

February 1956

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# QST

devoted entirely to

# amateur radio



**The features you want  
are now EASY TO OWN**

Completely New  
**RME ElectroVoice**  
**4300**  
**RECEIVER**



AMATEUR NET  
**\$194**

**Operator-Designed and Laboratory-Engineered for Amateur Communications**

**High Selectivity and Rejection**

Precisely tunes the signals you want, even at high frequencies. Rejects unwanted signals and undesirable noise.

**Easy Tuning and Smooth Operation**

Unique two-speed control knob provides smoother, accurate tuning and scanning.

**Mechanical and Thermal Stability**

Highly stable components and construction prevent frequency shift or drift.

**Structural Rigidity and Strength**

Heavy steel chassis, cast aluminum panel and rugged steel cabinet assure stable, long-life service.

This completely new receiver includes many deluxe features usually found only in higher priced models. It provides injection control of the beat frequency oscillator. Particularly useful for CW and SSB reception.

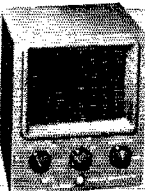
Large, evenly graduated, illuminated dial covers all six amateur bands from 1.76 mc to 29.8 mc (160 thru 10 meters). Unique differential 75:1 or 1:1 ratio tuning control. Plates in tuning condenser are triple-spaced to reduce drift and microphonics. Selectivity control with four positions. IF curve is 2.8 kc wide without crystal filter, attenuation 60 db down at 7 kc above or below the desired frequency. Crystal filter has phasing control for variable rejection of unwanted adjacent signals. Excellent image rejection. High sensitivity of 2 microvolts for 10 db signal-to-noise ratio. Temperature-compensated. Drift is negligible after 20-minute warm-up. Extreme stability permits single sideband reception with or without adapter. ANL. Antenna trimmer permits peak adjustment. 4-position function switch. Two coaxial jacks for SSB adapter. 4-ohm speaker terminals. Transmitter relay control.

Controls include: Dual-speed tuning, AF gain, BFO pitch, BFO injection, antenna trimmer, calibration adjust, band selector, RF gain on-off, function switch, 3-position recei e—standby—transmit switch, 4-position crystal selectivity control, crystal phasing-rejector control, ANL. Size: 10 in. high, 16½ in. wide, 10 in. deep. Finished in attractive instrument-gray. 117 volts, 50-60 cycle AC.

To own the 4300 means more QSO's!

See your EV-RME distributor or write for Bulletin No. 240 — Q611

**MODEL 4301  
SIDE-BAND  
DETECTOR-  
SELECTOR**



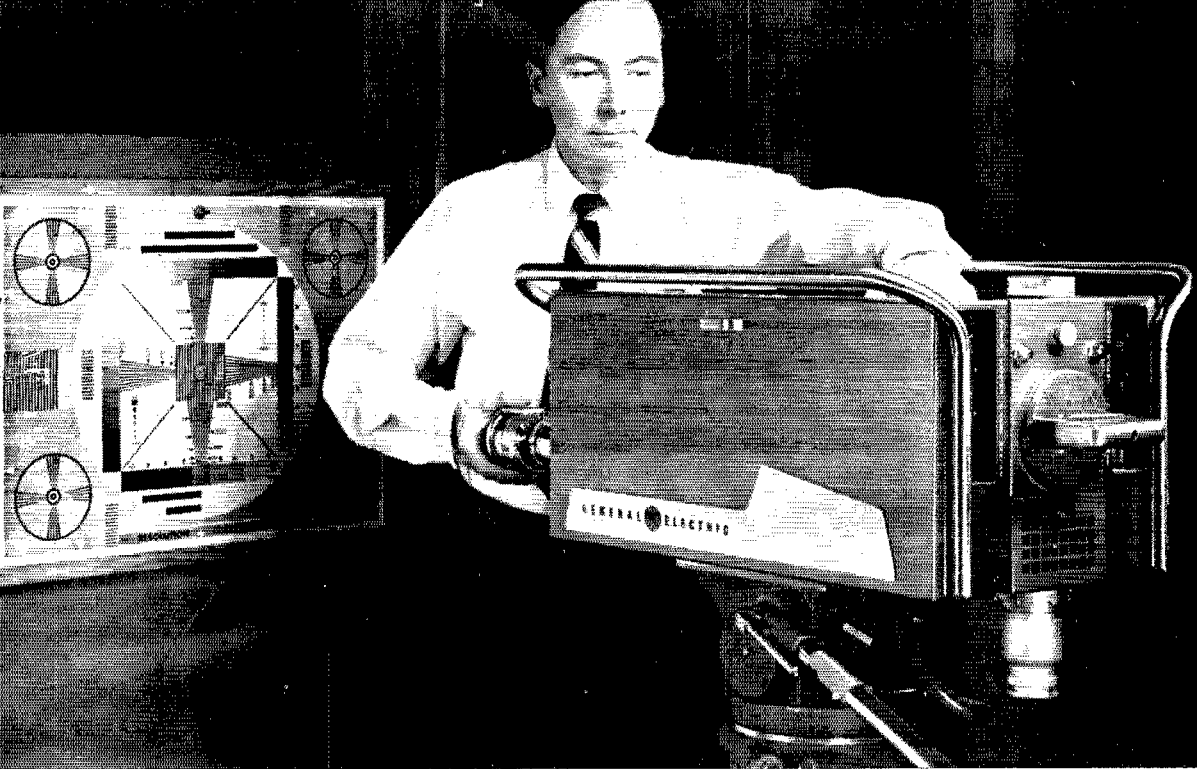
New RME 4301 provides easy-to-tune, stable SSB reception of both carrier present and carrier suppressed types. Plugs directly into the RME Model 4300 receiver or easily connects between IF and audio stages in any other communications receiver. Built-in power supply. Size: 10 in. high, 8½ in. wide, 10 in. deep. Net \$75.00

Model 4302—Matching Speaker in enclosure. Net \$17.50

**R-m-e**

RADIO MFG. ENGINEERS, INC.  
DIVISION OF

**ElectroVoice** INC.  
BUCHANAN, MICHIGAN



## W2CJO Supervises Final Testing of G-E Image Orthicons

**Amateur background contributes to skill and knowledge needed for highly critical job**

**T**HE TV image seen by millions on tonight's hit program, will be clearer, more lifelike because Donald R. Roberts, W2CJO, helped assure top performance by G-E tubes in the studio cameras. Intricate to build, image orthicons get 16 final tests, visual and electrical. All are exacting.

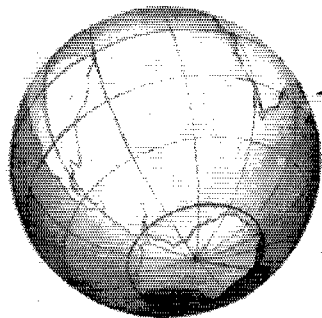
Certain of these tests call for a knowledge of electronic principles as well as a mature understanding of camera-tube design and use. Here both Roberts and G.E. give credit to amateur experience as a source that provides background in practical electronics. "When I test image orthicons for microphonics," says Roberts, "the problem encountered is identical to one every ham

wrestles with—except that the eye, not the ear, is affected."

A ham license-holder since 1941, Roberts is active on 2 meters, both phone and CW. Interest in electronics led to his first Schenectady job, as studio and transmitter technician with WRGB, pioneering TV station. Here he gained television experience that further aids him in his present camera-tube assignment.

Radio amateurs like W2CJO are found throughout G.E.'s 7 tube plants, doing key work in the design, production, and testing of transmitting, industrial, and receiving tubes of all types. Your General Electric distributor supplies you with quality tubes to which amateurs have made a direct and important contribution! *Tube Department, General Electric Co., Schenectady 5, N. Y.*

**GENERAL**  **ELECTRIC**



# Another Antarctic Expedition calls on COLLINS for communication

U.S. Navy Task Force 43 is establishing several bases in Antarctica in conjunction with the International Geophysical Year activities. Two bases will be built next year, one of them at the South Pole. The expedition, appropriately entitled "Operation Deepfreeze," is under the direction of Rear Admiral Richard E. Byrd and commanded by Rear Admiral George Dufek. For radio contact between bases and the outside world, the commercial and amateur communication equipment will be Collins.

The name Collins has figured prominently in polar expeditions since 1925. During Admiral Byrd's expedition of the early 30's, Collins transmitters were used in the first Arctic/Antarctic communication link—from the Byrd Expedition (Antarctic) to a CBS station in Northern Alaska. The Collins equipment is specially packaged for air drop and long sledge journeys. Superior performance and reliability, proven time and again, make Collins the logical choice when the need for radio communication is vital.

*Collins*

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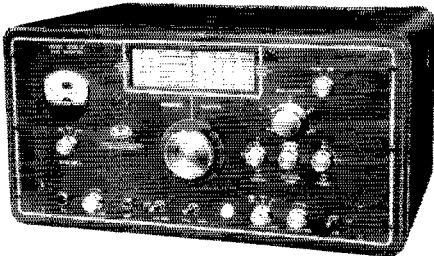
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# QUALITY PRODUCTS

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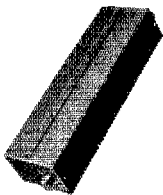


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Net Price .....\$475.00

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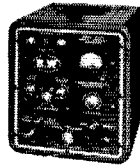


Fight TVI by attenuating undesirable harmonics and spurious radiation by a minimum factor equal to 17,780 to 1 with this new B&W low pass filter. Wave Guide principle and novel multi-sectional construction mean more attenuation in less space at lower cost.

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ALL OF THESE FINE B&W products are available at leading distributors' everywhere.

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The 51SB generator offers sparkling SSB performance with your present B&W, Collins, or Johnson transmitter, on 80 through 10 meters with the output frequency control presently in your transmitter.

Net Price .....\$279.50

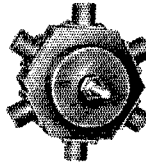
### MATCHMASTER



Three valuable instruments in one, the Matchmaster can be used as a dummy load, direct-reading r-f wattmeter, and an integral SWR bridge, for fast measurements on coaxial feed lines, antennas, and transmitting equipment.

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### COAXIAL SWITCHES



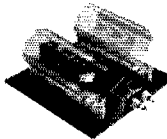
Model 550-A permits instant selection of any one of five 52 or 75 ohm lines. Model 551-A is a 2-pole, 2-position type used for switching various devices in or out of series connection with coax lines.

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On SSB, where stability becomes of utmost importance, there's nothing like crystal control with PRs . . . negligible drift (limited to less than 2 cycles per MC. per degree C). You can avoid the continuous annoyance of drift by depending on PRs . . . then you KNOW where you are, and you know you will stay there!




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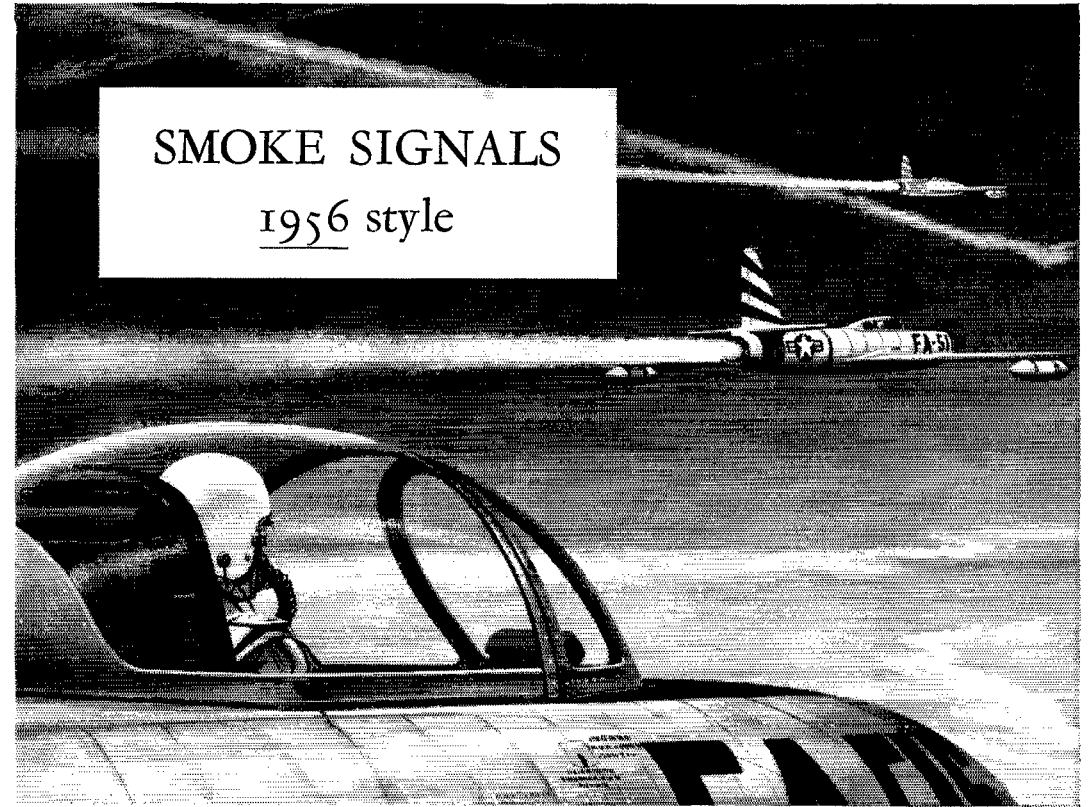
EXPORT SALES: Royal National Company, Inc., 8 West 40th Street, New York 18, N. Y., U. S. A.

## 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 (for preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio club reports are also desired by SCMs for inclusion in *QST*. **ARRL Field Organization station appointments** are available in the areas shown to qualified League members. These include ORS, OES, OPS, OO and OBS. SCMs also desire applications for SEC, EC, KM and PAM where vacancies exist. *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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# THE AMERICAN RADIO RELAY LEAGUE, INC.,

is a noncommercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, and for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

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.

All general correspondence should be addressed to the administrative headquarters at West Hartford, Connecticut.



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6840 Harriet Ave., Minneapolis, Minn.

### Delta Division

VICTOR CANFIELD, W5BSR  
Box 965, Lake Charles, La.  
*Vice-Director:* Milton W. Kirkpatrick, W5KYC  
113 Patton Ave., Hattiesburg, Miss.

### Great Lakes Division

JOHN H. BRABB, W8SFF  
708 Ford Bldg., Detroit 26, Mich.  
*Vice-Director:* Robert L. Davis, W8WEY  
247 Highland Ave., Salem, Ohio

### Hudson Division

GEORGE V. COOKE, JR., W2OBU  
88-81 239 St., Bellerose 26, N. Y.  
*Vice-Director:* Thomas J. Ryan, Jr., W2NKD  
2339 Redwood Rd., Scotch Plains, N. J.

### Midwest Division

ROBERT W. DENNISTON, W0NWX  
Box 631, Newton, Iowa  
*Vice-Director:* Sumner H. Foster, WUGQ  
2315 Linden Dr., SE, Cedar Rapids, Iowa

### New England Division

PHILIP S. RAND, W1DBM  
Route 58, Redding Ridge, Conn.  
*Vice-Director:* Clayton C. Gordon, W1HRC  
65 Emerson Ave., Pittsfield, Mass.

### Northwestern Division

R. REX ROBERTS, W7CFY  
837 Park Hill Drive, Billings, Mont.  
*Vice-Director:*

### Pacific Division

HARRY M. ENGWICHT, W6HC  
770 Chapman, San Jose 26, Calif.  
*Vice-Director:* Harold L. Lucero, W6JDN  
1113 Ellmore Ave., Dunsmuir, Calif.

### Roanoke Division

P. LANIER ANDERSON, JR., W4MWH  
428 Maple Lane, Dunville, Va.  
*Vice-Director:* Theodore P. Mathewson, W4FJ  
110 N. Colonial Ave., Richmond, Va.

### Rocky Mountain Division

CLAUDE M. MAER, JR., W0IC  
740 Lafayette St., Denver, Colo.  
*Vice-Director:* Walter M. Reed, W0WRO  
1355 E. Amherst Circle, Denver, Colo.

### Southeastern Division

JAMES P. BORN, JR., W4ZD  
25 First Ave., N.E., Atlanta, Ga.  
*Vice-Director:* Thomas M. Moss, W4HYW  
P.O. Box 644, Municipal Airport Branch,  
Atlanta, Ga.

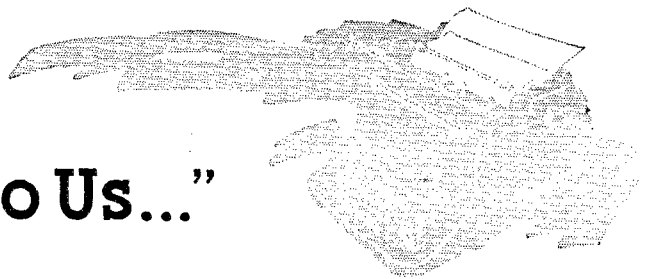
### Southwestern Division

WALTER R. JUOS, W6EKM  
1315 N. Overhill Drive, Inglewood 3, Calif.  
*Vice-Director:* Robert F. Hopper, W0YXU  
4327 Santa Cruz, San Diego 7, Calif.

### West Gulf Division

ROBERT E. COWAN, W5CF  
3640 Encanto Drive, Fort Worth 9, Texas  
*Vice-Director:* John F. Skelton, W5MA  
1901 Standish Dr., Irving, Texas

# "It Seems to Us..."



## INTERLOPERS IN OUR BANDS

One of the questions we're most frequently asked, whether on trips to clubs or conventions, or by letter to Hq., is: "Howcum these non-amateur stations are operating in our amateur bands — especially the broadcasters in the 7-Mc. band — and why don't we get them out?" It seems to us it's a good time to talk about this in *QST*.

Without any doubt, the prime sources of concern and indignation are the broadcasters operating in our 7-Mc. band, so let's take that one up first. Why are they there, and why don't we throw them out? Well, it may come as a bit of surprise to our newer amateurs, especially in North and South America, but those European broadcasters operating between 7100-7300 kc. have every right to be there, under international agreement. Only in the Americas is the band 7000-7300 kc. an exclusive amateur band. In the rest of the world amateurs can't operate at all between 7150-7300 kc.; that territory is allocated to broadcasting, with the sole exceptions that Nationalist China and New Zealand may permit their amateurs to operate there, with 100 watts peak power, along with broadcasting. As for 7100-7150, we've got just about the same story all over again except for the Union of South Africa; outside of the Americas, it is primarily allocated to broadcasting. Amateurs may be permitted there (though not necessarily) but they can't interfere with broadcasting. South Africa, alone of the countries outside our hemisphere, specified 7100-7150 is still an exclusive amateur allocation with her.

Thus, when you hear broadcasting stations operating outside the American continents in the band 7100-7300 you are listening to perfectly legal operation. It's tough at times, mates, but at least here in the Western Hemisphere we have the consolation that our governments have still insisted on 7000-7300 kc. for amateurs, *exclusively*, and you can be thankful you live here; also, the sunspot cycle is changing so that the interference from the broadcasters will be decreasing for some years.

How did this all come about? Simple: the world is propaganda conscious and most of it thinks broadcasting is an effective medium. International broadcasting first became wide-

spread in the thirties. With conflicting ideologies rampant in the latter part of that decade it started to grow, and that was easier in other countries because broadcasting is almost always a government project. It has been growing ever since and it is crowding on the heels of every service, not just us amateurs. For instance: at the 1947 world radio conference held in Atlantic City (the most recent conference where allocations were kicked around) the international broadcasting service — and remember we're talking about the governments themselves, not private interests — picked up 450 additional kc. of territory for their use from the fixed and mobile services, between 6 and 22 Mc. That's in addition to the 50/100 they picked up from amateurs — except, remember, that they didn't pick up a single kc. from amateurs in the Americas, where all our governments stood firm against any such goings-on.

At any rate, that's how matters stand, legally, and if you are occasionally annoyed by broadcasters in the 7-Mc. band (7100-7300) just remember that except for the Americas most amateurs can't use it at all.

Now, on 3.5: You'll hear fixed and mobile stations there occasionally, including teletype. If such stations are located in the United States or Canada, they're illegal; in our two countries the whole band 3500-4000 kc. is exclusively amateur. But if you hear stations in almost any other country of the world, including all of South America and most of Central America, they are probably legal. We do want to say this: while South and Central American amateurs themselves have never shown too much interest in this band, primarily because of the high noise level there and the greater distances involved, the administrations themselves are sympathetic to our U. S.-Canada amateur requirements and, generally speaking, keep their fixed and mobile operations in the low-power category. And a tip of the hat to them for that!

14 Mc.: It is an exclusive amateur band all over the world, except that the Russians have reserved the right to operate some of their fixed stations in the top 100 kc. there. Otherwise, here is one band where *anything* except amateur is illegal, and we want to hear about *any* other than amateur stations there. The same goes for the 21-Mc. band. It's all ours.



Summing up: If you hear fixed or mobile stations on 3.5 Mc. anywhere outside U. S. and Canada, they're quite possibly legal. However, if you hear any *broadcasting* it isn't legal in South and Central America, and may not be elsewhere. If you hear anything at all from 7000-7100 kc. that isn't amateur, no matter what service or from what country, it is illegal. From 7100-7300 anything in the way of broadcasting — so long as it's outside the Americas — may be and probably is legal, but *only* broadcasting (no fixed). On 14 and 21 Mc. anything except amateur (except Russian fixed on 14-Mc.) is illegal.

With these broad guides, we now want to ask every U. S. and Canadian amateur to report to us anything heard in our bands that he thinks doesn't belong there. It is true that the shift to the new Atlantic City allocations isn't yet complete and some stations admittedly are operating illegally until they can find a place to move to. Nevertheless, it is essential to all of us, if we are to exert the best effort we can to maintain our own frequency rights, to report anything . . . *anything* . . . suspected of not belonging in our territory. Hq. wants such reports. We will do the screening here. Don't report the occasional "in-and-out" — it happens to the best of us. But when you hear a station operating consistently in our bands, where you think he should not be, let us know about it (some U. S. stations occasionally have accidentally wandered in, for instance). Reports need not be complicated but they should include all available information as to time, call and frequency, and especially information on some amateur station they were interfering with that you were trying to hear or work. Check for image response. We have a form, CD-36, available on request for these monitoring reports.

We have means for protesting illegal stations in our hands, through our extremely sympathetic U. S. and Canadian administrations. Those protests don't always have an immediate effect but it is essential that we file them against illegal stations seeking to establish "squatters rights." All we need is your cooperation in reporting them.

»

Concluding more than *twenty-three* years' service as QSL Manager for the second call area, Henry Yahnel, W2SN, has reluctantly decided it is about time to take things easy for awhile. More than any other single person, W2SN has been responsible for the success of the present QSL system; for more than two decades he has worked quietly and devotedly in the interests of thousands of his fellow-amateurs. During his tenure, he has handled 862,744 cards — a record both in volume and in years of service.

Since the news "Hank" was resigning got around, we've received dozens of appreciative letters about him. We know we speak for their writers and uncounted other amateurs in wishing "Hank" well in the years ahead and extending to him the thanks of all of us for a superb job!

(Photo Courtesy of Newark Evening News)

## ARE YOU LICENSED ?

• When joining the League or renewing your membership, it is important that you show whether you have an amateur license, either station or operator. Please state your call and/or the class of operator license held, that we may verify your classification.

## Strays

Richard A. Schomburg, W7WUM, Opportunity, Washington, wonders how many VE's have ever noticed the inscription "We wine when we work willingly" inscribed in International Morse Code around the border of the reverse face of Canadian nickels. He says that the 1945 issue is a good example.

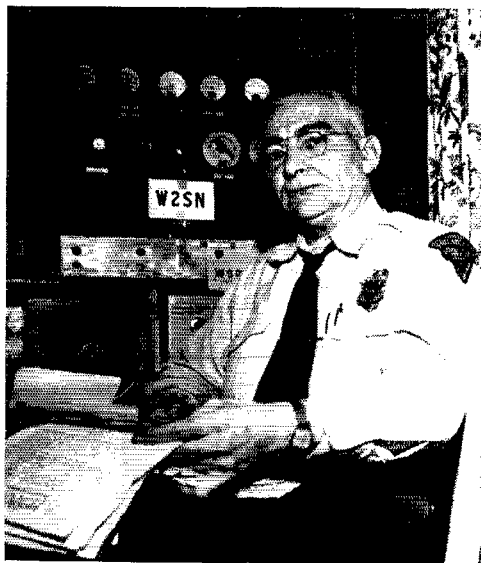
Overheard in a recent public information announcement from Seattle, Washington: In giving general instruction for receiving broadcasts reference was made to "the control of electrogrammatic radiation." Any wonder the man in the street is confused these days?

— . . . —

In the consideration of safety, a group of mobileers in Fort Worth, Texas, is using china grease marking pencils for recording calls, handles and other data. They just write information on the windshield right in front of their eyes. In this way one need not take his eyes from the road to record notes or jog his memory.

## OUR COVER

Sunshine or no, the groundhog will stay above ground after he sees our cover this month! WIICP's latest rig is easy on the eyes, and easy on the pocketbook, but with plenty of performance. "Eyes right" for a full description.



# A Complete 6146 Economy Transmitter

Phone and C.W., 80 through 10 Meters, VFO or Crystal

BY LEWIS G. McCOY, WIICP

• This transmitter design should appeal to quite a few of our readers, since an effort was made to build in at rock-bottom cost as many of the commonly-desired features as possible. It makes a good rig for an experienced Novice who wants to run his power limit, and the conversion to VFO operation for General operation is a simple matter. Completely self-contained and convenient to operate, it is a hard design to beat.

THERE can be no doubt that bandswitching transmitters are currently enjoying great popularity. In bygone days an amateur was content with one-band operation, but like the man says, you don't hardly see them no more. What the average Joe Ham is interested in these days is complete bandswitching, 'phone and c.w., compactness, and freedom from TVI. The transmitter shown in the photographs and described in this article makes every effort to fulfill these requirements. In addition, several other features are incorporated into the rig.

In designing this rig, consideration was given to such things as keying, adequate drive on all bands when using 80-meter crystals or VFO, and means for controlling the power output. The latter is a helpful feature if the unit is used to drive a high-power tetrode amplifier. Last, but by no means least, the cost was held to a minimum; the completed transmitter cost approximately \$90.00 without the meter.

## The R.F. Circuit

As can be seen in Fig. 1, the r.f. section consists of a 5763 oscillator, a 5763 buffer-multiplier, and a 6146 amplifier. Either 3.5- or 7-Mc. crystals

can be used in the oscillator, depending on the output frequency desired. The feed-back adjustment is controlled by  $C_2$ , the setting depending on the degree of crystal activity.  $C_1$  is wired into the circuit when VFO control is used. The plate circuit of the oscillator can be untuned or peaked in the 40-meter band by  $C_3$ , depending upon the following-stage drive requirements.

The buffer-multiplier stage output can be varied by the 25K potentiometer. This control varies the excitation reaching the grid of the amplifier. The multiplier stage works as a doubler for 20-meter operation, a tripler for 15, and quadrupler for 10. This is done without switching by the use of the multiband tuner  $L_2L_3C_4$ .

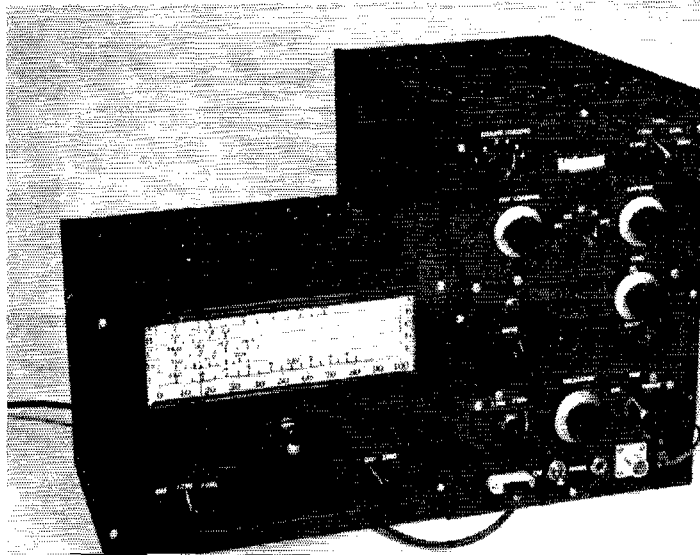
A pi network is used in the plate circuit of the 6146. The correct inductance for each band is obtained by switching in tapped sections of  $L_5L_6$ . The pi network is designed to work into a 52- to 72-ohm load. The output capacity is a dual broadcast t.r.f.-type variable of 365- $\mu$ mf. per section, and three 470- $\mu$ mf. fixed capacitors. When the transmitter is switched to the test position, the screen of the 6146 is grounded, enabling the operator to tune up without danger of damaging the tube.

The transmitter is keyed by feeding the screen voltage through the 12BH7 keyer tube. In the key-up position, -115 volts is applied to all three screens, cutting off the output. In the key-down position the screen voltage rises to the normal operating range. The keyed signal is shaped by  $R_2C_8$ . The 100K potentiometer serves as an output control, an extremely useful device when driving an amplifier or when using an s.w.r. bridge.

## Modulator and Power Supply

The modulator (Fig. 2) uses a 12AX7 dual triode acting as a two-stage resistance-coupled

The VFO and transmitter front view showing the VFO connected to the crystal socket. The controls on the transmitter are as follows: starting at lower left and going to the right, crystal socket, c.w.-'phone switch, key jack, output socket, VFO switch jack; second row at left, oscillator plate switch, plate tuning, c.w.-test-'phone switch; next row, at left, is the drive control, at right is output control, immediately above is grid tuning, amplifier tuning and bandswitch. The meter switch is below the meter and the fine loading control is at the left. The coarse loading control is in the upper left-hand corner.



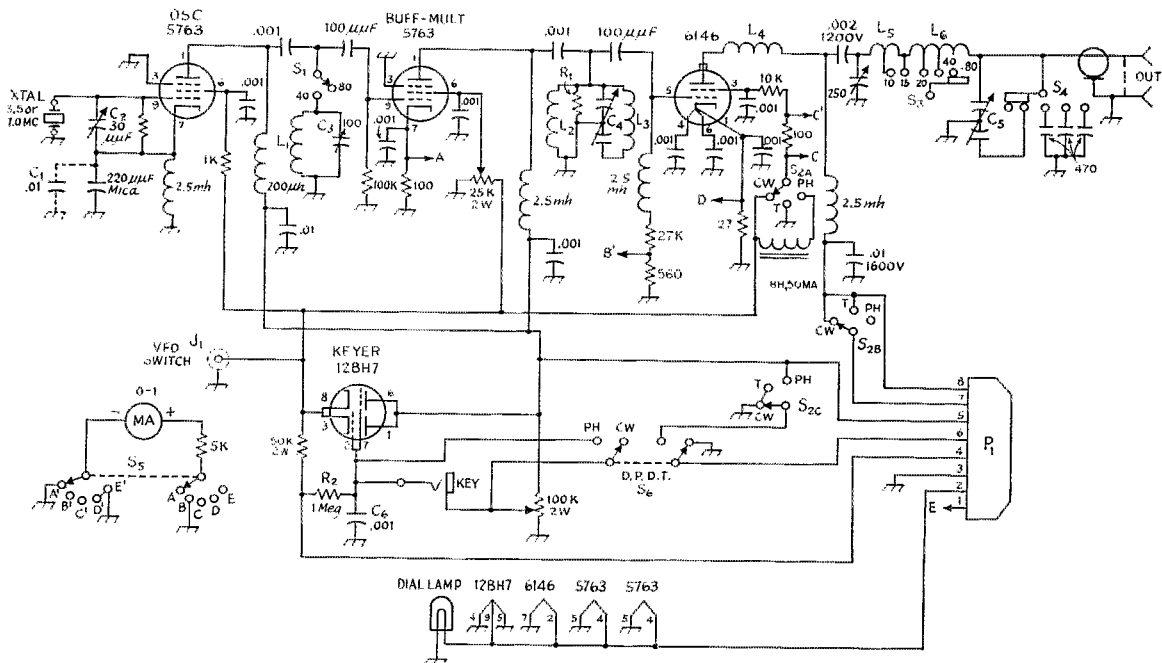
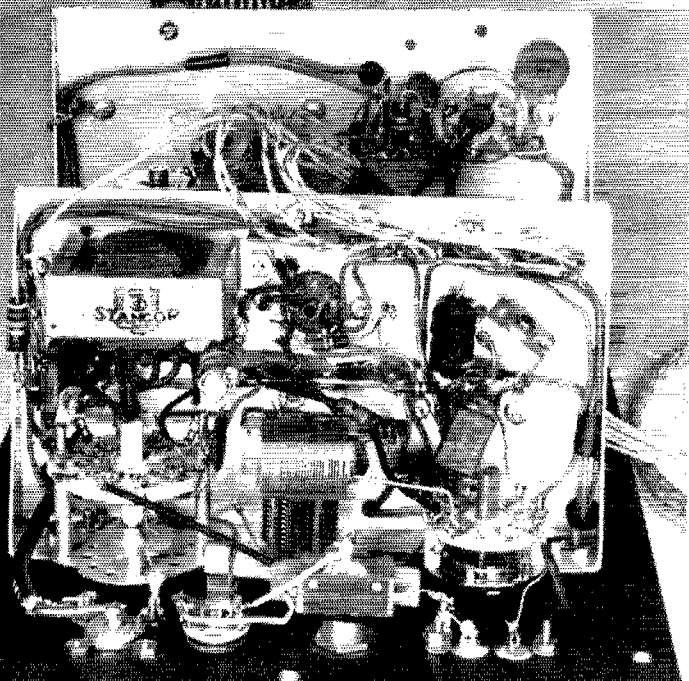
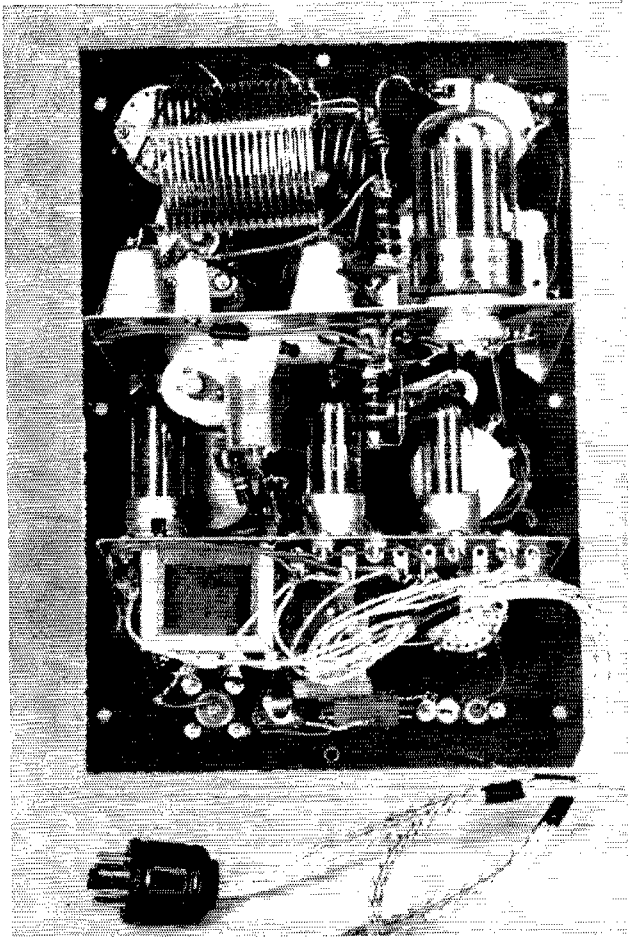


Fig. 1 — Circuit diagram of the r.f. unit. All capacitances given in microfarads unless otherwise specified.

- C<sub>3</sub> — 100- $\mu$ f. midget variable (Hammarlund HF100).
- C<sub>4</sub> — 140- $\mu$ f.-per-section variable (Hammarlund HFD140).
- C<sub>5</sub> — 365- $\mu$ f.-per-section variable (Broadcast replacement type).
- R<sub>1</sub> — 6000 ohms, 1 watt (two 12,000-ohm resistors in parallel).
- L<sub>1</sub> — 30 turns No. 24, 5/8-inch diam., 15/16 inches long (B & W 3012).
- L<sub>2</sub> — 32 turns No. 24, 5/8-inch diam., 1 inch long (B & W 3012).
- L<sub>3</sub> — 14 turns No. 20, 5/8-inch diam., 7/8 inch long (B & W 3007).
- L<sub>4</sub> — 4 turns No. 16, 1/4-in. diam., 3/8-in. long.
- L<sub>5</sub> — 8 turns No. 12, 1-inch diam., 1 3/4 inches long. 28 Mc. — tap 1 1/2 turns from input end. 21 Mc. — tap 7 turns from input end.
- L<sub>6</sub> — 17 turns No. 14, 2-inch diam., 2 1/8 inches long (B & W 3900). 14 Mc. — tap 1 1/4 turns from junction of L<sub>5</sub>L<sub>6</sub>. 7 Mc. — tap 10 1/2 turns from junction of L<sub>5</sub>L<sub>6</sub>.
- S<sub>1</sub> — Single-pole 6-position steatite wafer (Centralab PA-2001).
- S<sub>2</sub> — Three-pole 3-position steatite wafer (Centralab 2507).
- S<sub>3</sub>, S<sub>4</sub> — Single-pole 5-position steatite wafer, progressively shorting (Centralab PA-2012).



Bottom view of r.f. section showing components mounted below first shelf. The switch at the left is S<sub>2</sub>, the c.w.-test-phone control. To the right of S<sub>1</sub> is L<sub>1</sub>C<sub>3</sub>, the oscillator plate circuit for 40-meter output. The leads from the modulator/power plug are connected to terminal lugs which are visible at the upper edge of the shelf.



Rear view of the r.f. assembly showing modulation and power plug,  $P_1$ . The choke shown at left below the lower deck is  $L_4$ . Immediately above the choke is  $L_2$  which is mounted by means of Duco cement to a one-inch cone.  $L_6$  is mounted on one-inch cones at the upper left-hand corner.

amplifier, followed by a 6C4 triode transformer-coupled to the grids of two 1614s. The modulator operates in Class  $AB_1$  and will easily furnish 30 watts output, sufficient to modulate the 6146 at 60 watts input. Either a crystal or dynamic microphone can be used.

<sup>1</sup> Grammer, "More Effective Utilization of the Small Power Transformer," *QST*, Nov., 1952.

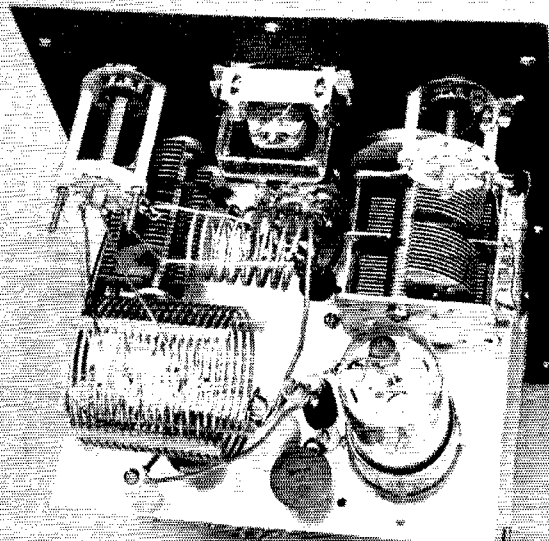
Top view of the 6146 amplifier and pi-network components. The 250- $\mu\text{f}$ . variable is visible at the left below the bandswitch. The high-frequency range coil,  $L_5$ , is between the meter and the low-frequency coil,  $L_6$ . At the right are the output capacitors,  $C_5$  and the three 470- $\mu\text{f}$ . fixed units which are mounted on the switch.

By using suitable values for the coupling capacitors between the two sections of the 12AX7 and the 6C4, the frequency response below 500 cycles is attenuated. The high-frequency response is limited by the 470- $\mu\text{f}$ . capacitor across the secondary of  $T_1$  and the 0.002- $\mu\text{f}$ . unit across the secondary of the modulation transformer. The over-all response of the amplifier is thereby restricted to the most useful range.

The power supply is the economy-type<sup>1</sup> that utilizes a replacement-type transformer. Instead of the usual two 6X5 rectifiers, an additional pair is added to furnish adequate current-carrying capacity. The low voltage is approximately 290 volts and the high voltage is 580 under a load of 155 ma. to the output stage. The supply was tested for extensive periods under a load of about 250 ma. without any apparent damage. Negative voltage for biasing the modulators and the keying circuit is furnished by  $T_4$  and CR.

#### VFO

The VFO (Fig. 3) is a 5763 tuned to 160 or 40 meters, depending on the operating frequency desired. The oscillator is turned on and off through a 6AL5 that acts as a switch. A lead is connected between the screen bus in the transmitter to the cathodes of the 6AL5. When the key is closed, the oscillator turns on before the rest of the stages. When the key is opened, the oscillator stays on slightly longer than the other stages. This action provides differential keying, one of the better methods for chirp-free break-in keying a VFO-controlled transmitter.



The power supply of the VFO is conventional and uses two 0B2s in series to furnish a regulated 220 volts on the screen and plate of the 5763. The output of the VFO is coupled to the crystal socket of the transmitter through a short length of 52-ohm coax.

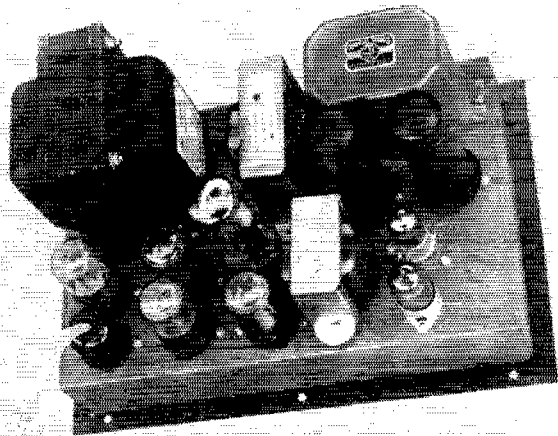
### Metering and Switching Circuits

Metering of the rig is accomplished by a 0-1 milliammeter connected as a 0-5 voltmeter. Currents are indicated by the voltage drops across suitable resistors in series with the circuits to be measured. The ranges selected were as follows: buffer cathode, 50 ma.; amplifier grid, 10 ma.; amplifier screen, 50 ma.; amplifier cathode, 200 ma.; modulator cathodes, 200 ma.

The various switching circuits are as follows. The plate circuit of the oscillator is changed from untuned to tuned by  $S_1$ .  $S_3$  and  $S_4$  respectively take care of the bandswitching and loading of the pi network.  $S_2$  serves as a C.W.-TEST-PHONE switch, the secondary of the modulator transformer being shorted when switched to c.w. or test. The d.p.d.t. toggle  $S_6$  is used to switch the rig on and off when operating phone. In the off position, the screens of the modulators are grounded. The power supply is turned on by first closing  $S_7$  and allowing the 6X5s to warm up and then  $S_8$  is closed, which turns on all the heaters and other voltages.

### Construction of R.F. Section

The transmitter, modulator and power supply are all enclosed in an ICA 8 × 11 × 12-inch steel cabinet. As can be seen in the photographs, the r.f. section is mounted on two shelves, the bottom one holding the oscillator, buffer, and keying circuits and the top shelf the amplifier. The shelves are made from sheet aluminum, the

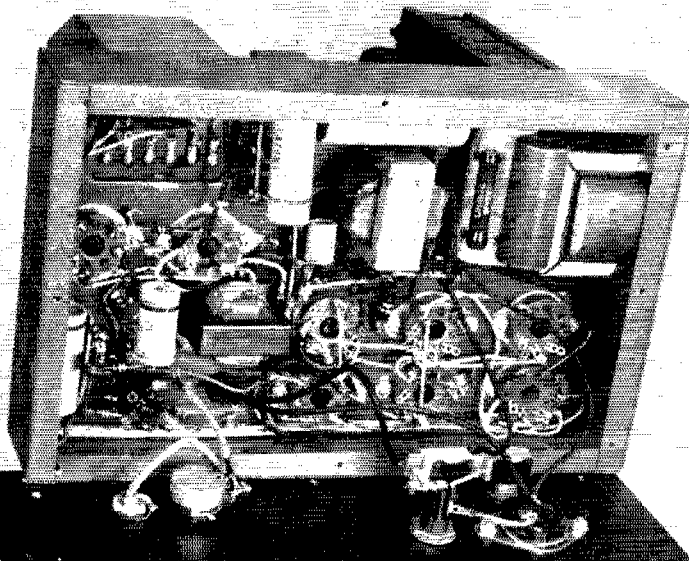


Power supply and modulator assembly showing placement of parts. The modulation transformer is at the upper right, next to the pair of 1614s. The transformer on the left-hand side, which is above the rectifiers, is  $T_1$ , the filament transformer for the 6X5s. The plug  $P_1$  is shown plugged in at the lower left-hand corner.

lower shelf measuring  $6\frac{3}{4} \times 4\frac{1}{4}$  inches, and the upper  $6\frac{3}{4} \times 5\frac{1}{2}$  inches. Both shelves are made up with a  $\frac{1}{2}$ -inch lip for mounting to the front panel. Placement of the tubes and components is not critical. However, if a symmetrical panel arrangement is desired, the layout should follow the photographs.

In the unit shown, the shelves were first drilled and punched to take the components and then they were temporarily mounted in place on the panel. The panel was drilled after being marked off for the controls. All controls around the outer edges should be mounted in a position where they will clear the  $\frac{1}{2}$ -inch lip on the steel cabinet. (Check the front-view photograph for placement of the various controls.)

When all the components are mounted in place, the r.f. assembly can be wired. If he desires additional TVI prevention, the constructor can use shielded wire for all d.c. and 60-cycle leads. However, in the unit shown, it was felt that in all but fringe areas, the complete metal enclosure



Bottom view of modulator and power section. The microphone jack and the audio gain control are mounted on the back panel of the transmitter cabinet and are shown at the lower left-hand corner. The 115-volt jack, the fuse holder, and  $S_7S_8$  are at lower right-hand corner of the panel. The terminal socket,  $J_2$ , is the octal socket at the lower right-hand corner of the chassis. The inductance at the upper right is  $L_1$  and the transformer just to its left is  $T_1$ .

would be adequate. A good tight metal enclosure with the output fed through a low-pass filter furnishes excellent harmonic attenuation.

To facilitate making up the 2½-foot cable that connects the power plug to the tie points (see photograph), it is a good idea to number the terminals on the strips. The oscillator plate coil,  $L_1$ , is mounted on  $C_3$  by cementing one of the coil support bars to the stator bars at the back of the capacitor. A few small drops of Duco cement will hold the coil in place. In the grid circuit of the 6146,  $L_3$  is held in place by soldering the ends of the coil to the stator terminals of

made by International Instrument Co. It is smaller than a standard two-inch meter but there is sufficient space to mount the latter type if the constructor desires.

### Power Supply and Modulator Construction

The two sections are mounted on a 7 × 11 × 2-inch steel chassis. If the layout shown in the photographs is followed, the constructor will find there is sufficient space both above and below the chassis for all the components. As the chassis is mounted to the back panel of the steel cabinet, care should be taken to insure that

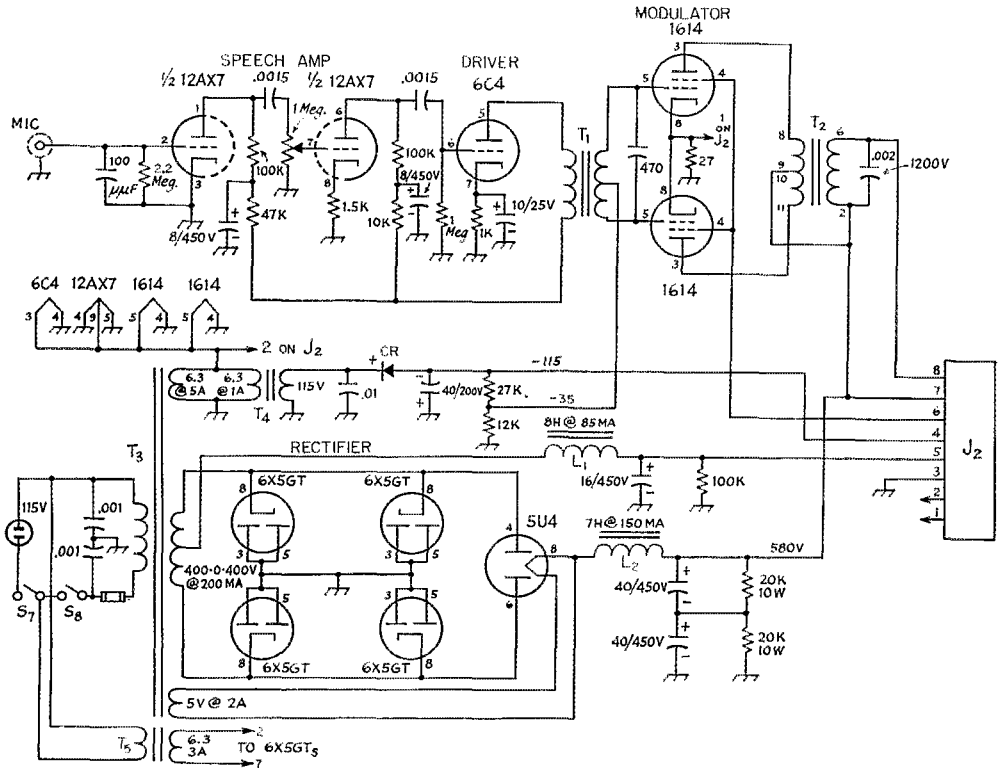


Fig. 2 — Circuit diagram of power supply and modulator. All capacitances given in microfarads unless otherwise specified.

- CR — Selenium rectifier 150 v. 20 ma. (Federal 1158).
- $T_1$  — Interstage audio transformer, center-tapped secondary, 10-ma. primary, total secondary-to-primary turns ratio 3 to 1 (Triad A-31X).
- $T_2$  — Universal modulation transformer, 30 watts (UTC S-19).

- $T_3$  — Power transformer, 400 v. each side of c.t., 200 ma., 6.3 v. at 5 amp., 5 v. at 3 amp. (Stancor PC-8412).
- $T_4$  — Transformer, 6.3 v. at 1 amp. (Stancor P-6134).
- $T_5$  — Transformer, 6.3 v. at 3 amp. (Stancor P-6466). Fuse in primary of  $T_3$  is 3-amp.

$C_4$ . There are two purposes served by  $R_1$  in the multiband circuit. First, it helps to level off the amount of drive at the lower frequencies while having very little effect on the higher bands. Second, it helps to stabilize the amplifier, particularly at the lower frequencies where several stages are operating on the same band.

The final-amplifier wiring is straightforward, as a look at the top-view photograph will show. There will no doubt be a question in the minds of many readers as to the meter used in the rig. It is a new type called a "slide-indicating meter,"

the chassis fits into the cabinet. In the completed rig, the chassis is mounted vertically with the power transformer at the bottom.

Rows of ¼-inch diameter holes should be made in the cabinet to insure adequate ventilation. One row on each bottom side and four rows over the r.f. section will prove sufficient.

### Testing

After the transmitter is wired, the r.f. section can be connected to the power supply with  $P_1$ . For initial testing, an 80-meter crystal should be

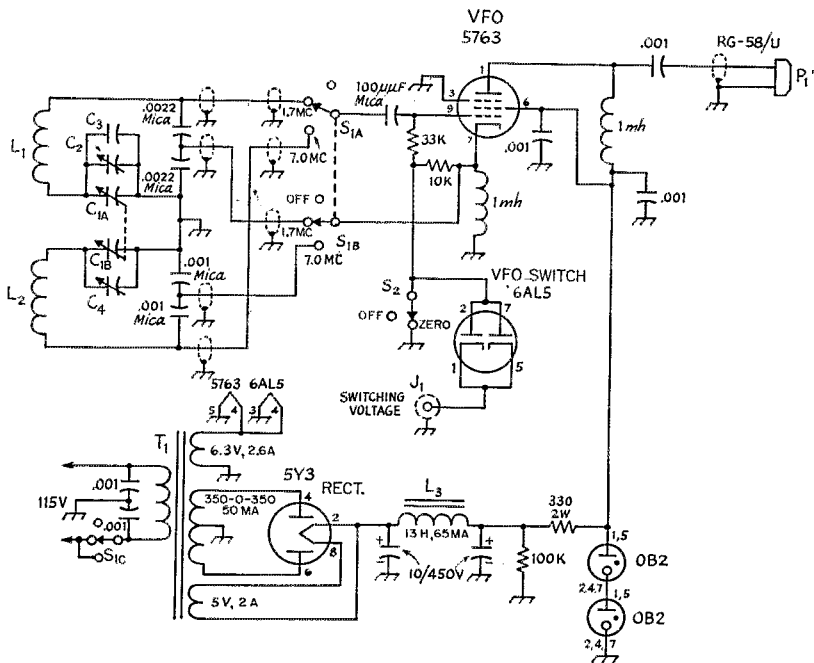


Fig. 3—Circuit diagram of the VFO. All capacitances given in microfarads unless otherwise specified.

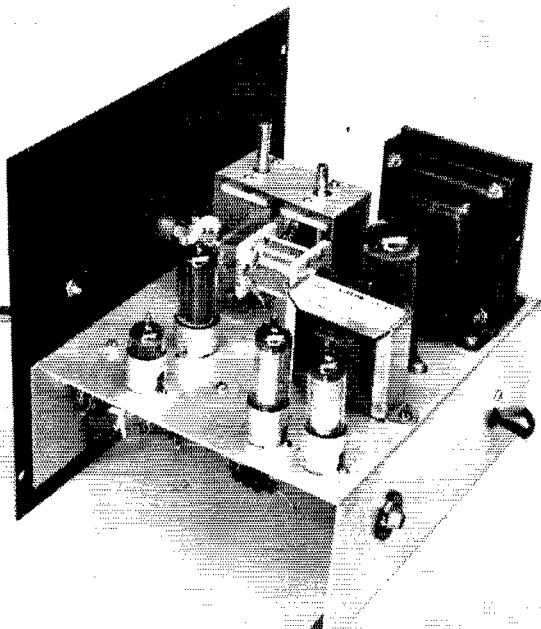
- C<sub>1</sub>—C<sub>1A</sub>, 9-plate midget variable; C<sub>1B</sub>, 2-plate midget variable. (C<sub>1A</sub>-C<sub>1B</sub> is made by cutting down a Millen 21100). (See text).
- C<sub>2</sub>—50- $\mu$ f. midget variable (Millen 26050).
- C<sub>3</sub>—47- $\mu$ f. silver mica.
- C<sub>4</sub>—100- $\mu$ f. midget variable (Millen 26100).
- L<sub>1</sub>—81 turns No. 24, 1-inch diam., 2½ inches long (B & W 3016).

- L<sub>2</sub>—25 turns No. 20, 1-inch diam., 1½ inches long (B & W 3015).
- L<sub>3</sub>—13 henrys 65 ma. (Stancor C-1708).
- S<sub>1</sub>—Three-pole 3-position 2-section switch (Centralab sections PA-12, PA-2, index assembly PA-300).
- S<sub>2</sub>—Single-pole 6-position (Central PA-2001).
- T<sub>1</sub>—350 v. each side of c.t., 50 ma., 6.3 v. 2.6 amp., 5 v. 2 amp. (Merit P-3160).

used. A 100-watt light bulb can be used for a dummy load. The operate switch  $S_6$  is turned to c.w. and  $S_2$  is set at "test." Leave the key open, turn on  $S_7$ , and allow the 6X5s to warm up. After the 6X5s are heated, close  $S_8$ . Switch the meter to read grid current and the bandswitch to the 80-meter band. For 80-meter operation, the oscillator plate is left untuned. Close the key

and tune the 6146 grid circuit. (With  $C_4$  at minimum capacity, the grid circuit tunes to 40 meters. As the capacity is increased, 10 meters comes first, then 15, then 80, and at maximum, 20 meters.)

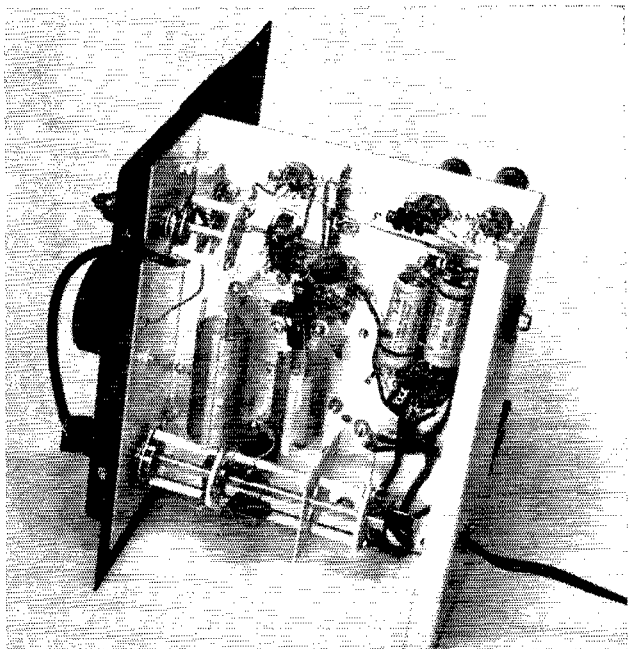
Tune the 6146 grid circuit to the 80-meter point and adjust the drive control for about 2½-ma. grid current. Open the key, switch  $S_2$  to c.w.,



Top view of the VFO showing the mounting of the tuning and bandset capacitors. The bandset capacitors are mounted on a U-shaped bracket. The shaft ends of the bandset capacitors are slotted with a saw to accommodate an insulated screwdriver for adjustment.



Bottom view of the VFO. The 160-meter coil is at the left and the 40-meter inductance at the right. The coax leads from  $S_1$  to the tube socket are visible between the two coils.



and reduce the output control to minimum. With the meter reading plate current, close the key and advance the output control, meanwhile tuning the 6146 plate capacitor for a dip. The fine and coarse loading controls will have to be adjusted as the rig is loaded up. It will be found that a large amount of capacitance is needed for 80 meters and progressively less for 40, 20, 15, and 10.

With the exception of 15 and 10, the same tune-up procedure is followed with the other bands. On 10 and 15, the oscillator plate circuit is switched to tune 40 meters.

For phone operation it is only necessary to switch  $S_2$  to phone and then use  $S_6$  for the operate switch. The 6146 should not be loaded to more than 60 watts input for phone operation. The modulator resting current should be between 30 to 40 ma. and rise to approximately 120 ma. on peaks. Loading of the amplifier should be adjusted so that 60 watts input is achieved with the 25K output control full on. The grid drive is adjusted to give about  $2\frac{1}{2}$  ma. on either phone or c.w. For c.w. operation, the amplifier can be run at 90 watts input. Although it exceeds the manufacturer's ratings, the 6146 was operated at about 110 watts input for extended periods without apparent damage to the tube.

The voltages on the various stages with the 6146 loaded to 150 ma. and the output control full on are as follows: oscillator and buffer-multiplier plates, 290; screen, 240; amplifier plate, 590; screen, 160. In the key-up condition all three screens should read approximately — 120 volts.

#### VFO Construction

The circuit diagram for the VFO is given in Fig. 3. With the exception of the 6AL5 switch, the VFO is the conventional Clapp circuit tuned to either 160 or 40. The 160-meter circuit furnishes adequate bandwidth for 80- and 40-

meter tuning, while the 40-meter range takes care of 20, 15, and 10.

The unit is housed in a  $7 \times 8 \times 10$ -inch steel cabinet. However, the builder can use any size adequate to hold the VFO. It must be remembered that TVI is just as much a problem with a VFO as with the transmitter it is feeding, so the housing should be sealed for r.f.

The tuning capacitor  $C_1$  is made by modifying a Millen 21100 unit. Counting from the rear of the capacitor, the 3rd, 4th, and 5th stator plates are removed. This is accomplished by bending the plates back and forth until they are loosened on their support rods. After the plates are removed, the rear two stator plates are disconnected from the front plates by cutting both the stator bars with a hacksaw blade.

Though the circuit diagram shows one side of  $C_1$ ,  $C_2$ ,  $C_3$ , and  $C_4$  grounded, in the actual construction they are insulated from the chassis and a common ground bus connects all the points together. The leads from  $L_1$  and  $L_2$  to the switch are run in RG-58/U 52-ohm coax and the ends of the coax outer conductors near the tube socket are the common ground point for the bus from the capacitors.

The transmitter and VFO shown in the photographs was completed several months ago and given a thorough on-the-air testing. In the first version it was found that the 10-meter coil of the pi network, which was made up from the same type coil stock as the low-frequency inductance, heated up and softened the polystyrene support bars. This was corrected by substituting the present coil. The rig was used both as an individual transmitter and then as a driver for a higher-power triode amplifier. In both cases it has proved to be worth its salt as a flexible unit.

# Converters for 7, 14, 21 and 28 Mc.

## Circuit and Construction Considerations in Converter Design

LAIRD CAMPBELL, WICUT, AND BYRON GOODMAN, WIDX

**T**HE CRYSTAL-CONTROLLED CONVERTERS to be described were designed to be used ahead of a receiving system that will tune 3.5 to 4.0 Mc., on the assumption that one has or can acquire a receiver that is satisfactory in this range but may deteriorate at the higher frequencies. We decided against a single switched unit in favor of individual converters, despite the necessary duplication of tubes and components in this approach. Our reasoning took the line that this way they would be simpler to build and service, and also many readers might be interested in single-band converters. Another objective was best usable performance. By this we mean not the lowest possible noise figure, but a noise figure that was good enough for practically any location. When you get down far enough, improving the noise figure doesn't help reception very much, because the noise on the band is the limiting factor, not the receiver noise. In the interests of excellent image rejection and minimum cross modulation, we used manually tuned r.f. circuits instead of bandpass circuits. This does require peaking the circuits as one tunes a band, something that might be considered an inconvenience by some but not by us. Lastly, we decided to include adjustable antenna coupling, to facilitate matching to the antenna and also to extend the signal-handling capability.

If you are unfamiliar with the principle of a crystal-controlled converter, it doesn't take long to catch up. It is like any converter in that it consists of a mixer and an oscillator (and preferably an r.f. stage ahead of the mixer). It differs from a tunable converter in that the oscillator frequency is fixed (and crystal-controlled for maximum stability). Consequently a portion of the radio spectrum is shifted to another portion, and by tuning across this second portion one

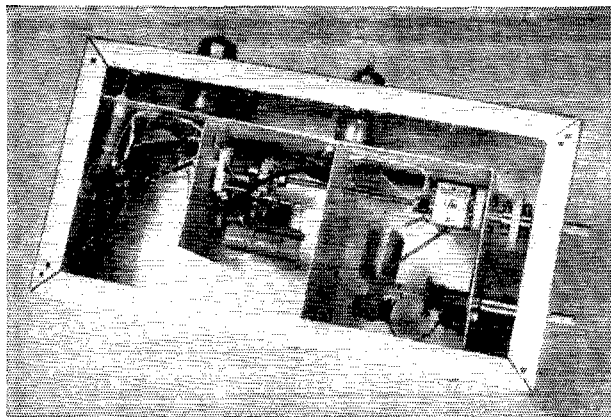
• Probably the easiest way to improve the high-frequency performance of a satisfactory low-frequency receiver is to add a crystal-controlled converter at the front end. Here is a circuit and some ideas for just such converters.

hears the signals in the first. To give an example: we wish to shift the 14.0- to 14.35-Mc. band to 80 meters. If the grid circuit of the mixer accepts the 14.0- to 14.35-Mc. signals, beating a 10.5-Mc. signal against them will shift them to 3.5 to 3.85 Mc. ( $14.0 - 10.5 = 3.5$ ,  $14.35 - 10.5 = 3.85$ , etc.). Thus if we use our 80-meter receiver in the output of the mixer, tuning 3.5 to 3.85 will enable us to hear the signals at 14.0 to 14.35 Mc. Of course signals between 7.0 ( $10.5 - 7.0 = 3.5$ ) and 6.65 ( $10.5 - 6.65 = 3.85$ ) could also be heard if the input circuit of the mixer didn't discriminate against them, and the oscillator harmonics (21.0, 31.5, etc.) might also bring in unwanted signals if the input discrimination weren't adequate. However, there is no problem if the input selectivity is good. The big advantage of the crystal-controlled converter is that the resultant stability and tuning rate is the same as you get with the 80-meter receiver. Anyone who has nursed a receiver along on 21 and 28 Mc. (and even 14) can appreciate the advantages.

Since the resultant combination is a double-conversion receiver with a first i.f. of around 3.5 Mc., image problems at these higher frequencies practically disappear.

### The Circuit

With two exceptions, the circuits for these converters are the same, differing only in the



A 7-Mc. crystal-controlled converter. The two shafts extending to the right are (lower) adjustable antenna coupling and (upper) signal-circuit tuning. The crystal holder is the dark object in the center section, just behind the coils.

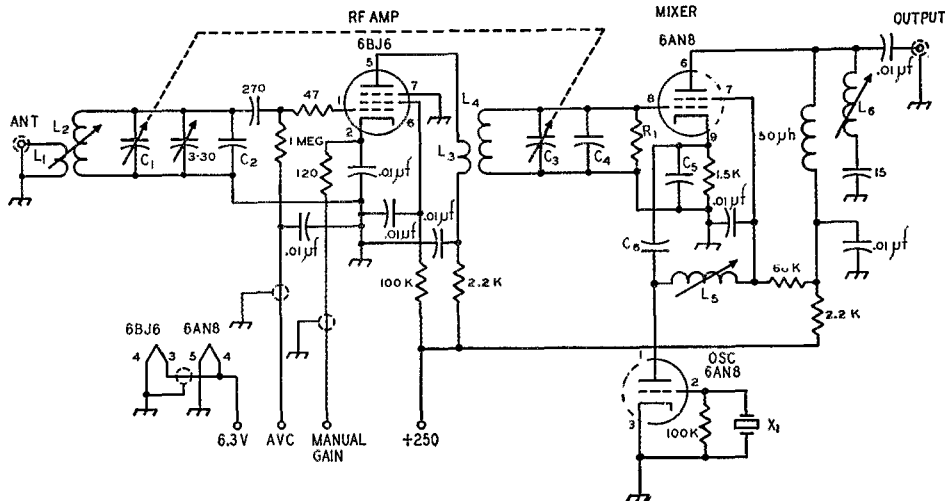


Fig. 1 — Schematic diagram of a crystal-controlled converter. The plate trap,  $L_6$  and the 15- $\mu\text{f}$ . capacitor, is used only in the 7-Mc. converter. The 10-meter converter uses two crystals, switched by a s.p.d.t. rotary in the "cold" lead from chassis ground.

All fixed capacitors are ceramic; all resistors are  $\frac{1}{2}$ -watt.

$C_1, C_2$  — 25  $\mu\text{f}$ . midget variable (Hammarlund MAPC-35-B with 2 rotor and 2 stator plates removed).

$L_6$  — 105–200  $\mu\text{h}$ . (North Hills Electric 120-II).

$X_1$  — See Table I (International Crystal, Type FA-9).

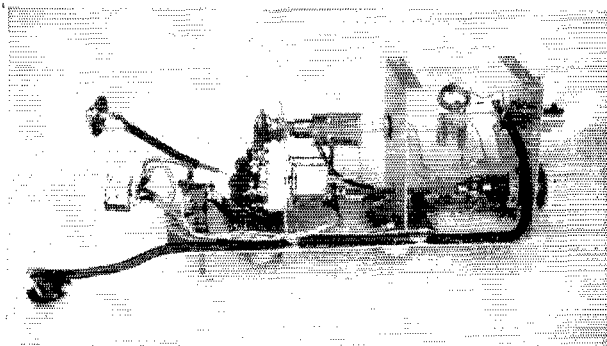
tuning range of the signal circuits and the frequency of the crystal. The exceptions can be found in the 7- and 28-Mc. converters. In the former, the 3400-ke. crystal is fairly close to one limit of the mixer output range, so a trap was added to attenuate the 3400-ke. signal that appears in the mixer output and might tend to overload the following receiver. The other exception can be found in the 28-Mc. unit, where a switch and additional crystal were added to permit covering the 27-Mc. band. It would not be necessary if the following receiver can tune as low as 2.5 Mc., and could be omitted in such a case.

The basic circuit is shown in Fig. 1, with the mixer plate-circuit trap ( $L_6$  and 15  $\mu\text{f}$ .) in place but not the s.p.d.t. crystal switch for the highest-frequency converter. Following the adjustable coupling between  $L_1$  and  $L_2$ , the signal goes to the 6BJ6 r.f. amplifier and then to a second inductively-coupled circuit and to the grid of the mixer. The mixer is the pentode section of a 6AN8; the crystal oscillator is the triode section of the 6AN8, and part of its output is applied to

the mixer cathode via a capacitance divider,  $C_5C_6$ . By using the high-frequency crystals made by International Crystal Mfg. Co., no fancy overtone oscillator circuit is required. Since the 1500-ohm cathode resistor of the mixer is the load for the oscillator, the capacitance divider,  $C_5C_6$ , is required to avoid overloading the oscillator circuit and consequent non-oscillation. In the oscillator in the 10/11 meter converter, a single setting of the oscillator coil,  $L_5$ , suffices for the two crystals. In the r.f. stage, provision is included for introducing a.v.c. voltage as well as manually-controlled cathode bias.

### Construction

Although there are many ways one could lay out a converter, we elected to build these on little sub-assemblies that could be fitted into a  $5 \times 9\frac{1}{2} \times 3$ -inch chassis that was to form the shielding case for the unit. In the design, particular attention was paid to see that the chassis grounds for the r.f. stage were all at one point, next to the socket. Since rather large diameter (for receivers) high-Q coils were to be used, a shield was used



The 10-11-meter converter removed from its case. The Lucite "crank-shaft" for switching crystals can be seen in the right-hand compartment.

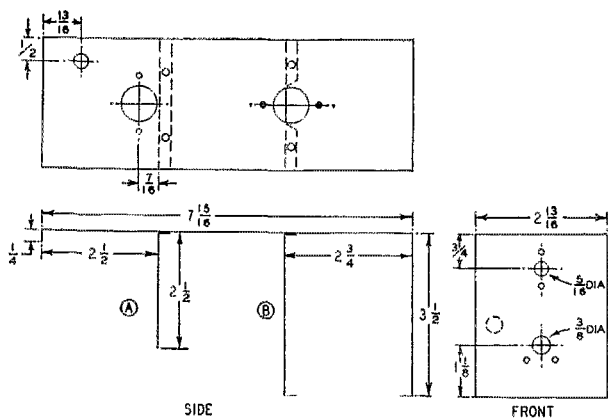


Fig. 2 — Details of the sub-chassis and partitions. The bottom lips of the front and of piece B rest on  $\frac{1}{4}$ -inch bars at the bottom.

between them, straddling the 6BJ6 socket. The tuning capacitors,  $C_1$  and  $C_2$ , were ganged mechanically by a length of  $\frac{1}{8}$ -inch diameter rod and two of the Millen M008 miniaturized shaft couplings. The only capacitors we could find with  $\frac{1}{8}$ -inch shafts were the Hammarlund MAPC-B. The  $\frac{1}{8}$ -inch shafts extend to the rear of these capacitors; the front portion is the standard  $\frac{1}{4}$ -inch diameter. To make room for the couplers, two rotor and two stators were removed from each MAPC-35-B 35- $\mu$ f. variable.

Dimensions for the sub-chassis are shown in Fig. 2, as well as the locations of most of the holes. Partitions A and B are held to the chassis by 6-32 hardware; partition A has mounting holes for the variable capacitor similar to those in the front view except that the two small holes are on the horizontal center line. Partition A also carries the crystal socket and two clearance holes for the stator and rotor leads from the variable capacitor. Partition B has a clearance hole for the variable capacitor shaft. The dashed hole on the front view is for the crystal switch shaft on the 10-meter converter; this switch mounts on partition A and is turned by the Lucite "crankshaft" shown in one of the photographs. While this crankshaft may look like something out of Rube

Goldberg, actually it is a simple matter to soften a length of  $\frac{1}{4}$ -inch diameter Lucite rod by rolling it on a soldering iron. When it is suitably soft, it is then bent and held in position until cool. The insulating crankshaft was used to escape running metal near or through the coil — the principle might come in handy in some other designs if you don't mind a few jeers from self-styled humorists. As mentioned earlier, it isn't necessary to switch crystals if the tuning range of the receiver following the converter includes 2.5 Mc.

The only other constructional Goldberg is the variable antenna coupling. This is made by running a piece of  $\frac{1}{4}$ -inch Lucite rod through a shaft bushing and using a rubber grommet between fiber washers as a friction lock. A screw through the shaft serves as a stop for the washer on one side of the grommet, and the shaft bearing serves as the stop on the other. Compression is maintained by using a solid shaft coupler on the other side of the bearing. Using a long set-screw on the solid shaft coupler provides an arm that can hit either of two stops (small screws) and thus limits the travel of the coil.

In wiring a unit, shielded wire was used for the heater and d.c. leads that ran past partition A up toward the r.f. stage. The antenna lead was a

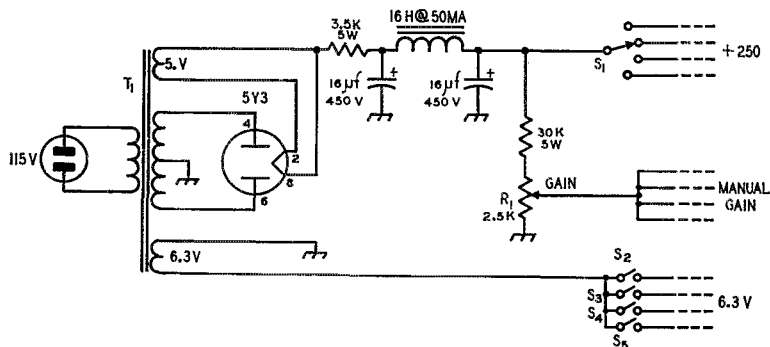


Fig. 3 — Schematic of a power supply for the crystal-controlled converters. If the power supply is to be used with only one converter, the switches can be eliminated from the circuit.

$R_1$  — Wirewound potentiometer (IRC WK2500).  
 $S_1$  — 2-section 4-pole rotary switch. Sections not shown switch antenna inputs and converter outputs through coaxial line. (Centralab PA-2015, one

pole not used).  
 $L_1$  — Replacement-type choke (Knight 62 G 137).  
 $T_1$  — Replacement-type transformer 325-0-325 v. (Knight 62 G 012).

**TABLE I**  
Component Values for the Crystal-Controlled Converters

Band	$L_1$	$L_2, L_4$	$L_3$	$L_5$	$C_2$	$C_4$	$C_5$	$C_6$	$R_1$	$X_1$
7 Mc.	12t <sup>1</sup>	28t <sup>1</sup>	18t <sup>1</sup>	9-16 $\mu$ h (120-D) <sup>3</sup>	25 $\mu$ mf	50 $\mu$ mf	1500 $\mu$ mf	150 $\mu$ mf	47K	3.4 Mc.
14	5t <sup>2</sup>	19t <sup>2</sup>	15t <sup>1</sup>	3-5 $\mu$ h (120-B) <sup>3</sup>	15 $\mu$ mf	25 $\mu$ mf	330 $\mu$ mf	33 $\mu$ mf	27K	10.5 Mc.
21	12t <sup>1</sup>	17t <sup>2</sup>	15t <sup>1</sup>	2-3 $\mu$ h (120-A) <sup>3</sup>	—	—	330 $\mu$ mf	33 $\mu$ mf	33K	17.5 Mc.
28	8t <sup>1</sup>	10t <sup>2</sup>	10t <sup>1</sup>	2-3 $\mu$ h (120-A) <sup>3</sup>	—	—	150 $\mu$ mf	15 $\mu$ mf	18K	11 meters: 23.4 Mc. 10 meters: 24.5 Mc.

<sup>1</sup> 32 t.p.l. No. 24, 5/8-inch diam. (B & W 3008)

<sup>2</sup> 16 t.p.l. No. 18, 5/8-inch diam. (B & W 3011)

<sup>3</sup> North Hills Electric Co. designation

length of RG-59/U coaxial cable. Input and output connections were brought to phono jacks at the rear of the unit; power and control leads were terminated in a Cinch-Jones P-304-AB plug.

Coils  $L_2$  and  $L_4$  are supported by No. 14 wire leads extending from the tuning capacitors. The B+ end of  $L_3$  is cemented to the ground end of  $L_4$  with Duco or Ambroid cement. This gives an improvement in minimizing spurious responses over that obtainable by sliding a larger-diameter  $L_3$  over  $L_4$ , but on the two lower-frequency ranges it requires the use of padding capacitors,  $C_2$  and  $C_4$ , because otherwise the  $L_3L_4$  assembly becomes too long. The 3- to 30- $\mu$ mf. compression capacitor across  $C_1$  is mounted on the terminals of the variable capacitor.

### Adjustment

The first step in checking a converter, after the wiring has been checked and a power supply and receiver have been connected, is to check the oscillator and mixer. With only the 6AN8 in its socket, turn on the power and look around the crystal frequency with your receiver to see if the crystal oscillator is working. If it isn't, tune  $L_5$  until it does. Then put the receiver in the range 3.5 to 4.0 Mc. and tune  $C_1 C_3$ . At some setting you should hear an increase in noise, indicating that the mixer input circuit is tuned to resonance. If the increase in noise is quite sharp, it indicates regeneration in the mixer, and the value of  $R_1$  (Table I) should be reduced. This mixer-oscillator combination is basically regenerative, and with  $R_1$  removed the mixer will oscillate.

Under normal operation of the mixer and oscillator, the voltage at Pin 7 will run around 50 to 60 volts, and around 3 volts at Pin 9.

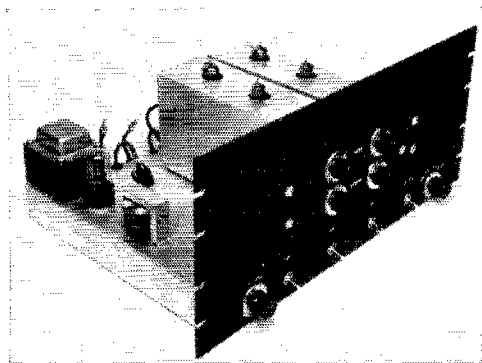
Leave the ganged capacitors  $C_1$  and  $C_3$  at the setting that gave the noise peak, connect a 2500-ohm wirewound potentiometer in the manual gain circuit to chassis ground, short the AVC connection to chassis, and plug in the 6BJ6. Connect an antenna and, with the gain control at maximum gain (minimum resistance), adjust the compression trimmer across  $C_1$  for maximum noise. The two circuits are now tracking and should tune together over the band. Tuning 3.5 to 4.0 Mc. with the receiver should now bring in signals from the band for which the converter is de-

signed. Loosening the antenna coupling by swinging  $L_1$  away from  $L_2$  should reduce the strength of incoming signals. If it doesn't, or if the sharpness of  $C_1C_3$  tuning changes with the gain-control setting, it indicates that the r.f. stage is regenerative. Since the mixer can be regenerative, as mentioned above, it is necessary to be able to isolate the two causes of sharp tuning. In either case the cure is to decrease the value of  $R_1$ . You shouldn't have any trouble, however, if the stage grounds are brought to one point on the chassis, as mentioned earlier.

When the converter is working properly, shorting either side of the 270- $\mu$ mf. capacitor to chassis with a screwdriver should reduce the noise output of the converter to a low value, when the manual gain control is set at minimum resistance. To get a wide range of gain control from the 2500-ohm gain control, a bleed current of 8 or 9 ma. should pass through it. A typical power supply and gain-control circuit is shown in Fig. 3.

If several converters are built and used, an arrangement similar to that shown in one of the photographs will be convenient. Here the several converters are mounted on a 13 x 17 x 2-inch chassis, and the power supply is mounted along one side. The input, output and power circuits make up to each converter at the rear, through phono plugs and Cinch-Jones connectors. Toggle

*(Continued on page 132)*



Several crystal-controlled converters can be installed on a chassis with a common power supply. Here the 20- and 15-meter converters are shown in place. On the panel, the lower left-hand knob is the common gain control, and the right-hand knob controls the switch that selects the converter to be used. The toggle switches control the heater circuits separately.

# An Accessible Antenna Tower

*Using the House as a Permanent Gin Pole*

BY HERMAN LUKOFF,\* W3HTF

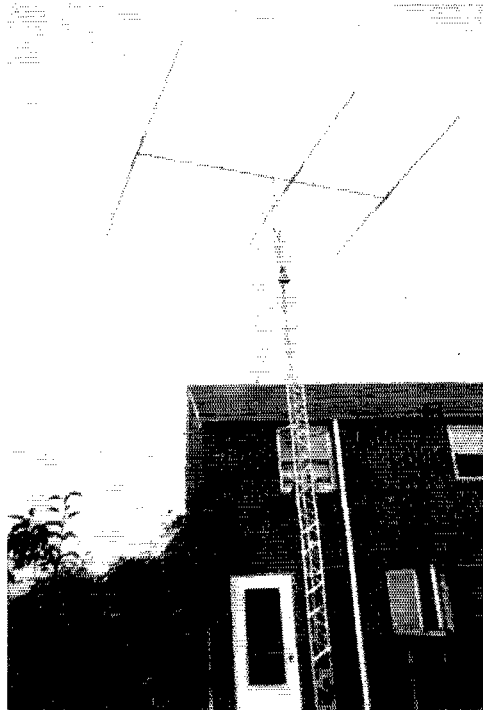
• Here is the way to use lightweight tower material for a rotary beam and still be able to adjust the elements when necessary. It may furnish an answer for your antenna problem.

ONE of the foremost requirements I had in looking for a new house was that it have a flat roof for easy antenna access. Therefore, it wasn't too surprising when I wound up with a peaked roof house which old "yellow-bellied" W3HTF was simply too afraid to climb. At one time climbing a 100-foot mast to repair a radar antenna was part of the day's job, but since then the responsibilities of family life have induced a new era of conservatism. Yet that beam antenna had to be put up somehow!

The first attempt at putting up my midget 20-meter beam involved an enormous amount of effort on the part of five men pulling and tugging at guy wires for hours. The 2 by 3s used as a mast acted more like a snake than pieces of wood. Nevertheless, it went up. It didn't take too long to discover that the beam was not working properly and required adjustment. At this point I was very discouraged with the whole project and rounded up five men to take the whole mess down again.

I firmly resolved not to put the beam back up until I had figured out a scheme whereby raising and lowering the antenna would be a one-man operation, solving once and for all the problems of adjustment, maintenance and future expansion.

Various types of towers on the market were examined for practicability. Most collapsible towers only lowered to 20 feet, which still presented a problem in reaching the elements



The tower in place against the house.

and another slightly down from the top of the mast. Half-inch weatherproofed rope is threaded through the pulleys with one end anchored at the top of the mast and the other brought to the window of the shack on the second floor level. Obviously, other pulley arrangements can be used to provide more or less mechanical advantage, but this scheme best fitted my condi-

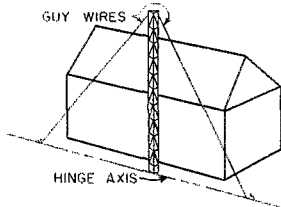
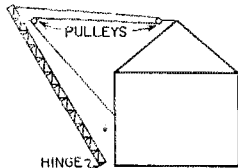


Fig. 1—Two views of the basic principle of using the house as a permanent gin pole. The guy wires must not be interfered with in any position of the tower.

from the ground. Flop-over towers were expensive and could not be placed alongside the house.

I then considered the idea of using the house itself as a combination gin pole and guying element in conjunction with a rugged TV-type tower. The basic principle is shown in Fig. 1.

One pulley is placed at the peak of the roof

\* 909 Glenview St., Philadelphia 11, Penna.

tions. The mast itself is hinged at the base through a large pin. Most TV tower companies sell the hinged base as an inexpensive accessory. Two guy wires are used from the top of the tower to any convenient point on a line along the axis of the hinge. The guy wires do not have to be symmetrically displaced about the hinge.

(Continued on page 114)

# A Simple Code-Practice Oscillator

Novel Circuit for Battery or A. C. Operation

BY DAVID T. GEISER,\* WIZEO

THE FIRST piece of equipment a beginner usually builds when he has finally made the decision to study for the amateur operator examination is a code-practice oscillator. The usual oscillator has at least one of several drawbacks: the theory is hard to understand, connections may be reversed, resulting in no operation, the tone may be shrill or varying, or there may be loud clicks on the key make and break. Cost is also a factor, and was considered in the design that follows.

## How To Generate A Tone Electrically

A tone is the vibration of air at a fixed rate. It may be created by starting an electrical vibration and feeding the electricity to a pair of headphones which, in turn, make air vibrate at the

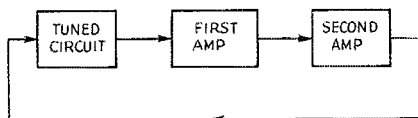


Fig. 1 — Block diagram of the simple code-practice oscillator showing how the signal travels through the circuit.

same rate. There are several ways to create electrical vibrations with parts that turn on and off, such as a door-bell buzzer or neon tube. It is also possible to turn on and off the current in a radio tube and get the same effect. These ways are called nonlinear methods and, strictly speaking, do not generate a tone like a good radio code signal, though they are quick and fairly good ways of obtaining a signal for code practice.

Radio tubes acting as amplifiers can generate very pure tones in special circuits where the current circulates through the amplifier and is fed from the amplifier output back into the input cir-

\* 275 Kemp Ave., North Adams, Mass.

• In this simple code-practice oscillator, WIZEO uses a novel circuit that produces a tone of good quality with a minimum of key clicks. Very few components are required and values are not critical. The unit may also be used as a selective audio amplifier.

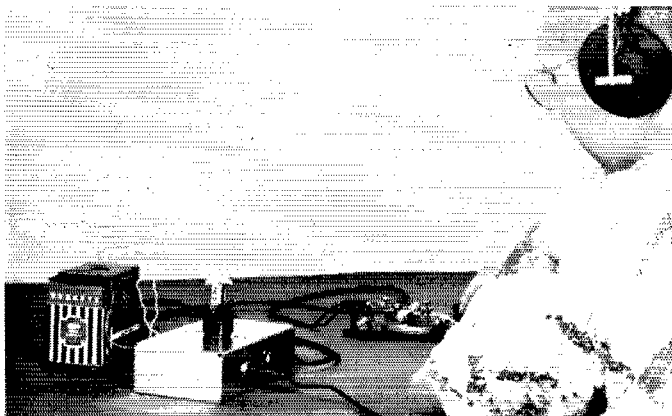
cuit at the proper time to reinforce itself. Thus a succession of waves is created which may also be used to feed the headphones and produce a tone. Usually it is desirable to regulate, in some fashion, the way the waves build up and decrease and this is done by tuning. The equipment described uses two amplifiers and a tuned circuit.

## How the Oscillator Works

The block diagram (Fig. 1) shows two amplifier stages with the output of the first stage feeding the second stage directly, and the second output feeding a tuned circuit and the input of the first stage. As each amplifier reverses the signal coming into it, the second output is a much amplified duplicate of the first input signal. The tuned circuit helps prevent the generation of any tone but the desired one.

Electrical tuned circuits in the audible range are usually expensive, but mechanical tuned circuits are cheap. Simple examples of mechanical tuning are seen in the violin string or a bell or tuning fork. Even the thin metal diaphragm of a headphone shows such tuning effects, so the headphone is used here as a tuned circuit combining mechanical tuning with electrical connections where the effects of the mechanical tuning appear electrical. Thus the headphone is used two ways, both as a tuning part and a device to convert

◆  
The author operating the battery model of the simple code-practice oscillator.  
◆





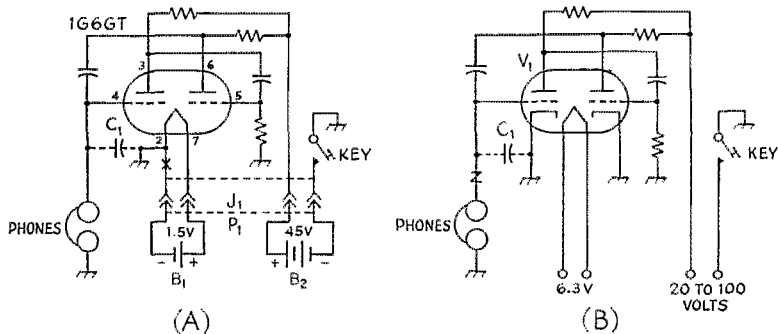


Fig. 2 — Circuits for the simple code-practice oscillator. A — Battery-tube circuit. B — Circuit for cathode-type tubes. In A, all resistors are 100K,  $\frac{1}{2}$  watt, and all capacitors  $0.017 \mu\text{f}$ , 200 volts (Sprague 2TM-S47).  $C_1$  may or may not be needed as explained in the text. An on-off switch may be inserted at "X." See text for a discussion of  $J_1$  and  $P_1$ .

In the circuit of B, any pair of triodes or a dual triode having an amplification factor of 15 to 100 may be used. Resistors may be between 20K and 100K,  $\frac{1}{2}$  watt. Capacitors may have values between  $0.01 \mu\text{f}$  and  $0.017 \mu\text{f}$ , 200 to 600 volts. (See text.) With some types of headphones, a resistor of from 3.9K to 10K may be inserted at "Z" for best results.  $C_1$  performs the same function as  $C_1$  in circuit A.

electrical waves into sound. Cheap magnetic headphones are ideal for this use. Peculiarly, the more "high-fidelity" a headphone is, the less suitable it should be in this circuit.

All tone generators require power and the usual way to start or stop the tone has been to turn the power on and off going to the plates of the tube. As the headphone has commonly been placed in this lead, the power switching has produced loud clicks in the headphones which are usually quite startling to the newcomer and are not representative of a good code signal. Here (Fig. 2) two tubes (in a single envelope) are used and, the click being the same (approximately) in each tube, tends to cancel out because of the signal-reversing action of the amplifier. Any remaining tendency to click is eliminated by not having the headphones in the power lead.

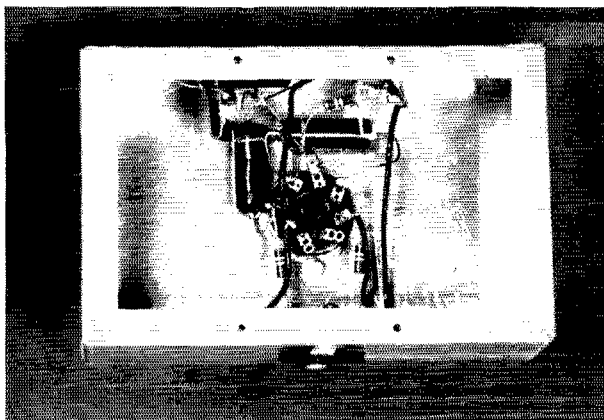
#### How To Build the Oscillator

The oscillator was designed so that only one value of each kind of part was needed. Thus, where the wiring calls for a resistor, any of the resistors purchased may be used; likewise with the capacitors. Sizes and ratings have been chosen for least cost and size. Any voltage or

wattage ratings higher than those specified for the parts are quite all right, but they will cost more and occupy more space.

The 1G6GT tube was chosen for the battery circuit of Fig. 2A since its pin connections make wiring errors almost impossible. The octal-tube base is keyed and each half of the pins on either side of the key bit connect to an identical "tube," for there are two "tubes" within the 1G6GT envelope. Thus, whether one is accustomed to wiring "from the top," or, as is more conventional, "from the bottom" of the socket, the oscillator should work the first time. (The wiring shown will also allow the use of the 2-volt-filament 1J6GT tube or, by adding the cathode connection at Pin 8, the 6.3-volt-filament 6N7 series tubes. "Series" means such as the 6N7, 6N7G, and 6N7GT, all of which are equivalent in this application.)

Make the connections as shown in Fig. 2. Carefully wrap each lead around the proper terminal tightly and solder, being careful not to let a blob of solder form, shorting terminals together. Binding posts or other connections may be used for the batteries and key, but the writer prefers the connections shown as it is then



Bottom view of the simple code-practice oscillator. The components are assembled on a  $2 \times 4 \times 6$ -inch aluminum chassis. In this model, battery connections are made through the octal socket at the rear, while jacks are provided at the front for key and headphones.

impossible to burn out the tube by connecting the wrong battery to the tube filament. Plug the battery connectors in after the headphones are connected and then plug in the tube. Pressing the key should result in a clean steady tone. Should there be any doubt whether connections are correct to the batteries, *before* plugging in the tube, connect a common 2-cell flashlight bulb to the two socket connections that are *second* from the key bit. The bulb should glow dimly. If there is no light, a wiring error has been committed. If the light comes on bright and flashes out, the wrong battery has been connected. That way the test costs a flashlight bulb instead of a tube.

Please note that the arm of the key is connected to the "common" or chassis ground lead.

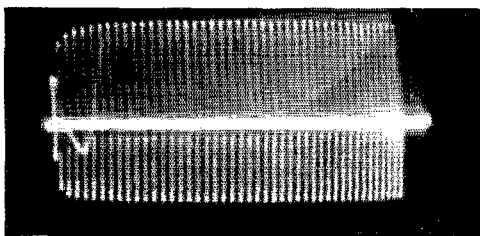


Fig. 3 — Oscillator keying and wave form.

This way there is no exposed voltage the user may come in contact with in normal operation. (There is no lethal voltage in the equipment.) The oscillator does not need a chassis to work properly; just the parts, properly connected, work fine lying on the top of a table (wooden or plastic, of course).

The reader, if he wishes, may install an on-off switch at the point marked "X" in Fig. 2. The writer considers this an unnecessary expense as the low temperature of the 1G6GT makes pulling out the tube a quite practical (and cheap!!) way of turning the oscillator off.

The capacitor,  $C_1$ , shown connected with dashed lines stabilizes the oscillator if the headphones fit poorly, as the air between the ear and the headphones forms part of the mechanical tuning circuit. The capacitor effectively closes this air chamber and thus may not always be necessary.

The photographs show the first of these oscillators constructed. A telephone jack was used instead of the phone tip jacks, since the writer uses most often surplus headphones having telephone plugs. The oscillator has been tested with headphones having impedances of 8000, 4000, 2000, 1000, and 600 ohms and in each case has worked satisfactorily. Only one type of headphone has been found unsuitable for the oscillator, the Brandes Type 10A/3038. Insertion of a small resistor in series with the headphones will permit oscillation with this and similar phones.

Fig. 3 is a photograph of the wave produced by the oscillator. Two things are worth noting; there is a smooth start

and stop, and there is slight distortion in the wave. The smooth start and stop are typical of click-free operation while the distortion is just sufficient to keep the tone from being boring.

The recommended circuit for "cathode" tubes is shown in Fig. 2B. The latitude of permissible circuit values is quite wide, making "junk-box" construction easy. Generally, the 0.01-0.05- $\mu$ f. capacitors, when chosen near the high end of the range, yield more pleasing tones when the 20K-100K resistors lie toward the lower end of their range, and vice versa. A point worth remembering, if parts must be purchased, is that *smaller* values of capacitors are cheaper and, correspondingly, higher resistors permit less current drain and longer battery life.

Different tubes perform well in the circuit — the writer personally has used widely differing types such as the 6C5, 6J5, 6N7, 6SN7, 12AT7, 12AU7, and 12AX7. The reserve amplification available from these tubes operating zero bias will slightly roughen the tone, though not objectionably. Should one of these "cathode" tubes be chosen, the beginner is well advised to purchase a 6.3-volt filament transformer to save ultimately high filament battery cost.

### Tricks with the Oscillator

The user may generate frequency-modulated audio by speaking into a headphone while the unit is oscillating. There isn't much deviation, but enough to be used as a demonstration on an oscilloscope or possibly enough for such purposes as telemetering.

The amateur will receive more use from the circuit of Fig. 4, where the oscillator is used to separate audio signals (such as radio code) close to the same tone. The regeneration control  $R_2$  is set just below the point of regeneration and a tone coming from the receiver will key the oscillator if the received tone is very close to the oscillation frequency of the oscillator. The proper setting of the regeneration control is the point at which a 100 per cent increase of the input tone voltage triggers the oscillator. Used in this fashion, the desired tone only is effectively amplified about 20 db. (10 times the original voltage). The desired tone should have

(Continued on page 120)

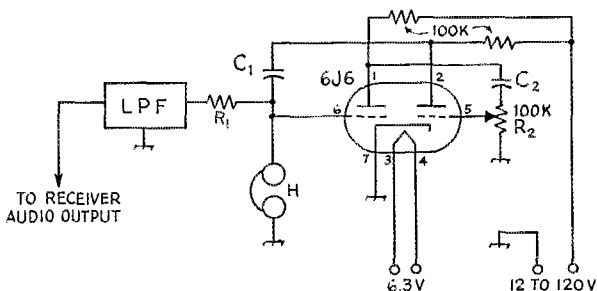


Fig. 4 — Circuit showing how the oscillator may be used as a selective audio amplifier.  $C_1$  and  $C_2$  may have values between 0.01 and 0.047  $\mu$ f.  $R_1$  should have a value of about four times the headphone impedance (33K for the 8000-ohm headphones used). All resistors are  $\frac{1}{2}$  watt. LPF is a low-pass filter to attenuate harmonics.

# "Echoes" with Home Tape Recorders

*Or, Two Heads Are Better Than One*

BY GEORGE A. BOWLEY,\* WITQS

• On the assumption that a large number of amateurs own tape recorders and might be interested in how to obtain echo effects, here is a how-to-do-it story on how WITQS modified his. The same principles apply to a variety of recorders.

You have perhaps noticed that, out of all the phonograph records on the market today, the most popular records achieve their popularity because they contain either an unusual arrangement of a song, an odd instrument, or an electronic gimmick. In other words, they all have something to catch the listener's ear and make them stand out above others. Like, for instance, Les Paul and Mary Ford with their multiple recorded guitars and voices.

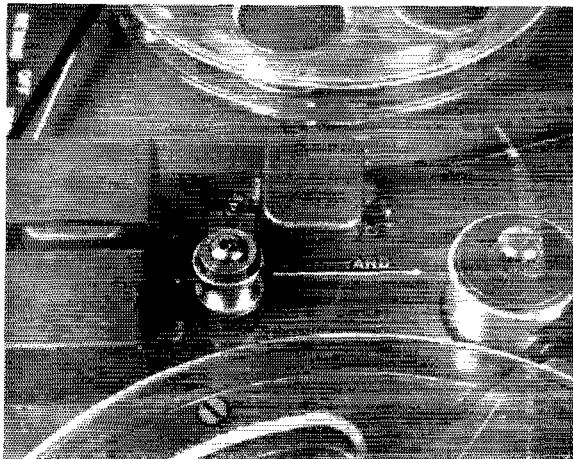
Generally an echo is produced by one of three methods. First, by the use of a room with highly reverberant walls, commonly known as an echo chamber. This chamber creates the effect of hollowness and space but, because of its massive size and cost, it is quite improbable that the average ham could afford to use it. The second method of echo generation is by the use of coiled springs immersed in oil to delay the sound mechanically. This set-up creates an effect similar to the echo chamber, and is an intricate piece of apparatus. The third method, and the one with which we will deal here, is the echo produced by a tape recorder. This effect is heard often on space-opera programs and TV advertisements, and it is the basic component of many commercial recordings.

Fig. 1 shows the basic layout of the tape-

recorded echo. The system requires two tape heads: one "Record" and one "Playback." A microphone is connected to an audio mixer which is, in turn, connected to the input of a recorder. The voice is recorded on the tape by recording head *A*. The sound just recorded travels by tape to playback head *B* where it is picked up and fed back through the mixer. This causes the sound to be re-recorded, and the entire process continues over and over until the decay of the system attenuates the echo to zero. The result is a steady repetition of any sound that enters the microphone. This arrangement of separate record and playback heads is standard equipment on machines like Ampex and Concertone, and an echo is achieved quite easily. But the average tape recorder in the \$100-\$200 class contains only one tape head. Since this performs both functions, it is impossible to record and play back at the same time. This is the main reason why most tape-recorder owners can't generate echoes. Not many of us can afford an Ampex.

Home recorders can be converted very easily to produce quite a professional-sounding echo. The first thing that is needed is an extra tape head. The Shure No. 816 head is preferable in this application because it has high impedance and can be fed directly into the microphone input of the recorder. Also, the price is lower because it does not contain an erase magnet. (Erasing is not necessary since only playback is involved.) This head should be mounted somewhere between the recording head on the recorder and the take-up reel — the closer to the recording head, the better. Almost any tape recorder has space enough, but the method of mounting may differ with various models. The head may be mounted by your own ingenious arrangement of

\* 12 Center St., Provincetown, Mass.



◆  
A close-up view of the recorder at WITQS, showing how the auxiliary head is mounted.  
◆

brackets and, if worse comes to worse, you can even use adhesive tape. The guidepost on the Bell tape recorder provides an excellent mounting place, as shown in the photograph. A little ingenuity will probably be necessary. Usually,

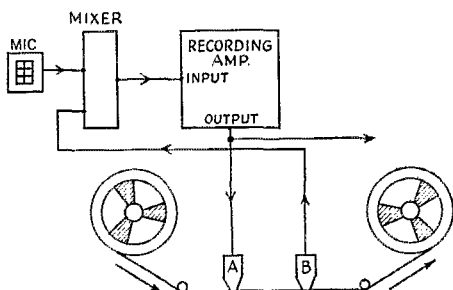


Fig. 1 — The "echo" is obtained by picking up the recorded voice from the tape through head *B* and re-introducing it at the input of the recording amplifier. Echo time is determined by the head spacing and tape speed, and the number of echoes is controlled by the gain through the *B* head circuit.

great care is exercised in mounting a tape head so that the head and tape meet at certain angles to prevent wear and distortion, but with the little space available, it is almost impossible to meet these conditions. All that is required in this application is that the head touch the tape and is perpendicular to it.

Once the head is mounted on the recorder, the only other consideration is the mixer. Fig. 2A shows a simple mixer. Two audio signals are fed through  $J_1$  and  $J_2$ . The resulting output at  $P_1$  is a combination of the two signals.  $R_1$  and  $R_2$  serve as isolation resistors, and prevent one circuit

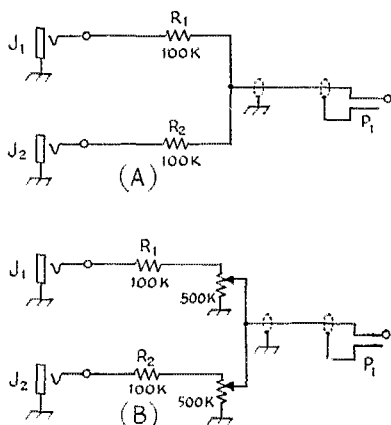


Fig. 2 — Two simple mixer circuits. B is preferable because relative gains can be controlled easily.

from shorting out, or dominating the other circuit. This effect is called "interaction" and is quite technical to explain. Satisfactory mixing action can be accomplished by this circuit, but that of Fig. 2B is more suitable because the gain of each input can be varied. In this way, the decay (number of echoes) can be controlled, thus preventing the level of the reflected sound from

becoming higher than the microphone level, which would cause a mechanical sounding type of feed-back becoming louder and louder with each reverberation.

With the microphone and the playback head connected to the mixer, and the mixer plugged into the microphone input of the recorder, the system is now ready to produce an echo. First of all, set the volume control on the recorder to maximum. Next, set the machine to the "record" position. Speak into the microphone and adjust the gain on the mixer to the point where the neon light, VU meter, or magic eye indicates normal recording level. Then set the tape in motion, and turn up the playback head gain on the mixer until an echo is heard. Adjust the playback head against the tape until the clearest and loudest echo is obtained. To prevent feed-back it is best to monitor the operation with headphones instead of a speaker.

By simply varying the head gain on the mixer the amount of reverberation can be controlled. With the gain low, the voice will come back only once or twice. With the gain high, as many as twenty-five reverberations are possible.

The speed of the echo depends on the tape speed and the distance between the two heads. When the playback head is one inch from the recording head, and the tape is running at  $3\frac{3}{4}$  i.p.s., the echo will come back at the rate of  $3\frac{3}{4}$  times per second. At  $7\frac{1}{2}$  i.p.s., the rate is doubled. As a rule, the faster the echo, the more pleasing it sounds.

#### Practical Hints

A few hints concerning the echo. First, the owners of Pentron tape recorders will have to mount their playback heads in a slightly different manner. Since on a Pentron the take-up and feed reels are exactly opposite from the standard arrangement, the Pentron recording head records on the bottom half of the tape instead of recording on the upper half (high track recording). Therefore, the playback head will have to be mounted upside down, in order to pick up the sound that was recorded on the tape. Secondly, those who are fortunate enough to own an Ampex or Concertone, or even certain models of Magna-Corders, can achieve an echo without the addition of a separate playback head. These recorders have the facility to monitor the tape through a head already incorporated in the machine. Just feed this special monitor signal back into the input using the described mixer, and the same result is obtained.

#### COMING A.R.R.L. CONVENTIONS

March 3 — Michigan State, Grand Rapids

June 15-16-17 — West Gulf Division, Galveston, Texas

July 6-7-8 — ARRL National Convention, San Francisco, Calif.

# The Ash-Tray Mobile

## *Inconspicuous Dashboard Mounting*

BY DEAN F. PFOST,\* W7KOT

• Faced with the problem of overcoming objections to the appearance and hazards of the usual mobile installation, W7KOT came up with the idea of using the ash-receiver space. He found that in most of the later-model cars sufficient space may be found for a one-band 2E26 rig.

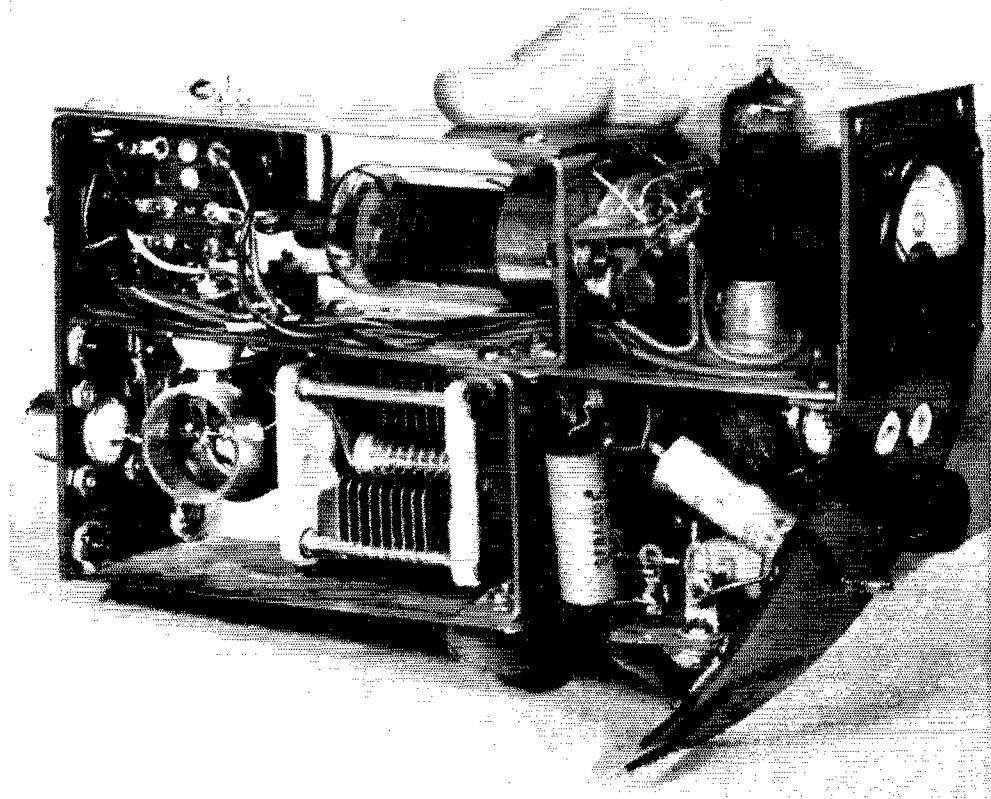
I, W7KOT, of Idaho Falls, Idaho, having all my life wanted a mobile rig in the family car, finally timidly approached the XYL, and proposed installing one of the popular manufactured transmitters under the dash of our 1955 Chevrolet station wagon. The reply was not entirely unexpected and went something like this: "I will

\* 238 West 20th St., Idaho Falls, Id.

not stand for that pile of junk hanging all over the car for me to snag my stockings on, and for the children to fall against and hurt themselves. Besides, it looks messy and it is embarrassing to explain its necessity to my friends each time we meet in our car."

This edict did not discourage me, however. I still persisted that there must be some way to please my XYL and still have my mobile. A survey showed that most of the manufactured units were much too large to be mounted inconspicuously under or behind the dash. However, withdrawal of the ash receiver revealed a very convenient space, approximately 2 by 5 by 9 inches, into which it seemed probable that a single-band transmitter might be built. The finished product is shown in the photographs. Although the ash receivers in cars of other makes and models will vary in shape, almost all

A 25-watt 75-meter mobile rig built to fit a Chevrolet ash-receiver compartment. On the panel, below the meter, are the crystal socket, final tank-capacitor control and the slug-adjusting screw of  $L_1$ . The oscillator tube is behind the meter, followed by the 2E26, mounted horizontally, and the relay. The output tank components are below.



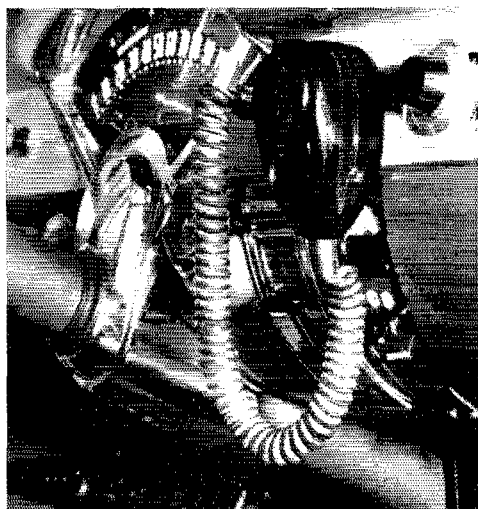
of them will yield approximately equivalent space in one form or another. Since the cigarette lighter wasn't much good without the ash tray, I removed it also and replaced it with a microphone connector.

### R.F. Circuit

The r.f. circuit is shown in Fig. 1. A 6AQ5 in a simple tetrode crystal oscillator drives a 2E26 amplifier. The output circuit of the oscillator is tuned by adjustment of the iron slug in  $L_1$ . The adjusting screw is brought out through the panel so that it can be reached conveniently when changing crystals.

The 2E26 was chosen because it best fitted the limitations of the Mark II dynamotor which I had picked up. A 6146 will fit in about the same space. A control for the final tank capacitor was also brought out to the panel by means of an extension shaft. The panel affords space for a 1½-inch millimeter which is not only indispensable in tuning the transmitter but which also adds to the appearance of the unit. A change-over relay is included which shifts the antenna between transmitter and receiver, and also turns the receiver B supply off while transmitting.

The panel is made of sheet brass or aluminum. It is cut and bent to fit the ash-receiver opening



The ash tray mobile rig installed in the instrument panel of W7KOT's station wagon.

and the contour of the dash. A framework, also of aluminum strip, provides a mounting for the tubes and other components.

(Continued on page 112)

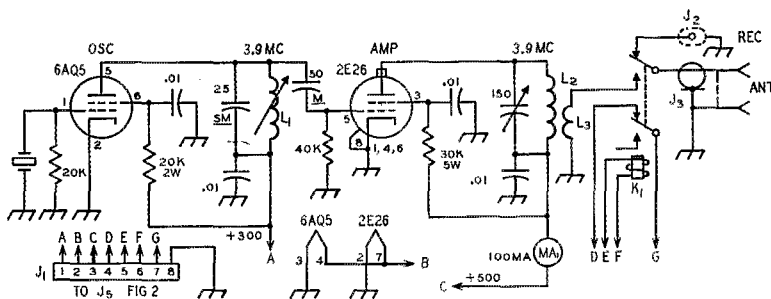


Fig. 1 — Circuit of the r.f. section of the ash tray 80-meter transmitter.

The 150- $\mu$ f. amplifier tank capacitor is a Bud CE-2005 or similar. All capacitances less than 0.001  $\mu$ f. are in  $\mu$ f. All 0.01- $\mu$ f. capacitors are disk ceramic. M = mica. SM = silver mica. Unless otherwise specified, all resistors are ½ watt.  $J_1$  is a male octal connector.  $K_1$  is a d.p.d.t. 12-volt change-over relay.  $MA_1$  is a

Marion 1½-inch unit (Type H1S-1).  $L_1$  — 40 turns No. 28 enam. on CTC LS-4 iron-slug form, ½-inch diam. (approx. 35  $\mu$ h.).  $L_2$  — 30 turns No. 20 enam., 1-inch diam.  $L_3$  — 1 turn No. 20 enam., wound over ground end of  $L_1$  (Scotch Electrical Tape between windings).

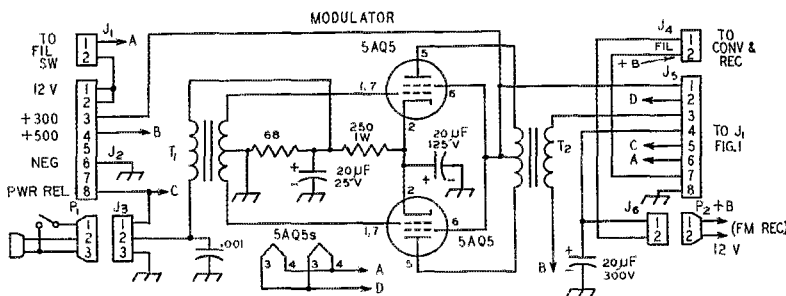


Fig. 2 — Circuit of the modulator for the ash-tray mobile rig, showing power and control cable connections.

- $J_1, J_4$  — 2-terminal female connector.
- $J_2$  — Male octal connector.
- $J_3$  — 3-terminal microphone connector.
- $J_5$  — Female octal connector.
- $J_6$  — 2-terminal male connector.

- $T_1$  — Microphone transformer, 1:84 (Peerless K-007X or equivalent).
- $T_2$  — Modulation transformer, 10,000 to 8000 ohms (Peerless M-013X or equivalent).

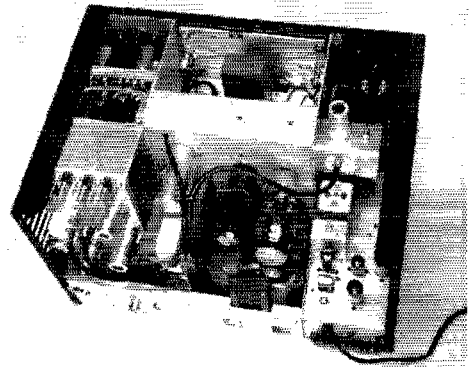
# • Recent Equipment —

## The Eldico SSB-100 Exciter/Transmitter

THE SSB-100 is a 100-watt peak envelope power s.s.b. transmitter, complete with power supply and VFO, that can also be used on a.m. and c.w. It occupies no more room than most receivers, since it is only 12½ inches high by 21 wide by 13½ deep. All you have to do with it to get on the air is plug in the power plug, connect a microphone and antenna and, of course, read the instruction book. It has a built-in monitoring oscilloscope, so you don't have to buy anything extra to be sure that you are tuned up properly.

Fig. 1, a block diagram of the SSB-100, tells a lot of the story. The microphone input is amplified in a 3-stage amplifier, the two sections of a 12AT7 and a 6C4. The output of the 6C4 is transformer-coupled to an audio phase-shift network, where the audio is split into two channels, differing in phase by 90 degrees. The output of these two channels is applied through half-12AU7 cathode followers to two balanced modulators using 1N60 germanium diodes. The r.f. applied to the balanced modulators is crystal-controlled at 8.15 Mc., and it is fed 90 degrees out of phase to the two balanced modulators. This basic "phasing" system for generating an s.s.b. signal is well-known, of course, to those who have followed such things. Out of the balanced modulators we have a single-sideband signal at a nominal-but-suppressed carrier frequency of 8.15 Mc. Which sideband is used (upper or lower) is determined by the position of a switch that reverses the cathode-follower outputs. For a.m. operation one of the balanced modulators is unbalanced and the other is switched out. Separate balancing potentiometers are used with the balanced modulators and for the a.m. position, and these are set up at the factory. The result is that the operator simply switches between a.m. and

s.s.b., without adjusting or readjusting controls. Further along this line, switching from s.s.b. to a.m. also modifies the gain of the 6C4 stage, and the operator doesn't have to dive for the audio



This rear view of the SSB-100 with the top and back removed shows the unit construction of this complete 100-watt s.s.b./a.m./c.w. transmitter. The audio and 8.15-Mc. s.s.b. generator are on the right-hand side, and the little one-tube stage riding above it is the 8.15-Mc. amplifier. Over on the left-hand side you can see the converter section in the foreground and the monitor scope section against the panel. In the center near the panel, the dark box is the low-pass filter in the output of the VFO stage.

gain control to avoid overloading amplifier stages later on.

The 8.15-Mc. s.s.b. (or a.m.) signal is amplified in a 12AT7, the first section connected as a grounded-grid amplifier and the second as a cathode follower. The signals then go to a 12AT7 balanced mixer, where they are heterodyned against the VFO signal. The VFO range is 800 to 1000 kc., and the consequent signal in the

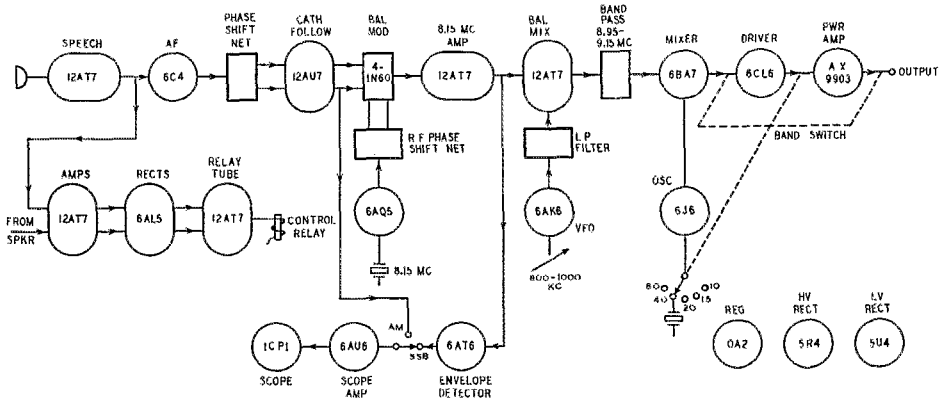
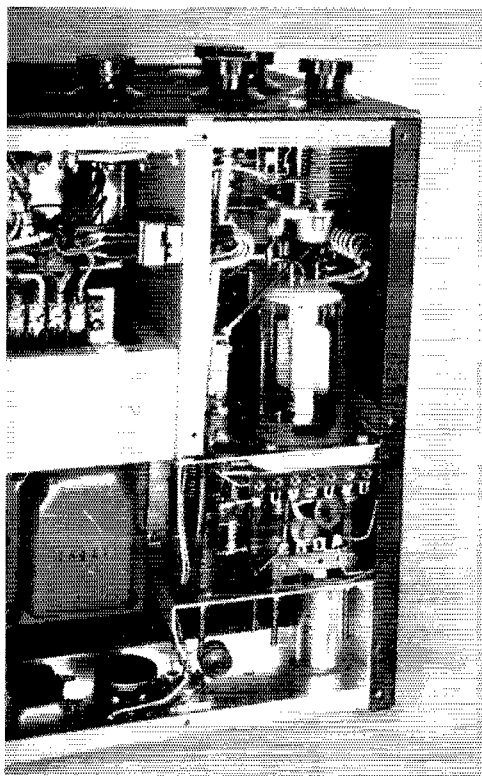


Fig. 1 — Block diagram of the SSB-100 transmitter.







A close-up view of the output stage that is tucked away under the right-hand corner of the SSB-100. The plate tuning and loading capacitors are near the front panel, and the switched grid circuits can be seen between the tube and the rear of the unit.

VFO and the plates of the 6J6 crystal oscillator.

The VFO requires  $7\frac{1}{4}$  turns of the knob to cover its 200-ke. range. As delivered, the output ranges of the SSB-100 are 3.8 — 4.0 Mc., 7.1 — 7.3, 14.15 — 14.35, 21.35 — 21.45, and 28.5 — 28.7 Mc. Other ranges can be covered, of course, by plugging in other crystals in the 6J6 stage. The VFO is permeability-tuned, with a gear-

driven shaft and string-driven slide-rule type pointer.

As indicated in the first paragraph and confirmed by the photographs, there is a lot of gear packed into the 2 cubic feet the SSB-100 occupies. Full use was made of subassemblies, which can be tested separately and then installed and cabled together. To facilitate identifying components, the instruction book carries sketches of the individual subassemblies in which each component is given its circuit designation.

Panel controls include the VFO knob, final stage grid, plate and loading controls, and the audio gain control. The switches on the panel are power on, band selection, emission (A3 — LSB — USB), operation (CW — MAN — VOX — QT) and control (CAL — STBY — XMT). For those unfamiliar with the s.s.b. terminology, the VOX and QT of the operation switch stand for "voice-operated" and "voice-operated with a loudspeaker on the receiver." The gain controls for the VOX and QT circuits have to be adjusted when the rig is first installed (or when the microphone and/or loudspeaker are shifted or changed), so these controls are available at the rear of the unit. A meter on the panel indicates plate current to the output stage. Carrier-balance controls, which need adjusting rarely, are inside the SSB-100.

Keying for c.w. operation is done by grid-block keying the VFO. Rapid voice-control operation is obtained by keying (with the relay) the VFO and the grid bias on the AX-9903 output stage.

From an operational standpoint the manufacturers appear to have included all of the desirable features for easy tune up and monitoring, and it is hard to see how anyone who spends a little time with the well-written instruction book could do anything but tune his SSB-100 "on the button." As for performance, the instruction book states that third order distortion products are down 35 db. or more, carrier suppression is down 40 db. or more, the second r.f. harmonic is down at least 40 db., and the higher r.f. harmonics are down 60 db. or more.

— B. G.

## The Hart-75 Transmitter

The "Hart-75" is a c.w. bandswitching transmitter that should have special appeal for the Novice because it will permit him to run the legal limit on the 80-, 40-, and 15-meter bands. Also, the transmitter should fill the needs of the General Class amateur interested in a 75-watt rig that will work 160 through 10 meters. It is a completely bandswitching transmitter with a pi-network output circuit. The r.f. section and power supply are mounted on a single chassis and enclosed in an 8 x 11 x 12-inch black crackle cabinet. The transmitter is available in kit form only and is marketed complete with all components (except key and crystal). In the r.f.

line-up, a 6AG7 Tri-tet crystal-controlled oscillator drives a pair of 807s in parallel. For 160-meter operation, 160-meter crystals are used; 80-meter crystals take care of 80 and 40, and 40-meter crystals are needed for the other bands.

A parallel tuned circuit is used in the output of the oscillator and is capacitor-coupled to the grids of the 807s. The amplifier works straight-through on all bands, and in order to prevent self-oscillation, the 807s are neutralized. Excitation to the 807s is less than rated when the transmitter is operated on 10 meters. The manufacturer states that while this is true, the output is considerably greater than if the 807s worked

as doublers on this band. In addition, there is much less danger of radiating an unwanted 20-meter signal.

The grid and plate circuits of the 807s are metered by switching to either circuit a 0-10-ma. meter connected as a voltmeter. The basic movement of the meter is used when reading grid current and a multiplier is switched into the circuit to read plate current.

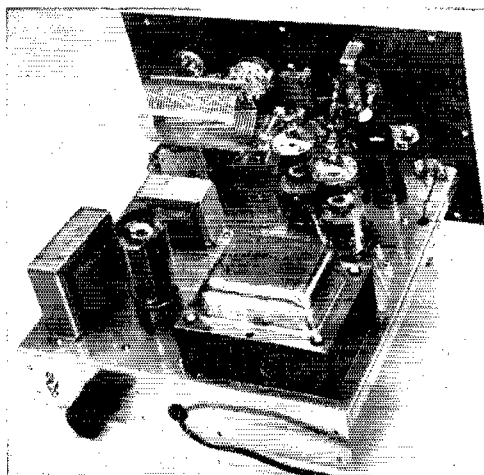
Two separate bandswitches are used, one for the oscillator output tuning and the other for the pi-network inductance. Depending on the output load impedance, a 5-position switch is used to switch in the desired amount of capacitance. An RCA type phono jack is used for the output receptacle and the output can be fed directly into the antenna or antenna coupler.

The keying system should be of particular interest to the c.w. operator. Differential keying of the oscillator and amplifier is accomplished by a double-pole, single-throw, 6-volt relay. The relay contacts are adjusted so that the oscillator comes on slightly before the amplifier. As the reader may or may not know, differential keying is turning on of the oscillator slightly before the amplifier and then turning off the oscillator slightly after the amplifier. This type of keying greatly aids in reducing chirp.

Key clicks are minimized by using a shaping filter, quite an innovation in a low-priced transmitter. The filter consists of an iron-cored inductor, paper capacitor and a resistor. By using the 6-volt relay, maximum voltage across the key terminals is 6 volts and the key is not very "hot".

Harmonic radiation from the transmitter is restricted by the complete metal enclosure. In addition, all power, key, and meter leads are bypassed with disk ceramic capacitors.

One power transformer is used for all the volt-



In this rear view of the Hart-75 transmitter, the 6AG7 oscillator is visible at the upper right-hand corner of the chassis. To the left of the oscillator are the 807 amplifiers. At the upper left-hand corner of the chassis is the fine loading capacitor of the pi network. Just above the capacitor is a section of the pi network inductor.

ages in the rig. Plate voltage for the 807s is approximately 500 volts, and the manufacturer gives a maximum power input rating of 80 watts for the transmitter. An auxiliary socket is mounted on the back apron of the transmitter chassis to accommodate modulator connections.

A separate modulator, designated the AM-1, is available from the manufacturer. The modulator uses a 12AX7 dual-triode speech amplifier and a 6550 modulator. Crystal, dynamic, or ceramic microphones can be used. Choke-coupled plate modulation is used to modulate the amplifier. The transmitter can be run at 55 watts input on phone. The modulator size is  $4\frac{1}{2}$  inches wide,  $6\frac{1}{8}$  inches deep, and  $5\frac{1}{2}$  inches high. — L. G. M.

## WWV-WVH SCHEDULES

For the benefit of amateurs and other interested groups, the National Bureau of Standards maintains a service of technical radio broadcasts over WWV, Beltsville, Md., and WVH, Maui, Territory of Hawaii.

The services from WWV include (1) standard radio frequencies of 2.5, 5, 10, 15, 20 and 25 Mc.; (2) time announcements at 5-minute intervals by voice and International Morse code, (3) standard time intervals of 1 second, and 1, 4 and 5 minutes, (4) standard audio frequencies of 440 cycles (the standard musical pitch A above middle C) and 600 cycles, (5) radio propagation disturbance warnings by International Morse code consisting of the letters W, U or N, together with digits from 1 through 9, indicating present North Atlantic path conditions and conditions to be anticipated. (See ARRL *Handbook* for details on interpretation of forecast symbols.)

The audio frequencies are interrupted at precisely one minute before the hour and are resumed precisely on the hour and each five minutes thereafter. Code announcements are in GCT using the 24-hour system beginning with 0000 at midnight; voice announcements are in EST. The audio frequencies are transmitted alternately: The 600-cycle tone starts precisely on the hour and every 10 minutes thereafter, continuing for 4 minutes; the 440-cycle tone starts precisely five minutes after the hour and every 10 minutes thereafter, continuing for 4 minutes. Each carrier is modulated by a seconds pulse, heard as a faint clock-like tick; the pulse at the beginning of the last second of each minute is omitted.

## FEED-BACK

R. W. Johnson, W6MUR, notifies us of this "feed-back" that occurred in conjunction with the publication of his manuscript in the December issue. In the equation on Page 46 the  $k$  should be  $f_B/f_A$ .  $f_B$  is the higher frequency,  $f_A$  the lower one, and  $k$  is greater than unity as indicated. Curves in the diagram are labeled correctly.

In the keying circuit of W8ETU's "Modern Medium-Power Transmitter," page 12 of the October, 1955, issue, the junction between  $R_2$  and the 8.2K resistor should be grounded.

## Strays

During a visit by W9BP to W9GWR, Roy Morrison, of Skokie, Illinois, the conversation drifted around to a pet cat that was quietly investigating the shack. A remark to Roy that this cat, following a serious illness, could not meow, brought this reply from its owner: "Yes, this is a 'low mu' cat."

# A Rugged 28-Mc. Coaxial-Antenna Design

## Mechanical Features of a Vertical Antenna

BY STEVE A. HORVATH,\* W8PVZ

• Building a 10-meter vertical antenna that will stay put in all kinds of weather involves more attention to mechanical than electrical details. The antenna described by W8PVZ in this article shows careful attention to the mechanical details, and it should be just the thing for good general-coverage operation.

LOCALLY, there is quite a bit of 10-meter fixed and mobile activity and, since skip conditions aren't always the best, many of the QSOs are of a local nature. Mobile coverage with a fixed station using a beam or long wire is difficult at times, which brings us to the subject of types of antennas. Since we're concerned mostly with ground-wave coverage, the vertical antenna is about the best for all-around operation. Ground planes and vertical coaxials are very common, and they are economical to buy or build. Having seen a few types of coaxial vertical antennas, we decided to incorporate the good points we noted along with a few of our own. And we might add that there certainly will be many who will have a few good points to add to the antenna we now describe!

\* 203 17th St., N.W., Barberton, Ohio.

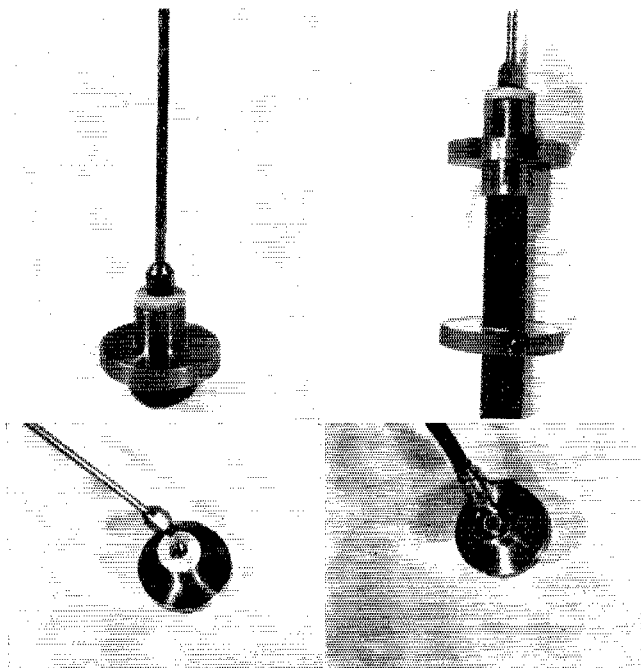
In the vertical coaxial type of antenna the point where the whip, skirts and feed line are combined is probably the most important part of the antenna. This is the point that was given prime attention. It's hard to give an exact name for this point, but we'll call it the "skirt support." Careful study was given as to what kind of metal to use and what shape would be the best. Steel, aluminum and brass are a few of the metals that could be used. We decided that brass was best because it will weather very well and it is very easy to handle in a lathe. Drilling and tapping also turned out to be a simple matter. The skirt support was made of one solid piece that added to the electrical length of the upper half of the antenna.

It is very important that the pieces described be made accurately, so that when they are assembled their centers are exact or close to it.

### Construction

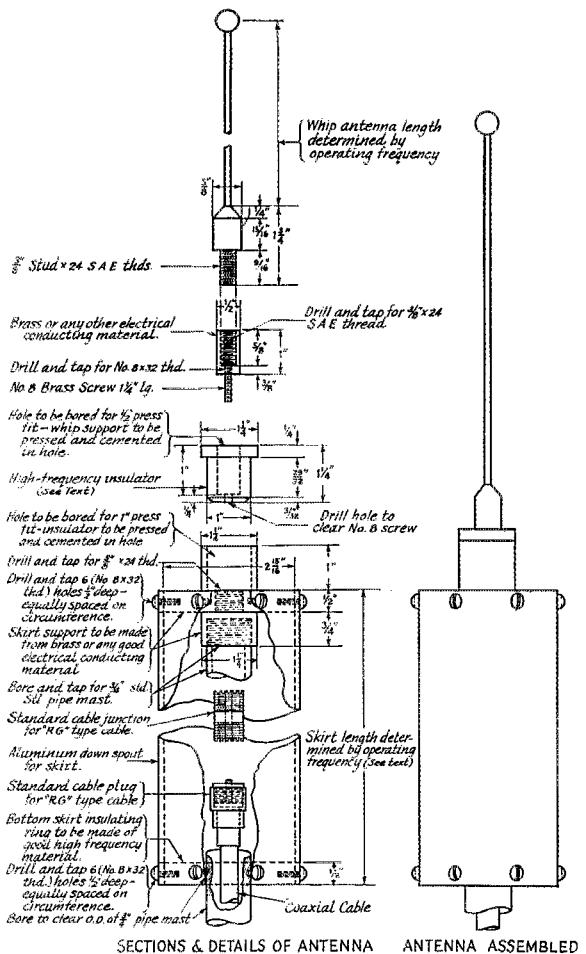
The mechanical details of the antenna design are shown in Fig. 1. The whip used for the top half can be purchased at almost any ham parts dealer selling mobile ham gear or, if other types are needed, assorted lengths of aluminum tubing can be ordered through your local hardware dealer. The center bushing that actually holds the whip in the support was made of brass because of its good conducting qualities and the elimination of corrosion and rust problems.

The insulator that is inserted into the support could be made of almost any good insulating plastic such as polystyrene or



Views of the coaxial-antenna skirt support and components in different phases of assembly. Reference to Fig. 1 will identify the parts.

Fig. 1 — Mechanical details of the coaxial antenna.



lucite. Probably the easiest material to obtain is the plastic handle of a screw driver. When the insulator is inserted into the support, a plastic cement or solvent should be used to make sure the insulator is secure in the support and to prevent the possibility of moisture getting into the base of the insulator. In our case, the brass used for the antenna was obtained from the local scrap-metal dealer at a very reasonable price.

After the parts have been machined, the coaxial junction is tightened into the skirt support. A No. 8 brass screw was used to connect the bushing, and the whip is screwed into the coaxial junction. The threads to hold the junction in place can be made on a lathe, or a special tap can be used. It may be possible to borrow the latter from a neighborhood machine shop or a friend in the machinist trade. The thread which the mast is screwed into can be pipe thread or, better yet, a uniform thread with no taper as is used on conduit. Whatever type of pipe is used for the mast, care must be taken to make sure there are no burrs or sharp edges near the thread end that is screwed into the support, because the coaxial connector that the feed line is connected to comes very near the inner wall of the mast.

The insulation at the bottom of the skirt is also made of good plastic. The thickness can vary according to the material available. We found that half-inch sheet plastic was quite suitable. Care should be taken that the screws fastening the skirt to the insulator are as short as possible, to assure clearance between the ends of the screws and the mast.

Depending on the height, the mast should be made of suitable material to support the antenna under a variety of weather conditions. The skirt used for 10-meter operation is Sears-Roebuck aluminum rainspout, which has a 3-inch outside

diameter and is sold in 10-foot lengths for about two dollars.

The dimensions of the whip and skirt are obtained from the following formulas, to the nearest sixteenth of an inch.

Length of the top section or whip:

Frequency in Mc. divided into 235.6.

Length of the bottom section or skirt:

Frequency in Mc. divided into 243.3.

Examples of a few lengths for whip and skirt for 10-meter operation are as follows:

Freq., Mc.	Skirt Length	Whip Length
28.5	8' 6 3/16"	8' 3 3/16"
29.0	8' 4 13/16"	8' 1 7/16"
29.6	8' 2 3/8"	7' 11 3/8"

This antenna was in operation on the 10-meter band, fed by a length of RG-11/U coaxial cable 35 feet long. The standing-wave ratio was less than 1.5 to 1.

Up until now no tests were made on the other bands; however, we believe the design would be applicable. Like any vertical antenna, height will add much to the effectiveness on ground wave. The antenna also does a surprisingly good job with skip conditions.

# High Stability in a Crystal-Controlled VFO

## A Simple Beat-Frequency System

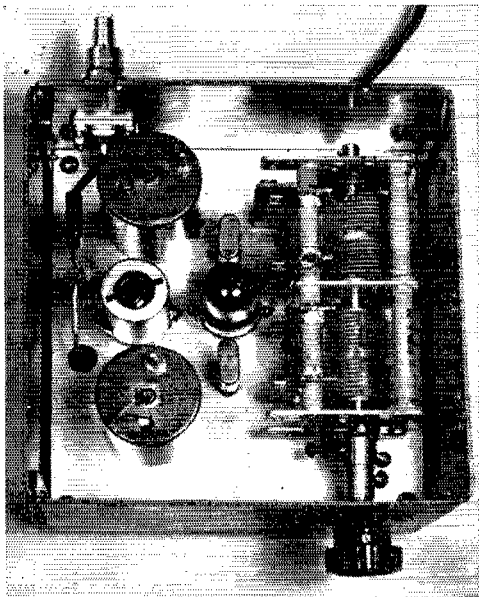
By JO EMMETT JENNINGS,\* W6EI

**I**N THE EARLY days of radio, oscillator stability was not too seriously considered; later, problems in stability were encountered and various methods have been used to produce oscillator stability in transmitters. Free-running self-excited oscillators generally have varying degrees of stability resulting from changes in the filament or plate voltage, temperature, vibration and shock as well as loading — all of which make the desire for stability more important when used in these particular situations.

### Usual Methods

Mobile operation, with the VFO in its present state, is generally satisfactory for a.m. operation or if the VFO is operated at a low frequency and mixed with a high frequency crystal. Our scope of experience has not encountered any VFO capable of producing a stabilized signal with a variation of only a few cycles when subjected to the changes mentioned above. One scheme for making a variable crystal oscillator by shunting the crystal with an inductance gives a small degree of frequency shift up to 4 kc. The change, of course, is not linear and, as the frequency deviates from the

\*970 McLaughlin Ave., San Jose 8, Calif.



Interior view of the variable-frequency crystal oscillator. The 12AX7 is between the two crystals.  $L_1$  and  $L_2$ , and their tuning capacitors, are enclosed in shielding cans. The size of the box will depend upon the components used, particularly the capacitor gang.

• In this system, two crystal-controlled oscillators are fed into a triode mixer, the difference between the two crystal-oscillator frequencies appearing in the output of the mixer. Frequency is varied by variable capacitors in shunt with the crystals. Greater variation than obtained with more conventional arrangements is secured by simultaneously increasing the frequency of one oscillator, and decreasing the frequency of the other.

crystal fundamental frequency, instability increases to the point where it becomes a truly self-excited oscillator under no influence of the crystal.

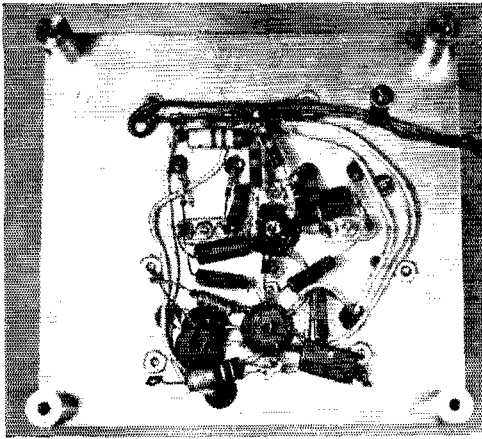
### New Approach

We were desirous of building an improved type of oscillator but could not find a simplified method until we contacted our friend Virgil Way, W6BYW, of Monitor Products in South Pasadena. A short time later, he sent us a circuit diagram and two special-type crystals, type CR/18U, which were expected to give an improved frequency shift over any other method with which we were familiar. Such a circuit has been constructed in several forms at the laboratory by Buddy Alvernaz, W6DMN. Careful frequency measurements were made with this system and it performed even better than Virgil had described.

The photographs show the completed variable crystal-controlled oscillator and its mixer. The output is constant over the frequency range of 12 kc. and is essentially a linear function of frequency vs. change in capacitance. A calibrated dial is used with a 180-degree rotation, and the whole operation is smooth. Frequency is not subject to vibration, shock, hand capacitance, filament- or plate-voltage changes or load. When it is turned off, the output gradually disappears without shifting the frequency.

### Theory

The crystal oscillator using a pair of special type Monitor crystals is built into a 12AX7 shielded Pierce oscillator circuit. There are two variable sections of approximately 100  $\mu\text{f.}$  per section which serve as feed-back capacitance for grid and plate. The two sections for each tube are mounted on the same shaft. However, as one pair of capacitors is increased in capacitance, the pair for the other tube is decreased. As you can see, this causes the frequency of one oscillator to



Bottom view showing arrangement of small components.

increase while the other decreases. The net result is a double frequency shift. The one question with which we were concerned was that of varying outputs due to change in feed-back. However, when the mixer tube is overdriven, saturation occurs which maintains a constant output and gives an output which overbalances the section which is underdriven and the final output remains constant.

### Performance

We have tested this oscillator for single-sideband operation in fixed stations and mobile operation and find it answers our problems of stability as well as size and weight, since this particular oscillator was built to operate on 3.801 to 3.813 Mc. Should such a system be

desirable on any of the other bands, the resultant frequencies could be set to be in harmonic relation at which time more frequency shift could be obtained; that is, every time the frequency is doubled, the frequency shift would be doubled. It is also possible to use this system on its fundamental frequency through 14 Mc. These are special crystals, smaller than the conventional FT243 which does not seem to give as wide a frequency shift as these new models. Using a frequency of 11,529.6 with a marked frequency of 7722, we produced the frequency shift of 3801 to 3813. One must always remember in working out a beat-frequency system of this type that crystals never increase in frequency when circuit capacitances are added in the form of a feed-back to the tube. As such, the fundamental frequency of the crystal starts near the marked frequency and gradually decreases in frequency as the capacitance is increased. It is also obvious that other frequencies than the ones mentioned will perform in the Pierce oscillator sections so the individual is not limited to these values. Since they were supplied to me by Mr. Way, he had them calibrated and ready to operate as soon as our actual circuits were completed. Results were gratifying due to the stability as well as ease of operation, and the output was a requisite for remote operation where coaxial lines present a loss factor and we wanted this unit to give equal or greater output than the crystal even though it was located a distance away from the transmitter.

In s.s.b. operation, it is seldom necessary to shift frequency far at the 3800-ke. end of the phone band. If a person wished to jump to the other end, it would only be necessary to have a switch for a crystal approximately 7890 kc. for

(Continued on page 116)

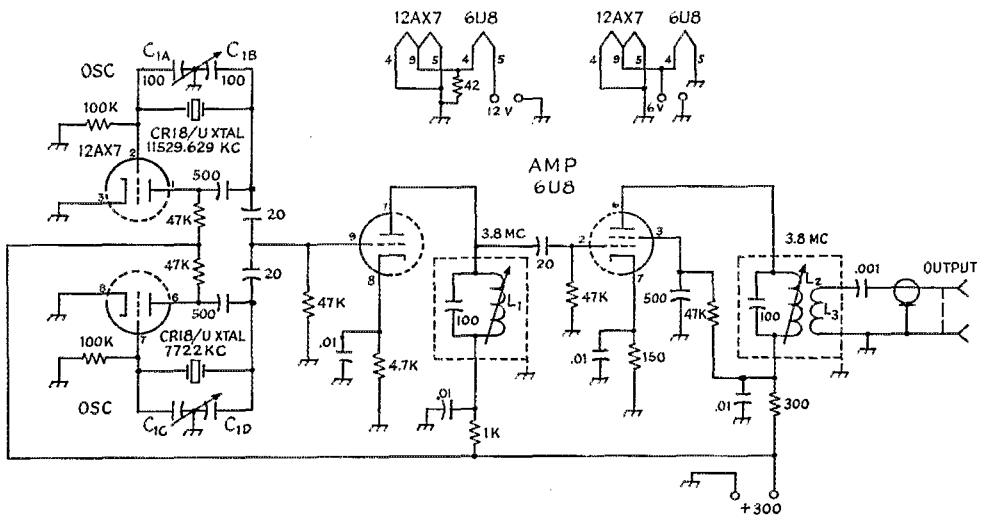


Fig. 1 — Circuit of the variable-frequency crystal oscillator. All capacitances less than 0.001  $\mu\text{f}$ . are in  $\mu\text{f}$ . All 0.01- $\mu\text{f}$ . capacitors are disk ceramic; all other fixed capacitors are mica. All resistors are  $\frac{1}{2}$  watt.  $C_1$  is a four-section variable arranged so that  $C_{1A}$  and  $C_{1B}$  decrease capacitance as  $C_{1C}$  and  $C_{1D}$  increase capacitance. Four single capacitors, or two split-stator units may be substituted.  $L_1$  and  $L_2$  are iron-slug coils having an inductance of approximately 17.5  $\mu\text{h}$ . (45 turns No. 28 close-wound on National XR-50  $\frac{1}{2}$ -inch form).  $L_3$  is 6 turns wound over the lower end of  $L_2$ .

# Happenings of the Month



## WHAT BANDS AVAILABLE?

Below is a summary of the U. S. amateur bands on which operation is permitted as of January 1st. Changes will, as usual, be announced by WIAW bulletins. Figures are megacycles. AØ means an unmodulated carrier; A1 means c.w. telegraphy; A2 is m.c.w.; A3 is a.m. phone; A4 is facsimile; A5 is television; F1 is frequency-shift keying; n.f.m. designates narrow-band frequency- or phase-modulated radiotelephony; and f.m. means frequency modulation, phone (including n.f.m.) or telegraphy.

3.500-4.000	— A1
3.500-3.800	— F1
3.800-4.000	— A3 and n.f.m.
7.000-7.300	— A1
7.000-7.200	— F1
7.200-7.300	— A3 and n.f.m.
14.000-14.350	— A1
14.000-14.200	— F1
14.200-14.300	— A3 and n.f.m.
14.300-14.350	— F1
21.000-21.450	— A1
21.000-21.250	— F1
21.250-21.450	— A3 and n.f.m.
26.960-27.230	— AØ, A1, A2, A3, A4, f.m.
28.000-29.700	— A1
28.500-29.700	— A3 and n.f.m.
29.000-29.700	— f.m.
50-54	— A1, A2, A3, A4, n.f.m.
51-54	— AØ
52.5-54	— f.m.
144-148	} AØ, A1, A2, A3, A4, f.m.
220-225	
420-450 <sup>1</sup>	
1,215-1,300	
2,300- 2,450	} AØ, A1, A2, A3, A4, A5, f.m.
3,300- 3,500	
5,650- 5,925	
10,000-10,500	
21,000-22,000	
All above 30,000	} pulse

<sup>1</sup> Plate input power must not exceed 50 watts.

In addition, A1 and A3 on portions of 1.800-2.000, as follows:

Area	Band, kc.	Power (watts)	
		Day	Night
Minn., Iowa, Mo., Ark.,	1800-1825	500	200
La. and east, including Puerto Rico and Virgin Ids.	1875-1900		
N. and S. Dak., Neb.,	1900-1925	500*	200*
Colo., N. Mex., and west, including Hawaiian Ids.,	1975-2000		
Texas, Okla., Kansas	1800-1825	200	75
	1875-1900		

\* Except in State of Washington where daytime power limited to 200 watts and nighttime power to 50 watts.

Novice licensees may use the following frequencies, transmitters to be crystal-controlled with a maximum power input of 75 watts.

3.700-3.750	A1	21,100-21,250	A1
7.150-7.200	A1	145-147	A1, A2, A3

Technician licensees are permitted all amateur privileges in 50-54 Mc. and in the bands 220 Mc. and above.

## DOCKET 11488

Though we have previously reported the Notice of Proposed Rule Making in Docket 11488<sup>1</sup>, and offered some suggestions for the observance of Rules on Radio Alerts<sup>2</sup>, we believe it proper to mention here that in mid-December the Commission amended our rules to require amateurs to provide some means of monitoring the broadcast band to insure station silence during periods of Conelrad alert. Accordingly, the Commission has added Rules 12.190 to 12.196<sup>1</sup> to cover the situation. The new rules become effective January 2, 1957, or sooner if the Commission so orders, and require that amateurs have some method that will enable them to continuously monitor the broadcast band; or alternatively, assure themselves, before going on the air, and at least every ten minutes thereafter, that a normal situation prevails. Normal broadcast station operation may be considered as evidence of a non-alerted condition while the confinement of stations to 640 kc. or 1240 kc. would indicate that an alert existed. *QST* will continue to keep amateurs informed on improved monitoring methods.

## STAFF NOTES

We regret to announce the resignation from our staff of Harold M. McKean, W1CEG, our managing editor since 1949 and a member of the Hq. staff since 1946, when he joined our editorial staff from a local newspaper, following service with the U. S. Coast Guard during World War II. Mac served us mightily, for the task is much more than the *QST* title implies; it was his job not only to put together *QST* each month, but to tackle the production problems of each annual revision of the *Handbook* and all the other volumes in the ARRL library. Their consistently excellent editorial appearance is a tribute to his extensive knowledge of production work.

Taking over in his place is Richard L. Baldwin, W1IKE, who formerly was with us for four years as a member of the secretarial staff and therefore rejoins us with a lot of built-in League know-how. Dick, a native New Englander, saw service in the Navy during the war, principally as a two-striper communications officer on destroyers with the Pacific Fleet, and came to us first in 1948 following completion of his education at Bates College and Boston University. He is an expert traffic handler, and an avid contest man, is WAC, WAS and DXCC (141 countries confirmed). We're glad to have him back.

<sup>1</sup> *QST*, October 1955, page 47.

<sup>2</sup> *QST*, January 1956, page 34.



## Linear Amplifiers for A.M.

ONE of the by-products of single sideband is a revival of interest in linear amplifiers for amplitude modulation, particularly on the part of a.m. users who don't understand the limitations of the linear. Linear amplifiers for either s.s.b. or a.m. belong to the same breed and operate in exactly the same way. The difference between



the two is in the kind of signal they have to handle, not in the amplifiers themselves.

A single-sideband signal is essentially one whose amplitude is proportional to the instantaneous amplitude of the modulating waveform, so when there is no modulation there is no signal. Usually, this means that there is comparatively little d.c. input to the amplifier during those periods when there is no modulation or low-amplitude modulation — periods that represent a large percentage of the total time in voice communication. This is quite similar to the operation of a Class B modulator — which in fact is simply a linear amplifier operated at audio rather than radio frequencies.

In contrast, in a proper a.m. signal the *average* amplitude stays the same whether or not there is modulation. Merely generating an unmodulated carrier demands just as much d.c. input as generating a fully-modulated signal. This is the key to the difference in ratings on a linear amplifier for a.m. as compared with s.s.b.

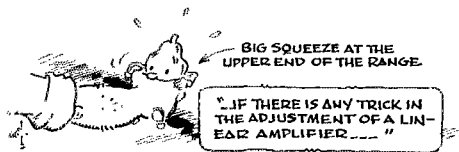
### What Is Linearity?

The word "linear" in this connection implies that there is a fixed ratio between the amplitude of the r.f. signal applied to the grid and the amplitude of the r.f. output voltage in the plate circuit. In other words, any change in the r.f. voltage applied to the grid is accompanied by a proportionate change in the amplifier's r.f. output voltage. So long as this simple relationship holds true the amplifier's output faithfully reproduces the variations in — that is, the modulation on — the signal applied to the grid.

One operating requirement that will be recognized immediately is that any r.f. voltage, no matter how small, applied to the grid must cause *some* output to be delivered by the plate, and this in turn requires that some plate current must flow even with the smallest possible grid signal. That is, the grid bias cannot be greater than the plate-current cut-off value (although smaller bias is permissible); any larger value would "clip" the signal. This bias requirement establishes a ceiling on the tube plate efficiency.

At the other extreme, the r.f. grid voltage must not be allowed to become so large that a further increase in it will not be accompanied by a corresponding increase in the r.f. output amplitude. If increasing the r.f. grid voltage does not increase the output the amplifier is said to be "saturating," and the modulation is clipped on the up-peak in much the same way that biasing beyond cut-off would clip it on the down-peak. Both types of clipping distort the output signal and the amplifier is no longer linear. The non-saturation requirement establishes the operating range.

What you can get out of a linear amplifier depends principally on how much power can be squeezed out at the upper (large-signal) end of the



linear range. If there is any trick in the adjustment of a linear amplifier, this is it.

### Plate Efficiency

What makes a linear amplifier linear? With the plate modulation customarily used in a.m., the plate voltage on the Class C amplifier is varied above and below the d.c. supply voltage at the modulation rate. The amplifier's plate current varies right along with the plate voltage, and so when the plate voltage is instantaneously doubled at the modulation up-peak the plate current likewise is doubled. Similarly, when the plate voltage is instantaneously zero the plate current likewise is zero. (These variations occur at audio frequency and so do not register on d.c. meters.) Since the plate voltage and plate current vary together, the Class C plate circuit "acts like" an ordinary resistor, in which the current is proportional to the applied voltage and the power is proportional to the square of the voltage.

In a linear amplifier the supply voltage does not vary with the modulation. The only thing in the plate circuit that can be varied is the plate current. The modulated r.f. grid voltage can cause corresponding variations in the plate current, and without attempting to dig into the technicalities of tube operation, it can be said that these plate-current variations can, within the operating limits mentioned above, be responsible for a fundamental-frequency r.f. output current whose modulated amplitude faithfully follows the amplitude variations in the modulated r.f. grid voltage. To a fair approximation, as most tubes are operated, the *d.c.* plate current

is proportional to the amplitude of the r.f. grid voltage. Thus we have a circuit in which the plate voltage does not vary at an audio-frequency rate during modulation but the plate current does. This means that at a modulation up-peak the plate current is twice the carrier-only value while the plate voltage remains the same; that is, the power input is doubled. Compare this with plate modulation where the voltage and current are both doubled and the power is four times.

Now it is *necessary* to reach four times the carrier power on a modulation up-peak if the amplifier is to operate without distortion. The fact that the r.f. output current and r.f. grid voltage go hand in hand does guarantee that the output power will meet this condition, because on the modulation up-peak the r.f. output current is doubled as compared with the carrier value. Twice as much current in a constant value of resistance — and the load resistance for the tube, as represented by the load coupled to the plate through the tank circuit, is constant — means four times as much power, by Ohm's Law. Thus even though the power input is only twice as great at the peak, the power output is four times as great. How is the difference accounted for?

This can be made clear by citing an example. Suppose that at the up-peak the instantaneous plate current is 200 ma. and the plate voltage is 1000, an input of 200 watts. If the plate efficiency is 70 per cent, a not-unreasonable value, the output will be 140 watts. If the r.f. grid voltage is now dropped to one half its former value, corresponding to the unmodulated carrier figure, the plate current will drop to 100 ma., and since the plate voltage remains the same the input is 100 watts. The r.f. output current also drops to

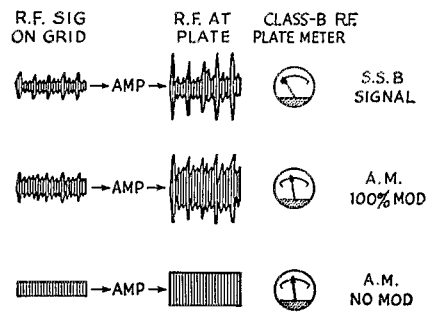


Fig. 2 — Behavior of the linear amplifier with a modulated signal. These drawings are to the same scale as Fig. 1, so the peaks in the s.s.b. and 100 per cent a.m. cases have the same height as the maximum-signal condition in Fig. 1.

With s.s.b., the plate current will vary at a syllabic rate according to the signal amplitude, as suggested in the upper drawing. In most cases, the d.c. meter will just "kick," on peaks, to about half the value shown in the maximum-signal drawing of Fig. 1. The a.m. signal will show the same plate-current reading whether or not the carrier is modulated, as shown by the two lower drawings above. The carrier amplitude and plate-meter reading are just half the maximum value shown in Fig. 1.

Note that the a.m. modulation drawings show a greater area than the s.s.b. drawing even though both signals have the same instantaneous amplitude on modulation peaks. This means that the a.m. signal has more average power than the s.s.b. signal, and since the power is handled by the amplifier at about half its maximum possible efficiency, the power used in heating the plate is considerably greater. Of the greater average power put out in the a.m. signal, over two-thirds is carrier and less than one-third is voice modulation.

half its peak value and so the output is one-fourth its peak value, or 35 watts. The plate efficiency is now 35/100 or 35 per cent instead of its peak value of 70 per cent.

At other values of r.f. grid voltage the plate current and plate efficiency are proportional. The smaller the r.f. grid voltage, the smaller the plate current, plate power input, and efficiency. This is simply a consequence of the fact that while the d.c. input is directly proportional to the r.f. grid voltage, because the plate voltage is constant, the r.f. output is proportional to the *square* of the r.f. grid voltage.

### Handling the Carrier

These relationships hold regardless of the type of signal being amplified — i.e., whether it is a.m. or s.s.b. In either case the power output, power input, and plate efficiency vary with the amplitude of the modulated grid signal. The loss in the plate of the tube, which is what determines how much power the tube can handle, likewise varies with the modulation. Thus in the example above, where the input on a modulation peak is 200 watts and the output is 140 watts, the power left on the plate is the difference, 60 watts. At the half-amplitude point the power input is 100 watts and the output is 35 watts, leaving 65 watts on the plate. Note that although the input is halved, the plate loss actually is a little higher than under peak output conditions. The fact is that the plate loss does not vary much with the grid signal level

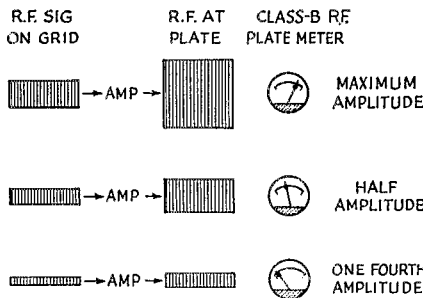


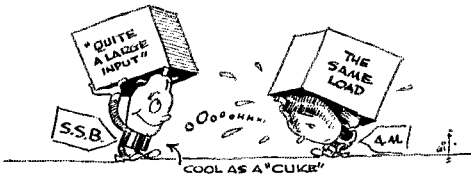
Fig. 3 — Three levels of operation in a linear amplifier when the grid is driven by a steady (unmodulated) signal whose amplitude can be adjusted within the limits of linear operation.

If the maximum amplitude within the linear range is as shown at the top, a half-amplitude signal on the grid will be followed by a drop to one-half in the output amplitude. The d.c. plate current likewise will drop to one-half the value it had with the maximum-amplitude signal. Similarly, decreasing the grid drive to one-fourth amplitude will be followed by corresponding decreases in output amplitude and plate current.

Strictly speaking, the plate meter will behave as shown only when the amplifier is operated true Class B; that is, biased to cut-off. With Class AB operation, where the no-signal plate current is appreciable, the d.c. plate current will not follow the grid driving voltage amplitude at low levels. Class AB operation is usually preferable to straight Class B because the AB amplifier is more truly linear at low levels.

except at low levels where the input likewise is low.

Now in both s.s.b. and a.m. the grid signal amplitude, the plate input and the power output all are varying at an audio-frequency rate. The s.s.b. signal starts from zero with no modulation, just like the Class B modulator, and when the amplifier is biased near cut-off the power input and plate loss are substantial only when the modulation is fairly high. This means that the plate of the tube is heating only part of the time. Add to this the fact that voice waveforms commonly have only about half the energy content of a sine wave and you have the condition where the amplifier is delivering its full output on modulation peaks with an *average* input of only about half the power that would be required to sustain the peak. Both these things mean that the *average* power loss in the plate is fairly low with an s.s.b. signal—in the neighborhood of one-fourth the loss under peak conditions. The tube can handle quite a large peak input without getting hot.



The a.m. signal, however, does not start from zero with no modulation. It works up and down about the carrier level, which is just one-half the modulation up-peak level. When there is no modulation the tube is still called upon to deliver the unmodulated carrier, and since the carrier is at half level the output is one-fourth the modulation-peak output and the plate efficiency is one-half the modulation-peak efficiency. Actually, the efficiency increases with modulation, but since there are times when a speaker has to stop to catch his breath, the amplifier has to be designed to handle the unmodulated carrier safely. The tube gets hotter with no modulation than with it—quite in contrast with the s.s.b. case.

To resume the example above, on a.m. the tube would have to be able to dissipate 65 watts safely on its plate in order to give a carrier output of 35 watts. On s.s.b. the same tube with the same output on the modulation peak would have an average plate loss of around one-fourth the peak loss, or about 15 watts. Putting it another way, if the rated plate dissipation of the tube is the limiting factor in design, the a.m. amplifier would require a tube having a rated plate dissipation of 65 watts, but the same tube as an s.s.b. amplifier could give a peak output 65/15 or about four times as great as the peak output on a.m., the plate heating being the same in both cases.

Actually, the 70 per cent modulation-peak efficiency assumed in the example is a little optimistic in many cases, and for estimating purposes it is convenient to assume that the maxi-

mum efficiency will be 66 $\frac{2}{3}$  per cent. This leads to the rule of thumb that on a.m. the carrier power output that can be obtained from a linear amplifier is equal to half the rated plate dissipation of the tube. It is easy to see why a linear amplifier is not worth while unless it uses a fairly big tube.

#### Where the Linear Might Be Useful

Altogether, it would seem as though the linear for a.m. would offer few attractions. This is especially so where it is being considered for following a plate-modulated transmitter running 75 to 150 watts input. The possible power gain, in most cases, is too small to be interesting.

It is possible to visualize cases, however, where there might be some advantages in the linear amplifier. Most such amplifiers need very little driving power for fairly substantial power output. By using any of several tetrodes in Class AB<sub>1</sub>, or zero-bias triodes such as the 811A, there is no need to provide extra driving power simply for the sake of throwing it away to get good regulation—i.e., low distortion—in the amplifier's grid circuit. Hence the driver need supply—only a few watts of modulated output. Also—and this is a point seldom appreciated—the total d.c. power required by the complete transmitter is just about the same, when a low-power driver followed by a linear amplifier is compared with a plate-modulated amplifier with its higher-power driver, Class B modulator, and more elaborate speech amplifier. The total amount of equipment is considerably less, for the same carrier output, with the linear amplifier, and in most cases the total cost is lower. The catch is, of course, that the most carrier output that can be hoped for with a kilowatt input is around 350 watts as against 700 or 750 with plate modulation. But if your requirements are not for more than 300 to 350 watts carrier and you're starting the complete transmitter from scratch, it might be interesting to work up the comparative costs of the two systems.

One of the nice features of such a rig is the ease with which an s.s.b. exciter can be substituted when you reach that stage. —G.G.

### Strays

"For sustaining service to amateur radio, and administrative leadership," the Institute of Radio Engineers conferred the grade of Fellow upon George H. Bailey, W2KH, its executive secretary.

— . . . —

The Association for Applied Solar Energy is retaining permanently in Phoenix, Arizona, the Solar Powered Amateur Radio Station (September *QST*). The exhibit will be kept in a group for display with appropriate credit to ARRL and W1CUT, the exhibitor. In connection with the exhibit a new \$700,000 solar research laboratory will be opened by the Stanford Research Institute, also in Phoenix.

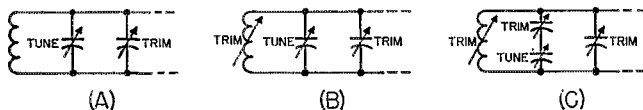
# • Technical Topics —

## Frequency Calibrations

THE other day we received a letter from a reader suggesting that a printed scale that could be cut out and pasted on the dial of the completed unit be included with any VFO article. Undoubtedly, others have thought of the same idea but haven't bothered to write. It should be easy, you might say; it has been done for things such as ohmmeters and wavemeters.

It is easy in the case of an ohmmeter or wavemeter. The milliammeter used in the ohmmeter has a scale of known tolerance (2 per cent in the better meters), and we can rest assured that you can duplicate our results if you use the right values of resistance and a decent meter. The wavemeter has a possible frequency range of  $2\frac{1}{2}$  or 3 to 1; you can't read it much closer than  $\frac{1}{2}$  Mc. and it doesn't matter if it runs off a little, because you won't use it for accurate frequency checking.

A VFO is a little different. Let's say we build one to cover the range 3.5 to 4.0 Mc. and we use a 180-degree scale on our dial. (It doesn't matter if the VFO is on 1.75 to 2.0 Mc. or 3.5 to 4.0; the scale will show the frequencies in the 80-meter band.) We can build the VFO with a small trimmer capacitor across the variable (Fig. A), use a



piece of prewound coil such as "Mininductor," and we know that by varying the trimmer you can bring your scale into calibration at *one* point, say the high-frequency end. The low-frequency end might not coincide on the scale for several reasons. Unless you use exactly the inductance we did it will be in error; the inductance change can be caused by manufacturing tolerances in the coil (should be slight), variation in lead lengths between your unit and ours, and the proximity of other objects to the coil (that consequently changes the inductance). The variable capacitor manufacturer must be permitted some tolerance, and every one of his capacitors in the same model is not likely to have exactly the same minimum and maximum capacitance.

Here in the shop we can get around the inductance variation by designing the VFO with an adjustable inductor as well as with a trimmer capacitor (Fig. B). Then we know you can make your calibration scale coincide with ours at *two* points, and these can be the extreme ends if desired. This takes a little juggling on your part, because the two trim controls interlock, but it isn't at all difficult to do.

What about the rest of the range? There is no assurance that the scales will coincide over

the entire range, because the variable capacitor manufacturer must be permitted some tolerance over the increments of change over the range of the capacitor, and capacitors that duplicate exactly over the entire range cost a lot more than ones that don't.

We have two more tricks we can pull. One is to use a third type of circuit, one with a capacitor in series with the tuning capacitor (Fig. C). With this circuit, the frequency is pulled to the high-frequency check point by the trimmer capacitor, a midpoint is dragged by the variable inductor, and the low-frequency end is modified by the series capacitor. With a little patience and three hands you can make your tuning correspond to ours — at *three* points! There is still no guarantee that the VFO will show correct frequency at the other points, because the capacitance-increment tolerance mentioned above is still in effect.

Our last trick is the one the capacitor manufacturer uses when he sells precision capacitors that must hit a calibration curve on the button: he bends plates. In other words, he laboriously bends little tabs on one or more of the rotor plates and by careful adjustment he can bring all of his capacitors into very close to exact tracking. It takes skill and it costs money. Suggesting that a *QST* reader bend plates on a capacitor to bring his calibration into exact track with a printed scale would be about as popular as TV receiver horizontal oscillator harmonics are. It is really a lot easier to provide a design in which the tuning range can be set to the proper limits and then to let the individual constructor calibrate his own dial.

### Receiver Calibrations

By now it should be obvious why all but the most expensive receivers can't be used as accurate frequency meters. To make each receiver match up to a printed scale, the tuning capacitor must be built with very close tolerances or there must be some means for bringing it into track at the receiver factory. If inductive tuning is used, the same problem exists and the same solution applies. The impecunious amateur has two possible courses if he wants to use his inexpensive receiver for frequency checking: he can bend plates on the tuning capacitor and bring the receiver into track with the scale (probably on only one band), or he can make a correction chart for his dial. The latter takes only a frequency standard (with 10-ke. intervals), a sheet of paper and some time. The former requires the frequency standard and quite a bit of patience. And, of course, the frequency drift of the receiver must already have been reduced to a minimum.

— B. G.

## Paradox: S.S.B. Splatter and Modern Receivers

As you look over the current crop of communications receivers, you can't help but see that more and more attention is being paid to the reception of s.s.b. phone signals. Forms of band-pass filters appear to be replacing the simple crystal filter in many of the bigger receivers, often backed up by a "rejection notch" that permits tuning out at least one interfering heterodyne. More attention is being paid to the beat-frequency oscillator level and tuning, and various types of detectors best suited for heterodyne reception can be found. Automatic volume control with the b.f.o. on, once a very *rara avis* indeed, is becoming more common. All in all, you can't help but get the impression that the manufacturers are conscious of the interest in s.s.b. and are making provisions in their receivers for it.

Now let's drop back in the past a few years, when s.s.b. was just getting started and was having considerable growing pains. A common cry among some of the poorly-informed operators was, "That s.s.b. is too broad — it takes up too much room in the band!" Time after time the story was told to them: s.s.b. is not broad when properly adjusted, but the a.v.c. in your receiver makes it seem so. In articles in *QST* and in conversations over the air it was suggested that operators listening to a.m. learn how to use their receivers a little more intelligently in the presence of an intermittent signal like s.s.b. In plain words, this simply meant turning off the a.v.c. and reducing the r.f. and i.f. gain until the peaks of the nearby (in frequency) s.s.b. signal didn't overload the receiver. It was pointed out how the a.v.c. was incapable of doing this job properly and that it could only be done manually. It was further stressed that the "splatter" from a well-adjusted s.s.b. signal simply disappeared when the receiver was held down below its overload point, and that the splatter was generated in the receiver itself. For those who couldn't be convinced by mere talking, it was suggested that a trip be made through a band crowded with a.m. signals with the a.v.c. off and the manual gain up, to simulate the condition one faces when the a.v.c. can't protect against overload by a nearby s.s.b. signal. This was a very convincing demonstration, as many can testify.

In other words, if you're trying to listen to an a.m. signal and there is a stronger s.s.b. signal 3 or 5 kc. on either side, you simply can't get solid copy from the a.m. signal with the a.v.c. on unless your receiver has superior skirt selectivity that rejects the s.s.b. signal to a fare-thee-well. Without the skirt selectivity, you stand a chance with the a.v.c. off and the i.f. gain backed down, but practically none with "ordinary" selectivity and the a.v.c. on. This isn't just true of s.s.b. — the same effect would be noticed with a strong c.w. signal nearby — but we don't run into the strong nearby c.w. signal quite as often when listening to a.m., except perhaps when chasing DX. And, for psychological reasons, even then the c.w. sig-

nal is not quite as annoying because it has a more nearly constant QRM pattern.

Back to the present again. While the current receivers have some mighty fine selectivity by earlier standards, it still isn't the superior skirt selectivity mentioned earlier, because that really requires practically straight-sided selectivity characteristics, and we don't know how to obtain them yet. Consequently, the operator who buys a new or second hand receiver is still occasionally faced with the problem of receiving weak a.m. in the presence of a strong nearby s.s.b. signal. Having read *QST* and listened on the air to the savants, he calmly reaches over to his receiver to turn off the a.v.c. and — horror of horrors! — finds that he turned on the b.f.o.! Yes, that's right; some of the receivers currently in use and in production, with all their provision for receiving s.s.b. and only one sideband of an a.m. signal, make no provision for turning off the a.v.c. without turning on the b.f.o. On the one hand they're promoting s.s.b. by including features that help in its reception, but they seem to have lost sight of the fact that there are a few a.m. operators around who don't want to use "exalted-carrier" reception. Yes, all you can do with these receivers in the presence of a nearby s.s.b. signal is to tune in the a.m. signal with your b.f.o. on and zero-beat the incoming carrier with the b.f.o. This will clear up the troubles if the receiver gain and tuning are properly handled, but it gives the operator two things to think about (tuning and gain) instead of only one, and in some circles this is a very unpopular approach.

We admire the manufacturers for trying to get more operators to try exalted-carrier reception, but we think they should make it possible to learn receiving techniques one step at a time. Please, no more "communications" receivers without an independent a.v.c. switch!

— B. G.

### Strays

Mosley Electronics, Inc., St. Louis, Mo., announce publication of the Mosley QSO Index, a handy volume designed to aid amateurs in recording calls and operators' identification, for use particularly during contests, when time is at a premium. The new book is complete with a full index of names.

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A new manual to assist manufacturers of equipment for the armed forces in meeting the requirements of radio interference specifications that may be of interest to hams is available through the Department of Commerce, Office of Technical Services. The text was prepared by the Signal Corps Laboratories at Fort Monmouth, New Jersey. Information contained in the manual is particularly applicable to amateur bands, it is indicated.

# A Variable-Frequency Crystal Holder

## Modifying Surplus-Type Crystal Holders for Shifting Frequency

BY ALLEN A. ENGLEMAN,\* W4RMU

THOSE WHO operate crystal-controlled transmitters will probably be interested in this article at once, but even the fellow who has used nothing but VFO for years should not pass it up. There are uses for crystal control in every ham station, and those uses could be expanded considerably if a convenient and satisfactory means were available for varying the frequency of the crystal by even a small amount.

Net operators know very well how hard it is to be exactly on frequency, and the higher the frequency the greater the difficulty. "Spot-frequency" v.h.f. nets, for example, often spread over many kilocycles either side of the specified channel, and even 3.5-Mc. crystals marked alike will not work on exactly the same frequency when used under varying circuit conditions. V.h.f. men, normally the least inclined to VFO operation, will find that the order of frequency multiplication used on 50, 144, and higher bands will transform the few kilocycles of shift available with these crystal holders into frequency changes of major proportions.<sup>1</sup> This could be of considerable advantage in solving the QRM problem that

thickness to which it is ground. One of these is the spacing of the metal electrodes, shown in exaggerated form in Fig. 1A. This is the FT-243 type holder, commonly called pressure mounting. The spring pressure is between 2 and 6 pounds

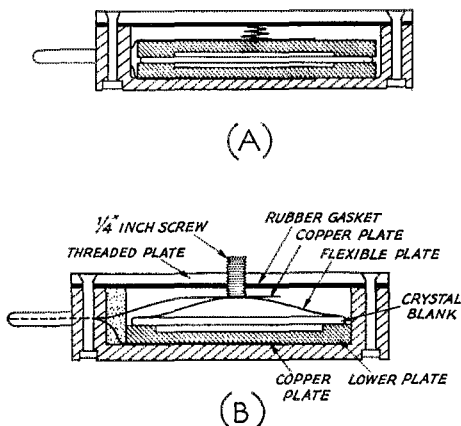
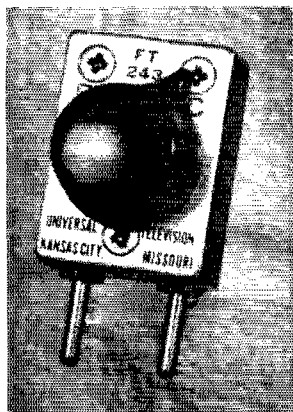


Fig. 1 — Cutaway views of the FT-243 holder, A, and its modified form, B. The crystal is clamped at its four corners in the original holder, with spring pressure maintained at between 2 and 6 pounds per square inch. In the variable-frequency device a flexible plate is substituted for the top electrode, and pressure is controlled by a screw adjustment.



An FT-243 surplus crystal modified for variable frequency control.

presently develops around the popular surplus-crystal channels when a v.h.f. band is open.

### How It's Done

The frequency at which a crystal oscillates is dependent on several factors in addition to the

\* RMU Crystal Company, Oceanway, Florida.

A crystal marked 6006.667 kc., selected at random from a surplus collection, was modified according to the instructions given here. Originally it provided a frequency of 144.16 in the 2-meter band. With the modification it gave smooth control from 144.16 to 144.26 Mc. with substantially no variation in grid drive to the final stage. This was in the band-switching exciter originally described in *QST* for September, 1952, and shown in all recent editions of the *Handbook*. — Ed.

per square inch. The crystal is clamped at the four corners and it will cease oscillating or be damped considerably if the pressure is increased to the point where the electrodes touch the crystal at other than these points. However, the spacing can be increased to several times that found in the commercial holders before oscillation ceases.

The crystal is most sensitive to changes in electrode spacing at the center. A number of crystal manufacturers have made use of this principle to provide variable-frequency crystals. It is a perfectly orthodox and practical method for varying the frequency of oscillation in a quartz crystal, and one that is readily adapted to use with inexpensive surplus crystals in FT-243 holders.

A simple way to vary the spacing is to substitute a flexible plate in place of the upper electrode in the holder, as shown in Fig. 1B. This flexible electrode is cut from 0.004-inch brass or 0.003-inch steel shim stock. It is cut the same size as the crystal plate and then bent around a 5/8-inch diameter rod. The corners should be rounded slightly on an emery stone, or with a very fine file. It is important that the surfaces of the plate be perfectly free of burrs, and the material must

(Continued on page 118)

# Using the MB-40SL as a Grid Tank

## Simple Modification for Better Performance

BY KATASHI NOSE,\* KH6IJ

**A**FTER constructing amplifiers using the National MB-40SL in the grid circuit of high-power tetrode amplifiers with pi-network output, it became apparent that efficiency was sadly lacking on the high-frequency bands. On 28 Mc., the coil became hot enough to char the form, the plastic melted off the link wire, and the Faraday shield dropped off. But on the lower-frequency bands there was an overabundance of drive. Using a Viking Ranger, about 70 watts of drive produced about 1.3 watts usable output at the grid of a 4-1000A. A similar lack of efficiency was found in another amplifier using paralleled 4-250s.

With slight modification, heating is reduced, the drive is equalized, efficiency stepped up on the high frequencies, 160-meter operation added, and more positive neutralization is realized. A diagram of the original tuner and modification is shown in Fig. 1.

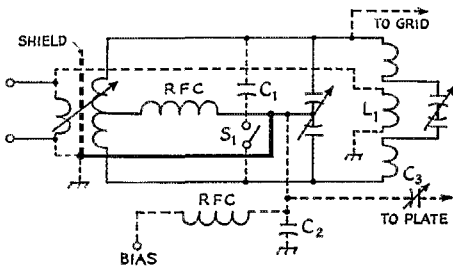


Fig. 1—In this diagram, the dashed lines show wiring to be added. The heavy line indicates a connection to be removed. The remainder is the original circuit of the MB-40SL multiband tuner. The 160-meter padder,  $C_1$ , is a 400- $\mu\text{f}$ , 2500-volt mica unit.  $S_1$  is a ceramic wafer switch, and  $L_1$  is a single-turn link.

### Better Matching

The original link was designed for impedances higher than that of the usual coax line. Removing two or three turns of the original five-turn link, and grounding one end directly to chassis stepped up the drive. This alone may suffice. However, a one-turn link, wound around the center of the high-frequency coil, and connected in parallel with the regular link, brings the excitation directly to the high-frequency coil without going through the low-frequency coil. These two modifications brought up the efficiency tremendously, and reduced heating to a negligible level. In use, the variable link is loosely coupled for high-frequency operation, and coupled tightly for low-frequency operation. A reduction in drive is encountered on the low-frequency bands, but this

\* Lihue, Kauai, T. H.

• If you have had trouble using the MB-40SL as a grid tank circuit the simple modification described here should solve the difficulty. Included is a means of extending the coverage to 160 meters.

is greatly offset by the gain on the high-frequency bands.

### Neutralizing

In the popular Breune neutralizing circuit, included in Fig. 1, the frame of the tuning capacitor is above ground. The original Faraday shield is grounded by a strap to the frame of the tuning capacitor, and therefore is above ground by a voltage equal to the neutralizing voltage. Removing the strap and grounding the shield directly to chassis ground eliminated erratic neutralization.

Paralleling the low-frequency section of the tuning capacitor with a 400- $\mu\text{f}$ . mica capacitor permits operation on 160 meters. A ceramic wafer switch is used to remove this padder when not in use.

## CALLING ALL NOVICES: CQ N-R!

The Novice Round-up makes its fifth annual appearance this year, February 4th through 19th. Old-timers are invited to join in the fun and give the newcomers contacts.

Full details appeared in January *QST*, but as a reminder, don't forget that the Round-up starts on Saturday, February 4th, at 6:00 P.M., local time, and ends on Sunday, February 19th, 9:00 P.M. local time. A time limit of forty hours is available. This can be used any way you prefer in operation on 80, 40, 15 and 2 meters.

You've still time to get extra scoring credits by qualifying in the Code Proficiency Run from W1AW on January 17th, or from W6OWP on January 7th. In the meantime, send to ARRL Headquarters for your free map of the United States, a contest log, and reporting forms for the Novice Round-up. The fine outline map can be posted in your shack to keep a visual check on your worked-all-states progress.

Remember to read January *QST* again for full details on rules.



# Hints and Kinks

## For the Experimenter



### HEAVY-DUTY 12-VOLT GENERATOR FOR THE 1955 CHEVROLET

OF possible interest to those mobileers who are getting a 1955 Chevy is the following: If you twist the arm of the salesman after first making a firm deal, you probably can get at no extra cost a 30-amp. generator, giving another 70 watts or so of power, which in many borderline cases will make the difference between having to home-charge the battery at times, or not having to bother. The unit costs only a little more than the standard 12-volt generator, so any reluctance on the part of the dealer probably is a matter of chasing one down and installing it, rather than the difference in cost between the two generators. The generator number is 1102005. It takes a special regulator No. 118825 and bracket 3712558. Incidentally, it cuts in at a slightly lower engine speed than the standard equipment generator, though not as low as the "police" model 40-amp. generator that costs several times as much.

— W. W. Smith, W6BCX

### SIMPLIFIED VERSION OF W6CHB'S TRANSISTORIZED CODE-PRACTICE OSCILLATOR

THE CIRCUIT shown in Fig. 1 is a simplified version of the transistorized code-practice oscillator described in *QST* for June, 1954. Comparison of the original and the new circuits will

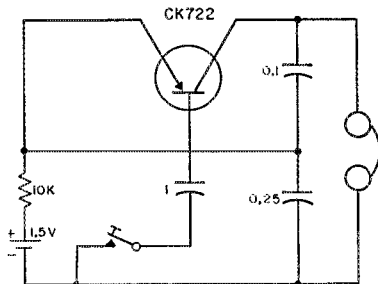


Fig. 1 — W0JV's version of the transistorized code-practice oscillator. High-impedance phones (4000 ohms) should be used with the circuit.

show that the principal change is the substitution of a pair of headphones for the tank inductance used by W6CHB.

The circuit of Fig. 1 requires no resistor across the capacitor in the base lead of the CK722. Current drain is not in excess of 50 microamperes with a 1.5-volt battery in use. Additional volume may be obtained by employing a 3-volt battery. Incidentally, the original circuit can be used with the phones replacing  $L_1$ .

— George S. Carson, W0JV

### SIMPLE HIGH-PASS FILTER FOR 28-MC. CONVERTERS

THE SIMPLE high-pass filter circuit shown in Fig. 2 has a cut-off frequency of approximately 10 Mc. It is used to suppress b.c. signal feed-through that frequently occurs when a

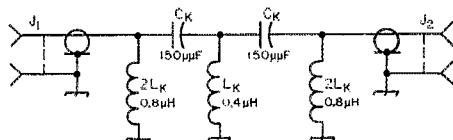


Fig. 2 — Circuit diagram of the high-pass filter suggested by W1DBM.

$L_K$  — 0.4  $\mu$ h.: 6 turns No. 20 enam. wire,  $\frac{3}{8}$ -inch diam.,  $\frac{3}{8}$  inch long.

$2L_K$  — 0.8  $\mu$ h.: 11 turns No. 20 enam. wire,  $\frac{3}{8}$ -inch diam.,  $\frac{3}{8}$  inch long.

Note: Coils are self-supporting.

28-Mc. converter is worked into a low-frequency tunable i.f. such as a broadcast receiver. In one particular installation — the C.D. layout described in *QST* for September, 1955 — the filter completely eliminates "birdies" which were encountered when using a ground-plane antenna and a long feed line. The filter was inserted between the antenna relay and the converter.

The housing for the filter may be made from either aluminum or flashing copper and should measure 2 by 2 by 4 inches. A box of this size allows inductors to be spaced apart enough to prevent coupling between coils.

Component values shown in Fig. 2 are for use with a 50-ohm antenna feed system. Values for a 75-ohm filter, or one having a cut-off frequency other than 10 Mc., may be quickly determined by employing the following formulas:

$$C_K = \frac{1}{4\pi f c}$$

$$L_K = \frac{1}{4\pi f c R}$$

where  $C_K$  = Capacitance in microfarads ( $\mu$ f.)

$f c$  = Cut-off frequency in megacycles (Mc.)

$L_K$  = Inductance in microhenrys ( $\mu$ h.)

$R$  = Termination resistance in ohms.

— P. S. Rand, W1DBM

### TAPPING HOMEMADE COILS

ONE neat and simple method of providing taps on hand-wound coils is to form, wherever a tap is necessary, a small tightly coupled loop in the wire. After the loop has been cleaned and tinned, the winding may be continued.

— Harold Morris, W4VUO



## USING B. C. SIGNALS FOR HAMBAND CALIBRATION

AN old-timer passed his idea on to me and possibly it may help some of the other fellows. The stunt is that of using a broadcast-station signal as a frequency standard for making calibration checks in hambands. Here is how the idea is put into practice.

First determine which b.c. stations would have harmonics — if they were not suppressed because of FCC regulations — that fall in the hambands. For example, here in Indianapolis we have the following combination to work with:

Station	Fund. Freq. Kc.	Harmonic Kc.
WLW	700	5th — 3500
WLW	700	10th — 7000
WISH	1310	3rd — 3930
WIRE	1430	5th — 7150

Next, using an r.f. signal generator and a receiver with the b.f.o. turned off, zero beat the generator with the b.c. signal. Leave the generator set as is and tune the receiver — with the b.f.o. turned on — across the ham-band undergoing calibration. When the harmonic of the generator has been found, turn off the b.f.o. and zero beat the VFO (or other r.f. generating device under test) with the generator harmonic.

Since the b.c. stations operate with a very close frequency, this method should provide a dependable frequency check.

— *Albert Szalay, W9CKD*

## A BUILT-ON CLICK FILTER FOR THE TYPE J-38 KEY

THE popular surplus J-38 key has a set of extra terminals which, when removed, provide space and mounting holes for a small "Minibox." The box may be used to enclose a key-click filter and also as the mounting for a send-receive switch. There is enough room on the rear wall of one of these boxes to accommodate a connector for the leads running to the receiver and the transmitter.

Nice thing about the set-up is that the filter is placed right at the key where it belongs, and the send-receive switch is about as close to the key as it can be located.

— *Clifford A. Mason, K2AFO*

## FORMED PLASTIC WASHERS FOR MOUNTING MOBILE ANTENNAS

IT is sometimes desirable to mount a mobile antenna on the fender or rear deck of a car where the body is not flat. Each such installation presents a problem of obtaining specially shaped washers to go between the car body and the antenna mounting surfaces which are always flat. The following method will provide a close-fitting and professional-looking job.

Two thermoplastic (plexiglas or lucite) washers about a quarter inch thick and the same diameter as the antenna base are first roughed out with a hack or jig saw. They must then be trued up in a lathe so that the outside rim and

the hole are round and concentric. The plastic washers are then placed in a pan of boiling water for a few minutes until they are soft enough to bend. One of the washers is then fished out of the water and immediately placed on the exact spot where the antenna is to be mounted and bent to fit the curvature of the car body at that point. The plastic ring can be handled either by wearing gloves or simply holding it with a dry rag. In a few minutes the washer will cool and set to the shape of the car body. If the underside is the same shape as the top surface, both washers may be shaped from the outside, which is easier.

The washers are then centered in a three- or four-jaw lathe chuck. They are easily centered by trial and error as extreme accuracy is not required here. The convex face of one washer is then turned flat and the concave face of the other one is made flat.

These two washers will now fit against the car body, one inside and one outside, with both external surfaces flat and parallel. The antenna can be mounted on them with a neat fit that would be very difficult to obtain any other way.

— *C. A. Thunen, W8ACT*

## MAKING FARADAY SHIELDS

THE CONSTRUCTION of Faraday shields can be simplified by using materials included in etched-circuit kits. The desired shield is drawn on a piece of copperclad phenolic using the special etch-resistant ink. Etching solution is then used to remove the unprotected copper, leaving the shield ready for easy mounting.

Incidentally, most mail-order houses list the kits under the *printed circuit* heading of their catalogues.

— *E. Laird Campbell, W1CUT*

## SERVICE HINT FOR COLLINS SERIES 75A RECEIVERS

THE COLLINS 75A series receivers are famous for their frequency stability and calibration accuracy, but the rigors of time, humidity, and wear may cause the variable-frequency oscillator to shift and throw the dial calibration off to the point where it can no longer be corrected with the zero set. If the calibration error is the same on all bands, the variable oscillator is at fault. If only one band is off calibration, the first oscillator for that particular band should be suspected.

The 75A-3 at W4CEN, when new, was calibrated perfectly at the high-frequency end of all bands, but at the low-frequency ends it was necessary to move the zero set pointer three kc. to the left to correct the calibration. This pointer can only be moved four kc. either side of zero center. After a year's use, the calibration drifted off two more kc., so it was no longer possible to correct the calibration with the zero set. The oscillator unit is completely sealed and there is no provision for adjustment of the oscillator frequency. The Collins instruction book says to remove the oscillator unit and return it to the fac-

tory when this condition occurs. If the calibration error is very great, these instructions should be followed.

In my case, such drastic action hardly seemed necessary, and I cast about for some easy method to correct the calibration. A very small reduction in the capacitance across the oscillator coil was necessary to do this. The tube tables in the *Handbook* list the input capacitance of the 6BA6 tube used in the oscillator ( $V_{14}$  in the circuit diagram) as  $5.5 \mu\text{mf}$ . The tables list a number of other miniature pentodes with a lower input capacitance, among them the 6AK5, with an input capacitance of  $4.3 \mu\text{mf}$ . The base connections are different, but the difference is in the manner in which the cathode and suppressor grid connections are made to Pins 2 and 6. Since both these pins are grounded in the receiver, the 6BA6 and the 6AK5 may be interchanged. A 6AK5 was then substituted for the 6BA6 in the oscillator socket, and presto, the zero set moved back to only one kc. to left of zero at the low-frequency end of the dial.

Incidentally, there may be considerable difference in the input capacitances of the same type tubes produced by different manufacturers. I discovered that a Tungsol 6BA6 had an input capacitance sufficiently lower than an RCA 6BA6 to move the calibration two kilocycles.

In cases where it is necessary to move the zero set to the right to correct the calibration, an increase in capacitance is indicated. This may be obtained by the simple expedient of taking a short piece of No. 22 solid hook-up wire, remove the insulation from about one-quarter inch at one end, form a small loop and crimp it around the No. 1 or grid pin of the 6BA6 oscillator tube, wrap the wire around the other pins to form a semicircle, and plug the tube back in its socket. The length of the wire may be adjusted until the calibration is correct.

— Tom Brandon, W4CEN

## STORAGE RACK FOR SPOOL-WOUND WIRE

THE ROUND slender type of curtain rod that is available from most dime stores and hardware concerns makes an ideal rack for spools of wire. One or more of the rods may be easily mounted on the workshop wall, under a table or bench, or on the inside of a closet door.

— Thomas Skopal, W3WJN

## WORKSHOP USE OF LIGHTER FLUID CANS

EMPTY Ronsonol lighter fluid cans make excellent non-spill containers for the several types of liquids commonly used in the home workshop. Suggested refills for the cans are: carbon tetrachloride for cleaning; kerosene as a cutting lubricant; gasoline for starting blow-torches, etc.; light machine oil for shafts, bearings, motors, and so on.

The plastic top dispenser can be flipped from a can with the aid of a screw driver and then

snapped back in place after the refill has been made. Fingernail polish can be used to identify the contents of a container.

— Cmdr. J. R. True, W4ROK

## 100-KC. MARKERS FROM A 50-KC. SECONDARY FREQUENCY STANDARD

A SECONDARY frequency standard described in *QST* for July, 1954, duplicated for use here at W5RSH, has been modified so that either 50- or 100-kc. harmonics may be selected. Although the 50-kc. markers are extremely helpful for many types of measurements, there are times when an unknown frequency, or a band edge, can be more quickly identified if the standard frequencies are spaced no less than 100 kc. apart. Unless the 100-kc. points can be definitely established, there is a possibility of a measurement being inaccurate by at least 50 kc. or more.

The circuit of the modified standard is shown in Fig. 3. Notice that except for the addition of  $R_1$  and  $S_1$ , the circuit is identical to the original. Also observe that the resistor and the switch may be added without requiring any alteration to the basic circuit. The functions of the new components are as follows:

With  $S_{1A}$  closed,  $L_1$  is shorted and the circuit takes on the appearance of the more familiar 100-

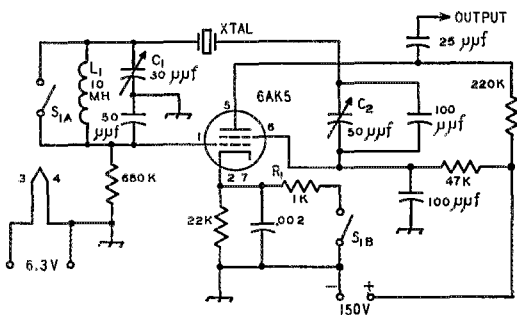


Fig. 3 — Circuit diagram of the modified 50-kc. frequency standard. All resistors  $\frac{1}{2}$  watt. All capacitors less than  $0.002 \mu\text{f}$ . are in  $\mu\text{mf}$ .

$C_1$  — 30- $\mu\text{mf}$ . ceramic trimmer.

$C_2$  — 50- $\mu\text{mf}$ . ceramic trimmer.

RFC<sub>1</sub> — 10-mh. r.f. choke (National R-100S).

$S_1$  — D.p.s.t. switch.

kc. standard. With  $L_1$  shorted, crystals cut for 100, 200 and 1000 kc. will oscillate in the circuit, but the activity of the crystals leaves something to be desired. However, crystal activity can be raised to normal by reducing the value of the cathode bias resistor for the 6AK5. This is easily accomplished by means of  $R_1$  and  $S_{1B}$  of Fig. 3.

If the circuit has been adjusted to zero-beat against WWV for accurate 50-kc. markers, it is probable that the 100-kc. (or higher) harmonics will be slightly off frequency when the circuit is switched over. This slight error is of no consequence provided the calibration using 100-kc. markers is rechecked with the aid of the more accurate 50-kc. frequencies.

— Clark A. Chamberlain, W5RSH  
(Continued on page 152)



# How's DX?

CONDUCTED BY ROD NEWKIRK,\* W9BRD

## How:

In the past two columns, among other things, we passed comment on Novice and newcomer DXers. Here follows a letter on that same tack, lines which reveal how the innocent 20- or 40-meter bystander can be divebombed by the DX bug with scarcely a moment's warning:

Dear Jeeves:

In scanning back over some old QST's note was made of your admonition (Feb. '53) to the fraternity to refrain from hiding even low-glow dial lights under the plate cap.

There's nothing — but strictly nothing — remarkable about the content of the following notations. But my DX, paltry as it may be, was unintentional, almost accidental, and not premeditated or purposeful, as it were. Fact is, having at last licked oncoming arteriosclerosis and the FCC, thus being shut of the "N" in my call (the 12-year-old jr. op, W8QQH, passed his code the first time) I had a powerful urge to draw three to an inside straight for WAS. In scanning around, some N.H. activity was noted on 20 meters, so the hunt was taken up on that band as well as 40, and the downfall of the Olde Prof became imminent.

In the course of events G PY LU DL VK and F were picked up (it's impolite not to answer a friendly CQ) with KH6 (plus WH6) KZ5 KG4 KL7 and two VE8s as salt and pepper. Yesterday the original mission was fulfilled and I now sweat out the N.H. QSL as well as the others.

I discover, however, that an insidious cerebritis was developed by even this minor exposure to DX, to those faint and far-off signals. As an electroencephalographer by trade I believe this disease is characterized by paroxysmal cerebral DXrhythms, easily demonstrated by recording the electrical activity of the auditory area of the brain. A peculiar series of square-shaped pulses may be detected, the sequence of pulses forming something like dits or dahs. In a far-gone case it is possible to demonstrate pulses translatable into "ON4" "CR8" "OA" "VQ5" and other strange combinations not readily decipherable through background QRM. Anyway, Jeeves, you have a new convert to your department and vice. And when you get that all-band tiny-beam worked out, you will publish it, won't you?

— Doc, W8USP

P.S. — Jr. op W8QQH, now turned 13, picked off VK3PG one recent night when his OM inadvertently left the shack to hunt up some cold suds to cool the final tank. So you've got two converts as a matter of fact. — Doc

One might surmise it likely that a lasting immunity to the ravages of DX fever could be attained through constant exposure. This may be true in rare cases. But here's another interesting letter from one sworn-off OT who dared to make a casual inspection of 14 Mc. one recent evening:

"How's DX?":

Now don't get the idea that I've had another attack of my old DX fever or anything like that, but — it just so happened that the other night around suppertime I turned on the receiver and there was a genuine PX on 14,020 kc. knockin' 'em off likes flies. So I worked him. . . .

Well, now, I got my "200" sticker back in 1950 when there were only about fifty of 'em around, and when I had 500 watts and a two-element beam and conditions were good. Then we moved, the antenna came down, and I became a suburban dweller complete with power mower and vegetable garden. The old HRO just didn't get turned on much except for the CD Parties and the SS (you wouldn't

expect me to give those up, would you?) and a coupla hundred watts seemed like plenty. But you know, after working that PX it seemed sorta natural to turn on the receiver the next night just before supper. And waddaya know — VQ6LQ! I suppose I should have quit right there. But after a few more tries I got F88BR (QSL already, too), VQ8AG, and this a.m. before work neighbor WIKFV called up to say that a 3A2 was on 14,060. So I worked him for a total of five fast new ones. . . .

There have been some changes in the past five years, though. The pile-ups are a little worse, there are more kilowatts and big beams, and it seems that everyone is a little more desperate. Maybe frantic is the word. Man, there's no such thing as an even break or courtesy anymore. Or do you suppose I've aged a little? Big DX hogs like old — and — have stepped aside for even bigger DX hogs like — and —. Many new big and middle-sized wheels have cropped up, too.

But one thing hasn't changed. Pick any hour of the day or night and let AC7AA sign his call just once. Then sit back and check off Ws IFH 8HGW 6VFR and the rest of the really good top men as they work him and again go back to their listening.

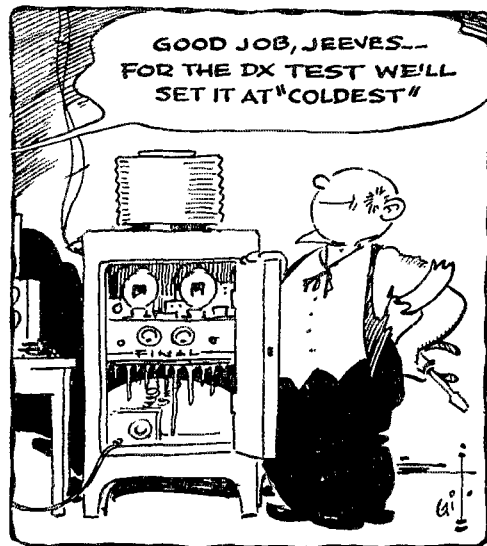
Been reading and enjoying "How's" for these past five years but haven't dared to listen for the stuff or write to you any more than an AA dares mix old-fashioned. If you hear from me again before 1960 you'll know I've really weakened.

— Roger, W1JYH

Any bets we won't?

## What:

In ages gone by, DX fever was characterized by an urge to loiter down by the wharves, watching seagoing vessels handling cargo 'mid dreams of the Orient, Spice Islands and the antipodes. How fantastic it would have seemed to young Marc Polo and Chris Columbus if they had been told that some day ordinary folk like themselves would step inside their parlors, throw a few switches, and communicate directly with those distant points! We take such a miracle for granted in the realm of modern amateur radio. This is how it comes about, band by band. . . .



\* 4128 North Tripp Ave., Chicago 41, Illinois.



HB9KB-3A2BH, far right, joins with (standing, l. to r.) 3A2s AU, BF, BH's XYL, AH, AM's sister BL, F9XV; (front) BE, AJ and AM on a recent tour of TV station Tele Monte Carlo conducted by sound engineer 3A2AM. Those weird props are positioned for use on TMC kiddies' program "Bill of Mars" — TV must be just about the same the world over! This occasion was a brief DXpeditionary respite for HB9KB who had 3A2BH set up for action in a near-by hotel. While some two dozen Monaco amateur licenses are extant no native 3A2 knows the code well enough to tackle c.w. DX bands. And because native 3A2s prefer phone QSOs of local nature the country continues as one of the rarer European entities on the ARRL DXCC Countries List. (Photo via HE9RDX and USKA)

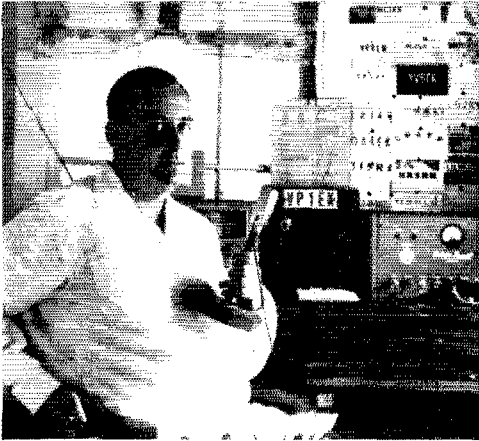
20 c.w., our main DX highway to far-away places, was WRKPL's route to GR6s CV (14,050 kc.) 11 GMT, CW (70) 11, DU8 ICV (60) 3, 7SV (95) 5, FO8AB (80) 20, HZ1AB (80) 13, MP4QAL (60) 7, VQ6LQ (40) 13, XW8AB (30) 3, ZB1GBF (70) 12, ZC4RX (120) 10, ZDs 3A (75) 13, 6BX (45) 10, ZS7H (80) 18 and other goodies. . . . Before becoming K4GSU, W9TGY rose to 163 with the aforementioned HZ MP4 and ZS7, as well as CT3AB (5), FF8BI (12), LU3ZE (58), VU2s JK (48), KM (13), Y1ZAM (70) 14, ZS3HX (29) and 4S7KH (62). . . . GRs 6AI (20) 2, 6BX (84) 5, 7AF (47) 5, MP4, PZ1BS (12) 13, VP8BC (8) 3, VS6DI (52) 14, VU2BL (57) 13, XZ2OM (95) 13-14, YA1AM (85) 13, YO2BN (7) 17, 3V8AB (4) 18, XW8 and ZS7 vagabonds visited W9EU. . . . K2BZT chatted with GR7CZ (75) 20, DU, JAs 2CZ (30), 3BN (25), 3CS (90), 5AB (37), 6AK (42), 7AD (59), 8AI (56), KA2SK (72) 0, KR6RS (90) 23, MP4 PZ1, SM2AQY (20) 23 north of the Arctic Circle for WAE aspirants, VQ4GC (65) 19, VS2DW (25) 0 and ZD6RM (10) 19. Those JAs broke through between 22 and 23 GMT. . . . W9QGI, up to 132 worked with his 2E26 30-watter, collected EA6AF, PZ1, YO8 3LM 4CR, 3V8AN (30) 21 and 4X4IE. . . . CR9AI (20) 12-13, FB8s BR (8) 16, BS (80) 14-22, ZZ (30) 14-15 of Amsterdam, FK8AH, GD3IBQ 18-19, FO8s AX AY 12-13, HZ1HZ (67) 16-21, IS1FIC (53) 15-19, KR6s QI QW 14, KT1EXO 16-17, W6FQF/KG6 7, OA4ED 19-20, VPs 3VN 5-6, 5DC 20, 8AQ (89) 21-2, VSs IGV 16, 6CG 6DE 15, ZS90 6 and a 3V8 will be delighted to receive ZD6BX QSLs. We also scooped up a pair of rare c.w. Mexicans, XEs IMB and 2OK 19. . . . Now a conducted tour of loggings here and there, at W1OJR, behind the Curtain for UA4KPA (50), UC2AA 12, W1WAI: OQ5BT (53) 21, W2FJH: Gough Island's ZD9AD (15) 21, W2GVZ: fast QSL from VS2. K8GMF: GN8MM (105), W3SWV: FY7YE, HZ1 VQ6 to hit a fast 1160/104, W3UXX: CN2AY, VP4LZ, YVs 5BJ 6BF, ZEs 2K0 6JP, W3YUW: ZD6RD (60), W4LIV: heard 3W8AA (60) 14; see Where and Whence. W4UWA: tried a 6AG7 doubling to 20 for KP4s, KV4AA (80) 22, K4DJJ: H1R1J, VP7NY, VQ8CB (47-100) 12-13, W6YFY: ET3AH (10) 13-15, many others. W7VWS: KA3AC (80) 19 and, of all things, W2UK/KH6 17. W9NDA: AC5PN (50) 13, W0NLV: YK1AB, DL4ZC: Amsterdam FB8, HK3PC, YA1. . . . Chets LU2ZY and LU3ZY take charge of delicious South Sandwich, an ARRL DXCC Countries List item long overdue for ham activity. . . . K6ENX, mainly concentrating on Africa, checked off CE7ZN (15) 2, CRs 6CH (50) 1, 6DA (70) 22, 7CI (50) 4, 7CN (20) 16, ET2AG (20) 16, FA8s AN DA RJ, FF8AP (90) 22, FQ8AX (50) 21, IT1AI (75) 16, OQ5CP (15) 16-17, SPs 1KAA (50) 16, 9UK (35) 15-16, TF3MB (25) 2, TG9MR (35) 1, VP2VB/P (30) 15, VQs 2AB (45) 17, 2GW (80) 17, 4EZ (50) 20, VU2JG (70) 2, VO2VM (40), ZB1HKQ (50) 16, ZDs 2FNX (20) 17, 6IEF (50) 16, ZEs JJC 3JL 6JR 6JX 6JY all 16-18, 4S7GE (35) 2, FB8s MP4 XZ2 ZSS and ZS7 customers, ZD2DCP, 4X4EQ and 5A1T escaped Otto's noose. A Sunday evening 1 hr.-55 min. "WAC" glows on one recent page of the K6ENX ledger and he reports the Asian long path holding up nicely. . . . West Gulf DX Club's *DX Bulletin* and Northern California DX Club's *DXer* account for 14-Mc. c.w. actives AP2Q (26) 13, AR1s AN (50) 2, TI (15) 2, CE7Z (61) 1, CRs 6AY (82) 12, 7IZ (90) 20, YL 7LU (56) 20, EL2L (18) 20, ET2s AG (60) 20, US (52) 16, FD4BD (23) 1, FO8AY 11-12, HA5KBA (10) 15-16, HE9LAA (32) 18, HSIYR (6-77) 13, KR6Gs (40) 0, KX6BU (50) 1, LU5ZF (15) 1, LX1QA (62) 18, LZ1s KAA KAB KCG KOZ all 15-16, MDSUK (85) 14, SUIIC (48) 15, 3KLLK/MP4 (50) 14, OD5AV (35) 15, OYs 2H (3) 14, 7ML (45) 14-20, ST2NG (90) 14, SUIIC (48) 15, SV0WY (5) 14-15, UA1KAI (54) 14, UG2s KAB (65) 17, KAD (27) 16, URFKAF (76) 13, UH8KAA (80) 13, UH8KAA (72) 13, VKs IRA (98) 15, 9RLM (70) 13, VPs 2GW (50) 22, 8BF (57) 1, 8BL (51) 2, VQs 4FI (77) 22,

8AG (15) 13-14, VSs 4BA (49) 13, 6CW (4) 14, VU2s AE AM AS BK DE DF HF JO SK all 13-15, YA5C (2) 13-14, Y1ZAM (1-56) 14, YO8 2VM 3CT 3RC 6AW 8MS all 14-18, one ZA1A (32) 14-15, ZC4s CKC (90) 15-16, 1P (61) 14-15, ZD6EP (30) 16-17, ZD6Gs JU (26) 17, JZ, ZP5HB (42) 2, ZS3BE (75) 21, 3V8AF (30) 19-20, 4S7s BW (38), CO (31), EW (40), GE (38), MN (43), MR (50) 13-14, 4X4s BH DE DX FA FK FR all 13-20, 5A1TD (96) 15 and 9S4AX (30) 16. Fancy VU6JJ (67) 1 is on hand.

20 phone, fount of fancy A3 scenery, served W4ALX (ex-W9NRB) with DU, 1OR, 78V, ET3AH, FM7WN, FY7YE, KG1FR, MDSUK, ODSAV, OE5CK, SV0WM, TA3US, VK1ZM, VS6s CG CW DE, VU2AK, ZC4IP, ZD4BR, 3V8FA, 4X4s DK GB and friend CR9AI. . . . W9EU and W4ALX grabbed HZ2AEH (103) 19-20 who usually sticks to c.w. . . . W4CBQ stashed away CR6AU, GT3AI, EA8BA, ET2AB, Corsican F9RY/FC 19-20, FA3GZ, FF8AK, HA5KBA (160) 14, HC8GI of the Galapagos, OX3KH, SV0WT, TF5SV, VPs 3LF 8AQ 8BF, VQ5FS, VU2EH, Y1ZAM, ZD4BZ and 4X4FK by mike means. . . . Pitcairn's VR6AC (143) Tuesdays and Saturdays, plus Gough Islander ZD9AD (215) 16-18, put good signals in at W6YV. . . . AP2U (170) 14, CR7CZ (120) 14, ET2s UO (182) 14, XX (280) 15, FB8s BC (158) 3, BZ ZS (23), HA4KBA (305) 14, KT1EXO (135) 0, MP4s KAB (150) 14, OAI (104) 14, OD5DA (145) 14, VK1YK (179) 15, VP1EE (190) 0, VU2s AK (185) 14, GJ (118) 14, XW8AB (15) c.w.-to-phone, XZ2s KN (145) 13, XX (151) 17-18, ZC4RX (121) 16, ZD6RD (175) 16-17, ZSs 2MI (169) 5 of Marion Isle, 8I (100) 4, 9G (120) 3, 4X4s BL (308) 14, DR (114) 19-20, IE (116) 20 and 5A2KB (141) 15 are contributed by NCDXC and WGDXC sources.

15 phone revelry grows more tumultuous. W6ZZ made merry with CR9AH, DU7SV, EL12A, FO8AD, JA3s FA OA, KAs 2DW 2KS 5CL 8AB, KC6CG, W6FQF/KG6, KR6s AB CR USA, KV4B, KW6BS, KX6ZB, VQ3DQ, VS1DU and ZS9G. The Tanganyikan was Miles' 100th 21-Mc. country, 72nd on A3. . . . K5AJP assailed EA8BO, ELIA, HR1FM, KG4AQ, KV4BI, VPs 1SD 7NG and YN1JO. . . . KG1KW and KV4BJ were among the many to fall prey to W0QDG's new Ranger and SX-99. . . . W5HEX clicked with FB8BZ, JA8AQ, PX1YR and VQ4EO. . . . It's 91 on 15 phone at W4UWC, FF8HA, GD3GMH, KA8SD, OE1PC, VP4TE and YU3JN were instrumental. . . . W1PWK, QSYing from 10 to 40, stopped off on 15 to swipe EA8AX 13 and HP3FL 20-21. The latter's QSL, arrived but three days later. . . . WG and NC DXCs add EL3A (200) 13, FY7YE (195) 22, VP8s AQ (200) 1, BF (200) 1, VQ4EU (220) 18-19, VU2CW (175) 13 and ZE2KJ (205) 20 to our 21-Mc. voice variegation.

15 c.w.? To be sure, Two more Novices claim the working of all continents this month — KN6JQJ (son of W6AOA) and WN7AOZ. KN6JQJ, only 12, bagged stuff that would make any Extra Classer bust his buttons: DU7SV (103), JA5 1AM (93), 3AB (99), 4AF (150), 4AH (106), LU5, VQ4CO (150) and a helping of Europeans. . . . WN7AOZ has that DU as well as KC6s AI CG, VP8BD, VQ4SS, YU3KT and a vast assortment of VK/ZLs. . . . Novice 15-meter notes from hither and thither, KN6MFY: FA8RJ, OE1FT, WNSBZ: WH6BPE (140), KN4DRO: WP4ACF (122) 21, KN5BGB: CE3AS, LU5 KZ5s. WNSWTO: VP6RE, 3V8AN, KN5ALA speaks for all our Novice DX hunters in writing, "I want to thank all DX stations that call Novices who can, in most cases, only call hopeful 'CQ DX' on their own rockbound frequencies." . . . KN6CER closes our 15-meter Novice report with notes on VPs 7ND 9BP and Europe worked with his Adventurer and 8-85. . . . Now turning to the 5-year men, we find W1WAI busy with CR6AI (67) 13, CT3AB (1) 19,



VPIEK favors 28-Mc. phone work and does his part to bring 10 back as a prime DX band. Ernie uses a Globe Scout, WRI, VFO, NC-98, Gosnet rotary beam and 136-foot long-wire. When ten is kaput VPIEK opens for DX business on 14, 7 or 3.5 Mc. Off the air Ernie doctors on the staff of El Cayo Hospital, El Cayo.

FM7WD (88) 13, GD3FXN (25) 16, TI2WR (3) 16 and 4X4FA (48) 12. WICTW climbed to 87 on 15 c.w. with WBE wherewithal to boot; a GD3, ZB2L, ZC4IP and 3V8 assisted. GC3EML and KG1KK made it 101 21-Mc. countries for W6ZZ and W6PRM did away with PJ2AV, SP5AR, YUs, VQ4 and 9S4AX while reconnoitering his limited acreage for a new ground-plane. UR5KAA and a GD3 came back to K2BZT and ZD6BX gladdened the hearts of IS1FIC 15-16 and ZB1AJX 19. K2GMF's 20 watts is sufficient for PJ2AA (22), TF3MB (20), YV5s BJ (90), BX (155) and 9S4BN (60). W8QOH/MM was worked in the CR4 vicinity. W9FNX raised 9S4BM (65) 13-14, while W8KYD was busy with EL2P. FY7YE and I1BLF/Trieste worked W3YUW. FAs 3HH (42) 17, 8ZZ (110) 16, FQ8AG 18, FU8AA, VP2VB/P (77) 20, ZDs 6RM (10) 18 and 9AD are specified by NCDXC informants.

40 c.w. supplied W1WAI with PZ1LM (4) 2 and YV9CT (2) 3, the latter supposedly scrutinizing algae on Aves Island. DU7SV (40) 15, JAs IANE (39), 1JH (8), 1UY (40), 3FV (39) and 8AA (38), all between 15 and 16 GMT, collided with W7VWS. KG1KK and a PZ1 succumbed to W1PWK's pursuit. W4EUH snapped up F8RJJ, LZs 1KAB 1KBN 2KAC, V6PGC and YO2VM. VPs 2GY (31) 20 and 8AL (35) 1 contacted W2FJH. W0VBS worked HK4DP, PJ2AJ, WP4ADR; heard DM2XLO, CR6AI and HPILO. K6DV nets his share of the 40-meter staff and wishes that rag-chewers would move up above 7050 kc. when the long skip slides in. W6RZS collected enough JAs on 40 to qualify for JARL's AJD sheepskin. PJ2AV and various European species also appear on Cherry's list. Novice notes on 7 Mc., at KN4CQA: WH6s BLM (151), BOK (175), BRX (178); notices YK2XZ seeking WN/KN QSOs around 7147 kc. K NOCER: WP4, W7N7AO: KG6s AGC NAB, KM6AX. Forty phone finds OE5CK (60) 1, SV6WT (50) 3, Y12AM (85) 3 and 4X4DK (63) 2 putting readable signals into WGDXCer W3ECR's shack but a persistent 7-Mc. A3 DX man is a rarity these days.

10 phone, still on the skimpy fringe area of the m.u.f., isn't exactly a ball of fire right now. But it's good enough for W2AEB to nail down CR6 6BQ 6CB 7AQ 7BB, FB8RG (ex-FD3RG), HR3HH, TA3US, VO2s AS JW NS, YU1AD, ZS7C, 4X4s BL and FV. And that ain't hay! K5AJP adds KT1PU, ZLs and ZSs to the pot. W3ZKH snagged CN8FN, CR6 CR7, 1ICGU/Trieste, PJ2AF, VO2RH, ZB1GBF, ZEs 2KR 6JJ, ZD6RM, ZS3AB, 5As 1TA and 2TZ within two weeks of receiving his General ticket. CN8FR, CR7, stacks of ZLs, KL7s, Europeans and YU1AA kept W8GNY on the ball. NCDXC and WGDXC join to recommend 28-Mc. vocalists FQ8AG (240) 19, LX1DC (180) 14, OQ5BW (275) 19, VR2CS (410) 23, ZD4BR (325) 17, ZS3s B (400) 19 and E (230) 18-19. In the rarified ionosphere of 10 c.w. we find W1PWK inhaling ZD6RM and ZEGJJ, while W0UWD made good with ZE3JP 14. With 10 meters flexing its long unused muscles

once more, a few of the old 28-Mc. regulars are coming back into the DX swim. W1PWK bears W1GOU, for instance, a guy who captured over 150 countries on ten when the band was in its late-40s heyday. Unk swapped his old BC-610 TVI generator for a Viking II and resumes his march toward the 10-meter 200-mark.

160 c.w. DX doings got off to a slow start but now begins to show a profit. Two of the nastiest two-ways went to VS6CQ-ZL3GQ and G3PU-ZL1GX. KP4KD got through to people like Ws 1BB 3FBV and K2MJZ. Ws 3FBV 8ANO and QPNE flagged down TI2BX through the Ioran splatter. Transatlantics were scarce. W3RGQ QSOd G5CV; and LU1EL was reported heard in the British Isles. W3E1S clicked with Gs 3GGN 3JVI 3PU 5JU 5RI 6GM, HB9CM, KP4CC and KZ5FB. Don's pal W3MSK scored with three Gs, HB9 and TI2 his first night on the band. A new 160-meter country, VN1AA (1802), came back to W2QHH. GD3UB (1830) 5, G510S and VP1SD are to be available on Top Band before OM Atmospherics again moves in, according to W1BB and W2FSN.

### Where:

As the DX facet flourishes and prop conditions improve, DX and DX-workers are faced with mounting tasks in the confirmation department. Certain QSL short cuts will be attempted. It's a tragedy to receive an eagerly-awaited pasteboard only to discover that it doesn't bear data necessary for DXCC accrediting. The call signs of the confirmer and confirnee, the geographical location of the confirmer if not conclusively indicated by the call, and the date of QSO — these represent the usual bare minimum so far as DXCC is concerned. You'd be surprised at the quantity of not-quite QSLs that enter ARRL Bureau channels with one or more of these "must" data omitted. Refer to page 57, October 1954 QST, for more detailed comment on the matter; also see W1VG's comprehensive "QSL Cards," October 1950 issue. PB8ZZ, now reported doing big 20-meter business by W6YY, ought to receive considerable fan mail when the next mailbox calls at Amsterdam Isle in May. WGDXC allows as how DXers with difficulties in the VS4CT-VS5CT-ZC5CT QSL line might make profitable use of the QTH to follow. The Texans also remind us that W4PJU is of possible assistance regarding CR5UP verifications. Now awaiting his new VE3 tag, ex-VP5BN is available for QSL matters at the address following. Via W4LYV, XZZOM would like it made clear that he does answer QSLs by airmail on receipt of sufficient IRCs. Aug is raising power from 20 to 80 watts and gets good results with W5DQV's "Cubical Quad for 20 Meters," January 1955 QST. WN5KNE/DL hears that some UB5KAB-bound QSLs were bounced back from an Odessa address previously published. You can't figure this "U" business; other fellows report positive results via the same QTH. If you run across pertinent postal data on DX stations, not previously published you'll be doing some one a big favor by sending it along. Just as Wis OJR PWK WAI WPO, K2BZT, W3NCF, W4CBQ, KN4CQA, W6ZZ, W8KYD, W9s CFT EU, DL4ZC, ZD6BX, NCDXC and WGDXC did in these instances:

AR1TI, P.O. Box 81, Beirut, Lebanon. EL2P, L. Hibbert, PAA, P.O. Box 36, Harbel, Liberia. ET3TRC, Box 114, Addis Ababa, Ethiopia. F9RY/FC, Bastia Airport, Corsica via France. GB2SM (QSL via G3JUL or R8GB). JA3AU, Y. Tsukamura, Box 1012, Kobe, Japan. KG1KK, APO 858, New York, N. Y. ex-KL7AON, L. A. Dyson, jr., 1518 Westover Ave., Roanoke, Va. KL7BBF, C. J. Kroh, Martin Arms Apt. 11-G, 3rd and East "Q", Anchorage, Alaska. KL7CCG, P.O. Box 718, Sitka, Alaska. LUZZY (QSL via RCA). LU3ZY (QSL via RCA). ex-MF2AH, S. Hinks, GM3JUJ, 30 Ross Crescent, Camelon, Falkirk, Shirlingshire, Scotland. OQ5BI, G. Capelle, c/o Utelex, P.O. Box 3085, Leopoldville-Kalina, Belgian Congo. OQ5BT, Box 2432, Elisabethville, Belgian Congo. OX3KW, Julianehaab, Greenland. PZ1BS (QSL via W2HQL). PZ1LM, P.O. Box 848, Paramaribo, Surinam. SV0WZ, W. Needham, USASG, APO 206, New York, N. Y. TG9RR (QSL via TGMG). UB5KAA (QSL via DL7AA). ex-VK1IZM (QSL to VK2ZM). ex-VP5BN, E. D. Squire, 3093 Danforth Ave., Toronto, Canada. WP8AL, A. F. Lewis, c/o Postmaster, Port Stanley, Falkland Islands. VO2NC, N. A. Clark, 378 Chapman St., Broken Hill, No. Rhodesia. VO2WP, W. A. Pope, P.O. Box 69, Mazabuka, No. Rhodesia. VS1DU, M. R. de Cruz, Box 176, Singapore 1, Malaya. YA5C

(QSL via RSGB) . . . . . ZC5CT-VS4CT-VS5CT, P. H. Green, G3DCT, 15 Western Rd., Brentwood, Essex, England . . . . . ZE1JBY, R.S.S.R. Bulawayo, So. Rhodesia . . . . . ZE2JZ, P. Mould, 4 Narvick Pl., Braeside, Salisbury, So. Rhodesia . . . . . ZE4JN, J. E. Rogers, P.B. 209a, Salisbury, So. Rhodesia . . . . . ZE5JC, D. J. Driver, P.O. Staff, Gatooma, So. Rhodesia . . . . . ZE5JH, S. Wright, Stand 15, Norton, So. Rhodesia . . . . . ZS3AM, P. de Villiers, Posbus 251, Tsameb, S.W. Africa . . . . . ZS4X, B. E. Pietersen, P.O. Box 53, Victoria, O.F.S., U. of S. Africa . . . . . ZS7J, A. Cloete, c/o Havelock Mine, P.O. Emblembe, Swaziland . . . . . 3A2BN (QSL to F7ER) . . . . . 3A2BP (QSL to F7AM) . . . . . 3A2BO (QSL to F7CZ) . . . . . 3W8AA, P.O. Box 109, Hanoi, Viet-Nam.

### Whence:

**Asia** — A few stations signing tantalizing HL and 3W8 prefixes are stampeding some of our more immature DX devotees but Korea and Viet-Nam still are under FCC-ITU ban at this writing. So are Cambodia, Indonesia and Iran. As W4LYV puts it, "Stations call and work 3W8AA by sending '3V8AA'. . . . I do not want to see these few irresponsible jeopardize our privileges. . . . They should realize that they are accomplishing nothing by working a country on the banned list because the QSLs won't count if received." The sham of pretending to miscopy a verboten DX station's call is shallow, indeed. The trick establishes the practitioner as either a hopeless lid, or a candidate for the nearest booby hatch, or both. This irksome ban list is gradually being eliminated through the required snail-like channels. Meanwhile we must use our noodles for something besides headphone holders. . . . . W6ZZ calls attention to additional objectives for wallpaper hounds: Sugunami (Japan) Radio Club's S-10, S-20 and S-30 certificates. DXers outside JA-land can qualify for these awards by confirming QSOs with two, four and six Sugunami JAs, respectively. There are approximately 100 Sugunamians available and contacts must date after July 29, 1952. Write SRC Awards Manager, P.O. Box 20, Sugunami, Tokyo, Japan, for current and detailed data. . . . . MP4QAL toys with Oman DXpeditionary ideas, according to W2FJH . . . . . K2CLA, stationed on Formosa, investigates hamming possibilities there but finds permit obstacles formidable. If Jerry swings a ticket in time he'll be pitchin' C3 or BVI fastballs in the impending ARRL DX spree . . . . . W6YY reports that VS2DW, normally a serene soul, gets roughed up by the North American power pack while trying to boost his own countries tally. Tan dislikes falling back on "CQ NO W/K" and atones for it by continuing to work long strings of Yanks when in the proper mood.

**Africa** — Scattered African notes courtesy W6YY: ZD6RD, rarely off phone, denies responsibility for many c.w. QSOs perpetrated in recent months under his call in the name of "Chuck", . . . . CR7s AU CO and DI regularly lead Mozambique's 14-Mc. A3 chorus. . . . ZS2AA informs that there are now over 80 South African YLs licensed and a diploma is available to certify the QSOing of any ten. . . . . WGDXC items from not-so-dark Africa include word that ZS2MI's Barrie is replaced by a new Marion Islander named Ken. . . . Z138A's recent QRX resulted from rig trouble since alleviated. . . . Ex-ZS1PD/Zs8S, Henry of Z88L, visited the Cape and brought back



FD4BD, currently doing a solo for French Togoland, needs only a 6L6 final to stir up a hornet's nest on 20 c.w. His receiver is a BC-342 and the skywire is a Windom. You may have worked Pierre previously as FD8AB and FF8BE. (Photo via W9EU)

enough electronic ingredients to set up his ZE hamshack at Gadzema . . . . . SUIAS drew applause for an extensive ham radio write-up in Egyptian roto magazine *Images* . . . . . OQ5BI is honing up on s.s.b. and may soon give such emission a whirl on one or more of his three favorite phone bands. . . . . Reference Ethiopia's gala Jubilee ham exhibit mentioned in last October's "How's", the call turned out to be ET3TRC and a goodly crowd was there. This call sign is the regular label of the Telecommunications Radio Club in Addis. . . . . Nyasaland tidbits thanks to ZD6BX: "ZD6RM keeps busy on 14, 21 and 28 Mc. and ZD6EF is mainly active on 14-Mc. phone or c.w. with his 829 final. An ex-DL2 will shortly be heard from Lilongwe, some 200 miles to the north of me, probably phone only." ZD6BX, himself, hits 20 hard, 15 and 40 lightly, using c.w. only.

**Oceania** — VK3WIA, staffed and organized by Wireless Institute of Australia stalwarts, opened 1956 with a jivy session at the Pan Pacific Boy Scout Jamboree in Victoria's Clifford Park. Some 10,000 Scouts were on hand to watch VK3WIA perform with a large Vee beam on 3.5, 7 and 14 Mc., c.w. and phone. Special commemorative QSLs will be forthcoming. . . . . VK9AU apprises K2OAH that New Guinea local QRM is on the upswing with VK9s RS BW GB HO KT PF RE and RM contributing their shares. . . . . Of the nineteen WAVKCA certificates already handed down by WIA, nine are on the walls of U. S. A. hamshacks. In order of qualification they be Ws 6YY 5KC 6ATO 8PQQ 1HA 6YC 2CC 8KPL and 7RT. WIA Awards Manager VK3XU comments: "Conditions down here are quite bright on 21 and 28 Mc. and seem to be improving generally with good European, African and South American openings. No need to mention North America, for we could doubtless hear you fellows on a (Continued on page 122)

KX6AF, ham installation of the 1960th AACs Squadron, emits a familiar signal from crescent-shaped Kwajalein in the Marshalls. That's T/Sgt L. C. Kelsey in the driver's seat. (Photo via K2OAH)



# The World Above 50 Mc.

1215-1300    1300-2450    2500-2800    2800-3200    3200-3500    3500-4000    4000-4500    4500-5000    5000-5500    5500-6000    6000-6500    6500-7000    7000-7500    7500-8000    8000-8500    8500-9000    9000-9500    9500-10000    10000-10500    10500-11000    11000-11500    11500-12000    12000-12500    12500-13000    13000-13500    13500-14000    14000-14500    14500-15000    15000-15500    15500-16000    16000-16500    16500-17000    17000-17500    17500-18000    18000-18500    18500-19000    19000-19500    19500-20000    20000-20500    20500-21000    21000-21500    21500-22000    22000-22500    22500-23000    23000-23500    23500-24000    24000-24500    24500-25000    25000-25500    25500-26000    26000-26500    26500-27000    27000-27500    27500-28000    28000-28500    28500-29000    29000-29500    29500-30000    30000-30500    30500-31000    31000-31500    31500-32000    32000-32500    32500-33000    33000-33500    33500-34000    34000-34500    34500-35000

CONDUCTED BY EDWARD P. TILTON,\* WHDQ

**I**n the ten years since we first moved from 56 to 50 Mc., we've seen how our lowest v.h.f. band reacts to all the variations of a solar cycle. We rode up over the peak of the previous cycle in 1947-8, down into the depths last year, and now we're hitting the steep upswing of another cycle.

During the heights of the last cycle, 50-Mc. amateurs around the world had unique opportunities to contribute to man's knowledge of v.h.f. propagation. CRPL predictions were available from the end of World War II on, but nobody really knew whether they would present an accurate picture of the maximum usable frequency for  $F_2$ -layer communication. There would be many checks on their accuracy for frequencies normally used in long-distance communication, but only hams would be using the frequencies that were actually near the "maximum usable."

Most of the predictions, it turned out, were on the low side. From the charts it would have appeared that we had no chance of working across the Atlantic, for instance. But, fortunately, most hams did not know that, so they went ahead with tests with European stations. The result is history — hundreds of contacts by Ws and VEs with stations in England, the Netherlands, France and Switzerland. Heard reports were received from most other European countries.

On north-south paths the results were even more revealing. The predictions indicated that some South American contacts might be possible from the Gulf States, and with South Africa from northern Europe, and so they were. But for 50-Mc. men in the more northerly parts of the United States the prospects to the south appeared dim. According to the charts, the highest frequency that would be open between W1 and

South America, for instance, would be about 38 Mc.

Once again, mostly in ignorance of this, we proceeded to check with South American operators who were united with us in a common interest in seeing what could be done on 50 Mc. First, as on other paths, commercial harmonics began showing up around 48 to 49 Mc. Then, finally, breakthroughs were made to Ecuador and Argentina from all U. S. call areas, and to Peru from some of them. From Mexico and several Central American countries contacts were made regularly from 1947 to 1951 with countries below the equator, at times of the day when the predictions showed not the slightest possibility of such things happening.

At least two factors of some importance were turned up by this amateur pioneering. A type of propagation, as yet not completely understood or explained, was brought to light for the first time. This made possible late-afternoon or early-evening north-south work during the equinoctial periods, reported by XE1KE, XE1GE and many South American operators.

Then there was the discovery that peaks of m.u.f. much higher than had been expected followed the breakup of major ionospheric disturbances. The 50-Mc. contacts made with South America by VEs and the northern Ws invariably came after there had been auroral activity the previous evening. Similar correlation of high  $F_2$ -layer peaks and ionospheric disturbances was observed on the Europe-to-South Africa 50-Mc. circuit.

Now we're approaching another period when such goings-on may be repeated. With television taking over the 50-Mc. region in Europe there'll be no two-way work with our friends across the

◆  
Rick Emerson, W3OJU, Washington, D. C., has been on 50 Mc. regularly for nearly ten years. His gear is entirely home-built, including the receiver and converter. The antenna is a stacked 4-over-1 array.  
◆





North Atlantic, though we'll probably have the distinction of setting some new TVI DX records! But there are still 50-Mc. men in several African countries, and all through South America. Those of us who are in a position to work DX on lower bands might well make good use of our DX facilities to line up 50-Mc. texts. Already, the predictions show areas of m.u.f. as high as 54 Mc. in parts of the southern hemisphere and across the Pacific in the vicinity of the Hawaiian Islands. NEIGE, near Mexico City, found it possible to work LUs as early as last April, and he made more contacts in the fall. By February and March there should be fairly frequent work over this path, and there seems a good chance that even a few Ws may get into the act. In 1957 — well, it's anyone's guess what may be happening by then.

The rising curve of solar activity may bring dividends for 144-Mc. operators, too. Aurora, conspicuous by its absence for the past few years, should be showing up more often, and probably with greater intensity. And though we're not too sure that there is much correlation between sporadic-E density and sunspot numbers, there is a good chance that the sporadic-E m.u.f. may rise high enough to permit more 144-Mc. DX of that nature than we've seen in the past few seasons.

This much is sure: Amateur work over long paths on the v.h.f. bands during the next few years is a potential source of information of real scientific value. We will have opportunities to justify our existence as something more than mere communicators. Such work can result in never-to-be-forgotten thrills, as well. To try again and again to break down a long path, when you know that there is no more than just a chance that you may make it, and then finally to succeed, is one of the high spots in the life of any good v.h.f. man.

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

The Geminid meteor shower, with a peak around Dec. 12th, produced some interesting effects on the v.h.f. bands. W4HHK, Collierville, Tenn., arranged a series of 144-Mc. skeds in the hope of adding a state or two by the meteor route. Tests with W1KCS, Providence, R. I., produced the usual short bursts each way, though not of sufficient quality to permit exchange of much useful information. Similar skeds with W5FAG, Albuquerque, N. Mex., worked out somewhat better. They were close to two-way communication on the morning of Dec. 14th, though not quite enough information was exchanged to qualify the work as a contact.

On the evening of the 12th 50-Mc. signals were reported as having considerably more than the normal amount of meteor-burst characteristics. Stations even less than 100 miles away showed pronounced flutter, and a few contacts were made that appear to have been the result of enhancement of signal strengths by meteor reflections. Your conductor worked W4UCH, Sterling, Va., who has not been heard before or since. Tropospheric propagation seemed poor at the time, and the signal sounded much like those received during the Giacobini-Zinner shower of 1946, except that the effect was noted in 1946 on much more distant stations. The Collins 49.8-Mc. signal was jammed with meteor whistles on the night of the 12th, and during the morning of the 13th, and its average signal level was much higher than normal at several observing points.

W4IKK, Rome, Ga., reports reception of weak phone signals on 50 Mc. the night of the 13th. About ten different signals were heard, all too weak for readable voice, though one was identified as a W5.

## 2-METER STANDINGS

Call States Areas Miles			Call States Areas Miles				
W1RFU	19	7	1150	W5MWW	9	4	570
W1HDQ	19	6	1020	W2LXL	9	4	700
W1REZ	18	5	710	W5ERD	8	3	570
W1UIZ	17	5	680	W5FEK	8	2	580
W1CCH	17	5	670	W5VX	7	4	1200
W1IZY	16	6	750	W5VY	7	3	1200
W1KCS	16	5	600	W5ONS	7	2	950
W1CLE	16	5	565	W5RSC	7	2	500
W1IBO	16	5	475				
W1AJR	15	5	600	W6WSQ	5	3	1380
W1AZK	14	5	650	W6DNG	4	2	350
W1MNF	14	5	600	W6ZL	3	2	1400
W1BON	14	5	650	W6BAZ	3	2	320
W1DJK	13	5	520	W6NLZ	3	2	360
W1MMN	12	5	520	W6MMU	3	2	240
W2ORI	26	8	1000	W7VMP	6	4	1280
W2NLY	23	7	1050	W7LEE	5	3	1020
W2AZL	21	7	1050	W7JUL	4	2	353
W2BLV	21	4	1020	W7YZU	3	2	240
W2UTH	19	7	880	W7JTO	3	2	140
W2AZP	19	7	650				
W2OPQ	19	6	—	W8WXV	28	8	1200
W2DWJ	19	6	630	W8LPD	25	8	750
W2AOC	18	6	660	W8RML	24	8	800
W2AMJ	17	5	550	W8RMH	24	8	850
K2CEH	16	7	910	W8SRW	23	8	850
W2WFB	16	6	900	W8RFG	23	8	850
W2PAU	16	6	740	W8VTL	22	7	725
W2PCQ	16	5	650	W8DX	22	7	675
W2PRT	20	5	550	W8BAX	21	8	685
K2IFJ	15	5	620	W8WRN	20	8	670
W2CFT	15	5	525	W8JWV	19	8	710
W2BRV	15	5	590	W8WSE	18	7	800
W2FLI	15	5	435	W8ZCV	17	7	970
W2LFX	15	5	—	W8RWV	17	7	630
W2DFV	15	5	—	W8WSE	16	7	800
				W8EGR	16	6	680
W3BGT	28	8	740	W9EQC	24	8	830
W3RUE	25	8	950	W9EKL	24	8	725
W3KCA	21	7	—	W9FVJ	23	8	850
W3KWL	19	7	740	W9BPV	23	7	1000
W3NKM	19	7	660	W9KLR	23	7	820
W3IBH	19	7	650	W9ZHL	23	7	690
W3GKP	19	6	800	W9WOK	22	8	860
W3TDF	19	6	720	W9KFS	21	7	660
W3BNC	18	7	750	W9UCH	21	7	750
W3FEH	18	7	—	W9GAB	20	7	750
W3LNA	16	7	720	W9MUD	19	7	640
				W9REM	19	6	—
W4HHK	28	9	1280	W9LF	19	6	800
W4AO	23	7	950	W9ALU	18	7	800
W4MKJ	20	8	725	W9JGA	18	6	720
W4RGT	20	2	—	W9MBL	16	7	660
W4JFV	18	8	830	W9JTY	15	7	560
W4VLA	17	7	825	W9BOV	15	6	780
W4TLV	16	7	1000	W9LEE	15	6	760
W4UMF	16	6	600	W9DSE	15	6	700
W4OLK	15	6	730	W9DDG	15	6	700
W4CLY	15	5	730	W9FAN	14	7	680
W4ZBU	14	5	800	W9QKM	14	6	620
W4OXC	14	5	500				
W4JHC	14	5	720	W0EMS	27	8	1175
W4WCB	14	5	740	W0GUD	25	7	1065
W4TCR	14	5	730	W0HED	24	5	870
W4UBV	14	5	435	W0UOP	18	6	—
W4IKZ	13	6	720	W0ONQ	17	6	1000
W4JFU	13	5	720	W0INI	15	5	830
W4SOP	13	5	680	W0OAC	14	5	725
W4UDQ	11	5	850	W0TJF	13	4	—
W4HJQ	11	5	500				
W4WNH	10	5	500	VE3DIR	26	8	895
W4MDA	10	4	680	VE3AI	22	8	890
				VE3ER	15	7	800
W5RCI	21	7	925	VE3RQN	15	7	790
W5JTI	19	7	1000	VE3FBP	13	6	715
W5AJC	13	5	1260	VE3AK	12	7	350
W5EHF	11	5	850	VE3AQQ	11	7	800
W5ABN	11	3	780	VE1QY	11	4	900
W5QNL	10	5	1400	VE7FJ	2	1	365
W5CVL	10	5	1180				

K2PJD, Utica, N. Y., found the 50-Mc. band open briefly to North Dakota at 1330, Dec. 11th. K2GRI, near Saratoga Springs, N. Y., and W1UNB, Paxton, Mass., who are on during the day, caught several daytime openings between the 10th and 15th, and several W1s worked W4s and W6s on the 11th. This coincidence of a major meteor shower and the usual December sporadic-E openings makes it difficult to sort out the contacts by propagation medium, but it appears quite possible that at least some of the DX reported was of meteoric origin.

A bulletin on the meteor shower and its possibilities was run on W1AW for several days previous to the 12th, in the hope that more v.h.f. schedules would be set up for the period. If reception or two-way work resulting from the meteor shower was done that has not been reported, we'd be glad to hear more about it. We have a third-hand report, for instance, that W2CXY worked W5RCI on 144 Mc. via the Geminids. Were there others?



More prospects for Bermuda DX on 144 Mc.: VP9CL, Hamilton, and VP9CB, St. Davids, began working each other on 144 Mc. in late November. They are presently using low power and simple antennas, but they promise something of DX proportions before spring.

And for still greater DX — G2ADZ says that his bid (Dec. QST, page 100) for transatlantic skeds has so far brought just one American reply. He wonders if nobody in this country is interested in trying to cross the Atlantic on 144 Mc. Who's to say it can't be done?

V.h.f. and u.h.f. — Russian style: Bands are now available to Russian amateurs at 38 to 40 Mc., 190 to 195 Mc., 1470 to 1520 Mc. and 5650 to 5850 Mc. Obtaining permission for the construction and operation on the "ultrashort waves" is somewhat involved, and a maximum input of 10 watts is allowed. Ciphored calls of six characters are assigned to these stations. This information is from a translation of an item in the Russian journal, *Radio*, by W8FAZ.

Addition to list of stations ready to try ionospheric scatter communication on 50 Mc.: W2WFB, Ithaca, N. Y., 1-kw. final, stacked-Yagi array in the works. Will welcome skeds with stations at suitable distances from Ithaca.

Interest in 144 Mc. is growing in West Texas. The Dec. 12th meeting of the Terry County Radio Club was devoted to a 2-meter discussion, with talk and demonstration by W5SNX and KNSBDX of Slayton. West Texas amateurs would like to coordinate their v.h.f. efforts with other 2-meter enthusiasts in the Northern Texas Section.

Evidence of rising m.u.f.: K6EDX, Fresno, Cal., has been checking daily since about November 1st, and in that time he has heard the radio paging service in New York on 36 Mc. regularly. Reception is between 0900 and 1400 p.m. Many other signals from eastern and middle-western stations are heard up to 38 Mc. or so. Teletype, not identified, is heard from the east and southeast as high as 44 Mc. An ionospheric-scatter circuit, apparently in the Hawaiian Islands, is heard S-9-plus on 43 Mc., peaking at around 1400 p.m. With commercial and other signals running this high, can 50-Mc. F<sub>2</sub> openings be far behind?

### The Ski-Rack Special for 144-Mc. Mobile

Results with cross-polarization in 2-meter mobile vary with the terrain between the mobile and the fixed station. In hilly country like that in western New England it is difficult to tell, when working mobile, whether the station at the other end is horizontal or vertical. In flat open country, however, the use of a vertical whip in working a horizontally-polarized fixed station is something less than satisfactory. And in any kind of terrain, the signal-to-noise ratio with horizontal-to-horizontal is much better than with vertical-to-vertical.

The problem of mounting a horizontal mobile antenna can be solved in many ways, and we have shown several in QST in recent years. The one in the accompanying photograph has the advantage of being readily demountable, yet it is up in the clear and is ruggedly built. The work of W1DXE, it has proven its worth again and again, particularly in the family-affair 2-meter QSOs between W1DXE and W1VLH/mobile. W1VLH travels northwest from West Hartford frequently, the route taking him into the foothills of the Berkshires, rough country for v.h.f. mobile coverage. Working with the home station, W1DXE, he has had ample opportunity to learn just where mobile reception drops off below the usable level, when using a vertical whip.

With the ski-rack mounted horizontal dipole shown, the two-way working range has been extended at least 25 per cent, and the quality of the signal at the intermediate distances has been vastly improved. Ignition interference, particularly that from other cars, is greatly reduced, compared to vertical whip reception, and the audio distortion that is experienced at normal highway speeds is almost wholly lacking. Modulation is easier to read at any distance where the signal can be heard.

Construction of the antenna is obvious from the photograph. The vertical support is ¼-inch brass rod about 19 inches long. A small plate, which can be either metal or insulating material, is fastened to the top of the rod, and on this the dipole is mounted with small cone standoff insulators. The dipole is fed with 52-ohm coax directly. This is "against the law," but at approximately a quarter wavelength above the car top it appears to work very satisfactorily with no balancing device.

Directional effects from the dipole? Possibly in open ter-

rain there would be objectionable drop-off in signal level when the dipole is end-on to the station being worked, but it has not shown up that way in the Connecticut hills. Should directional characteristics be troublesome, the dipole could be bent into a circle.

### How Not To Use Long Yagis

Having followed the work of W2NLY and W6QKI with long Yagi arrays closely for the past couple of years, your conductor jumped at the chance to try a large in-line recently made available to 2-meter men. The array tested was an unusual design, about which we hope to have more to say editorially in the near future. It is of general interest in that it achieves high performance through a somewhat different approach than that described by Kmosko and Johnson in their fine report on long Yagis in January QST. It is nearly 28 feet long, and has 15 elements in line. The manufacturer claims better than 16 db. gain over a dipole, and it undoubtedly is capable of that.

The manufacturer also states in his brochure that the array must be erected in a completely clear space, at least 20 feet above the ground plane. Take it from your conductor — he means it!

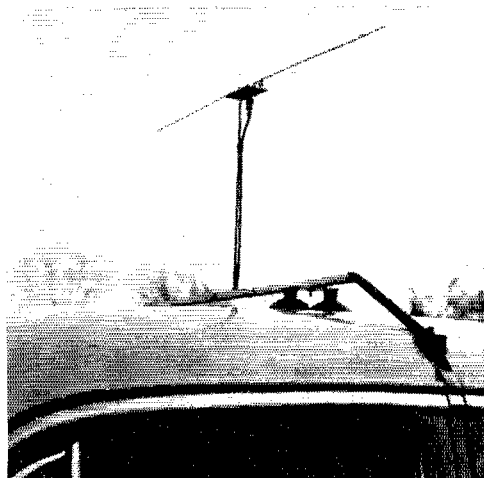
At W1HDQ the array was erected originally on a test support, about 25 feet above ground. This was by no means an ideal spot, as the long boom brought the ends of the array near to a guy wire, an aluminum rain gutter and two trees, at various points in its rotation. Even so, the long Yagi showed a receiving gain of 12 db. over a comparison dipole that was somewhat more favorably situated. At this rate it looked like a very good bet for installation atop our 60-foot tower.

But to be used there it would have to go in between the two bays of a 3-over-3 6-meter array. As these bays were stacked 12 feet (¾ wavelength) apart we hoped that there would not be serious interaction. The monster was finally juggled into place between the 6-meter bays, and we could hardly wait to hear the S9-plus DX rolling in on 2.

We never heard it. The long Yagi showed hardly any gain over the comparison dipole! The pattern, which had been remarkably clean on the temporary support, was now cluttered with large minor lobes, and the array was useless. Later it was turned at right angles to the 6-meter booms, but still no gain resulted.

The array has since been installed by another 2-meter man locally, in this case 12 feet above a 6-meter beam, but otherwise quite well clear of obstructions. A pattern check shows slightly lopsided minor lobes somewhat larger than the manufacturer's literature, but not at all bad. No comparison antenna was available at this location, so no direct check on gain has been made, but indications are that the array is doing a very satisfactory job.

Just a word about "aperture" or "capture area" in connection with these long arrays. Even though its frontal



Ski-rack mounted horizontal dipole for 2-meter mobile work built by W1DXE.

# 50 WASH Mc.

W0ZJB	48	W4FLW	43	W88QU	43
W0BJV	48	W4CPZ	42	W80JN	43
W0CJS	48	W40XC	41	W8LFD	42
W3AJC	48	W4MS	40	W8YLS	41
W9ZHF	48	W4FNR	39		
W9OCA	48	W4I0J	38	W9ZHB	48
W6OB	48	W4BEN	35	W9QUV	48
W0INI	48			W9HGE	47
W1HDQ	48	W5VY	48	W9ZP	47
W3MJD	48	W8SFW	47	W9RQM	47
W2IDZ	48	W8GNQ	46	W9ALU	47
WILL	48	W8ONS	45	W9QKM	47
W0DZM	48	W5JTI	44	W9UIA	45
W0HVW	48	W5ALL	44	W9UN8	45
		W5FSC	44	W9MFB	40
W1GJO	47	W5JLY	43		
W1CLS	46	W5JME	43	W0QIN	47
W1CGY	46	W5VV	42	W0NFM	47
W1LSN	45	W5PAL	41	W0PKX	47
W1DJ	41	W5HEZ	41	W0KVF	47
W1RFU	41	W5ELD	40	W0WKB	47
W1SPX	36	W5FXN	38	W0JOL	46
W1FOS	32	W5NSJ	24	W0MYG	46
W1WAS	23	W5ZVF	23	W0TJF	44
				W0URQ	44
W2MEU	47	W6WNN	48	W0JHS	43
W2AMJ	46	W6ANL	45	W0TKD	43
W2BYI	46	W6PML	45	W0PTI	41
W2RLV	45	W6IWS	41	W0ORE	37
W2FHL	45	W6ABN	35	W0USQ	36
W2QYV	40	W6GCG	35	W0VIK	34
W2QVH	38	W6BWG	33	W0PKY	32
W2ZUW	35				
W2ORA	35	W7ERA	47	VERAET	44
K2AXQ	32	W7ERA	47	VERAIB	35
K2JNS	30	W7BQX	47	VEIQZ	34
		W7FDJ	46	VEIQY	32
W30JU	46	W7DYP	45	VESDR	31
W3TFE	42	W7RFD	44	VEIEF	28
W3NKM	41	W7ACD	43	XEIGE	25
W3MQU	41	W7BOC	42	CO6WW	21
W30TC	40	W7JPA	42		
W3KMV	39	W7FV	41	Calls in bold	
W3RUW	38	W7CAM	40	face are holders	
W3MXW	38			of special 50-Mc	
W3LFC	37	W8NSS	46	WAB certificates	
W3FPH	35	W8CMS	46	listed in order of	
		W8NQD	45	award numbers.	
W4FBH	46	W8UCZ	45	Others are based	
W4FQM	44	W8RFW	45	on unverified re-	
W4QN	44	W8LFD	44	ports.	

area is small, a properly tuned long Yagi has a very large capture area. Other antennas or wires within a radius equal to about half the boom length are almost certain to impair its effectiveness. By the same token, stacking of long Yagis is a rather discouraging proposition. Very large spacings between bays must be employed, if any real gain is to be achieved. But that's another story, about which we hope to have more at a later date.

## OES Notes

We owe W4IKK an apology for an error in the printed report of his work with pentode r.f. stages that ran in this space in December *QST*. Bill's experiments were with 50-Mc. r.f. stages, but we wrote it up as 144 Mc. This was a pure slip of the typewriter on your conductor's part. We knew that the work was done on 50 Mc. and intended to report it as such.

**W1HDQ, Canton, Conn.** — Results of 50-Mc. ionospheric scatter tests very encouraging. W4HHK, Collierville, Tenn., 1020 miles, has heard a fair percentage of every test transmission made thus far. Best results are on morning transmissions (0830, 0840, 0850, 5 minutes each, 50.005 Mc., c.w., 400 watts output) with the signal audible better than 75 per cent of the time. Peaks are up to S9, and c.w. is readable if repeats are made. W4IKK, Rome, Ga., and W4LNB, Atlanta, both about 850 miles, also hear the signal, though apparently not as well as W4HHK. Would like to recruit listeners at 700 to 1300 miles for these or other skeds. Two-way skeds also desired.

Tropospheric scatter tests with W30JU, Washington, D. C., showed that consistent contact was possible. W30JU runs less than 100 watts input, but uses 4-over-4 array in better-than-average location. Though scheduled tests are

concluded, W1HDQ will continue to CQ on c.w., toward Washington area nightly at 2245, whenever possible, for other stations to attempt contact. W4UCH, Sterling, Va., and W3KMV, Chevy Chase, Md., have been worked at this time, in addition to W30JU.

**K2LRN, Liverpool, N. Y.** — New 6-meter rig with parallel 6146s in final delivers 100 watts output. Constructed low-s.w.r. v.h.f. dummy load, using 20 2-watt resistors paralleled in copper box. Tests with new ceramic triode 6BY4 show tube inferior to miniature types at 220 Mc. and lower, but it appears to have excellent possibilities for u.h.f. amplifier service. Activity on both 6 and 2 in Syracuse area on upgrade. Six-meter gang now includes K2s GEF GEI LIJ EPH OVH QKU, W2s UFI RHQ EMW HNH and W3ZGH/2.

**W3GKP, Silver Spring, Md.** — VFO with stability sufficient for T9 signal on 144 Mc. is achieved by running a Collins 70E-8 VFO unit and its following buffer stage on 1780 kc. with storage battery heater supply on the 6SJ7 and 6AC7. This is followed by four triplers, the first of which is keyed. VFO is warmed up one hour before use, and is left on continuously thereafter. At such a low frequency it does not interfere with reception.

**W4LNG, Atlanta, Ga.** — Opposed to present crowding of DX work at 144 Mc. Frequency at low edge has no propagation significance, and it wastes desirable passband characteristics in crystal-controlled converters on the aircraft band below the edge of the amateur band. If we must crowd a frequency, 145.000 would make much more sense. Beams and converters could be peaked to favor this frequency without sacrificing handpass, and it would give the Novice a chance.

**W5NSJ, Albuquerque, N. Mex.** — Experimenting with transistorized radio-control receiver on 54 Mc. 1AG4 detector feeds 2N107s in audio and relay stages. 5-microvolt signal 50 per cent modulated closes control relay.

**W5TIA/5, Fayetteville, Ark.** — Activity on 50.1 Mc. includes writer and W5s WHU/5 BHJ/5 UEB OXL and JBU. Usually on at 1230 and 1730. Mobile to mobile work done at distances up to 30 miles, using vertical whip and 25 watts input at each end.

**W6ORS, Alhambra, Cal.** — Mountains provide bounce points for 144- and 220-Mc. communication as far away as San Diego, 170 miles. Polarization vertical.

**W7JHX, Port Orchard, Wash.** — Completed work on sync generator and blanking unit for TV rig.

**W8NAF, Dayton, Ohio** — Use of m.c.w. on 144 Mc. provides excellent code training for Novices. M.c.w. net now in operation in Dayton area.

**W8DRN, Des Plaines, Ill.** — Had to reduce power on 432 Mc. by 50 per cent, to comply with new regulation, but seem to be doing about as well. Converting final from doubler to straight amplifier will restore power output to near original value. Operation on 432 Mc. each Thursday at 2100.

**W9KLD, Kankakee, Ill.** — As check on possibilities of 144 Mc. with low power, have kept regular sked with W99SKN, at a distance of 43 miles. Power used is 15 watts input at both stations. Antenna at W9KLD is 5-over-5 made from cut-down Channel 5 Yagis. W99SKN has 3-over-3. Signals are solid on voice, in all weather.

**W9MHP, Indianapolis, Ind.** — New 5-over-5 for 50 Mc. recently erected provides much better range and signal strengths than 3-element job it replaced.

**W0QLU, Cedar Rapids, Iowa** — Mobile on 220 Mc. showing up well. W0NRF, with 1 watt antenna power and quarter-wave antenna on car top, puts in good mobile signal over 17 miles of hilly terrain.

Notice to all OES appointees: Once again we point out that OES is a v.h.f. only appointment. You must be active on one or more v.h.f. bands to qualify for it. This does not, of course, prevent you from working other bands as well — but please do not report low-frequency work on OES report forms. It wastes everyone's time, including yours.

## ARE YOU LICENSED ?

• When joining the League or renewing your membership, it is important that you show whether you have an amateur license, either station or operator. Please state your call and/or the class of operator license held, that we may verify your classification.

# Results - 1955 W/VE Contest

Final results of the W/VE Contest of last September 24th and 25th have been received from the Montreal Amateur Radio Club, sponsors of the affair. Many regulars in the ARRL Sweepstakes and DX Contest were active in this annual "across the border" funfest. Canadian winner Thain MacDowell, VE2NI, racked up 68,400 points, 381 QSOs, 45 sections, using a Lysco rig at 30 watts input and a 75A-1 receiver. He received the trophy, pictured on page 58, September 1955 QST, in a special MARC Christmas party on December 14th. In the U. S. A., W8AJW set the pace with a score of 20,541. The Contest Committee, consisting of VE2ACA, VE2BB and VE2DY, states that the first-listed station in each ARRL section in the tabulation below will soon receive a certificate. The figure following each call indicates final score.

<i>E. Pennsylvania</i>		<i>Ohio</i>	
W3TYW.....	10,686	W8AJW.....	20,541
W3AIZ.....	7892	W8MKK.....	11,548
W3WEX.....	7678	W8SWZ.....	4266
W3MDO.....	5646	W8MQQ.....	2986
W3ZBQ.....	4266	<i>E. New York</i>	
W3YUW.....	2557	K2HZD.....	7807
W3SOH.....	1209	K2LDH.....	6470
W3YHX.....	1138	K2HVN.....	6371
<i>Md.-Del.-D. C.</i>		W8RGF/2.....	5759
W3HVM.....	10,750	K2D1M.....	2389
W3WZL.....	9385	W8AVT/2.....	1280
W3DKT.....	8778	<i>N.Y.C.-L.I.</i>	
W3HQZ.....	2752	W2EEN.....	6271
W3BFW.....	2688	K2GGG.....	5226
W3RYV.....	21	W2CPA.....	2304
<i>S. New Jersey</i>		K2HMG.....	2048
K2CPR.....	8660	K2KXZ.....	149
W2GND.....	1776	<i>N. New Jersey</i>	
<i>W. New York</i>		W2EIK.....	11,945
W2SSC.....	19,623	K2AFQ.....	11,006
W2QBB.....	3683	K2EPP.....	7821
W2KEH.....	2745	K2KUG.....	6526
K2JAD.....	1365	K2KFP.....	6399
W2MTA.....	1251	K2KDW.....	6143
W2ZCZ.....	1024	W2LRO.....	5333
K2EVP.....	683	K2HLA.....	4210
<i>W. Pennsylvania</i>		K2LBO.....	3413
W3GJV.....	5225	W2N1Y.....	2527
W3VKB.....	4949	K2JYS.....	2389
W3VKD.....	3484	W2Q9S.....	1422
W3KQD.....	1083	K2EFT.....	1085
<i>Illinois</i>		K2CCT.....	853
W9KLD.....	12,627	<i>Iowa</i>	
W9PZT.....	12,286	K0AZJ.....	5261
W9Y YG.....	5375	W0NPF.....	5077
W9CLH.....	1729	W0VFM.....	1138
W9CNF.....	1692	<i>Kansas</i>	
W9HVP.....	1664	W0GAX.....	6719
W9MAK.....	1280	<i>Missouri</i>	
W9ASK.....	1194	W0TWL.....	5631
W9JGV.....	725	W0YJM.....	4224
W9ALO.....	640	<i>Nebraska</i>	
<i>Indiana</i>		W0DW.....	7568
W9UKG.....	17,064	<i>Connecticut</i>	
W9FGX.....	14,494	W1TQ.....	15,358
W9UTL.....	4607	W1WY.....	14,732
W9SFR/9.....	2218	W1ACR.....	5716
W9SWR.....	1854	W1AMY.....	4507
<i>Wisconsin</i>		W1DDJ.....	2517
W9GWK.....	16,723	W1RGT.....	2248
W9WEN.....	12,841	W1AW.....	1991
W9BVG.....	9736	W1NLM.....	1962
W9OT.....	8873	W1HV.....	1045
W9DIK.....	8063	<i>Maine</i>	
W9RKP.....	5119	W1VEH.....	1557
W9BCC.....	569	<i>W. Massachusetts</i>	
W9YOS.....	455	W1JYH.....	5276
<i>Minnesota</i>		<i>New Hampshire</i>	
W9VBS.....	3683	W1FZ.....	10,900
W9YCR.....	3626	W1ARR.....	5972
W9QZR.....	1067	W1QUU.....	3306
<i>Louisiana</i>		W1DYE.....	1365
W5KC.....	1621	<i>Rhode Island</i>	
<i>Mississippi</i>		W1VBR.....	2773
W9APY/5.....	13,310	<i>Vermont</i>	
<i>Tennessee</i>		W1UGW.....	10,366
W4TJL.....	3669	W1QMM.....	7963
<i>Kentucky</i>		<i>Montana</i>	
W4OMW.....	5663	W7UGZ.....	2199
W8KPL.....	7338		
W8PGT.....	4266		

\* Labrador certificate winner.

<i>Oregon</i>		<i>New Mexico</i>	
W7TML.....	4095	W5VRP.....	12,969
W7UGO.....	2133	<i>Maritime</i>	
<i>Washington</i>		VE1EK.....	34,223
W7AJS.....	5852	VO6N*.....	29,498
W7WOQ.....	1394	VE1AEE.....	21,516
<i>East Bay</i>		VE1DB.....	11,550
W61PH.....	1109	VE1OM.....	3280
<i>Sacramento Valley</i>		<i>Quebec</i>	
W6PCA.....	853	VE2NI.....	68,400
<i>North Carolina</i>		VE2BN.....	54,162
W4BDU.....	1280	VE2DR.....	43,465
<i>Virginia</i>		W8VVF/VE2.....	35,200
W4WRM.....	8703	VE2YA.....	32,736
W4TFX.....	8461	VE2AQO.....	10,989
W4FPX.....	6940	VE2AGG.....	8556
W4JUJ.....	1963	VE2RL.....	5445
<i>West Virginia</i>		VE2AUR.....	4631
W8JWX.....	1877	VE2AEO.....	4140
<i>Colorado</i>		<i>Ontario</i>	
W0SJT.....	1728	VE3BXF.....	53,250
W0SGG.....	1664	VE3BHS.....	50,820
<i>Utah</i>		VE3QE.....	49,425
W7QDJ.....	939	VE3ASV.....	43,560
<i>Alabama</i>		VE3DSU.....	40,376
W4WOG.....	6420	VE3DN.....	39,928
<i>Georgia</i>		VE3ES.....	29,397
W4BEY.....	13,992	VE3BNQ.....	27,512
<i>Los Angeles</i>		VE3BOH.....	27,213
W6ZOL.....	9630	VE3AVS.....	26,319
K6GJZ.....	5375	VE3DII.....	23,936
W6NJU.....	4181	VE3DUS.....	21,318
K6ELX.....	2986	VE3MI.....	11,788
K6ICF.....	427	VE3BUR.....	10,998
<i>Arizona</i>		VE3GL.....	8910
W7RZQ.....	2837	VE3AJ.....	4133
<i>San Diego</i>		VE3DNR.....	1248
K6EBH.....	6371	VE3AU.....	512
W6GBG.....	3982	<i>Saskatchewan</i>	
<i>N. Texas</i>		VE5DZ.....	15,933
W5DXW.....	8137	<i>Alberta</i>	
W5RDL.....	6719	VE6NX.....	18,316
W5JD.....	4181	VE6IZ.....	7000
W5AQE.....	1280	VE6AJ.....	4133
<i>Oklahoma</i>		VE6SX.....	3150
W5CFG.....	10,750	VE6GX.....	2664

While chasing Canadian amateurs in the contest, Tony Rogers, W3BFW and son of U. S. Deputy Attorney General William P. Rogers, had distinguished company. It was September 24th, the date of President Eisenhower's heart attack, and Vice-President Richard M. Nixon had dropped over for some peace and quiet and conversation with Tony's dad, a long-time friend. Afterwards when Nixon tried to grab forty winks, it seems that he was kept awake by assorted noises from W3BFW's shack. So the 15-year-old not only made the Md.-Del.-D. C. tabulation above, but also *Time*, *Look*, and various other magazines, periodicals and newspapers. Noisy rays, Tony?



The Jewish Community Center of Indianapolis kept regular contact with its summer camp in Zionsville, Indiana, by ham radio during the summer season. Center director W9RGM set up a nightly 80-meter c.w. schedule with the camp, where Stanley Goldberg, one of the counselors, had a portable rig set up. W9RGM and the camp director were thus able to exchange reports and other information; a by-product of the arrangement was a series of radio lessons at the camp by Goldberg, which resulted in six new Novices among campers and staff members.

# YL NEWS and VIEWS

BY ELEANOR WILSON,\* W1QON

Amateur radio is many things to many people — a truism we often hear. The two YLs whose photographs appear on this page are glad to tell what amateur radio means to them, for they hope that others in similar circumstances may also realize the interest and pleasure they have experienced since becoming amateurs.

Jean Heikkila, W0IRJ, of Cromwell, Minnesota, writes:

"I have been a ham since 1952, when I started with a novice ticket after listening for several years. I find ham radio an excellent hobby, for I am confined to a wheel chair by muscular dystrophy. A group of wonderfully helpful local hams keep my Viking II and HQ-140X in good operating condition and have even wired my rig for remote control operation, allowing me to operate from my bed. My license has enabled me to travel to all corners of the earth and to make a world of new friends from all walks of life. No longer are there weary hours of nothing to do and nothing to think about. Now it is impossible to imagine how I got through one long day after another without my station."



Betty Wilson, W6REF, of Oxnard, California, has been confined to a wheel chair since 1948, when she was stricken with polio. Betty's activities since 1951 when she received her first license, W7PTC, would fill a page. Interested mainly in traffic handling, she has been an active member of seven nets. In 1953 she received a Public Service award for handling messages during the floods in Northern California. An ORS and RM, she has a Code Proficiency Certificate for 25 w.p.m. and several traffic certificates. As Secretary of the Mission Trail Net, she is the first YL to hold office in that organization. She is employed as a bookkeeper in a local airport office, and in her "spare" time she conducts code classes and builds some of her own equipment.

That amateur radio means much to Betty and

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



W6REF

Jean is obvious. The situation is reciprocal though, for the enthusiasm and cheerfulness and courage of the girls inspire all who meet them.

We regretfully add a postscript to the above. Word has come of the passing of Patt Parks, W5TTU, of Rotan, Texas. Patt loved amateur radio and people, and in spite of chronic invalidism for years, she thought only of doing things for other people. A tribute to Patt's contribution to our world may be found in the words of W5SYL, a devoted friend — "Always we listened for W5TTU."

## DXCC YLs

Last year only W1RYJ was added to our list of YLs who are members of the DX Century Club. This year five made the grade: W2FZO, W3WUH, W9QLH, KZ5DG, and ZS6WJ. The four girls who have worked the most countries are also the ones who upped their totals over last year.



While using her old call, LU4MG, Maria de Dantiacq, Buenos Aires, had 151 countries confirmed in 1949-1951. Mary now has 178 countries confirmed on phone under her present call, LU4DMG, issued in 1951. The only YL in Argentina on c.w., she is also working for DXCC on c.w. only. LU8DMC is Mary's OM.

Contacts on ten phone only have given W2PBI, Jerry Weinberg of N. Y. C., DXCC (113), WAS, WAC, BERTA, and WBE. Jerry's OM, W2YYL, also holds the same certificates, with all contacts made on ten phone too.

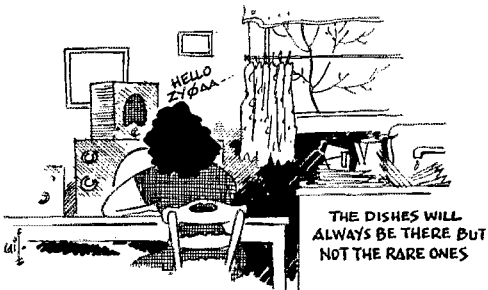




**W3WUH, Constance Hyden, is one of the newcomers to the list. With 108 countries confirmed on phone and c.w., Connie awaits a few more confirmations to make DXCC on phone too. A high-school senior, Connie has done her DXing on 20 mainly, but she "would go on any other ham band if [I] could work a new country." Her Dad is W3IMV.**

WIMCW, long our leading DX gal, was up 5 to 219 countries worked, on phone only. EA2CQ, up 13; LU4DMG up 28; CO2BK up 30, are all in the phone only class, too. W1FTJ also added 14 to her total, phone and c.w. All others maintained the same standing as last year.

Phone only: WIMCW 219; EA2CQ 203; LU4DMG 178; CO2BK 160; W9QLH 137; W2PBI 113; W8BFQ 110; KZ5DG 101; W2FZO 100; OE5YL 100.



Phone and C.W.: W6UHA 201; W1FTJ 134; W4ITR 123; W6YZU 120; W5UCQ 116; W2NFR 115; ZS6WJ 112; ZS6KK 109; W3WUH 108; KZ5DG 105; G3ACC 100; W1RYJ 100.

### YLs You May Have Worked

In little more than a year, after starting as a novice, W5EGD, Lillian Beebe, has WAS, WAC, and 62 countries confirmed. A member of the South Texas Emergency Net and the Texas YL Round-Up Net, she works 20, 40, and 80, phone and c.w. Lillian is married to W5DIW, an FCC inspector.

After twelve years of exposure to amateur radio, Ila Jennings decided to try for herself and came up with the call KN6MHU. She liked what she found and worked hard enough to drop the novice "N". Ila's OM, W6EI, was so pleased with her efforts that the use of DX100 and 75A4 and a KW mobile rig were her reward. Ila is on 40 and 80 c.w. from her San Jose QTH.

(Continued on page 138)



K6MHU

**CONTEST PERIODS**

**Phone:** Starts: Saturday, March 3, 1956, at 1:00 P.M. EST.  
Ends: Sunday, March 4, 1956, at 12:00 midnight EST.

**C.W.** Starts: Saturday, March 17, 1956, at 1:00 P.M. EST.  
Ends: Sunday, March 18, 1956, at 12:00 midnight EST.

### Seventh Annual YL-OM Contest

(Conducted by the Young Ladies Radio League)

**Eligibility:** All licensed OMs and all licensed YLs and XYLs are eligible.

**Operation:** All bands may be used. Cross-band operation is not permitted.

**Procedure:** Call "CQ YL" or "CQ OM."

**Exchange:** QSO number, RS or RST report, and state, U. S. possession, VE district, or country should be exchanged.

**Scoring:** (a) One point is earned for each station worked (YL-to-OM or OM-to-YL only). Phone and C.W. contest will be handled as separate contests. (b) Stations and multipliers will count only once in each contest . . . example: a station contacted on phone may be contacted in the C.W. portion of the contest for additional credit. (c) Add number of points and multiply by number of different states, U. S. possessions, VE districts, and countries worked. (d) All phone contestants running 150 watts input or less at all times then may multiply final score by 1.25. (e) All c.w. contestants running 150 watts input or less at all times then may multiply final score by 1.25. (f) Maryland and District of Columbia count as one state.

**Logs:** Copies of phone contestants' logs must be post-marked not later than April 1, 1956; copies of c.w. contestants' logs must be postmarked not later than April 10, 1956. Logs should be sent directly to Gloria Matuska, W9YBC, 2322 South Second Avenue, North Riverside, Illinois.

**Awards:** A silver cup will be awarded to the highest YL scorer and to the highest OM scorer. The highest score can be a combined total of c.w. and phone scores, or it may be either a c.w. score or a phone score. Gold cups will be awarded to first and second place scorers, YL and OM, phone and c.w. Winners of silver cup awards are not eligible for gold cup awards, i.e., if the highest scorer also has the highest phone or highest c.w. score, then the gold cup for first place phone or c.w. will go to the contestant with the second highest phone or c.w. score. Cups are awarded on a yearly basis, with a three time winner obtaining permanent possession. All winning contestants will receive a certificate. The highest scoring contestant in each district will receive a certificate.



W5EGD

## 22nd International ARRL DX Competition

Phone: Feb. 10th-12th, Mar. 9th-11th;  
C. W.: Feb. 24th-26th, Mar. 23rd-25th

DX Test time is almost here, and whatever your locale, you're urged to participate on phone or c.w. or both. Two weekend periods will be devoted to c.w., two to phone participation. Each of the four periods begins on Friday at 7 P.M. EST and ends on Sunday at 7 P.M. EST on the dates shown above.

Certificate awards will be given to the highest-scoring c.w. and phone operator in each country and in each continental U. S. A. and Canadian ARRL section. And then there will be the special certificates for club leaders and multiple-operator competitors and a gavel to the top club.

Those outside the U. S. and Canada will try to trade contest information with as many W (K) and VE/VO stations as possible. U. S. and Canadian amateurs will transmit RS or RST reports *plus states or provinces*. Returns from the DX, though, will be the usual 5- or 6-digit numbers indicating signal reports and powers input.

Free contest report forms are now available from the ARRL Communications Department upon request. These will facilitate preparation of your log for submission, but are not required by the rules. If you request these forms, please advise us whether you expect to enter the c.w. section, the phone section, or both.

You can be choosy and scout only new countries to fatten DXCC totals, or you can go out for your section award by chasing all comers. In the latter case, thumb through the results of the last DX Test (October, 1955, *QST*) to get an idea of your local competition. And by all means scan the rules in January, 1956, *QST* to learn the pattern of this year's contest. Fifteen meters should be "hot," so let's have some Novice entries too. Good fishing to everyone, whether newcomer or old timer, in February and March!

### Strays

This is the accomplishment of Jerry Johnson, W8TJV, whose home is in Glenwood Park, near Princeton, West Virginia. Jerry received his Novice license September 14, 1954. He received his General license on November 29, 1954, and his Second Class Radio telephone Commercial license April 7, 1955. He was awarded his First Class Radio telephone Commercial license on October 12, 1955. The entire time consumed from Novice to First Class Commercial was

only a little more than a year. But, the special significance of this is that Jerry is now just thirteen years old!

-----  
Add unusual calls—K6BLF, that of C. W. Hash, Fort Ord, California.



Johnnie Fearon, W4WKP, 11-year-old Atlanta, Ga., boy, blind since birth, on November 23, 1955 became the youngest MARS operator in the world. He is shown above at the controls of the Fort McPherson, Ga., radio station, as Capt. Donald Worth, jr., W2JJW (left), Third Army MARS Officer, and Col. A. R. Morley, Third Army Signal Officer, look on.

(U. S. Army Photo)

### Silent Keys

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

- W1MY, Donald C. S. Comstock, Somers, Connecticut
- W1NUN, Murray H. Barchard, Bangor, Maine
- W2QEN, Frank H. Wood, Salem, New Jersey
- W3ATR, Charles J. Schroeder, Philadelphia, Penna.
- W3MUZ, Donald Mook, Rouseville, Pennsylvania
- W3ZZD, Maurice B. Bernhard, Towson, Maryland
- W6AHU, Bardsley Whiting, San Francisco, California
- W6ODR, Robert Bowen, San Diego, California
- W7VCK, Leland W. Sturdevant, Wedderburn, Oregon
- W7YHA, Duane E. Names, Kelso, Washington
- W8NDA, Arnot P. Foster, Cincinnati, Ohio
- W9ICS, James R. Bailey, Barrington, Illinois
- W9QQ, John O. Weaver, Christopher, Illinois
- W0PZP, Walter A. Helm, Falls City, Nebraska
- W0UW, Homer G. Heidt, St. Paul, Minnesota
- W0YUN, Clyde N. Green, Minneapolis, Minnesota
- CX1AH, Jose P. C. Viera, Montevideo, Montevideo
- KH6BFQ, Louis A. Carvalho, Hilo, Hawaii
- KL7BKO, William L. Harnack, jr., Anchorage, Alaska
- KN4BYV, George Jenkins, South Hill, Virginia
- ex-LU3DE, Geronimo Chescotta, Buenos Aires, Argentina
- VE3BSQ, J. Harold M. Enright, Belleville, Ontario, Canada
- VE3BUS, Jack Rumball, Lockerby, Ontario, Canada



# Correspondence From Members -

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

## 40TH ANNIVERSARY ISSUE

5th & Kostner Aves.  
Chicago 24, Ill.

Editor, *QST*:

. . . Congratulations on our 40th birthday. The December issue with the reprint is wonderful.

— *D. L. Marquette, W8DHH, Treas.  
Dayton Amateur Radio Assn., Inc.*

P. O. Box 278  
Rochdale, Mass.

Editor, *QST*:

. . . The December issue of *QST* is really TOPS — the best ARRL has ever put out. Very nice work . . .

— *Alan D. McKerron, W1SPF*

77 Reservoir Road  
Kensington, Conn.

Editor, *QST*:

The December *QST* with the anniversary reproduction of the first issue was F.B.

— *William L. Miller, W1ESS*

62 St. John's Road  
Pointe Claire, Que., Can.

Editor, *QST*:

Many happy returns on *QST*'s anniversary and congratulations on a very fine December *QST*.

— *C. Bill Skarsledt, VE2DR*

Al Paul Lefton Company  
71 Vanderbilt Ave.  
New York 17, N. Y.

Editor, *QST*:

Your December, 1955, issue of *QST* is fabulous. . . .

— *Linwood G. Lessig  
Director of Technical Advertising*

842 Tuxedo Blvd.  
Webster Groves 19, Mo.

Editor, *QST*:

Say, wasn't that December issue a pip?

— *W. J. Bergmann, W0AUB, Secy.  
S. Louis Amateur Radio Club*

Chief, U. S. Weather Bureau  
Washington 25, D. C.

Editor, *QST*:

We have noted the article on U. S. Weather Bureau reporting procedures in the 40th anniversary reprint of the first issue of *QST*. We believe the item will be of interest to the many employees who have joined our organization since this early day, as well as the "old-timers" who are still with us or manage to keep in touch with the Weather Bureau. For that reason, we would appreciate having your permission to reprint the item in our house organ, *TOPICS*.

— *George C. Allen  
Editor, TOPICS*

St. Raphael's Church  
Dubois, Indiana

Editor, *QST*:

The insert copy of Number One *QST* dated forty years ago is most interesting and enlightening. Being a little past the half-century mark in age, I was born a little too late to enjoy loose couplers, crystal detectors, rotary spark gaps, and the first audions. It is evident that the old-timers did a bang-up job those many years ago, and it must be conceded, too, that amateur radio has made great progress because of the ingenuity and inventive ability of its members. . . .

— *Rev. Joseph Terstege, W9LQE*

Editor, *QST*:

Congratulations on the latest *QST*. I got a special kick out of the reprint even down to the Jove Detector (one of which I owned as a young ham). It was really a wonderful issue. Keep up the good work.

— *W. J. Halligan, W9AC  
The Hallicrafters Co.*

58 Throop Ave.  
Auburn, N. Y.

Editor, *QST*:

I have been reading *QST* for exactly a year now, and to my mind, this 40th anniversary issue has been the best to date. Not only was it larger than usual but the articles inside were fine.

However, I have been wondering about something: How is it possible to find a cover better than this one for the 50th anniversary issue? It is interesting to note the change of cover design and colors over the years. When I receive my *QST* each month, it is so new, so glossy, so very FB, that I feel that I must either put the issue in deep-freeze to preserve it, or else go out and buy another copy.

Again, many thanks for a really nice year of membership in the ARRL. If one is looking for a reason that people continue to renew their membership year after year, it is the fine job done on each issue of *QST* that is really the incentive.

— *George Hippisley, jr., K2KIR*

P.S. Wonder if that three-month trial offer for *QST* for January, February and March 1916 still holds? Hi.

1413 Valencia Rd.  
Schenectady 9, N. Y.

Editor, *QST*:

We all join in sending you folks at Headquarters our congratulations on the 40th anniversary of *QST*. It is a wonderful magazine for radio amateurs. We wish *QST* and its staff every success in the future years to come! . . .

— *Bob Burnett, W2YIV, Pres.  
Schenectady Amateur Radio Assn.*

10052 Sheldon Dr.  
St. Louis 15, Mo.

Editor, *QST*:

Just a line to let you know that I am thrilled no end over the 40th anniversary December 1955 issue of *QST*. A wonderful job for which you and the gang at Headquarters deserve a lot of praise.

— *Earl R. Linder, W0DZG*

Box 148  
Wood River, Nebr.

Editor, *QST*:

I want to say I really enjoyed your 1915 issue of *QST* in the December 40th anniversary issue. Wish I had been in the radio game at the time. Where can a feller get more literature on spark transmitters? . . .

— *Thomas J. Millette*

969 Middle Rd., RFD 2  
Oneida, New York

Editor, *QST*:

*QST* for December a masterpiece. Congrats!

— *N. J. Harrington, K2DYB*

Box 85  
Lanesboro, Mass.

Editor, *QST*:

It seems to me that more than one ham must have wondered what was inside when he first noted the hefty De-  
(Continued on page 126)



# Operating News



F. E. HANDY, WIBDI, Communications Mgr.  
GEORGE HART, WINJM, Natl. Emerg. Coördinator  
PHIL SIMMONS, W1ZDP, Asst. Comm. Mgr., C.W.

ROBERT L. WHITE, WIWPO, DXCC Awards  
LILLIAN M. SALTER, W1ZJE, Administrative Aide  
ELLEN WHITE, WIYYM, Asst. Comm. Mgr., Phone

**The ARRL DX Competition.** In getting into the DX test, use the abbreviation for your state or province given with the announcement (last *QST*). It will give you maximum assurance of being understood through QRM. Advance notice was sent to all overseas societies and the high popularity of this contest with DXers completing states-for-WAS and provinces-for-WAVE seems bound to continue. The 10-, 15- and 20-meter bands will be high producers this year. We hope the competition will help you add to your DX country totals, whether you follow DX regularly or just plan to knock off some and renew DX acquaintances during this highlight of the operating season. Don't forget the dates as given in the Contest Time Table (January *QST*). This is February 10th-12th (phone) and February 24th-26th (c.w.), also the corresponding week ends of March 9th and 23rd respectively for completing phone or c.w. lists. Best luck and DX.

**DX Operating Code.** The annual DX fray certainly is a suitable occasion for us to emphasize briefly the importance of making calls *short* and interspersed with listening periods. This makes for highest operating efficiency for everybody. Also it's a very good idea in DXing to make QSOs reasonably short, even at times other than in the contest, when the DX is rare. Courtesy and efficiency go hand in hand. For a more complete list of pointers and recommendations we suggest for all DX-interested amateurs *not* having this item to send us a postal card or radiogram requesting ARRL Operating Aid No. 5 . . . data for W/VE's on one side, and overseas operators on the other.

DX operators overseas can do much to minimize pile-ups by indicating *where they will listen*. This spreads out the replies so effective work can proceed with minimum QRM. By specifying UP TEN or DOWN FIFTEEN as appropriate, for example, the DX station can direct where to be called when this procedure seems to be necessary.

**Net Frequency Observance.** The new ARRL Net Directory spells out an increasing general interest in efficient net operations throughout the nation. We can all be proud of the number of nets now dedicated to traffic distribution and emergency readiness. Nets of 15 to 20 stations getting together on *one frequency* (when the members otherwise might *each* be using that many individual frequencies) represent high efficiency in the use of frequencies for their usually limited periods of operation. It must be observed, however, that this efficiency is to some degree limited by the care with which every member station

zeros exactly on the registered net frequency. In its *QMN Bulletin*, the Detroit Amateur Radio Association (referring to Michigan's QMN frequency 3663 kc.) urges netters to QNZ (zero beat) the NCS's signal with care. The DARA wonders if we need a new "special" Q signal to mean "I have not been using a coherer for several years, and your signals are well outside the pass band of my receiver."

**Speed of Putting it Down Determines Operator Speed.** We are a group of men dedicated to developing our communications abilities to the utmost. Speed is something we strive for, but of course never at the expense of accuracy. Accuracy must be paramount if any intelligibility is to be handled without distortion of meaning. In the significant-quotes department here's what *Midwest Clix* has to say about *possible* top speed:

"Where the operation is by voice, c.w., wig-wag or smoke signals, the top copying speed for reliable communications cannot be above what the operator can set down on paper in a manner that will be positively correct when read later on. A man may briefly understand something sent at 100 w.p.m. on voice or even 50 w.p.m. on c.w., but if his ability to put it with accuracy on paper is but 15 w.p.m., he is only a 15 w.p.m. operator."

*Auto Call*, edited by W3NL of the Washington Mobile Radio Club, points up the need for detailed studies along this and procedure lines in many groups dedicated to handling of emergency communications. If you've ever listened to a circuit manned by someone who never handled a message and noted the errors, repeats and needed fills, sometimes including parts of a message in the wrong order, you will know what Andy, W3NL, is driving at.

"During a recent CD drill the over-all speed of a message handled was noted as less than 3 words per minute, simply because of repetitions, by-play, extra words, etc. Two Novice c.w. operators with moderate training could have bettered this without half trying. The next time you hear a couple of hams handling messages (an idea for RMs and PAMs?) it might be interesting to put your watch on them and figure out the net words per minute. Then you'll know what we're talking about. Thanks to our traffic people in the Club (WMRC) a detailed study was made how to correct late messages and procedures and as a result we had no messages that required more than 20 minutes for delivery on a following exercise . . . and some of them were relayed three times."

We concur with expressed sentiments that more tests and/or drills designed for increasing operating efficiency and message handling are called for. Clubs can help by setting up some blackboard sessions and question-answer periods, so old and new amateurs will have the know-how needed.



**More FCC Suspensions.** These operator license suspensions include a 144-Mc. instance that belies the general feeling of some two-meter men that anything goes in that band and that FCC doesn't monitor there.

FCC ordered (30 Nov., '55) that the Technician Class amateur operator license of William C. Holtz, Chicago, Illinois, BE SUSPENDED for a period of *six months*. This is under the authority of Section 303 (m) (1) (A) of the Communications Act of 1934, as amended and Sec. 0.292 (f) of the Commission's Rules. This action is taken, it appearing, that said licensee on various occasions in the period June 21 to October 27, '55 and particularly on October 27, '55 operated his station W9HXF in the 144-148 Mc. frequency band, contrary to the terms of his radio license and in violation of Section 12.23 of FCC rules.

FCC ordered (30 Nov., '55) that the Technician Class amateur operator license of Paul R. Coleman, Chicago, Illinois, BE SUSPENDED for a period of *sixty days*. This action is taken, it appearing, that said licensee operated his amateur radio station W9HXK in the 144-148 Mc. frequency band, contrary to the terms of his radio license and in violation of Section 12.23 of FCC rules on Sept. 21 and Oct. 27 '55 and on various occasions between June 21 and October 27 . . . it further appearing that said licensee failed to maintain an accurate station log.

FCC ordered (10 Oct., '55) that the amateur operator license of M. R. Martinez, Miami, Florida, be suspended for the remainder of the license term (expiration July 9, '56), that the license be turned in to the FCC and W4JAV not be permitted to be operated by any person in this period, it appearing that the licensee (1) after changing his location engaged in operation without first notifying the FCC of his intended operation under portable regulations, violation of Sec. 12.91, (2) on Nov. 8, '54 attempted unauthorized communication with Mexican station XFIV, a violation of Sec. 12.101, (3) on Nov. 13, '54 retransmitted signals from KIE 367 over amateur frequencies, a violation of Sec. 12.103, (4) on Nov. 5 and Nov. 9, '54 used A3 on 3750 and 3780 kc. in violation of Sec. 12.111, (5) in the period Oct. 30-Dec. 29, '54, failed to maintain a proper station log, violation of Sec. 12.136, and (6) in Nov. '54 failed to identify his station while testing and otherwise operated said station to produce radiation in violation of Sec. 12.159.

FCC ordered (14 Oct., '55) that the Novice Class amateur operator license of W. D. S. Sharrett, Portsmouth, Va., be suspended for the remainder of the license term (expiration Nov. 22, '55) it appearing that the licensee in July-Aug., '55, engaged in mobile operation of KN4AZY in the 7-Mc. band, A-1, aboard a U. S. Navy vessel beyond the continental limits of the U. S. and in the jurisdiction of a foreign county without approval of the foreign administration, in a frequency band not allocated for mobile outside the continental limits and without first filing a notice of intended mobile operation with the FCC's Engineer-in-Charge of his home district, violations of Sec. 12.91(b)(1)(2)(3); also, that while engaged in such mobile 7-Mc. operation he failed to follow radio station identification procedure, required by Sec. 12.82(e)(1)(i). Also that his emissions from said radio station were not crystal controlled as required by Sec. 12.23(e)(2) and it further appearing that said licensee on specified dates engaged in such operation without the approval of the master of the vessel, and using apparatus not separated from and independent of other shipboard equipment contrary to sec. 12.94, FCC rules. Under suspension KN4AZY may not be operated by anyone, license to be turned in to FCC.

**Checking Harmonics at Output Important.** One of the simplest ways to invite FCC citation is to assume that any new rig with a pi-network is absolutely foolproof on the score of harmonic radiation. W0PME, ARRL Official Observer, reports that 7.6-8 Mc. range *much more* filled with harmonic emissions than ever in the past. Here's what he says, "These Saturdays and Sundays one can record a call, fill the card out, pick up another harmonic, fill out the address on the first card, get the new station sign, and repeat this procedure all day long . . . most stations seem to be new ones, perhaps newer hams on

phone before acquiring enough technical background. We tag and send ARRL-coöperative notices to as many as possible . . . and hope to get to them before the FCC."

Readers may review (p. 114, Dec. QST) some additional OO comments and suggestions bearing on this problem with respect to this and other bands. It's mighty important, not only to avoid FCC citations, but to keep channels properly assigned and used for life and death purposes, such as air-ground and police frequencies, free from interference!

—F. E. H.

## DX CENTURY CLUB AWARDS

### HONOR ROLL

W1FH . . . 262	W6SYG . . . 251	W6SN . . . 249
W6VFR . . . 258	W3GHD . . . 251	W6MEK . . . 248
W6AM . . . 256	W3JTC . . . 251	W7AMX . . . 248
PY2CK . . . 254	W8YXO . . . 250	W5MIS . . . 248
W3EES . . . 252	W8NFK . . . 250	W8EAS . . . 248
W8MX . . . 252	G3EL . . . 250	W2BXA . . . 247
W6HGW . . . 251	W2AGW . . . 250	W3KTC . . . 247
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PY2CK . . . 247	W9RBI . . . 230	N8IAC . . . 215
W1FH . . . 236	W1MCW . . . 230	W8HGW . . . 214
Y0ARR . . . 229	W1CXC . . . 219	W8EAS . . . 214
Z86BW . . . 229	W1NWO . . . 217	W9NDA . . . 213
	W3JNN . . . 217	

From November 15, to December 15, 1955 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

YU3BC . . . 120	G3FEW . . . 104	CT1PJ . . . 100
W5WZQ . . . 116	L1DCO . . . 102	F3PTE . . . 100
OZ9DX . . . 116	Z85AM . . . 102	G6AX . . . 100
W4RTA . . . 114	W8SMC . . . 101	W6SFE . . . 100
PY1PT . . . 109	G3EEL . . . 101	G6SSE . . . 100
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G3FJU . . . 108		V51FK . . . 100

### Radiotelephone

D14EA . . . 117	D14BY . . . 104	W0MCX . . . 100
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### ENDORSEMENTS

W1CLX . . . 241	W1BLO . . . 164	H89KB . . . 133
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W1TW . . . 240	E15F . . . 162	W2FBS . . . 130
W6TS . . . 240	W6DBP . . . 161	W3WDC . . . 130
ZL1HY . . . 240	W4QJW . . . 160	F8VK . . . 130
W2QHH . . . 230	W0ANF . . . 160	D14EA . . . 129
W4MTR . . . 229	W6CAG . . . 160	W4MTJ . . . 128
W8JBI . . . 220	W8EKK . . . 152	W1RB . . . 123
G3DHD . . . 220	W2IRV . . . 150	W2SUC . . . 122
W6NTR . . . 213	W5UX . . . 150	W4PVD . . . 122
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W6WO . . . 181	W6FOZ . . . 142	W9WKU . . . 119
W8BNO . . . 180	W9UXO . . . 142	ZE3JO . . . 114
H89MQ . . . 172	W4FFY . . . 140	JA1CR . . . 112
W9ABB . . . 170	W9ALI . . . 140	W1LHZ . . . 110
CT13S . . . 170	W9KXK . . . 140	W8ZCK . . . 110
O63WB . . . 170	PA0ZL . . . 140	D13SZ . . . 110
SM5WJ . . . 170	W2EGG . . . 139	DU7SV . . . 110
	W1FTJ . . . 134	

### Radiotelephone

W6MBD . . . 180	W8IBI . . . 145	K2CIN . . . 123
W8EKP . . . 170	SM5WJ . . . 140	W4FES . . . 121
LIASM . . . 161	W5CEW . . . 135	W2JIL . . . 120
W1CLX . . . 160	W3AEV . . . 130	1IAOE . . . 120
W8VDJ . . . 160	W9WHM . . . 130	W9LTR . . . 110
W0HXB . . . 150	W6TZD . . . 126	V82DQ . . . 110
	L8BS . . . 124	

### W/VE/VO Call Area and Continental Leaders

W4RPD . . . 241	VE4XO . . . 118	VE8AW . . . 160
W8NDA . . . 241	VE5QZ . . . 140	VE6EP . . . 140
W1HGC . . . 191	VE8GD . . . 108	Z86RW . . . 236
VE2WW . . . 189	VE7HC . . . 209	4X4RE . . . 218
VE3QD . . . 210		ZT2GX . . . 244

### Radiotelephone

W2APU . . . 202	W0ATW . . . 191	VE5YE . . . 140
W2BXA . . . 202	VE1CR . . . 130	VE7ZM . . . 140
W4HGC . . . 191	VE2GQ . . . 134	ZL1TY . . . 200
W6AM . . . 212	VE3KF . . . 163	OD5AB . . . 170
W7HIA . . . 135		GM3DHD . . . 212

**LONG CLAIMED SCORES —  
1955 SWEEPSTAKES**

The 1955 Sweepstakes was a real wing-ding! Star brass-pounders W7KVU and W9IOP wound up in a photo finish for national honors as K2AAA outmaneuvered the microphone crowd by a wide margin. Previous records were shattered in every category of competition with new contact and scoring highs reported on both modes. The more than 2000 entries will make this 22nd SS far outshadow its predecessors in participation. At least two Novices have set new QSO and score marks in the KN/WN department.

The figures after each call below indicate claimed score, number of contacts and number of ARRL sections worked. As soon as the checking work has been completed, the official results will appear in QST.

**C. W.**

W7KVU . . . . . 232,505-1277-73	W2GND . . . . . 119,446- 673-73
W9IOP . . . . . 232,505-1283-73	W8IFX . . . . . 119,093- 711-07
W4KFC . . . . . 209,954-130-73	W2RBN . . . . . 118,848- 651-73
W3DGM . . . . . 201,298-1104-73	K6CJQ . . . . . 117,862- 666-71
W6BUD . . . . . 191,430-1068-72	W3VAN . . . . . 117,072- 814-72
W5DWT . . . . . 178,831-1014-71	W4JBQ . . . . . 116,437- 675-69
W9ERU . . . . . 177,943-1003-71	W2CQB . . . . . 116,351- 676-69
W3EIS . . . . . 173,708-1007-69	W9FNE . . . . . 116,200- 669-70
W9RGM . . . . . 172,440- 934-72	W4WYU . . . . . 115,890- 674-72
W7KEV . . . . . 164,250- 918-72	W3IKN . . . . . 115,214- 756-61
W9YFV . . . . . 162,972- 893-73	W8CAY . . . . . 113,850- 702-66
W9OCB . . . . . 162,360- 919-72	W9AMU . . . . . 113,838- 651-70
W8YCR . . . . . 158,580- 886-72	W1RAN . . . . . 113,820- 813-70
W3AEL . . . . . 156,250- 875-72	W1YLD . . . . . 113,575- 649-70
W3JNQ . . . . . 153,352- 889-69	W1YMA/1 . . . . . 112,800- 802-71
W8LQA . . . . . 151,463- 878-70	W3DLR . . . . . 112,420- 770-73
W0PHR . . . . . 150,850- 862-70	W5BTS . . . . . 112,180- 635-71
W8PBU . . . . . 150,520- 848-71	W9KLD . . . . . 111,737- 642-70
W9APV/5 . . . . . 149,578- 898-67	W9TKR . . . . . 111,095- 659-68
W5MCT . . . . . 143,445- 800-73	W1ARR . . . . . 110,950- 634-70
W4PNK . . . . . 142,806- 786-73	W1ZTY . . . . . 110,380- 678-66
W3ALB . . . . . 141,270- 831-68	W4ZJK . . . . . 108,500- 621-70
W7VMP . . . . . 141,036- 971-73	W4HZE . . . . . 108,285- 676-64
W4CC . . . . . 140,000- 800-70	W9WBV . . . . . 107,476- 606-71
W28SC . . . . . 139,680- 776-72	W8NND . . . . . 107,450- 614-70
W80YI . . . . . 135,050- 775-70	W4YFQ . . . . . 107,355- 641-68
W3GRE . . . . . 133,520- 742-70	W4BZG . . . . . 106,782- 680-62
W3HEC . . . . . 133,000- 755-72	W8KT . . . . . 106,678- 601-71
W3GHM . . . . . 133,022- 941-71	W9WJV/8 . . . . . 105,941- 582-73
W9KZZ . . . . . 133,303- 760-71	W1BIB . . . . . 105,840- 594-72
W3JTC . . . . . 133,043- 729-73	W7GWD . . . . . 105,788- 606-70
W9TKX . . . . . 132,860- 610-73	W9PFT . . . . . 105,315- 620-68
W1BFT . . . . . 132,475- 757-70	W1AW . . . . . 105,000- 750-70
W3JBC . . . . . 132,090- 777-68	W9GWK . . . . . 105,000- 600-70
W9VUL . . . . . 131,600- 752-70	W4JAT . . . . . 104,401- 580-72
W6NWL . . . . . 131,583- 730-73	W7PQE . . . . . 103,988- 728-72
W8VTE . . . . . 131,527- 741-71	W3DVO . . . . . 103,850- 620-67
K6BLI . . . . . 131,400- 729-73	W9RND . . . . . 102,637- 598-69
W9NTL . . . . . 129,763- 742-70	W9WZA . . . . . 102,637- 590-70
W5BJA . . . . . 129,575- 712-73	W4YZC . . . . . 102,175- 630-65
W8BOJ . . . . . 127,970- 764-67	W3MFE . . . . . 101,850- 582-70
W3VOB . . . . . 127,090- 717-71	W9FZO . . . . . 101,660- 602-68
W1TYQ . . . . . 125,063- 726-69	W8FTU . . . . . 101,505- 606-67
W3EIV . . . . . 124,426- 701-71	W6LUB . . . . . 101,374- 657-64
W1JYH . . . . . 124,380- 691-72	W9UWU . . . . . 100,913- 587-69
W3CPS . . . . . 123,029- 741-67	W9ZAB . . . . . 100,625- 575-70
W0RYJ . . . . . 122,710- 883-70	W3ADZ . . . . . 100,375- 550-73
W8RUZ . . . . . 122,442- 731-67	W3ISE . . . . . 100,350- 669-60
W6CXN . . . . . 121,500- 675-72	K2U/PR . . . . . 100,332- 599-67
W6TTP . . . . . 120,158- 829-73	W1ZDP . . . . . 100,300- 593-68

**PHONE**

K2AAA . . . . . 188,559- 861-73	W5KCC . . . . . 65,340- 330-66
W7RAJ . . . . . 115,446- 544-71	K6BWD . . . . . 65,130- 335-65
W6NJU . . . . . 106,820- 504-71	W1JEL . . . . . 64,575- 310-70
W7ESK . . . . . 103,632- 512-68	W7ZZA . . . . . 62,928- 443-72
W4PFG . . . . . 101,616- 469-73	W3YRK . . . . . 62,210- 311-67
K6EVR . . . . . 97,020- 492-66	W9QMM . . . . . 62,207- 302-69
W6ZED . . . . . 96,579- 511-63	W5HQR . . . . . 60,786- 308-66
W0PRZ . . . . . 95,148- 445-72	W4RAN . . . . . 60,180- 295-68
W7UZR . . . . . 93,660- 449-70	W0BCF . . . . . 59,112- 419-72
W8NPR . . . . . 91,494- 449-68	W5KNA/5 . . . . . 59,004- 302-66
W3VKD . . . . . 89,352- 612-73	W9VKT . . . . . 58,825- 321-61
W8DUS . . . . . 89,352- 625-72	W4PJA . . . . . 58,149- 273-71
W6QEU . . . . . 87,543- 617-71	W9OJA . . . . . 57,960- 276-70
W1YWU . . . . . 87,360- 416-70	W4FGH . . . . . 55,476- 414-67
W9MPP . . . . . 79,488- 368-72	W8MNY . . . . . 55,377- 294-63
W1FZ . . . . . 77,627- 424-68	W0EIB . . . . . 55,120- 425-65
W4ODR . . . . . 77,417- 397-66	W4CBQ . . . . . 54,925- 427-66
K6DAC . . . . . 74,003- 882-65	W9TJP . . . . . 54,622- 461-62
W8KXZ . . . . . 72,633- 396-62	W3TJF . . . . . 54,545- 273-69
W3DHM . . . . . 71,208- 344-69	W2ICE . . . . . 54,400- 400-68
W5DQK . . . . . 69,300- 355-66	W1GRJ . . . . . 52,731- 285-62
K3WBZ . . . . . 68,352- 357-64	W1TRX . . . . . 52,338- 399-66
W6VVJ . . . . . 68,103- 504-69	W1ZKE . . . . . 51,972- 285-61
W6CBE . . . . . 67,184- 494-68	W4YTO . . . . . 51,675- 272-65
W8LXA . . . . . 65,520- 337-65	

W6CUF, opr. 2 Multioperator station. W7VMQ, opr. 4  
W1WPR, opr. 5 W3WPF, opr. 6 K4ARU, opr. 7 W1SDO, opr.

**W1AW OPERATING NOTE**

Complete schedules of current W1AW operation appeared on page 61 of November, 1955 and page 75 of January, 1956 QST. See those issues for full information on when and where to look for the ARRL Headquarters station.

**LATEST SWEEP-STEAKS NOOS**

Them fellers up in Vermont must uv bin out tappin' the maple syrup 'sted uv tappin' their keys this year. Heerd wun uv em once, then he plumb disappeared under a pile-up uv them Kilowatt Karakters snowin' him with calls. Why in tarnation is it you can't find a Vermont stashun fer beans and yet you kin nail 40-eleven guys in them other littol places like Road Eyeland, Merryland, Dellawear and the Districk of Colombia? Gits under yore hide the last danged hours of the contest.

As fer them chaps Down East to Nova Skosha, someone otta tie up a bundle of QST's and heave em aboard the fust schooner sailin' thet way. When you ask them VE1s fer an SS number they think yore a-talkin' about a Shortston on a ball team.

I see they finally done it — them K2s have run the W2s right off'n the air. Been so long since I worked a W2 that I wouldn't know what to say to the feller.

And if a guy had took a nice long nap like Rip Van Winkle and just fired up his spark gap again, now wouldn't he think all the old timers in W1-land were back on? Don't work nawthin' nowadays from Noo England but W1A-B-C-D-E-F and you can't hardly tell whether he's a new feller or been on 35 years. Less'n he tells you he's gotta QRT and get his home work done for the 7th grade 'fore his Maw tans his hide. Speakin' of young-uns, I thot them Novices wud be frantic fer workin' anyone who skedaddled up to within 100 kc. of their bands, fixin' to pile up the best Novice score in the section. Wonder where they wuz? Must uv all been out to the Junior Prom or the roller skatin' rink. Only snagged onto three uv 'em and wun wuz a persistent cuss in the next town who wuz gunnin' fer me fer two days.

Ain't seen nuthin' since the Gold Rush like the way the boys fled from ole 80 meters the minit the sun come up Sunday mornin'. Wuz like a skunk had waddled into the croquet game. Left nawt but two or three of us hollarin' our fool heads off into a big bunch of empty air. Come time the Sears Roebuck catalog gits here on the RFD, we're goin' to thumb through the pages. Then mebbe we'll no if they hev any of them new-fangled radio machines that goes up on them Ultra-High bands like 40 meters and see why it is that them fellers alither up there so durn fast come daylight.

Nuther thing that gits me to scratchin' my head is the lads you work in the first hour that hand you them numbers like 34 or 46. All I kin see is them boys must uv shot onto the air like a bull that's just busted its chain. And they must be fast-talkin' city fellers who use that-there Brake-In. Down our way we like to at least take a neighborly minit or two to ask a feller how his crops is comin' along and tell him yore name is Jed or Si 'fore you shet him off too abrupt-like.

Heerd uv wun case uv SS Shell-Shock. Lad over to Squash End (thet's just down the road a piece from here) is still tryin' to give a number to every wun he works and he gits mad as all git-out when they don't give him wun right back. Last time I heern him he wuz givin' a W7 number 304,675 and chortlin' like a nanny goat because he only needed two more sections. Poor feller's cows don't get milked half the time neither and the weeds is startin' to QRM his vegetable patch.

Feller up to the Four Corners (thet's just up the road a piece from here) went Sweep-Steakin' on phone this year cuz he went show-off and got wun uv them store-bought transmitters. Swore off real quick tho and sez he'll be back poundin' brass next year. Got so mixed up with them traffic nets that half the time he was takin' the word count on a message to some soldier-boy over to Puerto Rico and tho he was gittin' an SS number. He wuz gittin' sum TVI too over to thet pretty littol ranch house some city folks just built on his Back Forty.

Wal, got to git to gittin' down to write up the Grange Fair now. Hear tell there's some durn pretty heifers down there this year . . . waitin' on the customers at the cider and doughnut table, that is! We'll be SSein' uv you come next November.

— Jim Robbins, W1VJE, Framingham, Mass.

**NATIONAL RTTY CALLING  
AND WORKING FREQUENCIES**

3620 kc. 7140 kc.

## FLOOD ENCORE

Last summer we had drought, an almost-unprecedented dry period. In the fall, starting in August, we had floods the like of which we have never seen. Next summer we'll undoubtedly have drought again. Ho hum!

In October, around Columbus Day, it started to rain in the northeast, and rained for five days. The still-water-soaked soil refused to cooperate, and streams again rose. In some places the result was worse than the situation in August; in most places, it was not nearly so bad. We have several reports on October floods which we summarize herewith.

The Connecticut Net was active on 3640 in view of extensive flooding throughout the state. The worst seemed to be in Danbury, where EC W1ADW reported flooding worse than in August. W1DAV NCSed CN much of the time and was instrumental in getting W1TIB on the air after W1ADW had originated a request for help via W1YNC. During the early part of the flood, Danbury mobiles were used to check water heights. The first inkling of trouble came via WIRTH, Danbury, C.D. Radio Officer, who ran into high water in his mobile. W1VWA, the c.d. station located in the basement of the War Memorial building, was activated; during Sunday, when power failed, W1VWA operated on its 5-kw. emergency generator. On Monday (17th) W1ADW/m and W1ZKQ/m went to Georgetown, where they were instrumental in handling traffic for the Red Cross. W1UED, en route home to Hartford, was stranded in Danbury and volunteered his services; he was put right to work at W1VWA. W1ADW at one time found no power at the Federal Correctional Institution in Danbury, and no telephone lines operating to notify the power company. He reported to W1VWA from his mobile, who relayed the information to WIRTH/m who gave it to a power company crew who relayed it to the company on their own v.h.f. radio. Meanwhile, W1ADW had patrolled the lines and discovered the popped cutout. This info was passed over the same route and power was quickly restored. Other amateurs listed as having been active in the Danbury area: W1RDL/m, W1s ACR BEW DDJ EBW, W1N1s FBD FEH GKH. Some difficulty was experienced on ten meters due to long skip.

The Putnam County (N. Y.) net, just across the line from Danbury and Connecticut's Fairfield County, started operation on Saturday (Oct. 15th) on 3890 kc. Contact was also maintained with Dutchess County to the north and Westchester County to the south on 2 meters. A 2-meter link was in operation between NCS W2HIQ and the Carmel C.D. Control headquarters and police headquarters. Traffic on 75 meters was expedited to Carmel C.D. Control Headquarters via 2-meter link and landline to c.d. headquarters in Danbury. W2HIQ was flooded, but not seriously enough to cease operation. W2RGP relieved the NCS on 75 meters at regular intervals. K2DBE, Putnam County Radio Officer, operated the two-meter link between Brewster and Carmel. SEC W2RTE checked in on 75 meters with the Putnam County NCS. Mobiles checked on local road conditions and relayed this information via two-meter link to c.d. and police authorities at Carmel. Dutchess County control was operated by EC W2HZZ,

and Westchester County control by EC W2QGH.

Brewster EC W2HIQ reports that the overall operation between the three counties was a combined AREC and C.D. (RACES) function, and went off very smoothly. He particularly commends W2s FCA and RGP, and K2DBE for their aid to the control station. W2CRD, affiliated with the Red Cross in Syracuse, relayed much traffic via the Putnam County net to W2GTE, a similarly-affiliated amateur station in New York. Operation was discontinued late Sunday night with a message from the Putnam County C.D. Director thanking all amateurs for their valued assistance. Active but not mentioned above were the following: W2s PQZ FYB ATO AAR ZIS JGV BSR GDD DIR BXW KLD SUG IWI HAC; K2s DFR AYQ EWB EQE/1 CVZ BIF HXG JMY BRK JSK JEQ IWT EYZ BQI EGY EHI CON IEO, W1s YK ZVN BYF WHL, W3FVY.

Schoharie County EC and RO W2NAI reports that "placid little Schoharie Creek became a raging bully after three days of rain, flooding 3200 acres of valley." Mobiles were used almost exclusively until it appeared there would be no power failure, with additional mobiles coming in from Schenectady and Albany. Operation was on 75 and two meters, the latter mostly by RACES units. Local operators were on duty from 2330 October 15 to 2000 October 17, when the Albany contingent took over. In addition, some ten meter mobileers were standing by to help. Operation on 75 meters was performed mostly by the Second Regional Phone Net and the Interstate Phone Net with continuous operation during daylight hours on October 16 and 17. W2NAI reports the following as having been active: W1s BYS DHS EG RMS UKO ULY VAY VDI KIUSA; W2s APF AAO AOW BLN BKR BNC CYW COB CYD DXY DEL DMK DXI EOM EEO EFU FFU FVP GBN GBX GDD HEC ISE JGV JNM JVS KQW KFV KQL KZY LST NIV NOC OOF OPD VNJ WNO YLW; K2s AYQ BRV BDJ BQI BSD CKG CVZ DRZ DGD DJN DXE DYB EST EXB FCC GNZ GOE HQI HON IYP IJK IWO KWF KXZ LYE MEU OTQ PPB; W3s BFT BNR OGD WUE; W8AVT/2.

With rapidly rising waters along the Delaware River, W2ZI alerted the N. J. Emergency Phone Net on 3900 kc. at 0845 Sunday, October 16 and started lining up stations along the river. By 1530, when state c.d. officials decided to activate RACES networks, things were so well organized that it was decided to carry on on 3900 kc. This resulted in excellent cooperation between ARRL/AREC and RACES networks all along the river. By 1930, mobiles were at all river bridges from Stockton to Phillipsburg reporting the rate of rise, which was given to c.d. officials in West Trenton. Other stations were reporting from Milford, and along the Lehigh River Valley. W2SUG did particularly commendable work in lining up mobiles in Hunterdon County, and other mobiles were sent, through official c.d. request, from as far away as Somerville and Morristown. Over 50 stations reported into the Jersey Emergency Phone Net during the 14 hours of continuous operation.

The Jersey Net also handled an emergency which developed in the Pompton Lakes region and Bergen County when the Ramapo River and Wanauque Reservoir went on a rampage.†

Schoharie County civil defense officials were grateful for the services of the amateurs during the October floods. Shown here are, first row (l. to r.): W2BLN; Mayor of Middleburgh, N. Y.; CD Director of Schoharie County; W2GBN; Mayor of Schoharie; W2NAI. Second row (l. to r.): W2HEC; Sheriff; W2BKR; an unidentified RACES operator; W2OOF; K2BRV.





We presume that all of you are interested in having your activities reported in *QST*, whether it be in this column, your SCM's report, or elsewhere. If not, there is no problem — just don't report it. Assuming that you *do* want your activities written up, especially those along emergency, AREC or RACES (civil defense) lines, let's have a brief discussion on the best way of accomplishing this, to make it easier and quicker for all concerned.

First of all, we have what you might call a "horse back" policy for material in this column. That is, it's not official and we just *might* deviate, but usually we follow it. Reports of activities in real communications emergencies get first call on the space. After that come other public service activities, and then reports of tests and drills or other special activities. Of course, if you submit usable pictures with your material, that ups the priority considerably, regardless of the subject. Reports of actual emergency operation we consider "musts" in the first available issue of *QST*.

We want all emergencies reported. The best way to do this is to designate one of the group who took part to write it up and send it in. He should be sure to give the date it happened, what kind of an emergency situation was involved, and the calls of all known amateurs who took part. Sometimes it's very difficult to define participation. Is reporting into an emergency net during an emergency participating, even if no traffic is handled? Has a station who stood by ready to assist, but never actually did so, participated? Usually, we list all the calls contained in the report, and thereby let the reporter be the judge as to whether or not the station merits mention.

Very often, after an item appears in *QST* (or after one doesn't that should have), we get letters from irate participants who weren't mentioned, or from amateurs who claim they sent in a complete account to their SEC, their SCM or direct to headquarters many months ago. Well, first of all, don't forget that *QST* isn't a newspaper; we have a six week production lag. For example, this copy for February *QST* is being written on December 14, and must be turned in to the Managing Editor by the 15th. Secondly (let's face it), SECs and SCMs don't always forward such stuff promptly, sometimes (say it isn't so!) not at all. So the safest thing to do (you should know whether your section officials can be trusted to QSP) is send it direct to headquarters if it's for "With the AREC" or other than for the SCM's activity column.

Third, although we're not perfect and will cheerfully admit it (might as well), we'd hate to think that all the items which were "sent long ago" have been misplaced at headquarters, as charged or insinuated. We're not *that* bad. Often, we suspect, they were never really sent at all. Sometimes they get misrouted here at headquarters because they contain items and material for other departments; in these cases, we usually get them all right, but we get them late. Once in a while they actually do get lost in the mail, but not often. Address your stuff to the Communications Department, Attention National Emergency Coordinator, if it's for this column. If you include material or information for other departments, make sure it's on separate sheets with your name and address, so it can be routed separately.

Now you don't have to be a literary genius to write down some details of an operation. If you are, that's fine; but most of us are no great shakes with the pen and can only write down who did what and when. *That's all we want to know!* The chances of your copy getting into the column unscathed are mighty slim in any event; so keep it brief, double space it if typed, and be sure all the essential facts are included. If you help us out in these small ways, you'll be helping yourself out in the end.

During the Bennington Disaster of May, 1954, WITEN/m was operating at the scene and informed the Second Regional Phone Net and the Interstate Phone Net that telephone services were bogged down and that boys on the ship were anxious to let the folks at home know they were okay. The Red Cross collected the traffic and brought

it to WITEN/m, who sent it into the net. Later, WIKNE/1, operating from the hospital at Quonset Point, checked in with the same request. The following day W1ULG/1 at the hospital in Newport reported in with traffic, and operation continued until the load lessened. Over 160 pieces of traffic were handled.

During the months of July, August, and September, the Albuquerque, N. M., chapter of the Caravan Club of New Mexico was kept on a permanent ready status for flash floods. The Albuquerque V.H.F. Club was also alerted to help with a 2-meter net. The Caravan Club was actually called out to help with communications nine times. Use of mobiles for headquarters and patrols was the factor that enabled us to set up immediate communications. A total on-the-air time of approximately 72 hours was used in periods of from 2 to 12 hours. Our services were provided for use by the sheriff's office, city police, city and county manager's office. The following are known to have participated, with apologies to any omitted: W1WAL, W4ZOL, W9TLM, K5ADS, K6CQX, W5s ADX CZT ECN FAG FHP FIA FJE FVY GLT GPK GWI GWF LBN NSN OAT OIA PDY PIZ RLT UAF UCW UCX UOZ UWA WBG WRS YDE YIK ZMN ZSL. — W5UWA, EC Bernalillo Co., N. M.

In the August floods, the Red Cross of Woonsocket, R. I., called on the Blackstone Valley Amateur Radio Club to assist them with their communications problem. Club station W1DDD was activated on ten meters, a mobile was dispatched to Red Cross headquarters and four other



Being EC of an area like Philadelphia County, Pa., is no snap job, but W3DYL does it most capably, tied in strongly with the e.d. organization of the county. Here's the OM himself at his basement operating position.

mobiles were sent to relief centers. The next day relief was provided by mobiles from the Cranston Radio Assn. and amateurs in the surrounding area. One activity deserving special mention is that of W1AUT, who was instrumental in giving the alarm that saved hundreds of lives when the Spindleville Dam burst.

The above should have been included in the flood story which appeared in December *QST*. Thanks to W1ZEZ for calling it to our attention.

Nova Scotia experienced a severe wind and snowstorm on November 19th and 20th which brought amateur radio emphatically into the communications picture. The Cape Breton Emergency Net was activated and operated from 2000 until after midnight handling traffic for telephone, power, telegraph, press, broadcasting companies and many local newspapers. Conditions on 3750 were very poor and many relay stations were necessitated. The net operated for two days in connection with this emergency. SEC VEIRR and EC VE1FH list the following as having been active: VE1s FR PZ XD ZO ST ZB ME ZE ACM ZF FQ AV OC DQ UT AO FH FM SC JA SJ JB NY ACR ABW OM HC DW AAX GA ZM ZR RR. Those in italics received special mention by EC VE1FH.

The Cape Breton Emergency Net was again alerted and put into operation when a ship became grounded in Cape St. Lawrence in a place almost impossible for rescuers to reach. VE1AO got as close as possible with his mobile,

transmitted information on the situation to his fixed station from whence it was handed over to officials concerned. Communications were maintained with the ship by visual signals to VE1AO, then via the Cape Breton Emergency Net to officials concerned, until airplanes and helicopters could be brought into action. The crew was rescued by helicopter the following day. Among the amateurs listed by VE1FH as having participated were VE1s AO PZ FH ZB ZE ME ABW ST SJ JB XD FR HT DS KG ACM FZ OC FQ AV QM FM KK MX UT VU ABZ and VE2ANK.

Iowa SEC W0DDV reports that during a snow, rain and sleet storm on December 3rd, amateurs in Iowa were of assistance when the Iowa State Police radio repeater station was put out of action. They also assisted in restoring power to several farms in outlying areas through cooperation with the Rural Electrification Agency. Stan lists the following stations as having been active during the evening: W0s TED SWX CQL TKN LFJ NXW ZDX HNE SGZ AJA FKB DZC ZLC RAC TVE ZLU GKN CRG BSG OLM MYR VWF ILY/m PKH AZR TLB/m BDR PKT WBK YNF SRQ ZHR DDV; K0s AVO BEC and W9BUH.

On Labor Day, 1955, the El Paso Radio Club provided communications for the annual Pikes Peak Hill Climb. Club-member mobile units were stationed at key points along the course to check each racer as it sped past, reporting it to net control. All stations were tuned to the same frequency, so all knew the exact location of each racer at all times. Thus, when a racer was overdue, officials could be notified promptly. Whenever an obstacle or other danger occurred over the course, racers could be signaled down at check points and warned about it. The mobile radio units at the start and finish lines were also able to provide invaluable means of computing the time of each racer. Emergency radio units were also stationed with each ambulance spotted along the course.

The actual race was only the windup of seven days of test runs which preceded it, for which the El Paso club also provided mobile units. The following members participated: W0s CVD MEY TV JMB AVP QXQ TKZ VGU HEE HHR VLX KVD YNB YNC RZY KJF COF, K0s BOJ AGP, KN0CLK, W1VXN/0, W7VKO/0.

The Par-Troy Amateur Radio Assn. of Boonton Township, N. J., conducted an on-the-air survey on October 3rd to determine the practicability of a two-meter c.d. net. Five mobiles and one base station were used. The latter was at the firehouse, and mobiles dispatched to various locations about the township. The mayor and town committeemen rode in mobiles as observers, and the c.d. director was so pleased with the results that he expects to have a two-meter net in operation soon.

October SEC reports were received from sixteen sections: Ala., W. N. Y., Colo., NYC-LI, Minn., Tenn., S. Dak., Ore., Santa Barbara, Mont., Wash., San Joaquin Valley, Ontario, Wis., Nebr., Eastern Pa. Total AREC members represented, 4217. The addition of Eastern Pa. makes thirty sections heard from in 1955.

### RACES News

Atlanta RACES Radio Officer W4LXR informs us that the City of Atlanta has now joined the growing list of cities authorized for RACES operation. The plan is designated "Atlanta, Georgia Metropolitan Area Including the Counties of Fulton, DeKalb, Cobb and Clayton." It provides for a main control and four zone control stations, with mobiles. Operation is on two of the higher-frequency bands with five assigned frequencies, with state tie-in on disaster (non-amateur) frequencies. The plan is in coordination with and in addition to the state-wide RACES plan. Zone control stations have recently had new 16-element beam antennas installed. W4LXR says that they have their problems (as don't we all?) but improvement does continue from day to day.



The Baltimore RACES organization recently sent us a sample of their decals, used on RACES mobiles and other installations for identification purposes. It's very similar to the insignia at the head of this sub-column, except that it

has the words "Baltimore City" around the top of the circle. The letters are white, the background blue, the triangle white with letters "CD" in red and the lightning flash through the triangle with the word "RADIO" in blue inside the flash. We are told that these decals were manufactured by the American Decalcomania Company and were purchased through a local dealer at a cost of approximately ten cents each in lots of twelve hundred.

### A.R.R.L. ACTIVITIES CALENDAR

Feb. 3rd: CP Qualifying Run — W6OWP  
 Feb. 4th-19th: Novice Round-up  
 Feb. 10th-12th: DX Competition (phone)  
 Feb. 14th: Frequency Measuring Test  
 Feb. 15th: CP Qualifying Run — W1AW  
 Feb. 24th-26th: DX Competition (c.w.)  
 Mar. 3rd: CP Qualifying Run — W6OWP  
 Mar. 9th-11th: DX Competition (phone)  
 Mar. 15th: CP Qualifying Run — W1AW  
 Mar. 23rd-25th: DX Competition (c.w.)  
 Apr. 6th: CP Qualifying Run — W6OWP  
 Apr. 13th: CP Qualifying Run — W1AW  
 Apr. 14th-15th: CD QSO Party (c.w.)  
 Apr. 21st-22nd: CD QSO Party (phone)  
 May 5th: CP Qualifying Run — W6OWP  
 May 14th: CP Qualifying Run — W1AW  
 June 1st: CP Qualifying Run — W6OWP  
 June 9th-10th: V.H.F. QSO Party  
 June 12th: CP Qualifying Run — W1AW  
 June 23rd-24th: ARRL Field Day

### FREQUENCY MEASURING TEST, FEBRUARY 14TH

All amateurs are invited to try their hand at frequency measuring. W1AW will transmit signals for the purpose of frequency measurement starting at 9:30 P.M. EST (6:30 P.M. PST), Tuesday, February 14th. The signals will consist of dashes interspersed with station identification. These will follow a general message sent to help listeners to locate the signals before the measurement transmission starts. The approximate frequencies used will be 3535, 7091 and 14,129 kc. About 4½ minutes will be allowed for measuring each frequency, with long dashes for measurement starting about 9:36 P.M. It is suggested that frequencies be measured in the order listed. Transmissions will be found within 5 or 10 kc. of the suggested frequencies.

At 12:30 A.M. EST, February 15th (9:30 P.M. PST, February 14th), W1AW will transmit a second series of signals for the Frequency Measuring Test. Approximate frequencies used will be 3603, 7020 and 14,056 kc.

Individual reports on results will be sent to all amateurs who take part and submit entries. When the average accuracy reported shows error of less than 71.43 parts per million, or falls between 71.43 and 357.15 parts per million, participants will become eligible for appointment by SCMs as Class I or Class II OOs respectively.

This ARRL Frequency Measuring Test will be used to aid qualification of ARRL members as Class I and Class II observers. Present observers not demonstrating the requisite average accuracy will be reclassified appropriately until they demonstrate the above-stated minimum required accuracy. Class I and Class II OOs must participate in at least two FMTs each year to hold appointments. SCMs (see listing, page 6) invite applications for Class III and IV observer posts, good receiving equipment being the main requirement. All observers must make use of the cooperative notices, reporting activity monthly through SCMs to warrant continued holding of appointment.

Any amateur may submit measurements on one or all frequencies listed above. No entry consisting of a single measurement will be eligible for QST listing of top results; at least two readings should be submitted to warrant QST mention. Listing will be based on over-all average accuracy, as compared with readings made by a professional lab.

### NATIONAL CALLING AND EMERGENCY FREQUENCIES (kc)

C.W.: 3550, 7100, 14,050, 21,050, 28,100.  
 Phone: 3875, 7250, 14,225, 21,400, 29,640.

## 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 February 15th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters on 1885, 3555, 7125, 14,100, 21,010, 52,000 and 145,600 kc. The next qualifying run from W6WFP only will be transmitted on February 3rd at 2100 PST on 3590 and 7128 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.

Code-practice transmissions are made from W1AW nightly at 2130 EST. 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.

Date	Subject of Practice Text from December QST
Feb. 2nd:	<i>The Great Flood of 1965</i> , p. 11
Feb. 6th:	<i>Design Notes on a Four-Band Rotary</i> , p. 19
Feb. 14th:	<i>6AN8 — 6BQ6 Modulator</i> , p. 26
Feb. 21st:	<i>A Composite Test Set</i> , p. 29
Feb. 23rd:	<i>Designing the VFO</i> , p. 35
Feb. 27th:	<i>How to Tune In A.M. Phone</i> , p. 41
Feb. 29th:	<i>1955 Field Day — Official Results</i> , p. 56

## TRAFFIC TOPICS

A lot of things that are perfectly natural are not necessarily good. This is a truism that we don't have to accredit to anyone, and that's why we don't put it in quotes. We just made it up ourselves, just now. We were thinking about it in connection with traffic work.

It is perfectly natural for special interest groups to want to stick to and work with people of their own special interests. This is an age of specialization. But specialization tends toward narrowness, and narrowness toward limited vision and limited horizons. For example, take the amateur who operates strictly c.w. Nothing wrong at all about that; if he prefers c.w., and doesn't like phone or other modes, it is to be expected that he will operate on c.w. exclusively. It is his attitude that may be wrong. Too often, he is apt to take the viewpoint that anyone who prefers phone to c.w. has something wrong with him; usually, that he doesn't know the code and is too blankety-blank lazy to learn it. And therefrom comes the conclusion that all phone men are lazy, no-good bums who buy their equipment, stick an antenna on it and spend their amateur operating hours filling the phone bands with a lot of insane yakkyity-yak. The funny part of it is, this strictly-c.w. fellow not only won't be, but doesn't want to be persuaded that he may be wrong about a lot of phone men.

The same goes for the other side of the fence, of course — the phone guy who sees absolutely no sense in diddling a key when it is so much easier, faster and pleasanter to talk, and looks upon the c.w. hound as a queer kind of social misfit who doesn't belong in his exalted circles.

Through the years, we have developed a kind of segregation and standoffishness between the two groups that has been thoroughly inimical to our organized traffic facilities. The c.w. groups have set up their traffic facilities and, in recent years, the phone men their own — for the most part, entirely separate. V.H.F. enthusiasts have striven for independence by handling traffic in relays. RTTY addicts have set up long-haul and short-haul facilities without any particular thought to liaison with existing facilities, using other modes. Single side band nets are beginning to crop up, with a banding together of s.s.b. guys to form a nationwide traffic network. Each thinks that his method or mode is best and wants nothing to do with facilities using other modes, considered to be obsolete, cumbersome, too complicated, too elementary, etc., depending on who is doing the considering.

Well, we can't eliminate these general tendencies entirely, but we ought to give more thought to minimizing them. In 1949, your ARRL set up an entirely new traffic system dedicated to organized and systematic traffic handling by any or all modes. The emphasis was and has always been on organization and system. True, most of the nets have been on c.w., but they need not necessarily be. Versatility is

almost a "must" for effective liaison between all groups. Here are some thoughts that you traffic men might like to pore over:

(1) Phone is excellent for local coverage, because of the widespread availability of operators. V.H.F. should be used more for this purpose. Phone operators who can also operate c.w. for liaison purposes are most valuable. S.s.b. can be worked in either for local or medium-haul purposes. Get together with your SCM so that all section facilities will be working together.

(2) C.w. is fine for local coverage if you have enough operators to make it worth while; otherwise, your c.w. facilities are best devoted to medium-distance or long-distance use. If you have both c.w. and phone facilities at section level, don't neglect liaison between them; make maximum usage of those operators who are equally at home in both modes.

(3) An effective transcontinental RTTY circuit would be wonderful, worked in along with the rest of the system, preferably at the Transcontinental Corps level. If any of you RTTY enthusiasts would like to get in on the act, consult your TCC Director for more dope.

(4) Effective traffic networks do not grow like Topsy and spread like poison ivy. They are organized for a specific purpose along pre-set coverage boundaries. Don't get interested in traffic by starting your own net; take part in existing NTS nets, give them the benefit of your operating time and skill.

(5) Select the mode to suit the need. Almost everybody is prejudiced one way or another, but let's be practical, and let's let our sense of the practical outweigh our prejudices, for once, for the benefit of amateur radio as a public service.

W1LYL reports twenty stations participating during November in the Transcontinental Phone Net, First Call Area, with exactly 600 message counts. Second Call Area reported 901 message counts by 15 stations. W6CPI reports that TCPN W9 and W0 districts handled 286 in October and 559 in November.

*National Traffic System.* Several nets have written to ask, "How can our net become a part of the National Traffic System?" Unfortunately, in most cases, the answer is that it cannot. NTS is a system of nets at three levels (section, regional and area), each one serving a specific purpose and a specific coverage area. It is not set up to take in already-organized nets. Inexperienced operators start in at section level, gradually working into the higher regional and area levels as they accumulate experience and skill — not just skill in code speed, but in efficient net operation, because at regional and area level network "savvy" is the key to clearing the "through" type of traffic that accumulates there with the best combinations of speed and efficiency. All operators are welcome to participate in NTS, at the level commensurate with their net operating skill. But NTS nets are organized to perform a specific purpose whose functions can seldom be met by already-existing non-NTS nets. November reports:

Net	Ses- sions	Traffic	Rate	Aver- age	Repre- sentation (%)
EAN	1011	—	—	46 0	98.2
CAN	25	1053	0.83	42 1	93.3
PAN	22	611	0.59	27 8	91.0
1RN	26	352	0.71	13 5	91.8
2RN	26	420	1.47	16 2	98 7
3RN	44	293	0.51	6 7	88 6
RN5	42	573	0.76	13 7	74 1
RN6	52*	328	0.51	5 6	88 0
RN7	50	321	—	6 4	—
9RN	26	668	0.46	25 7	98 0
TEN	70	1600	—	22 9	70 5
TEN	32	78	0.28	2 5	82.3
Sections +	458	3484	—	—	—
TCC (Eastern)		367	—	—	—
TCC (Central)		897	—	—	—
TCC (Pacific)		660	—	—	—
Summary	895	12666	2RN	12 0	—
Record	895	12666	1.47	12 6	100 0
Rate reports:					
RN7 (Oct.)	49	332	—	6 7	—

\* Reported out of 60 sessions held.

\*\* Section nets reporting: TLGN (Iowa); AENT, AENP & AENB (Ala.); CN (Conn.); KYN (Ky.); QKS, QKS SS & QKN ( Kans.); GBN (Ga.); NTK (N. Texas); Tenn. CW & Tenn. 160; WYN (W. Va.); MSN (Minn.); Colo. High Noon & Colo. Slow Speed; Iowa 75 Meter Phone; N. Dak. Pone & N. Dak. CW.

W9DO is trying to get "solid" week end operation on CAN, sacrificing a perfect week day record to do so. PAN has moved to 3675 kc. to avoid commercial QRM; NCS

failing to report make records incomplete. Conn. and Maine made perfect attendance on 1RN. In 2RN, NYS and NLI were both 100% in attendance, NYS for the third consecutive month; certificates have been issued to W2s BXP EAS RG RUF and K2LSF. RN5 representation hit 74% this month, the best ever; W4OGG is looking for a replacement net manager. RN6 is still lacking representation from New Mexico, Colo., Utah, Nevada and T. H. The RN7 report was received on time this month, although lacking some NCS reports. Regional net certificates have been awarded to 9RNers W9EHZ, W9KJJ and W9ZYK — and certificates are not easy to get on 9RN. VE1DB is a newcomer to TRN, helping improve the attendance record from the Maritimes.

The Transcontinental Corps continues to show improvement and quite a rapid turnover. We note, since last month, the addition of W3GEG, W4ZFW and W2ZVW to the Eastern Area roster, and the loss of W8FYO. In the Central Area, Director W8SCA reports that W8ZJF is now assisting, and that W8RDN will soon be doing likewise, although W8BDR and W8SCA handle the bulk of the schedules. The most rapid progress is being shown in the Pacific Area, where Director W8KQD is really signing them up. Since last month we note no deletions and the addition of the following: W6YHM, W7DXV, W7FRU, W7PKW/7, W8BEN, W8CYT, W8KHQ, W8SGG.

In the Colorado Section of the Rocky Mountain Division, Mr. James B. Simpson, W0HEM, and Mr. Reno V. Rosellini, W8SYA, were nominated. Mr. Simpson received 117 votes and Mr. Rosellini received 92 votes. Mr. Simpson's term of office began Nov. 23, 1955.

In the Ohio Section of the Great Lakes Division, Mr. Wilson E. Weckel, W8AL, and Mrs. Marvel Sines, W8HUX, were nominated. Mr. Weckel received 617 votes and Mrs. Sines received 447 votes. Mr. Weckel's term of office began Dec. 14, 1955.

In the Illinois Section of the Central Division, Mr. George T. Schreiber, W9YIX, and Mr. Edmond A. Metzger, W9PRN, were nominated. Mr. Schreiber received 844 votes and Mr. Metzger received 275 votes. Mr. Schreiber's term of office began Dec. 15, 1955.

### 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 Section. 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

### BRASS POUNDERS LEAGUE

Winners of BPL Certificates for November traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W9NZZ	215	895	0	895	2005
W8BDR	46	783	750	8	1587
W0PZO	3	740	717	7	1467
W9PDC	41	657	634	64	1396
W2KRB	40	603	534	149	1326
W2KFF	22	671	620	61	1304
W0CPI	7	645	574	71	1297
W8SCA	18	655	611	3	1287
W3YYC	271	420	390	25	1106
W7FGY	34	492	427	64	1017
W7BA	27	491	450	38	1006
W4PFC	10	471	458	5	944
W8KQD	64	382	332	2	780
W4UHA	93	388	332	5	718
W7VAZ	22	308	256	52	638
W6DDP	3	263	359	4	629
K8HOV	2	308	302	8	620
W9OR	17	302	247	43	609
W8ZJF	14	289	280	3	586
K8WAY	146	133	246	27	552
W3CUL	49	251	216	33	549
W3TTT	3	288	239	0	530
W0CBJ	10	259	212	47	528
W2RUF	28	264	194	39	525
W4FJU	4	260	240	20	524
K6FCY	42	235	204	31	512
W7FRU	6	254	234	16	510

### More-Than-One-Operator Stations

W6IAB	22	1275	1203	72	2572
W6YDK	41	812	715	97	1685
K8GAJF	258	589	309	72	1228
K8QWB	107	473	396	47	1023
KLUSA	18	399	345	5	767
K4FDY	76	244	227	9	556
K8HQU	147	184	72	113	516
Late Report:					
W6YDK (Oct.)	46	884	831	53	1814

BPL for 100 or more originations-plus deliveries:

W4DDY	192	K2HVT	116	W0FDJ	103
W3CVE	179	W3ELI	115	VE1AO	103
W0NIY	167	W9SAA	112	W9DDC	102
W7WOK	162	K2KXZ	110	W1YBH	100
W6LYG	138	W0RLQ	110	W0W0W	100
W7ABY	136	W4HDR	108	VE1FO	100
W8NOH	127	W0LJW	108	Late Reports:	
W8DGA	126	W0WGB	107	W4ZEB (Oct.)	217
K4ASU	121	W0FEO	106	W4HDR (Oct.)	123
W6USY	119				

### More-Than-One-Operator Stations

W1AW 127  
K3WBJ 106

BPL medallions (see Aug. 1954 QST, p. 64) have been awarded to the following amateurs since last month's listing: W6MBW.

### ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

Alaska Dave A. Fulton, KL7AGU Jan. 15, 1956



• 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, Clarence Snyder, W3PYF — SEC: NNT, RM: AXA. PAM: TEJ. EPA Nets: 3850 at 1800 Mon. through Fri., 3610 kc. at 1830. AXA is the proud papa of a new YL jr. operator born Nov. 17th. He now has a new 813 rig on the air. OSA is off the air because of illness. Twenty-three operators are now taking code instructions at Lancaster ARC. WWG, president of the Mike Farad Traffic Net, has taken employment in W6-Land. The Carole Radio Club has changed its name to the Carbon Amateur Radio Club. ADE has a new Viking Ranger. ZRQ reports that the Tamaqua ARC now has 41 members. GH now has emergency power. BNR has a new Elmac AF67 for mobile. CBZ now has RCC and OTC certificates. YAZ has a new NC-300. ZIV and RUE are both instructors at East Stroudsburg State Teachers College. NNV reports his son AQI is now on duty at Plattsburg (N. Y.) AFB. FPC is looking for more 10-meter activity in the wee morning hours. GHS was the speaker at the December meeting of the North Penn ARC. VOE reports his traffic-handling has been curtailed because of school work. ARK now is Class I OO because of his efficiency in the P.M.T. The PFN continues to operate at 1800 hours week days, Mon. through Fri., under the direction of TEJ. TEJ invites interested amateurs to call in whenever possible. PVY, net manager of the Anthracite Net, invites amateurs interested in traffic-handling to call in on 3610 kc. at 1800 hours. The AN Net is a slow-speed net and newcomers are welcome. Once again I invite secretaries of clubs to write me regularly of news of their club members and club activities. Information should be in my hands by the 3rd of the month. A new amateur radio club has been formed in the Allentown Area called the Lehigh Amateur Radio Club with SCT, pres.; LXM, vice-pres.; OMI, secy.; and BPZ, treas. The NPARC aided the Lansdale Police during the Lansdale Jr. Chamber of Commerce's Christmas Parade and Mardi Gras. TSY has moved to York. WN3EEK is a new ham in the Tamaqua Area. RZV is now a reporter for the *Allentown Morning Call*. Traffic: (Nov.) W3CUL 549, OK 228, BFF 204, YDX 200, TEJ 150, ELI 130, DHJ 109, YVX 97, OGD 74, WUE 64, GIY 37, EAZ 37, NOK 35, ZBW 33, DDZ 28, DUI 28, DUL 28, BNR 26, AXA 23, ZRQ 21, GES 18, ZLX 16, PYF 10, ADE 8, ZLB 8, YUO 5, DGM 4, CMI 3, HOF 3, AMC 2, VOE 2. (Oct.) W3BFF 55, DUI 19.

**MARYLAND-DELAWARE-DISTRICT OF COLUMBIA** — SCM, John W. Gore, W3PRL — YBQ recently became a member of the Convalescent Net. After suffering a badly-broken leg he was taken to a Baltimore hospital and arranged to have his 10-meter station set up in his hospital room by his brother. ICA/M was his first contact and it developed that a better antenna was indicated. In no time at all ICA/M arranged for a VFO and a 10-meter whip on the hospital roof with a coax feedline, with the result that Bob was able to scoot up and down the band with a healthy signal which assisted greatly in his recuperative powers. #ZVS is a new qualified TCNR representative. K4WBK has been awarded an "active and qualified" TCNR certificate. ZME worked 39 countries in three months with 60 watts, on one 14,020-Mc. crystal. WV reports attendance in MDD picking up and traffic totals increasing. BKE has a new DX-100 transmitter, also a new NC-300 receiver. SPL reports JDP has been appointed secy.-treas. of the Delaware Emergency Net and ZNE is Radio Officer for Kent County. OYX reports that EHA has received his Old Timers Club certificate and that YRK has his new "fiber-glass Scottie beam" mounted on a 45-ft. pole and has been working all corners of the earth. OYX also reports three newcomers to the ranks in his area: WN3EDA, N3ENC, N3END. GKP has reported extensive experimentation on 2 meters, both transmitting and receiving, with the objective of getting the last mile out of the last ¼ watt and receiverwise to be able to receive the weak signals of distant stations built up to a readable level. AKB and BWT, OM

and XYL, finally are getting into full operation at their new QTH and after everything is smoothed out no doubt will be found more constantly on the bands. They report that the Washington Radio Club at its November meeting were treated to a presentation by the local Chesapeake & Potomac Telephone Co., who put on a demonstration with microphones and tape recorders, on "Voice Technique." The Capital Suburban Radio Club held a mammoth auction on Nov. 2nd. EQK wishes to express his many thanks to the 725 members in the Atlantic Division who had enough confidence in him to vote for him for Vice-Director and stated that he wishes more power to the man who won. EQK further reports that he recently worked VP8AQ, ZE3JG, and FB8BC. Art needs only one or two verifications to complete his WAA. CCC, and WW1 as well as TPG, certificates, having worked 32 out of 40 zones. Your SCM had an FB trip to the Harford Amateur Radio Assn. meeting in Aberdeen, where the groundwork was laid for the formation of a Harford County TVI Committee. Traffic: (Nov.) W3YYC 1106, WV 365, WZL 305, UE 241, CVE 235, K3WBJ 230, W3UCR 124, RV 58, BUD 55, PQ 43, PKC 8, OYX 6, BKE 4. (Oct.) W3WZL 298, BWT 4.

**SOUTHERN NEW JERSEY** — SCM, Herbert C. Brooks, K2BG — SEC: ZVW, PAM: ZI. New appointments: RUX as EC for Cumberland County. K2ETG is Asst. EC. YRW, Delaware Valley Net (2-meter) mgr. has a new 55-ft. tower. Net members regularly taking part are K2GWK, K2ITP, K2ITQ, KN2KVE, W3GDI and W3WQL. KTR reports working 34 countries in three weeks using vertical and 65 watts on 40 meters. ZI reports the Jersey Phone Net is operating daily on 3900 kc. with 8 to 15 stations taking part. So. Jersey was well represented in the SS Contest by K2CPR, W2HDW, K2HZR, K2ITP, and W2EBW. BAY is prepared for 10-meter DX with a new beam. ZVW is building new equipment for c.d. work. Burlington County's new officers are ADA, pres.; and WKI, vice-pres. Regular weekly drills are held by the club members on 2 and 10 meters. The club station is K2KED. The Jersey-Penn is in operation on 29.4 Mc. at 11 A.M. each Sun. New control stations are JRO and QBH. The Moorestown Friends School Fair was the origin of 20 messages as a result of a communication demonstration given by the licensed students. Those taking part were K2ITP, K2ITQ, KN2PDH, KN2MUJ, KN2PNY, KN2ODO, and KN2QKA. *DVRA News* keeps its membership well informed by printing our Official Bulletins. UAE now is located in Lambertville. ZI was a guest of the Antique Wireless Assn. in Rochester. It is hoped that counties not having an active EC will suggest one of their capable men for appointment. Traffic: W2RG 174, K2HZR 109, W2YRW 79, K2BHQ 64, JKC 36, ITP/2 30, W2ZVW 24, ZI 23, HDW 13, K2CPR 2.

**WESTERN NEW YORK** — SCM, Edward G. Graf, W2SJV — Asst. SCM: Jeanne Walker, 2BTB. SEC: UTH/ERL. RMs: RUF and ZRC. PAMs: TEP and NAL. NYS C.W. meets on 3615 kc. at 6:30 p.m., ESS on 3590 kc. at 6 p.m.; NYS Phone on 3925 kc. at 6 p.m.; TAR on 3720 kc. at 4 p.m.; NYS C.D. on 3509.5 and 3993 kc. at 9 A.M. Sun.; TCPN 2nd Call Area on 3970 kc. at 7 p.m.; SRPN on 3970 kc. at 10 A.M.; ISN on 3980 kc. at 3 p.m. K2HRB is a new OES. QXV renewed as EC. Club meetings devoted to discussion of incorporation were held by RAWNY, Elmira ARA, RAGS, and KBT. New officers of ARATS are VCI, pres.; OZP, vice-pres.; SEX, secy.-treas. At a recent meeting RPO and VCI gave a demonstration and talk on "Basic Antenna Theory, Feeding and Proper Loading." We welcome the Auburn ARA as an ARRL affiliate. It is with regret that we report the passing to Silent Keys of SOL. K2DQ now is vice-president of research at Eastman Kodak. ZS and his XYL returned from a trip to Europe. ZOL has three 75-ft. poles with ½-wave 75-meter doublet between the end poles, 20-meter telrex four-element rotary atop one pole, and 2-meter coax ground plane on another. The Rochester v.h.f. group met at the QTH of YIE. RACES authorization was received by K2AQY, Radio Officer for Wyoming Co. Net certificates have been issued to LGE and K2s JGP, IJT, and KWF. FE was elected president of the local Kiwanis Club. QXV is RO of St. Lawrence Co. The KBT held an Auction Nite. New officers of the Oswego Co. RC are UMI, pres.; K2DUR, vice-pres.; FFU, secy.; UNU, treas.; KN2OJK is a new ham in Madison Co., with an AT-1 and an S38-C. JNM spoke at a meeting of the Madison Co. Wireless Club on mobile operation. QHH has WAC on 21 Mc. (6-band WAC) with a Ranger; he has worked 235 countries. HXG is RO for Seneca Co. RACES authorization was received for Dunkirk and Chautauque Counties. New officers of the CARS are GRB, pres.; EJO, vice-pres.; THV, secy.-treas. GHU, TQT, and

(Continued on page 80)



## The Heterodyne V F O

**T**HE HETERODYNE V F O in its simplest form consists of a crystal oscillator, a variable frequency oscillator, and a suitable mixer circuit which will pass the desired sum or difference frequency of the two oscillators. A unit of this type appeared in an article by Bliss and Bailey in *QST* for July, 1940, and more recently the advantages of this method of frequency control were described by F. A. Bartlett in the June, 1952 issue. Construction of an elaborate heterodyne exciter is fully covered in recent issues of the ARRL Handbook, yet because of its seeming complexity and a lack of understanding of its many superiorities the heterodyne V F O has never enjoyed the popularity to which it is entitled.

**T**HE NEW HALLICRAFTERS HT-30 Transmitter Exciter embodies a heterodyne V F O of unrivalled versatility. In single sideband transmitters the customary methods of frequency multiplication by doublers, etc., cannot be used and any change of frequency from that at which the SSB signal was originally generated must be by the heterodyne method; therefore a heterodyne V F O is a natural for this application. However — that is only part of the story. The CW operator, and particularly the traffic man who demands perfect break-in operation, will find the new HT-30 with its heterodyne V F O the answer to all his problems.

**I**N THIS TRANSMITTER keying is accomplished in the mixer and amplifier circuits and because neither the crystal oscillator nor the V F O operates anywhere near an amateur frequency — when the key is up there is no signal, although both oscillators run continuously. Frequency stability is excellent, there is no possibility of chirp due to starting and stopping of an oscillator, and keying characteristics can be shaped as desired without difficulty.

**W**E ARE STRESSING the CW operation of the new HT-30 on this page because its outstanding performance as a single sideband phone transmitter may obscure some of its other virtues and we don't want our CW traffic handling friends to miss out on such a good thing.

— Cy Read, W9AA

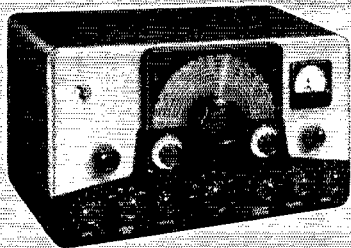
Bill Kelley Jr. W. J. Halligan W9AC for **hallicrafters**

I BOUGHT THE VIKING  
"RANGER"...

the best low power transmitter  
on the market!



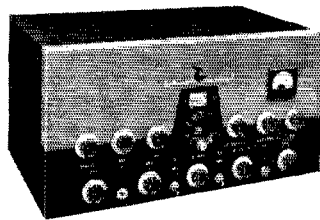
... says  
Alex Desmeules  
VE2AFC



**VIKING "RANGER" TRANSMITTER**

75 watts CW input . . . 65 watts phone. All amateur bands from 10 through 160 meters. TVI suppressed—built-in VFO or may be crystal controlled. Timed sequence (break-in) keying system. Available as a kit or completely wired and tested.

- |   |             |
|---|-------------|
| Cat. No.  | Amateur Net |
| 240-161-1 Viking "Ranger" Kit, with tubes, less crystals, key, and mike . . . . . | \$214.50    |
| 240-161-2 Viking "Ranger", wired and tested . . . . .                             | 293.00      |



**VIKING II TRANSMITTER**

180 watts CW input . . . 130 watts phone. Bandswitching on all amateur bands from 10 through 160 meters—effectively TVI suppressed—completely self-contained. Available as a kit or completely wired and tested.

- |   |             |
|---|-------------|
| Cat. No.  | Amateur Net |
| 240-102-1 Viking II Transmitter Kit, with tubes, less crystals, key, and mike . . . . . | \$279.50    |
| 240-102-2 Viking II Transmitter, wired and tested . . . . .                             | 337.00      |

**FOR CIVIL DEFENSE** . . . 1.7 to 30 mc.; push-to-talk operation; modulation limiting.

- |   |          |
|---|----------|
| 240-102-16 Viking II-CDC Transmitter, assembled, wired and tested with tubes, less crystals, key and microphone . . . . . | \$430.00 |
|---|----------|

**VIKING VFO KIT**

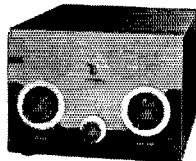
Variable frequency oscillator with 160 and 40 meter output for frequency multiplying transmitters. Accurately calibrated 160 through 10 meters. Available as a kit or wired and tested.



- |  |             |
|--|-------------|
| Cat. No.   | Amateur Net |
| 240-122-1 Viking VFO Kit, with tubes . . . . .       | \$45.50     |
| 240-122-2 Viking VFO Kit, wired and tested . . . . . | 69.75       |

**VIKING 250 Watt "MATCHBOX"**

Performs all loading and switching functions required in medium power stations. Fully shielded—covers 3.5 to 30 mc. Built-in transmit/receive relay.



- |  |                     |
|--|---------------------|
| Cat. No. 250-23 Viking 250 Watt "Matchbox", assembled, wired, and tested . . . . . | Amateur Net \$49.85 |
|--|---------------------|

**2 METER VFO**

Exceptionally stable, temperature compensated, and voltage regulated. Designed to replace 8 mc crystals in frequency multiplying transmitters. Only 4" x 4 1/2" x 5".



- |   |             |
|---|-------------|
| Cat. No.  | Amateur Net |
| 240-132-1 Viking 2 Meter VFO Kit with tubes and pre-calibrated dial . . . . . | \$29.50     |
| 240-132-2 Viking 2 Meter VFO wired, calibrated and tested—with tubes. 46.50   |             |

**SWR BRIDGE**

Provides accurate measurement of SWR for effective use of low pass filter and all antenna couplers.



- |                           |        |
|---------------------------|--------|
| Cat. No. 250-24 . . . . . | \$9.75 |
|---------------------------|--------|

**TELEGRAPH KEYS**

Semi-automatic, high speed standard, heavy duty and practice keys. Code practice sets, cords and wedges for semi-automatic models.



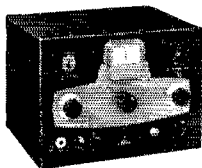
*See your distributor*

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**E. F. JOHNSON COMPANY**

2803 SECOND AVENUE SOUTHWEST • WASECA, MINNESOTA



### VIKING "ADVENTURER" CW KIT

Compact, completely self-contained 50 watt transmitter kit. Single knob bandswitching—effectively TVI suppressed. Easy assembly by novice or experienced amateur. 80, 40, 20, 15, and 11-10 meters. Cat. No. 240-181-1 Viking "Adventurer" Kit complete with tubes, less crystals and key . . . . . Amateur Net \$54.95

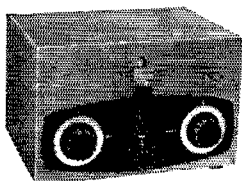
### "SIGNAL SENTRY"

Monitors CW or phone signals without regard to operating frequency. Energized by transmitter RF. Serves as code practice oscillator with simple circuit modification. Cat. No. 250-25 "Signal Sentry", wired and tested, with tubes. Amateur Net \$18.95



### 100 KC CALIBRATOR

Provides accurate 100 KC check points to 55 mc. High quality, hermetically sealed military type crystal. Requires 6.3 volts at .15 amps. and 150 to 300 volts at 2 ma. With 6BH6 tube. Cat. No. 250-28 100 KC Calibrator wired, with tube, less power supply. Amateur Net \$17.25



### VIKING KILOWATT "MATCHBOX"

Bandswitching—completely self-contained. Covers 80 through 10 meter amateur bands. Fully shielded—performs transmission line matching and switching functions at the kilowatt level. Cat. No. 250-30 Kilowatt "Matchbox", assembled wired, and tested. . . . . Amateur Net \$124.50

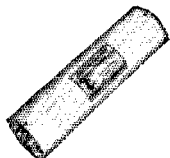
### POWER REDUCER

Permits 100-150 watt transmitters such as Johnson Viking, Collins 32V or others, to serve as exciters for Johnson Kilowatt. Shielded—up to 20 watts dissipation. Cat. No. 250-29 Amateur Net \$13.95



### LOW PASS RF FILTER

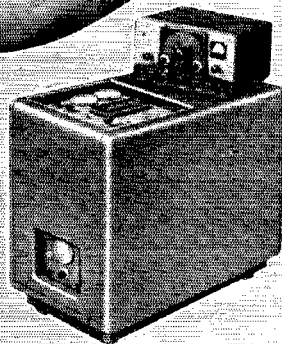
Handles more than 1000 watts RF—provides 75 db or more attenuation about 54 mc. Cat. No. 250-20 . . . . . \$13.50



I BOUGHT THE VIKING  
KILOWATT . . .  
a Full kilowatt  
AM, CW, and SSB!



... says  
Dr. George C. Wright  
WILO5



### VIKING KILOWATT POWER AMPLIFIER

1000 watts AM, CW, or SSB. Boldly styled . . . contains every conceivable feature for safety, operating convenience, and peak performance.

Cat. No. 240-1000 Viking Kilowatt Power Amplifier—wired, tested, complete with tubes. . . . . Amateur Net \$1595.00

Cat. No. 251-101-1 Matching Accessory Desk Top and three drawer pedestal . . . . . FOB Corry, Pa. \$123.50

*See your distributor*  
Johnson Amateur Equipment is sold only through Authorized Johnson Distributors—most offer convenient time payment plans. For complete information see your distributor.

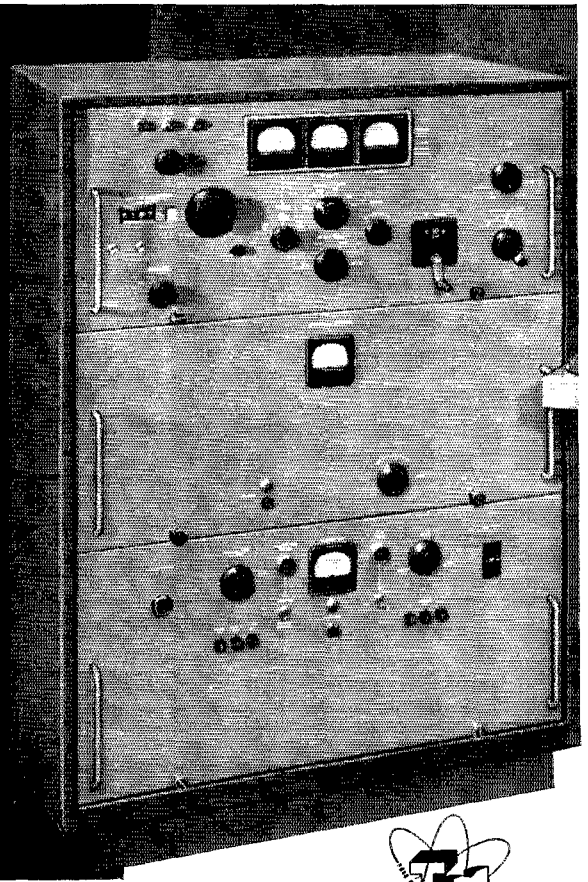


**E. F. JOHNSON COMPANY**

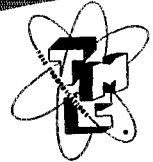
2803 SECOND AVENUE SOUTHWEST • WKSCEA, MINNESOTA



**THE TECHNICAL MATERIEL CORPORATION, and TMC CANADA, LIMITED,** have for many years been engaged in the manufacture and sale of high quality precision communications equipment such as, high stability direct reading oscillators, radio teletype frequency shifters and converters, broadband transformers, tone telegraph systems and diversity and fixed tuned receivers. Millions of dollars worth of this equipment is in use in twenty or more countries throughout the world.



# YOUR COMPLETE

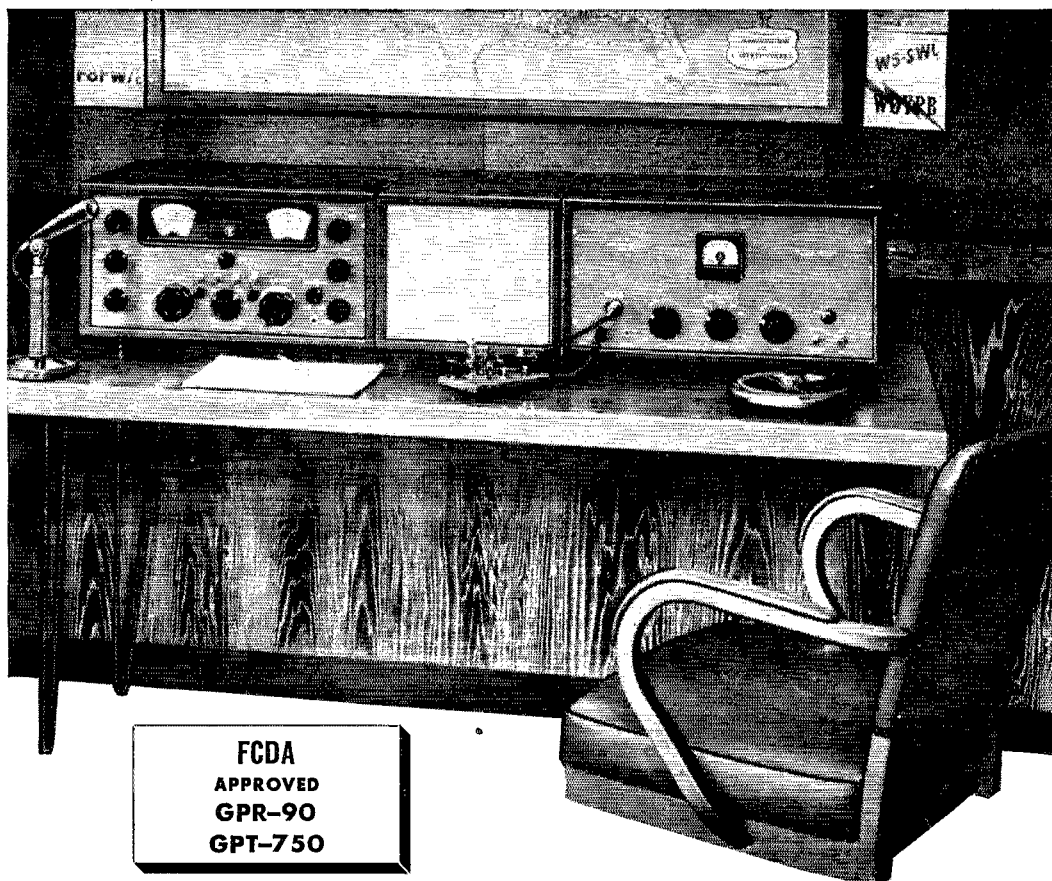


Here for the first time is a complete package - every item necessary to go on the air A1, A2, A3 except the antenna and that is in the works right now.



## GPR-90 RECEIVER

- Six Bands - .54-31 mc., AM, CW, MCW, FS.
- Full Electrical Bandsread and Main Tuning.
- Antenna matching with Ferrite Transformer. 75 ohm unbal. and/or 300 ohm bal. inputs.
- One Microvolt Sensitivity or better for 10-1 Signal to Noise Power Ratio.
- Selectivity in 6 Steps, Variable, 200 cy. to 5 kc. 5 Crystal, one non Crystal.
- Hum Level - Better than 60db down. Image Ratio - Better than 60db.
- Exclusive Audio Selectivity Control.
- SSB coaxial IF output and Audio input.
- Diversity Operation with GPR-D. HFO, BFO, IFO External Controls.
- For Complete Details Request Bulletin F-179B.



FCDA  
APPROVED  
GPR-90  
GPT-750

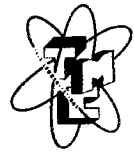
# EQUIPPED HAM SHACK

## GPT-750 TRANSMITTER

## RTC REMOTE CONTROL AMPLIFIER

- Full KW - input phone, or A2 or A1.
- Continuous Frequency Coverage 2 to 32 megacycles.
- Completely Bandswitched.
- High Stability Direct Reading V.F.O.
- Pi-network Output.
- TVI Suppressed
- Coax Output 30 to 140 ohms.
- All Decks on Slides for Easy Servicing.
- Double Blower Pressurized Cabinet. Fiberglass Filters.
- Interlock Protected - Overload Protected.
- F.S. Available on Request.
- Final Available for SSB Operation.
- For Complete Information Request Bulletin F-174A.

- Modulation Indicator.
- A1, A2 (tone), A3 Emission Control.
- Peak Clipping Amplifier - Clipper Adjustable 0 to 20db.
- Modulation Control.
- Keying and Monitor Jack.
- Push-to-Talk Mike Input.
- Receiver Muting.
- For Complete Information Request Bulletin F-183



**THE TECHNICAL MATERIEL CORPORATION**  
OTTAWA, ONT., CANADA  
MAMARONECK, NEW YORK.

# New

# Heathkit VFO KIT



MODEL VF-1

**\$1950**

Ship. Wt. 7 lbs.

Here is the new Heathkit VFO you have been waiting for. The perfect companion to the Heathkit Model AT-1 Transmitter. It has sufficient output to drive any multi-stage transmitter of modern design. A terrific combination of outstanding features at a low kit price. Good mechanical

and electrical design insures operating stability. Coils are wound on heavy duty ceramic forms, using Litze or double cellulose wire coated with polystyrene cement. Variable capacitor is of differential type construction, especially designed for maximum bandspread and features ceramic insulation and double bearings.

This kit is furnished with a carefully precalibrated dial which provides well over two feet of calibrated dial scale. Smooth acting vernier reduction drive insures easy tuning and zero beating. Power requirements 6.3 volts AC at .45 amperes and 250 volts DC at 15 mills. Just plug it into the power receptacle provided on the rear of the AT-1 Transmitter Kit. The VFO coaxial output cable terminates in plastic plug to fit standard 1/4" crystal holder. Construction is simple and wiring is easy.

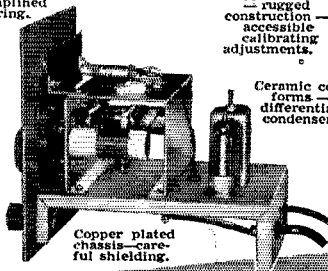
- Smooth acting illuminated and precalibrated dial.
- 6AUG electron coupled Clapp oscillator and OA2 voltage regulator.
- 10 Volt average output on fundamental frequencies.
- 7 Band calibration, 160 through 10 meters, from 3 basic oscillator frequencies.

Open layout—easy to build—simplified wiring.

Smooth acting illuminated dial drive.

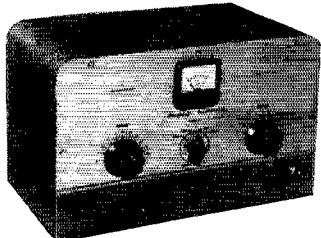
Clean appearance—rugged construction—accessible calibrating adjustments.

Ceramic coil forms—differential condenser.



Copper plated chassis—careful shielding.

# Heathkit AMATEUR TRANSMITTER KIT



MODEL AT-1

**\$2950**

Ship. Wt. 16 lbs.

### SPECIFICATIONS:

Range 80, 40, 20, 15, 11, 10 meters.  
 6AG7 ..... Oscillator-multiplier.  
 6L6 ..... Amplifier-doubler  
 5U4G ..... Rectifier.  
 105-125 Volt A.C. 50-60 cycles 100 watt. Size 8 1/2 inch high x 13 1/8 inch wide x 7 inch deep.

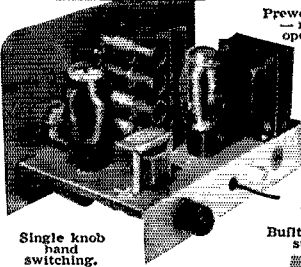
Crystal or VFO excitation.

Rugged, clean construction.

Prewound coils—metered operation.

52 ohm coaxial output.

Here is a major 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, stand-by switch, key click filter, A. C. line filtering, good shielding, etc. VFO or crystal excitation—up to 35 watts input. Built-in power supply provides 425 volts at 100 MA. Amazingly low kit price includes all circuit components, tubes, cabinet, punched chassis, and detailed construction manual.



Single knob hand switching.

Built-in power supply.

# Heathkit COMMUNICATIONS RECEIVER KIT

Four band operation 535 to 35 Mc.

Six tube transformer operation.

Stable RFO oscillator circuit.

Electrical bandspread and scale.

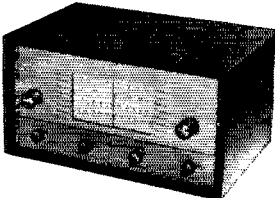
RF gain control with AVC or MYC.

5 1/2 inch PM Speaker-Headphone Jack.

Noise limiter—standby switch.

### SPECIFICATIONS:

Range.....535 Kc to 35 Mc  
 12BE6.....Mixer-oscillator  
 12BA6.....L. F. Amplifier  
 12AV6 Detector—AVC—audio  
 12BA6.....B. F. O. oscillator  
 12A6.....Beam power output  
 5Y3GT.....Rectifier  
 105-125 volts A.C. 50-60 cycles, 45 watts.



MODEL AR-2

**\$2550**

Ship. Wt. 12 lbs.

### CABINET:

Proxylon impregnated fabric covered plywood cabinet. Shipg. weight 5 lbs. Number 91-10, \$4.50.

A new Heathkit AR-2 communications receiver. The ideal companion piece for the AT-1 Transmitter. Electrical bandspread 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.

# HEATH COMPANY

BENTON HARBOR 9, MICHIGAN

# New HEATHKIT DX-100

# PHONE AND CW TRANSMITTER KIT



MODEL DX-100

Shpg. Wt. 120 lbs.

**\$189.50**

Shipped motor freight unless otherwise specified. \$50.00 deposit with C.O.D. orders.

- R.F. output 100 watts Phone, 125 watts CW.
- Built-in VFO, modulator, power supplies. Kit includes all components, tubes, cabinet and detailed construction manual.
- Crystal or VFO operation (crystals not included with kit).
- Pi network output, matches 50-600 ohms non-reactive load. Reduces harmonic output.
- Treated for TVI suppression by extensive shielding and filtering.
- Single knob bandswitching, 160 meters through 10 meters.
- Pre-punched chassis, well illustrated construction manual, high quality components used throughout—sturdy mechanical assembly.

This modern-design Transmitter has its own VFO and plate-modulator built in to provide CW or phone operation from 160 meters through 10 meters. It is TVI suppressed, with all incoming and out-going circuits filtered, plenty of shielding, and strong metal cabinet with interlocking seams. Uses pi network interstage and output coupling. R.F. output 100 watts phone, . . . . . 125 watts C.W. Switch-selection of VFO or 4 crystals (crystals not included).

Incorporates high quality features not expected at this price level. Copper plated chassis—wide-spaced tuning capacitors — excellent quality components throughout—illuminated VFO dial and meter face—remote socket for connection of external switch or control of an external antenna relay. Preformed wiring harness—concentric control shafts. Plenty of step-by-step instructions and pictorial diagrams.

All power supplies built-in. Covers 160, 80, 40, 20, 15, 11 and 10 meters with single-knob bandswitching. Panel meter reads Driver Ip Final Ig, Ip, and Ep, and Modulator Ip. Uses 6AU6 VFO, 12BY7 Xtal osc.-buffer, 5763 driver, and parallel 6146 final, 12AX7 speech amp., 12BY7 driver, push-pull 1625 modulators. Power supplies use 5V4 low voltage rect., 6AL5 bias rect., 0A2 VFO voltage reg., (2) 5R4GY hi voltage rect., and 6AQ5 clamp tube. R.F. output to coax. connector. Overall dimensions 20 3/4" W x 13 3/4" H x 16" D.

## Heathkit

### GRID DIP METER KIT



MODEL GD-1B

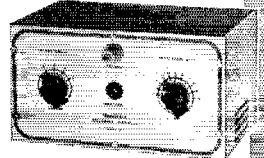
**\$19.50** Shp. Wt. 4 lbs.

The invaluable instrument for all Hams. Numerous applications such as pre-tuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, design procedures, etc. Receiver applications include measuring C, L and Q of components—determining RF circuit resonant frequencies.

Covers 80, 40, 20, 11, 10, 6, 2, and 1 1/2 meter Ham bands. Complete frequency coverage from 2—250 Mc, using ready-wound plug-in coils provided with the kit. Accessory coil kit, Part 341-A at \$3.00 extends low frequency range to 350 Kc. Dial correlation curves furnished.

Compact construction, one hand operation, AC transformer operated, variable sensitivity control, thumb wheel drive, and direct reading calibrations. Precalibrated dial with additional blank dials for individual calibration. You'll like the ready convenience and smart appearance of this kit with its baked enamel panel and crackle finish cabinet.

## Heathkit ANTENNA COUPLER KIT

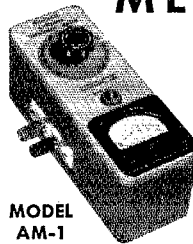


MODEL AC-1

**\$14.50** Shpg. Wt. 4 lbs.

Poor matching allows valuable communications energy to be lost. The Model AC-1 will properly match your low power transmitter to an end-led long wire antenna. Also attenuates signals above 36 Mc, reducing TVI. 52 ohm coax. input—power up to 75 watts—10 through 80 meters—tapped inductor and variable condenser—neon RF indicator—copper plated chassis and high quality components.

## Heathkit ANTENNA IMPEDANCE METER KIT



MODEL AM-1

**\$14.50** Shpg. Wt. 2 lbs.

Use the Model AM-1 in conjunction with a signal source for measuring antenna impedance, line matching purposes, adjustment of beam and mobile antennas, and to insure proper impedance match for optimum overall system operation. Will double, also, as a phone monitor or relative field strength indicator.

100  $\mu$ a. meter employed. Covers the range from 0 to to 600 ohms. Cabinet is only 7" long, 2 1/2" wide, and 3 1/4" deep. An instrument of many uses for the amateur.

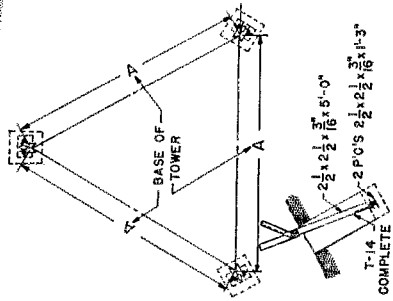
# HEATH COMPANY

A SUBSIDIARY OF DAYSTROM, INC.  
BENTON HARBOR 9, MICHIGAN

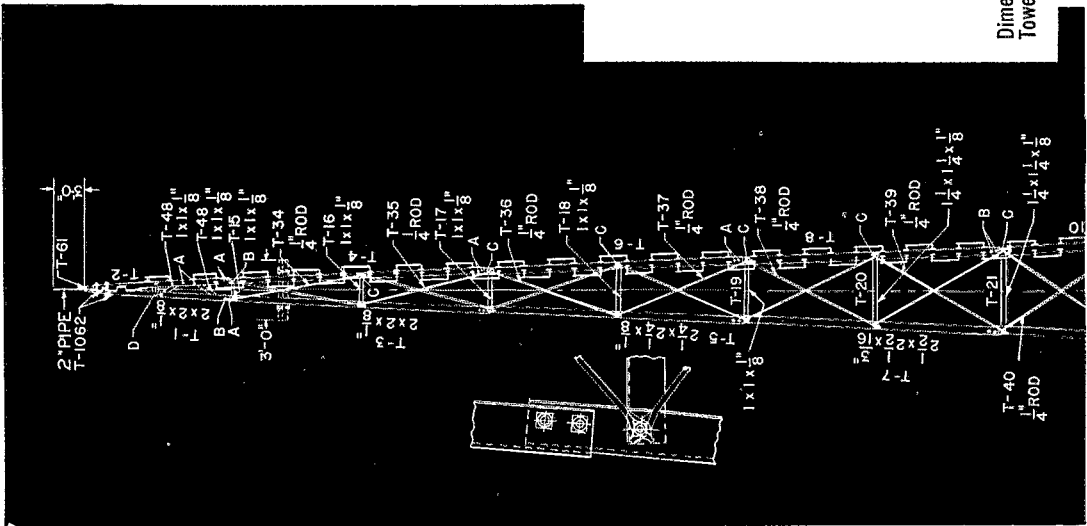
# SKY-TOP ANTENNAS TOWERS

— FROM COMMUNICATION HEADQUARTERS \*

- Completely self-supporting  
— no guy wires needed
- Simple in design  
for quick, easy erection
- Heavily galvanized  
after fabrication
- Loop steps on corner posts  
form solid ladder
- Triangular construction
- Trim, streamline appearance



Dimension A: 60 ft. Tower — 6' 1/4"; 87 ft. Tower — 11' 1/16"; 100 ft. Tower — 14' 6"







(Continued from page 70)

FDI are on 2 meters. UTH lost 2- and 6-meter beams during a recent windstorm. PPR has a new NC-300. K2DYC has a new rig on 6 meters with 829B final at 65 watts. AQS and EMW put on a realistic skit for RAGS on "How NOT to be a Lid on C.W." RWJ teaches Electronic Theory at Smith Tech. evenings. The Syracuse V.H.F. Club was addressed by I. Seeley, of S. U., on v.h.f. propagation scatter. K2GWN has an NC-300. EMW received a WNH certificate. OZR spoke at an RAWNY meeting on "Lightning Protection." K2EVP is the proud papa of a girl. BTB has been appointed as Air Force MARS Director for New York State. Traffic: (Nov.) W2RUF 525, K2DYB 357, W2ZRC 338, K2LSF 213, IYP 196, HVT 132, W2RUT 88, CXM 58, K2DSR 54, W2OE 45, K2KIR 41, W2OZR 38, K2DJN 35, W2QHH 34, K2CUQ 17, DG 17, GWN 16, W2FPW 15, RQF 15, BKC 12, ZHU 7, BLO 4, EMW 4 (Oct.) W2EMW 8, RQF 8.

**WESTERN PENNSYLVANIA** — SCM, R. M. Heck, W3NCD — SEC: GEG, RMs: UHN, NUG, NRE, and GEG, PAMs: AER and LXE/VKD. The WPA Traffic Net meets Mon. through Fri. at 7 p.m. on 3585 kc. The Radio Association of Erie members are looking forward to the time when amateur operation begins from Antarctica early next year. Interest is high because of the participation in the expedition of Ericite Dr. Paul Siple. Several fellow hams aided WJA in raising a new beam atop his garage on a recent Sunday, only to have a big wind bring it toppling down on Wed. W3BBO has 41 states toward WAS with 30 watts input. Bill Murphy is now W3EBK. MNP and LIF are vacationing in Bermuda. ZWK has joined the 10-meter enthusiasts. High winds damaged antennas at BBO and VHP. WAX is with A.T.&T. in Eric. Mobiles wound up '55 activities by assisting in the Christmas Parade. W3BZR, who has a total of 40 states worked, says that JW is organizing c.d. in Fayette County with a net on 28,640 kc. TTV is boosting c.d. in Connellsville. VKD will visit hams in 17 countries and expects to operate FM7WP, PZIRM, HC20M, and VP1SD during the coming ARRL DX Contest. WPY made a very good score in the SS while operating VKD on phone. AOX spoke on s.s.b. at the Indiana County ARC November meeting. The Allegheny Kiski ARA elected RSR, pres.; WGH, vice-pres.; R.E.R. secy.; SWV, treas.; NCF, WGR, and LPQ, directors. The BSN had about 26 NCSs on a rotating basis on 29 Mc. during the year. KWH/SVJ won the BSN's recent "mail-man" contest. TTR and PIQ'3 also were winners. BSN would like to see more logs in future contests. QYF worked SP9KAD for No. 100. TTR worked his first G. SIR needs only Wyoming for WAS. UJP is going f.m. soon. WFR and RSB are commended for their work on the Pennsylvania auto license plate law. JT likes his new 75A-4. LKZ, YIT, and SIR are ordering NC-300s. The Washington County ARC reports two members with new NC300s, UEM and KHY. The Steel City ARC reports. VZV, active on 10- and 20-meter phone, says the Mosley beam is FB. RUZ, all wrapped up in plans, is working on an RC job. ANX is on 40- and 10-meter phone. MPO has a new 20-meter beam. SDV is on 20 meters with a new beam. The Horseshoe Radio Club of Altoona increased activity on 20, 40, 20, and 160 meters with light activity on 10 meters. Calls heard from that area are OJX, KQD, BEY, WMM, YOZ, LQD, KFD, TAW, USG, VPF, AFH, LIV, AUD, BVE, ZVA, CHN, ZUG, ZUF, VXZ, UBP and Novices BSR, BTX, BZN, DKH, EGV, CLD, DPH, EDQ, BZG. BSR soon will be on VFO with a General Class ticket. YLs ZUF and BAMU are very active. The Bucktail ARC of Emporium is starting code classes at the community center. New club officers are SUL, pres.; PTU, vice-pres.; ZKY, secy.-treas.; RMX, sgt at arms. RVS, 2-year director; KUN, 1-year director; VEF, jr. vice-pres.; and WIL, jr. sgt. at arms. LAO has a second jr. operator, a boy. ZKY would like more participation in the 10-meter C.D. Net. Traffic: (Nov.) W3NRE 165, YUL 154, ZEG 109, ZEFW 89, WIQ 87, KUN 50, YA 48, UHN 43, NUG 24, NCD 10, KNQ 4, NMJ 2, SJJ 2, (Oct.) W3NUG 31.

## CENTRAL DIVISION

**ILLINOIS** — SCM, George T. Schreiber, W9YIX — Section nets: ILN c.w. 3515 kc. Mon. through Sat.; IEN phone, 3940 kc. RMs: BUK and MRQ. PAM: UQT. EC: HOA. EC Cook County: HFG. Thanks to all of you who voted for me in the recent election. We will try to serve you to the best of our ability. Club elections: Chicago Area Radio Club Council: LYI, chairman; HPG, vice-chairman; MHC, secy.; and YWH, treas. LARK: BCA, YXK, IWP, YWH, LDK, and Novice TDC. The North West Amateur Radio Club: NNU, RFR, JCX, and DRN. The Calumet Area Emergency Net (CAEN) is seeking traffic stations on 1805 kc. Mon. through Fri. at 7 p.m. Sparking the Net are UXX, EHY and EHZ. The Net publishes a fine bulletin appropriately named *Short Skip*, edited by EHY and DDK. The first Illinois amateurs to receive their call letter license plates were AC, EU, LZ, and CYD, all of whom were instrumental in assisting the matter through the Legislature. BPU and PVD both are sporting new Rangers and HGY a Globe King. MRH is operating from a new QTH.

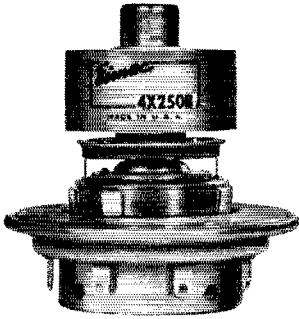
IDA worked 29 states with a 20A s.s.b. job. JMG has a new 811-A final and writes it's the first time he has used a triode. FXX now likes good results with a cubical quad. Happiness to the daughters of BPU and Novice BCY, who were married in November. FNX joined the RSGB so the DX cards will flow in. BRD is trying out another loop antenna. He's going to hit on something yet. The Chicago YLRL reports much interest on the YL Net on 29 Mc. each Tue. from noon to 2 p.m. DPF enjoyed a Mexico and California vacation and also toys with RTTY on 3620 and 7120 kc. The first station he worked was LAW. We extend our sympathy to HKA on the loss of his mother. WZV built a DX-100 and enjoys working it. IBU is going great guns on s.s.b. GAS reports trouble with the band-switching in his Ranger and is looking for help. FRP wrote from Florida, where he vacationed with ZAK, that he enjoyed the Illinois QSO Party and hopes for another soon. What do you think, gang? LL hopes he has his antenna problems licked. ZDQ's 2-meter antenna is down but he checks into the Kankakee loading the rig into a 10-meter dipole. VHY lengthened his feedline and his signal dropped 4 S-units. Active members of the Kankakee 2-meter Net are VQC, VYH, SKN, ZDQ, HKA, LCH, and KLD. OQN, who was appointed Radio Officer for Park Forest, built a new rig to go with the job. The DeWitt County Net is going well at 1 p.m. on Sun. (1805 kc.) reports KXN, the NCS. BPL certifies this month go to DO, his twenty-third, and to OR, his first. Congrats to both. Traffic: W9DO 1396, OR 609, IAK 336, IDA 308, MRQ 87, VEY 73, YIX 70, CTZ 52, BUK 46, FRP 36, CEE 26, EHY 26, SME 26, FAW 22, OCB 20, STZ 20, YYG 18, CZB 15, LL 15, LXJ 15, VBV/9 15, SXL 10, KLD 8, YFO 8, USI 6, HPG 5, VSX 4, LRA 3, AMD 2, OQN 2.

**INDIANA** — SCM, Seth Lew Baker, W9NTA — FWRC mobile units on 6 meters furnished communications for the Armistice Day Parade with 8 units. They also have a code class with 36 enrolled and BEM as instructor. BKJ is assembling a DX-100. New hams are KN9BLK at Brazil, KN9BOK at Noblesville, and KN9BNW at Columbus. The Hoosier Hills Club has a new shack at Bedford. HPN dropped the "N." K9AWI is new in Orleans; WN9UBX is new in Tipton. KN9AMT has 43 states and 17 countries. DKR is sporting a new Viking Mobile VFO. DDK, ZKX, and ZSW hold OPS appointments. NH reports working all sections in the SS and now is using a 75A-4. MZE plans to attend electrical school at Angola. IMI is on with a 2-meter rig. KN4CJB is new in Evansville and has put in for a 9 call. FJ1 is back in circulation after two operations. EQO gives the IFN morning traffic as 124 and evening as 182, for a total of 306. EHZ reports 208 for CAEN. UQP gives QTN traffic as 226 and TQC reports 81 messages for RFN. TTR reports a total of 2395 for UTL with over 80 per session. Reporting into UTL for Indiana are JOZ, DHJ, EHZ, WWT, UQP, UXK, and TT. AB has an HRO-7. BYY and WAU have DX-100s. The DARA conducts a code class. PSJ acquired a new Gonset 2-meter rig. From EQO we learn that the City of Gary has obtained a bus for a mobile communications center and the locals are revamping it for the job. A new net is the Lake Co. C. D. Net on 147.3 Mc. daily at 1830. NCSs are PAS and SNF. A new General Class licensee is Ann, MPX, who worked 51 countries in 6 weeks on 15 meters with Ranger and beam. Her OM is HYM. HHN is WAS on 80-meter c.w. with all but Utah as Novices. Those making BPL were NZZ, TT, DGA, and DDK. PNE has a 118-100 record for countries worked. YFD has acquired WAC. Traffic: (Nov.) W9NZZ 2005, TT 530, EHZ 400, JOZ 282, JYO 183, UQP 166, DGA 159, SVL 157, EQO 130, UXK 130, LDK 111, TQC 111, SWD 105, ZYK 88, BEJ 70, NTA 70, KTX 58, VNV 55, WBA 50, AZF 34, EHE 30, QYQ 30, ACW 28, AB 26, LGD 25, SVZ 25, CG 24, STC 22, HRY 19, PQA 17, WRO 15, WUH 15, TT 14, DOK 13, KDV 13, YB 13, ALL 11, ZSW 10, BDP 9, WLY 9, AQR 8, CMT 7, FHA 7, AMW 6, QR 5, YVS 5, GDL 4, NH 4, LKR 3, MZE 3, ZGB 3, FJS 2, NSY 2, PPS 1, (Oct.) W9WWT 113, CTF 66, EHE 39.

**WISCONSIN** — SCM, Reno W. Goetsch, W9RQM — SEC: OVO. PAMs: ESJ and AJU. RMs: BVG and YZA. Nets: WIN, 3685 kc., 7 p.m. daily; BEN, 3950 kc. daily; WPN, 3950 kc. 1215 Mon.-Sat., 0930 Sun. Wisconsin mobile and c.d. frequency: 29,620 kc. SQM is going s.s.b. with a 20A exciter, to be followed with a kw. final. SAA soon will have 500-watt final on s.s.b. JEF worked his first KL7 and VO4. GHT is NCS for the Northland Teenage Net. KXA is out of the Navy after 4 years, and he and the OM, KWJ, worked mobile in call areas 3, 2, 3, and 9 on the way home. Newly appointed as RM and WIN net mgr. is BVG, with YZA as asst. net mgr. IKY purchased an SX-100 to go with his DX-100! CCO has been assigned to Great Lakes by the Navy (Electronic Tech. School) and is operating from home on week ends. DIK has a new all-band antenna. LFP and ZLD are going to kw. AEM and LFP are using new "short-beams." NRP has been appointed as acting net mgr. of the B.E.N. The Wisconsin Section QSO Party held Dec. 12th produced an FB turnout. W9PJJ dropped the "N" from his call. YRO has 15- and 20-meter beams stacked at 60 ft. IFX is using a DX-100, Ranger, and 75A-3. IXF, ITI, BXB, and YOX are using

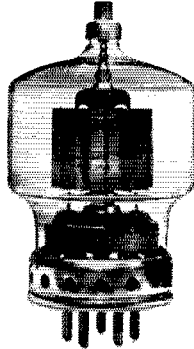
(Continued on page 88)

For all-band CW, AM, or SSB take your pick  
from **The EIMAC Big Six**  
High power, long life, simple circuitry



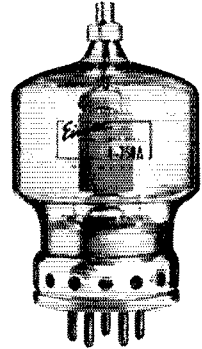
4X250B radial-beam power tetrode is an amazing compact, rugged newcomer unilaterally interchangeable in nearly all cases with the 4X150A but offering higher power and easier cooling.

	CW	AM	SSB
Plate Voltage	2000v	1500v	2000v
Driving Power	2.8w	2.1w	0
Power Input	500w	300w	500w



4-400A radial-beam power tetrode, the highest powered of the Eimac Big Six, is capable of handling a kilowatt per tube in CW, AM, or SSB operation. Forced air cooling is required.

	CW	AM	SSB
Plate Voltage	3000v	3000v	3000v
Driving Power	6.1w	3.5w	0
Power Input	1050w	825w	900w



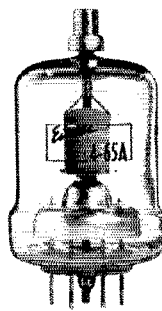
4-250A radial-beam power tetrode delivers high power with low drive. A kilowatt plate power input is handled easily by a pair in AM or SSB service and a single tube in CW.

	CW	AM	SSB
Plate Voltage	3000v	3000v	3000v
Driving Power	2.6w	3.2w	0
Power Input	1035w	675w	630w



4-125A radial-beam power tetrode made screen grid transmitting tubes popular. This 125-watt favorite for commercial, military, and amateur application is radiation cooled.

	CW	AM	SSB
Plate Voltage	2500v	2500v	3000v
Driving Power	2.5w	3.3w	0
Power Input	500w	380w	315w



4-65A radial-beam power tetrode is the smallest Eimac internal-anode multi-grid tube. An instant heating filament makes it ideal for deluxe high power mobile as well as fixed station applications.

	CW	AM	SSB
Plate Voltage	3000v	2500v	3000v
Driving Power	1.7w	2.6w	0
Power Input	345w	275w	195w



4E27A radial-beam power pentode gives outstanding performance in all types of operation. When suppressor-grid modulated, it will deliver 75 watts at carrier conditions.

	CW	AM	SSB
Plate Voltage	2500v	2500v	3000v
Driving Power	2.3w	2.0w	0
Power Input	460w	380w	345w

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rotatable dipoles on 21 Mc. KN9ABP is attending Harvard. UOI is using a pair of 813s at reduced power. VDW has a pair of 803s at 500 watts. ILR is frequenting 144 Mc. occasionally. YOS worked in the SS with 70 watts. DYG has 102 countries worked. CBW was active in the November F.M.T. New officers of the Marquette Radio Amateurs are TWA, pres.; LSK, vice-pres.; RUP, treas.; KN9ASW, secy. They send code practice on 29.2 Mc. Mon., Wed., and Fri. at 7:30 p.m. from ODD. SZR, at the U. of W., reports that the club station, GOC, is back on with a DX-100 built on a "round-the-clock" shift by SZR, VOO, ZQA, VAK, KN9BPJ, and 4 SWLs. VOO is in charge of Student Control Center of the C.D. Council. New officers of the Blackhawk Club are LIJ, pres.; IQB, KLJ, and MAQ, vice-pres.; KLL, secy.; YLR, treas. The Outagamie Radio Club has a new meeting room in the County Hi Way Building. YFW replaces NLY on the MRAC Board. FLARC (Madison) held an auction with GPI as auctioneer. 2BDS gave a talk and demonstration on beams. ZC4IP and FB8BR bring KKK up to 151 countries. Traffic: W9SAA 217, JEF 190, OMT 87, RQM 49, YZA 42, RTP 31, BVG 29, SQM 16, GHT 14, KWJ 9, UMJ 9, IKY 3, CCO 7, DIK 7, AEM 4, WN9NHE 2, W9OVO 1. (Oct.) W9RTP 22.

## DAKOTA DIVISION

**NORTH DAKOTA** — SCM, Elmer J. Gabel, W0KTZ — SEC: CAQ. PAM: HVA. RM: FVG. The Phone Net meets on 3845 kc. at 1800; the C.W. Net on 3670 kc. at 1830 Mon., Wed., and Fri. Every amateur should enroll in the AREC. Ask your County EC or the SEC for application blanks. ECs by counties are Benson K0AIP, Bottineau W0IRN, Burke DMK, Burleigh GJJ, Cass CAQ, Emmons UBG, Golden Valley RSA, Griggs ORU, Logan KLP, McHenry GQA, McIntosh K0ASV, McLean W0GQD, Morton ZCM, Mountrail NGO, Pembina HNV, Ramsey QOB, Richland K0ATK, Stark W0NPR, Steele EXO, Trail BFM, and Ward GNS. EC appointments are open in the missing counties. VQC traded his Ranger for a DX-100. FVG has been relaying traffic from TEN to CAN. KN0CND has the bugs out of his Adventurer and will be happy to sked anyone. Traffic: W0LHB 80, KTZ 59, FVG 46, WRK 36, VCQ 29, UBG 17, VQX 16, BFM 12, HVA 12, EXO 10, KLP 8, K0ATK 5, W0NPR 4, GQD 3, IRN 3, CAQ 1.

**SOUTH DAKOTA** — SCM, Les Price, W0FLP — SCM assistants are APL, YKY, HOH, GQH, FKE, RMK, TI, MZJ, and KDE. PAM: UVL. RM: SMV. The South Dakota 75-meter evening phone net has been changed to the 75-meter emergency phone net. PRL, the NCS, is going to Washington on Senator Case's staff so UVL and GDE have been made dual net controls and will call alternate weeks. ZWL is NCS for a weather net to collect weather information from isolated localities reporting to the weather bureau and general public. This net had an average report of 11.8. NJQ net, NEO as NCS, had 24 sessions, high 29, low 12, average 12, traffic per session 2.5. The c.w. net, SMV as NCS, had 13 sessions, QNI 86, high 10, low 5, average 6.6, traffic high 7, low 0, average 4. The traffic report for the 75-meter phone net: High 59, low 27, average 3.86 QNI, traffic high 10, low 0, average 2.46, formal high 15, low 1, average 4.7. The 160-meter net, FKE as NCS, averaged 17.2, 4.2 states, formals 12, informals 56. A new call in Sioux Falls is KN0CY. The SFARC had a family night Nov. 21st with 77 present. SIR now is in the CAA in Chicago. Traffic: W0SCT 190, SMV 54, NEO 53, DVB 52, RRN 52, PHR 37, BLZ 36, MZI 32, GDE 27, UVL 24, OII 15, BQH 12, CWS 12, HOH 4, QKV 2.

**MINNESOTA** — SCM, Charles M. Bove, W0MXC — Asst. SCM: Vince Smythe, 0GQD. SEC: GTX. RMs: DQL and KLG. PAMs: JIE and UCV. EXC is building a new rig for 2 meters using a pair of 24Gs. CAE and THY are on daily on 2 meters using modulated c.w. for code practice. The u.h.f. banquet at Anoka was a humdinger, with more than 25 hams attending. The Twin City Area Amateur Radio Council has been discussing the possibility of putting on another Division Convention. How many of you would like another good old Dakota Division Convention next year? WTP, of Austin, is now on the air in St. Paul. APW is a new ham in St. Paul. Your SEC wants everyone with an EC certificate that needs renewal to drop it in the mail for endorsement. SKQ is now sojourning in Florida. TQQ and her husband have returned from a trip to St. Louis, and are planning on a trip to Europe. WMA and TQQ each have a new SX-100. PBI is the portable located on North High School in Minneapolis. BWF has a new NC-300. IJN has been visiting in Minneapolis. HAH of Winona, ZXX of St. Louis, and ZSD from Florida are now living in Minneapolis. IRM now checks into the MSN. The Minneapolis Radio Club, Inc., has elected the following officers: RQJ, pres.; VLZ, vice-pres.; IXR, secy.; UYS, treas.; and ITQ, BSI, and TKX, directors. TKX also has a new NC-300. VBS needs only Asia for WAC on 7 Mc. The Wayzata Radio Club is located in the Wayzata High School and is headed by Brian Ford, with YVA, vice-pres.; and Jeanne Burnan, secy.-treas. Meetings are held every Mon. at 8:00 p.m. Members are BLA, ZML,

OGM, and YVA. A transmitter is being built for club use. RLQ and VDW made BPL in November. VBS is converting a BC-458 for 20 meters and a 500-kc. crystal standard and monitor. The North Star YL Club meets on the 2nd Tue. of each month at the home of one of its members. Club officers are MSW, pres.; VQV, vice-pres.; BJZ, treas.; QXA, secy.; QXF, asst. secy. The YL Pi Net meets at 0900 CST on 3838 kc. TCK bought TJA's 600-watt rig. Traffic: W0WVO 324, RLQ 266, KJZ 239, KLG 200, QHS 181, WDW 181, DQL 151, VEP 73, UCV 54, LUX 46, MXC 44, WMA 43, OSJ 37, KFN 32, IRJ 31, RVO 31, BUO 21, QXS 20, GTX 18, UBD 16, LST 12, UNJ 12, KNR 11, BGY 10, VOA 10, QVR 7, OPA 6, VEZ 5, TCF 4, UMX 4, NTV 3, TJH 2, SHU 1.

## DELTA DIVISION

**ARKANSAS** — SCM, Owen G. Mahaffey, W5FMF — The Ozark Academy Amateur Radio Club has a 125-watt c.w. rig on the air. The call is YZI. WTK is home from Colorado and is back on the air. 7BED/5 was on at Gentry and gave us some help on the c.w. net. He has now returned to Utah. TIA reports that he and BHJ, WHU, UEB, OXL, and JBU are active on 50.1 Mc. at Fayetteville, and have carried on communication up to 30 miles operating mobile. Gentry has four new Novice hams, KN5DEJ, DEN, DEO, and DEP. The Arkansas c.w. net joined with the Louisiana c.w. net on 3695 kc. starting Dec. 12th, hoping to stimulate more activity. Traffic: (Nov.) W5SXM 50, CAF 47, NKH 23, FMF 19, IAI 18, VAA 16, W7BED/5 12, W5DAG 8, K5AVR 6, W5WUM 6, ENZ 5, HEE 4, EBN 2, JZL 2, PX 2, ZJI 2. (Oct.) W5CAF 38.

**LOUISIANA** — SCM, Thomas J. Morgavi, W5FMO — Shreveport's Caravan Club held a fine hamfest on Cross Lake Nov. 20th. Among those attending were BSR, the new Delta Division Director, FMO, Louisiana SCM, and amateurs from Louisiana, Arkansas, Oklahoma, and Texas. G3BM was a recent visitor to the New Orleans Radio Club. HVY is active on 2 meters. The two clubs in Baton Rouge will combine under the name Baton Rouge Amateur Radio Club. The Ark-La-Tex Teenage Net meets on 3820 kc. each Mon., Wed., and Fri. RMD is NCS, HBC is asst. NCS and Net Manager. NDV spent 36 hours in the SS. RKO is chief operator at K5FFA. They monitor the Yankee Net on 7290 kc. all day. EA is working on a joint c.w. net for Arkansas and Louisiana. All interested are requested to get in touch with him. K5AIE has 43 states. DJU is waiting for his WAS certificate. EBK is active on 40-meter c.w. MXQ is getting ready to build a 15-meter bamboo beam. He meets RN5, CAN, and MARS regularly. TQJ is a new OPS and is on 10 through 75 meters. WCJ is on 40- and 10-meter phone. EDQ helped a YL get her Novice ticket. He operates 40 and 10 meters, phone and c.w. NG sends Official Bulletins on 7175 kc. Mon., Wed., and Fri., c.w. at 1800 CST. BES has worked wonders with the Emergency Net in New Orleans. At the last report he was getting a public service bus for a mobile emergency unit. TKV now has emergency power, ten kw. of it. UQK has a new jr. operator. Get your reports in early next month and accept a Communications Department appointment in your area. Make a habit of monitoring 3905 kc., the Louisiana calling frequency. Traffic: K5FFA 305, W5MXQ 151, NDV 86, EA 63, FMO 20, BMD 3.

**MISSISSIPPI** — SCM, Julian G. Blakely, W5WZY — SEC: PFC. RM: WZ. PAM: JHG. Congratulations to KYC on being elected as Vice-Director of the Delta Division. Kirk is an old hand at League participation and we know he will do an excellent job for the section and division. Also congrats to our new Division Director, BSR. It sure is a relief to have the new business location, new home, and new shack in full operation. We are now back in business 100 per cent. We appreciate the reports from stations who sent them in while we were off the air, and will appreciate a report from each station holding an ARRL appointment. News will be welcomed from any station in the section, appointee or not. Any information needed or certificates due will be rushed out on receipt of a post card. All hams who will meet our c.w. net, drop us a card for full information. Let's not let Mississippi bottleneck RN5. Traffic: W5JHS 35, EWE 26, GDW 20, OTD 4, WZY 2.

**TENNESSEE** — SCM, Harry C. Simpson, W4SCF — SEC: RRV. PAM: PFP. RM: WQW. Congratulations to the new officers of the Memphis Club, GQQ, pres.; LYX, vice-pres.; WBK, BAQ, STI, and NZP, directors; FRB, treas. OEZ reports the amended RACES Plan for the Nashville Area has been resubmitted. JVM says K4DVK is probably the first Tennessee mobile to run out of gas and request same via 6 meters! SCF had nice visits with BQG, IIB, PTI, UHA, WQW, and K4WBF. HUT starred as St. Nick in the Little Theater Christmas Play. DMU reports 42 stations on the roll of the Davidson County 10-meter Emergency Net, including two XYLs, K4s DHA and DIZ. WQT sends kind words concerning WQW's fine C.W. Net Bulletin, as do all net members and the SCM. UIO reports a fine total QNI of 301 for the East Tennessee Phone Net, an average of 13.6 per session. While we are speaking of fine net reports, Tennessee C.W. handled 247 messages and averaged 13 stations per session during November. K4BCV

(Continued on page 84)

# Performance



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Check on the NEW PRO-310—it's made to order for your "tough-spot" service. Write for specs and other details to The Hammarlund Manufacturing Co., Inc., 460 West 34th Street, New York 1, N. Y. Ask for Bulletin Q-256.



# HAMMARLUND

*Since 1910*

is a new ORS. Your SCM welcomes applications for appointment as OO, OBS, OPS, ORS, or OES. The 160-meter Net is going nicely under HHH and VJ. UWA is in the process of trading rigs. In the meantime he is using a 6AG7 final and has worked several KV4s and KP4s with the weenie-watt. TYW reports TCPN traffic at a high level and says the Kingsport RACES Plan should be approved momentarily. The closing date for nominating petitions for SCM is Feb. 15th. Don't forget to sign a petition for your favorite candidate, and don't forget to vote! Traffic: W4OGG 164, IIB 115, WQW 115, VNE 106, TFD 84, PGP 72, VJ 50, TYW 43, TIE 41, YMB 39, SCF 38, HLR 31, PAH 22, WQT 19, JYM 18, UVL 17, HUT 10, HSX 4, OEZ 4, SKH 4, YPG 4, DMU 1, PVD 1.

## GREAT LAKES DIVISION

KENTUCKY — SCM, Robert E. Fields, W4SBI — SEC: CDA, PAM; YYI, RM; KKW, Statistics for KPN for November are as follows: 30 sessions, 581 total call-ins, 19.4 stations per session, 79 total traffic, 2.6 messages per session. Looks like the score is on the upswing. The PAM would like to encourage anyone who wants practice as NCS to give him the word. How about it, fellows? Report from the RM as follows shows that KYN also is swinging upward in traffic totals: 70 sessions of all combined c.w. nets, traffic total 258, 3.7 messages per session. The high session, with CDA as NCS, cleared 17 messages in 82 minutes, ZDA was a close runner-up with 16 messages cleared in 80 minutes. There were 49 active stations for the month. PLEASE NOTE: The SEC asks that all ECs, AREC and other net stations stand by on nets KPN and KYN during the severe winter periods. SUD, WVU, and VJV are building 6-meter rigs. URF/1 says he is fairly active on 10 meters now with the mobile rig and put K1USA, at Fort Devens, Mass., on 15 meters. SBI is building a 10-meter beam getting ready for some DX. Traffic: W4KKW 172, QCD 162, ZDB 102, RPF 83, ZDA 70, GDA 59, SBI 47, SUD 44, NIZ 42, JCN 38, HSI 28, JP 22, SZB 21, K4AGT 17, W4URF/1 15, WMX 14, WBD 9, ZLK 9, JUI 4.

MICHIGAN — SCM, Thomas G. Mitchell, W8RAE — Asst. SCM (Phone): Bob Cooper, 8AQA. Asst. SCM (C.W.), Joe Beljan, 8SCW. SEC: GJH. Many thanks for the fine showing of activities reports and club bulletins this month. The traffic totals are picking up as expected. Several requests have been made regarding new appointments and more are solicited. Don't forget the Noon QMN Net, fellows. Here is a chance for those who cannot make the later sessions. New officers of the Grand Rapids Amateur Radio Assn. are ESR, pres.; LEZ, vice-pres.; OND, secy.; ZCH, treas.; DLE and FCP, activities; GWE, pub. dir.; YDI, station trustee; and QBA, editor of the bulletin QRM. DLZ says that the Annual Midwinter Radio Convention (Grand Rapids) will be held on Mar. 3, 1956, at the Rowe Hotel. Big plans are well under way and this should be even better than the 1955 Convention. The Blossomland Amateur Radio Assn. recently became incorporated and the new officers are FGB, pres.; QOQ, secy.; QOD, treas.; QOT, act. mgr.; PT, dir.; and ORM, publicity dir. They have started to publish a new bulletin known as QTX, which enjoyed a very interesting first issue. It is a project to which all members can contribute. Here's wishing them continued success. The recent election in the Edison Amateur Radio Assn. produced the following elected slate: EQY, pres.; WEL, vice-pres.; ILP, secy.-treas.; and IWG, act. mgr. Many clubs and groups are reporting activity in the form of drills with mobile and base stations. This is a wise move in view of the fact that the Michigan RACES Plan has been formally approved and adopted. It is only reasonable to expect that all members of the Michigan section will have access to this plan by the time this report is published. Please make every effort to familiarize yourselves with its contents. Any questions regarding same should be directed to your EC or to the SEC. Traffic: (Nov.) W8NOH 300, ELW 139, NUL 115, QOQ 111, RTN 89, ILP 85, IJW 74, PHA 72, WGU 71, ZLK 68, QIX 53, IKX 50, SCS 42, SCW 42, SIB 40, FGB 29, FX 22, RVZ 22, RAE 18, PHM 17, SJF 17, DSE 16, JYJ 14, OQH 12, FWG 11, TQP 9, PDF 8, AUD 6, DLZ 6, EGI 6, WXO 6, MLR 4, HKT 1, WVJ 1. (Oct.) W8PHA 57, SCW 40, SJF 16, OCC 12, PDF 4, NSS 1.

OHIO — SCM, John E. Siringer, W8AJW — Asst. SCMs: J. C. Erickson, 8DAE; W. B. Davis, 8JNF; and E. F. Bonnet, 8OVG. SEC: UPB. PAMs: EQN and HUX. RMs: DAE and FYO. At this time your retiring SCM wishes to thank all of the Ohio amateurs who helped make his terms in office pleasant ones by their splendid cooperation. Two well-qualified candidates, AL and HUX, ran for the office of SCM, with AL winning the election. My congratulations to both of them for the amount of votes they were able to obtain; the total vote far exceeded that of any previous election. AL is a genuine old-timer and I feel certain that the amateurs of Ohio will do all they can to assist him in maintaining or bettering the level of activities in this section. OHO has been made an OO Class IV. JDN has received his Extra Class license. HGC/HGB is a new OM/XYL combination in Coshocton. Ex-4EPJ is now

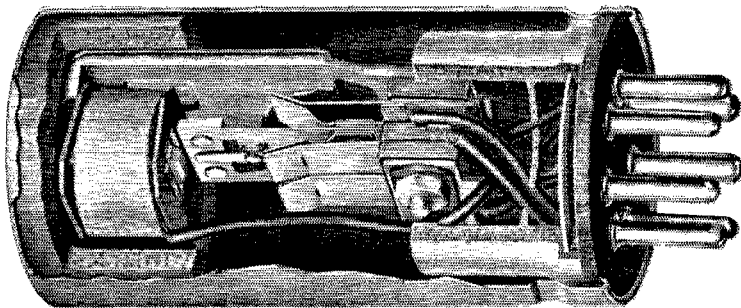
GYO. OPV, OPU's XYL, has returned to the air. The MVARA is building a club house at Canfield. LMB has recovered from a siege of illness. BEW worked FA8DA on 7 Mc. TZO made 564 QSOs in the SS with limited operating time. MGC's station was knocked out by lightning Nov. 16th. AQ is doing well with his new 803 grounded grid final. SWZ is s.s.b. on 3.8 and 14 Mc. QXH has been back in the nets since the conclusion of the football season. WNSBDH has worked KH6 and 41 states. The CACARC will sponsor a summer picnic in the Cleveland Area. Also a 10-meter groundwave contest will be held in the spring of '56, with AJH serving as chairman. OVG reports newly-elected DARA officers as WYL, pres.; RCA, vice-pres.; DEJ, treas.; QFA, secy.; and ACE, dir. New Westpark Radiop officers are HFE, pres.; OPX, secy. and treas.; and AGA and ZEU, trustees. The Dayton *KF Carrier* reports that a local V/U.H.F. Contest was held Nov. 12/13; OVG's Novice and Technician Class exam periods are progressing favorably; and the Queen City "Guest Night" of Nov. 4th brought out over 150 DARA members. The Toledo *Shack Gossip* informs us that TQY was winner of the last mobile transmitter hunt, with MQQ finishing second and JKR in third place; the HYE's were visited by the stork on Oct. 17th; and BGU has worked his 89th country on 10 meters. According to the GCARA's *Mike & Key*, a trip through the RCA Tube Plant was held on Dec. 6th. The OVARC *Ether Waves* states that there are now 30 members in their 50 or Better DX Club with JIN leading the pack at 253, BRA at 250, and BTI at 246. The DX column in this publication still is the best that the writer has ever observed in a club publication. The Fort Hamilton *Feedline* mentions that QJO is operating s.s.b.s.c.; HXB has installed a new vertical; the club will award a trophy to their high SS scorer in future years; and HFY is the area's most recent Novice. The Hocking Valley bulletin reports that LGR worked a W6 on 75-meter phone; PFP is the club's newest member and EQQ's son received the call WNSHFK. The Columbus *Caracase* tells us that UPS received his PhD degree; VHO runs 400 watts on s.s.b.c.s.c.; HUE worked over 50 countries in 2 months; and WXY has moved to Pittsburgh. Eastern Ohio's *Ham Flashes* reports new WARA officers are OKC, pres.; KCE, vice-pres.; and PBW, secy.-treas.; JBW has moved to Millersville, Penna.; a DX contest is being held in the Salem Area; ANM was elected president of the Cuyahoga Falls Club, with HQZ, vice-pres.; QYP, treas.; and PAB, secy.; and WNSFAS has worked 22 states. Traffic: (Nov.) W8AGZ 321, VTP 299, UPB 258, DAE 207, IIR 93, OPU 78, HUX 50, AJW 41, HDA 37, HFP 36, PLQ 36, AL 32, CVZ 24, RO 23, LER 18, WAV 18, ZAU 17, HNP 16, AJH 14, HZJ 13, BEW 12, ARO 11, RN 9, EQN 8, CGF 6, EEQ 6, WYL 6, PBX 5, QXH 5, MGC 4, BUM 3, CTZ 3, AQ 2, BLS 2. (Oct.) W8AGZ 309, DG 80.

## HUDSON DIVISION

NEW YORK CITY AND LONG ISLAND — SCM, Harry J. Dannels, W2TUK — SEC: ADO, PAM: NJL. RM: WFL. Section nets: NLI, 3630 kc. nightly at 1930 EST and Sat. at 1915 EST; NYLSPETN, 3925 kc. daily at 1800 EST. WFL reports increased traffic and membership in NLI, but outlets still are urgently needed in the Bronx and Suffolk. Sweepstakes activity in the section was excellent, with your SCM contacting sixty N.Y.C.-L.I. stations on c.w. alone. K2KXZ makes BPL for the second time. Club officers at Columbia U., AEE, are K2IKI, pres.; K2DPG, vice-pres.; K2JYD, secy.; K2CUI, trustee; and LRA, c.d. coordinator. K2DEM now has a Communicator II. The boys at K2GKQ are enjoying 2-meter operation through the courtesy of RB, who loaned the school a Communicator. K2AMP is now building 144-Mc. gear with a look into 220 and 420 Mc. planned for the future. K2CUI is using a Viking I, TVI suppressed. EC has a new Viking II in operation and is enjoying all-band phone-c.w. work. LGK suggests a reunion of all NLI Net members. How about a ten-year dinner commemorating the work from '46 to '56? IAG has set up a telephone alert for the Queens 10-meter Net. OBU has a crystal-controlled converter for 144 Mc. and is modifying an ARC-5 for that band. PF would like to start an s.s.b. traffic net. How about it? K2ECY is building 2-meter gear and a transistor VFO. K2DDK finds 10-meter c.w. open and his nine-wattah snagged several countries. EEN has a new SX-100. New officers of the Wantagh RC are DQN, pres.; LID, vice-pres.; and G. Wilkinson, secy.-treas. ELK has been appointed disaster chairman for the Wantagh Red Cross Branch. JCA participated in the F.M.T. and is building a new shack and kw. final. K2CMV's first operation on 21 Mc. netted four new states towards WAS. K2LYC received his General Class ticket. K2EJW is on s.s.b. The CCNY Club station, HJ, is on 2 meters. K2KRH has 75 watts on 144 Mc. into a ten-element beam. K2PHA dropped the "N." New officers of the Radio Club of Brooklyn are PF, pres.; CCW/KW, vice-pres.; BKP, secy.; AAZ, treas.; and AGW, DAK, HDV, and K2EIB, directors. K2PJE is new in Farmingdale and plans experimental work on 420 Mc. Six-meter activity is increasing rapidly in all parts of the section. In Nassau, activity centers on 50.25 Mc., where

(Continued on page 86)

# MALLORY HAM BULLETIN



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The internal mechanism in the new Mallory Series 1700 vibrator is so different from any other that we thought you should have a close look at it. Notice that there are *no* conventional button contacts. Instead, the make-and-break action is done by special alloy leaves, which serve both as contacts and as spring elements.

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*Consistently longer life.* On heavy duty cycle tests, the new vibrators give up to 100% longer service.

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You'll find the new Mallory vibrator just right for powering two-way mobile rigs and other heavy-duty battery operated gear. This design is available in the split-reed type shown here for 6/12 volt service\*, and in a Duplex heavy-duty model without the split-reed construction. Your local Mallory distributor is stocked to serve you promptly. See him soon . . . and write to us for a complete catalog of all Mallory precision components for amateur experimental use and repair work.

\*Use dropping resistor in series with drive coil for 12 volt operation

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the AREC Net meets on Tue, at 1930 EST and Thurs, at 1930 and 2300 EST. UYX joined the married ranks. KN2QO is active with an 8-38, a Q-5er, and an 807 rig. Ex-RTZ, now 8UFZ, and 8UKV are the proud parents of a baby boy. The Levittown RC now boasts of 99 members. K2EVE has a Communicator on 50 Mc. from Staten Island and would like to know of other 6-meter activity there. WFL is constructing a 300-watt final. 3ZVW/2 operates mobile from Amagansett. GF is building a 20A and VFO for a s.b. OBE now has a Viking II and Matchbox. LVN is on 75 meters with an 814 final. Ex-JBP, now K6MTX, ex-UCB, now 9VSS, and ex-UTB, now 7DTC, are looking for the N.Y.C.-L.I. gang on 14 Mc. QBS, now in Korea on business, listens for familiar W2 calls on 20 meters. TUK completed a sideband slicer and Q-Multiplier. RB added a 20A and kw. linear amplifier. Traffic: W2KEB 1326 KFV 1304, K2KXZ 301, CQP 251, W2AEE 182, K2DEM 178, W2VDT 121, WFL 103, K2AMP 88, ABW 76, W2DSC 72, TUK 62, K2CUI 46, GHS 45, W2GP 43, EC 23, LGK 19, IAG 9, DUS 8, OBU 8, PF 8, K2EY 6, W2VTS 2, K2DDK 1.

**NORTHERN NEW JERSEY**—SCM, Lloyd H. Manamon, W2VQR—SEC: IIN. PAM: COS. RMs: NKD, EAS, and CGG. K2EQP reports the Tri-Net, 0700-0730, on 3687 kc., is picking up new members every morning. K2GFX made WAS for the first time. K2KLR is working on a new antenna for 14 Mc. HXP is active in RACES work. YGM is doing a fine job as chief theory instructor for the Irvington Radio Amateur Club. K2EMN is the code instructor. K2BXN is finishing up his first semester at Oregon State. He would like to hear from the old gang, so how about dropping him a line. GVV has a kw. rig on 20-meter s.s.b.; a 3ZV-3 on all other bands. K2DSW and W2NTY have been QRL for the past few weeks. CFB still is plugging to get the bugs out of his DX-100. K2CHI is doing a bit of DX work from his portable QTH. EWZ would like to handle traffic on 40 meters. The Morris County RACES Control Center had a fine write-up and picture spread in the *Newark News*. Congrats to Radio Officer K2DO and his deputy, K2GQP. VMX has a new antenna up with the help of K2GTX. BRC is slowly recovering from the SS Contest. K2KHZ is doing a fine DX job with his Globe Scout. Dave has a new all-band rig in the making. BDS was speaker at a recent meeting of the Irvington Radio Amateur Club. The topic was "Beamed Power" antenna arrays. It was an open-forum type of meeting enjoyed by all. KN2LIU and LIW have both obtained their General Class licenses. LIW is the XYL and LIU the OM. KN2LIV also made General Class. The Freehold RACES group is planning a hidden transmitter hunt with prizes for the winning teams. OOG is in charge of the event. PWX and K2IPR are new OES appointees. NIE was heard mobile on 144 Mc. on the way to the deep forests of South Jersey on a hunting expedition. "Hams on Skates" is the title given to the outing being planned by "Annie" of K2ICE fame. The indoor ice rink at Asbury Park is the place of gathering for the 144-Mc. gang, all of whom are expected to appear at the center ice on skates. Age is no excuse for exemption. This is a new idea for winter activity by club groups. K2HNA is pounding brass for a change. K2DHE is all set up at his new QTH. OUS has a new DX-100 and is doing a fine job with the new rig. K2IPR is planning a new 6-meter rig. Traffic: W2EAS 272, K2GFX 40, W2BRC 34, K2EQP 20, W2CVW 12, K2KHZ 11, W2VMX 10, HXP 9, NIY 5, CFB 3, K2CHI 3, DSW 2, W2EZW 2, GVV 2, K2KLR 1.

### MIDWEST DIVISION

**IOWA**—SCM, Russell B. Marquis, W0BDR—ILY used his mobile to notify State Police Radio at Des Moines and the local power company that the police radio at Britt was off the air because of ice. Prompt action by several monitoring stations aided in getting the station back on in short order. New appointments: HWU and KJN as ECs; USQ as OES and OQ; NGS as OPS. Endorsements: FKB as EC, SCA and BDR visited the Spencer Club. New officers of the Club are CQL, pres.; ZDT, vice-pres.; FNJ, secy. The Waterloo Club made a peace offering to their XYLS with a Christmas dinner. Officers of the 160-meter Net are: BTK, pres.; CGL, vice-pres.; NKV, secy. BSG has a new 500-watt rig on the air. Congratulations are due to NWX and GQ, the new Midwest Division Director and Vice-Director. QZB and ZAM gave an s.s.b. demonstration at the Mason City Club. Ex-TA, now K6HHZ, was back in Iowa for his mother's funeral. CVU now has a 75A-4 and a KWS-1. NRE covers 17 miles over hilly country with 1 watt on 220 Mc. GZ returned from a trip to California and worked all hands mobile while en route. LCX now reports into TLN. K0BDB is a new ham at Red Oak. SQE has an HQ-140. Traffic: (Nov.) W0BDR 1587, PZO 1467, SCA 1287, BJP 465, CZ 377, LCX 358, SQE 350, LGG 183, LJW 154, QVA 129, BLH 49, UCB 37, TTT 30, EHE 26, PKT 24, UTD 19, NGS 16, PTL 14, UWF 14, EFT 12, HNE 12, NYX 11, UHO 11, WPM 11, VVK 11, KJN 10, VWF 9, PAN 7, K9WAD 7, W0DFI 6, K0BPR 5, W0BSG 4, FNR 4, GKN 4, GQ 4, SRQ 1. (Oct.) W0FDM 2.

**KANSAS**—SCM, Earl N. Johnston, W0ICV—SEC:

PAH. RM: FEO. PAM: FNS. The Wheat Belt Radio Club of Herndon held a regular meeting Nov. 13th with 15 members and more than 50 XYLS and jr. operators present to hear EXU, of McCook, Nebr., talk on antennas. EOT has left for the Service. The KFN and QKS will miss Jim's FB operating and traffic totals. FDJ, FEO, and NIY made BPL. RXM, of Fort Scott, is looking for some 6-meter activity. Twirl your beams about 2000 each week night and you might hit some of the Kansas boys. ABJ has a new mobile antenna that tunes all bands from the driver's seat. On Nov. 26th and 27th amateurs in Topeka, Emporia, Ottawa, Lawrence, Manhattan, Junction City, and Council Grove furnished communication for the Jay-Cees and WIBW-TV. KVRC, of Topeka, using CET, NI, KXB, WGM, KAAA, and QJO as fixed stations with 2-meter links to WIBW-TV, took the incoming traffic from WIZ (Neosho Valley Club), KFU at Ottawa, UNT (Lawrence Amateur Radio Club), PAH at Manhattan, BLI, with CV helping, at Junction City, FDJ at Council Grove, and FLZ, with JLZ, at Osage City. Thanks to all who did such a marvelous job. Incidentally, UPU was the coordinator of all these set-ups and has received many favorable comments on the service performed by you amateurs. Traffic: (Nov.) W0OHI 356, NIY 298, FEO 265, CQG 218, BLI 172, FCE 165, FDJ 156, LBJ 101, KSY 71, YVM 67, FNS 66, ABJ 58, DEL 45, ECD 45, RXM 42, SAF 42, UAT 29, EOT 16, LQX 13, TNA 13, VFC 11, ONI 10, WJB 10, LOW 8, KN9AQ 6, K9AHW 2, W0GVK 3, VCE 2, VNL 1. (Oct.) W0EOT 20, SVE 14, UUS 10, KN9CJ 2, COP 1.

**MISSOURI**—SCM, James W. Hoover, W0GEP—SEC: MFB. PAM: BVL. RMs: OUD and QXO. SAK reports that an amateur radio club is being formed in Jefferson City. RTO has an SCR-522 on 2 meters. The following EC appointments have been made: W0PTE, Howard County; K0ACK, Audrain County; K0BTD, Chariton and Randolph Counties. IJS received an OO appointment. The Bandhoppers Radio Club held a dinner with 9 members and their XYLS present. The Missouri Emergency Net, 3000 kc., on Mon., Wed. & Fri. at 1800, needs stations in the far southeastern part of the State. The Missouri Net, 3580 kc., Mon. through Fri., at 0700 and 1900, needs stations in the northern part of the State. ECE received an SWL card from Poland while running 50 watts on 80-meter c.w. Officers of the Shawnee-Mission High School Radio Club are VWZ, VBG, VXA, and WJC. KIK reports that BAF has a collection of old-time ham equipment. The MO-REB Amateur Radio Club held a dinner party with 14 in attendance. DFV has a new B&W 5100. ETW has enrolled in graduate school at Washington U. An article featuring CPI was carried in the *St. Louis Post Dispatch*. CPI has made BPL consecutively for the last 38 months. Traffic: (Nov.) W0CPI 1297, GBJ 528, OMM 200, BVL 172, SAK 114, CKQ 72, RTO 59, WFF 49, OUD 47, KIK 41, RTW 40, VWZ 31, KA 20, WAP 20, HUI 19, VTF 18, GEP 16, ECE 15, VPQ 14, K0BTD 12, W0VEF 7, EBE 3, MFB 2. (Oct.) W0HUI 7. (Sept.) W0ETW 2. (May) W0UD 79.

**NEBRASKA**—SCM, Floyd B. Campbell, W0CBH—Asst. SCM: Tom Boydston, 0VYX. PAM: HTA. SEC: JDJ. KN0CDG is the first amateur in Oak, Nebr. He is using a Globe Scout with a Midwest receiver for 80 and a BC-455 for 40 meters and is a new member of the NSS Net. ZJF has earned his first BPL. MAO is NCS of the Nebraska 75-meter Emergency Phone Net and was the happy recipient of a new 45-ft. doublet cut for the Nebraska Net frequency. FTR, GVA, SPV (Lincoln), VGH, ZWF, ZWG (Seward), 5TQQ, and K6DWD (MARS operator at K0TDU, Lincoln Air Force Base) collaborated in the erection of the new skywire. The 75-meter Net is ready to give any further assistance to assure a potent NCS signal. DDT traded the Viking II for an 813 rig. CIO is on the Nebraska C.W. Net, the Nebraska 160-meter Phone Net, and the South Dakota 160-meter Phone Net. AIN is on the Nebraska C.W. Net. DDT is on the Nebraska C.W. Net, the Nebraska Phone Net, and TEN. ZJF is on the Nebraska C.W. and Phone Nets, TEN, and CAN. The Ak-Sar-Ben Radio Club is now incorporated. The Johnson County Radio Club officers for '56 are DEL, pres.; GLN, vice-pres.; OYY, secy.; CLA, treas.; QYP, act. mgr.; OJW, tech. chairman; and NCK, publicity and public relations. Congratulations and a successful New Year. Traffic: (Nov.) W0ZJF 586, CIO 387, DDT 147, FTQ 136, AEM 56, EGQ 48, LJO 39, KDW 38, MAO 38, ORW 32, ERM 22, K0FBD 19, W0NIK 18, OOX 17, GVA 14, VRE 12, OCU 11, KN0CDG 8, W0VEF 8, RMO 7, VYX 6, CBH 4, DJU 4, GTW 4, IAY 4, K0MBY 4, W0QOU 4, SZL 4, VGH 4, YWK 4, ZOU 4, KLB 3, PON 3, UJT 3, ZWC 3, AIN 2, BEA 2, BOQ 2, KN0CDG 2, W0TRW 2, PNY 2. (Oct.) KN0CDG 2.

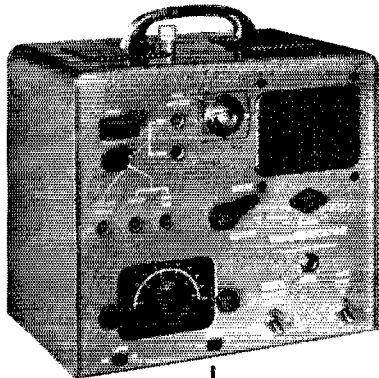
### NEW ENGLAND DIVISION

**CONNECTICUT**—SCM, Milton E. Chaffee, W1ERW—SEC: LKF. PAM: LWV. RM: KYQ. MCN and CN, 3640 kc. (0645 and 1845); FN, 3880 kc. (1880, Sun, 1000); CTN, 3640 kc. (Sun, 0900); CEN, 29,580 kc. The late session of CN (2100) has been abandoned for lack of traffic and participation. CN conducted 26 sessions with total traffic 271. KYQ, RGB, and LV were top reporters. MCN worked

(Continued on page 88)



# GONSET GONMETER Equipment



*Communicator*

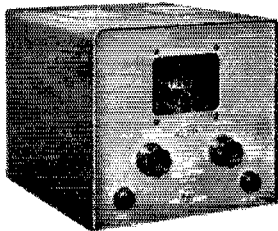
This complete station package puts you on six in a hurry! For fixed—or mobile—expect and get performance comparable in every respect to larger sized communications equipment suitable only for fixed station.

The excellent receiver features "Cascode" RF for high sensitivity, dual conversion for image rejection and added selectivity useable on six meters. Gonset noise limiter and adjustable squelch contribute greatly to outstanding overall receiver performance. Tuning range includes 49 mc BC band to assist in spotting band openings.

Transmitter uses 2E26 final to provide power output of 8-10 watts with high level modulation. Power supply is self-contained, universal for 6 volts, (or 12V) DC as well as 115 volts AC.

**DE LUXE MODELS:**

6V DC/115V AC, #3049 net 229.50  
12V DC/115V AC, #3058 net 229.50



*Linear Amplifier*

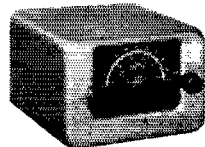
A complete, self-contained unit that can be quickly added to your 6 meter Communicator, (or other 6 meter, 5-6 watt AM modulated equipment) to increase POWER OUTPUT to 50-60 watts!

Easy to install, simple to adjust, fool-proof in operation. Requires no circuit alterations on companion Communicator. Antenna relay is built in, as is heavy-duty 115V AC supply.

Uses push-pull 826 triodes with forced air cooling. (Tubes supplied.)

Standard models of this excellent amplifier are also available for 2 meters. Other models for commercial, government, aircraft frequencies can be supplied on special order. Your inquiries are invited.

6 METER LINEAR.....net 149.50



*Converter*

This sensitive new converter for six meters operates in conjunction with conventional auto BC receivers or with communications or broadcast type home receivers. Frequency coverage is from 49 to 54 mcs, spread over a full-vision calibrated dial. Tuning knob has planetary drive with step down ratio.

Unit has switch to permit operation of heaters from 6 or 12 volts. "B" power is obtained from companion receiver.

The famous Gonset noise clipper is built into the converter cabinet, operates as a separate entity with receivers that do not have noise limiting. Connections are simple and straightforward.

This small size, ruggedly built converter is mounted readily on steering post.

net .....47.50

*also*  
FOUR ELEMENT  
BEAM  
*and*  
"COMMANDER"  
TRANSMITTER  
includes 6 meter band.

SEE THEM AT YOUR DISTRIBUTOR.



**GONSET CO.**

801 SOUTH MAIN STREET, BURBANK, CALIF.

**"10's  
coming  
back!"**

*...and you'll  
be ready!*

with a  
**mosley**

**"V-P" TEN METER  
ROTARY BEAM**

*the 'TEN-TWENTY'*

Two complete three element beams mounted on one boom and fed with just one coax line. Typical performance; 7½ db. forward gain, 28 db. front-to-back, 1.5/1 SWR or better on both ten and twenty meter bands. 12' aluminum boom, 22½' max. element length. 57 lbs. assembled weight. Pretuned.

**\$120.79**

Model VPA-1020, Ham Net ..

**10, 11 or 15 Meter "V-P" BEAMS**

Compact, lightweight rotary beams of exceptional efficiency. Can be assembled for operation in any one of 3 bands - easy to re-adjust for another band! Turn with TV rotor. 2 element model provides up to 5 db. forward gain; 3 element model, 7½ db. Heavy duty all-weather construction.

Model VPA1015-2, 2 element. Ham Net \$39.89  
Model VPA1015-3, 3 element. Ham Net \$59.68

**Convert your 20 meter V-P beam to a "1020"**

Your present 3 element 20 meter Mosley "V-P" Beam can be easily converted to a "Ten Twenty" with this complete kit.

Includes ten meter elements, coils, Auto-Lectronic Coupling Yoke, necessary hardware and instructions. Model VPA20-1020

**\$ 54.43**

Ask Your Ham Equipment Supplier or write direct for free Mosley Cat. H-56.

**Mosley Electronics, Inc.**  
8622 ST. CHARLES ROCK ROAD, ST. LOUIS 14, MISSOURI

22 sessions with 98 messages and QNI honors to IBE, RFF, and RGB. A nice note was received from RAN/4, who still is sweating it out at Ft. Bragg working K4WEE, including 18 hours in the first half of the SS as IRAN/4. An FB bulletin arrived from the Middlesex Club describing its activity and doings. EGS has a new Viking Ranger. EGX has a new rig for mobile on 10 meters. QPD has new final and tower. Officers at MRA are EGX, pres.; EWD, vice-pres.; QMB secy.; WRO, treas.; and QPD, activities. HCZ is a new Novice/Tech. Class licensee at Milford. WEL has opened up on 6 meters. BVB resumed activity on MCN while his broken knee was mending. YBH and AW hit BPL this month on originations plus deliveries. RFC received a WAM (Worked All Maine) certificate and also a sticker for QSOs with all 67 New England counties. A nice bulletin was received from the Tri-City Council produced by TVN, its secretary. QDI is a member of Operation Deepfreeze. The Council is working on a plan for a Worked All Connecticut award. GIX and TD maintain their OBS skeds. Hope all interested in call letter license plates have applied by now. If not, request application forms from the Hartford Office of the Motor Vehicle Dept. immediately. The cost is \$10 plus the usual \$8 registration fee. Plates are effective with the 1956 registration. It was a tough nut to crack so let's show we really wanted 'em. How about more club reports for this column? More than half the clubs in Connecticut have never sent in a word. KV, RAN, NLM, JTD, RWS, and AYC renewed ORS appointments. NLM, ODW, and ABZ renewed EG appointments. New ECs: PRT and MRP, New OO: FTX. Traffic: WIAW 327, YBH 252, KYQ 160, NJM 154, RGB 135, AYC 110, LV 89, EFW 73, YNC 63, TYQ 61, RRE 40, BDI 39, RFL 33, CUH 28, BVB 26, GIX 13, KV 11, UED 7, GVJ 5, JTD 1.

MAINE - SCM, Allan D. Duntley, W1VYA/BPI - SEC: TVB, PAM: WTG, RM: EFR. The Pine Tree Net meets on 3596 kc. at 1900; the Barn Yard Net Mon. through Sat. on 3960 kc. at 0800-0930; the Sea Gull Net Mon. through Sat. on 3940 kc. at 1700-1800; the Teen Age Forest Net Sat. and Sun. on 3900 kc. at 1000-1100; the State C.D. Net Sun. on 3993 kc. at 1100-1200. YDX is looking for contacts on 6 meters. New Augusta stations to look for are HWB, WN1HEE, and WN1HTD. Congratulations to BOC on becoming a grandfather. BKU is now chief engineer at WMEI in Brunswick. SCM keeps the pictures in focus at WCSH-TV. WXG has a novel way to hook up balun coils. CPS is on s.s.b. with a "killy willy." The "Golden Voice" now is on with her own call-HFL. Congrats to you, Gladys. No need to bother with being a Novice first. If she can do it, why can't the rest of you girls? 2GHR has an amateur TV station on Mt. Washington. Won't some of you Nebraska boys give WTG a contact so he can get his WAS on phone. Traffic: W1WPG 106, LKP 104, UDD 68, EFR 43, QVA 38, NXX 37, BDP 13, JIS 15, VBU 3, BBS 2. EASTERN MASSACHUSETTS - SCM Frank L. Baker, jr. W1ALP - New appointments: ZDN as EC for Medford, IPA as ORS and as EC for the Boston Metropolitan Chapter of the Red Cross, K1USA as ORS. Appointments endorsed: BL as SEC; LAE Sharon, MB Scituate, SMV Cohasset, MCB Boston, WLU Watertown, LAP Lexington, VAN Norwood, and VYS Weston as ECs; GDY as OBS. Heard on 10 meters: MJ, BAB, JSS, EMZ, IBY, ELE, LMP, NVB, SVU, and 3UAU/1 mobile. Heard on 2 meters: AMK, AEL, UBF, JTF, FEY, ELA, and EQY. Heard on 75 meters: CUW, TQS, at 3AD0, HJP, and 4YKB/1. ONZ is going to the Pacific. WN1GAI, Concord, is on 40 and 80 meters. NBT is the new c.d. director for Holbrook. ALP, YJG, and CLF attended a meeting of the Cape Cod and Islands Amateur Radio Assn. at Hyannis. BL says someone is bootlegging his call on 20 meters. New officers of the North Shore Radio Assn. are VMD, pres.; JLN, vice-pres.; YJY, secy.; OTK, treas.; ADD and SEV, dir.; VHF, ham tamer. WN1GIS is new in Chelsea on 40 and 80 meters. The T-9 Radio Club held a meeting at HBG's QTH. FEC is on 2 meters with a 522 and a five-element Yagi antenna. WN1FQA is new in Cohasset on 80, 40, and 15 meters. SEJA, the operator at K1USA, says they are on 15 meters now with a BC-610. HVQ, an ex-K2, now is in New Bedford. HBM is going after WAS. DIY has over 2000 QSOs on 80-meter c.w. ZE has retired from station WNBH. DIR is now General Class. CNT has a DX-100. LAZ has a new QTH. WGN has a new 5100B B&W rig. SSS worked Hawaii on 10 meters with his old TBS-50. ME has 75-A1, 2, 3, and 4. TEO, our 6-meter PAM, sends in the following: K2LXI/1 is in Cambridge. FZJ's son is WN1HIV and his XYL is HOY. The Huntsman family of Wakefield have their tickets; ma is EKC, pa is EKD, son is EKE. ATP is enjoying duplex/6 with LIY on 2 meters. CDR is in the c.d. group in Lexington. Ex-1PIU is now 3EDW. VYB moved to Nahant. PZA is in Gloucester. New calls on 6 meters are BLT, CEI, CHU, DVG, GPT, WUL, WXA, ZNG, and ZTO. Others heard are BWJ, DEL, FCZ, HOM, IYC, KLC, PRC, RLF, RMF, UZZ, WYC, WJR, and URG. DNO is now on at 7:30 p.m. with a code machine on 52.35 Mc. during the week. The Night Owls are on at 11 p.m. or 2300. BB held the annual Winthrop ham get-together at his QTH. DEL is running a code class every Fri. night at Town Hall C.D. Hq. in Winthrop. The last drill had DEL, LPN, AGB, BOX, CMW, DJ, OIR, GBI, DLY, DQF, EAJ, HFJ, MQB, TEO, DGY, BDU, and BB

(Continued on page 90)

**SPOT FREQUENCIES  
FOR**

# Amateurs and Experimenters



## ONE DAY PROCESSING FA-5 and FA-9 1500 KC to 90 MC

Wire mounted, plated crystals for use by amateurs and experimenters where tolerances of .01% are permissible and wide range temperatures are not encountered.

**Holders:** Metal, hermetically sealed, available in .093 dia. pins (FA-9) or .050 dia. pins (FA-5).

**Frequency Range:** 1500 KC to 90 MC.

**Calibration Tolerance:**  $\pm .01\%$  of nominal at 30° C.

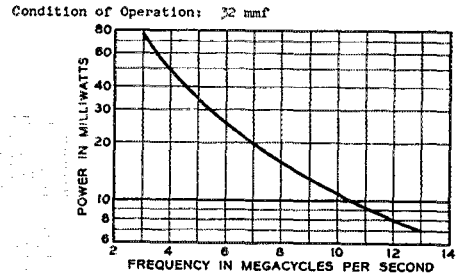
**Temperature Range:** -40° C to +70° C.

**Tolerance over temperature range from frequency at 30° C.:**  $\pm .01\%$ .

**Circuit:** Designed to operate into a load capacitance of 32 mmf on the fundamental between 1500 KC and 15 MC. Designed to operate at anti-resonance on 3rd overtone modes into a grid circuit without additional capacitance load. 5th overtone crystals designed to operate at series resonance. (Write for recommended circuits.)

**Crystals are guaranteed** only when operated under the conditions specified or in circuits recommended by International Crystal.

**Drive Level:** Recommended — Maximum 5 milliwatts for overtones. See chart for fundamental:



Maximum Recommended Power Dissipation in Crystal Unit

### PRICES

FA-9\* (Pin Diameter .093)\*  
FA-5 (Pin Diameter .050)

Pin Spacing .486 (\*FA-9 fits same socket as FT-243)

FREQUENCY RANGE	TOLERANCE	PRICE
<i>Fundamental Crystals</i>		
1,500— 1,799 KC	.01%	\$4.50
1,800— 1,999 KC	.01%	\$3.90
2,000— 9,999 KC	.01%	\$2.80
10,000—15,000 KC	.01%	\$3.90
<i>Overtone Crystals</i>		
<i>(For 3rd Overtone Operation)</i>		
15 MC—29.99 MC	.01%	\$2.80
30 MC—54 MC	.01%	\$3.90
<i>(For 5th Overtone Operation)</i>		
55 MC—75 MC	.01%	\$4.50
76 MC—90 MC	.01%	\$6.50

**HOW TO ORDER**—In order to give the fastest possible service, crystals are sold direct and are not handled by any jobber. Where cash accompanies the order, International will prepay the Airmail postage. Otherwise, shipment will be made C.O.D. Specify your exact frequency and the crystal will be calibrated to .01% or better of this frequency with the unit operating into a 32 mmf load capacitance.

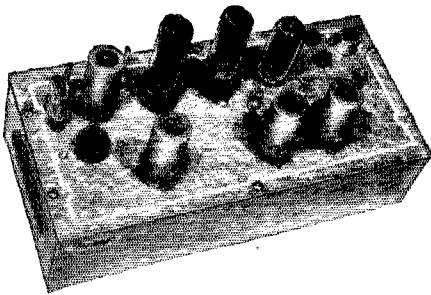


### ONE DAY PROCESSING

Orders for less than five crystals will be processed and shipped in one day. Orders received on Monday through Thursday will be shipped the day following receipt of order. Orders received on Friday will be shipped the following Monday.

**ONE DAY SERVICE**  
**Q**  
**U**  
**A**  
**R**  
**T**  
**Z**  
**C**  
**R**  
**Y**  
**S**  
**T**  
**A**  
**L**  
**S**  
**ONE DAY SERVICE**

# Tecraft



## TUBE LINE UP

6A6 osc.  
5763 Mult/amp.  
6360 Mult/amp.  
6360 final amp.  
12AX7 speech amp.  
and driver  
2-6AQ5 Modulators

Pwr. Imp. to final  
20 Watts  
EFFECTIVE  
PWR. OUT.

## TECRAFT TRANSMITTERS

For 220, 144, 50 mc.

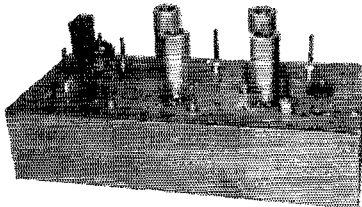
These Tecraft transmitters employ Hi-level plate modulation, use a hi-impedance mike, have provisions for metering all stages, tuned antenna output system to 52/72 ohm line and have an RF output indicator. Require 6.3 vac @ 4 amps and 250 vdc @ 250 ma.

Comes complete  
with tubes, crys-  
tal, plugs .....

**\$59.95**

**10.8 watts**

**FOR THE ULTIMATE IN  
PERFORMANCE!**



Model  
CC5

Any Model,  
any I.F.  
Complete  
**\$42.50**

Model  
CC5-50,  
144 and  
148 in kit  
form.  
**\$29.75**

CC5-50.....50-54 Mc.  
CC5-120.....CAP Intercom.  
CC5-144.....144-148 Mc.  
CC5-148.....CAP Intercom.  
CC5-220.....220-225 Mc.

Choose I.F. frequency—6-10, 7-11, 8-12, 10-14, 12-16, 14-18 or for COLLINS, 26-30 Mc. Model CC5-220 with I.F. 14 to 19 Mc. only. This is a Cascade model—4db noise figure. (144 Mc) Tube line up: 6BZ7, 2 6CB6, 2 6J6.

## THE MINI-VERTER

A natural for MOBILE use. Designed to use the broad-  
cast band of any radio for tuning. Compact, to tuck  
away anywhere. For 15 or 10-11 meters...**\$23.95**  
For 6 meters.....**\$25.95**  
Tubes, crystal, power and antenna plugs included  
with all models.

Other I.F. frequencies on special order.

**Matching 5-Element Beam \$7.45**

**SWR Bridge.....\$8.95**

## THE EQUIPMENT CRAFTERS INC.

523 Winne Ave., River Edge, N. J.

COlfax 2-0159

on the air. Ex-6EAP lives in Arlington, Mass. The Brain-  
tree Club's General Class license school is going well with  
WN1s GLW and GTX as new members. CTRX is busy at  
work. Hingham hams attended a zoning meeting about  
YKD's tower and it was decided in his favor. WN1HDK is  
new in Swampscott and has an Adventurer and an SX-99 on  
40 and 80 meters. CAM is working on a modulator for the  
AT-1 transmitter. New officers of the Satuit Amateur Radio  
Club are LCK, pres.; YTA, vice-pres.; ZUC, secy.-treas.  
OEX spoke about the NC-300 receiver. The Quannapowitt  
Radio Assn. had Phil Rand, DBM, at its meeting. BYB  
has a Gonset on 6 meters. The South Shore Club held a  
meeting. Radio Amateur Open House held two meetings  
and CTW and BL spoke. BPW worked a VK on 80 meters  
with 20 watts. BGW has an autostart RTTY circuit with  
FGL on 2 meters. CUW is fixing up his house. LM is bother-  
ed with arthritis in his hands. ABJ has a BC-610B trans-  
mitter and three-element beam. BB is busy with the  
160-meter DX tests. DFY is working 10-meter mobile with  
his dad and will have a three-element beam at home. SMO  
is on 40 and 80-meter c.w. with some 10-meter mobile.  
Stoughton is going to be the headquarters of Sector 1-B,  
which is made up of 21 towns, and Mr. Keating, our director,  
has his office in the Town Hall. New officers of the El-Ray  
Radio Club are JSM, pres.; JYC, vice-pres.; TSN, treas.;  
AAC, act. mgr.; WUP, secy.; TTS, chief eng. Traffic: (Nov.)  
KIUSA 810, WIEMG 402, UKO 236, EPE 160, AVY 79,  
BOA 54, BPW 49, IBE 38, BCW 15, VTT 15, NUP 14,  
CUW 13, LM 12, ABJ 11, TY 11, BB 10, ALP 8, HWE 7,  
ZQZ 7, DFF 6, BY 5, SMO 3, ATX 2, LLY 1. (Oct.)  
WIIEB 126.

**WESTERN MASSACHUSETTS**—SCM, Osborne R.  
McKeraghan, WIHRY SEC; REX, RM; BVR, PAM;  
QWJ. The WMCW Net meets on 3560 kc. Mon. through  
Sat. at 1900 EST. Net attendance is fair. Some of the  
younger members are away at school so the net could use  
support from some of the old-timers. The HCLA, Bark  
Yard Net, on 29,580 kc. at 2100 EST Tue., is doing fine  
with good coverage and attendance from all over W. Mass.  
and into Connecticut and Vermont. New Novices are HIR  
in Chester and GZD in Fairview. A JV has a 10-meter beam  
 atop a 40-ft. tower. QEA has his 20-meter beam tuning line.  
WNIGUD was heard doing a lot of brassounding in the  
Novice bands. AJX took part in the SS from the RPI club  
station. 2SZ, BYH has WAM and WAS just about made.  
JYH is hunting DX again and picked up five new ones.  
KFY has his "countries worked" total up to 195 and is  
knocking them off steadily with his kw. and telrex beam.  
COI reports signals booming through on 15 meters and  
some nice contacts made with his rhombic. MNG reports  
hearing LIB working ZLERZ on 10 meters at 8:30 one  
evening. THD has been appointed C.D. Radio Officer for  
Fast Longmeadow. ICY is moving to Canada. UUI is As-  
sistant EC in Pittsfield; also RACES applications have  
been sent in for approval and the Pittsfield C.D. has pur-  
chased five Elmac units for the local net. UVI is active in  
c.d. work in Westfield. An ORS certificate went to EOB;  
ORS and OPS endorsements to JYH; EC endorsements to  
LJQ, who is doing a fine job for Northampton C.D. The  
Sector 4A RO, KUL, expects sector radio units from the  
State any day now. RO HRV, of Easthampton, is placing  
an order for a town control station, as per c.d. plans. The  
Army Reserve Training Center in Springfield has a new  
amateur and MARS station. The call is KIWBX; the  
trustee WIWLE. Traffic: W1ZUU 125, BVR 52, TAY 36,  
DWA 25, AMI 22, MNG 18, BYH 5, HRV 5, JYH 2.

**NEW HAMPSHIRE**—SCM, Harold J. Preble, WIHS  
—SEC; BXU, RMs; CRW and COC, PAM; CDX. The  
Granite State Phone Net's new operating time is Tue. and  
Fri. from 1730 to 1830 and Sun. at 0900. The New Hamp-  
shire Slow-Speed Net is operating Mon. through Fri. at  
1830 on 3685 kc. COC is NCS and would like to have more  
members. DYE is chasing DX and WAS on 40-meter c.w.  
A radio club is being formed at Concord H.S. Those inter-  
ested should contact DYE. It's good to hear GMH and  
LXB on the air again after their recent illnesses. PFA,  
the frog man, has moved to his new QTH and is the proud  
daddy of a YL born in November. WUU has been off the  
air with rig trouble but hopes to take NCS for TCPN again  
soon. UNV is aboard the USS *Intrepid* in European waters.  
ASZ, with ARR as chief operator, is handling traffic for the  
University of N. H. BOF has been elected secretary of the  
Nashua M. & K. Club. YXA is back with Evans Radio.  
SSK is rebuilding his rigs and putting them in rack cabinets.  
When completed he should be on the air with a kw. Please  
check your certificates for expiration dates and send them  
in. Traffic: (Nov.) W1LP 114, SAL 100, HOU 88, COC 27,  
ASZ 26, GMH 22, FZ 12, WBM 12, DYE 11, CDX 9, BYS  
5, DYJ 5. (Oct.) W1LP 50, CDX 28, CCE 17, HOU 9.

(See New Hampshire Contest Announcement on page 92.)

**VERMONT**—SCM, Robert L. Scott, W1RNA—  
11GW left for the service Nov. 15th. Rutland ARC officers  
are WN1FKX, pres.; VTP, 1st vice-pres.; DES, 2nd vice-  
pres.; Henry Flagg, secy.-treas. In Vermont, during the  
Sports Car 1200-mile Endurance Run of Nov. 21th, starting  
at N.Y.C., officials of the Association maintained a constant  
check on 57 cars, or the survivors after break-downs or

(Continued on page 92)

# 3 BANDER

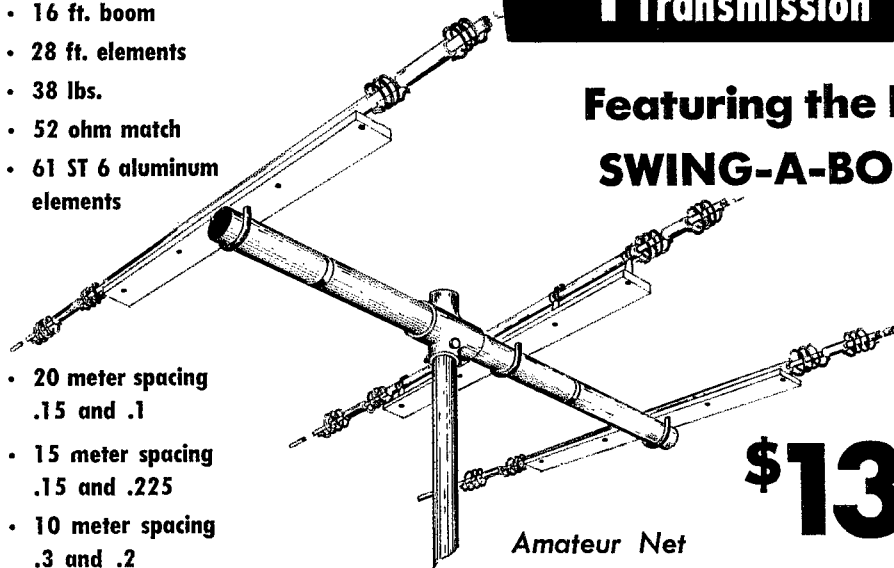
# 20-15-10 Meters

## 1 Transmission Line

- 16 ft. boom
- 28 ft. elements
- 38 lbs.
- 52 ohm match
- 61 ST 6 aluminum elements

### Featuring the New SWING-A-BOOM

- 20 meter spacing .15 and .1
- 15 meter spacing .15 and .225
- 10 meter spacing .3 and .2



Amateur Net

# \$139<sup>95</sup>

Now work 3 bands with the Radio Specialties new 3 Bander. Most T.V. rotators can be used. Band switch in seconds.

Tune your transmitter and receiver to either 20, 15 or 10 meters and you are ready to operate.

Radio Specialties Swing-A-Boom permits rotation of the boom and elements in vertical or horizontal planes so tuning adjustments are made possible from the tower.

#### Measured S.W.R.

- (a) 14200 — 1.3:1
- (b) 21300 — 1.4:1
- (c) 28750 — 1.3:1

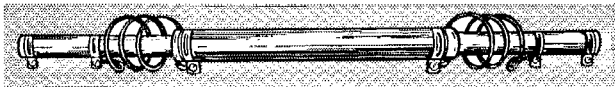
#### Measured front to back

- (a) 14200 — 30 DB
- (b) 21300 — 25 DB
- (c) 28750 — 30 DB

#### Measured Forward gain over Full Size Reference Dipole

- (a) 14200 — 7.8 DB
- (b) 21300 — 7.9 DB
- (c) 28750 — 8.1 DB

## Convert Your Present 20 Meter Beam To A 3 Bander



Your present beam now can be modified to work on 20, 15 or 10 meters, with results equal to the 3 Bander. One transmission line is used. Complete set of coils, instructions and fittings supplied.

Write for catalogue F-1 for 3 Bander or Conversion Kit.

Also available the W 4 G L all driven beam for 20 meters. Write for catalogue 4 G L

FOR AS LITTLE AS

# 39<sup>95</sup>

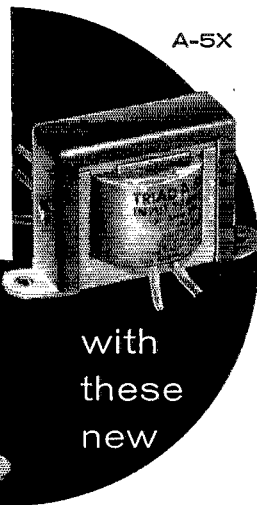
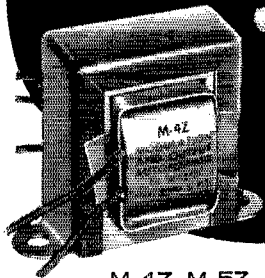
- 2 element beam kit — \$39.95
- 3 element beam kit — 59.95
- 4 element beam kit — \$79.95
- 5 element beam kit — 99.95

# RADIO SPECIALTIES INC.

354 SEVENTH AVENUE, BROOKLYN 15, N. Y.

modernize  
your  
portable/  
mobile rig

A-5X



with  
these  
new

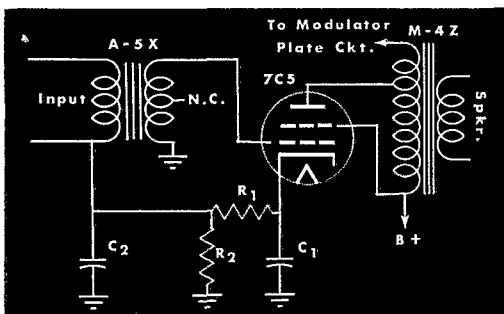
M-4Z, M-5Z

## TRIAD TRANSFORMERS

The TRIAD A-5x high gain microphone transformer eliminates need for audio amplifier with substantial savings in cost and space. TRIAD'S M-4z or M-5z eliminates over-modulation and boosts audio power. Both types are minimum size and low in price.

Type No.	List Price	Application	Primary Impedance Ohms	Turn Ratio	Wt. Lbs.
A-5X	\$4.15	Single button mike to p.p. grids—Hi-gain.	100	84	1/2

Type No.	List Price	Primary	Secondary		Audio Watts	Wt. Lbs.
			Impedance	Ma.		
M-4Z	\$3.40	5000 (Autoformer).	6750 4	100 (total)	10	3/4
M-5Z	5.60	5000 (Autoformer).	6750 4	250 (total)	20	1 1/2



Write for Catalog TR-55D



**TRIAD**  
TRANSFORMER CORP.



4055 Redwood Ave. • Venice, Calif.

### SEVENTH NEW HAMPSHIRE QSO PARTY

The Concord (N. H.) Brasspounders, W10C, announce their sponsorship of the Seventh New Hampshire QSO Party, and cordially invite all interested radio amateurs to participate. Here are the details:

- (1) Contest period: Saturday, February 18th, 6 p.m. EST, to Sunday, February 19th, 6 p.m. EST.
- (2) No time limit and no power restrictions.
- (3) Scoring: N. H. stations count 5 points for each N. H. contact, plus 1 point per outside contact; stations outside the state count 5 points per N. H. contact; both multiply by the number of counties worked (10 maximum).
- (4) Engraved certificates will be issued to all participants reporting, with special endorsements for the highest-scoring stations, both in N. H. and outside, in the following categories: phone only, c.w. only, combined phone and c.w.
- (5) The same station may be worked for additional credit on more than one band, phone or c.w. Suggested frequencies to congregate near are as follows: 1810, 3550, 3685, 3915, 7200, 14,100, 14,250, 27,000, 28,100, 28,800 kc.; 51,145 and 221 Mc. (Suggested time schedule for the above frequencies will be mailed upon request.)
- (6) General call: "CQ NH" on c.w.; "CQ NH QSO Party" on phone.
- (7) Contact information required: Report and QTH (including county of N. H. stations). Logs and scores must be postmarked not later than March 12, 1956, and should be mailed to the Concord Brasspounders, Box 312, Concord, N. H.
- (8) The WNH (Worked New Hampshire) certificate will be awarded to stations working all ten counties during this QSO Party, participating logs confirming.

disqualifications, with communications provided by amateur mobile and fixed/portable stations. KOO/1 operated as control at the summit of Mt. Mansfield, with KIWB1 as operator. Other stations, fixed and mobile, operating were QNM, TLI, WPK, VSA, CML, KJG, NLO, RFR, DAP, DBF, K2s HJC, HJC/M, HJD, BII, DEA, and ECW. The Lincoln Gap and Smugglers' Notch roads were the toughest mountain climbs they could find. The Grand Prize was an expense-paid trip to Europe and the winner will enter the Alpine Contest to be held next July. Traffic: W10AK 151, AVP 84, BJF 48, UEQ 48, UGW 34, IT 33, RNA 18, ZNM 14, VMC 6, KJG 1.

### NORTHWESTERN DIVISION

ALASKA—SCM, Dave A. Fulton, KL7AGU—A group of amateurs in Palmer, Alaska, have formed a ham club with about eighteen members, all Novices. They meet on Tue. evenings in the CO-OP Building. They are in need of technical assistance. Anyone interested is asked to contact WL7BMB, at Palmer. Another amateur radio club has been formed in the Anchorage Area at the high school. This club is composed of high school students, who meet at the high school on Thurs. after school. They are in need of both code and technical assistance. Anyone able to help here should contact BKN, ANO and AEQ are going to start a theory course for the YLRL. Ten-meter openings have been good the last few months with the 10-meter signals being the best since 1951. UM is getting ready to give the DX a go again after building a new kw. Also NT should be on with a kw, soon.

IDAHO—SCM Alan K. Ross, W7IWU—Smelterville: WHZ checks into the Montana, FARM, and WARTS Nets and reports that RQG, of Kellogg, has a new sideband rig on the air. Lewiston: GMC and HDT report on Halloween activities with a nice write-up in the *Tribune*. Those taking part were GMC, HDT, KKY, NOG, YBV, UJA, and IDZ. Ririe: LQU is working out FB on 10 meters. Moscow: A new OPS is VQC, who reports there are about 16 active amateurs in Moscow. I hope you fellows can form a club and send me a recommendation for an Emergency Coordinator. Those interested in RACES should write to Dean Mayes, MKS, Box 486, Meridian, for application forms. Both the phone and c.w. RACES nets should be in operation by the time you read this. Please, all ORS, OPS, OBS, ECs, etc., resolve to report each month during 1956. Just a few minutes time is all it takes and it surely is appreciated by your SCM. Traffic: W7GMC 211, WHZ 12.

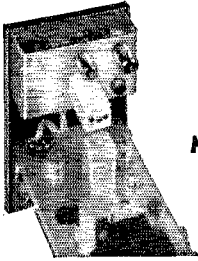
MONTANA—SCM, Leslie E. Crouter, W7CT—The Yellowstone Radio Club in Billings is conducting code classes on 3655 kc. Mon., Wed., and Fri. with PKR, VDZ, and YHS alternating on the chopper. Speeds from 5 to 15 w.p.m. are being sent. YZQ and KGF are starting a class in

(Continued on page 94)

# NEW MULTIPHASE "Q" MULTIPLIER

- Peaks Desired Fone or CW Signal
- Nulls Out Interfering Carrier up to 50 DB.
- No Loss in Speech Intelligibility

- No Insertion Loss — New Two Tube Circuit
- Special High "Q" Pot Core Inductor



**MODEL AQ**



**MODEL DQ**



**MODEL B SLICER**

## CONVERTS MODEL A SLICER

Plugs into Model A accessory socket, converting it into a Model B. New front panel and controls provided. Enjoy all the advantages of "Q" Multiplier selectivity on CW, AM & SSB with your present Model A Slicer.

Wired.....\$29.50  
Kit.....\$22.50

## FOR AM, CW, SSB OPS

Desk Model "Q" Multiplier for use with any receiver having 450 to 500 KC IF. In attractive, compact case with connecting power-IF cable. Power supplied by receiver. Also provides added selectivity and BFO for mobile SSB or CW reception.

Wired.....\$29.50  
Kit.....\$22.50

## BUILT-IN "Q" MULTIPLIER

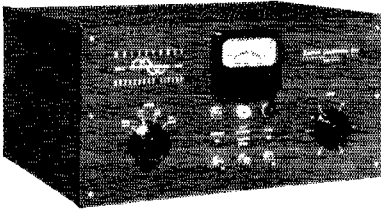
Upper or lower sideband reception of SSB, AM, PM & CW. For use with any receiver having 450-500 KC IF.

Wired.....\$99.50  
Kit.....\$69.50

## MODEL A SLICER

Same as Model B but less "Q" Multiplier  
Wired.....\$74.50  
Kit.....\$49.50

## A NEW CONCEPT IN LINEARS



## MULTIPHASE 600L

### BROAD BAND LINEAR AMPLIFIER

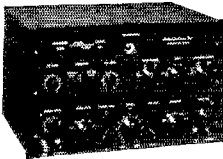
### NO TUNING CONTROLS!

### SINGLE KNOB BANDSWITCHING 10-160 METERS

- Single 813 in Class AB<sub>2</sub>. Approx. 2 watts effective or 4 watts peak drive for 500 watts DC input.
- New band-pass couplers provide high linear efficiency: 60-65%.
- Designed for 50-70 ohm coaxial input and output.
- Built-in power supply. Bias and screen regulation. Automatic relay protection.
- Exclusive metering circuit reads grid current,

watts input, RF output, reflected power from mismatched load — switch to any position while on the air!

- Completely shielded — TVI suppressed. Free of parasitics! Low intermodulation distortion.
  - Choice of grey table model (17 $\frac{5}{8}$ "W, 8 $\frac{3}{4}$ "H, 13"D) or grey or black rack model.
- Wired, with tubes.....\$349.50



**MODEL 20A**

- 20 Watts P.E.P. Output SSB, AM, PM and CW
- Bandswitched 160 — 10 Meters
- Magic Eye Carrier Null and Peak Modulation Indicator

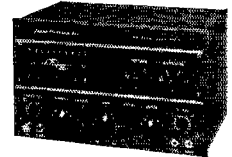
Choice of grey table model, grey or black wrinkle finish rack model.  
Wired and tested.....\$249.50  
Complete kit.....\$199.50

## MULTIPHASE EXCITERS

### Check These Features

### NOW IN BOTH MODELS

- Perfected Voice-Controlled Break-in on SSB, AM, PM.
- Upper or Lower Sideband at the flip of a switch, with 40 DB. suppression.
- New Carrier Level Control. Insert any amount of carrier without disturbing carrier suppression adjustments.
- Talk yourself on frequency.
- Calibrate signal level adjustable from zero to full output.
- New AF Input Jack. For oscillator or phone patch.
- CW Break-in Operation.
- Accessory Power Socket.



**MODEL 10B**

- 10 Watts P.E.P. Output SSB, AM, PM and CW.
- Multiband Operation using plug-in coils.

Choice of grey table model, grey or black wrinkle finish rack model. With coils for one band.  
Wired and tested.....\$179.50  
Complete kit.....\$129.50

MULTIPHASE  
EQUIPMENT

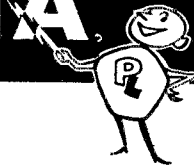
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1247 W. Belmont Ave.

Chicago 13, Illinois

WRITE FOR LITERATURE ON THE COMPLETE MULTIPHASE LINE

# PENTA



## PINT-SIZED POWERHOUSE!

Here is Penta's new PL-6549 beam pentode, a compact power package which is daily finding new applications where reliability, high efficiency at low and medium voltages, low driving power, and excellent linearity are required.

For r-f output of 50 to 250 watts, or audio output up to 325 watts, the PL-6549 outclasses all other transmitting-type tubes. The beam pentode construction improves linearity—provides distortion-free high peak power output in audio or linear r-f amplifier service.

### RATINGS

Filament—Thoriated Tungsten (quick heating)	
Voltage .....	6.0 volts
Current .....	3.5 amps
Plate Voltage, Max. ....	2000 volts
Plate Current, Max. ....	150 ma.
Screen Voltage, Max. ....	600 volts
Plate Dissipation, Max. ....	75 watts

A four-page technical data sheet giving suggested operating conditions and application information is available. Ask for data file No. 901.



**PENTA LABORATORIES, INC.**  
312 NORTH NOPAL STREET  
SANTA BARBARA, CALIF.

theory. If interested, call Pete or Ted for further information. YZQ has invited the club to meet at KBY's transmitter. Ted will conduct a descriptive tour of the station and also will furnish the eats. The meeting will feature a talk on Geophysical Electronics given by PXR, whose job is in this field. AZO is a new amateur located at Yank Air Force Base, Mont. A word of explanation regarding reports: Sometimes reports arrive too late to be mailed. Many reports are not usable because by the time the news gets into QST it is months old. Sometimes there are no reports at all and sometimes there are more than can be gotten in Montana's allocated space. Please help your new SCM and get your reports in early. KGJ is helping CT by writing the reports until CT is settled in his new home in Helena.

**OREGON**—SCM, Edward F. Conyngham, W7ESJ—The Oregonian Amateur Radio Society (Portland) has 129 members. A new and improved code and theory class is given once per week at Benson High School and Gresham Union High, helping prospective hams and those going for higher class tickets. The student turnout averages 40 per week. Those teaching are LFJ and DNB, theory; VGI, code machine; with JCF, pres.; and VGI, vice-pres. PGB is conducting code practice from Eugene on 160, while SME does the same on 2 meters. Ed is working for a better mobile antenna system. AQK made 31 net check-ins in November. UJ was down with pneumonia, but is up and going now. WGB also is back from hospitalization. BVH was away from home in November. OMO is building frequency measuring equipment to go with his new OO ticket. BLN keeps busy as net mgr. for OFN and as EC for Coos Bay. UJL is watching the piggy bank to see if there is enough for a new DX-100. QKU is NCSing NTN every Mon. night. QYS is a new ARRL member. PRA holds weekly code classes and is active on 2 meters. MKA has a new DX-100. New and renewed AREC members are EUG, OKM, TLQ, VPF, QYS, and SME. KAB sold some equipment and is shopping for a new receiver. WAT expects to move soon. SEZ and RET are building and assisting others on 2 meters. The Willamette Valley DX Club was formed in November, with HXG, pres.; GBW, vice-pres.; AC, secy-treas.; DJY and GHB, directors; MVC, photographer; QON, editor; ASG, DAA, DJY, ENW, FB, FMX, GJ, HQC, NKW, TML, and UAB, members. WKA is looking into more accurate frequency measuring systems. AJN moved into a new house. Traffic: W7QKU 286, HDN 66, OMO 34, PRA 30, BLN 26, TR 20, AQK 11, BVH 8.

**WASHINGTON**—SCM, Victor S. Gish, W7FX—On the day of the jet disaster at Eielson AFB near Fairbanks, Alaska, BA received a phone call from DET (engineer at KOMO in Seattle) asking if he could get through to Fairbanks as the phone calls were delayed six hours. At the time BA was working KL7FAF, handling traffic from the base, but he took time out to patch the news editor of KOMO through to Major Orr, public relations officer at Eielson AFB, and the tape made was used on several broadcasts from KOMO. WHX reports from the Apple City Radio Club as follows: PNN cleaned out his shack and auctioned gear for the club treasury with \$18 the result; MP has a new SX-100; WN7ZCK is on 2 meters; OVE is putting up a new 10-meter beam; and ETO is working on his beam rotator. Those making BPL this month were PGY, BA, VAZ, FRU, WOK, and AHV, the latter two on originations. OE is busy building a traffic man's dream—six frequencies on two bands with instant resonant shift without tuning. FWD reports that FWR is back from the hospital. JVB is crowing over his new grandson. APS claims he can't hear anything but DX these nights. NYJ QMLed WSN 100 per cent in November. The WARTS (3970 kc, 1730 PST Mon.-Sat.) has changed its time because of skip. The NTN (3920 kc, 0630 PST Mon.-Sat.) is going strong but still needs Southern Idaho and Utah check-ins. AMC reports that he now has a 2½-kw. alternator for emergencies. FZB made 109 contacts with 35 sections in the SS for 9494 points. YJE reports openings to the south on 6 meters. TIQ is revamping the rig for the new MARS frequencies. UIN is trafficking on WARTS and NTN and also is trying WSN and EN7. RDR hopes to be more active from Ocean Park. Traffic: (Nov.) W7PGY 1017, BA 1006, VAZ 638, FRU 510, OE 255, WOK 181, KZ 168, AHV 138, EHH 55, WQD 55, UIN 54, USO 46, FWD 32, KWAT 31, W7AIB 22, LVB 21, APS 19, NYJ 15, AMC 10, WZB 8, GAT 7, YJE 4. (Oct.) W7KZ 91, UIN 78, NYJ 55, K6BDF/7 24, W7RDR 10.

### PACIFIC DIVISION

**HAWAII**—SCM, Samuel H. Lewbel, KH6AED—The Honolulu Amateur Radio Club elected the following officers for 1956: AKE, pres.; AVH, vice-pres.; OS, secy.; AGH, treas.; KC, asst. treas.; ZP and AFG, directors. The Honolulu Mobile Club started a trophy contest Jan. 1st. The first to turn in QSLs for WAS on a mobile rig will win the beautiful trophy donated by KC (Takemoto). Check with the club officers for the rules. W2UK received his KH6 call; watch for UK on 2 meters from Kahuku. ZD has been on 40 and 2 meters with his RTTY gear. AED still is wiring up his printer and looking for a transmitter-distributor. Traffic: KH6AJF 1228, KH6QU 516.

(Continued on page 96)



# HOW MUCH SHOULD YOU PAY FOR A GOOD ROTARY BEAM?

**Only Two Ways To Judge!  
Don't Guess! Don't Be Fooled!**

The only true gauges of beam value are (1) performance, which only a full-size beam can give and (2) the amount of aluminum per dollar cost!

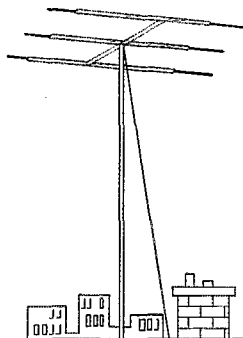
And that's why the GOTHAM ROTARY BEAM cannot be matched for value by any beam on the market today. Gotham gives you FULL SIZE BEAMS made (except for the polystyrene insulator) entirely of new, rustless, first-quality mill stock aluminum—and more of it, in both length and thickness. You'll find no link coupling, no complicated mounts, no tuning stubs. No flimsy wire, no wood to rot or weather-proof. Easy assembly, simple matching of line to antenna.

**YOUR GOTHAM BEAM ACTS AS AN AMPLIFIER:**

A three-element GOTHAM beam will multiply your power by four; a two-element GOTHAM beam will multiply your power by seven. In addition, GOTHAM beams cut down QRM and noise. And a GOTHAM beam will give your receiver the same gain it gives your transmitter.

Remember: Your GOTHAM beam can greatly improve the performance of the most inexpensive receiver and low-power transmitter! Get a GOTHAM beam and work the world!

**PROVED BY THOUSANDS OF USERS THE WORLD OVER!**



**This Full Size Gotham Cost Only \$21.95 And Brought In 87 Foreign Countries, All Continents And 30 Zones On 35 Watts!**

**MAIL THIS COUPON TODAY!  
10-DAY MONEY BACK GUARANTEE**

Order from these and most other good distributors

**HOW TO ORDER:**

Send coupon with check or money-order direct to Gotham or visit your local distributor. Immediate shipments via Railway Express, charges collect; foreign shipments sent cheapest way.

- Alabama: Curle Radio Supply, 406 Meridian St., Huntsville.
- Arizona: Kennedy Radio, 4511 N. 8th St., Phoenix.
- California: Offenbach & Reimus Co., 1569 Market Street, San Francisco.
- D. C.: Capitol Radio Wholesalers, Inc., 2120 N. 14th St., N.W., Wash.
- Florida: Kinkade Radio Supply, Inc., 402 W. Fortune St., Tampa.
- Georgia: Specialty Distributing Co., 1541 15th St., Augusta.
- Illinois: Atronic Corp., 6566 Sheridan Rd., Chicago.
- Indiana: Graham Electronic Supply, 102 S. Penn St., Indianapolis.
- Iowa: Ken-Eis Radio Supply Co., 501 First Ave. North, Ft. Dodge.
- Iowa: Radio Trade Supply Co., 1224 Grand Ave., Des Moines.
- Iowa: World Radio Labs., 3415 W. Broadway, Council Bluffs.
- Kentucky: Hobe's Radio & Video, 119 Crab Orchard St., Somerset.
- Kentucky: Universal Radio Supply, 533 S. 7th St., Louisville.
- Louisiana: Radio Paris, Inc., 807 Howard Ave., New Orleans.
- Michigan: M. N. Duffv & Co., 2040 Grand River, Detroit.
- Michigan: Northwest Radio, 435 Tamarack St., Laurium.
- Michigan: Purchase Radio Supply, 605 Church St., Ann Arbor.
- Minnesota: Lew Bonn Co., 67 South 12th St., Minneapolis.
- Mississippi: Swan Distr. Co., 342 N. Gallatin St., Jackson.
- Missouri: Henry Radio, Butler.
- New Hampshire: Evans Radio, Concord.
- New Jersey: General Radio Supply Co., 600 Penn St., Camden.
- New Jersey: Hudson Radio & TV, 35 William St., Newark.
- New Jersey: Radio Electric Service, 513 Cooper St., Camden.
- New York: Hudson Radio & TV, all New York City stores.
- New York: M. Schwartz & Son, 710 Broadway, Schenectady.
- No. Carolina: Allied Electronics, 411 Hillsboro St., Raleigh.
- No. Carolina: Electric Supply Co., P.O. Box 730, Wilson.
- No. Carolina: Johannessen Electric Co., Inc., 312N. Eugene St., Greensboro.
- N. Dakota: Fargo Radio Service, 515 Third Ave., North, Fargo.
- Ohio: Mytronco Company, 2145 Florence Ave., Cincinnati.
- Ohio: Selectronic Supplies, Inc., 1320 Madison Ave., Toledo.
- Ohio: Srepeco, Inc., 135 E. 2nd St., Dayton.
- Pennsylvania: George D. Barbey Co., Inc., 622 Columbia Ave., Lancaster.
- Pennsylvania: Radio Electric Service Co., 7th & Arch Sts., Philadelphia.
- Pennsylvania: Warren Radio Inc., 1313 Peach St., Erie.
- Rhode Island: W. H. Edwards Co., Inc., 94-96 Broadway, Providence.
- S. Dakota: Burghardt Radio Supply, Inc., Watertown, Aberdeen.
- Tennessee: Curle Radio Supply, 439 Broad St., Chattanooga.
- Texas: Gib's Ham Gear, 1118 Bellaire St., Amarillo.
- Texas: Neeves Radio Supply, 720 N. Stanton St., El Paso.
- Virginia: Radio Equipment Co., 819 W. 21st St., Norfolk.
- Virginia: Radio Supply Co., 3302 West Broad St., Richmond.
- Washington: C & G Radio Supply Co., 2502 Jefferson Ave., Tacoma.
- Washington: Western Electronics Supply, 717 Dexter Ave., Seattle.
- Wisconsin: A & F Electro Mart, 7833 West Greenfield Ave., Milwaukee.
- Wisconsin: Harris Radio Corp., 289 N. Main St., Fond du Lac.
- Canada: Louis Desrochers, P.O. Box 688, Amos, Quebec.

**GOTHAM HOBBY CORPORATION  
107 E. 126th ST. NEW YORK 35, N. Y.**

Enclosed find check or money-order for:

**2 METER BEAMS**  
 Deluxe 6-Element \$9.95      12-El \$16.95

**6 METER BEAMS**  
 Std. 3-El Gamma match 12.95      T match 14.95  
 Deluxe 3-El Gamma match 21.95      T match 24.95  
 Std. 4-El Gamma match 16.95      T match 19.95  
 Deluxe 4-El Gamma match 25.95      T match 28.95

**10 METER BEAMS**  
 Std. 2-El Gamma match 11.95      T match 14.95  
 Deluxe 2-El Gamma match 18.95      T match 21.95  
 Std. 3-El Gamma match 16.95      T match 18.95  
 Deluxe 3-El Gamma match 22.95      T match 25.95  
 Std. 4-El Gamma match 21.95      T match 24.95  
 Deluxe 4-El Gamma match 27.95      T match 30.95

**15 METER BEAMS**  
 Std. 2-El Gamma match 19.95      T match 22.95  
 Deluxe 2-El Gamma match 29.95      T match 32.95  
 Std. 3-El Gamma match 26.95      T match 29.95  
 Deluxe 3-El Gamma match 36.95      T match 39.95

**20 METER BEAMS**  
 Std. 2-El Gamma match 21.95      T match 24.95  
 Deluxe 2-El Gamma match 31.95      T match 34.95  
 Std. 3-El Gamma match 34.95      T match 37.95  
 Deluxe 3-El Gamma match 46.95      T match 49.95

(Note: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

**NEW! RUGGEDIZED HI-GAIN 6, 10, 15 METER BEAMS**

Each has a TWIN boom, extra heavy beam mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.

- Beam #R6 (6 Meters, 4-El).....\$38.95
- Beam #R10 (10 Meters, 4-El)..... 40.95
- Beam #R15 (15 Meters, 3-El)..... 49.95

Name.....  
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NEVADA—SCM, Ray T. Warner, W7JU—OYQ, former secretary of the Reno Club, now a permanent resident in Las Vegas, is quite active on 20 meters with 400 watts, UPS, now located at Wendover, Utah, near the Nevada-Utah line, has applied for MARS membership. Andy erected a three-element 20-meter beam and purchased a new NC-183D receiver. LHQ obtained the co-operation of the Asst. D.A. in Las Vegas in assisting the Southern Nevada Amateur Radio Club to prepare incorporation papers. 1JST/7 and MRN are recent SNARC members. The Las Vegas gang has been holding numerous 10-meter hunts lately. 5AOF/7 is now 7BRX. VIU, of Winnemucca, was quite active in the SS. WNTYNO also got in his ticks. Chas. received his YLCC and has worked considerable DX recently. YEX is now on phone with an AT-1. There are now four hams in Gabbs, so NWU won't be so lonesome.

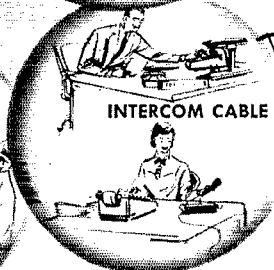
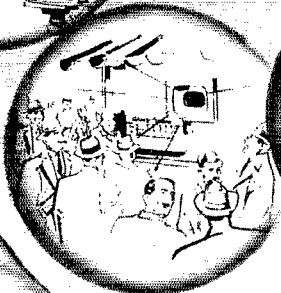
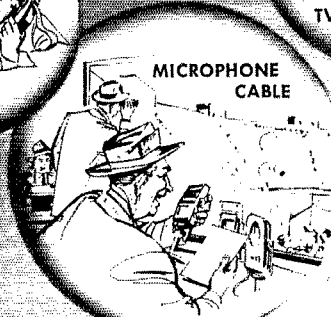
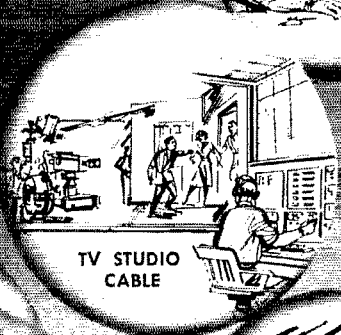
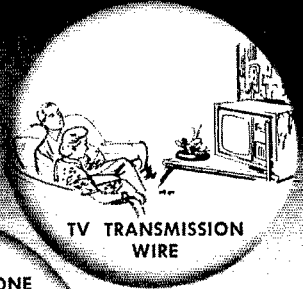
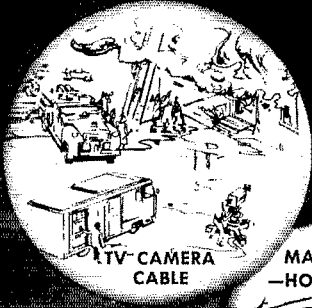
SANTA CLARA VALLEY—SCM, R. Paul Tibbs, W6WGO—Asst. SCM: Roy E. Pinkham, 6BPT, SEC: NVO. At the November meeting of the SCCARA, the following new officers were elected: BPT, pres.; VZT, vice-pres.; WGO, secy.; KRF, treas.; APV, RNG, and HC, board members. CFK and EOA are the two directors remaining in office for one more year. At the Jordan Jr., High School in Palo Alto, a radio club has been formed with K6JTG as president and KN6OLB as vice-president. WLI took part in the recent F.M.T. K6BAM built a Q-Multiplier and needs Maine, New Hampshire, and Vermont. EXX has started sending Official Bulletins on 6 meters. He has an exciter for 420 Mc. and is building a high-power final for 144 Mc. with a 4-65A. YHM is back handling traffic in full swing with the NCS job for PAN on Thurs. K6HGV is a code practice station. KN6IEE, of Redwood City is awaiting her ticket to clear the "N" from her call. In the Palo Alto Area 6-meter mobiles are working with the 144-Mc. c.d. drills. NMTV is NCS on 144 Mc. and K6IQY is NCS on 6 meters. LTT has completed a new Class AB2 linear amplifier which runs 150 watts. K6HGV drives a pair of 811s in the final. ZRJ is using a Pi-Net antenna coupler and new VFO. He has cleared up the TVI so is back on with his work as RN6 manager. VZT gave a talk on antenna and antenna matching networks at the SCCARA January meeting. HC is tapering off on his traffic work by working on the phone net. NYX has moved into his new home. Traffic: W6VHM 322, K6GID 178, W6BPT 63, ATT 56, K6DYX 34, W6HC 32, ZRJ 10, K6JTG 1.

EAST BAY—SCM, Roger L. Wixson, W6FDJ—Asst. SCMs: Harry T. Cameron, 6RVC; and Oliver A. Nelson, jr., 6MXQ. PAM: LL. RMs: EFD, JOH, and IPW. SXX reports poor receiving conditions aboard the *Hawaiian Rancher* for the month of November. K6EPC is putting out a general directory for NCN. Ed has hopes that it will be bigger and better than ever. K6WAY reports they are swamped with traffic since they put up a few posters letting the civilian and military personnel know about their activities. YDI seems pleased that the 10-meter band is opening more regularly and that his DX-100 is doing such an FB job. Our recent visit to the Napa Valley Amateur Radio Assn. was most enjoyable. We had a chance to discuss TVI problems with them and give some accounts of our experiences here in Oakland. NDY, EBG, HTE, KZD, and KN6KOI were nominated for offices for the coming year. HUY and BYQ have done an FB job. We enjoyed our visit very much. The ACACIA had a fine dinner at the Trails End and discussed the programs for the future. The December meeting was another dinner meeting. Don Batten and Don Doughty provided the entertainment for the evening. The Oakland Radio Club had its Christmas Party and held an election of officers. ZSS, GK, DDT, CCQ, HEX, and UTX are running the show in "56." The following are active on 2-meter RTTY: ASJ, VPC, JZ, YM, BNB, and FZC. The frequency is 147.29 Mc. Other RTTY activity has been good on 40 and 80 meters. An RTTY breakfast was held late in November where lower shift operation was discussed. Some operating procedures were adopted, such as closer frequency operation and the use of double CR and LF. Your SCM sure could use a few more activity reports. Traffic: K6WAY 552, EPC 51, W6ASJ 14, YDI 7.

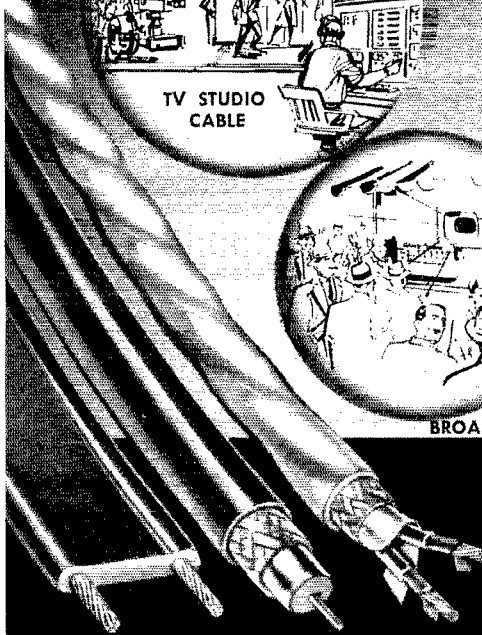
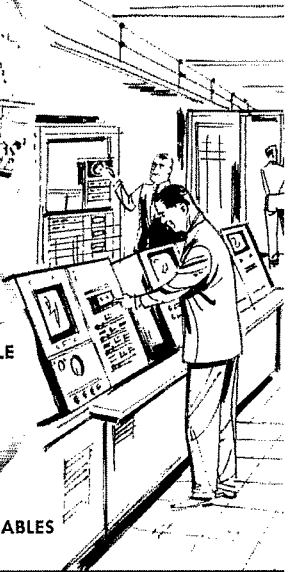
SAN FRANCISCO—SCM, Walter A. Buckley, W6GGC—The San Francisco Naval Shipyard Club held its Nov. 4th meeting at the QTH of UOQ. YLs and XYLs were included in the invitation. The 29ers Club had ABK as the hidden transmitter control station for its monthly 10-meter hunt. AHH came in first with K6KFS trailing in last. One of the local magazine script writers joined in the hunt and took pictures of the mobiles. Although not an amateur himself, Mr. Biddle is very interested in the work the amateurs do in civil defense and also in the fun the boys get through their radio hobby. The San Francisco Radio Club did not have a guest speaker but showed interesting movies at its last meeting. Installation of new officers also took place at the November meeting. Fellows on 6 meters in the HAMS (the Red Cross group) joined ranks at a luncheon in one of the Italian restaurants in Oakland with over fifty attending. The next monthly 6-meter luncheon will be held in San Mateo County. The fellows all decided that since there are so many interested hams on this band that hereafter a luncheon will be held once a month in one of the cities in the vicinity. In that way any

(Continued on page 98)

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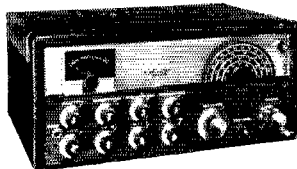
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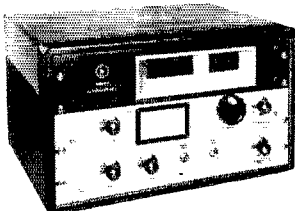
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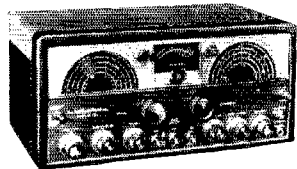
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amateur interested in attending these luncheons could make the necessary arrangements to meet in his own nearby town or city and members of other clubs could join in the fun. Many of the local 29ers joined the group at the last luncheon. YLs and XYLs and all harmonics are welcome. The Young Ladies' Club of San Francisco nominated officers at its November meeting and ballots have been mailed out to all the members. FEA spent Thanksgiving in her home town of Fresno. WJF is being kept pretty busy these days with commuting and trying to get up antennas so he can keep the rig on the air. QMO reports that USA is in a position to handle APOs, East Bound, Honolulu, and other traffic for the local nets. Operators are on duty at all times, seven days per week. Jeri is looking forward to the day shift soon so she can become active again ratchewing with the girls and fellows on different bands. We're very happy at USA as a civilian operator. GQ's QJ report for November lists W7 and K9 calls but only one Novice listing for second harmonics. BYS and GJC took a trip over to the Oak Knoll Naval Hospital recently to visit SWP. We're sorry to report that although Pat's physical condition seems very good, he did not recognize either of his friends. It is very doubtful if he will ever be active on the MARS Net again. Pat was a faithful worker and had many friends locally. P1T and her harmonic, Karen, were in an automobile accident last week. The car was struck by another auto and Cynthia was thrown to the street. Although no bones were broken, she was so badly bruised that she has to use crutches in order to get around. A hospital check-up showed that Karen was badly shaken up but had no serious injury. Please remember gang, to plan to attend the ARRL National Convention to be held in San Francisco in July, 1956. Traffic: W6FEA 48, GOC 28, QMO 26, WJF 7, GHI 6.

**SACRAMENTO VALLEY** — SCM, Harold L. Lucero, W6JDN. The Chico meeting was very nice with the Pacific Division Director and representatives from eleven towns present. S.s.b. seemed to be the main topic, but League affairs also were discussed. The meeting ended with refreshments and all went on their way in a jovial mood. LLT gave a talk on c.d. and answered a number of questions. Thanks, fellows, for your support in electing me your vice-director. I'll do my best to do your bidding during my term of office. The RAMS, a mobile club, meets the 2nd Fri. of each month at Wm. Land Park Club House, in Sacramento, California. All interested in mobile are invited to attend. ILZ spent some time in Santa Cruz. Local traffic men are K6FAY, K6CNE, K6CNA, and K6ASX and they are doing a fine job. NCV/MI is doing nice work with new equipment. IIR has requested appointment as OO. JDN spent some time in San Francisco during the illness of his wife and visited MARS and the SCM of San Francisco and Rose, his XYL. As the c.d. program has been in a slump in Niskiyou Co., the local EC, K6JVD, is working on a plan to increase the ARCC activity in this area. Let's be sure to give him a helping hand, gang. Traffic: K6ORT 202, W6CMA 163, ILZ 3.

**SAN JOAQUIN VALLEY** — SCM, Ralph Saroyan, W6JPU. The 2-meter repeater is working out very well. BUT, mobile in Taft, worked into the Bay Area and NTK worked into the Los Angeles Area. There seems to be no limit to what can be worked on the repeater. K6JQN is the call at C.D. Headquarters. Chandler Field, K6UTJ, W6ONK, ZYR, UBK, SMS, and QOS assembled a DX-100 for Eileen, FKY. Lots of luck to you, Eileen. The Turlock and Modesto hams have converted ARC-4 equipment with good success. UJU is being heard back on 75-meter mobile. UBK is on all bands with an HT-30 rig. The Fresno Radio Club handled the Motorcycle Enduro Run in the Sierras with good success on 75 meters. Those present were KN6KLE, KN6LRIU, W6DUD, JPU, K6GTI, W6ONK, UJU, UBK, JXX, OWL, GFV, BAN, and K6BGF. Richard Takakjian, a ham-to-be, fell out of a tree and broke his collar bone. That's the hard way. Richard! K6GHC is being heard on 75-meter s.s.b. BAN is now converted to Class B modulation on mobile. All Emergency Coordinators are requested to send in monthly reports to EBL. JPS is chasing DX on 20 meters. Please send in more news. See you next month! Traffic: W6ADB 108, EBL 23, SJJ 18.

### ROANOKE DIVISION

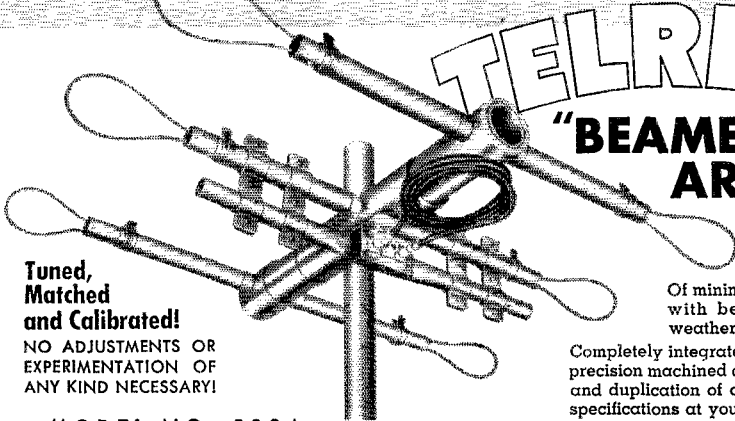
**NORTH CAROLINA** — SCM, Charles H. Brydges, W4WXZ — SEC; ZG, RM; VHH, PAM; ONAL, OOG; SOD and JZQ, Nets: Tarheel Net, 3865 kc.; Greensboro Two Meter Net, 145.88 Mc.; Charlotte C.D. Net, 3825 kc.; Skunk Ten Meter Net, 29,000 kc.; Tarheel Teen-age Net 3950 kc. The Greensboro Club station, GNF, is rebuilding the 3.8-Mc. rig. GNF also has a 144-Mc. rig and beam. 9QNR/4 is located at Roanoke Rapids. A very successful c.d. test evaluation was held in Charlotte on Nov. 9th. The Charlotte C.D. Net used BX/4 atop the 17-story Johnson Building as control station. Also used were mobiles AYA, BFJ, IBK, WDJ, HVK, CBP, CZR, and ZKX. BX/4 was manned by ZQB (EC), ZQA, WXZ, and K1BVQ. JZQ, NRN, and LCV have been posted on the civil defense committee for Elizabeth City. JZQ is Radio Officer. EZH now

(Continued on page 100)

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20 METERS	503	3 element Full Size	120.00
	503A	3 element w/loop ends Full Size Array	136.20
	504A	4 element w/loop ends Full Size Array	185.00
	505A	5 element w/loop ends Full Size Array	240.00
	506A	6 element w/loop ends Full Size Array	280.00
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	520	2 element (coil) Mini-Beam	55.50
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	156A	6 element w/loop ends Full Size Array	235.00
	<b>SUPER MINI-BEAMS</b>		
	1520B	2 element (with balun)	55.50
	1530B	3 element (with balun)	82.00
10 METERS	10M3A	3 element w/loop ends (with balun)	67.50
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	10M6A	6 element w/loop ends (with balun)	145.00
6 METERS	6M-3C	3 element (with balun) Wide Spaced	14.50
	6M-6C	6 element (with balun) Wide Spaced	57.50
2 METERS	2M-3C	3 element—"Quick-rig"	5.95
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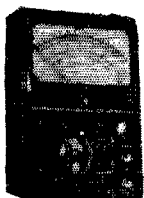
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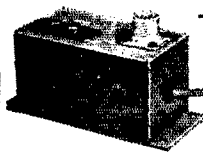
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Extremely accurate and sensitive. Single selector switch for all ranges. 3" rectangular meter with easy to read scale. 1% precision resistors; jeweled D'Arsonval microamp meter movement, completely plastic-shielded against magnetizing. Rugged metal case.

Ranges: AC-DC and output voltage: 0-5, 0-25, 0-100, 0-500, 0-1000 volts. DC current: 0-500  $\mu$ a, 0-25 MA, 0-500 MA. Resistance: 0-20K ohms, 0-2 megohms. Decibels: 0-20 db to +16db. Size: 3 1/2" x 5" x 1 1/2". Shipping weight 3 lbs. Complete with test lead and batteries.

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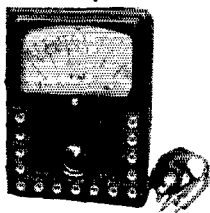
TR Switch

Automatic change-over from receiver to transmitter without coils, variable capacitors, or tuning adjustments. Peak power handling capacity of 1000 watts completely eliminates the difficulties encountered with heavy-duty antenna change-over relays. Range of 1.7 thru 32 megacycles. Insertion loss to receiver never exceeds one S-Unit.

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Rugged and compact. Large, easy to read scale on full 3" rectangular meter. 1% precision resistors; jeweled D'Arsonval microamp meter movement. Ranges: AC-DC and output volts: 0-10, 0-50, 0-250, 0-500, 0-1000 volts. DC current: 0-1, 0-250 MA. Resistance: 0-10K and 0-100K ohms. Size: 4 3/4" x 3 1/2" x 1 1/2". Complete with test lead and batteries.



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has a 510-ft. rhombic that works fine on 40, 20, and 10 meters. Bill also has a 300-watt r.f. deck for 2 meters. PEQ is working on antennas and exhales with a Viking transmitter. PMO works 75 meters in the early morning. AIR works out with his 16 watts and MARS gear. WYA is working on radio and television antennas for the winter season. ZQA is working on a high-power rig. HUO has a new receiver and is working plenty of DX on 20 and 40 meters using a vertical. Traffic: W4RRH 38, FDF 18, EJP 14, GHS 8, W9QNR/4 6, W4ACY 2.

**SOUTH CAROLINA**—SCM, T. Hunter Wood, W4ANK—GLU sends a nice report of activities in Rock Hill and advises that the emergency set-up includes 8 mobiles, K4DFW, W4CXO, GQV, GLU, JCP, UFP, UMW and ZPB. GLU and ZPB being a father-and-son team. ERG has a new mobile rig. K4AVU is very active on all bands with a Harvey-Wells. UJK is active on 40 meters. VJI and HMG are on 2 meters in Columbia. GQE, IZD, and SWT are on 2 meters in Charleston. HDR is handling a lot of traffic on phone. DYG is active on 75 and 10 meters. TSU has completed his kw, and should be heard soon. LXX and FGX are on 20-meter c.w. AUL is getting out well with his 500-watter. Route Manager AKC reports the following reported into SCN during November with times QNT indicated: AKC 22, ANK 12, K4ADQ 2, CHD 16, KYN 11, 9JBN/4 2, YAA 14, QCC 11, SOY 12, ITNO/4 2, K4AVU 11, SOF 6, RPV 6, DYP 13, IUB 1, KTI 1, AWY 6, UUD 1, ZRH 1, TTG 1, PED 2, HAP 6, UNO 1, and K4EKG 5. Fifty-nine messages were handled on the C.W. Net. K4CUB has left Charleston for KL7 country. #ZOP is being transferred to Germany. ANK received a reported accuracy of 3 parts per million in the last Frequency Measurement Test. Traffic: (Nov.) W4HDR 124, AKC 121, FFH 117, ANK 105, ZIZ 74, YAA 20, DYP 12, FM 12. (Oct.) W4HDR 160.

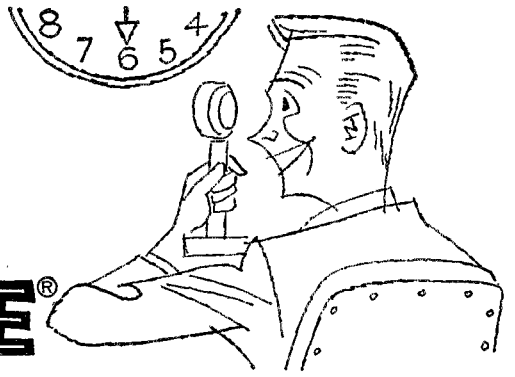
**VIRGINIA**—SCM, John Carl Moran, W4KX—SEC: RTV. Virginians again were well up in the forefront in the SS. KFC, in addition to making 1150 contacts in all 73 sections, reports a total of 2459 QSOs in October and November, including WAS and DXCC. IA missed only VE8, while JUJ failed to snag Utah. IA, who teathed on a coherer, finally is bucking for DXCC and has 81 confirmed of 115 worked. YZC, back with a rock-crusher, is out for Vic's laurels. ZM reports participating in his first SS in 40 years of hamming. BLR and CXQ snagged 30-w.p.m. stickers for their CP certificates. The Petersburg ARC put on an intensive "get your license" drive, resulting in several new tickets by K4s CEC, CMC, CDM, DEA, DWS, DVC, EMP, EUS, GBK, and GPW, as well as two teen-age YLs, KNs EUU and EUW. A new club has been organized at Wakefield High School with 15 members, including officers VQZ, K4AJA, and KN4BHX. Eleven fellow hams helped OUF put up a windmill tower, a most appropriate ham antenna support. LW, limited to occasional hamming between sea trips, reports VON is re-activated with K4CDK as manager. Diek also notes that a Virginia amateur, K4GFR, is communications officer for the Byrd Antarctic Expedition. BRF is catching up on hamming while recuperating from a month's rest in the hospital. K4ASU has been chasing DX on 20 meters, but again made BPL the hard way. FKP is trying a new "do it yourself" 10-meter beam. TYC/3 still is a VN old faithful from Washington. It looks like old times to see SHJ's sizable traffic total. Sea duty limits Hoppy's air time. Traffic: W4PFC 944, SHJ 229, K4ASU 203, W4BLR 129, YZC 88, K4DBC 81, W4CFV 43, FKP 38, YVG 36, FV 35, CGE 30, CZB 25, AAD 14, WBC 14, AQA 12, KFC 11, TYC/3 11, OFR 6, ZAI 4, APM 2.

**WEST VIRGINIA**—SCM, Albert H. Hix, W8PQQ—SEC: GEP. PAMs: FGL and GCZ. RMs: DFC, GBF, HZA, and JWX. The son of PNR, who is JDF, is now in the Navy. PNR has a new kw. rig. If any of you want to see an antenna that stretches from mountain to mountain go see PNR's layout. This section was well represented in the Sweepstakes. LSG has a kw. rig under construction. PQQ put up a three-element 10-meter beam and is finishing a kw. final for that band. UYR has been very active lately. BWK got a new car recently but still is active. BFG got his General Class ticket. KVO is operating portable at Greenbrier Military School. JBE has a new 8-40A receiver. 4SPG and WN4DJD visited the Princeton Club recently. PQQ visited 9VND and 9YFV while in Chicago. GCZ is planning a 15-meter beam. The Monroe Radio Club is a newly-formed club in this section. Members are WN8HNR, WN8VMM, TRT, TOB, WNSBLH (an XYL), WN8UJW (now away at school at V.P.L.), and WN8AWD (an XYL). The address is c/o W8TQB, Box 203, Union, W. Va. for those who might like to join. WNSDEY has an NC-300 on order. JWX will be getting married soon. NYH still is on the night shift but keeps up activity. Traffic: (Nov.) W8HZA 84, PZT 68, GBF 49, FJI 49, NYH 19, BWK 12, UYR 9, JWX 8, PQQ 4. (Oct.) W8GBF 68, JWX 54. (Sept.) W8GBF 28.

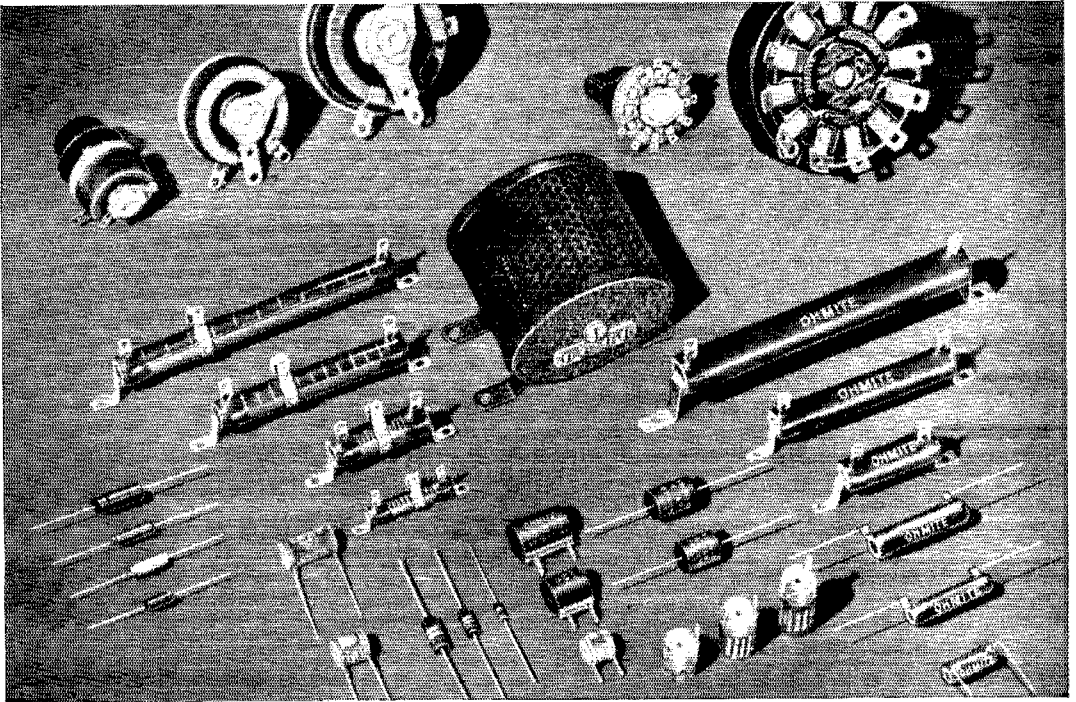
## ROCKY MOUNTAIN DIVISION

**COLORADO**—Acting SCM, Carl L. Smith, W6BWJ—SEC: MMT. RMs: KQD and MYX. PAM: IUF. The newly-elected SCM for Colorado is James Simpson, HEM1, (Continued on page 102)

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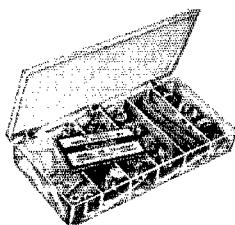
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825 South Weber St., Colorado Springs, Colo. Please send Jim all reports and letters concerning ARRL news and business. The Pueblo Radio Club bulletin has news of nine mobiles who participated in the Simulated Emergency Tests. BEZ is working on a kw. rig, and UNM has moved to Pueblo. MYX has been on vacation from K9WBB, returning in December. The net reporter for Colorado nets is TNK, of Cortez. IA has been studying unorthodox behavior of impedance bridges in his multi-band antenna coupler. TVI found some hard-to-locate troubles in his DX-100 and is going strong again. His stand-by Heath AT-1 was used to fill skeels while the bugs were being corrected. Net activities show the CWN going strong with 292 stations reported in 20 sessions. HNN had 398 check-ins and handled 262 messages in 25 sessions. CSSN shows 70 reporting and handling 74 messages in 15 sessions. K9FAM is back on the air as one of the kingpins in net coverage for Colorado. BPL for November was made by W9WGB, K9WBB, and W9KQD. Traffic: (Nov.) K9WBB 1023, W9KQD 780, WGB 216, EVL 81, K9FAM 66, W9NVU 61, YMP 61, IA 44, AGU 39, HOP 28, DRY 25, QXM 24, TNK 18, TVB 16, NWJ 15, LNH 12, SGG 7, SKK 6, SWK 5, VPE 4. (Oct.) W9IA 50.

UTAH—SCM, Floyd L. Hinshaw, W7UTM—The Ogden Club election shows the following results: IQE, pres.; ABI, vice-pres.; NHQ, secy.-treas.; and VHS and NAY, directors. Congratulations to all ZNZ and the gang still are keeping 3935 kc. heated up every morning. QDJ is trying horizontal polarization on 2 meters, but finds it does not give the coverage that vertical polarization has given in the past. The UARC round table is meeting on 3735 kc. for Novices and on 3830 kc. for phone stations. Net control stations are on both frequencies nightly. Look on these frequencies for that Utah contact for WAS. The Utah CARS Net is scheduling an additional session Wed. on 3700 kc. to participate in Utah c.d. drills at 7:30 p.m. MST. Traffic: W7UTM 4.

**SOUTHEASTERN DIVISION**

ALABAMA—SCM, Joe A. Shannon, W4MI—SEC: TKL, RM: KIX, PAM: WOG. Congratulations to the following new appointees: RYY, ZSH, SKS, and RLG as ORSs; K4AOZ as OPS; HKK as OO Class 1. Excellent scores were made in the last F.M.T. by HKK, YNG and FSA. OES appointments are going begging for lack of interest among the v.h.f. devotees. HKK recently was approved as State RACES Radio Officer. NZM scored 3750 points in the WV DX Contest. BMM is proudly displaying his first SP card! New officers of the North Alabama Hamfest Assn. are YXW, Pres.; BJJ, 1st vice-pres.; PKA, 2nd vice-pres.; DGN, secy.; YRO, treas. Anniston Club proxy GCV reports that the Club now has 30 members with 15 prospects attending code and theory classes. VIDL is the new proxy of the Alabama Federation of the Blind. Welcome to KN4EWM, in Montgomery. She is 12 years old and the daughter of EWT. Another newcomer is KN4GHQ in Anniston. K4ANB received General Class license and joined up with AENB. K4FDY reports there are five operators at the station. ZSQ is working on a 2-meter rig and has a new 10-meter beam on a 40-foot tower. He is the new net manager of AENB. JEU is sporting a new skywire and UK has a new shack! Traffic: (Nov.) W4UHA 719, K4FDY 556, W4YRO 101, KTX 96, RLG 67, ZSQ 63, WOG 62, ZSH 52, DTT 44, AVX 38, EVD 30, K4AOZ 29, W4TEL 28, TXO 20, DGN 11, OAO 11, K4AJG 8, W4EWB 5, K4BSV 3, W4PWS 2. (Oct.) W4HKK 100, NZM 16, BMM 8, WAZ 8, K4IDSJ 4.

EASTERN FLORIDA—SCM, Arthur H. Benzee, W4FPF—SEC: IYT, Ft. Lauderdale; New officers of BARC are BMR, pres.; AHZ, vice-pres.; LRM, secy.; EUV, treas.; FNR, act. mgr.; KN4CVP, sgt. at arms. PJJ made 273 contacts in 71 sections in the SE. Daytona Beach: The CD Radio Club has been formed with MSP in charge. DKY now is on 15 meters with a new Johnson. KN4EEK has just received his ticket. FSS spent several months "up north" but is back with us, Lake County. The following are now on 8 meters: ADB, IQJ, AYV, YAN, HZU, FE, and K4AAJ. The local frequency for the County is 50.16 Mc. Ft. Myers: SMK is back, after two years with the Signal Corps, with a DX-100 and will resume at the U. of F. next semester. KFT is DXing on 15 meters. LX is on 20 meters with 500 watts and is copied consistently in Korea by SMK. Sorry to learn of the passing of HSZ. New ECs are NQW for Monroe county, YJE for Dade, and FDK for Manatee. The So. Miami Radio Club meets the 1st and 3rd Fri. K6J is president. DX-100s are in operation at BTM, LMG, and K4AHW. JO won DRO a WAS contact. AG is snagging more DX with the new 10-meter beam. K4ANW has a new SX-100. K4CEJ has dropped the "N." The XYL of IYT is now GGQ. General Class. AHW is working ZS and OQ5 stations with ground plane but will have a beam soon. Traffic: (Nov.) W4PJJ 524, WEO 238, WS 106, LAP 100, LMT 70, ZIR 54, FE 38, AHZ 30, YNM 27, BWR 26, RWM 25, PZT 22, IYT 19, KN4EVY 15, W4FSS 12, WEM 11, EHW 10. (Oct.) W4ZEB 326, WEO 130, ELS 102, LAP 62, YJE 36, AHZ 23, EHW 6. (Sept.) W4ELS 69, LAP 69.

(Continued on page 104)

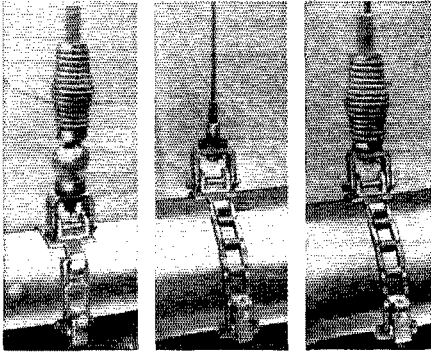


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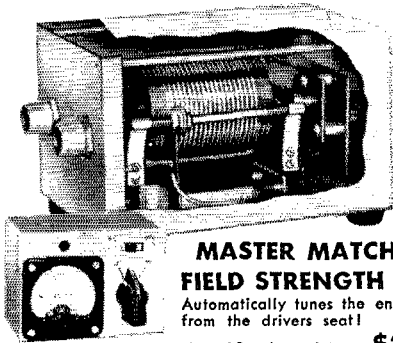
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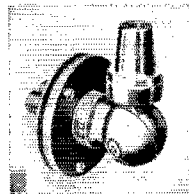
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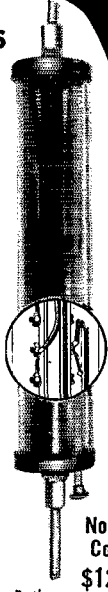
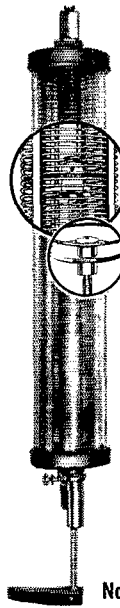
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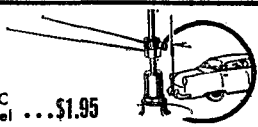
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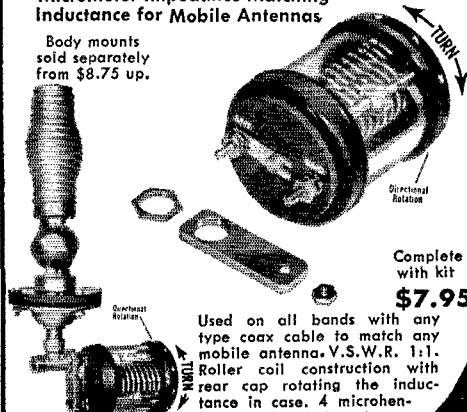
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**WESTERN FLORIDA** — SCM, Edward J. Collins, W4MS/RE — SEC: PLE, ECs: MFY and HIZ, CCY is looking for more audio now that he has r.f. AXP had a wonderful time in W-5-land. BGG says 15 meters is the only band. GMS has a new s.s.b. exciter. PAA is going after DX QSLs. K4AH is enjoying low power. YES is getting s.s.b. fever. K4AKP is a traffic expert. HJA has moved to Milton. HBK has a new 14-Mc. beam. KN4EEG is working hard for General Class. KN4ECP has the Adventurer going. MUX is hot on 15 meters. UCY is doing a swell job on 10 meters. BED is QRL "Porthole Radio." ZPN stays on 7 Mc. with VR. QK keeps tabs on the Hurricane Net. FHQ finds the slicer swell on c.w. LCF is after more power on 144 Mc. KN4ADY is after General Class. ROM sold out. QJ is threatening to get back on. CC still is getting parts for the gang. KHDD is sporting a General Class ticket. FDL is with the C.A.A. at Pensy. CQX is the spark plug at Crestview. CDF has a large time on 75 meters from Blountstown. ROX keeps Panama City on the map. MS is proud of his new 75A-4. DAO/DEF has been QRL the fish business. MEN was seen looking over parts in a local radio store. CLV is getting s.s.b. fever. GRO is QRL a harmonic. PQW is talking s.s.b. PLE would appreciate hearing from section members interested in emergency work. RZV has been checking in on the Daywood Net as usual. FAR has cured TVL. K4AGM wants his sked to be s.s.b. Hi. Traffic: K4AKP 370.

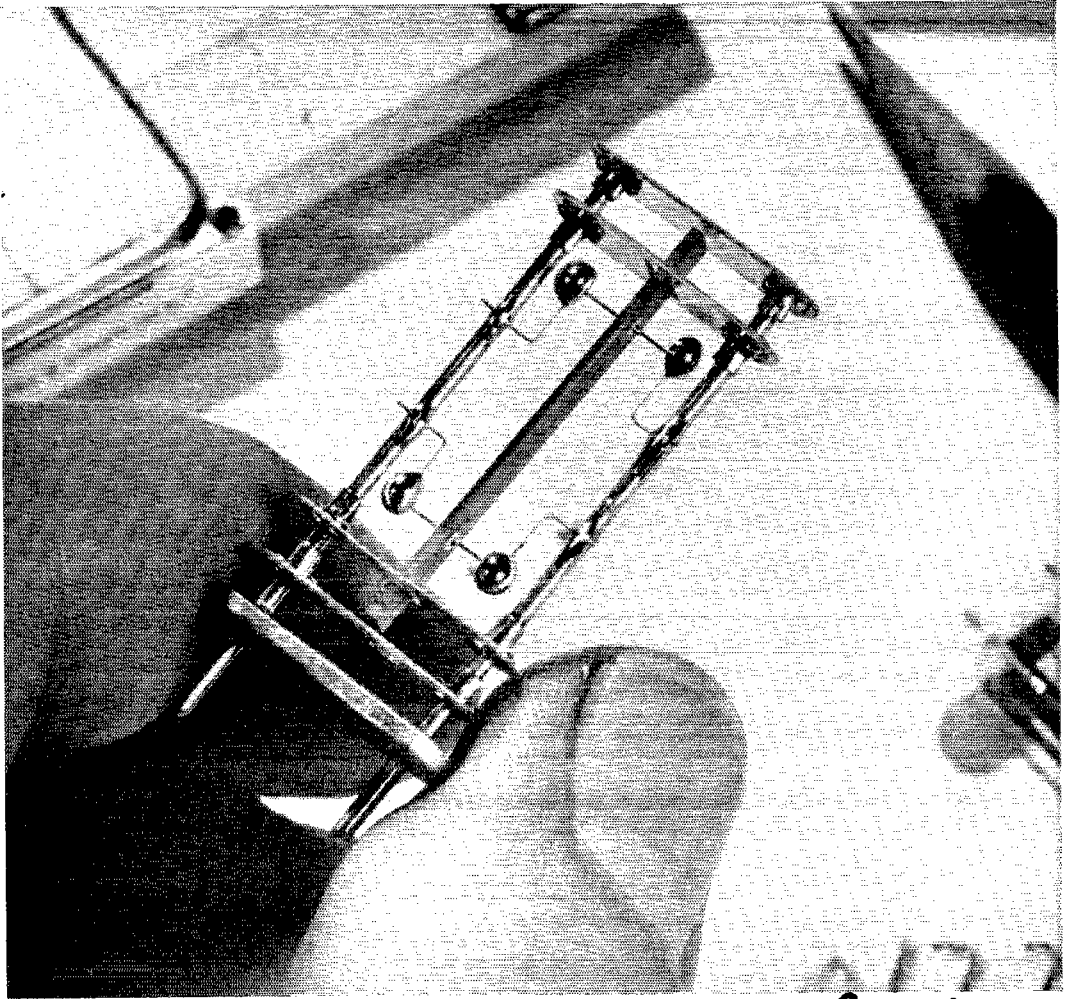
**GEORGIA** — SCM, George W. Parker, W4NS — SEC: YTO. PAMs: ACH and LXE. RMIs: MTS and PIM. Nets: Georgia Cracker Emergency Net meets on 3995 kc. Sun. at 0800, Tue. and Thurs. at 1830 EST; Georgia State Net (GSN) meets Mon. through Fri., 1900 EST on 3590 kc. We report with regret the loss of two appointees who have been very helpful and cooperative. CFJ has resigned as SEC because of personal reasons. He also has resigned as Asst. State Radio Officer of RACES and net control of the Cracker Net. YTO is our new SEC and we are sure that he will prove a good one. OCG, our RM and manager of GSN, has been transferred to Florida. He will be succeeded by PIM in both capacities. Other new appointees are YEK as OPS; DDY and BXV as ORSs. New General Class licensees in Atlanta are K4s CGT and GCF, the XYL and YL of ZD, and K4s GCL, GCK, and CZR, the XYLs of ZUF, MV, and CFJ. New officers of the Confederate Signal Corps are HYW, pres.; ORI, vice-pres.; CFN, secy.; DLE, treas.; and TJS, act. mgr. KN4DNI is now General Class. The Atlanta Radio Club held its annual Christmas Party on Dec. 2nd at BFOE 78 in Atlanta. Out-of-town guests included PAJ and his XYL from Reynolds. We missed BUD at the party. BXV has a new vertical antenna for 40 meters. LMG is back on the v.l.f. bands with a new 829 on 6 meters. FZO has a new 348 receiver. BWD is working DX. Traffic: (Nov.) W4OCG 333, DDY 216, PIM 188, HYW 57, HYV 56, ZDF 52, ZUF 52, BWD 26, MTS 28, NS 20, ZD 20, BXV 15, IMQ 10, FZO 8. (Oct.) W4OCG 298, HYW 40, HYV 39, MTS 30.

**CANAL ZONE** — SCM, Roger M. Howe, KZ5RM — VR has been accepted as a relay station for "Operation Deep Freeze." LC has been appointed ORS. W5DHA, ex-KZ5MD, paid us a visit at our last club meeting and gave us a very interesting account of himself and things around Jackson, Miss. DH had the gang over for an antenna-raising party and hit the air with dipoles on 10, 15, and 20 meters. GF, our QSL Manager, has returned from his Stateside vacation and is back on the air. PP took NCS on the net the other night and did a fine job for his first time out. TV is about to hit the Canal Zone and the KZ5 gang already is brushing up on ways and means of keeping out of channels 8 and 10. Frank Kennedy has been issued KY. BE was hospitalized as the result of a heart attack, but is coming along as well as can be expected. Traffic: KZ5VR 84, DG 52, LB 22, BR 19, EP 18, RM 14, LC 4.

## SOUTHWESTERN DIVISION

**LOS ANGELES** — SCM, William J. Schuch, W6CMN — Asst. SCM: Albert F. Hill, jr., 6JQB. RMIs: K6DQA and W6BITG. PAM: PIB. The 2X4 Net is reaching out for more traffic by sending liaison to c.w. nets. K6GUZ makes WAS and WAC. K6DDO has a new 7-Mc. vertical and is working lots of skeds. ORS reports 220 Mc. is picking up. AM skeds the Yacht YASME on its world trip. K6OIZ made WAS in the SS. K6BFC raised his DX count to over 90 while laid up with flu. K6LYF is working traffic on SCN and MTN. LPV is DXing these days. The section will miss MBW, who has moved to Arizona. K6OIZ and DNX teamed up for the SS and made 70,000 points. BUK now has the 21-Mc. beam up. UED is rebuilding the whole station. LVQ is doing an FB EC job in Whittier. NJU has a new kw. rig. K6GUZ was up to 400 contacts and then his receiver blew up. Traffic seems to be picking up again; five Los Angeles section men made BPL in November. A new General Class licensee is K6GCY in Riverside, on 7-Mc. phone and c.w. JQR turned in a nice report. K6LRY was host at the Rio Hondo Radio Club November meeting. KGCHN is building a TV transmitter. Congratulations to all the gang on the FB job done on Field Day. As so many of the gang are asking for a section QSO Party, we will have one in May or June

(Continued on page 106)



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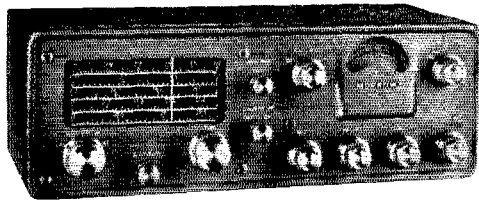


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if no other contests conflict. Watch QST for an announcement. USY and BHG are both very QRL on SCN and need help. K6EXQ is working toward 28-Mc. WAS. K6DQA is very QRL his job and running SCN. Much luck in the New Year. Traffic: (Nov.) W6DDE 629, K6HOV 620, FCY 512, W6LYG 414, BHG 402, GYH 353, USY 291, CGX 251, K6DQA 111, W6JQB 83, CK 82, K6KCI 59, W6CAK 55, K6COP 54, KN6MON 28, K6BWD 18, DDO 11, W6ORS 11, AM 8, K6IQF 8, OIZ 8, GUZ 7, W6WT 7, K6BFC 6, CBO 2, FLX 2, LYF 2, W6LPV 1, (Oct.) W6GUX 33, KN6MON 33.

**ARIZONA**—SCM, Albert H. Steinbrecher, W7LVR—Asst. SCMs: Kenneth P. Cole, 7QZH, and Dr. John A. Stewart, 7SX. PAM: KOY. RM: PKW. SEC: VRB. Arizona Phone Net: Tue. and Thurs. 7 p.m. MST, 3665 kc. Arizona C.W. Net: Tue. and Thurs. 8 p.m. MST, 3690 kc., also Mon. through Fri. 4 p.m. MST 7115 kc. In connection with the c.w. nets, your SCM is very happy to announce the appointment of PKW, as Route Manager for Arizona. John intends to QSP with the New Mexico Net and six other nets around the country. All interested in joining these nets, please contact John and give him full cooperation. Arizona needs c.w. nets badly, and here is our opportunity to obtain same. The AARC of Phoenix now has a Charles Middleton Memorial Station with the call IO. TPG is the trustee. Phoenix had a picnic at South Mountain Park with sixty in attendance. RTP got his Extra Class license. QFQ is back on the air. This is the last call for license-plate applications. Contact any Phoenix station for information. Your SCM is starting a "wanted" and "for sale" list of ham gear and parts. If you have anything for sale or want anything, write a postal. Traffic: W7QFQ 118, LVR 15.

**SAN DIEGO**—SCM, Don Stansifer, W6LRU—The entire San Diego section misses ODR, who was killed with his wife as they crossed a street in San Diego. Bob was past-chairman of the San Diego Council of Radio Organizations and a member of the Helix Club. K6EC is now on OO. The Coronado Club has instituted a novel idea; each member must give a 20-minute talk on some phase of ham radio at a meeting. The December meeting of the San Diego DX Club was held at the home of SEG. Three members of the Rohr Club are now Technician Class, K6HLL, H.X.K. and HLT. K6BGX is home from the hospital recuperating. KN6QW is now active in Costa Mesa on 2 meters. DEY and BQP have 600 watts of single sideband for 2 meters. K6GEI and W6ECP are building a kw. linear amplifier up Encinitas way. K6MUH is a new Technician Class licensee in La Mesa. New officers of the San Diego Council of Radio Organizations for 1956 are LRU, chairman; K6DKM, vice-chairman; W6KSI, secy.; and CAE, treas. The Brawley Amateur Radio Club has applied for affiliation with ARRL. It is quite a live-wire group in that area. Officers are UGM, pres.; QPK, secy.-treas. The various AREC groups in the section did an admirable bit of service during the pre-holiday season, utilizing their mobile facilities for annual parades. KN6PGO is a new Novice in the Pt. Loma Area on 7 Mc. HU, in Anaheim, is now an ORS. IAB and YDK continue to handle large amounts of traffic each month. Congratulations to the Helix Club on ranking second in the nation in the four-transmitter class in the 1955 Field Day. Traffic: (Nov.) W6IAB 2572, YDK 1665, K6DBG 50, W6BKZ 16, (Oct.) W6YDK 1814.

**SANTA BARBARA**—SCM, William B. Farwell, W6QIW—New General Class licensees are K6CVR and K6JRT. The Santa Barbara v.h.f. gang will form a new traffic net on 2 meters, and will install a repeater station on Santa Ynez Peak. Such a repeater would complete the chain of 144-Mc. communications between San Diego and San Francisco. K6HTX is active on 75 meters. K6ATX has a chance to swap a speed graphic for a Supreme transmitter. NKT and ENR are now OO Class I. The SLO Radio Club sponsored two contests in Nov., 1 to contact as many California stations and the other as many states as possible in one month. NKT has his 200-watt rig going again with a new antenna. BNZ and OTO were heard going full swing in the SS. New officers of the Ventura Club are Don Doss, pres.; Bill Farwell, vice-pres.; Diane Smithers, secy.; Geo. Sadorus, treas. The Oxnard Club is moving to new quarters. Santa Barbara Club will hold an election. Traffic: K6NBI 102, KPU 14, W6QIW 6, FYW 4.

### WEST GULF DIVISION

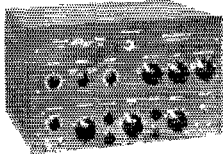
**NORTHERN TEXAS**—SCM, Cecil C. Cammack, W5RRM—SEC: PYI. PAMS: FFP and IWQ. RM: PCN. Since April K5AQD has maintained almost daily contacts with Peru on 20 and 15 meters; incentive—a brother in the Amazon Jungle Area. West Texas newspapers complimented WBY, NFO, SMK, YPI. RP, NEW, ILA, TWO, BFK, YIB, and PML for gathering Canadian River Municipal Water Authority election returns by 8:15 p.m. for publication. The Wichita Falls ARC has a new club house. JQD reports the South Plains ARC 10-meter Net has been reactivated on 29 Mc. at 1900 Fri. PBM reports SNX and KN5BDX spoke to the Terry County ARC and visitors on 2-meter operation and gave demonstrations. AVA has two 6-meter transceivers under construction. SFA is aeronautical mobile on 75 meters with a 61.6, OYF, YPI.

(Continued on page 108)

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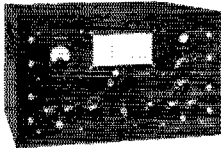
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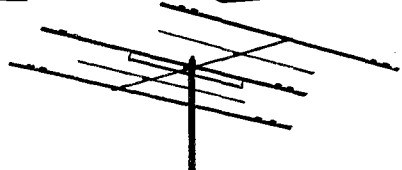
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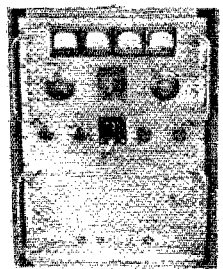
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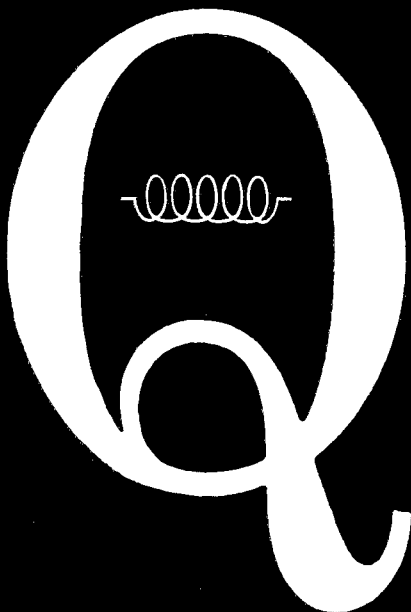
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and a mobile relayed Stamford-Burkburnett football scores for KSEY. Seymour. RHP reports N/TE Net average attendance for November was 77 per cent. ZTB and ESR are the new NCS and ANCS for the NTE Net. ZTG has a new Q-Multiplier. The East Texas ARC had a steak dinner at IYJ's, near Chicken Feather. LTB is now mobile. FJB and FIT each have a new DX-100. FIS is s.s.b. with 10 watts. FIP is building a 15-meter fishing-pole beam. The Panhandle ARC's new call is K5CQF. The club is running a series of code practice sessions with VUW, act. dir., cracking the whip. COQ has moved to Amarillo. The Abilene ARC assisted the Abilene Kiwanis Club in conducting a Telethon on KRBC-TV for the benefit of the crippled children's home, collecting over \$12,000.00 net. Traffic: W5UBW 330, BTH 265, PNV 247, KPB 221, AHC 200, BAT 184, K5AQD 115, W5BKH 106, PCN 62, DYU 31, TFP 27, CF 25, FCX 22, RP 22, YPI 19, ASA 18, PAK 16, ZTG 16, OCV 13, RRM 11, GHU 2.

**OKLAHOMA** — SCM, Dr. Will G. Crandall, W5RST — Asst. SCM: Ewing Canady, 5GIQ. SEC: KY, RM: GVS. PAMs: PML, SVR, and ROZ. The new officers of the Aeronautical Center Amateur Radio Club are RDI, pres.; VRV, vice-pres.; EHC, secy.-treas.; INQ, act. mgr.; BKN, asst. act. mgr. The two young McAlester YLs, ILO and IOZ, and K5BNQ from Broken Arrow attended the anniversary party of the Texas YL Roundup Net in Dallas on Nov. 19. Oklahoma hams are honored by having one of their number, PIG of Seminole, selected as a Rhodes Scholar. It would be interesting to know how many hams became Rhodes Scholars and how many Rhodes Scholars became hams. It is interesting to note that s.s.b. stations are passing traffic on regular phone nets without difficulty and there are more contacts heard between a.m. and s.s.b. stations, which is significant. Traffic: K5AOV 254, W5MRK 86, FEC 64, MFX 40, QAC 36, PNG 29, ADC 23, CFG 13, PML 13, SWJ 13, JXM 12, REC 11, SVR 11, TNW 10, RST 9, GXH 4, UCT 3.

**SOUTHERN TEXAS** — SCM, Morley Bartholomew, W5QDX — SEC: QEM. Those of you who are active in the NTO Traffic Net can get your Section Net certificate from TFP, APP and his XYL visited in Austin the first weekend of December. K5AWL is on with a Harvey Wells and a long-wire antenna. PRO still is fighting bugs in his 813 rig. KN5COU is a new ham in Corpus Christi. Ed has gotten twenty states after one month's operation with 65 watts. JXP assisted him in preparing for his license exam. Zone 4 members of STEN are moving to 7275 kc. after Sun. drills and are enjoying a round-table QSO together. CWK has four 837s driven by a 10B running 400 watts s.s.b. on 75 meters. Your SEC, QEM, has been successful in securing 3860 kc. as a clear frequency in case of emergency. A letter from Mr. P. H. Herndon, jr., FCC Regional Manager, granted this request. LUU has been to Louisiana on a business trip. VPQ made a trip to Carlsbad Cavern with some of the members of the Spelunkers Club. BE and FND have joined the San Antonio RC transmitters hunters. EDZ is sporting a new NC-300, CQY has a side-band slicer on his HRO. The San Antonio RC enjoyed a Christmas Party and dance at Wolf's Inn Dec. 16th. The Austin ARC is making plans for code and theory classes. Don't be surprised if you hear the Dallas Chess Club vs. the San Antonio Chess Club on 75 meters. THU has his 20-meter beam working. Traffic: W5ZWR 34.

**NEW MEXICO** — SCM, Einar H. Morterud, W5FPB — PAM: GQA. The NMEPN meets on 3838 kc. Tue. and Thurs. at 1800 MST, Sun. at 0730; the NM Breakfast Club meets on 3838 kc. daily except Sun. at 0700-0800 MST; the NM C.W. Net meets on 3633 kc. daily at 1900 MST. Thanks to GQA for accepting the appointment as PAM. We still need an RM and an SEC, as well as several OBSs. K5DAA, AI, and DAB, Ruth, are on from Carlsbad. NXF has his WAC certificate. GCI has an AT-1 with VFO and modulator. DWT has had three articles published in two months; he just got his final repaired from one contest and it blew up again in another contest. CXC, while mobile 27 miles from Roswell, came upon an auto accident and summoned ambulance and police through fixed stations. PXA, while mobile in the outskirts of Albuquerque, also came upon an accident and summoned ambulance and police through a fixed station. ROH has a vertical antenna. Will the secretary of each of the section's radio clubs PLEASE send me news items the first of each month so that there will be some news other than that from Albuquerque. Traffic: (Nov.) W5CEE 30, DWT 19, K5FEF 14, W5UAR 11, BZB 9, GQA 8, TBP 8, ZU 4, FPB 3, BIH 2. (Oct.) K5FHU 53.

## CANADIAN DIVISION

**MARITIME** — SCM, Douglas C. Johnson, VE1OM — Asst. SCMs: Fritz A. Webb, 1DB, Aaron D. Solomon, 1OC. SEC: RR. A new appointee is ZM as EC for Charlottetown. C.w. operators are urged to use 3535 kc. as their hangout. This frequency will be monitored at all times by VE1, VE2, and VE3 stations and should prove of great value for emergencies, traffic, and ragchewing within Eastern Canada. HQ, TS, EF FN 1W, and FC received praise for their work with their mobiles in assisting the parking

(Continued on page 110)



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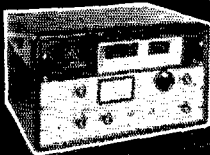
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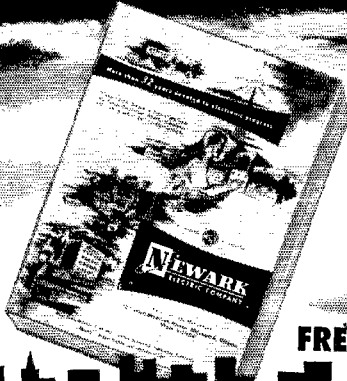
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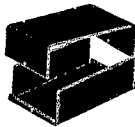
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officials at the St. John Exhibition. FH and his CB Emergency Net did a fine job on Exercise "SET" Oct. 15th. This test run helped them when they were called into action during the storm of Nov. 20th and also in the rescue of the crew from the Kismet II. WF, VN, SI, and VC are sporting DX-100 Heathkits. WK is back on the air from a new QTH. The XYLs of the Glace Bay gang are working for their Class A tickets. YV now is located in Dartmouth. AM and KZ have weekly skeeds with VE8SP at Nott Island. OC, XD, PZ, ZF, ME, and FH handled traffic on Nov. 21st for CNT, MT, and T during the blizzard clean-up period. VO6I is back on the air with his Viking II on 20 and 75 meters. VO6U is working 10, 15, 20, and 75 meters. 1QM is putting up a new antenna for 75 meters. The Maritime Net is going great guns on 3750 kc. seven nights a week. This is FQ pinch-hitting for your SCAM, who is in Toronto at this writing. Traffic: VE1FQ 281. AO 175. VO6U 90. VE1AY 75. UT 68. PH 64. VO6AH 49. VE1OM 47. ME 22. YB 9. KZ 8. BN 4. DB 4.

**ONTARIO** — SCAM, G. Eric Farquhar, VE3IA — It is with a heavy heart that we record the untimely passing of three fine people and offer sincerest condolences to KM on the loss of his mother, a lovely lady who behind the scenes did much for ham radio. We can recall with pleasure the early days of the Hamilton Amateur Radio Club, when it held its early meetings in her house and she always tended to the wants of the inner man. To the families of BSQ, who was a valued member of the Quinte Radio Club in Belleville, and BUS, well known for his fine personality and operating ability in Lockerby, we also extend condolences. The losing of these outstanding persons makes the writing up of this report most difficult. DN is getting good results on 15 meters using a rotary dipole. BRI is heard mobiling from numerous places in the section. He sure gets around. DSM won the first certificate awarded by Nortown in the "Worked all Nortown" contest. Events of this type go far in encouraging club activity. BJV, interested in photography, is rebuilding his rig between shots. Pictures, that is! Mark your calendars for Mar. 9th through 17th. That is when Nortown will operate at the Sportsman's Show in the Toronto Coliseum. NG will be coordinator. CJ, ARF, WT, RG, and NG were heard passing traffic relative to their deer-hunting activities. On the London Club's agenda recently was the showing of Field Day slides by George Ross and a newly-completed VFO by DDE. Contacts of three miles distance with transistor transmitters have been achieved by CAB and AAS. Traffic: VE3VZ 197. NG 72. DPO 39. BUR 37. NO 35. BZB 27. TO 27. AJR 17. AUU 13. PH 8. APL 6.

**QUEBEC** — SCM, Gordon A. Lynn, VE2GL — NK is getting the cobwebs out of the rig preparatory to getting on the air after a long absence. IB has been posted to Germany and has taken his rig with him. AFC is active on 15 meters keeping skeeds with VPBYB, whose daughter works in Quebec City. AFC uses an NC-98 and a Viking Kanzer. EO is moving to Fort Wayne, where he expects to operate portable W9. ATD is back on 20- and 15-meter phone with 125 watts. ADX, the South Shore Club station, skeeds the Ontario Phone Net at 1900 hours on Tue. and conducts code classes every Tue. night. KG reports good 2-meter results, contacting W2CFY, Malone, N. Y., and other stations in Maine, Vermont, and New York. YU reports most of his operation in November was in the SS Contest, where he made 414 contacts in 69 sections for 71,022 points! The St. Maurice Valley AREC has acquired a semi-trailer on which they plan to put a mobile unit. EC, AEM, KJ, UB, and AOB sked daily at 0830, 1300, and 1600 on 3690 kc. CA reports work is interfering with operating. Phyl worked a few VE8s and some DX lately. FL reports that because of poor receiving conditions during the daylight in his part of the country activity is limited. The Northland Net now meets twice weekly at 1915 on 3755 kc. Wed. and Fri. The VE2 gang extends congratulations to BE on his reelection to the post of Canadian Director. Traffic: VE2DR 104. EC 33. CA 32. ATQ 7. FL 7. LM 7.

**ALBERTA** — SCM, Sydney T. Jones, VE6MJ — PAM: OD, RM: XG. Congratulations to EO on his election to the post of Vice-Director of the Canadian Division. NX is the new EC for the Edmonton Area. HM has had a banner month in traffic to the north. FB is back on 3.8-Mc. phone after an absence of several months. The Lethbridge AREC holds practice sessions on Sun. mornings on 3740 kc. WC reports the rebuilding is going very slowly. YE holds forth with "Ye Swap and Shop" on Wed. evenings after the net. The Calgary AREC gang was very active during a recent community project. EA, WO, KC, NAD, and MJ are about ready for 144-Mc. operation. As well as being an active member of the Alberta Phone Net, 7HD finds time to play with hi fi. CP is leaving Edmonton for Bogota, South America. All the very best, George. Look for us on 21 Mc. Traffic: VE6HM 224. YE 33. OD 23. LZ 5. VE7HD 1.

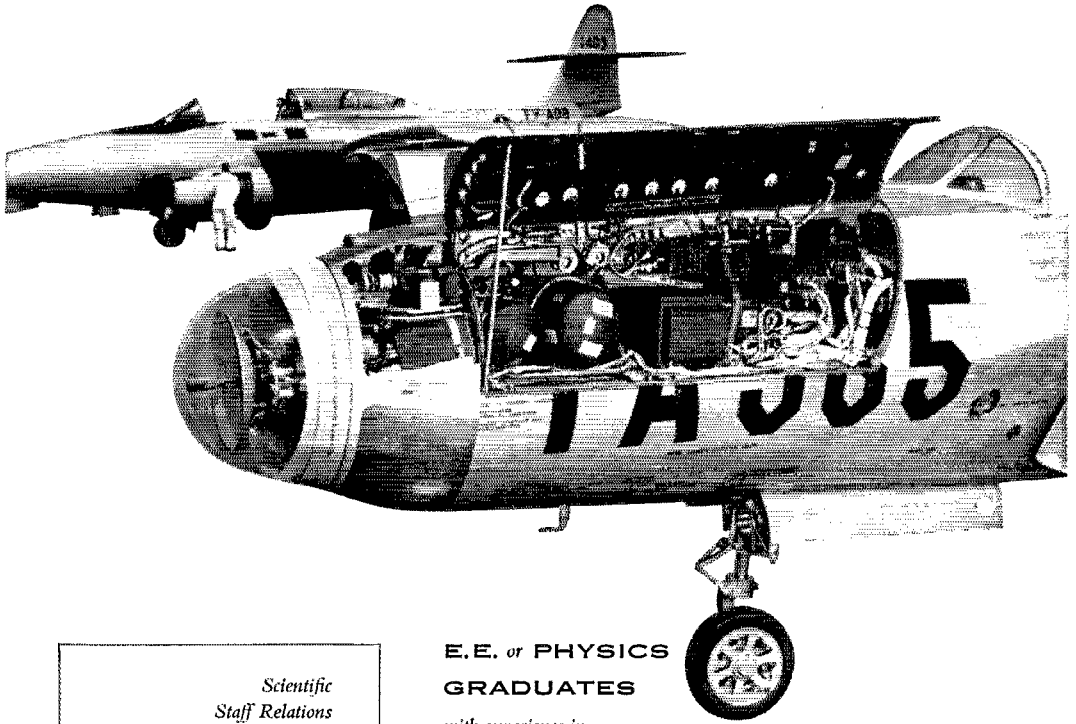
**BRITISH COLUMBIA** — SCM, Peter M. McIntyre, VE7JT — SEC: DH. The longest reports received are those from XY via the Dawson Creek Amateur's Grid Leak every three weeks. They are going ahead with a training program which at the moment has twenty prospective hams in it. The northern section will have more hams than snowflakes if the Dawson Creek amateurs can do it. I suppose

(Continued on page 112)



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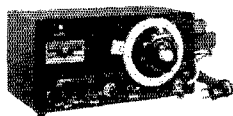
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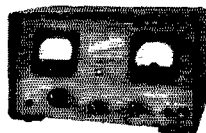
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when you read this you will have been able to admire all the new gear you got under the Christmas tree. The Vancouver gang had a meeting of mobiles and out of a possible 39 amateurs of known mobile status 23 turned out. ZF and his XYL had a close call driving over the Hope-Princeton Highway. We hope by now that Verona is well on the way to complete recovery. Just a reminder to all the readers that in your amateur regulations there is a difference between handling traffic and commercial significant traffic. If you haven't got the regs, a call at your R.L.'s office will enable you to obtain a copy. I think it would be a good idea if we all got one and read it once in a while. It would save receiving notices from D.O.T. with embarrassing contents. Also, remember we have to look after ourselves to some extent and nobody wants to put his license in jeopardy because of ignorance of the regs. Traffic: VE7ASR 81, DH 39, ZV 32, AUF 31, JT 30, XY 30, QC 23, FS 10, AIO 8.

**SASKATCHEWAN** — SCM, Harold R. Horn, VE5HR — The Hamfest this year will be sponsored by the Regina Club and plans are now under way for the affair. BZ is kept busy with Swap and Shop. CW is building a Panadaptor. HW visited VE7-Land and was in on the flood emergency on the Vancouver North Shore. I would like to congratulate the VE7 SEC and SCM for the efficient way the emergency work was handled. XX was a Saskatoon visitor. 7RZ (ex-5DW) and his XYL send their 73 to the VE5 section. CD is a new civil defense station at Saskatoon. Let's have some news for this column, fellows, please. It cannot be made up unless you let us know what you are doing. Traffic: (Nov.) VE5LM 61, BF 4, BZ 4, GO 2, VL 2, LJ 1, (Oct.) VE5CW 60, LM 50, BZ 25, RE 18, GX 11, BF 10, DD 8, CB 6, GO 2, HJ 2, LJ 2, PJ 2, RG 2, QL 1.

### Ash-Tray Mobile

(Continued from page 29)

#### Modulator

The modulator, whose circuit is shown in Fig. 2, is built as a separate unit on a 4 × 6 × 2-inch chassis tucked up out of sight under the dash. The 1955 Chevrolet has a 12-volt electrical system. For this reason, 5AQ5s were selected for the modulator, since their 600-ma. heaters are more suitable for series connection.<sup>1</sup> The paralleled heaters of the r.f. unit (total current 1.25 amperes) are connected in series with the paralleled heaters of the modulator (total current 1.2 amperes). This works out very nicely. In a 6-volt system, 6AQ5s would be substituted for the 5AQ5s and all heaters would be connected in parallel, of course.

Voltage for the carbon microphone is taken from the drop across a portion of the modulator cathode resistor. The microphone push-to-talk switch operates the dynamotor control relay as well as the change-over relay. A system of plugs and cables takes care of all connections between the transmitter, power supply and modulator.

Although this unit was designed for 75 meters, similar units may be made for other bands. The combination of this little transmitter and a single-band crystal-controlled converter<sup>2</sup> has resulted in an installation that has not only removed the objections of the XYL but has also provided the OM with a mobile rig that will stand up with the best of them.

<sup>1</sup> This results in somewhat high voltages for both groups of tubes. It would be safer to connect a 1.5-ohm resistor in series with the battery.—Ed.

<sup>2</sup> Deane, "Simple Crystal-Controlled Converters," *QST*, December, 1954.

Scherer, "The W2AEF Converter-ettes," *CQ*, May, 1953.

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## Antenna Tower

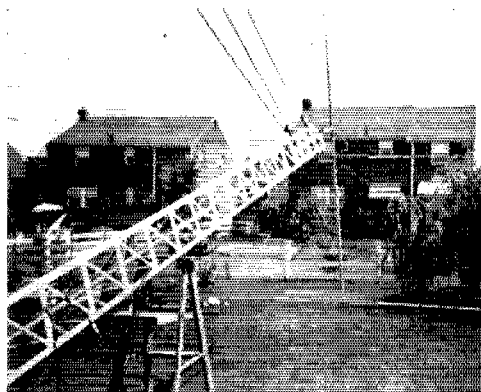
(Continued from page 22)

Any point on the hinge axis will do. Thus the guy wires will always be taut whether the tower is up, down, or in transit, and thereby remove any stress on the hinge pin that may occur with the tower being off dead center.

When the tower is fully up, brackets bolted into the wall near the second-floor window secure the towers. The bracket in itself prevents the tower from falling in any direction. In addition, the two guys and the rope acting as a guy provide an extra factor of safety. The tower is easily raised or flopped over into the back yard by pulling on the rope or paying it out from the shack window. A 5-foot stepladder appropriately placed in the back yard will stop the mast before the beam elements hit the ground.

It is of course necessary to eliminate any obstacles in the path of the moving guy wires or to place them at a point that avoids the possibility. Despite all planning, interference could not be avoided with the telephone lead-in wire. The local telephone company was glad to relocate the 'phone wires for the nominal fee of two dollars.

Two large screw eyes are driven into the center beam of the peak of the roof, to provide some factor of safety if one happens to pull out.

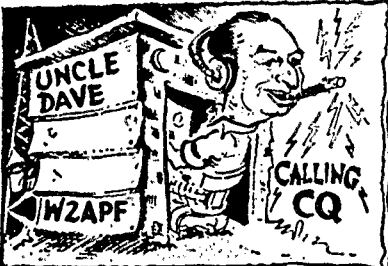


When the tower is lowered for beam adjustments, it rests on a ladder.

The guy wires are also duplicated for safety reasons. Anchors for the guy wires were provided by driving into the ground 6-foot long iron poker of the type used to tend to home furnaces. The rings on the ends of the poker provide convenient attachment points.

The pulleys are available through either Sears or Montgomery Ward, as is the 1/2-inch diameter weatherproofed rope, rated 2650 pounds tension. The tower is all aluminum, requiring no maintenance. The particular model I have is an Alproco, 11 inches on a side. It weighs one pound per foot, costs approximately \$1.30 per foot, and comes in 6-foot sections that are

(Continued on page 116)



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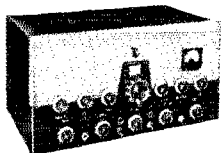
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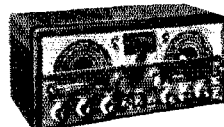
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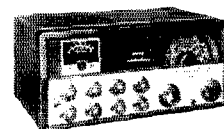
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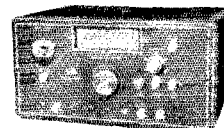
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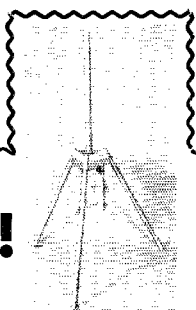
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easily bolted together. The manufacturer states the tower should be guyed every 24 feet.

For those who think that wind noises and tower creakings might be transmitted to the house frame through the wall bracket, I can report that there are none. The tower has now been through two hurricanes without any noticeable deflection or creaking. The coaxial line and control cables are taped to the side of the tower at 2- to 3-foot intervals to prevent slapping in strong winds. It is conceivable, however, that a full-sized beam used on the tower in conjunction with a frame house might generate some noise that could be transmitted through the wall.

Since putting up a 30-foot tower of the type described, it has been a major convenience in adjustment of the beam antenna. The beam has been up and down countless times in a matter of minutes, but now it's really peaked for performance.

## Crystal-Controlled VFO

*(Continued from page 37)*

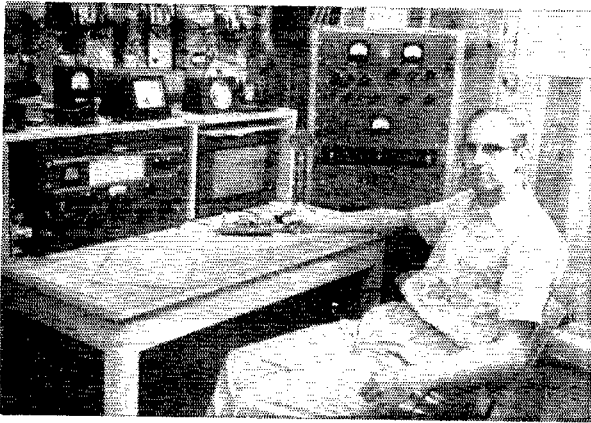
operation on the high-frequency side of 75 meters. Many different combinations of crystals may be possible, especially where the operator wants to end his difficulties with drift of the VFO or other problems arising from frequency shift. For the present, this seems to be the answer to single-sideband frequency control for fixed or mobile operators.

### Circuit Analysis

As can be seen in the schematic, the main tuning capacitor consists of four variable capacitor sections operating from a single dial with the rotor shaft grounded. This is used as the feed-back circuit for both tubes. Single capacitors can be used or two split stator units; however, the single four-gang miniature type used was found to be the smallest as well as the most flexible. It was taken from some surplus gear and has ceramic insulation and provision for grounding of the rotor sections. Everything else in the circuit is completely straightforward and should be no problem for anyone to assemble as well as put in operation. There is nothing tricky or difficult in the circuit. The output of the Pierce oscillator is fed directly into a 6U8 shielded tube. The tube elements are used in a cascade arrangement for bringing the output up to the desired power level.

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**World Radio's**  
**65-A GLOBE SCOUT**  
**\$9995**  
Or Pay Just \$10.00 Down  
and \$7.95 per month

It is quite a thrill for us when the D-X stations come back to us and compliment us on our modulation. The rig is a gem-dandy and needless to say, we are very, very happy with our installation. Of major importance to us in the purchase of the transmitter with the power in-put of the Globe King was the matter of TVI. Leo, we have yet to experience any TV eye and in our living room, directly above the Ham shack, we have our TV set and there is absolutely no interference of any kind, even though we do not utilize the TV antenna on our set.

Words cannot describe how happy we are with our Globe King and we never hesitate to recommend this wonderful piece of equipment to the many Hams with whom we talk throughout the world.

Very sincerely yours,

*Richard J. Curzon*

Richard Curzon

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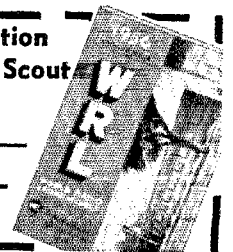
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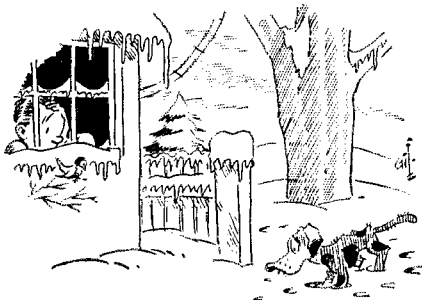
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## Crystal Holder

(Continued from page 44)

be such that it will spring back to its bent shape after being compressed.

The flexible electrode is placed on top of the crystal, under the copper plate that makes contact to the holder pin. The cover of the holder is drilled and tapped so that a screw can be used to vary the spacing between the electrode and the crystal. The screw should be at the center of the crystal to have the greatest effect on the oscillation frequency. The range of frequency shift will be from the point at which the center of the plate touches the crystal (low-frequency end) to where the spring tension is too loose to clamp the crystal firmly or the spacing between the electrode and the plate reaches a critical maximum. The activity will drop off quickly before oscillation stops at either end, but across the useful tuning range the output from the average oscillator is fairly uniform. There is little effect on the stability of oscillation except at the extreme limits.

If a fine-thread tap is used a considerable vernier effect can be achieved, but even standard threads make it possible to adjust the frequency fairly smoothly. Care should be used in increasing the pressure, as going too far can easily fracture thin plates. The more bend in the flexible electrode, the greater will be the frequency range. The screw can be turned with a tool, or fitted with a knob. Where exact tuning to a net frequency is all that is desired the adjustment may be made and then sealed with household cement. This also aids in sealing the holder against dust and moisture.

### How Much QSY?

Crystals found on the surplus market are finished in two contours. One is perfectly flat, or with only a very slight bevelling at the edges. The other is convex in shape, with a large amount of bevelling. A micrometer will show the difference easily. The convex type will give the greater frequency change in a variable-spacing holder of

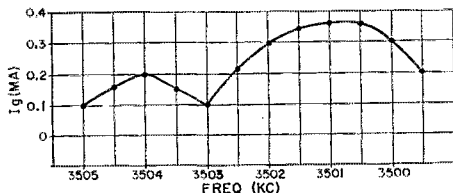


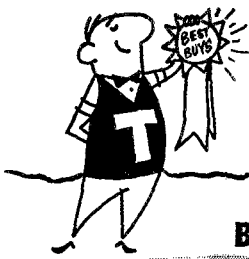
Fig. 2—Typical activity curve for a modified FT-243 crystal. Activity of crystals may vary considerably from this representative curve. The dip at 3503 kc. results from mechanical relationships in the holder. These may not be present on all modified units.

this type. A convex crystal of around 7 or 8 megacycles can be made to change as much as 8 kc. before the activity falls off below a usable value. A 3.5-Mc. crystal will show up to 7 kc. useful variation.<sup>1</sup>

A typical crystal activity curve is shown in Fig. 2. This was taken with a 6F6 oscillator, measur-

(Continued on page 120)





**MR. "T" Says**

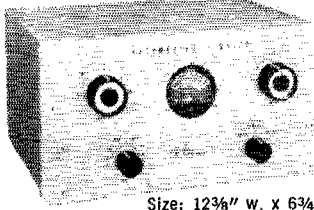
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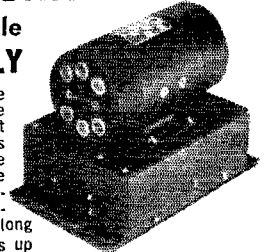
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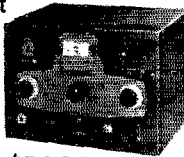


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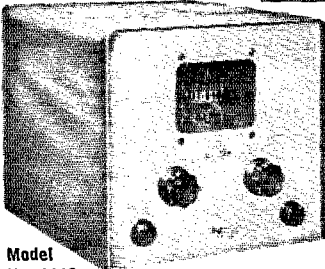


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**9 SECTION**

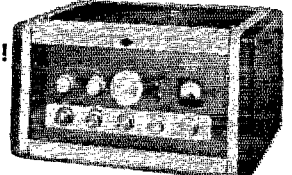
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ing the rectified current through a 50,000-ohm grid resistor. Plate voltage was 140, screen voltage 80. It should not be inferred that all crystals will follow this example; in fact, almost every crystal will show a slightly different curve. The peak activity and the frequency of oscillation at maximum pressure are usually close to the characteristics obtained with the crystal before it was modified.

If the crystal does not oscillate when first tried, turn the screw all the way up. Then turn it gradually downward until the crystal pops into oscillation. This will be approximately the high-frequency limit of oscillation. Check the frequency range by turning the screw until the oscillation stops. Do not go beyond this point as there will be danger of damaging the crystal.

This modification is not limited to the FT-243 type holder; however, larger crystals such as those found in FT-171, DC-34 and DC-35 holders will not show as much change as the smaller plates. In general, the smaller the plate, the greater the possible frequency range.

Don't be misled by the simplicity of this device. It does a smooth job of varying the frequency, while retaining the obvious advantages of crystal control. If the modification is made properly and the crystal is handled with care, your variable-frequency crystal should last for many years.

## Code Practice Oscillator

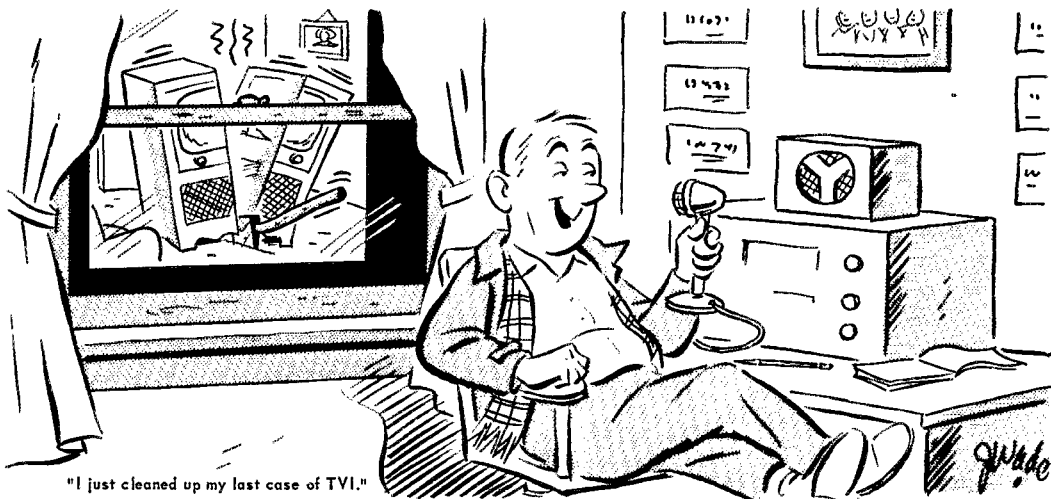
(Continued from page 25)

a level of about 1 volt input and there will be a keyed output of about 0.5 volts across 800-ohm phones. Note that the low-pass filter greatly attenuates frequencies at a multiple of the desired tone as these frequencies will also key the oscillator. This unit works satisfactorily with B voltages ranging from 12 to 120 volts. Should a code oscillator be desired,  $f_2$  can be advanced to maximum and the B supply keyed, as in Fig. 2.

All in all, the simple code-practice oscillator is a versatile gadget. When all the use has been made of the unit in any of the above forms that the builder desires, about two dollars additional will permit construction of a regenerative receiver and purchase of a quartz crystal will then permit construction of a simple transmitter. Incidentally, should it be desired to finally make a transmitter out of the unit, a few pennies may be saved by the purchase of a crystal socket (such as the Millen 33102) which can be used as a phone tip jack on the code oscillator and receiver and as a crystal socket for the transmitter.

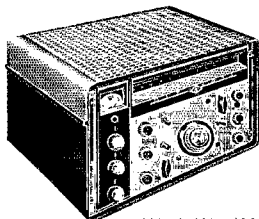
**SWITCH TO SAFETY!**



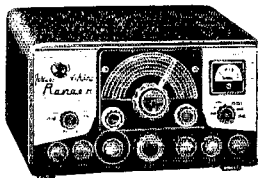


"I just cleaned up my last case of TVI."

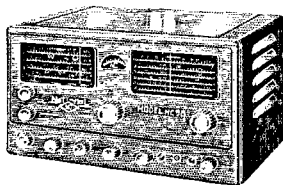
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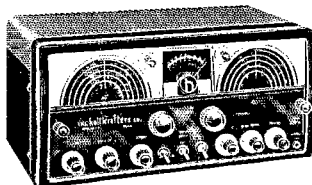
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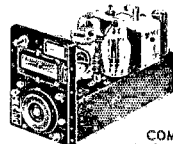
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Address.....  
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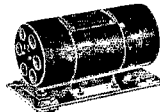
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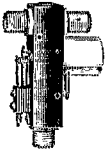
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Length 4 1/2",  
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DKF2 rigid adapter for external chassis mounting, \$1.85



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See your distributor. If he has not yet stocked Dow Co-axial relays, order from factory. Send check or money order or will ship COD. Prices net FOB Warren, Minn. Shipping Weight 9 oz. Dealers' inquiries invited. Literature on request.

Add \$1 for external switch (Optional)  
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275 Craig St., W. Montreal, Quebec

## How's DX?

(Continued from page 52)

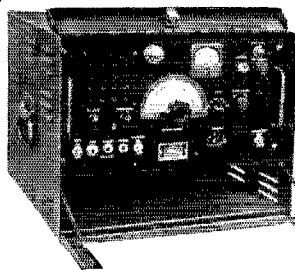
galena crystal.".....Oceaniagrams via WGDXC and W6YY; VK1ZM departs cold Macquarie Isles for more element VK2 climates. . . . VP2VB/P is well heard on 15 and 20 on *Yasme* shipboard in the Tahitian vicinity. . . . The biggest noise from Western Australia henceforth doubtless will be VK6MK with 85-foot-high Telrexes for 10, 15 and 20. . . . ZLIPA withdrew from ZL2GX's Kermadecs enterprise in favor of ZL2CU. When ZL2s GX and CU pull off this stunt the New Zealand navy likely will share credit, for other Kermadecs-bound water transport is unavailable. . . . VR6AC tells the NCDXC gang he'd be more active if generator fuel wasn't such a scarce commodity on Pitcairn. Floyd's high-priced jenniejuice dribbles in all the way from Balboa, C. Z.

Europe — Monaco DX-band workability is enhanced by newly licensed 3A2s BN BP and BQ. Respectively, they are K2JCS-F7ER, K0BGZ-P7AM and K6CDT-F7CZ, all members of the Yanks-in-France La Rochelle Radio Club. . . . HB9OP leaked to K2BZT that he plans more Liechtensteining in a month or two (HB1OP/HE). . . . W9IOP and XYL have been touring the Continent. W2F50 wouldn't be greatly surprised if Larry tried his hand as an M1 HV or 3A2. . . . W8KYD's friend E18C, a regular Sunday fixture on 14,060-ke. c.w., may leave the old stand for a joyful job at 15 meters. . . . Germany-stationed WN5KNE is in on the radio club plans of DLs IBZ 4CCB 6EN and 6EQ at Bad Kreuznach. Bob knows little German but ham radio is ham radio, be the QTH Texas or the Rhine valleys. . . . F9TB is radiop aboard a Mediterranean oceanographic vessel chartered by Monaco's famed science museum. F9LT/MM is the ship's ham band call. HE9RDX of USKA reports W1MXA (ex-111Y-CN8CM) doing radio duty aboard a U. S. minesweeper plying the same waters. . . . WGDXC has DL3AO preparing a DXpedition to, possibly, Luxembourg. LXs always have been scarce on c.w. and not too abundant on voice. . . . NCDXC sources learn that ARI (Italy) schedules a yearly DXcursion to San Marino, an event usually occurring in midsummer. Also, OK1MB speaks of future Albanian ham activity but isn't too specific.

Hereabouts — VE7QF nails down this VE0N business: "The series VE0N- have been set aside for allocation to amateur stations located on board Royal Canadian Navy ships; the series VE0M- for stations on board ships of Canada's merchant fleet. As the call itself indicates maritime-mobile operation no suffix MM is used. The order

(Continued on page 124)

## Proven Performance



MODEL  
**CD-2**  
**FCDA**  
APPROVED

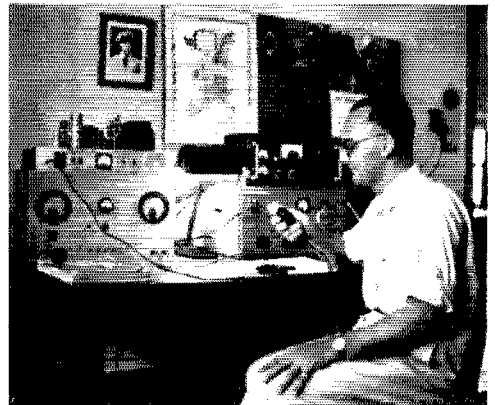


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OQ5BI hits 10 and 15 heavily, and 20 occasionally, with this layout in Leopoldville. At left on the op table an 807s Class AB<sub>2</sub> modulator perches atop a power-supplies cabinet; at right Gerard's handswitching 6146 rig rests upon a homebrew double-conversion super designed by F9AF. OQ5BI, now at the 110-country mark on phone, uses a pair of three-element rotaries mounted on the W11YI elevator mast described in April, 1952, QST.

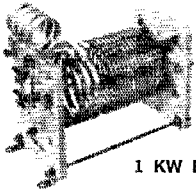
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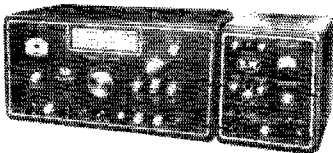
These Experienced Hams Will Assist You and Fill Your Orders Correctly.

W60YD	W6YML	K6CRD
W6QJI	W6YPA	W6LTY
W6KSF	W6VCR	KN6JIM
K6DPH		W6VBY

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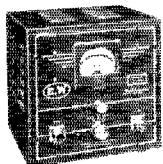


1 KW PI-NETWORK  
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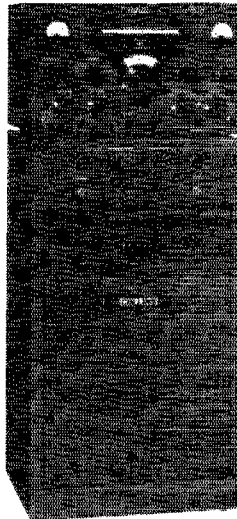
MODEL 5100-B XMTR.  
Amateur Net: \$475.00

MODEL 51SB-B SSB  
GENERATOR  
Amateur Net: \$279.50



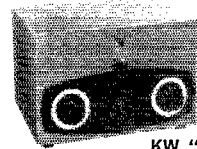
MATCHMASTER  
Amateur Net: \$47.50

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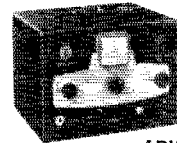


KWS-1 XMTR.  
Amateur Net:  
\$1,995.00

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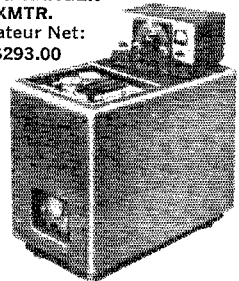


KW "MATCHBOX"  
Amateur Net:  
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authorizing operation aboard naval ships was dated May, 1954, and to date only two stations are on the air. . . . The licenses are issued as club licenses; therefore any licensed amateur aboard [each particular] ship is permitted to use the club station, signing the club call. Only one license is issued each ship and these stations are subject to all the regulations that apply to the ordinary Canadian amateur, plus additional ones imposed by the Navy and the captain of each ship. . . . There is no change in regulations regarding ordinary VE mobile operation. . . . The call is still the operator's station call, siant, and a number indicating the call area he is operating in." . . . W2COT has possible bad news for YS QSL aspirants: "I understand that on the night of November 9, 1955, the main post office and its contents at San Salvador were destroyed by fire." . . . ARRL W9 QSL Bureau Manager W9CFT is hampered DXtensively by Green Bay, Wisc., Channel Two emanations. Although TVI no longer is the ogre it was a few years ago, fringe-area DX chasers still are hard put where Channels Two and Six are involved. . . . Ohio Valley ARA's *Ether Waves* lists its local DX champs on a band-by-band basis. W8JIN leads the flock on 75 phone (22 countries), 40 c.w. (133), 40 phone (28), 20 c.w. (242), 20 phone (129), 15 phone (102), 15 c.w. (81) and 10 c.w. (86). W4KVX controls the situation on 160 c.w. (4 countries) and 80 c.w. (65). W8ELB holds claim to leadership on 11 phone (14 countries) and 10 phone (82). W8EV is boss on exclusive 11 c.w. (13 countries). W8JIN's aggregate 931 band-countries is tops for OVARA. How does your club stack up with this yardstick? . . . W1ONV, ex-8RY-9FO and *Call Book* editor from 1927 to 1936, is curator of birds of the Chase Wild Animal Farm at Hingham, Mass. Art also plucks a feather from the DX Bird on 20 c.w. now and then. . . . TG9RR was put through paces at last December's Guatemalan Boy Scout Camporee. Special QSLs are en route to confirm numerous QSOs garnered on 7 and 14 Mc. . . . The W9-DXCC clan, chairman W9EU presiding, is considering publication of a DX bulletin on a monthly basis. . . . CO2GO calls attention to the RCC (Cuba) DX award labeled CUBA. Confirmation of a certain number of CM-CO QSOs is necessary, the required total depending on an applicant's geographical location. It's a shazzy sheepskin—write CO2GO of RCC's awards committee for up-to-date details on rules. . . . Surinam's PZIBS daily becomes more popular with his rockbound 6V6-6L6-807 25-watter, folded 14-Mc. dipole and modified all-band s.w.b.c. 6-tuber. He writes W10JR that only N. Mex., Utah and Vt. remain unworked after two months of activity. W/K/VE pursuers demand continual attention but An has squeezed in contacts with over thirty countries on all continents. . . . Top performers of the new Willamette Valley (Ore.) DX Club are W7s HXG GBW ENW and AC with 209, 194, 176 and 160 countries confirmed. W7s HXG and HGC head up the phone-only group with 128 and 100 accounted for. This via NCDXC's *DXer*. . . . Only very few days until our DX bands throb with the 22nd ARRL International DX Competition. *QST* carried the deteuded announcement last month and you'll find a reminder boxed in this issue. There are several approaches to these annual DX jamborees: (1) strike out for score; (2) concentrate on new countries and call your shots; and (3) focus your attention on certain countries to clinch some of those foreign-society awards you're almost ready to apply for. If the first proposition strikes your fancy you can get a line on your competition by perusing WIZDP's statistical study of last year's affair beginning on page 60, October 1955 *QST*. You take it from there—good hunting!

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Width of Base Equal to 1/5 Height

SMALL DOWN PMT.—EASY TERMS

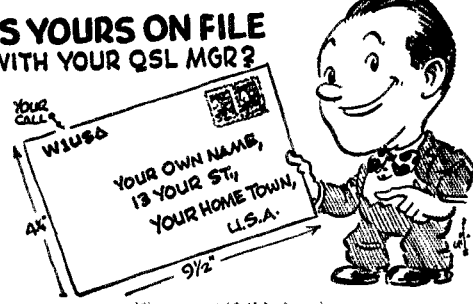
Vesto Towers are available in a wide range of sizes to meet requirements of amateurs and commercial users alike. Note the low prices for these quality lifetime towers: 22'—\$104, 28'—\$127, 34'—\$149, 39'—\$182, 44'—\$208, 50'—\$239, 61'—\$339, 100'—\$895.

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(See page 140 this issue)

# 4 top receiver buys!

...and you'll do better on trade-ins, too!

**Terrific Trade-Ins**—As liberal as anyone in the country ... and yours may be worth more at Burghardt's. Trade-ins usually cover down payment on your new gear.

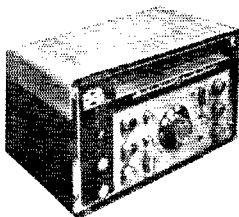
**10% Down—Easy Terms**—10% down lets you "take it away." Up to 18 months to pay on balances over \$200. Burghardt's financing saves you money—adjusts terms to your budget. All time payments based on local bank rates. Full payment within 90 days cancels interest.

**Speedy Delivery—Personal Attention**—No order too large or small for personal attention. All inquiries acknowledged and orders processed day received.



**Satisfaction Guaranteed**  
or your money refunded  
after 10 day trial.

Designed for the future, these 4 receivers are up-to-the-minute in design and performance ... engineered for SSB as well as other modes of reception. Remember, as little as 10% down and one of these fine units can be yours!

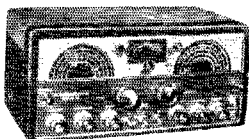


**NATIONAL NC-300**—Dual conversion—better than 50 db primary rejection 160 to 1 1/4 meters. More than 60 db secondary image rejection. Extra long slide rule dial. Super selectivity—giant, easy-to-read "S" meter. With tubes.

\$34.95 DOWN ..... \$19.07 per mo. for 18 mo.  
NC-300TS Speaker ..... Amateur Net \$17.00  
300XCU-2 Crystal Calibrator ..... Amateur Net \$19.95  
6, 2, 1 1/4 Meter Converters ... Amateur Net \$39.95 Ea.

**NEW! GPR-90**—15 tube dual conversion superhet receiver for .54 to 31 mcs. 6 accurately calibrated bands with full electrical bandspread. AM, CW and MCW. Excellent sensitivity and selectivity—highly effective noise limiter—"S" meter. With tubes.

\$39.50 DOWN ..... \$21.52 per mo. for 18 mo.  
Matching Speaker ..... Amateur Net \$16.00



**SX-100 RECEIVER**—Loaded with features: Selectable sideband operation—"T"-notch filter—50 kc highly selective i.f. system—crystal controlled second conversion oscillators—built-in crystal calibrator.

\$29.50 DOWN ..... \$16.07 per mo. for 18 mo.  
R-46B Speaker ..... Amateur Net \$17.95

**COLLINS 75-A4**—Excellent selectivity—covers 160 thru 10 meter bands. Dual conversion—crystal controlled converter—"drift-free" VFO. Sensitivity: 1.0 microvolt for 6 db signal-to-noise ratio with 3 kc bandwidth. Includes noise limiter and crystal calibrator. With tubes.

\$59.50 DOWN ..... \$24.99 per mo. for 24 mo.  
270-G Speaker ..... Amateur Net \$20.00  
312A-1 Speaker Control ..... Amateur Net \$37.50

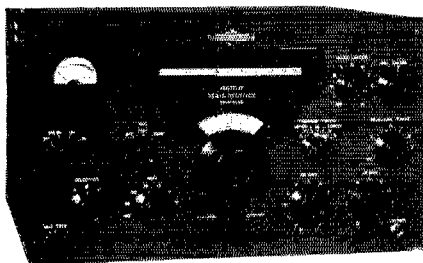


**TOP TRADE-INS**—We have hundreds of standard brand pieces of equipment in our trade-in department and prices are realistic! Write for current bulletin.  
**NEW CATALOG**—The most up-to-date presentation of amateur equipment available. Chock full of gear and accessories. Write for your free copy today!

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## The 75A-4



### Designed Expressly for Amateur Operation on the 7 HF bands

The Collins 75A-4 receiver retains time-proved features of earlier 75A series, plus AVC on SSB and CW, separate detectors for AM and SSB. Pass band tuning, rejection tuning, superior selectivity. Many other outstanding features.

Send for complete details in Bulletin 5M-3-JPC

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# EZ WAY TOWERS

### CRANK UP AND DOWN TILT OVER

It's the original tilt-over tower. Easy to install and adjust antennas. E-Z Way manufactures 22 different types of towers from 40 ft. to 120 ft. including crank-up towers that can be attached to side of building and lay-over towers for flat roof installation.



Write for free Ham  
Tower Catalog.  
Dept. HT

**E-Z WAY TOWERS Inc.**  
P. O. Box 5491 • Tampa, Fla.

## Correspondence

(Continued from page 61)

ember issue of *QST*. Perhaps the discovery that the extra pages did not mean more technical material brought disappointment to some. In my own case this was not so. I was well pleased to see for the first time what the first issue of my favorite radio journal looked like. . . .

— Elmore J. Fitz, W1DGT

6730 N. Temple City Blvd.  
Arcadia, California

Editor, *QST*:

Congrats on December *QST* with reprint of 1915 magazine. Am very interested in history of amateur radio but have never seen early issues.

— Frank Q. Newton, jr., W6SYG

1440 N. Dearborn Pkwy.  
Chicago 10, Illinois

Editor, *QST*:

. . . Congratulations on your fortieth anniversary issue of *QST*. My husband (W9GK) and I — and thousands of others, I am sure — thoroughly enjoyed the reprint of the first issue. My, how you've grown! . . .

— Evelyn M. P. Meskan

P. O. Box 283  
Warrenton, Va.

Editor, *QST*:

. . . It is *some* issue! That trick of including *QST* No. 1 was a good one. F.B. Makes a fellow proud of his ARRL to get a magazine like this December issue! Cover was impressive, too. . . .

— Ev Batley, W4IA

25 Chittenden Ave.  
New York 33, N. Y.

Editor, *QST*:

Nice work on the 40th anniversary issue of *QST*! It brings back many pleasant memories and I hope that you will reprint other early issues from time to time.

— Leon L. Adelman, W2AFS

1907 Clark Street  
Des Moines 14, Iowa

Editor, *QST*:

Congratulations on publication of 1915 issue of *QST*. I still have my own CZ license for that year 1915.

— A. Lee Chamberlin, W0CZ

21 Morin Ave.  
Keene, N. H.

Editor, *QST*:

Congratulations on fortieth anniversary issue of *QST*. It is a fine example of amateur radio over the years.

— Dana Parks, jr., W1BYS

## SERIOUS AMATEUR

8136 Wortser Ave.  
No. Hollywood, Calif.

Editor, *QST*:

This 75 meter "politician" of many years standing seems to detect a note of "sour grapes" in one letter in the November issue, and a sort of "grandfather clause complacency" in another, both on the subject of the Extra Class license.

Granted, the ticket is hard to get. I hold a 1st phone commercial, and consider my Extra Class a greater accomplishment. But the point is that it has been traditional in amateur radio for a man to work up to something better as he progresses.

We seem to have retained this tradition the wrong way. Instead of raising our sights and going along with the Extra Class idea, we have instead started lower and worked up to where we were all the time.

Now, the General Class men who are content to buy their commercial rig, plug it in, and chew the rag, have all the privileges they could possibly feel entitled to, so WHY NOT have something for the serious amateur who pursues his hobby for something more than shooting echo chambers and train sound effects across town?

Let's have the 14300 to 14350 and 3600 to 3700 for Extra

(Continued on page 128)



# Wanted!

## COMMUNICATION & RADAR PERSONNEL

AT ALL LEVELS AND IN ALL FIELDS OF ELECTRONICS

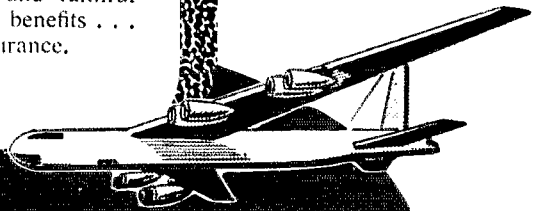
### Immediate Openings!

Our assignments cover an interesting variety of BOTH Commercial and Government operations to be serviced on a long range basis. Needless to say — they offer challenging opportunities and employment security to those who possess the ability and/or educational background necessary to the DESIGN, MAINTENANCE and/or INSTRUCTION of others in the fields of COMMUNICATION, RADAR and SONAR EQUIPMENT.

In addition to TOP PAY, commensurate with your ability to do a *better than average job*, PHILCO has many levels of SPECIAL ASSIGNMENT BONUSES . . . valuable company benefits including a profit sharing program, merit and faithful service salary increases . . . retirement benefits . . . liberal hospitalization and group insurance.

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Shakespeare **WONDEROD**

# FIBERGLASS Whip antenna

- Excellent Insulation
- Shorter Resonant Length
- Will Not Corrode
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- Will Not Take a Set
- Light Weight

Made by the pioneer manufacturer of FIBERGLASS fishing rods. Industrial applications solicited

—with 3/8-24 tld chrome-plated brass fittings

Whip: 54 to 59", \$5.75 — 60 to 90", \$6.95  
 Base Extension: .350" dia. — 18", \$3.95  
 .350" dia. — 36", \$4.70  
 .500" dia. — 36", \$5.82  
 prices amateur net

Tech. Rep. Inquiries Invited

If your jobber can't supply you, write

## COLUMBIA PRODUCTS CO.

P O Box 5207, COLUMBIA, SOUTH CAROLINA, SUBSIDIARY OF SHAKESPEARE CO

Pat. Applied for.

Class phone, and 7100 to 7150 c.w., exclusively for Extra Class. You'll see — make something to shoot for, and there'll be plenty of the boys shooting. What a letdown, as change after change came through in the last few years, as possibility after possibility for Extra Class privileges went down the drain, as everything was handed on a silver platter to the lazy men.

— Richard Blanchard, jr., W6UYG/QYR

### WARM FEELING

1542 1/2 — 2nd Avenue  
Los Angeles 19, Calif.

Editor, QST:

Due to a severe and prolonged illness I was unable to fulfill operating time requirements for renewal of my amateur radio license. FCC workers certainly put themselves out to keep me from losing my ticket. Correspondence between the FCC and me covered a period of several months. To save me personal embarrassment, the FCC even went so far as to write to my doctors (to whom I am so financially indebted) for the necessary affidavits.

I know that the relating of this incident gives all the guys and gals engaged in ham radio who read this the very warm feeling toward the FCC that the experience itself gives to me. And so long as that good feeling exists, it's bound to help make better operators out of all of us.

— Felix F. Januss

### PIRATE

Intelec S. A.  
Ave. Este 2  
Caracas, Venezuela

Editor, QST:

I would greatly appreciate your assistance in the apprehension of that lowest of skunks, the call letter pirate. Too lazy to take the FCC examination and get his own license, he picks out the call of someone who is not currently on the air, and uses it for a while.

Today I received a QSL card from W3ZIR/3, claiming a contact with W2EWP on June 26, 1955, on 7 Mc. phone. I have been in Venezuela since December 1954 and my equipment is in a storage warehouse awaiting my return to the States. The fact that I am overseas and not on the air was brought to the public attention in connection with an article of mine which recently appeared in another radio magazine. It is apparent that someone who read the article decided that mine would be a good, safe call to steal for a while.

I have also written to the FCC today about this, and I have told them that I will advise them in writing when I return to the States and again resume operation of W2EWP.

— Paul H. Lee, W2EWP

### NEW DIAGRAMS

Arrayan 1767  
Montevideo, Uruguay

Editor, QST:

Just a line to express my appreciation for the good stuff you get out in QST and to let you know that I like the modernized diagrams. At first it took me a little longer to figure circuits out, but now I find them easier to read at a glance than the previous ones.

— Kenneth Indart, CX2BP

### INTERESTING WORK

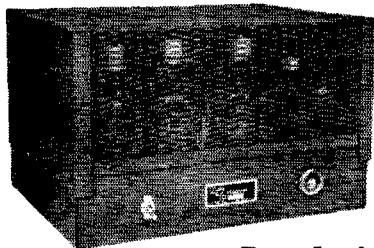
4101 Hughes  
Amarillo, Texas

Editor, QST:

In regard to the W2JTJ "Budget 7 Mc. Vertical" in the November issue of QST, the idea appealed to me immediately and I set out to obtain the principal materials; namely 82 beer cans. However, only 7 empty cans were located and since the project hinged on these particular type cans, I ordered the remaining 75 from a local distributor of this type of antenna material.

Said material was delivered this morning and at present I am removing the contents in order to properly prepare the cans for soldering. The process is rather slow but it is most interesting work. I now have about a dozen cans

(Continued on page 130)



# NEW

## Revolutionary System of Audio Control

### THE ULTRA MODULATION UNIT

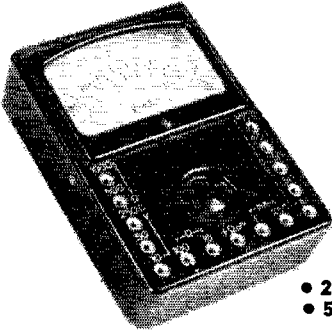
- ✓ Use MORE Audio Power than Carrier Power without Overmodulating!
- ✓ No Splatter — No Distortion!
- ✓ Punch Thru QRM!
- ✓ Simple to Install On Any Plate Modulated Rig — Only 3 Leads to Connect!
- ✓ Low in Price!

**Ultra Modulation Company**  
For Information Folder, write to:  
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**SENSATIONAL MICRONTA**

# MULTI-TESTER SALE!

**ALL ASTONISHINGLY LOWER PRICED!**



**\$7<sup>79</sup>**

- 250 ua 4000Ω/v DC
- 500 ua 2000Ω/v AC

Best buy in America! MODEL R-600 — ultra compact 3½ x 4¾ x 1½" multi-range univers. l circuit tester of pocket size, equipped with a 175 ua jeweled meter of high sensitivity. Micronta RETMA guarantee, plus exclusive silver switch contacts, rubber test leads. Ranges: AC 10, 50, 250, 500, 1000 volts — 2000 ohms per volt. DC 10, 50, 250, 1000 — 4000 ohms per volt. DC current: 250 ua, 10 ma, 250 ma. Resistance: 0-10K, 0-1 meg. Decibels: -20 to +22, +20 to +36 db (Odb-0.775v-600 ohms). Complete with leads, batteries, bakelite case. Imported to save you money, MICRONTA-branded to assure you of Radio Shack quality! Ship. wt. 2½ lbs. Order No. R-600 Q..... Only **\$7.79**

**ALL WITH SILVER SWITCH CONTACTS!**



**\$11<sup>95</sup>**

2000Ω/v AC, DC!  
QUALITY 160 ua METER!

If made in this country the MICRONTA R-4500 would cost at least TWICE Radio Shack's exclusive low price! Sensitive, accurate, well-built, and featuring silver switch contacts and rubber leads. 18-position single rotary knob selected ranges: AC 10, 50, 250, 500, 1000 volts — 2000 ohms per volt. DC 10, 50, 250, 500, 1000 — 2000 ohms per volt. DC current: 500 ua, 2.5 ma, 25 ma, 250 ma. Resistance: 0-1K, 0-10K, 0-100K, 0-1 meg. Decibels: -22 to +50 db (Odb-0.775v-600 ohms). Complete with batteries, leads, bakelite case, magnificent 160 ua jeweled meter, MICRONTA-RETMA guarantee. Compact pocket size: 3¾ x 5¾ x 2". Ship. wt. 4 lbs. Order No. R-4500 Q..... Only **\$11.95**

**ALL WITH RUBBER LEADS, 3" METERS**



**\$17<sup>95</sup>**

SLOPING PANEL!

NOT a kit, like all Micronta V.O.M.'s it features silver switch contacts, rubber leads, standard RETMA guarantee. From its 3" full-scale jeweled .45 ua meter to its sloping front bakelite panel, this is truly the meter buy of the year. Ranges: AC 10, 50, 250, 500, 1000 volts — 8000 ohms per volt. DC 10, 50, 250, 500, 1000 volts — 20,000 ohms per volt! DC current: 50 ua, 2.5 ma, 25 ma, 250 ma. Resistance: 0-5K, 0-50K, 0-500K, 0-5 meg. Decibels: -20 to +5 db, to +5 to +22 db (Odb-0.775v-600 ohms). Single rotary range 18-position selector! Complete with leads, batteries, sloping front bakelite panel. An added feature is its extremely compact size of 3¾ x 5¾ x 2¾". Imported to save you many, many dollars! Ship. wt. 4¼ lbs. Order No. R-4002 Q..... Only **\$17.95**



**RADIO SHACK**

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length 6¾"  
width 5"  
height 4¼"

**NE-6**  
"6 Meters"

**NE-2**  
"2 Meters"

## HARRISTAHL

Presents a new concept in  
**VHF transmitters**

- 12 watts to a 5763 final
- Internal antenna relay and spdt contacts for receiver disabling
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- Real Audio punch
- 6 or 12 volt operation
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- Very low power drain
- Uses low cost 8mc crystals
- Easily accessible crystal
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- CW or phone operation
- Compact construction
- Price \$69.50 Amateur Net, with tubes

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## BARGAINS in QUALITY CRYSTALS BY MANUFACTURER

### AMATEUR BAND CRYSTALS

In FT243 Holders

3500 to 4000 KC                      7000 to 7300 KC

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Your choice of frequencies ± 1 KC

3 for \$2.00                              10 for \$6.00

### OTHER FREQUENCIES

In FT243 Holders

6000 to 7000 KC                      7300 to 8000 KC

± 1 KC your specified frequency

50¢ each

### SSB FILTER CRYSTALS

New stock—Gold plated—No WW2 surplus

54th and 72nd harmonic type in FT241A holders

All channels 370 to 480 KC

50¢ each

Every crystal guaranteed

Minimum order \$2.00 NO C.O.D's.

Add 5¢ postage per crystal

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soldered together and the possibilities of these cans seem innumerable. The project is so enjoyable I have plans for a 40 meter beam on a 10 meter ground plane and a 20 meter cubical quad and oh jush losh and losh of others.

I always had a whole bunch of trouble fixin antennas and I sure wanna thank Mr. W2JTJ and Mr. Editor for letting me know about these fine type antennas. Shur wanna thankem. Jush wanna say lesh have more these wonderful storis. Itsa wonderful antenna an I sure gonna work lotsa DX with it. Ham radio shure ish a fine hobby. Hi Hi Got tget bizzi fore the exYL gesh back. Thanksh to all my of fransh.

— R. R. Lacy, W8DXZ

## EX-BOOSTER

R.F.D. #1

W. Springwood, Ohio

Editor, *QST*:

I've been a booster of ARRL for a good many years but I want to tell you right now that I don't intend to renew my membership. I've been waiting for you to do something about the Sweepstakes rules and I'm plenty sore about it. The SS Contest is unfair.

Why should the best operators always win? Those fellows spend weeks, even months, fixing up their stations. Then they put up new antennas. They figure out which bands pay off at certain times and operate during the best hours of the permitted 40. Why, I hear that some of those jerks even practiced sending on a code oscillator so they could operate faster and better.

If they want to do those silly things, let them. But it's not fair to the rest of us. We — and there are more of us than you may think — want to be taken care of by ARRL. That's why we belong to the League, not to get *QST*. Why should I have to work fast break-in or push-to-talk in the SS? Throwing four switches always worked for me. Why must I put up good antennas to compete with those eager beavers when my single wire still loads? As for operating, I'll do mine when I feel like it, maybe when I'm tired of TV for the evening, and when I'm on c.w. I'll use my good old bug swing. It's not my fault if the contest is full of lids who can't even get my call right.

The only fair way to run this contest is to give everyone an equal chance to win. The way to do this is by the intelligent use of multipliers. I have given this a great deal of thought and have now figured exactly how the multipliers should be used. Here's how you should do it:

*Multiplier Earned by*

- 1.5 C.w. operator not able to send over 18 wpm.
- 1.5 C.w. operator who can "copy in his head" but can't write it down correctly.
- 1.5 Phone operator who really projects his personality.
- 1.5 Phone operator having too much Queen Roger Mary.
- 1.5 Station throwing two or more send-receive switches.
- 1.5 Station with only one antenna.
- 1.5 Station using only one band.
- 1.5 All west coast stations because they expect it.
- 1.5 All east coast stations because they don't.
- 1.5 All others because they aren't on either coast.

I brought this up at the last radio club meeting and it sure was a surprise to see how dumb those guys were. When they didn't agree with me it burned me up. I told them what I'm telling you now — they could go along with me or I'd resign.

I'm glad I don't belong to that radio club any more.

— A. L. Worron, SAOF

## NEED PARTS?

**CURLE RADIO SUPPLY**

439 Broad St., Chattanooga, Tennessee  
406 Meridian Street, Huntsville, Alabama

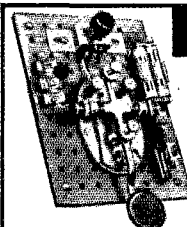
# FREE! LAFAYETTE CATALOG



## 132 PAGE ELECTRONIC CATALOG

Packed with the largest selection of Electronic, Radio and T.V. Parts, and equipment. PA, Hi-Fi systems, tubes, antennas, Transistor Kits, parts and components, Test Equipment, new built your own kits, tools, books, Microscope, drafting equipment, Binoculars, Telescopes, All Radio, TV and Ham supplies—ALL AT GREAT SAVINGS—For the economy minded servicemen, dealer, engineer and technician. **CHUCK FULL OF BUYS! SEND FOR YOUR FREE COPY TO-DAY.**

# Just a few of Lafayette's Values



### TRANSISTOR CODE PRACTICE OSCILLATOR KIT

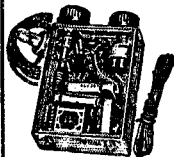
For those interested in mastering the international code, an audio tone oscillator is essential. The circuit of this transistorized feedback oscillator has the simplicity of the neon glow, the signal strength of the vacuum tube, and requires only two pentode cells for weeks of service. It may be used for solo practice, or two may send and receive with the same unit. Kit comes complete with Transistor, Telegraph Key, Resistors, Condensers, Masonite Board, etc., and Schematic Diagram.

KY-72 ..... Net **2.99**  
Cannon EC1—Single Headset ..... Net **1.13**

### 2 TRANSISTOR POCKET RADIO KIT

Packed into a 2 1/2" x 3 1/2" x 1 1/4" plastic case. This two Transistor plus crystal diode radio kit offers many surprises, utilizing a regenerative detector circuit with transformer coupled audio stage, gives you high gain and excellent selectivity. Falls in distant stations with ease with more than ample earphone volume. Kit comes complete with two transistors, crystal diode, loopstick, Arzonne transistor audio transformer, resistors, condensers, plastic case, etc. Including schematic and instructions.

KT-48A Complete Kit less earphones. Net ..... **11.80**  
MS-260 New Super Power Dynamic Earphone. Ideal for Transistor Circuit Imp. 8000 ohm, D.C. 2000 ohm ..... **3.95**



### SLIM HIGH OUTPUT DYNAMIC MICROPHONE

Reg. Price ~~47.50~~

A pencil-slim design, high output PA Dynamic Microphone of exceptional quality, at a price that is 1/3 of the price of any comparable microphone on the market today. Very smooth response, 80-10,000 cycles, Omnidirectional, tiltable head. Switch on side gives choice of either high impedance (50,000 ohms) or low impedance (250 ohms). Instantly removable bracket permits use either on stand or as hand mike. Features exceptional mechanical strength. Cast case with satin chrome finish, 5/8"-27 thread. Acoustically-treated grille head, 3" long; 1 1/4" barrel diameter. Shipping weight 2 lbs.

**NEW!**  
9.95

PA-29 ..... In lots of 3, Each **9.25**  
Singly, Each **9.95**

### CRYSTAL MICROPHONE

COMPARE IT WITH ANY MIKE AT 2 to 3 TIMES THE PRICE

A quality crystal Microphone for PA systems, house recorders, etc. Frequency response 30 to 10,000 cycles. Output level -58 db. Provides ample output for use with low gain amplifiers. Complete with 5 ft. of shielded cable. Shpp. wt., 3 1/2 lbs.

PA-24— in lots of 3, each ... **3.95** singly, each ..... **4.25**



### HIGH SENSITIVITY 20,000 OHM PER VOLT DC 10,000 OHM PER VOLT AC MULTITESTER

35 ua 3" METER SILVER CONTACT SELECTOR SWITCH 1% PRECISION RESISTOR

LOOK AT THESE FULL SCALE RANGES!

D.C. VOLTS: 0-6; 0-30; 0-120; 0-600; 0-1200; 0-6000 Volts—A.C. VOLTS: 0-6; 0-30; 0-120; 0-600; 0-1200 Volts—RESISTANCE: 0-10K; 0-100K; 0-1 Meg; 0-10 Megohms—D.C. CURRENT: 0-60 Microamp; 0-60; 0-600 Milliamps—DECIBEL: -20 to +17 db (0 db = 0.774V)—CAPACITY: .0001 - .01; .005 - .15 mfd—INDUCTANCE: 20-2000 millihenry—OUTPUT RANGES: 0-6; 0-30; 0-120; 0-600; 0-1200 Volts

The new Lafayette high sensitivity Multitester is a complete instrument (not a kit). In addition to its unusual sensitivity of 20,000 OHMS PER VOLT ON D.C. AND 10,000 OHMS PER VOLT ON A.C., and the extraordinary number and scope of its ranges, it is packed with features that would make it cost at least twice as much if made in this country. Uses 1% precision resistors, silver contacts on selector switch, 35 ua 3" meter. Size: 6 1/4" x 4 1/4" x 2 1/2". Complete with batteries and leads. Shipping weight 4 1/2 lbs.

RW-30A ..... In lots of 3, each **19.25** ..... Singly, Each **19.95**



### TRANSISTOR TYPE 2N107

P-N-P  
\$1.25

### RAYTHEON TRANSISTOR

CK722  
P-N-P  
99c



### STUDIO CRYSTAL MICROPHONE

- DUAL CRYSTAL CARTRIDGES
- ALL DIRECTIONAL
- FINE QUALITY
- HIGH OUTPUT

Here is a microphone with a 360° pickup, and the added power and sensitivity of two individually shock mounted and phased crystal cartridges. This arrangement assures you of maximum pickup from all sides. Swivel mounted to give fuller flexibility. Case is chrome plated. Standard 5/8"-27 thread. Overall size 7" H x 3" W complete with 4 ft. cable. Shpp. wt. 4 lbs. PA-17—

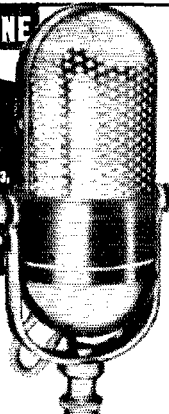
In lots of 3, each **6.95**

Singly, each ..... **7.25**

**6.95**

ea. in lots of 3,

single, each **7.25**



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DEPT. B Radio

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## Converters

(Continued from page 21)

switches on the front panel control the heater circuits to the converters, so that they can all be running at the same time or selected individually. A selector switch switches the input, output and B + circuits to the converter in use; the manual gain and a.v.c. circuits are left connected together all the time. An arrangement like this permits keeping all converters warm during a contest, or the use of one only during casual operation. It also permits the ready comparison of two converters on the same band (if some later developments show up or if you want to compare different circuits), and if the two crystals are on the same frequency no retuning of the following receiver will be required.

With the crystal frequencies shown in Table I, the 7-Mc. band tunes 3.6 to 3.9 Mc., and the other bands (except 11 meters) start at 3.5 Mc. and tune higher. The tuning will be "on the nose" if the crystal frequencies are exact. Since the nominal tolerance of the crystals is .01 per cent, you will have to be prepared for an error as large as 3 kc. at 28 Mc., just in case you thought this would end all of your frequency-measuring problems. And if you want to tune more than the first 500 kc. of 10 meters, your receiver will have to tune higher than 4.0 Mc. (5.2 Mc. to hit 29.7 Mc.)

## Hints & Kinks

(Continued from page 48)

### USING A TV RECEIVER TO CHECK GRID-DIP METER CALIBRATION

I RECENTLY completed a kit-type grid-dip oscillator and wanted to check oscillations at the high-frequency end. The unit was designed to oscillate up to 250 Mc.

It occurred to me that the home TV set might be used to check frequencies up to 216 Mc. (Channel 13). So I turned on the grid-dip unit and the TV set. The grid-dipper was rested on top of the TV set and Channels 2 through 13 were turned on in succession. For each channel the grid-dip frequency dial was appropriately set, using the correct plug-in inductance.

It was observed that both sound and picture were distorted when the grid-dipper was tuned through the appropriate range of frequencies for each channel. It is not necessary for a station to

(Continued on page 134)



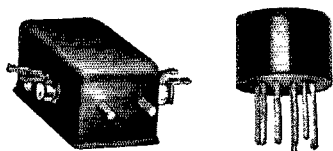
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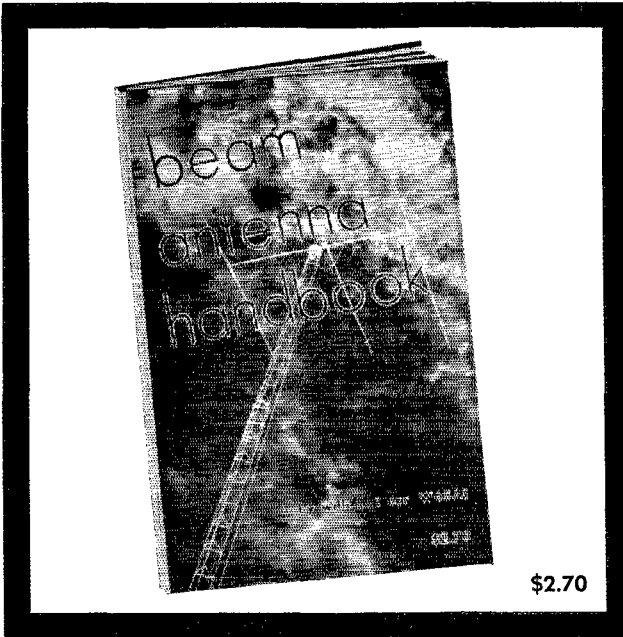
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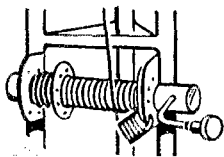
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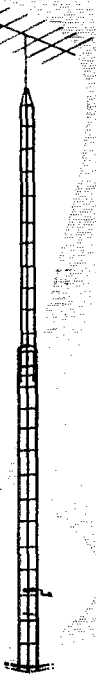


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be operating in order to perform a quick check on any channel. As long as any kind of raster can be seen, the disturbance caused by the grid-dip oscillator will be readily seen.

This simple test actually serves two purposes: first, it shows the presence of oscillation from about 50 to 216 Mc. Second, it indicates the accuracy of dial calibrations of the instrument tested.

This same method can be used to check other types of oscillators operating in the 50- to 216-Mc. range.

— Paul Goldman, K2GKU

[Editor's Note: Frequencies of oscillation below 50 Mc. can probably be checked quite accurately by the above method as long as the oscillator output contains harmonics falling in the TV range. The BCI and TV chapter of *The Radio Amateur's Handbook* lists the frequencies of TV Channels 2 through 13 and explains how the frequencies of the picture and the sound carriers may be determined.

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— Sam Goldish, W5TVG

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— John C. Hemby, W5WQQ

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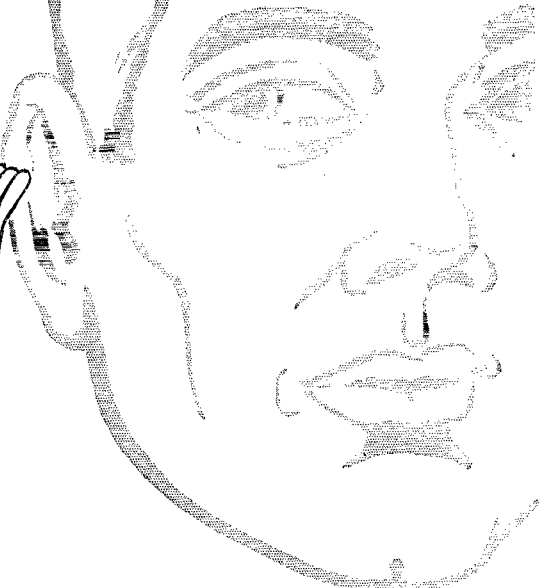
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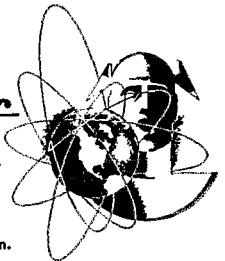
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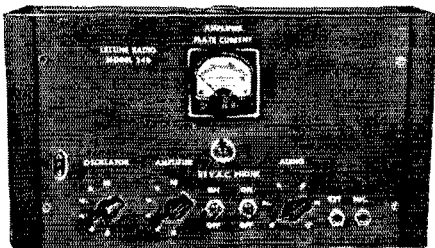
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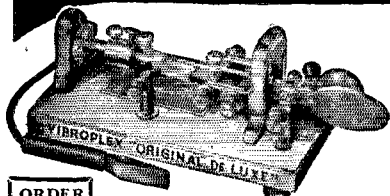
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... Effects of atmospheric conditions upon high frequency transmission — not yet eleven years old, which is believed to be the period required for a complete atmospheric cycle — are commented upon editorially with the statement that from the first amateur trans-Atlantic two-way working, in 1923, conditions steadily improved until 1928 and then declined until the present year. A prediction is made that by the winter of 1934-35 the 1715-2000 kc. band may well become the most valuable location for the throbbing heart of amateur radio — the traffic system.

... How Uncle Sam checks frequency through its Department of Commerce station at Hingham, Mass., is fully described in an article by Irving L. Weston, WIBHB, assistant radio inspector and Ralph L. Renton, W1CU, junior radio engineer. More time is being allotted to observation of amateurs and several licenses have been suspended for repeated off-frequency operation.

... Technically, further notes on the Zeppelin antenna — a novel system of feeder and antenna adjustment — are given by IIMM. Notably, his article deals with facilitating changes from one band to another.

... "The vacuum-tube voltmeter is deserving of more attention than the average amateur gives it," William Wagner, of Cincinnati, Ohio, tells readers in his article describing an a.c. model. Wagner points out the instrument can be used for a large variety of special voltage measurements such as amplifier gain, comparative signal strength and modulation of a phone transmitter.

... Three new directors are named to the ARRL Board in the 1930 elections, results of which are tabulated this month; L. G. Windom, W8ZG-ZG, Central; R. J. Andrews, W9AAB, Rocky Mountain; and H. W. Kerr, W9DZW-GP, Midwest Division. In many cases elections were marked by spirited campaigning, amateurs showing more interest in their Board spokesmen than they have in many a year.

... Howard Allan Chinn, W1AXV-W1XP, returns to the ranks of QST contributors with an article describing "A New Type of Peaked Audio Amplifier" for use in obtaining good selectivity in reproductions of code signals. "The use of radio telephony demands," he says, "the availability of a high quality amplifier for faithful reproduction."

... The past four years have seen an about-face in design and adjustment of amateur transmitters, according to George Grammer, assistant technical editor, who tells hams in his article on "More Power With Better Frequency Stability" of practical suggestions for oscillator-amplifier transmitter design. The smaller bands have practically outmoded the use of a self-excited oscillator to feed the antenna directly, because of frequency instability.

... Charles E. Seymour, W9FMN, gives seasoned operators details for the home-construction of an electrically operated "bug" which he claims will make perfectly-formed dots for hours on end.

... Chief Operator R. B. Parmenter describes the dynatron frequency meter in use at ARRL headquarters station W1MK.

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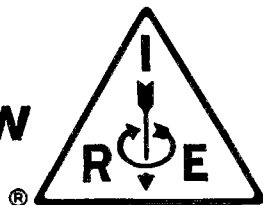
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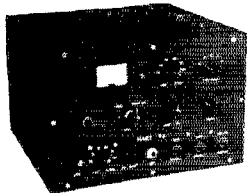
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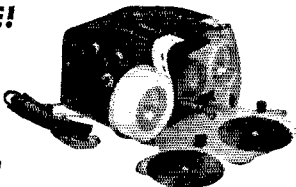
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## YL News

(Continued from page 59)

Kazuko Hiraki, JA6KH, is the fifth licensed YL in Japan (see Feb. '55 column). Using mainly homebuilt gear, Kazuko is on 40 and 80 phone from her Fukuoka QTH.



OM K6DV who sent the photo points to the oriental flower arrangement and delicate figurine, and bids for more such femininity in YL shacks.

W1VBT, Cecile Malo, has worked forty meters during the past four years as often as caring for her four jr. ops has permitted. A member of RACES, Cecile is active in Leominster, Mass. C-D with her OM W1VBS.



### Keeping Up With The Girls

W6PCA, Opal, custodian of the WAC-YL award, announces that certificate No. 4 has been issued to OM CE5AW. . . . In November seven Rhode Island YLs met and organized the Rhode Island YL Club. Charter members were W1aCEW, HUH, VXC, WED, WPX, WN1s CFT and GSD. Officers are W1VXC, Pres. and Secy., and W1CEW, V.P. and Treas. All R. I. YLs are invited to join. The club will issue a certificate to any station submitting confirmation of QSOs with ten YLs from the state. A net is conducted on 145.3 Mc. at 8:00 p.m. each Thursday with W1WPX, Evelyn, as NCS. . . . The Milwaukee Radio Amateurs' Club Auxiliary has 18 XYL members. Evelyn Dawson, the wife of W9CUW, is President. . . . W3s AKB, CDQ, and YTM were heard working in the SS contest. . . . W9OTO, Edith, reports her daughter June (ex-W9OTM) is now K6MXC in Los Angeles. . . . W3UKJ is on 14,235 kc. nightly looking especially for South American DX. Mena converses ably in *Espanol*. . . . On November 19th, thirteen members of the Texas YL Round-up Net celebrated the net's first anniversary with a luncheon in Dallas. Present were K5BNQ, W5s BDB, EGD, ILO IOZ, LGY, PFW, RYX, SYL, WXY, YKE, YRT, ZPD.

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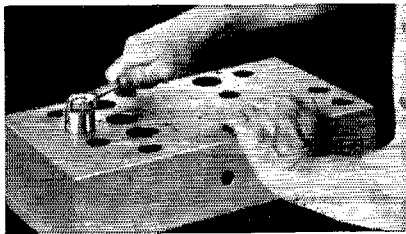
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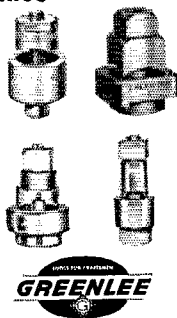
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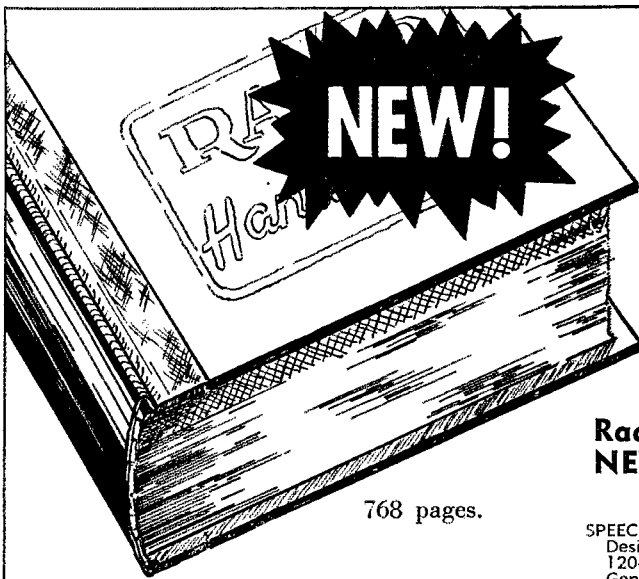
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The function of the ARRL QSL Bureau system is to facilitate delivery to amateurs in the United States, its possessions, and Canada of those QSL cards which arrive from amateur stations in other parts of the world. Its operation is made possible by volunteer managers 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.

- W1, K1 — D. W. Waterman, W1IPQ, 99 Flat Rock Rd., Easton, Conn.  
 W2, K2 — E. F. Huberman, W2JIL, P. O. Box 62, Station P, Brooklyn 12, New York.  
 W3, K3 — Jesse Bieberman, W3KT, P.O. Box 400, Bala-Cynwyd, Penna.  
 W4, K4 — Thomas M. Moss, W4HYW, Box 644, Municipal Airport Branch, Atlanta, Ga.  
 W5, K5 — Robert M. Roden, W5UXY, 5929 Bertha Lane, Ft. Worth, 11, Texas.  
 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 — L. J. Fader, VE1FQ, 125 Henry St., Halifax, N. S.  
 VE2 — Harry J. Mabson, VE2APH, 122 Regent Ave., Beaconsfield West, Que.  
 VE3 — Leslie A. Whetham, VE3QE, 32 Sylvia Crescent, Hamilton, Ont.  
 VE4 — Len Cuff, VE4LC, 236 Rutland St., St. James, Man.  
 VE5 — Fred Ward, VE5OP, 899 Connaught Ave., Moose Jaw, Sask.  
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 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 Namau Dr., Honolulu, T. H.  
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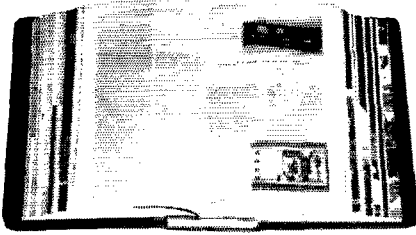
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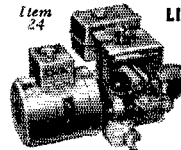
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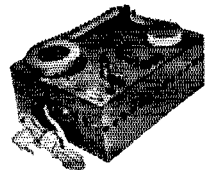
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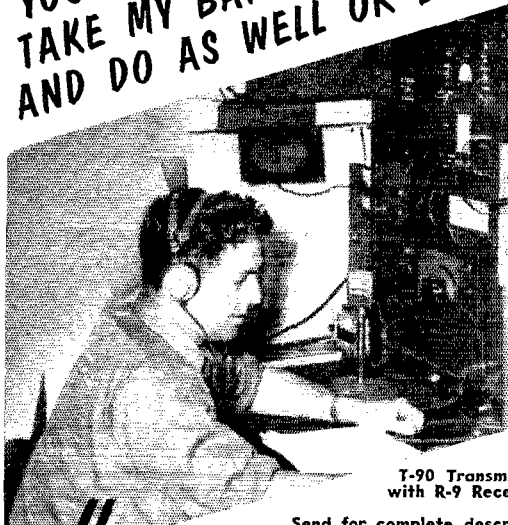
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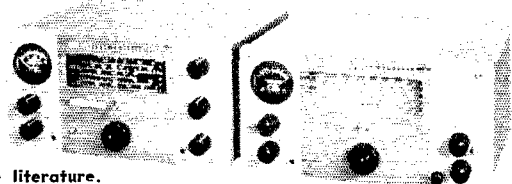


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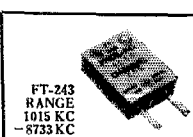
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376	397	420	490	512	536	444	466
377	398	422	491	513	537	445	469
379	401	423	492	514	538	446	470
380	402	424	493	515		447	472
381	403	425	494	516		448	473
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384	405	427	496	519		451	475
385	406	431	497	520		452	476
386	407	433	498	522		453	477
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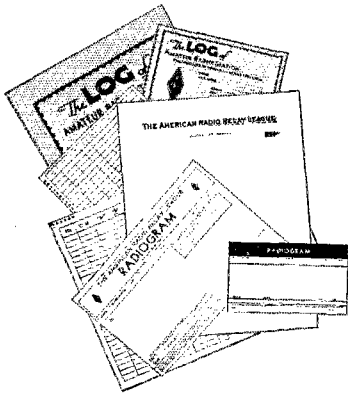
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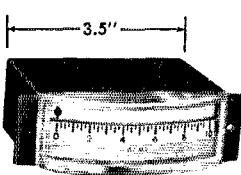
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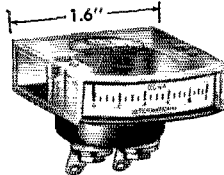
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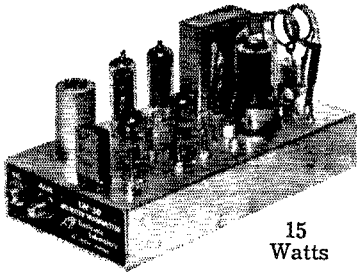
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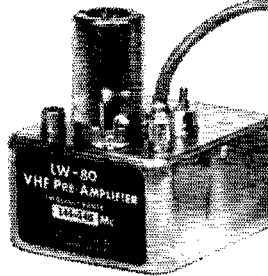
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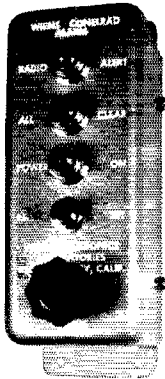


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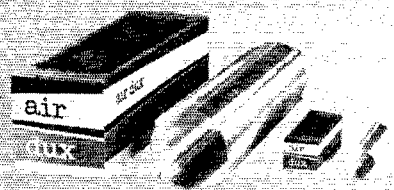


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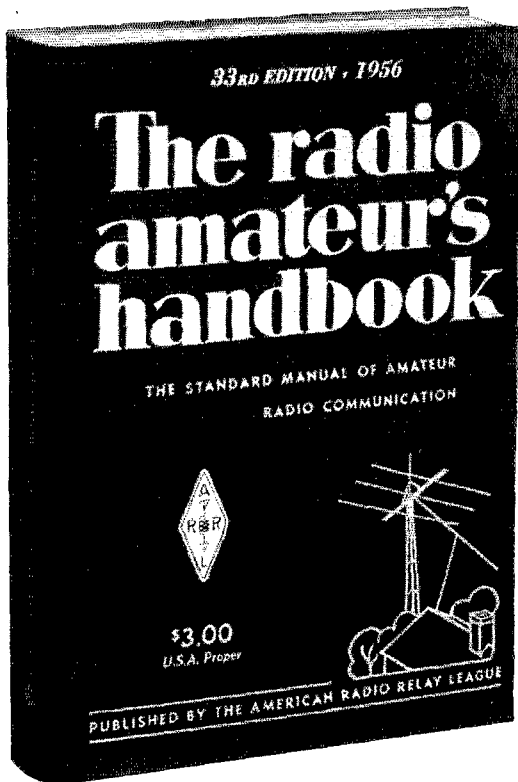
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**MICHIGAN HAMSI** Amateur supplies, standard brands. Store hours 0800 to 1800 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 605 Church St., Ann Arbor, Michigan. Tel. NOrmandy 8-8696, NOrmandy 8-8262.

**WANTED:** All types aircraft & ground transmitters, receivers, ART-13, RT18/ARC1, R5/ARN7, BC610E, BC221 mounts and parts wanted. Fairlest prices possible paid. Dames, W2KUW, 308 Hickory St., Clifton, N. J.

**PANORAMIC** Adapter AN/APA-10 Tech. Manuals \$2.75 postpaid in U. S. A. Electrorcraft, 27 Milburn St., Bronxville 8, N. Y.

**DX-O-GRAPE:** The DX man's guide for band conditions. Know when, where, how to get DXers use it. \$2.50. Request flyer. Box 4596, Winston-Salem, N. C.

**RECEIVERS** repaired and aligned by competent engineers, using factory standard instruments. Hallcrafters, Hammarlund, National, Collins authorized service station. Our twentieth year. Douglas Instrument Laboratory, 176 Norfolk Ave., Boston 19, Mass.

**NEW ICA** deluxe Signatone Code Oscillator (Reg. \$15.75); Special, \$7.95. Key, \$1.35 extra. Surplus RG-8/U cable, 100 ft., \$5.95, 250 ft., \$13.25, 500 ft., \$25.00. Free Bargain Bulletin. Visit store for unadvertised bargains. Lectronic Research, 719 Arch St., Philadelphia 6, Pa.

**OUTSTANDING** ham list revised monthly. Our prices on trade-ins are realistic and down to earth. We feature Johnson, National, Collins, Hallcrafters, Gonset, Elmac, Harvey-Wells, Morrow, Central Electronics and all leaders. We trade easy and offer time payments tailored for you. All leading brands of equipment in stock. Write today for latest bulletin and a copy of our new catalog just released. Alan Burghardt, W9BJV, Burghardt Radio Supply, Inc., Box 746, Watertown, N. D.

**MULTI-BAND** Antenna, 80-40-20-10, \$18.95. Patented. Send stamp for information. Attn Radio Laboratories, Owensboro, Ky. UFO Patrol data. W5CA.

**ATTENTION** Mobileers! Leeco-Neville 6 volt 100 amp. system alternator, regulator & rectifier, \$60.00. Also Leeco-Neville 12-volt 100 amp. system alternator, regulator & rectifier, \$85.00. Good condition. H. A. Zimmermann Jr., K2PAT, 570 Jamaica Ave., Brooklyn 8, N. Y. Ulster 2-3472.

U. S. A. DX QSL Co-op. Free information write: Bill Tagan, W0DVN, P. O. Box 5938, Kansas City 11, Mo.

**WANTED:** QST March and May 1916 \$25.00 each or will swap any eight 1917 or 1919 issues for each. Have 1935 to 1954 complete. Four issues or more at 25¢ each. W6MXX, 1022 N. Rockhill Rd., Rock Hill 19, Mo.

**CASH** for your gear. We buy as well as sell. Write for cash offer or trade. We stock Elmac, Gonset, Hallcrafters, Hammarlund, Johnson, Lyco, Master Mobile, Morrow, National and other ham gear. H & H Electronic Supply, Inc., 506 Kishwaukee St., Rockford, Ill.

**HEATHKIT** and Johnson equipment wired and tested. Write Matt, 2322 So. 2nd Ave., No. Riverside, Ill

**QSL'S? SWL'S?** Largest variety and finest samples, 25¢ (refunded) Callbooks (latest) \$4.00. "Rus" Sackers, W8DED, P. O. Box 218, Holland, Mich.

**QSL'S-SWLS:** Meade W0KXL, 1507 Central Avenue, Kansas City, Kans.

**QSL'S-SWLS:** 100, \$2.85 up. Samples 10¢. Griffith, W3FSW, 1042 Pine Heights Ave., Baltimore, Md.

**QSL'S:** Nice designs. Samples. Beseparis, W3QCC, 207 S. Balliet St., Frackville, Pa.

**QSL Specialists:** Distinctive. Samples free. DRJ Studios, 1811 No. Lowell Ave., Chicago 39, Ill.

**DELUXE QSL'S**—Pretty, W2HAZ, Box 27, Trenton, N. J. Samples 10¢.

**QSL'S-SWLS:** Samples free. Bartnoski, W2CVE Press, Williams-town, N. J.

**QSL's of distinction!** Three colors and up. 10¢ brings you samples of distinction. Uncle Fred, Box 86, Lynn, Penna.

**QSL'S:** Samples free. Albertson, W4HUD, Box 322, High Point, N. C.

**QSL'S "Brownie,"** W3CJI, 3110 Lehigh, Allentown, Penna. Samples 10¢; with catalogue, 25¢.

**QSL samples:** Dime, refunded. Roy Gale, W1BD, Waterford, Conn.

**QSL'S-SWLS:** Samples 10¢. Malgo Press, 1937 Glendale Ave., Toledo 14, Ohio.

**QSL'S:** Western states only. Fast delivery. Samples 10¢. Dauphinee, K0JCN, Box 66009, Mar Vista 66, Calif.

**WOODY'S** (Formerly Rosedale Press QSL'S), Box 164, Asher Sta., Little Rock, Ark.

**QSL'S:** Taprint, Union, Miss.

**QSL'S:** Postcard brings samples. Fred Leyden, W1NZJ, 454 Proctor Ave., Kevere 51, Mass.

**QSL'S, SWLS:** High quality. Reasonable prices. Samples. Bob Teach-out, W1FSV, 204 Adams St., Rutland, Vt.

**QSL'S Multicolor:** all kinds, all prices. Samples dime. Fast service. DX Cards, Kulik St., Clifton, N. J.

**QSL'S:** Comic, rural, Doctors!! Samples 10¢. C. Fritz, 1213 Briar-gate, Joliet, Ill.

**QSL'S:** Fluorescent, Rainbow, cartoons. All types. Samples 10¢. Catalog, 25¢. World Printing, 100 Barkley Avenue, Clifton, N. J.

**QSL'S:** Samples, dime. Printer, Corwith, Iowa.

**QSL'S-SWLS:** Samples free. Backus, 5318 Walker Ave., Richmond, Va.

**QSL'S-SWLS:** Samples free, W3EHA, Cy Jones, 840 The Terrace, North, Hagerstown, Md.

**QSL'S-SWLS:** Cartoons, colors, etc. Samples, 15¢ (refunded). Chris, W9PPA, 365 Terra Cotta, Crystal Lake, Ill.

**QSL'S-SWLS:** 2 colors, 125, \$2.00. Samples, 10¢. Bob Garra, Lehigh-ton, Penna.

**QSL'S:** The kind you want! Samples, 10¢. Graphic Crafts, Route 12, Ft. Wayne, Ind.

**QSL'S:** Something new, different, multicolored Jumbo on glossy stock or our beautiful blue, silver and gold on standard glossy cards either 100 for \$3.85 or 200 for \$7.50. Sorry no samples but satisfaction guaranteed. 2 days service. The Constantine Press, Bladensburg, Md.

**COLLINS 310B1** unmodified, \$185; UTC Kw plate transformer similar to CG306, 4000, 3500 volts ct. 500 Ma. CCS, \$40.00; Thordar-son choke 10 hv, 450 Ma, 10 Kv, insulation, \$8.00; UTC S-47 plate transformer 3000, 2500, 2000 volts ct. 300 Ma., \$15.00 cash only. Aaron Spiro, W2ZUC, 2739 Wallace Avenue, New York City, N. Y.

**FOR Sale:** AR-2 Heathkit recvr and cabinet. Like new: \$25.00. William Donohue, K2LIV, 46 Ford Ave., Freehold, N. J.

**FLORIDA** Bound! Stop at Tamishaw Motel, a Ham's Haven. North Trail, Ft. Myers, Fla. "Eb" Long, K4GBW.

**CASH** for BC-610E, BC-614E, BC-939, BC-729, BC-221, BC-312, 348, TCS, AN/GRC-9 and higher, and parts for all these. Amber Industrial Corporation, Surplus Div., 75 Varick Street, N. Y. C. 13, N. Y.

**FOR Sale:** SX-71; \$135; 32VI, \$325. Both are in excellent condition. C. B. Storey, W7TGT, 340 Wyoming Ave., Sheridan, Wyoming.

**COLLINS** K-W-1, in excellent condition, \$2500. F.o.b. location. National HRO-60, \$25.00. Electronic Devices, Inc., 642 Grant St., Pittsburgh 19, Penna.

**CLEANING** Shack! Have equipment for AM, SSB, Power supplies, rotator, Hi-Fi, air conditioner, books, magazines, test equipment for TV-Radio repair, few TVs and radio-phonos. Consider trades. Stamp for list, W4AP1, 1420 South Randolph, Arlington 4, Va.

**WANTED:** Viking Mobile, \$65 plus shipping, W9BOR.

**KEEP** your QSL's filed for quick reference in our Hammerloid Steel File, size 11" by 6 1/2", by 5" with alphabetical index. Will initial call letters if desired. State call. Send \$5.50. We pay shipping. G. Kaminski, 2814 Albion St., Toledo 6, Ohio.

**FOR Sale:** Never used, (3) 813s, \$5 ea; HK-54, \$2; 829B, \$5; (2) 815s, \$2 ea; Chi. xfrm 1100vct @ 300 Ma. w/matching coils, \$20. Gerald Edson, W7BII, 2323 N. 39th Pl., Phoenix, Ariz.

**RUBBER** Stamp: call, name and address, \$1.00, includes inking pad. Richard's, 2029T Bradley, Chicago 18, Ill.

**2-METER** beams: 6 element, horizontal or vertical, all seamless aluminum. \$6.95 prepaidd. Wholesale Supply Co., Lunenburg, Mass.

**WANTED:** ARC1, ART-13 transmitter. Write to W4VHG, Box 5878, Bethesda, Md.

**WANTED:** ART-13, ARC-3, ARN-6, ARN-7 test sets, other military surplus. Advise price, condx. We pay freight and C.O.D. James S. Spivey, Inc., 4908 Hampden Lane, Bethesda, Md.

**NATIONAL** NC-57B with "S" meter accessory. In gud condx: \$50. K2DIL, 1845 Greenport Rd., Far Rockaway 91, N. Y.

**FOR Sale:** Collins 32V-3, \$500; 75A-2 with calibrator and speaker, \$300.00, both perfect. Herb Hollister, W0DRD, 709 Baseline, Boulder, Colo.

**VERTICAL** antenna: 20-40-80M, \$59.50 to \$89.50. Information on request. El Cajon Electronic Engineering Enterprises, Building 4, Gillespie Field, Santee, Calif.

**ENGRAVING:** Call letters white on black, 2" x 8", \$1.50; Key-chains 1" x 3", 50¢; also signs, trophies, plaques, nameplates, panels, etc. Inquiries invited. "Cliff" Head, W2FKH, 443 Fayette St., Bridgeton, N. J.

FREE List! New and used. AM, CW, SSB, RTTY, mobile equipment. New time payment plan saves you money. Get your copy today. Dossett, 355 North Columbia, Frankfort, Ind.

BC-3480 with 110 V. rectifier and headsets, \$65.00. Leonard Quitt, 25 West 88th St., New York, N. Y.

SELLING: 32V2-HT18-500 watt phone-KW final and modulator. High voltage power supplies. Pick up real bargains. Want: Viking Ranger or equivalent Multi-band beam and tower. C. Greene, W2PCI, 107 W. Center St., Clayton, N. J.

300 imprinted labels with name and address. Two color, silver and blue on mirror finish, gummed stock, for \$1.00. 300 extra labels free if you order 1000 labels. Labels in handy pad form. Size is 1 1/2" x 3". I. Smith, Rainbow Press, 816 Maple Ave., NW, New Philadelphia, Ohio.

SELL/Swap new, never used: Triplett 3434A. Westinghouse 6v/600/175 Ma. dynamotor, \$15.00; new PE103 in crate, \$35.00; GR583A power output meter, just factory checked, \$75.00 (new cost \$145.00); new Heath AG7 Sine/Square and IM1 analyzer on 16" black panel like new REL 0465 FM tuner/amplifier, \$200.00 (new cost \$345.00). Want: Comm. trans., Viking IIR or Ranger or what have you? W9MAQ, 1627 Emerson, Beloit, Wis.

VAN SICKLE has the NC-300s and SX-100s. Big trades, too! Gene, W9KIF, 1320 Calhoun, Ft. Wayne, Ind.

SELL: QSI's: January 1939 through December 1949, \$30.00. Luternau, 32 NW. 4th, Oklahoma City, Okla.

TRADE new BC221M frequency meter, plus cash, for Hasselblad, Exacta 66, or Graflex Super D camera. Myskens, W7LX, P. O. Box 127, Port Orchard, Wash.

WANTED: Prop pitch motor. Sell: TR4 rotor and indicator, used one day, \$20.00; mobile power supply Carter 6 volt inp. 600 at 170 Ma. outp. relays break Hi and low voltages; filtered; Mallory 551 Vira-pack, Terminal box plug-in for Elmac rec/xmitter push-to-talk, 2-meter, bridge, 200 watts, 2000 Hz, \$25.00; N4100A5, \$45.00. Will pay shipping costs. DL4XJ, Bonham, 1972 AACRSRN, A.P.O. 131, NYC.

SELL NC125 receiver with speaker: \$125.00. W2NDY, John A. Zender, 311 Garden St., Carlstadt, N. J.

SALE: RME MC-55 five-band converter, 6-12 volts. New, used one week, \$50.00. Hallicrafters HT-18 VFO, CW-NBFM, in A-1 condx, all tubes, instruction book, \$45.00. Viking Adventurer, wired, tested, new, \$45.00. R. Hertzberg, W2DJJ, 241-16 Alameda Ave., Douglaston 62, L. I., N. Y.

WANTED: ART-13 and ARC-3 equipment. Let me know what you have and the price. B. Spivey, 3117 Kolling Rd., Chevy Chase, Md.

SELL: B&W-K antenna switch, \$18.00; Tecraft 144-148 Mc. converter, \$25.00. A. H. Hardwick, W2JQ, Orange, N. J.

BEST offer (takes all: cash and carry, home-built: 600 V 1 1/2 amp.; 300v. 250 ml. VFO; modulator and xmitter, two-thirds constructed workbench. New York City. Tel. LU 4-3375 on Tuesdays or Thursdays after 9:30 P.M.

RAYTHEON 15 amp. auto transformer; antique Westinghouse 1922 180-700 watts for 3 C-X-12 tubes; power supply and modulator for ARC-3-4 Mc. 100 watt; RC-459A, 40 to 6 meters, 30 watts; 1-23 2-meter xmitter with 829B final, 100 watts; 2-meter 350 watt amplifier, pair 351G6, four 351G6, 50 at 10 amp. xmitter, VHP-152. Make an offer on each item. ar. P. O. Box. Want: WHF 20-15-10. W3VAM, Grounds, 1805 Gilbert Ave., Hagerstown, Md.

FOR Sale: RME-45 with speaker, \$75.00; model A sideband slicer with AP1, \$45.00, W9SA, Dr. George Postels, 1533 Hawthorne, Deerfield, Ill.

SALE: KW 6AG7 osc., 307, PP813s. Speech amplifier with 811 pp modulator, J3B2 rectifier, antenna tuner, all tubes with spares and meters, 2.5 Kw variac. In 6 ft. enclosed metal cabinet. Never on air due to passing of W2QEN. Asking \$200. Mrs. F. H. Wood, R.D. #2, Salem, N. J.

LEECE-NEVILLE 12 v. 100A alternator, regulator, rectifier, new, \$100; General Electric Inductotherm, complete, crated, \$20; 5514 modulators using CMV-4 with 1500 VDC 280 Ma., supply, \$75. Worth \$130. New 80HDV, 40HDV, jack bar, link assembly, 3783 link, \$16.00; Cardwell XG50XD condenser, \$5.00; new Weston 20" sq. meters, two 0-500 Ma., two 0-50 Ma., \$2.00 each; Mallard 800 base coil, \$5.00; Taylor tester, 2-200 watt socket, \$5.00. Want small prop pitch motor with transformer. All offerings F.o.b. Midland, Mich. W8LJV, Nash, 134 Ashman Circle.

SALE: Adventurer kit and NC-88, \$120.00; in gud condx. Come and get it. R. Myers, K2KIQ, 735 Michigan Ave., Kenilworth, N. J. Tel. CH 5-4249.

GLOBE KING 400 C 10 to 160 meters, TVI suppressed; antenna tuner to match; Hallicrafters VFO, in perfect shape, complete, \$400.00; Sonar SK1-120-100W mobile or 110 AC with VFO and AC power supply, in perfect condition, \$150.00; Elmac PMR-GA rec with 6 volt power supply, perfect condition. First \$95 buys it. Also have 1955 Drake Q multiplier, brand-new, in factory carton, #21. H. Webb, K2GKH, 125 Ocean Avenue, Jersey City, N. J.

SELL: HRO-60 receiver with speaker and extra AC coil set, like new, \$330; Viking II transmitter, factory-wired, TVI suppressed, with tubes, like new, \$195; Millen 90810 transmitter with blower, custom-built modulator power supply tubes, \$95. L. L. Caudle, Jr., W4BOM, 1427 Woodland Dr., Charlotte 5, N. C. Phone FR 5-4051.

SELL-Trade: 3 modulators PP 807s, 100 watts, \$22 each; 3 modulators PP 616s, 40 watts, \$7.00 each; modulators almost new, 12 dynamotors 0 v. 425 v. 375 Ma., \$15.00 each; 400 v. 90 Ma. Vira-pack, \$7.00; complete new 30-watt 80-40 meter CW xmitter with 100 ft. new 58 ohm coax \$30.00. Dual supply, 1000 v. 275 Ma. and 400 v. 125 Ma., \$22. Need: Grid driver, receiver. Zuchora, W8QKU, 2748 Meade St., Detroit 12, Mich.

S-20R receiver. In gud wkg condx and appearance, \$45 or best offer. W1TPM, 51 Pembroke Ave., Providence, R. I.

SELLING Out: Hickok 195B scope, \$75.00; SCR522 including manual, \$25.00; Gonset test meter converter, \$15.00; Telrad frequency standard, \$18.00; Wilcox fixed frequency receiver, \$25.00; McElroy Electronic Keyer with complete set of linked tapes, \$25.00; T126/ARC5 2 meter xmitter, \$22.50; BC696A 3-4 Mc. xmitter, \$8.00; MDY-ARC5 modulator with dynamotor, \$7.50; 456E modulator with dynamotor \$3.00; commercial heat frequency audio oscillator \$15.00; 4" Brophlex high speed key, \$10.00; Par-Metal enclosed 6 ft. relay rack, \$20.00. Miscellaneous meter, coils, condensers, Karl Neuirth, 16 May Place, Nutley 10, N. J.

HALLICRAFTERS SX-71 one month old, perfect, \$175.00; also Celoso 25 v. xmitter, phone/CW VFO, in new condx, \$350 value for only \$200. W2LZY, 58 Warwick St., Iselin, N. J.

FOR Sale: 20-meter TVI-suppressed, final, 250 watts, \$40.00; 75-meter whip ant. with base loading coil; \$4.50; 25 watt 75-m. mobile xmitter with VFO, cabinet 5' x 3' x 10", \$200.00; Tri-Band Gonset converter, \$28.00; Mallory 6 volt vibrator supply, 400 V., 150 Ma., \$20.00. Ester, W9OEV, 149 Harrison, De Kalb, Ill.

COLLINS 32V2 xmitter for sale. In excellent condx: \$400. Will ship a reasonable distance. W2URM, Pete Unchur, RF'D #5, Amsterdam, N. Y.

VIKING Mobile, in excellent condx, no bugs: \$70.00 or will consider trades. Stevenson, 71-B Hilltop, Manhattan, Kansas.

WANTED: Complete used mobile rig. Must be for 12 v. system. Contact: Ronnie Gann, W1FGF, c/o ARRL, 38 LaSalle Rd., West Hartford 7, Conn.

SELL: Heathkit 6-watt amplifier: VHF 152A, W9R0V, Dakota, Ill.

FOR Sale: 1 TCS-9 transmitter; 1 TCS 9 receiver, unmodified. Guaranteed perfect condition. First \$100 takes it F.o.b. W4RHB, Floyd Clayton, P. O. Box 463, Edenton, N. C.

COMPLETE mobile rig: Elmac AS4H; Morrow 4BR dynamotor 600 v. 225 Ma.; Master Mobile stainless mount, Hy Q coil whip, coax and control relays. In operation now and new condition, \$150. W4KGR, Bob Reagan, 2401 Parkway Dr., Winston Salem, N. C.

WANTED: Model No. 380 Simkison wavemeter modulation indicator complete with coils, etc. State ppd. price and condition in first letter. Harold Morris, K0AEK, 4390 West 17th Ave., Denver, Colorado.

SELL or swap: 20A with VFO, 200 watt linear; pair 4-125As, 36" cabinets, long list of parts, transformers, meters, etc. Want mobile gear, DLX-10, 10 meter beam or? W5KLM, 3210, Sue Ann, Wichita Falls, Texas.

CADILLAC: Ideal CD mobile unit, 7-passenger, General Dual-8 tires, pp tubes, power windows, duals, injector, red light, siren, 80 amp. Leece-Neville, 10, 2 meter and BC antennae, complete power and control cables for 2 rigs. 1947 model 75, in excellent condition. Bill Fricke rebuilt motor, 1953, 7 ft. steel & oak platform on roof with steps. Sacrifice 10% of cost. Larry Racies, 140 East 46th St., N. Y. Tel. PL 5-9300.

SELL: Collins 353A-08 plug-in mechanical filter for HRO or Super Pro, \$40.00; RME MD, 100 speed clipper, \$20; Master Mobile 4333 loading coil to 40 meters, \$5.00; Meters 2 amp and 3 amp. RF, \$5.00 each; 3" 200 ma. meter \$4.00; all like new. Following new: 3" meters 100 Ma. and 500 Ma., \$5.00 each; National 175-A choke, \$2.50; 4D32, \$12.00. Woolfries, W9DSE, Box 1264, Sioux City, Iowa.

NOVICES! A Hallicrafters S-53A receiver and Heathkit AT-1. In excellent condition, \$65. Carl Moje, K2JQB, 540 Marshall Drive Hoboken, New Jersey, Tel. HO 2-4380.

FOR Sale: Amateurs - Experimenters! Have a variety of items for sale: R44 receiver, crystal calibrator, power supplies, transformers, blowers, condensers, meters, etc. New and used. Send for list. H. C. Franke, P. O. Box 11, Morristown, N. J.

FOR Sale: Mobile radio complete: Elmac xmitter A 54H, Sonar R3 receiver, Mallory dual vibrator, relays, etc., \$175.00 or best offer. Also VHF 152A, \$50.00. All gear in first class condition. H. B. Pearson, W2G6A, 98 21st St., Brooklyn 32, N. Y.

WANTNA extend the 2-meter range without fuss or bother? Telrex optimum-spaced, wide-spaced long wave, precision tuned and matched, fed with 200 or 32 ohm, will do the job! 6 element 1 1/2 wave-lengths, \$12.50; 8 element, 2 wave-lengths, \$13.75; 15 element 4 wave-lengths, \$39.25. Rugged light weight design with built-in performance and no adjustments of any kind. Four bays, vertically stacked 15 element units provide better than 20 honest DBs with patterns comparable to 60 ft. parabola. Write for data or order through your distributor. Telrex, Inc., Asbury Park, N. J.

BARGAINS: Viking I (TVI-suppressed), \$175.00; Lysox 600, \$70.00; 32V2 (TVI-suppressed), \$395.00; 75A3, \$425.00. All in A-1 shape. Several tubeless TV chassis (lots of parts), \$5.00. Want Gonset G66 and G77. All gear F.o.b. W3EEB, Justis, Box 3145, Newport, Del.

SELL: 250-watt rig, 813 final, 811s modulator, speech ampfi., power supply, for best offer. Also: BC-696 with pwr supply, very neat, in cabinet; 10 watt 80 meter fone rig, complete; Rek-O-Kut turntable with cutting mechanism. Want: Johnson Matchbox or Bandmaster 2-meter, 2-watt, 2000 Hz. Bob Monerett, W6ZRK, 1521 Michigan, Los Angeles 33, Calif. Tel. Angelus 2-5290.

SELL: Heathkit 0-6 5/8" oscilloscope. Except for testing and checking voltages, I have never used it. \$30.00. Philco signal generator, 120 Kc. 70 Mc. Old, but still accurate enough for ordinary alignment purposes. Philco signal tracer. In good condx. Either one, \$10.00; R4/ARR2, with tubes and dynamotor. Unmodified. In gud condx, \$99.90. 300 volt 55 Ma. power supply, \$5.00; 832-A. Brand new, \$11.00; shielded socket for 832-A. Brand new, \$1.50; pair of 388A doorknob tubes and three 8012s, 50¢ apc; Ghirardi's Troubleshooter's Handbook, \$5.00; Radio Operating QNA, Nilson & Hornung, \$3.00; Sam's Postwar Audio Amplifier Manual, \$3.00. Cecil Baumgartner, Box 343, Milton, Pa.

FOR Sale: Cash, complete mobile station, Elmac, Gonset, Carter, Master, Relays, Also, excess transmitter parts. W4MA.

HOUSECLEANING: Gonset 2-meter Communicator, perfect, \$145.00; Magnetone recorder (Brush BK-401 tape deck) good condition, \$5.00. Wharfside Super-S CS-AL tweeter, unused, \$12.50. Walnut jensen bass reflect cabinet for 12"-11 1/2" speaker, \$15.00 (won't ship). Electro-Voice 1000 speech clipper, perfect, \$8.00. Bob Lewin, W2PIE, 28 Fenimore Drive, Harrison, N. Y.

KWS-1 for sale. Used 12 hours, \$1700. W9PQS, Dr. Tamulis, 2101 State St., Granite City, Ill.

FOR Sale: Meissner EX signal shifter, \$40; 90 watt final & P/S, \$15; RMEDB22A, \$20; receiver BC-639 100-156 Mcs with P/S, \$35; Triumph 3" scope, \$22; new 60 watt modulation transformer \$30.00; \$5.00; 90 watt 2 meter transmitter, RF section made by Federal, includes Tecraft converter, mounted in 4" rack, completely metered, 3 months old, \$150. Charles Copp, W2ZSD, 3 West Drive, Port Washington, N. Y. Tel. PO 7-2271.

WANTED: Collins KWI transmitter. State price and condition, also set sound powered phones. W9MLY, Box 185, Perry, Iowa.

5BPI oscilloscope tubes, \$1.00 each prepaid in the United States. F. C. Pratt, 1257-B St., Hayward, Calif.

SX-71 with speaker, \$160, or swap for Communicator II; 847" enclosed relay rack with door, \$30; (pick-up deal only); Heath 0-9 scope, \$50; Heath TS-3 TV generator, \$35.00; Thordarson transformer, 2580 CT at 300 miles, \$15.00; Granco model LCTI HF converter, \$10.00. All like new. Irvington, N. J. A. E. Kimmel, 936 Chancellor Ave., Irvington, N. J.

BARGAINS: with new guarantee: S 3RD, \$39.50; S-40A or S-77, \$69.00; S-47C, \$59.00; HFS w/pow. supply, \$99.00; Lyco 600, \$79.00; S-27, \$79.00; S-76, \$149.00; SX-71, \$159.00; SX-96, \$189.00; HQ 140X, \$199.00; SX-42, \$199.00; HRO-50T1, \$299.00; Collins 75A3, \$375.00; Sonar VFX 680, \$29.50; Elicio TR75TV, \$35.00; Heath AT-1, \$4.50; Mike, \$2.50; HT-47, \$29.95; EX-Smitter, \$35.00; Globe Scout 40A, \$69.50; Globe Trader, \$49.50; HT18, \$59.00; Harvey Wells Sr., \$69.00; Elmac A-54H, \$89.00; PSA-500, \$27.50; Viking I, \$159.00; Viking II, \$229.00; Globe King 275, \$249.00; Globe King 400A, \$299.00; 32V1, \$325.00; 32V2, \$375.00; and many others. Free trial. Terms financed by Leo, W6GFO. Write for catalog and deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

TRMENDOUS bargains: New and reconditioned Collins, Hallicrafters, National, Johnson, Elmac, all others. Completely reconditioned with new guarantee. Hallicrafters S38, \$29.00; S40B, \$79.00; SX71, \$149.00; SX62, \$159.00; SX96, \$199.00; HQ129X, \$159.00; HQ140X, \$199.00; National NC125, \$129.00; NC173, \$139.00; NC183, \$179.00; HRO50T, \$229.00; NC183D; HRO50T1; HRO60; Collins 75A1, \$249.00; 75A2, \$299.00; 75A3, \$399.00; 32V1; 32V2; 32V3; Viking Ranger; Viking II; large stock of mobile receivers, transmitters, converters, hundreds of other items. Easy terms. Shipped on trial. Write for free list. Henry Radio, Butler, Missouri.

WANT Auto writing head for perforated tape. Drive and polar relay not required. State make, model, condx, price. Nisbet, W8ZLH, Box 243, Bryan, Ohio.

NC-98 receiver, \$110; MB-40SL tank, \$8.00. All like brand-new. W3VAG, Riderwood, Maryland. Phone VA 3-1759.

WANT: ARC-1, ART-13, DV-17, CU-25, BC-610, BC-614, BC-930, BC-221, BC-312, BC-342, BC-348, TD\*7, APR-4, 32V, 75A, teletype, Boehme, test equip., manuals, ICS dynamotors, amateur receivers, transmitters, and best deals to New National NC-300, Hallicrafters SX-100, Hammarlund PRC-310, HQ-140X, B&W 5100B, Johnson Viking, Ranger, Conset, Elmac, Morrow, Telrex, Kuehne, Fisher Hi-Fi, Penton, etc. Stores: 44 Canal, Boston, 60 Spring, Newport, R. I. Write: Tom, WIAFN, Alltronics, Boston 1, Mass. Phone: Richmond 2-0048, 2-0916.

SALE: 60 watt Multi-Match modulator and pwr supply, \$30.00. Scott Smithson, Colonial Beach, Va.

FOR Sale: Heathkit AT-1, VF-1, AC-1, Like new, \$55.00. B. H. Cathey, K4ALG, 265 S. Main, Davidson, N. C.

VIKING Ranger in original carton, \$195.00. Looks like new. Works perfectly. John Miller, 17 Polster Drive, Evansville, Ind.

SELLING VHS-152A, \$40; Precision E-400 FM signal generator with xtals, \$85. John Holmbeck, W9KZO, 853 Lincoln St., Burlington, Wis.

TROJAN battery charger, like new, 36-cell capacity, charges 6-12-24, etc at the same time, extra non-hull, \$30; Seabeam electric heater with blower, in gud condx, \$5.00; portable Remington typewriter and case, 4 row keyboard exc. condx, \$25; A eliminator 6V gen. xtals. Send stamp for detailed list. Cash or trade for Trade new blood pressure gauge, complete w/ instrc. book and stethoscope, 12 gauge Ithaca trap gun, L. Blum, 1587 Kent St., Columbus 8, Ohio.

SEATTLE: For sale, Viking Ranger, \$180; 75A2 w/spkr, \$300. John Leeson, W1WZK, 2846 W. 67th St., Seattle, 7, Wash.

GOING Mobile! Viking II, filter, coax relay, \$220; SX-71, matching speaker, \$125; Heath VFO, Q-multiplier, Bud calibrator, CDE rotator, balun, Special price on lot sale. All inquiries will be answered. F.o.b. Ft. Worth, Texas. K5ADD, Box 289, Carswell AFB, Texas.

NATIONAL HRO-60 with R-42 speaker, in new condx, \$400; Johnson Viking I with Viking VFO custom-wired including spare new 929-B, \$200. Andy Martin, W6UC, Box 264, Carmel, Calif.

FOR Sale or trade: Crystal mike, \$5.00; desk mike stand, \$2.00; portable mil, \$10; General Electric LB-530 self-charging 3-way portable radio, \$25; all in excellent condx, priced F.o.b. V. R. Hein, 418 Gregory, Rockford, Illinois.

JOHNSON Viking Adventurer, \$44.95; VFO, \$44.95; Mobile, \$99.95; L-TV, \$249.95; II, \$265.00; mobile VFO, \$34.95; Matchbox, \$39.95; vco, \$29.95; 43, \$9.95; 43, \$29.95; 500, \$79.95; 600, \$99.95; 600, \$129.95; 650, \$69.95; A-180, \$9.95; 381, \$14.95; Harvey-Wells APS-50, \$29.95; VFO, \$37.50; TBS-50C, \$69.95; TBS-50D, \$49.95; National HFS, \$99.95; HRO-M, \$99.95; HRO-3, \$99.95; HRO-60, \$399.95; 1-10, \$29.95; NC-57, \$69.95; NC-98, \$119.95; NC-100, \$75.00; NC-173, \$129.95; NC-183D, \$299.95; NC-200, \$124.95; HFS, \$99.95; C-13, \$17.50; SW, \$4.50; G. Ganset 10-1, \$24.95; 3001, \$5.95; 3008, \$29.95; 3011, \$24.95; 3028, \$29.95; 3030, \$39.95; 3041, \$39.95. Other used items available; write for list. Evans Radio, Concord, N. H.

I KW Temco with plug-in units, \$785; Collins 75A1 Rec., \$225; BC610D, \$350; DB22A, \$30; SX42, \$95; Panadapter, \$25; BC224B, \$70. W4SFW.

SELL or Trade: NC-98 receiver with matching speaker, in excellent condx, \$115, or will trade for Elmac AF-67 transmitter, S. Spilke 160 W. 174th St., Bronx 53, N. Y.

FOR Sale: Collins 75A1 receiver w/spkr, \$225; Central Electronics 20A exciter with Q1-1, \$190. W0ICY, Hoffman, Minn.

NATIONAL 183, in excellent condx. \$200. Will crate and ship PP anywhere in U. S. Matching speaker, \$10. Douglas Stone, W6QWJ/4, 2929 Salpan Dr., Tarawa Terrace, N. C.

RECEIVER: Collins 75A-1 with triple conversion unit and speaker; \$225. Eugene B. DeTurck, 841 47th Ave., San Francisco 21, Calif.

SELL: BC342 receiver with xtal filter. In fine condx, \$50.00. K2GFG, 76 Hewlett, Rye, N. Y.

SELL: Central Electronics 10B exciter, \$119; HRO-50A1, \$149; Viking I, \$169; HQ-140X, \$189; Want ART-13, ARC-1, BC-610, Collins 310B. Cash or trade. Tom Howard, WIAFN, 46 Mt. Vernon St., Boston 8, Mass. Tel. Richmond 2-0916.

WANTED: Collins 75A1 receiver. Please state condition and price. H. B. Goss, W1AB, Box 157, Essex, Conn.

NEON-GLO desk call-signs, \$2.00. Write: Hulvey, W9PLW, 4325 Johnson St., Gary, Ind.

SELL: HQ-129X, fine condition, \$140. W2ZMK, 35-52 64th St., Woodside 77, L. I., N. Y.

FOR Sale: All perfect: 32V3 as new, \$475; 32V2 1/2 Perf. like V3, \$400; HQ-129X, perf., \$135; Lettine Mod. 240 xmitter, \$35.00; MB150 final tank, \$12.50; MB20, \$6.50; B.W. BTCL 5bd turr, 3 wts, \$5; Conset signal slicer (455 Kc), \$20; ST 202A mobile kit, \$25; 807-10 mtr. mobile xmitter and Carter gen., \$30. E. D. Flynn, W9IHD, 3118 N. Francisco Ave., Chicago 18, Ill.

SELL: Complete 40-watt fone/c.w. station: S-40B rcvr, Lettine 240 xmitter, Heathkit VFO, antenna coupler, coils 80 thru 10 M., xtal calibrator, xtal mike, key, \$159 firm. S-38A, \$24. Local sale. K2AQE, Gano, 159 Marlborough Road, Brooklyn, N. Y.

SALE: SX-42 receiver with tilt base, operating, gud mech. condx, needs minor repair and adjustment, \$125.00. In ex. instructo-graph with 12 tapes, \$50; Hallicrafters K-42 base-reflex speaker, \$25. Radio City Products V-1 voltmeter, \$15. Col. Chatfield, Ord Corps, OML, Redstone Arsenal, Huntsville, Ala.

BUY Heathkit, Johnson Viking, Tecraft and other equipment wired and tested direct. New Heath DX-100 Transmitter wired and tested, \$241.50 complete. Free list of reconditioned equipment, trades and terms. J. Lynch Electronic Co., P. O. Box 54, Glen Oaks Branch, Floral Park, N. Y., N. Y.

ATTENTION Communicator Owners! Want an Illuminated "S Meter" which can be attached in 10 seconds, that requires no cutting, soldering, or disassembling? Write R. T. Graham, W1K7J, Graham Company, Stoneham, Mass.

CALL letter signs for car, operating desk, shack, etc. Yellow translucent plastic sign with 1 1/2 in. black letters, \$1.00 each. The Plastic Shop, 5100 "Y" St., Lincoln, Nebr.

RECEIVER Scott RC87, \$87.50; UTC LS-12 low impedance to PP grids, \$9.75; three 6AQ5, \$2.25; pair 829B's, \$14.00; three 5763s, \$3.75; four 860s, \$19.50; pair 809s, \$6.50; tubes unused; Vibroplex Original bug, \$10.95; GE 0-5 RF ammeter, \$22.95. Want: 2500 watt final with power supply, W2BE.

SELL or swap for Hi-Fi equipment: Hallicrafters SX-28 with speaker, AM-FM SX-62U, Hewlett-Packard 400A VTVM, General Electric CRO-5 scope, Sprague TO-2 analyzer, Presto 88A recording p.a. 50-watt amplifier, three broadcast quality microphones. All like-new condition. Make offer. KN4EKX, 45 Helen St., Melbourne, Fla.

VE Ham! Sale: TR75TV2 65 watts, complete, with VFO and coils for 20, 40 and 80 mtr bands. Also 8 crystals and extra set tubes, in excellent condx. Will ship prepaid. VE4BE, RCAF, Ft. Churchill, Manitoba, Canada.

WANT: Good mobile rig. Description and price in your first letter. Dr. Curt Mahowald, Parshall, N. Dak.

WANTED: New 4D32 tube. Roy Sawdey, 5255 Harper Rd., Solon, Ohio.

SELL: RME-84 receiver, like new, \$69.50. Bob Garra, 414 Mahoning St., Leighton, Penna.

TRADE for late model 8 or 16 mm movie camera and projector, 807, PP813amp LV-bias pwr on chassis, 2000 v, 400 mil. pwr supply Maj. C. Murगतroyd, W5UBU, 335 Gillette Blvd., San Antonio 4, Texas.

FOR Sale: NC-98 with speaker, \$125; also Johnson Adventurer, \$40, or best offer. Both are 10 months old and in excellent shape. W8VMR, Thomas DeLoach, 121 Jefferson, Blissfield, Mich.

SELL: Super-pro BC-889 in perfect condition. Stanley Rymau, Durex Hardware Corp., 527 West 34th St., New York, N. Y.

MIAMI and vicinity: Communications receivers repaired. Bryant Electronics, 13344 N.W. 7th Ave. Phone 84-4001.

FOR Sale: Central Electronics 20-A exciter with 80-20 VFO, \$185.00; BC-610 transmitter with speech amplifier, \$295.00. Wayne County Amateur Radio Association, W4GJS, Box 132, Goldsboro, N. C.

HEATHKIT V-5, \$15.00; VT-1, \$10; BE-3, \$20.00; T-3, \$15.00; 0-8, \$40.00; C-2, \$15.00; Eico 221, \$10.00; Telrex 20-meter 2, 4e Super Mini Beam, \$50. Precision 612 tube tester, \$45. W1ERX, 34 Emerson St., East Norwalk, Conn.

FOR Sale: Viking mobile trans. Viking mobile VFO, Conset Super-Six \$135; Matt Klapp, W2EQV, 17 Kenosha St., Albany 9, N. Y.

PERFORATED Aluminum sheet, .051, 5/64" OD holes, 1/2" centers, \$1.20 sq. ft.; cut to size. Send for listing on beams, aluminum tubing, etc. Radcliff's, Fostoria, Ohio.

WANTED: Early radio books and magazines dealing with crystal sets and 1-tube receivers. Send description and prices. G. E. Taylor, VE3BNJ, Graham, Ont., Canada.

150 Watt gene/xmitter: \$100, 1000 volt generator, \$50. Lorentz, 577 South 12th St., Newark 3, N. J.

SELL: Receivers w/spkr NC173, \$120; NC125, \$125; NC98, \$115; BC453, \$10; Eico 1040 eliminator, \$15; Heath TCIP, \$25. All plus shipping. M. J. Marshall, 455 Washington Ave., Dumont, N. J.

WREP has three excellent receivers. Will sell two of the following: SX28 - A real good one - just out of Douglas Instr. Labs with complete overhaul including new noise-limiter, Navy HRO model RAS 150 to 30,000 Kc with seven trays (they don't build 'em like this anymore), includes 15 meter xtal converter and Heath Q-multiplier, also NC300? Prefer local deal but will deliver up to 150 miles. R. L. Gibbons, 15 Everett St., Canton, Mass.

FOR Sale: Partially wired kilowatt amplifier for T-200 and four 838s modulators; two heavy power supplies, speech clipper and automatic C bias; brand-new cabinet. Write for pictures and more information. W. A. Kuehl, 6647 Kenton, Lincolnwood, Ill.

WANTED: Power supply unit PE-110. Ralph H. Schneider, 41 George St., Saratoga Springs, N. Y.

CASH and Carry! Viking II, Viking VFO factory-wired and calibrated, Viking Matchbox, Hallicrafters S-38, Never used, W4VQA, Ocala, Fla.

SELL: Collins 32V-1, spare 4D32, \$325.00, excellent one-owner condx; manual & orig. carton, 4 new Eimac 304th's, \$6 each. Chas. Kigel, W1DDL, Warren, Me.

DX-100 xmitter, wired and operating FB: \$240. W. Ives, W9QFX, Medford, Wisconsin.

LYSCO 600 and 20-watt modulator, like new, used very little: \$95. A complete bandswitching xmitter 60 to 10 meters; 35 watts; two BC458 xmitters one converted for single sideband with filament xfrmr, \$15; the other in very good condx, not converted: \$7.50. W8THJ, 104 E. Greene St., Piqua, Ohio.

HALLICRAFTERS S-76 receiver for sale. In perfectly new condx. Sacrifice at only \$135. W00MH, RFD #2, Hastings, Nebr.

TRANSMITTER-Receiver, BC654A, one complete except tubes, \$12.00; one junk, \$6.00; ARC-5 xmitters, two 4.0 to 5.3 Mc., \$3.00 each and two 5.3 to 7.0 Mc., \$3.00 each; two ARC-5 rcvrs 6.0 to 9.1 Mc., \$3.00 each. All ARC-5 units have tubes and are in gud condx. W6KEG, Woods, 2142 Parkway Dr., El Monte, Calif.



Designed for



Application



90672

**The No. 90672  
ANTENNA BRIDGE**

The Millen 90672 Antenna Bridge is an accurate and sensitive bridge for measuring impedances in the range of 5 to 500 ohms at radio frequencies up to 200 mc. It is entirely different in basic design from previous devices offered for this type service inasmuch as it employs no variable resistors of any sort. The variable element is an especially designed differential variable capacitor capable of high accuracy and permanency of calibration over a wide range of frequencies. A grid dip meter such as the Millen 90651 may be used as the source of RF signal. The bridge may be used to measure antenna radiation resistance, antenna resonance, transmission line impedance, standing wave ratio, receiver input impedance and many other radio frequency impedances. By means of the antenna bridge, an antenna matching unit may be adjusted so as to provide the minimum standing wave ratio on the radiation system at all frequencies.

**JAMES MILLEN  
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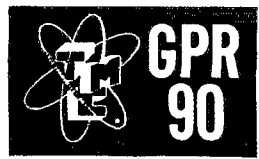


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... still more about the all new



Having told you how good  
the Receiver is, we now feel  
we have enough receivers  
in the field to detail  
all our complaints  
to date and give you  
the answers . . .



<u>Trouble</u>	<u>No. of Comp.</u>	<u>Explanations and Remedy</u>
High Hum Level	(1)	Replace defective 6V6 tube.
Birdies in BC band	(1)	Replace defective 6CB6 tube.
Birdies in all bands	(1)	Set located 1/2 block from 50 KW FM station. Remedy: Trap out FM station or move.
Calibration	(2)	Set was zero with WWV at one end and 1/2 division out at the other end (possible in general coverage receivers. Error, etc. is less than 0.01%). Remedy: Circuit for xtal calibrator sent.
Drift, HFO	(1)	Cold start error. All precision VFO instruments drift but will stabilize in about 20 minutes to 1 hour. Remedy: We replace the receiver and the customer is happy.
Noise Limiter	(1)	Set located where no limiter would eliminate all the noise (10 meters operated at base of heavily travelled avenue). Can't lick 'em all—We took it back.
Set Inoperative	(1)	Phono-Radio Switch in rear in "phono" position. Surprise !!!
Scratched Cabinet	(1)	Packer with heavy stapler hand and light heart. Remedy: Scratch one packer to large broom dept.
S-meter	(1)	Meter Reading not as great as on "X" receiver—We calibrate S-9 at 50 Microvolts. We could make it S-9 at 10 Microvolts. What'll you have ?
Audio Spread	(1)	It didn't work. Remedy: Read instruction book. Customer now very happy, (another one).



These are all the problems received to date—more later if we get any. Well, as far as we know, everyone is happy with the GPR-90 and if you are skeptical just listen to the chatter on the ham bands.

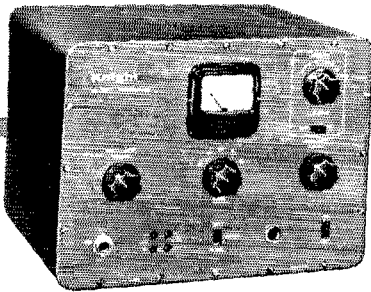
We must apologize for being totally unprepared for the rush of orders for the GPR-90, but deliveries are presently being made to the dealer within 30 days.

**THE TECHNICAL MATERIEL CORPORATION**  
 IN CANADA: TMC CANADA, LTD.  
 OTTAWA, ONTARIO  
 MAMARONECK, N. Y.

# Save Money

**BUILD YOUR OWN  
ENGINEERED-QUALITY**

## Ham Gear



Model SX-255

**Built-in Pi-Type Antenna Coupler**

**\$42<sup>50</sup>**

Check the features packed into this new transmitter kit and you'll see why it's one of the greatest Amateur values ever offered. Compact and versatile, it is the perfect low-power rig for the beginning Novice or seasoned veteran. Features: 50 watts input to 807 final; high-efficiency 6AG7 modified-Pierce oscillator takes crystal or VFO without circuit changes; bandswitching coverage of 80, 40, 20, 15, 11-10 meters; pi-section antenna output matches line impedances from 50 to 1200

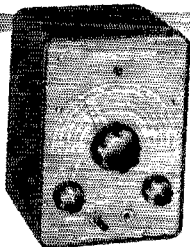
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They're better by far...

**BUY DIRECT AND SAVE:** Knight-Kits give you the last word in Amateur design and value. They're easy to build from crystal-clear manuals, and the performance is unequalled. Save money—buy direct—get top quality with these Knight-Kits.

### LOW COST knight-kit 50 WATT CW TRANSMITTER KIT

- Pi-Type Antenna Matching
- Bandswitching
- For 80 Through 10 Meters
- TVI Suppression

ohms—permits use with any type of antenna. Crisp, clean, cathode keying of oscillator and final. Power take-off plug supplies filament and B-plus voltages for other equipment. Copper-finished chassis and cabinet interior, filtering, shielding, bypassing, and coaxial SO-239 antenna connector provide excellent TVI suppression. Meter reads either plate or grid current of final. Jacks for VFO, crystal, and key. Supplied with all parts, tubes and step-by-step instructions. Less crystal and key. Size, 8 $\frac{3}{4}$  x 11 $\frac{3}{4}$  x 8 $\frac{3}{4}$ ". For 110-120 volts, 50-60 cycle AC. Shpg. wt., 18 lbs. **SX-255, 50-Watt Transmitter Kit. Net. . . . . \$42.50**



### knight-kit SELF-POWERED VFO KIT

Model S-725

**\$27<sup>50</sup>**

Complete with built-in power supply! Careful design and voltage regulation assure high stability. Excellent oscillator keying characteristic for fast break-in with clicks or chirps negligible. Full TVI suppression. Has plenty of bandspread: separate calibrated scales for 80, 40, 20, 15, 11 and 10 meters; vernier drive mechanism. 2-chassis construction keeps heat from frequency determining circuits. Output cable plugs into crystal socket of transmitter. Output on 80 and 40 meters. With Spot-Off-Transmit switch for "no swish" tuning. Extra switch contacts for operating relays and other equipment. Complete kit for easy assembly. Shpg. wt., 8 lbs.

Model S-725, Self-Powered VFO Kit. Net. . . . . **\$27.50**



### knight-kit CODE PRACTICE OSCILLATOR KIT

Model S-239

**\$4<sup>95</sup>**

Transistorized—  
Powered by Flash-  
light Battery

An ideal new code practice oscillator. Uses transistor circuit. Extremely low current consumption—powered by single penlight battery. Provides crisp, clear tone (400 to 600 cps). Has input jack for earphone; screw-type terminal strip for key. In compact bakelite case (2 $\frac{3}{4}$  x 3 $\frac{1}{4}$  x 1 $\frac{1}{4}$ "") with anodized aluminum panel. Complete with all parts, battery and easy-to-follow instructions. Shpg. wt., 1 lb. **Model S-239, Code Practice Oscillator Kit . . . . . \$4.95**

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It's packed with dozens of other Knight-Kit values and the largest selections of station gear—your complete buying guide to everything in Electronics. If you haven't a copy, write for it today.



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**Highest Trades.** Tell us what you've got and what you want—we'll go all-out to give you the top-dollar trade.

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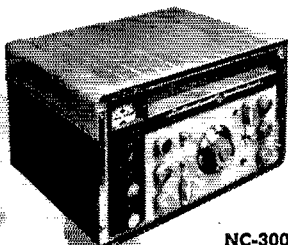
**Top Buys in Reconditioned Gear.** Send for our lists of big values in high quality reconditioned receivers, transmitters, mobile gear, etc. We've been trading high and wide and that means we've got top reconditioned buys for you.

## ALLIED RADIO

100 N. Western Ave., Dept. 15-B-6  
Chicago 80, Illinois

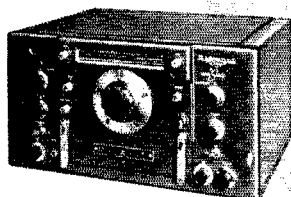
# world famous for quality dependability and value

... National Receivers set the standard for the industry—  
with a complete line for novice, SWL or old timer



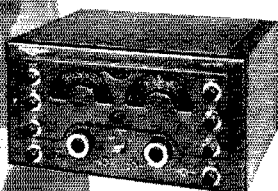
NC-300

The NC-300 incorporates all the features most hams want . . . at a price most hams are willing to pay! It features a sensitivity of 10 db noise figure on all amateur bands. Warm-up drift less than .01%. It has the longest slide rule dial ever . . . with 10 dial scales for coverage of 160 to 1 1/4 meters with National's exclusive new converter provision for 5 to 10 meters. These are only a few of the highlights!



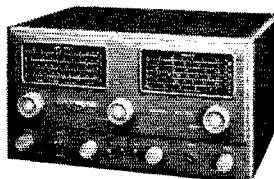
HRO-60

Latest and greatest of a great series! Frequency range: 1.7 to 30 mcs., additional coils available from 50 kc to 35 mcs. Gives you dual conversion on all frequencies above 7 mcs plus 12 permeability-tuned circuits in the three 456-kcs IF stages! Has current-regulated heaters in the high-frequency oscillator and the 6BE6 mixer. High-frequency oscillator and 8-meter amplifier are voltage regulated.



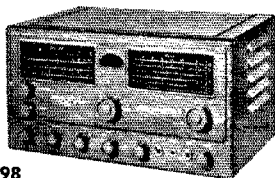
NC-183D

Has dual conversion above 4 mcs . . . steep-sided skirt selectivity with 3 IF stages (16 tuned circuits on the 3 high bands—12 on all other bands) plus a new crystal filter. Approximately 1 microvolt sensitivity on 6 meters for a 10db signal-to-noise ratio. Frequency range: .54 mcs to 31 mcs plus 47-55 mcs.



NC-88

Compare these features! Calibrated bandspread for 80, 40, 20, 15, 11 and 10 meter bands . . . advanced A. C. superhet circuit uses 8 high gain miniature tubes plus rectifier . . . covers 540 kcs to 40 mcs in 4 bands . . . tuned RF stage . . . two IF stages . . . 2 audio stages with phono input and two position tone control . . . built-in speaker . . . antenna trimmer . . . separate high frequency oscillator . . . sensitivity control . . . series valve noise limiter . . . delayed A. V. C. . . . headphone jack . . . standby-receive switch.



NC-98

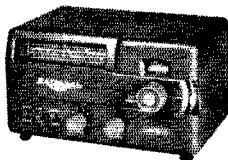
The lowest priced receiver with a crystal filter, the NC-98 has calibrated bandspread for 80, 40, 20, 15, 11 and 10 meter bands . . . advanced A. C. superhet circuit uses 8 high gain miniature tubes plus rectifier . . . covers 540 kcs to 40 mcs in 4 bands . . . tuned RF stage . . . two IF stages and 2 audio stages with phono input and two position tone control. ALSO, antenna trimmer, separate high frequency oscillator, sensitivity control, series valve noise limiter, delayed A. V. C., headphone jack, standby-receive switch. Available with a calibrated bandspread scale for the SWL bands.



NC-125

Frequency range: .56 to 35 mcs. Has built-in SELECT-O-JECT audio filter. Average sensitivity 3 microvolts for 10 db signal to noise ratio. Has AVC, noise limiter, voltage regulated stabilized oscillator. Audio system essentially flat to 10,000 cps. Provision for NFM Adaptor.

SW-54



The most astonishing little receiver on the market today! Covers broadcast and 3 shortwave bands—540 kcs to 30 mcs. Receives voice or code. Police, ship, amateur, foreign stations clearly marked. Uses new miniature tubes for improved sensitivity. Easy-to-read indirectly lighted scale. Accurate "logging scale" also provided. Provision for headphones. Send-Receive switch for "ham" use with transmitter. Measures only 11" x 7". AC-DC operation.

Write for National's New Receiver Catalog

*tuned to tomorrow*

**National** 

NATIONAL COMPANY, INC.  
62 SHERMAN STREET, MALDEN 48, MASSACHUSETTS

# RCA POWER TUBES

## CLASS C POWER AMPLIFIERS AND OSCILLATORS

RCA Type	Class of Service	Max. Plate Ratings			Max. Frequency for full input Mc	Heater (H) Filament Volts	Typical Operating Conditions						
		DC Input Watts	DC Volts	Dissipation Watts			DC Plate Volts	DC Grid-No. 3 Volts	DC Grid-No. 2 Volts	DC Grid-No. 1 Volts	DC Plate Current Ma.	Approx. Driving Power Watts	Approx. Power Output Watts
<b>TRIODES</b>													
811-A†	CW Phone	260 175	1500 1250	65 45	30	6.3	1500 1250	—	—	-70 -120	173 140	7.1 10	200 135
812-A†	CW Phone	260 175	1500 1250	65 45	30	6.3	1500 1250	—	—	-120 -115	173 140	6.5 7.6	190 130
800‡	CW Phone	300 240	1500 1250	85 75	60	10	1500 1250	—	—	-130 -195	200 190	7.5 9	220 170
800‡	CW Phone	750 500	2500 2000	175 125	30	10	2500 2000	—	—	-240 -370	300 250	18 20	575 380
833-A†	CW Phone	1000 3000	3300 2500	350 250	30	10	3000 3000	—	—	-160 -240	335 335	20 26	800 800

<b>BEAM POWER TUBES AND PENTODES</b>													
5618	CW	7.5	300	5	100	3.0 6.0	300	0	75	-45	25	0.2	5.4
5763†	CW Phone	17 15	350 300	13.5 12	50	6.0 (H)	350 300	0	250 250	-28.5 -42.5	48.5 50	0.1 0.15	12 10

Same as 5763 except for 12.6-volt heater													
2E24†	CW Phone	40 27	600 500	13.5 9	125	6.3	600 500	—	195 180	-50 -45	66 54	0.21 0.16	27 18
2E26†	CW Phone	40 27	600 500	13.5 9	125	6.3 (H)	600 500	—	185 180	-45 -50	66 54	0.17 0.15	27 18
832-A†	CW <sup>o</sup> Phone <sup>o</sup>	50 36	750 600	20 15	200	6.3 (H) 12.6	750 600	—	200 200	-50 -70	65 60	0.24 0.21	35 26
807†	CW Phone	75 60	750 600	30 25	60	6.3 (H)	750 600	—	250 300	-45 -85	100 100	0.3 0.4	54 44
6524†	CW <sup>o</sup> Phone <sup>o</sup>	85 55	600 500	25 16.7	100	6.3 (H)	600 500	—	200 200	-44 -61	120 100	0.2 0.2	56 40
6146†	CW Phone	90 67.5	750 600	25 16.7	60	6.3 (H)	750 600	—	160 150	-62 -87	120 112	0.2 0.4	70 52
4X150A†	CW <sup>o</sup> Phone <sup>o</sup>	260 200	1250 1000	150 100	500	6.0 (H)	1250 1000	—	250 250	-90 -105	200 200	1.2 1.2	185 140
829-B†	CW <sup>o</sup> Phone <sup>o</sup>	120 90	750 600	30 28	200	6.3 (H) 12.6	750 600	—	200 200	-50 -60	160 150	0.4 0.5	90 70
5894†	CW <sup>o</sup> Phone <sup>o</sup>	120 72	600 450	40 27	250	6.3 (H) 12.6	600 450	—	250 250	-80 -100	200 150	4 0.6	85 50
4-65A	CW <sup>o</sup> Phone <sup>o</sup>	345 275	3000 2500	65 45	50	6.0	3000 2500	—	250 250	-100 -135	115 110	1.7 2.6	280 230
4-125A/4D21	CW <sup>o</sup> Phone <sup>o</sup>	500 380	3000 2500	125 85	120	5.0	3000 2500	—	350 350	-150 -210	167 152	2.5 3.3	375 300
813†	CW Phone	500 400	2750 2000	125 100	30	10	2750 2000	0	400 350	-155 -175	220 200	4 4.3	375 300
4-250A/5D22	CW <sup>o</sup> Phone <sup>o</sup>	1000 675	4000 3200	250 165	110	5	4000 3000	—	500 400	-225 -310	312 225	2.46 3.2	1000 510

## MODULATORS OR RF LINEAR AMPLIFIERS (SINGLE-SIDEBAND)

RCA Type	Class of Service	Max. Plate Ratings			Typical Operating Conditions (Two Tubes, Except Where Shown)							
		DC Volts	DC Input Watts	DC Plate Volts	DC Grid-No. 2 Volts	DC Grid-No. 1 Volts	Peak AF to Grid-No. 1 Volts	Zero-Signal DC Plate Current Ma.	Max.-Signal DC Plate Current Ma.	Plate-to-Plate Load Ohms	Approx. Max.-Sig. Driving Power Watts	Approx. Max.-Sig. Power Output Watts
829-B†	AB <sub>2</sub> ♦	750	100	600	200	-18	36	-40	110	13750	0	44
2E24†	AB <sub>2</sub>	500	37.5	500	125	-15	82	20	150	9000	0.46	54
2E26†	AB <sub>2</sub>	500	37.5	500	125	-15	60	22	150	8000	0.36	54
6524†	AB <sub>2</sub> †	600	85	600	200	-26	76	21	135	11400	0.1	57
4X150A†	AB <sub>2</sub> ♦	1250	300	1250	300	-44	100	180	475	5600	0.15	425
807†	AB <sub>2</sub>	750	90	750	300	-35	96	30	240	7300	0.2	120
	BA	750	90	750	0	0	555	15	240	6650	5.3	120
6146†	AB <sub>2</sub>	750	90	750	165	-46	108	22	240	7400	0.04	131
5894†	B♦	600	120	600	250	-25	53	35	168	8000	0.2	70
811-A†	B	1500	235	1500	—	-4.5	170	32	313	12400	4.4	340
813†	AB <sub>2</sub> †	2500	450	2500	750	-95	180	50	290	19000	0	490
810†	B <sup>o</sup>	2750	510	2250	—	-60	380	70	450	11600	13	725
800‡	B**	2750	510	2250	—	-130	560	65	450	12000	7.9	725

Values shown are for Intermittent Commercial and Amateur Service (ICAS), unless otherwise indicated.

†High Perveance Type.

‡Values are for both units.

\*For all applications.

<sup>o</sup>For beam power tubes and pentodes the values shown are for mu-factor, Grid No. 2 to Grid No. 1.

\*\*Recommended for rf applications because of low output capacitance.

♦ Values shown are for Continuous Commercial Service (CCS).

‡ All ratings are Absolute Maximum values.

§ Grid No. 3 connected to center-tap of filament supply.

▲ Audio driving signal fed to Grid No. 2; Grid No. 1 tied to Grid No. 2 through 20,000-ohm, 2-watt resistor.

**for every transmitter need ...**

This chart has been prepared expressly for radio amateurs to show operating conditions and maximum ratings on RCA's wide line of power tubes for amateur transmitter application. High-perveance design on many of these types enables you to get the power you want at lower plate voltages. Conservative ratings assure you long hours of reliable operation.

Whether you are planning high power or low power, CW or 'phone, AM or SSB—you can rely with confidence on RCA Power Tubes. Your RCA Tube Distributor handles the entire line. For additional tube data, write RCA, Commercial Engineering, Section B37M Harrison, N.J.



**TUBES for AMATEURS**

RADIO CORPORATION OF AMERICA