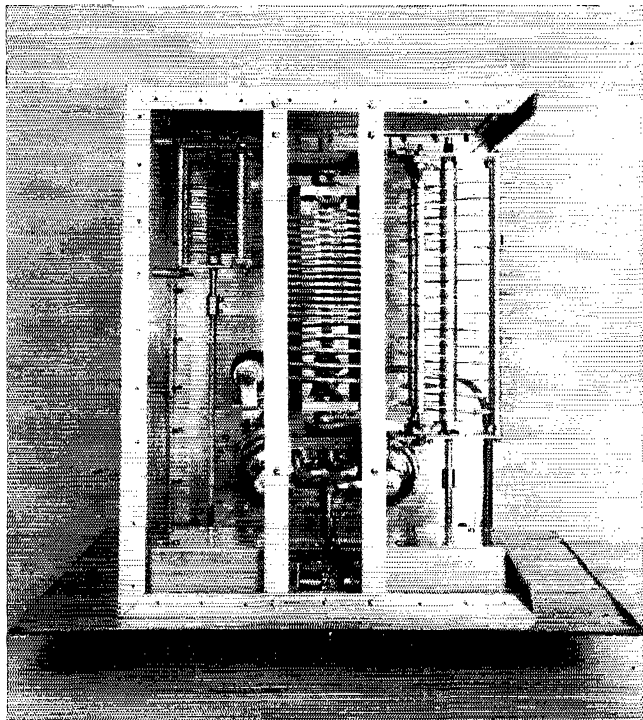
cuit consists of a National MB-40-L multiband tuner which covers all bands, 80 through 10, with one rotation. Separate parasitic suppressors, L_1 and L_2 , are used in the grid leads.

The plate circuit uses parallel feed and terminates in a pi network using a Johnson 226-3 13.5- μ h. rotary inductor at L_1 . This unit is edge-wise wound with heavy bus bar, and will stand any power that an amateur will ever use. However, care should be used in initial tuning, as explained later. The plate by-pass condenser C_{11} , v.h.f. filter condensers C_{17} and C_{18} , and the d.c. blocking condenser C_{28} are TV-type high-voltage ceramic units. C_{12} is the plate tuning condenser (or pi-section input condenser), and C_{13} is the output condenser, used as a fine coupling control. S_2 inserts additional capacity in the output circuit for the lower frequencies and is used as a coarse-coupling control. To make it sound a little simpler, if C_{13} alone is 500 μ f., and S_2



Front view showing the panel layout. Controls along the bottom are S_2 (coarse coupling), filament switch and grid-tuning. Above the window are the controls for C_{13} (fine coupling) and plate tuning. Between the meters is the counter dial on L_1 . The input and output connectors are along the left drop of the chassis. The hole in the center of the perforated top cover is for access to C_{10} . The chrome strips are from some discarded cabinets and cover the 6-32 machine screws that support the angle to the panel. National CFA chart frames are used to cover the meter openings, and one is placed between the plate and output controls to use as a tuning chart. The bottom of Rf/C_2 shows between the tube bases, through the screened opening.

Top view showing the chassis layout. The two meter-shield boxes are seen at the bottom of the photograph with the counter-dial mechanism between them. C_{12} is to the right, the rotary inductor in the center, and C_{13} in upper left. C_{10} is in front of C_{13} and just to the left of the rotary inductor. The tops of the two tubes can just be seen on the bottom center of the chassis. The plate r.f. choke, RFC_2 , is between the tubes and slightly to the rear, hidden by the front end plate of the rotary-coil frame.



switches in an additional 500 and 1000 $\mu\text{f.}$, you wind up with a system that will give you any capacitance from practically zero to 1500 $\mu\text{f.}$ on the low-impedance end of the pi network. While the TV doorknob-type condensers used as output capacitors are not reputed to be too stable with temperature, they are relatively inexpensive, and have worked satisfactorily in this installation. RFC_3 , connected from antenna terminal to ground, is a safety device in case C_{28} should break down. The condenser and coil, C_{27} and L_6 , are not necessary, but can be resonated to a local TV channel to further the reduction of harmonics.

L_3 consists of $4\frac{1}{2}$ turns of No. 14 wire wound around a globar resistor. These resistors, until recently, have been hard to come by and, when available, were expensive. However, they have been used for some time in commercial transmitters as parasitic suppressors. The resistance varies from approximately 50 ohms when cold to 20 ohms when hot. They can be had from any General Electric television-parts supplier, at a very nominal cost. The amplifier is neutralized with the combination of C_1 and C_{10} , the latter being a variable neutralizing condenser. The value of C_1 is fairly critical, as will be explained later.

The input and output circuits are well shielded from each other to keep coupling to a minimum, and all power leads are shielded and terminate in a shielded compartment housing the v.h.f. filter components for the bias, screen-voltage and high-voltage leads. The meters are mounted on panels that insulate them, and are shielded with $4 \times 4 \times 2$ -inch aluminum boxes, and the openings in

the panel are rimmed with National chart frames.

The screen lead is brought out to a separate terminal so that the builder can use the system he chooses for applying voltage to it. If the amplifier is going to be used primarily for c.w. operation, a separate low-voltage screen supply seems logical, since the tubes can then be protected simply by the use of sufficient fixed bias to limit the input. With this sort of supply, however, it is important not to apply screen voltage and excitation in the absence of plate voltage, because the screen current will run to excessive proportions, with danger of ruining the tube. For this reason, it is a good idea to have a screen supply delivering a voltage somewhat higher than the screen operating voltage, and use a dropping resistor in series with the screen. This will tend to limit the amount of screen current in case of failure of the plate supply.

Construction

The construction illustrated in the photographs permits short connecting leads, yet there is no need for crowding components. Although solid aluminum sheet was used for the enclosure, perforated sheet is preferred if it is available, since it will afford better ventilation.

The amplifier is laid out on a $13 \times 17 \times 4$ -inch chassis, using a standard 19×19 -inch panel. The chassis is placed with the 13-inch edge against the panel. All the paint is removed from the back of the panel to afford a good bond to the chassis and enclosure. Framework for the enclosure is made from $\frac{3}{4} \times \frac{3}{4} \times \frac{1}{8}$ -inch alumi-

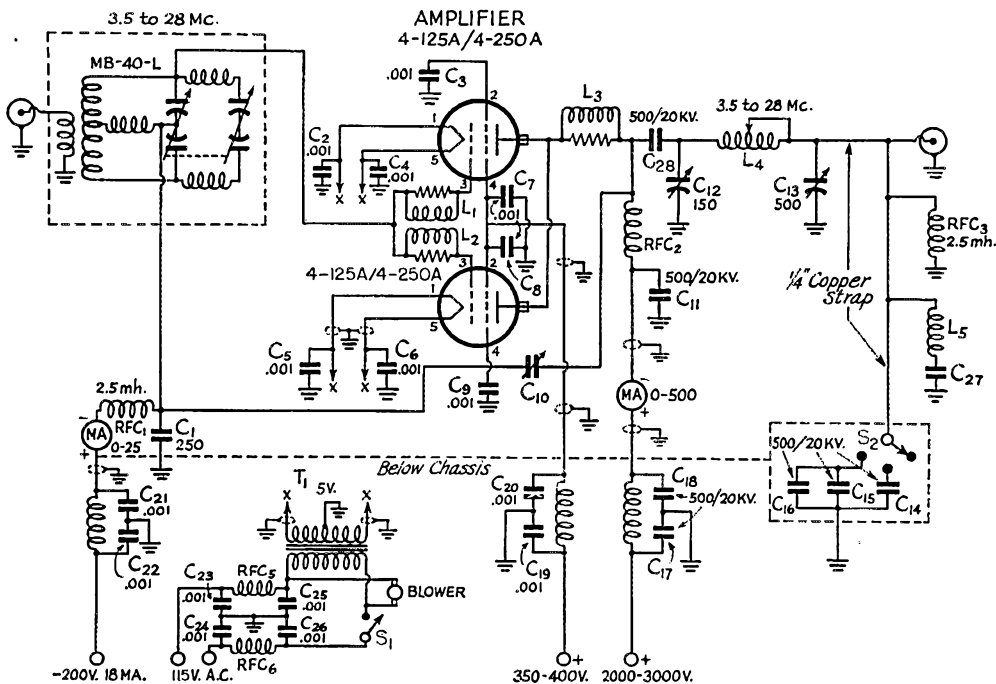


Fig. 1 — Circuit of the "Connecticut Kilowatt" amplifier.

- All capacitances less than 0.001 are in μf .
- C₁ — Mica.
 - C₂, C₄, C₅, C₆, C₂₁, C₂₂, C₂₃, C₂₄, C₂₅, C₂₆ — 500-volt disk ceramic.
 - C₃, C₇, C₈, C₉, C₁₉, C₂₀ — Two 500- μf , 3000-volt disk ceramics in parallel if screen voltage from plate-dropping resistor; 500-volt disk ceramic for 350-400-volt screen supply.
 - C₁₀ — 1.4-10.6 μf , 11 kv. (Johnson N-250).
 - C₁₁, C₁₄, C₁₆, C₁₇, C₁₈, C₂₈ — TV doorknob ceramic.
 - C₁₂ — Johnson 150D90, 2000-volt rating.
 - C₁₃ — Johnson 500E20, 9000-volt rating.
 - C₂₇ — See text.
 - L₁, L₂ — 4 turns No. 14 on 1-watt 100-ohm resistor.

- L₃ — See text.
- L₄ — 13.5- μh rotary inductor (Johnson 226-3).
- L₅ — See text.
- Blower — Newark Electric 28F996 motor, 28F997 fan; or Allied Radio 72P702 motor, 72P703 fan.
- MB-40-L — National multituner.
- RFC₁, RFC₃ — National R-100S.
- RFC₂ — National R-175A.
- V.h.f. filter chokes — 7 μh . (Ohmite Z-50).
- S₁ — Toggle.
- S₂ — Ceramic rotary.
- T₁ — Filament transformer: 5 volts, 12 amp. (Merit P2942).

num angles. A 16-foot length of angle will be just enough for the job. Two pieces of $\frac{3}{4} \times \frac{1}{4} \times \frac{1}{8}$ -inch channel will also be needed to support the variable inductor. These can be seen in the top view photograph.

The panel is laid out with the outer edges of the two meter openings spaced 3 inches from the top and $4\frac{1}{4}$ inches in from the edges. The counter-dial assembly for the rotary inductor is mounted in the center of the panel, with the hole for the shaft $6\frac{1}{4}$ inches from the top. Two $\frac{3}{8}$ -inch holes are drilled for the plate-tuning and fine-coupling condensers, $5\frac{1}{4}$ inches in from the edges and 9 inches from the top. An 8 × 3-inch opening is cut, with the bottom edge $4\frac{3}{4}$ inches from the bottom of the panel. Three $\frac{3}{4}$ -inch holes are spaced $2\frac{1}{2}$ inches from the bottom of the chassis, for the coarse-coupling, grid-tuning and the filament-switch controls. The tube sockets are mounted 2 inches behind the opening with the grid terminals to the rear. The MB-40-L is mounted on $\frac{3}{4}$ -inch cone stand-offs directly behind the tube sockets. The shaft is connected through a Johnson insulated coupling and National right-angle drive

to the front control knob. A $\frac{3}{4}$ -inch cone stand-off is placed between the grid terminals as a tie point for the parasitic chokes and grid-tuner lead. The filament transformer and a cooling fan are placed in a line behind the grid tank, and a 3-inch hole is cut in the rear drop of the chassis behind the fan, and covered with copper screen. S₂ and C₁₄, C₁₅ and C₁₆ are mounted on a 4 × 4 × 4-inch L-shaped shield placed in the rear left-hand corner in the bottom view. The switch shaft is connected to the front control knob with a length of $\frac{1}{4}$ -inch rod. A 6 × 2 × 4-inch shield is placed in the opposite corner surrounding the line-filter components. Two four-terminal Millen ceramic strips are mounted back to back to supply tie points for the Z-50 chokes and filter by-pass condensers in the power leads.

The tube sockets should be wired carefully, using as short leads as possible. The filament terminals are connected together with strips of flashing copper, one strip laid flat, and the other placed in a vertical position. The filament by-pass condensers can be connected with practically no lead length. The four screen terminals

will be in a line and can be very conveniently connected together with a strip of copper. Four by-pass condensers are used on the screen strip, one at each terminal, and the screen-voltage lead is soldered to the exact center of the strip.

All of the shielded leads are run in the fold of the chassis, and are held down with solder lugs. A $\frac{3}{4}$ -inch ceramic feed-through is placed in the lower left-hand corner of the chassis (bottom view) to bring the output lead through the chassis to S_2 and the output connector. A short piece of coax is run from the input connector to the link on the MB-40-L. A $\frac{3}{8}$ -inch ceramic feed-through is placed near the neutralizing condenser to bring a lead through to C_1 and the center tap on the MB-40-L.

Adjustment

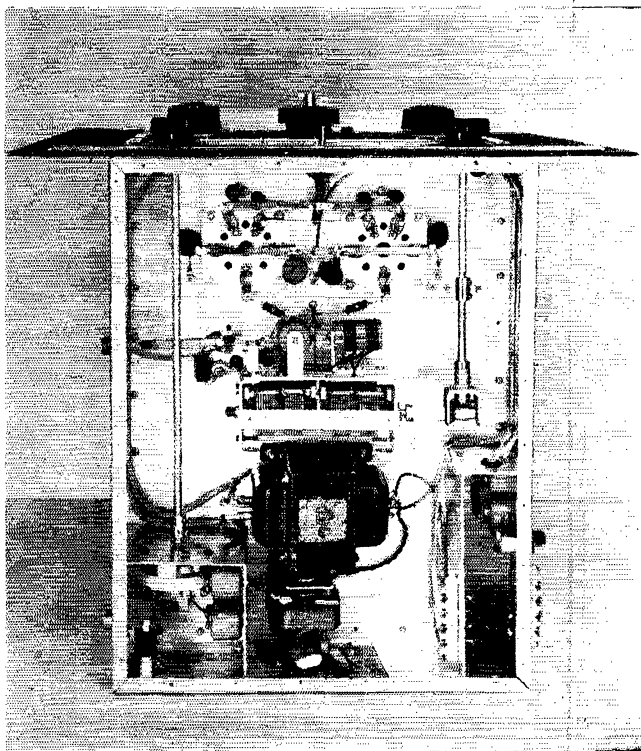
Before any high voltages are applied, the amplifier should be neutralized. This can be done by using a fixed resistor of approximately 7000 ohms for grid bias, and r.f. applied to the grids with the grid tank tuned to resonance. The input should be adjusted to give 20 ma. of grid current. A grid-dip meter or indicating wavemeter is coupled to the rotary coil, and the circuit tuned to resonance. This shouldn't be hard to find because, unless you were just born lucky, there will be r.f. in the output circuit at resonance. C_{10} should now be adjusted to bring this r.f. to a minimum. If a minimum cannot be reached in the normal range of C_{10} , the value of C_1 should be changed to bring neutralization midway in the range of C_{10} . At this point, a dummy load

can be connected to the output, and reduced plate and screen voltages applied. A check should be made now for parasitic oscillations. If any are found, they will probably be of the v.h.f. variety, and adjustment of L_3 should get rid of them.

When you are reasonably sure that the rig is stabilized, full voltage can be applied and the final smoke tests carried out.

Either 4-125As or 4-250As should be run at about 2500 volts for the best average tank Q for 1-kw. input. The input condenser and coil will have to be set very close to maximum for 80. The condenser should be set close to minimum for 14 Mc. and higher. For 7 Mc. it should be set at approximately half capacitance. In each of these cases, the coil should be adjusted to resonate after the condenser has been set. The output capacitance then should be adjusted to give proper loading, maintaining resonance with the coil. The input condenser may also be used to reestablish resonance as the output capacitance is changed, provided its setting does not depart appreciably from the one suggested above. A wavemeter should be used to make sure that the circuit is tuned up on the desired band. An antenna tuning unit of some sort is strongly recommended with this amplifier unless the line impedance is very low. In spite of what you may hear about the pi network doing all kinds of wonders with different loads, you don't get something for nothing. If you build this rig, you'll have a final to be proud of, so just add an antenna tuner to really get the mostest of the bestest.

Bottom view showing under-chassis layout. The tube sockets are top center showing the method of connection and by-passing. The grid tank is in the center of the chassis with its drive shaft going to the right. The filament transformer is bottom center, and the cooling fan just below it. At the lower left is S_2 and its associated condensers and shield housing. At the lower right is the shield containing all incoming-lead filters.



Some Checks on 10-Meter Mobile Whips

Results of an Interesting Club Activity

BY ARTHUR W. PLUMMER,* W3EQK, AND HERBERT W. SEIDEL,** W3JCI

NOT long ago, on a Sunday afternoon, several mobile members of the Baltimore Amateur Radio Club got together and made a series of checks on the field patterns of twelve 10-meter mobile installations. The objective was principally to learn something about pattern characteristics in general, but interest was added by making the project a competitive comparison of the relative effectiveness of the several units.

At 2 P.M., the twelve cars assembled at the northeast corner of the Baltimore Municipal Stadium parking lot. A spot had been previously marked and radial lines indicating compass directions laid out. Each of the cars followed a similar routine, making a heading for each of the eight major points of the compass: north, northwest, west, southwest, south, southeast, east, and finally, northeast. On each bearing, the car was maneuvered so that the base of the antenna was directly over the marked spot. The closest structure was the stadium itself, 200 feet to the west.

Operators at six receiving points made a set of

S-meter readings for each of the transmitters, all of which were tuned to the same frequency. The recording operators were W3s BYI FVK NKY PRL QLG and SLG. W3FVK was 20 miles from the test site and W3LSG 17 miles away. The rest of the receiving points were within the Baltimore area. Those transmitting were W3s EQK FDJ FMG GBB IFW IQP JCI NNX QLF RQP SSF and VLL.

For the competition each of the recording operators totaled the S-meter readings for the eight positions for each transmitter, and rated it first, second, third, etc., according to this total. At the conclusion, the "place" numbers won by each transmitter at the six receiving points were totaled. The transmitters were then given a final rating according to this total, the one having the lowest total being rated first. W3IFW was declared the winner, having placed first at five receiving points and third at the last of the six, for a total of 8. The other scores in order were as follows: W3EQK — 18, W3FMG — 23, W3GBB — 24, W3NNX — 29, W3FDJ — 36, W3VLL — 40, W3IQP — 43, W3QLF — 50, W3JCI — 64, and W3SSF — 70. W3RQP, working on a

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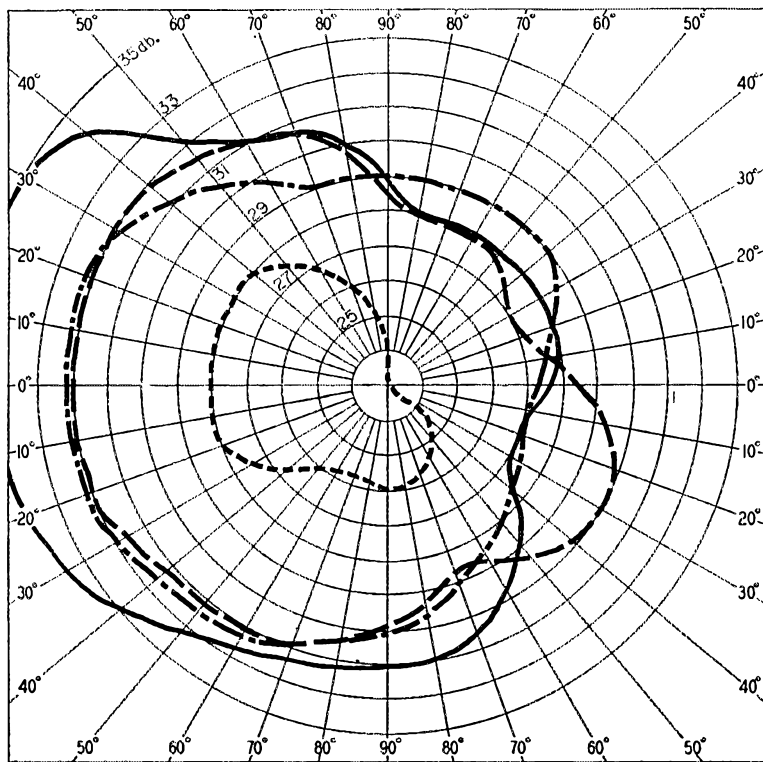


Fig. 1—Typical field patterns from a group of four cowl-mounted 28-Mc. whip antennas. The patterns of W3FDJ have been corrected by 2 db. at all points to compensate for a lower power (24 watts) than the other three (40 watts). The consistent directivity to the left of the car is quite marked (cars headed along vertical center line). Patterns are identified as follows: W3IFW, solid line; W3GBB, dash line; W3FDJ, dash-dot line; W3FMG, dot line.

different frequency in the band, had a score of 54.

Of more general interest are some of the field patterns shown in Figs. 1 and 2. These were plotted from readings made by W3NKY, about 3 miles west of the test site. These patterns were made by assuming a scale of 3 db. per S unit, and plotting in terms of db. above a selected minimum. While high accuracy is not claimed for such a system, the general characteristics shown by the patterns should be fairly reliable.

Fig. 1 shows the field patterns of four car units using whips mounted on the left front cowl. The most striking feature that will be noticed is the signal variation, amounting to 5 db. or more. Also, the most favored direction is consistently at approximate right angles to the car, on the side on which the whip is mounted.

Fig. 2 shows similar patterns of units working with the whip at the left rear. W3EQK and W3NNX had theirs mounted high on the rear deck of the car, while those of W3QLF and W3IQP were mounted at bumper level. Fig. 2 does not show the close agreement of the cowl-mounted jobs. However, it will be noticed that the patterns of all but W3IQP show a gain of 5 db. or better in the favored direction compared with the least favored direction. All except the pattern of W3EQK show best directivity off the right front fender. W3EQK's, however, is off the left front fender. This discrepancy might be explained by the fact that W3EQK's car has a sloping back, while the others have flat decks at the rear.

All of the cowl-mounted jobs ran at 40 watts input except W3FDJ, whose input was 24 watts.

To put his antenna on the same basis as the others, his pattern has been raised by 2 db. to compensate for the 2-db. difference in power. Similarly, all of the rigs using rear-mounted whips ran 45 to 50 watts except W3IQP, who ran 80 watts. His pattern has been reduced by 2 db. for an equivalent of 50 watts.

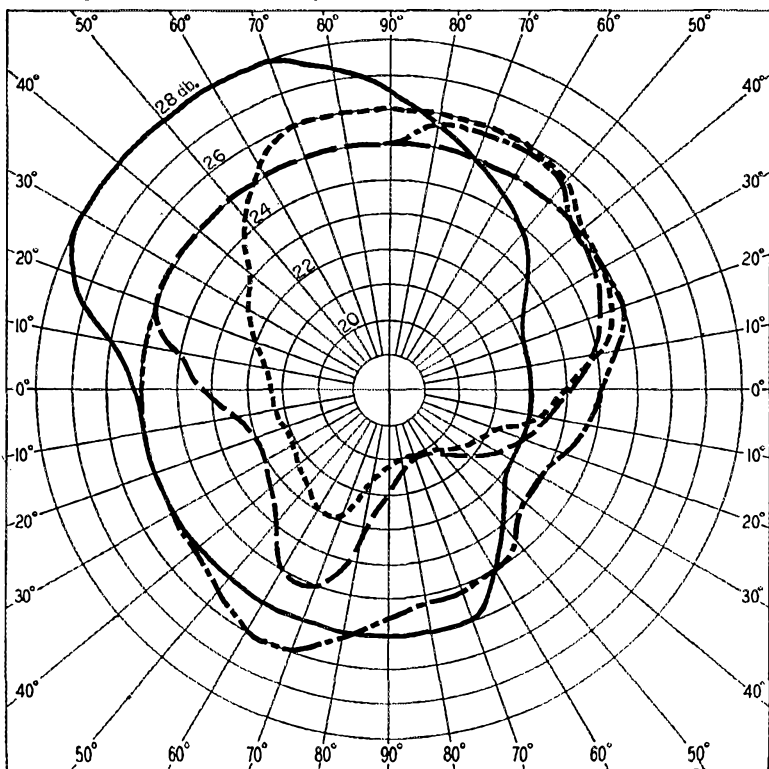
Although no attempt was made to estimate the influence of transmitter or feeding efficiencies, it seems quite apparent that the cowl-mounted jobs are definitely superior to the rear-mounted whips. The pattern of the poorest cowl-mounted antenna (W3FMG) appears to equal the best of the patterns for rear-mounted whips (W3EQK). W3IFW, running 40 watts with his cowl-mounted whip, shows a better maximum signal by about 7 db. than W3IQP with his bumper-mounted whip and 80 watts input — a total difference of 9 db. for the antenna!

The difference between bumper and rear-deck mounting does not seem to be so marked, but any difference would favor the higher mounting.

In the scoring described earlier, it is interesting to note that cowl or rear-deck antennas took the first six places. Only W3SSJ and W3RQP placed below the bumper-mounted group, and they were running 6 and 7 watts, respectively — about 8 db. below the rest.

Granted that the system of making patterns leaves some question as to accuracy, there seems to be little doubt that most 10-meter mobile antennas will show enough directivity to be worth considering, and that a cowl-mounted job is preferable to others.

Fig. 2 — Typical field patterns from a group of four rear-mounted 28-Mc. whip antennas (cars headed along vertical center line). The whips of W3EQK (50 watts, solid line) and W3NNX (45 watts, dash line) were mounted on the rear deck of the car. Those of W3QLF (45 watts, dot line) and W3IQP (80 watts corrected down 2 db. to 50 watts, dash-dot line) were mounted at bumper level.



Let's Meet Mr. Ionosphere

What To Expect from the Novice Bands

BY LEWIS G. McCOY,* WHICP

ONE of the first decisions any newly licensed Novice must make is which of the amateur bands to use. Of the four bands available, each has certain characteristics that set it apart from the others. A mistaken concept many beginners have is that all bands (frequencies) have the same characteristics. In other words, they assume that if an 80-meter signal can get through to Podunk at a given time, a 7- or 21-Mc. signal can duplicate this performance. Actually, each band is different, as will be shown.

Maybe your first interest as a ham is to talk to "faraway places with strange-sounding names," perhaps it is just to make contacts with near-by amateurs and get to know them personally. Or it may be both. But whatever your desire, it is nice to have a general idea of how your signal reaches the other station and vice versa. Knowing how this takes place then gives you some idea of what can be expected from the various bands at your disposal.

To keep our discussion simple, we'll dispense with transmitters and receivers and just try to

mind during this discussion that, although we talk only about certain parts of the signal, the wave is being "broadcast" like the light from a light bulb. The part of the signal under discussion will be a "component," or ray, of the total signal radiated. Like light, it travels in a straight line until it is reflected, bent or absorbed.

Now visualize a cross section of the earth plus the space above and around our antenna, as shown in Fig. 1. When radio signals are broadcast from the antenna, they leave the antenna at the speed of light and travel in nearly all directions. Some of the waves travel along the surface of the earth, and these components of the signal are called the *ground wave*. The rest of the signal takes off from the antenna at many different angles up into the sky; these are called the *sky wave*. The ground wave travels along the surface of the earth and is dissipated in the earth. This rapid attenuation with distance puts a stringent limit on the communications range that is possible via the ground wave.

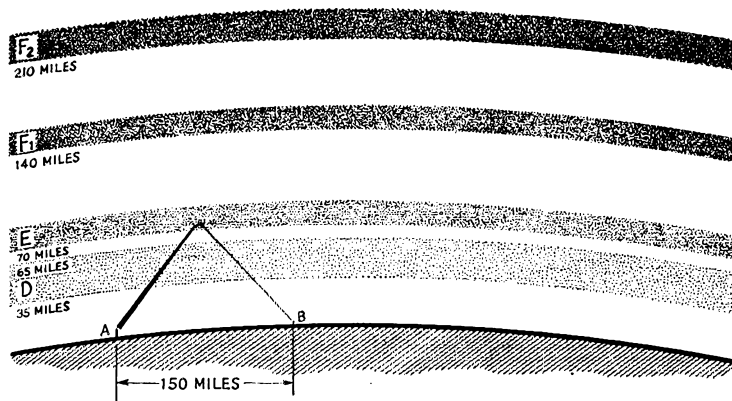


Fig. 1 — A portion of the earth's surface and the various layers of the ionosphere as they might appear during the daylight hours. It should be pointed out that the heights of the various layers will depend on the time of day and sunspot activity. After sunset, the F_1 layer combines with F_2 and the E and D regions disappear. The F layer remains, whose height can be anywhere from 150 to 250 miles, depending on the sunspot cycle, time of day, and season.

The drawing illustrates how part of an 80-meter signal goes from point A to point B, 150 miles apart. As explained in the text the radio signal is "broadcast" in all directions, while in this drawing only a "ray" of the total signal is shown. This portion is shown being partially absorbed by the D region and reflected by the E layer. This effect is illustrated in Fig. 2.

visualize an antenna from which radio waves are radiated. Think of the antenna as an electric light bulb, with the light (radio waves) traveling in all directions from it. In actual practice, certain types of antennas ("beams") would concentrate the waves, or light, in a particular direction while others would "broadcast" it. Keep in

Ground-wave communication is useful for only short distances, at least for the frequencies we are interested in here. Where does that leave us? How can we communicate with stations on the other side of the earth? Apparently, some of the sky wave must return to earth at some distant point. Fortunately, this is true.

Starting approximately 35 miles above the

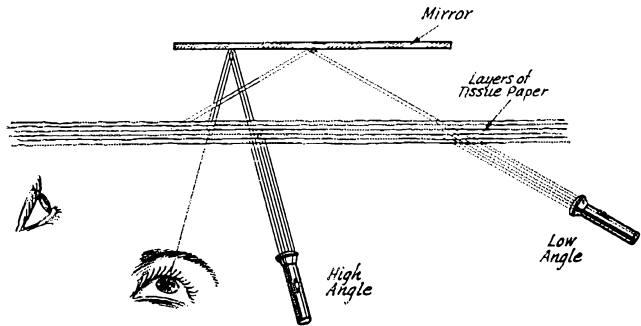
* Technical Assistant, QST.

earth's surface and extending to about 250 miles are three regions collectively called the *ionosphere*. The name "ionosphere" is derived from the fact that these regions, or layers, are composed of rarefied air in various degrees of ionization. The amount of ionization is believed to be controlled by radiation from the sun. Consequently, ionization of the various layers goes

region, it enters the *E* layer. The *E* layer, which is heavily ionized, reflects the signal back down to earth. Before reaching earth, the reflected signal must then go back through the *D* region, which further weakens it. The whole process could be likened to aiming a beam of light at a mirror, as shown in Fig. 2. Between the light source and the mirror, some material, such as

Fig. 2.—The high-angle beam of light penetrates the layers of tissue paper (*D* region), reaches the mirror (*E* layer), is reflected back through the tissue paper to the eye. In passing through the tissue paper, most of the light is dissipated.

With the low-angle light, the beam is subjected to greater dissipation because it travels farther through the layers of tissue paper. If any light does get through to the mirror, it is completely absorbed going back through the tissue after reflection from the mirror. This corresponds to what happens to radio waves leaving an antenna at low angles and passing through the *D* region.



through pronounced changes from daylight through darkness. As a matter of fact, the lowest area, the one nearest the surface of the earth, exists only during daylight. This is called the "*D* region."

About 70 miles up we encounter the next region of the ionosphere and it is called the "*E* layer." During daylight hours, the ionization characteristics are similar to the *D* region, greatest ionization occurring near local noon and disappearing at night. As we will see in a moment, the *E* layer plays a much more important part in communication than the *D* region. Starting approximately 175 miles up is a third region called the "*F* layer." During daylight, the *F* layer splits into two parts. The lower, or F_1 layer, starts at about 140 miles altitude and the F_2 layer at about 200 miles.

It is interesting that when the first discovery was made of the existence of the ionosphere, the region was named the *E* layer. The reason was that scientists believed there might be layers lower than the *E* layer, and they wanted some letters left if and when other layers were discovered.

As has already been pointed out, ground-wave communication is good for only very short distances. For signals to travel any appreciable mileage, they must go via the sky wave. This is where the ionosphere enters the picture. The details will vary with the particular frequency, the time of day, and the power level. There are other factors that enter the picture but, to keep the explanation as simple as possible, we'll forego them here.

Let's say we use a frequency of 3750 kc. and we transmit at noon, local time. The sky wave leaves the antenna and shoots up toward the ionosphere. The first ionized layer it enters is the *D* region. This region cannot reflect signals and only serves to weaken the passing wave. After the signal, or what's left of it, gets through the *D*

sheets of tissue paper, could be inserted that would reduce the total amount of light reaching the mirror. The light beam would travel through the hindering material to reach the mirror and then back through it after the light was reflected. The returned light is much weaker than if the absorbing layer were not present. This is similar to what takes place with a radio wave traveling to the ionosphere and back to earth. In Fig. 1, we see this represented by an 80-meter signal leaving the antenna as a high-angle wave. At this frequency, all of the signal components that leave the antenna at low angles are absorbed by the *D* region as they pass through it. The signals have to travel farther in the *D* region and, consequently, the absorption is higher.

Now let's take the same frequency and make the time four hours after sunset, local time. As mentioned earlier, the *D* region only exists in the daytime. Also, the *E* layer practically disappears at night. Several things happen now that weren't possible under daylight conditions. The signal travels up until it reaches the *F* layer and is then reflected back to earth. With the *D* and *E* areas absent, the signal doesn't lose as much strength on the way up and back. In addition, the low-angle component of the signal gets a chance to be returned. Also, because the *F* layer is considerably higher than the other regions, the possible distance between the sending and receiving point is increased.

When radio waves return from the ionosphere and strike the earth, they often bounce right up again like a rubber ball, traveling back and forth between the earth and ionosphere until completely dissipated. This effect is called *multihop* transmission. How much of a bounce the signal gets from the earth depends on where it strikes, and the angle at which it strikes. Some portions of the earth's surface are good reflectors and some are poor. Water, for example, is an excellent reflector.

Fading

A little thought at this point will turn up an interesting fact about radio wave propagation. It should be apparent that, for a given destination, our radio signal is liable to travel by several paths in reaching a particular receiving antenna. Some of the signal may arrive in one hop and some by several hops. Since these paths are of different lengths (and their lengths will change slightly as the ionosphere changes), the signals may or may not add up together, or "in phase," at the receiving antenna. When they add "in phase" the signal is strongest — any other condition will make the signal weaker.

Examples of "multipath transmission" are shown at Fig. 3. This is one of the reasons we have fading of signals, or in radio parlance, QSB. In addition, there are many times when the *E* and *F* layers both reflect the signal at the same time, causing severe fading. Nearly all of us are familiar with the phenomenon called "airplane flutter" observed on TV receivers. This is where an airplane, flying between the transmitting and receiving points, acts as a "layer" and gives multipath transmission. The "flutter" is caused by the combination of the constant signal path of "ground wave" combining with the changing path of the "sky wave" reflected from the airplane.

High Frequencies

We've discussed what happens to a 3.7-Mc. signal during day and night conditions. The case of the 7-Mc. signal is somewhat similar, and the differences will be pointed out in the summary later on.

Again taking local noontime, let's shift to a signal frequency of 21,150 kc. The signal leaves the antenna and shoots up toward the ionosphere. It goes through the *D* region without attenuation, since the absorption in the *D* region varies inversely with frequency and becomes insignificant

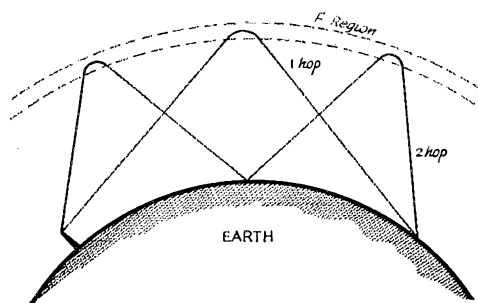


Fig. 3 — As shown above, the signal reaches the receiving point by different paths, one part by a single reflection, the other by two. Both of the signal components travel at the same speed so the two-hop component takes longer to reach the receiving point because it must travel farther. Although the difference in time is in the order of microseconds, it is enough to cause fading of the received signal. Only two components of the signal are shown above. One should keep in mind that it is possible for parts of the received signal to follow several paths to its destination. This makes for considerable time variations in the received signal.

at frequencies as high as 14 and 21 Mc. The high-angle portions of the signal go right on through the *E* and *F* regions, so no signal is returned to receiving locations within several hundred miles of the transmitter. (This zone of no-signal return is called the "skip zone.")

However, signals leaving the antenna at lower angles will approach the *E* and *F* layers at some angle farther from perpendicular. If the ionization of the layers is insufficient, the signals will still pass on through. But if the ionization is sufficient, and the "band is open," the signals will be bent back toward earth, to reach it at a distant point of a thousand miles or farther. Multihop transmission will account for still greater distances, of course. At distances of several thousand miles or more, the signal often will be stronger (when the band is open) than it will be at any time with similar power on 3.7 Mc., because the absorption in the ionosphere is much less at the higher frequencies.

At night, the same frequency is still good for ground-wave communication of a few miles, but the ionosphere will seldom be of sufficient density to return the sky-wave signal, and consequently the signals traveling skyward will be lost in space.

Sunspot Cycle

As mentioned earlier, many points of radio-wave propagation have been passed over. However, one point that bears mentioning is the *sunspot cycle*. One of the most important factors governing the amount of ionization in the ionosphere is the number of sunspots at any given time. During the years of sunspot maxima, the ionization is heaviest. During sunspot minima, the ionization is weakest. Although there is much to be learned about sunspots and what causes them, we do know they have pronounced effects on radio communication. They are considered to go through an eleven-year cycle and, at the present time, we are close to a minimum point. In general, the higher frequencies (up to 30 Mc.) become more useful for DX work during sunspot maximum periods.

How the Bands Behave — Or Misbehave

Let's now take the Novice bands, one at a time, and see what they have to offer. Maybe you have already done some listening with your receiver and come to some definite conclusions. However, don't be misled. It is possible to do a lot of listening and still not know what a band has to offer. For example, you could listen on the 21-Mc. band for a long period of time — a month or more — and still never hear anything but local stations. All of a sudden, bang! Stations come pouring into your receiver from such places as Australia, South Africa and Europe. Then you'll begin to realize some of the lure and wonderment of amateur radio. Knowing about propagation and each band's characteristics will help to forewarn you about conditions.

3700-3750 kc.: From our discussion, this lowest frequency Novice band is one we already have

(Continued on page 112)

A Phase-Modulation Exciter for the V.H.F. Man

A Simple BCI-Free Audio and R.F. System for 50 Mc. and Up

BY MASON P. SOUTHWORTH,* WIVLH

• The "get-through" quality of either frequency or phase modulation can be improved markedly if the average deviation is kept high and the frequency response of the audio system is held to the minimum needed to transmit clean intelligible speech. Stability of the center frequency and freedom from hum are also important. In this phase-modulated exciter for the v.h.f. man the pure d.c. quality of crystal control is maintained, and the signal is given a punch that will enable it to compete on nearly even terms with a.m. stations of the same power. Perhaps even more important, it eliminates the audio rectification type of BCI and TVI that can make life on the v.h.f. bands a problem in congested areas.

V.h.f. enthusiasts have, for the most part, been overlooking a good thing in phase modulation. Frequency modulation has been tried at intervals for v.h.f. work, but the poor stability of reactance-modulated VFOs generally employed for f.m. and lack of suitable receiving systems have kept it from enjoying very general acceptance. Phase modulation, properly used, can correct the principal shortcomings of f.m., and the receiver problem is by no means as acute as it was some years ago, receiver bandwidth having become more nearly standardized.

It is well known that the use of either f.m. or p.m. will eliminate the audio interference that is all too familiar to v.h.f. men who have tried amplitude modulation with a fair amount of power in residential neighborhoods. This shows up not only in broadcast and television receivers, but in hearing aids, record players, and, in fact, any device using an audio amplifier. It is particularly troublesome at 144 Mc. and higher because even audio grid leads become an appreciable portion of a wavelength and consequently act like v.h.f. receiving antennas.

The economy and simplicity angles in the use of f.m. or p.m. are particularly appealing to the v.h.f. man who makes extensive use of c.w. with a high-powered rig. His audio requirements are taken care of by a simple exciter such as the one described, at any power level, and the business of changing from voice to c.w. is greatly simplified. Not to be ignored is the fact that his final amplifier can be set up for maximum c.w. ratings, rather than the considerably reduced operating

conditions usually required for high-level plate modulation. Changing from c.w. to 'phone requires no more than turning up the gain control on the phase modulator.

Here, then, is a simple crystal oscillator and phase modulator that can be substituted for the oscillator portion of any new or existing v.h.f. rig that starts out on 6 or 8 Mc. Being crystal controlled, it has none of the fuzziness generally associated with reactance-modulated VFO rigs on the v.h.f. bands, where the large order of frequency multiplication required shows up any instability in the oscillator to a marked and usually objectionable degree. Use of speech clipping and filtering increases the average deviation without causing excessive channel width or splatter. With this simple set-up substituted for your crystal oscillator you can forget your troubles with audio circuit rectification BCI and TVI, and you can throw away those plans for the high-powered modulator, too. This unit will provide modulation for any v.h.f. rig you'll ever want to build.

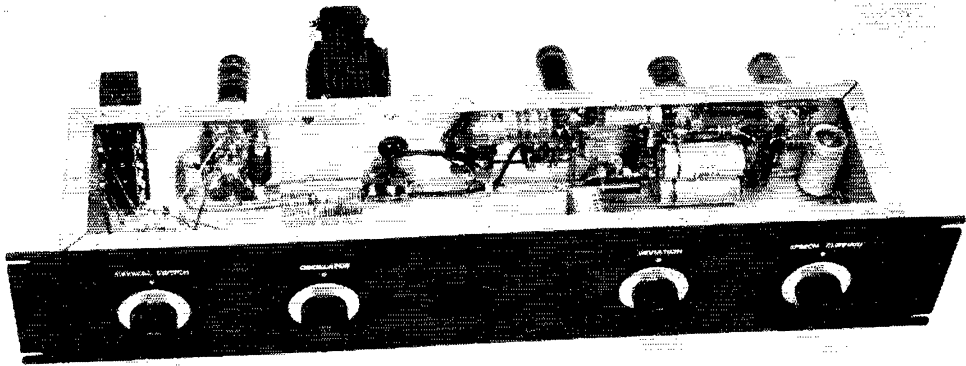
Deviation and the Receiver Problem

With frequency modulation the deviation is proportional only to the amplitude of the modulating signal. With phase modulation of an r.f. amplifier or crystal oscillator plate circuit the deviation is proportional to modulation frequency. Such a signal lacks "lows" when received on a set designed for a.m. or f.m. reception. Fortunately, it is a simple matter to correct this by building inverse frequency response into the transmitter audio system and cutting off everything above 3000 cycles.

The wide range of receiver bandwidths formerly encountered in v.h.f. work was a deterrent to greater use of f.m. or p.m. As the most effective deviation depends on the receiver bandwidth, the f.m. user was at a disadvantage in trying to communicate with stations employing receiver bandwidths that ranged all the way from a megacycle or so down to the best obtainable with a crystal filter. It was hard, indeed, to please everyone. Now, however, 2-meter operation is almost completely standardized on communications-receiver bandwidths, and while this is still far from uniformity, a small adjustment of the deviation will hit the optimum for nearly every station worked. A happy medium, usable for all, is not difficult to achieve.

Maintaining the most effective deviation for a given channel width is accomplished through the use of speech clipping (to hold the average

* Laboratory Assistant, QST.



Front view of the phase-modulated exciter. Crystals and oscillator tube are at the left rear; audio components and tubes at the right. Parts are mounted inside a standard aluminum chassis, shown with the cover removed.

supply is required. This should be well filtered, to prevent hum.

Construction

While the original unit was built with a form factor suitable for compact rack-mounting, the layout is not critical, and it may be built into almost any desired shape and space. A $3 \times 4 \times 17$ -inch aluminum chassis (Bud AC-432) was used with the open side (normally covered by a plate) on top. This is held to the $3\frac{1}{2}$ -inch panel (Bud PA-1102) by the four controls. These are, from left to right in the front view: the crystal switch, the oscillator tuning condenser, and the deviation and clipping controls. Five crystal sockets are provided on the rear. These may be distributed between 6- and 8-Mc. crystals as desired. The diagram shows connections for two 6s and three 8s. Next to the crystal sockets in the rear view is the 6CL6 oscillator tube with the coaxial output fitting beneath it. To the left of this is the filament transformer, and the power fitting is in the center. Starting at the left end are seen the 12AX7 and microphone jack, the 12AU7, and the 6CL6 modulator.

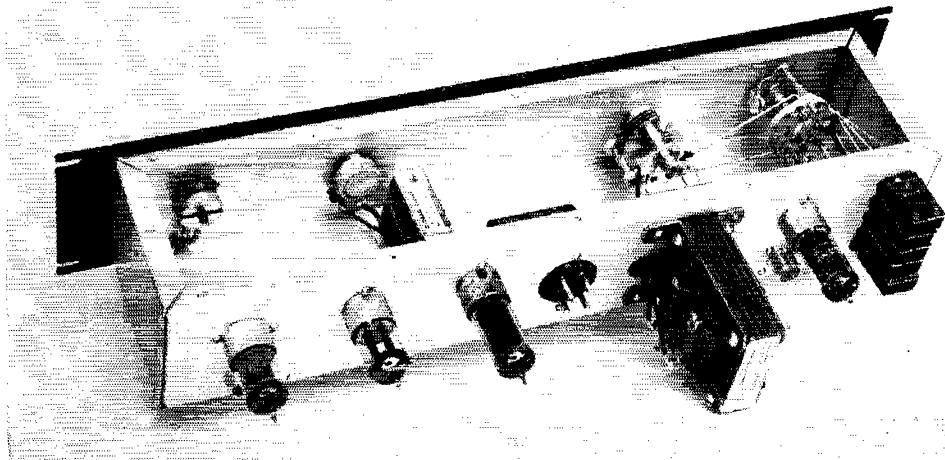
Looking inside the chassis in the front view, we see the small audio and oscillator components mounted near their respective tube sockets. The filter choke is mounted on the bottom of the chassis, and the coil is mounted by its leads between the tuning condenser and a tie-strip terminal near the back. Shielded wire should be used for the filament, microphone jack, and gain control leads to prevent hum pick-up. The crystal switch is wired with No. 16 tinned. The coil tap may be made most easily if the adjacent turns are pushed toward the center. The lead from the modulator plate to the tuned circuit should not be shielded as this would introduce more capacity across the coil.

Adjustment and Operation

Because of the simplicity of its circuitry, no trouble should be encountered in firing up the rig if it has been wired correctly. Apply 115 volts to the filament transformer and check to see that all the tubes light. Before connecting the plate voltage supply, the oscillator output should be connected to the grid of the following stage

(Continued on page 116)

Rear view of the exciter. Speech amplifier and reactance modulator tubes are at the left.





Hints and Kinks

For the Experimenter



LOW-VOLTAGE REGULATION

If it is desired to obtain low voltages with good regulation, voltage-regulator tubes connected in a differential circuit, as shown in Fig. 1, can be used to yield a good many values of output volt-

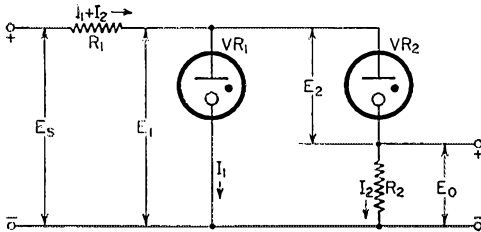


Fig. 1 — Circuit diagram of the low-voltage regulation system.

age. The output voltage E_o is the difference between two regulated voltages and, as such, possesses fairly good regulation. General design equations are given so that resistor values may be determined in terms of supply voltage, rated tube-voltage drops, and permissible tube currents:

$$R_1 = \frac{E_s - E_1}{I_1 + I_2}$$

$$R_2 = \frac{E_1 - E_2}{I_2}$$

E_s = source voltage;
 E_1 = rated voltage drop across VR_1 ;
 E_2 = rated voltage drop across VR_2 ; and
 I_1, I_2 = currents in VR_1 and VR_2 , respectively, under no-load conditions.

I_1 should be in the vicinity of 20–40 ma., as in the case of orthodox regulator circuits. I_2 should be about the same for bias circuits where grid current is involved; however, if used only to feed a resistive load, I_2 may be the minimum current necessary to keep VR_2 ionized (about 5 ma.).

E_o is the difference between the rated operating voltages of VR_1 and VR_2 , and utilizing Type 0A2, 0B2, 0A3 (VR-75), 0B3 (VR-90), 0C3 (VR105) and 0D3 (VR-150) tubes in correct combinations will yield the following voltages: 3, 15, 18, 30, 33, 42, 45 and 60 volts. Other voltage combinations may be derived if desired by substituting two or more VR tubes in series for VR_1 and VR_2 ; however, this results in bulkier equipment, and may prove economically unfeasible.

The writer is using this circuit to furnish 42 volts of regulated bias to a pair of 807 modulators. In this case, VR_1 is an 0A2, VR_2 an 0B2, R_1 is 1000 ohms, 10 watts, and R_2 is 1500 ohms, 2 watts. Supply voltage E_s is about 200 volts, and I_1 and I_2 are calculated as 23 and 28 ma., respectively.

— James Fernane, W0JOP

COLOR-CODE REMINDER

MANY of the sentences used for remembering the resistor color code are not exactly printable. However, *Radio ZS* for March, 1954, carried one that is worthy of being repeated for the benefit of anyone who finds only occasional use for the color code. The sentence, "Better Be Right Or Your Great Big Venture Goes West," supplies in correct order the necessary reminders for Black = 0, Brown = 1, Red = 2, etc.

— Perry F. Williams, W1UED

USING 12-VOLT DYNAMOTORS WITH 6-VOLT CHARGING SYSTEMS

RECENTLY a surplus 12-volt dynamotor was acquired at very nominal cost because there is little demand for these units. Immediately, the problem arose as to how the dynamotor could be put to use for mobile operation without extensive and expensive modification of the auto electrical system. The addition of a relay and an auxiliary battery to the existing system provided the solution.

Fig. 2 shows how a 6-volt d.p.d.t. relay is wired to permit feeding 12 volts to the dynamotor whenever the push-to-talk switch is activated. With the switch open and the relay in the normally closed position, the two batteries are connected in parallel and both receive charge from

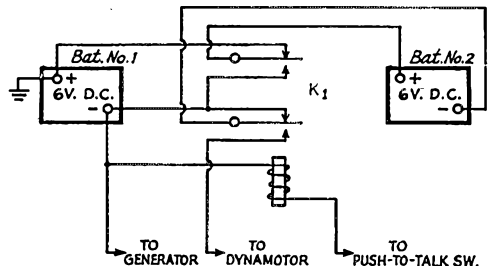


Fig. 2 — Diagram of the 12-volt electrical system used by W4ZMZ/8. K_1 has contacts rated at 35 amperes.

the car generator. With the *talk* switch in the on position, the relay connects the batteries in series. Battery No. 1 continues to receive charge when the series circuit is employed.

Filament and relay voltages are taken from the No. 1 battery to keep the load on No. 2 as light as possible. It has been the writer's experience that the auxiliary battery will stay charged as long as normal periods of receiving, transmitting and driving are involved.

— Edward Matthews, W4ZMZ/8

• Recent Equipment —

The NC-98 Receiver

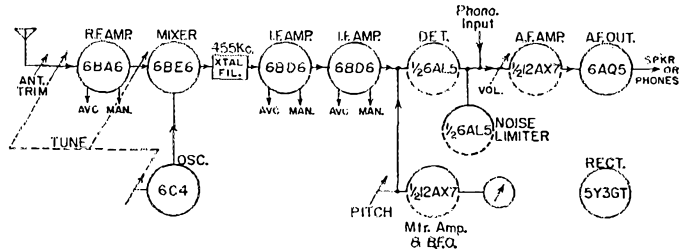
ALTHOUGH the term "communications receiver" has often been applied to an all-wave broadcast receiver that had a b.f.o. added to it, the amateur usually thinks of a communications receiver as one that permits good 'phone and c.w. reception from at least 1.8 to 30 Mc., has at least one r.f. stage, and has some provision for i.f. selectivity better than the average b.c. receiver. Using the amateur understanding of what a communications receiver is, the National NC-98 meets these requirements, since it is the NC-88 with a crystal filter and S-meter.

The NC-98 is a two-dial (bandset and bandspread) eight-tube superheterodyne using miniature tubes, and it covers the range 0.55 to 40 Mc. in four bands. A block diagram of the receiver is shown in Fig. 1, and it can be seen that the re-

ceiver perhaps more interest to the amateur use is the tuning rate of the bandspread dial. On 20 meters it takes $6\frac{1}{2}$ turns to cover the 500-kc. range, on 40 it requires $4\frac{3}{4}$ turns for the 300 kc., on 15, $2\frac{3}{4}$ turns are needed for the 350 kc., on 10 meters is covered by $3\frac{3}{4}$ turns. An auxiliary logging scale is available on all bands. String drive is used for the bandset and bandspread condensers and their scales. The tuning knobs are $1\frac{1}{2}$ inches in diameter, but there is enough room for an owner to substitute larger knobs if he considers them preferable.

Aside from the tuning controls, the other front-panel controls are "Selectivity" and "Phasing" on the crystal filter, "Sensitivity" (manual gain control), "Antenna" (antenna

Fig. 1 — Block diagram of the NC-98 receiver. The tuning range is 550 kc. to 40 Mc., in four bands. The a.c. switch is on the volume control — a "Receive/Standby" switch opens the B+ on the r.f. stage, second i.f. amplifier stage, and the audio amplifier stage.



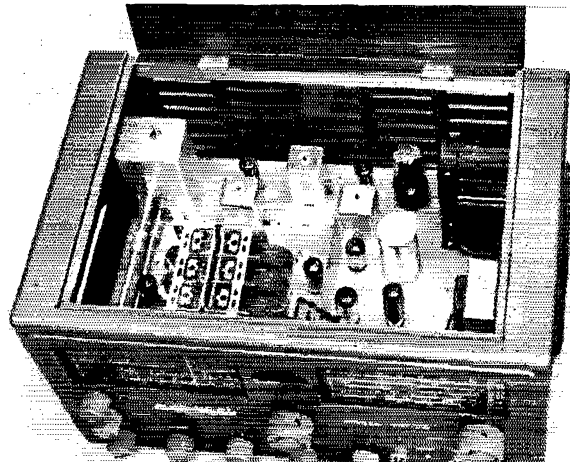
ceiver incorporates the features amateurs have come to expect in any "communications receiver."

The four bands of the NC-98 are 0.54 to 1.6 Mc., 1.6 to 4.7 Mc., 4.7 to 14 Mc., and 14 to 40 Mc. The receiver can be obtained in either of two models: the NC-98 with amateur-band bandspread calibrations, and the NC-98SW with short-wave b.c. bandspread calibrations for the 49-, 31-, 25-, 19- and 17-meter bands. On the bandset dial, the b.c. band scale has the two e.d. frequencies (640 and 1240 kc.) marked "CD" for easy reference, and in the other ranges "Police," "Ships," "Amateur," and "Foreign" ranges are marked by "P," "S," "A," and "F," respectively.

trimmer), "Bandswitch," "CWO-MVC-AVC-ANL" (switch for b.f.o., a.v.c. and noise limiter), "Pitch" (b.f.o.), "Receiver/Standby," "Tone/Low" (switch), and "Volume" (audio volume and a.c. switch). The S-meter and headphone jack are also on the front panel.

The crystal-filter "Selectivity" switch is a three-position affair, giving a filter-out position plus two degrees of crystal selectivity. The "Receive/Standby" switch disconnects the B+ supply from the r.f. stage, the second i.f. amplifier and from the audio amplifier. Power remains on the oscillators, of course, so there is no tendency for them to drift through intermittent applications of power when one is operating. The

The NC-98 receiver is an eight-tube superheterodyne that includes an r.f. stage, a crystal filter, S-meter, noise limiter, antenna trimmer, and separate high-frequency oscillator tube. The crystal filter shield can is at the rear left.



noise limiter is the familiar series-type, which is self-adjusting to the incoming 'phone carrier level. Like all such limiters, it doesn't help c.w. reception, but it is quite effective on 'phone reception through many types of noise.

On the back of the receiver chassis one finds the antenna binding posts, the loudspeaker ter-

volts at 15 ma. can be "borrowed" without burdening the receiver power supply. A record player can be connected to the "Phono" plug and the receiver audio system used — any crystal cartridge delivers enough output for this purpose.

The S-Meter Circuit

The circuit trick that catches your eye when you study the circuit diagram of the NC-98 is the use of the same triode for b.f.o. and S-meter amplifier. It's logical enough — the b.f.o. and S-meter are never used at the same time. As shown in Fig. 2, the grid side of the b.f.o. circuit is shorted to ground when the b.f.o. is not in use, and the tube is used as a meter-amplifier tube to measure the voltage developed across the second-detector load resistor. The S-meter indicates the signal level, as represented by the voltage at the second detector, in all settings of the switch except "CWO." Before you rush off to put the circuit in your own receiver, however, you should note that the meter must be one that swings from right to left, if you want it to move to the right with increased signal. The meter reads cathode current (except in the "CWO" position), which decreases as the grid voltage becomes more negative.

Another departure from usual practice is the use of a 1500-ohm variable resistor for the "Pitch" control on the v.f.o. As the circuit indicates, this resistor is in series with a 180- μ f. condenser across half of the b.f.o. coil. As the resistor is decreased in value, the b.f.o. frequency is lowered.

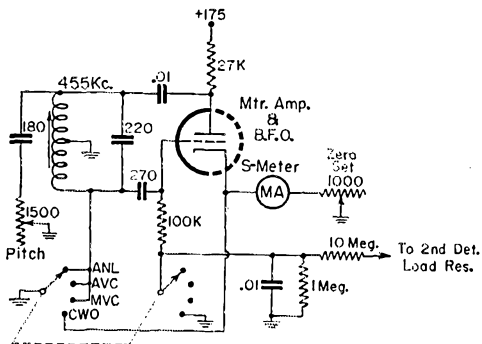


Fig. 2 — The meter-amplifier and b.f.o. circuit of the NC-98. The same triode (one section of a 12AX7) is used to operate the S-meter or as the b.f.o.

minals, the S-meter zero adjustment, the "Accessory Socket," and the "Phone" jack. The "Accessory Socket" normally has a shorting plug in it, but this can be removed and a National narrow-band f.m. adapter (not furnished) can be plugged in if n.f.m. reception is desired. Other accessories could be built and plugged in here also, since 6.3 volts at 0.6 ampere and 200

The 10B S.S.B. Exciter

IT is perhaps a little unfair to call the Central Electronics 10B an "s.s.b. exciter," since the manufacturer calls it a "Multiphase" exciter and it is actually a "basic" exciter capable of delivering s.s.b., a.m., p.m., and c.w. signals. However, our title can perhaps be justified by the knowledge that owners of the 10A, forerunner of the 10B, bought the excitors so they could go on the air with s.s.b., and the same will be true with the 10B. But it's nice to know that the exciter will do *everything* that can be asked of an exciter in the bands below 50 Mc.

Owners of the 10A will, of course, be primarily interested in how the 10B differs from its predecessor. Looking at these changes first, before going on with a general description of the unit, it appears that all the new features have been in the direction of greater operating convenience. For example, there are two audio input jacks on the front panel — one is the usual microphone input and the other is for a high-level signal such as the output from a tape recorder. The "Modulation" switch is now a 5-position affair that permits setting up one or the other sideband, a.m., p.m., or c.w. The two "Carrier Null" controls on the panel are not touched except during initial adjustment; instead, a new "Carrier" con-

trol permits injection of a desired amount of carrier at any time, independently of the carrier-null controls. And the last new operating feature is a "Calibrate Level" control on the panel that permits adjusting the level of the "calibrate" signal, the one you use to find where you are in the band. The usefulness of such a control is obvious, since most hams have, at one time or another,



The 10B s.s.b. exciter has the same power output and frequency range as the 10A, but several features that improve operating convenience have been added.

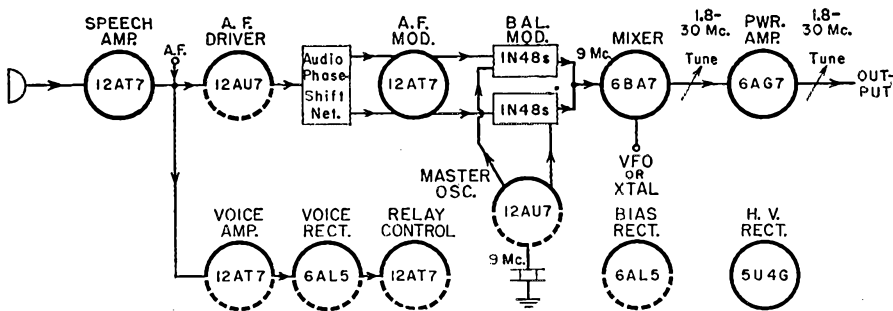


Fig. 1 — Block diagram of the 10B s.s.b. exciter.

suffered the inconvenience of having too much or too little signal coming from the VFO or exciter during "spotting" conditions.

A block diagram of the tubes and their functions is shown in Fig. 1. The exciter has a basic frequency of 9 Mc., and an s.s.b., a.m., or p.m. signal is generated at that crystal-controlled frequency. This signal is fed to the 6BA7 mixer where it is heterodyned by a crystal- or VFO-controlled signal to the output frequency. A 5-Mc. signal is used to heterodyne to either 4 or 14 Mc., and a 16-Mc. signal is used when 7-Mc. output is required. A 7-Mc. oscillator puts the output on 2 Mc., and 12 Mc. is required for 21-Mc. operation. Band-shifting involves changing the heterodyning frequency, if necessary, and plugging in the proper coils in the power-amplifier grid and plate circuits.

The s.s.b. signal is generated by the "phasing" method, from which a.m. and p.m. signals can be derived by disabling one of the two balanced modulators and inserting carrier. The 1N48 germanium diodes in the balanced modulators are now a plug-in unit — they were soldered into the 10A.

Voice-controlled operation is obtained by amplifying and rectifying the voice signal and using the resultant d.c. to control a relay. In the 10B exciter a blocking voltage of —100 volts is available when the rig is "off," for use in cutting off an external amplifier or amplifiers. The relay in the voice-controlled circuit is a new telephone-type relay using gold contacts, and the coil is vacuum varnished. Speaking of such treatment (to withstand humid conditions), the three audio transformers in the 10B are also treated to withstand humid basements and tropical locations. Now perhaps a South American will get on s.s.b. and make an s.s.b. WAC a possibility!

One set of coils is furnished with the 10B exciter, and coils for the other bands are available from the dealers. The coils are the same as those in the 10A.

The power output of the 10B is the same as the 10A, about 10 watts peak down to 20 meters and slightly less on 15 and 10.

For voice-controlled operation with a loud-speaker, an auxiliary unit, the QT-1, is available

¹ Grammer, "A Tubeless VFO for the 10A," *QST*, June, 1954.

that plugs into the 10B. For headphone operation, the receiver output is fed into the 10B and taken out from a jack on the panel. When the exciter goes on, the receiver output is shorted.

Two sets of r.f. output terminals are provided — a coaxial-connector socket and a two-terminal strip. The proper load for the exciter is 50 ohms.

VFO Operation

As it stands, the 10B can be put on the air with crystal-controlled operation by simply plugging in a crystal of suitable frequency. If VFO is desired, one can rework a BC-458 and feed it to the crystal socket — the instruction book carries several pages of detailed information on this operation. Power up to 300 volts d.c. at 25 ma. and 6.3 volts a.c. at 2 amperes can be "borrowed" from terminals provided for this purpose at the rear of the exciter; or the "tubeless VFO" described recently¹ can be used.

And speaking of the instruction book, it covers the operation of the 10B in painless form, and it has a lot of good dope for the amateur who has a 'scope and wants to do a little checking on his signal. But a 'scope isn't necessary to set up the 10B — the book also describes how to use a receiver for the purpose.

The 10B Multiphase Exciter is available in kit form or completely wired and tested. — B. G.

Silent Keys

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

- W1DFE, Clarence Brightman, Randolph, Mass.
- W1JMW, Harris L. Grader, Essex, Mass.
- W2GVF, Edward J. Mack, Bayonne, N. J.
- W2KAX, Colgate Craig, Peekskill, N. Y.
- W2QWE, Cassius L. Jones, jr., Syracuse, N. Y.
- W3VUR, Richard D. Reed, Clark, Penna.
- W4IMJ, Lloyd F. Boyle, Sanford, Fla.
- K6BFF, William G. Tracy, Azusa, Calif.
- W6LKF, John B. Derby, Paso Robles, Calif.
- W7DXZ, Frank E. Pratt (former ARRL QSL Manager), Tacoma, Wash.
- W8HL, Dr. Frank C. Witter, Detroit, Mich.
- W9ETD, Ralph N. Hardin, Belleville, Ill.
- W9OLN, Joseph D. Huber, Salem, Ill.
- W8AHQ, George E. Smith, Sioux City, Iowa
- VK5BF, Francis G. Miller, Murray Bridge, South Australia

Happenings of the Month



ELECTION NOTICE

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

An election is about to be held in each of the above-mentioned divisions to choose both a director and a vice-director for the 1955-1956 term. These elections constitute an important part of the machinery of self-government of ARRL. They provide the constitutional opportunity for members to put the direction of their association in the hands of representatives of their own choosing. The election procedures are specified in the By-Laws. A copy of the Articles of Association and By-Laws will be mailed to any member upon request.

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

Executive Committee

*The American Radio Relay League
West Hartford 7, Conn.*

We, the undersigned Full Members of the ARRL, residing in the Division, hereby nominate of as a candidate for director; and we also nominate of as a candidate for vice-director, from this division for the 1955-1956 term.

(Signatures and addresses)

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

All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon EDST of

the 20th day of September, 1954. There is no limit to the number of petitions that may be filed on behalf of a given candidate but no member shall append his signature to more than one petition for the office of director and one petition for the office of vice-director. To be valid, a petition must have the signature of at least ten Full Members in good standing; that is to say, ten or more Full Members must join in executing a single document; a candidate is not nominated by one petition bearing six valid signatures and another bearing four. Petitioners are urged to have an ample number of signatures, since nominators are occasionally found not to be Full Members in good standing. It is not necessary that a petition name candidates both for director and for vice-director but members are urged to interest themselves equally in the two offices.

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

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

Present directors and vice-directors for these divisions are as follows: *Central:* Wesley E. Marriner, W9AND, and Harry M. Matthews, W9UQT. *Hudson:* George V. Cooke, jr., W2OBU, and Thomas J. Ryan, jr., W2NKD. *New England:* Percy C. Noble, W1BVR, and Frank L. Baker, jr., W1ALP. *Northwestern:* R. Rex Roberts, W7CPY, and Karl W. Weingarten, W7BG. *Roanoke:* P. Lanier Anderson, jr., W4MWH, and Gus M. Browning, W4BPD. *Rocky Mountain:* Claude M. Maer, jr., W0IC, and (no vice-director). *Southwestern:* John R. Griggs, W6KW, and Walter R. Joos, W6EKM. *West Gulf:* A. David Middleton, W5CA, and Carl C. Drumeller, W5EHC.

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

For the Board of Directors:

A. L. BUDLONG
Secretary

July 1, 1954

CONELRAD PLAN APPROVED

FCC has given its general endorsement to a plan for bringing the amateur radio service under the "CONtrol of ELectromagnetic RADiations" procedure for silencing radio stations in the event of enemy attack. Basically, the amateur station would be required to monitor or otherwise maintain a knowledge of the activities of standard broadcast stations; the amateur station may engage in its usual activities so long as broadcast stations are observed operating normally; when the Conelrad procedure is invoked and all broadcast stations except key stations on 640 or 1240 kc. leave the air, the amateur station must immediately cease operation.

Detailed rules for the application of Conelrad to the amateur service are now in preparation.

NEW SECURITY RULES

On June 11th FCC issued a Notice of Proposed Rule Making, apparently in conformity with the present national policy to tighten security measures, excluding from eligibility to hold an

amateur license any person who is a member of the Communist Party, any Communist front organization, or any organization advocating the overthrow of the Government by force and violence. Additionally, it is provided that only persons of good moral character will be eligible for amateur license; factors to be considered in applying this rule will be past memberships in above-named organizations, or conviction of a felony. (Similar rules are being set up for commercial operator licenses.)

Comment date was July 19th, it being obviously the intention to hurry the amendments through.

AMATEUR WEEK IN INDIANA . . .

Following closely the action in Maryland alert amateurs in Indiana obtained from their Governor Craig a proclamation designating the third week in June as Amateur Radio Week also in that state. The text follows:

WHEREAS, at the present time a Joint Senate-House Resolution is pending in the Judiciary Committee in the United States Senate, which calls upon the President of the United States to declare, each year, the third week in June as Amateur Radio Week; and,

WHEREAS, the radio amateurs of Indiana are playing an important part in promulgating and participating in matters of Civil Defense and distress emergency communication work, both through the medium of radio and through their organizational and individual activities; and,

WHEREAS, the many contributions being made by the radio amateurs to the nation's progress and defense are, frequently, taken for granted; and,

WHEREAS, the radio amateurs of this country are diligent and sincere in their work, having in mind the pleasure and service of their fellowmen, and should have the encouragement and interest of all the citizens in their efforts toward their goal;

NOW, THEREFORE, I, George N. Craig, Governor of the State of Indiana, do hereby proclaim June 13 to 19, 1954, as Amateur Radio Week in Indiana and urge all citizens of this State to exert their interest and influence and good will toward the observance of this occasion.

. . . AND MICHIGAN

Largely through the fine efforts of W8HSG, the week following Field Day was designated by Governor Williams of Michigan as "ham" week in that state with the following proclamation:

One of the most valuable assets that any city or community possesses in times of emergency or disaster is a communication system to transmit information quickly and efficiently. This can best be supplied by radio.

Radio amateurs, better known as "hams," are an integral part of our nation's and state's communication system. Over the years they have won for themselves a widespread reputation for selfless service to the American people, giving freely of their time and energy with no thought of reward.

Thousands of these amateur radio operators have worked tirelessly and effectively in advancing our civil defense efforts. In developing their own proficiency in radio, they have equipped themselves to play an important role in war as well as peace. They have passed on their training and professional know-how in the sciences of electronics and code transmission to many of our younger citizens prior to their induction in the armed forces.

All of these services and others have been performed efficiently and effectively with a minimum of fanfare or publicity. It is more than appropriate that we give recognition to our "ham operators" for the great contribution they have made to the general welfare of our state, its communities and the nation.

Therefore, I, G. Mennen Williams, Governor of the State of Michigan, do hereby proclaim the period of June 19 to June 25, 1954, as RADIO "HAM" OPERATOR WEEK

in Michigan, and request all citizens to use this occasion to become better acquainted with the work of the "ham" operators by visiting their base of operations and providing them with encouragement to carry on a job well done.

3.5 MC. PACIFIC USE

Effective July 2nd, FCC amended the amateur rules slightly modifying the availability of the 80-meter band in certain Pacific areas. These actions come about both through coordination with the military, and through the necessity of having our domestic regulations follow the provisions of the Atlantic City allocations table.

Specifically, American possessions in Atlantic City Region 3 — Baker, Canton, Enderbury, Guam, Howland, Jarvis, Palmyra, American Samoa and Wake Islands — will be assigned the band 3500-3900 kc., the maximum permitted in that region for amateurs. For most of these islands the authorization is a new one, the band having been assigned by FCC only in areas up to 170° west longitude; the exceptions, Jarvis and Palmyra, have up to now enjoyed the full band but must be cut back to the Atlantic City limits. Possessions in Region 2, such as Midway, will have the full 3500-4000 kc. width.

DOCKET 10927 FILING

At its meeting in May the ARRL Board of Directors went on record as opposing the setting aside of portions of the amateur bands for the use of special groups on the basis that it would not permit the fullest and most diversified use of all frequencies available for amateur radio operation. At the same time the Board withdrew an earlier request for a special 75-meter mobile voice band. The text of the filing follows:

FEDERAL COMMUNICATIONS COMMISSION

In the Matter of

Petitions of the American Radio Relay League for amendment of Part 12, "Rules Governing Amateur Radio Service."

DOCKET NO. 10927

COMMENTS OF

THE AMERICAN RADIO RELAY LEAGUE, INC.

Pursuant to Paragraph 13 of the Notice of Proposed Rule Making in Docket 10927, released February 23, 1954, the American Radio Relay League, Inc. files these comments on behalf of the more than 40,000 licensed amateur members of the League.

These comments were formulated on decisions made by the Board of Directors of the League at its meeting May 14-15, 1954.

As concerns the propriety of subdividing the amateur bands for various specialized purposes, the League expresses itself as in agreement with the general philosophy of the Commission as indicated in earlier findings, e.g., its Order of December 3, 1952, dealing with a request of the Chicagoland Mobile Radio Club, and its Report and Order in Docket 10237 also dated December 3, 1952, that the setting aside of portions of the amateur frequency bands for the use of special groups would not permit the fullest and most diversified use of all frequencies available for amateur radio operation.

Accordingly, the League now requests the withdrawal of its petition dated September 3, 1952, seeking to establish a mobile voice suballocation in 3775 to 3800 kilocycles.

Additionally, the Board of Directors at its meeting this year informally discussed several other aspects of the cur-

(Continued on page 120)

YL NEWS and VIEWS

BY ELEANOR WILSON,* W1QON

Results of the 1954 Young Ladies Radio League election were given in this column last month. Some changes and additions are herewith noted.

The editor and publicity chairman will not be as stated. W9YBC, Gloria Matuska, has accepted appointment as publicity chairman, and W3-RXV, Peg Ferber, has agreed to serve as *Harmonics* editor. W6WSV, Carol Witte, will be chairman for the sixth district. The third district chairman will be announced next month.

Vada Letcher, W6CEE, of Santa Monica, is the new president of YLRL. Licensed in 1948, Vada has served as an officer in the Los Angeles Young Ladies Radio Club and the Inglewood Amateur Radio Club. At present she is secretary-treasurer of the L. A. Area Council of Amateur Radio Clubs. Her OM is W6HWM. Looking forward to a successful and progressive year, she welcomes ideas and suggestions for the betterment of the YLRL.

The new vice-president, Gilda Shoblo, W6-KER, has just completed a term as president of the Young Ladies Radio Club of Los Angeles. Licensed in 1950, and the XYL of W6MES,

*YL Editor, QST. Please send all contributions to W1QON's home address: 318 Fisher St., Walpole, Mass.



W6CEE



W6KER

Gilda operates 75 'phone from her South Gate QTH, and 75, 40, and 20 mobile. A member of RACES, she participates in local c.d. nets and the San Diego AREC.

Starting a second term as vice-president, Miriam Blackburn, W3UUG (picture on p. 53, March 1953 QST), served the organization most ably in the same office last year. The XYL of W3MPO, she is an outstanding YL net and contest operator. Miriam is the officer to whom applications for membership should be sent.

Information on newly elected YLRL district chairmen follows:

W1VOS — Marjorie Snow of Plainville, Conn., was licensed as a Novice in 1952 and received her General Class license in 1953. Holder of YLCC No. 18, she is net control of the eastern section of the YLRL 75-meter 'phone net. Her OM is W1VOV. You'll find Marjorie in group photos in July, 1953, and July, 1954, QST YL columns.

W2JZX — Viola Grossman of East Rockaway, Long Island, is well known for her ability as an operator and for her services to amateur radio. Holder of a number of ARRL appointments and certificates, Vi's recent activities have included chairmanship of amateur activity for the All Women's Transcontinental Air Race for the past two years and serving as president, then secretary-treasurer, of the L. I. unit of the YLRL, which she founded in 1951. (For W2JZX's portrait see p. 52, Sept., 1953, QST.)

W4RLG — Currently confined to a hospital bed, Frances Shannon is gratified with the trophy cup she received for placing first in the c.w. section of the most recent YLRL Anniversary Party. She extends her thanks to all who have sent her cards and letters, and trusts the YLs in her district will forward news to her at the U. S. Army Hospital, Ft. McClellan, Ala. (ward 28). Frances has been active on 20, 40 and 75, and is a member of the Alabama Emergency Nets (phone and c.w.) and also of MARS. The XYL of W4MI, she holds a CPC for 25 w.p.m., A-1 Opr., ORS and RCC certificates.

W5TTU — Amateur radio has meant much to Pat Parks since she received her license in 1951, for she is a shut-in. Recently appointed EC for Rotan, Texas, Pat is net control of the "Zany Net" on 75 'phone.

W7SBS — Lurynne Conner of Klamath Falls, Oregon, particularly enjoys net operation. She is NC of the Oregon Emergency Net and is an alternate NC of the Northwest YLRL 75 'phone net. Her OM is W7JRU.

W9LOY — Cris Bowlin of Chicago is one of the founders and a past-presi-



KZ5DG



W7SBS



W5TTU



W0ERR



W9LOY



W4RLG

dent of the Ladies Amateur Radio Klub of Chicago. Licensed in 1950, she particularly enjoys 40 'phone. Cris and her OM, W9RQF, are publicity chairmen for the North Suburban Radio Club.

WØERR — Anna Belmonte of Denver was licensed as a Novice in 1952 and became General Class in 1953. Secretary and a director of the Denver Radio Club, she likes to handle traffic and operates daily between 10:00 P.M. and 2:00 A.M.

KZ5DG — Grace Dunlap was licensed in May, 1951, and has also held the call WØDLU. The XYL of KZ5GD, she operates mostly 15 'phone from her Balboa Heights QTH. She is the first amateur in the Canal Zone to receive a Maritime Mobile Certificate.

VESAJR — The February column for this year contains a photograph and information on this popular VE YL. Dell Daykin continues to be very active on 20, 40 and 80 from Leamington, Ontario.

We hope to have information on the new YLRL publicity chairman, editor, and the third, sixth, and eighth district chairmen next month.

As stated in the information sent to new members of the YLRL: "The Young Ladies Radio League is an organization consisting solely of duly licensed women amateur radio operators. The aim of the YLRL is to further cooperation among members, to develop efficiency in radio operating and to further the interests of amateur radio in general." The club was organized in 1939 by W3MSU, Ethel Smith (then W7FWB), and now has a membership of almost 400. Any licensed woman amateur radio operator may join.

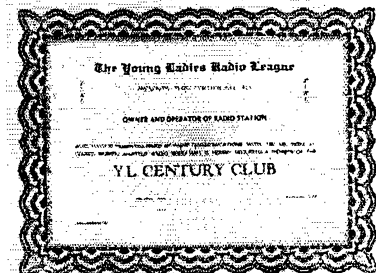
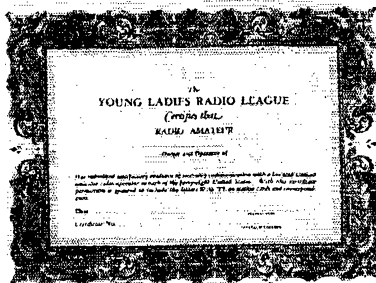
Novices, too, are eligible; however, their membership is limited to the duration of validity of their licenses. YLs of all countries are welcome.



Thirty-five of the 44 licensed members of the Los Angeles Young Ladies Radio Club were present at the installation of officers at the annual June meeting. The new officers, shown above from left to right: W6QOG, Helene Leonard, treasurer; W6QGX, Harriette Barker, vice-pres.; W6PJU, Mildred Griffin, president; W6DXI, Gladys Eastman, recording secretary; W6AKE, Lorraine Freeberg, corresponding secretary. W6LBO, Mary Brandvig, not in the picture, is publicity chairman. All of the ex-presidents (6), except ex-W6NLM (now W4DEE), were present. Outgoing president W6KER, Gilda Shoblo, who was presented with a gavel in gratitude for her service during the past year, praised the membership for their excellent cooperation and the work they had accomplished.

WAS-YL and YLCC

In December, 1952, when rules for obtaining the WAS-YL Certificate were first published in this column, not one certificate had been issued. At this writing (June, '54) WAS-



The YL-WAS (top) and YL-CC certificates are 8½ by 11 inches and are colored blue and red, respectively.

YL Custodian W1MCW, Lou Littlefield, reports five certificates have now been awarded as follows:

- | | |
|---------------|---------------|
| 1. W2QHH (OM) | 4. W8HWX (YL) |
| 2. W1F1J (YL) | 5. W3OR (OM) |
| 3. W4ARR (OM) | |

While only five have made WAS-YL thus far, many YLs and OMs are very close to it — they lack YL contacts in but one or a few states.

Interest in this certificate and the YL Century Certificate has increased remarkably during the past year, and inquiries about rules have been numerous. Write the respective award custodians for full rules and information as an aid to getting yours.

Custodian for the YLCC is W7GLK, Dot Dickey, whose new address is Route 1, Box 347, Ashland, Oregon. The following YLCC certificates have been issued to date:

- | | |
|---------------------------|-------------------|
| 1. W1BFT (OM) | 11. W4ARR (OM; 1) |
| 2. W2QHH (OM; 3) | 12. W8HUX (YL) |
| 3. W3JSH (YL — now K2DYO) | 13. W3OP (OM) |
| 4. W8HLF (YL; 2) | 14. W9CMC (OM) |
| 5. W4SGD (YL; 2) | 15. W4KYI (YL) |
| 6. W4CKB (OM) | 16. W4VJX (YL) |
| 7. W3QQF (YL) | 17. W8SDD (OM) |
| 8. W7HHH (YL; 2) | 18. W1VOS (YL) |
| 9. W8ATB (YL) | 19. WØTAB |
| 10. W8HWX (YL; 2) | 20. W6WRT (YL) |

The numbers in parentheses refer to the number of endorsements issued, each endorsement representing 50 additional YLs.

Important: The WAS-YL Certificate and the YL Century Certificate are issued by the Young Ladies Radio League. They are **not** ARRL certificates. Please send inquiries and QSLs only to W1MCW and/or W7GLK.

Dot admonishes applicants to be sure to enclose sufficient money for return postage for QSLs.

Certificate seekers will find that the annual YLRL Anniversary Party and the YL-OM Contest offer excellent opportunities for new YL contacts. The Anniversary Party is for YLs only, but the YL-OM Contest offers the OMs their biggest chance of the year to meet YLs.

(Continued on page 180)

A.R.R.L. Dakota Division Convention

Rapid City, S.D. — Sept. 17th-19th

The Black Hills Amateur Radio Club is sponsoring the ARRL Dakota Division Convention to be held September 17th-19th in Rapid City, So. Dak.

The convention proper will be held in the City Auditorium with displays, prizes and entertainment. There will be open forum meetings and group meetings with outstanding speakers in their respective fields.

One of the highlights of the convention will be a conducted tour through the Black Hills by Les Price, W0FLP, State Park Superintendent, with particular emphasis on Mount Rushmore Memorial, the Needles, Sylvan Lake and Custer State Park, followed by a chuck wagon buffalo feed at Custer State Park with western entertainment.

For information on reservations and registrations, write Frank M. Mayer, W0GLA, 511 St. Joe Street, Rapid City, South Dakota.

HAMFEST CALENDAR

ALABAMA — The North Alabama Hamfest will be held August 28th-29th. Attendance tickets are \$1.00 and meal tickets \$1.50. Order from W4TKL, Route 4, Box 51, Huntsville, Ala.

FLORIDA — The Tampa QEM Net Hamfest will be held September 5th at Tampa. There will be speakers, a trading post, swimming, and a delicious Spanish dinner. Registration \$1.75 with dinner, 25 cents without. Reservations must be in 48 hours in advance to insure sufficient food. For details contact W4KQS.

ILLINOIS — Sunday, August 8th, at Mance Park, $\frac{1}{4}$ mile east of Route 45 and $\frac{1}{4}$ mile south of Route 66 (Stinson Airport) — the 20th Annual Picnic and Airmobile Meet of Hamfesters Radio Club; the friendliest get-together in the Midwest. Planes parked free, but pilots must bring their own tie-downs. Food, ice cream, and beverages available — games and contests for kiddies and grown-ups. Plenty of tables and free parking. Donations are \$1.00 to August 1st, \$1.25 thereafter. Tickets available from John J. Ruth, W9GVO, 4460 Oakwald Ave., Chicago 15, Ill.

INDIANA — The Big Bull Hamfest will be staged at Highland Park, Kokomo, August 15th, 10 A.M.-4 P.M. Registration \$1.00. Games to keep the children busy, contests for the ladies. OMs can chin-chat. Sponsored by Kokomo Amateur Radio Club, Inc. Contact W9DKR, Secy.

INDIANA — The Tri-State Amateur Radio Society will hold its annual Hamfest on Sunday, August 29th. The affair will be held at the same location as last year, at the Rural Center located $7\frac{1}{2}$ miles north of Evansville on Highway 41 North. Large signs will be posted along the highway to direct all comers. Activities start at 10 A.M. CST with games and activities for all members of the family. A basket dinner will be held at noon, and refreshments of all kinds will be available on the grounds. Transmitters will be set up on 10 and 75 meters to guide any mobile needing directions to the grounds. Registration fee is \$1.00. For other info, contact Wilbur Weisling, W9OVV.

MARYLAND — Sunday, August 15th, at Triton Beach, Mayo — the Seventh Annual Hamfest-Picnic of the Baltimore Amateur Radio Communications Society. Program begins at 10 A.M. Refreshments sold. Bring your picnic basket. W3PSG will guide mobiles. Tickets \$1.00 (children 50¢). Includes bathing, bathhouse, picnic tables and pavilion. Write W3JCL.

MICHIGAN — The Annual Michigan V.H.F. Picnic will be held on August 1st at Allegan County Park on sunny Lake Michigan. No admittance charge. Bring your lunch and kiddies. Write W8EYD for details.

COMING A.R.R.L. CONVENTIONS

Sept. 17th-19th, Dakota Division, Rapid City, S. Dak.

Oct. 2nd-3rd — West Gulf Division, Kerrville, Texas

Oct. 10th — New England Division, Manchester, New Hampshire

Oct. 16th-17th — Midwest Division, Des Moines, Iowa

Oct. 30th-31st — Roanoke Division, Richmond, Virginia



August 1929

... James J. Lamb's "Modulometer," a simple device for determining percentage of modulation, is an invaluable test instrument for the radiotelephone enthusiast.

... A. W. McAuly, W8CEO, details his "Bear-Cat Model 3B" receiver that expeditiously covers three bands by switching between three separate detector circuits.

... In "Resistance Control of Regeneration" Beverly Dudley reports on his comparative analysis of eleven regenerative detector circuits.

... Alphy L. Blais, VE2AC-VE2AS, itemizes causes, symptoms and remedies for common troubles encountered by neophytes operating their first simple transmitters.

... "The Inductor Dynamic," by Harold P. Westman, is a discussion of a type of loudspeaker designed to overcome inherent disadvantages of conventional reproducers.

... "Introduction of Losses in Radio Circuits by Coupling," by Rinaldo de Cola, takes a close mathematical look at mutual effects produced by r.f. couplings.

... "An Effective Break-In System" is volunteered by Ricci B. Parker, W1AJZ, a circuit that automatically disables the receiver during key-down periods.

... Elmore B. Lyford, in providing suggestions for simplest effective transmitter metering arrangements, assures "Getting the Most Out of Your Meters."

... "The Amateur and the Naval Reserve," by R. H. G. Mathews, W9ZN, is descriptive of the rôle played by hams in our navy's Volunteer Communication Reserve.

... The fourth of a series of descriptions of modern amateur stations, "W1WV" features the installation of Miles W. Weeks located at Chestnut Hill, Mass.

... In this month's Communications Department pages: W1ZZA's QRP-portable results, hints for tune-up without QRM, expedition notes and other news of wide interest.

... QST staff changes announced: James J. Lamb, W1CEI, succeeds Harold P. Westman as Technical Editor; G. Donald Meserve, W2JR, becomes Advertising Manager to succeed F. Cheyney Beckley, W1KP; Clark C. Rodimon, W1SZ, takes title as Assistant Editor; and Beverly Dudley, W9RR, becomes Assistant Technical Editor.

Strays

George W. Bailey, W2KH, Executive Secretary of the Institute of Radio Engineers, was elected president of the Armed Forces Communications Association during its convention at Washington in early May. W2KH is well known to amateurs as president of ARRL from 1940 to 1952 and previously as ARRL New England Division Director and vice-president.



Correspondence From Members-

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

QSL NOTES

22 Ross Street
Rochester 15, N. Y.

Editor, QST:

How many times the first words one hears coming from the loudspeaker are "My P. O. Box is — please QSL, I will send my QSL right away." Nine chances out of ten this chap doesn't even have a QSL card. . . .

The DX man works a new country. He asks if the fellow will QSL as it means another notch in his certificate. Have you ever heard the chap in the new country say "I'm sorry, but I do not QSL"? He will lead you on and let you send him a card with no thought of having done a fellow ham an injustice.

This DX man a few weeks later again has luck in working a different ham in this same country. Knowing of the time and expense in QSLing he refrains from asking for a QSL as he already has one promised. He is satisfied with one QSL from each country.

It would have been nice if the first chap had been truthful.

This applies to Ws as well as DX. Regardless of who or where you are, you may be DX to someone. . . . If you say you QSL — *do so*. If you don't QSL — *say so*.

— Orville F. Bauer, W2TEX

Golden
Illinois

Editor, QST:

. . . . When I first received my license as a WN9, I was very glad to receive QSL cards. Every morning I could hardly wait to get to the mail for QSL cards. About 85% of all the stations worked while I was a Novice promptly QSLed. Then came the tragedy. I advanced to my General license. Working on 40 c.w. I had hoped to really build up my QSL collection. But to my disappointment, hardly half of the stations QSLed. I asked every station to QSL when they received my card. This year my averages are as follows: January 50%, February 56%, March 28%. This has been so discouraging that I have almost lost interest in ham radio because my main objective is to collect the "postcards." I QSL 100% and wish something could be done to bring up the percentage of returns. I believe others will agree with me that they have been disappointed also. Please, fellows, let's bring QSLing back into the modern trend along with the other ham improvements.

— Roger Aden, W9U'P

LETTERS FROM FRIENDS

74 Raymond St.
Fairhaven, Mass.

Editor, QST:

I don't suppose I have any business writing this letter as I do not qualify for membership in your association. I have no ham license and am merely one of those nosy short-wave listeners. However, I have a sixteen-year-old son who, until lately, has been interested in getting a ticket. This is the reason for the note.

We have both been very disgusted of late listening to the arguments between the a.m. and single-sideband operators. At times they both act like spoiled children and their remarks to one another are most unpleasant to hear; in fact, at times, if the authorities were listening they would probably be taken off the air. This is going to hurt the many sincere operators as well as the ones who are causing the trouble. What is happening to the old gang of good sports who always tried not to interfere with each other? This is the kind of thing that is happening all over the world and causing wars and suffering. Some guy gets on a certain fre-

quency with his call and then one of these soreheads with three or four times the power tries to drown him out.

There is enough arguing and fighting in the world today without getting into a hobby which is supposed to be relaxing and getting all wound up in a fight.

Another reason that my son is fast losing interest is the really *dirty* cracks some of these fellows make on the air about the newcomers to the field. Didn't they have to start the same way or were they born with a radio on their shoulders instead of a head?

I sincerely hope that you can get these thoughts across to the worst offenders and please understand that this is not a spite letter; I am only trying to help correct a bad situation.

— William C. Brennan

32103 Genesee Ct.
Wayne, Michigan

Editor, QST:

I have long been an admirer of all radio amateurs, and the day will come when I will have the time and funds to get into it myself. As a result of this interest I spend an hour or two quite often listening to the many stations in this area; the set I have doesn't give me much in the way of DX. I have never heard any of the boys say anything objectionable over the air, therefore I was quite surprised to hear W8— at 2 a.m. today give a lengthy discourse on the folly of the American people in putting the present administration in Washington, etc., etc. From that he went into an attack on the management of the company he worked for, which happens to be one of the largest railway systems in this area.

The man is entitled to his opinions, as I am to mine, and even though I could agree with him, I think he is doing the hams in general a lot of damage. I presume that he is within his legal right to make remarks like that over the air, but it don't think it sounds at all good. There are a lot of people that listen in on the amateurs and they certainly could get a lot of wrong ideas about ham radio in general from this sort of thing. I understand that there are forces at work to ban the amateurs and use the frequencies allotted to them for commercial work. Well, I've spoken my mind; here's hoping ham radio may go on forever.

— John K. Adams

'PHONE ANTICS

P. O. Box 471
Nome, Alaska

Editor, QST:

Heard on a 20-meter 'phone traffic net, operated primarily by "salty" service personnel.

"I QUEEN ROGER UNCLE you, do you QUEEN TARE CHARLIE me?"

"Please stand by til I finish this QTC."

"I am unable to hear JF8XX, do you QRK JIG FOX 8 XRAY XRAY?" . . . and many others.

Fellows, it looks silly in writing, doesn't it? It sounds just as ridiculous on the receiving end.

— Joe Frydlo, KL7PB

CODELESS LICENSE

2744 N. 33rd St.
Kansas City, Kans.

Editor, QST:

I was reading all the fine answers to Mr. Ginn, WH6BAQ, in the June issue of QST and I just have to put in my two cents' worth. I don't think that we will miss Mr. Ginn in the ARRL, but that's beside the point.

(Continued on page 128)

Results - Armed Forces Day 1954

Receiving Competition

Two hundred and five operators have been mailed certificates of merit signed by the Honorable Charles E. Wilson, Secretary of Defense, in recognition of making perfect copy of the special Armed Forces Day message to radio amateurs. There were 375 individuals participating in this phase of the special activities conducted by the Army, Navy and Air Force. The message was transmitted at 25 w.p.m. by military stations AIR, NSS and WAR at 1900 EST on May 15, 1954. A paraphrase was transmitted at 0100 EST on the 16th.

An indication that conditions were much better than last year was evidenced by an entry received from Binningen, Switzerland. Kurt Hubner, HB9KX, who submitted the entry, has been awarded a certificate for a perfect copy. Entries also were received from such far-off places as Hawaii and Alaska. Certificate winners are as follows:

W1s CSX IKE QHC QJM RCI RWP RWR/3 SRM THR WDW WGN, W2s AFZ ALZ BO HAZ JB JCA JOA LA/5 LRW NUI NVB PAF QND TUK UAP UXD VEH VNJ WC WH WVE ZMK, W3s ADE BHK BQU FFF FFN GRB JH MCD MCG NRE PZW QOJ QQS RLA VAR WZA, W4s AQM CDA CUP CYR EPN FJ GLL IUY JDU KJ KX MPA SOI UMO ZPR, W5s EBQ EGX HBZ JPC KXR RH YOU, W6s AIA/7 BVY/4 BXL CAJ CRT DTY FCX FYW GYH LDO MCY MKH MYP NDI OWP YHM, W7s FIX KQV LT NUN OVU, WN7VOF, W8s AYT DAE DCE DNB FFK FLA GGX HZA KNX ORY PAC SDD WVL, W9s ACB BA CXY GIN JUJ UN UNJ, W0s BHA FEO JFK KFS NIY QBA

Message from the Secretary of Defense

In the United States of America and overseas wherever there are members of our Army, Navy, Air Force, Marine Corps, Coast Guard or Reserve Forces this is Armed Forces Day. We emphasize again today our desire to work together both at home and with other peace loving peoples toward preservation of individual freedom throughout the world. Worthy of particular note on this occasion therefore is the working relationship of amateur radio operators. Each day you demonstrate the important role you can take in research and development, in disaster relief, and in training others upon whose technical knowledge and continuing efforts the welfare of our people, the security of our country, and the peace of our world may depend. On behalf of the Armed Forces of the United States and as Secretary of Defense, I heartily welcome your active participation in the fifth observation of Armed Forces Day.

Signed CHARLES E. WILSON

RSL THD TKX, K2s BHN CIP DDE DG NAH, K4WCZ, K5NRA, K6s CRR DL DQA DV FBO, K7NAMI, KA2NY, KH6FX, KL7EVR, KP4s PM WH ZI, HB9KX.

Burl T. Arbogast, Charles R. Armbruster, sr., William J. Beetham, John J. Bisbee, Louis A. Cantolla, Jewel P. Caraway, George Caulfield, Neil L. Christensen, Gene Cochran, C. J. Corrigan, C. E. Darnell, J. M. Davidson III, Salvatore Defonce, William G. Donberger, Walter R. Emrich, jr., Robert L. Estep, Ted R. Ezell, John Fouch, jr., James N. Fraser, C. L. Fry, Milton D. Haines, Robert E. Hamilton, E. H. Hansen, William J. Harmon, Loren E. Hayes, Donald C. Hartung, Evelyn M. Headings, Frank B. Heselton, John J. Humphrey, Harvey H. Hustad, Harry Huth, Marion R. Kinnett, Roger C. Lagerquist, Wallace C. E. Leveille, Stewart Liner, Frank R. Lopez, L. E. Lyvers, David P. McCarthy, John A. Meyer, Joseph J. Mooney, Charles R. Murray, John R. Newman, Finbar O'Driscoll, Robert Nolan Onstott, Richard B. Owens, John Stanley Pakosky, George F. Parsons, Conrad Rippe, Garner D. Roach, Samuel P. Sassano, Ernest R. Seay, Lawrence Sebring, Donald E. Signor, Richard P. Stauffer, Walter R. Stechmann, Bob Steele, John W. Watkins, W. H. Watts, Bernard Weeks, Charles Windle, John F. Wojtkiewicz, William J. Zahalka, Paul Zunno.

Military-to-Amateur Test

Operating on military frequencies, AIR, NSS and WAR worked amateurs in the 3.5-, 7- and 14-Mc. bands. The three military stations made a total of 940 QSOs with amateur stations during the six-hour test. Special Armed Forces Day QSL cards have been mailed to all stations worked by AIR, NSS and WAR. It was possible to receive three cards by working all three stations.

Radioteletypewriter Receiving Competition

Because of the interest shown in the radioteletypewriter transmissions last year, the number of stations and frequencies used was doubled for the 1954 broadcasts. Due to transmitter trouble, the broadcast from A2USA was delayed until 1355 EST. The 91 entries received were broken down as follows:

Call Sign	Entries
1300 EST A2USA	2
NDC	16
1300 CST A4USA	2
NDS	11
1300 MST A5USA	15
NDF or NDW2	16
1300 PST AF6AIR	5
NDW	24

A special certificate is being furnished each participant in addition to the letter of acknowledgement previously announced. It has been suggested that the radioteletypewriter competition include an amateur-to-military test period. The feasibility of such a test will be studied during the forthcoming year.

The interest in the special amateur Armed Forces Day activities grows each year. The Army, Navy and Air Force look forward to your participation in these activities next year on May 21, 1955!

• Technical Topics —

Sunspots Just Around the Corner?

THERE is considerable interest in the question of when we will pass through the sunspot minimum — or, as it is usually expressed, when “conditions will start to get better.” There is a well-established relationship between what are called “smoothed running average sunspot numbers” and the maximum frequencies usable in radio communication. The smoothed sunspot number has been going down monotonously now for a number of years, and most of us are looking forward hopefully to the time when the trend will reverse. It will reverse sooner or later; sunspots have been going through such regular variations for a long, long time, the last 200 years being a matter of record.

Most amateurs probably know that the average length of a sunspot cycle is eleven years. If all cycles were alike it would be easy to forecast the maximum or highest usable frequencies far in advance, but the eleven-year figure is only an average. Some cycles have been as short as seven years, others as long as thirteen. In any particular sunspot cycle, you never know when the maximum or minimum occurs until you pass through it, especially since the smoothed sunspot number is based on six months ahead as well as six months behind the date to which it applies. We could “hit bottom” this month and not be sure of it until a year from now.

Because of these factors, astronomers and others concerned with sunspots are reluctant to attempt predicting dates of maxima and minima. A recent article by T. W. Bennington¹ is about the most illuminating discussion of the present sunspot situation that we have seen. While not making a definite prediction himself nor reporting any, Mr. Bennington states that there is a fair amount of evidence to indicate that we are close to the turning point. First, based on what is known about previous sunspot cycles, our present one exhibits the characteristics of a medium-length cycle — in other words, its actual length should be close to eleven years. The last minimum was in April, 1944, so a length of exactly eleven years would place the next minimum in April, 1955. (There is, however, no good reason for assuming that the present cycle will be *exactly* eleven years.) Second, for the past year or so the sunspot numbers and maximum usable frequencies have been exhibiting “quasi-minimum” values, meaning that they have been what you might expect around the minimum. Third, past experience has shown that during a period of a year or so before the minimum new small spots

appear in the northern solar latitudes, which up to that time are free from spots since the ones associated with the “old” cycle congregate in the southern solar latitudes. Such new spots have now been reported. Taking them all together, these things indicate that we should pass through the minimum before too many months — possibly during early 1955.

So the end is pretty surely in sight. But where does that leave us? Is it going to take several years to get back to the point where 28 Mc. is a reliable daytime DX band and 21 Mc. will give 14 Mc. stiff competition? Not likely, happily. Sunspot numbers have a habit of climbing to the peak much more rapidly than they descend to the valley. In the last cycle, for example, the maximum occurred in April, 1947 — just three years after the 1944 minimum.² The average seems to be three to four years, from which we might speculate (not predict!) that 28 Mc. should be livening up the winter after next and should be good enough by the winter of 1956–57 to make us wonder how it ever could go “dead.”

It may be a little early, right now, to polish up that 10-meter rotary in anticipation of gathering in a lot of multipliers in the next DX contest. This time next year, though, you'd better start getting ready!

— G. G.

Strays

Life is precarious. Here we are, living on one plate of a condenser that is charged to a potential of at least 100,000 volts. This voltage is the difference between the earth and the upper stratosphere as established by USAF measurements (balloon) reported in *Jet Propulsion*, journal of the American Rocket Society.

— K6BGD

— ... —

The Division for the Blind, Library of Congress, is in the process of producing a Talking Book on the Novice Class amateur radio operator license, based on excerpts from the ARRL *License Manual*, and including an hour or more of code practice at 5 words per minute. These “books” will be distributed through the usual libraries. However, arrangements can be made for the production of extra copies for individual purchase at cost price, at the moment estimated to be on the order of \$10. Persons who are interested in such purchase are requested to notify ARRL Hq. promptly so that an estimate can be made of the number of extra copies to be produced.

¹ Bennington, “Ionosphere Review: 1953,” *Wireless World*, February, 1954.

² It was a whale of a maximum, too — one of the highest on record. We may not have it so good next time, judging by the history of sunspot cycles. This means, mostly, that the chances for another session of transatlantic 50-Mc. work look rather slim. On the other hand, who can tell?

Strays

Our Strays editor, crawling from under a small avalanche of ridicule, asks for this one more try: It's P-u-n-x-s-u-t-a-w-n-e-y, *not* Punxsatawney, Penna. (p. 25, June *QST*). He says it's about 55 miles northeast of Pittsbrugh.

In the story "DXpedition to Clipperton," Denniston, July *QST*, the Phillips Export Corp. was inadvertently referred to as the North American Phillips Co.

We are sorry to note the listing of Florida State Senator Lloyd F. Boyle, W4IMJ, in this month's Silent Keys. W4IMJ sponsored the legislation in 1949 that resulted in issuance of call-sign auto tags to amateurs, making Florida the pioneer among the several states that so recognize mobile hams.

Handicapped hams seeking ways to add to their incomes may be interested in doing at-home work monitoring certain television programs, a job usually arranged by a centralizing agency under contract with the sponsor. One such is the Television Monitoring Service Co., attn. Mr. Richman, 15 West 44th St., New York 36, N. Y., which will be glad to furnish details on request.

Is your ham station home-built?

Wanted: photographs of homemade stations. While we know that most amateur stations these days consist of manufactured transmitters and receivers, we sometimes hear the statement, "No one builds his whole station any more." In an effort to find out if this statement is true, we are asking for photographs and short descriptions of any stations in which the receiver and transmitter in use at all times are both homemade. Receiver and transmitter kits assembled by the operators are ruled out, as are pieces of war-surplus gear that have been modified. The receiver and transmitter designs do not have to be the work of the amateur — they can be copies or modifications of designs appearing in books and magazines. The stations should not be in the flea-power class; we would like to see descriptions of stations running at least 100 watts, although we will settle for 25- or 30-watt mobile units. (A homemade converter working into the car radio doesn't qualify as a homemade mobile receiver.) Test equipment for the station, such as oscilloscopes and multimeters, does not have to be homemade — we are primarily concerned with the transmitter, receiver and antenna system. There is no motive other than to find out the truth of the statement quoted above, but if anything interesting shows up we will devote adequate space to it in *QST*. Address any correspondence to Technical Department, ARRL, West Hartford 7, Conn.

Among the many hammy Connecticut license plates WILIG has observed are "CQCQ," "QRM," "QRN," and "QRU."

W3AXT's publication, *DXerama*, should be of considerable interest to DXers. Its sixty-four log-size pages include details on the securing of 32 world-wide operating awards as well as other information pertinent to the DX field. It is available to amateurs in the U. S. and possessions for one dollar from Sam Fraim, W3AXT, RFD 1, Box 127, Lancaster, Penna.

ARRL QSL BUREAU

The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. Its operation is made possible by a volunteer manager in each W, K, and VE call area. All you have to do is send your QSL manager (see list below) a stamped self-addressed envelope about 4¼ by 9½ inches in size, with your name and address in the usual place on the front of the envelope and your call printed in capital letters in the upper left-hand corner. For a list of overseas bureaus see p. 59, June 1954 *QST*.

- W1, K1 — J. R. Baker, jr., W1JOJ, Box 232, Ipswich, Mass.
- W2, K2 — H. W. Yahnel, W2SN, Lake Ave., Helmetta, N. J.
- W3, K3 — Jesse Bieberman, W3KT, Box 34, Philadelphia 5, Penna.
- W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.
- W5, K5 — Oren B. Gambill, W5WI, 2514 N. Garrison, Tulsa 6, Okla.
- W6, K6 — Horace R. Greer, W6TI, 414 Fairmount St., Oakland, Calif.
- W7, K7 — Mary Ann Tatro, W7FWR, 513 N. Central, Olympia, Wash.
- W8, K8 — Walter E. Musgrave, W8NGW, 1294 E. 188th St., Cleveland 10, Ohio.
- W9, K9 — John F. Schneider, W9CFT, 311 W. Ross Ave., Wausau, Wis.
- W0, K0 — Alva A. Smith, W0DMA, 238 East Main St., Caledonia, Minn.
- VE1 — I. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.
- VE2 — Austin A. W. Smith, VE2UW, 6164 Jeanne Mance, Montreal 8, Que.
- VE3 — W. Bert Knowles, VE3QB, Lanark, Ont.
- VE4 — Len Cuff, VE4LC, 286 Rutland St., St. James, Man.
- VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.
- VE6 — W. R. Savage, VE6EO, 329 15th St., North Lethbridge, Alta.
- VE7 — H. R. Hough, VE7HR, 2316 Trent St., Victoria, B. C.
- VE8 — W. L. Geary, VE8AW, Box 534, Whitehorse, Y. T.
- VO — Ernest Ash, VO1A, P. O. Box 8, St. John's, Newfoundland.
- KP4 — E. W. Mayer, KP4KD, Box 1061, San Juan, P. R.
- KH6 — Andy H. Fuchikami, KH6BA, 2543 Namaau Dr., Honolulu, T. H.
- KL7 — Box 73, Douglas, Alaska.
- KZ5 — Gilbert C. Foster, KZ5GF, Box 407, Balboa, C. Z.

How's DX?

CONDUCTED BY ROD NEWKIRK,* W1VWV

How:

J. Hoot MacToot, the Scotch S-meter tycoon, voices his opinion that several silver-tongued giants of history would have made darned good DX men. And, if they had taken a fling at the thing, this is what he thinks they¹ might have said:

- "Never have so many been QRMD by so few."
- "Don't give up the frequency!"
- "I do not choose to QSY."
- "DXCC on every wall and two kw. in every garage."
- "Go west, young lid, go west."
- "You may call that AC4 when ready, Gridley."
- "Raise him yourself, John."
- "The Gs are coming, the Gs are coming!"
- "OM Livingston, I presume." ("Yes, handle here is Livingston.")
- "What this country needs is a good 5-cent low-pass filter."
- "Ceylon, OMs, Ceylon!"
- "There's a BCL born every minute."
- "I never met a DX hog I didn't dislike."
- "I hate pile-ups, and I say it again and again."
- "A loaf of bread, a jug of wine and the annual ARRL DX Contest."
- "Early to bed and early to rise will get you more Asians, brother — get wise."

Hoot has a lot more but we're afraid he's being carried away. (*Cherchez la XYL.*) As his bagpipish audio QSBs in the distance, we hear him observe: "You can break through some of the QRM all of the time, and you can break through all of the QRM some of the time; but you'll never break through *all* of the QRM *all* of the time!"

What:

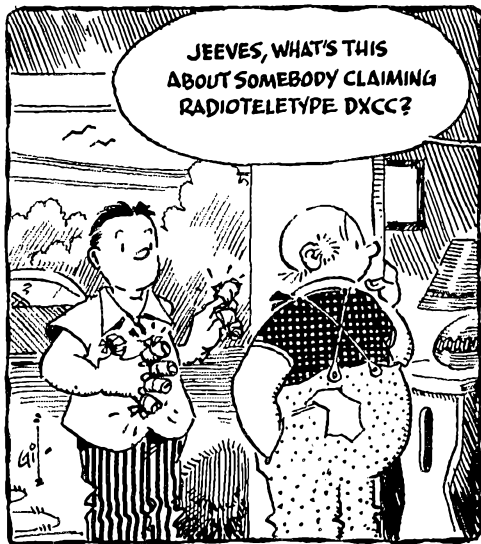
Twenty has been such a good boy (keeping rather late hours, however) that it rates its usual lead-off spot this month. Let's see what the gang is doing on "phone, first of all. W9HUZ is doing plenty after throwing together W6LNN's "The Simplest Modulator" (Sept. 1953 *QST*): CP5AB (164), CR6BX (115), CS3AC (178), CX5AF (193), EL2X (142), ET2LV (322), FO8AC (168), HC8GI (120) of the Galapagos, HI6EC (176), HK1AI (170) on San Andrés, KA7LJ (235), KJ6FAA (200), KX6BU (205), OQ8DZ (188), TF3MB (240), TG9HM (182), VK9YT (200), VQs 2HN (127), 3EO (108), 4AC (137), ZB2A (118), ZEGJD (124), ZM6AP (137) and ZP5CF (238)..... KA2AK worked CN8MM, KC6KU (255) 15 *GMT*, SV8VK and VK9RM..... TA3AA and SV8WE came back to W5YAA/KG6, while YV5FL chatted with GC3EBK (145) 19 *GMT*..... W6YY, prowling for KC6s, encountered AB1US (no go for DXCC credit) and FF8AP..... FO8AB and a CP5 raised VE5HR, and W2KJG added CN8EY, KG4AO, 5A5YG, a CS3 and TA3..... In the West Gulf DX Club's *DX Bulletin* the 14-Mc. A3 activities of CRs 4AP 5SP (198) 15, 9AH (120) 15, CT3AN (175) 21-22, EA9AR (193) 17, FM7WN (164) 14-15, HZ1AB (147) 19, 15BC (160) 15, KC6UZ (215) 14, LZ1KSI (120) 20, M1B (148-210) 21-0, MD5AP (115) 18, MF2AA (123) 10-14, OE5HA (151) 14, OD5BA (155) 0, SU1MR (124)

* DX Editor, *QST*.

¹ In order: Churchill, Perry, Coolidge, Hoover, Greeley, Dewey, Priscilla Mullens, Revere, Stanley, Marshall, Columbus, Barnum, Rogers, Roosevelt, Khayyám, Franklin and Lincoln.

22-23, SV0WG (138) 19, VKs 1DY (135) 10 of Heard, 1HM (172) 7 on Cocos Isles, 9DB (138-180) 13-14, 9RH (134) 21-22, 9SP (196) 14, 9SS (190) 14, VQ5CY (121) 19, VS1s AY (177) 13, DO (140) 14, ES (148) 15, FD (204) 14, FE (190) 14, FV (170) 14-15, VS2EB (153) 14-15, VS6s CL (140-195) 14, AY (256) 14-15, VS9AS (156) 14, VU2EJ (150) 13, ZCs 5VR (100) 8, 7DO (164) 14-21, 3A2BA, 3V8AS (205) and 9S4BN (168) 18 are ascertained, all times *GMT*..... F9UC/Corsica retains his popularity on 20 "phone. CT1PK has Jean's layout as a 6V6-807 25-watter, a folded dipole and an HRO..... The *Newark News* Radio Club bulletin contains annotations on 14-Mc. microphonists CP4DG, CT2AG, DU1s AP AS CV VVS (185), DU9VL (164), ET2AB 16 *EST*, FK8AM 7, GC8MF, HHs 2JK 3L, HI8WF, JA4BB, JY1XY, KA2s AC AK (202), AM DQ (250), FC (278), IM (285), LG (200), LK (205), NA (205), ON WL WW (297), KA3s AA MD RR (275), KA4DR (297), KA5s CW (231), HM, KA7s LJ LX RC (255), SL, KA8IJ (210), KC6KN 7, KG6s ABN (255), IG (210) of the Bonins, KR6s AF (278), AZ KS OY PD USA, KT1FT, KW6s AX (285), BR (283), KX6s AF BU, LX1DU, MF2AG, OE13USA, PJ2s AA AF AK AM, SV8WU (120) 16, TG9AL, VK9GV (120), VPs 1AD IGG 2AB 2DA 2DL (100) 2DN 3YG 7NS, VQ4RF, VSIMP (190) 9, YSIMS, ZBs 1CM 2A, ZD4BF 17, ZP4AM, 4X4s BO 14, DK GF, 5As 1TZ 2TZ 3TC 3TE 4TL and 4TR.

Twenty c.w., crammed with its usual unusuals, provided DU1CV (11) 8-9, one EA6UU/MM (35) 17-18, JAs 1AAW (27) 8, 2XE (30) 8-9, 3DM (63) 9, 4BB (64) 9, KA2JL (7) 8, KM6AX (37) 9, MB9BJ (54) 17, MP4QAD (15) 21-22, OD5AV (25) 18, VQ4CF (32) 17, VR3A (50) 23-0, VS6CL (31) 8, YOs 3RZ (32) 17, 4CR (29) 15, 5AITZ (55) 19-20 and 9S4AX (3) 17 for W9EU, all times *EST*..... MP4BBL (51) 22 *GMT*, VP2GX (73) 13 and ZC7DO (69) 23 were among those who came back to W2WZ. Al's list is topped off by CR9AH (82) 14..... W3LEZ nabbed AG2DX (30) 22, LZ1KDP (60) 22-23 and 4X4FW (48) 22, while one HE1BL intrigued W2LRS..... VO3X made hay with EA9DF, KR6OS (34) 12, LZ1s KPZ KSI, SV8WL and YZ2AM. Horace keeps his digits crossed for a card from AC4NC to confirm a recent c.w. QSO..... DU7SV (83) 13, FK8AL (83) 5, FO8AB (70) 3, JZ8KF (84) 12-13, KR6OL (94) 14, LU1ZT (30-55) 14, MF2AG (20-52) 0, VS6CT (108) 12-13, ZC4CK (44) and a ZP5, among others, were gathered at W9HUZ..... Past 100 goes W9UEG because of IIBNU/Trieste 17 *GMT* and VQ5DZ (40) 21



Doug still pursues CP3CA (50) 0, EA6AW 20, GD3IBQ 20 and ZP5BC 23 W9KXX, with a 122/112 situation, put his hex on CR7AF, JAs 1AQ 3BB 3BP 6AY 7AU, KAs 2KS 2ZZ 7SL 8AB 8RW, KW6BB (85) 15 GMT and VK9AU, MP4QAH and 4X4AE got away JAs 3AC 3AW 7AU, KAs 2ED 0IJ, TA3AA (70) 22 and VS4RO were captured by W5IUK's new 2-element twirler. Johnny still stalks ISLV, KJ6AI and 4X4KD W3M1WL with W3ULI reporting, racked up CS3AC (35), EA9AP (50), FA8DA (15), OX3UD (30) and VQ3EO (35). This school station also worked DI9AA, the *Xarija* (see p. 120, March QST) W4ZAE hit the century bull's-eye to reach 102/74. EL2P (41), FM7UP (45), JAs 1CR (62), 2CB (32), KS4AS (36), TF5SV (25), VK9RA (4), VS6s AE (31), CR (28), YOs 3ZC (28), 5AC (52), YV2AP (42) and ZC6UNJ (40) are among Mick's numerous successes FAs 8DA 9VN, FO8AC, HA70L, HZ1AB (90) 19, IS1AHK (10) 19-23, JAs 1CG 2AN 8AQ 9MF, KG4AN, OD5KJ, OE3HP, OQ5GU, PK1AR, SP5s BQ KAB, VQ4EG (30) 14, VR2IB, XZ2OK, ZC4s IP RX (90) 20-21, ZK1AB (30) 3, 3V8AN, a 5A1 and 5A4TG, times GMT, came back to W8HEV who reported to Jeeves via radio through W1YYM at W1AW AB1US, CN8FL, SP3AN, VK9AU, VQ2AB and ZK1BI weren't unhappy about catching KL7AWB of Anchorage Random reports from scattered points follow. At W4YZC: CPLAY: CT2BO 20 EST, EA9DF 23, a TA3 and W7YAU: 6 W5YAA/KG6: DM2ABK, LZ1KDA and OD5AB. W6NJU: KR6LN and VS1YN. W6QPM: 4S7LB (62) 14 GMT. W6YU: LUs 1ZK 8ZS and a pair of VS6s. W6ZZ: JAs 1CC 1FA 2AB 3DY 5AA and KA7LX. W7JLU: an FK8 and LB8YB. W8DLZ: an EA9, a VP2 and ZB2A (10). W8PCS: FA8SB (55) and IT1AGA (55). VE5HR: a DU1, JA1AA and 4X4RE. VV5FL: an EA9, GC2FZC (85) 19 GMT and ISLV (25) 19-20 W5FXN and the West Gulf crew fill us on the 14-Mc. c.w. potentialities of AC3PT 12-13 GMT, Easter's CE9AD (10) 2, CR9AH (55) 14-20, CX2AM (15) 12, EL2X (66) 13, FF8BH, IIBLF/Trieste (60) 22, IS1IMW (30) 23, IT1s BYF (88) 21, FGA (66) 23, JA5AB (11-50) 13, KA2YA (80) 13, KB6AQ (50) 0, KJ6s AZ (120) 10, FAA (112) 2, KR6s AA (10) 13-14, MS (75) 12, KW6BS (62) 13, KX6AF (100) 13, LBs 6IE (40) 4, 7C (40) 21, LZ1UA (58) 18, MDs 4YL (68) 23-1, SEU (16) 23, OA4C (85) 13, OD5s AV (20) 20-21, AX (72) 20, OE5AH (32) 0, SV8WA (1) 21, TF3AB (30) 14, UA6KFA (70) 12, UQ2AN (60-80) 12, Vks IAC (50) 3, 1BJ of Cocos 7-15, 9RV (25) 13, 9WZ (60) 14, VQ4EN (62) 18, VS6s AE (75) 14, CR (60) 12, CW (45-97) 13, VuS 2AN (65-80), VU7BX, ZC6UNS (60) 22, ZDs ISS (38) 20-21, 6BX (70) 13, 9AB (80) 14, 4S7WG (15) 13, 4X4DR (80) 22, 5A4TT (75) 15 and 9S4AD (47) 0. Also mentioned: LB8ZT of Spitzbergen, ZC2s AC AD, ZD3BFC and 3A2AR W4YHD writes of the tentative activity of HV1AA, a call legitimately assigned by the Vatican. CR19AC, SV8WG/Crete, ZC5PM and ZD8V bear watching for, too.

Forty c.w. remains a happy hunting-ground and W7JLU has JA0BD, KG6AA, KR6AA, KX6BU, LUs 3ZB (1), 4ZL (5), TI2s BX (10), WR (12), Vks 1DY (25), 6WT (40), 9YY (15), VP8AZ (1), VR2AS (25), YV5FH (10) and ZK1AB (1) to show for it FO8AC, LU8ZS and VK9GM satisfied KL7AWB W9HUZ caught that FO8, LU7ZO on Deception and VQ3EO (37)

LB8YB, VP2AD and many Europeans grabbed VO3X. VP8AK escaped the clutches of Horace W3LEZ made the grade with Jan Mayen's LB6IE and the only Czechoslovakian regularly worked these days, OK1MB W7UQU stabbed a pair of nice ones: LU1ZT (30) of So. Shetlands at 9 GMT and ZD9AB (70) 8 W2ESO writes of ZC6UNJ (20) around 21 EST; W9TKV likewise re CE5AW/P5 (1) and a Grahamland VP8 W3WPG dropped his net around HA70L, HC1LE, HK6JII, IT1TKK, LU3ZB, SP9KAD, YV5DE and was YU3FS's first W contact. Harold is a confirmed ground-placer DU8 7SV (40) 11 GMT, 9AM (10) 12, JAs 2AI (32) 11, 3DV (15) 12 and some VK9s looked good to the WGDXC boys.

Forty 'phone goes well for those with enough front-end selectivity to keep BBC sidebands from blocking. The stuff isn't so bad in Guam and W5YAA/KG6 picked off KG4AT and several eastern Ws WIAPA vocalized with DL4YJ's c.w. at 20 EST. HK1GV and VK7JP 5 W7NVY hears HK3FL and their 'phone DX down around 7100 kc. but the W/VE 40-meter A3 crowd rarely gives 'em tumbles 7-Mc. radiotelephones reported active by the NNRC contingent: DU7SV, FUBAC at 2 EST, HK4DP, JAs 1CX 1GU 2ES 2IW, KL7s AQY AWI AWR AZN, KP6US, KS4AV, KX6UZ, TI2TG, Vks 2AGH 2AQD 2DN 2HL 3AKR 3RR 4BJ 4TN 5MS 7SK, ZD9AB, ZLs 1BY 1BZ 2BE 2BH 3LE, ZM6AP and oodles of KH6s.

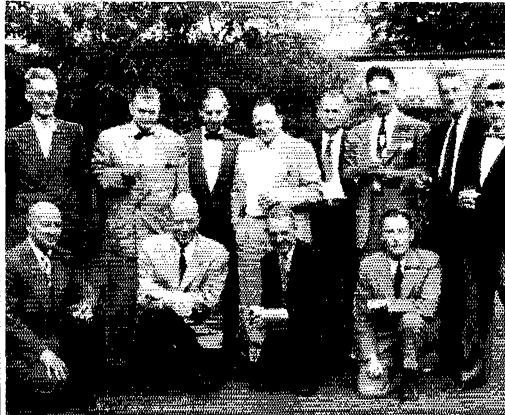
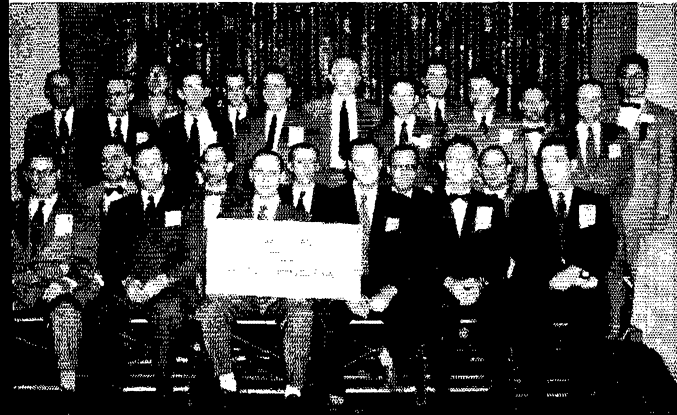
Fifteen 'phone retains the approbation of many including W1RIL. Ken scooped up CE5 2CI 2HJ 4BP, EA8AX, HR1FM, KJ6AZ, PJ2AP, TI2BX, ZS1BV, Gs DLs LU8 PyS Vks and ZLs. A 92-foot-high 4-el. rotary assisted W6ZZ annexed a flock of KH6s and TI2EA SV8WO (240) 20 GMT and ZB1AUV worked YV5FL CP5EK, CX5AF, Vks 4XA 5RM, VQ4-ERR, ZLs 1BN 1BV 1BY 2LV, ZS6s RA and RD checked in with the NNRC The 15-meter news at W8DLZ: HK4DP (17), LU1EP and VP3YQ (37).

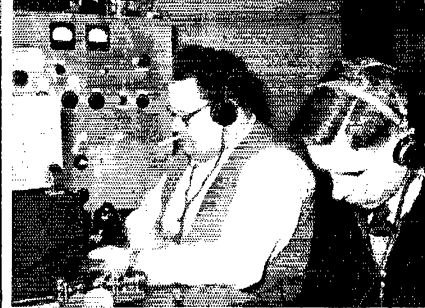
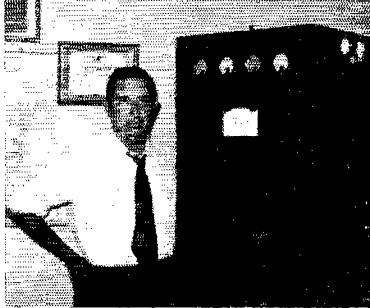
Ten 'phone gets its monthly inspection by W4NQM and Sparky finds DX activity soaring. F8s Gs and ON4ET raised LU4DZI, while LU4AAR encountered CT1HK, EAs 1DK 4EP 7EU, IIs GZ and QP 28-Mc. gleanings here and there, at W5FVX: HC1RT, LU4DZI, YVs 3BD and 5BX. W4JGO: HC1MB, HR1LW and TI3LA. W4NQM: CE3CC, HK5ER, HP3FL, VPs 2DN 2GX 9F and two YVs. W6DHF: LU3AAT and XE1BH. W6JCH: CE2HJ, CX4CS, LU7DDC and VP6WR. W8GAN: LU7s DCO DI, a VP2 and XE1MB. W8GNY: an HC1, KV4BD and TI2TC PA8CT worked VPOF and says he's on the lookout for W/VE patrons just off the low end around 18 GMT Among others, KE6AFS raised Ws 3PII 3QYF 3SJK and 4NVY Ws 4WVM 5VYN and 6NJU are also accumulating DX on 10.

Eighty c.w. refuses to fold, so W9HUZ collected an FO8, and W3MWL (W3ULI keying) checked off ZS3K (10) VO3X got EL2X, FA8BG and assorted Europeans W7JLU expects fresh 3.5-Mc. QSLs from JA2WT, VP3YG and ZL1CI W6HBF kept his 80-watt busy on several KH6s, KL7s AEC APH AWB BN RZ and ZL1AMO.

One-sixty news is less than inspiring. VR2BJ tells W2QHII that he wasn't on the band last season — scratch another!

There are prominent DXers galore in these two group pictures. At left, attending the successful 1954 Dayton Hamvention, we find (seated, l. to r.) DXCC members W9VND, W8s JRG ZOK TJM UDR OPC KIA CED NBK, W9IOP, W8DUY; (standing) W8s ZJM SYC, W9VW, W8BKP, W9s SSI TKV, W8s ZY CXN AJW, W9VW, W8s PQQ LJ and ACE Right, inveterate New England DX enthusiasts gather at W1NWO's diggings on the occasion of a May visit by DX favorite GM8MN. Kneeling, l. to r., are Ws LYH DR, GM8MN and W1NWO; at rear are W1s MB LMB JCX HX BLO AT AFZ and ENE.





Left, W1VQG at the operating position of TA3AA. This popular Asian station runs 500 watts, 'phone, and 750 watts, c.w., to a BC-610E feeding terminated stacked rhombics oriented toward Washington, D. C.; a 75A-1 receives. W1VQG logged over 3000 QSOs from Turkey and TA3AA before leaving on reassignment to W7-land Center, the chief op and home-built transmitter of HK1TH at Barranquilla. Enrique's snappy c.w. signal now is a landmark on 14 Mc. (Photo via W8IV) Right, fast "field day" action at HB1KB/Uri during the Swiss Helvetia-22 contest held in March. HB1KB's 285 QSOs and 85,030 points for the affair were second only to HB9EU's 118,650-point tally. In this scene HB9RQ logs at right while HB9KB dissects pile-up QRM. (Photo via HB9CZ);

Where:

KA2OL informs us that the FEARL (Japan) QSL bureau has on hand thousands of unclaimed QSLs. Most are for J and JA call signs issued to former occupation personnel who returned to the States long ago, but many are for KA calls. Any former J, JA or KA can claim his cards by sending a stamped self-addressed envelope to the Far East Amateur Radio League, P. O. Box 111, APO 500, % Postmaster, San Francisco, Calif. W6NJU, on behalf of the Pacific Radio Club, goes on record with an offer to assist a deserving rare-DX station with W/VE QSL chores. Candidates may write Gary at his *Call Book* QTH Hallicrafters Co., Chicago, taking care of FO8AJ QSL matters, reports that dozens of QSLs have been received with faulty return-address information on them. This may be the case with you if your FO8AJ confirmation hasn't yet shown. If so, reapply. This from W3GPB via W1WPO. Writes Graham, VP8AQ: "Although most of us down here try to QSL as soon as possible, there are only two outgoing mails a year from the VP8 bases. Thus there is bound to be delay. In some cases this may be up to nine or ten months, as no ship calls here between March and November." You no doubt know by now that W1JOJ does QSL chores for EL2X. The latter adds in a letter to Jeeves: "I QSL all Ws and VEs through W1JOJ, and all others either directly or via their bureaus, depending on how many cards have to go out. I will also clear any other EL cards if forwarded to me." W1s TSZ VG WPO YBH ZDP, K2GPFQ, W2s HSZ WZ, W3SOH, W4YZC, W6YY, W8s GZ JBI PCS, W9s CFT EU HUZ, AG2AA, KL7s AWB PI, VO3X, VP8AQ, Mr. LeRoy Waite, SSA's QTC and the WGDXX *DX Bulletin* pitched in on this assortment:

- CP5AB, Box 496, Cochabamba, Bolivia ET2LV
- L. Valeriani, Box 374, Asmara, Eritrea ET2US,
- F. S. 8604, APO 843, c/o Postmaster, New York, N. Y. F9UC/Corsica, Jean Lanfranchi, Saint-Marie, Sicche, Corsica FA8SB (QSL via REF)
- FF8BE, Pierre Dubourdiou, Box 44, Niamey, Niger, Fr. W. Africa FF8BG, Dr. Lucien Perrot, Hospital de Niamey, Niger, Fr. W. Africa GM3JWM, W. Morris, 12 Shrub Pl., Edinburgh 7, Scotland HK1AI (QSL via I.CRA) ex-KA7AR, L. J. Mathews, W4FFR, 1316 E. 36th St., Savannah, Ga. KG4AN, Navy 115, Box 41, FPO, New York, N. Y. KJ6AI, APO 105, c/o Postmaster, San Francisco, Calif. ex-KP6AE (QSL to K250M) KS6SB, Box 14, Navy 935, FPO, San Francisco, Calif. KZ5CA, Hq., Fort Davis, Canal Zone LU4JAD, Mario D. Avignolo, Francia 1184, Gualaguay, Entre Rios, Argentina LU8FBH, Box 14, Galvez, Santa Fe, Argentina OD5AX, P. O. Box 3245, Beirut, Lebanon SU1MR, Box 672, Cairo, Egypt TG9HM, Box 12, Guatemala City, Guatemala VK1PG, J. K. Gore, Heard Island, c/o WIA, Box 2611W, GPO, Melbourne, Victoria, Australia VK9SP, c/o APC, Omati, Papua Territory VK9YT (QSL via W8EUR) VP6EB, Woodstock, Spooners Hill, Barbados, B. W. I. VP6NV, N. B. Valentine, c/o Cable & Wireless, Barbados, B. W. I. VP8AA, Arthur Swain, Base A, Grahamland, Falkland Islands Dependencies VP8AQ, Graham Davis, Base H, Signy Island, So. Orkneys, Falkland Islands Dependencies VP8AX, Rod Nalder, Base G, So. Shetlands, Falkland Islands De-

- pendencies VQ4EN (QSL via RSGB) VS6CT (QSL via HKART) YU2DU, M. Poldruzac, P. O. Box 9, Rijeka, Yugoslavia ZC4CK (QSL via RSGB) ex-ZC4XP, Sid Parks, GM3JXP, The Observatory, Lerwick, Shetland, Scotland ZE6JD, Box 1186, Bulawayo, So. Rhodesia ZK2AC E. Hickford, Niue Island via New Zealand ZM6AP, R. Tarlton, Box 23, Apia, Samoa ZM6AR, Ron Berry, Apia, Samoa.

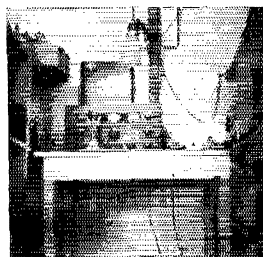
Whence:

Asia—MP4BAF reports that MP4BBD is off to the Philippines and that he, himself, QRTd for leave in the U. K. BAF writes of roasting weather on Bahrein and adds: "In my long period of hamming from Bahrein (since about 1931) I have never experienced such lousy conditions." From KL7PI, now past 180 confirmed: "KG6IG on Chichi Jima expects to get a KAØ call which would be more correct than KG6. He doesn't know when it will come through." VS2DB knocked off for a spell from May through June. Prior to that, "Double-Brandy" QSOd over a hundred W5s, W6s and W7s during operating periods that usually include 1430-1530 GMT. Steward hears 2s 3s 9s and 8s but they seem reluctant to take his 14-Mc. 'phone bait. The Malaya-U. S. A. path opened in late February and has been productive ever since. VS2-W6 openings occurred on 18 days of March, 21 days in April and on 15 of the first 18 days of May. Ex-ZC4XP acknowledges a hoek of QSLs for the "YPI" jokers who radiated from the Midwest earlier this year. Now signing GM3JXP, Sid knocked off at ZC4XP in June of '53. "Most of the [YPI] QSL-letters contain reply coupons. I propose to cash these at the local post office and deposit the proceeds with the local Lifeboat Fund." Sid also offers to reship QSLs to amateurs whose ZC4XP cards went astray; send full QSO particulars to the address in "Where." Ex-ZC4XP confirmed 99 'phone countries on Cyprus and has 14 additional A3 possibilities to give him ZC4 DXCC hopes. As confirmed by W1JNV and W6UJ, G2RO is going strong with Asian RO-suffixed call signs. See recent QST's re QSLs for Mr. Roberts FEARL (Japan) tidbits: KG6FAD paid the KA bunch a pleasant visit. . . . KA2DX (ex-W4GVU) regaled the gang with a chat on the subject of s.s.b. at one recent meeting. . . . The society holds on-the-air "meetings" on 1,250 kc. nightly at 1900 local time. . . . The Tokyo Amateur Radio League is a new organization with more than 50 members. . . . Japan's Radio Regulatory Commission should soon grant JA nationals permission to use the entire 40- and 80-meter bands. A prospective JA call area modification: JA1WA-JA1WZ will become JA9, and JA2WA-JA2WZ will switch to JAØ. One JAØAA is already active. . . . Rev. Joseph B. Pomeroy, S.J., W1ZJI, writes us that a ham station at Iraq's Bagdad College should soon be ready for Y12 action.

Africa—How revolting can a development be? From deposition by G2MI of RSGB it is evident that many widely worked DXpeditions whose call signs ended in "UU" never left the Sudan. Brace yourselves and then see "DXCC Notes," p. 65. This is a variation on the EA9DC system which was to go, all right, but not QSL; ST2UU QSLd but apparently didn't go. Since we have much DX ground to cover we won't waste further space here with language of outrageous indignation and condemnation. Your own opinions of such chicanery undoubtedly will be much more adequate than any we could print. EAØAB

tells W2EBV of his summer holiday in Spain. Angel should be back at the old stand by the time you read this, however — 2100-2200 GMT daily on 14,200-ke. 'phone and 14,080-ke. c.w. EA9AB has applied for his WAB award and needs but 13 more U. S. A. for WAS. . . . Nyasaland notes courtesy ZD6BX: "I believe that ZD6EF is the most active ZD6 (20-meter 'phone) but he is keen on 2-meter experimentation, too. ZD6DU was pretty active a while back but is no longer in this country. . . . Conditions are very variable, indeed. I've plans for a 3-element rotary. Our power restriction is 100 watts, so one needs a good antenna to ensure a decent signal. My location is a good one with an elevation of 2500 feet." . . . 5A2CO (ex-MT2E-VS9AO) hasn't yet had an opportunity to fire up his U. K. installation, G3JHO. . . . EL2X has a Viking II ready for action according to this schedule (times GMT): *Saturdays*, 1200-2200, 14,085 kc.; 2200-0000, 7003-7014 kc. *Sundays*, 0100-0200, 7003-7014 kc.; 0200-0430, 3505-3510 kc.; 0500-0600, 1812 kc. when conditions warrant a try at 160. Ray plans a new Vee array. 'Phone frequencies EL2X uses at times other than periods listed: 3612, 3799, 7073, 7220, 14,105, 21,219 and 21,160 kc.

Oceania — "Rev. Robert J. Keck, S.J., left here recently for St. Francis Xavier Apostolic School, Truk, Caroline Islands. He will apply for a KC6 call to replace W1ZJH which he now holds." This from W1ZJI, activities manager of the Weston College Radio Club. . . . Ex-KJ6AY runs 800 watts to four 813s in p.p.-parallel under his new call,



VK9OK, operated by ZL1AJU in April and May of this year, worked all U. S. call areas on 20 c.w. with the layout at left. A view of the rugged Norfolk coastline appears above. The isle is 3 by 5 miles in dimension and some of its pine antenna masts tower to 200 ft.

KA2AK. "I will QSL all KJ6AY contacts who didn't get cards." His Japanese QTH ran in last month's "Where" section. Bill wonders if anyone knows anything about the ZB5BZ character regularly encountered on 20 'phone. . . . W6UJ understands that VR3A hopes to visit W6-land in eighteen months or so. Fanning mail arrives and leaves only once every four months — a big batch departed last month. KH6VW commends the activity of VR3A and suggests that DX men get together to provide Ray with a few thousand average-grade pasteboards. If the idea strikes your fancy or that of your club, communicate with Smitty, KH6WW, and arrangements will go forward. VR3A, who works W/VEs without stint, will be VR3ing for at least two years and operates in close accordance with this pattern (local time): *Mon.-Fri.*, 1800-2200 on 14 Mc.; 2200-0000 on 14, 7 or 3.5 Mc. depending upon conditions. *Sat.*, 1600-2200 on 14 Mc.; 2200-0400 on other bands. *Sun.*, 1000-1200, 14 Mc.; 1600-0200, other bands. In three months or so VR3A reeled off over 2000 QSOs with 50 countries. Ray runs 30-50 watts and receives with an HQ-129X. . . . The ZL2RCs sailed for New Zealand on June 11th. Ron wishes to express his appreciation for the wonderful hospitality extended to the Coakleys during their States stay. They look forward to renewing acquaintances over the air

when they arrive home. ZL2RC's temporary mail address: % Les White, ZL2HQ, Eltham, N. Z. . . . Band allocations changes announced by FCC: Midway Island, 3500-4000 kc.; Palmyra and Jarvis Islands, 3500-3900 kc., a reduction; Baker, Canton, Enderbury, Guam, Howland, American Samoa and Wake Islands receive 3500-3900 kc. privileges. . . . W5YAA/KG6 will return to Uncle Sugar shortly, after a busy term as Marianas Amateur Radio Club secretary. Jerry reports that KG6AEX (pic on p. 64, April QST) will try KL7-land after a Stateside vacation and that KG6ADH is the happy recipient of a scholarship to a British college. . . . KC6AE, with a Viking II, is a new Palau possibility.

Europe — AG2s are back at it once more. They went off the air in early October, 1953, but new regulations have been drawn up and Yanks again can help represent Trieste on DX bands. At this writing four new ones have been ticketed — AG2s AA DX GY and LN. They are Statesiders W7SEI, W1QPX, W4WVB and W7MVU, respectively. AG2AA hits 20 'phone hard; AG2s DX and LN like c.w. "As for QSLs . . . we guarantee 100 per cent." writes AG2AA. You can use the *Call Book* AG2 bureau address for all AG2s. In closing, AG2AA declares that the F.T.T. DX certificate, mentioned here last month, really is a beauty. . . . The 7-Mc. PX1AR who told W2ESO and others to "QSL via W4BRB" is not known to W4BRB. . . . If you wonder what ever happened to Ada, 11MQ, the very active early-postwar Italian YL, she now signs 11ADA. W2WZ hears that Ada recently married 11MM. . . . George W. Olesen, editor-in-chief of the prominent Continental publication *Radio Ekko*, was feted in Denmark on a 60th birthday that coincided with his 30th anniversary as an editor. George has been a ham for 40 years and now does his operating under the calls OZ5RE and OZ7RE. . . . The Swiss Shortwave Service broadcasts a program for radio amateurs that is beamed to North America on 6165 and 9535 kc. at 0150 and 0335 GMT on the first Friday of each month. HB9s GI IS and HE9RDX do the honors. . . . W9MQK finds that club station LZ1KPKZ, located in the town of Pazardjik, is staffed by seven ham operators. . . . Austrian nationals now are being licensed by the numbers. On the first list published in May there were four OE1s (Wien), four OE3s (Niederosterreich), 17 OE6s (Steiermark), an OE7 (Tirol) and one OE9 (Vorarlberg). . . . An official gathering of the Union of Yugoslav Radioamateurs will be held on August 19th-23rd in Ljubljana and an elaborate agenda is planned. There will be code contests, transmitter hunts, homebrew-gear awards and various other competitions. Foreign hams able to attend are declared welcome. . . . W2ESO received an interesting letter from an LZ correspondent who mentioned the activity of SV2RI of Rhodes (14,020 kc.). Several Greece residents now are active with SV1 labels. . . . The *DX Bulletin* points out that PX1YR will have a new 100-watter ready to perform daily at 1900-2000 GMT on 14,020 kc. At present Yves is the sole native Andorra licensee.

Hereabouts — While no ham beachhead has been established on Navassa Island at this writing, an invasion is highly imminent. Several parties have expressed DXpeditionary intentions, so pass up no KC4s. . . . KL7AWB finds Alaskan paths to Asia and Oceania a cinch, but paths to Europe and Africa are intermittent and marginal at best. In two years of KL7 DXing Joe has snared but four Africans. . . . Ex-KZ5IP is now W8BQVing in Bellaire, Ohio. Ike seeks old DX pals on 20, 40 and 80 c.w. . . . VP9BM points out that western European hams can make handy use of the great-circle map appearing in the May 17th issue of *Time*. You've no doubt worked Jules under one or more of these previously held calls: W8DVS, W8OSL, W4LUI, TA3AA, SV6AA, SV7AA, AR8AR and W8SPI. . . . W1ZL, up to 205 countries sans beam antennae, joins others who have complimented the F08AJ gang on their snappy Clipperton operating. . . . QSL manager W4HYW isn't fooling — Tom is rigging up a stacked 10-15-20 rotary, has verticals for 40 and 80, and a doublet for 160. . . . Over 11,000 IARU WAC awards have been issued to date. . . . Newly confirmed DX hound W3SOH is due for early competition from his XYL, now WN3ZCE. . . . K2ERC is ex-W3HRD-J3AAE. . . . VE3RCS, club station of the Royal Canadian Signals, Kingston, is spouting a potent signal DXward with an elaborate new 20-meter spinner. . . . VO3X, who has little trouble raising some of the more rare varieties, reports a heck of a time raising HI, KS4, TG and XE customers.

(Continued on page 110)

The World Above 50 Mc.

1215-1300

2300-2450

3300-3500

5650-5925

10,000-10,500

21,000-22,000

30,000-?

CONDUCTED BY E. P. TILTON,* WIHQ

WHAT with the June V.H.F. Party, some of the best sporadic-E DX in years, tropospheric openings of the usual June caliber, a new 420-Mc. record, the demise of a v.h.f. landmark, extensive use of 6 and 2 in the Field Day, and post-mortems following the first 2-meter transcontinental relay, June was at least up to standard for this month of months for v.h.f. men. If there were some way to spread the reports we have on file this month over the leaner seasons of the year, there'd be no problem involved in filling our page quota the year around.

Take the June V.H.F. Party. The Communications Department has more than 300 logs already on file, with some still trickling in from western areas as we write. Time was when 100 logs was a good return. Most of them came from the Northeast, a smattering from the Middle West and a fair number from California. Now they show up from all parts of the country. Three-figure contact totals are common, and scores run to thousands of points. Placing high in a v.h.f. contest has become evidence of a first-class station, backed by operating skill and perseverance of the highest order. No attempt will be made to treat the highlights this month, but the full story will be available for the September issue.

After a rather barren season last year, 50-Mc. enthusiasts were agreeably surprised to find their favorite band acting up in a way not equaled in several years. There were a few openings in April, more in May, including some good double-hop toward the end of the month, and June was running true to old-time form as we closed out copy for the month. While the 6-meter men along the Atlantic Seaboard waited in vain for a break during the V.H.F. Party, the gang from Ohio west enjoyed widespread openings. W5SFW, Amarillo, Texas, worked 19 ARRL sections in

31 contacts on 6, and W0CNM, Grand Junction, Colo., got 15 different sections in 21 QSOs. W6AJF, Sonoma, Calif., caught S. Texas, Colo., Wash., Mont., and B.C. sections on 6, to give him one of the best West Coast scores in v.h.f. contest history. The sporadic-E DX was a great equalizer, providing multipliers where they were needed, and skipping over the small-section East, where high multipliers are a matter of course.

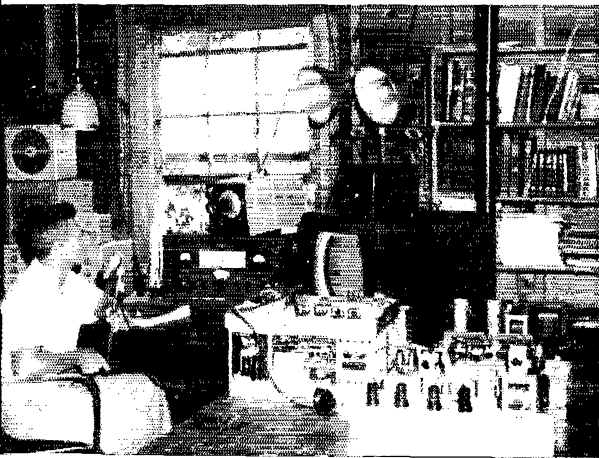
Tropospheric DX was conspicuous by its absence from the East during the V.H.F. Party week end also, but again the Middle West and South reported conditions good to excellent, particularly in the closing hours Sunday night. This was a little rough on the folks in the Eastern time zone, as just after midnight EST things were hot to Tennessee and Mississippi. This helped the scores of W4HHK, W5RCI and others in that direction, but it was for-fun-only for W8WXV and W8BFQ, the contest having run out on them before things hit their peak.

September probably occupies first place in the tropospheric scale, but June is certainly close behind. And this June produced at least two noteworthy firsts, one of them a new 420-Mc. record. On the night of the 12th things were hot between W1 and W4. This was one of those odd times when signals in between were relatively poor. W1RFU, Wilbraham, Mass., hooked up with W4VVE, near Hampton, Va., on 144 Mc., and they changed to 432 Mc. at 2125 EST. Signals were S5, increasing to S8 before the end of the contact. The distance is 415 miles, about 5 miles beyond the previous (W1RFU-W4TLM) record. Following this, W1RFU worked W2s QED, EH and BLV on 432 Mc. Though these stations are just about midway between W1RFU and W4VVE, they were all far weaker than the Virginia station.

What may be the first Virginia-Tennessee

* V.H.F. Editor, QST.

Two-way television communication is maintained between W4ATO, right, and W4PGK, both of Albany, Georgia. Type 5527 iconoscopes are used in both stations. The transmitters use 832A tripler and amplifier stages, feeding corner-reflector arrays.



(Western Tennessee, at least) 144-Mc. contact was made on the night of June 20th. W4AO first heard W4HHK during Paul's schedule with W2UK, at 2030 CST, but it was not until 2207 that a contact was completed. This puts W4HHK into that exclusive circle of 2-meter operators who are working on the *second* half of their 2-meter WAS. Other members are W8BFQ, W8WJC and W0EMS.

In the midst of a fine tropospheric opening the night of June 22nd, W1JSM, Waltham, Mass., was amazed to hear VP9BH/airborne calling CQ on 146.5 Mc., announcing that he was listening on 145.2 Mc. Don had such a crystal, so he replied on the latter frequency and made contact. The VP9 was 200 miles from Bermuda at the time. Another contact was made at 0005, when VP9BH was approaching Bermuda at 7000 feet, and a schedule was made for nightly tries from the home station. VP9BH operates on 144.1 or 144.2, with 50 watts input and a 10-element vertical array. The schedule is for midnight EDST.

2-Meter Standings

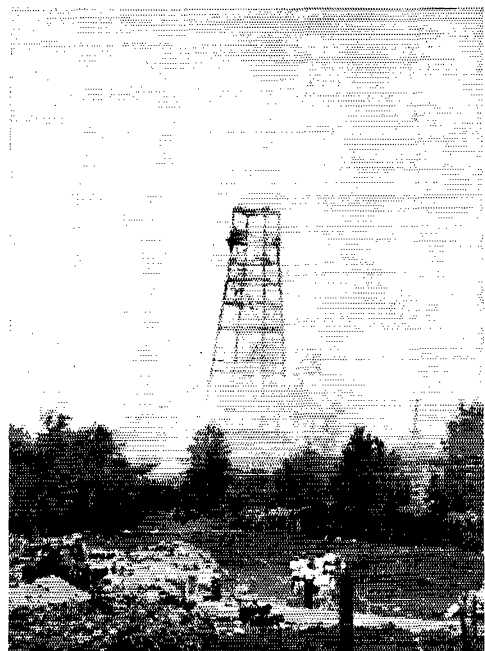
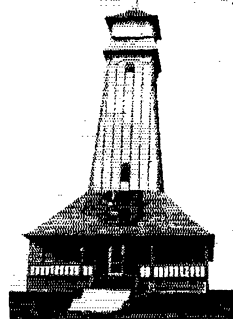
Call	States	Areas	Miles	Call	States	Areas	Miles
W1HDQ	18	8	850	W6W8Q	3	3	1390
W1RFU	17	7	1150	W6BAZ	3	2	320
W1WZY	16	6	750	W6NLZ	3	2	247
W1MNF	14	5	500	W6MCG	2	2	240
W1BCN	14	5	580	W6GJC	2	2	210
W1DJK	13	5	520	W6QAC	2	2	200
W1KCS	13	5	465	W6EXH	2	2	193
W1MMN	10	8	520				
W2UK	23	7	1075	W7JU	3	2	247
W2NLY	22	7	1050	W7LEE	3	2	240
W2ORI	21	8	1000	W7YZU	3	2	240
W2AZL	20	7	1050	W7JUO	2	2	140
W2QED	20	7	1020	W7RAP	2	1	165
W2FAU	16	6	740	W8RFQ	25	8	275
W2DFV	15	5	550	W8WJC	24	8	275
W2AMJ	14	5	550	W8WXV	32	8	1200
W2BLV	14	5	700	W8WRN	20	8	670
W2AOC	14	5	450	W8DX	20	7	675
W2QNZ	14	5	400	W8BAX	19	7	655
W2UTH	13	7	880	W8EP	18	7	800
W2SFK	13	6	400	W8IUS	18	7	720
W2CET	13	5	405	W8RMH	18	7	690
W3QKI	22	8	820	W8RWW	17	7	630
W3RUE	22	8	760	W8WBE	16	7	830
W3KEM	19	7	660	W8SRW	16	7	700
W3KWL	16	7	720	W9EHX	23	7	725
W3LNA	16	7	720	W9FVJ	22	8	850
W3PPH	16	7	—	W9EQC	21	8	820
W3GKP	15	6	800	W9BPV	20	7	1000
W3IBH	15	5	570	W9UGH	20	7	750
W4HHK	24	7	940	W9LF	19	—	—
W4AO	22	7	950	W9ALU	17	7	800
W4JFY	18	7	830	W9KLR	17	7	690
W4MKJ	16	7	665	W9WOK	17	6	600
W4OCX	14	7	500	W9ZHL	17	6	660
W4UMF	14	6	800	W9MBI	16	7	660
W4JHC	14	5	720	W9BOV	15	6	—
W4TCR	14	5	720	W9LEE	14	6	780
W4IKZ	13	5	720	W9DDG	14	6	700
W4JFU	13	5	720	W9FAN	13	—	680
W4ZBU	10	5	800	W9ULA	12	7	540
W4UDQ	10	5	850	W9OSP	11	4	700
W4WCB	9	4	650	W9GTA	11	5	540
W4TLA	7	4	850	W9JBF	10	5	760
W5RCI	20	7	925	W0EMS	24	8	1175
W5JFI	14	5	670	W0GUD	22	7	1065
W5QNL	10	5	1400	W0HED	19	7	725
W5CVW	10	5	1180	W0ONQ	17	6	1090
W5AJG	10	4	1260	W0INI	14	6	830
W5MWW	9	4	570	W0ZJB	12	7	1097
W5ML	9	3	700	W0OAC	12	5	725
W5ABN	9	3	780	W0WGG	11	5	760
W5BERD	8	3	570	VE3AB	20	8	890
W5VX	7	3	—	VE3DIR	17	7	990
W5VY	7	3	1200	VE3BQN	14	7	790
W5FEK	7	2	580	VE3BPB	12	6	715
W5ONS	7	2	950	VE3AQQ	11	7	800
W6ZL	3	3	1400	VE1QY	11	4	600
W6PJA	3	3	1390	VE3DER	10	6	800
				VE2AOK	10	5	550

Passing of a Landmark

Occasionally, when a well-known v.h.f. man joins the ranks of Silent Keys, we are tempted to write an obituary, but we refrain as a matter of long-standing QST policy. But perhaps we may be permitted a lapse in favor of a famous building. It was a tall and rather ugly structure, not looked on with favor by owners of adjoining property and residents of the quiet little prep-school town in the valley below. But to v.h.f. men of the '30s, the Wilbraham Tower ranked with M. Eiffel's Paris masterpiece.

And well it may have, for it played an important role in the promotion of 5-meter interest throughout the Northeast. Rented in 1931 by a group known as the Radio Research Association of New England, it served as base of operations for W1AWW, and later W1HMO. Built entirely of wood and 90 feet tall, it was a natural for the purpose. The Wilbraham Range is not high, even as New England mountains go, but it is the first rise from the floor of the Connecticut Valley as one travels east from Springfield, Mass. The buildings of downtown Hartford, 30 miles to the southwest, are visible in fair weather, and there is a clear shot west to the Catskills and Adirondacks. In a day when line of sight was a prime factor in v.h.f. coverage, Wilbraham was a prime location. It still is.

The tower was used intermittently through the '30s by hams and groups of hams and in 1939 it became the v.h.f. station of a little-known 5-meter enthusiast, W1HDQ. If that call later attained a degree of recognition, it was



largely the result of incentives offered by the superb location. In fact, it was the 5-meter doings of the W1AWW days that started your conductor on the road to becoming a ham in the first place. No amateur was ever sadder than he, when the events of December 7, 1941, brought an end to a thrilling era.

The tower entered the v.h.f. scene again the late '40s, when it was used by W1RFU. Bill was so impressed by the location that he bought a home nearby, and W1RFU has

been a call to reckon with in the v.h.f. picture ever since. The old tower will serve no more v.h.f. men, for fire of unknown origin broke out inside its walls on June 19th, as members of the Hampden County Radio Club were setting up gear there for Field Day. Equipment on the lower levels was rushed out, but almost the entire inventory of W1RFU had been installed on the observation platform, 80 feet above ground. Bill escaped with his life, but little else; in minutes after the fire was discovered, the sturdy but tinder-dry wooden structure was a roaring mass of flame.

News traveled the Field Day circuit rapidly, and Bill was soon receiving offers of help in getting back on the air from a radius of hundreds of miles. With the assistance of local hams and his own never-say-die spirit, W1RFU will be back in business long before this report is printed — but to v.h.f. men whose experience dates back a generation or so, things will never be quite the same with the old tower gone. It would be interesting to know how many of us are hams today because of things that transpired within its walls!

Here and There on the V.H.F. Bands

Worked any rare DX on 6 lately? A note from ZK1BG via K6DM reports that ZK1BH is on 50 Mc. regularly, beamed on W6. He is an ionospheric observer, so he should know when to be in there pitching.

And here's some choice 2-meter foreign news. On June 12th, FA8RJ, Algiers, worked F9BZ, Toulon, France, on 144 Mc., using only two wats and a folded dipole. The distance is nearly 600 miles. Thanks to K2BZT for this one.

An American station many of us would like to work on 144 Mc. is W7RCC, Panguitch, Utah. Ed has 450 watts input to a pair of 4-65As, a 30-element array, a crystal-controlled converter feeding an NC-183, and an 8000-foot elevation, but he has never worked or even heard a 2-meter signal. He works c.w. only, on the low edge of the band. How about some skeds for a fellow who is really trying?

W6IHD, Overland, Mo., reports working W5JTI, Jackson, Miss., for the first time during the June V.H.F. Party. This is some 450 miles. Two Texas TV stations were received during the same period, but there was no sign of Texas on 144 Mc.

The 6-meter band had its devotees really up in the air during the V.H.F. Party. As reported earlier, it did well enough for operators other than in the Atlantic Seaboard states, but the Easterners waited in vain for a DX opening. There was a smattering of short skip on 10 at intervals, but 6 never quite made it for the W1s, 2s, 3s and northern 4s. Then the following day everything broke loose. W4UMF, Arlington, Va., heard all U. S. call areas and VE1 and VE4 Monday night. What that sort of thing would have done to Eastern scores!

W4UMF, incidentally, would like to check on 220 Mc. with stations he works on 50 or 144 Mc. He has 100 watts on 220.05 Mc. This is the frequency used by Washington area 220-Mc. stations for their weekly workouts at 2000 EDT Tuesdays. Active stations include W3s TFA PRB ARQ UJG and SFY, as well as W4UMF.

W5RCI, Marks, Miss., reports his first Louisiana contact on 220, with W5UZW/5, Barkadale Air Force Base, near Shreveport, June 5th. This is a distance of approximately 200 miles.

We have several inquiries regarding 220- or 420-Mc. activity this month. These come from W9EPD, Ft. Wayne, Ind.; W8HDD, Huron, Ohio; W9QYJ, Pleasant Hill, Mo.; and W8OYY, Kansas City, Mo. Anyone in these areas on 220 or 420 can do these fellows a service by dropping them a note, describing equipment, operating schedules, etc.

W9OVL, Hammond, Ind., says that installation of a 6360 in the output stage of his 12AT7-12AT7 exciter gave more drive to his 9903 final than he was able to get with the three 12AT7s as originally described in February QST. It doesn't take much to neutralize those little bottles, says W1HDF, Elmwood, Conn. Carl has just a short stub of wire on the plate pin "looking" at the adjacent grid terminal. If you haven't noted the base layout carefully, the grid leads are crossed over inside the tube. You don't have to cross them externally for neutralizing purposes. Neat design trick!

W2QED, Seabrook, N. J., and W8BFQ, West Richfield, Ohio, pulled off a rare 4-band deal on the night of June 24th, working two-way on 50, 144, 220 and 420 Mc. This is unquestionably the greatest distance over which these four

bands have been used for two-way work. Ken and Margaret are separated by some 350 miles, with plenty of rough terrain along the way. Their contact on 220 is believed to have been the first between Ohio and New Jersey on that band.

Over the past several years we've had many reports of amateur TV activity. Most of this has been experimental, however, and little two-way work has been mentioned. So, when two fellows actually communicate two-way by amateur TV, it is still news. W4PGK and W4ATO, Albany, Ga., have such a two-way set-up, their first contact being made on June 5th. Cameras are 5527 iconoscopes built by W4ATO. The transmitter r.f. sections use 522s driving 832A tripler-amplifiers, along the lines of the unit described in the ARRL Handbook. Corner-reflector antennas are used at both stations.

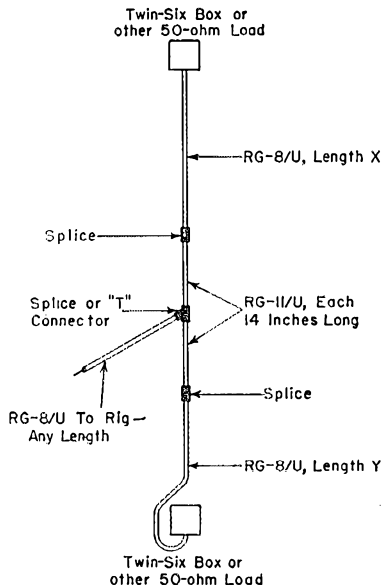
W2PPT, Richmond Hill, N. Y., has a flying-spot scanner running, with a pair of 2C44s tripling for the r.f. section. He would like to hear from anyone around the New York area who is interested in amateur TV work, transmitting or receiving.

In these days of ever-higher power on 144 Mc., we sometimes lose sight of the fact that plenty of fun can be had with very low-powered gear. K2DUI started on 144 Mc. last year with the 6J6 rig described in the ARRL booklet, *How To Become a Radio Amateur*. With never more than 12 watts input, he's worked 12 states so far. His antenna is a simple 5-element horizontal array.

Final Report on W2SC 144-Mc. Tests

The experimental equipment for which the big dish at Evans Signal Laboratory was built is now nearing completion, so the 50-foot parabola is now no longer available for amateur 2-meter work. In the three months of use of the

(Continued on page 122)



Feeding Stacked Arrays with Coaxial Line

Many inquiries are received regarding the feeding of stacked v.h.f. arrays with coax. The method shown was supplied by W6BCX of the Gonet Company, primarily for feeding two of their Twin-Six arrays in phase, but it can be applied to any two arrays that are matched individually for 50-ohm coax.

Lengths X and Y are 50-ohm coax. They should be identical, but may be of convenient length. The 72-ohm Q sections located at the center should be exactly 14 inches long.

The physical spacing between the two arrays can be any convenient distance, though optimum gain will be achieved with spacings of $\frac{5}{8}$ to 1 wavelength, center to center.

Coast to Coast on 144 Mc.!

Second V.H.F. Relay Attempt Clicks in Both Directions

FOR years v.h.f. enthusiasts have dreamed of a transcontinental traffic system composed entirely of stations using frequencies where ionospheric propagation is not a factor in communication. Sporadic tries have been made over many years, but only recently has anything like the necessary organizational work been done to make the dream a reality.

First moves toward a 2-meter transcon appear to have been made at the Southwestern Division ARRL Convention at Los Angeles last fall,



though there was some informal discussion along these lines at the National Convention in Houston a year ago. Relays started with little or no planning had shown that 2-meter circuits from the East to Ft. Worth, Dallas or Houston were practical, but there was the big question of what to do for the tough grind over the mountains to the Pacific Coast.

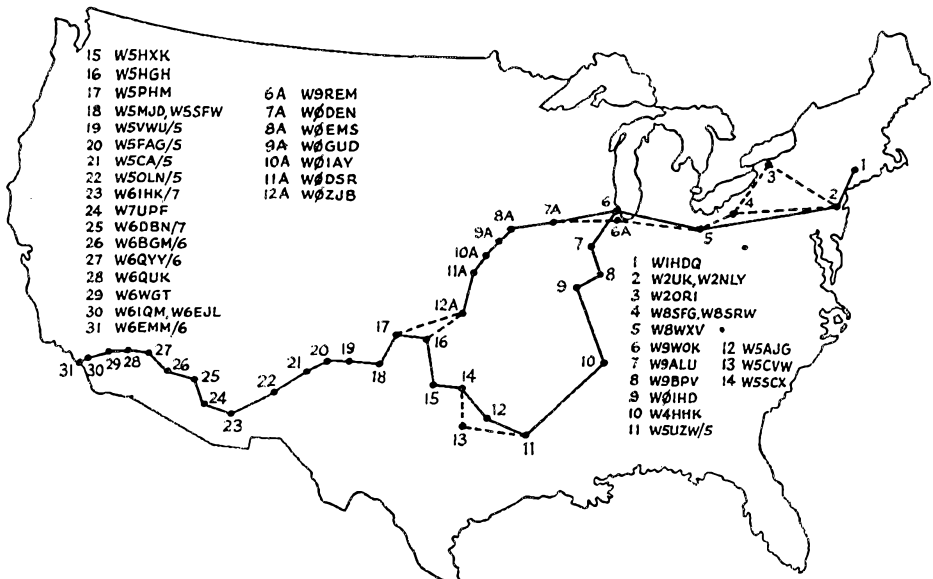
Members of the Albuquerque V.H.F. Club and the Two Meters and Down Club of Los Angeles saw in such a feat a fine way to sell v.h.f. They were willing to organize and man expeditions to a score of mountaintop locations in California, Arizona and New Mexico, if the 2-meter hams east of New Mexico would do their part from

fixed stations. In the informal way such projects have of taking shape, the idea began to spread. W6IHK, secretary of the Los Angeles club, took on the job of corresponding with the gang. And what a job it turned out to be! Mimeograph after mimeograph listing potential routes and frequencies went out over Bill Myers' signature to 2-meter men all over the country.

In the East, W2UK, W2NLY, W2ORI and W8WXV had been keeping nightly 2-meter skeds, with W8WXV working W9WOK in the western direction as well. W9WOK made skeds with WØEMS and W4HHK, and showed that either of these circuits could be kept open for reliable traffic work, if everything was maintained at top effectiveness. The previous week end showed up the weak spots, and these were well taken care of. At 10 A.M. PDT, Charles Perry Walker, ex-W6MN, Mayor of Manhattan Beach, handed a message for Mayor DeLuco of Hartford, Conn., to Horace Bodine, W6LJO, who was operating W6EMM/6, again on the pier. (This was a genuine "West Coast Station!") A duplicate of the message addressed to W1HDQ the previous week was also sent on its way.

At 0620 EST the east-west relay got under way with a message from your conductor, addressed to "the first West Coast station to receive this message," asking that ARRL be notified by collect wire when the message arrived. These two messages made v.h.f. history by going the intended distances, the east-west circuit being completed in just under 16 hours.

Routes are shown on the accompanying map.



The Two Meters and Down Club messages went to W6IQM or W6EJL, Manhattan Beach. They were relayed via W6WGT, Riverside, to W6QUK, San Bernardino. From here on it was a job for the portables. W6BGM/6 had his 100-watt mobile on Eagle Mountain, a 3000-foot elevation near Desert Center, Calif., working W6QYY/7 on Mt. Union, near Prescott, Ariz., an 8000-foot site 170 miles to the east. W6QYY/7 had the option of sending direct to W7UPF or W7FGG, Tucson, or relaying via W6DBN/7 on South Mountain, near Phoenix. Most of the time he could work directly to W6IHK/7, on 10,700-foot Mt. Graham, near Safford. With four relay points available to cross Arizona, there was little chance of failure.

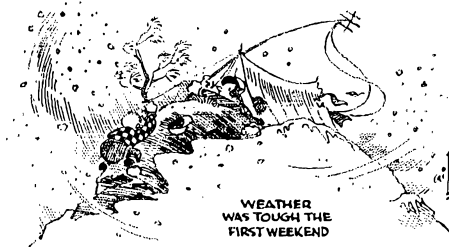
From W6IHK/7 traffic could be routed via W6ZW/7 at Safford, or across the New Mexico line to W5OLN/6 on Mt. Withington, near Socorro. W5CA/5, Capillo Peak, took it from there, working W5FAG/5 near Clines Corners, and W5VWU/5 at Tucumcari, about 50 miles from the Texas line. Thus, two clubs provided eight portable stations (and many others standing by to help if needed) to put the relay across a thousand miles of mountainous country. Probably never before in the long history of amateur v.h.f. expeditions has there been anything quite like this for sustained cooperative effort. To the Two Meters and Down Club and the Albuquerque V.H.F. Club, congratulations on a job well planned and executed!

Once a link to W5SFW and W5MJD in Amarillo was established, success of the transcon was never in doubt. From there to the East Coast operators willing to concentrate on the job at hand were keeping the necessary schedules in both directions. Not that the crossing of the last two thirds of the country was easy; poor conditions at the eastern end made some of the long hauls rough going, and it is doubtful if the circuit would have worked at all but for the outstanding weak-signal capabilities of such stations as W8WXV, W2ORI and W2UK.

As may be seen from our map, there were at least two reliable routes available. The first messages in both directions went by way of the longer southern path, Amarillo, Texas, to Balko, Buffalo, Watonga and Ardmore, Okla., back down into Dallas, across to Shreveport, La., and north through Collierville, Tenn., the St. Louis area, Central Illinois and up to Bensenville. But while the relay between the Oklahoma stations was being completed, W0ZJB, Wichita, Kansas, was copying the messages, for the shorter route through Greenleaf, Kans., Pawnee City, Nebr., Conway, Adair and Iowa City, Iowa, and Downers Grove, Ill. Either circuit could have been used successfully, and many messages did later traverse the northern route.

Alternate circuits were used for traffic east of Chicago, also. The first east-west message went to W2UK, New Brunswick, N. J. Tommy tossed it over a 450-mile hop to W8WXV, Shiloh, Ohio, who in turn relayed to W9WOK. A direct-line distance of more than 800 miles thus required

only two relays. Nightly schedules between these stations, kept regularly for more than a year, had shown the feasibility of this long-haul work. But conditions were never worse than when it came



time to relay the messages from the West, and relays by W8SFG-SRW, Hubbard, Ohio, and W2ORI, Lockport, N. Y., saved the day. W2UK and W2ORI had been keeping schedules over their 275-mile path with close to 100 per cent copy for nearly two years, but one eastbound message alone required more than an hour of constant repeats and fills. Your conductor, listening to W2UK's back-of-the-beam signal was able to appreciate fully the job he did in completing the transcontinental circuit. We know from personal observation that W8WXV, W2ORI and W2UK did little else for two solid week ends but keep schedules, hourly and almost around the clock!

The night-and-day relaying by W4HKK, with W4UDQ taking over when Paul had to go to work; the cooperative effort of W0s PLJ, IHD, KYF and ETJ of the Missouri span; the message-handling skill of W5UZW/5, Barksdale Air Force Base (he was DL4XS of "Radio Hill" fame), and W5AJG, Dallas; and the solid work of W5s SCX, HXK, HGH and PHM in Oklahoma, and W0s ZJB, DSR, IAY, GUD and DEN on the Kansas-Nebraska-Iowa route to W9WOK and W9REM, all were outstanding jobs.

No little thanks are due to scores of operators who stood by, monitoring circuits "just in case," handling an occasional message or perhaps none at all. We probably will miss many of them, but some who have come to our attention include W1MMN, W2s ESW QED AZL, W5s ABN BIW CVW JTI FPB RCI RFF MWW PZ TAF URI WXU ZU, W6s LIT ZW MJ IBS, W7s FGG JU LEE, W8s RMH DX, W9s ALU EHX MUD JVC EQC BPV, W0s MVG UOP RUF. We have record of more than 30 different messages handled over various parts of the system.

Though the operation across the eastern portion of the circuit was more or less routine, from Texas west the relay was a real shot in the arm for localities where interest in 2-meter work has been low in the past. There is much talk of eventually making a home-station transcon on 144 Mc. now, and an almost unanimous demand that the relay be repeated. Several have suggested that the Memorial Day week end be utilized for future workouts, whenever the holiday

(Continued on page 126)



Operating News



F. E. HANDY, WIBDI, Communications Mgr.
R. L. WHITE, WIWPO, Asst. Comm. Mgr., C.W.
PHIL SIMMONS, WIZDP, Communications Asst.

GEORGE HART, WINJM, Natl. Emerg. Coördinator
ELLEN WHITE, WIYYM, Asst. Comm. Mgr., 'Phone
LILLIAN M. SALTER, WIZJE, Administrative Aide

ARRL Announces Traffic Medallions. At the May meeting of the Board, provisions were adopted so that after qualification for BPL listing the third time in *QST*, such individual accomplishment in traffic may be recognized by an appropriate medallion to be issued by the League. The individual station reports for the traffic-months of June, July, and August will be the first considered. Reports must have been made to the proper SCM in the field organization in the first seven days of the month following that in which the traffic was handled. The messages must have been handled in proper normal amateur form, shown in detail in *Operating an Amateur Radio Station* booklet, also on amateur frequencies. It must be capable of demonstration from one's message file and handling data on the radiograms that each message counted was handled inside a 48-hour maximum delay period for domestic traffic, or within half the period for mail to reach destination, for any legitimate overseas traffic to be counted. Qualification in consecutive months is not necessary, but the following four points must be met . . . awards to be made after the SCM-approved reports appear in *QST*.

1) Only individual amateurs working at their own stations are eligible. (Club, post-training-602 and other multi-operator stations are not eligible, nor may an amateur receive a medallion on the basis of traffic handled at a station other than his own.)

2) All traffic counting toward the medallion must be duly reported to your SCM and listed in the BPL column in *QST*.

3) Each amateur may receive only *one* medallion, this on the third time he reports a BPL traffic total.

4) Only traffic handled and reported after June 1, 1954, shall be considered.

The ARRL Field Organization. There are 3252 station appointments as entered by SCMs at this time! During '53 the number of Emergency Coördinators increased by some 10 per cent. There was continuing growth in the Official Observer and OBS groups that render services to brother amateurs. Our *average* field organization section today has a League membership of just over 600 full members with some 62 appointees (22 ECs, 16 Official Relay appointees, 8 or 9 Official 'Phone Stations, 6 OBs, 6 OOs and 3 OESs) not counting the elected SCM or his immediate assistant, the Section Emergency Coördinator, a 'Phone Activities Manager and two Route Managers. In the mail balloting for SCM

candidates the average return of ballots was 51 per cent, showing the high degree of interest in these elections.

For those not familiar with the station appointments, we might mention here that each is explained fully in the League booklet *Operating an Amateur Radio Station*, sent to members on request (25 cents to others). The Section Communications Managers, addresses on page 6 of *QST*, solicit reports from all active stations. For those on the air consistently who are interested and qualified, there are the SCM appointive posts.

Club Progress. There are now some 747 active-list club affiliates! Some 77 clubs have arranged code and theory classes for their progressing membership and interested newcomers, as will be detailed elsewhere. According to club "annual" data analyzed for the League's Board of Directors, the *average* club has 34 members and now has 13 registrants in the AREC. Of the hundreds of reporting clubs, 42.5 per cent have (or participate in) TVI or interference committees. This compares with only 25.5 per cent a year earlier. If one larger club in a community has a committee with representation from smaller suburban clubs, each club may not require a full committee. From the emergency-preparedness standpoint it is interesting to know that this average club has 9 to 10 mobiles among its members. Also, 4.9 vibrator supplies and 6.7 dynamotors appear to be distributed among each such club group, a distinct increase from the survey of emergency equipments made a year earlier. There are only something like 2.8 portable rigs per club. There's room for improvement equipment-wise then, by building programs that promote more hand-carried equipment, or arrangement of station equipments to be more readily detachable from car mobiles for fixed-station use.

A.R.R.L. ACTIVITIES CALENDAR

Aug. 7th: CP Qualifying Run — W6OWP
Aug. 13th: CP Qualifying Run — W1AW
Sept. 5th: CP Qualifying Run — W6OWP
Sept. 13th: CP Qualifying Run — W1AW
Sept. 16th: Frequency Measuring Test
Sept. 18th-19th: V.H.F. QSO Party
Oct. 8th: CP Qualifying Run — W6OWP
Oct. 9th-10th: Simulated Emergency Test
Oct. 12th: Qualifying Run — W1AW
Oct. 16th-17th: CD QSO Party (c.w.)
Oct. 23rd-24th: CD QSO Party ('phone)
Nov. 6th: CP Qualifying Run — W6OWP
Nov. 13th-14th, 20th-21st: Sweepstakes
Nov. 17th: CP Qualifying Run — W1AW

Safety Precautions. Before making adjustments on your transmitter, remember the following code of ARRL Safety Rules for Amateur Operators.

1. KILL ALL TRANSMITTER CIRCUITS COMPLETELY BEFORE TOUCHING ANYTHING BEHIND THE PANEL.
2. Never wear 'phones while working on the transmitter.
3. Never pull test arcs from transmitter tank circuits.
4. Don't shoot trouble in a transmitter when tired or sleepy.
5. In working on the transmitter avoid bodily contact with metal racks or frames, radiators, damp floors or other grounded objects.
6. Keep one hand in your pocket.
7. Instruct members of your household how to turn the power off and concerning approved methods of resuscitation.
8. Develop your own safety technique. *Think* before making adjustments.

BE CAREFUL. DEATH IS PERMANENT.

Send a message or card for a more complete ARRL discussion on SAFETY which lists several points for safety in transmitter construction. This will be sent gratis.

QTH OM? When working 7-Mc. c.w. W4TAS says he always identifies his state by interspersing the letters or abbreviations for Florida with his calls. He writes, "By designating my location I work a great many fellows who have been looking for my state for weeks and months. The remark 'first Florida QSO' is quite common in my log. The practice (of putting in your state) would help all fellows trying to get their WASs or contacts with your state for other reasons. . . . I have, for example, worked hundreds of W3s hoping one would be located in Delaware. I would surely like to hear some station sign that state." W4TAS's point may appeal to some. There's also the "useful tool" of the directional CQ which is explained on page three of the League's booklet *Operating an Amateur Radio Station*. Making CQs informative, following each call or group of CQs by indication of direction, district, etc., is often helpful in moving traffic or finding stations in particular areas when on the air with such a purpose. Just one precaution in making informative calls: We hams of course do have to observe the FCC regulations (Section 12.82) that specify that the authorized call sign of the station transmitting be sent "at the end" of single transmissions or those in a series, so special calls and identification of QTH by state must come at other than the very end of one's call.

"OK but Please Repeat." For many years certain newcomers and even older amateurs who should know better have fallen into the habit of using this faulty response. Whether the rejoinder is by c.w. or by voice, the skilled operator instantly labels such a response as spurious, the "OK" both deceitful and misleading. Unless all of a transmission was received correctly, one should at once ask repeats on the parts needed. If interference is knocking out transmissions or conditions are poor, there is the strong possibility in radio work that any indication of acknowledgment or receipt may be taken unjustifiably for a complete receipt of perfect transmission! In this event such expressions are worse than wasted.

Only when a full text being conveyed between responsible operators has been completely received, and handling data (if a message is involved) of time, date, and station are being recorded on the message form is the R, OK or "Roger" appropriate to the occasion. Efficient communications procedures save time for all concerned. Experienced operators under difficulty invariably engage in asking and getting the specific portions missed, rather than wasting time discussing the interference or poor conditions. Most of all these operators avoid any ambiguous or erroneous responses that they have received information OK, until this is indeed a fact.

— F. E. H.

DXCC NOTES

Notice is hereby given that DXCC credit will be deleted from all members' totals, and any future claims rejected, for confirmations credited or presented for credit toward FB8UU, FF8UU, FL8UU, HZ1UU, 15UU, VQ8UU, VQ7UU, VQ9UU, VS9UU, YA3UU and 4W1UU. This action is taken as a result of evidence supplied by RSGB which indicates that these stations could not possibly have been in operation at the times so indicated on the confirmations presented.

DX CENTURY CLUB AWARDS

HONOR ROLL

W8HGW...253	W6YXO...248	G6ZO...244
W1FH...252	W8ENV...247	W4JTC...243
W3BES...251	W3GED...246	W8NBK...243
G2PL...250	W6AM...246	G6RH...243
W6VFR...249	W2BXA...244	LU6DJX...243

RADIOTELEPHONE

PY2CK...233	Z86BW...215	W1JCX...211
W1FH...224	W8HGW...214	SM5KP...207
VQ4ERR...223	WINWO...212	W2APU...202
XE1AC...215	W1MCW...211	W3JNN...201

From May 15 to June 15, 1954, DXCC certificates and endorsements based on postwar contacts with 100-or-more countries have been issued by the ARRL Communications Department to the amateurs listed below.

NEW MEMBERS

DL1HH...112	D1LIZ...101	W5VIR...100
W9AMU...102	PY4AJD...101	W8DLZ...100
W6VAT...101	K8BZT...100	W8EV...100
	W4KKG...100	

RADIOTELEPHONE

HCWX...108	W8JWV...105	F8SE...103
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ENDORSEMENTS

W3EUV...240	W3NOH...178	W4HQN...138
W1GLX...231	W2GVZ...170	W3MFW...132
ZL2GX...230	W2REF...170	W4ML...132
W6RW...218	W7HXG...170	W4EV...131
W1BIH...213	G5VT...170	G8ON...131
W9FKC...213	Z82AT...160	W1JOJ...130
W8ATW...202	W2BYE...153	W9KA...130
W8B1...200	W8MET...150	Z1LQW...130
W2CNT...191	W6MEL...153	W9WFS...121
CM9AA...186	W8LAV...151	W8CLR...120
G3BKF...184	PY7LJ...151	DL1HA...120
ON4FQ...180	9S4AX...151	F8VK...120
	W5DML...150	

RADIOTELEPHONE

G3HLS...170	1U4DMG...150	W2VZ...133
G5VT...164	PY2JU...143	G2BK...130
11BIC...161	W1CLX...140	PY4PL...121
CT1PK...160	W8TT...140	W8LAV...112
PY1AQT...160		ZP5CF...110

CALL AREA LEADERS

W4BPD...241	W7AMX...238	W9RBI...225
W5MIS...241		VE4RO...221

RADIOTELEPHONE

W4EWY...172	W8DI...195	W8ATW...156
W5BGP...197	W7HA...175	VE3KF...163
	W9RBI...200	



There will be lots of mobiling going on this summer, and lots of traffic accidents. We hope none of them will be caused, or even involve, amateurs yapping into microphones at the time of the accident. This could make a very bad name for us. In some states it is illegal to operate while driving a car; so if you are traveling out of your state and get pulled in for operating while driving, don't plead ignorance. That's no excuse. Our suggestion is that if you must operate in motion, let someone else do the driving. We think amateurs must be pretty careful in this respect, because we haven't yet heard of a single accident caused by operation of a mobile transmitter.

Aside from keeping our own house in order in this respect, we can be very useful on the road, from time to time, by reporting accidents. The annals of amateur emergency work contain many such instances. This summer will probably see a record amount of motoring, and with it a record number of traffic accidents. Those of you with rigs in your cars might do well to keep them tuned, both for receive and transmit, to one of the National Calling & Emergency Frequencies (see box). A squelch circuit is very useful for this purpose. Those who are sitting at home (the smart ones) during rush traffic hours can also help by similarly keeping their receivers tuned to one or more of the NCF frequencies in order to be able to receive urgent calls for assistance from the highways and relay them by landline to the nearest highway patrol or state police station. Probably 3875 and 29,640 kc. are best adapted to this use.

What say we all pitch in on this during the summer? As already mentioned, it has been done before — lots of times. But chances are there are innumerable instances when such calls for help have gone unanswered that we never heard of, while we almost always hear of those that are successful. Maybe this can be one more way in which we can show the public that amateurs are a source of something besides TVI.

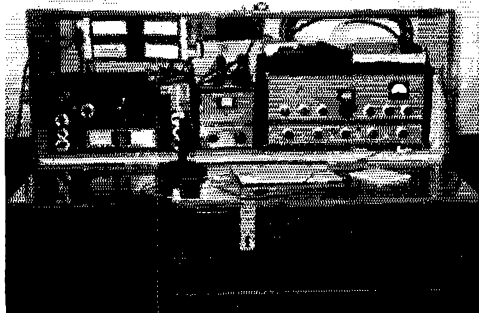
On Saturday morning May 1st, a jet aircraft crashed about 5 miles south of Great Falls. W7PCZ/M directed W7KUH/M to the scene of the crash. W7KUH/M arrived shortly after and provided communications between the scene of the crash and the Great Falls Air Force Base with K7FCC. Vital traffic was handled. After approximately an hour of operation W7VPY/M relieved W7KUH/M at the crash scene. W7CRD also participated from his home station. Amateur radio was the only means of communications between the crash scene and the Air Force Base. Letters of appreciation were received by W7CRD, W7RIL and W7KUH. W7PCZ/M is provost marshal at the Air Force Base. Thanks to W7SFK, W7EWR, and W7TAT for helping to keep the frequency clear.

— W7KUH, SEC Montana

On May 16th at 2112 EDST the Lyon C.D. net was alerted. EC W1QQL went to Peabody in response to a request for aid regarding a flash flood in the downtown section covering an area of one square mile and up to six feet of water. Mobiles were dispatched to the scene and messages were relayed. The following stations took part in the emergency: W1s JLN (NCS) VMD PBQ KEK OAY RNM NVB JZV YQF TTQ QQL OGG SNZ QNC KWD RFE WNN NO. The Net was secured at 2345.

— W1VMD

On May 22nd, Marion, Ind., experienced a mock air raid. The assumption was that a part of the city of Marion was damaged by the explosion of an enemy bomb of the 2000-lb. class. We received our yellow alert at 0900. Four portable transmitters were set up. One was for damage control and set up about 150 feet from ground zero for damage control officers. The second transmitter was set up 300 feet from No. 1 for use by the Red Cross. No. 3 unit was set up at the field hospital about one mile away, while the fourth unit was set up at the Armory, which was the c.d. headquarters. A fifth permanent station running 250 watts was about five



The Scott County Amateur Radio Club (Scott City, Kansas) is always prepared for emergency work with this "100 per cent portable" station, which two men can easily carry when the box front is closed. Under the club call W0TYL, the station can be set up and operating in five minutes. Club members also own a 1-kw. a.c. generator on trailer wheels and a telescoping 30-foot vertical. (Photo courtesy W0ZUX)

miles from ground zero, to cover the state. The club call, W9EBN, was used. We were set up and had good communication between all units by 1030, one and one-half hours after the alert. We received our red alert at 1245 and were under attack from 1300 to 1330. A total of 75 messages was received at c.d. Hq. Frequency used was 3822.5 kc. The exercise ended at 1530. Much was learned and the public was enlightened as to the value of the amateur. Participants: W9s ZTZ NTB NPL MXV MU OUN BSZ and UCT.

— W9BSZ, EC Grant Co., Ind.

The province of Ontario had a Simulated Emergency Test on the week end of May 15th-16th. SEC VE3KM reports gratifying participation and success in the test, almost every EC having reported some activity. Hamilton-Waterdown, London, Toronto, Belleville and Hanover all conducted tests to coincide with the province-wide SET. Hamilton was represented by 23 of its 35 members, with five mobiles on ten meters and five on 75. The 75-meter control was also used for long-haul purposes around the province. A total of 60 messages was handled with 30 outside contacts. In Belleville, four portable, one mobile and two fixed stations participated under VE3AUU. In Glencoe, four amateurs operated four fixed stations, two mobiles and several 2-meter portables.

VE3ATR played a big part in the test and submitted a complete report to his SEC. His Kincardine post was in operation from 1300 Saturday to 2200 Sunday; his traffic total was 90. Thirteen different stations throughout the province were contacted on Saturday, eight during Sunday. In concluding his report, VE3ATR says "... We recommend that all AREC card holders be required to QNI one or more nets, either 'phone or c.w., or both, in order to make themselves efficient." How about this idea, you ECs?

The Okeechobee region of Florida is a favorite spot for hurricanes to strike, as past experience has proved. On May 16th a communications drill was held in which the Miami Weather Advisory issued advisory warnings on a simulated hurricane, following the actual wording of advisories issued in connection with the September, 1948, hurricane, except that the word "simulated" was added. The Florida AREC was set up to operate on 3910 and 7105 kc., for contact with Atlanta and Washington; due to skip conditions, these frequencies were almost totally useless, although W4IEH/M appears to have gotten through at intervals. The test, which included more than amateur radio, was termed a "tactical success" and was summed up by SEC W4IM as follows: "It was noted that on several of the frequency bands utilized by the AREC a high degree of skip was experienced, notably ... 3910 and 7105 kc., particularly the latter. Civil defense frequency utilization was of an experimental nature and no

traffic was handled. Full support in the drill was extended by the American Red Cross and the U. S. Weather Bureau. All participating organizations worked in close harmony crowding into a two-hour drill period a full six-hour work load of traffic and survey. Our thanks to all participants."

Fourteen SECs submitted reports for April, representing 3964 AREC members. New reporters were the SECs of Saskatchewan and Idaho, making our total reported for 1954 twenty-one different sections. Only 52 to go to make it unanimous, at least on a once-per-year basis. We look forward to the day when we can list the nonreporters as the exception rather than the rule.

1954 FIELD DAY NOTE

With Field Day now past history and logs showing up at ARRL in foot-high stacks daily, it appears that once again enthusiastic participants have shattered all previous FD records. Certain to fall by the wayside are 1953 highs as to number of individuals afield and number of portable and mobile set-ups active. Early reports point to ideal band conditions in all quarters, with some old-timers averring this the first recallable FD where not a speck of QRN marred operations. Watch for high claimed scores next month and for the final results, slated for December QST. To clubs and individuals, this last-minute reminder: you've still time to get your Field Day photos to the Communications Department for possible use in QST. Better act now!

TRAFFIC TOPICS

Starting with June traffic, ARRL headquarters will present a small medallion to every amateur as he makes the BPL the third time. As this is written (early June), details are still being worked out, but by the time you read it you will be working on your second month toward the medallion. This is in accordance with an action of the ARRL Board of Directors at its Denver meeting in May.

Two essential rules appear to be obvious: first, that the medallions will not be awarded on a retroactive basis. Our records begin with June traffic, and we'll have to keep another card file to keep track of how many times each BPLer has made it and if he or she has been presented with a medallion. Second, that only one such medallion is presented to each amateur, no matter how many times he or she makes the BPL. Other rules are still being considered.

We hope that this action of the Board will have a salutary effect on amateur traffic handling. No medallion presentations will be made prior to September 1st, and it may prove expedient to await appearance of August traffic in November QST. In any event, we start with June traffic and we suggest you continue your traffic work as in the past, letting the medallions fall where they may. However, here is an extra incentive to newer traffic men to get into the swim.

W8AMH reports a May traffic total of 968 for the Early Bird Net.

National Traffic System. This copy is being written early, since your reporter is departing June 11th for an extensive western trip. Thus, the tabulation below will not include data from those net managers who habitually just get in

under the wire. Such an early deadline does not happen very often, but that is no guarantee it won't happen again. We suggest you get into the habit of compiling and mailing your report just as soon after the end of each month as data from the NCS are available. This also means that NCS, particularly near the end of the month, should make a special effort to report QNI data promptly.

Of course we'll include any late statistics in the September QST report.

May Reports:

Net	Ses- sions	Traf- fic	Rate	Average	Represen- tation
EAN	21	758	1.12	36	97.6%
1RN	21	453	0.46	21.5	85
2RN	37	249	0.40	6.7	
3RN	21	208	0.47	9.9	98.4
RN6	41	556	0.61	13.5	23.1
RN7	51	415		8.1	
8RN	19	144		7.6	80.7
9RN	39	798	0.99	20.5	54.5
TEN	68	2548		34.5	62.5
TRN	42	72	0.27	1.7	68.3
TLCN (Ia.)	21	371	0.92	17.6	
LSN (Los. A.)	24*	239		10	
AENP (Ala.)	30	325	0.24	10.8	
NLI (NYC-LI)	21	153		7.4	
QKS (Kana.)	30	295		9.8	
NTX (N. Tex.)	21	120	0.35	5.7	
WVN (W. Va.)	21	130	0.22	6.1	
WSN (Wash.)	21	206		9.8	
Summary	549	8140	1.12 (EAN)	13.0 (EAN)	98.4 (3RN)
Record	568	10275		30.8	

* Out of 26 scheduled

May of 1953 was an exceptionally heavy traffic month, so we were unable to topple any records this month. However, the fact that four reports did not get here in time for this copy may have had something to do with it.

Both Massachusetts sections made perfect attendance on 1RN. There is no early (1830) session of 2RN in June, July and August. W3ONB reports continued excellent attendance, even though one of the section nets has closed down for the summer. W7KZ continues to report for RN7 in the absence of a manager; we're working on it. W8RO has earned an 8RN certificate. On 9RN, only Wisconsin is providing really good representation; W9DO is doing most of the work for Illinois, while Indiana representation is only fair and Kentucky very poor. How about some support from the section nets in 9RN? Traffic has slowed down to a trickle again on TRN; summer schedule is 1945 EST Monday through Friday. W6IPW submits his last report for RN6; sorry to lose you, Gene.

Several of our TCC reliables are dropping out for the summer. This is understandable enough, but who is going to handle the traffic? Summer is the time that free-lance traffic men "put the snatch" on traffic that normally flows through NTS channels. Traffic that is dammed up will, just like water, make its own channels. The difference is that it doesn't always willingly flow back into the channel when the dam is broken. *Can we have some TCC volunteers, please?* If we have alternates one, two or three deep for each assignment, we ought to be able to keep traffic moving through regular NTS channels. Otherwise, we lose it and may never get it back. What say, fellows?

The Palmetto Net (FN, 3765 kc. nightly) at Orlando, Florida, hamfest April 26th. Left to right, front row: W4LVV, W4BMY, W4IYT. Back row: W4DVR (Net Manager), SWL, W4OZC, W4WEO, W4TYE, W4LAP. (Photo by W4IYT)



BRASS POUNDERS LEAGUE

Winners of BPL Certificates for May traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W3CUL	291	2717	1922	686	5616
K4VAR	604	2428	2256	137	5445
W6LAB	69	2064	1892	172	4197
K0AIR	296	1713	1640	61	3710
W0BDR	11	1397	1367	24	2799
W3WJQ	95	1180	1215	68	2538
W9UJ	10	1181	1178	52	2421
K6FCZ	44	1033	979	54	2110
K6FDG	169	884	817	25	1895
K6FAU	126	879	838	41	1884
W7BA	25	913	906	34	1878
K6FFB	219	782	735	54	1790
KLZAB	35	845	692	149	1721
W4USA	67	711	678	161	1617
W3USA	26	786	704	32	1598
W9DO	0	760	701	59	1520
K6FAE	19	690	685	19	1413
W6SWF	43	636	629	96	1304
K6HFB	107	538	536	25	1283
KLZAOB	33	624	620	4	1281
W0SCA	3	610	583	5	1201
K6FCA	45	544	551	15	1155
W7PGY	14	561	488	73	1136
W6LYG	42	483	302	181	1008
K6FDL	39	482	416	36	948
W9NZZ	276	332	2	329	939
W4FJU	24	435	300	135	894
W2JOA	16	439	399	36	890
K6FCT	30	484	349	37	880
W8ELW	12	473	412	10	857
W2KEB	43	394	189	205	831
W9JBO	47	397	364	17	825
W2K FV	15	379	335	44	773
W8RJC	4	372	344	28	748
W6CPI	9	368	329	39	745
K6CQP	25	350	270	75	721
W6BLI	12	345	320	19	698
W6ELQ	27	316	302	33	678
W6PHT	41	330	190	113	674
K7FDB	64	345	243	9	661
W9UQP	3	290	311	32	636
W2RUF	47	298	185	79	609
W7HKA	20	295	290	2	607
W1EMG	0	299	222	77	598
W6QMO	62	279	162	100	593
W9T1	7	305	264	11	587
W6CXY	7	285	259	26	577
W8FYO	4	282	232	49	567
W0GAR	3	279	274	10	566
W0RTA	100	238	225	6	564
K2FAV	112	222	186	36	556
W7SFK	2	276	276	0	554
W6ZG	19	270	216	45	549
W4KBR	11	268	171	95	543
K2CHA/4	460	40	38	2	540
W0QXO	7	258	200	58	523
W5M N	35	238	129	108	510
K2BJS	12	243	203	48	506
W9VBZ	37	214	206	49	506

BPL for 100 or more originations-plus-deliveries:

W6KVB	202	W4AUR	129	K6BFC	108
W4WVT	195	W1BTV	127	W6WET	108
W3CVE	178	W4DRD	124	K2BWP	105
W1EFP	168	W2JZX	112	K7FDD	102
K4WBP	148	W8N1Y	111	Late Reports:	
W4ZWT	137	W2EMW	110	K2BSD (Apr.)	205
W5CKN	135	W4TWA	110	W0CEB (Apr.)	120
W9CEE	135	W4WED	109	W06U (Apr.)	108

The BPL is open to all amateurs who report to their SCM a message total of 500 or more, or 100 or more originations-plus-deliveries for any calendar month. All messages must be handled on amateur frequencies, within 48 hours of receipt, in standard form (number, station of origin, check, place of origin, time, date).

ELECTION NOTICE

(To all ARRL members residing 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 in West Hartford, Conn., on or before noon 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, and station call of the candidate 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 reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested: (Signers will please add city and street addresses to facilitate checking membership.)

Communications Manager, ARRL. [place and date]
38 La Salle Road, West Hartford, Conn.

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.

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.

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.

— F. E. Handy, Communications Manager

Section	Closing Date	SCM	Present Term Ends
Yukon *	Aug. 16, 1954	W. R. Williamson	Mar. 17, 1949
West Indies	Aug. 16, 1954	William Werner	Aug. 15, 1952
Utah	Aug. 16, 1954	Floyd L. Hinshaw	Feb. 18, 1954
Nevada	Aug. 16, 1954	Ray T. Warner	June 15, 1954
Nebraska	Aug. 16, 1954	Floyd B. Campbell	Aug. 15, 1954
New Hampshire	Aug. 16, 1954	Carroll A. Currier	Aug. 15, 1954
Santa Clara Valley	Aug. 16, 1954	Roy I. Couzin	Oct. 15, 1954
Kansas	Aug. 16, 1954	Earl N. Johnston	Oct. 29, 1954
Kentucky	Aug. 16, 1954	Ivan C. Kelly	Resigned
North Carolina	Aug. 16, 1954	J. C. Geaslen	Resigned
Western			
Massachusetts	Sept. 15, 1954	Roger E. Corey	Nov. 10, 1954
Saskatchewan *	Oct. 15, 1954	Harold R. Horn	Dec. 15, 1954

* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian Director Alex Reid, 169 Logan Ave., St. Lambert, Quebec. To be valid, petitions must be filed with him on or before closing dates named.

ELECTION RESULTS

In the Louisiana Section of the Delta Division, Mr. Thomas J. Morgavi, W5FMO, and Mr. William H. Bell, W5MWE, were nominated. Mr. Morgavi received 149 votes and Mr. Bell received 67 votes. Mr. Morgavi's term of office began May 31, 1954.

In the Ontario Section of the Canadian Division, Mr. G. Eric Farquhar, VE3IA, and Mr. Richard W. Roberts, VE3NG, were nominated. Mr. Farquhar received 146 votes and Mr. Roberts received 116 votes. Mr. Farquhar's term of office began June 15, 1954.

W1AW OPERATING NOTE

See page 79 of May QST and page 77 of July QST for full information on when and where to look for the ARRL Headquarters station.

CODE-PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made on August 13th at 2130 Eastern Daylight Saving Time. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7125, 14,100, 21,020, 52,000 and 145,600 kc. The next qualifying run from W60WP only will be transmitted on August 7th at 2100 PDST on 3590 and 7138 kc.

Any person may apply; neither ARRL membership nor an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at 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.

The RTTY Society of Southern California held its May 21st meeting at the Western Gear Works, Lynwood, Calif. Teletype enthusiasts in attendance included W6LSG, W6CND, W6AEE, W6RZ, W6PZV, W6CL, W6NAT, W6ILW, W6EV, W6EGZ, K6CHU, W6DYW, W6FLW, W6WYH, W6CNF, W6IEU, W6MRO, W6UPY, W6LDG, W6ZBV, W6IIV, W6PJF.



Code-practice transmissions will be made from W1AW each evening at 2130 EDST. Speeds are 15, 20, 25, 30 and 35 w.p.m. on Monday, Wednesday and Friday, and 5, 7½, 10 and 13 w.p.m. on Sunday, Tuesday, Thursday and Saturday. Approximately 10 minutes' practice is given at each speed. References to texts used on several of the transmissions are given below. These make it possible to check your copy. For practice purposes the order of words in each line of QST text is sometimes reversed.

Date Subject of Practice Text from June QST
 Aug. 3rd: *New Record on 10,000 Mc.*, p. 10
 Aug. 5th: *Some Principles of Radiotelephony*, p. 13
 Aug. 9th: *A Bandswitching 815 Rig . . .*, p. 16
 Aug. 11th: *50-Mc. TVI — Its Causes and Cures*, p. 21
 Aug. 17th: *A Low-Cost . . . Oscillator*, p. 24
 Aug. 19th: *Mobile Loop Antennas*, p. 26
 Aug. 24th: *A Tubeless VFO for the 10A*, p. 28
 Aug. 27th: *TVI "Diplomatics"*, p. 30
 Aug. 30th: *A Receiver for Flat Purses*, p. 34

MEET THE SCMs

Floyd B. (Red) Campbell, W0CBH, Nebraska's SCM, received his license in 1947, although he had maintained an interest in amateur radio for several years previous.

Upon his election to the SCM post he discontinued his appointment as Emergency Coördinator, but carries on his work as an Official 'Phone Station. An all-around ham, he is a member of the TCPN and MARS, is Alternate Control

for the MARS Nebraska Net, and is vice-president of the North Platte Amateur Radio Club, in which club he formerly held the posts of president, treasurer, and activities manager. In addition to two Public Service certificates for his meritorious work during the Midwest floods of April, 1952, and the 1949 Nebraska blizzard, he also holds RCC and WAS certificates.



The line-up at W0CBH includes two complete transmitters, either of which can run a full kw. One rig uses a Meissner Signal Shifter and 304TTLs in the final for 40, 20, 15, 11, 10, and 6 meters.

The other consists of a Millen VFO driving an 813 and a pair of 357As in the final for use on 80 meters, 'phone or c.w. Receiver is a prewar S-20R with Q5-er and Panadaptor. Antenna is a half-wave doublet.

Hunting, fishing, and bowling are included among his hobbies, and baseball and football are his favorite sports. Red derives a great deal of pleasure from attending hamfests and meeting other amateurs. Currently he is employed by the Union Pacific Railroad as a boilermaker and welder.

BRIEFS

All clubs are invited to drop a line to Headquarters for cards on which to register places and schedules for round-the-table code-practice/theory classes so we can include these in material sent newcomers who inquire.

Cards and applications for the Worked All New England certificate award should now be sent to the Port City Amateur Radio Club, P.O. Box 622, Portsmouth, N. H. See page 63, September, 1953, QST for other details.

ARRL Quizzes, ranging from operating procedures to TVI and DX, make interesting program material for educational-entertainment programs. Your affiliated-club secretary can request any of the ten quizzes from the League's Communications Department.

The Car-Le Radio Club Certificate of Achievement is now available to any amateur submitting proof of contact with at least ten club members. All contacts must be made after March 1, 1954. Members of the club are W3s AIW AVM HA JPR OP OWP PVY RQK RXV RXW SEB SNZ TCC TSI UEU UQL WJM WJY YBI. Confirmations should be sent to E. J. Knoll, jr., W3OP, R.D. 1, Slatington, Penna. There is no charge for the award.

NATIONAL CALLING AND EMERGENCY FREQUENCIES

C. W.		'PHONE
3550 kc.	14,050 kc.	3875 kc. 14,225 kc.
7100 kc.	21,050 kc.	7250 kc. 21,400 kc.
	28,100 kc.	29,640 kc.

During periods of communications emergency these channels will be monitored for emergency traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be vacated immediately to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: c.w. — 3535, 7050, 14,060; 'phone — 3765, 14,160, 28,250 kc.

NATIONAL RTTY CALLING AND WORKING FREQUENCIES

3620 kc. 7140 kc.

These frequencies are generally employed by amateurs using radioteletype throughout the United States. Other frequencies are under discussion and will be listed in future issues of QST.

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

ATLANTIC DIVISION

EASTERN PENNSYLVANIA — SCM, W. H. Wiand, W3BIP — SEC: IGW, RM: AXA, PAM: PYF, E. Pa. Nets: 3610, 3850 kc. Through the combined efforts of the South Philly ARK membership, the following advanced from the rank of SWL to General and Novice Class: VNP, VSD, VSC, VXO, WAE, WMB, YAX, YBK, and WN3YLG. QLZ reports the club station now is sporting two Collins transmitters and receivers operating on 10 and 80 meters. MWL, the Hill School's ARC station, is silent for the summer but will resume operation in the fall with ULI, pres.; and 5AHS, vice-pres. of the Club. EGT was host to about 40 members of the CHERN Net and their families at his spread near Eagleville, V.h.f. was the main topic of discussion while everyone enjoyed a swell picnic lunch. SNM, operating fixed portable, was squiring his 2-meter signal far and wide from atop the 150-foot tower located on Mt. Penn near Reading during the V.H.F. Party. (Total elevation above sea level is approximately 1300 feet.) SVL won a new Gonset Communicator on a bet. WJN reports completing a "built-in-the-wall" ham installation with a new NC-98. Operation is on 40 meters. PWH is back on the air after returning home from Haiti, where he was known as HH3RC. EAN reports his new 20-meter beam is working out FB and he's busy handling overseas traffic. CUL again will continue her traffic work from her ham-radio-equipped trailer while vacationing at the shore. A new licensee from down Wayne way is WN3YYY. Welcome to the ham fraternity, OM. At this writing, plans for the E.Pa. Net picnic are incomplete. However, AXA informs us that it will be held on a Sunday afternoon in August at a central location convenient for all. This announcement is probably news to everyone except the net gang and perhaps a bit on the short-notice side but if you would like to meet some of the gang in person and your August Sundays are unplanned, write now for full information. Address your card to W3AXA, Jacobus, Pa., or drop yours truly a card (address page 6). Your cards will be answered immediately. We understand it will be an informal gathering, no speeches, no prizes, just a gabfest get-together. All are welcome. Traffic: W3CUL 3616, BFF 350, NOK 158, RSC 156, VNJ 121, UOE 84, AXA 79, PYF 67, QZV 60, TEJ 52, GES 50, MWL 39, DUI 36, GYJ 34, PVY 30, VN 26, TTW 24, QLZ 17, KUQ 9, TKB 8.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Arthur W. Plummer, W3EQK — SEC: PRL, EC for Maryland and Asst. SEC: JE, EC for Washing. D. C., and Asst. SEC: PWB, EC for Delaware and Asst. SEC: SPL, RMs: AKB, BWT, CDQ, ECP, JE, MCG, and ONB. PAMS: AVL, DC, DQZ, EQK, HL, JZY, KTR, and OSF. ORRS: AEL, AKB, BM, BWT, CDQ, CIQ, COK, CQS, CVE, ECP, EEB, EIS, FPQ, FWP, GA, GRF, HC, HKS, IKN, IYE, JE, JHW, JZY, LSX, LVJ, MCD, MCG, NOE, NPQ, ONB, PKC, PRT, PZW, QCO, QQS, QZC, RNY, TGF, UE, WKB, WSE, and WV. OPS: BM, DNN, EQK, HGA, JE, JZY, MAX, OQF, PKC, WKB, and WV. OOs: AFR, AYS, BII, BM, CVE, DVO, EEB, EQK, FQB, ILD, JTK, LUL, MFJ, OSF, QCB, QZC, VOS, and VQZ. OESs: FU, KMA, and OTC. OBSs: AFR, CDQ, CVE, EQK, FU, JE, NNX, RMD, and WSE. Your SCM doesn't expect to run again. Oct. QST will set the date for SCM nominating petitions and the new SCM will take over in March. Welcome, new clubs: The Andrews Electronics Assn., 29 members, 4VXJ, pres.; 3RV, secy.-treas.; URQ, act. mgr.; and the Radiation Lab. Radio Club of Johns Hopkins, LMC, pres.; JCI, vice-pres.; RVL, secy.; WN3YPW, treas.; and WN3WYJ, sgt. at arms. A transmitter hunt is being planned by the group. The Chesapeake Amateur Radio Club held a transmitter hunt May 9th. LDD reports Armed Forces Day netted the APG Radio Club about 300 messages, relayed to K3WAS. Mobiles were

provided for the Paul Seward Harford County c.d. test June 14th. Call areas in the Club are: ISCF, 2YAY, 3LDD, SZY, RMY, VEK, and WWK. Also 5YWA, 5ZOG, 6SCA, 7UPW, 8CPN, 9AWX, 9BUB, 0OKI, and 0MZN. AKB and BWT hope to be back on the air soon with rebuilt rigs. The Washington Radio Club recently elected 9CSK, pres.; CDQ, vice-pres.; PPQ, treas.; TBO, corr. secy.; and VBP, rec. secy. MCG worked F08AJ, ESM, RUN, MKKE, and TRG ragchewed for three hours recently until dawn. PAT, QWN, and OSF did the same thing for 2½ hours. QQS will be heard with a new rig. LSX has gone to Boulder, Colo., with the Quartz Research section of Bustan. ECP reports the Washington TVI Committee is planning a bang-up affair for this fall, WN is quite active in Little League Baseball and Optimist Club work. The Blue Hen Radio Club has grown to more than 14 members and is on 29,520 kc., the Wilmington stand-by frequency. The Club provided communications during Armed Forces Day, K3FBC, at New Castle County Air Force Base, will answer 29.5 Mc. calls from 8:00 a.m. to 5:00 p.m. The Eastern Shore Radio Club will have a series of picnic meetings. At the May meeting Al Barnes lectured on transistors. The Chesapeake Club members saw color movies of the principles of nuclear physics and recent "H" bomb tests. Gambrell State Park was the scene of the MEPN picnic. As of May 1st the Washington Mobile Radio Club had 108 members, of which 13 are residing in other locations. GBB, who works with radar commercially, had an interesting experience with the State Police, AEA, WMRC, and MARS, handled all communications for the National Sports Car Races. The Andrews Ragchewers Net was forced to leave 7.4 Mc. recently and go to 10 meters because of skip conditions. RLJ soon will be mobiling with Elmec gear and over-size generator to his new Alaska assignment. WKB is putting 20 watts into a 2-meter rig with a five-over-five antenna. KAT, DQZ, and LZN are sporting GE 6-meter c.d. mobiles. ASD has had lots of visitors and is active on 2 meters. There is a new 10-meter ground plane at WH's. SQV has new Elmec AF67 transmitter and PMR6A receiver. TKM has returned from Hollywood, Fla., where he worked some Delaware boys. 4ANL/3 now is mobiling a Viking. PCZ, UDN, TDU, MZQ, and DQZ are new MARS members. MZQ has not been very active with his new Viking II because of ill health. Most Delaware mobiles are working in the "Blue Hen Net." The Delaware C.D. Net operates each Tue. at 9:00 p.m. on 146.85 Mc. MEPN now has 60 members. Many Delaware stations have received RACES authorizations. CQS visited RAK recently. OMN recently was appointed to State of Md. C.D. Staff as CDRO for Washington Metropolitan Area. JZY now has 24 elements on 2 meters. MDD, closed for the summer, still averages 3.2 stations per session. AYS reports contact with YO3RZ on c.w. and H16EC on phone. PRL is sporting a new Mercury with new Elmec transceiver and receiver. NNX also has new Vaaro. NNX recently erected Hi-lite two-element 20-meter beam. MZK has moved to new QTH with lots of antenna room. The Washington Mobile Radio Club will run a hamfest Oct. 3rd, for the benefit of the Washington TVI Committee. ECP is revamping his control set-up. EPV gave a talk to ARA on how to chase DX. NZT, RAI, and OYX attended the I.R.E. trip to National Airport. CIQ and RAI were in the V.H.F. Contest. TJV reports into the Micro-Frad Net at 1200 on 7238 kc. Traffic: (May) W3USA 1598, CVE 307, JE 182, ONB 137, UE 33, ECP 31, CQS 22, JZY 20, OYX 15, NNX 12, HKS 10, TGF 8, SPL 6, QQS 2. (Apr.) W3ECP 30, MCG 16, FDK 15, WSE 9, EEB 7.

SOUTHERN NEW JERSEY — SCM, Herbert C. Brooks, K2BG — PAM: ZI, K2CPR, Jack DuBois, will be back at FP8AA in July. W2SDB reports plenty of good DX on 20 meters with conditions on that hand improving. K2HBQ, ex-W3NLL, now is located at Bellmawr. LYL had a close call when lightning hit his 40-meter skywire. ZI reports good DX on 40 meters, having worked ZL3JA and KX6BU. FYT is operating 75-meter phone and expects to have s.a.b. soon. K2DQR is back on 2 meters with a 20-element beam and an FB signal. The DVRA meets the 2nd Wed. of each month in the Hotel Stacy Trent. UPS was DVRA Field Day chairman. The Dawn Patrol operates five mornings each week on 147.150 Mc. All are welcome. GTN has received his WAC certificate. KVV, Lawrenceville, is doing a swell job on 2 meters with an 80-watt rig and a new sixteen-element beam. There is lots of 2-meter activity in Mercer County. Reports from Atlantic and Cumberland Counties would be appreciated. Burlington County Radio Club members are building a transmitter and receiver for 2 meters, and increasing power on 10 meters with a new

rig. Serious consideration should be given by all organizations in the section in maintaining and testing emergency equipment. LS, Pleasantville, and VMX, Ventnor City, are doing a swell job as Official Observers. Traffic: W2ZVW 172, RG 165, K2BG 34, W2ZI 31, K2CPR 5.

WESTERN NEW YORK — SCM, Edward G. Graf, W2SJV — Asst. SCM: Jeanne Walker, 2BTB. SEC: UTH/FRL. RM: RUF. PAMs: GSS, NAI. NYS meets on 3615 kc. at 6:30 p.m., 3925 kc. at 8 p.m. NYSS meets on 3595 kc. at 7 p.m. Mon., Tues., Wed., Fri., at 4:30 p.m. Sat. NYS C.D. meets on 3509.5 and 3993 kc. at 9 a.m. Sun. My sincere thanks to all for the kind expressions of sympathy on the passing of the XYL. K2CUX received Gen. Class license and is on 75 and 80 meters. DUC is rebuilding the Viking I. RUT is busy working DX on 20 meters. KEL has 813 final at 300 watts but is unable to be on 80 meters because TV receivers cause QRM in his receiver. K2DYB formed the Madison County Wireless Club (MCWC) with the assistance of K2s EJE and APT. PZC is Alternate C.D. NCS of NYS C.D. and Area 9 C.W. Nets. K2DG spoke at a KBT meeting on "35 Years in Ham Radio." K2APT is knocking off the DX on 40 meters with his Viking II. KN2DWZ has the 807 going FB. Our sympathy to CZT on the passing of his father. We regret to announce the passing of QWE. ISI now is in Syracuse. JVO spent some time in the hospital. KN2GVD has a new jr. operator. UTH received the first Mobile NYS 'Phone Net certificate. Dave Chase, editor of Corning ARA bulletin, QRM, lets the gang in the area know what's cooking. QQ made a trip to N. Y. C. by way of West Hartford and enjoyed his visit at ARRL. UTH is the proud papa of a girl. COU and ZRC came in first and second, respectively, in the code speed contest. The Northern Chautauqua ARC is raising funds to purchase gear for a club station. ZBS drove from Poughkeepsie to the RARA 'fest just to meet some of the W.N.Y. gang who QN the NYS 'Phone Net. The NYS 'Phone Net presented its manager, GSS, with a pen and pencil set. Sam Semel demonstrated VOM at an Elmira ARA meeting. K2AQY is much improved and back with us again. 81XA is working mobile while motoring through W.N.Y. RUI, ALR, TPB, ELS, ZOC, and K2EGD, the TVI committee of the Lockport ARA, put on a demonstration. "TVI. Its Causes and Cures for the radio and TV dealers. ECs renewed: PPY for Erie Co., NAI for Schoharie Co., VTR for Ontario Co. and HXG for Chenango Co. RUI and K2FAV made BPL Traffic. (May) W2RUF 609, K2FAV 556, W2EMW 314, K2DYB 163, W2HKA 91, DSS 77, OE 76, K2DSR 59, W2ZRC 58, BNC 42, RUT 29, OPD 24, PZC 20, COU 26, K2CUC 14, W2RQF 14, K2GDG 10, W2JMT 10, DVE 7, VEP 4, (Apr.) K2DYB 151, W2COU 39, FGL 26, JMT 24, PZC 9.

WESTERN PENNSYLVANIA — SCM, R. M. Heck, W3NCD — SEC: NEG. RMs: UHN, GEG, NUG. PAMs: AER, LXE. The WPA Traffic Net meets on 3585 kc. Mon. through Fri. at 1900 EST. The Net Manager is UHN, who I wish to thank for the fine job he has done and is doing with the c.w. traffic net. The response has been gratifying. In May a total of 207 stations and 181 messages averaged 10 stations and 9 messages per session. Thanks, Tony and gang. Sorry to report that Ken Speer, Jr., has been forced to resign as SEC because of the press of business but I am happy to report that I have been able to retain the services of A. C. Heck, GEG, 615 Cedar Ave., Sharon, Pa., as SEC and request that you cooperate with him in our AREC program. UUH is going mobile with ST-120 and also working the 40-meter phone band. 4YCL heard on mobile, is the former NWD. Members of the SCARC active in the Pittsburgh Mobile Club are UAK, MPO, VBL, SVJ, NRG, and SDV. Among those attending the recent WPEN Hamfest were SCARC members NKM, SVJ, MPO, UUH, SDV, TOB, MBK, OKU, UAK, LOR, QOQ, UHM, and NDH. All members join in wishing CTN a speedy recovery from a recent illness. The RAE reports its emergency trailer now is completed and in use, taking part recently in the c.d. drill at Union City with mobiles TLA, MED, NXX, STK, NRL, ODF, and ODI accompanying. New directors of RAE are IYX and NXX, with GCH appointed to fill the term of ODF, who has resigned. KVB worked F08AJ, the Clipperton Expedition thanks all for the excellent cooperation which made the RAE exhibit at the Home Show a great success. We are sorry to report that the condition of AER still remains critical. Traffic: W3W1Q 2538, LMM 168, QFQ 167, TSY 114, UHN 103, OEZ 71, LXQ 56, KNQ 37, SIJ 32, KUN 30, UTR 5, NMJ 4, RVS 1.

CENTRAL DIVISION

ILLINOIS — SCM, George Schreiber, W9YIX — Section Nets: IEN (3940 kc.) ILN (3515 kc.). PAM: UQT. RM: BUK, SEC: HOA. EC Cook County: HPG. The annual Starved Rock Radio Club picnic was "sell-out" this year, with cars parked outside the park unable to get in. AND returned from a Mexican vacation and hamfest. He managed to work dozens of Central Division stations as an XE. ZUJ is ready to launch his first radio control model aircraft. ABS now has 79 countries on 40-meter c.w. NN is running him a close second, but Bob doesn't count

on unless the DX signal is an S9. KHJ vacationed in Florida and had 80-meter mobile contacts. YMI has given up radio for the summer, devoting his time to motors and boats. YLU is an ardent Spanish linguist, and so is ROE. They have fun practicing on our Southern brothers. OAL's booklet, "Ham Expressions I Abhor," is about done, and he is seeking a publisher. CKU chats with his brother, 6FCS, at El Toro Marine Base. ATH wants to know "watts wrong." He says he puts 300 watts of audio into the modulator and gets 15 out. PCGW scattered a nice shredded haul of fish all over a Wisconsin Lake when he absent-mindedly tied the day's work on the stern of the boat. JGL toured Europe via Pan-American. AHO, the local It. I., with the assistance of NN trapped a bootlegger in Mt. Prospect, pirating the calls IEI (not issued) and WCU, who could not protect himself because he is in the Army in the Far East. BA with his mobile rig summoned assistance for the victims of two automobile accidents in less than two weeks. He had the assistance of KCV, PIA, and 5YUO/9. The latter is doing fine with his "droopy" ground plane. The St. Clair Amateur Radio Club issued its 55th ten-station certificate to 4TEQ. To get one all you have to do is work ten St. Clair County stations. The Twin City Radio Club puts out an FB bulletin. IVB has a 2E26 rig going with VFO and all. LOC can't make up his mind between a 10- or 20-meter beam. Why not both, Dick? BUK, the Route Manager for ILLN, is seeking c.w. station outlets in Danville, Quincy, and Springfield. The Net meets at 7:00 p.m. CDT Mon. through Fri. Check in, some of you chaps. GMU is papa of a baby girl. UZF enrolled in electronics school at Valpo Tech. SKR is enjoying 20 meters during the warmer months. The Watch Dog Net (2 meters) demonstrated ham radio for a group of doctors in North Chicago suburban areas and opened the medics' eyes. Club members agree that NIU spends more time on club activity and fixing other fellows' rigs than he does on the air. Brass Founders certificates this month went to DO, K9FCA, and CEE. That's three in a row for DO and twice for CEE. IIF got an automatic keying head and threatens to return to 80 meters. LMC has TVI with his VFO, but none when he uses crystal. YIX helped a young ham out down the street with parts and now his family is hollering for YIX to get the neighbor out of the TV set. Traffic: (May) W9DO 4520, K9FCA 1155, W9CGC/b 332, CSW 310, CEE 264, CQR 190, SBE 189, MXXF 155, YIX 108, QBH 106, SXL 86, LIA 66, VHD 66, BLX 61, W6CTW/9 58, W9LXJ 55, STZ 53, BUK 43, CTZ 43, OKQ 33, WHF 24, UFN 20, UVM 79, LCP 16, USI 15, VSN 12, PHE 10, LMC 9, LXD 30, LXD 6, UZI 4, DUA 2. (Apr.) W9CEE 283, LXD 30, UVM 13, FRP 11.

INDIANA — SCM, George H. Graue, W9BKJ — SEC: LZJ. RMs: OLX, WWT, JUJ, JWB. REC: TT. PAMs: NTA, CMT. Congratulations and thanks from all to FJI for his untiring efforts and ultimate victory in persuading Governor Craig of Indiana to proclaim June 13th to 19th as Amateur Radio Week. TARS conducted another c.d. drill. Assisting were BBN, RDJ, GFS, UMS, HRH, AIN, ZPP, ELW, RIT, RIV, RDJ, KVE, FJI, and 4RYM. KVE is hospitalized with a blood clot. NTR will be in Indianapolis as chaplain at St. Vincents Hospital. DLACT-MZE is home from Germany on a sixty-day leave. WVF, Father Nicholas, passed his General Class exams. 60XA is visiting Evansville. LVS moved to Minnesota. CKR now has a General Class ticket. YWF is back from the Army. The mobile hunt was won by MYI. The Mobile Club of So. Bend furnished communication for the Armed Forces Day parade and also for Decoration Day. LPQ now is among the Silent Keys. NTA was elected president of the Martinsville Radio Club. 60DO now is 9GFZ. RBV is editor of *Sparks*. OCL is returning to his native Oklahoma. MAM has added a 32V-2 to his collection. YME is convalescing. N9YLY was winner of the ARRL Novice Roundup. OTR and JWR have new Globe King. BNY and ZRH now are on 75 meters. BOC improved his mobile signal with a new load coil. CMT has new Elmac in the car. DUK was airborne on 147.3 Mc. on Armed Forces Day. IFX is at Valpo Tech. PEO has his 1 kw. Vied. WRO is new OPS and ORS. YUE trained twenty Novices. FYM is on the engineering staff of WISH-TV. YQY built a 13-watt mobile rig. The Kokomo Radio Club invited all hams to its second annual hamfest Aug. 15th. NTA reports IFN traffic for May as 423; JBQ for BFN as 103. Brasspounders for the month are TT, UQP, JUJ, JBQ, and NZZ. Traffic: W9JWJ 2421, NZZ 939, JBQ 825, UQP 638, TT 587, SNT 435, YWE 85, KDY 78, STC 78, NTA 76, QOQ 66, UGH 63, VNV 62, YIP 61, WUH 47, FYM 49, DOK 35, CMT 33, DKR 31, WRO 23, CC 16, PPS 15, BKJ 12, BRW 9, EQO 8, NYK 8, QR 8, DGA 6, NTR 5, YVS 5, BDF 4, ZQW 2.

WISCONSIN — SCM, Reno W. Goetsch, W9RQM — SEC: OVO. PAMs: ESJ, GMY. RMs: MQV, UNJ. Nets: WIN, 3625 kc., 6 p.m. daily; BEN, 3950 kc., 8 p.m. daily; WSPN, 3950 kc. 1215 p.m. Mon.-Sat., 9:30 a.m. Sun. State mobile and c.d. frequency: 29,820 kc. CXY chalks up BPL as well as membership in the Traffickers 2500 Club. VBZ, new MRAC secretary, placed 2nd nationally in the YLRL/OM Contest. UNJ is running 100 watts. Net certificates (BEN) were issued to MQC, RQQ, UMJ, NAW,

and NTD. RTP is building a new 300-watt final. The new mobile rig of WWJ has 2E26 final. KXA, AT-2. USN is attending radar school at NAS, San Diego, where he operates 6ZSC. OVE and JAW are active in BEN, while KQB represents Manitowoc on WIN and 9RN. DKH has new mobile installation. Congrats to TRG and NRJ on newly-arrived "harmonics." WN9BTM now is General Class. WOD has new three-element 20-meter beam. The Racine Megacycle Club elected LXY, pres.; KZZ, vice-pres.; NVK, secy.-treas. CFP, examiner for ham exams. RKP put up a new 20-meter beam and lost it in 65-m.p.h. storm the following day. AEM, WAN, and ZAN worked IAW. PWD received 1st-class radiotelephone license. KXX now uses two-element beam on 20 meters since the director fell off. The Browning School Radio Club (TBT) elected MGT, pres.; UBV, vice-pres.; BPR, bus. mgr.; YAY, treas.; AER, secy. As a result of club classes they have as new licensees: WZJ, DVD, ETZ, ZDU, and ZAO, and WGNs HAU, GYO, GYL, HBC, GXX, GYY, GXC, GLH, HCB, and GXU. MGT and WAN are new WAS recipients. YAY is working on 220-Mc. exciter. Thanks to WAN for this FB report. The Fond du Lac Mike and Key Club is now ARRL affiliated. Using 600 watts to p.p. VT127As and 24-element beam ISP worked South Dakota for his 11th state on 144 Mc. LEF has added LJV at Waukesha and ZAD at Milwaukee to his 144-Mc. schedules. New appointments include QXE and LVB as EC, and ZAD as OPS. Traffic: W9CXY 577, WZJ 506, SR 189, SAA 186, UNJ 157, ESJ 139, RTP 109, WWJ 58, KXW 47, WIR 47, KQB 30, UIM 28, SZR 24, QFX 21, RUB 15, IBQ 13, YLE 10, RQM 9, BVG 8, AEM 5, CFP 5, RKP 3, OVO 2.

DAKOTA DIVISION

NORTH DAKOTA — SCM, Earl Kirkeby, W0HNW — PAM; GZD, RM; LHB, OBS; KZZ, ORS; EBA, CAQ. The Sioux Amateur Radio Assn. has purchased a large inter-city bus and is busy converting it to a super mobile emergency unit with a 5-kw. a.c. generator and 500-watt transmitters. PMZ and SDN recently dropped the "N" from their calls. PMZ is firing a new Viking II. NQI has a new Elmac AF67 in his Oldsmobile. New on the air is WN9UFT, at Neche. Traffic: (May) W0K7Z 62, NPR 42, EXO 39, LHB 36, FVG 12, KZZ 5, PHH 3.

SOUTH DAKOTA — SCM, J. W. Sikorski, W0RRN — Asst. SCMs: Earl Shirley, 0YQR, and Martha Shirley, 0ZWL, SEC: GCP, RM; SMV, PAMs: NEO and PRL. The S. D. QSO Party drew 100 stations, with GDE taking first prize, followed by PRL, SCT, OJQ, and PHR. Prizes were donated by BJV. New calls: UAJ, Mission (XYL of RMK), and N0SXQ, Selby. AKH and son, KYO, have a Viking I. Ia KYO, 12, the youngest General Class licensee in the State? GDE received a 25-w.p.m. CP certificate. DTB's new QTH: Box 105, CTM School, Naval Station, Treasure Island, San Francisco. QKV is mobile with Gonsset Super Six and homemade 15-watter. 9HUI (ex-0HFE) has returned to Yankton. SCT reports 98 hours ham activity during May. The 75-meter Phone Net reports 1030 checked in 30 sessions, with a traffic average of 7.5 per session. The C.W. Net had 107 in 13 sessions, with an average of 3.6 per session. A new call in Rapid City is TZZ. OJQ is running 6 watts mobile to a 6AQ5 and has a new NC-125. QEK has increased mobile power to 40 watts and a pair of 813s at home. OII has a new 4E27 final. SFARC operated ZWY for three days at the Telephone Pioneers Convention. ORS appointments: OJQ and GWS. It's vacation time for RRR, so reports received after June 4th will be included next month. Traffic: (May) W0GDE 117, PHR 83, SMV 48, SCT 37, BLZ 11, MPQ 11, QKV 10, FFP 6, GWS 3, IGG 3, RRR 3. (Apr.) K9FCR 127, W0PRL 50, NEO 46.

MINNESOTA — SCM, Charles M. Bove, W8MXC — Asst. SCM: Vince Smythe, 0GGQ, SEC: GTX, RMs: OMC, DQL, PAMs: JIE, UCY, ARRL President G. L. Dosland, TSN, attended a meeting of the Runestone Radio Club at Alexandria. Dos gave a talk on ARRL legislation. The Mobile Amateur Radio Corps of Hennepin County supplied the communications for the orderly control of the Aquatennial Parade. EYW is back on 75 meters from Motely. IVS got his and his station's picture in *College Chips*, the official college paper of Luther College of Decorah, Iowa, which he attends. TRH is now attending U. S. Naval Academy at Annapolis. Roy is operating 3ADO while there. HOL, our former SEC, moved to Seattle where he still will be with NWA. RA has been elected president of the St. Paul Radio Club, Inc. Other officers elected were PYC, secy.; and NGF, treas. Lydia, KJZ, attended the YL Convention at Milwaukee. KFN, IXR's sister Eunice, and Mrs. MXC had a hamfest all of their own at Daytona Sky Room in Minneapolis. Eunice passed her Novice Class exam but had not received her ticket at this writing. JNC is well again after an operation. Your SEC has made the following EC appointments: JDO, Carver Co.; EYW Morrison Co.; DPP, Sherburn Co.; and UNK, Olmsted Co. If there is no EC in your county and you are willing to organize an emergency corps in your county, drop a card to George Lord, GTX, P.O. Box 8, Alexandria, Minn. Do you want a new certificate to adorn that wall? This is a contest sponsored by the Minneapolis and St. Paul Radio

Clubs to enable the hams in the State to become better acquainted. A scoring system has been worked out and the highest scorers will be issued a certificate signed by the Governor. There will be separate awards for Novices. More information will appear in QST. Traffic: W0KLG 469, UCV 203, WET 131, DQJ 99, CID 78, HLN 71, TJA 66, KFN 57, IRJ 55, EHO 53, TKX 53, CXN 50, LST 50, LUX 44, RKJ 43, NJZ 38, AGD 35, RQJ 32, BZG 27, MXC 27, PCU 23, GTX 20, PBK 18, JIE 17, BUJ 16, KNR 15, ABA 14, PAM 13, GWU 12, OJH 12, QBW 12, OFA 11, DYD 10, FIT 10, KGG 10, FYT 5, LIG 5, AFP 3, GWJ 3, JNC 3, ZQQ 2.

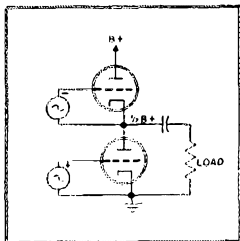
DELTA DIVISION

ARKANSAS — SCM, Fred Ward, W5LUX — Everyone had a big time at the Camden Hamfest. It was held at Bragg Lake, 9 miles west of Camden, and the Camden Amateur Radio Club was the host. ZBX, at West Helena, is the new EC for Phillips County. ZJI, at Huntsville, now is EC for Madison County. OCX has his E.E. degree and has moved to New Jersey to work for RCA. DRW is falling in love with that s.a.b. Doc says that BAB has a new 10A, and that PUN is home from the Marines and has a new jr. operator, also Van has an s.a.b. exciter on 20 meters. NDH has been working 80 and 40 meters with his new 400-watt rig. TJH sent us a copy of his emergency plan for Desha County. Wish all ECs could see it. It is really FB, and they have provided for just about everything. It's a swell job, Frank. Not many reports were received this month, fellows, and traffic seems to be light. Traffic: W5NDH 8, LUX 2.

LOUISIANA — SCM, Thomas J. Morgavi, W5FMO — This being the initial report from your new SCM, I wish to thank you fellows for the honor and I hope that I will be able to fulfill the desires of each and every one of you. Wish me luck but also send along a heap of cooperation. The call of Charles Freitag, 5UK, deceased treasurer of the Greater New Orleans Amateur Radio Club, will be set up in memorial by that club in his memory. The club is ARRL affiliated. The first out of town or state WA-25 certificate went to 8MRC. SPZ has a new 50-foot trylon tower. Through the efforts of HEJ, the Delta Net had a revival for the old-timers. Such calls as AXS, AAT, AXD, DGB, FDC, HRC, IVF, MBE, and QH were heard. Over one hundred reported. Credit goes to HEJ for the effort he put up. FMO was N.C. The May picnic at Harold Myles Park near Alexandria was a big success. Texas, Arkansas, and Mississippi were well represented. NG, according to station activities report cards received, seems to be the only one active in the State. Appointees are requested to mail in their cards regularly. ORS, OPS, and OO appointments are open over the entire State. If you feel you can do one or more of those jobs in your area, contact your SCM. The New Orleans Club is formulating plans for the Labor Day week end in New Orleans with a dance on Sat. night in the French Quarter and a picnic on Sun. More details later. The Greater New Orleans Amateur Radio Club used a rig loaned by the Red Cross at the Home Show (New Orleans). ZNI, FMO, and others of the club kept the booth ably manned. Traffic: W5CMG 476, FMO 21.

MISSISSIPPI — SCM, Dr. A. R. Cortese, W5OTD — SEC: KHB, PAM; JHS, RM; WZ, Well, gang, the news has fallen off this month. Guess the heat is too much for you. Let's get with it this next time. CKN made BPL this time. Good work, OM, keep it up. YBF and YBH now are ECs and ACS is Asst. EC. CFL is now in Grenada. TIR was Mississippi's MARS Operator of the Month of April. IGW is ORS. LBY is now 4EXE, DT is OBS. AMZ is now ORS. Traffic: (May) W5CKN 138, JHS 120, VME 48, TIR 46, OTD 36, KYC 34, YXZ 34, AMZ 13, RIM 12, YBH 6. (Apr.) W5YBH 2.

TENNESSEE — SCM, Harry C. Simpson, W4SCF — SEC: RRV, RM; WQW, PAM; QT. Twenty-seven reports were received this month. Traffic dropped, with only one BPL, but many new stations reported. PL still is ailing, but improving. The Chattanooga Club has reorganized after a long layoff and will be active under BND, chairman; QT, secy.; and KPR, treas. HHK and his XYL, UDS, took part in the recent successful transcontinental u.h.f. test. An HHK recording of W2UK's 2-meter signals was played at a joint IRE-ISRU meeting. Engineers were lavish in their praise of noteworthy work in u.h.f., pioneering by these, and other stations. The Kingsport Club is putting out a nice bulletin. Contact SWW for a subscription. AKB, CVM, and VKE set up Armed Forces Day show at Camp Campbell. WQW, SUH, and WQT assisted with traffic. WQW sends red, red roses to the group for its fine origina-tions — no rubber stamps, no books, all good traffic, with phone numbers in most cases. Thirty were graduated from the Memphis Club's first ham school under DCH and ZER, with code by CLL. Eighty Memphis hams will take part in the c.d. alert. The C.W. Net's fall session opens Labor Day. Get set, gang, RRV, our SEC, reports AEE, State R.O. in c.d., plans installation of equipment in a bus now set up as the mobile communications center. Traffic: W4OGG 457, WQW 346, TYU 300, OEZ 155, UWA 148, SCF 147, IIB 135, TZD 93, DTI 57, BQG 44, TIE 40, WJG 34, DIJ 31, (Continued on page 74)



LAST MONTH Ralph Hawkins, W1OEX, took the opportunity afforded by this page to cite some of the salient advantages of using stiff doses of clipped pre-emphasized speech in communications work. Clipped speech is just one of our advanced current programs in audio at NATCO. Another new avenue in audio is High Fidelity which will receive this page's attention this month. Invariably the process of communication involves the audio frequencies and the techniques special to this part of the spectrum. Development and manufacture of communications equipment are the center of our business

— hence, our extreme interest in audio.

In times past hams, with few exceptions, have shown but limited interest in the domain of Hi-Fi. But lately one can observe an ever increasing number who imbibe equally of both. We are sure this healthful trend is on the upswing. The amateur now looks upon Hi-Fi as musical "hamming" conducted in the living room. We know the ham stands to profit by extending his field of interest to include Hi-Fi. Not only is it a pleasant diversion, Hi-Fi is essentially of an electronic nature, educationally broadening (if one reads the record jackets) and a thoroughly enjoyable vice in which the whole family can indulge. The latter asset may be of some value in the discussions which invariably arise over how much to spend for what.

As an example of a Hi-Fi technique that has some use in amateur equipment, consider the circuit shown above. It is the essence of the output circuit we use in our new Hi-Fi "Horizon 20" and "Horizon 10" power amplifiers. The tubes are driven in push-pull but the output is single ended. This connection which "floats" one tube above another gives "unity-coupling" between the output tubes without sacrificing the beneficial effects of push-pull.

Unity coupling eliminates the switching transients that occur in conventional circuits under class AB_2 or class B operation when one tube on one half of the primary ceases conduction and the opposite tube starts conduction. These transients can be excruciatingly annoying to a Hi-Fi listener. To the ham, they are generally of academic interest. Of more universal interest is the circuit's "single ended" feature which greatly lightens the task of output transformer design and suggests transformer-less modulation schemes.

With a prudent choice of output tubes it is possible to use load impedances of 500 to 3000 ohms. The experimenter is now at liberty to remove his modulation transformer, replace it with a less expensive audio choke and make a direct connection (or through a condenser if the dc voltages are different) between the common cathode-plate terminal and the choke. Such a scheme which reduces cost, improves quality and eliminates the insertion loss of the modulation transformer should find instant application in 50 to 500 watt equipments. A driver transformer will be required for class B operation; resistance coupling may be used for class AB and AB_2 operation. It is desirable, though not imperative, to drive the top tube with respect to its cathode as shown in the circuit.

This new unity coupling is but one of the interesting phases encountered in Hi-Fi audio. Every ham will find new and interesting developments of this nature in amplifiers, preamplifiers and new designs in AM-FM tuners.

An active interest in Hi-Fi can do much to broaden your knowledge of the electronic art and keep you technically "Tuned To Tomorrow."

(See inside back cover of this issue)

Peter K. Lindenmuth

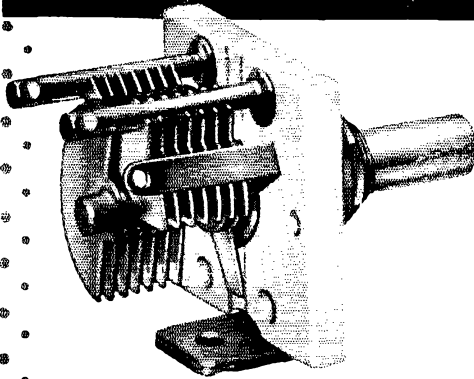


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HAMMARLUND

(Continued from page 72)
RET 22, H1H 18, RMJ 18, UDQ 18, TUO 16, CV 15, VJ 15, AFD 11, HHK 11, ZJY 8, BAQ 7, YZO 6, RRV 5.

GREAT LAKES DIVISION

KENTUCKY — Acting SCM, Robert E. Fields, W4SBI — KKW, our new RM, is doing a swell job with the KYN. Give him all the support, fellows, that you can. NBY, the new SEC, is going great guns. His goal is one KC for each county in Kentucky, which is 120. Let's give him all the support he needs, too. Another swell hamfest at Mammoth Cave is over. A lot of the old-timers were there, NEP who used to be 9NEP, 4KKW, ex-9EDQ, also BNP. ZCI is burning up the airways with a Heathkit transmitter. URF still is very much a civilian. WXL now is a high school graduate. ZLK has started work on a modulator, but plans to work c.w. as much as ever. JCN is having trouble with his self-excited transmitter. BJN has worked 18 states on 80 meters in the last 6 months with a 10-watt one-tube transmitter and now is building a 150-watt rig. Traffic: W4KKW 177, SBI 125, YZE 118, WNH 117, ZLK 90, WXL 49, SYD 27, JCN 26, NBY 24, AZQ 18.

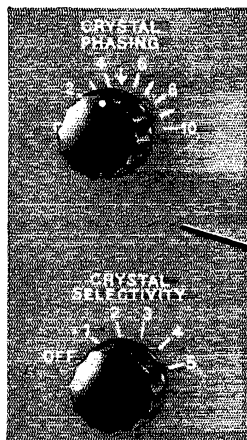
MICHIGAN — SCM, Fabian T. McAllister, W8HKT — Asst. SCMs: Joe Beljan, 8SCW; Bob Cooper, 8AQA. SEC: CJH. New appointees are NOH as OES, URM as RM and EDN as EC for Kalamazoo County. RJC reports traffic conditions from overseas were much improved during May and the totals from our regular traffic men seem to bear this out. Herb had a six-hour power failure over Memorial Day, but he made up for it. The THN Net had 15 sessions this month, with 41 messages handled. FX took a trip up Elk Rapids way, visiting with ZLK, NUL, and some of the other fellows. Tate reports much interest up there in traffic-handling, but more missionary work is needed. The Flint gang assisted "the law" over the Memorial Day traffic rush. RTN says they had 17 mobiles out, with 26 hams participating. The Red Cross provided a first-aid man to ride in each car. AQA found a new traffic link. His next-door neighbor came up with a new license (QBA) so guess where Bob operates during the house remodeling. WVL worked both NSS and AIR during the Armed Forces Day shindig; and also submitted what he thinks was perfect copy on the Sec-Defense message. WN8PDF took a shot at the General Class test, but missed the code. Too bad, Rudy, but we know you'll make it yet! The Lansing Club XYLs recently entertained the OMs at a picnic. Picnics held and to be held are the Genesee County Club picnic July 11th, the BR Net picnic July 18th at Alma, and the annual V.H.F. picnic at Allegan County Park Aug. 1st. There's the place for you 2-meter boys to swap stories! Traffic: W8ELW 857, RJC 748, NOH 296, NUL 220, ILP 138, FX 137, QIX 135, JKC 77, IV 63, MLR 57, RTN 51, WXO 45, OQH 42, NEK 38, SWG 33, TPB 32, ZLK 32, AUD 27, SCW 27, IKX 24, SFZ 24, FSZ 21, HKT 21, AQA 12, EGI 11, WVL 9, PUV 6, DSE 2.

OHIO — SCM, John E. Siringer, W8AJW — Asst. SCMs: C. D. Hall, 8PUN (phone); J. C. Erickson, 8DAE (c.w.); and W. B. Davis, 8JNF (adm.). SEC: UPB. PAM, PUN, RMs: DAE and FYO. New appointees are AFL and RVU as OOs and OPU and VAZ as ECs. FYO received the only BPL card for May traffic. The QCWA met in Cleveland on May 5th. Approximately 45 attended from 10 Northern Ohio cities. QV was elected chairman and BF secy.-treas. The latter requests all 25-year men in this area to get in touch with him. The Mayor of Fairview Park is greatly pleased with the work being done by C.D. Communications Chief JNF. PAD is hospitalized because of a coronary attack. The Intercity group held a picnic June 11th. The Rag Chewers picnic will be held two miles south of Brunswick on Aug. 1st. FYO has upped the power to a kw. CTO's last report states he's moving to Orlando, Fla. SPU, an EC, has appointed OSD, PSK, QOV and KGL as her assistants. DSX, 8BN Manager, reports good activity on the part of Ohioans. The Van Wert Club is the section's latest ARRL affiliate. Fort Hamilton's Field Day call was MDY. Newly-elected OCARC officials are VTP, chairman; HNF, vice-chairman; AL, treas.; VHO, secy. Dayton's *Hot Carrier* announces that ACE will be chairman of the 1955 Dayton Hamvention and that new operators in the area are RH8 and RKP. Eureka! Springfield's Q-5 is mentioning club members by all signs. The editor, JRG, writes that BMC, RWZ, and JRG are staging a race to see who'll be first on a.s.b.s.c.; the gang lauds EQN for his excellent traffic and net work; BLN, CQI, and SVI are the town's star-bys on 2 meters; QWC is deserting amateur radio; LAB has completed a push-pull 813a rig; and RMJ is slugging 'em on 40-meter 'phone. The Cleveland Council is to be allowed 15 minutes of radio time over b.c. station WDOK for public service. ARRL scripts are to be used. RQI won Toledo's May hidden transmitter hunt, followed by VSB and OQR. Twenty-five Worked Toledo Ohio awards have been issued. According to *Mike and Key*, Cincinnati's Summer Stag Hamfest will be held on Sept. 12th at Ash Grove. The Columbus Caracase states that new Novice calls in town are RHL and RHY; JJ has been on the sick list; and QQ received a letter from the FCC commending the TVI

(Continued on page 76)

THE HQ-140-X...

SEEMS TO STRETCH THE BANDS



HQ-140-X

In these days, when the amateur bands are more crowded than ever, it's important to make sure the receiver you buy will bring in the desired signal with minimum interference from adjacent channels. That's why more and more 'hams' are turning to the HQ-140-X communications receiver.

The HQ-140-X's outstanding performance under today's difficult operating conditions is achieved because of the Hammarlund patented 455Kc crystal filter and phasing network. This circuit, identical to the one used in the Super Pro-600-JX professional receiver, is controlled by a front panel 6-position Crystal Selectivity switch and provides

an OFF position and five increasingly selective bandwidths.

The Crystal Phasing control is a differential-type variable air capacitor which permits precise adjustment of the crystal selectivity for extremely high attenuation of closely adjacent channel interference.

Because there is no interlocking effect, the Selectivity or Phasing Controls can be changed without de-tuning.

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Get the details on these and other important advantages of the HQ-140-X. Write to The Hammarlund Manufacturing Co., Inc., 460 W. 34th St., New York 1, N. Y. Ask for Bulletin R80.



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committee. The QVARC held Field Day at the Police Dept. Firing Range in Evendale. There is no TVI in Cleveland, according to members of the TVI committee of the CA-CARC, and they have a letter from the FCC Regional Engineer praising them for their work. *Shack Joannip*, edited by those lovely ladies, HUX and HWX, of Toledo, tells the world that PXO received his General Class license; HWX received YL-WAS No. 4; and BIQ recently celebrated his 30th birthday, that is 30 years on the air. Eastern Ohio's *Ham Flashes*, edited by FRY, relates that new Novices in Niles and Youngstown are RBM, RCD, RCE, RCT, RCU, RDE, and QYR, the last mentioned being but 12 years old; YKU, Youngstown's only YL operator, is a communications officer for the CAP; NQQ recently threw a feed for ten of his freeloading friends from surrounding towns; and those desiring information concerning the Cleveland-Pittsburgh 2-meter contest may contact SFG, SRW, or UKS. Traffic: (May) W8FYO 567, UPB 348, DG 247, RO 163, IFX 122, AL 113, ARO 105, LEV 105, YCP 102, HNP 95, DAE 86, FSM 43, LMB 40, AJW 35, GZ 34, WE 28, AJH 26, LJH 24, ZAU 21, EQN 17, HUX 16, QJE 14, KXN 13, TLW 12, HHF 9, CTO 8, KDY 8, KIH 8, ET 7, BUM 6, PBX 6, KZM 5, PIJ 5, PIV 5, BLS 4, BZD 4, HPP 4, MGC 4, NQQ 4, WYL 4, SFU 3, THJ 3, VUS 3, ABO 2, AYR 2, LT 2, RZ 2, JIF 1. (Apr.) W8ZAU 28, PBX 6.

HUDSON DIVISION

EASTERN NEW YORK — SCM, Stephen J. Neason, W2ILI — SEC: RTE, RMs: TYC, KBT, PAMs: GDD, JQI, IJG. The Crystal Radio Club celebrated its 23rd anniversary with a dinner. The affair was well attended. EHZ reports that the club station, DMC, used both 29.6 and 220 Mc. for Field Day. New officers of the YRC are LWK, pres.; GHH, vice-pres., and treas.; K2HGN, secy.; K2BRJ and BVV, act. dir.; and K2AAF, pub. dir. Congrats to K2BUS on making BPL and BRAT, K2DOK is General Class. AARA: The first issue of the new club bulletin proved to be an excellent job and a great success. FMA is the editor. IVP and IFP are proud owners of Extra Class licenses. LXP, ANB, and FMA all have teletype equipment ready to go. AWF is looking for stations around Berne and Knox for AREC and c.d. work. SARA: FGL, from the G. E. Research Lab, gave a fine talk on "Antenna measurements." Also, movies of past Field Days were shown by GTC. EFU wants to contact local hams who are interested in 6 meters. SLRC: KN2GSE, ex-Navy and a 35-w.p.m. expert, is a new member. K2BPG has a pair of 6146s on four bands. ZTZ, Rockland EC, is looking for recruits for the 14-Mc. County Net. Congrats to K2BSD, who made BPL for the second time. CFU has a new Windom antenna and is active on TCPN. K2BE completed a new 813 final. HRL: Congrats to KN2EJU on a very impressive showing in the Novice Roundup. AWQ and KN2HRQ have started to acquire FSK equipment. AAD was in charge of the Field Day skeed. KN2DHS is on the air with 75 watts and WQL's S-40 receiver. Best of luck, Karen. BWS and K2AEH are members of a 30-member radio models club. K2CQS is winding coils for 7 and 14 Mc. Traffic: (May) K2BJS 506, W2TYC 78, K2BE 48, EQQ 34, W2CFU 31, APH 30, ILI 29, LRW 28, EFU 26, GDD 22, YXE 19, MRQ 14, ZBS 5. (Apr.) K2BSD 412, W2WSS 15. (Mar.) K2BSD 211.

NEW YORK CITY AND LONG ISLAND — SCM, Carleton L. Coleman, W2YBT — Asst. SCM; Harry Daniels, 2TUK. SEC: ZAI, PAM; JZX, RMs: VNJ, LPJ. AEW spent two weeks in Africa visiting EL2P, EL2X, and ZS6FT. EL2P is on 14,036 kc. at 1100 EDST daily and 2X on 7009 to 7024 kc. at 1800 daily. Look for 61T on 10 meters. OGX has a new 2-meter converter. TUK and QBR had a USNR training cruise of two weeks. CQP got a QSL from ZL3 QSO on 80 meters with his 30 watts. KQC, 2-meter Net Manager, reports the Net has been discontinued for the summer and will resume Oct. 3rd. K2CUI returns in September after a summer visiting F-, I-, and HB-Land. ZAI is on another vacation south. VKF, EC for Staten Island, reports increased activity on 2 meters and one RACES-AREC drill per month. AEE is NCS of the new 40-meter phone net, the Humdingar Net, on 7222 kc. Sat. at 1200 EDST. K2CMV has a Viking and operates mostly 40-meter c.w. with some operation on 75-80 meters and is active in 2-meter RACES Net. VNJ reports NLI c.w. traffic is up somewhat but it is intended to cut schedules to the usual three a week for the summer months. LPJ reports 2RN rolling along FB. Ex-W2HBO, of the Tu-Boro Club, now is 4BPV on the low end of the 7-Mc. band. K2BEC, EC for Manhattan, has resigned and is moving to the Far West. K2DEB is a new OPS. Section Net certificates went to JXM, OG, and K2CQP. The section will miss JXM, who got his MS at Columbia and leaves the section permanently. For a start Tom will be at ARRL Headquarters. Officers of the Brooklyn Radio Club are PF, chairman; ARW, vice-chairman; AAZ, treas.; and BKP, secy. KGN is putting mobile rig in that new Ford and reports a good Brooklyn turnout for RACES drills. GP reports increasing QRN and nice weather outside so probably he will not be so active! KN2HTO passed Technician Class exam and will be active on 220 and 420 Mc. Contact with Director Cooke can be

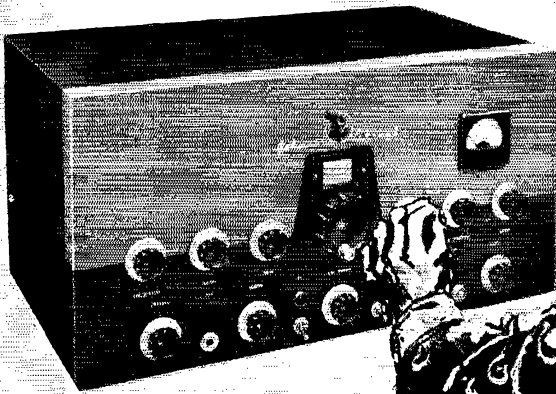
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APPROVED FOR CIVIL DEFENSE

VIKING II-CD

Power input—180 Watts CW, 135 Phone

A deluxe version of the famous Johnson Viking II, the Viking II-CD transmitter features push-to-talk operation, modulation limiting and extended frequency coverage for Civil Defense.



Designed to meet requirements of the Federal Civil Defense Administration, the Viking II-CD has been approved for CD use as listed in Issue No. 1 "Certified Radio Equipment" and qualifies for the matching funds program. Transmitter modifications for FCDA conformance as follows:

1. A three circuit microphone connector and a DPST relay have been installed to permit push-to-talk control.
2. To prevent over-modulation, a 6J6 limiting circuit controlling the 6AU6 speech amplifier, provides more than 6 db of fast acting compression.
3. Coverage has been provided from 1.75 to 4.0 mc for Civil Defense Frequencies. (Complete out-range listed at right.)
4. Entire cabinet has been cadmium plated in conformance with FCDA requirements.

Available only as a completely assembled, wired and tested unit, the Viking II-CD includes all tubes and self-contained power supplies—less crystals, key and mike. Weight 65 lbs.

Low Frequency Limit	High Frequency Limit
1.75 mcs	4.0 mcs
5.2 mcs	8.0 mcs
9.8 mcs	15.0 mcs
15.0 mcs	21.8 mcs
21.0 mcs	30.0 mcs

- 240-102-15 VIKING II-CD TRANSMITTER \$398.00
- 250-20 JOHNSON LOW PASS FILTER—Required as certified in FCDA Contribution Manual M 25-1 Revised \$ 13.50
- 250-23 JOHNSON "MATCHBOX" ANTENNA COUPLER—Required for operation above 7 mc and specifically for range from 28 to 30 mcs to provide necessary spurious harmonic attenuation. Furnished wired and tested \$ 49.85

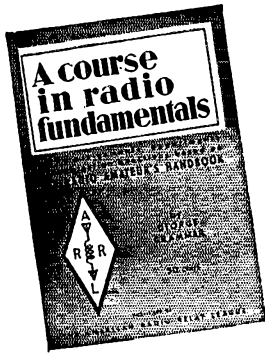
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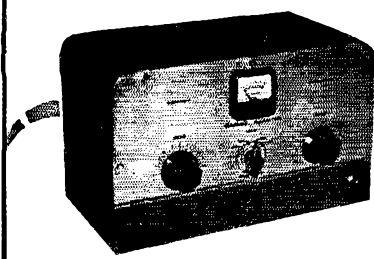
made evenings on 3600 kc. OBU keeps a listening watch each evening and reports he had an FB time at the Board Meeting in Denver. KJG completed his kw. rig but is off for the summer on vacation. IVU and ZRC received 2RN Net certificates. GPQ and NJL are active in NYSP and ET Net. AFA, DFL, and VDT are new Tu-Boro Club members. K2CQP has a new Viking II. JOA still is hitting the high spots traffic-wise. The FLIRC picnic held at Hempstead Lake State Park was a success. EEO and CYK are on an air vacation to California. The Nassau Radio Club elected the following officers: PC, pres.; DGF, vice-pres.; GLU, treas.; AC, VL, and BMD, board members. KN2GIE, HEA, HQG, and HZB are new hams from the NRC radio class. KN2HYY, K2ATL, BPY, ZYC, W2PVV, and CO2WP/W2 are new members of the New York Radio Club. ZAI reports a total of 710 AREC members in the section with 27 active ECs. There are a total of 17 emergency nets active in the section. OMG is experimenting with compact antennas at the new QTH. EC is active in the NYS c.w. net and with UTL. QPQ took a trip to W8-Land. The U.H.F. Club is compiling a list of stations active on 220 and 420 Mc. in the section and Westchester. Contact QPQ if you are on these bands or know of anyone who is. Five stations, JOA, KEB, KFV, JZX, and K2CQP, made BPL Traffic: (May) W2JOA 890, KEB 831, KFV 773, K2CQP 720, W2VNJ 368, JZX 364, K2EOR 310, W2LPJ 234, NJL 155, JXM 151, GP 68, EC 63, K2DCL 35, W2PF 26, GQP 26, KJG 24, LGK 24, OBU 18, K2DEB 9, CMV 8, W2KQC 7, OMG 6, TUK 4, MUM 3, K2CUI 2, KN2HTO 2, W2AEV 1. (Apr.) K2CQP 479.

NORTHERN NEW JERSEY — SCM, Lloyd H. Manamon, W2VQR — SEC: NKD. PAM: CCS. RMs: NKD, CGG, WCL. YVQ has a new 144-Mc. rig and is giving the band a try for the first time. The Pompton Valley Radio Club is a new club in the section with SHC president and ZNJ secretary. Meetings are held the 2nd and 4th Thurs. of each month. All local hams are invited to attend the meetings. K2EMW is doing a fine job as secretary of the Jersey City ARA. From reading over the RVRC news sheet it looks like QW will be right up at the top in the final Field Day scoring. LOP reports on the recent Union County AREC activity in connection with a communications test conducted for the Boy Scouts of America. Communications in rescue work were demonstrated employing land, sea, and air operations. BWI, LOP, and CCY were the project coordinators. Others included NMA, HRG, 5KXD, and 2QWR. K2BCK is expected to leave for sea duty soon. K2HDZ is a new ham in Teaneck. Special QSL cards are available to all who work any member of the Windblowers V.H.F. Society. K2DFS is the designer of the QSL 90WV/2 and his XYL, KN2HLV, has a novel hookup on 144 Mc. between the home QTH and the roving OM, who is mobile. NQA made his annual pilgrimage to the upper Delaware River to canoe the rapids on Memorial Day. DWJ now is on 144, 220, and 420 Mc. XAJ is active during the early mornings on 75 meters. K2DI and W2AZP have AX-9903 final with coaxial tank circuit for operation on 144 Mc. GJC has a new rig on 144 Mc. GBY and FLB are active in the Union County 144-Mc. nets. The Avenel Radio Club has just received the club call, K2IBC. The trustee is FSL. ZPD has about completed a fine series of c.d. installations for the Bloomfield Civil Defense Council. ZRU is new Radio Officer for Ocean County. JT is Radio Officer for Passaic County. CVP, Bergen County Radio Officer, is busy getting out the RACES licenses. A staff meeting of key c.d. personnel was held at the Newark Armory to discuss plans for the June 14th C.D. Test. Personnel attending were CVP, IIN, KLA, JT, NKD, NUI, GNU, and VQR. During a recent communications test for the benefit of the State Director of C.D., NKD and KLA, along with LEG, performed an excellent bit of operating which greatly impressed officials at the State Control Center. ZI was at the key at the Control Center. K2DHE, mobile on 10 meters, is very active in local nets. K2EBL has left for a new QTH in California. KBI is active on 75-meter phone. NIE takes to the high seas every week end in his cruiser. New radio equipment will be placed on board soon for operation in the amateur bands. EGM is active in Dover Township c.d. activities. GUM is very active as c.d. communications chairman in Long Branch. The GSARA provided competition in Field Day activities. OOG did an excellent job handling communications for the recent three-day Boy Scout Camporee in Monmouth County. Traffic: K2BWP 200, W2CQB 207, JCO 199, EAS 145, K2BWQ 136, BCK 73, W2PFM 44, YVQ 7, K2BCK 4, W2NIY 3, CJX 2.

MIDWEST DIVISION

IOWA — SCM, William G. Davis, W8PP — BDR has pulled out all the stops. He won't tolerate competition in traffic handling. Ft. Dodge has a new club officered by NCV, pres.; JOL, vice-pres.-treas.; and NGS, secy. Directors are WIT, FWF, and VCM. The Club meets the 2nd Thurs. of each month. The Southwest Iowa Amateur Radio Assn. now is affiliated with ARRL and is 100 per cent ARRL. New officers of the Iowa 75-meter Net are NCS and YUA. Alternate NCSs are IYW, BSG, DWD, and KJN. Secretary

(Continued on page 80)



Heathkit AMATEUR TRANSMITTER KIT

MODEL AT-1

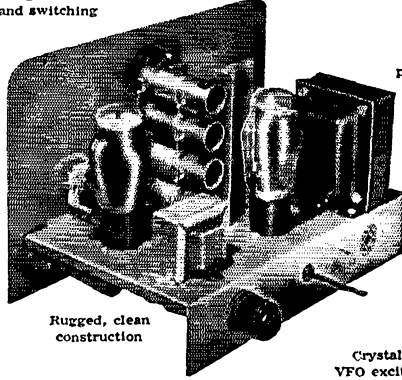
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 6AG7 Oscillator - Multiplier
 6L6 Amplifier - Doubler
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 105-125 volts AC 50/60 cycles 100 watts
 Size — 8 1/4" high x 13 1/2" wide x 7" deep

Pro-wound coils — metered operation
 52 ohm coaxial output

Single knob band switching



Built-in power supply

Rugged, clean construction

Crystal or VFO excitation

Here is the latest Heathkit addition to the Ham Radio field, the AT-1 Transmitter Kit incorporating many desirable design features at the lowest possible dollar-per-watts price. Panel mounted crystal socket, standby switch, key click filter, AC line filtering, good shielding, etc. VFO or crystal excitation-up to 35 watts input. Built-in power supply provides 425V @ 100MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis and detailed construction manual. (Crystal not supplied.)

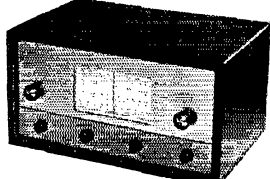
New HEATHKIT COMMUNICATIONS RECEIVER KIT

Four band operation
 535KC to 35MC

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RF gain control with AVC or MVC

Range.....535KC to 35MC
 12BE6.....Mixer oscillator
 12BA6.....IF amplifier
 12AV6.....Detector - AVC - Audio
 12BA6.....BFO oscillator
 12A6.....Beam power output
 5Y3GT.....Rectifier
 105-125 volts AC 50/60 cycles 45 watts

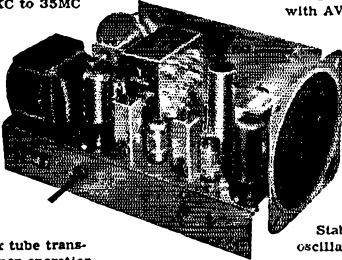


**MODEL AR-2
\$25⁵⁰**

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CABINET

Proxylan impregnated fabric covered plywood cabinet. Ship. wt. 5 lbs. No. 91-10. **\$4.50**



Six tube transformer operation

Noise limiter — standby switch

Stable BFO oscillator circuit

5 1/4" FM speaker — headphone Jack

A new Heathkit AR-2 Communications Receiver. The ideal companion piece for the AT-1 Transmitter. Electrical band spread scale for tuning and logging convenience. High gain miniature tubes and IF transformers for high sensitivity and good signal to noise ratio. Construct your own Communications Receiver at a very substantial saving. Supplied with all tubes, punched and formed sheet metal parts, speaker, circuit components, and detailed step-by-step construction manual.

THE IMPROVED Heathkit GRID DIP METER KIT

- Pre-wound coil kit
- Range — 2MC to 250MC
- Meter sensitivity control
- Compact one hand operation
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- Transformer operated

The invaluable instrument for all Hams. Numerous applications such as pre-tuning, neutralization, locating parasites, correcting TVI, etc. Receiver applications include measuring C, L, and Q of components, determining RF circuit resonant frequencies, etc. Thumbwheel drive for convenient one hand operation. All plug-in coils are wound and calibrated (rack included). Headphone panel jack further extends usefulness to operation as an oscillating detector.



MODEL GD-1A

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SHIP. WT. 4 LBS.

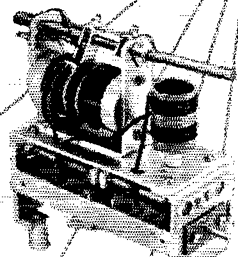
Two additional plug-in coils are available and provide continuous extension of low frequency coverage down to 355KC. Dial correlation curves included.

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 Kit 341.

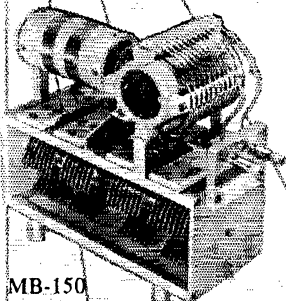
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MB-40SL



MB-150

MULTI-BAND TANK ASSEMBLIES

The unique MB-150 high power and low-power multi-band tank assemblies will tune all bands from 80 to 10 meters with a single 180° rotation of the capacitor without changing coils.

The MB-150 is intended for use in plate tank circuits having an input up to 150 watts. It is ideal for a pair of 807's, 809's or a single 829 B.

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is WLY. Directors are TTT, BDR, BWL, KJN, YDN, and IYW Chairman. It is indeed with regret that I must report YKN in Silent Keys. AUL now is a proud papa; Melodee Sue arrived Apr. 14th. YTA has moved to California. TLCN now is on summer sked, Mon., Wed., and Fri. at 1830. The following TLCN men attended the hamfest near Rock Island, Ill. May 23rd: BLH, CGY, FDL, KSF, LJW, QVA, and TGQ. A new Novice at Burlington is WN9UBY the son of IUP. GXH reports that he now has a radiotelegraph 2nd-class license to add to his 1st-class 'phone radar and ham tickets. JTF reports the Cedar Rapids Club officers as follows: GQ, pres.; UCU, vice-pres.; HSV, secy.; IUY, treas. Directors: FPO, PEO, TUI, and UKK. They have an approved RACES Plan now. Traffic: (May) W8BDR 2799, SCA 1201, CZ 190, NGS 183, MGM 142, ERP 121, QVA 116, BLH 106, GXH 48, BTL 45, PUR 14, PAN 5. (Apr.) W8CZ 175, NGS 78, GXH 57, ERP 49, JTF 8, PAN 4.

KANSAS — SCM, Earl N. Johnston, W8ICV — SEC: PAH. RM: KXL. PAM: FNS. Christy's Picnic held May 22nd was a record-breaker with 332 registered in spite of the rainy weather. Several mobiles got stuck on the hidden transmitter hunt but a grand time was had. The CKRC Picnic at Salina had very fine weather and a large turnout. GCJ, RRR, and CTQ furnished communication with their mobiles for the Pony Express run from St. Joe to Marysville June 4th. TOL, of Manhattan, is back on the air after an absence of 15 years and shows up with a traffic report the first month. TSR, of Salina, is back on after spending a year in La. Salina now boasts of 18 mobiles. FDI, of Hadam, has a new Elmac transceiver and receiver in the car. Besides making BPL, the gang at K8FDD, Smoky Hill Air Base, has initiated some new Novice tickets from its ranks. HAW, back from Upland College in W6-Land, is on the air with a Bandmaster on all bands. LOP has a new 183D. EZT has acquired an SX-43. ZUX, YLO, and MI moved their c.d. station to Syracuse after the tornado struck leaving the town without power and communications and on May 20th they gave a demonstration to the Lions Club at Scott City on what their mobiles can do. UPU, of Topeka, has a new SX-88 receiver for a home rig and a new Elmac transceiver for his mobile. Traffic: K8FDD 948, W8BLL 806, NIV 269, OBJ 144, EOT 112, FRO 89, NFX 44, KFS 30, YFE 28, DEL 26, PDJ 25, ONC 25, TOL 24, GGG 18, MXG 16, LCV 13, NLV 13, LIX 10, TNA 10, LHX 8, MLG 8, ZUX 6, QVJ 3.

MISSOURI — SCM, Clarence L. Arundale, W8GBJ — SEC: VRF. PAM: BVL. RM: OUD. QXO, the Amateur Radio Club of Central Missouri and the Lebanon Amateur Radio Club are now officially affiliated with ARRL. CPI has installed a Panadapter for checking purposes. KZR has been appointed EC for the Lebanon Area. The SRC held a very successful hamfest at Moellerus Grove on May 22nd. In spite of the rain, there was a good turnout at the Eldon Picnic. NXY is building a new exciter for the 813s. JHY is attending Navy Radio School in Norfolk. SLH has left for Camp Chaffee. GAR earned a 5,000 Traffickers Club certificate and ZLN the 1,000 certificate. A Bendix Corporation representative addressed the HARC meeting on "Color Television." NDS is assembling a Viking II. UHB completed his exciter and soon will have a pair of 813s. QXO has the big rig back on the air. BZK has a new antenna up and puts out a better signal now. The Early Bird Net handled 7136 messages during its winter sessions. RNK is using vibrator power supply with the mobile rig. ECE now has an antenna that works 80 and 40 meters although it is only 87 feet long. QMF has a 5-over-5 2-meter antenna in operation and doing a good job with it. RR found time for some traffic work. New AREC members: IFM, MXU, and WN8TGC. BPL certificates go to CPI, GAR, and QXO. Traffic: (May) W8CPI 745, GAR 566, QXO 523, BZK 129, HUI 100, EEE 71, KA 54, BVL 52, GBJ 49, TSZ 44, EBE 30, BUL 25, ZWI 25, ZVS 23, CXE 22, KIK 20, ECE 17, OUD 14, CKQ 10, LQC 10, QWB 7, NHO 6, KZR 5, QMF 4, RR 4. (Apr.) W8ZLN 48, ETW 5, LQC 4, ZWI 4, FLN 1.

NEBRASKA — SCM, Floyd B. Campbell, W8CBH — Asst. SCM: Tom Boydston, 8VYX. SEC: JDJ. ERM has a new rig with 2 RF chassis, one on 20, 40, and 80 meters and one for 10 meters running 100 watts to a pair of 807s. KXD has a new Viking II. ODB is working on mobile. FQB came up with the top c.w. score in the CD Party. CQX and GYM had high 'phone scores in the recent SS Test. Garry has a Viking II and Art has a home-brew rig. JJK has a new NC-98. ISV is on with new mobile equipment. YZK is the Ham Station of the Month at Omaha. KYM and THF now have new 20-meter beams. Welcome to the new club at Beatrice and Scottsbluff. The Teen-Age Net is in operation and meets Mon. through Fri. on 3885 kc. at 1630. MGM is NCS. The Ak-Sar-Ben gang did fine business in the last Cancer Drive with GNM and NHW among the ring leaders. Two new calls at North Platte are WN8ULN and WN8ULC. CKZ now has the 75-meter antenna up. IJK is busy catching 4-lb. rainbows instead of completing that 300-watt a.s.b. Let's get those reservations in for the Midwest Division Convention at Des Moines Oct. 17-18. LRK has a new B&W 5100. K6AIR has a new five-element on 20 meters. See you at the Convention. Traffic: (May)

(Continued on page 82)



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Included in the incomparable list of Eimac developed electron-power tubes, which range to 9600mc and 25 kw power output, are six favorites of Amateur Radio Operators. Application-proved in many types of commercial and military service, the 4-65A, 4-125A, 4-250A, 4-400A and 4X150 radial-beam power tetrodes and 4E27A radial-beam power pentode possess the inherent features of Eimac multi-grid tubes—high power gain, minimized neutralization needs, and on-the-air economy. Mobile or shack, 2mc or 420mc, CW or phone, there's a tube in the Eimac Amateur's Big Six to do the job for you with a wallop. When visiting your distributor ask for Eimac—the mark of excellence in electron-power tubes.

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4PR60A	250TH
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4X150A	304TH
4X150D	304TL
4X150G	450TH
4X500A	450TL
4X500F	592/3-200A3
4E27A/5-125B	750TL
3K20,000LA, F, K	1000T
3K50,000LA, F, K	1500T
3W5000A3	2000T
3W5000F3	2-25A
3W10,000A3	2-50A
3X2500A3	2-150D
3X2500F3	2-240A
3X3000A1	2-2000A
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35T	8020(100R)
35TG	KY21A
75TH	RX21A



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DE LUXE COMMUNICATOR net 229.50
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(Less squelch, earphone jack, etc.)

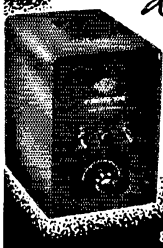
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K0AIR 3710, W0ZJF 207, AEM 144, HTA 72, VYX 38, MAO 36, K0WBF 34, W0ERM 34, FQB 33, KDW 29, WR 27, IAY 26, QHG 26, EQG 25, RRH 12, LGT 10, QOU 10, K0FBD 9, W0JHI 9, DDP 8, DJU 8, KLB 8, ISV 6, CBH 5, CIH 5, HQM 5, NHS 5, QVV 5, FJU 4, KFY 4, HXH 2, IRW 2, BEA 1, ORW 1, QMZ 1. (Apr.) W0IXL 12.

NEW ENGLAND DIVISION

CONNECTICUT — SCM, Milton E. Chaffee, W1EFW — SEC: LKF, PAM: PRE, RM: KYQ, MCN and CN, 3640; CPN, 3880; CEN, 29,580 kc. With summer activities at their peak, traffic has slowed considerably, but the regulars are in there pitching just the same. New ORS: RGB, New OES: UIZ. EC renewals: LWW, PHP, QXN, ORS renewals: BDI, HYF, LV, NJM. OPS renewals: NBP, NEK. OES renewal: BDI. TYQ is off the air lacking a vacuum condenser but stays in the air as a pilot for Aramco. BDI is reporting on the 3620-kc. RTTY Net Wed. exchanging traffic with CN and NTS. A nice note was received from AOS, whose power source is truly unique. TD still is confined to 146 Mc. and OBS schedules. TSZ reports 24 OBS schedules met in May. NEK reports being active on CPN and noon Dragnet. ODW has stacked arrays on a 40-foot tower for 14, 21, and 28 Mc. GIX continues OBS schedules. BVB and GIX submitted the only OO reports in May. VYM works DX on 21 Mc., enjoying plenty of contacts. NJM was on a West Coast trip during most of June. The Willimantic Radio Club is newly affiliated with ARRL. RRE is resting comfortably at the Newtoning Veterans Hospital but hopes to be out soon. WN1AXE is a new ham in Groton. State Police Communications Auxiliaries have been active assisting the highway patrol during holiday periods. This is a good time to check up on appointment renewals. Has your certificate been endorsed within the past year? Traffic: (May) WIUNG 222, WNH 213, AW 193, KYQ 177, EFW 111, LIG 108, CUH 96, BVB 81, RGB 81, TSZ 56, NJM 53, YBH 48, KV 39, BDI 31, YJM 30, FTM 27, NEK 22, RFJ 21, LV 19, GIX 17, QJM 10, ODW 9, HYF 6, AOS 4. (Apr.) W1NEK 8, W1NZJZ 1.

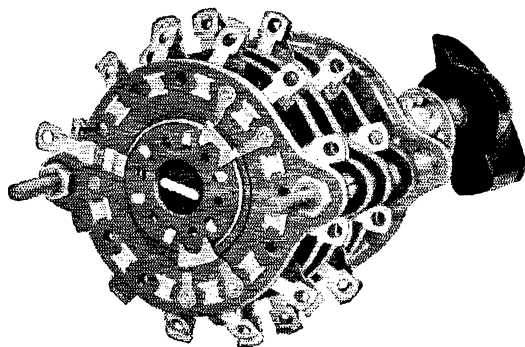
MAINE — SCM, Bernard Seamon, W1AFT — SEC: BYK, PAM: BTY, RM: OHT. The Barnyard Net meets at 7:30 a.m. on 3960 kc. Mon. through Sat. B.X, the Old Maine Schoolmaster, is taking a busman's holiday at the University of Maine summer school. WN1ZAL dropped the "N." A new husband-and-wife team in Freeport, is WN1-BBS, Kay, and WN1BDP, Myron. VYA now operates under a new c.d. call of BPI. The Sheepscot Valley Club held its election of officers the first Mon. in June. FTU is now on the engineering staff of North American Phillips at Lewiston. They have a good man there. Dr. J. Ed. Mignault, of Quebec City, Canadian Controller of Radio Communications for Private Commercial Stations, who is also VE2ZL, called on relatives in the State of Maine and Ed, LYK, recently. There is much 2-meter activity in the State. LHA is dreaming up a half-gallon job on the band. JIS is doing much experimenting, also. Your SCM had a nice visit from Hap and Grace, WRZ, on their way to the Portland encampment of the V.F.W., of which he is Past State Commander. Don't forget to get your tickets early for BOK's ham picnic at Dexter on Aug. 15th with a turkey dinner and all the fixins. Traffic: W1AFT 180, OHT 122, VYA 53, WTG 42, AFT 1, LDD 19, LYR 17, BTY 14, BX 14, PTL 10, RJL 3, TGW 2.

EASTERN MASSACHUSETTS — SCM, Frank L. Baker, jr., W1AEP — New appointments: ISU Holbrook, CLF Norfolk, YLV Essex as ECs; MKW as OO Class III/IV. If anyone wants to offer to take over as EC for his city or town, please drop me a line. Appointments endorsed: ALP Quincy, JXM Avon, HKG Malden, VVI Topfield, MKW Dennis as ECs; BY and WU as ORS; VHH as OO; MEG as OES; BGW as OO; GDY as OFS. Sorry to have to report the death of DRE. LID is moving to Lexington. JOM is on 10 meters. Sector 5's monthly simulated test was held in Scituate with a tidal wave and MB, our EC, and his c.d. director called for various types of equipment. The following were on and offering help: AS, WFO, ZWQ, ALP, KYV, CQN, SH, TYN, VPR, DW, ONV, TQQ, MME, ISU, and JNO. The Braintree Amateur Radio Club held its annual banquet at the Allison House. A new club, the Wayland Radio Club, has been formed with UTU, pres.; KHI, vice-pres. and act. mgr.; RZF, secy-treas. NUP is on 2 meters with a 522 and Workshop beam. IQQ needs 12 QSL cards for DXCC. The Yankee Radio Club is having its annual banquet. MEG is mobile on 75 and 10 meters. The Framingham Club has a new 2-meter net on 145.350 Mc. We received a card from Putnam Breed of Lynn and he feels better and hopes to go home soon. The T-9 Radio Club held its meeting at ISX's QTH and elected TYP, pres.; WNK, vice-pres.; RCA, secy.; CVM, treas. ISX has a new 813 rig on 20 meters and new receiver. WNK has a new modulator and 35 watts. TYP and KON are mobile. The North Shore Radio Assn. of Lynn held a Dutch Treat Supper and a meeting with By Goodman and Lew McCoy of ARRL as speakers. GL is the new call of ex-1YRQ, BPA, and GN who is in Ipswich. Latest DX is ZL3GQ on 80-meter c.w. with 35 watts at 3:30 a.m. OKO

(Continued on page 84)

MALLORY HAM BULLETIN

For Meter Switching In Beam Tube Circuits



Most amateurs agree that measurement of grid, screen and plate currents in transmitter amplifier stages employing power sensitive 6L6, 807, 832A and similar beam tubes is highly desirable to assure most efficient and reliable operation with a minimum of harm to these tubes.

Yet, in practice, few amateurs observe this rule, mainly because of the apparent difficulty in designing a suitable meter switching circuit which will permit economical single meter measurement of the three circuits.

Probably you have encountered a similar problem in your own rig, and wondered how it could be solved. If you have, we'd like to recommend the Mollory 1400L "Circuit Opening" switch as the ideal solution.

The 1400L is a 12 position, 4 section rotary switch. The outer 2 sections consist of 1 circuit 12 position wafers of the non-shorting type. The inner 2 sections consist of wafers with 12 positions, but of a special construction to permit automatic shorting of all like positions between wafers with the exception of the position in use at any one time.

The unique construction of the 1400L switch makes it ideal for transmitter and test equipment meter switching when complete electrical isolation of the meter from all circuits but the one in use is desired.

The 1400L is so versatile that with its use a single meter may be inserted into or removed from, up to 12 electrically isolated circuits. Voltages and currents may be measured inter-mixed. Multiplier shunt or series resistors may be inserted automatically into each circuit to expand the basic movement of the meter. And circuit polarity can be observed automatically so that either grid or plate currents may be measured.

The 1400L gives the amateur precisely what is needed in meter switching circuits.

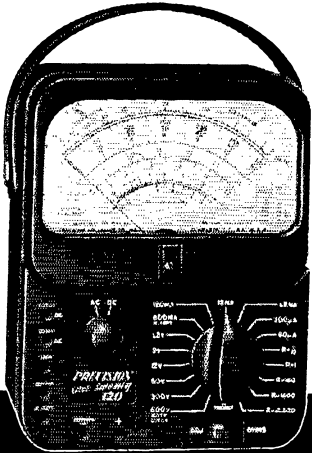
Even so, in spite of its unusual, special construction, its price is still well within the limits of the average pocket-book.

If you have a beam power tube in your Xmitter (and who hasn't in this day and age), it will pay you to see the 1400L at your Mollory Distributors', and lay plans to add its usefulness to your rig.

Incidentally, when you go to see the 1400L, don't forget those other fine Mollory parts including: controls, rheostats, potentiometers, pads, tubular capacitors, transmitting capacitors, dry electrolytics, dry disc rectifiers, vibrators and vibrator power supplies.

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- MODEL 120... complete with internal ohmmeter, batteries, banana-plug test leads and detailed operating manual. Overall Case Dimensions, 5 3/4" x 7 x 3 1/4"
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is Alternate Net Control of the Inter-State 'Phone Net on Wed. and N.C. on Sat. This Net is on 3980 kc. at 1500. YZE, secretary, says the Harvard Wireless Club, will be on again in the fall. BB is fixing up beams and sailing. IKT overhauled his NC-200. HIL has a new VHF2-11. CLF, who was TV in 1916, has his call back. YLV is on 2 meters. New calls: WN1BEV Belmont, BKP Watertown, BKQ Waltham, WN1BKW West Peabody. IAE has a Viking II and NC-183D and is on mobile. The Bedford Radio Club has an 80-meter c.w. net on 3600 kc. at 6:15 p.m. ZJI, act. mgr. of the Weston College Radio Club, reports that the Club has started to train faculty directors to obtain their licenses, and has three others now. WJS, YSO, and ZJH. ZJH leaves soon for Truk, Caroline Islands Trust Territory in the Pacific, to teach and set up a station. The Club has 450 watts and an NC-173 receiver on 20, 40, and 80 meters, with a Gonset on 2 meters for c.d. work. DWO is working on antenna and mobile on 3800 kc., making s.s.s.c. for his wife. TUD. BGV copied the Armed Forces day message on RTTY. WN1BOX is a new ham in Winthrop on 2 meters. On the last drill in Winthrop SBT, DJ, OIR, MQB, NMX, UOC, BDU, CMW, BB, and BB/mobile were on. SBT and DJ chucked in on 6 meters with Revere. The New Bedford Emergency Net test is held at 10:15 a.m. on Sun. WKM has a Lyco ground plane on 10 meters. New officers of the Gypsy Radio Club are SIX, pres.; UHH, vice-pres.; RZZ, secy.; Ike Tift, treas. SNZ is Asst. EC to SIX. The Framingham Radio Club's 2-meter net has the following on: QQW, RCJ, MHC, MEG, ZEN, HPB, SQY, SRG, and YGS. In the recent flash flood in Peabody the following were on the air: QQL, JLN, VMD, PBQ, KEK, TTQ, OGE, OAY, RNM, NVB, JZV, YQF, SNZ, QNC, KWD, RFE, WNN, NO, WFG, and ZWQ. IBE, Rockport EC, reports that his town finally has gotten going on c.d. and a plan has been sent in. The following have been doing a nice job as instructors in code and theory at the El-Ray Amateur Radio Club: SAD, BOD, EIQ, JSM, NXY, PAW, PNW, RSR, T8N, and YSY. Anyone is welcome to come to 158 Lexington St., Waltham, Tue. nights for these classes. QLT reports for the Falmouth Amateur Radio Club. DVS is going to start a code and theory class in the fall. If interested, contact him. TJW is working on a RACES plan. LYV had a Cape Cod ragchew at his QTH. QON and QLF have a new baby. YL, UVF and SNN are on 2 meters. The South Shore Club held its annual banquet with over 100 present. AKY was M.C. New officers were installed and certificates were given to retiring officers. MCR won a receiver and TA won a portable icbox. A skit, "This is Your Life" was given with IS as the person. WK's boy ASG got married and is going to Pearl Harbor. YJG has General Class license. Traffic: (May) WIEMG 598, WVA 291, UKO 286, AVY 165, LM 104, UE 82, UTH 69, EPE 64, IBE 41, QLT 27, TY 20, AF 10, BY 10, NUP 10, BGV 9, AHP 8, BB 7, HIL 3, LLY 2. (Apr.) WI1KT 5. (Mar.) WINUP 4. WESTERN MASSACHUSETTS - SCM, Roger E. Corey, W1JYH SEC. KUE, RM. BVE, PAM: RDR. WMM meets at 7 p.m. EDST Mon. through Fri. on 3560 kc. MKD is new EC for North Adams. WEU has installed a new 6140 in his 10-meter final in place of his 6BQ6 which couldn't take it. YHT now is General Class and is a new member of the AREC. ZPJ, Northbridge High School Radio Club station, is dismantling with the close of school and will be installed in the new school in the fall. GUZ has just returned from several weeks in Georgia, and reports into the Sector C.D. Net. RIN scheduled his nephew, RIN in DL4-Land on 20 meters. BDV copied the Armed Forces Day message and contacted all three stations. NSS, WAR and AIR, on 80 and 75 meters. TAY and his Amherst c.d. group, consisting of JOU, WXF and W0FALM/1, put on demonstrations for the town and for the local Boy Scouts. WCC is on 80 and 40 meters crystal-controlled, but is building a VFO. BVR attended the ARRL Board Meeting in Denver and came back a vice-president. Our congratulations on this well-deserved honor. TVJ is up to 51 countries with his HT-20 but expects to forsake DX for QRP operation in Maine during the summer. QWJ has a new 304TL final on his s.s.b. rig and KK has changed his 814 to p.p. 811s. KVF has a new Elmac transmitter. QPX now is AG2DX in Trieste and was contacted by JYH and KPV recently. Don't forget to get your nominating petition in for a new SCM before Sept. 15th. See p. 65 June QST for details. Traffic: (May) W1TVJ 388, UKR 383, BVR 90, RRE 39, WCG 32, TAY 31, WDW 26, MNG 18, JYH 16, JRA 15, WEF 8, HRC 5, OBQ 1. (Apr.) WIUKR 139.

NEW HAMPSHIRE - SCM, Carroll A. Currier, WIGMH - SEC. RXU, RM: CRW, PAM: AXL. Many thanks to CRW for writing the report for me last month while I was in the hospital. TNO is doing a good job with traffic at Dartmouth College. UEB now is living in Portsmouth, and is an ORS. WUG has a new S & W Mobil-Ceiver and says it works FB. The Manchester Radio Club has a new transmitter on all bands with a 4-250A in the final, driven by a TBS-50. BFT and FTJ still are winning top honors in contests. LCD, WIUU, TXK, and YHI have a 10-meter mobile round table on the way to work mornings. KYG and family, who have been living in California, are calling on old friends in Manchester. POK, UEB, WHI, and CDX are putting on a ham demonstration in the lobby

(Continued on page 86)

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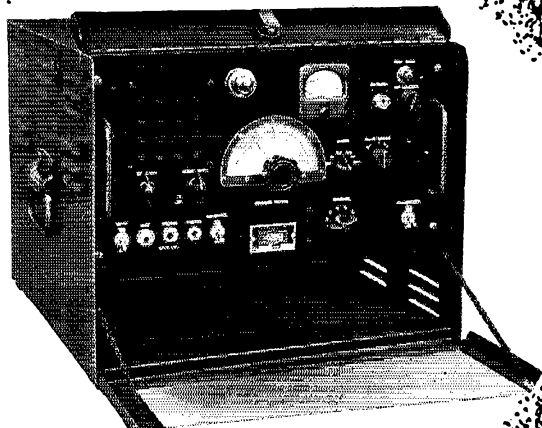
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The CD-2 is a combined 2 meter crystal controlled transmitter and double conversion super heterodyne receiver. It is designed for CD fixed and emergency operations, and is engineered to meet all the rigid specifications of the FCDA. The CD-2 is a rugged, quality constructed unit, dependable for the serious work of CD — ideal for just pleasant QSO'ing on two. Compare these fine outstanding features . . .

- 110 VAC AND 6 VDC OPERATION
- RCVR SENSITIVITY: 0.5 MICROVOLTS
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of the Civic Theatre, Portsmouth, during NAR week. The NHCW Net is looking for outlets in the northern part of the State. GMM has worked all 67 counties in the New England States. TXK worked UNV in Portsmouth, Va., on 10-meter mobile. Where are those news items that were promised from the radio clubs? New calls in New Hampshire: N1ZZA, N1ZZC, N1ZYD, ZZE, YZN, and ZYK. Welcome to WCH to our State. Traffic: (May) W1WU 81, CQC 25, TBS 25, CDX 11, FZ 6, QGU 5, POK 4. (Apr.) WICDX 72, WBM 5.

RHODE ISLAND — SCM, Merrill D. Randall, W1JBB — SEC: MJJ, RM: BTV, RIN meets Mon., Wed., and Fri. at 1900 on 3540 kc. We are particularly proud of the part that Rhode Island amateurs played in passing traffic for the survivors of the *USS Bennington*. Many Rhode Island hams took part but the work of KNE and ULG is especially noteworthy. The nets were set up and operating almost as soon as the ship arrived at the dock! Those of you attending the TCPN meetings for the ensuing three days deserve our thanks for the very welcome assistance that you rendered. And when anybody says that the average amateur won't cooperate, he should have listened to the guys clearing the bands when requested. Thanks, all hands! The Cranston C.D. Net (10 meters) handled the Cranston Bi-centennial Parade and Marathon in noble fashion. W1 LZJ, BTV, YK, OGY, and Control VXL received the thanks of the TV and b.c. announcers publicly for the quickness of their respective reports during the running of the race and the passing of the parade. Guess too much happened this month for reports. We have only two! Traffic: W1BTV 18, VXC 51.

VERMONT — SCM, Robert L. Scott, W1RNA — PAM: RPR, RM: OAK, VTPN: 3860 kc., 0930 hours, Sunday only. VTN: 3520 kc., summer sked 1900 hours, Mon.-Wed.-Fri. GMN: 3860 kc., 1200-1300 hours, Mon. through Fri. The last Maple Sugar "RF" for the season is out. I know the boys and gals will miss the very best work of Ann, OAK. CGW has a new jr. operator. QXU and RNF have a new jr. operator. Keep in touch with the Vermont nets for the latest information on the Vermont Hamfest to be held in September at Brattleboro. News items are scarce and the activity of stations has fallen off. It must be that the OMs are busy doing what the XYs have been thinking about all winter. Traffic: W1OAK 170, RNA 132, JLZ 89, VFP 66, TEW 56, TLI 42, KJG 40, UGW 18, TAN 17, VZE 11, VVP 9.

NORTHWESTERN DIVISION

ALASKA — SCM, Dave A. Fulton, KL7AGU — The Elmendorf Amateur Radio Club's 2-meter project is progressing quite well and the committee has decided upon horizontal polarization. Chairman of the committee is PIV, who is well acquainted with 2-meter DX-chasing. ATL reports he is working into the States every evening on 3802 kc. with his 120-watt s.s.b. rig. ALJ reports he will be on with s.s.b. soon. The YLs in the Anchorage Area are making a project out of monitoring 3892 kc. YG reports that one station is listening on the frequency daily now with more to follow soon, so anyone with emergency traffic give a shout on 3892 kc. The 1954 All-Alaska Hamfest, which is to be held at Paxson Lodge Aug. 13th, 14th, and 15th, is really shaping up with a lot of good fun in store for all those attending. Traffic: KL7AIR 1721, AOP 1281, ATL 11.

IDAHO — SCM, Alan K. Ross, W7IWU — Lewiston: The Lewiston Clarkston Amateur Radio Club filled an Idaho Power Co. window with a display showing emergency equipment and how to get started in amateur radio. TLV and TLW have their new B.&W. transmitter on the air. Operation Alert sported 8 mobiles, 4 fixed emergency powered, and 2 walkie-talkies on 3995 kc. Kellogg: RQG checks into the FARM, Montana, and MARS Nets. Ririe: LQU bought a Globe Scout to give his 813 rig a rest. Gifford: WN7VWS, age 14, has applied for AREC membership. He is on with crystal-controlled Commanding rig and three-tube Ocean Hopper receiver. Poise: IWU has a 5 watt mobile with loaded 3-section car b.c. antenna for local QSO on 75 and 40 meters. Ten-meter activity during Operation Alert was QRMed by short skip from W6-Land. Shelley: ACD is on 50.1 Mc. with 120 watts, four-element beam. Traffic: W7ACD 130, RQG 18.

MONTANA — SCM, Edward G. Brown, W7KGIJ — Emergency drills conducted by the Great Falls gang have all been very successful and everyone participating has done a swell job. These are held without the gang, having any knowledge of when, where, or what simulated emergency has been planned by the committee. In the last drill KUH, TLA, MM, GCS, and BOZ were dispatched to outlying towns to report back with their mobile stations. GFT made a two-and-one-half-hour tape recording of the last drill. Other groups and clubs throughout the State should follow the Great Falls example and find out how interesting these drills can be. SFK has been doing some very good work as Official Observer and has some well observing equipment. Ray also has been making BPL every month lately. The Northern Montana Radio Club held its annual banquet May 23rd and 30 hams were present, some of them coming from quite a distance. KUH has received a

(Continued on page 88)

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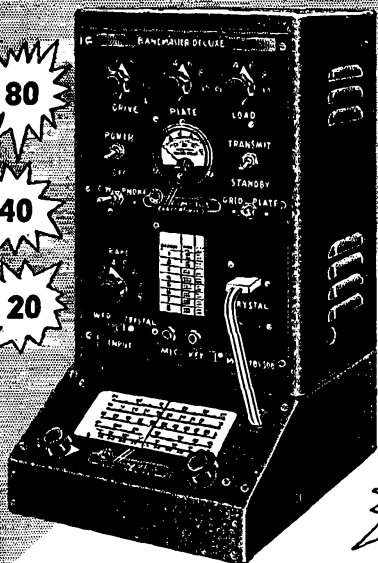
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letter of commendation from the Army Air Base for the timely and efficient amateur radio service extended to the Great Falls Air Force Base, the Fire Department, and the Police by operating his mobile rig at the scene of two aircraft accidents. Traffic: (May) W7SFK 554, TKB 13, EWR 9, FIS 8. (Apr.) W7EWR 3.

OREGON — SCM, John M. Carroll, W7BUS — RLG advises of summer activity on mobile in LaGrande. AJN reports UFL and TYG are prospective OSN members, and OSN had 17 sessions with 124 attendance and 51 messages. RCL and UHK are new OSN members. BRAT awards this month go to TH, PHJ, PRA, and AJN. PRA developed a new type field-strength meter. TVW still is working on his a.s.b. linear final. WJ made a flying trip to the cow country for a visit with the SCM. QEI and 33 other hams signed up to assist the Multnomah County Civil Defense Committee. CZ is going a.s.b. mobile. PRO and GLK are settled in their new QTH. FUN is servicing TV sets. TJJ is off the air and is hauling logs. HPO has an ARC-5 on 40 meters. UGE is going to take his General Class exam soon. KTG and LNG are working DX on 20 meters. VIL passed General Class exam and dropped the "N." QQP has been transferred to Crescent City, Calif. ESJ requests all ECs to send in their certificates for endorsement. PJJ, RGE, ROH, and CPE assisted in a civil defense trial at Grays Harbor. WN7ULB was injured in an accident. QVY is working for his Extra Class ticket. QF resigned as net director of the Cascade Net because of the press of business. The Cascade Net had 471 check-ins with 31 net controls on 29.2 Mc. BUS still is on crutches but hopes to be back on both feet soon. Traffic: W7APF 118, KTG 95, PRA 86, TBT 60, THX 52, QEI 51, AJN 50, OMO 21, ESJ 6, EDU 4, BUS 2.

WASHINGTON — SCM, Victor S. Gish, W7FIX — SEC: QZF, RM: OE, PAMS: EHH, PGY. Traffic Nets: WARTS, 3970 kc., 1830 PST daily; Washington Section Net, 3575 kc., at 1900 PST, and 1988 kc., at 1930 PST Mon. through Fri. (both c.w.) The North Seattle Radio Club has new quarters which were officially opened with an open house night, with civil defense rigs all over the place, thanks to the work of OEX, PGY, and WAO. UQY, a new OO, received 35-w.p.m. sticker, worked WAR and NSS on Armed Forces Day, and finally hooked LU1ZT on South Shetland, and with all this the first jr. operator arrived May 9th. BA is going to slow down on traffic (he says!), ZU bought a Heathkit scope for the jr. operator, PRZ, to assemble during his summer vacation from E.E. studies at Cornell. KCU is off the air because of TVI and ITV. TGS is taking UMK's place on WSN and RN7, rig and all. FWD discontinued code practice for the summer, but will resume Sept. 7th. K7FDD lost W7VKK on a transfer to Tennessee. VNZ was in a car wreck and is in a Tacoma hospital. EVW has separate finals on 10, 20, 40, and 80 meters and expects to start an RTTY Net around Tacoma on 10 meters. The following appointments were renewed: PQT as EC, JFB as OBS, CWN, CZX, GAT, JC, KCU, OE, PYV, and RXX as ORS, EVW and PGY as OPS, EHH and PGY as PAM. New appointments: TGO as OBS, UQY as OO, OE is now in Goleta, Calif. for a couple of months on CAA work. At the Washington Apple Blossom Festival at Wenatchee mobiles OVE, 8XN, PNN, ETO, HQO, and EVB were available along the parade route assisting coordination of the parade movement while standing by to relay information for any emergency. Thanks for all the congratulations on the SCM job, but if you want your news in this report it must reach me by the 7th of the month. Traffic: (May) W7BA 1878, PGY 1136, HKA 607, QQW 211, FRU 160, K7FDD 136, W7RXH 101, AIB 67, FIX 57, TGS 54, HAK 52, AMC 33, APS 29, EHH 29, FWD 18, PQT 17, GAT 16, ZU 15, HDT 13, EVW 11, DDU 6. (Apr.) W7PQT 14.

PACIFIC DIVISION

NEVADA — SCM, Ray T. Warner, W7JU — ECs: KOA, LGS, NRU, TJY, and ZT. OPS: JUO, ORS: MYP, VIU. JUO is engaged in building another mobile transmitter for his new Buick. VDC is doing a fine job with affix at K7FDB. Stead AFB. Al made BPL with 651 messages handled. TJY arranged for a radio circuit to the Boy Scout camp near Gardnerville, in cooperation with PST RNZ, and UPH. BVZ is considering 2-meter activity. LGS is QRL Naval Reserve activities. UPS, PEW, and VIU are making plans for Field Day. JU handled traffic for the 2-meter transcon relay. HJ, our SEC, who has reported faithfully for 24 consecutive months, has resigned. Congrats on a job well done, Frank. DVJ, in Las Vegas, has been heard on 2 meters. Traffic: K7FDB 661, W7VDC 88, JU 14, VIU 3.

SANTA CLARA VALLEY — SCM, Roy I. Couzin, W6LZL — The Santa Clara County Amateur Radio Assn. had its hands full with plans and preparations for the Pacific Division Convention which took place July 4-5-6. The Monterey Bay Radio Club held an election of officers in May. The Mountain View Amateur Radio Club had its final planning for Field Day in May. INN is back in business sending me dope from the San Mateo County Amateur Radio Club. The Club voted to purchase window badges

(Continued on page 90)



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D103T • DeLuxe 10m 3-El. T match, \$25.95. 1—8' Boom, 1" Alum. Tubing; 3—6' Center Elements, 1" Alum. Tubing; 6—6' End Inserts, 3/4" Alum. Tubing; 1—T Match (4'). Polystyrene Tubing; 1—Beam Mount.

S104T • Std. 10m 4-El. T match, \$24.95. 1—12' Boom, 1" Alum. Tubing; 4—6' Center Elements, 3/4" Alum. Tubing; 8—6' End Inserts, 3/4" Alum. Tubing; 1—T Match (4'). Polystyrene Tubing; 1—Beam Mount.

D104T • DeLuxe 10m 4-El. T match, \$30.95. 1—12' Boom, 1" Alum. Tubing; 4—6' Center Elements, 1" Alum. Tubing; 8—6' End Inserts, 3/4" Alum. Tubing; 1—T Match (4'). Polystyrene Tubing; 1—Beam Mount.

15 M. BEAMS

S152T • Std. 15m 2-El. T match, \$22.95. 1—12' Boom, 1" Alum. Tubing; 2—12' Center Elements, 3/4" Alum. Tubing; 2—5' End Inserts, 3/4" Alum. Tubing; 2—7' End Inserts, 3/4" Alum. Tubing; 1—T Match (6'). Polystyrene Tubing; 1—Beam Mount.

D152T • DeLuxe 15m 3-El. T match, \$39.95. 1—12' Boom, 1" Alum. Tubing; 3—12' Center Elements, 1" Alum. Tubing; 2—5' End Inserts, 3/4" Alum. Tubing; 2—6' End Inserts, 3/4" Alum. Tubing; 1—T Match (6'). Polystyrene Tubing; 1—Beam Mount.

20 M. BEAMS

S202N • Std. 20m 2-El. (No T), \$21.95. 1—12' Boom, 1" Alum. Tubing; 2—12' Center Elements, 1" Alum. Tubing; 4—12' End Inserts, 3/4" Alum. Tubing; 1—Beam Mount.

S202T • Std. 20m 2-El. T match, \$24.95. 1—12' Boom, 1" Alum. Tubing; 2—12' Center Elements, 1" Alum. Tubing; 4—12' End Inserts, 3/4" Alum. Tubing; 1—T Match (8'). Polystyrene Tubing; 1—Beam Mount.

D202N • DeLuxe 20m 2-El. (No T), \$31.95. 2—12' Booms, 1" Alum. Tubing; 2—12' Center Elements, 1" Alum. Tubing; 4—12' End Inserts, 3/4" Alum. Tubing; 1—Beam Crosspiece, 1" Alum. Tubing; 1—Beam Mount.

D202T • DeLuxe 20m 2-El. T match, \$34.95. 2—12' Booms, 1" Alum. Tubing; 2—12' Center Elements, 1" Alum. Tubing; 4—12' End Inserts, 3/4" Alum. Tubing; 1—T Match (8'). Polystyrene Tubing; 1—Beam Crosspiece, 1" Alum. Tubing; 1—Beam Mount.

S203N • Std. 20m 3-El. (No T), \$34.95. 1—12' Boom, 1" Alum. Tubing; 3—12' Center Elements, 1" Alum. Tubing; 6—12' End Inserts, 3/4" Alum. Tubing; 1—Beam Mount.

S203T • Std. 20m 3-El. T match, \$37.95. 1—12' Boom, 1" Alum. Tubing; 3—12' Center Elements, 1" Alum. Tubing; 6—12' End Inserts, 3/4" Alum. Tubing; 1—T Match (8'). Polystyrene Tubing; 1—Beam Mount.

D203N • DeLuxe 20m 3-El. (No T), \$46.95. 2—12' Booms, 1" Alum. Tubing; 3—12' Center Elements, 1" Alum. Tubing; 6—12' End Inserts, 3/4" Alum. Tubing; 1—Beam Crosspiece, 1" Alum. Tubing; 1—Beam Mount.

D203T • DeLuxe 20m 3-El. T match, \$49.95. 2—12' Booms, 1" Alum. Tubing; 3—12' Center Elements, 1" Alum. Tubing; 6—12' End Inserts, 3/4" Alum. Tubing; 1—T Match (8'). Polystyrene Tubing; 1—Beam Crosspiece, 1" Alum. Tubing; 1—Beam Mount.

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to wear at club meetings so visitors will get acquainted easier. Bud Bane gave a very interesting talk on antennas and propagation. ZUZ has a new vertical on 7 Mc. INN still is plugging 7 Mc. with long wire. TPZ still is QRT as the new QTH in the backwoods is absorbing operating time. BHR still is faithful to 6 meters and has quite a bunch to talk to, including EDC and ZBS. BHR and EDC also are experimenting on 420 Mc. The SCCARA used the call UW on Field Day. The North Peninsula Electronics Club used the call PMK. EXX has just finished the 144-Mc. rig for mobile and is on 75-meter mobile now and then. WMM is in the throes of moving so is QRT at home but has the 144-Mc. mobile fixed and back in business. MMG is back at the home QTH after an Eastern jaunt. K6BBD has hi-poweritis and won't be happy until he can compete with the old die-hards. YHM is off again for Alaska and won't be back until fall. He sure puts a dent in the traffic picture when he leaves. Traffic: W6YHM 364, UTV 208, FON 70, K6BBD 50, W6MMG 4.

EAST BAY—SCM, Guy Black, W6RLB—Asst. SCMs: Harry Cameron, 6RVC; Oliver Nelson, 6MXQ, SEC: WGM, RMs: IPW, JOH, PAM; LL, ECs: AKB, CAN, CX, F.L.T., NNS, QDE, TCU, ZZF. Bob Weber, JOH, long one of the most active of the traffic gang, has been selected as manager of RN6. The gang should know that in addition to all his radio activities, Bob rides herd on six harmonics. Now who wants to complain about not having enough time for ham radio? K6FDG reports that the most active operators at the Travis AFB station are NRN, K6CRX, K6CRY, W3PFN/6, IOT, TMX, and OVQ. They sure handle a lot of traffic. Among the East Bay clubs active on Field Day were the Oakland Radio Club, Mt. Diablo Radio Club, SARO, Richmond Radio Club, and North Bay Amateur Radio Association. Anyone interested in contacting a club in his area can obtain information from the SCM. K6DX has IGV helping to put up his new 20-meter beam. The Mobilizers had a fine turnout at its annual picnic in Redwood Park, Oakland, on June 6th. The v.h.f. gang on that day was very busy in the middle of the V. H. F. Party, and some of the highest scoring stations will be those who took advantage of the 6-meter openings during the day to build up their section multiplier. OHQ operated from Mt. Diablo, WGM and AFC from Mt. Vaca, VSV, MXQ, DNX, GQK (and son), and RLB from Ebbetts Pass. Six meters was sensational in May with almost daily openings. #HTZ/6 is a papa. A new Novice in Richmond is K6GEZU. A new VU Novice in Albany is K6GCHW. Three new AEC members are K6EDN, K6EAI, and W6AW. The new EC for the Vallejo Area is ZZF, who has had plenty of experience and is very efficient. NGC has a son in the Coast Guard whom he contacts through KH6BCU. HBF, age 14, does a better job as Official Observer than some of the tired old men three times his age. How about that? Traffic: (May) K6FDG 1895, WAY 370, BDF 223, W6QPY 65, NGC 64, JOH 62, HBF 7, YDI 7, EA 6. (Apr.) K6BDF 244.

SAN FRANCISCO—SCM, Walter A. Buckley, W6GGC—SEC: NL, EC: BYS. The SCRA held a recent meeting at the Sebastopol Swimming Pool with swimming from 6 to 9 p.m. The SFNSY held an auction to raise funds for Field Day. They were at Windy Hill for contacts on that day. The 29ERS now has a mobile club group of about 18 cars. Net Control FVK planned the 10-meter hunt held at the Pacific Division Convention in San Jose in July. The Mobilizers held a picnic at Roberts Redwood Park with free bingo for the XYs and plenty of prizes for the OMs and XYs. All went home happy. The raffle cleared about \$50 for the license plate deal coming up again in 1956. Everyone agreed the picnic was a great success. The SFRC held its annual auction night at the last meeting. Many good pieces of junk were sold. Club Novices had a field day buying up all worn-out rigs the old-timers brought there. The boys of John O'Connell, QRMI, participated in Field Day. The YLRC held open house to the OMs at the May meeting and a good time was had by all. The local radio store donated some nice prizes. No news was received from the HARC boys this month. UEV spoke on mobile f.m. gear at a recent HAMS meeting. George brought along his own demonstration. The TARC had its regular meeting at the home of OZC. Congratulations to SWP, K6FCT, W6PHT and QMO on making BPL in May. Congratulations to K6ACC on his new YL; also to HKK on the birth of a YL May 28th. BIP has written an article on his super-snooper mobile beam which has won so many transmitter hunts for him and SY. URA will not be heard mobile until he finds a way to work a bug and drive at the same time. CTH has returned from Chicago. He went on business and then took in the Indianapolis Memorial Day Race. NCK is teaching the code to four potential Novices. K6ACN is going mobile on 75 meters with 60 watts. HDP has built test equipment to measure small capacities and resistances. He also has wave meters to 500 Mc. and a voltmeter for measuring hum voltage in power supplies of his own design. NIM/1 is back on the air from Groton, Conn. He is attending Electronic Technical School at Coast Guard Training Station. He hopes to work some of the local boys from base station WKCGS. CBE attended the Electronic Parts Convention, #PBPM, at Kansas, has new ideas for inexpensive c.w.,

(Continued on page 92)

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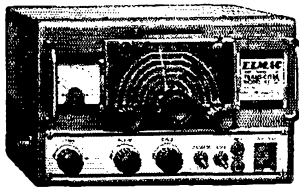
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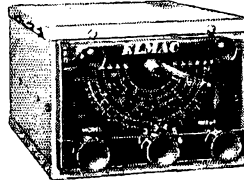
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especially for Novice operation. Johnny is a member of SFRC, which he joined during his assignment at Treasure Island. Traffic: W6SWP 1304, K6FCT 880, W6PHT 674, QMO 593, GQY 425, NCG 344, GGC 50, BIP 8, MWF 8, GQA 4.

SACRAMENTO VALLEY — SCM, Harold L. Lucero, W6JDN — EKP has been made Asst. SEC for the Yuba City Area. A fine meeting was held in Sacramento with the Stockton Club attending. A talk on mobile antennas was given by UAF. VBI was chairman of MARS Field Day plans. LLR is mobile on 75 meters and active in c.d. PVI is active on 144 Mc. GDO is with the telephone company. HTS and HSB moved to new QTH. MIW is looking for a new QTH. QDT is going mobile for a trip to Texas. AK and his XYL returned from a trip to the southern part of U.S.A. They were mobile all the way. QYQ has his Transciter pushing the kw. on 75-meter phone. CLV, the flea power king, reports 40 meters fairly hot in the early morning. CIS and ZF, Asst. Directors, attended the Pacific sub-directorate meeting in Berkeley. Also these two are experimenting with 1/2-wave vertical for all-band operation. QKJ is experimenting with low-powered rig on 75 meters. KA2HP, ex-6HOP, visited in Sacramento en route to Tinker AFB, where he hopes to become a W5. ILZ is active on 20 and 75 meters while being president of the SARC. AHN is about to become active again. AD, of old Piedmont fame, is active again. KKI, HIR, ZSL, and GNH are active on MARS. GQS is on with high power. ROO has a new vertical. JN is on 75-meter phone occasionally. SBH, of Chico, is doing a very fine job with his new appointment as OBS. Let's help build up the Sacramento Valley Section Traffic Net. No word was received from the Redding Club. Many from all parts of the section were active in the Field Day. We're about at the end of the news and this is it unless our membership grows, so what's the word, fellows? Traffic: W6REF/6 188, JEQ 87, MWR 60, JDN 16, TYC 15.

SAN JOAQUIN VALLEY — SCM, Edward L. Bewley, W6GIW — SEC: KRO. RM: OPU. PAMA: ZRJ, WJF. The hamfest at Fresno was a big success, with more than 400 attending. The Fresno gang deserves a big vote of thanks from all of us who enjoyed the many activities, dinner, and entertainment put on for us. Of course the main fun was meeting friends, old and new, in person. On May 21st the Sacramento Club played host to 25 hams from the Stockton, Modesto, and Turlock Area. Most of the cars were equipped with 75-meter mobile, which made the trip more enjoyable, and were guided to the meeting place by hams in Sacramento. LEH is getting excellent results with his 5-watt mobile rig. FKL has mobile in both his car and pickup. He also is working on RTTY. NAS has 400 watts on c.w., with modulator under construction. RRN and his XYL have a new harmonic, a boy, who arrived May 27th. K6BMM and his XYL also have a harmonic, a boy, born May 11th. ZRJ reports he is getting good results with Carter modulation in the mobile rig. SAH still is very busy handling phone patches on 20 meters, one as far as New York. We notice that K6BP now is a technical author, with a nice write-up on his 2-meter transmitter. EXL, as NCS on the Stockton 2-meter Net, worked out a nice stunt for the gang. A mobile station in the area had to be pinpointed from the home stations with the aid of maps and beam bearings. Traffic: K6FAE 1413, W6ZRJ 219, SJJ 71, K6BGM 60, W6WJF 30, EBL 24, FEA 19, K6BMM 3, W6GIW 1.

ROANOKE DIVISION

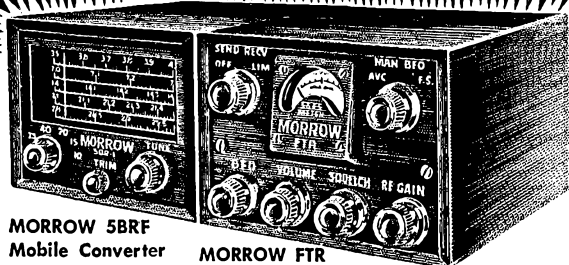
NORTH CAROLINA — SCM, J. C. Geaslen, W4DLX — The annual Charlotte Hamfest was held May 23rd. The registration was 162 with more than 30 mobiles. The club station, BFB, was on the air at the site from 9 a.m. Director MWH gave a talk on the highlights of the Board Meeting. ZG, the SEC, gave a short talk on c.d. plans for North Carolina. The SCM made a short explanatory resignation announcement. The mobile contest was won by ZG. The worst spring "Nor'easter" didn't prevent the Winston-Salem 75-meter gang from motoring to Doughton Park, on the Skyline Drive, for a picnic. TQU/M and XYL braved rain and a London fog to be early to check mobile to mobile communication and weather. YPI, YSB, and WSS/M, with XYLs and jr. operators, started the motorcade to the mountain around 0930. IGE/M jumped the gun and departed at 0920. Mobiles ZG, KGR, RNW, RCR, YSB, MZZ, and JCB followed. 3865 kc. was loaded with cheerful chatter. WSS/M and YPI maintained contact with the group and relayed weather predictions. After a big feed a contented group was spread over three routes on their journey home. BOH, operating NC, furnished a link with Winston-Salem. SAD, TMB, TFF, and BNN cooperated in giving the group signal reports from Virginia southward through the Carolinas. The Forsyth County AREC participated in an Explorer Scout simulated emergency mobilization May 8th. Two Net Controls were established at the First Baptist Church Annex in downtown Winston-Salem. KGR parked his mobile on the church lawn to act as 75-meter Net Control. He dispatched BIU, WSS, REO, and IGE (all mobile) to various emergency facilities throughout the city. YLU, assisted by MRH,

(Continued on page 94)



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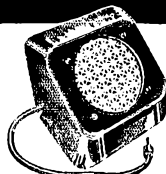
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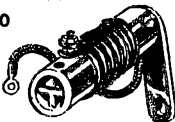


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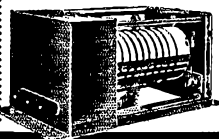
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installed the 2-meter Net Control Station on the top floor of the Annex building using equipment supplied by YJG. CPI, using a Gonsel Communicator, went mobile and was dispatched to the north side as a communication link. PJO stood by and relayed as needed. TQU, EC, was on hand and directed the activities. The first unit was dispatched at 0810 and the last mobile returned to Hq. at 1040. RNA and HUW, of Raleigh, won first and second place in the Feb. 20-21 15-hour Inter-American Contest sponsored by the League of Radio Amateurs of Venezuela. They received their gold and silver medals in a presentation ceremony. Contacts were made with every country in the western hemisphere. VHH is using a new V.R. keyer which works FB. Traffic: W4VHH 120.

SOUTH CAROLINA — SCM, T. Hunter Wood, W4ANK — FM has completed a new emergency rig for use on vacations, using a BC-696 and 454 with economy power supply. DX and TWW used their mobile rigs to advise the highway department to clear the road near Aiken of fallen telephone poles. ZIZ reports into the Fla. Phone Net, the Early Birds Net, 4RN, and can take traffic for any direction. AKC has moved to Rock Hill from Gastonia, N. C. DMX reports that the Columbia Hamfest was a success. OXO reported from Rock Hill that as a result of coaching by NDH there are 25 new WNs in Rock Hill including a 10-year-old Novice, 2 YLs, a mother-and-son team, a father-and-son team, and a husband-and-wife team. A "well done" goes to NDH, who has helped some 40 obtain their licenses. HDR and CEL attended the Atlanta Hamfest. IIB/4 is being transferred to sea duty. A ham picnic was held in Charleston on May 30th with TWW operating from the end of a 1000-foot pier into the Atlantic using a 260-foot antenna supported by a kite to work mobiles en route. Some 100 were in attendance with a highlight of the affair being a mobile field strength contest with HMG taking first honors. Traffic: W4ANK 204, ZIZ 86, HDR 79, DMX 7, FM 4.

VIRGINIA — SCM, John Carl Morgan, W4KX — FV was top man by a wide margin in the Virginia QSO Party, with HQN and YZC in place and show. WN4CHK and WN4CKW were the only Novices reporting and were only 2 points apart. Some 30 logs were submitted, but nearly 80 participated. Nearly 100 had the usual FB time at NV/SB's Fluvanna County farm on the VFN picnic. TVO was elected net mgr.; YVG, asst. mgr.; and ONV, secy.-treas. TVO is a new PAM, and YVG and ONV are RMs for VFN. UHG and YZC are sparking the curtailed summer sked of VN. This is a chance for the younger or newer hams to get their hands in both QNI and QNG. Don't be bashful. BLR says the feminine contingent in the Richmond Area had a distaff Field Day outing on Skyline Drive. XYLs BQI and DWP are now General Class. The SVARC will take the responsibility for Novice and Conditional Class exams in Northern Va., west of Blue Ridge, with THF, ATQ, PAB, OOL, BOT, and KX as a committee. The SVARC annual Dickey Ridge Hamfest is set for Aug. 1st. The RARC announced a big hamfest to be held in Richmond Oct. 30th. CU, GEB, GP, EYX, JXX, KRG, SN, and ZLA furnished base and mobile communications during the May 16th Fairfax County ARC Disaster drill. School QRM reduced a tivity of the younger element. YZC says teen-agers do not like the "squirt" cognomen. Don't take it as a term of opprobrium, squirts. The late "T.O.M." always used it with implied pat-on-the-noggin connotation. KRR made BPL as an anniversary celebration for doing so last May. NightshifTERS are reminded of the Old Dominion Net, 3845 kc., Mon.-Fri. at 1300 EST. Quite a few net certificates were issued for VN, VFN, and VSN. If you've reported once each week for 3 months, or 50 times during the season in a given net, you're eligible. Just let me know. OWV worked AIR, NSS, and WAR on Armed Forces Day. TFZ had to sign /4 because he moved next door — even though he didn't have to move the antenna. 3UE (ex-SCM 4FP) sent a wistful note expressing regret at not being eligible for the Virginia QSO party. We missed you too, Lindy. Traffic (May) W4KRR 643, FV 169, AUR 129, TFZ 88, YVG 85, VYZ 83, BLR 79, UWS 60, KX 52, RJW 39, CWV 19, IF 12, OWV 9, UHG 9, WBC 6, LE 4. (Apr.) W4FV 115.

WEST VIRGINIA — SCM, Albert H. Hix, W8PQQ — SEC; YPR. PAM: FGL. RMs: GBF, AUJ, DFC, HZA. HNC is a new OPS. NYH is a new ORS and OPS. KDQ is a new ORS. Welcome to these c.d. appointees. HZA and GUX participated in the recent c.d. test as MARS members. 4URF is operating mobile in West Virginia with a new Elmac rig. HI has QSOed a few 6-meter stations out-of-state recently. NYH is very active in several of the nets. CLX has new 15- and 20-meter three-element wide-spaced beams ready to go. Ex-SCM KKG, now holding another W8 call in Charleston is making plans to get back on. GIO now has a pair of 6C2Ls on 75 meters which are perking very well. It would be appreciated if more of the fellows would send in monthly reports. A supply of report cards will be sent to those who desire them. GEC gets out very well on 7-Mc. c.w. LSG is working a lot of DX on 20 meters with a Viking and ground plane. ORC is quite active on 7-Mc. c.w. LAJ, BNL, and HYU, in Dunbar, are all active on 75-meter phone. Several appointment vacancies are open

(Continued on page 96)

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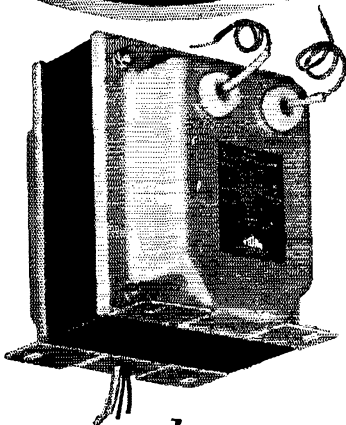
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ROCKY MOUNTAIN DIVISION

COLORADO—SCM, Karl Brueggeman, W0CDX—SEC: MMT. There is not much news this month because no cards came in. Your SCM has a new idea. If you all want to send in the news via messages, we'll be on Sunday morning on the CEFN to copy. BWJ has a new two-element beam on 20 meters and promises to try to beat YMP in the next Sweepstakes. The Alamosa gang is going to work on its TVI, which is strictly a fringe proposition. RTA is taking summer relief for KHQ on the traffic work. OHB is head of the TVI committee. We regret to announce the passing of Graham Dodge, CPA. Marie, MMT, not only is working hard as SEC but also is helping to organize a new radio club in Ft. Collins. Single sideband is in Denver now, with FNQ running a linear 811, UQM a pair of 6146s, and UJS a cool kw. A nice letter was received from MBM in Hayden. The radio club there is the Hayden Amateur Radio Propagation Society, or HARPS. New ticket-holders in the club are WN0SJJ, WN0TUT, and WN0UTN. All are using Heath-kits. RQC, from Craig, is handling the exams and has 3 more coming up. MBM has new Viking, PE-103, and Super Six mobile combo. A new ham in Craig is TVB. We wish to thank all the members of the Denver Radio Club who worked so hard to put the Convention on. K0WBB sent in his traffic total like this, "484 nuts!" Better luck next time. Hi. Traffic: K0FAU 1884, W0RTA 564, K0WBB 484, W0BWJ 72.

UTAH—SCM, Floyd L. Hinshaw, W7UTM—6JZ and 6HC visited and demonstrated the feasibility of 2-meter gear, working S.L.C. from Bountiful with a good-sized mountain in between the two towns. K7FCN, busy on his big rhombic, has little time to operate, but is getting his emergency gear in shape. Look for him soon on all frequencies. NVY is new OBS and Class III OQ. SP has his 2-meter beam up again and is hearing the gang much better. Utah c.d. plans are shaping up with the State divided into 6 areas reporting to headquarters in S.L.C. Salt Lake County has received its DCS call of KOAAS. OGG has his new rig loaded to an indoor antenna but hopes to put up a ground plane on the roof soon. He works 40 meters mostly. Two reports on the Rocky Mountain QSO Party place QDJ first in Utah with SJD second. We do not have the winner for the Division. Traffic: W7UTM 6.

SOUTHEASTERN DIVISION

ALABAMA—SCM, Joe A. Shannon, W4MI—SEC: ISD. RM: KIX, PAM; RNX. Two excellent banquets were held in the section during the month of May, Birmingham on the 16th and Mobile on the 30th. Both were well attended. Birmingham reported a total attendance of nearly 550 and Mobile was not far behind. The next section fest is scheduled in Decatur on Aug. 29th, and should prove to be another good one. The Birmingham and Mobile Clubs are to be congratulated on excellent organization of their 'fests. YRO reports that CMK has been elected secretary of the Muscle Shoals Club. She is one of the first XYLs to be elected to club office in the section. VE3OJ has returned to Canada after completing school at Maxwell AFB. The Montgomery Club will miss his mobile activity and club participation. During May, EBD reports that a total of 114 mobiles reported into AENB, the Birmingham Emergency Net. ARR and YXX have joined the net. Traffic: (May) W4WOG 162, TXO 93, KIX 70, RNX 68, EJZ 62, YRO 59, EBD 42, DDX 34, CRY 31, PWS 28, BJL 21, TKL 17, MKV 12, AZX 10, VLY 6. (Apr.) W4YAI 64, PWS 17, BFM 11, MKV 10.

EASTERN FLORIDA—SCM, John W. Hollister, jr. W4FWZ—JOCO was tremendous and congrats to IM and his participants. Thanks to IM, IYT, YNM, DRD, AYX, FE, UHY, PBS, IEH, PZT, and others for detailed reports and clippings. With deepest sympathy and regrets the passing of IMJ is noted. Lloyd will be remembered for many things but primarily as State Senator when history was made with the first State auto license call plate. Clearwater: CARB officers include SZZ and MTL. Deland: FE reports LARA sponsored a c.d. meet with a talk by RWM at Tavares. Every town in the County was represented. Gainesville: TJU, skipping the Tropical, reports 345 net traffic. Doug is authoring RTTY articles for Southern California RTTY Society! Ft. Lauderdale: SDI says the Flamingo will handle communications for the famed Gold Coast Marathon again, and that new certificate for working 10 Flamingo members is an eye-opener. OM/OW combines include MVR/SDI, TOJ/TOK, DTJ/WYR, and VYU/VZC. Jacksonville: JGD's XYL is WN4GAN. Armed Forces Day traffic skipped by DSC, UHE, WEO, TRN, NKC, and others totaled 140. EFN uses new B & W transmitter. Lakeland: VIE reports a mother/son combine is WN4FXL/WN4FWK. Miami: WYR reports DRC officers include AZO, IEH, WYR, and QLC. VET is working MM. IYT's XYL is WN4GGQ, his father-in-law is WN4ZYM. Ocala: DVR uses Windom antenna. Skipper Mac reports 187 for the FN Net. Sarasota: LMT is a c.d. (Continued on page 98)

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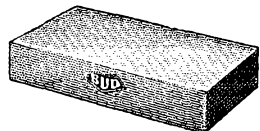
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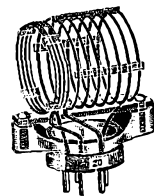
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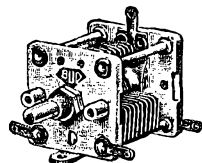
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Polystyrene has proven superior to porcelain for many reasons, including far greater resistance to breaking or cracking—the Q of the coil is exceptionally high due to the low power factor—pins are molded in place and always remain perfectly aligned—sharp corners are eliminated. Coils are furnished with fixed or adjustable center links or fixed or adjustable end links. They can be used on bands from 6 meter to 160 meter or in circuits using Pentode tubes.



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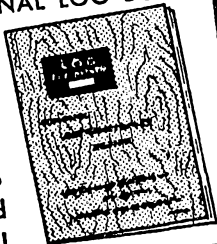
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radio officer. Ken says the FPTN handled 259. General: Dade and Broward Clubs gave AK, of FCC, a farewell dinner as Larry is transferred to Denver. The new EC for Broward is PPR. Traffic: W4PJT 894, PZT 246, DRD 231, WEO 187, DVR 182, TJU 95, SVB 92, LAP 88, LMT 85, WS 45, IYT 41, RWM 35, BZI 18, PBS 14, VIE 13, AYD 7, YNM 3, DRT 2.

WESTERN FLORIDA — SCM, Edward J. Collins, W4MS/RE — SEC: PLE, SYP is selling out the mobile rig. WKQ received an FB ARRL certificate for the SS Contest. UNV won the EARS hidden transmitter hunt. YFF, YFG, YFH, and GCX are all one family. WN4GMS is a new Pency ham. HJA has a new mobile unit. CCY works DX mornings. PTK and TTM made the Mobile Hamfest. NOX won a 4-250A. WN4BGG is going after General Class. ZFL works all bands. DEF/DAO keeps 75 meters going. ZUN runs 1000 volts to a Command transmitter. ZPN wants more power. NJB has a fine new shack. AXP keeps the c.w. rig hot. UCY is happy over 10 meters opening up. MS is fighting bugs in the TV transmitter. PQW has the section's hottest mobile signal. MUX is editor of the PARC bulletin. YRF is working on the high school station. UTB/VCB now is on as KA2NS. The PARC wants to set up a monitor system for 29,560 kc. to cover visiting mobile units. RVZ keeps the Dagwood Net perking. PAA wants 20- and 15-meter beam. PLE is looking for interested hams for the AREC. ROM is active helping others. SOQ wants better antennas. 9CPI/4 has a new FB mobile installation. UUF is looking for 144-Mc. contacts. DRT worked VE8ML twice and has Utah and Nevada to go for WAS. Fellows, I cannot write you up if you do not let me know what you are doing. How about some reports? Traffic: W4DRT 2.

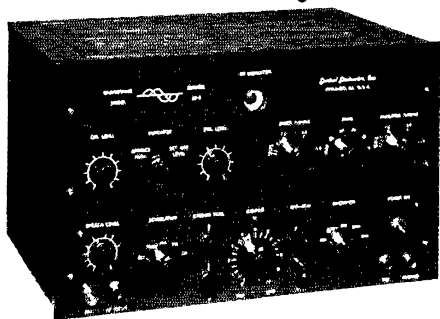
GEORGIA — SCM, George W. Parker, W4NS — SEC: MZO. PAM: LXE. RM: MTS. Nets: (GCEN) 3995 kc. at 0830 Sun. and 1900 Tue. and Thurs., mobile round-up Sun. at 1300. Some difficulty is being experienced in getting our new c.w. net under way. All interested should contact the SCM or RM. Let's go, boys, and have this net working by fall. PMJ now is in Atlanta and is active on 75 meters. TJS is slowly getting his s.e.b. exciter wired up. MV has a new slicer and is active on his new 88 Olds equipped with Elmec gear. Attending the Division Convention in Atlanta were W1s BDI and JEL, W2BDS, W3s HH and AYW, W5ONL, and KP4DV. Seventy-nine Novices were initiated into the Royal Order of the Wouff Hong with KL as master of ceremonies, and a degree team composed of ZD, NS, MZO, OPS, and LXR. WN4GLO is a new ham in Quitman. EEE has a new (used) KW-1 and an HRO-60. RT has moved to Decatur and is rebuilding. LRR is now at Warner Robins. The Confederate Signal Corps now has a new meeting place in its new club room. The Athens Club has a new call, FFE, and soon will air a new club station. The Atlanta Radio Club's mobile emergency truck is now in operation with two complete stations and emergency power units. You are invited to contact the SCM if you are interested in appointments. Traffic: K4WAR 5445, W4USA 1617, K2GHA/4 540, K4WBP 369, W4ZWT 243, WBD 219, IMQ 214, YWT 198, CAZ 66, NS 32, MA 22, ARA 10.

WEST INDIES — SCM, William Werner, KP4DJ — SEC: HZ. The VINET has been reorganized and renamed the Antilles Net, operating daily at 7:30 a.m. and 7:30 p.m. AST on 3865 kc. and at 12:30 p.m. AST on 7205 kc. with the main purpose of providing the San Juan USWB with reports and hourly barometer readings during the hurricane season from some of the Islands not now connected via CAA or PAA radio circuits. KP4s PAC, MV, RL, TO, WN, and YC in Puerto Rico, KV4AA St. Thomas, KV4AB and BB in St. Croix, VP2s VA Tortola, DA, DL, and DN Dominica, EG and KM St. Kitts, MC and MY Monserrate, SH and SI St. Vincent, GH Grenada, AJ Antigua, VP4TT Trinidad, and HH3RC, Haiti are members. NCS is VP2KM. Stations who participated during the simulated hurricane test of May 25th and 26th were ES, TO, ID, PZ, CO, WU/mobile, VK mobile, MQ and OS portable from police stations in their towns. RC was NCS from c.d. control at Gurabo. ID was Red Cross station in San Juan, with RK and MV as operators. VP2VA and KM also reported. Aquadilla is well represented on the AREC Net. Besides OS, the EC, AL, VK, WR, and WQ report consistently. MS has a new Turner mike. PW installed transmitter at the National Guard station, KP4WAC. DG has a new doublet on 75. LC, on 75 meters with ART-13, reports to the Net regularly. While on a vacation in the States, DV is operating mobile on the East Coast using 14,250 kc. VK, a new station on 3925 kc., uses TBS-50. USA operated portable from U. S. Naval Base during Armed Forces Day. TO now owns a 1.5-kw. gasoline generator power plant. YE, a new station, reports from Camp Losey. Cuba: CO3RC, Director of the National Emergency Service, announces the following Provincial Net and Zone controls in the Emergency Net: National, CO3RC, 7020 and 3750 kc.; (1) Pinar del Rio, CM1EC, 7000 and 3730 kc.; (2-3-4) Havana, CO1CH, 7010 and 3740 kc.; (5) Matanzas, CO5PN, 7030 and 3760 kc.; (6) Las Villas, CO6ED, 7040 and 3770 kc.; (7) Camaguey CO7KK, 7050 and 3780 kc.; (8) Oriente CO81L, 7060 and 3790 kc. Net c.w. stations will use 7070-7090 kc.

(Continued on page 100)



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MODEL 20A

Most SSB OPS Use MULTIPHASE EQUIPMENT and here's why—

MODEL 20A

- 20 Watts Peak Output SSB, AM, PM and CW
- Completely Bandswitched 160 thru 10 Meters
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Choice of grey table model, grey or black wrinkle finish rack model.

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Upper or lower sideband reception of SSB, AM, PM and CW at the flip of a switch. Cuts QRM in half. Exalted carrier method eliminates distortion caused by selective fading. Easily connected into any receiver having 450-500 KC IF. Built-in power supply. Reduces or eliminates interference from 15 KC TV receiver sweep harmonics.

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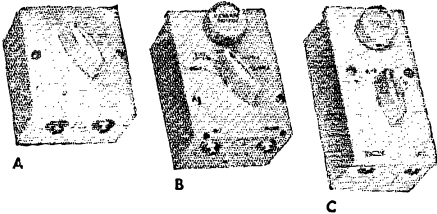
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Watch For Early Announcement Of The New DeLuxe MULTIPHASE VFO.

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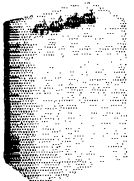
- (A) BC-345, 3 1/2" x 3 1/2" x 1 7/8" aluminum, 2 standard open-circuit jacks, 3-position switch, 6-contact banana plugs and jacks.
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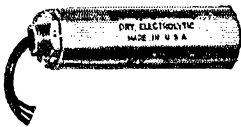
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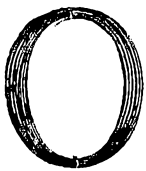


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SOUTHWESTERN DIVISION

LOS ANGELES — SCM, Howard C. Bellman, W6YVJ — Asst. SCM: William C. Coe, 6KWQ, SEC: QJW, PAM: PIB. RMs: BHG and GJP. BES owns a "new" 32V-2 and has 200 watts on 75 meters, s.s.b. ORS worked UID/6 and UID/7 near the Nevada border on 2 meters. YSK reports that the new officers of the San Fernando Valley Radio Club are YSK, pres.; JLB, vice-pres.; K6BOX, secy.; KN6EIA, treas. EBK is vacationing in Idaho, Montana, and Canada, all authorized mobile. IIF did too much fishing in May. His traffic report shows it. SQY is a new member of the Pacific Radio Club, and with NJU took 4th place in the transmitter hunt sponsored by the Coronado Radio Club of San Diego. TZU is a new member, too. See K6EA's traffic report below for March. The SCM regrets not noting it earlier in letter correspondence. Thanks, Army, for calling attention to this. Reporters are all invited to include traffic totals and other reportable information on the handy Form 1 cards available to ORS, OPS, and others from ARRL and on request from the SCM office. TWZ was contacted by San Fernando organizers of the Cerebral Palsy Telethon and plans to help worked out by the c.d. 10-meter net. A fixed control, HOW/6, was set up in Van Nuys with TWZ, JOG, and KWJ helping. Mobiles K6CX, W6HFA, and QNP and fixed K6CHR, W6AR, JLB, KJC, KWJ, MEF, and TWZ worked as a net while QNP/6 ferried collectors to their destinations. KLTSA/6 from Kodiak, now is on 2 meters from N. Hollywood and says JLB, the Upland College Amateur Radio Club, at Upland, is a new ARRL affiliate. Welcome. K6ARG, who received his ticket after his 70th birthday, has passed away after a heart attack. On the Long Beach end of the All Women's Transcontinental Air Race, as far as amateur radio is concerned is, NZP, Evelyn Scott, and other YLs she can recruit from Long Beach and the YLRL of Los Angeles. *The Oscillator*, which supplied the last few items, has devoted half of its pages to the Long Beach Civil Defense and its organization. BHG and CK have a 2-meter "pipe-line" between Idyllwild and Lakewood City, S9 all the way. CAK and the gang at Lockheed have volunteered to help out at the Lake Elsinore Soaring Contests with 10 mobiles and a house trailer. Fourteen-year-old Lennie, HJK, is back in the harness and rarin' to go. He is in the 9th grade at Emerson Jr. High School in W. Los Angeles. His goal is BPL, of course. Eugene Taylor came back from Acapulco just gushing with Convention news and tropic rain. Lucky stiff. The following stations took part in the American Cancer Society drive for L. A. City RACES: AEJ, AOP, AQP, AXB, BFT, BMT, CLA, CSP, EIH, ENC, ESX, FMO, FPD, FTJ, GEM, GFV, GWB, HLA, HSI, HWM, HSW, ILW, IWV, JDB, JEL, JVL, KBS, LXR, MEW, MTQ, NMP, NUA, PRO, PTR, QVV, RSA, TKP, TLI, UAT, VTW, ZFA, KN6BBW, K6BO, CHB, FQ. Traffic: (May) K6FCZ 2110, W6LYG 1008, GJP 270, USY 235, HJK 190, BHG 174, K6BFC 169, EA 126, BHD 11, W6SWE 42, NJU 25, NIE 24, FMG 21, NTN 20, WIF 93, ORS 9. (Apr.) W6TRF 29, FAI 7. (Mar.) K6EA 58.

ARIZONA — SCM, Albert H. Steinbrecher, W7LVR — Asst. SCMs: Kenneth P. Cole, TQZH; Dr. John A. Stewart, 7SX. SEC: OIF, PAM: KOY. This month (May) again saw the annual Montezuma Well Hamfest with the best turnout of all time. There were 168 persons present including 79 calls and 59 mobiles. Credit for this hang-up hamfest again goes to GYK and OAS. BFA showed a colorful movie of the Smoki Ceremonials held annually in Prescott. Asst. Director of ARRL, Walter Joos, EKAL, gave a report on the recent Board Meeting at Denver, and announced his candidacy for Director, since Johnny Griggs does not wish to run again. Walter advised that he would continue the same type of directorship as his predecessor, namely to work wholly for the interests of his constituents. IRX gave final instructions on obtaining license plates. The following were present: From out of state: VE1LL, 2GZB, 6EL, GUP, IQL, QPK, RQI, VXML, 8CVG. From Arizona: BFA, CDQ, DOH, EAW, EKM, GYK, HSM, HYQ, IRX, JLV, KGB, KOY, KQV, KUJ, KYM, LUN, LQB, LSK, LVR, MAE, MES, MOP, MWD, MWQ, NGJ, NRI, NUL, NYN, OAS, OIF, OJT, OQS, OUE, PJY, PKM, PLX, PMQ, PST, PUD, PUR, PZ, RAK, RBA, REO, RFE, RG, RIJ, ROZ, RUK, SNI, SNJ, SUI, SX, TJT, TNY, TPL, TPM, UBT, UCA, UCX, UKD, UKO, ULY, UNK, UNL, UPQ, UUV, UXT, UXZ, VAV. Traffic: W7KOY 115, LVR 15, NRZ 9.

SAN DIEGO — SCM, Don Stansifer, W6LRU — Asst. SCMs: Tom Wells, 6EWU; Shelley Trotter, 6BAM; Dick Huddleston, 6DLN. SEC: VFT, ECs: BAO, BZC, DEY, DLN, FJH, HFQ, HRL, IBS, KSI, KUU, WYA. RM: ELQ. BLZ is now s.s.b. Congratulations to the Fullerton Radio Club, now officially an ARRL Affiliated Club. New officers of the Imperial Valley Club are AWZ, pres.; UGM, vice-pres.; LVN, secy.-treas.; KJB, act. mgr.; and IQL, dir. LVN has a new 32V-3. PWQ has a new 20-meter beam. QJH handled 130 'phone patches last month, 108 of them with KA2FC, into 33 different states. K6CBM won the

(Continued on page 102)

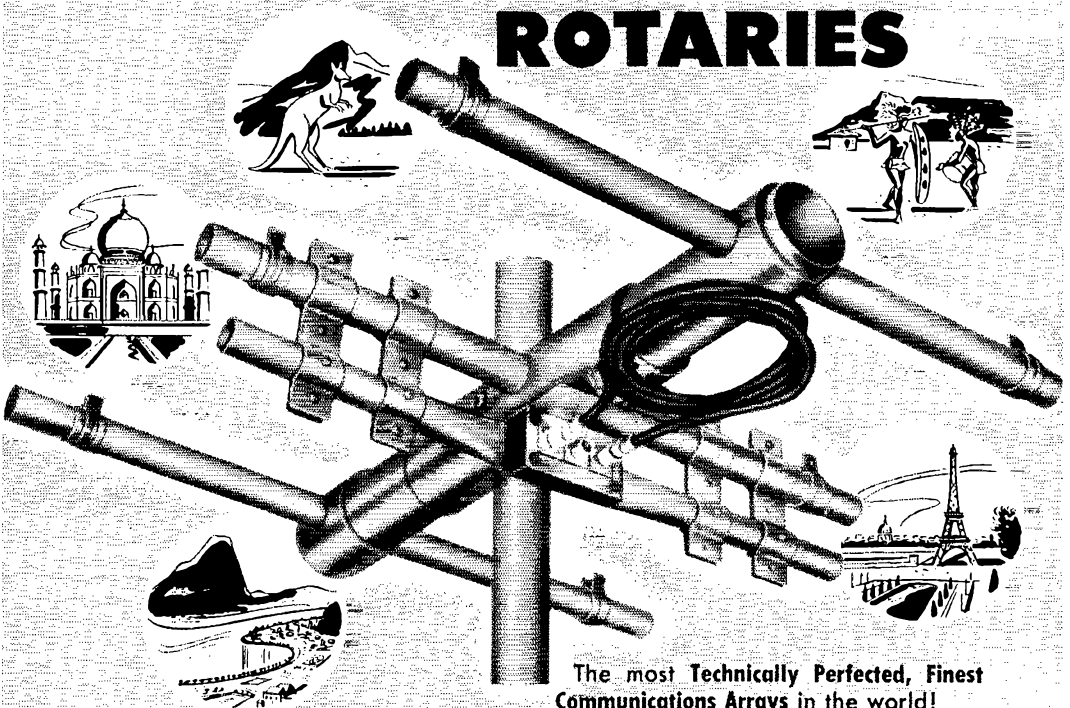
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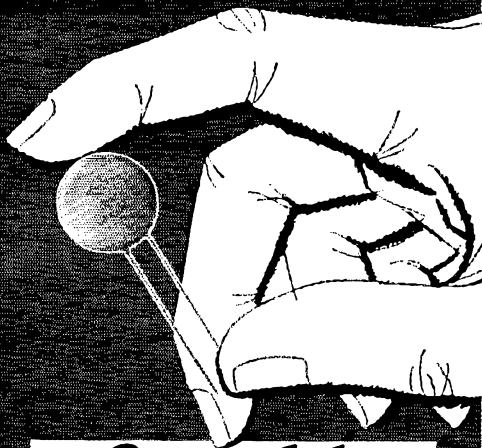
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Coronado Club hidden transmitter hunt with K6DGB a close second. The Orange County Club made its annual trip to the top of Santiago Peak. The Escondido Union High Club recently put on four demonstrations of amateur radio for civic groups. CAE bought CQ's two-element 40-meter rotary. KN6BOR dropped the "N" and is now a Class IV OO in Escondido. Our thanks to HDZ for the excellent job he has done as chairman of the San Diego TVI Committee. We hope the new group will be as successful and efficient. KN6EBX, EPN, and EPO are new Novices in Escondido. CRT copied the armed forces broadcast from AIR, WAR, and NSS. DLN is going to summer school at U. S. C. CQW is building a new bandawitching rig. HMF has a new jr. operator. The Upper Ten Picnic in July was a huge success with a good time had by all. VFT is teaching summer school in San Diego. ELQ, IAB, and IZG continue to make BPL month after month. WYA now is putting out official bulletins on 29.5 Mc. each Tue. night at 1900 for the AREC 10-meter gang. Traffic: W6IAB 4197, ELQ 678, IZG 549, KVB 214, CRT 51, FCT 22, K6DBG 22.

SANTA BARBARA — SCM, Vincent J. Haggerty, W6IOX — The section mourns the death, on June 2nd, of John R. Derby, LKF, Emergency Coördinator for Paso Robles. Condolences are extended to his family. QIW led the section in traffic this month, with good schedules on both 'phone and c.w. nets. ERU, MWF, and CEV are very active on 2 meters in the Ventura Area. IGH has a mobile rig installed in his truck. HHE is quite active on 75-meter mobile 'phone. The Santa Barbara Section Hamfest, held at Paradise Camp on May 16th, was well enjoyed by all in attendance. K6NBI reported by radio, his message to the SCM being delivered by JPP. IHD is assembling a 20A s.s.b. exciter. Traffic: W6QIW 194, K6NBI 133, W6FYW 6.

WEST GULF DIVISION

NORTHERN TEXAS — SCM, T. Bruce Craig, W5JQD — SEC: RRM, PAM; IWQ, RMA; PCN, QHI. If you have a station activity report card then make some notes on it and send it to the SCM so that your news item or happening of the month can be sent in to QST. If you do not have a station activity card, a postcard will do. You do not have to have a traffic report to send in a news item about your club or acquaintances. Two-meter activity is capturing hams in West Texas. KTX, SNX, and OMX plan to further their 2-meter activity by trying to meet some of the Oklahoma boys at the Southern Oklahoma ham picnic. JQD, TXN, and PTK attended the New Mexico Ham Picnic at Silver City. DARC had a movie on "Tornado Warnings" as a part of its program June 1st. YXR has rebuilt his rig. The DARC expects to get a low-power rig on the air in addition to the existing kw. on 20-meter c.w. The Sweetwater Radio Club has started regular meetings again. No. Texas C.W. Net had 21 sessions with a total of 120 messages. TFB reports an "Early Bird" Teen-age Net at 0700 on 3985 kc. daily. The Blue Ridge 160-meter Net held its fourth annual picnic at Lake Laron near McKinney, Tex. May 23rd. MBP reports 7 mobiles present on 160 meters out of the 18 mobiles in the net. 160-meter boys are making great strides on 160-meter mobile. The North Texas C.W. Traffic Net meets on 3770 kc. at 1900 GST. Mon. through Fri. Traffic: (May) K5FFB 1790, W5TFB 424, PAK 167, KPB 135, UFP 135, YPI 127, AHC 50, CF 48, DYU 44, YXR 28, WNK 8. (Apr.) W5UVC 380.

OKLAHOMA — SCM, Dr. Will G. Crandall, W5RST — Asst. SCM: Ewing Canady, 5GQ, SEC: CKQ, RM; GVS, PAM; SVR, ROZ. Your SCM, RST, has been appointed Asst. Director. GVS will have his WAC as soon as the QSL card comes from J8AI. ITF has gone mobile with a Babcock. W5NEGW, as the oldest (in age) Novice in Oklahoma, was presented with a transmitter by ACARC. YQO now is at Waco AFB. DEY and ELP are at Vance AFB MARS. McAlester now has an affiliated club, the Pittsburg County Amateur Radio Club, with Don McClain, secy-treas. Watonga had a good picnic attendance and all had a good time. Phyllis, CXM, is a real spark plug. Storms and tornado warnings were frequent with many cycloptic (one-eyed monster — TV) and some ham antennas going down. HXX lost his snazzy 2-meter array. The SEC had a good meeting at Watonga with about 15 ECs present and laid out an excellent program. Oklahoma MARS is showing more activity with most of the BC-660s delivered and without power supply, so there has been much scratching in junk boxes and scrounging others to get on the air with them. What a boost the s.a.b. boys would get if someone would put out a receiver that would be as simple to tune as a m. That voice control is the berries and comes as close to duplex as anything could. Traffic: (May) W5PML 188, GVS 101, TNW 72, QAC 50, MFX 48, SVR 37, SWJ 31, EHC 24, FEC 23, MQI 16, ITF 14, ADC 10, GVV 8, PNG 4, GQ 2, VAX 2. (Apr.) W5MRK 325. (Mar.) W5MRK 69.

SOUTHERN TEXAS — SCM, Dr. Charles Fernaglich, W5FJF — 4SWM now is 5EWS, TPP, president of A.&N. College Radio Committee, was awarded the Westinghouse undergraduate fellowship in E. E. KFY is doing some deep-sea fishing. EEX's XYL is recovering from an operation. BHO and family are vacationing in Colorado. NOT, work-

(Continued on page 104)

24 HOUR
SERVICE ON ALL
STOCK ITEMS

Uncle Dave's Radio Shack

SUBSIDIARY OF
FORT ORANGE RADIO DISTRIBUTING COMPANY

24 HOUR
SERVICE ON ALL
STOCK ITEMS

WE'VE GOT EVERYTHING

for the ham — plus Uncledave, W2APF and Tiny Miller to answer any of your questions. Call or write!

VIKING MOBILE TRANSMITTER KIT



\$99.50

Amateur Net
Immediate Delivery

SUMMIT RC 1A



2 mtr. conv. with tubes and xtal.
SPECIAL while they last.....\$35.00 ea.

Electric "HAM" Clock
Again by popular demand
24-Hour with GMT Indicator

\$11.95 Ea.
Regular \$15

872A surplus tubes ea. \$2.25
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Use 6-Volt Pilot Lamp
5" x 2 1/4" x 1 1/4"
\$1.95 ea.

SONAR SRT 120 TRANSMITTERS

All bands 120 w. CW, 100 w. phone



Switches to all six bands. TVI suppressed, with 10 tubes.

SRT 120 Kit \$159.50
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Including Power Supply in Deluxe Case
VFO 120 \$19.95
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PARTIAL LIST OF USED EQUIPMENT

National 5886 power supply (new condition).....	\$ 25.00
Webster Chicago Wire Recorder, Model 78 (almost sold out).....	50.00
Wilcox Gay 78 RPM Wireless Record Player (brand new).....	10.00
Hallicrafters S53A, new condition.....	75.00
General Electric Oscilloscope No. 155	25.00
Precision Model 864, rack mounted multimeter (large meter).....	35.00
Meisner EX Signal Shifter, With FMX	50.00
RME DB22A, like new	75.00
National NC 100X, less speaker	65.00
RME VHF 152A, like new	75.00
Meisner Analyst	50.00
Rider Chanalyst, with UHF converter	75.00
Gonset Tri-Band.....	30.00
Hammarlund 420	50.00
Hammarlund 411 Modulator	50.00
Hallicrafters SX 42	150.00
Hallicrafters SP 44, Pan Adaptor	45.00
Motorola FMT 30DS trans. complete w/cables, mic, etc.	150.00
Jackson 106 Signal Generator	35.00
Jackson 109 VTVM	35.00
Sonar MB 611	25.00
Sonar FM Exciter	50.00

JOHNSON VIKING II



\$279.50

(In Stock)

Kit, complete with tubes — less crystal, key and mike.
Wired and Tested, \$337.50

GONSET COMMUNICATOR 2-Meter Transmitter Receiver

Model 3026 \$209.50
Model 3025 \$229.50



Operates from either 115-Volt AC or 6-Volt DC source.

NEW TELREX MIDGET BEAM ANTS.

No. 503, 3 El., 20 meter	\$ 120.00
No. 520, 2 El., 20 meter	77.50
No. 250, 5 El., 2 meter	45.00

Collins 32V-3 Transmitter



\$775

VFO Controlled, Bandswitching, Gangtuned. Covers 80, 40, 20, 15, 11 and 10 meters; 150 watts CW; 120 watts phone; entire RF section enclosed in metal shield. (In Stock)

COLLINS 75A-3 RECEIVER \$550

With Mechanical Filter and Speaker

National TMA150A Condenser

\$7.42

ea.

We "got 'em" in stock

Mobile Special

NEW SHIPMENT

Hand mike, single button carbon. Complete with cord and plug. Finest made.

\$2.50 Ea.

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ANTENNA ROTATOR SPECIAL

Will hold up to 200 lbs.

\$29.95

Complete with 100 ft. 4 Cond. Control Cable

New

ELMAC TRANSMITTER AF-67 Trans-Citer

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Net

Folded dipole amateur antennas 300 ohm (kilowatt cable) each cut to band length 75 ft. lead-in,
10 meter 28 mc, 20 ft. \$3.00
20 meter 14 mc, 36 ft. 4.50
40 meter 7 mc, 68 ft. 5.85
80 meter 3.5 mc, 134 8.45

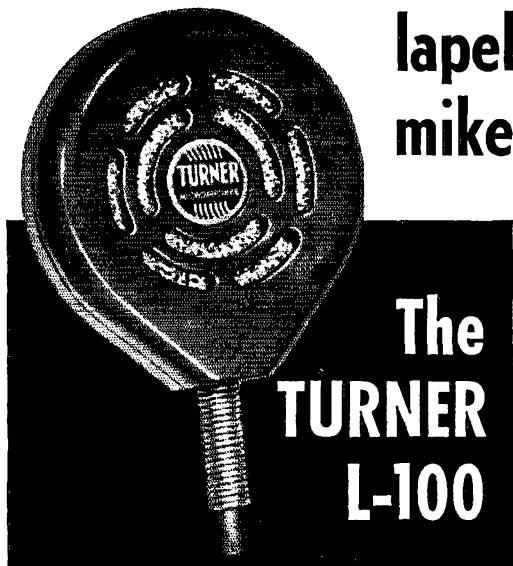
CABLE SPECIALS

4 cond. rotor..... per 100' \$2.50
RG 59/U 6c ft. per 100' 4.00
RG 58/U 6c ft. per 100' 4.00
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Kilowatt twin lead, clear poly insulated. 12 ga. cond. 9c ft. 100' 5.00

Here is a new shipment of telegraph keys. ea. **\$1.25**

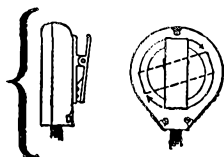
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New, Improved lapel mike



The TURNER L-100

with exclusive
adjustable clip



Here's good news for you lapel mike users. A high-quality, low-cost microphone with exclusive adjustable clip that grips securely from any angle. You can fasten it to right or left lapel, draperies, chair backs, any suitable object and quickly adjust the clip so the mike stays straight up and the cord hangs straight down. It's rubber padded, too. Can't tear or scratch. *Performance will amaze you.* Clear, crisp voice reproduction with a Bimorph moisture-sealed crystal. (Chest sounds damped out) Weight only 1 oz. less cable. Size only 2" x 1 1/16". Response: 50-10,000 c.p.s. Level: -52 db. Also available without clip for hand held uses (Model 100). And with ceramic interior (Model L-100C and 100C).

Models L-100, L-100C (with clip and 20 ft. cable) List price.....\$12.50
Models 100, 100C (without clip and with 7 ft. cable) List price.....\$8.00



ing in Dickinson, is back on 40 meters with p.p. 8005, 600 watts. LSE has a new kw. c.w. rig, p.p. 250TH. WKL still is rebuilding his shack. JFW is building a new pulse-modulated rig. KSW recently visited Houston. NMG and his XYL recently returned from a world tour. From the *Monitor* and TPD: Bill Rogers is a new Novice. CCT is getting back on 75 meters. CCT, OPJ, DEW, and BUZ recently made connections in Kerrville and Alexandria. Several of the teen-age hams went out for Field Day. A new DX battle is on between VOM and TPD. A recent one was between WPL, VOM, WRW, and TEH. VOM has 41 countries with 25 verified. TPD has 37 countries. FCD has a total of 104 countries with 90 confirmed. Congrats to the recent high school grads, WPL, WRW, BLR, and Ted. BCE needs a converter to go 75-meter mobile. APX, TEH, and family will go on vacation with 75-meter mobile. The recent STEN Convention in Kerrville was a huge success. QEM was elected Net Control, FJF was elected Public Relations Officer. Next year's STEN meeting will be in Kerrville. FNH and QDX did a great job. DZ and his XYL have a new Cadillac and mobile, first-class all the way. On June 14th the civil defense had a nation-wide test in 43 cities throughout the U. S. Houston was one of the designated targets so the amateurs of this area prepared to render emergency communications. Almost 100 hams participated with fixed and mobile rigs and did an FB job. The test proved that the hams are willing and able to furnish the necessary communications. We learned that we need to make more elaborate plans to be able to work in the state of confusion that will exist after a great disaster. It is this kind of cooperation coupled with the proper kind of publicity that will let the public know how invaluable the amateur is. We must show that we operate in the public interest. A complete list of those participating is not available at this time. Traffic: W5MN 510.

NEW MEXICO—SCM, G. Merton Sayre, W5ZU—SEC: MYL RM: JZT. PAM: BIW, V.H.F. PAM: FPB. The 4th Annual New Mexico State Ham Picnic, held at Silver City June 5-6, was a very successful affair, thanks especially to WBC and TVB, who did much of the preliminary work. About 125 registered for the prize drawings. OME won mobile judging, BIW best mobile DX en route to the picnic, and GEM found the hidden transmitter first. About 70 attended the banquet Sat. evening followed by movies, slides, and talks by various officials. JQD, SCM of Northern Texas, won the prize for coming the greatest distance. Naval Reserve communication vans from Albuquerque and El Paso, and several vans from White Sands Signal Corps Agency, with the latest in communications gear, were prominently displayed. A pole-setting demonstration was another feature exhibit. Our thanks to the military for supporting our activities. The swapest and gabfest and a huge picnic dinner were enjoyed. The Albuquerque V.H.F. Club was successful in spanning New Mexico in the 2-meter trancon. Active were CA-WXU, OLN, FAG-WIY, VWU-UEO. Congratulations! Our Official Observers, AFB and BIH, send in first reports. WN5-ECQ and WN5ECR are new hams at Tohatchi. AKR mobiled throughout the East during June. Traffic: K5FEF 1283, W5CEE 27, ZU 22, FVY 21, ZSL 16, BIH 7, WBC 6, BZA 5, RFK 5, BZB 2.

CANADIAN DIVISION

MARITIME—SCM, Douglas C. Johnson, VE1OM—Asst. SCM: F. A. Webb, 1DB. SEC: RR, ECs: DQ, EK, PAM: OC. New appointments are: W4KVM/VO6 and VE1ZZ as ORS. AAV as OPS. VO6U as EC (Goose Bay). VO6N as PAM (Labrador). Officers of the Fredericton Radio Amateur Club are WB, pres., ABT, vice-pres., PF, secy.-treas. Congrats to ABT and her OM, PF, on the new jr. operator. Doreen also came in second in Canada and fourth in North America in the c.w. portion of the YL-OM Contest. AM is getting good results with new 20-meter ground plane. ARB is happy with new 813 rig on 75-meter phone, while brother ABP is active on 20 and 40-meter c.w. also with 813 final. AA is running 150 watts to the mobile rig. RL is doing nicely with Heathkit transmitter and cathode modulator. A recent visitor to Halifax was W0DZU from St. Louis. The HARC had a successful Lobster Party at LZ's summer home. Winners of the first Goose Bay Amateur Radio Club QSO Party were: Senior, VO6U; Intermediate, VO6N; Junior, VO6Y. W4KVM/VO6 has been trying out his 1000-foot long wire, and s.s.b. also. VO6U now is up to 91 countries and 47 states. Doug mentions the great turnout by the Goose Bay boys on 14,340 kc. each night. Traffic: (May) VE1FQ 255, VO6U 159, VE1AAW 145, VO6B 138, AF 81, VE1OC 76, VO6N 68, VE1ME 30, UT 30, OM 15, WK 10, BN 3, DB 3. (Apr.) VO6U 206.

ONTARIO—SCM, G. Eric Farquhar, VE3IA—The summer slump is on apparently as very little news has reached this QTH. The Grey-Bruce Amateur Radio Club and the Capreol Radio Club have become ARRL affiliated members, following issuance of charters from headquarters. The best wishes of all are extended these organizations. AOE has completed the rebuilding job and is circulating fine. The HARC ran a very interesting series in its monthly

(Continued on page 106)

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1200 FT. REEL
Genuine Plastic Base
RECORDING TAPE



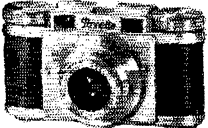
\$1.89
C.O.D.'s accepted per roll plus postage

LAFAYETTE made a terrific deal with one of the leading manufacturers of recording tape to supply us with their regular tape which sells for almost twice our price. WE GUARANTEE ABSOLUTE SATISFACTION OR YOUR MONEY BACK. The finest, professional-quality recording tape obtainable. Highest performance for thousands of playings. Red Oxide Base in a smooth, uniform coating; greater signal strength; with maximum fidelity; uniform frequency response from 40-15,000 cps at 7 1/2" per second; and freedom from background noise and distortion. Each reel is individually boxed. Shipping weight 10 oz.

FREE! Lafayette's new bargain packed catalog. Write today!

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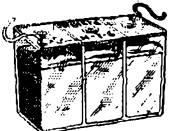
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35mm CAMERA WITH F2.8 LENS AND EVEREADY CARRYING CASE

Look at the features of this finely crafted camera
● F2.8 color corrected 3 element coated lens ● Optical exposure meter and a self-timer—both built in ● Shutter speeds up to 1/200 and bulb ● Single knob winds, counts and cocks ● Synchronized for both flash and strobe ● Focusing lens mount ● Tripod socket ● Finished in satin chrome and black leather ● Size: 4 1/4" x 1 1/4" x 2 3/4". Made in West Germany.

WILLARD 6-VOLT MIDGET RECHARGEABLE STORAGE BATTERY



Brand new storage batteries rated at 4 volts 2.4 amp./hour. These midget sized units in transparent plastic case measure only 2 1/4" H x 1 1/4" D x 3 1/2" W. Ideal for use in experimental, photo-flash lab and a host of similar uses. Connect several to get 12 or 24 volts, etc. Has 3" leads. Vent holes are sealed. Shipped to you dry, so you can insert electrolyte when put in use. Uses standard low cost 1.275 electrolyte available all over. Recharge it like any regular battery. Shpg. Wt. 1 1/2 lbs.

WILLARD TYPE N-T-6
EACH 2.39
LOTS OF 4 EACH 2.00

PRECISION DRAFTING SET

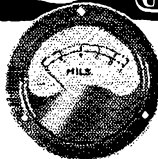
11 Pieces—Fitted Felt-Lined Case Made in Germany, of heavy brass, nickel plated and polished. Instruments include 5/16" Compass with pencil and pen points and lengthening bar, 5/16" Divider, three 3/4" sidewheel bow dividers with needle point, pen point and pencil point. 5" Ruling pen, extra handle for pen or pencil, capsule with extra leads. Interchangeability of these many parts makes this an exceptionally versatile set. Your money back—if this set is not worth twice our price!

F-13.....Net 2.75



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ROLLER-SMITH METER
0-1 D.C. MIL.

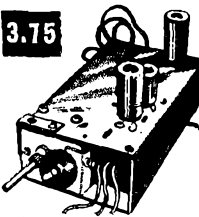
*HERMETICALLY SEALED
A vibration proof, shock proof, weather proof, hermetically sealed meter made to government specs. Has 2% accurate D'Arsonval movement. In metal case, flange size 2-11/16", body diameter 2 1/4". With removable flange and mounting hardware. Shpg. Wt. 1 1/2 lbs. Stock No. DS-10 Net **4.50**



TRIPLETT METER
DUAL SCALE!
0-200 DC MICROAMPS
-8 to +6 DB
4.95

*HERMETICALLY SEALED
Triplett panel meter with 0-200 DC microamp and -8 to +6 DB meter scales. Knife edge pointer. Hermetically sealed in metal case. Flange size 2-11/16" O.D. Body 2". With removable flange, rubber gasket and mounting hardware. DS-11..... Net **4.95**

FAMOUS VHF INPUTUNER



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Brand new DuMont style VHF inputuner featuring Mallory inductor. Used by DuMont, Crosley, Stromberg-Carlson, United Television, etc. Tunes 44 to 216 Mc. Ideal as a high gain TV or FM tuner—replacement—booster—field strength meter—VHF experimenting—etc. Input 72 ohms—sound output 21.9 Mc.—Video 22.9 Mc. Complete with 2-6J6 and 1-6AK5 tubes and shields, leads, shaft and gears. 7 1/8" x 3 1/2" x 2" overall. Shpg. wt. 5 lbs. TL-21..... Net 3.75 ea.

WESTERN ELECTRIC HEARING AID



Red. price **\$185.00** Our price **\$14.95**

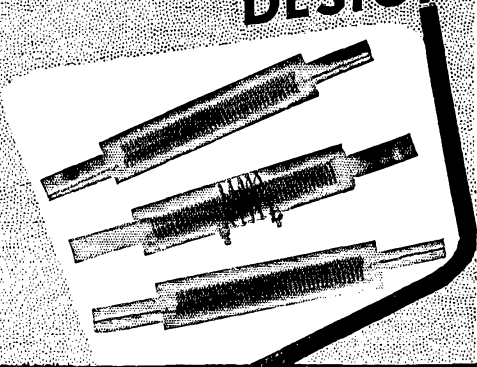
Brand new, in original Western Electric's jeweler's case. Supplied with receiver, receiver cord, battery cord and plug (less batteries). Money back guarantee. Act now while they last! Uses Burgess XCX30E and 8R batteries at \$1.55 per set.

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Whether you're running ten watts or the full gallon — for top performance from your V-P Beam, use *Factory Made* and *Factory Matched* MOSLEY V-P LOADING COILS! Only MOSLEY is licensed by the designers of the V-P Beam, W9VZC and W9QFG, to manufacture the *Original Design* Coils that make this amazingly efficient, compact 20 Meter Beam possible!

- Performance Comparable To Full Size Beams When Matched With Elements Of Proper Length!
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Cat. VP20-2, 2 Element, 20 Meter Coils.
Amateur Net \$16.95

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* See May '54 QST — P. 27

NOW AVAILABLE — Complete factory-tuned, 20-Meter V-P Beam in Easy-to-Assemble Kit! Write for full details.

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bulletin of forgotten or newsy information pertaining to Canadian participation in ARRL Field Days since its inception. Mobile equipment was the topic of the Kitchener-Waterloo May meeting. Excellent speakers on power supplies, transmitters, and antennas gave those attending much material to work on. AJR, DNV, KM and XYL mobilized their way to Ohio recently. The section-wide S.E.T. of May 15-16 was very successful. Congrats to all participating. TM has been licensed some thirty years and is doing a fine job on several nets. Holders of ARRL appointments are reminded of the annual endorsement, which is one of the requirements as well as monthly reporting to the SCM. Please check your certificates, fellows. If in arrears, and you are still interested, forward for further endorsement. EAB checked in and out at Jackson, Mich., again this year, reporting a very fine trip and good food. Traffic: VE3ATR 260, TM 104, BUR 83, AJR 75, IA 73, WY 54, DQX 38, AUU 35, DPO 31, AOE 22, NC 18, AOJ 17, EAB 10, BQA 9, DSQ 2, VZ 2.

QUEBEC — SCM, Gordon A. Lynn, VE2GL — CA reports the rig rebuilt and 20 meters seems to be picking up again although activity was at a low ebb for the month. KZ claims DXCC and WBE, DB and KZ visited VF6FO recently, from where they worked the home town, VE2AKZ and YZ. They also visited G6ZO during their jaunts but were not successful in working home from there. KJ, AEM, ACS, AGP, APP, and EC continue daily sprints twice daily at 0900 and 1300 EDT. ANB and AON are very active on 75-meter phone. VE1YW has changed QTH to Three Rivers for the summer, working portable 2. Considerable talk of preparations for Field Day was heard in May. Perhaps this accounts for the scarcity of reports. BR and QN attended c.d. college recently for a week's instruction. Traffic: VE2EC 36, CA 15.

ALBERTA — SCM, Sydney T. Jones, VE6MJ — FF, WT, TK, and MJ attended the civil defense college at Arnprior, Ontario, for the first communications course and report a most enjoyable time. The highlight of the May meeting of the NARC was the visit of our Canadian Director, Alex Reid. Several visitors from other points were in attendance. Alex reported on the 1954 ARRL Board Meeting and answered many questions. WS and EA have changed cars and are in the process of installing the mobile equipment. NX and KZ are attending a TV course on Friday evenings. WT is experimenting with SCR-522 on 144 Mc. and is planning a mobile trip to the U. S. A. KX now is in charge of RCMP Radio in Edmonton. ZR has a 8X-28 receiver and reports several nice DX contacts. WC has a new folded dipole for 75 meters. Possibly the first marine mobile contact in Canada was made recently by VE6LB, station of the training vessel of the Lac La Biche Sea Cadets from their ship, *Exeter*, to VE5BF. Traffic: VE6HM 64, OD 50, WC 35, YE 24, MJ 7, WT 2.

BRITISH COLUMBIA — SCM, Peter McIntyre, VE7JT — congrats to YR, who has won his DXCC award with over 100 countries confirmed, and he did it with an 807 in the final. The civil defense mobile group, under the direction of the EC for Vancouver, AOB, had a very successful test exercise for 2-meter communications along the Fraser River between a base station in New Westminster and various spots along both sides of the river as far east as Agazzi and Chilliwack. Disputing certain remarks that have been heard in the past the amateur is still a very much considered person in the overall picture in communications for civil defense from reports that have come from c.d. meetings in the East. A good meeting was held with Alex Reid with over 40 present. It was somewhat disappointing as to turnout but barring the long discussion of 40 meters and some non-essential topics it was a good meeting. It is suggested that the amateurs in each district contact their EC and that the EC contact the c.d. authorities of his community with the thought of cooperating with them in the communications sections of c.d. The RM, TF, is back in operation again and in full swing in RN7. DH and ALL are going all out on 2 meters along with several others. Please don't expect any report for the month of August as your SCM will be away on vacation. Hope you all had a good Field Day. Traffic: VE7QC 151, DH 57, FS 9.

YUKON — (See Election Notice, this issue, soliciting ARRL member nominations for SCM vacancy.) — There is a very good net formed with VE8GY as the Control Station on the Arctic Coast of the Yukon Territory, and the fellows have contacted a total of 55 Northern stations. This net is named the Polar Net and is on every night except Sun, at 2230 MST. Please send in news to GY or AO for forwarding to QST via VESHR until an SCM has been elected.

MANITOBA — Leonard E. Cuff, VE4LC — On May 25th the VE4 gang held a dinner and social evening at The Paddock in Winnipeg, the occasion being the visit to Winnipeg of Mr. Alex Reid, VE2BE, Canadian Director of ARRL. In all about sixty hams and their YLs and XYLs attended and an enjoyable evening was had by all. The highlight of the evening was a talk by Alex Reid, the guest of the evening, in which he especially urged all hams to make more use of the frequencies allotted to them. Word has been received

(Continued on page 108)

Now you can afford to own a WRL Transmitter!



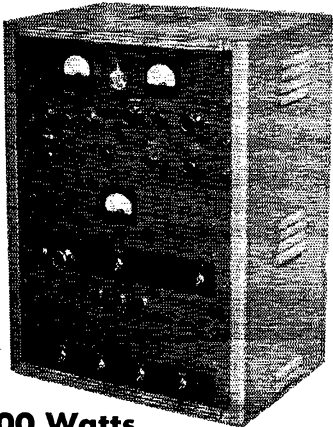
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We've made it easier than ever to own your own WRL transmitter. Pay as little as 10% down and the balance in 12 to 18 months. No red tape — we handle our own financing. We have over 600 reconditioned used items — with new factory guarantee. Send for free list. You will profit most when you deal with WRL — "THE WORLD'S MOST PERSONALIZED RADIO SUPPLY HOUSE and ONE OF THE WORLD'S LARGEST DISTRIBUTORS OF AMATEUR RADIO TRANSMITTING EQUIPMENT."

Just \$36⁷⁸ Per Month
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MODEL 500

**500 Watts Complete Band Switching
GLOBE KING XMTR**

**\$67.50 Cash Down
\$675.00 CASH — WIRED-TESTED**

In keeping with WRL's policy of always giving you MORE WATTS PER DOLLAR, we now offer you a complete 500 watt band switching 160 through 10 meter transmitter using the popular husky 4-250 A tube in final. Complete TVI shielding and by-passing of RF section and meters. Includes co-ax antenna, change-over relay and push-to-talk features. Pi-network final tuning will match any antenna system from 52 to 600 ohms with output impedance selector switch on front panel. This arrangement serves as an ideal antenna tuner. Metering of all stages with 2-3" meters. Several safety features included for protection of final tube which is forced air cooled. Has provisions for VFO. High level 100% plate modulation. Hammertone finished cabinet approximately 31" H x 21 3/4" W x 15" D.

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108

that AZ now has a complete new set of teeth and as soon as he recovers financially he will be on 'phone. JE is operating mobile again and on May 31st made a fast trip to the shack of HL at Portage la Prairie. GB is another mobile active again. AZ took ten days holiday recently and visited TD, LS, LB, and FD. Because of a heavy storm that hit this area on June 7th and many communication lines being down Jean, JM, was called upon to handle some emergency traffic in which an aircraft was thought to be lost. However, after enlisting the aid of a newspaper and an airlines office in Winnipeg the aircraft was quickly located safe and sound and Jean was able to send a favorable reply. Traffic: VE4AI 75, GE 42, EF 31, RB 31, KG 19, AZ 17, JM 10, YR 10, FD 8, GB 8, JY 6, MO 6, AO 5, IF 5, NX 5, VE5CI 4, 5CW 3, VE4EU 2, VE5DS 2.

SASKATCHEWAN — SCM, Harold R. Horn, VE5HR — Our thanks to the Moose Jaw Club for the fine time that was given to all attending the hamfest. Registrations were very good despite the wet weather. 2BE, Alex Reid, and Mrs. Reid attended and a very informative talk was given by Alex. The ARRL, SARRL, and civil defense meetings were the best attended ever held. IL located the hidden transmitter first. JK received highest points from the judges for his mobile installation. DM proved the best in the liars' contest and also the youngest licensed ham attending. GO received the award for the oldest. MS put his recently-attained ARRL 30-w.p.m. special to use and won the Gus Cox Memorial Trophy for c.w., followed by VP and DZ. HR attended the civil defense communications course and this turned out another hamfest with 21 hams making the largest percentage of the class. While in the East HR visited FS and ex-GR, who send their 73 to the VE5 gang. DR is doing well with 14-Mc. mobile. MK now is mobile. The Saskatoon Club has been given club rooms at CDHQ in the city and will be in operation soon with the call VE5AA.

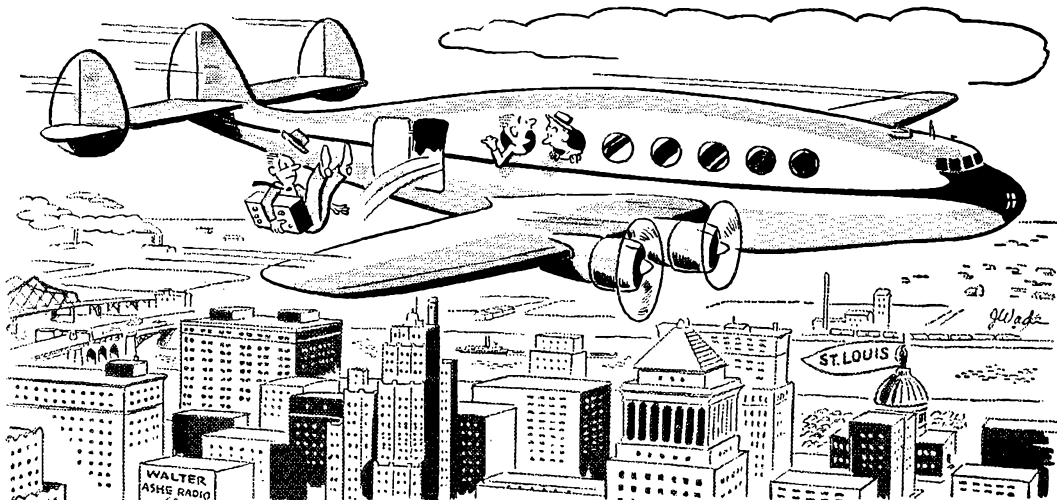
Strays

W3TIC, recently enlisted into the navy, has serial number 456 73 88. — W3MSU

An American Institute of Electrical Engineers informational release tells of an interesting expedient that "licked" power-leak noises emanating from a 400-kv. line in Sweden. A 250-watt transmitter, operating at 182 kc., was coupled to the offending power line. Listeners normally bothered by power-line noise radiation now find that the 182-ke. signal, radiated by the same line, brings them their standard b.c. programs with a signal that far exceeds the hash level.



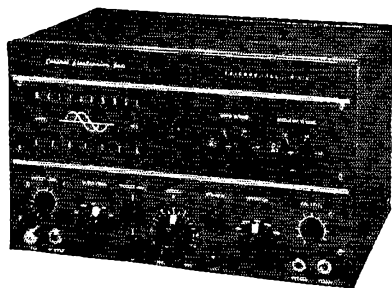
"Ham families," as such, no longer are rarities in amateur circles. However, the entire Menke family of four in Mount Vernon, Ill., became licensed Novices on the same day. Shown above are OM Harold, WN9EXA; mother Susie, WN9EYH; son John, WN9EXL; and daughter Mary, WN9EYI. The Menkes already have accounted for over 40 states on 40-meter c.w. (Photo via W9JLL)



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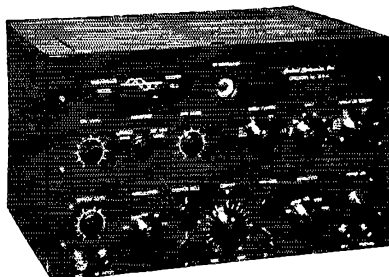
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New multiphase exciter. 160 to 10 meters. 10 watts peak output. Switchable SSB. With master crystal and coils for one band. MODEL 10B KIT \$129.50. Wired and tested \$179.50. Extra coils, per band \$3.95.



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C.D. Transmitter

(Continued from page 19)

supply. By judicious use of this monitoring system, the Radio Officer can get a good idea of the manner in which his entire system is operating.

Testing

The power supplies and modulator may be tested and placed in readiness for the r.f. section to be built later. Insert tubes in the power supplies and check voltages. If all appears normal, tubes are then placed in the speech amplifier and modulator. The taps on the modulation transformer are selected to match a pair of 807s Class AB₂, with 500 volts, 4240 ohms, to an r.f. load of 4000 ohms (500 volts at 125 ma.). Connect a 4000-ohm 25- or 50-watt resistor temporarily across the secondary. Adjust the bias divider so that minus 29 to 30 volts appears on the 807 grids. Power may now be turned on and the audio checked by plugging 'phones into the monitor jack.

The no-signal plate current of the modulators should be set to about 70 ma. by adjusting the bias tap. The modulator screen voltage will be that of the low-voltage supply, 260 to 300 volts.

[Part II of this article will appear in a subsequent issue. — Ed.]

Tuning Single Sideband

(Continued from page 20)

APB 1492 TO ALL RADIO AMATEURS. STRANGE SIGNALS IN PHONE BANDS LIKELY TO BE SINGLE SIDEBAND. CAN BE COPIED ON COMMUNICATIONS RECEIVER BY CAREFUL TUNING. FIRST PEAK SIGNAL WITH AVC OFF, VOLUME ON FULL AND SENSITIVITY REDUCED. LEAVE TUNING SET AFTER PEAKING AND TURN ON BFO. TUNE S-L-O-W-L-Y WITH BFO PITCH CONTROL UNTIL VOICE CAN BE HEARD. OTHER SSB SIGNALS CAN BE TUNED IN BY LEAVING BFO PITCH CONTROL AT THIS SETTING AND TUNING S-L-O-W-L-Y WITH TUNING KNOB. USE EXTREME CAUTION AT ALL TIMES. IF RECEIVER OVERLOADS SSB CANNOT BE TUNED IN. SO HANDLE SENSITIVITY CONTROL WITH CARE. CULPEPPER.

— B. G.

How's DX ?

(Continued from page 68)

..... W2ZK is slated to be a member of the forthcoming Byrd antarctic expedition..... K2GFQ desires dope on the present whereabouts of F8NE/Corsica ('48) and ZM6AF ('49)—one guess why..... KZ5LL (ex-KW6AR-KH6ARC) is about to be transferred to Miami where he expects to fire up W4IKC once more..... W4KVM/VO6 continues his search for buddies on 80 through 15 meters with a Viking II and SX-71..... VP8AQ, South Orkneys, is available almost daily from 0000 to 0200 GMT on 7 and 14 Mc..... News dispatches doubtless informed you of the evacuation of Fletcher's Ice Island (T-3). The base, temporarily at least, outlived its meteorological usefulness. Hats off to the several past operators of KF3AA and KF3AB who provided DXers with some most unusual DX for many months.



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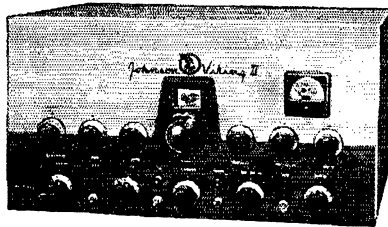
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Factory wired and tested, complete with tubes....net **\$258.00**



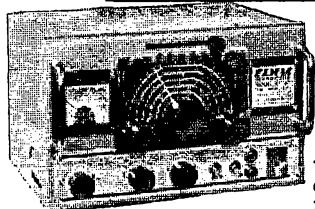
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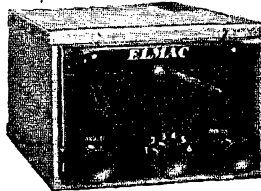
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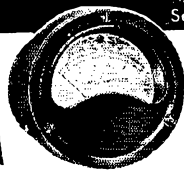
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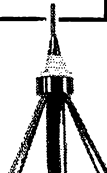
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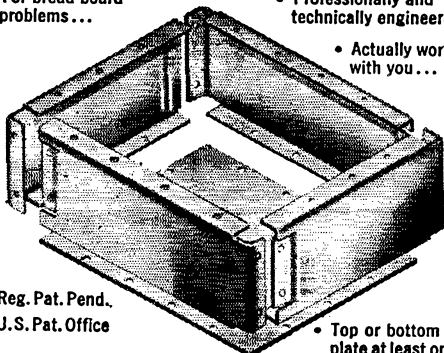
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The "Paratone"

(Continued from page 29)

of its small dimensions, the r.f. power supply could be placed in a waterproof package coupled directly to the antenna. The d.c. line from the supply need only have a modest diameter since the total current is only a few ma.

If the feature of electronic switching is not desired, any of the oscillators described in this article could be used, with an r.f. power supply, as a more conventional monitor. As such, the output of the oscillator can be placed in parallel with the headphone jack of the receiver. If the audio amplifier of your receiver is operative when in the "transmit" condition, it may be expedient to couple the audio oscillator to it directly by means of a small condenser.¹

Operation

After the monitor has been completed, it is best to check its operation with a battery connected to the r.f. terminals. Be sure to observe the proper polarities: positive (+) to the ground and negative (-) to the r.f. terminal, when using a *p-n-p* transistor. About 6 volts will be sufficient, except in the case of the point-contact relaxation oscillator where about 22½ volts will be needed. Once satisfactory operation of the monitor has been obtained using a battery, the monitor can be coupled to the transmitter. Start with loose coupling, for if it is too tight, excessive currents may cause damage to some of the components of the monitor. It should be possible to find a coupling that will not require attention even when switching from band to band. At W1GKR, one coupling to a multiband antenna has allowed operation of the monitor on 80, 40, and 20 meters.

The Paratone provides a completely r.f.-powered c.w. monitor containing the desirable features required of a good break-in monitor. Its small size and simplicity of design further enhance the merits of this unit.

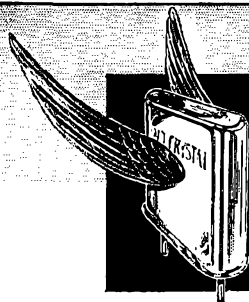
Meet Mr. Ionosphere

(Continued from page 58)

some ideas about. During daylight hours, communications are possible over distances of 150 to 200 miles, give or take 100 miles. At night, possibilities of extremely long-distance contacts are often present. Because of the absence of the *D* and *E* regions, low-angle sky waves have an excellent chance to produce good DX. Heavy "static" can be expected during the summer months in most latitudes.

Transmitter requirements for this band are the simplest of all among the Novice assignments. However, the length of a half-wave antenna for this band is approximately 136 feet, which can be a problem in some locations. In addition, the antenna should be 60 feet or more above ground for DX work, although a height of 20 to 30 feet gives louder signals within a 100 miles or

(Continued on page 114)



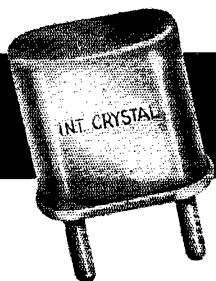
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International TYPE FA-9

(fits same socket
as FT-243)

RANGE (kc)	TOLERANCE	PRICE
3500-4000	.01%	\$2.80
7000-7425		
8000-8222	.01%	\$2.80
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14000-14850	.01%	\$3.90
24000-24333	.01%	\$3.90
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so. Thus optimum height for all types of operation cannot be obtained, and the average Novice antenna for this band is usually a compromise.

7150-7200 kc.: During the daytime, the 7-Mc. band will permit contacts over ranges from 500 to perhaps 1000 miles. The D-layer absorption is less, and lower-angle signals can be reflected from the E layer without undue attenuation in the D region. At night, world-wide communication is possible, depending upon conditions and the time of year.

Transmitter requirements are a little more demanding than on the 3.7-Mc. band, though the difference is small. Antenna dimensions are approximately half those of the lower-frequency band. TVI isn't much of a problem on either 3.7 or 7.1 Mc. A small amount of shielding will usually prove sufficient, even in fringe areas.

21,000-21,250 kc.: During our present sunspot condition, the 21-Mc. band will be "open" on some days for extremely long-distance contacts. The band openings will take place only during daylight hours, at least in our present sunspot condition. After dark, the range of the signals becomes a distance of a few miles.

This band presents more of a problem transmitterwise. Frequency-multiplier stages are usually needed between the crystal-oscillator stage and output amplifier. However, antennas shrink to a convenient size that makes for interesting experimenting. A half-wave antenna for this band is only 21 feet long. In addition, an antenna 30 feet high on this band will usually give a good account of itself. Television interference can be a problem with receivers having a 21-Mc. intermediate frequency, plus the fact that the third harmonic of this band falls in Channel 3. However, the TVI problem is by no means serious enough even to discourage the newcomer.

145-147 Mc.: This highest frequency Novice band is usually good for contacts averaging about 50 miles. Normally the ionosphere has no effect on signals in this band. However, phenomenal distances are sometimes possible during the occasional "tropospheric openings" that occur. These openings depend on weather conditions prevailing from a few thousand feet to several miles above the surface of the earth. At times signals will be refracted back to earth, making long-distance contacts possible. The tropospheric openings occur when there is a "temperature inversion," which means that there is a layer of warm air above a layer of cold air.

Several WN1s have worked over 12 states, and a WNØ in the Midwest totaled 20 states worked on this band. As would be imagined, antennas are relatively small and elaborate arrays are possible. Transmitters are the most complicated to be found for any of the Novice bands, although a simple-enough rig is described in *How To Become a Radio Amateur*.

On the profit side of the ledger, it should be pointed out that only 75 kc. is available to the Novice on the two low-frequency bands, while the 144- and the 21.1-Mc. band total 2150 kilocycles that is open to beginners!

(Continued on page 116)

HARRISON HAS IT!

**A Complete
ROTARY BEAM
ANTENNA PACKAGE
(At a Bargain Price)**

HERE IS WHAT YOU GET:

- TOWER**—Self supporting (no guy wires) triangular all steel, heavily galvanized. Strongest and sturdiest—you and four other Tarzans can climb all over it! 264 pounds! Will support any rotator and stack of beams. Ideal for apartment house, or any roof, or yard.
Regular net value, F.O.B. St. Louis.....\$114.50
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A real bargain at only\$29.95
- MOUNTING BRACKETS**—To securely mount the prop pitch rotor inside the tower, 4 ft. from the top. Set, complete with hardware (Requires no drilling)
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- SWITCHES**—Power, direction control panel switches, and two rotation limit switches to keep coax feed lines from wrapping themselves around mast SW-2K\$4.90
- DIRECTION INDICATOR KIT**—Top selsyn (21G1) with mounting bracket, connector cap, gear, and coupling to mast. Indicator selsyn with mounting bracket, to go behind your control panel, connector, 6" dia. great circle mull and compass rose. Complete with full instructions. DI-4K\$19.80

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3 EL 15	8.9 db	110.00
5 EL 15	11.2 db	210.00
2 EL 20	5.6 db	97.00
3 EL 20	8.9 db	120.00
4 EL 20	9.7 db	185.00
5 EL 20	11.2 db	240.00
2 EL 40	5.6 db	275.00

* (This is what makes the whole thing such a worth-while investment!)

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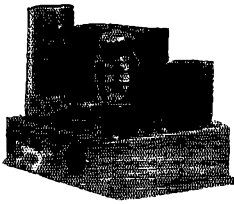
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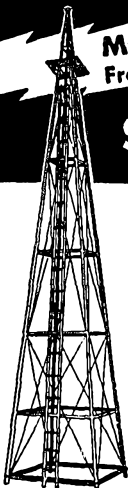
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It is hoped that the discussion here will help a newcomer to make decisions concerning the band or bands he wants to use. Admittedly, the propagation information set forth is by no means complete. The subject, to be covered properly, would require considerably more space than allowed here. For additional information, the reader is referred to *The Radio Amateur's Handbook* and an excellent elementary manual on propagation by Donald H. Menzel, director of Solar Research at Harvard University.¹

By this time, the reader will have realized that there can be no hard-and-fast rules for making "guaranteed" predictions about radio-wave propagation. Because of the many variables involved, any statements about what a given band will produce on a given day must be based on averages garnered from past performances. And many a gambler went broke betting on past performances! But that's one of the reasons radio can be so fascinating — you think you know how a band will behave, but you can never be sure until you try it. And even then you're only sure about the *past* performances!

¹ Donald H. Menzel, *Elementary Manual of Radio Propagation*, 1948, Prentice-Hall, Inc., New York, N. Y.

Phase-Modulation Exciter

(Continued from page 41)

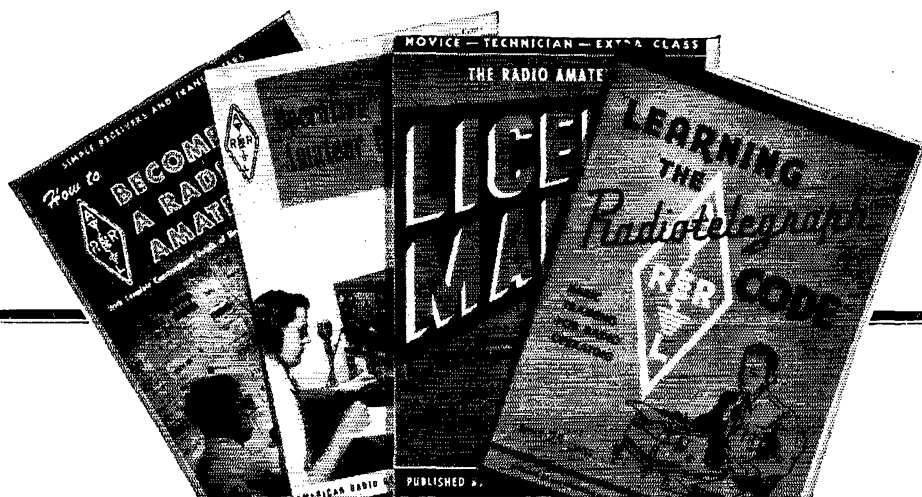
since this will affect the tuning range. Now apply high voltage and with a crystal in place, tune the oscillator to resonance as indicated by a grid current in the driven stage or light in a 60-ma. pilot lamp coupled to the coil with a loop of wire. When capacity coupling is used, the exact number of turns needed for the plate coil will depend on the length of coax used. The dimensions given are for a 20-inch length of RG-59/U. If less than this is required, the coil will need more turns. The correct number may be determined by cut-and-try pruning until the high end of each range is tuned with the condenser set at minimum.

After the circuit is resonated, the modulation may be checked by listening to the oscillator harmonic falling in the band in question. While an oscilloscope and audio generator would be handy at this point for setting up the clipping and deviation, they are not necessary. Simply listen to the signal while someone else speaks into the microphone, and adjust the gain controls until the audio is the loudest and best. It is important to listen on the band to be used, as the deviation will be correct for that band only.

Bear in mind that too much clipping will give you some distortion even though you are not deviating enough. Too much deviation will make the signal too broad and distorted, and it will splatter beyond where you get a reading on your S-meter.³ With the deviation correct and not enough clipping, the audio will not sound so solid. With not enough deviation, the audio will

(Continued on page 118)

³This method applies only for operation with stations having receivers of the same selectivity characteristics as your own.



Gateway to Amateur Radio!

- ★ HOW TO BECOME A RADIO AMATEUR
- ★ THE RADIO AMATEUR'S LICENSE MANUAL
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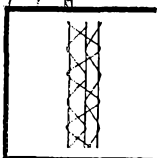
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TRYLON

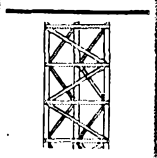
Towers and Masts

Amateur radio types • Guyed towers for FM-TV antennas • Vertical Radiators • Microwave towers • Commercial Communication towers • Transmission line supports, etc.



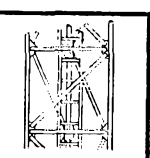
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Microwave
antennas



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Width—60"
10' section—
653 lbs.
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curtain antennas
for International
Broadcasting

* Between CG of Tower Legs

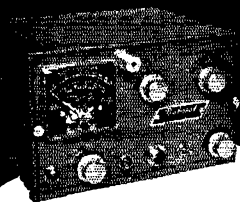
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be nice and clear but too weak to copy without turning the audio gain on the receiver away up. There should be a definite null when the carrier is tuned on the nose, but clear speech should be heard on tuning off either side until the S-meter reading drops about $\frac{1}{2}$ to 1 S unit. The clipping control setting should hold for any frequency, and it will be necessary to shift the deviation setting (for a given bandwidth) only when changing bands. It may also be necessary to vary the deviation to suit the fellows with very sharp or very broad receivers, but this situation is being improved as the advantages of selectivity are discovered.

There are a number of ways that this exciter can be used. If it is part of a new rig, it could drive a 5763 or similar multiplier that would quadruple or triple to 24 Mc. with 6- and 8-Mc. crystals, respectively. This would be followed by other multipliers to the desired bands. Probably the easiest way to employ an existing rig using an overtone or harmonic oscillator would be to convert such an oscillator stage to a frequency multiplier, with its grid circuit coupled to the phase-modulated oscillator output. Another possibility is to build only the audio and reactance tube portion, and use it to modulate the existing oscillator. Enough deviation for 50 Mc. and higher should be obtained if there is a low-C tuned circuit at 6 or 8 Mc., and enough for 144 Mc. and above with crystals up to 24 Mc. The latter would, of course, require room to mount the modulator within a few inches of the existing oscillator.

It is very easy for the writer to become enthusiastic about this particular rig, since it has made it possible for W1VLH to continue operating on v.h.f. In our residential location there are enough poorly shielded and filtered radios, TV sets, phonographs, and even tape recorders to make life very unpleasant for anyone operating a 144-Mc. a.m. transmitter. We had a good demonstration of this the other night when a friend brought over his 2-meter portable rig to try on the W1VLH antenna. We had been operating our 100-watt transmitter with phase modulation for over two months with no complaints, but the first CQ with the 6-watter brought an angry 'phone call. Almost as pleasant as the lack of interference is the way many stations don't realize we're using phase modulation unless we mention it. And our audio problems are solved for any power we'll ever want to run!

Strays

Three members of the Bielski family, Tacoma, Wash., were licensed at unplanned intervals.

OM George drew W7QPM.
XYL Vivian got W7SRL.
George, jr. is W7TDU.

—W1ICP

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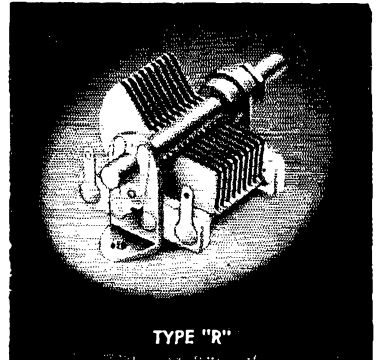
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Now... the "TWIN SIX" a rugged, quickly assembled dual Yagi array which provides well over 10 DB gain and front-to-back ratio throughout the two meter band. (Referred to a matched, resonant half-wave dipole.)

The Twin-Six is designed for use with 52 ohm line; extremely low standing wave ratio and electrical symmetry being assured by the use of special balun and matching networks. A spacing of approximately 3/4 wavelength between bays has been found optimum from the standpoint of gain and reduction of spurious lobes when oriented for vertical polarization. This same spacing also provides optimum gain when horizontal polarization is utilized.

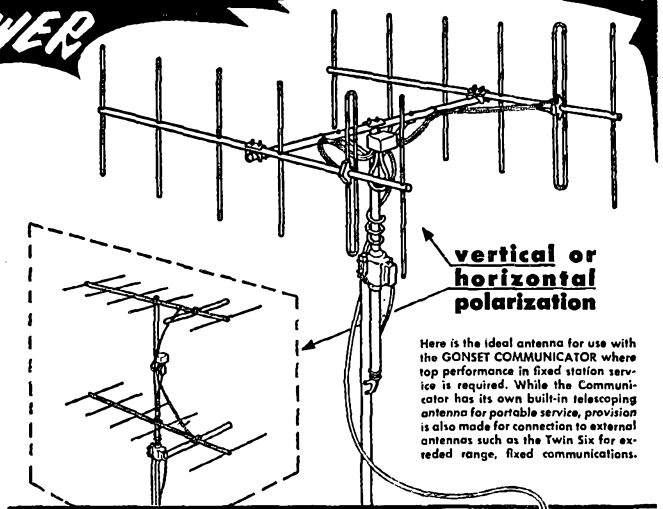
This array is largely preassembled and is designed for use with typical TV antenna rotators. STANDARD MODEL 1560 attaches to your rotating mast section, (up to 1 1/2" O.D.) for horizontal polarization, or to a 5 foot cross-boom "T" section, (not supplied) for vertical polarization. DE LUXE MODEL 1560-V includes braced, tubular steel "T" assembly, (5 foot boom and mast section) for vertical polarization.

Both models are complete with matching harness, balun and rain shield junction box ready to attach to 52 ohm coax. Instructions are furnished describing simple modification to permit use of GONSET 450 ohm open wire line, recommended where runs exceed 100 feet.

MODEL 1560, STANDARD TWIN SIX. (For horizontal or vertical use) includes: (1) Model 1558, (2) Model 1559's Amateur net. 29.50

MODEL 1560-V DE LUXE VERTICAL TWIN SIX. Includes: (1) Model 1557, (1) Model 1558, (2) Model 1559's Amateur net 34.50

Model 1558 Matching harness for (2) Model 1559's.....net 7.50
Model 1559 Single, 6 element Yagi.....net 11.00
Model 1557 Braced, tubular steel assembly.....net 5.00

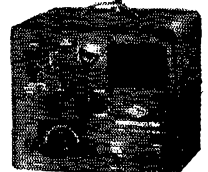


vertical or horizontal polarization

Here is the ideal antenna for use with the GONSET COMMUNICATOR where top performance in fixed station service is required. While the Communicator has its own built-in telescoping antenna for portable service, provision is also made for connection to external antennas such as the Twin Six for extended range, fixed communications.

THE GONSET "COMMUNICATOR"

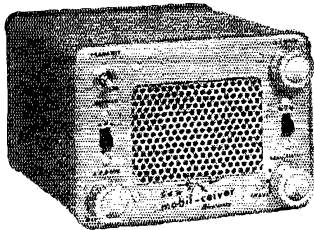
A completely self-contained 2 meter station in a single, highly compact unit. Power supply is arranged for both 6V, DC and 110V, AC operation to provide utmost flexibility and the ability to adequately handle casual or emergency communications. Receiver is a red-hot superhet, transmitter is crystal controlled for maximum stability. Self-contained speaker and audio channel that may be utilized as an excellent emergency PA system. Covers 2 meter band and adjacent CAP frequencies. The top unit in the field for amateur or Civil Defense applications.



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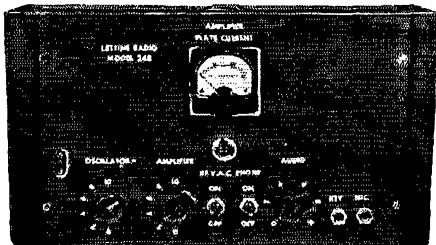
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Happenings

(Continued from page 47)

rent proposals of the Commission and during its examination found that over-all amateur sentiment continues strongly to support the requests for rules changes which originated with the League in 1952 and are now the basis for proposals in this Docket.

AMERICAN RADIO RELAY LEAGUE, INC.

By PAUL M. SEGAL
Its General Counsel

A. L. BUDLONG
Its General Manager
May 28, 1954

EXECUTIVE COMMITTEE MEETINGS

The following is an abstract of the minutes of the Executive Committee of the League during the twelve months between the 1953 and 1954 Board meetings, published here for your information:

Meeting No. 226, July 10, 1953. Decided that the 21-Mc. maritime-mobile proposal was not, at this time, in the best interest of the amateur service because of the international situation, to request oral argument, and to seek all-band mobile operation by amateurs on vessels engaged in the coastwise service. Approved Proposal No. 86 in the June IARU Calendar. Approved plans for the Eastern Canada, Southwestern Division, Midwest Division, and New Hampshire State conventions. Affiliated eight clubs.

Meeting No. 227, September 28, 1953. Examined nominations in regular autumn elections; determined eligibility of candidates; in cases where there was only one eligible candidate, declared him elected without ballot; ordered ballots sent on others. Affiliated fifteen clubs. Authorized the staging of the Ritual of the ROWH at ARRL state conventions as well as division conventions.

Meeting No. 228, November 20, 1953. Appointed Committee of Tellers to count ballots in the autumn elections. Ordered the ballots for the Atlantic Division sealed by the attending Certified Public Accountant. Discontinued authorization of John E. Cann to sign checks on behalf of the General Manager. Decided to file with FCC indicating no objection to the proposal to give Novice and Technician Class operator examinations by mail only, and to express the view that the 50-mile personal-appearance limit for examination procedures was too small. Affiliated ten clubs.

Meeting No. 229, January 18, 1954. Approved plans for the West Gulf Division Convention. Affiliated thirteen clubs.

Meeting No. 230, March 12, 1954. Approved the financial report of the 1953 ARRL National Convention. Authorized Leland W. Aurick to sign checks for the General Manager. Approved plans for the Rocky Mountain, Pacific and South-eastern Division conventions, and for the Oregon State Convention. Affiliated fifteen clubs. Selected recipients for cash awards for QST articles. Decided to oppose the FCC proposal for license fees.

Meeting No. 231, May 13, 1954. Approved plans for the Midwest Division Convention. Affiliated twenty-six clubs.

YL News & Views

(Continued from page 49)

Keeping Up With the Girls

W4UDQ wonders if she was the only YL who participated in the Transcontinental Relay on 2 meters in May. Listening hard and long for signals, "DB" handled nine messages. On June 9th she worked W9WOK in Bensenville, Ill., from her Collierville, Tenn., QTH, and in the June V.H.F. contest she and her OM vied with each other for the greatest number of sections worked. . . . W6GQZ has received an ARRL certificate for placing first in the San Joaquin Valley section in the January ARRL V.H.F. contest. Iva also made the highest phone score in her section in the 1953 Sweepstakes. . . . A 75-meter YL phone net for the Middle West is suggested by W0MJK, Marian. . . . W6JMS, Lucille, noted the following YLs at the Fresno Hamfest: K6DLL, W6s EYS FEA GQZ

(Continued on page 122)



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RADIO TELEGRAPHY
RADAR & TELEVISION**

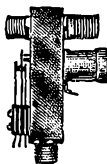
Courses ranging in length from 7 to 12 months. Dormitory room and board on campus for \$48.00 a month. The college owns KPAC, 5 KW broadcast station with studios located on campus. New students accepted monthly. If interested in radio training necessary to pass R.C.C. examinations for first-class telephone and second-class telegraph licenses, write for details. New: Advanced TV Engineering Course.

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Further recent improvements in our new type magnet provides thrust pressure of over 200 grams and 300% increase in relay contact pressure — Dow relays have now definitely set a new standard for the industry.



Type DKC
1000 Watts
Length 4 1/4"
Width 3"

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Type DKM
500 Watts
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Width 2 1/4"

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FEATURES:

1. AC types entirely free of hum, guaranteed equally as silent as DC. Transmit contact pressure now increased to over 100 grams; receiver contacts 45-50 grams.
2. Causes negligible change in s.w.r. up to 100 mc.
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4. External SPDT switch available (Optional).
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JMC JMS JZA KER KNJ LFR PJF QGX and W0BFW. . . . Openings on 21 Mc. (A3) have afforded W1YYM a number of choice contacts—ZLs, VKs, FO8AB, and FO8AJ, "Clipperton." From ZL1BY Ellen learned of an active YL in Ceylon—487YL. . . . W6NAZ, Lenore, was heard operating portable on 20 'phone in Mexico as XE1-NAZ. . . . KN2EBU, Min. represented the Long Island YLRL at the Hudson Division Director's meeting. W2JZX, Vi, represented the Nassau Radio Club at the same meeting. . . . W2YCX, Carlie, is teaching code and theory at the Boonton, N. J., YMCA. . . . W5s TEB, Bonnie; DEW, Mary; and HEK, Fran, attended a Ham Picnic in May at Alexandria, La. . . . Twenty-five YLs enjoyed the May meeting—a "theatre party"—of the N. Y. C. YLRL. . . . W5DRA wrote the script for a discussion of amateur radio presented on KROD/TV. Teev and her OM also gave a talk and demonstration at the local Lions Club. . . . YLRL 5th District Chairman W5HWK reports W5TGZ, Ruth, and W5VYI, Jewell, active on 75 'phone, and W5IKO, Lou, on 40 c.w. Jessie also relates that W5s OLL NOW SYL and WXY, along with other ham friends, presented W5TTU, Pat, with a TV set complete with antenna and tower. . . . In January, wives of members of the Johnson County (Kans.) Radio Club organized their own XYL club (yet unnamed). At present only W0SAJ, Marquerite, and W0JJC, Jeanne, hold licenses but new calls among the membership are expected soon. . . . WN0QIW, Ann, of Denver, is another 10-year-old YL. . . . On May 23rd the L. I. unit of the YLRL sponsored a supper, the proceeds of which went to the *Braille Technical Press*. Guest of honor W2JJO, Bob Gunderson, of the *Press*, was presented with a check for \$150 by the unit's members, who worked hard to make the affair the success it was. W2JZX was chairman, with W2s BXT KAE KDP, K2CFF and KN2-EBU serving as hostesses. . . . From Northern Texas SCM W5JQD we learn that at an April meeting of the Waco XYL Club presented the Central Texas Amateur Radio Club with a coffee urn. . . . W3CDQ, Liz, aided the Washington Mobile Club with the TV Telethon for crippled children. . . . W8HLP's (Arlie) new QTH is Orange, Virginia. . . . W3NXU, Betty; W3SVY, Loreli; and W3UUG, Miriam, were the three YLs present at the annual Pittsburgh Hamfest at North Park.

World Above 50 Mc.

(Continued from page 61)

giant antenna system on 144 Mc., some rather interesting facts came to light.

No phenomenal DX was worked, and nothing came of the lunar tests conducted over several week ends. Meteor-scatter tests with W4HHK showed far less in the way of bursts than were observed on the signals of W2UK in similar periods only a few minutes apart. This would indicate that a beam can be too sharp for good results via the meteor route.

The beam certainly was too sharp for the signal to attract much attention in normal 2-meter communication. To pay off it would have to be used on definite point-to-point schedules. The chances of hearing the signal at random were greatly reduced by the narrow coverage of the antenna at any one time. On one occasion when they caught a good southern opening, W4ZBU reported that W2SC was the strongest signal he had ever heard outside of nearby locals. And under normal dead-band conditions of mid-afternoon, W2SC was good up through New England, when nothing else could be heard from the same locality.

The big array was not built for point-to-point communication, so it was not high above ground. This may have reduced its effectiveness in all directions except along the coast. The station was never on the air during an aurora, so there was no opportunity to check its effectiveness in this form of communication. If any conclusion can be drawn from the rather limited use of the big dish at W2SC, it was probably that a big antenna, by itself, will not work any miracles. It would have to be used regularly in communication schedules over a considerable period of time to show its real merit. A gain of 25 db. or so sounds quite tremendous, but it is not a large margin over the gain achieved by some of the better amateur arrays. A margin, to be sure, but not enough in itself to insure phenomenal results under any and all conditions.

(Continued on page 124)

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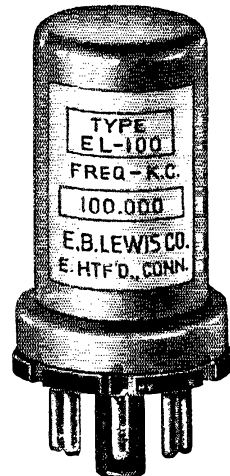
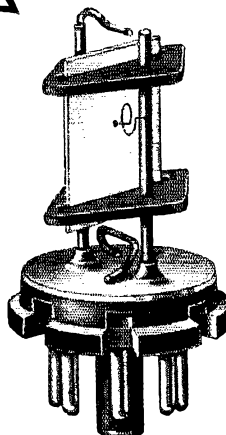
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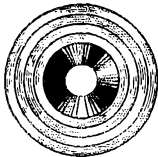
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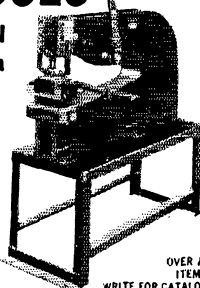
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RADCLIFF'S

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OES Notes

W3UQJ, York, Pa. — Hairpin loop (quarter-wave) tank circuits don't compare with half- or three-quarter-wave systems at 420 Mc. Changed to the W5HPC method shown on page 55 of January *QST*, with much improved results.

W4FLW, Dresden, Tenn. — 50-Mc. DX season opened at least a month ahead of last year, with openings in May comparable to June of 1953. Weakley County RACES net meets on 50.35 Mc. each Monday at 2130.

W5FPB, Albuquerque, N. Mex. — Transcontinental 2-meter relay occupied most of Albuquerque V.H.F. Club's time in May. The first week end saw W5a VWU OLN UEO CA NSJ FAG WIY and ZU in the field, with FJE FMM FPB IFF LKX MPR and RFF at home. W5WXU joined the W5CA/5 expedition to Capillo Peak the following week end. W5RFF heard the signal of W6LHK/7 on Mt. Graham, near Safford, Ariz., between 1840 and 1920 on May 29th. This is 250 miles over very mountainous terrain.

W5SCX, Ardmore, Okla. — Failure of a coaxial relay threatened to disrupt transcon activity until a solution was rigged up to work the relay mechanically. A hole was drilled through the panel and the arm of the relay was held in the transmit position by a string. This was a deterrent to long transmissions, if nothing more!

W6VSV, Berkeley, Calif. — TV camera under construction using 6198 Vidicon with 4-lens turret and all commercial features. Also machined several coaxial cavity tank circuits for 4X-150A 420-Mc. final stages for local hams.

W6ZDO, Canoga Park, Calif. — Running nightly A2 transmissions on 431.5 Mc., with 20 watts output. Antenna is coaxial dipole 72 feet above ground.

W7JRG, Billings, Mont. — 50-Mc. activity curtailed in evening hours because of Channel 2 TVI, but still active mornings. Can run 300 watts c.w. on 144, however, so hope to do more on that band.

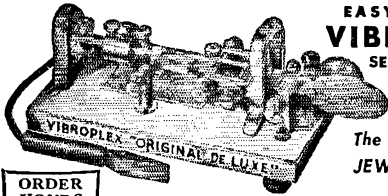
W8UZ, Columbus, Ohio — 50-Mc. DX much better than in 1953. Band open almost every day in latter part of May. F.m. net on 145.26 Mc. very active.

(Continued on page 126)



W8ZJB.....48	W5VY.....48	W8OJN.....40
W8BJV.....48	W5MJD.....47	W8LPD.....37
W6CJS.....48	W5GNQ.....46	
W5AJJ.....48	W5ONS.....45	W8ZHB.....48
W9ZHL.....48	W5JTI.....44	W8OVV.....48
W9OCA.....48	W5MLL.....44	W8HGE.....47
W6OB.....48	W5EFW.....44	W8PK.....47
W6INI.....48	W5LJY.....43	W8VZP.....47
W1HDO.....48	W5JME.....43	W8RQM.....47
	W5VY.....42	W9ALU.....47
W1CLS.....46	W5PAL.....41	W9QKM.....46
W1CGY.....46	W5FSC.....41	W9ULA.....45
W1LLL.....46	W5HLD.....40	W9UNS.....45
W1LSN.....44	W5HEZ.....38	
W1HMS.....43	W5FXN.....38	W8QIN.....47
W1DJD.....41	W5LIU.....37	W8DZM.....47
		W8NFM.....47
W2AMJ.....46	W6WNN.....48	W8TKX.....47
W2MEU.....46	W6ANN.....45	W8KYF.....47
W2RLV.....45	W6TMI.....45	W8JOL.....46
W2IDZ.....45	W8IWS.....41	W8HVW.....46
W2FZH.....44	W6OVK.....40	W8MVG.....44
W2CYV.....40	W8CGG.....35	W8TJF.....44
W2QVH.....38	W6BWG.....29	W8WKB.....43
W2ZUW.....35		W8JHS.....43
		W8PKD.....43
W3OJU.....46	W7HEA.....47	W8PKD.....43
W3NKM.....41	W7ERA.....47	W8IPI.....41
W3MQU.....39	W7BQX.....47	
W3RUB.....37	W7FDJ.....46	VE3AET.....43
W3OTC.....37	W7DYD.....45	VE3ANY.....42
W3FBH.....35	W7JRG.....44	VE1QZ.....34
	W7BOC.....42	VE1QY.....31
W4FBH.....46	W7JPA.....42	XE1GE.....25
W4FQM.....44	W7FVU.....41	CO6WW.....21
W4QJN.....44	W7CAM.....40	
W4FWH.....42	W7ACD.....40	
W4PCZ.....42		
W4FLW.....42	W8NSS.....46	Calls in bold face are holders of special 50-Mc. WAS certificates listed in order of award numbers. Others are based on inverted reports.
W4OXC.....41	W8NGD.....45	
W4MS.....40	W8UZ.....45	
W4FNR.....39	W8RFW.....45	
W4TJL.....38	W8CMS.....43	
W4BEN.....35	W8BFO.....42	
	W8YLS.....41	

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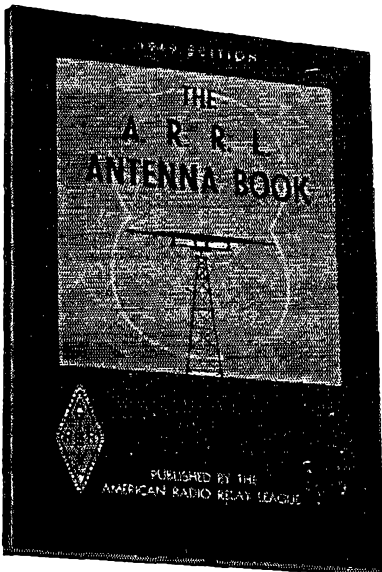
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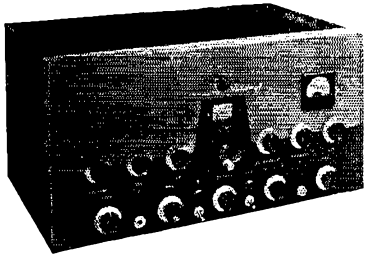
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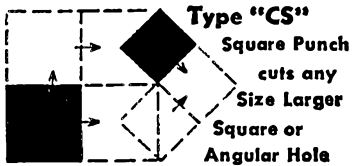
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W9DSP, Chippewa Falls, Wis. — Worked WNØRSP, Marvin, S. Dak., in May, and in June V.H.F. Party; first station from that state heard. How about some 2-meter activity in North Dakota?

W9LEE, Westboro, Wis. — WNØRSP and W6ORE, Gary, S. Dak., worked with good signals June 1st.

Mt. Whitney Expedition

Just in time to slip it in at the end of this month's news, we have word of an expedition to the top of the highest mountain in continental U.S.A. Over the week end of July 31st to August 1st, W6FCH, W6VIB and W6VYQ are going to climb 14,495-foot Mt. Whitney with light-weight 144- and 220-Mc. gear. The call will be W6LS/6, this being assigned to the Lockheed Amateur Radio Club. The boys will be looking for contacts with stations in areas sufficiently distant to offer hope of breaking the 220-Mc record. They will be on the air from 10 A.M. to approximately 2:30 P.M. PDST, August 1st. Operators in Denver, Boise, Tucson, Portland and Seattle, please take note.

2-Meter Transcon

(Continued from page 68)

falls so that it extends the available time of those who ordinarily have to work. Some would like to see relays established on a regular schedule several times a year.

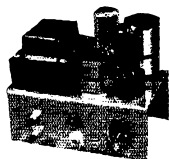
One point of some significance can be made from these first attempts at v.h.f. traffic handling on a national scale: it is an entirely practical matter for at least a large portion of the country. Few people would have thought that a 2-meter circuit from the Northeast to Amarillo, Texas, could be maintained without some special stations set up along the line, but this circuit worked on the first try. There was nothing startling about the elapsed times, but there is no question good handling time could be established for 1500- to 2000-mile circuits, if there is interest in handling traffic on 144 Mc. regularly. For years it has been said that v.h.f. should occupy a larger place in the amateur message traffic picture. These first transcontinental relays have demonstrated that we need only the urge and experience to handle long-haul traffic, as well as local, successfully on the v.h.f. bands.

Future relays might well bring in other sections of the country, and other stations in the areas covered by the first attempt. Operators at natural terminal points should look for opportunities to start messages along divergent routes, so that everyone who wants to participate will have a chance to do so. Handling of message traffic was once an important part of the program of almost every amateur. There are few of us who would not benefit from being exposed to a little more of it in this day and age. There just might be a time when the message-handling know-how so built up could come in handy!

Historical coincidence: July, 1934, QST reported the first successful Boston-New York relay on 56 Mc. It took seven stations, four of them mountain portables to achieve this history-making feat. July, 1954, QST broke the news of the first transcontinental relay on 144 Mc. Who will make the prediction for the July, 1974, issue?

— E. P. T.

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2" Model TC2 \$3.90

3" Model TC3 \$4.20

See page 141 April QST. Order or Write for descriptive literature.

R. W. GROTH MFG., CO.

10009 Franklin Ave.

Franklin Park, Ill.

JOB OPPORTUNITY

Progressive young manufacturer located in south central Pennsylvania offers a real opportunity to a man interested in challenging work involving original circuit design on RF oscillators at communication frequencies as well as associated measuring equipment and techniques. Degree not necessary if you possess sufficient experience.

Send resume to Personnel Director

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Designed by W2NGA — An Omnidirectional HI-GAIN Vertical Array for 2 METERS.

- 2MR-Q \$18.90
- 2MQ-P \$7.95
SINGLE QUADRAPOLE
- 4E2 \$8.75
2 MTR—4 ELEMENT YAGI
- 8E2 \$20.50
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3 EL. 10 MTR/T-MATCH PLUMBERS DELIGHT
- 3E10F \$42.40
3 EL. 10 MTR/FOLD. DIPOLE
- 3E10T \$41.80
3 EL. 10 MTR/T-MATCH
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- 2E20T \$47.95
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242 E. 137 ST., N. Y. 51, N. Y.

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RCA INSTITUTES, INC.

A Service of Radio Corporation of America
350 West 4th St., New York 14, N. Y.

OFFERS COURSES
IN ALL TECHNICAL PHASES OF
RADIO, TELEVISION, ELECTRONICS

Approved for Veterans
Write Dept. ST for Catalog

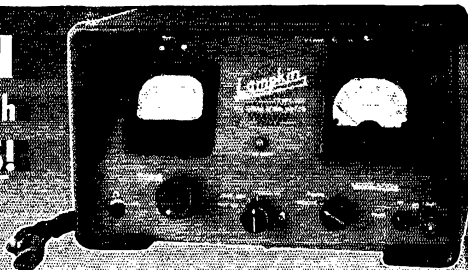
THERE'S MONEY IN Commercial Mobile-Radio Maintenance with 2nd Class Ticket and LAMPKIN METERS!



NOW Check frequency
and FM
swing to **500MC!**

LAMPKIN 105-B MICROMETER FREQUENCY METER. Heterodyne type, uses only one crystal to measure all transmitters 0.1 to 175 mc., crystal-controlled transmitters to 500 mc. Precision CW signal generator for receiver final alignment above 20 mc. Weight 12 1/2 lbs. Width 13". Price \$220.00.

**MAIL
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LAMPKIN 205-A FM MODULATION METER. Tunable 25 to 500 mc. in one band. Direct indication of peak voice deviation, 0-25 kc. positive or negative. Relative field-strength meter. Built-in speaker. Weight 14 lbs. Width 12 3/4". Price \$240.00.

LAMPKIN LABORATORIES, INC.
Mfg. Division, Bradenton, Florida
Please rush me more dope on the 105-B and 205-A.

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VACATIONING?



GET THAT NEW MOBILE
INSTALLED BEFORE YOU
LEAVE ON THAT LONG
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We have in stock
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| BABCOCK | ★ | JOHNSON |
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Teecraft

CASCADE CRYSTAL CONTROLLED CONVERTER

for 144 or 220 Mc.



Provides:

- HIGH SENSITIVITY — Sensitivity better than 1/10 microvolt. Gain approx. 30 db. Noise approx. 4 db.
- COMPLETELY STABLE. C.W. on 144 mc. NO mechanical modulation. Pure D.C. note. No drift.
- RUGGEDLY BUILT — Suitable for mobile application.
- USE WITH ANY COMMUNICATIONS RECEIVER — Availability with output at I.F. frequencies 6-10 mc., 8-12 mc., 10-14 mc., 12-16 mc., 14-18 mc. We recommend use at I.F. output 14-18 mc.
- COMPLETELY SHIELDED — In beautifully finished silver gray hammertone steel case.
- Available (SPECIAL ORDER) for other (C) or industrial frequencies. Also available for Collins receiver.
- USES 6BZ7, 2 — 6CB6, 2 — 6J6 tubes. COMPLETE with plugs, tubes and crystal. \$42.50
- Kit Form. Complete. \$29.75

Ask your dealer or write us

THE EQUIPMENT CRAFTERS, INC.

238 Union St.

Hackensack, N. J.

Correspondence

(Continued from page 51)

I am really interested in this codeless ticket idea. I'd like to get a ticket like that for my boy. He is an excellent 'phone man and has received many compliments from old 'phone hands on his excellent voice and diction and the way he holds his microphone (just at the proper rakish angle). He has also picked up enough shop talk from the 'phone bands to pass his General test. In fact, just the other day I heard him mumbling something about external nonlinear systems, as he twirled the knobs on his Tinker Toy. The only thing between him and a license is his lack of c.w. know-how. You see, he's only 3 years old and doesn't know his ABCs yet.

Earl Romans, W0QPL

152 Pine Hill Circle
Waltham, Mass.

Editor, QST:

After having read the rebuttals to the point involving the matter of continuing or eliminating code as a requirement in the amateur license law, I have reached the conclusion that those who favor its continuance have not presented one logical reason for it. They are so engrossed in self-adulation in their little accomplishment of having mastered the code that they lose sight of the point in question. Why should everyone learn to communicate by using code — even those who don't want to learn it, have not the time, or, more important, those who learn it just to obtain their licenses and promptly forget it.

Perhaps almost anyone can build a modulator as one wit put it. Well, certainly anybody with the mentality of the average 10-year-old could dismantle the family BCL receiver and revamp it into a semblance of a c.w. transmitter. Nothing said about the technical knowledge necessary to eliminate chirping, clunks, thumps and clicks. Some of you birds don't know the meaning of "pure d.c. note" or can't tell me what it is if you heard one.

That's exactly what we have on the air, not in most cases but enough to consider seriously — men with nothing above the lip-line but the mentality of ten-year-olds so far as art is concerned radiowise. These people who raise the hue and cry of "grand old tradition," "real amateur" and similar rot, might stop to think a moment that tradition pertains to the past and that is what horse and buggies are a part of. They are only revived for those who eat, live and wallow in tradition — the rich and the dreamers among us.

Let's take up this "real amateur" bosh for a moment and make short work of it. The real amateur gets into every phase of ham radio — 'phone not excepted. He generally is equipped with the technical know-how so that if he errs and is detected he can dig into his rig and correct it. He does not hide in the moldy shrouds of code communication content with the knowledge that since his neighbors, in a mile or two radius, can't copy Morse, they won't be able to "pin" it on him when they experience BCI and TVI. They can guess and suspect themselves blue in the face and all this ingenious fellow has to do is point out other ham antennas in the vicinity and infer "why not them?"

The 'phone man is compelled to disclose his identity each time he mentions his call letters and even then a lot of people don't know what the FCC is and don't even think there is a place to lodge a complaint. So the c.w. man has a swell time of it snapping a couple of wires leading from a revamped a.c.-d.c. receiver in order to key it. Let those who like code communication learn it — also something useful such as the technical side of radio. The 'phone man has to know what he is doing or he is off the air but fast.

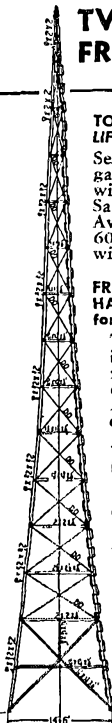
Because I don't know Morse code, using that for an excuse to prevent me from enjoying 'phone communication is like telling me that I must not eat fish because I won't eat oysters.

Please, no more of that poppycock about how your dits and dahs can be heard in Surinam or someplace. Get off the tangent and come to the point as to why I should be denied the pleasure of ham radio, qualified as I am except for not knowing or wanting to know anything about Morse code.

— Frank W. Wenzler

NEW SUPER POST TOWERS for TV ANTENNAS in FRINGE AREAS

Available in Heights from 33 ft to 100 ft



TOWERS of STRENGTH to LAST A LIFETIME

Self supporting tower built up of galvanized steel sections. No guy wires necessary. Easy to erect. Safe and resistant to high wind. Available in heights 33 ft, 47 ft, 60 ft, 73 ft, 87 ft, and 100 ft, with bases in proportion.

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TERRITORIES OPEN for JOBBER DEALER FRANCHISE

Write for complete structural details, packing, prices, discounts, and territorial assignment.

Manufactured by
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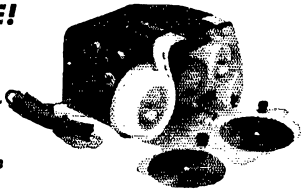
BUILDERS OF STEEL TOWERS SINCE 1888

LEARN CODE!

SPEED UP Your RECEIVING with G.C

Automatic Sender

Type 5
\$28.00 Postpaid in U. S. A.



Housed in Aluminum Case Black Instrument Finished. Small—Compact—Quiet induction type motor. 110 Volts—60 Cycle A.C.

Adjustable speed control, maintains constant speed at any Setting. Complete with ten rolls of double perforated tape. A wide variety of other practice tapes available at 50c per roll.

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GUARANTEED!

Low Frequency—FT-241A for SSB, Lattice Filter etc., .093" Pins, 486" SPC, marked in Channel Nos. 0 to 79, 54th Harmonic and 270 to 389, 72nd Harmonic. Listed below by Fundamental Frequencies, fractions omitted.

49¢ each—10 for \$4.00		99¢ each—10 for \$8.00	
370	393	414	436
498	520	400	459
372	394	415	437
501	522	440	461
374	395	416	438
502	523	441	462
375	396	418	481
503	525	442	463
376	397	419	483
504	526	444	464
377	398	420	484
505	527	445	465
379	401	422	485
506	529	446	466
380	402	423	486
507	530	447	468
381	403	424	487
508	531	448	469
383	404	425	488
509	533	450	470
384	405	426	490
511	534	451	472
385	406	427	491
512	536	452	473
386	407	429	492
513	537	453	474
387	408	430	493
514	538	454	475
388	409	431	494
515	539	455	476
390	411	433	495
516	540	456	477
391	412	434	496
518	541	457	479
392	413	435	497
519	542	458	480

FT-243—.093" Pin Dia.—.486" Pin SPC for Ham and General Use.

49¢ each—10 for \$4.00

4035	5437	5950	6800	7610	7900
4080	5485	5973	6806	7625	7906
4165	5500	6240	6825	7640	7925
4190	5660	6250	6850	7641	7940
4280	5675	6273	6875	7650	7950
4300	5700	6275	6900	7673	7973
4320	5706	6300	6925	7675	7975
4397	5725	6325	6950	7700	8206
4490	5840	6350	6975	7706	8225
4495	5750	6373	7450	7720	8260
4535	5773	6375	7473	7725	8273
4735	5780	6400	7475	7740	8275
4840	5806	6406	7500	7750	8300
4930	5840	6425	7506	7773	8325
4950	5852	6673	7525	7775	8630
4980	5873	6675	7540	7800	8683
5030	5875	6700	7550	7825	8690
5205	5880	6706	7573	7840	
5300	5906	6725	7575	7850	
5385	5925	6750	7600	7873	
5379	5940	6775	7606	7875	

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CR-1A	FT-171B—BC-610
SCR 522- $\frac{1}{2}$ " Pin, $\frac{1}{2}$ " SP	Banana Plug, $\frac{1}{2}$ " SPC
5910	7350
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6450	7390
6470	7480
6497	7580
6522	7810
6547	7930
6610	2220
	2155
	2220
	2258

Special—200 KC or 500 KC in FT241A Holder—only \$1.79 each

Add 20¢ postage for every 10 crystals (or less).



520 TENTH ST., N.W.—Wash., D. C. Dept. Q

99¢ each—10 for \$8.00

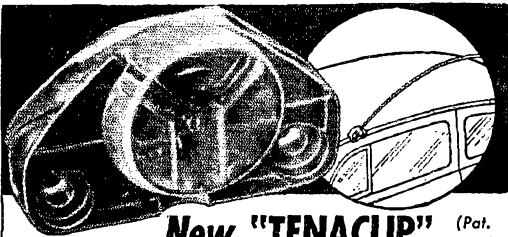
1015	6100	6600	7200	8075	8500
2125	6125	6606	7250	8100	8525
3500	6140	6625	7300	8125	8550
3640	6150	6640	7306	8140	8575
3680	6175	6650	7325	8150	8600
3735	6200	7000	7340	8173	8625
3760	6440	7025	7350	8175	8650
3800	6450	7050	7375	8200	8700
3885	6473	7073	7400	8340	8733
3960	6475	7075	7425	8350	
3990	6500	7100	7440	8380	
6000	6506	7125	8000	8400	
6025	6550	7140	8025	8425	
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SPECIAL—200 KC without Holder 59¢ each—3 for \$1.50

BC-746 TUNING UNITS

Channels 10 and 12 Foundation coils and condenser for 80 meter VFO or ex-98¢

See Article by W3PPQ in Mar. '54 CQ



New "TENACLIP" (Pat. Pend.)

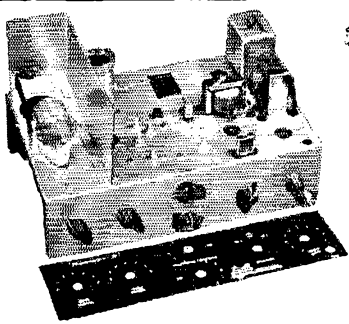
attaches to car... stops antenna whipping

Clear plastic clip quickly fastens to rain molding... holds right or left antennas. Prevents damage to antenna from low hanging limbs or driving into garage. See your dealer or order direct. No C.O.D.'s please.

\$1.98

PLASTICLES, 4207 GRAND RIVER, DETROIT 8, MICH. postpaid

NOW... Single-Sideband for Everyone!



"Phasemaster-Jr."

Up to 50 watts output.
Fixed or mobile, 6-12v fil.
SSB, AM, PM or CW.
9 mc phasing circuit.
Less power supply and tubes.

Kit \$74.50
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SPECIAL SSB COMPONENTS
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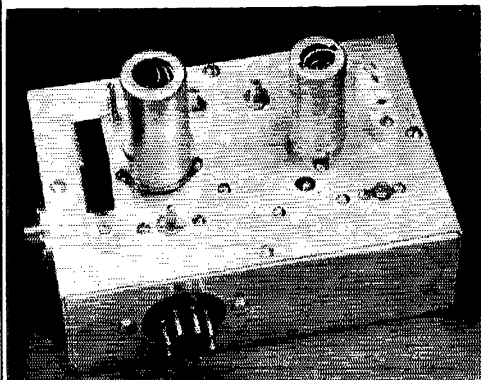


P. O. BOX 163 MANITOWOC, WISCONSIN
MANUFACTURERS OF PRECISION ELECTRONIC EQUIPMENT

As SEEN in QST

XTAL Converter

March 1954
page 29



21 Mc Converter

RECEIVERS

Whether you like to ragchew, handle traffic, seek DX, or work the contests, you need a receiver. And if you're the average ham, you're always looking for ways to improve your receiving set-up. The last twelve issues of *QST* carried

19 articles, covering

73 pages, using

85 illustrations

describing many types of converters, filters, SSB modifications, TRFs and superhets—to help you get better reception. More are coming. Don't miss any!!!

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\$4 in U.S.A. • \$4.25 in Canada
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**THE AMERICAN
RADIO RELAY LEAGUE
WEST HARTFORD 7, CONN.**

NEW BOOKS

Theory and Design of Electron Beams, second edition, by J. R. Pierce, Technical Staff, Bell Telephone Laboratories, Inc. Published by D. Van Nostrand Company, Inc., New York. 222 pages, 6¾ by 9¼, cloth cover. Illustrations. Price, \$4.50.

The new edition of this work contains added material on focusing in the presence of space charge, and has a new chapter on focusing by means of periodic fields.

Elements of Mathematics for Radio, Television and Electronics, by Bernhard Fischer and Herbert Jacobs. Published by The Macmillan Company, New York. 569 pages, including index. 5¾ by 8½, cloth cover. Price, \$7.20.

Covers arithmetic and elementary algebra, emphasizing electrical and electronic applications. A large number of problems of a practical nature are included, with answers.

Radio Data Charts, by R. T. Beatty, revised by J. McG. Sowerby; fifth edition. Published for Wireless World by Iliffe & Sons, Ltd., Dorset House, Stamford St., London S.E. 1, England. 91 pages, 8¼ by 10½, paper cover. Price \$1.75. Available in U. S. from British Radio Electronics, Ltd., 1833 Jefferson Place, N.W., Washington 6, D. C.

A new printing of an old favorite. Contains 43 nomographic charts covering most of the common problems in circuit design.

Transistors, Theory and Practice, by Rufus P. Turner. Published by Gernsback Publications, Inc., 25 West Broadway, New York 7, N. Y. 144 pages, including index. 5½ by 8½ inches. Price, \$2.00. Paper cover.

Elementary transistor theory, combined with typical circuit applications and descriptions of a number of practical devices using transistors.

Crystal Handbook, compiled by the Research Division of the James Knights Company, Sandwich, Ill. 6 by 8½ inches, 36 pages. Schematics, bibliography, paper cover. Price, \$1.00, direct from James Knights Co.

Gives general performance data on various crystal cuts and outlines factors that should be considered in equipment design for maximum crystal performance.

Highlights of Color Television, by John R. Locke, jr. Published by John F. Rider Publisher, Inc., New York. 44 pages, including index. Paper cover, 5½ by 8½ inches. Price, 99 cents.

A nonmathematical sketch of the principles of color television, under the NTSC standards, at a technical level that can be followed by those familiar with the present monochrome system.

Introduction to Color TV, by M. Kaufman and H. Thomas. Published by John F. Rider Publisher, Inc., New York. 140 pages, including index. 5½ by 8½ inches, paper cover. Price, \$2.10.

Covers principles of color television and circuits used to achieve color reproduction at the receiver.

HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

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(5) Closing date for Ham-Ads is the 20th of the second month preceding publication date.

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature, and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League take the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly. Typewritten copy preferred.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

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SUBSCRIPTIONS. Radio publications. Lateat Call Books, \$3.50. Mrs. Earl Mead, Huntley, Montana.

WANTED: Cash or trade, fixed frequency receivers 28-42 Mc. W9YIV, Troy, Ill.

WANTED: All types of aircraft radios, receivers and transmitters. Absolutely top prices. Dames, W2KUW, 308 Hickory St., Arlington, N. J.

DON'T Fail! Check yourself with a time-tested Surecheck Test. Novice, \$1.50; General, \$1.75; Amateur Extra, \$2. Amateur Radio Supply, 1013 Seventh Avenue, Worthington, Minn.

WANTED: Early wireless gear, books, magazines and catalogs before 1925. W4CH, 1010 Monte Drive, Santa Barbara, Calif.

TUNING shafts for ARCS, 274N, ARN7 ARB, RUI6, \$2.00; MC211A, right-angle for tuning shafts, 35¢; MC136, \$2.50; SC8374N, racks and mountings, \$1.00; BC348 potentiometers, \$2.00. All new. L.I. Radio, Box 474, Montrose, Pa.

CODE slow? Try new method. Free particulars. Donald H. Rogers, Fanwood, N. J.

POSTCARD brings you free information on our new Amateur Desk Signs and money-saving club purchase plan. Hawkins Distributing Co., Paquattuck Terr., East Moriches, N. Y.

ATLANTIC City vacation. Kilowatt accommodations at low power prices. Luxury rooms with private bath and radio, or budget special rooms with running water. Garden-like atmosphere in quiet location yet near everything. Write for information or reservations. Commodore Hotel, 715 Pacific Ave., Atlantic City, N. J. Phone 4-6993, Ben Robin, W2BIG, Manager.

SURPLUS specials! RG-8/U Cable 100 ft. \$5.95, 250 ft. \$13.25, 500 ft. \$25.00. Coaxial Connectors—PL-259 5 for \$2.25, SO-239 5 for \$2.00. New tubes—807—\$1.65, 811A—\$4.25, 812A—\$3.50, 813—\$10.50, 866A—\$1.48, 304TH—\$8.75, 872A—\$3.95, 24G—\$1.85. Postage extra. Request free bulletin and visit our new store for thousands of bargains. Want to buy or swap: Selyns, Synchron, Servo Amplifiers, RTA-1B Aircraft Radio, Lectronic Research, 719 Arch St., Philadelphia 6, Pa.

WANTED: Measuring and testing equipment and VFO. Ken Miller, W8LSA, 1108 Clearview Ave., Parma 9, Ohio.

MICHIGAN Ham's! Amateur supplies. Store hours 0800 to 1800 Monday through Saturday. Purchase Radio Supply, 605 Church St., Ann Arbor, Michigan. Phones 8696 and 8262. Roy J. Purchase, W8RP-Leroy Reichenberger, W8LDJ-Edmund E. Gunther, Jr., W8HMW.

URGENTLY need AN/APR-4 items. New high prices. Littell, Far Hills Branch, Box 26, Dayton 9, Ohio.

PERFORATED Sheet Aluminum 18 gauge with 1/16" holes. Easily worked with hand tools or cut to your pattern. Perfect for shielding. One dollar per square foot. Minimum order four feet. Write for bulletin. Nertimo-Duffie Company, 2740 S. 32nd Street, Milwaukee 46, Wisconsin.

SSB FT-241-A crystals. Individually activity-tested, measured, marked exact true frequency. Guaranteed satisfactory, \$1.00. Orco Products, Box 51, Downey, Calif.

TRADE or sell: Model 12 teletype with synchronous motor, table, cover, stand and polar relay. Tape perforator, distributor and tape transmitter with three polar relays. All converted, wired and ready for operation. Excellent condition. Bennett, W4EBH, 328 West Whitlock Ave., Winchester, Va.

FOR Sale: QST's, good shape: May 1939 through Sept. 1953—\$40.00. Merl Shipp, W01VF, Maple Hill, Kans.

QSL'S? State-map? Rainbow-map? Cartoon? Mobile? Largest variety QSL samples, 25¢. Sakkers, W8DED, P.O. Box 218, Holland, Michigan.

QSL'S-SWL's Meade W0KXL, 1507 Central Avenue, Kansas City, Kans.

QSL-SWLS, 100, \$2.85 up. Samples, 10¢. Griffith, W3FSW, 1042 Pine Heights Ave., Baltimore, Md.

QSL of distinction. Three colors and up. Uncle Fred, Box 80, Lynn, Penna.

DELUXE QSL'S, Petty, W2HAZ, Box 27, Trenton, N. J. Samples, 10¢.

QSL-SWLS, free Samples. Backus, 5318 Walker Ave., Richmond, Va.

QSL-SWL cards. Sensational offer. Bristol stock 500 1 color \$3.95, 2 color \$4.95, 3 color \$5.95, Super gloss \$1.25 extra. Rainbow cards. Samples. QSL Press, Box 71, Passaic, N. J.

QSL'S Samples free. Albertson, W4HUD, Box 322, High Point, N. C.

QSL'S! Two colors, \$2.00 hundred. Samples for stamp. Rosedale Press, Box 164, Asher Station, Little Rock, Ark.

QSL'S, SWLS. High quality. Reasonable prices. Samples. Write to Bob Teachout, W1FSV, Box Q124, Rutland, Vermont.

QSL-SWLS Samples, free. Bartinoski, Houlton, Me.

QSL's, SWL's. Fair prices for excellent quality cards. Eleven styles for you to choose from. Samples, 10¢. Almar Printing Service, 423 Barker Bldg., Omaha, Nebraska.

QSL'S "Brownie," W3CII, 3110 Lehigh, Allentown, Penna. Samples 10¢; with catalogue, 25¢.

QSL-SWLS samples, 10¢. Malgo Press, 1937 Glendale Avenue, Toledo 14, Ohio.

QSL'S Amateur radio's favorite QSL printer. Samples catalog, 25¢ refunded. Stronberg, P.O. Box 151, Highland Sta., Springfield, Mass.

QSL'S! "America's First Choice!" Samples 10¢. Tooker Press, Lakehurst, New Jersey.

QSL'S. Beautiful 3 colored, for \$2.85 per 100. Samples for stamp. Fast service. Satisfaction guaranteed. Constantine Press, Bladensburg, Md.

QSL'S. On vacation. C. Fritz, 1213 Briargate, Joliet, Ill.

QSL of quality. Reasonably priced. Samples. W3QCC, Besesparis Printing, 207 So. Balliet St., Frackville, Pa.

QSL'S 150, \$2.00. Samples, 10¢. Bob Garra, Lehighon, Penna.

WILL sell or trade brand new radio parts, tubes, relays and a BC459 transmitter. Write Toie Owen, Jr., W5YBF, P.O. Box 509, Gulfport, Miss.

QSL the way you want them. Samples, 10¢. Vern't Print, 729 Juul, Hutchinson, Minn.

QSL samples, 10¢. Plenty styles. W4AYV, Stinnette, Jr., Box B155, Umatilla, Fla.

QSL samples. Dime, refunded. Roy Gale, W1BD, Waterford, Conn.

QSL'S: Ham's "Super-Speed Specials" are engineered to cover knot holes in drafty shacks. Samples 10¢. Robinson, W9AYH, Dept. 1, 12811 Sacramento, Blue Island, Ill.

HOTTEST Ham List in the nation! Trade-ins and closeouts of all leading Amateur brands including Collins, National, Johnson, Hallcrafters, Gonset, Elmac, Morrow, Harvey-Wells, RME, Miller, Meissner, Sonar. We trade and offer our own time payments tailored for you. All leading brands of new equipment in stock. Write for latest bulletin. Stan Burghardt, W0BJV, Burghardt Radio Supply, Inc., Box 41, Watertown, South Dakota.

TELEVISION set, 7". \$30.00. Suitable for monitor. Have couple larger. Want TV camera equipment. W4API, 1420 South Randolph, Arlington 4, Virginia.

WANT: 450THs; have BC1306 75-meter mobile station, \$90. W6WZD.

TRANSFORMERS while they last! 550VCT @ 90 mile with 6.1VCT @ 1/4 A, cased, \$2.00 each; 700 VCT @ 90 mile with 6.1VCT @ 1/4 A, cased, \$2.20 each; 5260VCT @ 1/2 amp. ICS, \$40.00 each. Grand Transformers, Inc., 226 Washington St., Grand Haven, Michigan.

SEE you at Hamfesters Radio Club 20th Annual Picnic and Airmobile Meet at Mance Park near Chicago on Sunday, August 8th. Donations, \$1 to August 1; \$1.25 after.

COMPLETE station including recently built all band 500W. rack and panel transmitter with 813 final and Sonar CFC VFO with NBFM, NC-81X rcvr., Aattic T-3 microphone, etc. Sell complete for \$200 or in parts. Richard Applegate, W8ESJ, 19 Maple Street, Berrien Springs, Michigan.

WANTED: Babcock mobile transmitter and associated power supply. Also want 3 band converter, mobile receiving equipment. State lowest price. For sale: 32V2, Box 33, Dyker Heights Station, Brooklyn 28, N. Y.

SELL: TR-75TV, 80m coils, three Novice xtals, \$50. S-38B, \$32. Both \$77.50. Express collect. Want SX-28. WN9ZXY, Route 2, Rock Falls, Ill.

SELL: Collins 600 watt input 30-J Transmitter, \$275., Boehme automatic keyer and McElroy three-key tape puncher for Morse code, \$145., #241 Dumont scope, \$245. HRO Sr., \$95. 32V-1, \$385. 12,000 ohm grid 110 dev relays, \$1.75. Want technical manuals, 310B Exciter, Tom Howard, W1AFN, 46 Mt. Vernon St., Boston 8, Mass. Richmond 2-0048, 2-0916.

SUPREME Tube-Set Tester (599). \$25.00. Michael Neidich, 198 Anstice St., Oyster Bay, L. I., N. Y.

RK-4D32 brand new, \$17.50 postpaid. W5AXI.

SELL NC 125 receiver one year old, guaranteed like new. Best offer over \$110.00. E. Carter, W4YHW, 910 Oriole Dr., Miami Springs, Florida. Phone: 804001.

HALLCRAFTERS S-77A Receiver. Like new: \$70.00. A. Gantcher, 1973 81st Street, Brooklyn, N. Y. Tel. TErrace 7-1354.

VIKING II with VFO, factory wired. Hardly used. First highest cash offer takes it. Prefer personal pick-up. W2ZZWA, 231 Snowden Lane, Princeton, N. J.

TWO Gordon rotary beams, motors complete with aluminum arrays, and complete with elements for 10 and 20 meters, with direction indicators. Best offer takes them. Crating extra. W. Kuehl, W9EZN, 3654 Lincoln Ave., Chicago 13, Ill.

ART-13, 2-47A, complete with power supplies, modified for ham coverage 3-30 Mc., \$150.00, S-40 receiver, \$45.00. W1KJO, 29 Pine St., Bedford, Mass.

SELL: Harvey-Wells TBS-50C Xmitter and Harvey-Wells A.C. power supply. In good condition and completely TVI-proofed. Best offer over \$90.00. K2CWS, Theodore Fine, 3139 Godwin Terrace, New York, N. Y.

COLLINS 32V2 and 75A1 for sale. Perfect condition. Never unpacked since complete overhaul of both units at Collins factory. \$650 for both. Dr. H. E. Hubbard, Marinette, Wisconsin.

TRADE: Gonset 10-11 Meter Mobile Converter. Want 2 Meter crystal controlled converter suitable for fixed operation. W2VUW, R. F. Bishop, 46 McCouns Lane, Oyster Bay, L. I., N. Y.

FOR Sale: Gardiner "Type S" automatic tape sender, 4 to 60 wpm, with 12 rolls, double perforated tape, \$20.00. ICA Deluxe Signatone code practice oscillator, \$10. Both for \$26.00. In grid condx. James E. Brugh, 400 Whitney Ave., Pittsburgh 21, Penna.

WANTED: BC-348 receivers. Write James S. Spivey, Inc., 4908 Hampden Lane, Washington 14, D. C.

FOR Sale: Unused prop pitch motor, \$15.00. RCA dynamic mike, 88A, with 91B stand, \$25.00; Astatic MU-2 crystal sound cell type mike with stand, \$15.00; power transformer 400 and 600 volt at 600 Ma, \$8.00; National PW dial, \$4.00; 522 transmitter and receiver; transmitter rack mounted with power supply, push to talk, antenna relay, now on air, \$7.00. Prefer local deals. Robert Cobough, W2TBE, Bayside 9-2449.

NEED: AN/ARC-3. R. Ritter, 4908 Hampden Lane, Bethesda, Maryland.

SELL: \$175, or trade in for good receiver. Complete TV camera, power supply, and tripod. Professional appearance. Blue crackle finish. Includes new Iconoscope and monitor tubes, plus 14 other associated tubes. Schematic supplied. Needs the bugs worked out of it. Also sell 75 w. cw/foe xmitter, modulator, and uncalibrated VFO. For reference, see pages 162, 188, 252 in the 1954 ARRL Handbook. Equipment duplicated almost exactly: \$100. Paul White, W9WDU, 1536 W. Groes St., La Crosse, Wis.

GONSET Communicator II Deluxe new, complete, all cables, manual, first class condx. First \$190 takes it. Adolph Mogavero, K2BYO, Pulaski, N. Y.

5000 VCT, 600 Ma. with 100 es 125 V pri. New, \$40.00. Other parts. Write to G. Grothen, RFD #2, Box 10, Hastings, Nebraska.

NEED: AN/ARC-3. W. Richards, 4908 Hampden Lane, Bethesda, Md.

FOR Sale: Cleaning house, Telvar T602 xmitter, 80 to 10 meters with Bud VFO, low pass filter, completely filtered and shielded, no TVI, \$135.00; RCA police mobile xmitter MI-7814 with power supplies, 10 meter, \$35.00; BC-645 Transceiver, new, 450-500 Mc. with tubes, \$17.30; SCR-522 100 y 150 Mc. xmitter-rcvr, power supply parts, with T1B, mike, \$31.50; Johnson Rotomatic, complete with 10 and 20 meter beams, boom, 70' selsyn indicator, cable, \$239.00; Patterson PR16 all band rcvr, \$22.50. Equipment F.o.b. Chicago, Dave Sandline, 10537 Hale, Chicago 43, Ill., Tele. PR 9-0061.

MODEL ATD transmitter, 100 watt, fone & c.w. VFO 1500-9050 Kc., complete with power supply; new BC459 transmitter and companion receiver with dual power supply 7-9 Kc. Sell reasonable. W8ET, 366 Canterbury Road, Bay Village, Ohio.

FOR Sale: 60 w. transmitter; 80, 40, 20; coils for 80; metered with power supply; in wood rack. \$35.00. K2EXD, Walsh, 614 Orchard St., Cranford, N. J.

FOR Sale: 500 watt final, 80 thru 10, P-P 4-65A, shielded, blower cooled, fully metered, Lyco Transmitter, BC221T. Write for details. Welch, W3PXX, 5014 59th Ave., Hyattsville, Md.

SELL: Hallcrafters Model HT-9 transmitter, 125 watts phone, 150 watts CW, complete with 10-20-40 Mc. tubes, low pass filter, Manuel Freitas, W2JOS, 507 Elizabeth Ave., Elizabeth, N. J. Phone EL 2-6854.

FOR Sale: One new Panoramic adaptor, Model PCA-2, manufactured by Panoramic Radio Corp. of New York. It was purchased last February for \$149.75. Has been in use only a few hours. Works with any communications receiver with 455 kc. if frequency bandwidth of Panadaptor is plus or minus 100 kc. Will ship to any point within U. S. free of shipping charges. Price of Panadaptor is \$100. For further info write to Ronald L. Cummings, W5WMB, CR Division, U.S.S. Northampton, Naval Operating Base, Norfolk, Va.

NOVICE: General 75 watt c.w. TVI proof xmitter, 6146 final, \$90.00. Dallas Ward Jr., 1421 Webster St., New Orleans, La.

WANTED: Complete set of coils for National S-W3 rcvr. Reply to Dick Yates, 3054 9th Ave., Rock Island, Ill.

WANTED: 4 Mc. coil for BC-189 receiver. Holbrook, W4VYN, 187 N. Lumpkin St., Athens, Ga.

SELL: Heath AR-2 receiver, \$20.00; Heath SG-8 signal generator, \$15.00; G.E. Variac 115V 2KVA, \$30.00; 28" ICA metal cabinet, \$17.00; UTC motor, 200 W, 200 Ma. supply, \$18.00. All in good condition. Need 33 ft. Vesto tower. C. P. Ross, W9ABA, 1606 Lake Ave., Wilmette, Ill.

FOR Sale: 32V-1, excellent, \$125.00; 75A-2, speaker, \$350.00; Elmac A-54-H, \$105.00. Super-Six converter, new, \$40.00; PE-103, \$22.50. James Craig, 3413 W. Roosevelt, Lake Charles, La.

SELL: Viking I xmitter, factory-wired, never was used. Rig at home. Also Viking VFO. Best offer to W0MTZ, Ralph L. Eaton, AF 37 014 410, Flt. D, 36th Comm. Sqd., APO 862, New York, N. Y.

FOR Sale: Motorola T-69-20A modified, complete 10 meter mobile transmitter, with dual vibrator supply, \$40.00. Also, BC-453B Q5'er with attached AC supply, \$20.00. Gordon E. Hopper, W1MEG, 75 Kendall Avenue, Framingham, Mass.

TRADE or sell: Generator, 110 VAC, Hobart four cylinder, water-cooled 5Kw, ICAS conservative. In good condition. W4PFA, Cates, 2045 Springlake Dr., N.W., Atlanta, Ga.

FOR Sale: Gonset Communicator I, perfect, six weeks old, with crystals and mike. P. E. Stone, 518 Congress, Green Bay, Wis. W9BFX. Best offer.

EXCELLENT mobile 10-meter rig, RCA xmitter. Dynamometer power supply, Morrow converter, all controls and cables, mike. Prefer deal Cleveland area: \$85.00. W8OPR.

VTVM Simpson 303, \$45.00; Signal generator Triplett 3432, \$60.00;

Oscilloscope RCA type W6-8A 5-inch, \$125.00; dynamic tube testor Jack 115, \$50.00. Lloyd Locke, Richmond, Mass. All four instruments, \$250.

SX-28 Receiver, in excellent condx, \$110; BC-645, brand new, \$20; BC-454, built-in 110V, supply, perfect, \$12.00; G. H. S210D speaker, like new, \$14. Ransome, W9BTS, 2405 E. State, Rockford, Ill.

TRADE 6 Hn Wizard outboard motor, 1953 model, used less than 10 hours, guaranteed like-new. Want: HQ-129X or other good rcvr. Must be in excellent condition. Mark Anthony, WN5CHK, Box 204, Brownwood, Texas.

SELL: Hammarlund Pro 400X, complete, guaranteed like-new, \$269. R. Long, 933 E. Broadway, So. Boston, Mass.

FOR Sale: 2 Kw. modulation transformer. Matches p.p. 450TH R.F. to P. p.p. 450TH modulators. Use 304TL's for economy 1 kw. xmitter. Like new, 106 lbs. First \$90.00 takes it. W7HAD, Riggs, 131 Elm St., Brementon, Wash.

MOVING! Must sell: Collins 32V2, \$475, TVI proof; HRO-60, \$450.00; Hallcrafters Sky Buddy, \$28.00; new Simpson T.V.-P.M. signal generator, cost \$325.00, will sell for \$250.00; Stancor 203A, \$25.00; PE103, \$20.00; Gonset Tri-Band, \$20.00; Precise scope #300, \$65.00, also 1 K.W. transmitter phone/c.w., complete, \$150.00 or will sell units. S. Gogel, 24 Olsen St., Valley Stream, L. I., N. Y. Crtias 5-9754.

SALE: Viking II xmitter, VFO, low pass filter Advance 7204 relay, 807 614 tuner, 503 Ma. (UTC) choke, BC453, meters, tubes, RG-59 and RG11 at 3¢ and 5¢ per foot; Pilot 3" TU, Pilotone, BTCAI units; other community TV gear. Want BC611's, portable gear. No reasonable offer refused. W8LRT, Graves, Barnesville, Ohio.

COMMERCIAL design applied to amateur equipment at amateur prices. What's your problem? Write to Arthur K. Henschel, Electronic Engineer, Member of IRE, ARRL, W2CTB, 11-A Wayne Gardens, Collingswood, N. J.

HARVEY-WELLS Bandmaster deluxe with Bandmaster VFO and Johnson lo-pass filter. Partially de-TV'd. No power supply. Rig is nine months old. Will sell for \$100.00. T. S. Kaszuba, W1ZQT, 473 Elm St., New Haven, Conn.

WANTED: Schematic with or without instruction book for Mark II transmitter. Will buy outright or pay for use. Boyd King, W3WG, Prince Frederick, Md.

SELL or Trade: BC645's, BC222's, HK354's, 250TH's 2000VDC 500 Mc. or 1000 Mc. (UTC) chokes, BC453, meters, tubes, RG-59 and RG11 at 3¢ and 5¢ per foot; Pilot 3" TU, Pilotone, BTCAI units; other community TV gear. Want BC611's, portable gear. No reasonable offer refused. W8LRT, Graves, Barnesville, Ohio.

SELL: Selsyn rotary beam indicator with 40 volt transformer, \$35. Prop pitch motor modified and hasy filtered, \$22. Drilled steel frame for prop pitch, \$10. Cash and carry deal only. W2GVZ, Jessup, 337 Hamilton Ave., Glen Rock, N. J.

FOR Sale: Motorola 100 watt 'phone and c.w. xmitter, 10 and 80 meter control relay rack, in deluxe 72" Motorola cabinet, \$150. 100 watt Stancor c.w. and 'phone 20, 40 and 80 xmitter: \$100.00. R. E. Dumas, W6I2D, Long Lake, Minn.

FOR Sale: Dynamotor type BD77 volts, input 14 volts, output 1000 (350 Ma.), new, \$12.00; BRW variable condenser, type W-58B (20-58µm) .375 spacing, like new, \$12.00. Many other bargains. Cash & carry. Blamey, W3BKL, 24 Conestoga Drive, Pittsburgh 34, Pa.

TRADE miniature Speed Graphic and accessories for good rcvr, complete. Prefer Harvey-Wells Bandmaster with VFO. Johnny Wood, P.O. Box 723, Tyler, Texas.

FOR Sale: Collins 75A3, only 20 hours use: \$395.00. Jack Haley, 22 E. 38th St., New York 16, N. Y.

NOMINAL Trade-in will bring you \$90 allowance on new Harker & Williamson transmitters, Hallcrafters HT-20, or any model Concrete tape recorder: \$100 on SX-88, \$60.00 on Viking II, \$40.00 on Viking Ranger, or Elmac AF-67; \$30.00 on Elmac receivers or Pentron tape recorders, 20% on Lansing, Stephens, Fisher, etc. Hi-Fi components, Oberlin territory, bargains! Telcoa, Azurelee Dome, Malibu, Calif. Tel: Globe 6-2611.

HAMFEST! Seventeenth annual "Stag Hamfest" sponsored by the Greater Cincinnati Amateur Radio Association is to be held Sunday, September 12, 1954, at the location in Koning Grove (formerly Ah Grove) on Winton Road at Compton Road two miles south of Greenhills. Registration, \$2.50 at the gate and here's what you get: Hot dogs on bun all day, donuts and coffee served until noon; beer and pop served all day. Full picnic dinner and supper (all you can eat), rain or shine. Games, hidden transmitter hunt, etc. For additional information contact Byrum Henry, W8QB3, 1120 Elberon Ave., Cincinnati, Ohio.

UNUSED, factory-wired, de-TV'd, complete 150 w. phone/c.w. transmitter, \$100 or best offer, K2DQH, Chris Lane, North Street, Harrison, N. Y. Tel. Ry 7-0114.

SELL: New Collins 32V3, in factory sealed carton, \$625; HRO-60 used only 10 hours — not even a fingerprint — with all coils, xtal calibrator, spkr, like new, \$425.00; Also complete mobile unit: used only 3 months, Elmac AF-67 xmitter, Palco 500 volt supply; Morrow 5BR converter, 8-tube Ford radio converted for 5BR; stainless steel heavy duty Master Mobile antenna with all coils; Electro-Voice mobile all cable, push-to-talk, push-to-talk; beautiful chrome plated xmitter mount. All in perfect condx: \$300.00 complete. W6IOS, Cooper, 901 So. 80th St., Omaha 3, Nebraska.

MOBILE! Reflectorized aluminum call signs, regular 2" x 5"; \$1.50; Jumbo size, 4" x 12", \$2.00. Overnight service. J. Whitley, W2LPG, 133 Airside Ave., Long Branch, N. J.

420 Megacycle gear: APT5 xmitter, \$35; AX9903 final with meters, \$30; AP513 rcvr with S-meter, \$20; C.C. converter, \$20; 316A m.o. with modulator, \$10; also: RME-45, \$60; 522 2m xmitter, \$15; 522 6m. xmitter \$10; 6v. Vitrpack, 200v, at 100 Ma., \$5.00; 832's, \$2.50 each. W6ABN, 414 E. 55th St., Long Beach, Calif.

SELL or trade: HF 10-20 for VHF 152A or \$40.00; BC453A, \$12.00; new 813, \$6.50, 811, \$2.00; 809, \$2.00; 815, \$2.50. Postage extra. Want xtal 8000-9200 Kc., 2 m. gear. W7JXS, Fischer, 6355 Dible Ave., N.W., Seattle 7, Washington.

FOR Sale: Collins 75A2, speaker, calibrator, like new, \$325. Millen G.D.O. like new, \$40.00; Stanley Bressler, W2GVS, 1901 Ave. P., Brooklyn, N. Y.

QSTs for sale. Have 1931 (Volume 15) through 1944 (Volume 28) except for 1938 and 1941. Each year is bound in black buckram with gold letters. Low price per volume — special price on all twelve. L. A. Morrow, W1VG, 99 Bentwood Rd., West Hartford 7, Conn.

SELL: War surplus transmitters, receivers, accessories, parts, at prices considerably below lowest current prices to insure quick sale. Write for list, Wray, 482 Old Farm Road, Pittsburgh 34, Pa.

VIKING I with 4D32 in final, Johnson TVI Kit, built-in, Johnson VFO, Johnson Low pass filter, Eldico ant. tuner, coax relay, Electric Voice 915 xtal mike, instruction books: \$220.00 f.o.b. Hicksville, L. I., N. Y. HRO Senior with apr., \$70. f.o.b. Alan Saeger, W2FGK, 26 Alpine Lane, Hicksville, L. I., N. Y. Phone Hicksville 3-5663.

AIRPLANE propeller feathering motor, never used, \$20. Sonar SR9, 10-meter converter, \$35.00. H. B. Pearson, W2GBA, 98-21st St., Brooklyn, N. Y.

REX RADIO, 88 Cortlandt Street, N. Y., sells surplus. Low prices. Current specials: PE101C new, in original packing, \$3.75; plug, 75¢; conversion kit, J38 type key, new, \$1.19; 3X10 ufd 450 VDC, plug-in electrolytic, 60µ, Dual 5 µ, 400 VDC, \$1.29. Quantity discounts. Mail orders FB.

COMPLETE 2-meter rig BC639A receiver (100-156 Mc) two heavy duty power supplies and SCR522 xmitter with 4 xtals, all mounted in standard 19" rack. Instruction manuals included. Ready to go on air. Will sell or swap for mobile rig. SX-25 receiver, in gud cond, \$65.00. FL 8 audio filter, two for \$2.50 prepaid in USA. M. D. Haines, W5QCB, 1316 S.W. Military Drive, San Antonio 4, Texas.

VAN SICKLE has new V-D-X rotors with control box for your new 10 and 20 Mc beam, only \$20.00. Van Sickle also is the place where more hams are finding real bargains, trades and terms. Gen. National, Johnson, B&W in stock. Park in the rear or write to Gene, W9JKF, 1320 Calhoun St., Ft. Wayne, Ind.

COLLINS J10-B1, \$200. SSB-JR, power peak with tubes, \$60.00. New 828 tube \$5.00. W5BSU.

METAL Lathe, Atlas, ball bearing, 10-in. swing, 36-in. centers, like new, with accessories to swap for good ham gear. Will deliver within 300 miles. Dean Townsend, W8QQA, 1903 Prosperity Drive, Kalamazoo, Mich.

FOR Sale: Collins 32V2, laboratory job of built-in coax relay, illuminated final plate meter, external anemeter circuits well filtered against TVI even more than the 32V3. B&W low-pass filter attached to rear, commercial brute force filter, Spars 4D32, shielded cabinet. All in perfect condition. \$500.00. John A. Kammerer, W2WRI, 23 New Street, Katonah, New York.

FOR Sale: Lyco T600, \$85.00. Tecraft 2-meter crystal control converter, \$27.50; 20-watt p.p. 61.6 modulator with built-in power supply, \$23.00; pilotuner T601, \$10.00; all items excellent and F.o.b. Allentown, Penna. Henry Mohr, KL7AG/W3, 1005 Wyoming.

SELL or swap for Viking transmitter. Complete mobile installation. Elmac A54-H, Shure 505-C, remote control antenna-tuner, coax relay, Master Mobile antenna with coils, PE-103 with relays. All used less than ten hours. Norval Wallen, Mansfield, Mo.

FOR Sale: Cleaning house. Have several amateur transmitting and receiving tubes and parts. Stamp for list. W8CBS, Austin, 743 Erie Ave., Chillicothe, Ohio.

COLLINS 32V2 with filter, \$395 cash; Collins 75A1 with speaker, \$225 cash. Larry Chilton, W5THI, 3412 Whittier, Fort Worth, Texas.

LYSCO Transmitter, model 600, new, \$75.00. E. J. Runge, 15 Holmes St., North Easton, Mass.

SELL: Meisner EX Signal Shifter with FMX modulator, \$60. Bud VFO, coils for 80, 40, 20M, \$20. Cash and carry. 10 mi. from George Wash. Bridge. Mandell, W2NPM, Rochelle Park, N. J. Hubbard 8-9142.

PAIR 4-125A Elmac used, guaranteed, with 2 fil. transformers CT 7 Amp, tapped primary new, \$33.00; Elmac 4-400A, new, \$35.00; HT-1000, \$40.00; HT-900, \$18.00; coil BC-35, \$6.00. Want 310 B. W2WHW, 152 Garfield Place, Maplewood, N. J.

SELL: Meck all-band 60 watt self-powered phone/cw transmitter-\$50 or trade. G. Greenstein, 2532 University Ave., Bronx, N. Y. FO 5-4493.

SALE - Hallicrafters 577A used 18 mos., excellent condx., \$70.00 call for only. W400F 26-160th St., St. Petersburg 6, Fla.

FOR Sale - any reasonable offer accepted. SS75 and mixer for 20-40 foot wire, little used, BC645A rec. trans. new, I-222A-Sig Gen freq meter 10 position push-button tuner, new, BC 654A Rec-Trans w/PE 103A. W2IQ Demarest-E. Crescent Ave., P.O. Ramsey, N. J.

ENGINEER, Technician, wanted for development work on ham and commercial communications equipment, HF and VHF. Amateur license required. Permanent position. Transiron, Inc., 154 Spring Street, New York City.

BARGAINS: With New Guarantee: Gonset Triband \$29.50; VHF-152 \$39.50; S-72 \$59.50; S-40 \$65.00; NC-57 \$69.00; RME-45 \$99.00; HRO Senior \$99.00; Lyco 600 \$99.00; S-27 \$109.00; SX-43 \$129.00; S-76 \$149.00; SX-71 \$169.00; HRO-50 \$275.00; 75A1 \$275.00; HT-17 \$32.50; EX-Sifter \$69.00; Globe Trotter \$59.50; Hayes VFO \$79.00; HT-900 \$18.00; HT-900 \$18.00; New SX-75 \$199.00; Elmac A-54 \$99.00; HT-9 \$189.00; Globe King \$295.00. We need used receivers: We give highest allowances for S-20R; SX-71; NC-100; S-40B; NC-125; SX-24; SX-25; HQ-129X; and similar receivers. Free trial. Terms financed by Leo, W6GFQ. Write for catalog and beat deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

WANTED used National receiver. L. D. Chipman, W4PRM, 816 Lincoln Street, Winsted, Salem, N. C.

FOR Sale: SX-71, excellent condition, matching speaker, \$190. Used by careful but busy high school senior. W3SRJ, 3309 Sequoia Avenue, Baltimore, Maryland.

LOOK Builders! All new unused B&W ITEL Coil Turret \$9.50. National MB40SL \$16.00. Stancor A4762 Poly-Peptide Drive Xfmr \$8.00. Thord. T-19M16 Univ. Mod. Xfmr 100 watts audio \$18.50 (both \$25.00). Kenyon 6-19 hy, 300 ma. swinging choke \$8.00. Pair 304T's \$10.00. FOB Indianapolis, Indiana. R. B. Ricketta, W9AMV, 4232 No. Oxford.

PAIR Army Handy-talkies on 3885Kc, good cond. w/batteries. Make offer. Portable field receiver 1.5-6 Mc. pushbutton tuned \$15. Several stepping relays up to 50 position. Write: W9DSV, Box 261, Webster, Wisc.

NATIONAL schools radio, TV course with some parts for experiments \$35.00. New IC-100, Trans 2, 1-MC. Navy type, blue, brand new \$22.00. Code machine, Gardner & Co., complete, almost new \$19.00. Trade all or part for ham gear or tape recorder. W5SYB, 1412 N. Manhattan, Amarillo, Texas.

TRADE: Office typewriter for Harvey-Wells VFO. Will Trade: Ham items for Harvey-Wells TBS cabinet. Samkofsky, 527 Bedford Ave., Brooklyn, N. Y.

WANTED BC-610E-C. Hoffman 4908 Hampden Lane, Bethesda Maryland.

JOHNSON Viking I, Viking VFO guaranteed A-1 condition. First \$175.00 check takes both. Joe Weizler, W4SXN/9 113 "B" New York Ave., North Chicago, Illinois.

REAL bargains: New and reconditioned Collins, National, Hallicrafters, Johnson, Elmac, Gonset, Babcock, Morrow, RME, Miller, Lyco, others. Reconditioned: GS38 \$29.00, S40A \$69.00, S76 \$129.00, NC57 \$69.00, NC88 \$89.00, NC125 \$129.00, NC183 \$199.00, HRO-50T1 \$299.00, HRO60 \$399.00, HQ129X \$169.00, VHF152A \$39.00, RME45 \$99.00, Gonset Tri-band \$29.00, Super-Cefer \$89.00, SX-71, SX28A, SX42, SX62, HFS, HRO5, HRO7, Collins 75A1, 75A2, 32V2, 32V3, Vikings II, Harvey-Wells Bandmaster transmitters, others. Shipped on trial. Easy terms. Satisfaction guaranteed. List free. Henry Radio, Butler, Mo.

FOR Sale: Dynamotors PE103, \$13; 12v in 540 output 450 ma, \$15.00 12v in 680v output 210 ma, \$12; 12v in 200v output 100 ma, \$5; prop pitch motor \$7; APN-1 \$5; brand new BC645, \$15; BC-457 \$7; two BC458 ea \$7; tubes 6 832a ea \$4; 813 \$7; 6 815 ea \$3.50; 5AP1, 5AP4, 5BP1, 5BP4 ea \$3.50. Charles Copp, W2ZSD, 3 West Dr., Fort Washington, N. Y. (PO-7-2271)

WANTED: War surplus and amateur equipment. Cash or trade for new: Viking, Kamin, National, Hammarlund, Hallicrafters, Gonset, Elmac, B&W, Williamson, etc. Especially want complete or any part of: ART-13, ATC, DY-17, CU-25, BC-610-E, BC-614-E, BC-39, BC-729, BC-312, BC-342, BC-348, APN-9, RTA-1B, ARC-1, ARC-3, TCS, TDQ, BC-221, LM, RA-34, RA-20, RA-62, RA-87, anything made by Collins Radio. Test equipment. Technical Manual, Teletype, APR-4, APR-5A, panadaptors. Alltronics, Box 19, Boston 1, Mass. Richmond 2-0048.

NEED ARC-1 - Bill O'Connell 4908 Hampden Lane, Bethesda, Maryland.

NATIONAL NC57 short-wave rcvry, used but a few hours, new condx, \$60.00. Louis M. Blum, 47 N. Westgate Ave., Columbus 4, Ohio.

SSB - Tubeless VFO covering 80-20 meters for use with multi-phase exciters 10A, 10B and 20A, stable operation, \$35.00. Kit for plugging into rear socket with instructions, \$3.00. Eastern Electronics, P. O. Box 308, Putnam, Conn.

FOR Sale: Eico 425 ocelliscope, W. E. Co. 754A and 756 speakers, other ham equipment. Write for list. George A. Diehl, Wilson Ave., Chatham, N. J.

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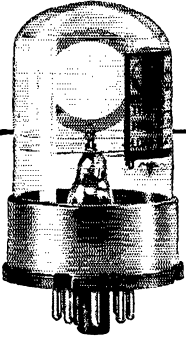
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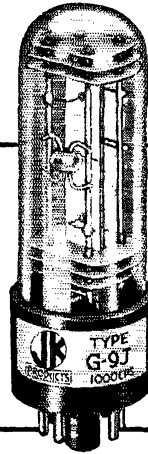
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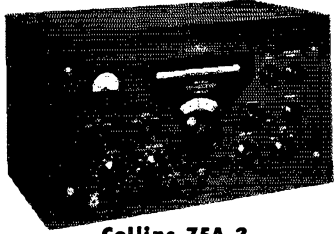
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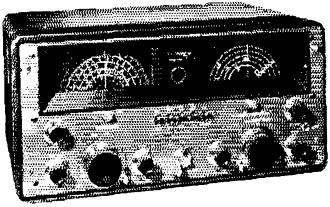
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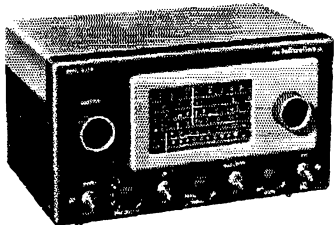
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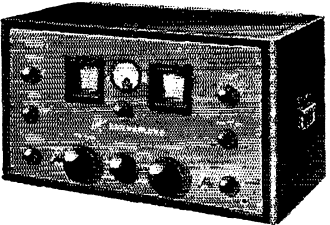
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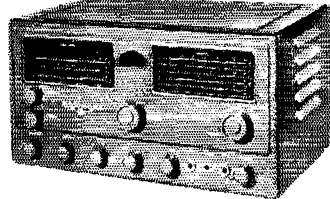
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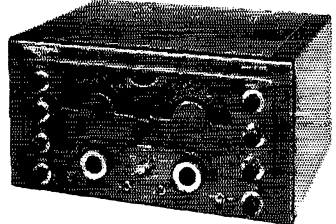
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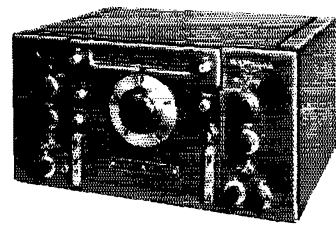


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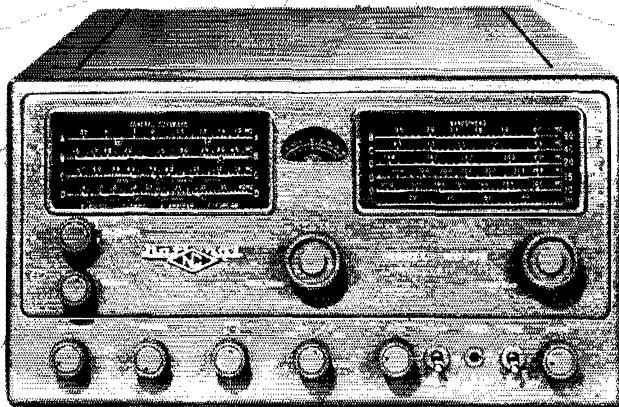
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813	Beam Power	500	2250
833A	High-perveance triode	1000	2250
8000	High-perveance triode	500	2000
8005	High-perveance triode	600*	1500



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