FEBRUARY
1957
50¢

CQ

RADIO AMATEURS' JOURNAL

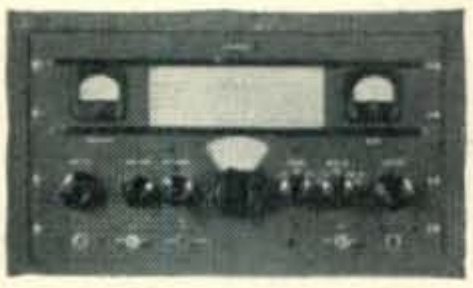
Transistorized Slicer

75A-1 . . . 1948

75A-2 . . . 1950

75A-3 . . . 1953

32V-1 . . . 1948



32V-2 . . . 1949

32V-3 . . . 1953

310B-1 . . . 1948

310B-3 . . . 1948

All these years YOU could have owned Collins

KWS-1

75A-4

. . . because it costs only a few cents a day to own the world's finest. Considering performance you can't buy or build equipment that costs as little per day to own. The reason is Collins high resale value. Check the chart below. See why Collins Amateur equipment is not only the standard for performance, but the best investment, too. So why miss out any longer on the kind of performance that puts your signal out sharp and clear and pulls in the good ones. Invest today in Collins Amateur equipment. Get the performance you've always wanted.

Collins CREATIVE LEADER IN COMMUNICATION

COLLINS

COST PER DAY TO OWN COLLINS EQUIPMENT

			FALL OF 1955		FALL OF 1956	
MODEL	PRODUCTION YEAR	COST NEW	AVERAGE MARKET RESALE PRICE	COST PER DAY TO OWN	AVERAGE MARKET RESALE PRICE	COST PER DAY TO OWN
75A-1	1948	$ 375	$ 300	2½c	$ 260	3c
75A-2	1950	440	350	4	350	3
75A-3	1953	530	425	10	400	9
32V-1	1948	475	300	6	300	5
32V-2	1949	575	350	10	425	5
32V-3	1953	775	500	27	550	15
310B-1	1948	190	150	1	150	1
310B-3	1948	215	175	1	200	½
KW-1	1952	3,850	2,850	66	3,000	59

For further information, check number 14 on page 128.

B & W PRODUCTS of the YEAR

L-1000A

1 KW Grounded Grid Linear Amplifier—Model L-1000A

• Outstanding performance on all bands 80 through 10 meters • Peak envelope power 1 KW SSB, 875 watts CW • Heavy duty pi-network output circuit allows precise adjustment and loading on all bands • Broadbanded input requires no tuning • Contains own power supply • All power switching operations controlled by a single front panel switch • Ideal for use with 5100-B or 51SB-B/5100-B combinations and other commercial or home built transmitters • Full output with r-f excitation of only 80 watts. Power Source 117 VAC 60 cycles.

NET PRICE $460.00

5100-B

Medium Powered Transmitter 5100-B

• Completely self-contained including power supply and VFO • Bandswitching on the 80-40-20-15-11/10 meter bands. Peak envelope power 180 watts CW-SSB; 145 watts AM. • Excellent SSB when used with the 51SB-B described below. • Stable VFO accurately calibrated for all amateur bands including 10 meters. Bias system provides complete cut-off under key-up conditions • Excellent TV1 suppression • Pi-network output • Output receptacle on the back for powering other units including the 51SB-B. • Plenty of audio for 100% AM modulation at all times.

NET PRICE $475.00

51SB-B/51SB

Single Sideband Generator 51SB-B/51SB

Excellent SSB with your present transmitter • Provides push-to-talk, speaker deactivating circuit, TV1 suppression • Complete bandswitching on 80-40-20-15-11/10 meters • Utilizes frequency control method of your present rig • R-F portion has 90° phase shift network, double balanced modulator, and two class "A" r-f voltage amplifiers. • All operating controls on the front panel • Input impedance 50 ohms resistive; input voltage 1.5-2.0 RMS on all bands.

MODEL 51SB-B—For use with B & W 5100-B from which it derives all operating power.

NET PRICE $265.00

MODEL 51SB—Similar to 51SB-B, but contains own power supply. For use with other commercial or home built rigs.

NET PRICE $279.00

*All prices subject to change without notice

B & W

BARKER & WILLIAMSON, INC.

Bristol, Pennsylvania

For further information, check number 7 on page 128.

CQ, The Radio Amateurs' Journal

February, 1957
Vol. 13, No. 2

Wayne Green, W2NSD Editor — **Associate Editor: Art Brothers, W7NVY/2**

CQ—(title Reg. U.S. Post Office)—is published monthly by Cowan Publishing Corp. Executive and Editorial offices, 300 West 43rd Street, New York 36, N. Y. Phone JUdson 2-4460. 2nd Class Mail privileges authorized at New York, N. Y. Subscription rates in U.S.A., Possessions, APO FPO, Canada & Mexico, 1 year $4.00; 2 years $7.00; 3 years $10.00. Pan-American and Foreign 1 year $6.00; 2 years $11.00; 3 years $16.00. Single copies 50 cents. Printed in U.S.A.

Real Cool Editor: Jim Morrissett, W8BAJ; Contributing Editor: William I. Orr, W6SAI

Feature Articles

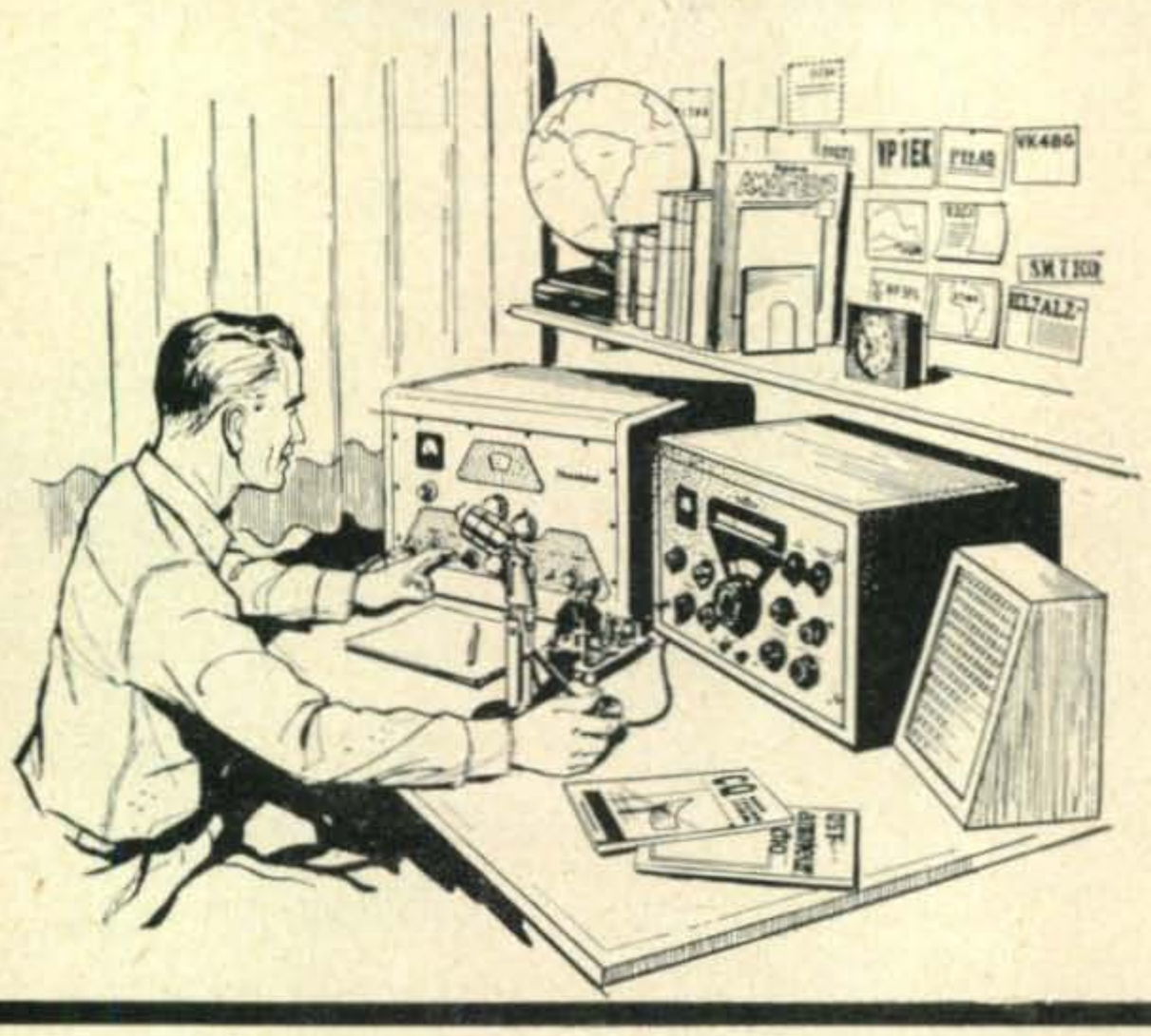
Departments

Miscellaneous

Branch Advertising Offices: Ted E. Schell, 2700 West 3rd St., Los Angeles 5, Calif. DUnkirk 2-4889; James O. Summers, 400 N. Michigan Ave., Chicago 1, Ill. SUperior 7-1641; Charles W. Hoefer, 1664 Emerson St., Palo Alto, Calif. DAvenport 4-2661.

POSTMASTER: SEND FORM 3579 to CQ, 300 WEST 43rd ST., NEW YORK 36, N. Y.

HEATHKITS®



The world's finest ham equipment in kit form . . . designed especially to meet your requirements!

Heath amateur radio gear is designed *by* hams—*for* hams, to insure maximum "on the air" enjoyment. Good design and top-quality components guarantee reliability. Heathkits are easy to build and are easy on your budget! You save by dealing direct, and you may use the Heath Time Payment Plan on orders totaling $90.00 or more. Write for complete details.

HEATHKIT
DX-100
TRANSMITTER KIT

PHONE AND CW

- *Phone or CW—160 through 10 meters.*
- *100 watts RF on phone—120 watts CW —parallel 6146 final.*
- *Built-in VFO—pi network output circuit.*
- *Easy to build—TVI suppressed*

MODEL DX-100

$189.50

$18.95 dwn., $15.92 mo.

Shpg. Wt. 107 Lbs.

Shipped motor freight unless otherwise specified. $50.00 deposit required on c.o.d. orders.

The Heathkit DX-100 phone-CW transmitter offers features far beyond those normally received at this price level. It has a built-in VFO, built-in modulator, and built-in power supplies. It is TVI suppressed, and uses pi network interstage coupling and output coupling. Matches antenna impedances from approximately 50 to 600 ohms. Provides a clean strong signal on either phone or CW, with RF output in excess of 100 watts on phone, and 120 watts on CW. Completely bandswitching from 160 through 10 meters. A pair of 1625 tubes are used in push-pull for the modulator, and the final consists of a pair of 6146 tubes in parallel. VFO dial and meter face are illuminated. High-quality components throughout! The DX-100 is very easy to build, even for a beginner, and is a proven, trouble-free rig that will insure many hours of enjoyment in your ham shack.

HEATH COMPANY BENTON HARBOR 12, MICHIGAN

A Subsidiary of Daystrom, Inc.

For further information, check number 26 on page 128.

HEATHKIT DX-35
TRANSMITTER KIT

PHONE AND CW

MODEL DX-35

$56.95

Shpg. Wt. 24 Lbs.

$5.70 dwn., $4.78 mo.

This transmitter features a 6146 final amplifier to provide 65 watt plate power input on CW, with controlled-carrier modulation peaks up to 50 watts on phone. Modulater and power supplies are built in, and the rig covers 80, 40, 20, 15, 11 and 10 meters with a single band-change switch. Pi network output coupling provides for matching various antenna impedances. Employs 12BY7 oscillator, 12BY7 buffer and 6146 final. Speech amplifier is a 12AX7, and a 12AU7 is employed as modulater. Panel control provides switch selection of three different crystals, reached through access door at rear. Panel meter indicates final grid current or final plate current. A perfect low-power transmitter both for the novice or the more experienced amateur. A remarkable power package for the price. The price includes tubes, and all other parts necessary for construction. Comprehensive instruction manual insures successful assembly.

- *Phone or CW—80 through 10 meters.*
- *65 watts CW—50 watts peak on phone—6146 final amplifier.*
- *Pi network output to match various antenna impedances.*
- *Tremendous dollar value—easy to build.*

BRAND NEW

HEATHKIT DX-20
CW TRANSMITTER KIT

MODEL DX-20

$35.95

$3.60 dwn., $3.02 mo.

Shpg. Wt. 18 Lbs.

- *Designed exclusively for CW work.*
- *50 watts plate power input—80 through 10 meters.*
- *Pi network output circuit to match various antenna impedances.*
- *Attractive and functional styling—easy to build.*

Here is a straight-CW transmitter that is one of the most efficient rigs available today. It is ideal for the novice, and even for the advanced-class CW operator. This 50 watt transmitter employs a 6DQ6A final amplifier, a 6CL6 oscillator, a 5U4GB rectifier and features one-knob bandswitching to cover 80, 40, 20, 15, 11 and 10 meters. It is designed for crystal excitation, but may be excited by an external VFO. A pi network output circuit is employed to match antenna impedances between 50 and 1000 ohms. Employs top-quality parts throughout, including "potted" transformers, etc. If you appreciate a good signal on the CW bands, this is the transmitter for you!

HEATH COMPANY BENTON HARBOR 12, MICHIGAN

A Subsidiary of Daystrom, Inc.

For further information, check number 26A on page 128.

HEATHKIT

COMMUNICATIONS-TYPE, ALL BAND

RECEIVER KIT

This receiver covers 550 kc to 30 mc in four bands, and is ideal for the short wave listener or beginning amateur. It provides good sensitivity and selectivity, combined with fine image rejection. Amateur bands are clearly marked on the illuminated dial scale. Features transformer-type power supply—electrical band spread—antenna trimmer—separate RF and AF gain controls—noise limiter—headphone jack—and AGC. Has built-in BFO for CW reception. Shpg. Wt. 12 Lbs.

MODEL AR-3

$29.95

incl. excise tax (less cabinet)

$3.00 dwn., $2.52 mo.

CABINET: Fabric covered cabinet with aluminum panel as shown. Part 91-15A. Shipping Wt. 5 Lbs. $.50 dwn., $.42 mo. $4.95

Ⓐ HEATHKIT VFO KIT MODEL VF-1

Covers 160, 80, 40, 20, 15, 11 and 10 meters with three basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Requires 250 VDC at 15 to 20 ma, and 6.3 VAC at 0.45A. Incorporates regulator tube for stability and illuminated frequency dial. Shpg. wt. 7 lbs. $1.95 dwn., $1.64 mo. **$19.50**

Ⓑ HEATHKIT GRID DIP METER KIT MODEL GD-1B

Continuous coverage from 2 mc to 250 mc with prewound coils. 500 ua panel meter for indication. Use to locate parasitics, for neutralizing, determining resonant frequencies, etc. Will double as absorption-type wavemeter. Shpg. wt. 4 lbs. $2.00 dwn., $1.68 mo. **$19.95**

Ⓒ HEATHKIT ANTENNA IMPEDANCE METER KIT MODEL AM-1

The AM-1 covers 0 to 600 ohms for RF tests. Functions up to 150 mc. Used in conjunction with a signal source, will determine antenna resistance and resonance, match transmission lines for minimum SWR, determine input impedance, etc. Shpg. wt. 2 lbs. $1.45 dwn., $1.22 mo. **$14.50**

Ⓓ HEATHKIT "Q" MULTIPLIER KIT MODEL QF-1

Functions with any receiver having IF frequency between 450 and 460 kc that is not AC DC type. Operates from receiver power supply, requiring only 6.3 volts AC at 300 ma (or 12.6 vac at 150 ma), and 150 to 250 vdc at 2 ma. Simple to connect with cable and plugs supplied. Provides extra selectivity for separating signals, or will reject one signal to eliminate heterodyne. Effective Q of approximately 4000. Shpg. wt. 3 lbs. $1.00 dwn., $.84 mo. **$9.95**

HOW TO ORDER...

It's simple—just identify the kit you desire by its model number and send your order to the address listed below. Or, if you would rather budget your purchase, send for details of the Heath Time Payment Plan for orders totaling $90.00 or more.

HEATH COMPANY BENTON HARBOR 12, MICHIGAN

A Subsidiary of Daystrom, Inc.

For further information, check number 26B on page 128.

Feenix, Ariz.

Deer Hon. Ed:

With reference to your letter of the 15th, I beg to report that . . . How are that, Hon. Ed., are not proper way for big bizzness man to starting letter? Yes indeedy. Eggscoosing please while liteing this two-bits seegar.

Aaaah, thats better. Now, whats with all this big bizzness stuff, I'll bet you are thinking. Nothing much, just pulling big 1/c deal what gonna make me lotsa bux. Yes indeedy, it surely are nice to being able to making money with Hon. Brain rather than Hon. Hands. Are you not thinking likewise, Hon. Ed?

Ackchewally there are nothing to it. Like take me. Cupple days ago reeding classifyed pages of local newspaper and coming across item reeding: "For Sale, large quantity of 810 toobs, surplus, reel cheep".

Now what wood average amchoor do, seeing that ad? Why, he'd telling himself that he not being able to getting the toobs cheep, or that they not being good toobs, or sumthing like that.

Not old bizzness-man Scratchi. Not on your tinny-type. I figyouring maybes can making some money, so I desiding to calling feller on landline. When I getting thru with him, he knowing he deeling with reel bizzness mans, too.

So, when getting him on fone, I asking him how manies of these toobs he having. He saying about hundred and ten, but if I intrusted in hole lot he calling it even hundred. Then I asking him how much he thinking he gonna get for each toob.

He doing little shilly-shallying around, but finally saying he liking to get one bux apiece. I saying this sounding reel high to me, and are toobs any good. He saying they usable. I asking if they all used, and he saying no, about half of them are not being used at all.

Not to being outdone, I asking him if they having any air in them, and he saying how stoopid did I think he was, on acct. natchurally there are no air in them. I saying OK, and offering him ten bux for the lot.

After this are heering lotsa funny noyses over fone, but to cutting down long story, he and I argewing awhile and finally we reeching

For further information, check number 33 on page 128.→

price of twenty-five bux for lot. He saying he having truck and he'll delivering them to me on Sattidy.

Pretty slick, Hon. Ed., are you not thinking? Are getting bunch nice big xmitting bottles at twenty-five sents each. Man oh man, Scratchi will be rolling in money. Almost anybuddies being willing to pay cupple bux for 810 toob in yewsable condishun.

And thinking what I can doing with them. Can putting about ate of them in push-push pairalel push-pull pairalel in the final, and that being goods for good Arizona kilowhat. Can even yewsing them for modyoulators.

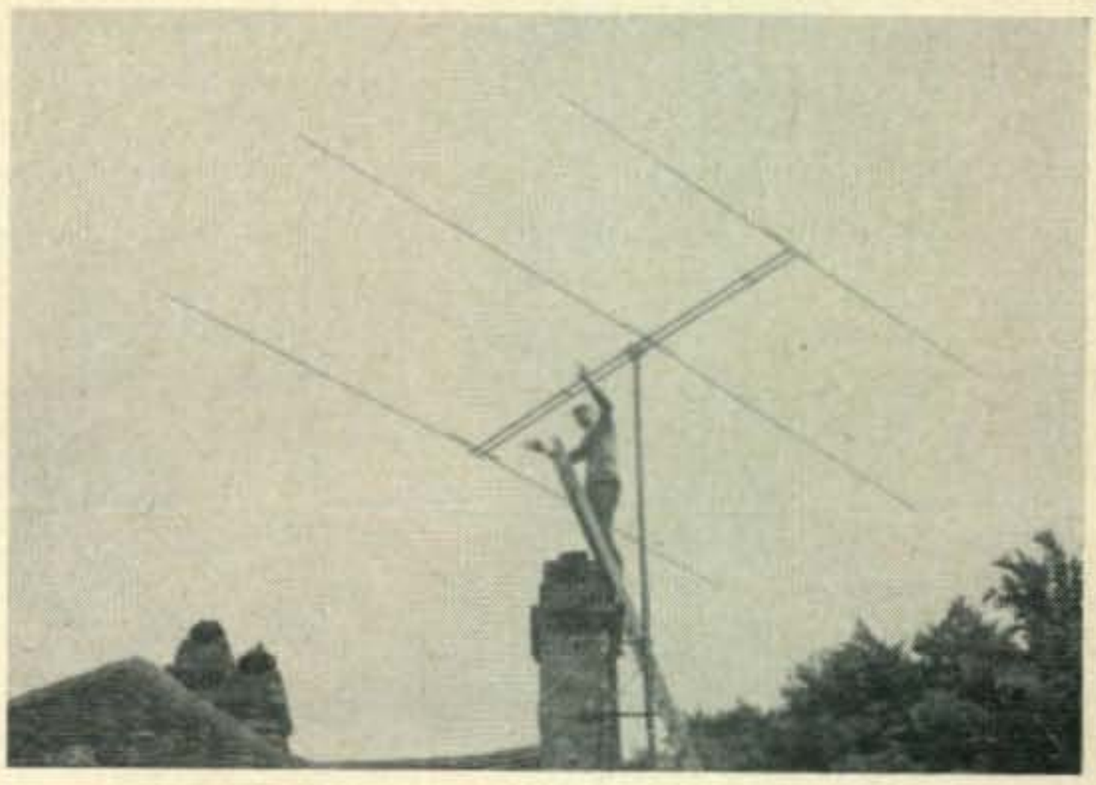
If local amchoor club asking me Scratchi mite even be willing to donating some for prizes at next meeting. Just a big old generus bizzness-type man Scratchi donation. Waiting until I telling fellers at club about big deal I making.

Oh! Eggscoosing one moments, Hon. Ed., this being Sattidy, and heering truck outsides, maybe its the feller bring the toobs. Be rite back.

Yes, Hon. Ed., it were the feller with the toobs. One hundred and ten of them. One hundred and ten tire toobs, size 8.10. For which I just handed him twenty-five bux, cold hard cash. Which leeves Scratchi broke. Of all the . . . why didn't the ad in the paper say . . . I wonder if I can sueing??

Hon. Ed., you and me good friends, no? Will you putting For Sale ad in your Hon. Mag? On credit? I thinking of selling big bunch 810 toobs. What you saying?

Respectively your,
Hashafisti Scratchi

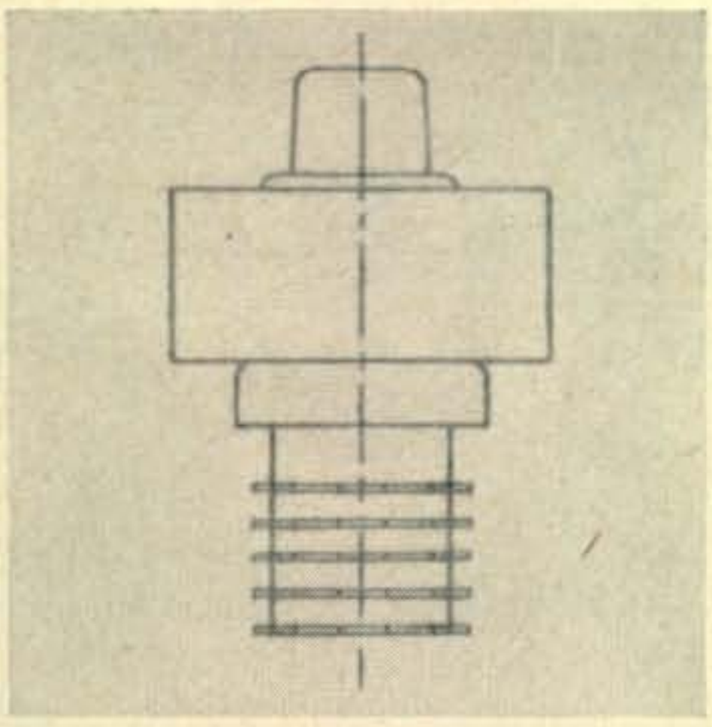


Next Month . . .

The complete story and designs of the G4ZU Mini-beam

9 Over	9	ob gain on	10	
" "	8	" "	"	15
" "	4	" "	"	20
" "	20	" f/b on all bands		

For further information, check number 32 on page 128.



New ceramic tubes assure longer life—greater dependability

Ultra-compact new HT-33 kilowatt amplifier first to employ extra-safe, extra-long-life ceramic power tube

Performance and dependability were key words in the Hallicrafters laboratories when the HT-33 was on the drawing boards. That's why our engineers insisted on new, costlier ceramic power tubes. Result: another Hallicrafters first that means consistently higher performance over a longer life.

Here's what ceramic tubes mean to you: 100 watts greater plate dissipation. Greater overload safety. Unbelievable ruggedness (they'll withstand repeated 11 milli-second shocks of 50g) and reliability. *Advanced design, too.* Notice the clean lines, the *compactness* of the HT-33—just 12⅜ inches high, for trim table-top application. See it, and compare these and other features, at your supplier's today.

MORE FACTS ABOUT THE HT-33

- Six amateur bands: 80, 40, 20, 15, 11-10 meters
- Simplified tuning: greater power transfer and higher harmonic attenuation.
- Low drive requirement: 8 watts P.E.P. will drive to full KW
- New type Neon Indicator light for fuse overload.
- Quieter operation: higher performance allows low speed blower.

NEW

FROM

hallicrafters

CHICAGO 24, ILLINOIS

WHERE THE BEST IDEAS IN COMMUNICATIONS ARE BORN

EXPORT SALES: Phillips Export Co., 100 E. 42nd St., New York 17, New York

For further information, check number 24 on page 128.

EDITORIAL
WAYNE GREEN

. . . de W2NSD

NEVER SAY DIE

The editorial last month shook things up a bit, as I sort of suspected it would. I had several calls from key hams in Washington congratulating me on bringing our problems out into the open where we may be able to get busy and work on them. To preserve your peace of mind (and to let me get some more facts) I'll pretty much let things ride until next month.

My Mail

This will probably disillusion most everyone, but it is really about time that I explained the CQ setup. If you will turn back a couple of pages to the Contents page (3) and read over the list of the CQ staff you may notice that outside of the department editors we have only Frozen Jim, Busy Bill Orr (both far far away) and Art Brothers. It comes down to this: Art and I handle the whole editorial end of CQ. Breaking it down further we have me reading, editing, and rewriting the incoming manuscripts and Art processing them into the finished page form. There are of course hundreds of minor items that we have to frantic over, like certificates, those cards in the October issue, Frozen Jim, visiting VIP's, etc., ad nauseam.

Now understand, we're not complaining . . . we can put out a darned good issue of CQ every month as we stand. But on top of all this I get several letters a day asking special technical questions (which should have been sent to the ARRL, which has a technical correspondence section to handle just that) and requests for information on articles that have appeared in past issues of CQ. The writers could have done the same thing I have to do . . . look it up in the January 1956 eleven year index, or for more recent items check the 1956 December Index. Bah!

So look, if I don't answer your letter right away just keep in mind that I share my secretary with five other fellows, I'm away every now and then for a week, I may not know what to answer you, or your letter may have gotten lost in the deplorable mess on my desk. If you can't stand not having an answer drop me another note with all the details of the first (they'll never get together) and hope for the best. If you get mad about it then forget the whole thing and write to someone else. Legitimate gripes are acceptable, but references to my incompetence or laziness are not legitimate.

W2NSD Speaks

Single sideband may aggravate the AM boys, but it sure is a whiz at getting through. Whenever I have someone stop by for a visit that isn't familiar with ham radio I turn on the SSB and amaze them. If it is evening I can usually work into the western states with solid results and a short talk with someone up in Idaho really bugs out the eyes of a non-ham.

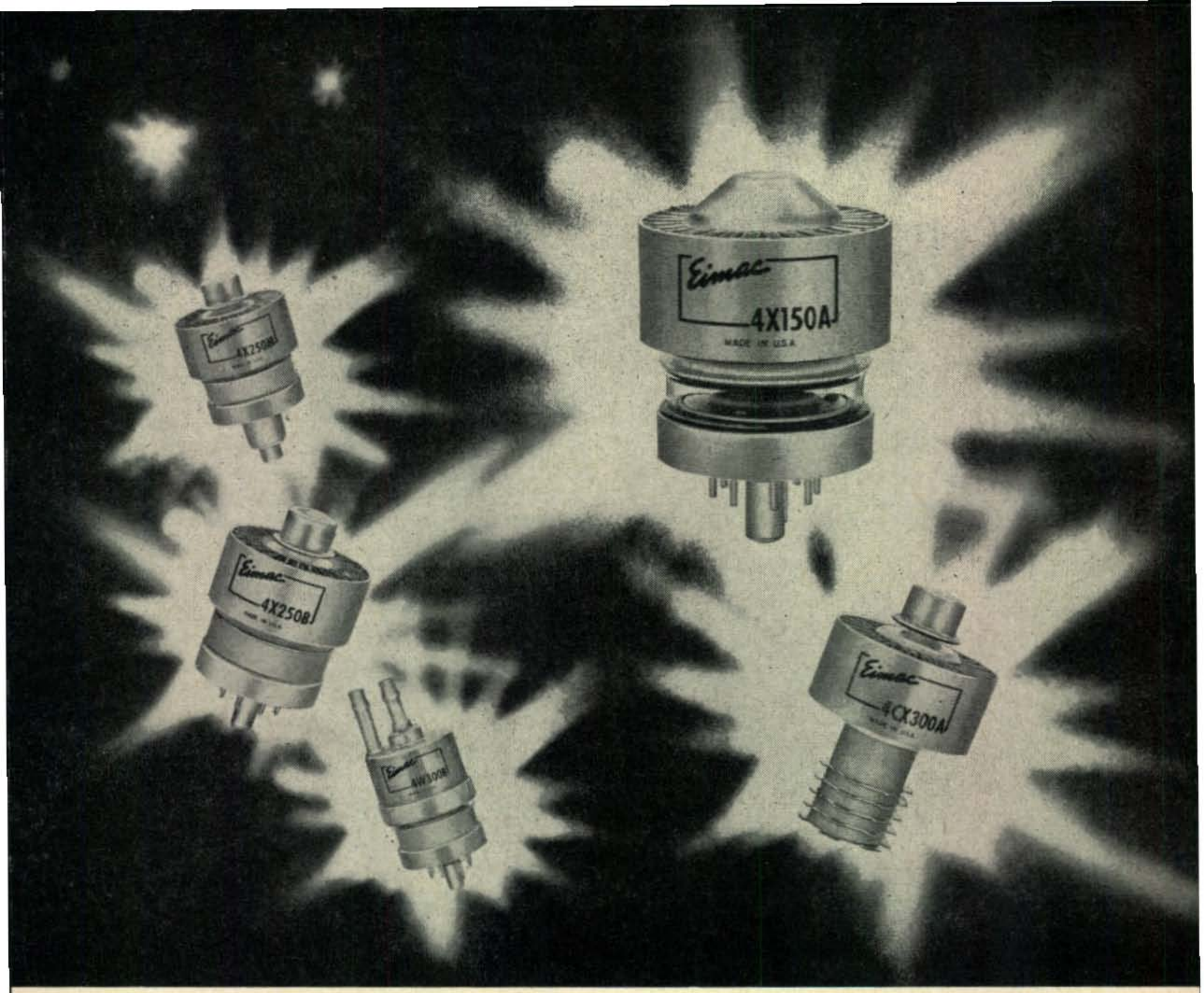
I'm generally on 20 SSB around eleven p.m. looking for DX (which I seldom find), so how about giving me a call? I finally gave up waiting for a promised 600L and, with the help of K2IEG, got a pair of 813's hooked onto the Lakeshore Phasemaster II. The result certainly is terrific. Darned few fellows have any trouble hearing me now, even with my folded dipole antenna. Some day I suppose I'll put up a beam, probably when I get finished with the car payments.

I've built up quite a collection of receivers over the twenty years that I've been hamming, but the real gem for SSB is the National 300. That product detector never ceases to amaze me . . . even with the r-f gain full on you can copy the stations perfectly! Since I operate a lot of two and six meters the special National converters make for a very handy setup too. Hey National, when are you going to put out a converter so I can hook my Panadaptor, etc., on the 300?

New Gimmick

My shifty little mind is always coming up with some new startlement for CQ which is scuttled merely because we can't afford it. Like for instance, I've been wanting for a long time now to run a postcard in every issue so you could check off whatever literature you want out of our ads, flip it in to us and we would handle the rest. If you read this issue the normal way, from the back, you have already run across step one, a slice of particularly tearable paper, backed up with a sub ad so's you won't miss it once you've sent it in (and you can kill two birds with one

For further information, check number 19 on page 128. →



Evolution at Eimac

Back in 1946 Eimac developed and produced the 4X150A—a new concept in power tetrodes. Its immediate acceptance by the industry then, has led to even more popularity now.

But today at Eimac the glass 4X150A is virtually obsolete.

Since 1946 Eimac has constantly improved the 4X150A to the point where it has evolved into a family of superior quality 250w and 300w tubes for operation to 500Mc. Small, compact structure has been retained. In fact, the 4X250 series is interchangeable with 4X150 tubes. Ceramic envelopes make possible greater mechanical strength, better production techniques, and higher temperature processing.

Because "good enough" has never been accepted at Eimac, however, this family of air cooled or water cooled, co-axial or conventional socketed tubes (2.5v, 6v, and 26.5v) is again accelerating the pace in quality, design, and performance, exactly as the 4X150A did a decade ago.

For further information, contact Amateur Service Bureau

EITEL-McCULLOUGH, INC.

SAN BRUNO · CALIFORNIA

The World's Largest Manufacturer of Transmitting Tubes

Eimac

4X150A

4X150 Series	4W300 Series	4X250 Series	4CX300 Series
4X150A-1946	4W300B-1953	4X250B-1955	4CX300A-1956
4X150G-1949		4X250F-1955	
4X150D-1952		4X250M-1955	
		4CX250K-1956	

stone by sending a check for the sub). Check page 128 for more details. If enough of you send in that form I will probably be able to swing the postcard deal. There'll be enough margin on the postcards for you to make the usual hound-dog remarks. Don't Be Cruel, rip and flip.

Home Movies Wanted

Lawrence Schwab, K6RWR, a west coast Television Producer, is putting together a film series called, Amateur Film Festival. The "Amateur" in that name refers to amateur movie makers, not ham radio . . . but as Larry points out, he would like to get prints of you or your clubs efforts toward deMille'ing ham radio. If you have a good interesting film which you have been showing around to radio clubs without too many discouraging comments get in touch with Larry.

Global Ham Caravan

Uncle Dave, W2APF, with the dust hardly settled from his last round-the-world extended jaunt, is on his way again . . . this time with fifteen hams in tow for a 90 day 40,000 mile sight-seeing trip. I'll keep you up to date on this excursion as the facts sift in.

DARA Award

Each year the Dayton Amateur Radio Association gives an award to an individual who, in the pursuit of his hobby, has performed an unselfish public service or humanitarian act. If you or your club knows anyone who fits the description please send the details to D. L. Marquette, 4209 N. Hyland Drive, Dayton 4, Ohio.

House Hunting?

K2HBZ, Sam Hochman, a real estate salesman in northern New Jersey, keeps his eyes pealed for good ham radio locations and has been doing quite a job of putting VHF men on the top of hills, etc. K2AUR and K2OVJ recently moved into two of the higher crags of New Jersey as a result of this service. If you are looking for a high spot you might give Sam a call at Geo. H. Beckmann, Inc., Teaneck, N. J.

Autocall

Andy, W3NL, the editor of Autocall, the bulletin of the Washington Mobile Radio Club and almost every other radio club in the D.C. area, mentioned that he would be glad to swap club bulletins with any other club in the world. Just drop a copy of your bulletin to

[*Continued on page 104*]

YOU CAN'T GO WRONG WITH MULTIPHASE!

CENTRAL ELECTRONICS, a pioneer in the amateur SSB field, is justly proud of the fact that all over the world MULTIPHASE equipment has established an enviable reputation for SUPERIOR DESIGN, WORKMANSHIP and PERFORMANCE. Couple that with REASONABLE PRICES and you have a combination impossible to beat.

MULTIPHASE 600L

Broad-Band Linear Amplifier

For SSB, AM, PM, & CW

Here's the amplifier that is making History! YEARS AHEAD IN DESIGN - The 600L has NO TUNING CONTROLS OF ANY KIND! New BAND-PASS COUPLERS, an exclusive development of CENTRAL ELECTRONICS, provide linear efficiencies of 60-65%. COMPLETE FREEDOM FROM SELF-LOADING!

- Single 813 in Class AB2. Approx. 8 watts peak drive power for 500 Watts DC input.
- Single knob band switching 10-160 Meters.
- Automatic relay protection.
- Designed for 50-70 Ohm co-ax input and output.
- Built-in HEAVY-DUTY power supply. Bias and screen regulation. 45 Mfd. oil filled output capacitor.
- Extremely low intermodulation distortion.
- Completely shielded - TVI suppressed - Parasitic free.
- Exclusive meter features originally developed by CENTRAL ELECTRONICS. Often copied but never equalled.

A 600L and a reasonably decent antenna invariably result in an OUTSTANDING SIGNAL. Ask the ham who uses one!
MULTIPHASE MODEL 600L.....Complete, ready to operate.....$495.00

NEW MULTIPHASE MODEL MM-1

RF **ANALYZER**

One compact unit provides oscillator and 3" scope for CONTINUOUS MONITORING OF SSB-AM-CW. COMPLETE ALIGNMENT OF SSB EXCITERS and GENERAL MODULATION ANALYSIS.

Amateur Net
Kit . . . $99.50
Wired. . 129.50

- NO TUNING required. Broadband response flat 1 MC to 55 MC at power levels of 5 watts to 5 kilowatts.
- Built-in 1 KC audio oscillator has less than 0.5% distortion.
- Automatic blanking protects CRT during standby.
- RF attenuator controls height of pattern, calibrated in 3 db steps.
- For use in "Series" with 50-72 ohm co-ax lines. A short pickup antenna is recommended for other systems.
- The MM-1 provides: SPEECH ENVELOPE patterns without annoying 60 cycle double trace.
- TONE ENVELOPE patterns automatically synchronized with self-contained 1 kc audio generator.
- AF TRAPEZOID patterns for HIGH LEVEL AM systems.
- DOUBLE TRAPEZOID OR BOW TIE patterns for analysis of LOW LEVEL LINEAR AM systems.
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NEW MULTIPHASE MODEL GC-1

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*Pat. 2-659-777

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The GC-1 is a complete audio output system. With its novel Gated Audio AVC circuit, changes in level of approximately 40 db. produce less than 3 db. variation in output. The unit may be connected between the receiver or Sideband Slicer output and the speaker voice coil - it's that simple.

Thousands of GATED COMPRESSION units are in daily use by Deaf Training schools throughout the world to prevent painful "blasting" and to provide relaxed listening pleasure.

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For further information, check number 12 on page 128.

Guest Editorial George Bonadio, W2WLR

320 Winslow St.,
Watertown, N. Y.

Is Conelrad the Answer?

I speak from a background which includes official liaison with 6 American and 9 foreign military services, an instructor at 5th Army Invasion Training Center, observer from the ground of over 100 air raids upon 9 cities, conceptionist of the Joint Assault Signal Co. (JASCO) which coordinated all communications of land, sea and air in an invasion, one of 263 who knew and worked with the D-Day-Normandy secrets (Overlord "BIGOT"), field inspector for the Office of the Inspector General, official plannings with 18 general officers, and (at the risk of 18 court martial charges) the usurptive party who got the missing manifests through for Bradley and Ike (Bradley—"A Soldier's Story" pp. 304-305, "without further apologies or explanations").

The apparent objective of Conelrad is to avoid giving a flying enemy a true bit of information for correcting his navigation errors. Beyond this, anyone skilled in the arts of radio communications and psychological warfare will discount any Conelrad values in these two fields.

The way a commander works is to evaluate what of the enemy's he can use. He cannot use anything of the enemy's which that enemy is in complete power to confuse him with. He cannot afford to send a multi-billion dollar mission with last moments to be corrected by random bearings upon enemy amateur stations. He will, however, depend upon his own radar, which is jamproof, except from immediately below him, to spot each stream, river and lake he passes over. This is far more useful to him than any enemy sent signal. The rivers are 100% dependable. His enemy is not.

Hence, we can be sure that any invader's navigation will be under his own control, not subject to our turning off or easy jamming.

It being clear that the enemy is not going to rely upon direction finding stations which can go off the air completely, or which change frequency, or get crowded, or change call letters to mislead him, it follows that we should not destroy our own senses when we need them urgently while the enemy is here. It is outrageous that we harm ourselves greatly in a futile attempt to annoy slightly a prudent enemy.

It follows that amateurs should not abridge their useful facilities. It also follows that the usefulness of identifications should be abridged when an enemy is here or imminent.

No amateur operator is naive enough to believe that even a silent band, in an alert, is going to keep the occasional ham from bursting out with a call and identification which is quite reliable for locations. This present Conelrad system would be an ideal service to an enemy. First it would clean the band of most of the clutter, then it would give him a few long winded tests, or CQ calls with identification. It would be harder for the enemy if all the other hams stayed on. (At 50,000 ft a plane can tune in any 2 meter signal in over 200,000 square miles!)

Better yet for us, and sure to destroy all enemy advantages, while maintaining all amateur facilities, is an "operation alert". In this, under F.C.C. approval, when an alert became known to an amateur operator, his call letters would be used under one of several of his authorized transpositions, for each QSO just as though no alert were in process. Thus the enemy would be deceived as by the Conelrad on 640 or 1,240 kc.

The procedure would be thus: As W2WLR, I would send U.S.G.P.O. 2¢ postal cards of offers and solicitations, under F.C.C. regulation xxx, to W1WLR, W3WLR, W2RLW, W2LRW, K2..., etc., for an exchange of permission to use his call, name and address in qso's during alerts. His postal card approval would be carried interleafed in my log as authorization. Also, within 48 hours after each use of a transposed call, a postal card transcript of log references would be forwarded to the appropiate station concerned, for his logging, with the reference to F.C.C. regulation xxx, in each such entry.

At the end of Conelrad alerts, calls would revert to normal. The procedure would be widely publicized, so that all possible enemies would realize the uselessness of amateur station identifications in an alert. Would he be better prepared and more burdened otherwise, or are we naive to think him naive?

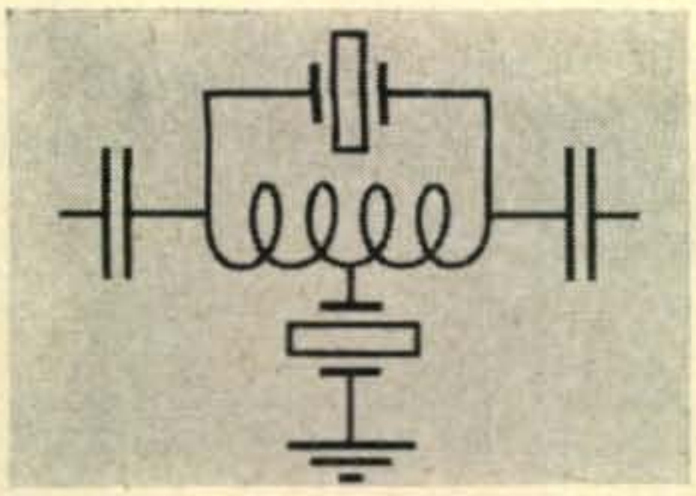
In other words, the present Amateur Conelrad procedure is far from being "fail-safe."

The "transposed call" alert system recommended herein is "fail-safe", with no average of calls being worth risking a whole nation's war effort upon.

We can be sure that any enemy would attempt to navigate by "fail-safe" means, without hampering his own facilities.

We must also be sure that we, too, would keep our systems "fail-safe", without hampering our facilities.

Our present Amateur Conelrad system is, compared to no system, an aid and comfort to an enemy. It must be removed. In its place a "fail-safe" system must be instituted at the earliest possible date. ■



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Hallicrafters new HT-32 transmitter features 5.0 mc. quartz crystal filter... new bridged-tee modulator...high stability...gear-driven V.F.O.

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ADDITIONAL FACTS ABOUT THE HT-32

- SSB, AM or CW output on 80, 40, 20, 15, 11-10 meter bands.
- High-stability, gear-driven V.F.O.
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For further information, check number 24A on page 128.

Letters . . . to the editor

Dear Wayne:

I was very happy to see W9PXA's letter concerning the discussion of topics, which might be considered "science-fiction", over the air. I have been the advocate of such discussions for a long time, but I haven't been successful so far as most hams I have talked to don't seem to be interested in such "impractical" things. It is my belief that ham radio would be a useful "airing ground" for pet theories regarding psionics, etc.

Speaking of psionics, Mr. John W. Campbell, Jr., editor of Astounding Science Fiction, has recently been attempting to stir up interest in this fascinating subject (see A.S.F., June 1956). Mr. Campbell is well known for his work in the science-fiction field and is equally well known in the pages of CQ as W2ZGU, author of many articles in the amateur radio field. Mr. Campbell's interest in both sf and electronics has resulted in a rather unusual piece of electronic circuitry (A.S.F., June 1956. "Psionics Machine-Type One"), which warrants investigation by more whose interests lie in the electronics field. The point is: what could be more compatible than both of these fields? Hams have been known to solve "impossible" problems in the past, so why not some electronic research in the fields of ESP, anti-gravity, etc.? Let's hear from some of those interested and form some kind of "S-F Net"! 73

Doug Westover, WØQFD/Ø
9071 Poze Blvd.
Denver 16, Colorado

Ground Wire

Dear Sirs:

A little filler item for your consideration:

When installing an outside TV or radio ground rod, sprinkle a little salt around it and soak in. This will increase its effectiveness electrically, Another good idea is to give the ground clamp and connection a coat of asphalt roof cement. This is waterproof and will minimize corrosion which brings about high resistance.

The rod should not be driven clear to the ground. but to about one to two feet above it with the clamp at the top. This will keep the ground wire out of the way and avoid breakage from kicking, lawn mowers, etc.

Maurice Peacock, Jr.
Radnor, Pa.

Ten Meter Noise Problem

Dear Wayne,

Now that activity is increasing on 10 and 15 meters, many of us are starting to use the highest frequency band of our receiver which has not had much attention in the past few years. In some cases the performance is not too satisfactory. One problem is noise in the tuning condenser. It is normal procedure to clean the dust from between the plates using a pipe cleaner or a strip of paper and to clean the rotor spring contacts with "No Noise" or other similar product. If after this treatment the noise is still prevalent, it may often be traced to the rear ball thrust bearing on the end of the condenser shaft. If this is removed, cleaned and lubricated with "No Noise" or vaseline and re-assembled the trouble will be eliminated. This point is apt to be overlooked as it is not intended to be a ground connection for the rotor shaft. There are apparently ground currents passing through this point however and the ground loop formed seems to affect only the highest band.

William C. Ryder, W1JNM
Chatham, Mass.

Another TBY Conversion

Hon. Editors,

I have read your request for conversions of the TBY-7. This unit is very helpful for Field Days, almost an absolute necessity. It can be used to hold down helium filled balloons, providing it is filled with concrete, for those long vertical antennas. It also is excellent for keeping the car from rolling when one wheel is jacked up.

Bob Sull, Cleveland

[Continued on page 82]

YOUR BEST BUYS...

HQ-100

Q-multiplier for continuously variable selectivity. Electrical bandspread tuning. 10-tube superheterodyne with noise limiter. Auto-response circuit for finest fidelity under all conditions. Optional Telechron Timer. Completely voltage regulated and temperature compensated. Continuously tunable from 540 KCS to 30 MCS.

$169.00
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New, smooth-as-silk tuning. Crystal filter for extreme selectivity. Electrical bandspread tuning. Extremely high signal-to-noise ratio. Positive noise limiter. Full 2-watt undistorted output. Continuously tunable from 540 KCS to 30 MCS with adequate selectivity to separate crowded signals.

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A really different receiver. Combines Q-multiplier with crystal filter to provide the widest range of tuning techniques. Extra fine superheterodyne circuit with full noise limiter. Full 2-watt output. New, improved S meter with illuminated scale. Built-in crystal calibrator.

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HAMMARLUND SETS THE PACE

For further information, check number 25 on page 128.

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Yours for just **$159.50** down*

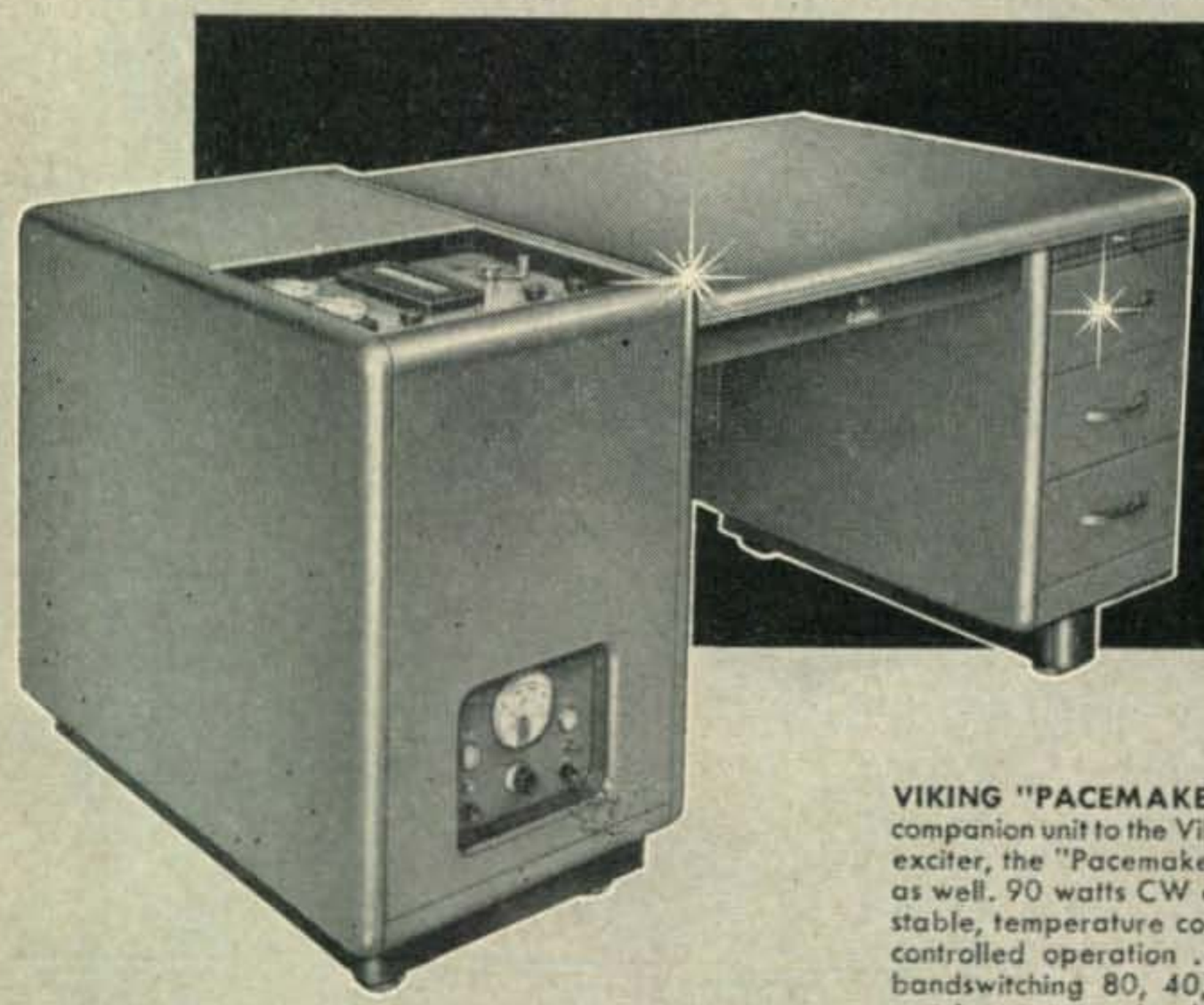
Imagine yourself at the controls of this exciting Viking Kilowatt. You'll marvel at the ease of selecting maximum legal input AM, CW or SSB with the flip of a single switch . . . you'll be delighted with the convenience of its desk-top controls . . . and you'll immediately sense the authority of its *full* kilowatt signal, placing the world at your finger tips.

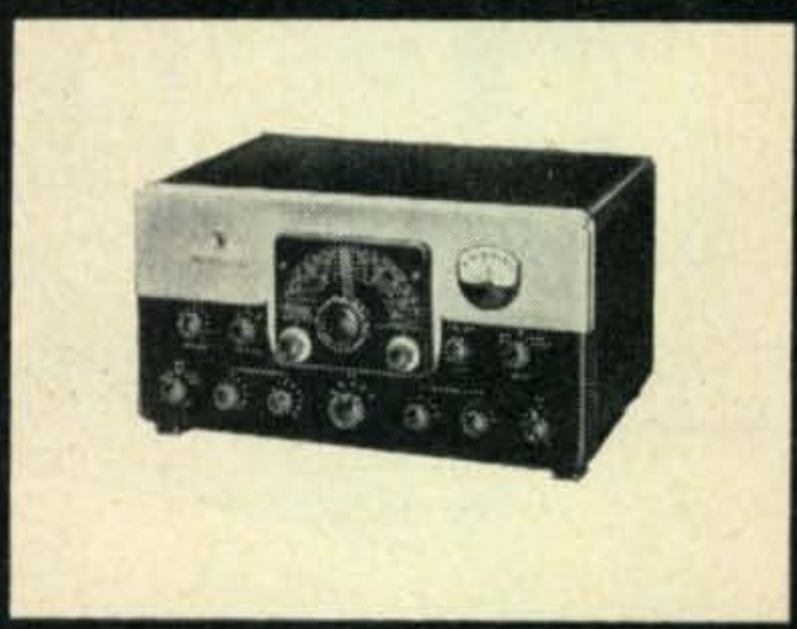
Truly tomorrow's concept of electronic equipment design and operating convenience, the Viking Kilowatt provides continuous frequency coverage from 3.5 to 30 megacycles, wide range antenna matching and complete TVI suppression. The compact pedestal contains the complete Kilowatt—rolls out for adjustment or maintenance. Excitation requirements: 30 watts RF and 10 watts audio for AM; 2-3 watts peak for SSB. Completely wired and tested with tubes.

Cat. No. 240-1000 . . . . . Amateur Net $1595.00

Matching accessory desk top, back and three drawer pedestal.

Cat. No. 251-101 . . . . . FOB Corry, Pa. $123.50





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For further information, check number 29 on page 128.

Right Way vs. Navy Way

Say, how do you go about sinking an admiral and getting away with it? Your normally happy smiling editor is in the mood for mayhem; let me tell you how it came about.

While down in Washington a couple months ago collecting on a free dinner I got to wandering around the Pentagon and came by the information that an empty billet was available for a correspondent to go to Antarctica in December on the USS Curtiss. My eyes lighted up "tilt" at the thought of a free trip someplace and I immediately started scheming to use it. The trip would take three months, one month down, one there and one back. If I went there would be no February, March or April CQ, so that was out. Jim Morrissett, K2OLK, jumped at the bait and we started all the necessary paper work.

The original purpose, outside of getting the Navy used to CQ having a correspondent who should be taken places, was to get some sort of inside report on the ham activities in Antarctica. Then we got to figuring, why shouldn't Jim take along a small SSB/CW rig and receiver to provide ham contacts all the way down and back? The Air Force has been doing this with amazing results on many occasions. We called Washington and talked with Admiral H. C. Bruton (W4IH), the Chief of Naval Communications. He said it was fine with him if we got an OK from Captain C. T. Fritter of the USS Curtiss. We then called Capt. Fritter in San Diego and he had no objections. We got him to write a letter to that effect. Next we asked the IGY Committee to contact CNC and endorse the idea. Mr. Ross Peavy of the IGY Committee did this immediately.

Once the problem of getting the OK was out of the way we explained the situation to the E. F. Johnson Company and the National Company. They shipped a Pacemaker and NC-300 (respectively) by air to the Curtiss and Jim got them installed ready to go the day before shoving off. That night I got through a phone patch to Jim via W6ONP and found that he still hadn't gotten the go-ahead from Bruton.

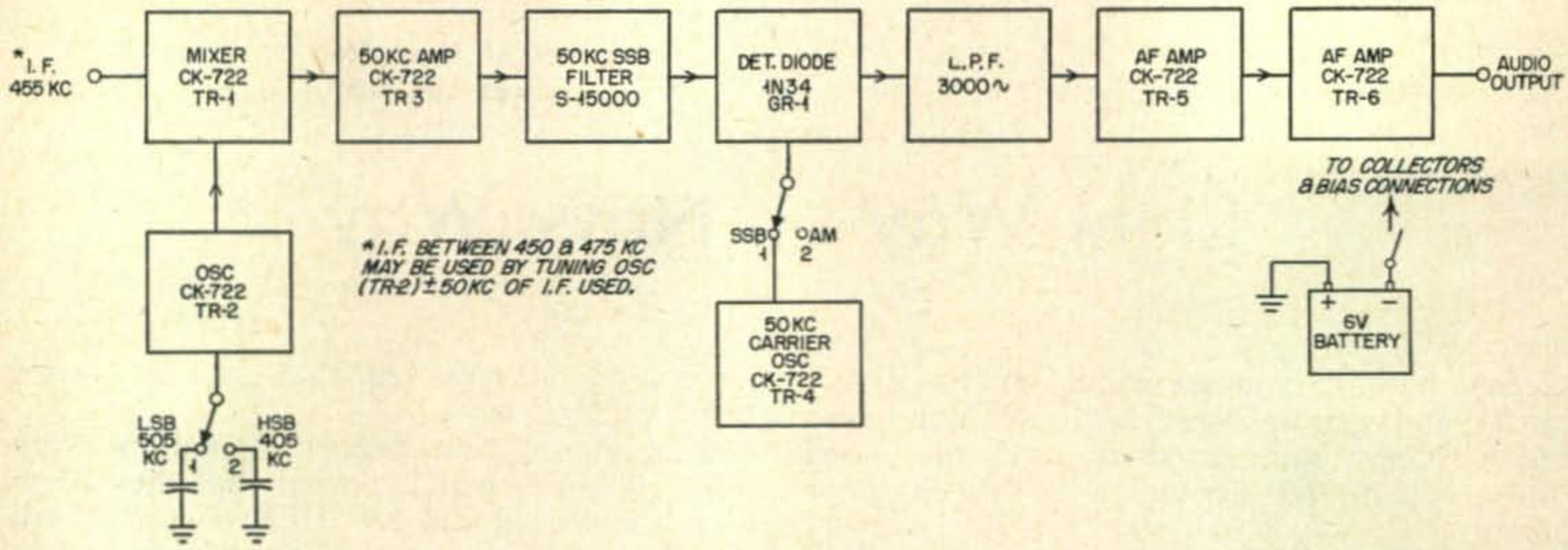
Back to the phone again. Capt. Fritter of the Curtiss was still agreeable and said, "It certainly would be an excellent morale booster aboard ship." The Office of Naval Operations said they had no objections. After much buck passing we finally pinned down the problem to Admiral Bruton (W4IH), who had changed his mind and now felt that it was "against Navy policy."

This was a great disappointment to everyone. The FCC had indicated that they might issue the special call KC5USN to the expedition and permit operation on twenty meters. The IGY had been interested in getting propagation information on ten, fifteen, and twenty meters over the path of the Curtiss' cruise, as well as the considerable publicity that would be involved. The Air Force had mentioned that they would be quite interested in running skeds for long range air-to-ship propagation tests with the low power SSB equipment.

I had hoped that in view of the importance of ham radio to the Navy for their morale in the Antarctic that they might be willing to give us a little consideration. Apparently it is all pretty much one sided. They'll accept anything we care to do to help them, but don't ask for anything from them. How many hundreds of phone patches have we put through for the Antarctica boys? Admiral Bruton can be reached at Chief of Naval Communications, Washington 25, D. C. in case you have a message for him.

We are still trying to find some way around Bruton's infamy and get KC5USN on the air. Once down at Antarctica Jim will be able to operate since he did get permission from the FCC for that. (Providing the local Navy CO agrees). Listen for K2OLK/KC4. Maybe on the trip back we will have KC5USN perking.

R. Adm. H. C. Bruton (Navy photo)



for that lower priced receiver

the Translicer

a Transistorized 50 kc Sideband Adapter

Chris Buff, W2ABS
39 Haight St.
Deer Park, N. Y.

Although several modern amateur receivers now incorporate sufficient selectivity with sideband switching, there still exists a considerable need for a high performance single sideband adapter for the older receivers and for mobile work. The unit to be described, when connected to a receiver of ordinary selectivity, actually outperforms certain modern receivers as far as selectivity is concerned.

X-str

Transistorization of the circuits results in a unit of much smaller size and power drain than could be accomplished with vacuum tubes. Total power requirements are 6 volts at 6 milliamperes. This makes the slicer ideal for mobile work, in conjunction with the BC receiver and an HF crystal converter.

The highly selective element is a 47-50 Kc. sharp sideband filter, *Burnell type S-15000*. The carrier side of this filter has an attenuation rate comparable with a 250 kc mechanical filter, while the opposite slope has a somewhat lower attenuation rate which results in a smoother high frequency roll-off and hence a more agreeable voice quality than a sharply breaking filter. It should be realized that when switching sidebands in the circuit described, the inversion is such that the steep side of the filter always is doing the work of rejecting the opposite sideband.

The transistors used are all of the *Raytheon CK-722* type. These transistors are readily available and reasonably priced at present.

Circuit Description

Functionally the circuit may be described as follows. A *CK-722* transistor input stage, *TR1*, acts as a frequency converter, mixing the

Variable mica padders for 50kc amp. and 400-500kc osc. tuning are on the left side while "Trim" control varies 400 or 500kc osc. for fine tuning of SSB signals.

455 kc i-f signals from the radio receiver with either a 405 kc or a 505 kc signal from the local oscillator, *TR2* (*CK-722*). Switching the oscillator frequency between 505 kc and 405 kc produces lower and higher sideband outputs, respectively. The 50 kc i-f produced in either case is amplified by *TR-3* before being applied to the sideband filter, *FL-1*. The output of the filter is combined with a 50 kc carrier frequency oscillator and demodulated to audio by the diode, *GR-1*. The 50 kc oscillator circuit is rather unusual in that the emitter return is through the output coil of the filter which has a low d-c resistance but high reactance at 50 kc. This results in very effective mixing of the carrier with the filter output signals.

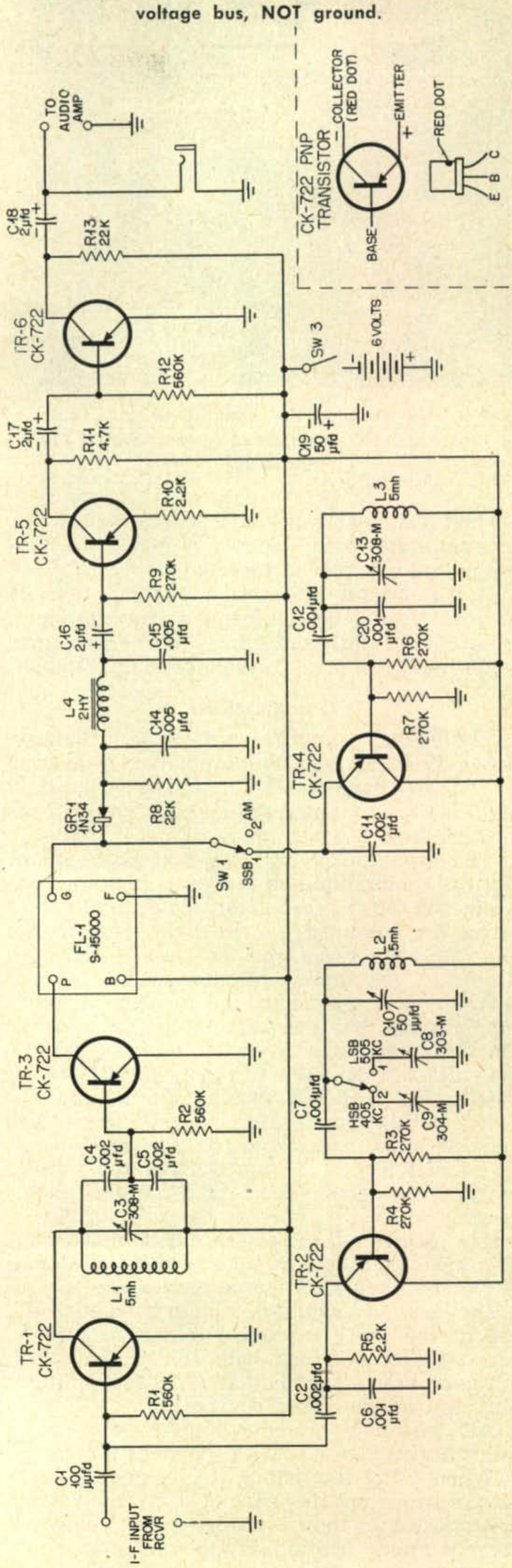
Following the diode is a 3000 cycle low pass filter of conventional design. Two audio stages follow the LPF. These are both grounded emitter stages. The resulting audio output is of comfortable earphone level. In most cases the output will be applied to the audio amplifier of the associated receiver for loudspeaker operation.

AM operation, on either sideband, is obtained by opening the emitter return of the 50 kc carrier oscillator, *TR4*.

The unit was designed for 6 Volt operation since this is convenient for commonly available cells and yields the required output. A self-contained battery of four 1½ Volt flashlight cells will give many hundreds of hours of operation and will result in excellent stability.

Since the *CK-722* is a PNP junction transistor, the positive side of the battery is ground-

Schematic of Slicer. Note R2 goes to voltage bus, NOT ground.



Parts List

C1 — .0001 µfd., 500V., Silver Mica, 5% (CM15-E-101J)

C2, C4, C5, C11 — .002 µfd., 500V., Silver Mica, 5% CM20-202)

C3, C13—425 To 1260 µµfd., Variable Mica (El Menco 308-M)

C6, C7, C12, C20—.001 µfd., 500V., Silver Mica, 5% (CM20-102)

C8 — 65 To 320 µµfd., Variable Mica (El Menco 303-M)

C9—100 To 500 µµfd., Variable Mica (El Menco 304-M)

C10—50 µµfd., Variable Air (Hammarlund HF-50)

C14, C15 — .005 µfd., 500V., Mica, 10% (CM30-502)

C16, C17, C18 — 2 µfd., 12V., Electrolytic (Barco PT12-2)

C19—50 µfd., 25V., Electrolytic (Barco P25-50)

R1, R2, R12 — 560,000 Ohms, ½ W., Comp., 10% ("Little Devil")

R3, R4, R6, R7, R9 — 270,000 Ohms, ½ W., Comp., 10% ("Little Devil")

R8, R13 — 22,000 Ohms, ½ W., Comp., 10% ("Little Devil")

R5, R10 — 2,200 Ohms, ½ W., Comp., 10% ("Little Devil")

R11—4,700 Ohms, ½ W., Comp., 10% ("Little Devil")

L1 — Inductor, Choke, 5 mh. (Miller #954)

L2 — Inductor, Choke, 0.5 mh. (Miller #951)

L3 — Inductor, Choke, 5 mh. (Miller #954)

L4 — Inductor, 2.2 hys., Mean (UTC VIC-13 [or equivalent])

F1—1—47-50 kc., Sideband Filter (Burnell S-15000)

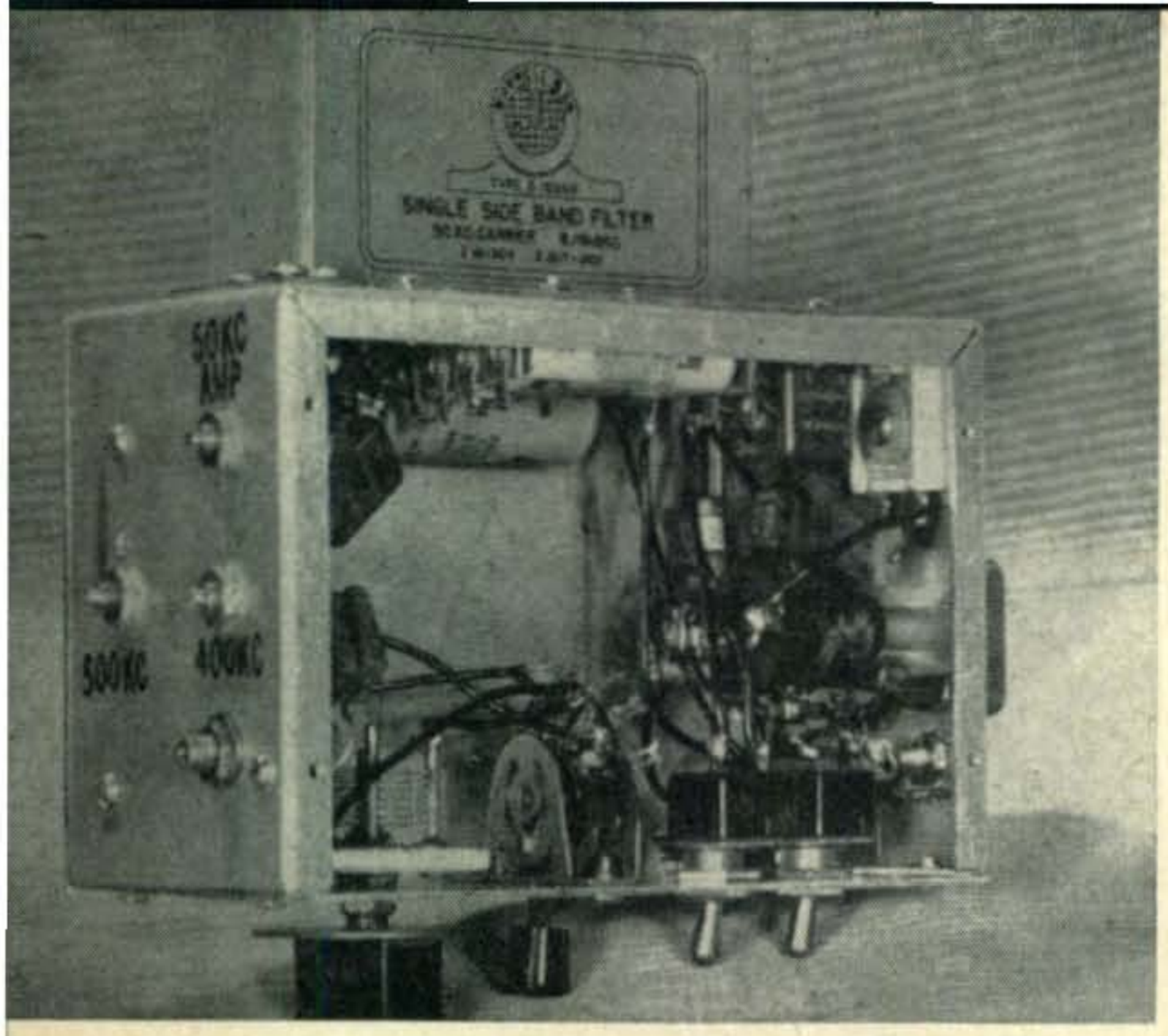
S1, S2, S3 — S.P.D.T., Rotary, Wafer (Centralab #1460)

J1—Jack, Single Contact (Mallory SC-1A)

GR1—Diode, Germanium-1N34

TR1, TR2, TR3, TR4, TR5, TR6—Transistor, PNP (Raytheon Ck-722) Junction

Battery—6 Volts (4—1½ V. Cells) (Eveready #7)



Top view showing the batteries at rear, 50kc carrier osc. coil at right and some of the CK-722 transistors.

ed and the negative side is connected to the collectors and base biases. For NPN junctions the polarity would be reversed.

It was found that this particular type of transistor ran quite uniform in characteristics, from unit to unit, and gave good performance when used as a mixer, oscillator, and amplifier.

Construction

The slicer, complete with 6 Volt battery, was built in a small aluminum box measuring 6″ long, 4″ deep and 3″ high. The 50 kc sideband filter is mounted on the back and extends an additional 2⅛″ to the rear.

The input mixer and 400-500 kc oscillator circuits are mounted on the left side of the box, while the 50 kc oscillator, *LPF*, and audio stages are mounted on the right. Due to the low levels employed and the lack of AC hum problems, the layout of components is considerably less critical than equivalent vacuum-tube circuits. No internal shielding is required. On the front panel from left to right are the 400-500 kc oscillator trimmer, the *HSB-LSB* switch, the *AM-SSB* switch, and the battery switch with a monitoring jack underneath. The variable mica main capacitors for the 400-500 kc oscillator may be tuned from the outside of the box, as may be seen from the photographs.

The *Miller* r-f chokes specified, make suitable low cost inductors for the 500-400 kc and 50 kc oscillators. Some improvement in frequency stability would be obtained through the use of the more expensive miniature toroids. The stability obtained with the present coils, however, seems adequate at room temperature, plus and minus a few degrees.

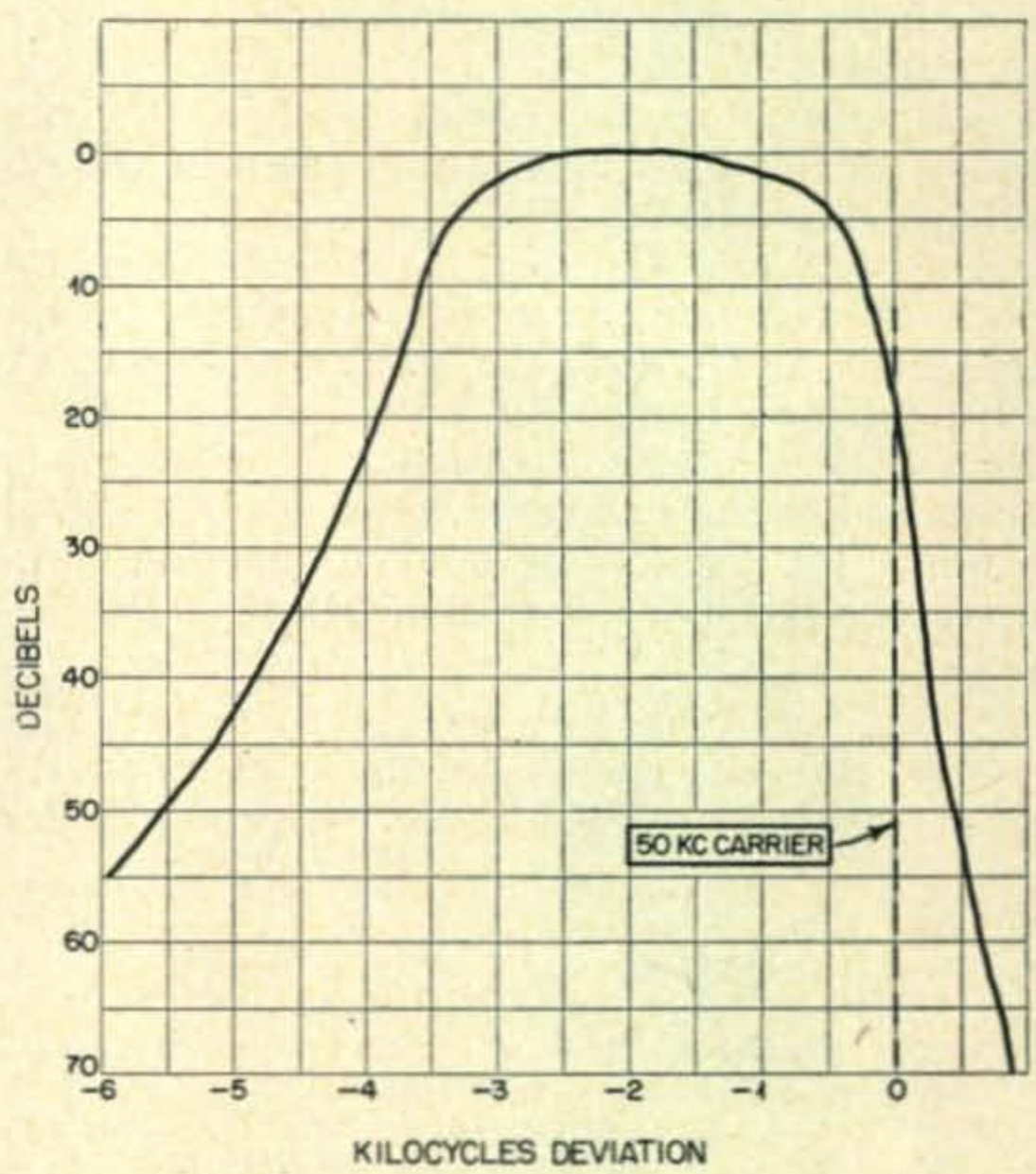
All wiring is straight point-to-point using solid, tinned #20 wire with spaghetti tubing.

When using transistors, it is a good idea to always wire up the rest of the components first and to put the transistors in last. This will prevent undue heating of the transistors while wiring other components. Also, the normally supplied lead lengths should be retained on the transistors. Place small lengths of tubing over each one and fold over as required, but do not cut them off short. You may want to use them over again!

Actually these transistors handle much more easily than might be suspected. No duds were experienced out of ten bought recently. Using the values given, there should be no difficulty with obtaining the desired oscillation and amplification.

Adjustment and Operation

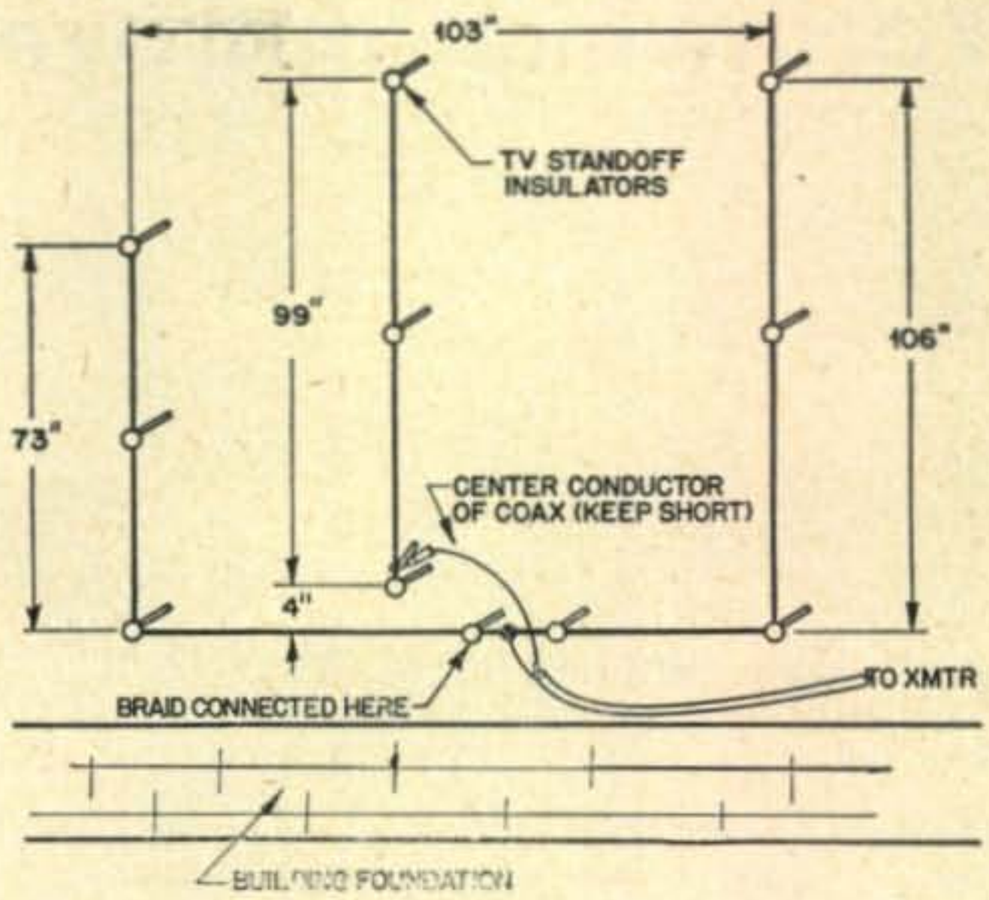
The carrier oscillator should first be adjusted, by means of trimmer *C13*, to exactly 50 kc by comparison with a known standard (such as the second harmonic of the 50 kc carrier oscillator against the 100 kc crystal standard in the station). Switch *S1* must be in the *SSB* position for this, and coupling to the oscillator should be as light as possible.



Bandpass curve

Next, the i-f oscillator should be adjusted to plus 50 kc of the receiver i-f with *S2* in the *LSB* position and to minus 50 kc of the receiver i.f. with *S2* in the *HSB* positions. Trimmers *C8* and *C9* are used for the LSB and HSB, respectively. A signal generator at the receiver i.f. is helpful for this, but not absolutely necessary. Once the slicer is operative, headphones may be plugged into the monitor jack and final trimming adjustments may be made on actual signals. An AM broadcast station is very good for final line up of the i-f oscillators. With the switch, *S1*, in the *SSB* position, the associated receiver is tuned to zero beat with the AM

[*Continued on page 116*]



the Apartment-Dweller's Beam

E. B. "Buck" Buchanan, K5GWX
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San Antonio, Texas

Having been an apartment-dweller for many years and not intending to be anything else for awhile I saw the need for a cheap, easily installed, but effective antenna. Ten-meters seemed the logical band choice for experimentation since it is fast approaching the DX-abilities of twenty.

This antenna, of course, is vertical and won't approach the performance of a wide spaced full size beam but as mentioned before I live in an aparement and am not permitted to erect towers and such. So . . .

Parts

The parts list consists of wire. Yes, that's all . . . wire. One piece of wire is cut to 23′6″. This wire is formed into the parasitic elements as shown in the diagram. The dimensions given are for 28.9 mc. The antenna was installed with the bottom only three feet off the ground. Construction details will have to be worked out for each individual installation, but at my ground floor apartment 300 ohm twin lead standoff insulators were screwed into the outside wall to support the corners and ends. To keep the antenna from whipping standoffs were also installed half-way between the ends of each element. The driven element is an 8′3″ length of wire mounted 41 inches from the director. This leaves 61 inches between the reflector and the driven element.

Feed

At present I am feeding the beam with 52 ohm coax (it shows an impedance of 27 ohms at the feed-point), and have had phenomenal success with it. A 67 inch or quarter wave matching stub would bring this down to a very close match if the builder found need for it. The feed line is attached to the antenna with two alligator clips, the center conductor being clipped to the bottom of the driven element and the braid connected to the *center* of the wire between the parasitic elements.

In an installation of this type the system is, of course not rotatable. However, after a month's use I have had reason very few times to wish to rotate it. It is pointed toward Europe which gives me, with appreciable gain, the entire eastern section of the United States plus Africa in addition to the European countries.

Instruments to measure accurately the gain obtained with this system, were not available but gain seems to be on the order of 5 db over a reference dipole. Front-to-back ratio is approximately ten db. ■

Worthwhile Improvements for that Old Receiver

Paul H. Lee, W3JHR
c/o Page, Creutz, Steel, and Waldschmitt, Inc.
Washington, D. C.

While overseas in Venezuela for two years, we were reduced to the status of SWL in our spare time as the result of a "silent key" enforced by Zenezuelan law which grants amateur licenses only to nationals. Therefore, we did our best to think up ways and means of improving the RCA Model CR-88A receiver which was the best thing available locally for our SWL-ing. For those who have never seen a CR-88A, let us state for the record that it is an excellent receiver of the H.F. superheterodyne variety, designed and built by RCA for point-to-point communications service. It is a component of their DR-89A Triple Diversity Receiver Unit, and is brother, sister, or what-have-you to their other models, namely the AR-88, AR-88D, AR-88LF, CR-88, CR-88B, CR-91, and CR-91A, many of which are in use by the Armed Forces both here and abroad. Now and then, some of the AR-88's find their way into surplus, or can be seen advertised in the "Ham-ads" in magazines. Many of them are in surplus in England, as a glance through the ads in "Wireless World" will show. (And at very reasonable prices, too, for anyone interested). All of the above is merely to introduce the reader to this type of receiver, because some may not be acquainted with it. However, the modifications described in this article will be applicable not only to the above receivers but to almost any standard communications superheterodyne receiver found in the average ham shack. We are planning to "do the deed" to our Super-Pro now that we are back in the United States. It is not the purpose of this article to describe a new invention, but it is merely to show the application of simple principles which will put new life into your old super-het, and lift it out of the "trade-in" class.

Much has been written in the past about low-noise-level amplifiers, and many schemes have been tried. For those who wish to indulge in a bit of mathematics as self-justification, reference may be made to page 374 of "Reference Data for Radio Engineers," Fourth Edition, published by Federal Telephone and Radio Corporation, wherein one finds practical approximations of formulae for equivalent noise input-resistance values for triodes and pentodes. Quoting: $R_{eq} = 2.5/G_m$ for triodes,

and $R_{eq} = \frac{I_b}{I_b + I_c^2}\left(\frac{2.5}{G_m} + \frac{20\ I_c^2}{G_m^2}\right)$

for pentodes.

In the above formula, R_{eq} is in ohms, I_b is the average plate current in amperes, I_c^2 is the average screen current in amperes, and G_m is the transconductance in mhos. A few computations with paper and pencil, using data from the tube handbooks, will show that the R_{eq} for a triode is much lower than for a pentode. The best triode of all will be the one with the highest transconductance, as can be readily seen. Reference to the tube handbooks shows that the 6BK7A fills this requirement very well. This tube was designed for use in TV receiver 'front ends," and has a transconductance of 9300 micromhos. Its equivalent noise resistance is only 270 ohms. Fine! Let's use it!

Fig 1 shows the basic circuit of the first R.F. stage of the CR-88A before modification. No doubt the first R.F. stage of the reader's receiver is very similar, and therefore we can say that the modification shown in *fig 2* will be just what is needed to reduce input stage noise and increase sensitivity and selectivity. The poorer the pentode, the greater will be the

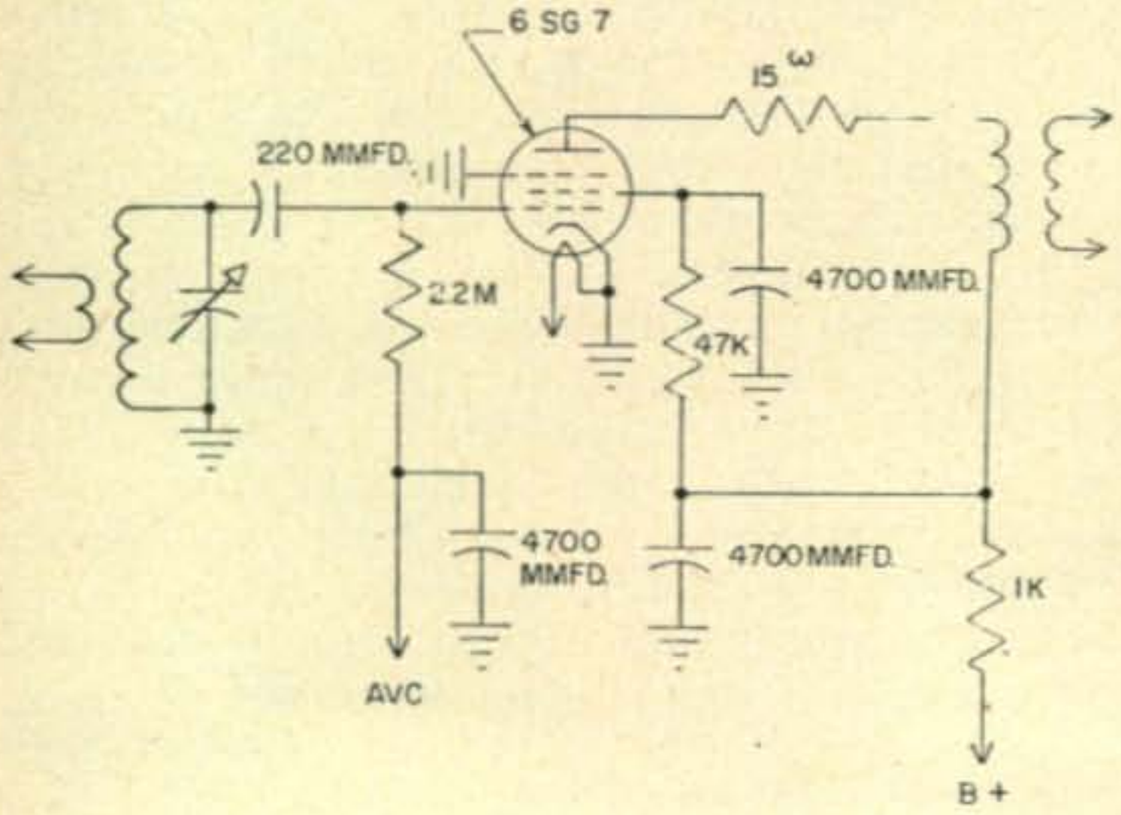

Fig. 1. Old 1st AF Stage

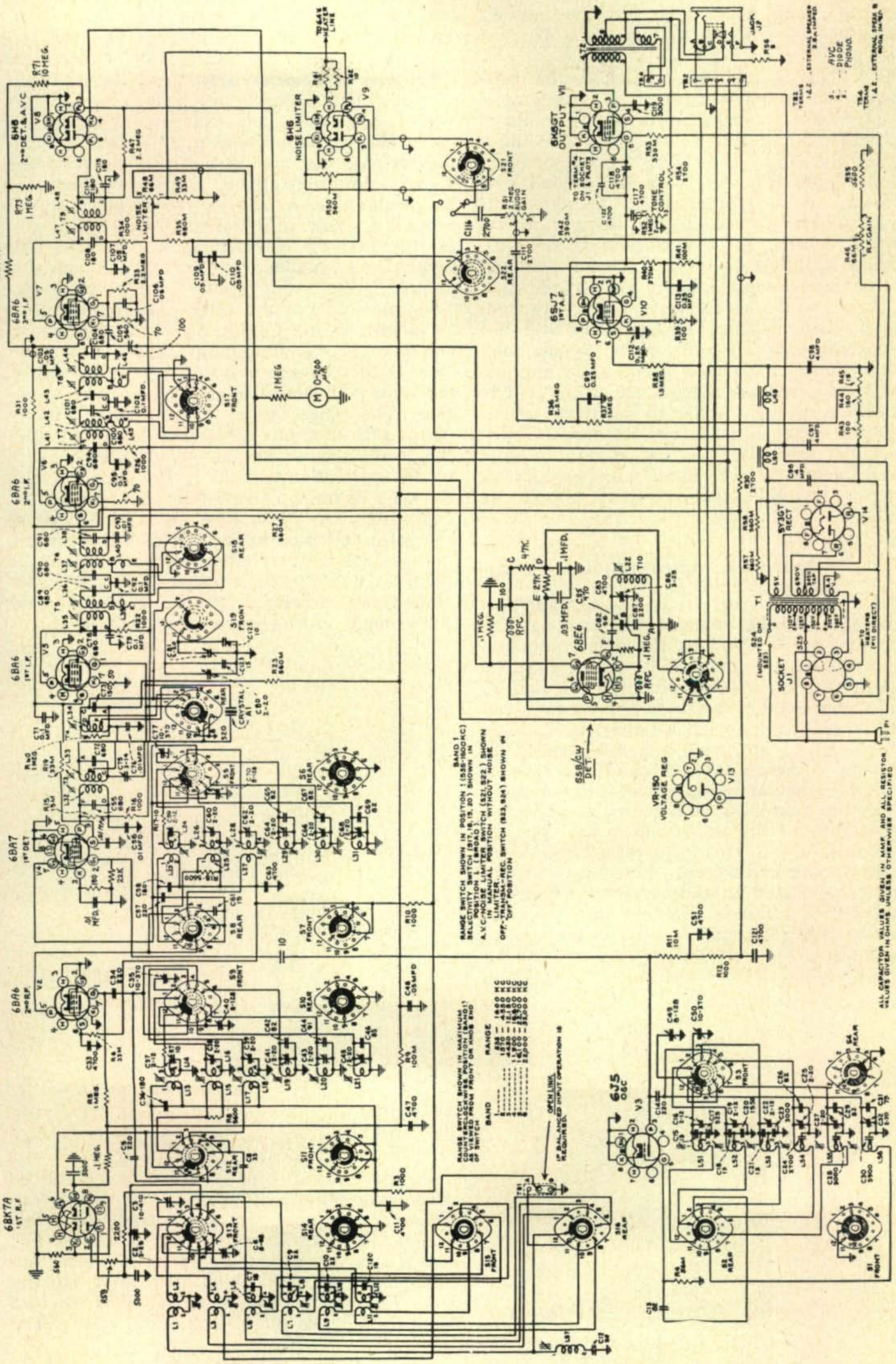

Diagram of Modified CR-88 Receiver

improvement upon substitution of the triode. That old 6K7, 6SK7, 6SG7, or 6S7 should come out—it is probably acting like a diseased tooth.

As for the circuit used, we chose the cathode-coupled circuit, because it is very simple, requires no neutralization for stability and is easily adapted to control by AVC. The input half of the 6BK7A operates as a grounded-plate cathode follower, with the second half operating as a grounded-grid cathode-input amplifier. The two cathodes use a common cathode resistor. The overall gain of the combination is almost equal to that of a pentode, but the input stage noise is greatly reduced, and selectivity and sensitivity are improved.

The actual physical modifications will not be described here, because the reader will have to look at his own input stage and see what is required after reference to *fig 2*. The main thing will be a small adapter plate to hold the 9-pin socket in the larger octal socket hole. We made ours out of 1/16" aluminum. The socket should be one fitted with a retaining ring for the tube shield, which should be grounded.

Operating Advantages

After making the modifications, and realigning the input stage of the receiver, the thing first noticed will be the great reduction in receiver background noise, especially on the higher frequency bands such as 14, 21, and 28 mc. If there is no external QRN present, sometimes it is difficult to tell whether the receiver is turned on or not, until a signal is tuned in, and then it comes in with plenty of "sock." Another immediately noticeable improvement will be the sharpness with which the antenna trimmer tunes, with the triode in use. The input circuit "Q" is greatly increased by use of the triode and consequent reduction in circuit loading, especially in the reception of strong signals. AVC action is excellent, and no cross-modulation is experienced, even on the strongest signals.

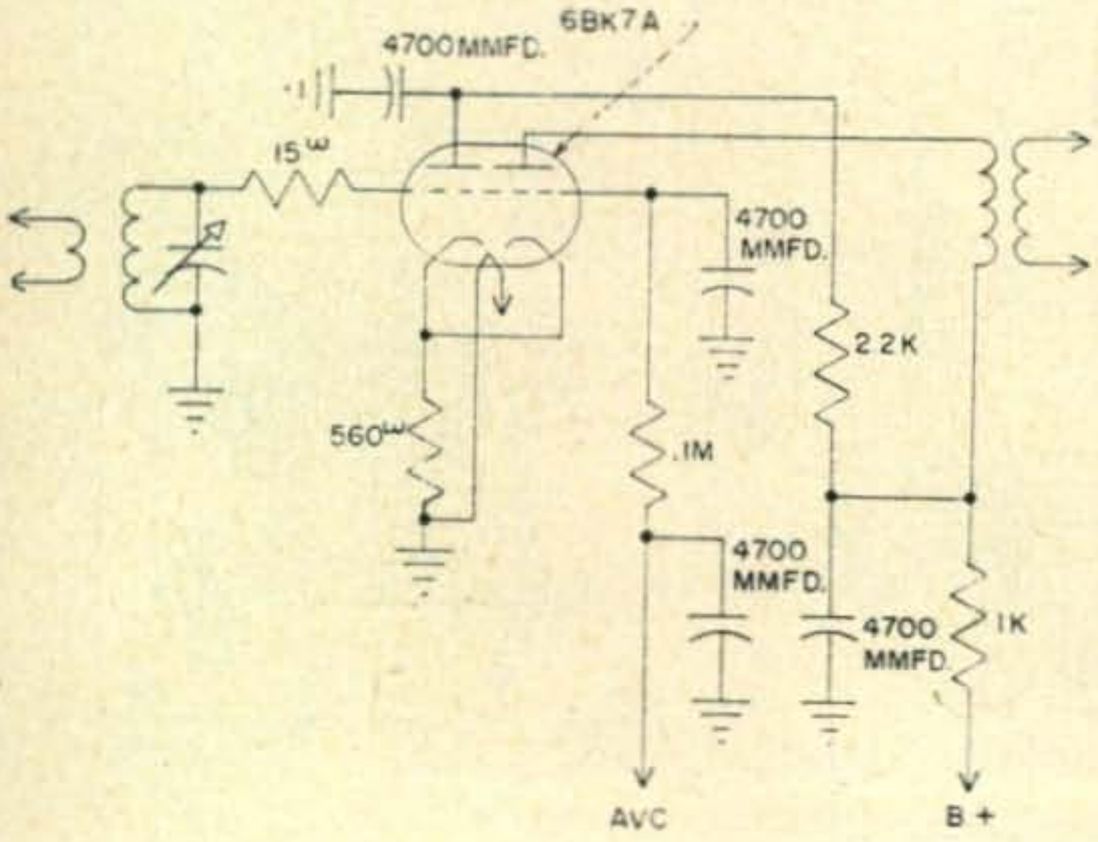

Fig. 2. New 1st r-f Stage

The second modification we can make in the way of modernization is the substitution of a mixer-type second detector for the beat frequency oscillator, for SSB and C-W reception. This type of detector is no good for AM, but it works like a charm for SSB. The CR-88A had a 6J5 b.f.o., and here again we substituted the miniature socket, this time a 7-pin variety, for the octal socket. *Fig 3* shows the b.f.o. before conversion, and *fig 4* shows the new, alternate second detector. The original second detector, a 6H6 diode, is left alone, and is still used for AM reception. The AM/CW switch was modified to include contacts for switching the audio input of the noise limiter from the 6H6 to the 6BE6. When the 6BE6 is in use on the C-W position of the switch, the 6H6 is still functioning, but its sole use then is to continue to provide AVC, which is used for SSB and c.w. as well as AM reception. The noise limiter in this particular receiver still functions for SSB and c.w. Whether the reader's noise limiter will or not, depends on the particular type of receiver he has and the type of noise limiter used in it. By way of explanation, in *fig 4*, RFC_1 is needed because the b-f-o coil used in the CR-88A has no tap, and the condensers across it act as the voltage divider circuit for the cathode connection. Obviously the cathode of the 6BE6 had to have d-c ground return, hence the use of RFC_1.

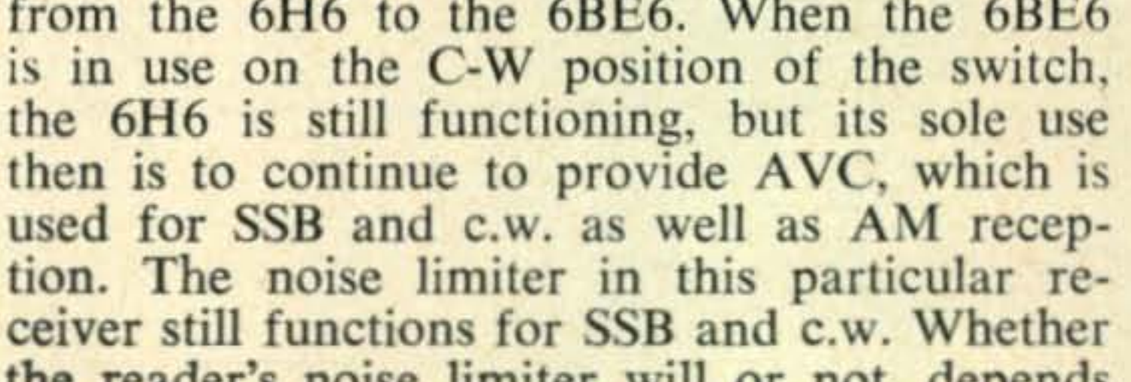

Fig. 3. Old BFO

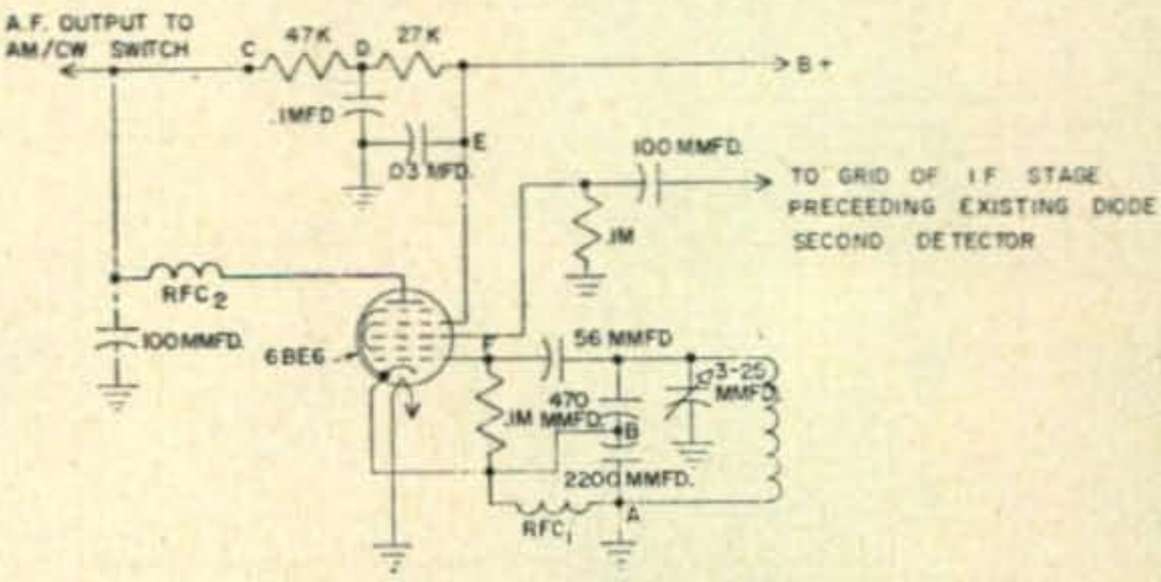

Fig. 4. New SSB/cw detector

A conventional type of b.f.o. coil could be used, with simplification of the circuit shown. However, we used the one already available in the CR-88A, with these modifications. The reader's own receiver will probably have another type of coil which will work equally well. The plate choke RFC_2 is an i-f filter to keep the 455 kc out of the audio stages. The

[*Continued on page 118*]

WWV Converter for Band Spread Amateur Receivers

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Modern amateur communications receivers tend to cover just the amateur bands. Many of the receivers come with a built-in 100 kc frequency standard. It occasionally becomes necessary to check, or zero, the crystal with WWV. As there is no provision to do this, a simple converter could be used. After an initial receiver investment the more simple device appeals to the set owner. The following is the most simple circuit design using a minimum of parts to accomplish reception.

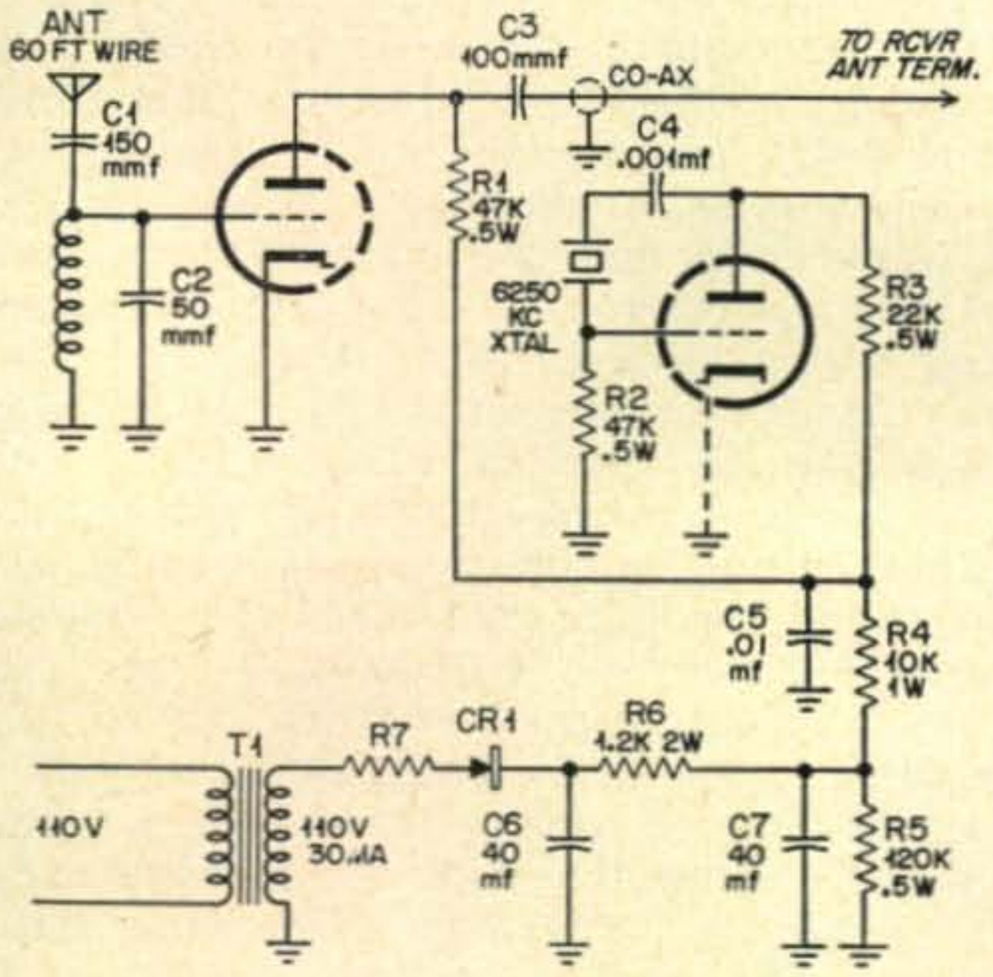
The circuit shown in fig. 3 will tune WWV on 10 mc, which is a fair compromise for most parts of the country. If a 5 mc or 15 mc WWV signal is desired the crystal frequency and plug-in coil could be changed. For 10 mc reception a common surplus crystal of 6250 kc is used in the converter. The receiver is tuned to 3750 kc. Any crystal in 6000 kc to 6500 kc would work equally as well by retuning the receiver to the proper frequency. This is found by subtracting 10,000 kc from the crystal frequency. In our case 10,000—6,250=3750kc.

The lead from the output of the converter should be shielded and of short length to prevent pick up of spurious amateur signals in the frequency range.

After the converter is constructed, determine if the crystal is oscillating. Tune the receiver to 3750 kc and vary C1 until peaked up with WWV. A short piece of antenna wire is capacity coupled to converter. If a long piece is used it would be better to inductively couple to the coil.

To zero your calibrater the BFO on the receiver should be on. A simple power supply is shown, however, most band spread receivers are being manufactured with an auxiliary power plug where voltage can be tapped off.

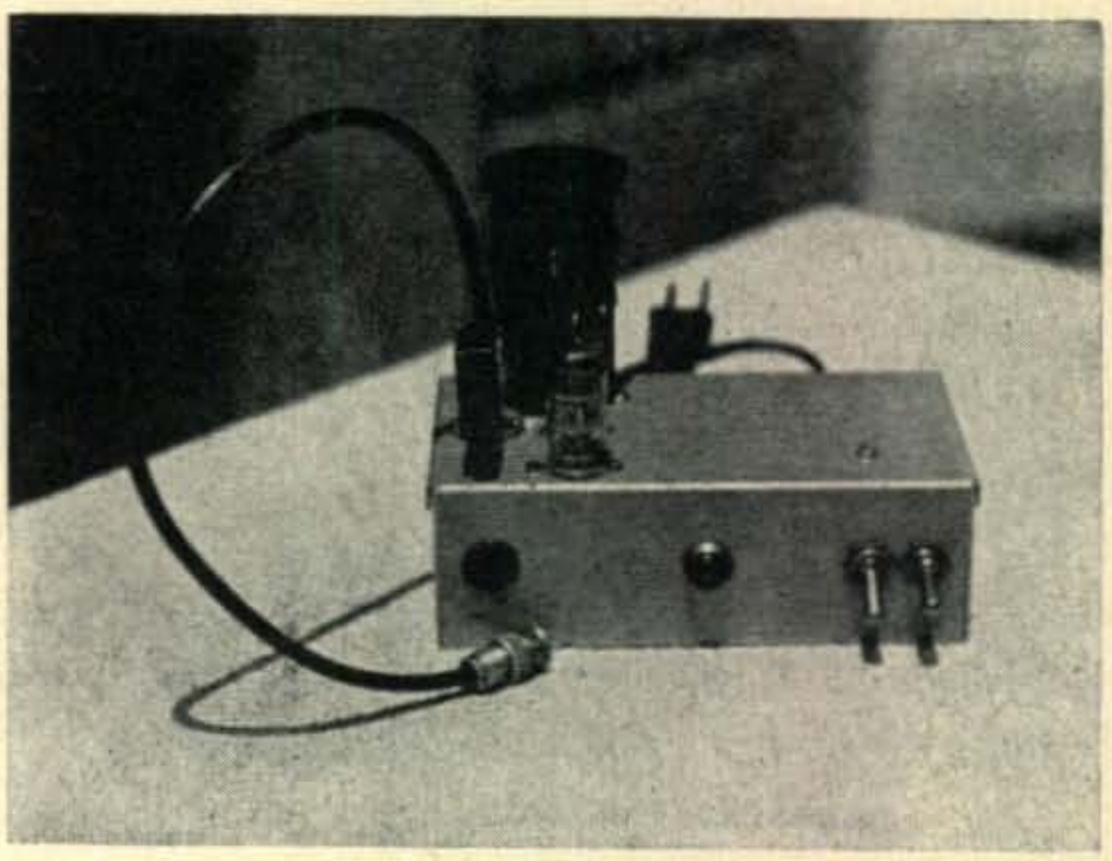
To copy 5 mc WWV signals tune the receiver in the 3500-4000 kc range using any crystal 8500-9000 kc. For 15 mc reception use a 8000-7700 crystal and tune the receiver from 7000-7300 kc. ■

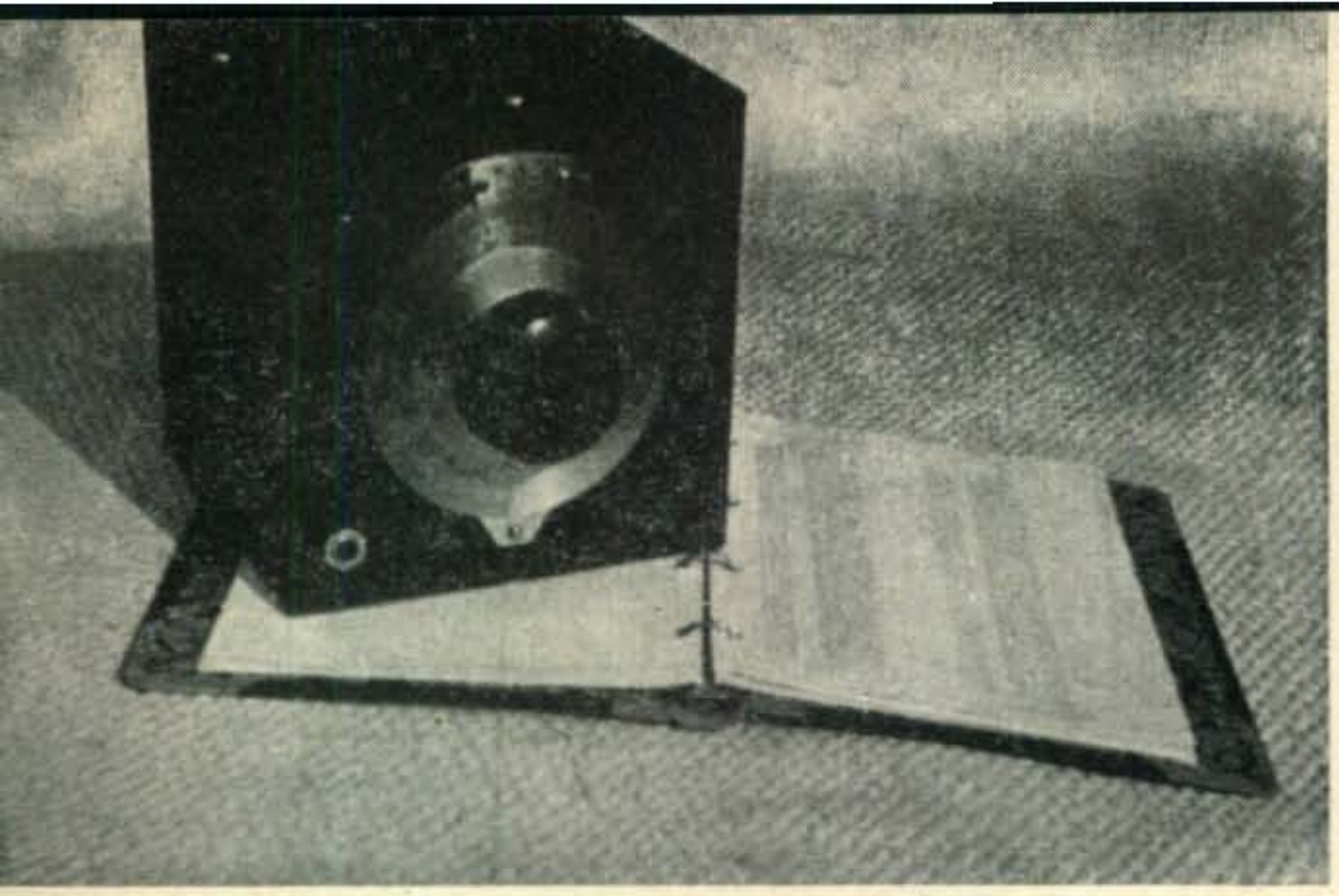


Parts List

C1—150 mmfd
C2—50 mmfd APC variable
C3—100 mmfd
C4—.001 mfd
C5—.01mfd disk
C6—40 mfd
C7—40 mfd
R1—47 K ½ watt
R2—47 K ½ watt
R3—22 K ½ watt
R-4—10 K 1 watt
R5—120 K ½ watt
R6—1200 ohm 2 watt
R7—35 ohm 1 watt
T1—110 V AC @ 30 ma — 6.30 @ 1.2 A Burstein-Applebee midget transformer #18 B 991 or power supply kit #18 C 182
CR1—65 ma @ 130 V Selenium rectifier
Chassis—LMB box #138
Coil—10 mc: 1½" diameter 12 T #18 enamel close wound.
6J6 Tube

Below: Complete converter





The instrument has clean-cut lines. No on-off switch is necessary. The transistor freq meter operates continuously with an estimated battery life of 1½ to 2 years. The book is used instead of a graph and provides readings every tenth of a division on the fundamental frequency.

Transistor Heterodyne Frequency Meter

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Imperial Beach, Calif.

The heterodyne frequency meter has enjoyed a return to popularity lately with the increased interest in the BC-221 and LM type surplus frequency meters.

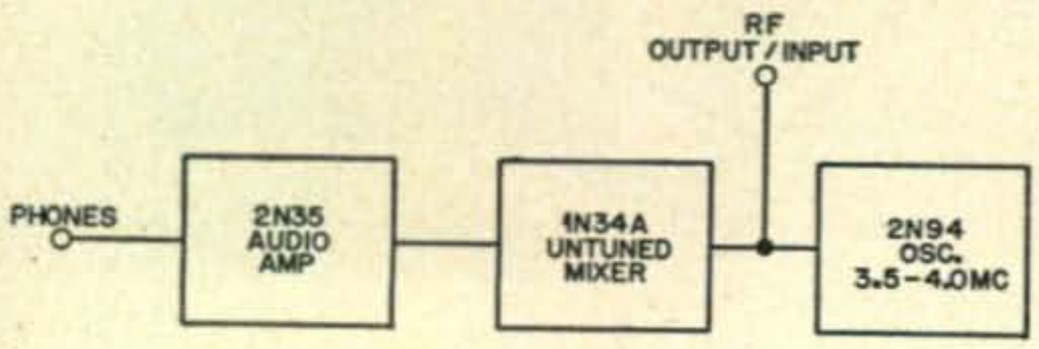
The frequency meter to be described in this article is a heterodyne type using two transistors and one germanium diode. The general theory and method of calibration were copied from the popular BC-221. The two moderately priced transistors function as oscillator and audio amplifier. The diode mixer provides the audible beat when the meter is used to measure transmitter frequencies. Note block diagram.

One problem in frequency meter or VFO construction is the change in calibration with expansion or contraction of frequency determining components with temperature changes, or the variations of vacuum tube characteristics with age. Since transistors use such little power and there are no heated filament circuits the heat problem is eliminated. The useful life of the transistor is much greater and it is anticipated there will be no changing of characteristics, as with vacuum tubes. It's too early to tell yet.

Note from the photographs that the frequency meter has no on-off switch. The emitter and collector voltages are supplied by two standard size flashlight cells and the current drain is 450 microamperes. The manufacturer of the batteries, in reply to a letter describing the application and the current drain, stated that the batteries as used in this frequency meter would have a life of between 1½ to 2 years on continuous operation. With toggle switches at 35 cents each, it's cheaper to let the meter run and never turn it off.

The variable oscillator uses a 2N94 as a base tuned oscillator and tunes the frequency range of 3.5 to 4.0 mc. Several other oscillator circuits were tried and this proved to be the most stable and richest in harmonics. It was first planned to tune the oscillator from 2 to 4 mcs and use the meter for all frequencies: ham band and otherwise. Since the station receiver only tuned the ham bands it was thought useless to provile calibration for frequencies not normally used. Also, the number of kilocycles per division on the tuning dial would have been too great—covering 2 to 4 mc—to make accurate measurements possible. The fundamental range therefore was settled on 3.5 to 4.0 mc. This gives fundamental coverage on 80 meters and harmonic coverage on all other ham bands. Fifteen meters is the sixth harmonic of 80 meters and ten meters is the 8th harmonic of 80, but it took some head scratching to come up with 11's calibration. The eleven meter band is,

Block diagram of Frequency meter



fortunately, the seventh harmonic of the portion of 80 meters near 3800 kc.

The meter's two controls are the main tuning dial and the calibration knob. The main tuning dial is a *National* Type N. The type N dial is capable of being read to within one tenth of a division, and with careful use and close reading can be read even closer.

The calibration knob serves the same purpose as the calibration knob on a BC-221: correction of the dial readings at known "Marker" frequencies. This instrument, however, has no internal 100 kc frequency standard. I use two "on the air" calibration points that can be heard anywhere in the U.S. The two I have found most accurate and the most consistent in operation are: NSS on 4005 kc and the Canadian time signal station on 7335 kc. Both of them are on 24 hours per day.

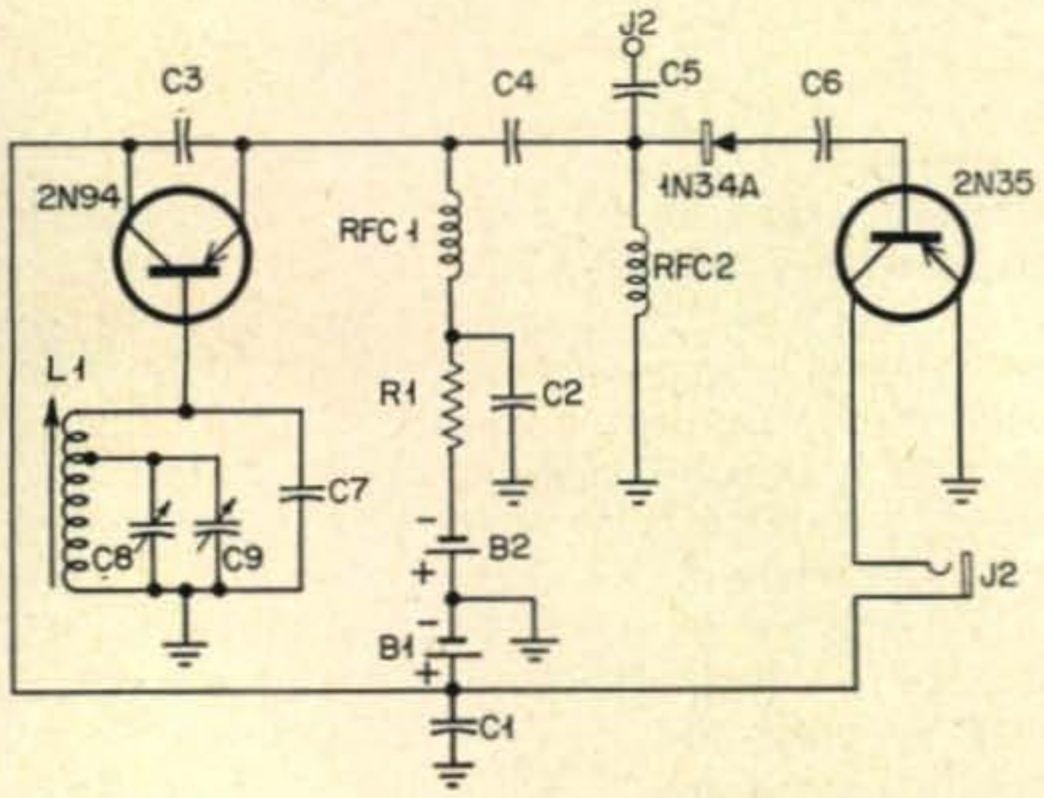
The calibration is typed with two columns of figures per page. (See photo and example.) The left column giving the dial readings every tenth of a division and the right column the fundamental 80 meter frequency. At the bottom of each page the dial divisions and fundamental frequencies covered on the page are easily read when leafing through the book. Often used harmonics—band edges, calibration points, etc—are marked, otherwise only fundamental frequencies are given.

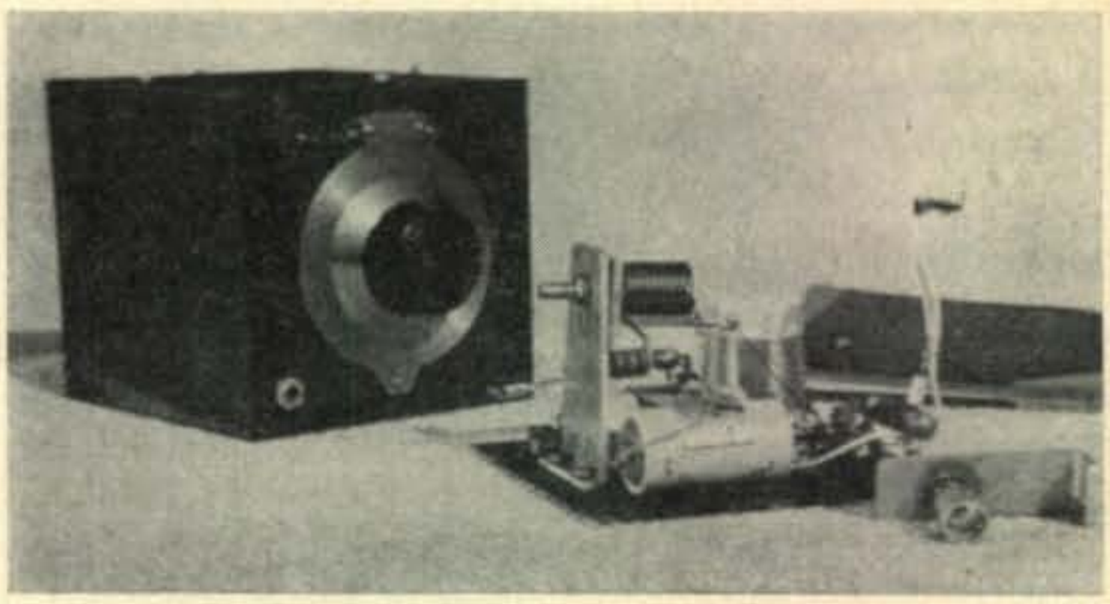
The meter was calibrated and the calibration book made up by comparison with a borrowed frequency standard. A dial reading was taken every ten kilocycles over the entire range of the meter. The readings were recorded and the intermediate dial readings, between the measured 10 kc points, were figured by interpolation. It's a bit of work to make up the book, but I think it's worth it.

The entire meter is built in a small 6″ x 6″ x 6″ utility cabinet. The bottom plate serves as a chassis for all parts except the calibrator

[*Continued on page 117*]

Schematic diagram





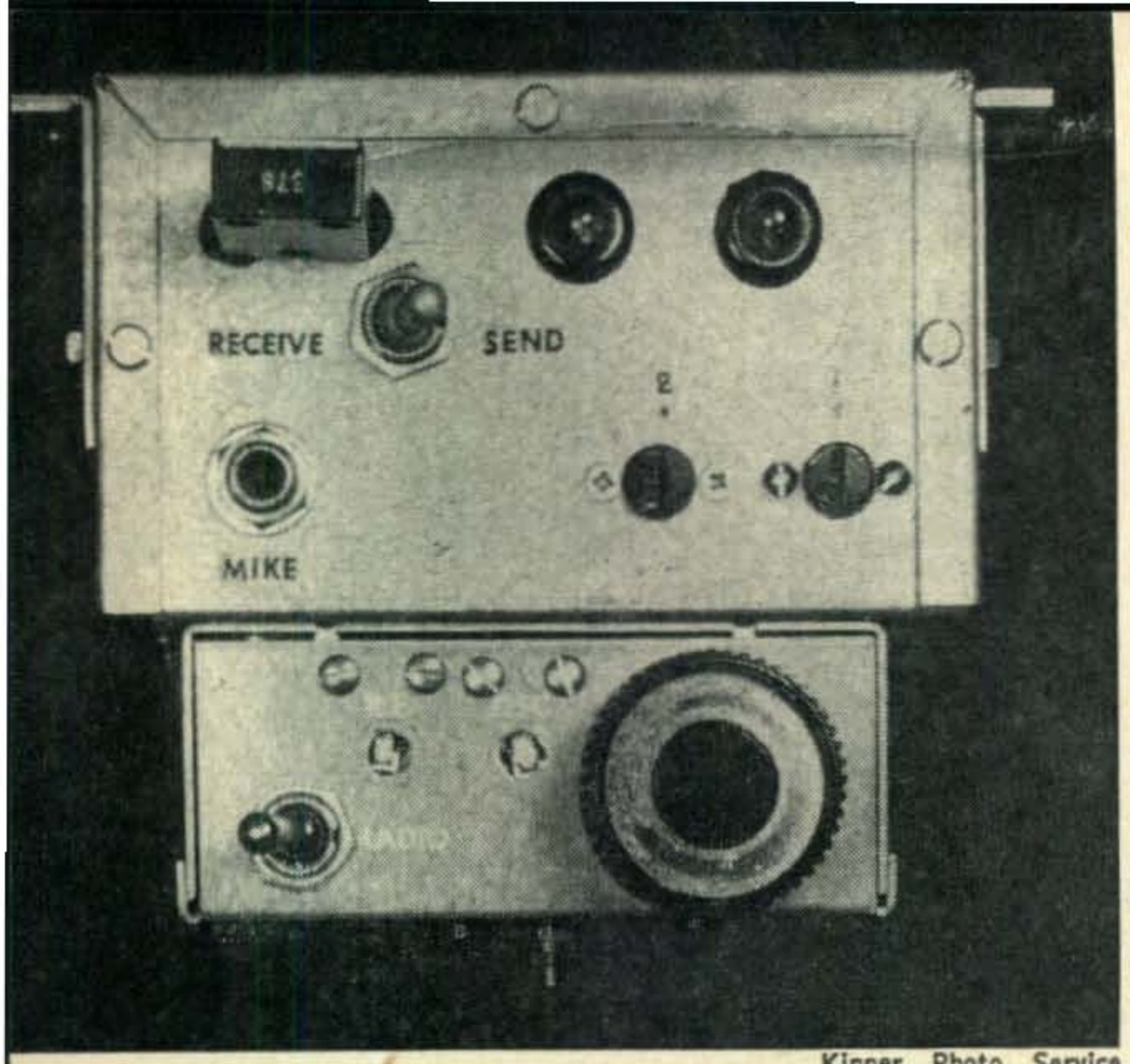
The works of the meter. Note the aluminum bracket holding the flashlight batteries in place. The oscillator transistor is to the right of the coil. The homemade brass slug on it's mounting bracket is lying in front of the frequency meter. Below: Tuning chart

27.4	36Ø9.435	31.5	3633.33Ø
27.5	361Ø.ØØØ	31.6	3633.885
27.6	361Ø.588	31.7	3634.44Ø
27.7	3611.176	31.8	3634.995
27.8	3611.764	31.9	3635.55Ø
27.9	3612.352	32.Ø	3636.1Ø5
28.Ø	3612.94Ø	32.1	3636.66Ø
28.1	3613.528	32.2	3637.215
28.2	3614.116	32.3	3637.77Ø
28.3	3614.7Ø4	32.4	3638.325
28.4	3615.292	32.5	3638.88Ø
28.5	3615.88Ø	32.6	3639.435
28.6	3616.468	32.7	364Ø.ØØØ
28.7	3617.Ø56	32.8	364Ø.558
28.8	3617.644	32.9	3641.176
28.9	3618.232	33.Ø	3641.764
29.Ø	3618.82Ø	33.1	3642.352
29.1	3619.4Ø8	33.2	3642.94Ø
29.2	362Ø.ØØØ	33.3	3643.528
29.3	362Ø.588	33.4	3644.116
29.4	3621.176	33.5	3644.7Ø4
29.5	3621.764	33.6	3645.292
29.6	3622.352	33.7	3645.88Ø
29.7	3622.94Ø	33.8	3646.468
29.8	3623.528	33.9	3647.Ø56
29.9	3624.116	34.Ø	3647.644
3Ø.Ø	3624.7Ø4	34.1	3648.232
3Ø.1	3625.292	34.2	3648.82Ø
3Ø.2	3625.88Ø	34.3	3649.4Ø8
3Ø.3	3626.478	34.4	365Ø.ØØØ
3Ø.4	3627.Ø56	34.5	365Ø.488
3Ø.5	3627.644	34.6	3651.176
3Ø.6	3628.232	34.7	3652.764
3Ø.7	3628.82Ø	34.8	3652.352
3Ø.8	3629.4Ø8	34.9	3652.94Ø
3Ø.9	363Ø.ØØØ	35.Ø	3653.528
31.Ø	3630.555	35.1	3654.116
31.1	3631.11Ø	35.2	3654.7Ø4
31.2	3631.655	35.3	3655.292
31.3	3632.22Ø	35.4	3655.88Ø
31.4	3632.775	35.5	3656.468

Parts List

B1, B2—Flashlight batbatteries, 1½ volt
RFC1, RFC2—2.5 millihenry RF choke
C1, C2—.001 Disc Ceramic
C3—40 mmfd fixed capacitor, mica
C4, C5—5 mmfd fixed capacitor, ceramicon
C6—.05 paper capacitor
C7—270 mmfd capacitor, ceramic. Plus 30 tem coefficient
C8—15 mmfd variable capacitor. HF15 Hammarlund
C9—140 mmfd variable capacitor. HF140 Hammarlund
R1—2500 ohm, ½ watt resistor
J1—Phone jack
J2—Feed through insulator

L1—18 turns of #18 tinner wire on 1 5/16" dia form, spaced on form to cover 1⅝" winding space. Form used was rescued from an ARC five transmitter: a ceramic form originally having three windings. The inner and interlaced windings were removed. Tap four turns from top end.
Dial—National Type N
Cabinet—6 x 6 x 6 in. Bud type CU-1098
Three metal pieces. One for C9, one for brass slug, one for battery brace. All made of soft aluminum.
Tie point strips.
One brass slug and machine screw. Brass slug made from male coax fitting, threaded cover.



Kinner Photo Service

The complete unit hangs under the dash, only two screws are required to fasten it.

Byron G. Wels, K2AVB
6 Timber Lane
Levittown, L.I., N.Y.

Six Meter Mobile

My story in the February CQ on the Levittown Six Meter Project brought so many requests for circuit information that it is apparent that an article is in order. So be it.

The prime overall consideration in the design of this equipment was to keep it as simple as possible and still provide good reliable communication over a short range. DX'ers will want higher power and more sensitivity, we wanted something that the club members could build as a group project and use for local contacts. When band conditions are right these units will possibly work into Europe, but that is extra.

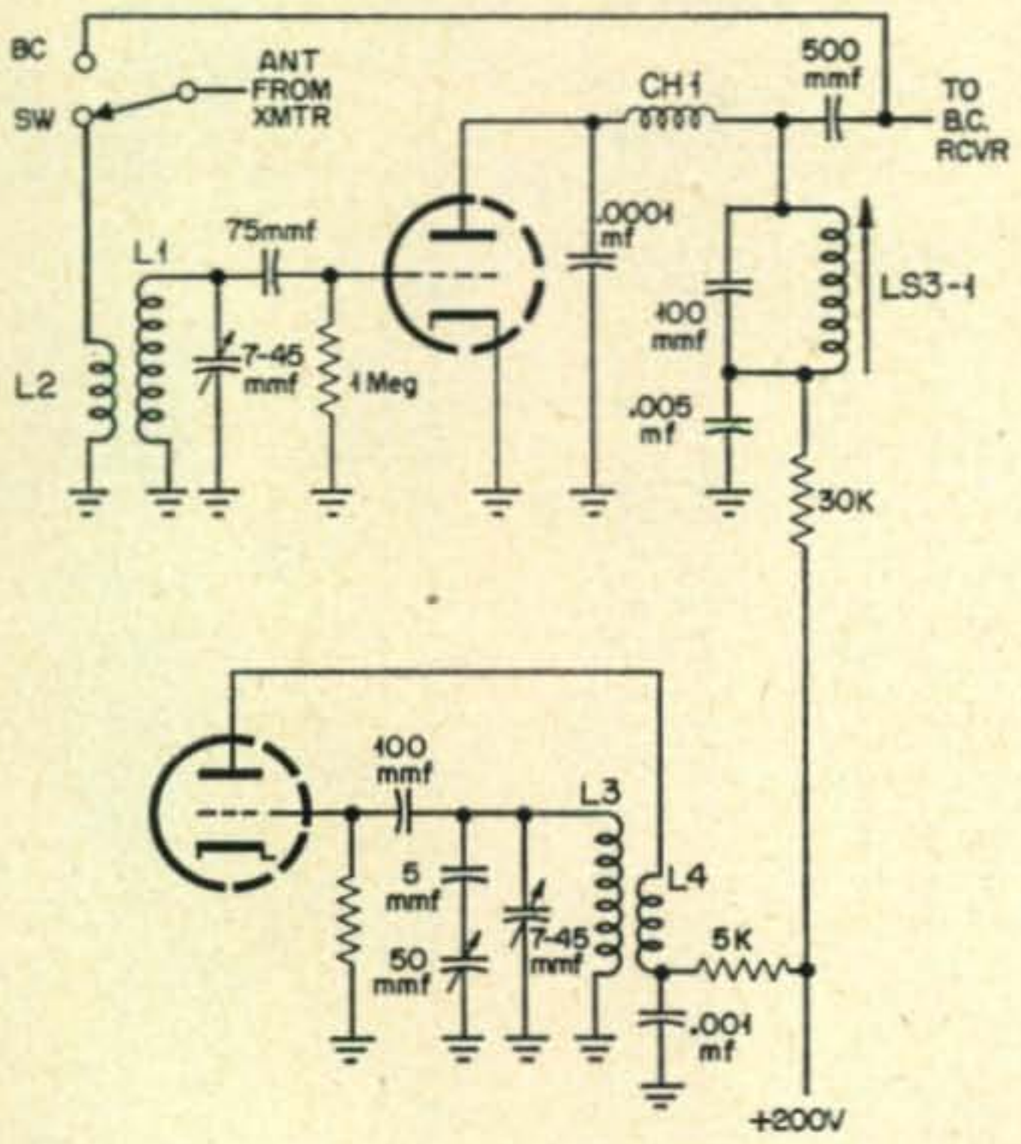


Fig. 1. Converter schematic, the tube is a 6J6 and the resistor from the lower grid to ground is about 47K.

The Transmitter

For maximum flexibility we designed the transmitter to be used either for mobile or fixed station operation. It covers both six and ten meters, being a modification of the "10-6 Packset" (May and July 1954 *CQ*). The entire unit is housed in a gray 3″ x 4″ x 5″ flexi-mount case (I.C.A.) giving a professional appearance when finished with decals.

The wiring is quite simple, with no trick circuits involved. Note that flashing copper is used between the two variable condensers to provide shielding. Use shielded wire on all leads to and from the send/receive switch.

To tune the transmitter: plug in a crystal for the band you wish to use. Connect six volts to the filament, connect the ground. Make sure the filaments light up. Put some sort of load on the antenna jack . . . a small pilot lamp will do. Plug in the mike and then connect the high voltage. The neon bulbs should glow with the dull red of d.c. The color in the bulb will change to bright bluish pink, indicating r.f. is present, when the grid condenser is tuned through resonance. When the plate has been peaked do the same with the plate condenser, the pilot lamp should begin to glow. Don't expect it to burn out, this is a low power transmitter.

Speaking into the mike will make the neon lamp blink. To change frequency plug in a different crystal and reset the condensers. Since the frequency will seldom be changed we used screw-driver adjustable type condensers. They take up less space too.

If you follow our design, wire the speech amplifier stage first since just about everything else is wired above it. Be careful for the compactness of this rig leaves little room for errors and an early mistake can bring grief.

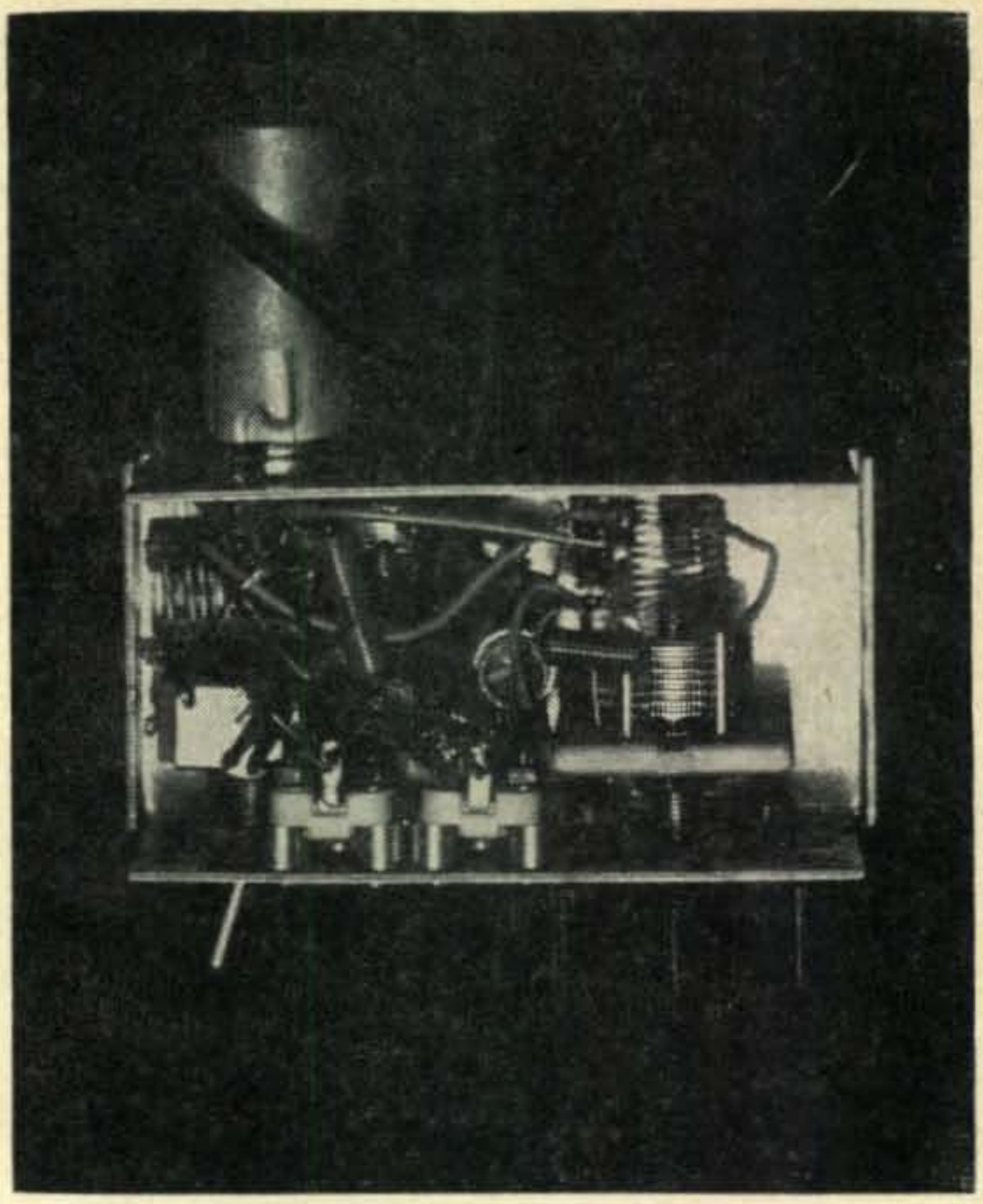
Again, to conserve space, the neon bulbs are held in place by slipping them through a pair of half-inch rubber grommets. No lamp holder is needed since they are wired in directly.

The Converter

This was a problem. Small converters were easily available, but either they were crystal controlled or worked into a high-frequency i.f. There was no happy medium that we could strike. A tuneable converter was desired, sensitivity wasn't horribly important due to the limited range of the transmitter. Small size, to match the transmitter was another requirement. A 1000 kc output to work into a broadcast receiver seemed best for the mobile installations.

W2OWO gave thought to the matter, whipped out his trusty slip-stick, and proceeded to amaze us by designing the converter to our specifications.

It is housed in a 1½" x 1½" x 4" Gray hammertone channel-lock box (I.C.A.). The antenna and power leads are brought out through the back, with the slug for the output coil protruding from the bottom and the 6J6 emerging from the rear apron. On the front, is an antenna switch so that the car radio can still be used as a car radio. Above the switch, concealed by snap-hole plugs, are



Underside of the converter

the two trimmer capacitors. These are mounted on ¼" standoffs, with shielding between them. The large knob on the right is the main tuning condenser. Alignment: first check all the LC circuits with a grid dipper and then peak up the coils and trimmers by actually listening to signals on the air. Once set there should be no further need for adjustment.

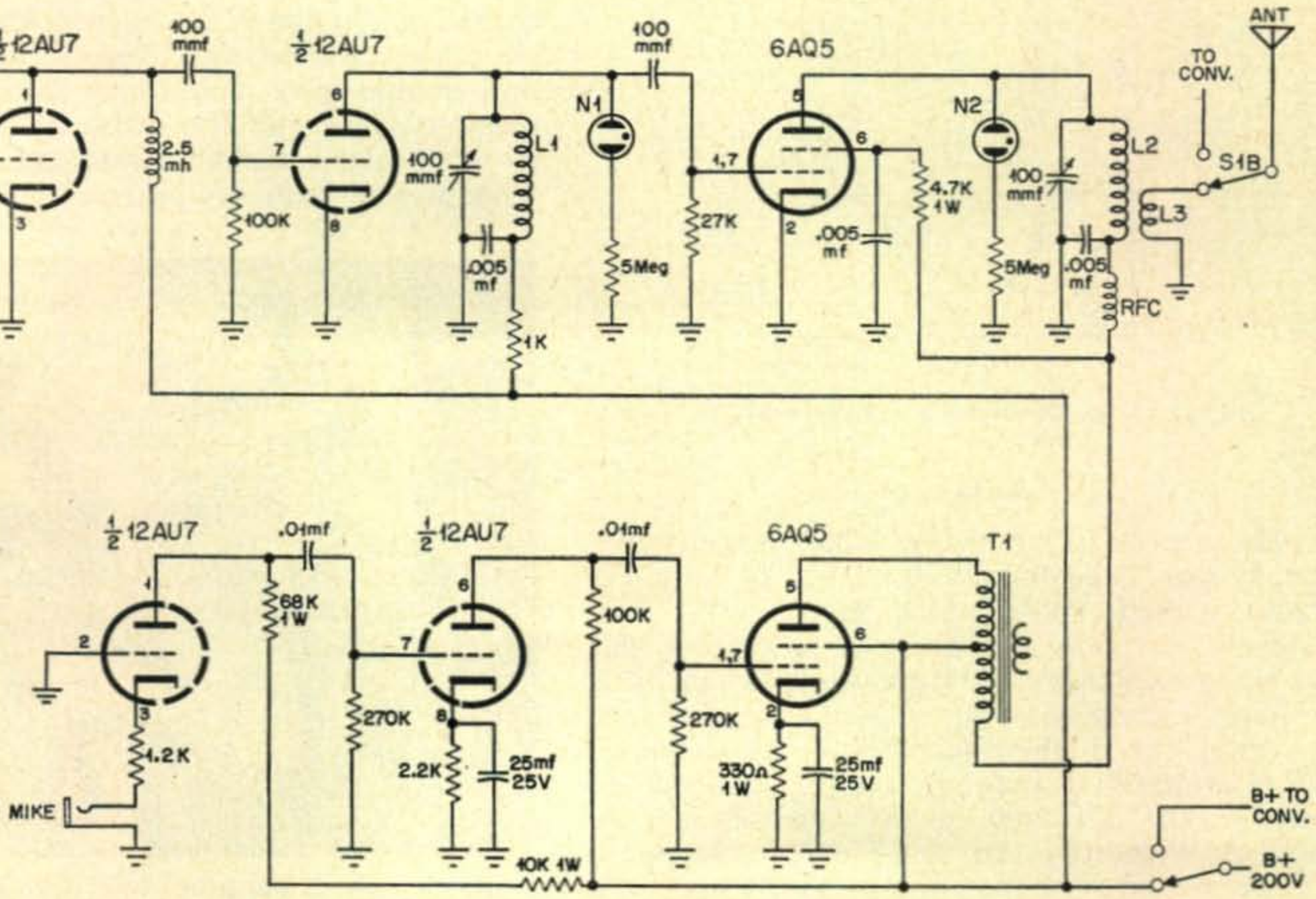


Fig. 2. Transmitter schematic

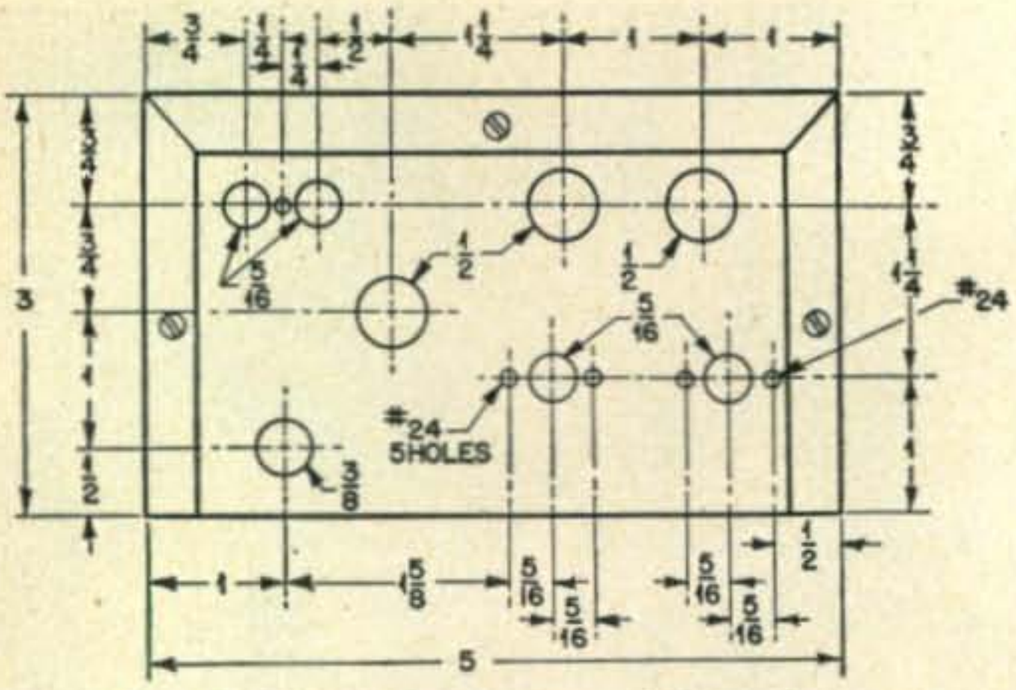
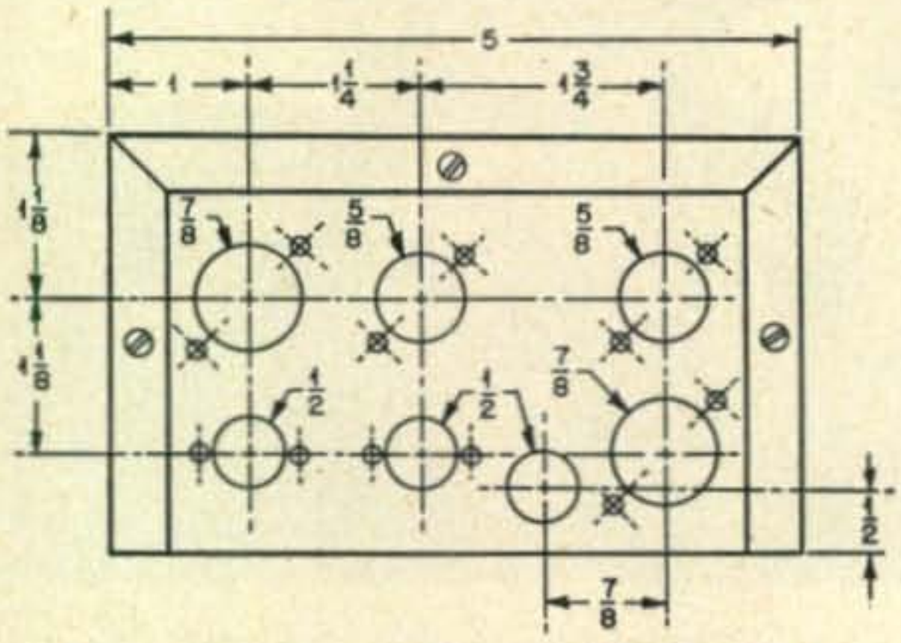


Fig. 3. X-mtr front view drilling layout



'Fig. 4. X-mtr rear view drilling layout

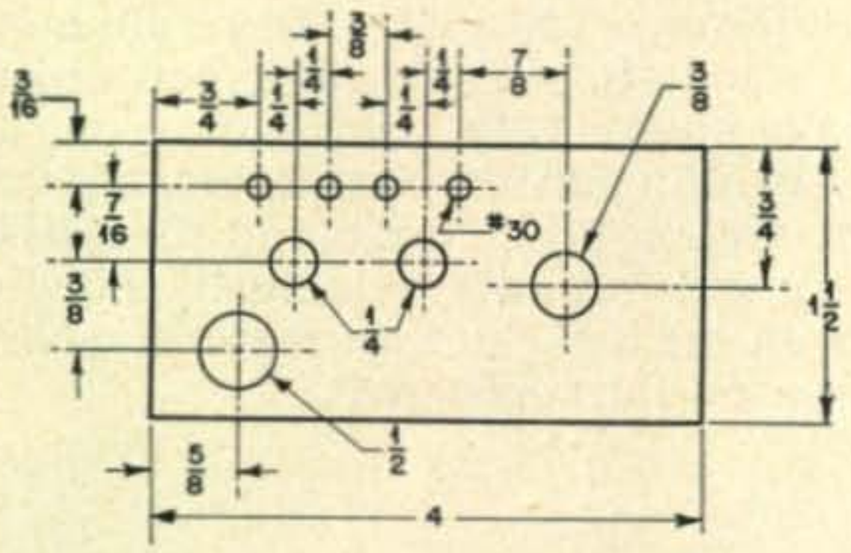


Fig. 5. Front view, converter layout

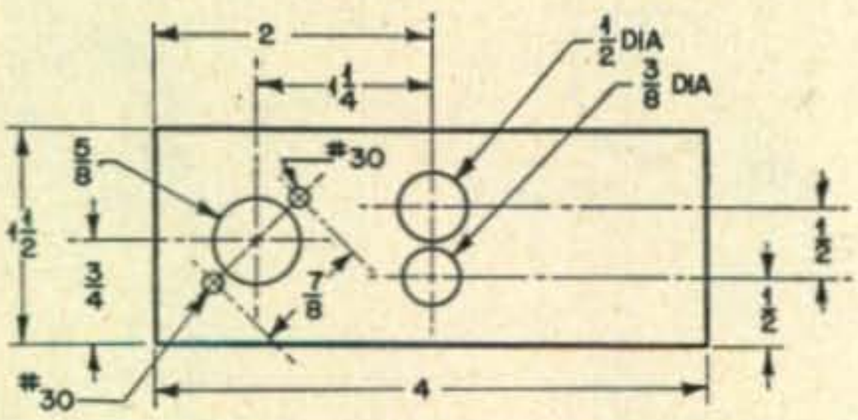


Fig. 6. Converter assembly, rear

Antennas

The necessary length for a half wave is 55". Lucky you! The broadcast aerial for your car radio will probably reach that length. If it doesn't, buy one that does. It is a good idea to make scratch marks at the joints when using collapsible antennas when you have them set at resonance. It then becomes a simple matter to reset them if they should be changed for any reason. Of course, any antenna can be used provided it is cut for the 6 meter band. If the station is to be used in the home, as a fixed installation, nothing is better than a beam, the more elements the better.

Power supplies

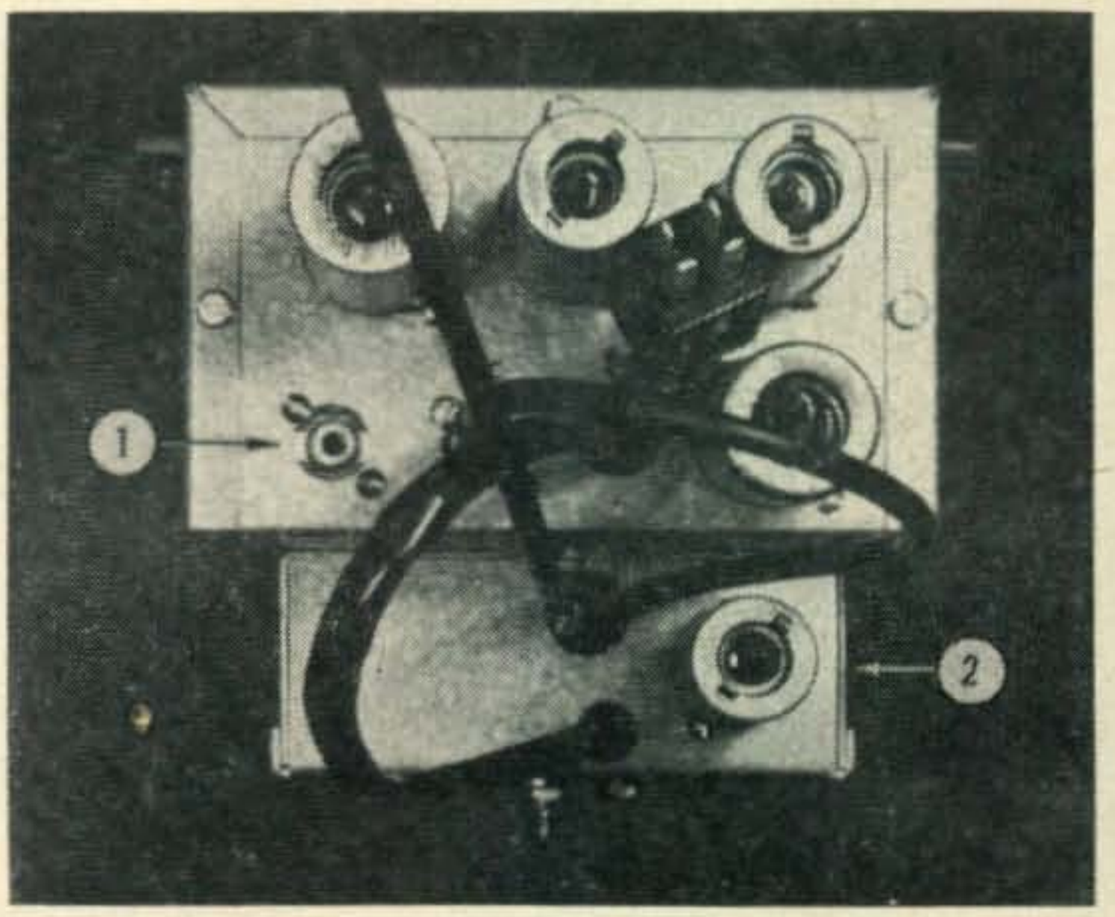
Any supply capable of delivering 200 volts at 80 ma will serve for the unit. We don't plan to enter the age old discussion of vibrator versus dynamotor here . . . however it is recommended that for ease of operation and clean installation a power source other than that in the car radio be used. Since the transmitter draws 70 ma it would necessitate removing B-plus from the car radio during the transmit condition. As the converter requires that this voltage be reapplied to the car receiver in order to receive, you can see that the complex switching required would demand more than two hands . . . especially if you plan to drive at the same time.

There are many sources of commercially available power supplies, both vibrator and dynamotor types. However one should not entirely eliminate the local radio repair shop and the nearby auto junk yard . . . both fine sources for beat-up old car radios which can be pirated for the power equipment they contain.

The Last Word

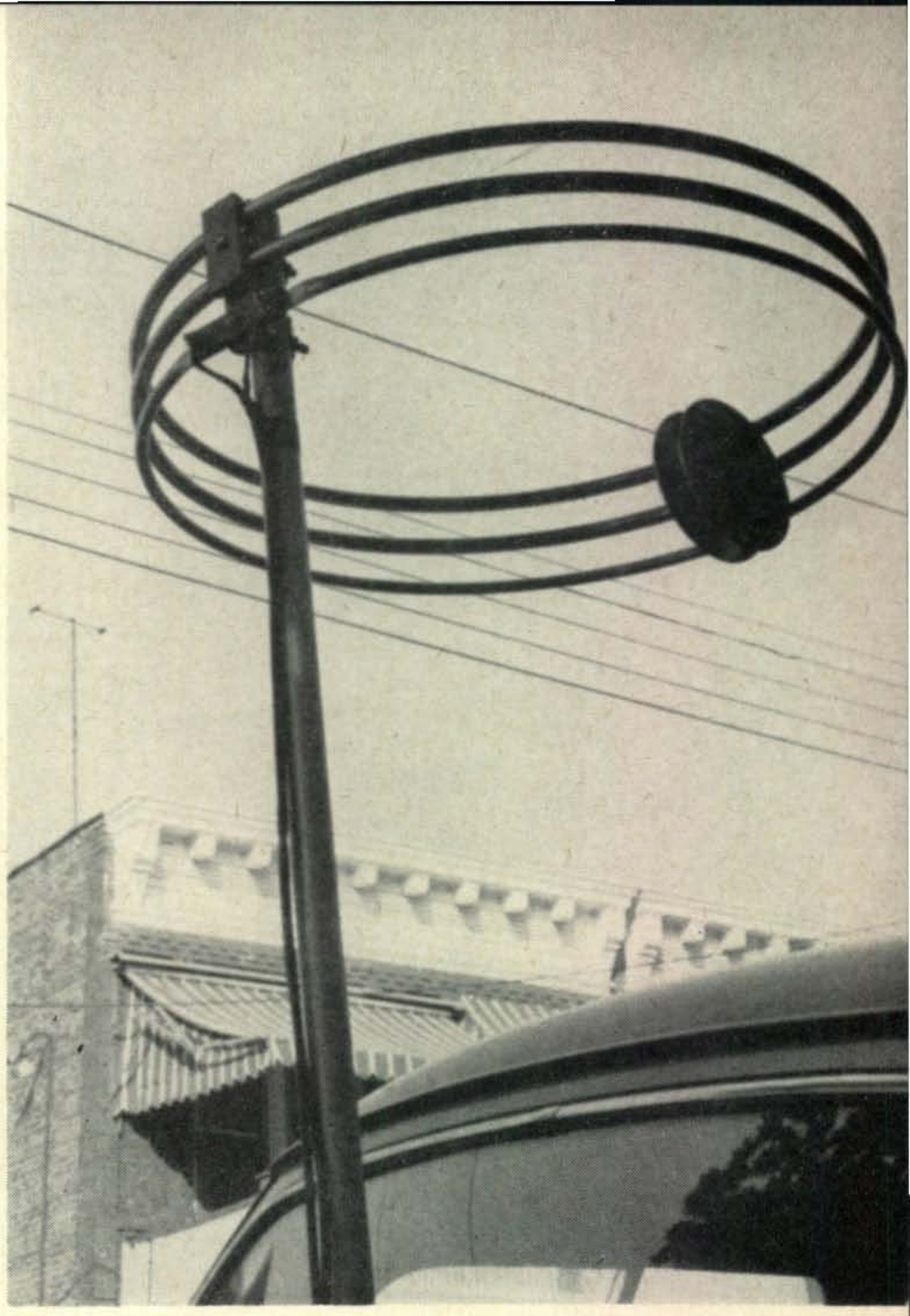
Bearing in mind that most of the operation will be of the "net" type and that adjustment of this equipment is limited only to initial set-up, the location of this gear isn't critical.

We have seen some very nice installations under the dash and in the glove compartment. The size and design lend themselves nicely to the overall decor of most cars and this, of course, keeps the XYL happy. The clean constructional design and convenience of operation should give you many happy hours of pleasant QSO's. In the event of an emergency it will prove a valuable asset and addition to your present ham equipment. ■



Number one is the transmitter, with number two the converter.

Wayne Green, W2NSD
Editor CQ



The Saturn Six

There are two main things you want in a mobile antenna. You want it to work right and you want it to stay together. Since most of the stations on six meters these days are using horizontal polarization it behooves the mobile operator to do likewise. If you have tried to figure out how to go about this you will realize that it isn't easy, not at all easy.

The Saturn Six is available with a bumper mount which allows you to get the whole works set up on any car in about ten minutes. Results with a Gonset were quite good and the antenna must certainly be considered satisfactory. QSO's with other mobiles using the antenna confirm that others have reached the same conclusion.

The most interesting aspect of the antenna was its effect on non-hams. Every person passing the car stopped to remark on the unusual contraption. Gas stations invariably asked what on earth that thing was for. I gave straight answers to the first few questioneers, but soon I got bored with that and shifted to the "Radar Jammer" explanation. It seems, say I, that with the growing use of radar by the police, that means are necessary for countering this invasion on our privacy. This antenna, I explain, picks up the radar and cancels it so the police can't figure out how fast I'm going. They all marvel, but they believe.

The Saturn Six has been mounted on W2NSD/M for over 2000 miles and still is drawing crowds. Not a nut has needed tightening since it was installed either. The unit is made by Hi-Par Company, Fitchburg, Massachusetts. Costs $16.95 complete. ■

Roll Your Own

Hector E. French, W1JKZ
9 Davidson Road
Wakefield, Mass.

Both the radio amateur and the TV service businessman need printed material to do a particular group of jobs which can be done in no other way.

Printing is an absolute necessity in radio and TV service. A successful business uses advertising, sales records, service histories, form letters and special layouts for card files to name just a few applications. The modern amateur, too, uses printing: in his QSL cards, in logbooks designed to his own particular requirements, or for special records of experiments he may be conducting. The radio amateur club needs printed material to send its members as notifications of meetings, for ballots, for by-laws, for field day log-books and so on. Even the SWL listener is not left out; he uses printing in his SWL cards, in letterheads, and in many other ways limited only by his own imagination.

All of these items can be supplied by a commercial printer, but the cost is often too high to make this practical, especially when you consider that many of these applications don't need the polished job a printer will supply. Billheads and letterheads, of course, should be as attractive as possible so as to make a good impression, but TV service file cards or radio amateur club ballots are much more functional and need only be clearly legible in order to do their job perfectly.

The best way to get around this problem of expense is for the businessman or the amateur to do the printing himself. It's a very simple procedure; anyone who has the ability to run a business or run an amateur station can learn how to satisfy most of his own printing requirements.

There are three printing processes that are specially adapted to radio service and radio amateur applications. These are: hektograph (or gelatin process) duplication, spirit duplication, and mimeograph duplication. Equipment for any of these can be ordered directly from the catalog of most of the large mail order houses. The catalog will give a picture and a description of these units, and will probably have more than one model of each kind of duplicator available. Each process has its own particular advantages and disadvantages.

Hektograph (gelatin process)

A hektograph, or gelatin process duplicator, is the simplest duplicator of all. It is nothing more than a shallow tray of a rubbery substance which feels like a cross between a particularly tough gelatin dessert and an old automobile inner tube.

This is an old process; it is older than either the spirit duplicator or the mimeograph duplicator. It operates by transferring a soluble dye

onto a gelatin surface, and then transferring this dye in turn onto a blank sheet of paper pressed against it. You'll start with a blank sheet of good quality white paper, preferably the kind of bond paper that is used for letterheads.

You'll write, draw, sketch or type onto this paper to make the master sheet. If you write, draw or sketch, use the special pencils or inks that the stationery stores carry for just this application. These pencils contain the dyes that will transfer over to the gelatin surface. With a typewriter, use the special typewriter ribbon or the special carbon papers the stationery stores carry for this application. You have one advantage here over some other processes: multi-color work is easy. Just use your own selection of pencils or inks or ribbons or carbon papers in whatever combination of colors you want.

By the time you have made your original, or master sheet, (be careful in handling, because it will smudge easily), your next step is to moisten the gelatin surface so that it can take an impression from this original. To make this impression, carefully lay the original sheet face down on the gelatin surface (after wetting), and rub the back of the original so that the whole surface of the original presses against the gelatin surface. Then peel off the original. Now you'll see a reversed image of your original right on the gelatin surface, and you're ready to start printing.

The printing process is very simple. Let's assume you're making up some cards for your card file. Take the first blank card, lay it face down on the image in the gelatin, rub the back of the card briefly to make sure that the card is in perfect contact with the gelatin, and then lift off the card. Now you'll find that some of the dye of the image in the gelatin has transferred to the card. Repeat this with the second card, and so on, until you either have enough copies or until the copies have become too dim for your requirements.

If you need more copies, wash off the gelatin, make up another master sheet, and go through the process again to make another run of file cards, or whatever you may be printing. In any case, wash off the gelatin when you are through. There will always be a small amount of image left in the gelatin after washing but this is too light to cause any trouble.

This kind of printing has some disadvantages. For one thing, it is slow, because each copy must be laid in place accurately, rubbed down, and then peeled off. Another disadvantage is that each copy is just a little bit lighter than the one before it; after about thirty or forty copies the printing sometimes becomes too light to be practical, although up to sixty or seventy copies can sometimes be run with care. This process transfers a dye rather than an ink, so that the printing always has a slightly watery, washed-out appearance, which gets worse as more and more copies are run. Also, the copies sometimes have a tendency to curl; this can be cured by placing them under a weight overnight or by making the copies on a heavy paper.

But this kind of printing has definite advantages, too. The most important advantage is the economy. In fact, by making a shallow tray of metal or wood and pouring in the gelatin solution, which you can buy at your stationers, you can make your own gelatin-process reproduction equipment yourself at very little expense. For around two dollars you can make up everything you'll need to satisfy a large part of your printing requirements.

To sum it up in one sentence: gelatin-process reproduction is recommended when economy is the important consideration, and when the time required to make a few copies is not important.

Spirit duplicators

A spirit duplicator gives copies which are similar to the copies from a gelatin-process duplicator, but the process is much faster. Here, too, there is an original, or master sheet which must be prepared. This most convenient original is made from a paper-plus-reversed-carbon sandwich, with a protective slip-sheet in between. Most stationers carry these as a standard item.

To make the original, remove the slip-sheet and sketch, write, draw, or trace your QSL or your file card directly on the master sheet, just as though it were an ordinary sheet of paper. The reversed carbon at the rear will deposit a thick image on the back of the master sheet. When the master sheet is complete, tear off the carbon paper and throw it away. The sheet is then ready for the spirit duplication machine.

In case the original is a complicated page, which might include text, drawings, and possibly a sketch or two, as in advertising literature, you'll want to leave the slip sheet in place first while you make a light preliminary layout in pencil on the master sheet. The slip sheet will protect the master sheet so that this preliminary layout work will not transfer any carbon. Once the page has been laid out lightly in pencil to your satisfaction, remove the slip sheet and make the original in the usual way, following the light pencil sketch. Then when its completed, tear off the carbon.

When making this original, there's always the problem of a typographical error or some other mistake. If you find a mistake, scrape it off with a razor blade and then repeat the work correctly, with an un-used part of the reversed carbon placed at the rear when making this correction.

The spirit duplicator machine itself is built around a cylinder which mounts the master sheet. The master sheet is placed in the duplicator machine with the typing or drawing fac-

ing inward, in contact with the cylinder, so that the carbon image at the rear of the master sheet faces outward and will press against a sheet of paper each time the cylinder revolves.

The duplication is a two-step process: as the cylinder revolves, the carbon deposit at the rear of the master sheet is first moistened by a duplication fluid, and then is pressed against the sheet of paper where the printing is to appear. Because the carbon deposit has been moistened by the fluid, a small amount of the dye in this deposit prints onto the sheet of paper.

Running the duplicator is a simple procedure: load on a pile of paper, check that the fluid reservoir is filled, and then just turn the crank. Some units are powered by an electric motor instead of being manually operated.

Spirit duplicators are available in a number of sizes, over a wide range of prices. You can get a spirit duplicator for postcard-size work for around $25.00 at most of the mail-order houses. This size is just the thing for printing file cards, direct-mail postcard advertising, and QSL or SWL cards. The larger 8½ x 11 letterhead size is available for as little as $40.00. Any stationer can sell you all the other supplies you'll need.

The spirit duplicators are much faster than the gelatin-type duplicators, because the printing is done by turning a crank rather than by laying down each sheet one at a time and then peeling it off. This gives spirit duplication an advantage when there is any appreciable quantity of work to be done. Even though the equipment is more expensive, your own time is worth money, too, and in the long run it will often be cheaper to pay a little more at the beginning for the faster process.

The printing has the same appearance as the gelatin-process copies. Each copy is slightly lighter than the one before it. The master copy is worn out after about one or two hundred copies, after which the copies are usually too light to be practical. If you need more than a couple of hundred copies, it is easy enough to make up a second master sheet.

To sum it up in one sentence: spirit duplication is recommended for its speed and convenience, especially when you don't expect to need more than a couple of hundred copies of any one form.

Mimeograph duplicators

Mimeograph duplicators have important advantages over the gelatin-process duplicators and the spirit duplicators. First, the process will print many thousands of copies without any fading or other change in appearance; the last copy is just as clear and firm as the first copy. And second, the printing is done with ink rather than with a dye; this gives a much firmer and clearer reproduction than even the best gelatin-process or spirit duplicator.

A new, un-used mimeograph stencil is a wax-filled sheet of a thin, felt-like material. Typing or writing on this stencil presses the wax to one side, so that the ink can come through. This process is called "cutting the stencil" but the term is not exactly accurate, because there is no cutting involved at all, but merely a pressing away of the wax to expose the stencil material below.

The mimeograph duplicating machine is similar in appearance to the spirit duplicator. The stencil is wrapped around a cylinder, which presses the stencil against the paper as it turns. The mimeograph process prints by pressing ink *through* the stencil, rather than by transferring a dye from a surface to the paper, as in the other two processes. This means that there is nothing on the stencil to wear out, and that thousands of copies can be made, with all the copies having the same firm, solid appearance and not becoming progressively dimmer with each successive sheet run. This ink is available in black and a range of colors.

With a little practice, simple drawings and sketches can be used in the mimeograph process. This is especially valuable for QSL cards and direct mail advertising. You'll need a few special tools: a loop stylus for straight lines, a ball-point stylus for curved lines, and a transparent writing plate.

You'll probably need a little practice in using these tools. Try few sketches on a stencil or two to become familiar with the technique. It won't take long to learn how to draw the lines firmly enough to press away the wax filler, but not so hard as to cut through the stencil.

If you're planning to use the mimeograph process for your advertising, you can give it a professional touch by tracing a few drawings from magazines or newspapers, and keying these sketches in with your sales message.

Mimeograph duplicators are usually cheaper than the spirit-type duplicators. The mail-order houses carry postcard-size duplicators for around $15.00, and have the 8½ X 14 size for as little as $40.00. The stencils are a few cents each; your stationer can supply everything else you need. With the duplicator of your choice, and a few stencils and other inexpensive supplies, you can prepare a large part of your own direct-mail advertising and internal records, for example, or if you are a radio amateur, you can design and print your own QSL or SWL cards at a minimum of expense.

These drawings and sketches are a little more difficult to prepare than would be the case with a spirit duplicator, but this is offset by the more professional appearance of the mimeograph process, which is very valuable for efficient advertising.

To sum it up in one sentence: the mimeograph process is recommended when you'll need long runs or where appearance is important, as in direct-mail advertising. ■

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Fort Worth, Texas

Push-To-Talk
for the Viking

Reaching for the receiver gain control with one hand while blindly aiming for the plate switch of the Viking II with the other hand and wishing for a third hand to straighten out the pile of traffic stacked on the desk, I proceeded to turn the filaments of the transmitter OFF. This, quite naturally, caused a break in operations.

Later, with the traffic handled and the situation back to some semblance of normality, the answer to the problem bubbled close to the surface of my mind. What? Why a push-to-talk circuit of course. But wait, P-T-T would eliminate the possibility of turning the filaments off accidentally but still call for the use of one hand. Why not use a *foot* switch?

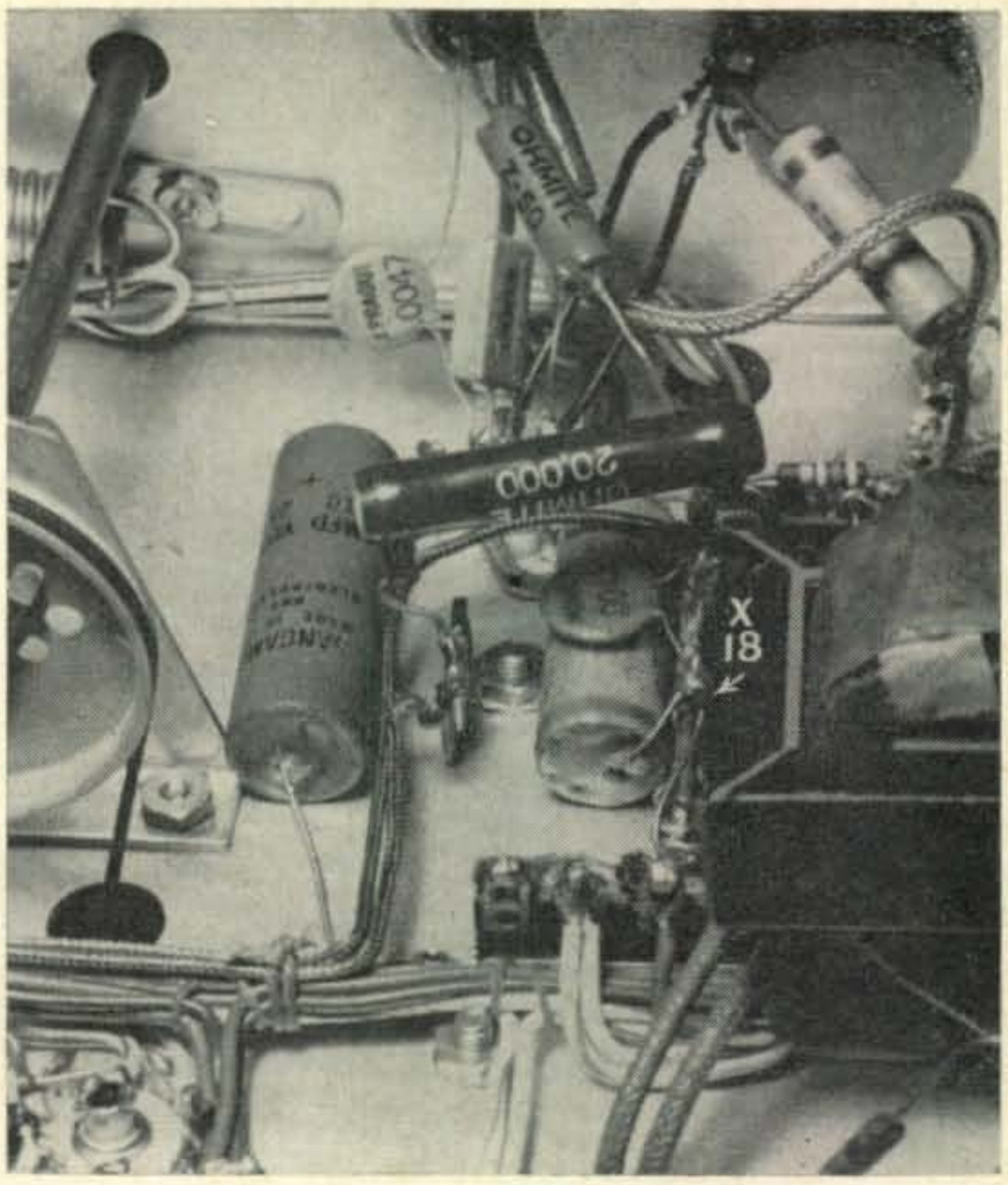

Fig. 2: Single puncheon tie-point mounts under one of screws holding modulation transformer just to the left of terminal strip X18. 20,000 ohm resistor, bypass condensers, and Z50 choke are at the top of the illustration.

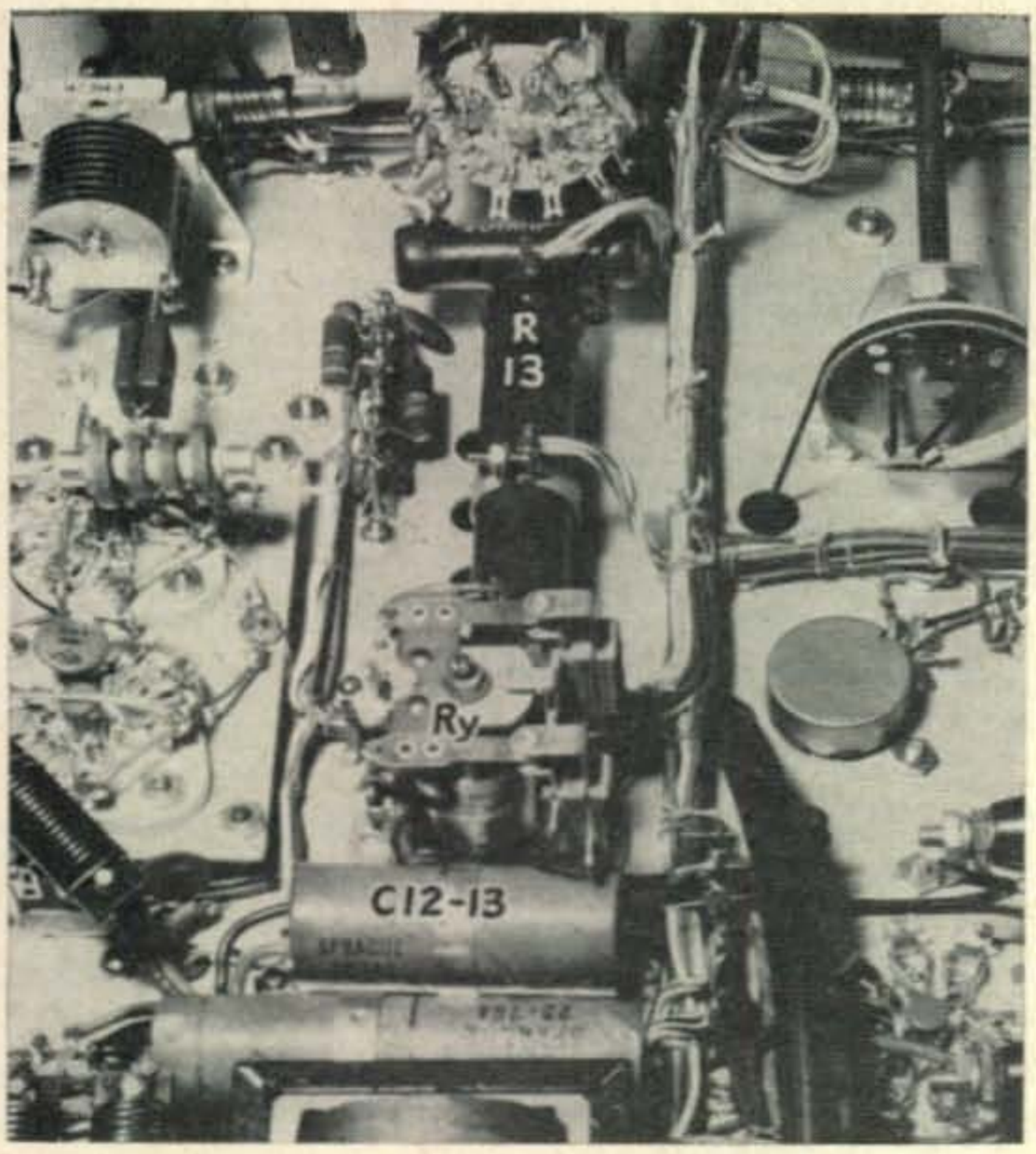

Fig. 1: Relay (Potter-Brumfield LM-11 10,000 ohms) mounts between R13 and C12-13. Care should be used in drilling the mounting hole for the relay. Wiring may be laid alongside the original harness making a neat installation.

Foot switches are available at a relatively low price. However, if you happen to have a friend who works for a photographer it is possible that there is a "worn-out" switch lying around the darkroom somewhere.

If so, often the only thing worn out is the "micro-switch" unit which can be replaced easily.

Over to Bill Wood's (W5QFN) workshop went the problem and the transmitter. As owners of Viking II's know, a push-to-talk circuit is

[*Continued on page 125*]

Joseph H. Kuranz, W9CWK
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Waukesha, Wisc.

The Portable Vertical

Generally speaking, amateur radio operators are poor excuses when it comes to public relations. Most people think amateurs as a whole are a group of eccentrics who spend the wee hours of the morning off in some attic corner with strange and weird contraptions conversing with other seedy characters in some far off place. Of course, you and I know that this is true but is the general public to be so informed? They are not!! The types of questions asked by members at a recent amateur radio demonstration for a local service club seem to verify the above unrealistic characterization of the average "ham." However, after successfully completing our first public relations assignment, the membership were not only informed this was not so, but for the most part, left singing our praises, so to speak. So much so that many requests for similar demonstrations have been received from civic clubs, church groups, schools, etc. These requests required readily portable equipment and antennas that when hurriedly installed would work with assurance of reasonably successful results.

The transmitter, receiver and other gear presented no problems as many "Commercial" as well as "Home Brew" units fulfill the requirements, but a good antenna that could be erected in a few minutes without a Steeple Jack's permit, boring of holes or tree climbing (in one's Sunday suit) was something else.

A little head scratching came up with the answer shown here. Actual use of this antenna has proven its practicalness and has brought to mind other possible uses, such as field days, vacations, etc.

Construction

The dimensions of the base are not critical nor is the size and type of materials. It just happened that most of the materials used were available in ye ol' junk box. The base was designed to facilitate its transportation via the author's 1954 Plymouth, and this requirement had to be met by all other units that made up the antenna. In the original version, the antenna proper was made from three pieces of 12′ lengths of aluminum tubing ranging in size from ⅞″ to ⅝″ inclusive, each piece telescoping into the next. However, after transporting the 12′ lengths around, it is recommended that the antenna proper be constructed as shown in the drawing. The original base was welded together, but if one prefers, bolts and nuts or rivets may also be employed in assembly.

The antenna should be insulated at the point where it passes through the TV-type wall bracket. About the simplest way to accomplish this is to wrap the area involved with rubber insulating tape. A short piece of wire is then soldered to the center conductor of the 52-ohm coax chassis receptacle that is bolted to the base, and an alligator clip is connected to the bottom of the antenna when all is assembled. Each length of tubing is 7′ long, with the exception of "A" which is 6½′, and each telescopes into the next size, 6″. A hole should be drilled about 3″ down from the top of each length and the pieces secured with a small bolt and nut. Make the hole large enough to assure easy and quick assembly.

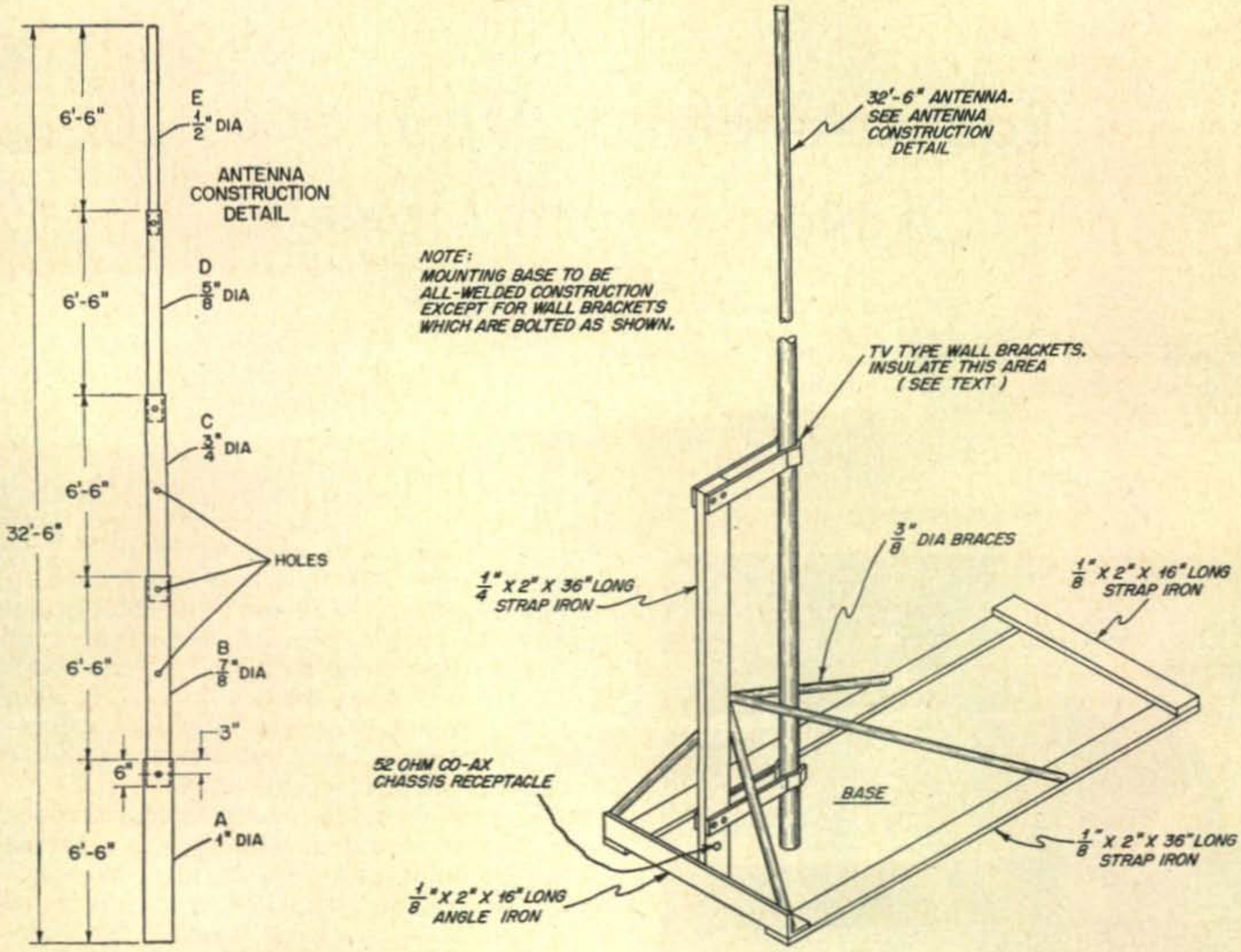
The antenna as now built will perform well on forty. It should work on fifteen and perhaps ten meters also. To operate on other bands the upper mast sections may be removed and the lower sections telescoped down into each other until the required length is arrived at. The best method is to tune the antenna on all bands with a GDO and antenna impedance meter. Holes can then be drilled in the various sections where you wish to lock the length for that band.

To use the antenna, simply telescope the

required sections together, depending on the operating frequencies desired, then clamp the antenna between the two TV-type wall brackets, connect the 52-ohm coax to the coax chassis receptacle, fasten the alligator clip to the bottom of the antenna and place a suitable weight across the base and you are ready to operate. All of this in but a few minutes. The wheels of your car could be driven over the base and would serve as an excellent ballast. However, just how serious the resultant interaction would be has not been determined. We have been using a Johnson Viking transmitter with this antenna and loading proved to be no problem. However, if loading and severe SWR difficulties are encountered, some form of tuner may be built. (William I. Orr, *Ground Plane Matching Network*, CQ, P. 39, July, 1952.)

The antenna may be used for field days by simply following the previously outlined assembly procedure. However, if a more efficient unit is desired, the following installation may be used with little extra expense and effort. Select a spot in the clear and then drive a steel or iron rod into the ground. From this rod, extend 4 radials to 4 wooden stakes driven into the ground at points diametrically opposite to each other. The lengths of the radials may be calculated by simply substituting in the formula $L = \frac{241}{f(mc)}$. Place the antenna assembly over the rod and make a good electrical bond between it and the antenna base. Throw a couple of large stones on the base, connect the 52-ohm lead and you are ready to go. A slight wind will cause the antenna to flex. However, this does not appear to affect the over-all efficiency to any noticeable degree.

As mentioned earlier, the method of construction does not have to be followed exactly. If the size of tubing shown is not available, other size and length combinations may be substituted without appreciably changing the final results. So don't be hasty and run off to buy materials to make an exact copy. Shop around a little, and we are sure that your "Portable Vertical" will cost you less than $15.00. ■



The portable vertical and construction details.

by Bernard R. Malandain, F9MH
R.E.F. Representative in the U. S.

Left: the real F8YT with gear used in picture. Above: Helene Perdriere and Jean Luis Trintignan using the same equipment in the film.

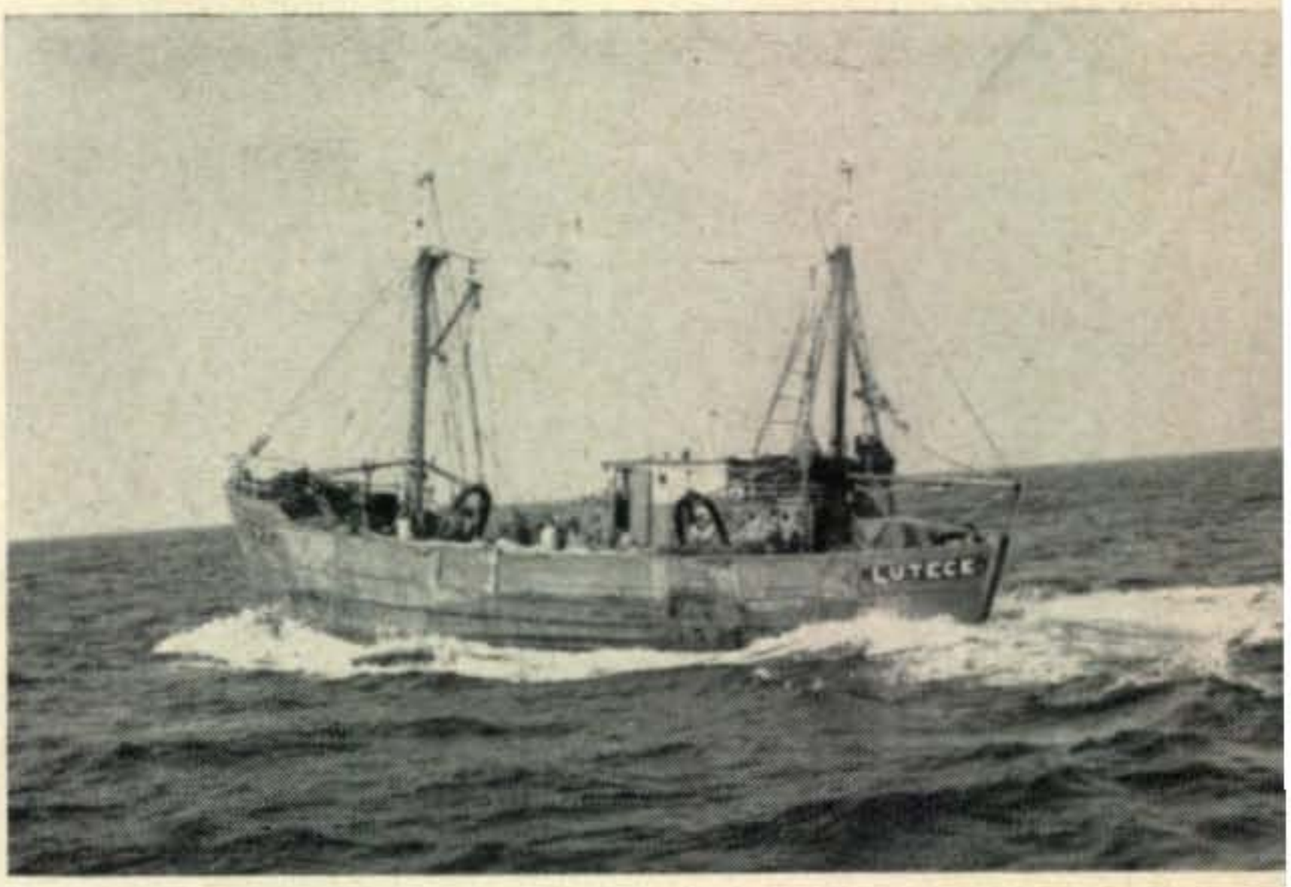
Radio Amateurs Are Theme Of New French Movie

French movie producer, Christian Jaque, is famous for his typically Gallic pictures, realistic, gloomy and sexy. Just to show his critics he has not a single track talent, he shifted his interest to an entirely different type of picture. The French title is "Si tous les gars du monde . . ." (If all the guys in the world) which is the first line of a famous poem by a contemporary French author, Paul Fort. It says in part: If all men in the world would only be sailors, with their boats they could bridge the seas, and then you could dance all around the world, if all men would only hold hands". In other words, Christian Jaque wanted to stress some highlight of human solidarity. He found his subjects in a story about men of different countries—radio amateurs—joining together to save other men, unknown to them, from disease and death.

Scene from the movie

The story is based on an actual incident. A French trawler from Brittany has set sail for the fishing grounds off the Norwegian coast. Aboard, that night, everybody is treated to a home-made pork pie brought by one of the sailors. All eat except the North African oiler who, being a Moslem, does not eat pork.

Prop of the ship



The stricken trawler

Soon after this, the men feel sick with a sore throat and impaired vision. To top it all the radio equipment breaks down when the radio operator wants to send out a call for help. There is no doctor on such a small craft. Then the skipper remembers he has tucked away a small ham transmitter he built a long time ago. He puts it on the air and his signal is picked up by FD8AM in Togoland. It is the start of a race against the clock which will last for fifteen hours, and makes for many moments of tense viewing. A colonial medic who reads the description received by FD8AM diagnoses botulism, a deadly form of food poisoning for which there is only one cure: a serum to be administered no more than 15 hours after the last symptoms appear. FD8AM contacts F8YT a teen-ager who, finally, with the help of his girl friend secures the serum and tries to ship it. The only plane to take off so late that night is a Polish airliner bound for Berlin. But in Berlin, F8YT, thinks, U.S. airmen will certainly be able to forward the parcel. A blind DL amateur in Berlin is reached and agrees to arrange for delivery of the serum to a U.S. officer at Tempelhof airport. However, the plane lands in East Berlin. An U.S. sergeant decides to take a chance, crosses over to the Soviet zone, but is intercepted by the Russians who refuse to believe his story. Eventually they agree to cooperate. A Russian plane is taking off for Narvik, it will carry the precious containers to LA land where a Norwegian Air Force plane takes over, spots the stricken vessel and parachutes the box. The Algerian sailor, the only one aboard who has not been stricken, dives in the icy water of the North Sea to retrieve it, after he has covered himself with machine oil.

The script was written by Clouzot, a suspense specialist, author of "Diabolique" the famous thriller. No well known actor was hired for this production which was filmed on location off the coast of Brittany, in Berlin, French Togoland, Norway and the Soviet Zone of Berlin. It is the first full length movie stressing so strongly the activities of radio amateurs. Christian Jaque would not let anything be improvised. He spent many hours at the QTH of F9AA, President of the R.E.F., to familiarize himself with actual amateur radio operation and he used gear made available by F8YT, F3CU and F9AA.

The English version of the film is named "Race for Life". To stress the universal character of our hobby, a really world premiere was arranged with the cooperation of six broadcasting networks. The film was seen simultaneously in Rome, Paris, Berlin, Oslo, Moscow and New York (at the Paris Theatre). An international radio hookup was set up. At the end of the performance, which was a matinee in New York, an evening presentation in Paris, Rome and Oslo and a night performance in Moscow (3 a.m.), the reporters asked the spectators for their impressions. During one hour, the listeners of the French State Broadcasting Administration (Radiodiffusion Francaise) were able to hear various personalities from the six capitals. From Rome, Mrs. Marconi, widow of the famous Italian pioneer of radio, expressed her satisfaction to see her husband's work put to such a wonderful use. Both in New York and Moscow, Army officers described similar rescues made possible by the help of Hams and the use of helicopters.

The film has not yet been distributed in the United States. It will probably appear soon. Its presentation will contribute a great deal to the popularization of amateur radio activities, too often ignored or unknown by the public at large. In France, the R.E.F. Secretary reports numerous applications for new memberships, brought by the film impact. "Race For Life" is certainly an effective means of propaganda, plus good entertainment. ■

73, F9MH

Phil Cutler
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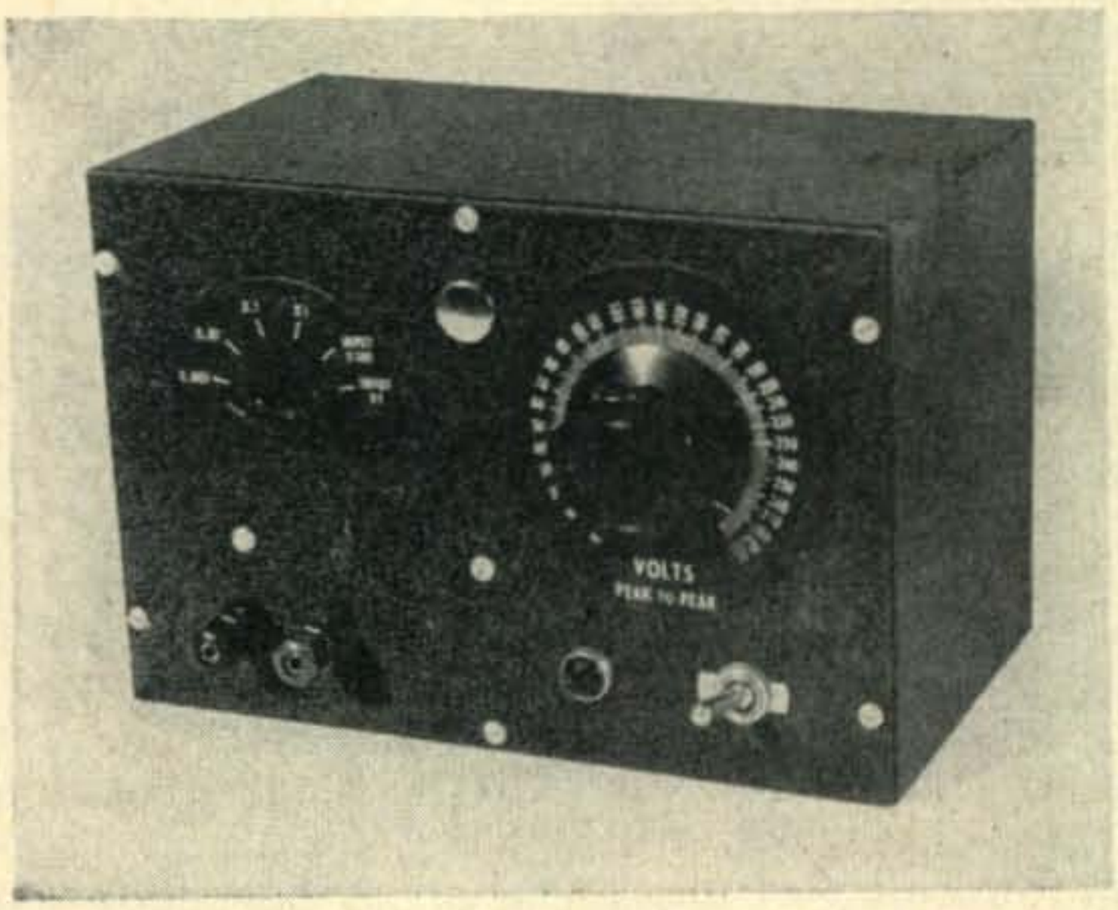
Garden Grove, Calif.

Simplified Voltage Calibrator

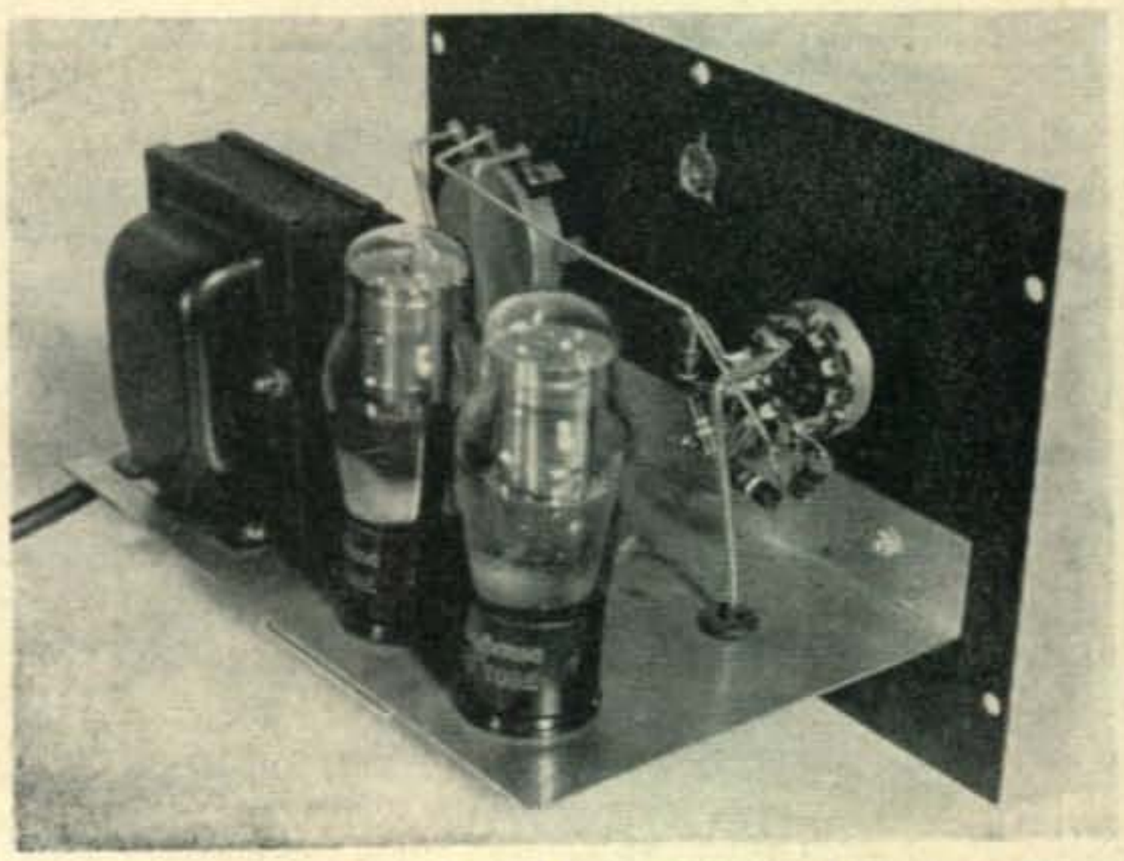


Amateurs & TV servicemen will find this instrument quite useful as a means of measuring the synch, sweep, etc., pulses of receivers under test, and making sure that the receiver meets the performance specs of the manufacturer. Power supply ripple, audio gain measurements & clipping levels are typical amateur applications. The inexpensive instrument described in this article features accuracy, wide range and excellent stability.

Uses

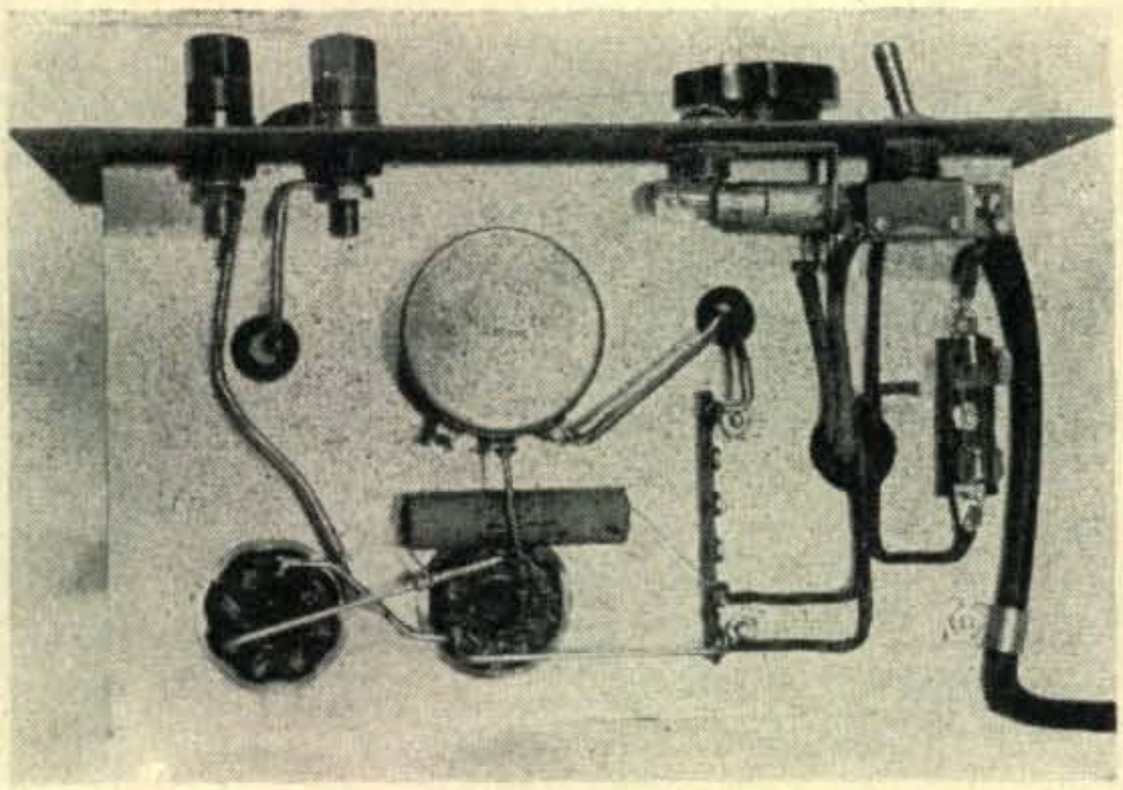
A voltage calibrator is a piece of test equipment which effectively converts an oscilloscope into an accurate peak to peak reading voltmeter. It may also be used to measure the amplitude of any significant point along a complex wave, an operation which cannot readily be done by any other method. If your scope does not have DC amplifiers, DC measurements can be made by direct connection to the deflecting electrodes.

The output voltage is a clipped sine wave whose amplitude is continuously variable from 0 to 300 volts. The accuracy may be held within 5% of full scale on each range if 1% resistors are used in the decade divider. Line voltage variations between 105 and 130 volts produce less than 1% change in the output. The circuit is simple and virtually foolproof.



This view shows the clean lines of the chassis

The below chassis wiring is also simple



With the use of demodulating probes or direct connection to the deflecting plates, modulation envelopes or carrier frequencies up to 100 mc may be measured.

Operation

The transformer develops 240 rms volts across the full secondary winding, which in turn is applied to the VR tubes. These tubes are connected so as to conduct on alternate ½ cycles. The current through the conducting VR tube is limited by the 10k 10 watt resistor. As the transformer secondary voltage starts to rise from zero, in a positive direction, and reaches the ignition potential of V_1, ionization occurs. The tube, which exhibits a non-linear volts vs. amp characteristic adjusts its resistance so that the voltage drop across it is 150 volts (peak value). When the transformer secondary voltage drops below the extinction potential of the tube, the tube loses control and the voltage across it varies in a sinusoidal manner until V_2 conducts on the negative ½ cycle.

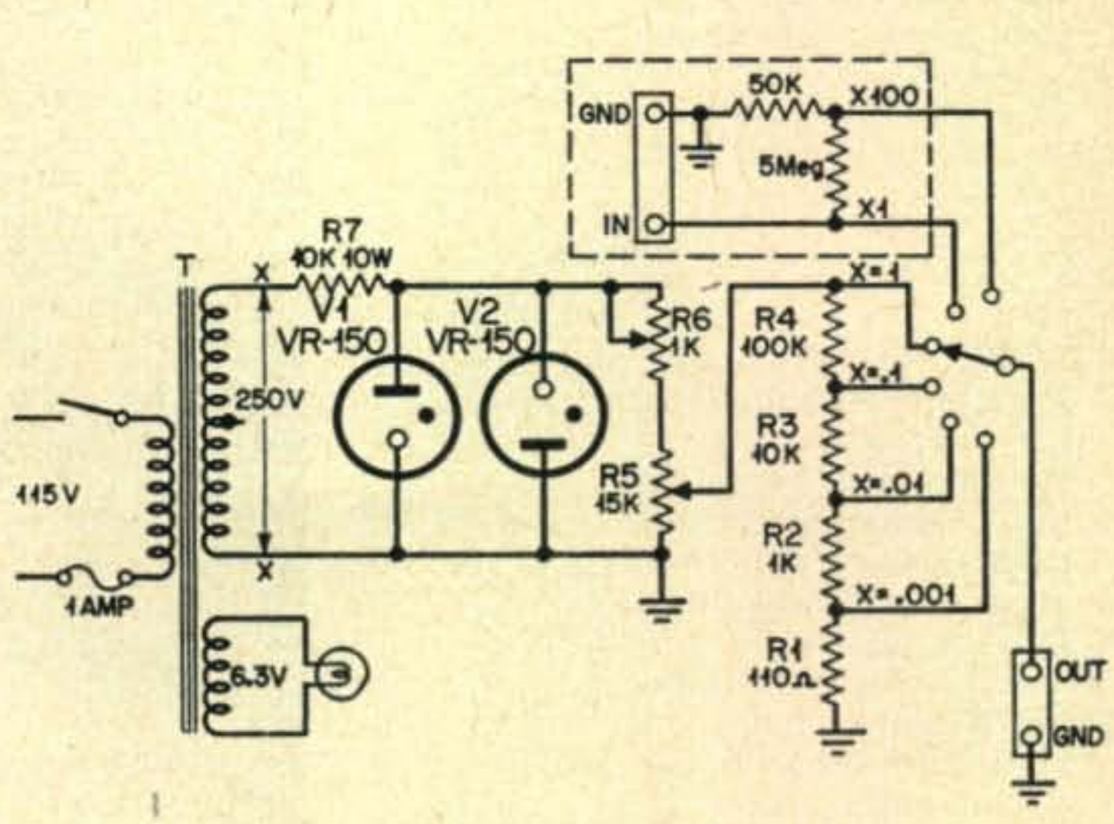
This is essentially a positive and negative clipping circuit, operating on a 150 volt level. Since the ignition potential is somewhat greater than 150 volts, a small spike may appear on the leading edges of the trapezoidal pulses. The 1000 ohm potentiometer may be eliminated if maximum accuracy is not required, as it is used to compensate for slight discrepancies between tubes. The output waveform developed across the tubes is then applied to a decimal attenuator which consists of a continuously variable linear taper potentiometer. This in turn shunts a decade voltage divider whose function is to divide the potentiometer (R_5) output voltage by some multiple of ten. The pot should be wire wound, and while resistance tolerance is not important, linearity of taper is required. The decade resistors used were of the 5% carbon type and were selected to about 2% with an ohmmeter. A linear taper pot does not imply a linear scale calibration due to the loading effect of the decimal attenuator. To avoid tedious calibration, a dial face, suitable for use with a Clarostat type 58, 15,000 ohm wire wound pot, is presented.

To set R_6, the peak to peak output is adjusted by setting R_4 to the 300 volt position and the output multiplier is set in the X_1 position. A 10,000 ohm/volt, or better, DC voltmeter having a range of 150 volts or more is connected to the output. The leads marked 'X'-'X' are disconnected from the secondary winding and transferred to a DC power supply with a 300 volt output. Turn the power supply on and note the voltmeter reading. Turn the supply off and reverse the leads and again note the voltmeter reading. R_6 should be adjusted until the sum of these two readings is 300 volts. For most TV and similar applications of servicing, R_6 can be eliminated, along with the above described procedure.

Unknowns

Unknown waveform amplitudes are measured by first connecting the scope probe to the point under test and adjusting the vertical gain controls until a convenient size pattern appears on the screen. The peak to peak amplitude is noted by actual measurement or by comparison with the screen face grid. Do not readjust the scope gain controls. The probe is then transfered to the output terminals of the calibrator and the vernier control is set to mid-scale.

Turn the range switch until approximately the same size calibrator waveform appears. Adjust the vernier control until the calibrator pattern is exactly the same size as the unknown signal. The vernier dial reading multiplied by the range switch setting equals the peak to peak amplitude of the unknown signal. For example; the unknown signal measures one inch. When the calibrator output is adjusted to measure one inch the vernier reading may read 183 volts. If the range selector switch is in the X .1 position, the unknown signal



Schematic of Calibrator

is 18.3 volts. In the case of sine waves the peak to peak values can be converted to rms values by dividing the peak to peak value by 2.83.

Other Methods

An alternative method may be used in obtaining peak to peak measurements. In this case, the scope deflection sensitivity is established at some desired peak to peak volts per inch and the height of the unknown signal is also noted. If it is desired to have 1 volt peak to peak equal a certain height, the vernier dial (calibrator) is set at 100 and the range selector switch at X .01. The peak to peak calibrator output is then 100 x .01 or 1. The vertical gain control and attenuator on the scope is then adjusted to give a peak to peak scope deflection of 1 inch. If the scope face grid is physically small, greater accuracy, with the same calibration can be had by setting the calibrator range switch to X .1. The output is now 100 x .1 or 10 volts peak to peak. The scope gain control is then adjusted so that 10v peak to peak occupies 10 times the original grid height. This will produce the same 1 volt per grid spacing deflection sensitivity.

Should the unknown signal be very small, DO NOT touch the scope gain control, but turn the scope step attenuator to the next range, which is 10 times more sensitive. The deflection sensitivity is now .1 volt peak to peak per grid space. Conversely, if the unknown signal were too large, the scope attenuator would have to be turned to decrease the sensitivity 10 times.

When the calibrator was first buit, extra terminals of the range switch were utilized in order to have a pair of input terminals on the calibrator become the input terminals to the scope.

This would avoid transferring the scope probes from the unknown source to the calibrator every time a measurement is made. This scheme distorts pulses having high frequency components due to cable capacity. An input attenuator was also built into the calibrator to reduce large input signals 100 times. This accounts for the input X 1 and input X 100 position of the range switch.

The circuitry within the dotted line is not recommended for pulses having significant frequency components in excess of 5000 cycles. ■

Parts List for Voltage Calibrator

1 Case 5" x 6" x 9" ICA #3801
1 Transformer Merit #P-3147
2 Tubes VR-150 (OD3)
2 Tube sockets (Octal ring mount) Amphenol 78S8
1 15,000 ohm W.W. pot. Clarostat #58-15K
1 1,000 ohm W.W. pot. Clarostat #58-1000
1 Rotary switch 6-position Mallory #3226J
1 ON-OFF switch SPST Arrow-Hart & Hegeman #20994-LH
1 Switch plate Arrow-Hart & Hegeman #20590-1

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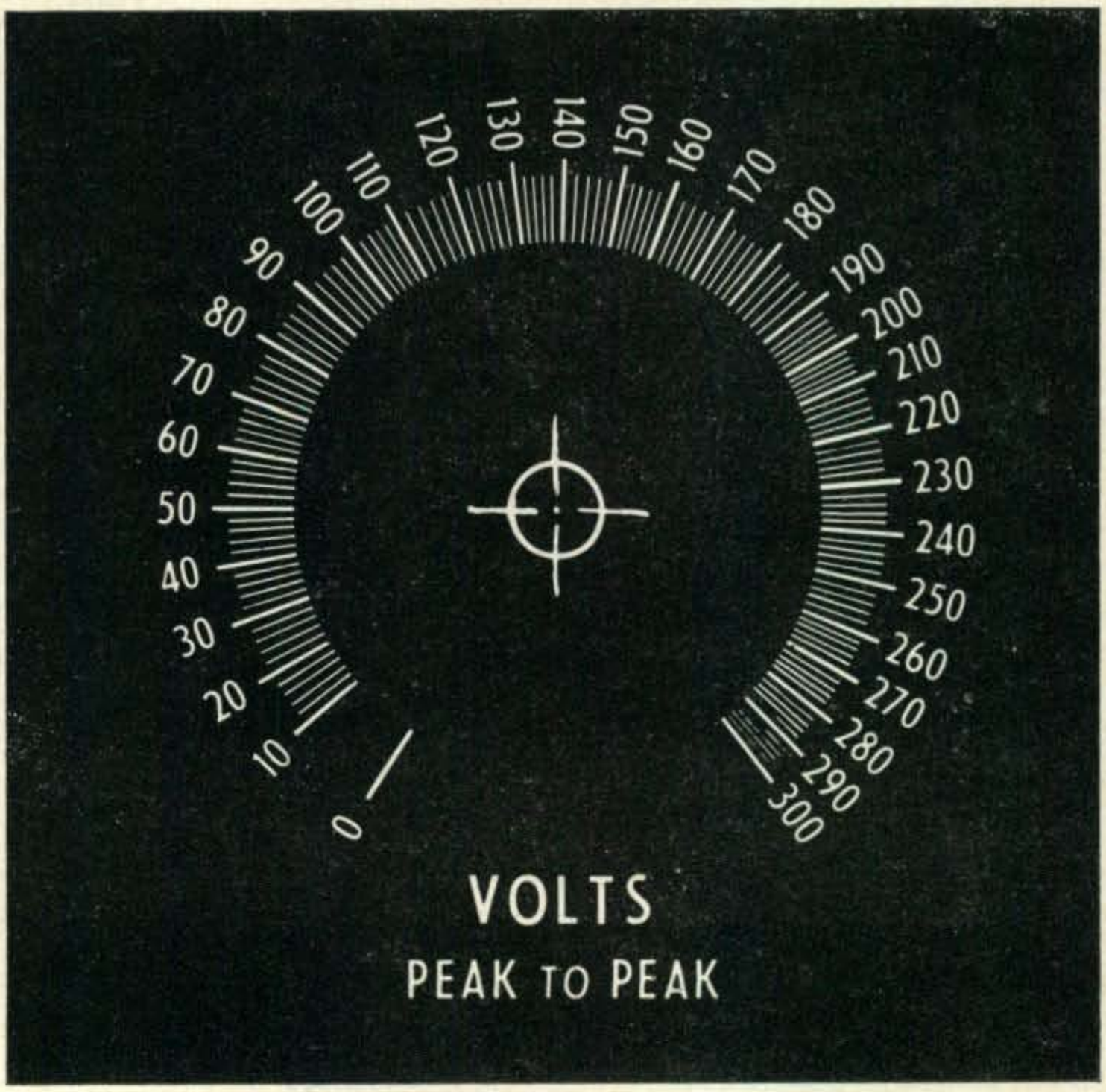
1 Small pointer knob
1 2" finger grip knob
2 Binding posts (1 red, 1 black) Superior #DF30RC and BC
1 Dial light assembly (Red) Dialco Series 510
1 6.3v pilot bulb to fit socket.
1 Fuse holder Buss #4405
1 Fuse lamp 8AG
1 Terminal strip 6-position Cinch-Jones #2006
1 Resistor 10,000 ohms 10W Sprague Koolohm
1 Resistor each: 100K, 10K, 1K, 110r all 1 watt, 5%
1 6' power cable and plug
1 1/32" x 5¾" x 7¾" steel or ½H aluminum for chassis
Miscellaneous hardware; nuts, bolts, grommets, cable clamp, #14 buss wire and spaghetti. DIALS, see text.

Above parts obtainable from Newark Radio, 223 W. Madison St., Chicago and Lafayette Radio, 100 Sixth Avenue, New York, New York

This chart may be cut out and pasted directly to the front panel for calibration



Spark Suppression

. . . in Relay Contacts

Harold Reed, W3EJP
3917 Madison St.
Hyattsville, Md.

Amateur radio operators, experimenters, and electronics workers using circuits employing relays are always concerned with keeping the magnitude of the spark across their relay contacts to a minimum. And rightly so, because sparking results in burned, or pitted contacts, causing poor electrical conduction, resulting in equipment failure and finally in completely unusable relays due to deterioration of the conductive material making relay replacement necessary.

When a high intensity spark appears across relay contacts, we usually think of connecting a large capacitor across the contacts to remedy this undesirable condition. This seems to yield some improvement, but actually, we may be fooling ourselves.

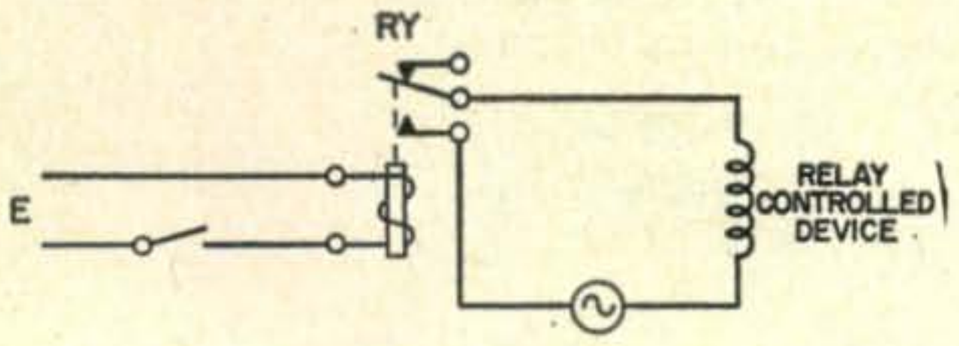


Fig. 1.

Before applying any corrective measure, however, we should first ascertain whether the spark occurs during "make" or "break" of the contacts in question. Let us first consider the condition of "break" of the contacts of a certain relay.

Suppose we have a relay whose contacts are completing the circuit to a 115 volt a-c operated device, say another relay, a motor or transformer. See *fig. 1*. Current flows to this device through the relay contacts. Suddenly, we open the contacts, disrupting the current flow. This, of course, is the break condition. Electron movement is not so easily discouraged in its flow in a circuit, and when the relay contacts open, the electrons tend to bridge the small gap between the contacts until the gap is sufficiently large to extinguish the arc. Heating and burning of the contact material is thus produced. It is, therefore, important that the time duration and intensity of the arc be held to a minimum.

It is observed that the intensity of the spark varies in accordance with the magnitude of the changing ac voltage when the contacts "break."

If a capacitor of about .25 μf is placed across the relay contacts, as shown in *fig. 2*, the arcing may be reduced or completely eliminated for

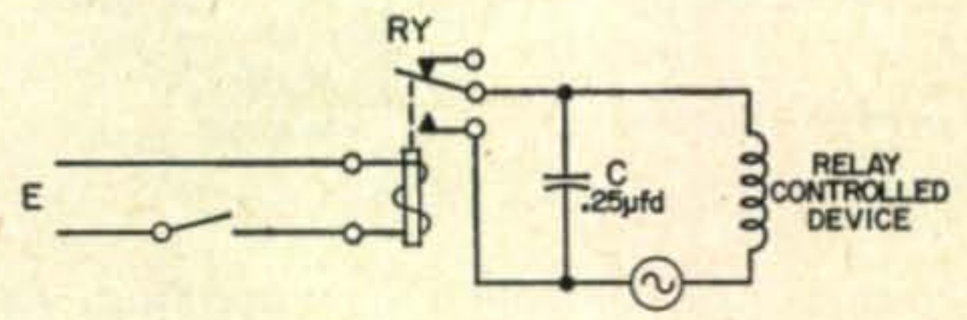


Fig. 2.

the "break" condition. The suddenly interrupted current, instead of jumping the small contact gap, when the relay contacts begin to open, will flow into and charge the capacitor, thus absorbing the electron flow which would otherwise jump the contact gap. The relay contacts will be separated far enough before the capacitor has been completely charged so that high intensity, damaging sparking, is prevented. However, another undesirable condition has been created.

The capacitor is now in a charged state, and if the relay contacts are again closed, which is the "make" condition, discharge current from the capacitor will instantaneously flow across the contacts, resulting in pitting of the contact material. In some circuits, using very sensitive relays, it may even result in a welding condition such that the contacts will stick together and not normally reopen. Thus, it is desirable to reduce the discharge rate of the capacitor. This may be accomplished by simply inserting a suitable resistor in series with the "break", spark reducing capacitor, as shown in *fig. 3*.

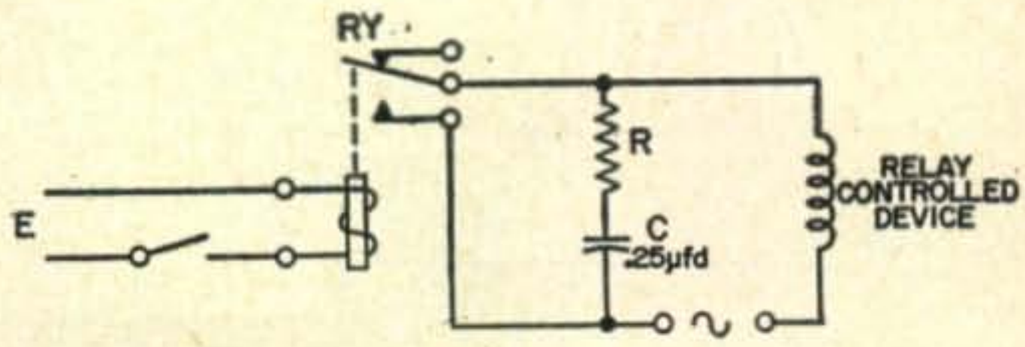


Fig. 3.

The resistor must be chosen carefully. If its value is too great the current flow to the condenser, that is, the charging rate, will be retarded and sparking may occur when the contacts "break." If, on the other hand, the value of the resistor is too small, the magnitude

of the condenser discharge current may be of such value as to cause pitting or welding of the contacts.

A good experimental procedure is to use a variable resistor, such as a rheostat or potentiometer, and vary this control until the arc is minimized, or eliminated when the relay contacts are caused to both "make" and "break"

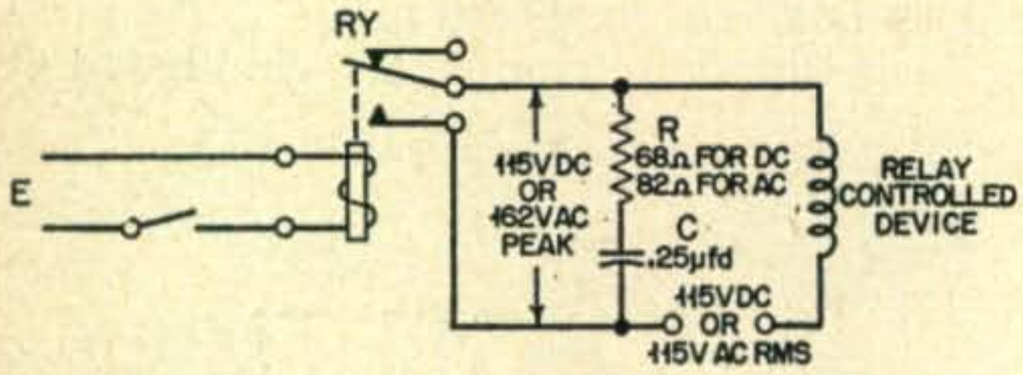


Fig. 4.

the circuit to be controlled. The optimum value of resistance of the variable control can then be measured with an ohmeter and a fixed resistor of approximately this value substituted in the circuit.

The constant current flow demanded by the device operated by the relay contacts must not, of course, exceed the current rating of the relay contacts. But, more easily overlooked is the instantaneous discharge current of the absorption circuit composed of the capacitor and resistor in series, which also must not exceed the contact rating. This will be understood if we analyze the circuit of *fig. 4*, for a relay with contacts rated at 2 amperes, and apply the ohms law equation, $I = E/R$.

Neglecting the resistance, or impedance of the device to be operated, for in this analysis we do not know what its value may be, but we will assume that its value is less than the value of R, then for d.c. operation, the voltage across R and C with the relay contacts open will be 115 volts. When the relay contacts close, the instantaneous discharge current from the condenser will be equivalent to $I = 115/68$, or 1.69 amperes. The maximum relay contact rating is, therefore, not exceeded.

For a.c. operation C will charge up to the peak a-c voltage and the instantaneous discharge current through the relay contacts will be equal to $I = 115 \times 1.41/68$, or about 2.38 amperes. Thus, it is apparent that for a.c. operation the discharge current will exceed the maximum current rating of the contacts and R should be increased to about 82 ohms in order to bring the instantaneous discharge current flow slightly under the 2 ampere rating.

Providing the value of R is high enough so that the current flow does not exceed the relay contact rating, any capacitor value that proves to be most effective in suppressing the arc may be chosen. It is simpler to select the proper values, experimentally, rather than to calculate the inductive reactance and RC time constant of the circuit to be controlled. ■

Inductively-Coupled Harmonic Traps

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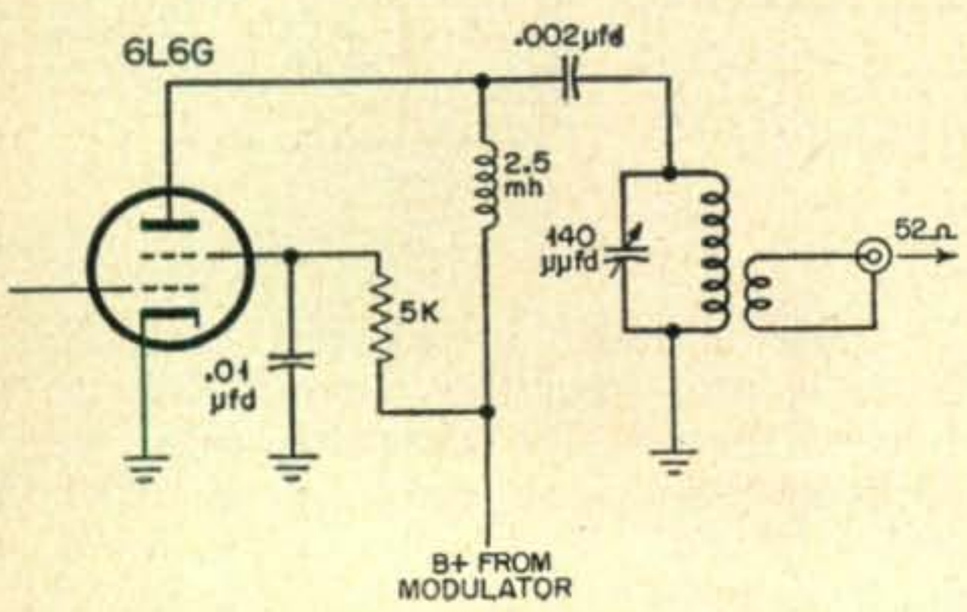
Second and third harmonics not only cause TVI; they also interfere with other radio services if caused by low-frequency ham rigs. This is a description of an approach to harmonic elimination that turned out to be particularly effective.

Harmonics can be caused by any oscillator or amplifier. Sometimes strong second harmonics will also be responsible for a strong third harmonic. Here, an inductively coupled trap removed the second harmonic and almost completely eliminated the third harmonic.

Fig. 1.



Harmonic Sidebands

The amplifier, *fig. 1*, produced fundamental and second harmonic voltage in its plate circuit. The amplifier was a modulated class C stage, so the second harmonic voltage also modulated the carrier, giving output at a frequency equal to the carrier plus twice carrier frequency. This resultant sideband is called the third harmonic. Now, if the second harmonic voltage does not appear in the plate circuit, any third harmonic energy for which the second harmonic is responsible shouldn't appear either. A test was run, and here are the results as monitored at a nearby station

	Before	After
Fundamental	80 μv.	80 μv.
Second Harm.	50 μv.	absent
Third Harm.	5 μv.	not measurable

The only difference between the two sets of readings was ten seconds of work.

How

The photograph shows the quick cure: placing a wavemeter tuned to the second harmonic near the tank coil. The test transmitter was operating on 1.8 megacycles; the wavemeter was tuned to 3.6 mc.

Later tests have shown that the trap can be built on the amplifier coil form itself (tuned with an APC or trimmer capacitor), making sure the right trap is always plugged or switched in with the right coil.

The arrangement worked well with pi or L networks, though probably its effectiveness depended on the *particular* load used. A matched line at the fundamental frequency doesn't necessarily look like the same load on a harmonic. This trapping method *does* work well on a parallel-tuned amplifier tank.

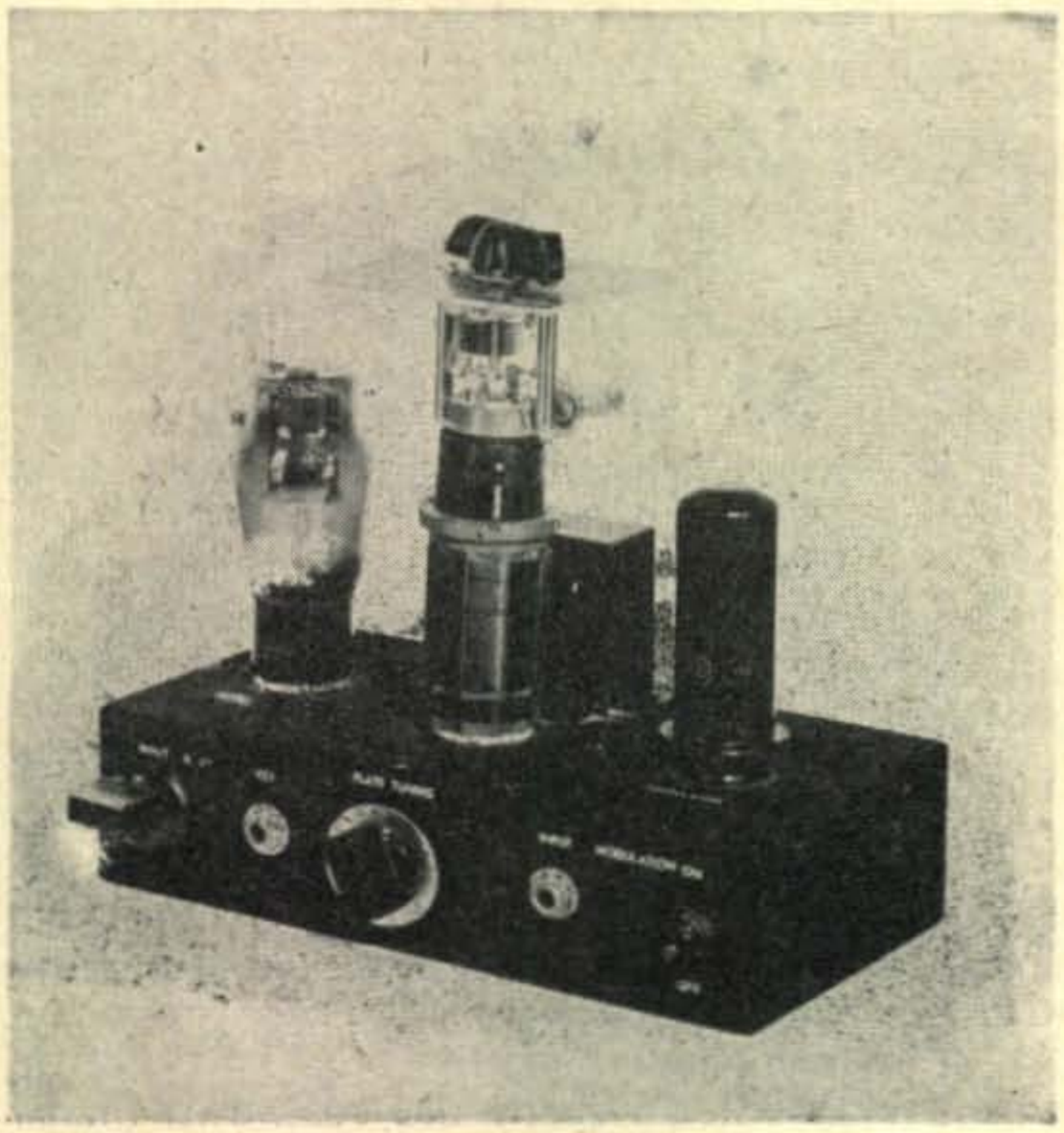
The wavemeter bulb (lamp) offers two advantages—it indicates unintentional doubling in the final amplifier by lighting up and it tends to broaden the trap tuning.

Extra Advantages

The inductively coupled trap has a combination of advantages offered by no other trapping method:

1. There is no d.c. present.
2. If it does its job effectively, it has practically no power to dissipate.
3. Broadness (and likewise Q) may be widely varied by plugging in different types of wavemeter lamps.
4. Effects on fundamental tuning and loading are practically absent.
5. A high-Q wavemeter may be located several inches from the tank. It may even be link-coupled.

Below, completed unit



Circuits and Construction

Directions for wavemeter circuit construction can be found in any amateur handbook, but, briefly, here are the fundamentals. First, make a parallel tuned circuit to resonate to the undesired harmonic (*fig. 2a*). Use between

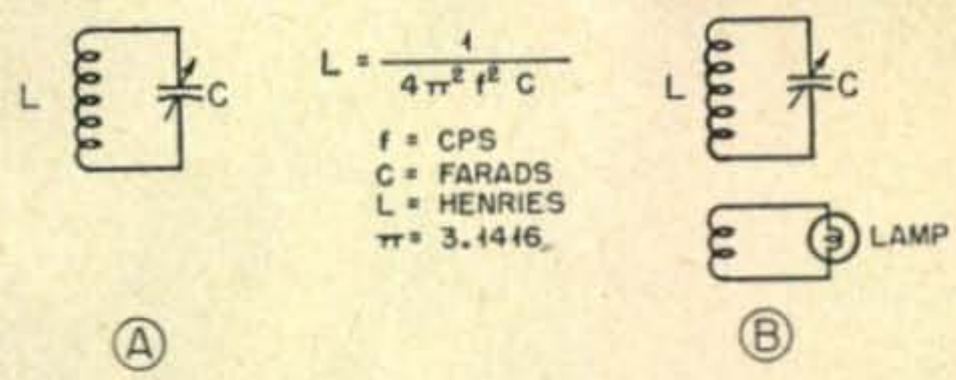


Fig. 2.

¼ and ½ μμfd per meter (10-20 μμfd for an undesired harmonic in the 40 meter band), though it really doesn't hurt to use more capacity. Use the formula for inductance (L) to find the right value for the coil, remembering to be careful with the decimal point in the figuring.

Wavemeter coil construction is shown in *fig. 3* with the formula for the number of turns. The lamp winding should have ¼ to 1/3 as many turns (closewound) as the main winding.

The particular lamp used is not very important. The best compromise is a #47.

Wavemeter positioning is simple. The amplifier tank should be near the indicated end of the main wavemeter coil, but not near enough to light the lamp with the wavemeter detuned from the fundamental and harmonic frequencies. Resulting harmonic strength can be checked on a well-shielded receiver in your own station while tuning the wavetrap for minimum harmonic strength. If the station receiver is overloaded, enlist the aid of a nearby ham to monitor while you make adjustments. In any case, have the neighboring ham make the final check. ■

$$N = \sqrt{\frac{18L}{d} + \frac{40\,lL}{d^2}}$$

L=Inductance (Microhenries)
d=Coil diameter
l=Coil length
N=Number of turns

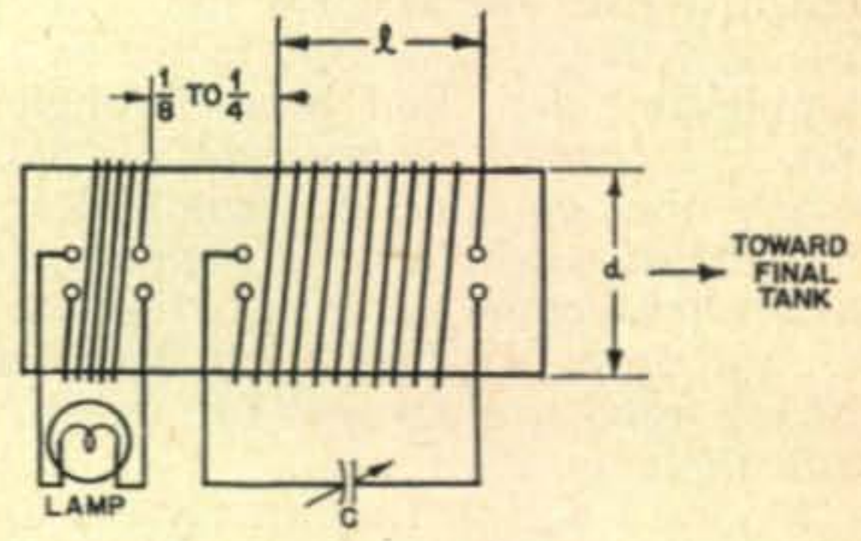


Fig. 3.

Danny Weil, VP2VB/P

YASME . . .

Nauru to Guadalcanal

And ashore at Honiara

The trip from Nauru was expected to be short, easy, and very comfortable. That's the trouble with me, I expect too much in life, and usually get a kick in the ear for my trouble. The day I left was really a yachtsman's dream, and the old tub certainly lifted up her skirts and flew over the sea. My new sails were pulling, and their set was perfect, considering the hammering they had been through in recent blows. I cleared Nauru and the Island faded away, the confounded wind dropped. The thought of a whole night running with engine was not welcome, but that's the way it had to be, and from the time I left Nauru to the following noon, we covered 100 miles . . . mainly with the engine.

Really, I was getting utterly fed up with this weather. Since the day I left Tahiti I'd had lousy winds, bad seas, and in general things had been tough. But then, I had taken the unorthodox route for sail boats, and could only expect what I got . . . and I got it too.

Two days out, boiling sun, no wind, and the engine purring away, with this poor clot sitting at the helm all the time with the wonderful aroma of exhaust drifting around his beak. I had plenty of chow, but every time I nipped into the cabin to get something organized, the old tub would sheer off course. This wasn't so bad when I was able to reach the tiller quickly, but when the time came for taking sights, which necessitated sitting on the cabin roof for maybe half an hour with the tiller way out of reach, that's when I really did cuss. Just imag-

ine sitting there trying to get the sun lined up in that midget telescope, then, without warning, you find the sun has slid around the edge of the sail somewhere and can't be found. Of course, the darn boat had altered course, so it means very carefully climbing back into the cockpit, putting the so and so on course, and then searching for the sun again. What you fellows don't know is, the sun doesn't hang around for anyone, and what with large chunks of cloud butting in on the landscape all the time, it really makes even the most good natured bloke tear his hair out . . . incidentally, I am almost bald now . . . wonderful head of skin.

In addition to the lack of wind I found that Yasme had developed a leak and seemed to be taking more than her usual 50 tons of water. It didn't really bother me much, except I had to pump the darn thing out every hour. The engine driven bilge pump did the job fine until it decided to seize up with a chunk of string in the gears. I was thoroughly enjoying myself, and I bet you lads sitting there in your shacks were real envious of all the pleasure I was getting from this yachting.

I finally found the leak, but couldn't fix it right then. It was the engine water pump leaking around the gland. It was pushing ½ gallon through the engine every few seconds and ½ gallon into the bilges . . . as though the bilges wanted cooling . . . it was me that needed all the cooling.

Three days out and up comes a spot of wind. Oh brother, what a relief to get that engine into cold storage for a while, and to be able to sit back whilst she steers herself. This breeze lasted until just after midnight, then, as I slept soundly below, I was suddenly awakened by a terrific crash. What the . . . heck was that? I shot out on deck and discovered that one of the 20-foot booms holding the "Yankee" genoa had jumped out of its socket and was doing its darndest to bore a hole through the Onan generator on the foredeck. The point had lodged between the cylinder head and the gas tank, and whilst it made a good location for the end of the boom, it was hardly very helpful to the Onan. It had already cut through the HT lead, and was doing its level best to drill into the gas tank. Naturally, just at that moment, the wind decided to come up, and that of course increased the pressure on the tank. I tried with all my puny strength to lug that boom out of its self-made niche, but it had really got itself wedged. Then I cussed. Just when I had got a decent breeze again I had to take down all the canvas to get this thing fixed. Many of you seem to think that dropping my two genoas is just a matter of letting a couple of ropes go, and collecting the canvas on the deck . . . that's what you think.

I reckon that the pull on those two sails might be around a couple of tons, and when the wind is showing off a bit, well, they can do a lot of damage if you let 'em go. As per usual it was pitch dark; it's always dark when anything happens; never quite figured it out, but there it is. All deck lights on, now to get those beautiful new sails down without them running amok and either (a) taking me over the side, or (b) dropping in the drink and getting under the boat . . . both pretty disastrous. They had to come down fast, otherwise I'd have no generator left, so I released the halyard on the offending sail. The pull came off the tiller as the sail dropped and the other sail wrenched the tiller over hard, slewing the old tub around in a half circle, then backing itself. No damage was done, but the backed sail enveloped me completely, and there I was on a frantically pitching deck with a few hundred square feet of Orlon sail draped around me. How I loved "Hard Sails" of New York who supplied those sails at that time! I cursed their toughness.

As much as I fought with that fabric, so it seemed to hold me down. I know ordinary sails would have ripped with the terrific strain on them. Very few small sails will stand up to the treatment that particular one got at the time. When a great chunk of stuff like that gets backed with a 40 mph wind, and is being jerked around by me, caught up on the deck winch and a couple of deck cleats, and still remains in one piece, well . . .

Maybe three days later I got out of my shroud, and after fumbling around for a while, found the right rope to get the blighter down. By now the wind had really picked up and there I was with every stitch of canvas on the deck when it should have been flying and sending the Yasme along around 7 knots.

Soon as I got clear of the mess I stuck the boom back to where it came from and started to hoist the sails together, as is my custom. Half way up one stuck. I jiggled the ropes, let the sails down a bit and then hoisted 'em again, but they just won't budge above the half way mark. Whilst I was playing around, the sails filled, what there was of them above the deck, and the old tub was fairly screaming through the water. I watched the surplus sail creeping over the edge of the rail, dead scared it would get under the boat and snap the booms with the strain. I knew darned well I couldn't stop this creeping, so I tugged, pulled and cursed, but still that rope stuck. Yes, you fellers are right . . . dead right. Up that stick I went into the dark, and there I fumbled around with about 50 ropes to find the one that was jamming. Why is it an ordinary piece of rope can get itself tied up into 20 knots, and yet the ends are fixed? There was enough tangle up that stick to give the average bloke about three weeks' work to clear, but my persuader known as a knife did wonders in the emergency. Yes, once again you've hit it, I cut the wrong rope. Now I had to climb all the way to the top of the mast to find the end

which felt the air was purer up there. . . . I don't wonder after what I said at the time. Without going into a lot of minor details, such as skinned knuckles, shins and an odd broken leg, I did, strange as it may seem, actually get that rope down. Ultimately I got the two sails up, quite expecting after all that treatment to find that the port sail had got a rip in it. As I said before, they are tough, and there wasn't a blemish on it.

That night Yasme really showed me what she could do. With a gale force wind behind her and a fair sea, she sped along at a steady 7 knots. The prop screamed as it free-wheeled so much I had to stick the engine in gear to shut it up. What a night of sailing that was . . . the best of the trip. The next day the wind threw its hand in and left me in the usual lousy flat calm.

Oh well, it was good fun while it lasted. I had to stick the iron horse on again, and worse still, fix the generator which was at the other end of the ship. Need I tell you how much fun I had running back and forth along that deck? I would take a screw out of the generator, nip to the stern to put her back on course, return to the generator, and find that the screw had vanished. Replacing the new screened HT lead on that generator took me exactly 4½ hours, and I reckon I ran about 6 miles doing it. I developed ten different new cuss words . . . this sailing certainly broadens one.

Back to Work

Having had a thorough day's enjoyment, I decided it was time I figured out when I should sight land. Naturally it was going to be that evening, so that meant another night without sleep. One can't just turn in when there might be an odd island opening up in the way, so Danny had to start this business of peering through the binocs the rest of the night.

The wind was fitful that night, calms and squalls, and rain most of the time cutting visibility to nil, but at daybreak, the faint outline of Malatia loomed above the clouds. Approaching that mountainous island the wind dropped altogether and we were subjected to sudden bursts of wind that materialized from nowhere, so I decided to keep all canvas down until I was well clear of land. We seemed to sail for hours and still get no nearer to that mass in the distance. Suddenly, the sky seemed to clear, as though by magic, and there ahead loomed Malatia with its densely wooded forest, with here and there a faint wisp of smoke lazily climbing into that cloudless sky. I knew that I dare not land on this wild island. Head hunters and cannibals were still in existence there, and I had no wish to be served up for supper that evening. I learned that very few white men had visited the island, and only one man had ever penetrated deep into the bush and got out alive. He was a very old missionary (probably too tough to eat), and was still kicking around someplace.

I closed the shore 'til most things were visible to the naked eye, and whilst I saw one or two native huts between the trees, never once did I sight a native; I might add that my engine was running at all times in this area, also the old shooting irons were nicely to hand. Malatia swept by very slowly and ahead loomed several islands, the main one being Florida Island. The reefs were faintly visible around all of these islands, and whilst the sea was calm, I knew exactly what a reef could do to the tiny Yasme should she strike one, so we gave them a very wide berth at all times. The next job as I saw it was to cross a large puddle to get to Honiara.

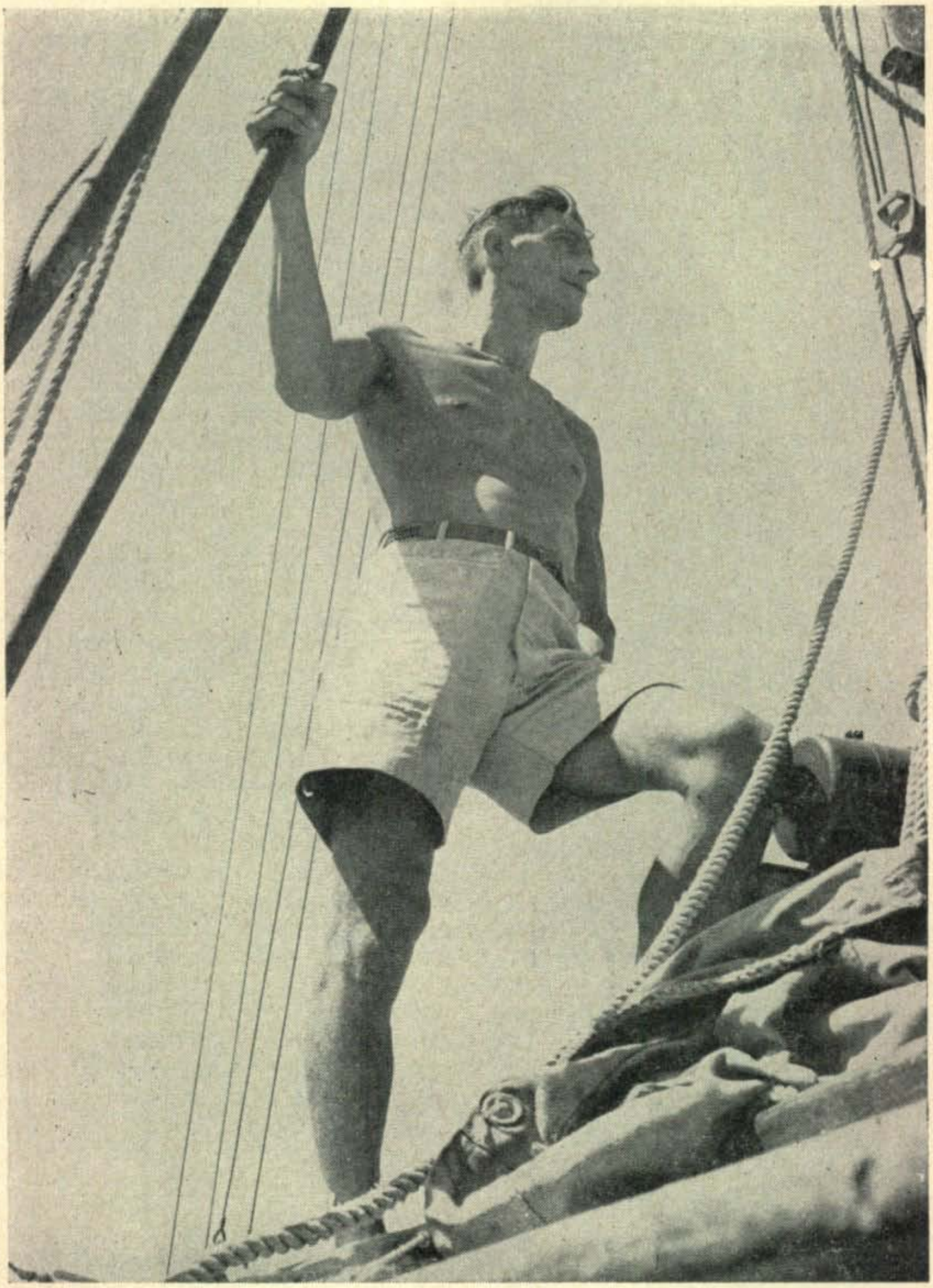
This chunk of wetness was called Iron Bottom Sound, and whilst Honiara was almost Due South, the wind started to blow like stink from the southeast, and in that narrow channel, the seas very soon built up into man sized waves. With just reefed mainsail and engine, Yasme stuck her nose into it, and we plugged along at a steady 3 knots. The seas were breaking over the bows, making it quite unpleasant. Yasme seemed to be straining hard to get South, but that wind and sea were forcing here westward more and more. Just over halfway across was Savo Island, just a mere 1700′ high, but also with many tide rips around it and an odd reef here and there just to keep everyone's spirits up. Yasme was slowly but surely being forced onto this tiny volcano. By the time we got within 3 miles of it I had decided that the time had come to go around the other side since the chances of clearing it safely were nil.

I went below to plot another course and noticed directly that Yasme had altered her motion. Wondering what the heck had happened and thinking we had got in the tide rips, I skidded out onto the deck, only to find the wind had changed around for our benefit. It seemed that the wind was hitting the island, rebounding, and giving us a favorable wind. Well, that suited me fine, so I let the sheet out and with the big genoa pulling like a train, Yasme swept by that Island at top speed. The tide rips were visible from the deck. I thought then what a mess we should have been in had the wind dropped, but one gets to know whether a wind is likely to stay, and this one did . . . all the way to Honiara. Honiara itself is not an easy place to find late in the afternoon as a thick haze settles over the whole place, and I scanned the land ahead of me for some time before I finally picked out a few boats. As there were no outlying dangers there it was easy sailing into the anchorage. Seven days out from Nauru I dropped the anchor into Honiara coral, having covered around 700 miles of really lousy sailing. We had arrived without any damage and

everything looked rosy.

Customs lost no time in boarding me, then I was left to myself. Not a soul came to greet me, and really, I felt far lonelier then than I had been all the time at sea. This is something I hardly expected, but one has to accustom oneself to all sorts of places. I knew from the moment I stepped ashore that I was not staying long enough for a haircut. Mooching around looking for a suitable QTH was a tough job. It seems to get tougher everywhere I go, but here it seemed hopeless. No one seemed to care whether I had arrived or not, and for the first time for many months I really felt despondent. After my wonderful experiences in Nauru and then to arrive in a dump like this was a real shaker, but I kept at it for a couple of days and finally found the one good natured bloke in the whole community. He was Hewton Amos, the secretary of the Copra board, and very kindly offered me the use of his office to do my DX work.

This was something really fine, as it was reasonably close to the boat, had power laid on, and a nice area at the back for the beam. So, within a few hours, up went the beam and I was on the air as VR4AA. What a wonderful reception I had from the boys when I bashed the old key. It far surpassed my expectations there for DX, and I know for a fact I made more QSO's here than Nauru, yet it was not such a rare spot. Apparently I was putting out a fair signal and the lads simply flocked in for a report.



Danny on watch

When I tell you blokes I spent 12 hours a day on that rig it's no lie. I was happy working there and it took the bad taste out of my mouth of the place itself. Old Hewt certainly pulled his weight there on fixing me up with the shack, and later I found he was an old pal of ZL2GK (whom I sked daily), so by the time we had finished, we were good friends. Quite frankly I don't know how many countries I contacted in the short time I was there,

Yasme

but it was the ham's delight from a good QTH. Everyone came through, and I felt if had I stayed another week I should have made my DXCC. Fone QSO's were made to Europe as easy as the W's and I really had a good time there on DX work. My plans to stay for two weeks were strictly adhered to, not because I hated the place, but because of the bad weather ahead of me. After 12 days' solid DX I pulled the big switch.

The general idea was for me to pack in on the Friday night, work all day Saturday getting the rig aboard, and leave Sunday morning. However, when I made my last QSO around 2 a.m. on Saturday morning and the band had folded up I just couldn't bear the thought of returning to the boat with everything lying around the shack, so I went out to the beam and started to climb the pole. It was one of the usual black nights, the moon hadn't decided to show itself, and there I was 40′ up with a torch gripped between my teeth, dismantling the beam. By 4 a.m. I was pulling out the last iron stake holding the wire stays to the mast. Then back into the shack to disconnect all the gear. By daybreak I was on board Yasme feeling a little tired, but nevertheless very happy at the thought that all I had to do was to load the gear on and get to heck out of the place. Around 9 a.m. that Saturday morning, with the aid of a few of the natives, I stacked the lot on board and got to heck out to the anchorage. By 3 p.m., after a hard day's work, Yasme was ready for sea, and with only Hewton to say cheerio to, I lost no time in dragging up the anchor and getting clear of one of the worst QTH's I have had the misfortune to visit. Maybe I was a bit of a clot, but I was so fed up I never even saw the place. I never took a foto other than the Yasme at anchor and a couple of motheaten natives sitting on the beach. I hate to run a joint down, but apart from Hewton and the local garage man who helped out in one or two little ways, I had absolutely no social life at all, so I think you blokes will understand why I upped and out as quick as possible. I'm sorry blokes and blokesses that I can't give you a nice description of the island, but that's the way it was, and I think you would have done the same as me. Well, I had the next little trip to look forward to, so with a song in my heart, and the engine flat out, Yasme and I left Honiara and all it stood for behind us in the mist that settled later.

Well that's about all for now, we shall all meet again in Port Moresby, so wonder what the trip will be like there?

Cheerio for now, CUAGN ver soon, and let's hope the next QTH's is a better one. 73s and all that,

Danny . . . VR4A (ex)

Bill Leonard, W2SKE, got on the air from the hospital while recuperating from a recent heart attack and with a 15 meter dipole hanging out the window managed to make WAC before being discharged a month later.

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Conelrad

After trying several versions of Conelrad monitors described in various amateur publications, and not being exactly satisfied with the methods of indication used, this following form of simple, dependable monitor was devised.

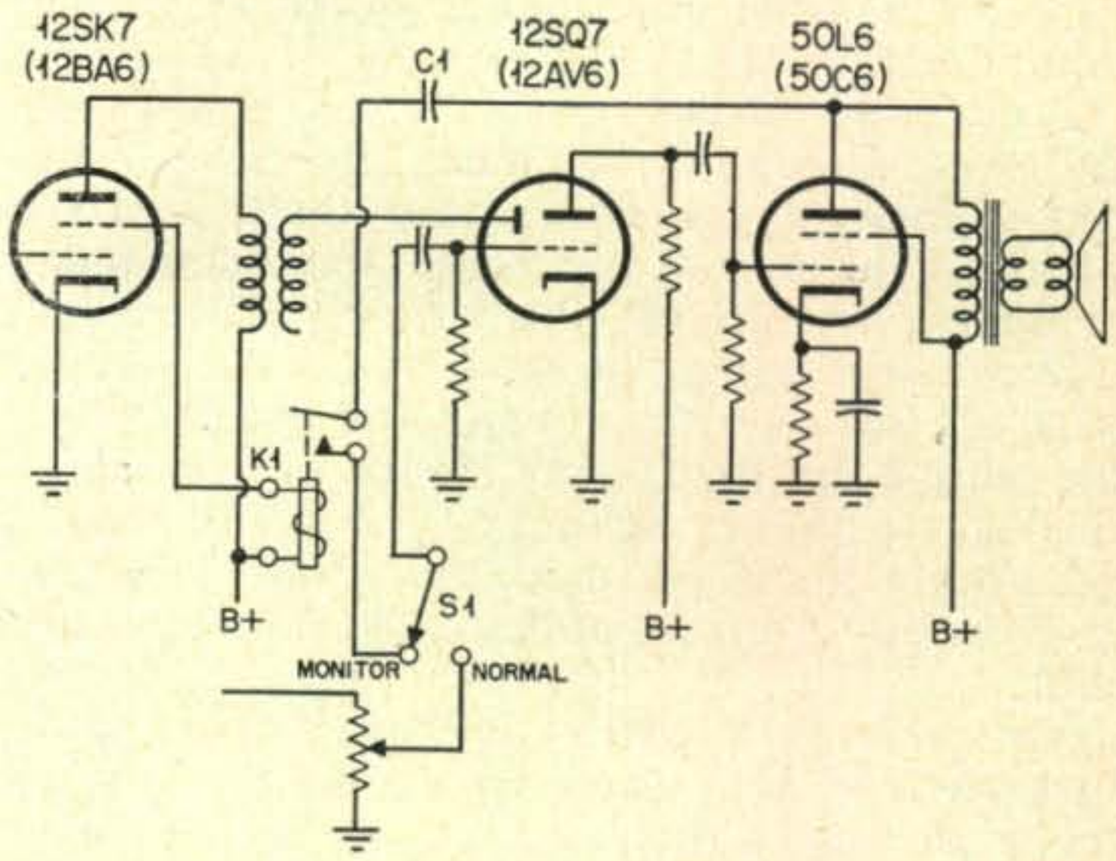
Actually, no sequence signal is required to operate this monitor as it responds to either presence or absence of a carrier. This, however, is adequate to signify a Conelrad Alert, since the procedure followed by BC stations is as follows: Cut carrier 5 seconds; carrier on 5 seconds; cut carrier 5 seconds; carrier on with 1000 cycle tone for 15 seconds. Among the features of this monitor are:

1. Only two components plus a standard AC/DC table model radio required.
2. Volume of alarm signal independent of volume control setting
3. Silent monitoring—No noise in shack to distract regular hamming activities
4. Simple to operate—Once constructed, no adjustments are required; just tune to a local BC station
5. Normal operation of the radio is returned simply by throwing one toggle switch
6. When the alarm operates, the full 1.5 to 2 watt output of the radio blasts out into the room with approx. 1000 cycle tone, assuring immediate recognition even if the operator is working some hot *c.w.* with phones clamped on tightly.

The circuit is simplicity itself and only two initial adjustments are required. The construction consists of adding almost any plate relay with normally-open SPST contacts, in the screen grid lead of the i-f amplifier 12SK7 (12BA6 miniature) of a 'garden-variety' AC/DC receiver. The screen current change from signal to no-signal conditions is approx. 3 ma., which is adequate for a wide variety of relays.

Next, add a SPDT toggle switch, as shown in the diagram, to the input of the first audio stage, 12SQ7 (12AV6 miniature). Thus in the *normal* position, the switch connects the center arm of the volume control to the input capacitor and normal radio operation results. In the *monitor* position of the switch input of the audio stage is connected through the relay contacts (normally open), through the 'gimmick' capacitor, and thence to the plate of the output tube, 50L6 (50C5 miniature).

Operation in this *monitor* position is as follows: With a signal present, screen current of the i-f stage is at its lowest level, *not* operating the relay. Should loss of carrier occur, screen current rises, thereby operating relay which applies feedback through the 'gimmick' capacitor to the audio stage, causing approx. 1000 cycle tone at full power level of the audio



stage to be emitted from speaker. Upon receipt of tone, operator merely throws switch from *monitor* to *normal* position and listens for Conelrad message. It then is a simple matter to tune to 640 or 1240 kc.

Operation of this monitor receiver can be checked at any time by tuning in a BC station in the *normal* position, switch to *monitor* and tune off station, the alarm will operate. This unit is simple to construct and fulfills F.C.C. requirements regarding amateur compliance with Conelrad monitoring which became compulsory on January 2, 1957. ■

How To

Make Your Wife Love Radio

in One Easy Lesson

Anne Gardocki, K2DWB
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Maywood, New Jersey

If you're the type of ham that is happy all alone in his ivory tower—if you are one of those that say contentedly "I got my rig an' the XYL's got her canasta. We don't get into each other's hair and we get along swell—," then read no further, brother. This isn't for the likes of you.

But ever since my husband and I ventured into hamhood together a few years back he has been regarded with envy and awe by most of his ham friends.

"Aw, Joe's lucky, his wife's a ham," seemed to explain away any chance purchase of new equipment.

"Yeah, Joe, I sure wish I knew how ya did it," was a wistful comment we have heard many, many times. Some poor souls, deprived of any nook to call their own, have demanded to know how to get the wife to understand.

Now Joe, being the soul of brevity, would mull all this over for a while and usually come up with a brilliant reply, more or less along this tack—"Yeah, Schultzy, you really oughta get your wife to go in for this stuff." And the conversation would end there, amid much head-shakings.

Or perhaps a really desperate case would turn to me even, (and he would have to be really desperate, because I have noticed that most hams are rather girl shy, actually, in person, although there are some who cut quite a swath over the air waves), and ask "How'd you ever happen to get to be a ham?" To which I would reply truthfully, "Well, Joe had always wanted to be a ham and when he finally got around to doing something about it I just studied along with him." True, but not the answer they wanted, I now realize.

What those guys really wanted to know when they asked Joe how he did it was actually how *they* could do it. So, for those who really want their wives to join them at the rig, and those who don't care whether their better halves ever get a ticket or not, but think it would be nice if there were a little more understanding about the home; and for those who merely want to be sneaky and buy more and higher-priced equipment without quite so much repercussion—well, pull up a chair, boys. I'm going to tell all.

Now don't worry that your wife may see this article and ruin your nefarious little plot. If your particular helpmate is a dyed-in-the-wool ham-hater, she won't touch your old *CQ* with a ten foot pole. And if she is open to reason (and of course all the gals who read this are open-minded) she will be grateful that at last someone is making an effort to bridge the gap!

Enough of generalities—let's get down to cases. And first comes the approach. There are a few important "don'ts" that might not occur to a man, but this is a woman speaking, and every word of this is written to try to help you understand the feminine point of view.

DON'T tell her Susie Dullbrain got her ticket last week, and if Susie could do it, why certainly . . . this will only confirm wifey's suspicions that Susie isn't all she should be, or worse!

DON'T tell her it's easy! First of all, it isn't And second, and most important psychological-

ly, it will make her feel wonderful to think she is accomplishing something difficult. It will also give you a very fine line as you struggle along the rocky path licenseward. You can say "Gee, Mabel, you are sure working hard on this, and I'm proud of you." You see, if it was supposed to be easy, and poor Mabel had to slave away at it, she would feel stupid. In fact, if you tell her it's terribly difficult and then parts of it come quite easily for her, she will feel immensely brainy and breeze through in nothing flat, on her newfound self confidence.

Now for the DO'S! If she'll approach the ham shack at all, get her to come in! Ask her to hold something for you—a condenser with a pair of pliers, while you solder a connection; ask her to put in a tiny screw for you because your hands are too clumsy; then praise her! Thank her, tell her you needed her help, and tell her she did it beautifully, and *mean* it. Or maybe you've called her in to say hello to an ice-bound ham in the Arctic or to chat with a service wife about high prices in Hawaii. Then tell her she sure can handle a mike. Or if she doesn't know what to say, tell her you felt exactly the same way when you first had to find words to speak out over the air. But do, do, do be sure to take this step at a time when she is free! She won't be swayed at all if the baby is screaming and the roast is burning. So make it cozy-like, in the evening, when all is quiet. In some such way you've got her there and you've got her feeling good about it. So much for the approach. You can probably think of others equally effective.

Why?

Now we begin to get a little more serious. First off, what makes a wife want to be a ham? (I say wife advisedly, for none of this applies to the clever girl who loves radio for itself alone and got her ticket all by herself back in her teens.)

Judging from my own lengthy experience of being a plain old average wife, I would say that any ham's wife taking up radio does so because of her husband. Yes, you, great big old gruesome you! Because it's more fun to do things together than alone; because she sees what a ball you and your buddies are having when you get together to work, trade, and talk—typical girl reasons like that.

Speaking of buddies, there's another point for our side. How? Why, it's simple. It's all those men! Don't get me wrong, but honest and truly, a girl would have to be either an awful liar or dead not to admit she got kind of a kick out of being surrounded by great gobs and handfuls of men, and admiring men at that! We can't all be Marilyn Monroes, but deep down inside most girlish hearts there lies a dream and sometimes I do think that the dream is pretty close to reality when all her husband's friends think her sandwiches hit the spot, her coffee is superb and she's interested in radio—in other words, she's tops! Maybe I'm giving away secrets, but I told you that I'd let you in on how the gals look at things.

Okay. So now you have her interested, and you have her in the ham shack, and she's doing something, however remotely, connected with ham radio. Congratulations! Probably the next steps, and how you go about them, are the most important, for more would-be lady hams have fallen by the wayside at this point than any other. The great stumbling block is *how you answer her first timid questions!*

The Usual

If the following isn't a true enactment of a familiar scene, I will personally eat your hat. Just send it postage paid.

Mabel: Georgie dear, what's this tiny little thing I'm holding?

Georgie: (That's *you* bud) Hun? Oh, a resistor.

Mabel: Well, what I mean, what's a resistor?

George: Um—well, its just a resistor. That is, you need 'em in lots of ways, receivers, transmitters, all circuits use resistors, controls current, all sizes, very common thing.

Mabel: Oh. I guess I don't quite understand. You're so clever, dear. Oh, yes, there's something else I wanted to ask you. You were talking about voltage, and so was the electrician that put in the new outlets. What is voltage?

George: What's voltage? Ha! Ha! Well, you wouldn't get much electricity without voltage. You might say it's potential difference, or electric force. Mabel, you're a riot!

Mabel: (Feeling very unriotous and puzzled) Well, Georgie, I guess I'll go up and look at TV for a while.

George: (to himself, as she goes) She sure got out in a hurry. It'd be fun to have her here, but guess women just don't dig this stuff. Ah, well, CQ CQ CQ—Whatcha gonna do? CQ CQ CQ. This is . . .

So! That's the way it goes, eh? George, you flubbed it! The trouble is that you know so much about radio (even though you think you scarcely know a thing) that it's hard for you to be elementary. And elementary is just what you're going to have to be.

At this point you sorely need a good, simple, clear book on the subject, not to give your wife to read, because it would be too complicated at first, but for you to check with so you'll be able to sort of translate very basic information into even more basic answers to her first odd little questions. I would highly recommend "Understanding Radio" by Watson, Welch and Eby. It's perfect for this situation.

And for the women's point of view again—do you know how I would have explained those things to Mabel? Now, don't laugh. Well, on

second thought, go ahead and laugh, but pay attention!

If Mabel had asked me what a resistor was, I would have said "Well, Mabel, it's a little thing made specially to sort of cut down on the electricity that is flowing through its wires —you see, maybe a whole bunch of electricity is coming in through the wire, and part of your radio just needs a tiny bit of electricity to make it work right. Well, they stick this little resistor between the wire with all the electricity coming in and the little part that only needs a tiny bit of electricity to work, and this resistor cuts out all the extra, just in that one little section, so everything will work right. It actually resists electricity, to tell the truth, because it's made of materials that don't carry electricity very well. That's why it's called a resistor."

Sneer if you will, George, but I bet Mabel knows what I mean.

And voltage. Ah, that's easy. "Mabel, voltage is the pressure that pushes the electricity, just like water pressure pushes the water out of your faucets. If the water barely trickles out you would say that the water pressure was low—and if the force that pushes those old electrons is weak, you would say it was low voltage. Lots of force, like when the water comes rushing out of the faucet—that's high voltage. There are ways to measure the voltage by certain little measuring devices called voltmeters."

Take Time

Time enough for Mabel to pick up the lingo when she has some rudimentary knowledge of what makes things work—the kind of knowledge that will really sink in and make sense to her and help her to achieve a solid foundation of facts to learn and build on.

From now on, when Mabel asks you a question, try to look at it from her point of view, which has no background of reference. You might start with your book, and look at it together chapter by chapter, explain the diagrams, discuss the new terms, let her ask questions and don't push it. Take your time.

You might start to send her a few code letters now, a couple of evenings a week, and it's fun to learn enough letters so she can recognize when simple words are sent, such as eat, ate, rat—you know the bit. Teach her to send and recognize "HI" the ham's old standby for greetings, laughter, and general cameraderie. She'll get a kick out of feeling it tapped out on her fingers when you are marooned together with a bunch of bores, or stuck at a late PTA meeting. If you're the dashing type you might even progress to "I love you"—that will get some more of the advanced letters learned and might do some good in other ways, who knows???

So comes the Novice ticket! She has learned some simple theory, worked up to five words per minute, and much to her surprise, passed the test! You're so proud, and you tell her so! The thrill of going on the air, the pleased response of all the boy hams when they find out they're in contact with a YL—all these will encourage her to go on studying.

But now she needs a boost more than ever. Some girls pick up the code in no time at all, and to some it comes hard. In this I doubt if we girls differ much from the menfolks. But the theory for General Class looks almost insurmountable to the average wife-type we're discussing. So don't spring it all on her at once, and don't make the mistake of thinking that now she has her Novice ticket she understands the facts of radio, and is mad for the whole thing.

Oh, no. No, indeedy. Do take the points that must be learned one at a time, simple step by simple step, using the same basic formula for explaining things that you used in the beginning. Tell her she's doing a swell job when she gets discouraged. Don't push her too fast, and don't expect her to learn everything. Enough if she really understands what makes the darned thing work and knows what the simple terms and formulas and diagrams mean.

As for being mad for radio, well, she probably does like going on the air, and enjoys reading the articles in *CQ* if they're not too technical. But this growing interest is a tender little bud that's gotta be nurtured and protected and you're the guy to do it. Spread the word around to your friends, for the more people who know she is slaving away for her General, the more there will be to encourage and praise her, and well—she just can't let all of you down, can she? A girl has her pride, and so the chances are she'll have to show you, by passing her General exam and becoming a full fledged ham!

So There You Are

You'll be so proud, George, and well you might, for believe me when it happens you will deserve plenty of the credit yourself. It takes lots of time and monumental patience. But now you can sit back and be the envy of your friends and the delight of the advertisers.

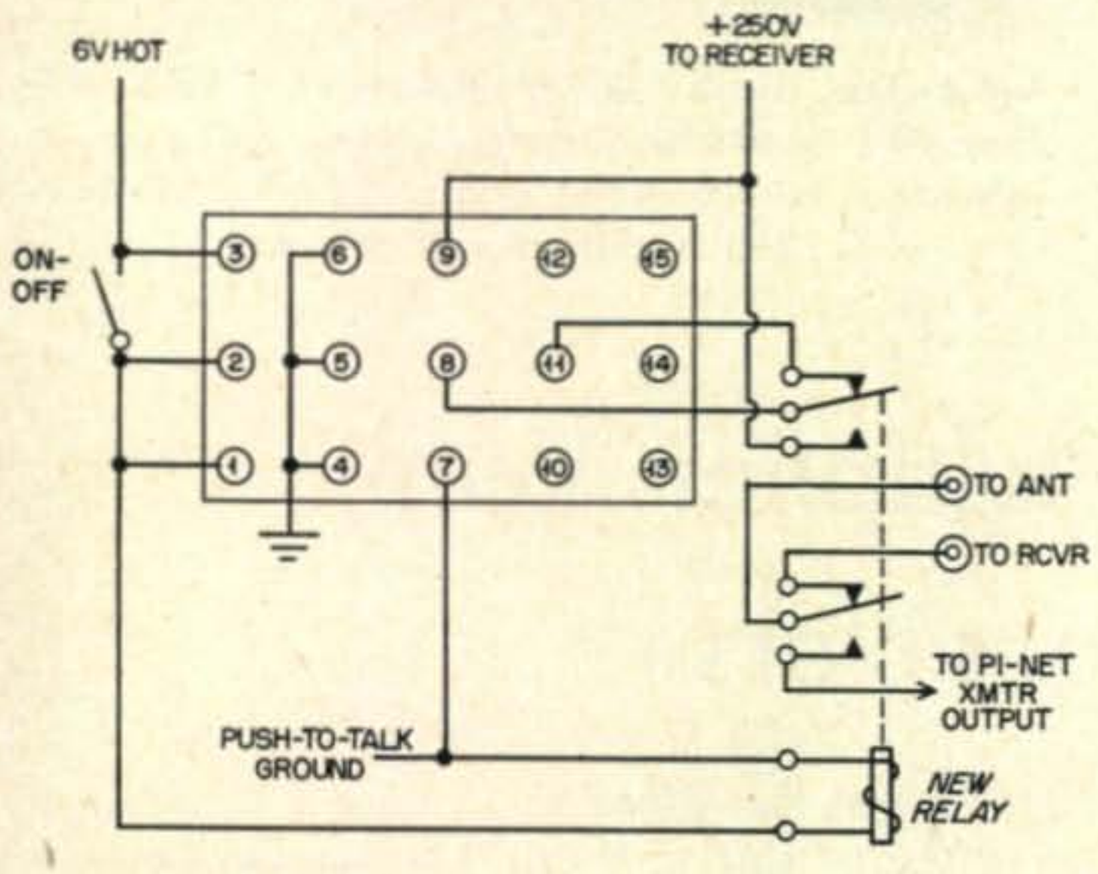
Of course, there may be drawbacks, so don't say you weren't warned! One day you'll come home from work and she'll greet you with a specially nice dinner and then say sweetly, "Georgie dear, I was feeling kind of low today, and I went downtown, and just happened to stop by Garrison's, and they had this darling little two-meter thing, it was honestly just like new, and it was a terrific bargain, and hardly takes up any room, and I just thought that maybe . . ."

Well, isn't that what you wanted? ■

Elmac AF-67

Modifications

New plug diagram



Lloyd Jones, W6DOB
534 Miramonte Drive
Santa Barbara, Calif.

Bias Batteries in transmitters are a source of trouble and extra cost, and should be eliminated. Class AB1 modulators draw high static plate current as compared to Class B modulators. Therefore, in modifying my Elmac AF-67, it was decided that better performance could be obtained by discarding the battery and using Class B Modulation. Another desirable feature is the built-in send/receive relay.

Class B Modulation

To convert the AF-67 to class B modulation, Remove the bias battery and ground the center tap lead from the transformer.

Remove the 5881 tubes and insert two 1635 tubes. Rewire the two sockets V8 and V9 as follows: Pin 1 not used; remove jumper to pin 8. Pin 2 heater, leave as is. Pin 3 plate, leave as is. Pin 4, cut screen grid wire and tape end so that it cannot short out and fold back along cable. Pin 5 now connects to Pin 4 with short jumper. Pin 6 was blank; now connect to Pin 3 with a short jumper. Pin 7 heater, leave as is. Pin 8 cathode, leave as is. This connects the two triode sections of each tube in parallel. The socket connections for the 1635 tubes now are . . .

1. Not used
2. Heater
3. Plate #1
4. Grid #1
5. Grid #2
6. Plate #2
7. Heater
8. Cathode

Now indicate these changes in your instruction book.

Installing the Relay

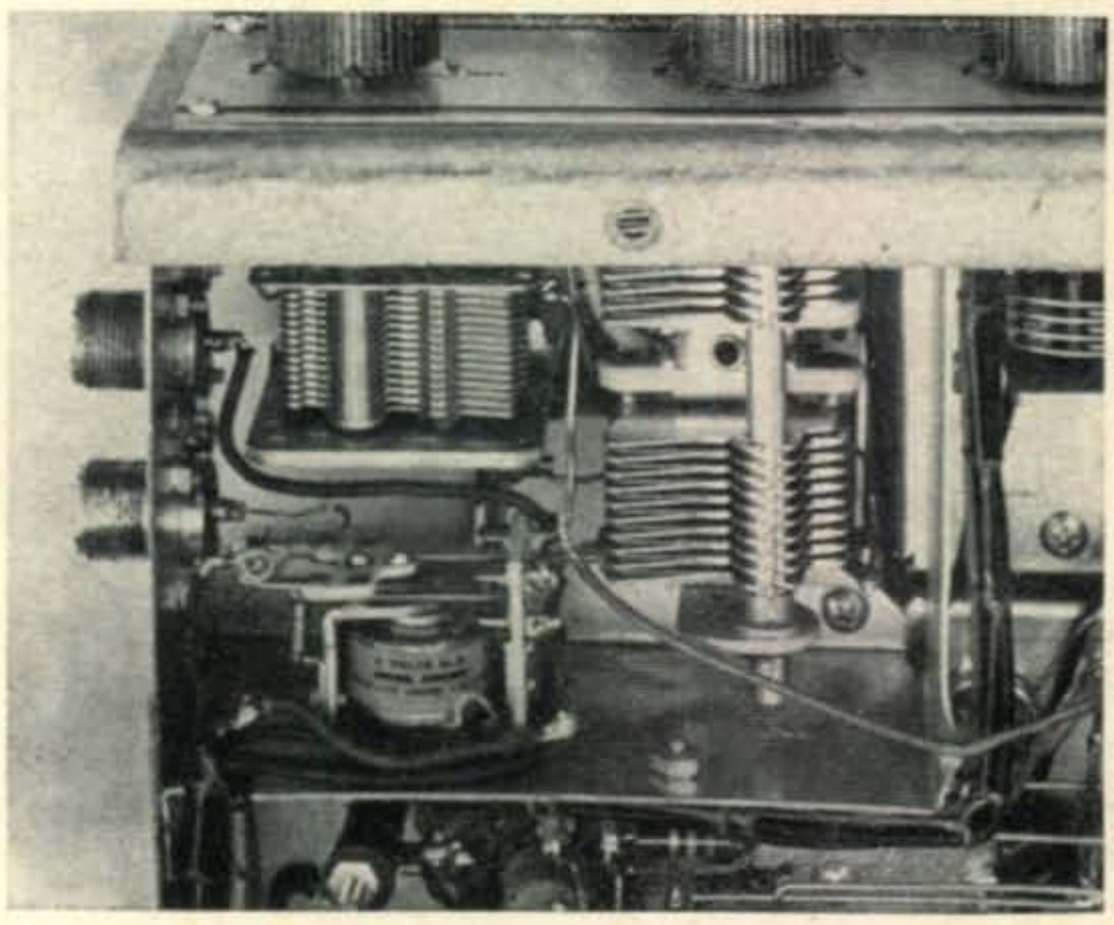
Remove the chassis from the cabinet and work on the unit where it is convenient to drill some holes and make the soldered connections. Lay the chassis on some cloth material to protect against scratching.

Remove the antenna wire from the original co-ax connector and loading condenser. (*Later, this wire will connect to the movable arm of the relay nearest to the top of the chassis and to the opposite side of the loading condenser stator.*)

Drill a new hole to the front side of the original co-ax connector and install a new co-ax connector, Amphenol SO-239.

Mount an Advance type AM/2C/6VD in the position shown in the photograph so that the two movable arms of the relay are nearest

[*Continued on page 112*]



Right: Relay installation

SURPLUS

Fig 6—The Heath "Q" Multiplier used with a converted BC-348/0 aircraft receiver. The phone selectivity is 2400 cycles and the c-w selectivity is 750 cycles, 6 db down.

Using the "Q" Multiplier With Military Receivers

Donald L. Stoner
Engineering Consultant
P.O. Box 137
Ontario, California

If you use, or have used a war surplus unit for a receiver, you probably know how inselective they can be. All the stations seem to appear as a tight cluster right on top of the station that you are trying to copy. A radio amateur friend of our used a BC-455 Command receiver on 40 meters during his Novice license period. I will never know how he got his General ticket using that "beast."

Most military receivers just do not have the selectivity necessary for amateur communications. There is a very good reason for this lack of selectivity in these receivers, at least from the user's standpoint. Most of these receivers were designed for use with a companion transmitter at the other end of the communications link. The transmitter might be used in an airplane with a fluctuating power source, in a jeep or tank and subject to tremendous vibration, or under severe battle conditions. In any event, these transmitters almost always drifted (some of them seem to have built-in drift). For this reason, the reception bandwidth of the receiver was usually three or four times the maximum drift of the companion transmitter. To this was added a "fudge factor" to compensate for tuning errors at each end. The result was a receiver that stayed on frequency but was broader than a barn door, as the saying goes. If someone interfered with the net operation, the radio operator reported it to the C.O. Unfortunately, we do not have a C.O. when the going gets rough on 75 meter phone (or do we?).

Generally speaking, the selectivity of the receiver is directly proportional to the i-f frequency, all other things being the same. There are many ways that a receiver can be made more selective. For example, the windings of the i-f transformers can be moved further apart, a crystal filter may be incorporated, or the i-f frequency can be lowered (such as with double conversion).

The "Q" Multiplier

The simplest method, of course, is to add a "Q" Multiplier to the receiver. Unfortunately, there has been little information on using the "Q" Multiplier on frequencies other than 455 kc (the standard i-f). The author used the "Q" multiplier with an 85 kc i-f amplifier (Sept. 56 CQ) and found the results most gratifying. Experiments along these lines were continued using a Heath QF-1 "Q" Multiplier modified for operation on other frequencies. As its name implies, the "Q" Multiplier uses a high "Q" coil and by introducing a controlled amount of regeneration, the effective "Q" of the coil is multiplied many times. As an example, the Heath QF-1 uses a "cup core" type of coil with a nominal "Q" of around 200. A small amount of positive feedback raises the "Q" from this value to around 4000. Actually, the apparent "Q" of the tuned circuit is continuously variable by adjusting the *Peak* control. You might consider the i-f amplifier as being a very busy sidewalk and all the people traveling on it represent the interference. When the "Q" Multiplier is placed in the circuit and switched to the peak position it is like placing a very narrow doorway right in the middle of the sidewalk. Consequently, only a very few persons (or is it signals?) get through. If we narrow the doorway even further (by adjusting the peak control) only the "person" we want to get through will be able to make it.

On *Null* position, a similar action takes place. This time we want to get rid of one of the signals. In this case, the "Q" multiplier acts like a trap door on our hypothetical sidewalk and the unwanted signals drop through and right out of sight. This comparison is slightly ridiculous, of course, but it does illustrate the effectiveness of the "Q" Multiplier. Technically, the "Q" Multiplier represents a very high impedance over a very narrow band of frequencies on peak position. Signals within this band of frequencies are amplified but other signals off to the side of the peak are rejected. On the null position, the tuned circuit represents a very low impedance at one frequency and signals that appear in the i-f amplifier at this frequency are shorted out. Signals on either side of the null or "notch" are allowed to pass with no attenuation. The tuning control on the front panel varies the position of the peak or notch with respect to the i-f bandpass curve so that the desired station may be boosted or the undesired station eliminated. (See *fig. 1*).

Modifying the "Q" Multiplier

Coils L1 and L2 shown in the schematic of the "Q" Multiplier (*fig. 2*) are the principal frequency determining components. The coil values shown are for receivers with a 450 to 500 kc i-f amplifier. The 120-150 uh coil is the high "Q" coil that determines the position of the null or peak with respect to the i-f bandpass curve. The 1.5-3.0 mh coil is used to tune the reactance out of the cable that is used to connect the "Q" Multiplier to the receiver. When this cable is shunted across the i-f transformer winding in the receiver, the capacitive reactance will detune the coil seriously. L1 is adjusted so that it adds just enough inductive reactance to cancel out this effect. When changing the frequency range of the "Q" Multiplier it is necessary to change these coils and the capacitors associated with coil L2, to maintain the same L/C ratio. The author felt that it was better to replace these coils rather than modify them, in case the reader wanted to return the "Q" Multiplier to its original operation. The selection of filament voltage will be determined by the piece of equipment that the "Q" Multiplier is used with. If the unit is wired for six volt tubes, the filament circuit of the "Q" Multiplier should be wired in the following manner. The wire from pin 3 of terminal strip B is connected to pin 9 of the 12AX7. The wire from pin 4 of terminal strip B should be passed through pin 5 of the 12AX7 socket and then connected to pin 4 (don't forget to solder 'em). For a surplus receiver with a 12 volt filament circuit, make the following changes. Connect the wire from pin 4 of terminal strip B to only pin 5 of the 12AX7 socket (this can be accomplished by clipping the wire between pins 4 and 5). Remove the wire from pin 9 of the 12AX7 socket and connect it to pin 4 of the 12AX7 socket (pin 9 remains blank).

Modifying the Command Sets

I got quite a sensation when the "Q" Multiplier conversion was finished on an old 3-6 mc Command receiver. It was the first time that I ever heard a space between two phone stations on the 75 meter band. When the *Peak* knob was turned up, c-w stations down in the Novice band had the characteristic "selectivity ring" just as though the BC-454 had a crystal filter installed in it. Even with the great increase in selectivity, the stability of the Command set was still very good, it was not necessary to keep one hand on the knob as you might suppose.

The method of adding the "Q" Multiplier to the Command Sets is identical for all the various models. First, the mica socket on the rear apron was removed and the hole was filed out to accept a 1-3/16 inch 8 pin tube socket. Next, drill a ⅜ inch hole and two small 6/32 drill holes on the rear apron. A phono connector is mounted in the hole and the shielded connector from the "Q" Multiplier plugs into it. The rear apron layout may vary depending on your particular conversion, but generally, locating the connectors as shown in *fig. 3* should be satisfactory. After this has been accomplished, wire the connectors to the i-f amplifier and power supply as shown in *fig. 4*.

Those interested in real selectivity with the 85 kc "Q"5'er Command receiver (BC-453) will be interested in the details of the 85 kc "Q" Multi-

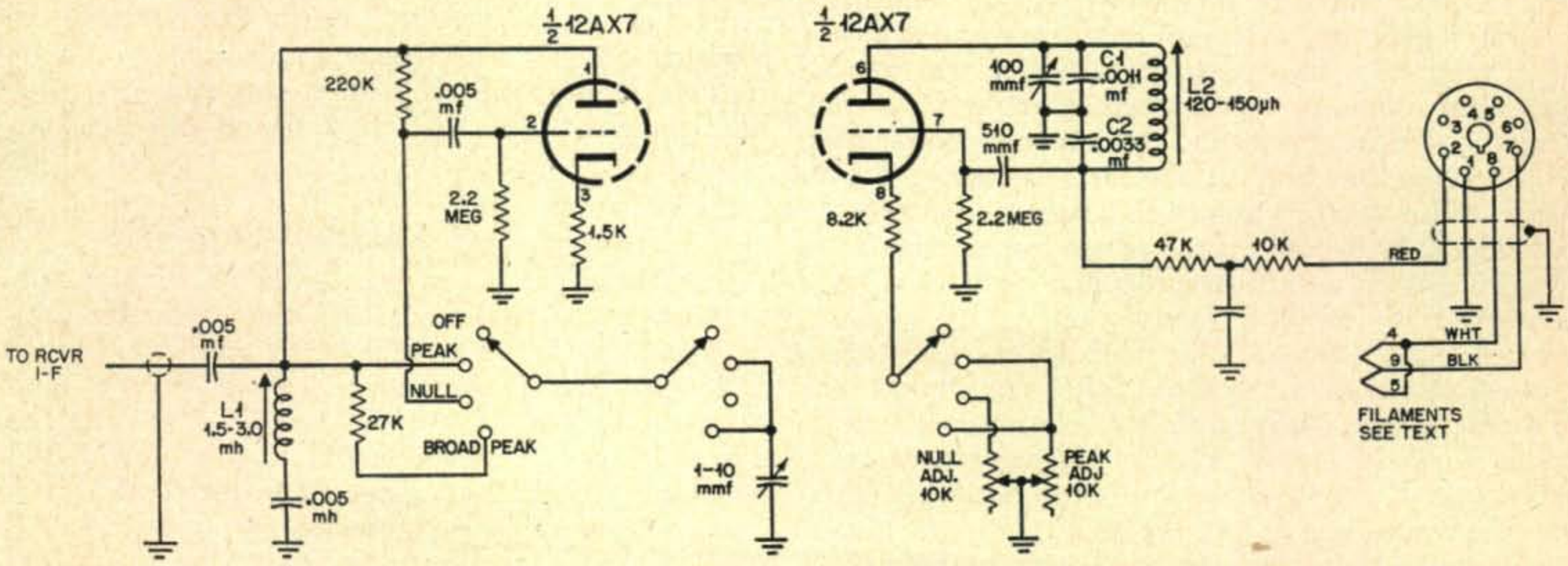


Fig 2—Schematic diagram of the Heath QF-1 "Q" Multiplier.

INTERMEDIATE FREQ.	COIL L1	PART #	COIL L2	PART #	C1	C2
85 Kilocycles	15 - 60 mh.	Miller # 6319	.5- 5 mh.	Miller # 6313	750 mmf	2000 mmf
235 Kilocycles	2.0- 18 mh.	Miller # 6314	245 -475 uh.	Miller # 4411	2000 mmf	6000 mmf
455 Kilocycles	1.5- 3.0 mh.	Heath #40-67	120 -150 uh.	Heath #40-68	1100 mmf	3300 mmf
915 Kilocycles	245 -475 uh.	Miller # 4411	68 -130 uh.	Miller # 4409	500 mmf	1500 mmf
1415 Kilocycles	68 -130 uh.	Miller # 4409	30 - 69 uh.	Miller # 4408	250 mmf	750 mmf
2830 Kilocycles	14 - 31 uh.	Miller # 4407	14 - 31 uh.	Miller # 4407	110 mmf	330 mmf

NOTE: All capacitors are silver mica, with 5% tolerance
uh.=microhenries
mh.=millihenries

Fig 5—Q Multiplier component chart for the various war surplus receiver I.F.'s.

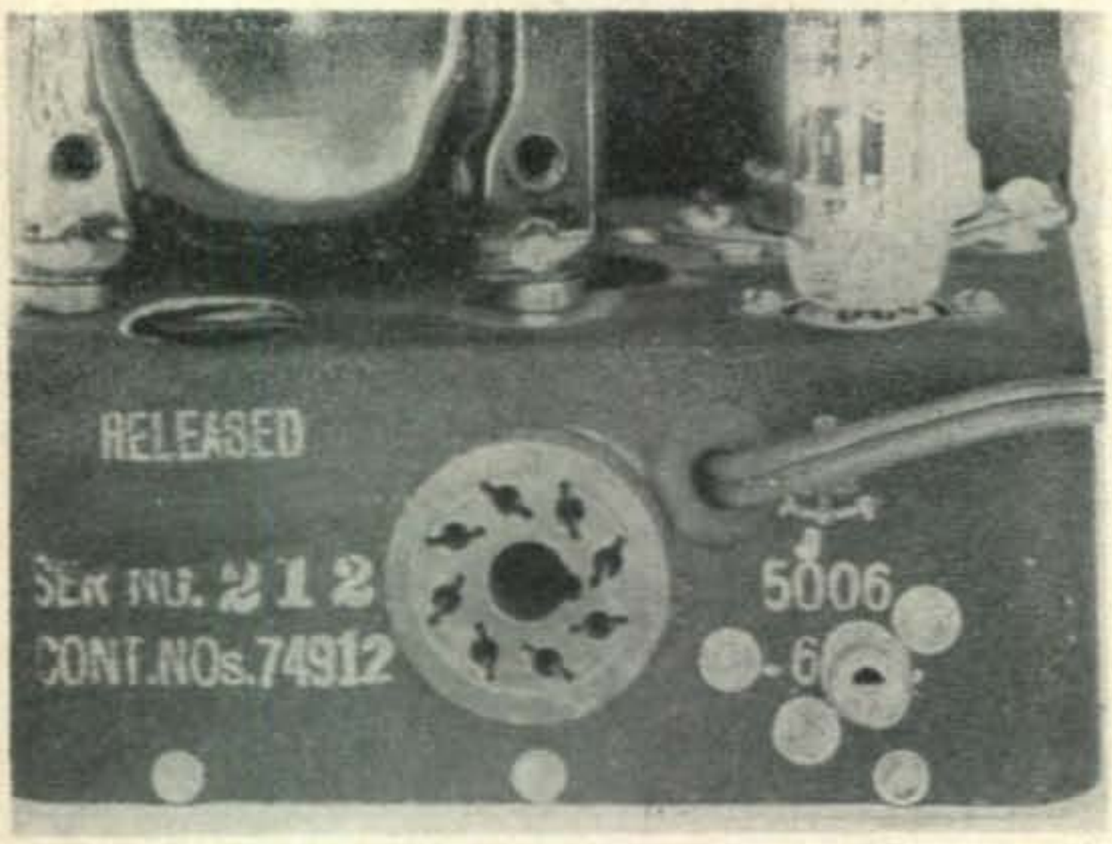


Fig 3—View showing the layout on the rear apron of a typical Command Set.

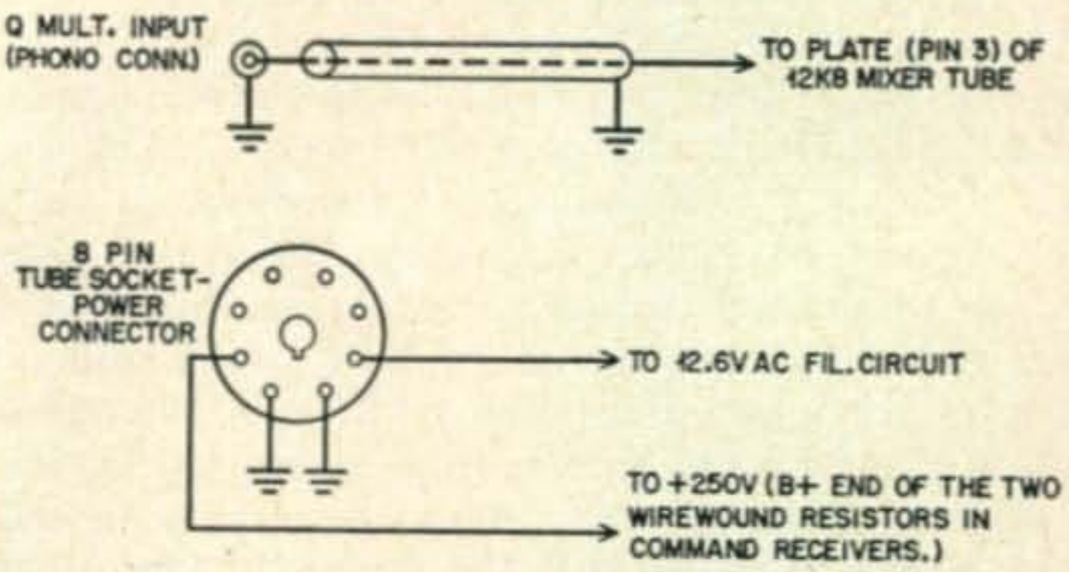


Fig 4—Connections to the Command Set receiver for incorporating the "Q" multiplier.

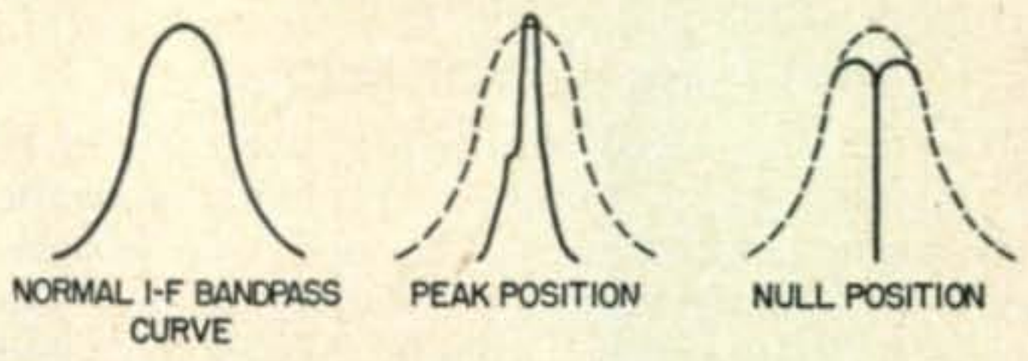


Fig 1—Typical receiver selectivity curves when using the Heath QF-1 with military receivers.

plier. The correct coils and capacitors can easily be determined from the component chart, *fig. 5*. As an example, for the 85 kc "Q" Multiplier, the component chart shows that a 15-60 mh. width coil would be installed to replace the original coil (L1). L2 is changed to a coil with a 0.5-5 mh. inductance range. Also, a 500 mmf and a 1500 mmf capacitor is substituted for C1 and C2 respectively. After the connectors are installed and wired and the QF-1 modified, the "Q" Multiplier should be given a "smoke test" and aligned as described under the paragraph titled *Adjustments*.

Conversion of the BC-348 and BC-312

The author was flushed with so much success with the Command Set conversions, that I decided to "press my luck" and try it on a converted BC-348 receiver. After some weeks of cajoling, W6JHQ was induced to bring his BC-348 around for the treatment. With some misgivings he arrived with the receiver and we promptly plunged into the task at hand. An aluminum bracket was installed in a relatively empty space between the dynamotor area and the adjacent coil compartment. An 8 pin octal tube socket and a phono connector was mounted on the bracket and corresponding holes were drilled in the cabinet to allow the cables to pass through. Because there are so many models in the BC-348 series it is difficult to give a "pat" conversion. In looking over the many 348 schematics, it was discovered that there are modifications such as placing the crystal filter between the mixer and first i-f while others placed it between the first and second i-f circuits. Quite a few of these receivers used a 6K6 audio output tube, while the one we worked on used a type 42.

Generally the following steps should be satisfactory. Locate the grounded filament pin of the audio output tube and connect pins 1 and 8 of the "Q" Multiplier power connector at this point. Locate the filament pin of the audio output tube with 6 volts on it and connect pin 7 of the power connector at this point. Next, locate the screen grid pin of the audio output tube and connect pin 2 of the power connector at this point. The i-f shielded cable presents somewhat of a problem. It will be necessary for you to ascertain the electrical location of the crystal filter unit. If the filter is located between the mixer and first i-f amplifier, connect the shielded phono connector cable to the plate of the mixer tube. However, if the filter is located between the first and second i-f stage, connect the shielded cable to the grid of the first i-f amplifier tube.

The addition of the QF-1 to the BC-348 gave the same results as with the Command Sets. Phone stations were easily separated and the c-w stations sounded like they had the whole band to themselves.

TCS and RAX-2 Surplus Receivers

The Heath QF-1 can be used in its original condition with the TCS and RAX-2 receivers for they both use 455 kc i-f amplifiers. In the TCS, pins 1 and 8 of the power connector should be connected to pin 2 of V-207 (12A6). Pin 2 of the power connector is connected to pin 4 of V-207 and pin 7 should be connected to pin 7 of V-207. The shielded cable is connected to pin 3 of V-202 (12SA7). It is necessary to rewire the QF-1 filaments for 12 volt operation for use with this receiver.

The RAX-2 (1.5-9.0 mc) receiver must have its filament circuit rewired for 12 volt operation to use the "Q" Multiplier. To incorporate it, connect power connector the same as in the TCS modifications. However, connect the shielded cable to pin 3 of V-203 (12K8). The QF-1 filaments should also be wired for 12 volt operation as in the TCS conversion.

Miscellaneous Surplus Receivers

RAX-1 and RAX-3 The RAX-1 receiver (200-1500 kc) uses an 80 kc i-f system. The power and i-f connections are made the same as the RAX-2 as described above and the components from the chart (*fig. 5*) are selected for 85 kc. The tuning range of the coils is sufficient to reach this frequency. The RAX-3 receiver (7-27 mc) uses an i-f of 1140 kc. The values shown in *fig. 5* for either 915 or 1415 should be sufficient to hit this "in between" frequency.

The ARB receiver (195 kc to 9.0 mc) is rather an odd one in that it uses two i-f bands. On bands one and two, a 135 kc i-f is switched in for maximum selectivity. On bands three and four, the ARB receiver uses an i-f of 915 kc to obtain the wide bandwidth that I spoke of earlier. Because the amateur stations appear on bands three and four, the "Q" Multiplier modified for 915 kc operation would be used. As with some of the other conversions, the ARB receiver must be modified for 12 volt operation. Pins 1 and 2 of the power connector are wired to pin 1 of V-106 (another 12A6). Pin 2 of the power connector connects to pin 4 of V-106 and pin 7 should be connected to 12 volt filament connection on the 12A6.

Obviously there are many more surplus receivers that have not been mentioned here. The brief descriptions of converting the more popular receivers for use with a "Q" Multiplier should give the reader an insight as to how his particular receiver could be converted. At this time, 3 mc seems to be the upper limit of i-f bands. Above this frequency things start to get unstable and the usefulness of the "Q" Multiplier diminishes.

Adjusting the "Q" Multiplier

As soon as the shielded cable is connected to the mixer plate or i-f grid, the shunt capacity of the lead will detune the corresponding i-f coil. The reactance coil (L1) in the QF-1 is used to bring the coil back to resonance, however, it means that the "Q" Multiplier must be left connected all the time or the gain of the receiver will suffer. To avoid this, peak up the primary or secondary of the i-f transformer that is associated with the connection to the i-f circuits. Since the shielded cable represents more capacity, it will be necessary to reduce the capacity or inductance of the i-f transformer, as the case may be.

Once the foregoing has been accomplished, plug in the "Q" Multiplier and place the function switch in the off position. You will note that when you plug in the i-f cable that the volume drops quite a bit. To bring the volume back up to normal, adjust coil L1 for maximum volume with a station tuned in. At this point the volume (and sensitivity) of the receiver should be about the same as it was before the cables were connected to the i-f amplifier. Next, place the function switch in the peak position. Again the volume will probably drop. This time, advance the *Peak* knob and adjust coil L2. As you approach resonance, the volume will increase and when you tune the coil to resonance, the "Q" Multiplier will break into oscillation. When this happens, you have "arrived." Switch the QF-1 to the off position and carefully tune in a station on your receiver, for maximum signal. Set the QF-1 tuning capacitor in mid-position and adjust coil L2 further until the station has reached maximum volume. Now, when you tune set the *Peak* control almost to the point of oscillation, stations tuned in on the receiver will have the "ringing" sound that is characteristic of high selectivity. You only need switch the "Q" multiplier on and off a few times to prove to yourself that the time spent on the conversion was well worth while.

The null feature is automatic when the "Q" Multiplier has been peaked correctly. To check its operation, find a heterodyne on a phone signal (that should not be too hard) and place the function switch on the *Null* position. Alternately adjust the tuning control and the *Null* control until the heterodyne disappears. This adjustment is a little tricky the first time that you tune a "Q" Multiplier for there are two places where the heterodyne disappears i.e. the frequency of the wanted station and the unwanted station. The first few times that the unit is adjusted you will catch yourself nulling out the wanted station! With a little practice you will be able to jockey the knobs with the best of them.

There is one change that may have to be made in the Heath QF-1. As the frequency is raised above the design center of 455 kc, the oscillator has less tendency towards oscillation. Therefore, if the "Q" Multiplier does not break into oscillation when coil L2 is tuned through resonance, it will be necessary to replace the 8.2K cathode resistor to a 1K, ½ watt resistor.

If the above adjustment instructions and those in the Heath manual are carefully followed, the reader should have no difficulty in modifying and using the "Q" Multiplier. When used with a military receiver the additional selectivity will contribute to user's operating pleasure many times over.

Surplus News

If you have been hording piles of surplus equipment, you might examine it carefully. Many surplus dealers are on the look-out for units such as the ARC-1, ARC-3, BC-788, APR-4, BC-221 and ART-13 to mention only a few. As you may know, the foreign governments purchase much of this equipment for their use. Some of the equipment is used by our airlines also. As an example, the ARC-1 multi-channel transmitter receiver is one

The Heath Model QF-1 "Q" Multiplier. The operating frequency of this unit can be easily modified for use with any war surplus receiver.

of the few military units that were approved by the CAA for commercial use. Actually, it is a glorified SCR-522 but because of its "type approval" it is in much demand. Some surplus dealers are paying as much as $300.00 for them. If you have any of this equipment, a quick scan through the ads in CQ Magazine will tell you who needs what.

New? Surplus

If the military runs true to form you might find a AN/PPS-4 in the surplus stores in a few years. The accompanying photo is a shot of the new "doppler radar system," built by Sperry Gyroscope. This highly mobile gear is self contained in a drum-shaped metal case, only 14 inches high and 14 inches long and it weighs 25 lbs. According to the government the Sperry radar set can reveal the difference between fixed and moving targets at ranges up to three miles. In the hands of trained ground operators, it also distinguishes a vehicle from moving personnel, and indicates whether a single vehicle moves on track-type treads or wheels. This is just what I need on my Volkswagen for those smoggy days in Los Angeles.

Letters to the Surplus Editor

This month, I received several SOS's from hams looking for information on surplus units. I was able to help a few of them from information in my stacks of surplus equipment schematics, but many requested information that was not on hand. As an example, Fred Marco, W9ZA writes the following:

"Do you know of any published information re that conversion to ham use of a Bendix ATD Aircraft Transmitter. It has a 28 volt d-c power supply, 814 final with plug in units from 500 kc to 15 mc. Has anyone ever made use of this rig? Fred. 1105 Jeannette Avenue, Des Plaines, Illinois."

Or maybe the readers can come to the aid of Ed Bujanowski, 21 Edward St. of Lancaster, New York.

"Recently I purchased a BC-AS 429 receiver. The company ran out of instruction books and I do not know how to operate, connect the voltage or headphones up. Maybe you readers have one instruction book that goes with this receiver that they do not need or are willing to sell."

How about it, can anyone help Ed out?

I was more successful with this one:

"I would greatly appreciate any information you can give me on the R1/ARR1 surplus receiver."

Arthur Lebermann, 116 Cortland Apartment 407, Highland Park 3, Michigan. An extensive article on converting this unit was printed in the January 49 issue of Radio News by Leroy W. May Jr., W5AJG.

William R. Deal, Piermont, New Hampshire sent us the information that he had built the SSB Q5'er and made the following changes:

"I built a converter similar to the one in your article—only using a 6AC7 and a 6J6, a product detector, the 3 triode type as described in "QST" for May 1956—the 4th triode being used for the BFO. I also added a switch and a crystal diode so I could use either the product detector for SSB and CW or the diode for AM. The product detector seems to be a much more sensitive device than the diode—I have to back the r-f gain way off when I use it and also, on c-w, it seems to produce the beat note on only one side of the carrier. It is fb on SSB too, but I do not like it too well on a-m, so I switch in the diode for that."

Better write it up for CQ OM, or I predict that you are going to receive an awful lot of mail requesting more information on this one.

A letter from Henry Stickler, 75-80 179th St.

The new Army doppler radar system, the AN/PPS-4 in action. This unit has an effective range up to 3 miles in any weather.

in Flushing 66, N. Y. wanted to know how to connect a noise limiter to the ASB-5 that was converted à la CQ (October 56). I advised him that a simple method of installing a noise limiter was to disconnect the resistor R105-2 from pin 5 of V103 (6H6) and connect pin 5 to the grid (pin 4) of the 6AG7 audio output tube. The diode will then clip most of the noise pulses from the signal. However, if a more elaborate noise limiter is required, I would suggest that you get a copy of the CQ Mobile Handbook and incorporate one of the circuits presented there.

Dear OM: I went thru back issues of CQ, etc, even contacted some companies that had advertised BN's some time back. No luck. Where can I buy BN-1 converters for the price of a carton of cigarettes—or more?

This may give you a laugh. During WWII, while in the BuShips, I initiated the original procurement for $8,900,000.00 worth of BN equipment for Farnsworth. I never "liberated" one for myself. I don't know if that attests to my honesty or stupidity! Hi. Cordially, Walter M. Clevenstine, W3CUO.

Obviously you are an honest man, Hi. Rather than turn this column into surplus advertisements, a post card sent to me will bring the name and QTH of the surplus dealer with the best price on equipment used in the Surplus Column. Walt has been advised and by this time should be on 2 meters with the BN converter.

Dear OM: I saw your article in CQ on the Q5'er and have intentions of building same. I would like to ask you if the antenna coil and the r-f coil for 2100 to 6300 kc will tune to resonance on the 40 meter band? It seems to me these coils should be able to go as high as 7300 kc. Evidently the dual section 365 mmfd variable capacitor compensates for this. Thanks a lot OM and best of 73's and DX. Gene Manning, W5FZQ

Just as you suspected, the coils will work fine business on the 40 meter band. Actually, with the capacitor at minimum capacity and the coils tuned for minimum inductance, it is possible to receive 8.5 mc with the proper crystal.

Dear Don: I intend on buying an ASB-5 receiver and converting it per your article in October, 1956 CQ magazine. I have been scanning the surplus ads in past issues of CQ etc, and haven't had any success in locating a dealer who sells GL-446 uhf triodes used in the ASB-5. Would you please send information as to where I may obtain the GL-446's. Thank you. Arnold J. Carmody, K2BZC

In our travels, we located a source of GL-446 lighthouse tubes at 4 for a buck. If anyone else needs any, drop me a line.

Dear OM: I have recently acquired an R-28, ARC-5 surplus receiver, (100-156 mc) and would like to convert it for use on the 2 meter amateur band. Also, I would like to get a circuit of the unit as it is wired now. I trust you will have some helpful information on this matter and will look forward to an early reply. Al Brown, VE3DSM

Sorry to disappoint you, but I do not have any dope on this popular rig. Possibly, if I am prodded a little I can work out a conversion of this unit. Any takers? Incidentally, it should be possible to make a 10, 6, 2, and 1¼ meter band switching rig out of this because of the coil turret.

Dear OM: I must compliment you on your Novice Q5'er. I am very pleased with it. But, there are two things that I miss that were on my other receiver, the r-f gain control and a c-w pitch control. Could you draw me some schematics on the above items? Hope to hear from you soon. 73's George Ashby, KN9DXG

They have been there all the time only you did not recognize 'em. The gain control on the front panel is actually an r-f gain control and not an audio volume control. The c-w pitch control is located around on the right hand side of the Q5'er, near the rear of the chassis apron. Thanks for the kind words.

Dear Don: We have completed the 85kc "Q" multiplier in the September issue of CQ. We thought the Q5'er was sharp, but with that "Q" multiplier on there, I don't think anything can beat it. It is the only thing we have found that will cut through the SSB signals and copy 40 phone around 7215. Every thing works just as you said. We did make one change after using it a couple of hours and that was to change the switch from Peak-Off-Null to Off-Peak-Null, because of the rise in receiver volume when going through the off position. Our receiver is a 1937 Howard 450. Very truly yours, Benjamin L. Covert, W9PAK.

Thanks for the bouquets, I am about to break my arm, Hi. The reason for the volume change appears to be the loss in high frequency audio which is attendent with additional selectivity. Don't forget, the purpose of the SSB Q5'er is to receive SSB signals, not to get rid of them, when do you get your SSB exciter, Hi.

Dear Mr. Stoner: I have a problem. How stable is a converted APN/4 scope when used on the radio-tv service bench? Respectfully, Robert E. Riddle.

Afraid that I can not be of much help to you. I do not know of anyone that has had enough time or nerve to convert an APN/4 to an oscilloscope.

Dear Mr. Stoner: I have a 13 tube 46ACJ, uhf radio receiver. I have just finished your article in the October CQ. I desire to receive the Citizens Radio Phone band, on 460 to 470 mc. Will I have to make additional changes in my ASB receiver? Respectfully, Harold Otis.

No, the article is still correct for a citizens band conversion. However, rather than adjusting the local oscillator for reception of 420 signals, it is necessary to adjust if for 460 using the same procedure as outlined in the article.

Dear Don: Have been studying your article for quite a bit—your explicit directions make it sound so easy to construct, however—there are quite a few questions that arise. Will this Q5'er operate to 100% efficiency with an S-20R Hallicrafter receiver. If not what modifications would have to be made? Does the performance surpass the Heath "Q" multiplier? Should I use a converter ahead of your multiplier (as I interpret your article a converter would not be necessary—right or wrong?) What 6 volt tubes could be used to replace the 12 volt tubes? Lot of interrogation, eh Don. However, they are not idle questions, I really want to know. Sincerely, Ward Powell, W3IMT.

Dear Ward: No trouble at all, that's what we are here for. First of all, I am not quite sure what you mean by 100% efficiency. The Q5'er will work fine with your S-20R by feeding the output (from the last i-f can) to the antenna jack on the BC-453. However, with the additional selectivity, you will discover that the S-20R will drift somewhat. It may be necessary to make the crystal controlled converter. It is difficult to compare the 85 kc "Q" multiplier with the Heath model, for they are on different frequencies. However, if the Miller width coil was installed in the Heath "Q" multiplier, I see no reason why it will not work as well, possibly better. You will not need the crystal controlled converter, unless the S-20R drift is excessive. Last but not least, you can replace the 12K8 with a 6K8, the 12SK7 with a 6SK7, the 12SR7 with a 6SR7 or 6SQ7 and the 12A6 can be replaced with a 6K6 or 6F6.

Dear Mr. Stoner: Would you please send me or publish in your next column in CQ, how to change a BC-458, 457 etc. to operate on a-c. In other words a conversion. Yours very truly, U. D. Bryant.

Dear OM: One of the best articles on converting the Command Set transmitter to a-c operation appeared in the Command Set Round-up in the Feb. '54 issue of CQ. I do not think that I can improve on it, Hi. In a few months a conversion manual for all Command sets will be available from CQ for about a dollar.

73, Don, W6TNS

NOVICE

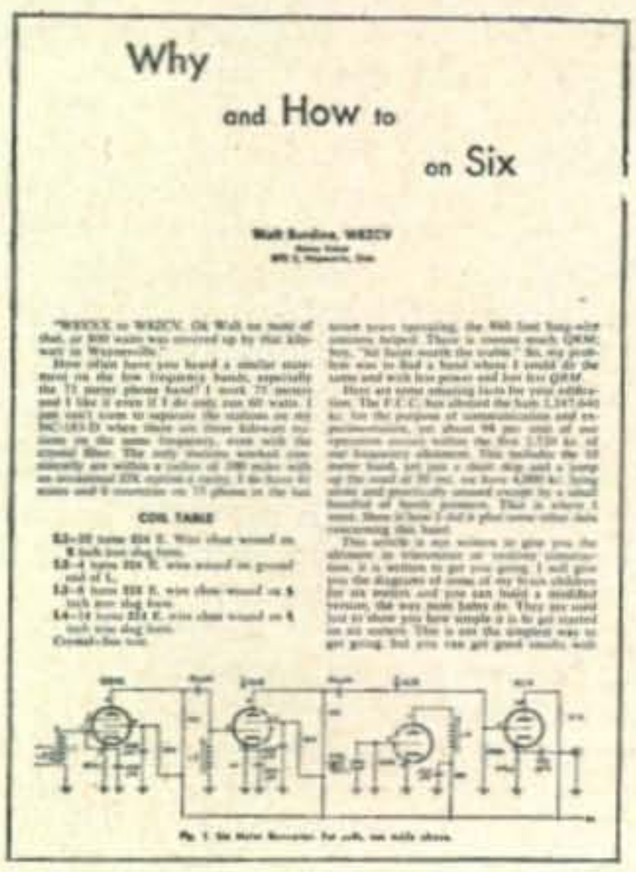
Walt Burdine, W8ZCV
Waynesville, Ohio

Due to circumstances beyond my control I am turning over the writing of *Novice Shack* to Mr. Donald L. Stoner, W6TNS, Box 137, Ontario, California. Many of you will remember Don's excellent articles on converting the war surplus v-h-f equipment that have appeared in CQ over the last year or so and I wish to express my wishes for a long and successful term as editor of *Novice Shack*. It is my wish that you will help Don as much as you have helped me. Thank you and Good Luck, Don.

At the same time I would like to express my own thanks to all of you that helped me to keep informed of your wishes for articles in my column. I might say that Idaho was the only hold-out state on letters to *Novice Shack* while I was editor. Doesn't Idaho have any Novices or don't any of the Novices there have a problem? Letters were received from 22 countries. Thanks to everyone that took the time to write.

I will not be writing for any other magazine, but I will be reading *CQ* and *Novice Shack* for a long time yet I hope and watching for what you are doing. I really believe in the Novices and Technicians. I'll see you on the air.

Six Meter Article Reprint



Why

and How to

on Six

Walt Burdine, W8ZCV

"W8ZCV to W8ZCV. Oh Walt no matter of that, at 800 watts was covered up by that kilowatt in Waynesville."

How often have you heard a similar statement on the low frequency bands, especially the 75 meter phone band? I work 75 meters and I like it even if I do only run 60 watts. I just can't seem to separate the stations on my NC-183-D when there are three kilowatt monsters on the same frequency, even with the crystal filter. The only stations worked consistently are within a radius of 200 miles with an occasional DX station a rarity. I do have 61 states and 6 countries on 75 phone in the log

COIL TABLE

L1–35 turns 22d T. Wire close wound on ¾ inch iron slug form.
L2–4 turns 22d T. wire wound on ground end of L.
L3–6 turns 22d T. wire close wound on ¾ inch iron slug form.
L4–14 turns 22d T. wire close wound on ¾ inch iron slug form.
Coaxial-See text.

Fig. 1. Six Meter Converter. For coils, see coils above.

never were operating the 800 foot long-wire antenna helped. There is waaaay much QRM, here, "ist leicht wurth the trubble." So, my problem was to find a band where I could do the same and with less power and less less QRM.

Here are some relaxing facts for your edification. The F.C.C. has allotted the bars 1,347,840 kc. for the purpose of communications and experimentation, yet about 98 per cent of our operators remain within the first 1,710 kc of our frequency allotment. This includes the 10 meter band, yet just a short skip and a jump up the band at 50 mc. we have 4,000 kc. being silent and practically unused except by a small handful of hardy pioneers. That is where I want. Here is how I did it plus some other data concerning this band.

This article is not written to give you the ultimate in transmitter or receiver construction, it is written to get you going. I will give you the diagram of some of my brain children for six meters and you can build a modified version, the way most hams do. They are used just to show you how simple it is to get started on six meters. The is not the simplest way to get going, but you can get good results with

Parts list for power supply on page 67

L L—16T—No. 16 enamel wire ½ in. diameter spaced 1¼ inch.
Ch—10 hy 75 ma filter choke AC-DC type.
C1—.005 mfd—600 ceramic disc condenser.
T1—600 volts CT @ 50 ma. 6.3 volts @ .2 amp and 5 volts 2 amps. I used Utah Y650—
T2—12 volts 2 amp CT. Stancor p.-8130—

The six meter article by me in the November 1955 *CQ* has been made available by *CQ* as a reprint. You can obtain your copy by sending a self-addressed, stamped (large size please) envelope either to me, Walter G. Burdine, W8ZCV, Waynesville, Ohio or to *CQ* at New York.

Novice Net Information

Dave Angel, KN8BDZ, 807 Washington Street, Marietta, Ohio says that any that is interested in joining the Ohio Novice Net and getting it going should contact him for particulars. Dave says that he will also be on six meters very soon with a Globe Scout (November and December *CQ*) a five element beam and a converter for his RME will complete the set-up.

The Hellgate Radio Club will be giving code and theory classes for those interested in getting their Novice licenses. Contact the City Recreation Department of Missoula or Chuck, WN7EJY, 234 Beverly, Missoula, Montana for information.

Dave Reinhart, KN8BPX, 1925 Madison Avenue, Cincinnati 31, (Mt. Healthy) Ohio announces the formation of the Northern Hills Amateur Radio Club of which he is the Activities Manager. The primary purpose of this club is to arouse more activity in amateur radio in this

Chuck, KN9EIN, 4625 South Richmond Street, Chicago 32, Illinois has no trouble keeping his rig warm. Chuck runs 75 watts to a 6146 oscillator, his receiver is an SX-100. The antenna is a 40 meter folded dipole 35 feet high. Chuck would like to get on two meters.

area. The club will give code and theory classes for the help of would-be amateurs in the Greater Cincinnati area.

Operating Note

It has been called to my attention that there are many amateurs that are operating their stations without strictly adhering to the rules and regulations of the FCC. This could cause you no end of embarrassment and possible loss or suspension of your license, also that of the offending operator.

If your friend is awaiting his license and has his station set up just waiting for the call, it is illegal for you to operate that station and sign your call as a portable. Example: If I go to Bill's house and find that his call has not arrived from the FCC it is illegal for me to operate his equipment and sign W8ZCV portable 8. Bill and I are both in danger. Bill's location and equipment are not licensed as yet.

A Technician licensee can not operate the station of a Novice licensee.

The Technician licensee can talk on the two meter station of a Novice station but can not use the key of that station because operating the key is turning the transmitter on and off, therefore operating the station.

It is permissible for the Technician licensee to operate the station of a General class licensee ONLY to the extent of the Technician license.

The amateur that permits the operation of his station by improperly licensed personnel is just as liable to action by the FCC as the operator.

Let's all read and understand the rules and regulations of the FCC to save ourselves embarrassment or trouble with the FCC. If we have too many infractions of the rules, we can expect more stringent and restricting ruling from the FCC. Watch your step, watch the steps of your neighbor ham, help him to understand the rules.

Carolyn Cardosa (14), KN6ULC, Route 1, Box 146, Holtville, California would like skeds with KN5 and WN7 stations. Her rig is a Globe Chief, a Hallicrafters S-38-D and a 40 meter long-wire antenna. Her frequency is 7,160 and 7,180 kc. There won't be any trouble working them with that rig, Carolyn.

Error In Diagram Wiring

The printer's gremlin crept in and changed the schematic for the six and two meter converter diagram on page 52 December CQ while he wasn't watching. The switch that changed the B plus voltage should be wired to apply the high-voltage to the i-f stage at all times, not just when it is on six meters as shown. Just lift the connection from coil L-5 and place it on the B plus post on the switch, then B plus will be applied to the i-f stage at all times.

Hint of the Month

Every station visited lately has a dog-eared logbook lying on the operating table. This log book usually contains all of the pertinent data for the station, but that dog-eared log does not add to the appearance of the station. Just take an ordinary paper clip and clip the pages of each corner together and your troubles are over. A clip at each corner keeps the log book flat on the desk and prevents the pages from curling.

Six Meters

I will be looking forward to contacting some of you to whom I have sent reprints of the six meter article to finish out my 6 meter WAS. Also to you in other countries to whom I have sent these reprints don't think that you won't be able to work Waynesville just because of the low-power, VP7BI on Grand Bahamas was 5-9 here and he was running a *Gonset* Communicator with a folded dipole 90 feet in the air. Conditions, not power dictate the distances to be worked on six meters. Oh yes, power does help, but is not the only thing that affects the ability to work DX on six meters. Put up the best antenna that you can afford, match it to your transmitter and receiver, get it as high as is practical and you

David Horbachuk, KN1ACC, 242 Oak Street, Waterbury, Connecticut owns this nice rig. He will sked. The rig is an AT-1 feeding dipole antennas on 40 and 15 meters. The receiver is an NC-98. In two weeks Dave has had 37 QSOs in 15 states.

will work out with low-power. I will be watching the six-meter band for any opening this winter and all next summer.

There is now plenty of six-meter activity in most all of the larger cities and the trend toward six is rapidly gaining momentum. A letter from K4GXZ, Nashville, Tennessee tells me that there are about 50 hams on six in that area. If you tune over the band and don't hear a CQ there, put out one of your own, maybe he is also listening. Call all four points of the compass and listen carefully, it will pay off in more good solid QSOs. C U on 6.

New Equipment for the Novice

I have just finished building the new Model AC-1 Novice transmitter put out by The American Electronics Company (Ameca) 1203 Bryant Avenue, New York 59, New York. This small transmitter has built-in power supply and features a nice key click filter to reduce interference to televisions in the neighborhood. It is small enough to place on top of the receiver and not look at all bad there. I built it completely in about three hours (I'm sure you can beat that time) and it worked the first time it was turned on. The signal was clean, no hum or key clicks. It sure looks like a nice buy for the low price of $16.95, less tubes and crystal. The power output approached that of the AT-1 and you should be able to work out very well with a good antenna. I tested it as a driver for the r-f amplifier described in the following paragraphs and it delivered far too much drive for the pushpull 1625's. I was able to get 14 ma. grid drive on 40 meters and 16 ma. on 80 meters; this was more than twice the grid drive required for full output of the final. You won't be wasting your money if you buy the kit and build it up for your Novice days.

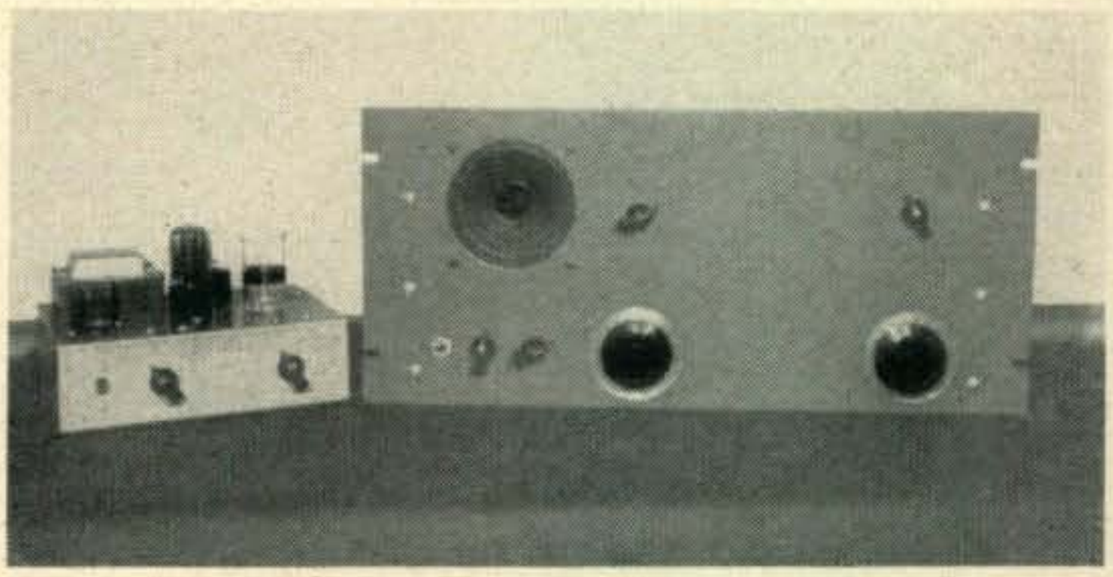
Here's Your Final Amplifier

Numerous requests have been received for an r-f amplifier to increase the power output of the popular low-power Novice rigs. Well, here it is. I have been using this amplifier circuit in my home station for about four years and have had very good luck with it. I drive it on all bands (80 to 10 inclusive) with a *Meissner* EX Signal Shifter with plenty of excitation to spare. It has helped to account for 109 countries on phone.

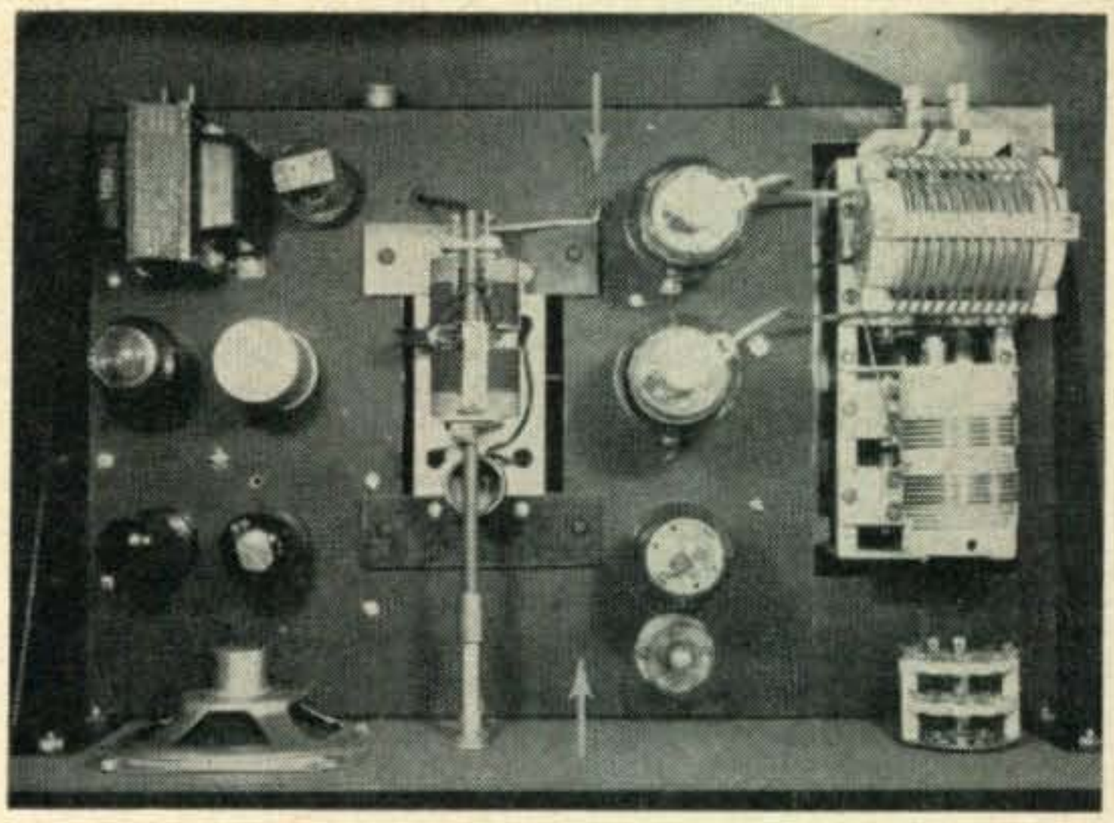
This amplifier can be driven by most of the transmitters now in use by Novices. Some of the requests list The *Knight*, *Hart*-25, *Heathkit* AT-1 and other small transmitters with powers ranging from 6 to 25 watts output. I know it can be driven by the *Ameco* AC-1. Drive to the grids of the 1625's can be adjusted by the swinging link.

Circuit Details

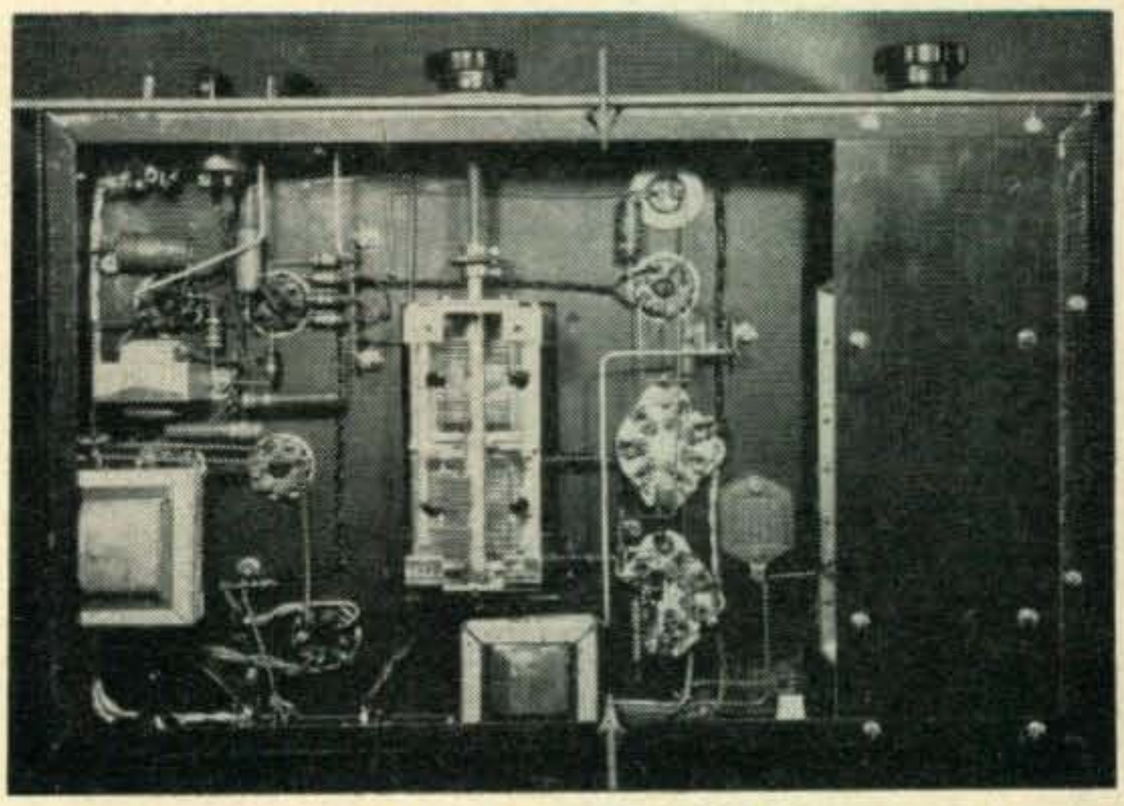
The only unconventional items in this amplifier are the *National* multi-band tank circuits and the built-in c-w monitor, the rest is conventional circuitry. The "all-band" tank is designed to tune through two different frequency ranges without any switching what-so-ever. Both of these tank circuits tune two ranges: 3.4 to 10 mc and 12.3 to 35 mc. Tuning any of these frequencies is accomplished by simply turning the control knob. No coil changing or band switching is necessary. The Tank is tuned to two different frequencies at each setting of the tuning capacitor as shown on the chart accompanying the tank. These two frequencies are not harmonically related. The 3.4 to 10 mc range is tuned in the conventional way with 3.4 mc near the maximum capacity setting of the capacitor and 10 mc near the minimum. The 12.3 to 35 mc band is tuned in the same



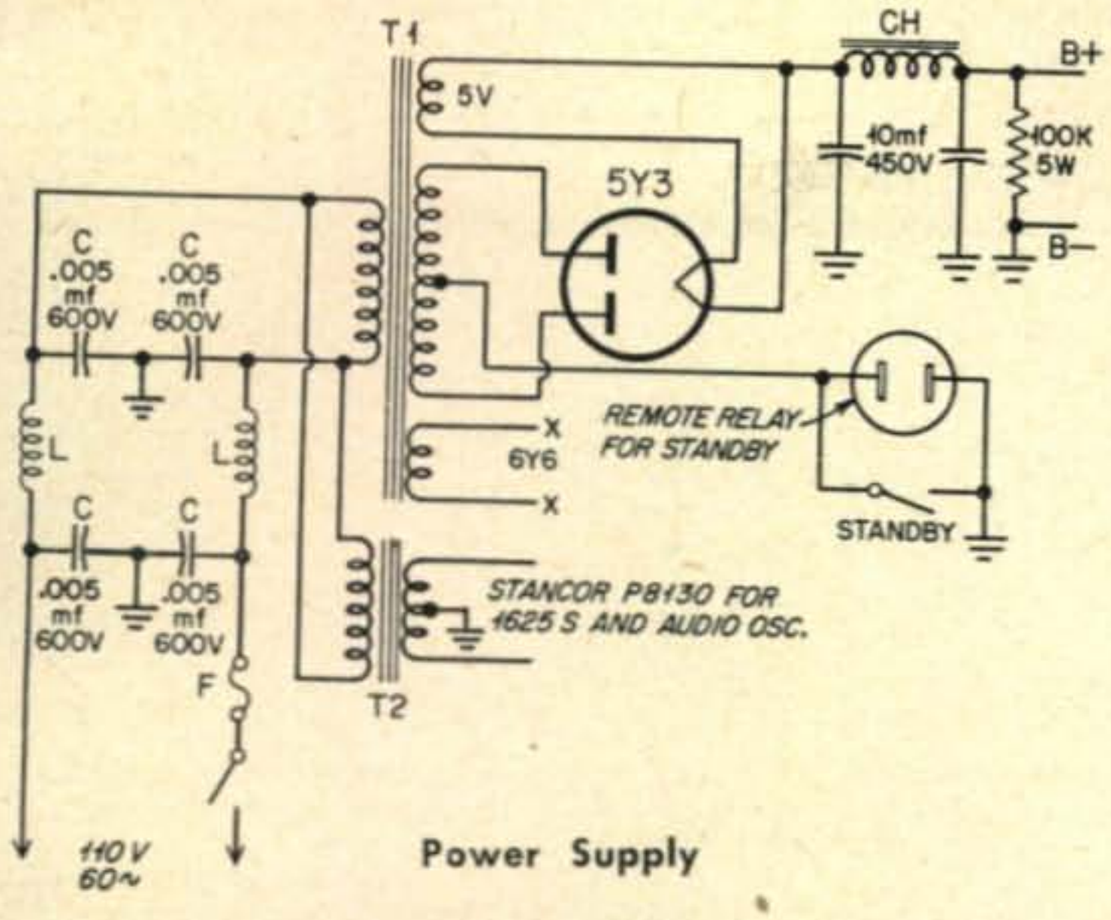
Front view of pp 1625 final. It can be driven by the Ameco AC-1 (left) on 80 and 40 meters.



Top view of final using pp 1625s. Shield should be placed between arrows to top of panel. Note cut-out for tank circuits used to save panel space.



Bottom view of pp 1625 final. Place shield in space indicated by arrows.



Power Supply

manner with 12.3 mc near the maximum capacitor setting and the 35 mc near the minimum. Tune the tanks for maximum plate current dip or maximum grid current peak. I would suggest that you check each setting with your grid dip meter and put a chart on the panel (as I did) or possible color code your bands. These tanks will tune to harmonically related frequencies just the same as any other coil-condenser combinations. No neutralization was found to be necessary. If it is found to be necessary in your model, neutralize the final in the conventional way.

One of the reasons for some of the poor c.w. that we hear on the air these days is that we fail to monitor our sending. A built-in monitor was used for that purpose in this unit. The 12SN7 tube was used as a multivibrator oscillating in the audio range and deriving its plate voltage from the screen of the 6Y6 clamp tube through the NE-32 neon bulb. The tone of the audio oscillator is varied by the potentiometer in the grid of the 12SN7 and the output is amplified to loud speaker volume by the 12A6 amplifier stage. The 6Y6 clamp tube provides protection to the final tubes by controlling the screens of these tubes during key-up periods.

This amplifier can be run at voltages ranging from 300 to 750 volts, thus giving us a wide range of power output. For the Novice the recommended power can be obtained by running 500 volts at 150 ma., this gives the maximum power allowable to the Novice. 150 watts on c.w. and 120 watts on phone are the recommended maximum given by the tube manufacturers. Other tubes that will work without circuit changes are the 6146 and the 807. Neutralization and parasitic oscillations might be encountered by using these tubes but they can be overcome in the conventional way.

Construction

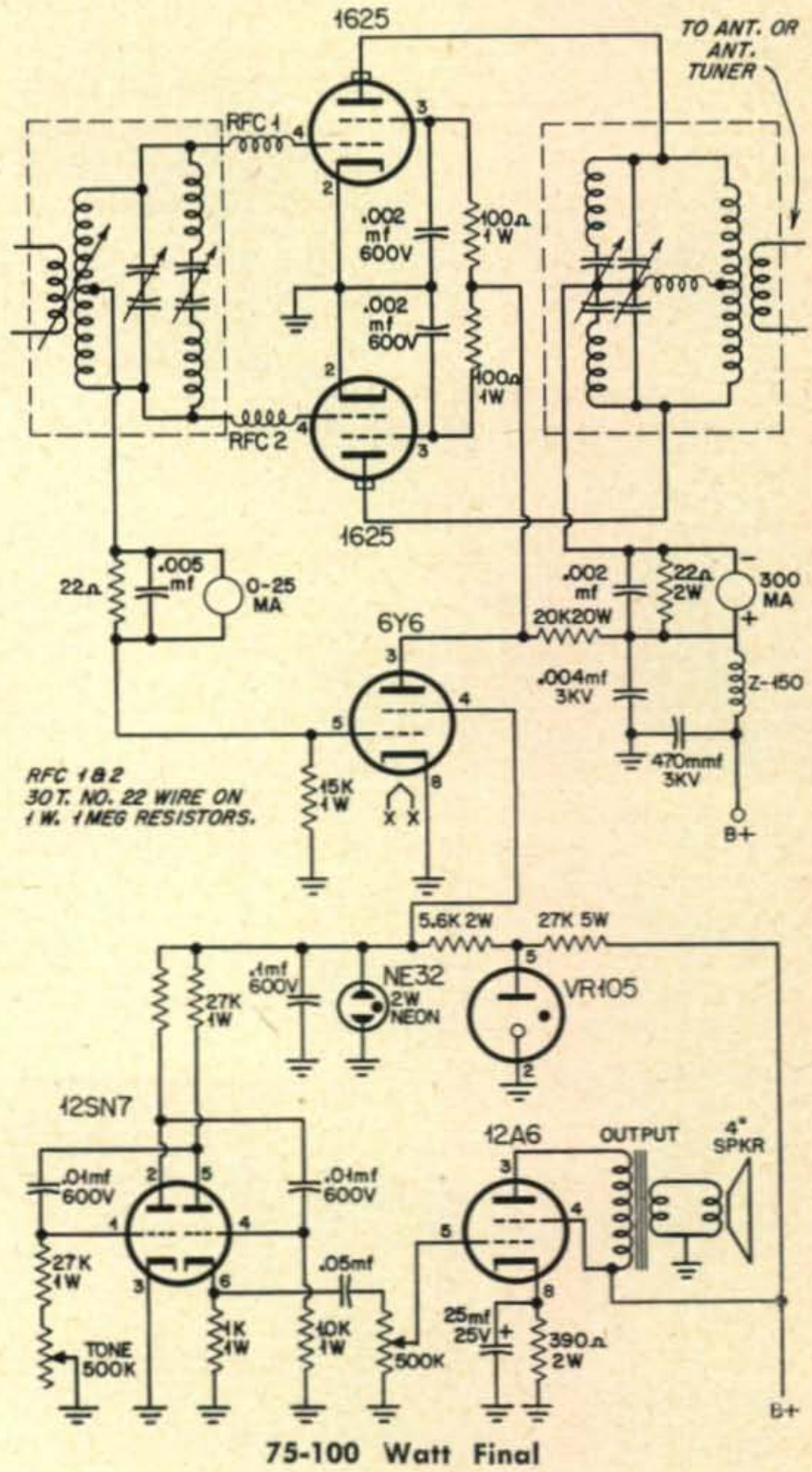
The three accompanying photos show the layout and wiring. Please note that a shield was used as indicated by the arrows on the photos. This was found necessary to prevent magnetic coupling between plate and grid circuits. These shields were made of aluminum and filled the space completely.

The switch shown near the plate tank is to be used to switch in the different antennas that will be used with this final. Incidentally the output link will match impedances from 52 to 600 ohms.

Use care in layout and soldering and I'm sure that you will have a unit that you will be proud to show your friends. The cost of the *National* Multi-band tanks will be off-set by the ease of changing bands and by the fact that you will not have a table full of coils lying around. The coils for each of the 5 frequency ranges for both grid and plate circuits and the condensers to use with them will cost as much or more than the *National* units.

Using the Final

This final is a joy to use and as I am using the *Meissner* EX signal shifter I can change bands as quickly as I can on my receiver. I use the antenna from the March 1954 *CQ*, page 18 for all bands except 15 meters. On 15 meters I switch in a three element beam. I worked New Zealand three times lately with the all-band antenna and 54 watts to this transmitter. I use pushpull 1625's as modulators. No trouble should be encountered,



75-100 Watt Final

but if you have difficulty, use your handbook and apply any of the remedies for that trouble described therein. Good luck in building this unit.

73, Walt, W8ZCV

Letters

This letter is typical of many that have come to me over the past few months and I am sorry that there is nothing I can do about it except to tell you that the best I can tell you is to read the comments about general conversion of the popular low-price transmitters to six meters at the beginning of the article on the Globe Scout. Most small transmitters have the oscillators at the fourth harmonic of a 7 mc crystal and operate the final r-f amplifier as a straight amplifier. Others operate the oscillator on the second harmonic and use the final as a doubler to ten meters.

In converting your transmitter to operate on six meters, you will operate the oscillator on the third harmonic of an 8.35 (or up) mc crystal and double in the final to six meters. Use a crystal multiplier of six to get the six-meter frequency. You might get more output by using a 25 mc crystal and using a multiplier of two to get on six meters.

Joseph A. Sah, 409 South Lehigh Street, Baltimore 24, Ohio, writes:

Dear Sir: On putting the AT-1 on six meters, how about the Viking Adventurer? I believe there are quite a few more Adventurers on the air than any other rigs according to the rigs listed on my QSL cards. I sure would like to get him on six meters. 73 . . . Joseph.

Ellis, W7BEC, Route 2, Box 186, Bothell, Washington comes through with this father-son letter.

Dear Walt: Just a few lines to let you know the set-up here at W7BEC/WN7CIN. I have passed my General the first time I tried for it, and my Dad, WN7CIN will probably be W7 by the time this is published.

The rig here is a DX-35 with a borrowed VF-1. Receiving duties go to an SX-71. I have two antennas, one an 80 meter full-wave center-fed and the other is a one element beam for 15 meters. I soon hope to make this into a 3 element beam.

I like working DX the best of all and I have worked ZL2, GM3, KL7, KH6, VO6, FA8 and 35 states as a Novice with a crystal for 21,108 kc.

I would like a sked on 15 meters with Alabama as I have all of the Southern states except Alabama.

That's it from the Evergreen state, Walt. 73 . . . Ellis, age 15.

Can *Novice Shack* help in a situation like this as told to me in a letter from Jim Crump, Jr., (20), KN2RYP, 728 Winsor Avenue, Elmira, New York? Jim writes:

Dear Walt: Well, I see lots of letters in your column from my state, but decided to write to you anyhow. You see, we seem to have a problem of a bootlegger. Both the FCC and I are trying to track down this station. I hope some Novice has worked this illegal station and can give me some information about him. He gives the name of Ed and his QTH as New York only, I always give my full QTH. (*Come on fellows help Jim if you can.*)

The rig here is a Viking Ranger feeding a 137 foot off-center fed long-wire antenna. The receiver is an NC-300. I have worked 33 states, ON-4, KV-4, KZ-5, TI-3, PAØ, G-3 and a VE-3.

73, Jim.

Don Birch, KN9ESC, 202 Sixth Street, Winchester, Indiana writes:

Dear Walt: . . . Max Holland, KN8AMV/K8AMV, 126 Orange Street, Urbana, Ohio is very pleased with my conversion articles on the popular low-power transmitters but says that the DX-35 can be used on six meters without any conversion. This is his method: Plug an 8,500 kc crystal in the crystal socket, set the band-switch on ten meters, antenna tuning at 0, and final set for dip. Drive set for maximum and "presto" you are on six meters. Now check to see that you are on six meters only. I was loading into a 40 watt light bulb and it will glow at about half brilliance. The final is loaded to 120 ma and the grid is about 1½ ma. This will be an easy way for you to get on six meters without any expense except that of the crystal and you have to have that anyway. I have not tried this as I have no DX-35. (*Thank you Max for the letter, that is what we need, more people helping to get the high-frequency populated, not just leaving it to George.*)

Ed Engel, KN2RIS, P.O. Box 34, Lewiston, New York writes.

Dear Walt: I have been following your column closely and I think it is tops. I enjoy the helpful tips and the news of the other hams.

I am 16 years old and in the 11th grade. I have had my ticket since February 6th. I did not get on the air regularly until about a month ago.

Dorothea A. Gelineau, KN4LEU, 425 Falcon Avenue, Miami Springs, Florida says if OM W4LEQ doesn't help her get the General he will eat burnt toast and she will steal the 807 from his rig. Dotty says he is a good instructor. She operates 15 meters

The rig here is a Johnson Adventurer running 40 watts to a 65 foot three band vertical. The receiver is an NC-125. I have worked 20 states. I would like to thank all of the members of the Niagara Radio Club, they sure helped me get my ticket. 73, Ed.

Donald Simonsen, Box 313, Yelm, Washington writes this note.

Dear Walt: I haven't seen Washington State represented in your letter column for some time. I read the *Novice Shack* every month, and I think many thousands of hams have you to thank for your contribution by writing articles that the small fry and "dumbbells" can really understand.

I am waiting on my WN7 call and in the meantime I am building a DX-35. How about some dope on the DX-35? I have an NC-88 receiver. I'll be working 15 meters and two meters. I have a pair of two-meter walkie-talkies for two meter C.D. work.

I am a member of the Olympia Radio Club. 73, Don.

Chuck Munce, KNØGJX, 2530 South Phillips

and Steve, KNØGWJ, 222 North West Avenue, Sioux Falls, South Dakota, write this letter.

Dear Walt: Every time we get hold of a *CQ* we head for your Novice column.

We both have been on the air for about three months. We both operate 15 meters almost all of the time but do go to 40 meters occasionally. We will sked anyone needing South Dakota for WAS.

Chuck's rig is an Adventurer running 50 watts to a 40 meter dipole. His receiver is an NC-98. He has 25 states and 5 countries.

The rig in my shack is a DX-35 running 65 watts to a 40 meter dipole. The receiver is an S-40-A with a QF-1. I have worked 36 states and WL-7. 73 . . . Chuck and Steve.

Jim, W8BZY, Chapmanville, West Virginia solves one of your little problems with this letter.

Hello Walt: I am writing to tell your readers that have the S-38-A, -B, -C, -D that they can put in a stand-by switch that will cut out the noise of their own transmitter while they are transmitting. A SPST switch can be put in or a little rewiring can be made to use the stand-by switch in the receiver. The switch is put between pin 8 of the 35Z5 rectifier and R-18. When the switch is put on stand-by only the filaments remain on.

Well I'll say 73 for now Walt, what do you think of my idea? It works fine for me. 73 . . . Jim.

More advice to the new Novice comes from Harold F. MacDonald, KL7BEV, Box 593, Kodiak, Alaska. He says.

Dear Walt: Please tell the fellows not to retune their rigs after they answer a call. Also when working westward on 15 meters they receive better than they are heard, so sign their call twice (their antenna may not be as good as the other ham's antenna either). 73 . . . Mac.

I have been listening on the Novice bands and notice that a lot of the Novices are calling CQ about 15 to 50 times and then signing their call two or three times and then very sloppily so that it would be hard to decipher the call. When a fellow ham comes back to your CQ it is not necessary to repeat his call three times followed by two or three DEs and then your call three or four times. This only takes up valuable time in copying you and does not add to the content of the QSO. A one by one call is all that is necessary after contact is established if you get a good report. Incidentally a report of 4-7-9 does not mean that the other fellow cannot read you solid, but that there may be some QRM on your frequency. Read the handbook section on operating procedure and follow its form of procedure, learn the Q signals, the abbreviations in common use and use them to shorten the time required for a QSO. Don't make your QSOs just a report and request for QSL card, try to talk about something that will interest both you and the ham on the other end of the QSO.

Walton R. L. Taylor, WN7EJZ, City Manager, Missoula, Montana writes.

Dear Walt: I enjoy reading your column in *CQ* and feel that like many other newcomers to amateur radio, reading it has helped steer me in the right direction with a marvelous hobby.

My son, WN7EJY, and I, WN7EJZ took advantage of a class jointly sponsored by the Missoula-Hellgate Radio Club and the City Recreation Department to get our tickets. We operate from the same shack, but haven't yet found how both of us can operate at the same time using the same transmitter and receiver.

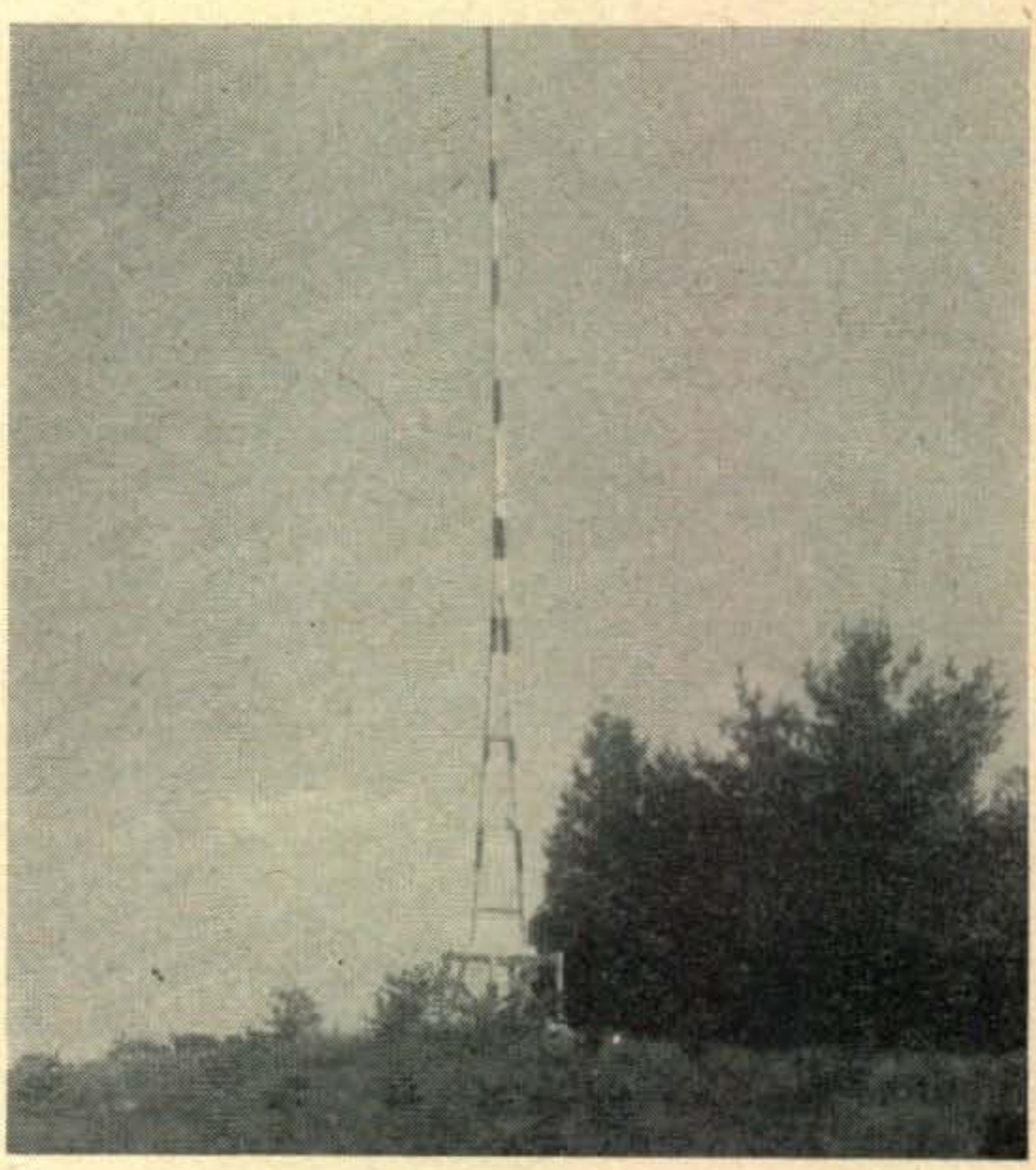
One thing that would eliminate a lot of QRM on the Novice bands would be for each new Novice to visit his post-office and give the post-master his name, call and address, so that all cards to him could be delivered without delay.

Keep up the good work, Walt. 73 . . . Walton.

A nice long letter from Nelson G. Beals, WN1MUZ, Director, Department of Civil Defense,

Herb, KN9EAO, 5121 Jarlath Avenue, Skokie, Illinois uses an Eldico TR-75. The receiver is an NC-98 with a QF-1. The antenna is a folded dipole for 40 meters. Herb has worked 46 states in three and a half months, he needs New Mexico and Vermont. He is interested in 220 and 420 mc.

I had planned to use this picture in an antenna article, but I'm sure you would want to see this picture of the $15.00 mast of Edward Marks, c/o Carol Bass Lakes Cabins, Pentwater, Michigan. I wish you could see the beautiful Chinese red, Jet black and white coloring. They are 55 feet high.



Bristol, Rhode Island is printed in part.

Dear Walt: I read your article in *CQ* regarding the conversion to six meters of the Globe Scout. Very Good, but how about us peasants that own the DX-35? A lot of we Novices would like to have an article on converting the DX-35 to six meters, how about it? (Read the method of using the DX-35 on six meters as outlined by Max Holland, K8AMV in this month's *Novice Shack*. An article on converting the DX-35 will soon appear in *CQ*.)

I have been in radio since 1942 when I started operating for Uncle Sam, but had no ticket until September. It seems that G.I. operators do not need a ticket. USAF had as much QRM as Novice alley. I am in the Reserves and it sure makes me mad to use an ART-13 and G.I. 75A4 airborne and then come home to a DX-35 and an S-40. I have found that a full wave antenna at 20,000 feet sure puts out a good signal, especially when you use it as a wick for the juice that an ART-13 puts out.

Good as we all are (hi) we all can use some brushing up on our operating procedure.

73 . . . Nelson.

A letter from John C. Grady, K6JGB, Box 122, Hemet, California tells me that his mother who is 80 years young has just received her Novice license. Congratulations and good luck. She is the oldest person to obtain a Novice license that I have heard of.

HELP WANTED

Each month *CQ* lists the names and addresses of those who are interested in becoming a ham, but need a little help in learning the code or in theory. Some only need a little advice on equipment or setting up their station. If you are able to offer help will you please contact them and do your bit toward bettering ham radio by increasing its ranks. Thank You.

Jerry G. Webb (16), 120 South Fairground Street, Savannah, Tennessee needs help in code and theory.

Tom Koerber, 1304 Girard Avenue, Middletown, Ohio. Telephone: GArden 3-7149. Tom needs help with code.

Henry J. Maresi, TD 3, FAETU Det. # 3, NAS, Quonset Point, Rhode Island needs help with the code.

Gayle Eastman (16), Route 1, Box 286, Clackamas, Oregon needs help with code and theory. Her Dad is a ham.

Sam Colilla, 131 Owasco Street, Auburn, New York would like to meet a local ham to explain what it is all about. Can you help him?

Terry Greenwell, Route 2, Raymond, Washington needs help with code and theory plus some advice. Terry is 13 years old.

Buddy Murray (14), 2301 East 5th Street, Greenville, North Carolina needs help with code and theory.

L. Richard Woodyall (15), 140 1 East Mountain Road, Scranton, Pennsylvania, wants to hear from other SWLs interested in ham radio.

Thomas J. Orzech (18), 6929 South Washtenaw, Chicago 29, Illinois. Telephone WA-5-7241. Tom needs help with code and theory.

Lewis Winkler, 100 Catherine Street, Valley Stream, New York. Telephone: VA-5-4859. Lewis needs help on his General exam.

Bill Gordon (13), 7225 Mound Street, El Cerrito, California. Telephone: BE-4-6998. Bill needs help with code and theory.

Louis Harper Jr., 17233 West Wright, Milwaukee, Wisconsin needs some help and advice on getting started in ham radio.

If you can offer any help please do so, I'm sure you will enjoy your radio a lot more by being of help to someone else.

As this is my last column, it is my wish that I have been of some help to you and that you will be as nice to the new editor, MR. DONALD L. STONER, W6TNS, Box 137, Ontario, California as you have been to me.

Thanks for all of the nice letters and suggestions. I'll see you on one of the ham bands.

73, Walt, W8ZCV

Elsco Ground Plane

Wayne Green, W2NSD
Editor, CQ

The large percentage of the operation on two and six meters is of the local QSO type. In this sort of deal those big beams are quite unhandy . . . what you need most is an omnidirectional antenna so you can work equally well in all directions. In other words, you want a ground plane antenna. This is the best deal for a newcomer to the band, too for it is easy to put up and easy to load. Certainly the serious VHF operator will have both a ground plane and a beam available so he can meet all conditions.

The Electronic Specialties Manufacturing Corporation (ELSCO) of Worcester (Wooster), Massachusetts, run by some active and savvy hams, have ground planes on the market for two, six and ten. I got hold of one of their six meter models and looked it over pretty carefully. The element and radials are made from *solid* aluminum. The base of the antenna is designed to fit over the standard 1¼" pipe (any TV supply store sells these pipe sections in various lengths) and has two set screws to hold it in place. A coax connector is built into the center of the base so you can feed the coax up through the pipe and connect it.

The whole thing should only take a few minutes to get up into place. A lot of us have the top of the TV antenna pipe left over and can set it up on there . . . etc. I set mine on top of the two meter rotary beam since rotating doesn't affect the ground plane. No matter where you put it there is little difficulty since it is relatively compact and light in weight. Hmmm, wonder how that would go on my car? ■

AMATEUR RADIOTELETYPE CHANNELS

National, FSK	3620, 7140, 27,200, 29,160, 52600 kc.
National, AFSK	27.2 147.96, 144.138 Mc.
Area Nets.	
California	147.85 Mc. AFSK on AM
Chicago	147.70 Mc. AFSK on FM
Detroit	147.30 Mc. AFSK on FM
Washington, D.C.	147.960 Mc. AFSK on AM
	14 .. .. a.c. A.. .K on AM
New York City	147.960 Mc. AFSK on AM
Buffalo/Niagara	147.50 Mc. AFSK (space) on AM
Boston	147.96 Mc. AFSK on AM
Seattle	147.00 Mc. AFSK on AM

Byron H. Kretzman, W2JTP
16 Ridge Drive, High Hills
Huntington Station, N. Y.

NARCAST, which stands for "North Atlantic Radioteleprinter Broadcast," has recently appeared in the news. Behind this news lies a story of interest to RTTYers. Remember, back in the October '56 issue of CQ, we discussed the transmission of weather reports on RTTY, particularly aerological information? Well, this discussion evoked quite some interest from those RTTYers who do a bit of flying. (This, by the way, includes ye Editor, W2NSD, or don't you read those long editorials?)

A few months ago publicity was released (Electronics, p 20, Oct. '56 and p 192, Nov. '56) telling of trans-Atlantic flight tests of teleprinter transmissions to airliners fiying the North Atlantic route. These experimental transmissions are being made from two low-frequency stations, one on each side of the ocean. FSK is used, with a 40-cycle shift (yes, I said 40 cycle!), and with standard 60-w.p.m. 5-unit start-stop teleprinter code. 60-cycle shift may be tried later to ease frequency stability requirements.

The European-side transmitter is located near Galdenoch, Scotland. Its call letters are MYB, and at present they are transmitting on a mean frequency of 121.6 kc with a power of 1000 watts. They expect to change later to 124.05 kc with a radiated power of 2000 watts.

On the American-side of the Atlantic, the station is near Chatham, New Brunswick, in Canada. The call letters are VE90G and they are transmitting on 118.8 kc with an estimated radiated power of 2000 watts. Transmissions now consist mostly of test message blocks of RY's, with identification. Actual meteorological broadcasts are expected to begin about March. Another Canadian station is also being planned. This one will be located near Halifax, Nova Scotia. Its call letters will be CHF and they expect to radiate 8 to 10 kw on 115.3 kc.

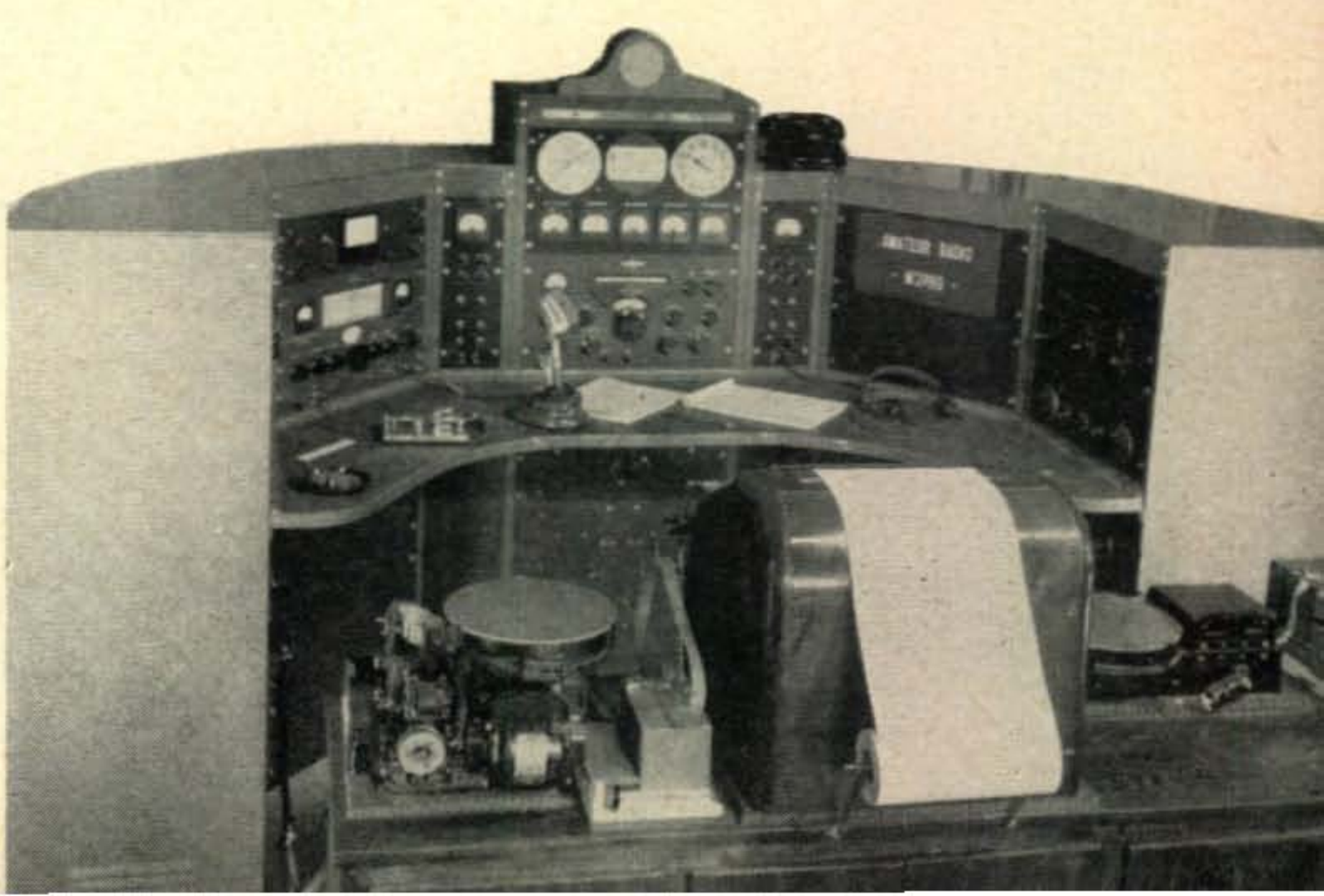
Aboard the airliners an extremely compact light-weight combination receiver and converter is used. No fine details are available as yet, but an extra high order of selectivity is reported—something in the order of 150 cycles. The printer is also light-weight and compact; a *Creed* Model 75, made in England. Reception along the east coast of the U.S. ought to be pretty good. What we need is a good low-frequency receiver with a built-in discriminator.

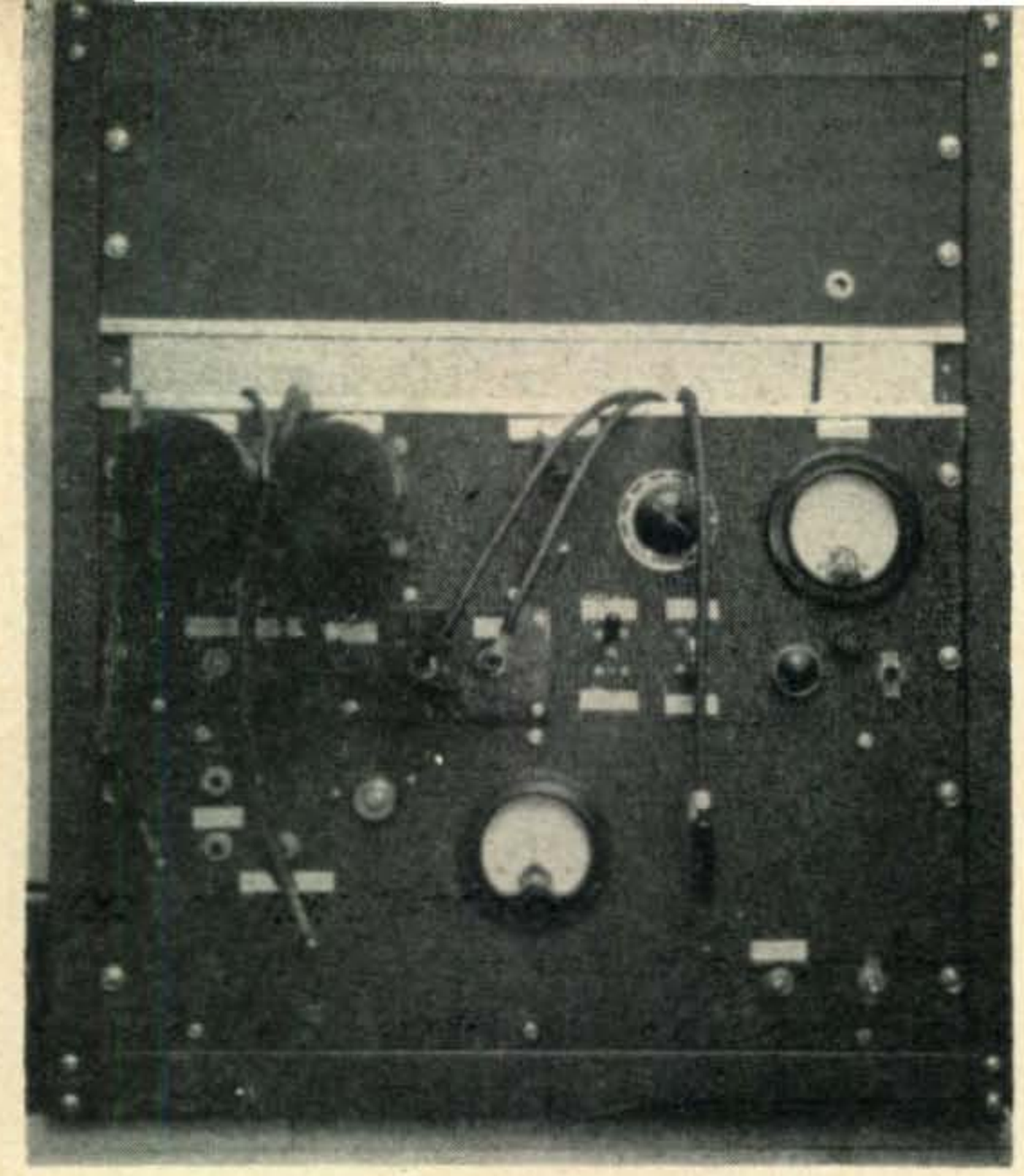
We are much indebted to VE2LD for his very fine cooperation in answering our many questions regarding this low-frequency operation, and your RTTY Editor would greatly appreciate any reports of successful printing from any of the stations in this system.

For the benefit of those of you reading here about amateur radioteletype for the first time, your monthly RTTY column has been carrying a section called "RTTY Principles & Practice" since the January 1956 issue of *CQ*. Also, the January 1957 issue contained a complete index of all the RTTY information published in *CQ* during the past year. Check it. You will undoubtedly find something of special interest to you in a back issue.

W2PBG-RTTY Deluxe; operated by Bob Straub, and located at Bayside, N. Y. Equipment consists of a W6UPY AFSK converter, Model FRE i-f converter, W2JAV frequency meter, 32V1, 75A2A, and a kilowatt final using 4-250 tubes.

A half-wave center-fed dipole antenna is used on 80-meters, and a combination 40-20-15 meter beam is used on those bands. TTY gear includes a Model 15, a Model 14 keyboard-perforator, a 1A tape head, Morkrum distributor, and a 5032A transmitter-distributor.





RTTY Control Panel, and converter rack at W1BGW, Dorchester, Mass.

RTTY Principles & Practice

Part 6—Interconnecting TTY Equipment

There has been a good deal written for the amateur RTTYer on receiving converters, teleprinters, tape equipment, FSKing a VFO, etc., but little has been said about how to hook up all this gear. To the beginner in RTTY, this is a big problem; a problem with many possible solutions.

Actually, for the newcomer, who in most cases has just a Model 26 page printer, there is a fairly simple solution. The converter, or terminal unit, connects directly to the selector magnets of the machine. Uusually, the selector magnets are then in the cathode circuit of the "keyer" tube in the *TU*. *Fig. 1* shows a simplified diagram of these connections. Variable resistor *R* and jack *J*, if not built into the TU, should be provided to adjust and measure the marking current in the selector magnets. For the Model 26, for the series connection, this current should be 20 to 30 ma. (See p 76, April '56 *CQ*) Local copy is obtained by tuning in your own signal, which should be zero-beat with the station you are working. The advantage, of course, is that you then monitor not only your own frequency, but your shift and keying as well. The keyboard simply connects directly to the diode keyer in your VFO. (See p 68, Nov. '56 *CQ*)

The trick to using the above arrangement is to prevent blocking your receiver while listening to your own transmitter. This is not as difficut as it may appear. In practice, it is very desirable to use a co-ax relay of the type that shorts the line going to the receiver when in the transmit position. A further reduction in your own signal might be obtained by connecting two 1N34 germanium diodes back-to-back across the antenna terminals on your receiver.

Now, for the fellow who has been on RTTY for some time, and who has acquired tape gear and another printer or two, it may be more convenient to run a d-c local loop in the shack. For this we need some sort of jacking and/or switching system, preferably centralized in a control panel close to the operating position.

The requirements for an RTTY control panel are: To supply power for the printer magnets, allow equipment to be connected and disconnected easily, allow easy switching from transmit to receive, supply local copy, and key the diode keyer in the VFO. *Fig 2* shows the schematic diagram of a control panel which meets the above requirements. Two polar relays, *K1* and *K2*, are the heart of the unit. They could be either *WE* 215-A or 255-A relays. All the parts can mount on a 7" rack panel.

Operation is quite easy. The output of the converter plugs into *J*, or if the converter has its own relay, into any of the other jacks. (Switch *S2* is used to turn over the received signal, if necessary.) This keys the 60 ma d-c neutral loop, and any other equipment plugged into jacks *J2*, *J3*, and *J4*. These jacks are of the closed-circuit type and they permit equipment to be removed from the circuit and still maintain continuity. Note that these jacks are insulated from the panel.

Polar relay, *K1*, actuated by the converter, or TU, has in its contact circuit a key-click filter consisting of two r-f chokes and a by-pass capacitor. Polar relay *K2* is used to FSK the transmitter VFO or AFSK oscillator. Switch *S4* is used to provide *mark* high or *mark* low, depending upon which is used—FSK or AFSK, respectively. Coil *2-7* of *K2* is used as the "operate" winding and coil *3-6* is used as the "bias" winding. *R2* sets the

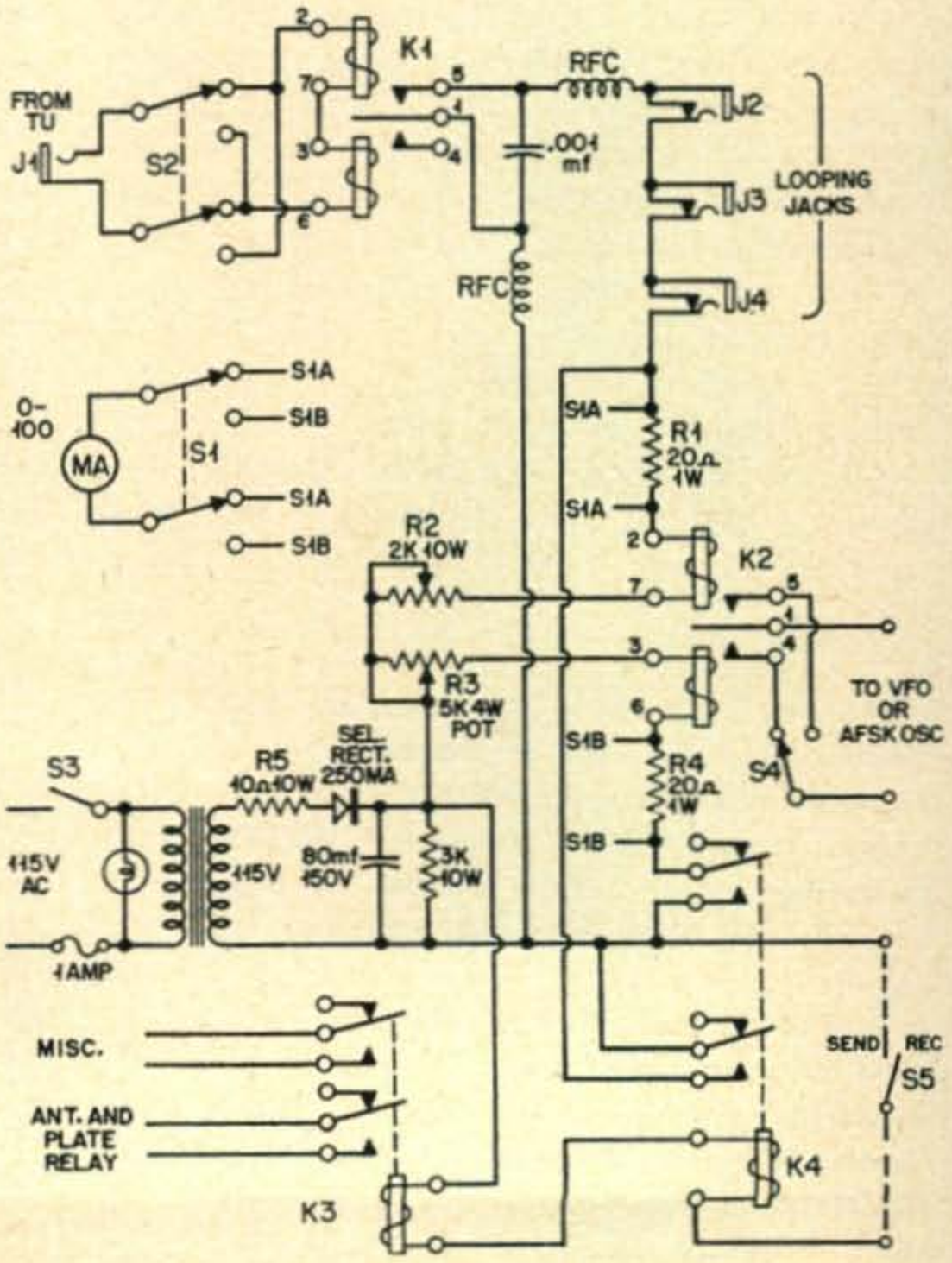


Fig 2—Local Loop Interconnections.

local loop marking current at 60 ma, and *R3* sets the bias current in the other coil to one-half that value. A 100 ma meter and switch *S1* is provided to facilitate setting these currents.

The power for the local loop and the relays is provided by a half-wave selenium rectifier supply supplying about 115 volts d.c. at full load. Highly recommended from the standpoint of safety is the use of an isolation transformer. This is shown on the diagram as *T1*.

Relays *K3* and *K4* are 12,000-ohm telephone-type relays, each with DPDT contacts, and their coils are energized by the SEND-RECEIVE switch S5. (S5 is usually mounted on the printer.) Here is how they work: When S5 is thrown to SEND, relay *K3* shorts the contacts of the receive relay *K1* and completes the circuit to the bias winding on the send relay *K2*. The other telephone-type relay *K4* is utilized to actuate the transmitter plate and antenna relays.

It is a good idea to ground the frames of all the machines used as noise sometimes orginates from these sources. Remember, too, that Model

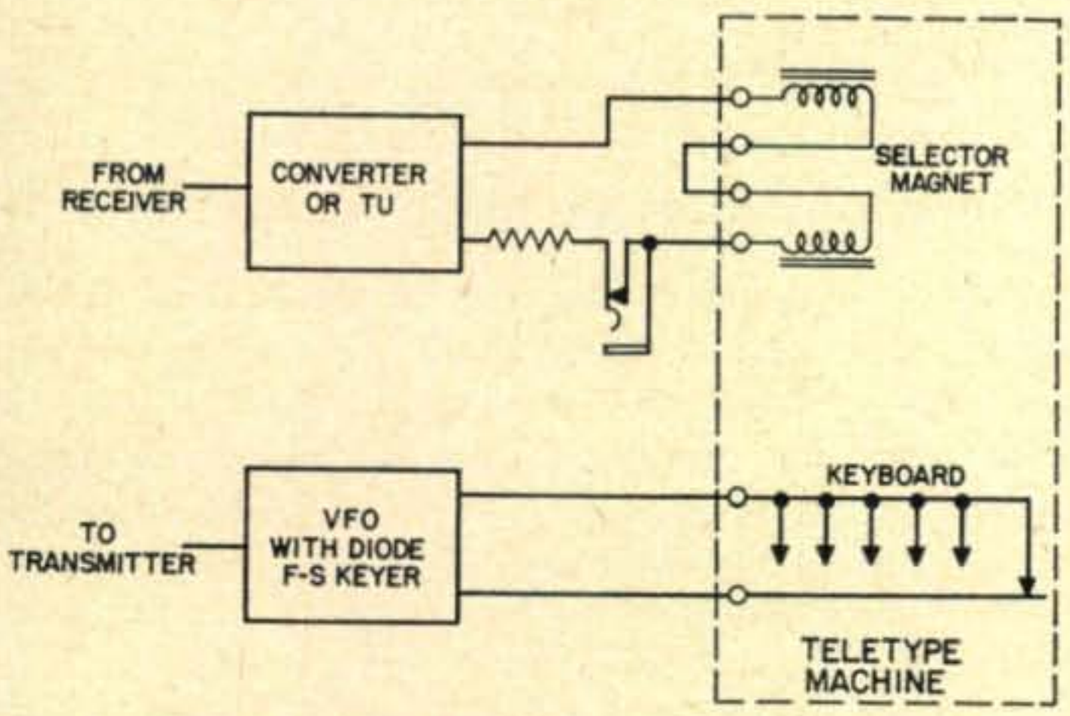


Fig 1—Simple Interconnections for RTTY.

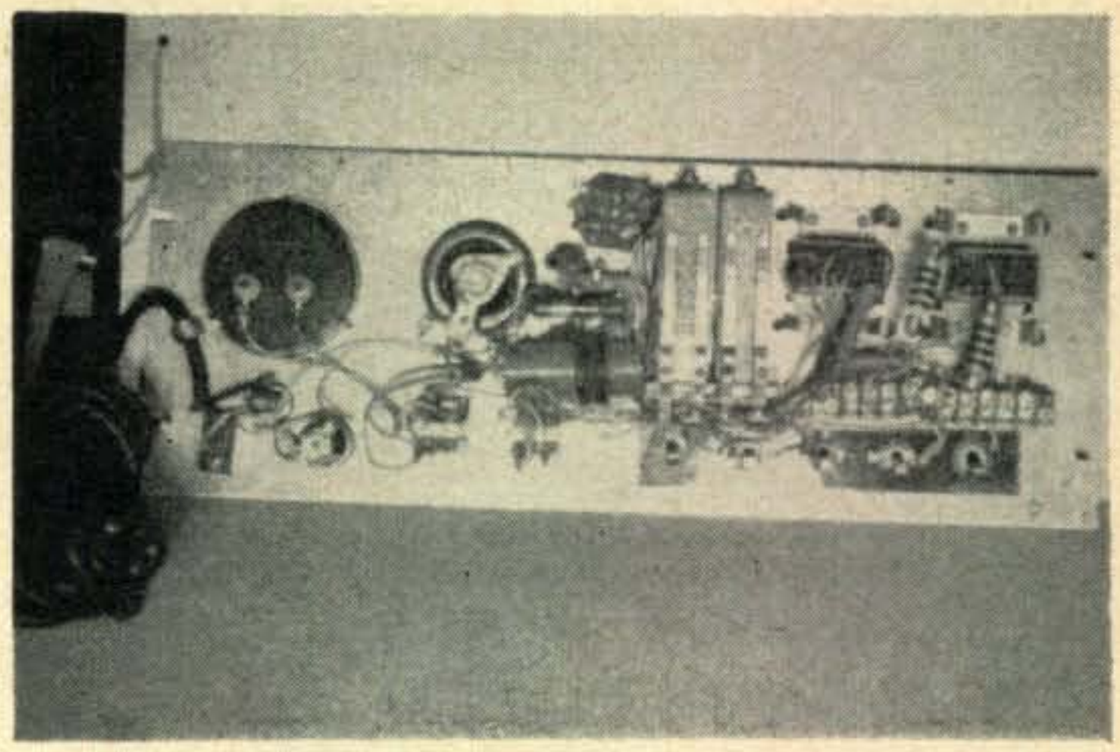
26 selector magnet coils must be connected in *parallel* for 60 ma operation. Polar relays are obtainable from several surplus sources, such as from W2ZKV, as are the telephone-type relays from W1AFN.

The accompanying photos show the control panel built by Jack Berman, W1BGW, of Dorchester, Massachusetts. Jack has been using this panel for several years, and its schematic appeared in the Aug. '54 issue of *RTTY*.

Across the Nation

K2JXQ, Stan Hockman, gave a talk on RTTY before the Brooklyn Civic Center Radio Club (K2QDB). The club is housed in the Red Cross Building in Brooklyn and was organized to provide the Red Cross with communication in an emergency. Stan set up a BC-348, Model 26, and his own TU to copy the East Coast RTTY Net, which conveniently was meeting that night, and NSS.

W4IYP is now in San Mateo, Florida. Allen is going to be on 80-meters soon with his Ranger and Model 26. W4EBH of Winchester, Virginia, and W4EKB of Greensboro, North Carolina, are



RTTY Control Panel, rear view.

putting fine signals into New York City on 80-meters, as does W8TLW.

W6CQK/2, in Summit, New Jersey, got married recently. Congratulations OM! Jack and his new XYL will return to sunny California before too long. K6LFK, in North Hollywood, is on 40-meters and 6-meters RTTY with his Model 26. Mort reports many pleasant QSO's around Los Angeles and San Diego, with a net of over 100 members and "growing fast."

W3CZE, an old-time 2-meter RTTYer from Washington, D.C., is getting back on again, this time on the lower frequencies. Mac has built a W3PYW terminal unit and hopes fervently to get his Model 26 before too long. (Mac used a Model 12 on 2-meters.) He also has some tape gear ordered. 3620 kc awaits, OM!

Bargains

Ray Morrison, W9GRW, 8029 Keeler Avenue, Skokie, Illinois, reports that he now has available "Ø" type pallets and key-tops for the Model 26 machine. These he has made, special, and are available to RTTYers for $1.35, postpaid.

Two very useful tuning forks are available from *Herbach & Rademan, Inc.*, 1204 Arch Street, Philadelphia, Pa. The first is *Teletype* #103628, and it is the 87.6 cps aperture-fork used to synchronize governed motors. The catalog number is TM 7766, and the price is $1.95. The second bargain is a small 435-cycle German tuning fork. This is quite easy to move to 425 cycles by a little filing in the crotch. (W2JTP has already built a miniature transistorized tone standard using one of these forks. More about this later.) The catalog number is TM 4796, and the price is $1.00. Figure on postage and insurance for 1 pound for either of the forks.

Comments

What would you like to see in your RTTY column? More activity news? More technical dope? We at *CQ* would like to know just what your specific desires might be. This is *your* column, and we would like to try and give you what *you* want. Write us, will you?

73, Byron, W2JTP

PROPAGATION

LAST MINUTE FORECAST: Seasonally normal. Short wave radio propagation conditions are forecast for the first three weeks of February. Based upon the recurrence tendency of ionospheric disturbances, conditions during the last week of the month may be unstable, fluctuating between normal and disturbed.

George Jacobs, W3ASK
607 Beacon Road
Silver Spring, Md.

Propagation Record

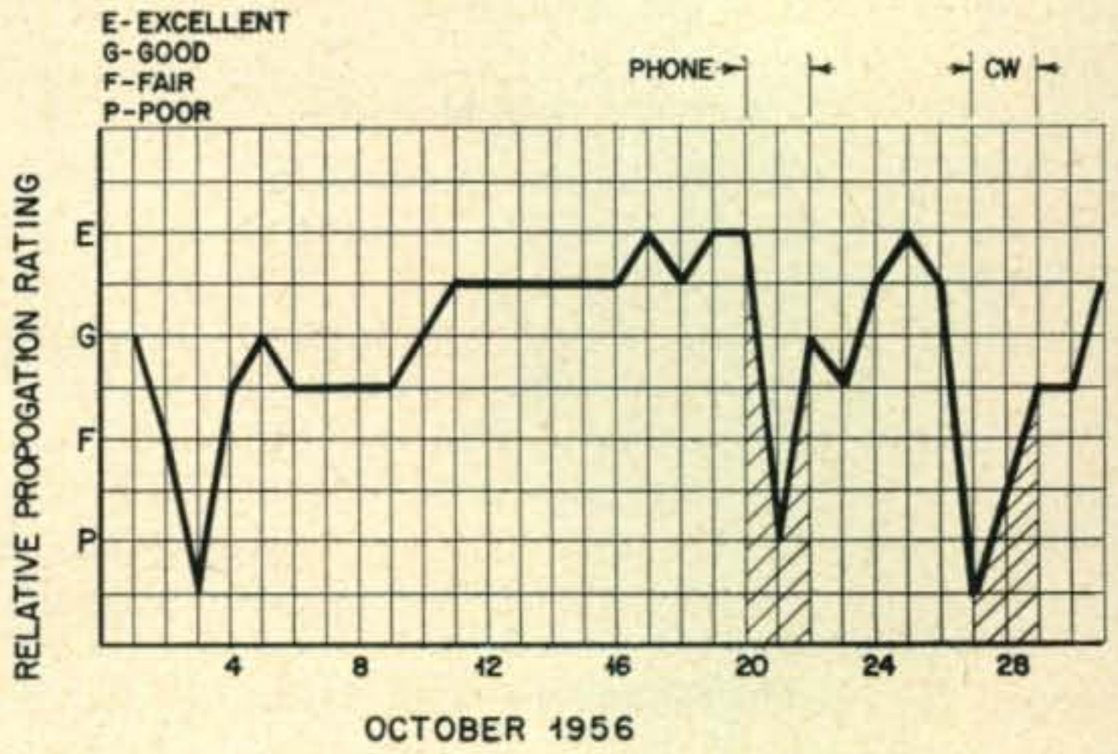
Evidence is now available indicating that record breaking radio propagation conditions occurred during the winter months of 1956. Maximum usable frequencies rose to values higher than ever recorded previously. The six-meter amateur band opened almost daily to Europe, the Far East and South America, considerably surpassing the openings of 1947. On a few occasions frequencies in excess of 70 mc were propagated several thousand miles for short periods of time and there were several reports of European reception of American TV signals on frequencies as high as 66 mc. Even the lower frequency bands came in for their share of long-distant openings with W1BB reporting several trans-Atlantic openings on 160-meters during December and January. December 2nd is a good example of the dynamic propagation conditions that occurred on numerous other days during the winter months of 1956. Between Midnight and 3 AM, EST, W1BB reports that 160-meter conditions were excellent and several British stations were worked with good signals. Propagation observations made in Europe, Canada and the United States show that 80, 40 and 20-meters were also open between both Continents at the same time. By 6 AM both 15 and 10-meters opened to Europe and by 7 AM the trans-Atlantic MUF had soared to 48 mc. East Coast W's began breaking through to West Europe on six-meters shortly after 9 AM EST. By 10 AM traces of American TV signals near 56 mc were received in Europe and the MUF remained above 50 mc until noon. A propagation range as dynamic as this has seldom, if ever, occurred prevoiusly—trans-Atlantic openings on all bands between 6 and 160-meters, and all within the space of a few hours!

Propagations Conditions—February

During February, the sun continues its travels toward northern skies, and as it does so its distance from the earth is also increasing. As a result, the peak intensity of ultra-violet radiation sweeping across the ionosphere from the sun decreases somewhat from mid-winter values, and daytime maximum usable frequencies are expected to be a bit lower than during the winter months On the other hand, because of the longer hours of daylight during February the ionosphere will be illuminated by the sun for a longer period of time, and late afternoon and evening MUF's will be somewhat higher than during the past few months.

During February static levels remain generally low, but begin to increase. Ionospheric absorption also begins to increase during February.

The following is an overall picture of band conditions forecast for February, 1957, with a brief discussion of the qualitative changes in each ama-



October Propagation Chart

teur high frequency band from month to month. For specific times of band openings for a particular circuit, refer to the *CQ Propagation Charts*.

6 Meters:

The almost daily 6-meter openings observed during the winter months were far more numerous than the most optimistic predictions. Despite a slight seasonal decrease in maximum usable frequencies on many circuits, unprecedented 6-meter openings are expected to continue during February and early March. Trans-Atlantic openings are optimum from a few hours after sunrise until shortly after noon. Trans-Pacific circuits are most likely to open during the late afternoon and early evening hours. South American 6-meter openings have a tendency to occur a few hours after sunrise until noon-time and again during the late afternoon hours. The record 6-meter openings of the past few months are discussed at greater length in W1FZJ's VHF Column.

10 Meters:

Excellent world-wide propagation conditions are expected to continue through February and early March from shortly after sunrise through the evening hours. Short-skip openings, between 750 and 2400 miles, are expected to occur daily from before noon until early evening. With longer hours of daylight, the band is expected to remain open an hour or two later than during the winter months. Ten-meter signals coming from the east and south generally peak in signal strength shortly after noon, while those arriving from the west and south usually peak during the late afternoon and early evening hours. Because of relatively low ionospheric absorption on this band, signal strengths should be exceptionally strong during most openings. Propagation conditions on the 11-meter amateur band are expected to be almost identical to those forecast for 10-meters.

15 Meters:

Excellent world-wide propagation conditions are forecast for the 15-meter band for most of the period between sunrise through the evening hours. On exceptionally good days the band may remain open around the clock to South America and possibly other areas of the world. Short-skip propagation, between approximately 500 and 2400 miles, should be possible daily from a few hours after sunrise until after sunset. Because of increased solar absorption, 15-meter signals may be weak, or fade out entirely on many circuits, during the forenoon period. Signal strength is expected to increase rapidly after noon and during the evening hours. The signal peak on 15-meters generally occurs about an hour or two later than on 10-meters.

20 Meters:

Increased hours of daylight during February results in 20-meters remaining open longer than during the winter months. During periods of better than normal propagation conditions the band should remain open around the clock to many areas of the world. Short-skip openings are also forecast from shortly after dawn until midnight, with the skip shorter than 100 miles during the noon period. Exceptionally high daytime absorption associated with the rapid rise in solar activity will cause DX signals to be weak, or fade out entirely, during the late morning and early noon hours. During February, peak conditions are expected to occur on 20-meters shortly before, and shortly after, sunrise and from the late afternoon through the evening hours. During the evening hours 20-meters is expected to be the optimum band, propagationwise, to many areas of the world.

40 Meters:

Fairly good propagation conditions are expected to continue on 40-meters through February and early March, with DX openings possible to many areas of the world from shortly before sundown, through the hours of darkness, until shortly after dawn. Short-skip propagation is forecast daily around the clock, with daytime absorption limiting range to a few hundred miles, with range increasing as the hours of darkness approach. Early morning openings to Australia generally improve on this band during February and the spring months but generally February marks the passing of the seasonal peak on 40-meters to most other areas of the world. Static levels are expected to remain relatively low during early February but should begin to increase towards the end of the month and during March.

80 Meters:

Ionospheric absorption and static levels are beginning to rise towards summer values and consequently propagation conditions on 80-meters are expected to be no better than fair during February and early March, be-

coming poorer as the summer months approach. During the daylight hours, skywave openings will be limited to distances of 250 miles or less, increasing in range towards the late afternoon and evening hours. During the hours of darkness, when solar absorption is at a minimum, the skip should extend beyond 2000 miles. On a small percentage of nights DX openings to some areas of the world may occur, but signals will be weak and the band noisy.

160 Meters:

Despite the exceptionally high sunspot activity recorded during the winter months, several DX openings were reported for 160-meters. During February, night-time skywave propagation should be possible for distances as great as 1500 miles on most nights, and when static levels are exceptionally low the skip could extend out to several thousand miles. Intense ionospheric absorption limits daytime propagation on this band to a groundwave distance of less than 50 miles. This winter's 160-meter DX tests should tell a better story of the sunspot cycle influence on 160-meter propagation. I want to thank W1BB for the exceptionally helpful data submitted to this column during December and January and I would like to receive as many reports as possible of 160-meter openings in excess of 1000 miles.

Sunspot Cycle

Dependent on observations made at the Zurich Solar Observatory and its stations in Locarno and Arosa, Switzerland, the provisional sunspot number for November, 1956, was 203. This is the highest monthly number recorded since December, 1836, and results in a 12-month, smoothed sunspot number of 128 centered on May, 1956. The sunspot cycle continues to rise at an unprecedented rate and a smoothed sunspot number in excess of 170 is forecast for February, 1957.

What Happened?

Several dozen very interesting letters have been received from all parts of the world describing conditions during the fall CQ DX Contest periods as ranging from "the best ever" to "down-right rotten." Data is now available from many of the Ionospheric Research Stations throughout the world and for those of you who don't already know it, here's what happened during the Contest period.

Propagation conditions throughout most of October were exceptionally good. Most ionospheric sounding stations throughout the world measured critical frequencies considerably higher than were observed during the past several Contest periods and somewhat higher than those measured during October, 1947, the year of the last sunspot maximum. Trans-Atlantic MUF's exceeded 43 mc almost daily, peak trans-Pacific MUF's were almost as high, and the MUF to South America rose over 50 mc on several days. Everything was fine during

ALL TIMES IN EST

EASTERN USA TO:	6/10 Meters	15 Meters	20 Meters	40/80 Meters
Western Europe	9A-1P (2)** 5A-7A (2) 7A-3P (4) 3P-5P (3) 5P-7P (2)	5A-1P (3) 1P-5P (5) 5P-7P (4) 7P-1A (3) 1A-5A (1)	1P-3P (2) 3P-7P (5) 7P-1A (4) 1A-7A (3) 7A-1P (1)	5P-7P (2) 7P-1A (3) 1A-3A (2) 8P-2A (2)*
Central Europe & European USSR	9A-1P (1)** 6A-8A (2) 8A-11A (3) 11A-1P (4) 1P-4P (2)	3A-5A (1) 5A-11A (2) 11A-3P (4) 3P-6P (2)	1P-4P (2) 4P-11P (3) 11P-6A (2) 6A-1P (1)	5P-7P (1) 7P-3A (2) 11P-2A (1)*
Eastern Mediterranean	9A-11A (1)** 5A-11A (2) 11A-1P (3) 1P-3P (2)	1A-5A (1) 5A-7A (2) 7A-11A (1) 11A-2P (3) 2P-4P (1)	1P-3P (2) 3P-9P (4) 9P-12M (2) 12M-5A (3)	6P-11P (2) 8P-10P (1)*
North & Central Africa	9A-12N (2)** 6A-11A (3) 11A-4P (4) 4P-7P (2)	3A-6A (1) 6A-12N (2) 12N-5P (4) 5P-8P (3)	2P-4P (2) 4P-8P (5) 8P-3A (4) 3A-6A (2) 6A-2P (1)	6P-8P (2) 8P-10P (3) 10P-1A (2) 10P-12M (1)*
South America	9A-12N (1)** 3P-6P (1)** 6A-1P (3) 1P-5P (4) 5P-8P (3)	5A-9A (3) 9A-2P (1) 2P-4P (2) 4P-8P (4) 8P-2A (3)	3P-5P (2) 5P-1A (5) 1A-7A (3) 7A-9A (2) 9A-3P (1)	7P-9P (2) 9P-4A (3) 4A-7A (2) 9P-5A (2)*
South East Asia	7A-9A (1) 6P-8P (2)	7A-10A (2) 10A-1P (1) 4P-6P (1) 6P-10P (2)	3P-3A (2) 3A-9A (3)	5A-8A (1)
Australasia	9A-11A (3) 11A-1P (2) 1P-4P (1) 4P-6P (2) 6P-10P (3)	8A-11A (2) 11A-5P (1) 5P-7P (2) 7P-10P (3) 10P-2A (2)	9P-12M (2) 12M-4A (3) 4A-8A (4) 8A-10A (2) 10A-9P (1)	4A-9A (3) 5A-8A (2)*
Guam & Pacific	4P-6P (1)** 3P-5P (2) 5P-7P (4) 7P-9P (2)	8A-12N (2) 3P-5P (2) 5P-9P (3) 9P-11P (2)	7P-9P (1) 9P-3A (2) 6A-8A (2)	10P-6A (1)
Japan & Far East	4P-7P (3)	3P-5P (2) 5P-8P (3) 8P-10P (2)	3P-5P (1) 5P-3A (2) 3A-8A (3) 8A-10A (2)	4A-8A (1)

ALL TIMES IN CST

CENTRAL USA TO:	6/10 Meters	15 Meters	20 Meters	40/80 Meters
Western & Central Europe	9A-11A (1)** 6A-8A (2) 8A-10A (3) 10A-1P (4) 1P-6P (2)	5A-10A (3) 10A-12N (4) 12N-2P (5) 2P-6P (3) 6P-12M (2)	1P-4P (4) 4P-12M (3) 12M-5A (2) 5A-11A (1) 11A-1P (2)	6P-1A (2) 8P-12M (1)*
Southern Europe & North Africa	8A-11A (1)** 6A-10A (3) 10A-1P (4) 1P-6P (2)	4A-11A (3) 11A-2P (4) 2P-7P (3) 7P-12M (2)	12N-2P (3) 2P-9P (4) 9P-12M (3) 12M-7A (2) 7A-12N (1)	6P-1A (2) 8P-12M (1)*
Central & South Africa	8A-11A (1)** 6A-9A (2) 9A-12N (3) 12N-3P (4) 3P-6P (2)	12M-2A (1) 6A-11A (1) 11A-2P (2) 2P-6P (4) 6P-9P (2)	12N-3P (2) 3P-9P (4) 9P-12M (3) 12M-6A (2) 6A-12N (1)	6P-10P (2) 9P-12M (1)*
South America	8A-11A (1)** 5P-7P (1)** 6A-2P (3) 2P-5P (4) 5P-8P (3)	5A-9A (3) 9A-2P (2) 2P-7P (4) 7P-12M (3) 12M-5A (2)	12M-8A (3) 8A-2P (2) 2P-4P (3) 4P-12M (5)	6P-4A (3) 4A-6A (2) 8P-4A (2)*
Japan & Far East	3P-6P (1)** 2P-4P (2) 4P-7P (3) 7P-9P (2)	2P-4P (2) 4P-10P (3) 10P-12M (2)	7A-9A (3) 9A-1P (1) 1P-5P (2) 5P-2A (3) 2A-7A (2)	12M-8A (1) 1A-7A (1)
South East Asia	8A-11A (1) 3P-9P (3)	7A-12N (2) 12N-3P (1) 3P-9P (3) 9P-12M (2)	3P-3A (2) 3A-8A (3) 8A-10A (2)	4A-8A (1)
Hawaii	11A-4P (2)** 10A-2P (4) 2P-7P (5) 7P-9P (3) 9P-11P (2)	8A-3P (4) 3P-11P (5) 11P-3A (3)	3P-6P (3) 6P-3A (5) 3A-7A (3) 7A-3P (2)	7P-7A (4) 9P-7A (3)
Australasia	8A-11A (3) 11A-2P (2) 2P-8P (4) 8P-11P (2)	7A-9A (3) 9A-3P (2) 3P-7P (3) 7P-10P (4) 10P-3A (2)	6P-12M (2) 12M-2A (3) 2A-8A (4) 8A-10A (2) 10A-6P (1)	3A-8A (3) 4A-7A (2)*
Antarctica	7P-11P (1)	6A-8A (3) 8A-12N (1) 12N-6P (2) 6P-12M (3)	3P-6P (1) 6P-11P (2) 11P-3A (3) 3A-9A (2)	11P-7A (2)

ALL TIMES IN PST

WESTERN USA TO:	6/10 Meters	15 Meters	20 Meters	40/80 Meters
Europe & North Africa	6A-8A (2) 8A-11A (3) 11A-1P (2)	6A-9A (1) 9A-11A (2) 11A-1P (3) 1P-3P (2)	11P-2A (2) 2A-8A (1) 8A-1P (2) 1P-6P (3) 6P-11P (1)	6P-12M (1)
Central & South Africa	8A-12N (1)** 6A-9A (2) 9A-12N (3) 12N-4P (4) 4P-7P (2)	6A-9A (1) 9A-12N (2) 12N-2P (3) 2P-7P (4) 7P-11P (3)	12N-2P (1) 2P-4P (2) 4P-6P (3) 6P-10P (4) 10P-12M (2)	6P-10P (1)
South America	8A-12N (1)** 3P-5P (1)** 6A-12N (3) 12N-4P (4) 4P-8P (3)	5A-8A (3) 8A-12N (2) 12N-8P (4) 8P-2A (3) 2A-5A (1)	8A-2P (1) 2P-4P (2) 4P-10P (5) 10P-2A (4) 2A-8A (3)	7P-9P (3) 9P-4A (3) 9P-2A (2)*
Guam & Pacific Islands	12N-4P (1)** 11A-4P (3) 4P-6P (4) 6P-10P (2)	10A-12N (2) 12N-4P (1) 4P-6P (2) 6P-10P (3) 10P-12M (2)	8P-10P (2) 10P-2A (4) 2A-7A (2) 7A-9A (3) 9A-11A (1)	2A-6A (2) 3A-5A (1)*
Australasia	2P-4P (1)** 8A-1P (3) 1P-5P (2) 5P-8P (4) 8P-11P (3)	7A-12N (3) 12P-6P (1) 6P-11P (4) 11P-1A (3)	6A-10A (3) 10A-12N (1) 9P-11P (1) 11P-2A (4) 2A-6A (2)	2A-7A (3) 3A-6A (2)*
Japan, Okinawa & Far East	3P-5P (1)** 12N-3P (3) 3P-7P (4) 7P-9P (3)	12N-4P (3) 4P-8P (4) 8P-11P (3)	6P-8P (2) 8P-4A (4) 4A-10A (3) 10A-12N (2) 12P-6P (1)	1A-6A (3) 2A-5A (1)*
Philippine Islands & East Indies	4P-6P (1)** 8A-10A (2) 10A-1P (1) 1P-6P (3) 6P-8P (2)	8A-11A (3) 11A-1P (1) 8P-10P (1) 10P-2A (2)	12M-2A (1) 2A-6A (3) 6A-8A (2) 8A-10A (1)	4A-6A (1)
Malaya & Southeast Asia	4P-6P (1)** 9A-11A (3) 2P-6P (3) 6P-10P (2)	8A-12N (3) 12N-2P (2) 2P-4P (1)	12M-3A (1) 3A-9A (3) 9A-11N (2)	4A-8A (1)
Hong Kong, Macao & Formosa	4P-6P (1)** 1P-9P (3)	12N-3P (3) 3P-5P (2) 5P-11P (3)	10P-12M (2) 12M-4A (4) 4A-9A (3) 9A-11A (2)	3A-7A (2) 4A-6A (1)*

SYMBOLS FOR NUMBER OF DAYS CIRCUIT FORECAST TO OPEN:

(1) 1-4 days (2) 5-11 days (3) 12-18 days (4) 19-26 days (5) over 26 days

** Indicates possible six-meter openings
* Indicates possible eighty-meter openings

Time Symbols: A - A.M. N - Noon
P - P.M. M - Midnight

The CQ DX Propagation Charts are based upon a CW radiated power of 150 watts at radiation angles less than thirty degrees and are centered on the Eastern, Central and Western areas of the USA. They are valid through March 15, 1957. All forecasts are based upon ionospheric data published by the CRPL of the National Bureau of Standards, Boulder, Colorado.

October, except during one period . . . October 20th to 29th, and as luck would have it, the CQ DX Contest fell between these dates!

Fig. 1 is a daily rating of conditions reported by a consensus of several observers during the Contest periods. The disturbance observed during the c-w period, October 27th-29th, was not unexpected and was actually forecast in the October column. The disturbance, or possibly more appropriately, the unusual conditions observed during the Phone period, October 20th-22nd, were not predicted as such.

The Phone period began at 0200 GMT on October 20th with conditions considerably above normal. Fifteen-meters was still open to Europe, South America and towards the Pacific, and 20-meters was open to Europe, South America, Africa, Australasia, the Far East, etc., during the first few hours of the Contest period. Then it happened . . . early on the morning of the 20th, faint shimmering glows appeared on the northern horizon bursting into a colorful auroral display. As a result of the aurora and the accompanying ionospheric absorption, reception from Europe was weak and fluttery, or practically non-existent to the northern areas of the United States. In addition, noise levels were higher than usual and long-path reception was quite noticeable since the direct path from many areas of the world was blocked by the aurora. Fortunately the area of high absorption associated with the aurora was rather limited geographically, adversely affecting reception in the northern states between New England and the Pacific Coast far more than the remainder of the country. While conditions were "down-right rotten" in Michigan, further south the aurora's influence was hardly felt at all, and Florida and California heard almost everything with conditions reported as the "best ever!" While most of Europe was blacked-out from the northern areas of the USA, the extra ionization associated with these unusual conditions actually improved reception from the south. Both 15 and 10-meters remained opened well into the evening hours on circuits to South America and on the morning of the 21st the 6-meter band opened between both Continents. Good reception from Australasia and the Pacific was also reported throughout most of the United States. On the 21st conditions began to return to normal and by the end of the period most signs of the disturbance had disappeared.

In the October column we forecast a disturbance to occur during the c-w period of the Contest. We hit this one right on the nose. Almost coincident with the start of the c-w period, a severe ionospheric disturbance began at approximately 0500 GMT on October 27th. During the day MUF's to most of Europe and Asia dropped more than 40% from their normal values, signals became weak or fluttery or faded out completely, noise levels increased, and in general conditions were quite poor, especially on the 10, 15, and 20-meter bands. On the other hand, as often happens during disturbed periods and as forecast in the October column, conditions on 40 and 80-meters were relatively good, especially during the times that conditions on the higher frequency bands were poorest. Fortunately the disturbance was rather short-lived, and by the 28th conditions had built up to near normal again on all bands, and rated as fair to good to most areas of the world.

Unfortunately radio storms marred the advantages of a DX Contest conducted during a period of exceptionally high sunspot activity. Despite the storms, however, preliminary scores compiled by W1WY unofficially show that record breaking scores were compiled during both the Phone and c-w periods of the Contest. Whether or not this was the record breaking Contest expected will depend upon the final tally of scores.

I want to thank W2ESO, W8NGO, W6SAI, W6YY, G3CEU, G4HQ, F8SH, I1ER, VS2DQ and scores of others who sent me detailed observations made during the Contest periods.

Next month a discussion of Pigeons and sunspots!

73, George, W3ASK

W7QKU, Donna Gettman, is the first YL in Oregon to receive the BPL medallion for handling over 500 messages each month for three months, the second Oregon Ham ever to have earned it. Donna is president of the Portland Roses YL club, a member of the Oregon Emergency Net and the Northwest Traffic Net, and holds a Grand Masters Certificate of the Brotherhood of Radio Amateur Traffickers. She has participated in several emergencies, is PAM for Oregon and serves with the Mountain Rescue & Safety Council. On the air since Nov. 1951 W7QKU operates on 75, 40, 20 or 10. Donna and OM W7OEV have two jr. ops. Her other hobbies are sewing, textile painting, fishing and raising African violets.

Louisa B. Sando, W5RZJ
U. S. Indian School
Santa Fe, N. M.

YL

Looking for DX? KA2MR, Marcia Rast, according to her OM KA2TR, president of the FEARL, is the only KA YL operator in Japan. Look for her on 20, 10 and 15 using a Viking I driving a home-brew 500-watt final. Marcia (home call K6DLL, ex-W4STU), is anxious to QSO the YLs.

Another YL who enjoys being DX is DL4HO (W5RFK), Deloris Dyvad. At Ramstein, Germany with her OM DL4BS, they are on 10 phone every a.m. Look for Deloris on 28,470, 28,480 or 28,490 kc.

Results: 17th YLRL A.P.

Congratuations to W3OQF, Barbie, for making top place in the phone section, and to W4RLG, Frances, for first place in the c-w section of YLRL's 17th Anniversary Party held in November. This is the third time win for each of these YLs! This would have entitled them to permanent possession of the A.P. gold cups, but under the new rules cups are to be awarded permanently each year—either way, they'd get their cups!

In the phone section (Nov. 7-8) Barbie, using her OM's station W3MAX, ran up a score of 10,587.50. For second place W3URU, Sarah, turned in a score of 10,125, and K4CXJ, Lois, made 8,905 points for third high.

In the c-w section (Nov. 14-15) Frances won easily with a score of 1,822.50. In second place was W4HLF, Arlie, with 1,500, and W3YTM/3, Mildred (YLRL's new vice president) made third high score with 1,380.

Certificates will be awarded for the high phone and c-w scores, and to the highest scoring YL in each district, U.S. possession, VE district and country, where three or more entries were received.

W9YBC, Gloria, out-going YLRL vice president who handled the contest, reports that approximately 400 YLs participated in the phone section of the 17th A.P. with 140 logs received. This compares with 195 YLs participating and 75 logs received last year! As W1FTT comments, "My first A.P. and what a ball it was!" There must have been lots of other YLs who felt the same way, and for old-timers, well, we wouldn't miss it! The c-w section drew 140 YLs with 56 logs submitted—compared with 88 and 44 a year ago.

Improved band conditions enticed the DX YLs to participate and W9YBC says about 40 YLs from DX countries entered the A.P., with all continents represented. Anyone else make WAC/YL?

Club entries were allowed for the first time in the 17th A.P. and the Los Angeles Young Ladies' Radio League won handily with a score of 52,803.00, thereby gaining possession of the club prize, a gavel. Other club entries:

Texas YL Round-up Net	**33,347.50**
Ladies Amateur Radio Klub (Chicago)	**24,232.50**
Washington Area Young Ladies Amateur Radio Club	**13,871.25**
Penn-Jersey YL Radio Club	**12,280.00**
San Diego Young Ladies Radio League	**5,568.75**

These YLs sent in logs for confirmation only: Phone—W3CDL, W4SGD, K5ADQ, K6BUS, W6EHA, W6KER, K6KUP, W6PCN, W7FDE, W7NJS, W8RIR, W9KCF, WØEEE/DEY. C.w. —K4APF, K6BUS, W6JZA, W7FDE, W9MYC.

Here are the scores by district. An asterisk (*) denotes the power multiplier was used.

CW

W1RLQ	315.00*
W1VXC	468.75*
W1YNI	560.00*
W1YPH	225.00*
K2DXD	210.00*
W2EBW	117.00
K2IWO	658.75*
K2JBX	50.00*
K2JYZ	225.00*
W3OQF/MAX	1290.00*
W3TSC	540.00*
W3UKE	60.00*
W3URU	918.75*
W3UTR/4	157.50*
W3YTM/3	1380.00*
W4BIL	412.50*
K4BKT	367.50*
W4BLR	209.00
K4EQB	35.00*
W4HLF	1500.00*
W4PPQ	517.50*
W4RLG	1822.50*
W4KYI	178.75*
W4SGD	350.00*
K5ADQ	920.00*
W5EGD	540.00*
K5KEC	1300.00*
W5RYX	425.00
W6DXI	20.00*
K6ENK	884.00
K6KUP	24.00
W6NAZ	391.00
K6OWQ	1250.00*
W6PCA	715.00*
W6WRT	112.50*
W6WSV	495.00*
W7COX	531.25*
WN7DIF	5.00*
W7PTX	67.50*
W7PUV	935.00*
W7RAX	50.00*
W8KLZ	31.25*
W8OTK	37.50*
W8SJF	756.00
W9UON	11.25*
W9USR	187.50*
W9YWH	5.00*
KP4ZV	675.00*
KZ5KA	5.00*
VE3AJR	510.00*
VE5DZ	187.00

Phone

K1ADY	782.50*
W1CEW	5400.00*

[Continued on page 114]

YL Nets

Phone

Band	Freq. (kc)	Day	Time	NCS
75	3900	Wed.	8:00 a.m. EST	W1YPT
	3900	Wed.	9:30 a.m. EST	W8ATB
	3900	Mon.	3:00 p.m. PST	W7HHH
			(alternate	W7NJS)
	3915	Wed.	9:00 a.m. PST	W6PJF
	Ironing Board Net		(alternate	W6GQZ)
	3970	Mon.	10:00 a.m. CST	WØUDU
	Iowa Net		(alternates WØBFW,	WØPIK)
	3900	Tues.	8:00 a.m. EST	W4HLF
	The Blue Ridge Net			
	3820	Wed.	9:00 a.m. PST	W7QYN
	Nylon Net			
	3838	Tues.	9:00 a.m. EST	WØKJZ
	Pi-Net			
	3880	Thurs.	9:30 a.m. CST	W5WXY
	Texas Round-up Net		(alternate	W5ZPD)
20	14,240	Thurs.	1:00 p.m. CST	W9RUJ
	Tangle Net		(alternate	K5ADQ)
	14,275	Wed.	2:00 p.m. EST	W8SPU
	SSB Net			
10	28,900	First Fri. monthly	9:00 p.m. EST	
	QRMary Round Table			
	29,000	Tues.	1:00 p.m. EST	W9GME
	Hair-pin Net		(alternate	K6EXQ)
	29,640	Fri.	10:00 p.m. CST	W9LDK
	Lark Nest			
	28,800	Mon.	8:00 p.m. EST	W1RLQ
	WRONE Net			
40	7215	Thurs.	9:00 a.m. EST	K2IWO
	Friendly Forty Net			
15	21,390	Fri.	2:30 p.m. EST	KZ5VR
	Cross Country Net			
	(alternates W9RUJ, W5RYX, W7WLX)			

CW

80	3610	Wed.	9:00 p.m. EST	W1YPH
	3750	Thurs.	2:00 p.m. CST	W9MYC
	Lark CW Nest			
	3743	Wed.	1:30 p.m. EST	KN1AAK

SSB

Bob Adams, K2DW
245 Revere Road
Roslyn Heights, N. Y.

COUNTRIES WORKED
(Two-way SSB)

K2DW	62	W6IAL	51
ZS6KD	61	W5HHT	51
W2JXH	60	ZL3IA	51
W3ZP	60	W2CFT	50
VE4NI	58	VE7EL	49
K2AAA	58	ZL3PJ	49
W2GG	57	PAØIF	48
DL4SV	57	HR2WC	47
W2EWL	56	G3AAO	46
W8DNY	55	W9JJC	45
VK3AAE	54	DL4KS	45
G6LX	53	W8QNF	43
W5HHT	53	HB9FU	42
W4INL	52	K2GLG	42
OH2OJ	51		

Each month we creep a little closer to the century mark in countries worked. Your editor made it 62 with BV1US, EA4CX, HP1EH and EA9AR to keep ahead of the pack, but it gets tougher each day. Also new countries become harder to find. There must be many other stations with 40 or more countries worked on SSB, two-way, whose calls do not appear in our list, but to repeat myself, I am not a mind reader. A postcard or a call on the air will insure your call appearing in future lists. BV1US, Howard in Formosa, continues to work the gang each Monday, Wednesday and Friday from 0730 CST. His only assigned frequency is 14163 for transmitting but he listens for the SSB stations at the top end of twenty. Howard uses a 20A exciting a 600L and a W3DZZ beam.

Manuel, EA9AR came on 20 this month with one of the strongest signals heard from outside the States. Manuel looks for USA contacts each day from 1700 EST. He is rock-bound on 14307 temporarily, but will soon have other crystals for 20, 15 and 10.

Luis, EA4CX using a KWS-1 and a 75A4 made his debut last month, with a big bang and the pile-up on the high end of twenty calling him was ten deep. Welcome Luis. Louis, HP1EH put Panama on the SSB map last week, and is now a confirmed SSB advocate. ZE5JJ finally fired up his rig and together with ZE6JB are ably representing Southern Rhodesia.

This month we are pleased to feature HR2WC, Wayne Cooper, who needs no introduction to the single side-band gang. Prior to his present La Lima, Honduras QTH, Wayne was active as YN1WC in Nicaragua on SSB. Wayne is plant engineer for Tropical Radio Telegraph Co. and has been in the tropics for six years. His state-side call is W6EWC which he has held over twenty-five years. He is still a bachelor, but in his own words "his hunting license is still unrevoked." HR2WC uses a B & W 5100 xtr and an NC-183D with mechanical filter and a product detector. His antenna is a doublet among the palm trees and close to a tin roof, which, judging by his tremendous signal sure does work well. By working HH2JT, CX5AF, HR1EZ, KX6BU, OA4BK and ZE6JB, Wayne brought his countries worked total to 47. Good luck Wayne.

Alvey who is now up to 45 countries on SSB, reported the second annual single side-band dinner

Alvy, W9JJC

(Long John) Harry, W9HB

was held in Indianapolis on December 14th with 38 attending from Indiana, Ohio, Kentucky, Michigan and Illinois. (Alvey is W9JJC.)

W9AOV, George, reports working W9THI/KL7 mobile during the entire trip up the Alcan Highway from Canton, Illinois to Anchorage, Alaska. The mobile rig was a W2EWL SSB converted BC458 transmitter and the receiver was a BC453 with xtal converter. Signals were phone-patch quality all the way.

David, G2MA is experimenting with a new cubical quad on twenty. Our long silent friend Jim, DL4WM is back on 20 again after being confined to a hospital for several months. Jim expects to return Stateside in July. Mike, DL4KS has been very active lately with a big signal. Your Editor worked VS2DW last week and although Tan was using AM, he is gettting very interested in SSB. Maybe we will soon have a Malaya station to QSO on SSB. Tan, who is heard on 14168, listens to SSB and is quite an interesting chap to rag-chew with. KA2YA has been putting through an incredible signal on twenty lately at 2200 EST. We welcome Eva and Alex of CN8MM to SSB and with their 100 watts they have an outstanding signal.

Our old friend W4INL, one of the pioneers of SSB, is now up to 52 countries and is getting set to operate in fifteen to look for some more DX. He is all primed for the SSB DX Contest. Good hunting, Bob. Last month we reported all the DX that Dave, W6VX was working with "only his final." Quite a feat if true, but he did use his *exciter* only on fifteen.

W2KR, K2AAA and W4FB are back home again after a trip with General LeMay, KØGRL. Twenty and fifteen meter SSB stations were operated while en route and hundreds of contacts were made with fifty foreign countries. Editor handled many phone-patches while the plane was flying over the ocean including one to Arthur Godfrey, K4LIB. The call K2AAA/AM was used on the amateur bands while out over the Ocean and MARS calls and frequencies were utilized while flying over foreign countries.

A testimonial dinner to Fred Schnell, W9UZ was held in Chicago on December 19th, at the Palmer House. Fred, who is moving to Florida, has contributed much to Ham Radio, during his forty odd years as an amateur. While serving as Communication Manager of the League, he interested the U. S. Navy in "short-waves," and using ham gear sailed to New Zealand early in the thirties and worked American amateur stations on forty meters en route. He was also instrumental in sending Paul Godfrey to England to listen for U. S. amateur signals in 1921 during the unforgettable "Transatlantic Tests." Fred is active on 20 SSB, and we hope to hear his cheerful voice from his new W4 home. Good luck, Fred.

DL4WM, Jim has been appointed Director of the MARS for Europe. Manuel, EA9AR when not on twenty SSB is Chief of Customs in Spanish Morocco. Pres, ex K6EB has moved to Cedar Rapids and has a new call, WØRT. Frank, W6AOR has a new wide spaced three element beam. Ron, W6CRV has a new 20A exciter. XE2JK is active on SSB from Mexico City. PAØIF is a pilot on the Dutch Air Lines and gets to the States every two weeks. W4HB, Stu lost his Dad last week after a long illness. Our sincerest sympathies, Stu. W2ZE, Stu is home again after a tropical cruise. W2JXH, Harry is leaving January 10th for KP4-land. Maybe while he is away I can catch a few countries, and get a more comfortable lead. Wish Empty, ZS6KD and Allen, W3ZP would also take a trip some place, hi.

We welcome pictures of SSB operators and their stations for future issues. Why not get out your cameras and take some snaps, fellows? Harry, W9HB heard me asking some of the DX boys for pictures and sent me one of himself relaxing in his longies. He's quite a handsome lad, isn't he? I'll bet he will have quite a few calls from the YL's.

In two weeks from the time I am writing this we will be going hot and heavy in our SSB DC Contest. Hope to work all of you and that we all run up some big scores.

73, Bob, K2DW

HR2WC

letters [*from page 16*]

On page 16 of the October 1956 CQ there appeared a letter from W3LSG asking about conversion instructions for the Mark II tank transmitter. In the chance that he may wish to follow through with the CQ recommended conversion we now have more details available.

Upon investigation there actually were two variations of the conversion which seemed to work out OK. We shall not go into a detailed discussion here on the merits of each, rather we will leave it to your own inquisitive nature to find which is best for you. Method #1 is the lateral hitch and provides for good balance of the unit as it is heaved over the side. #2, the end-hitch, is shown in the second photo. Photo #3 shows Art Brothers, loyal Associate Editor, K2VOO, about to run some drag tests with the CQ Lab Boat.—Ed.

Photo I

Photo II

Photo III

Dear Wayne:

I thought you would like to know, that for the past few weeks I have received an average of six letters per day from fellow hams, supplying more than ample info on the conversion of the Mark II into a swell rig (not an anchor-hi).

It is certainly surprising to learn that there are many Mark II's on air today, and they seem to all be doing yeoman service, and I do agree with all the letters that the receiving end of this job is sure F.B. after adding bandspread, and the xmtr is also F.B. as a low power job—

W3LSG's Shack

Proof pasitine that the Mark II is much better suited as a Ham rig than an anchor is shown by the enclosed photo of my shack, in which you will notice that the Mark II now occupies a prominent spot next to the other gear, much of which is also surplus.

For 20 cw, a modified BC-348, and for 2 meters a converted R28/ arc 5 both of which are FB receivers. The rest of the line-up consists of a 15 watt 2 meter xmtr, 600 watt 20 cw xmtr, and 125 watt all band xmtr. into a 3 element 20 meter Beam, a 4 oner 4 2 meter Beam, and a long wire—

I might add in closing that the Mark II might well make a good anchor, but it certainly makes a much better Ham rig.

David James Wilke, W3LSG
R.D # 2
Pottstown, Penna.

We're Wrong

Shame on you!

Don't you know that there are some screwballs who would do just as the ad suggests (Blind Your Friends, November CQ, page 52). Let's grow up and cut junk like this out of CQ.

G. Chassman, W8DOO
Detroit, Michigan

We're Write

Dear Editor,

Just a line to state that what I like best of all about CQ is the progressive, un-orthodox attitude and articles.

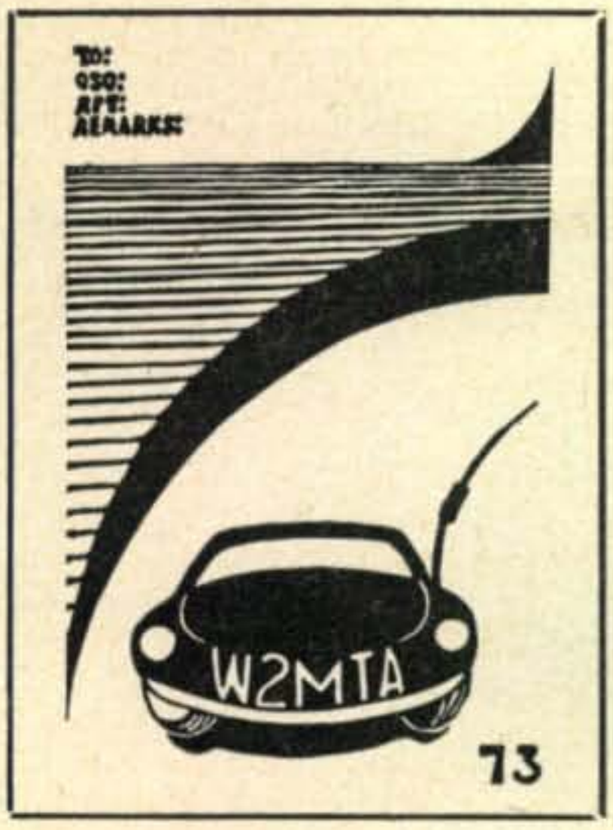
Charlie, W3UJP

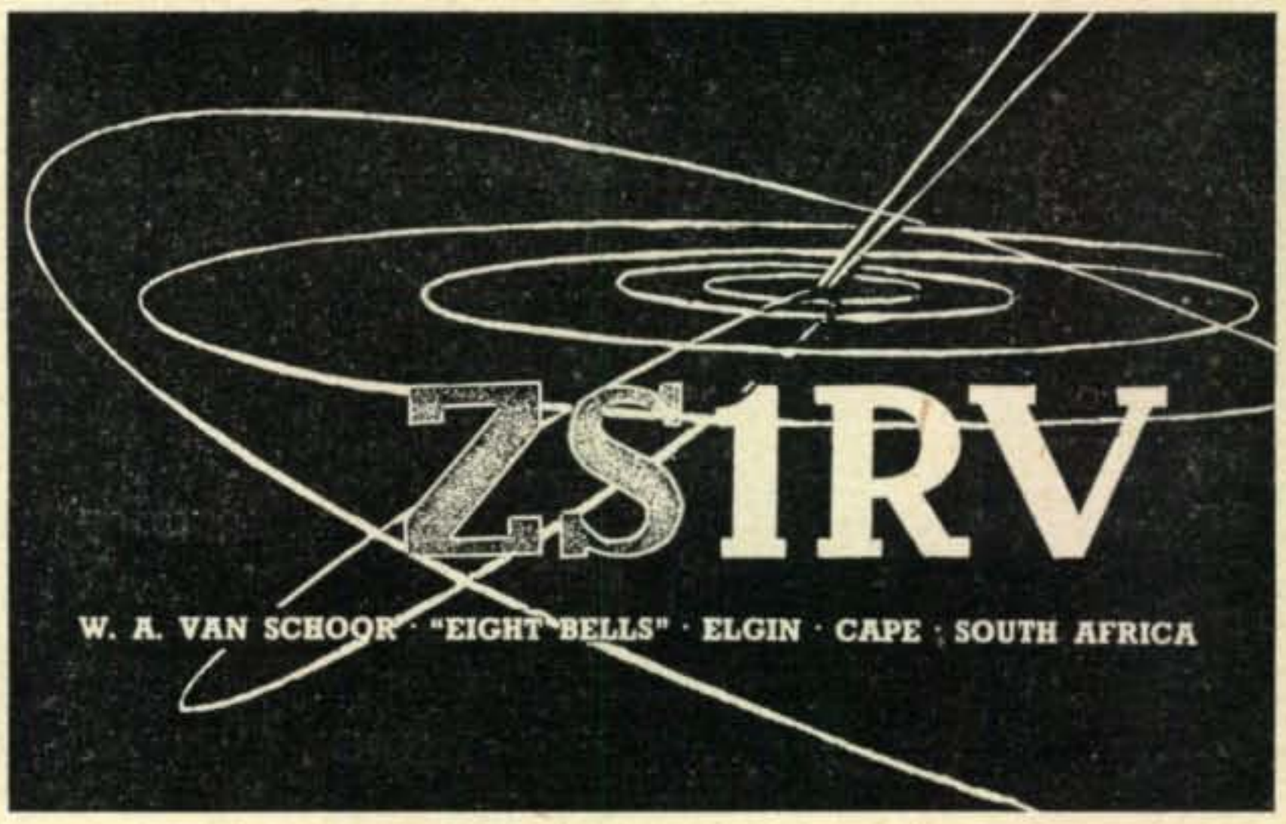
Hi Wayne,

I roll on the floor when I read some of the humor in the ads. Especially the one for non-headlight dimmers. I have thought of this method many times.

Bill Ziesler, W2DLP/3

[*Continued on page 106*]





QSL Contest

Are you looking here for your card again? Sorry Bud, another loser. Tough luck, looks like ZS1RV wins the two year subscription which we foist off on winners. Maybe next month, eh? Better get that card of yours in to our impartial judge, honest Wayne. You may at least become world famous as one of our runners-up, like the four other cards here. Quite a few darned good photographic cards have come in lately. Tops in this category are W2SKE and KØAIE. W2MTA did his with a linoleum block. K5CEV/Mobile's card looks a lot like my car after one of our usual New York snow storms. Where's your card?

Frank Anzalone, W1WY

Contest Calendar

February	8-10	ARRL - DX - Phone
March	8-10	ARRL - DX - Phone
February	22-24	ARRL - DX - CW
March	22-24	ARRL - DX - CW
April	6-7	DARC - WAEDC - CW (Last half)

Current and coming DX contests, DARC and ARRL, were covered in last month's calendar so there is nothing new to report in this issue. We have been trying to get dates and rules for the REF contest that is usually heard during the month of April but those in the know have been very lax in getting this information to us, so we have nothing to report at this time.

What happened to the South African contest that was so popular up to a few years ago when it was suddenly discontinued?

It would seem to us that with conditions rapidly approaching a peak, some of these foreign clubs are missing a good thing by not taking advantage of all the open dates available in February, March and April.

Correspondence is welcome from contest editors of other magazines and clubs so that ideas and dates can be exchanged for future contest activities.

I would especially like to hear from participants in our own World Wide DX Contest. Do you approve of the dates and having the Phone and CW Sections run on successive week-ends? Or would a rest period of a month between the two sections be desirable? Let me hear from you, fellows.

73, Frank, W1WY

DX

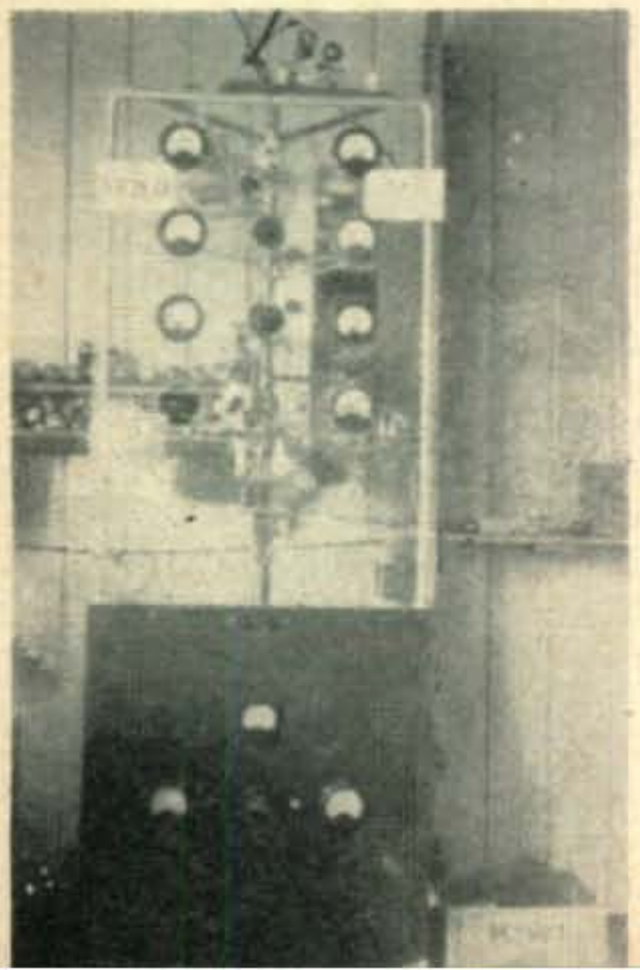
Operating position of W1BB/1 "Villa Mon Repose" his Summer place in Eastern Maine. During an October stay Stew's 75 watt 160 meter signals were copied by PY2AJK, RST 329.

R. C. "Dick" Spenceley, KV4AA
Box 403, St. Thomas, Virgin Islands

Our heartiest CONGRATULATIONS to the following stations upon their achievement of WAZ:

NO. 329 G3DOG		
Richard F. C. Crowther	**40-173**	**(26th G)**
NO. 330 W4AH		
Thadeus C. Wood Jr.	**40-190**	**(5th W4)**
NO. 331 GM3DHD		
George W. D. Brown	**40-250**	**(1st GM)**
NO. 332 W6CUQ		
Edward R. Hawkins	**40-263**	**(120th W6)**

Charley Freeman, ex-VR2CD, signed VE7ASL/VR3 and VR3D from Christmas Island from April 13th to June 29th, 1956. He is now located at KM6AX and can be reached via Box 32, USNS 3080, FPO, San Francisco. The other Christmas Island is in the Indian Ocean and is the present habitat of ZC3AC and ZC3AF.



A QSL from AC4RF gave G3DOG his WAZ while W4AH went over the top with an overdue pasteboard from UAØKFD. GM3DHD hopped on board with cards from UAØAB and UAØCB as W6CUQ made the grade thanks to UAØOM.

We also welcome the following as newcomers to the HONOR ROLL:

W5ADZ	**39-254**	**CO2BL**	**36-215**
W7EJD	**39-191**	**W8EUP**	**36-118**
W6GMC	**39-170**	**W8LY**	**35-130**
W5RIO	**38-179**	**PHONE ONLY**	
W3RUT	**38-164**	**CO2BL**	**35-210**
W9YSX	**37-158**		

DX Notes

Via W7DJU UA1KAU advises that there is an active station on Wrangel Island signing UAØKSI on 14 mc . . . The expedition to Tannu Tuva which was to have signed UAØKTT apparently did not materialize, however Sakalas, UP2AS, and Larry, of UA1KAI say that they will operate from that spot for a month in the Spring or Summer. This trip will be under government auspices . . . Topping this off there is reported to be a club station, UAØKTA, operating from Kyzyl in Tannu Tuva . . . OK1MB located UA1KGA on Hooker Island and says another station will soon be active from Rudolph Island. We understand both of these will count as Franz Josef Land . . . UM8KAA has made some appearances on 14 mc as promised and puts out a drifting T8 VFO signal. UM8KBK has been reported as a new UM8 on 14 mc . . . UPOL6, North Pole, has been active on 14040 around 1615 GMT while UPOL4 is often heard near 14080 skedding UA1 . . . Again re Tannu Tuva. UA1KAU was contacted and said he was using the 40 watt rig which would be on the air as UAØKTT before July . . . LA9LF/P, 14035,

ALL-BAND VERTICAL ANTENNAS

GOTHAM'S sensational new vertical antennas give unsurpassed multi-band performance. Each antenna is absolutely complete, can be assembled in less than two minutes, and requires no special tools or electronic equipment. Radiation is omni-directional, with maximum radiation at very low, DX angles. Perfect multi-band operation is secured through simple, efficient design and superior materials. In the V160, resonance in the 160, 80, 75, and 40 meter bands is secured through use of the proper portion of the loading coil. Yet, when the coil is eliminated or bypassed, the V160 will operate perfectly on 20, 15, 10 and 6 meters! The same idea applies to our V80 and V40 multi-band verticals. No guy wires needed, rugged, occupies little space, proven and tested. Send for your vertical multi-band antenna today!

V160 (for 160, 80, 75, 40, 20, 15, 10 and 6 meters)..... $18.95
V80 (for 80, 75, 40, 20, 15, 10 and 6 meters)..... 16.95
V40 (for 40, 20, 15, 10 and 6 meters)..... 14.95

Complete instructions included with each antenna—literature on request

WORK THE WORLD WITH A GOTHAM BEAM

Study these specifications—compare them—and you too will agree, along with thousands of hams, that GOTHAM beams are best!

TYPE OF BEAM. All Gotham beams are of the full half-wave plumber's delight type; i.e., all metal and grounded at the center. No wood, tuning stubs, baluns, coils, or any other devices are used.

MORE DX CONTACTS WITH GOTHAM

GAIN. Gotham beams give the maximum gain obtainable. Our 2-element beams give a power gain of four (equivalent to 6 db.); our 3-element beams give a power gain of seven (8.1 db.); and our 4-element beams give a power gain of nine (9.6 db.)

THE DESIGN IS PROVEN

FRONT-TO-BACK RATIO. We guarantee a minimum F/B Ratio of 19 db. for any of our 2-element beams; 29 db. for any of our 3-element beams; 35 db. for 4-element beams.

THOUSANDS IN DAILY USE

MATCHING. Matching of the transmission line to the beam is extremely simple and quick. Everything is furnished and the matching is automatic. No electronic equipment or measuring devices are required.

ALCOA QUALITY ALUMINUM

ASSEMBLY AND INSTALLATION. No special tools are required for assembly and installation. Entire job can be done by one man in less than an hour. Full instructions are included with each beam.

CONSISTENT PERFORMANCE

MAST. Any Gotham beam can be mounted on a simple pipe mast. Diameter of the pipe should be between ¾" and 1⅝".

NO FLIMSY WOOD OR INSULATORS

STANDING WAVE RATIO. A very low SWR of approximately 1.5 to 1 will result from following the instruction sheet, depending on the height above ground and the surrounding area. If an SWR indicator is available, Gotham beams can be quickly and easily adjusted to 1.1.

QUICK INSURED DELIVERY

STANDARD AND DELUXE BEAMS. Standard beams in the 6, 10 and 15 meter bands use ⅝" and ¾" tubing elements; the deluxe models for these bands use ⅞" and 1". In 20 meter beams, the standard has a single boom, while the deluxe uses twin booms.

THE PRICE IS RIGHT!

HOW TO ORDER: Send coupon with check or money order directly to GOTHAM or order from your local distributor. Immediate shipment by Railway Express, charges collect. Foreign orders accepted.

AIRMAIL ORDER TODAY—WE SHIP TOMORROW

GOTHAM

DEPT. CQ

1805 Purdy Ave., Miami Beach, FLA.

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	28.95
☐ 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 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 .....
Address .....
City ..... Zone..... State.....

For further information, check number 23 on page 128.

W6GVM, Emil Malek, of Sacramento, Calif. has racked up over 200 countries and 37 zones on phone. (Courtesy North Calif. DX'er)

All set to go in the recent CQ World-wide phone contest are ops (l to r) R. F. Krist W6KTE/KA5MC, Zane Sprague W6UWL/KA5ZS and Jim Ahneman W9FWQ. Other op at KA5ZS is Smitty W6FHG.

visited Jan Mayen in December and gave many a "new one". QSL via N.R.R.L. . . . 4S7MR is going to the Maldive Islands soon, says VK3CX, no date given but keep your ears peeled . . . ZK2AB showed up on 14087 giving his QTH as Box 41, Niue Island . . . LU5AQ reports contacts with Chiong, HL2AC, in Seoul and HL2AN . . . KW6CM is a new YL op, c.w., on Wake Island . . . News from Swan Island has it that W5TET/KS4 is on daily from 2000 to 2100 GMT, 14015. W4EMF/KS4 was due to leave around the middle of December while KS4AX, active on 21 and 28 phone, left about January 1st. W5TOP/W5TOI/KS4 was OK but is now back in Ft. Worth, Tex. KS4AX is W4OAZ . . . The VKØ prefix is now official for Australian Antarctica and probably will be heard from around February . . . Watch for Dave, W6VX, who hopes to be on from VQ9. He will be QRP, xtl freqs, on 21 mc. His trip covers January to April . . . BV1US appears on SSB on Mondays, Wednesdays and Fridays during daytime (USA time) and nightly on Tuesdays and Thursdays. He run a 20-A and 600-L to a three element beam . . . YU1HU/SU came on 7020 from the Sinai desert while MD5ADG has also been heard . . . FG7XD should be on by now with good receiver and 50 watt rig . . . Via W4ML, who just completed his 300th Russian QSO since June 1st, submits the following list of UAØ Club stations now active:

UAØKAB, Krasnoyarsk, Zone 18.	UAØKJF, Blagoveshchensk, Zone 19.
UAØKAG, Zone 18.	UAØKUB, Zone 18.
UAØKFE, Sakhalin, Zone 19.	AØKKB, Vladivostok, Zone 19.
UAØKFO, Zone 19.	
UAØKGO, Khabarovsk, Zone 19.	UAØKOA, Ulan Ude, Zone 18.
UAØKCA, Khabarovsk, Zone 19.	UAØKQB, Yakutsk, Zone 19.
	UAØKQC, Yakutsk, Zone 19.
UAØKJA, Blagoveshchensk, Zone 19.	UAØKSB, Irkutsk, Zone 18.
	UAØKUO, Chita, Zone 18.

John, W6YY, advises that Toshio, ex-JA3VO, will operate the Japanese IGY station from their Prince Harald Base in Antarctica. The call will be JA1JG and the 7, 14 and 21 mc bands will be used. QSL via J.A.R.L. . . . The first JA/W six meter 2 way phone contact occurred on October 27th between JA1AUH and K6EDX . . . VQ8AP and VQ8AD are active from Mauritius on c.w. as well as VQ8AR on phone . . . Dave, YJ1DL, is now in VK5 but expects to be back in YJ-land in March . . . CO2BL advises that EA9EE hands out 14 mc phone contacts, from Rio de Oro, on Saturday mornings . . . Lucien, XW8AC, is again active on 14165, A3, 1530 GMT . . . The New Zealand IGY station in Antarctica expects to start operation around the first of the year with a possible prefix of ZL5 . . . CEØAC, Easter Island, occasionally gets on 14058 at 0430 GMT . . . YK1AK's QSL says "5 watts to a 6AQ5" . . . EA8CM cards have been returned by U.R.E. marked "N.G." . . . HS1WR is now back on 14 mc c.w. from Thailand . . . Gold Coast, ZD4, becomes an independent African state this March. Its name will be GHANA. New prefix is not known as yet . . . Saarland disappeared as a separate country when it was absorbed into Western Germany at the end of 1956. Prefix was 9S4 . . . The Saar may be DL8 after January 1st . . . VP5KT was heard from Turks Island saying QSL via RSGB . . . W6GMF reports ZB2AD, manned by ZL1DA, on 14042 at 0430 GMT. QSL N.Z.A.R.T. . . . FW8AA was heard on Dec. 13th, 0630 GMT, 14280 A3. He is reported to have xtls on 14152, 14163, 14280 and 14340 . . . WØAIW worked VU4AB who claims to be in the Laccadives (???).

Via K6ENX we hear that FB8BR returns to Paree in March 1959 but plans a bit of operating from the Comoros before leaving. In the meantime there will be two permanent hams in the Comoros, one on Moroni Island and the other on Anjouan Island. The latter has passed his exam and should have been on the air by the first of the year. His call may be FB8CB . . . W4EPA advises that ZC3AF showed up one Saturday in November and was promptly snagged

BLILEY NOVICE BAND CRYSTALS

BAND	MULTIPLIER	CRYSTAL FREQ. RANGE	TYPE	PRICE
80 Meters	1	3700.0 to 3750.0 kc's	AX2	$2.95
40 Meters	2	3587.5 to 3600.0 kc's	AX2	2.95
40 Meters	1	7175.0 to 7200.0 kc's	AX2	2.95
15 Meters	1	21,100 to 21,250.0 kc's	SR10	8.50
15 Meters	3	7033.33 to 7083.33 kc's	AX2	2.95
15 Meters	6	3516.66 to 3541.66 kc's	AX2	2.95
2 Meters	6	24,166.66 to 24,500.0 kc's	SR10	8.50

AX2

SR10

Bliley CRYSTALS

BLILEY CRYSTALS FOR SPOT FREQUENCIES IN NET OPERATIONS

MC9

TYPE	APPLICATION	TOLERANCE	PRICE
MC9	3 mc-12 mc experimental frequencies	±.03%	$6.50
SR10	12 mc-27.5 mc experimental frequencies	±.03%	8.50

SR10

Bliley CRYSTALS

BLILEY CRYSTALS FOR AMATEUR • EXPERIMENTAL CITIZEN'S BAND • SINGLE SIGNAL FILTERS

KV3 SR10 CF6 AX2 MC9

TYPE	APPLICATION	TOLERANCE	PRICE
KV3	Reference Frequency 100 kc	±.005%	$8.50
MC9	Marker Frequency 1000 kc	±.05%	8.00
MC9	13.6275 mc (Multiplier to 27.255 mc) CITIZEN'S RADIO SERVICE (CLASS "C")	±.04%	5.50
SR10	27.255 mc (3rd Overtone Crystal) CITIZEN'S RADIO SERVICE (CLASS "C")	±.04%	5.50
CF6	455 kc — 456 kc — 465 kc Single Signal Filters	±5 kc	4.50
AX2	1800-1825 kc; 1875-1900 kc; 1900-1925 kc; 1975-2000 kc	See Note A	3.75
AX2	3500-4000 kc; 7000-7425 kc; 8000-9000 kc	See Note A	2.95
AX2	14-14.5 mc	±10 kc	3.95

Note A: We will supply to integral spot frequencies (no fractions) as ordered; calibration ± 500 cycles in factory test oscillator.

NEW HIGH STABILITY PACKAGE WITH 100 kc AND 1000 kc CRYSTALS

This compact temperature controlled package provides a high stability reference source at both 100 kc and 1000 kc. Precision reference for general amateur use.

TYPE	DESCRIPTION	STABILITY	PRICE
TCO-2L	6.3V Oven	75°C±5°C	$ 9.00
BH6A Crystal	1000 kc	±.0002%	12.50
BH9A Crystal	100 kc	±.0005%	11.00

TCO-2L

Crystal units described are calibrated in recommended oscillator circuit—adjustable to zero beat (at 75°C) in this circuit.

BLILEY ELECTRIC CO. UNION STATION BUILDING ERIE, PA.

Major producers of crystal units, crystal ovens, oscillator assemblies and solid ultrasonic delay lines for commercial and military equipment.

For further information, check number 10 on page 128.

by W4FU and W8BRA. ZC3AF is not very active as he has to transport a receiver over a long distance, from a commercial installation to the shack, whenever he is in the mood for ham operation . . . W5OLG received dope from VQ6LQ that a new VQ6 ham will be on signing VQ6AB with QRP rig . . . OH2YV says there will be activity again in June or July from OHØ, Aaland Islands . . . Pete, G3HVG/4S7XG is now settling in Karachi, Pakistan, and finds it difficult to obtain that AP2 ticket . . . UAØKTX has been active on 14040 around 1300 GMT (Could be Tannu Tuva). While Tannu Tuva has been deleted from the country lists we understand that, should Tannu be active on the air, it may be reinstated. Why it was removed in the first place is somewhat of a mystery to us . . .

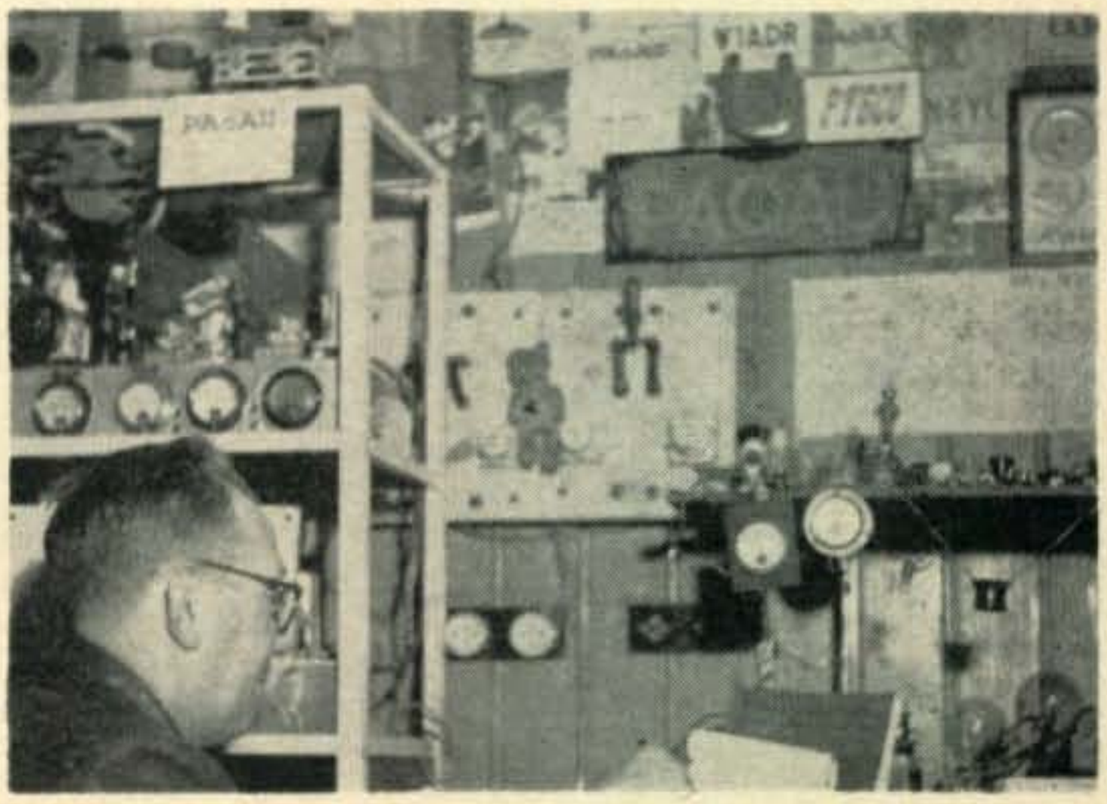
Addresses

CN8FT—Sam Galloway, Sidi Slimane Mars Stn. 49th Comm. SQDN. APO 117, N.Y.
CN8JG—Bill Rosecrans, Sidi Slimane Mars Stn. 49th COMM. SQDN. APO 117, N.Y
CN8JP—Elmer Schroeder, Sidi Slimane Mars Stn. 49th COMM. SQDN. APO 117, N.Y
CN8JQ—Jean Audette, Sidi Slimane Mars Stn. 49th COMM. SQDN. APO 117, N.Y
CN8JX—Glenn Luse, Sidi Slimane Mars Stn. 49th COMM. SQDN. APO 117, N.Y
KAØIJ—(Iwo Jima) APO 815, San Francisco, Calif.
MD5ADZ—Via G3ADZ/R.S.G.B.
SVØWO—(Rhodes) J. W. McMinn, USCGC COURIER (WAGR-40) F.P.O. N.Y.
W7LQN (KR6RY)—W7LQN. c/o Mac Wilkinson, Route 1, Gooding, Idaho.
XZ2OM—(New) F/LT. Myint, BAF/1064, Rangoon, Burma.
ZB1BF—8 Bemelli St., Hamrun, Malta.
ZD1AO—Box 430, Freetown, Sierra Leone.
5A5TH—Box 372, APO 231, N.Y.

Thanks to the Willamette Bulletin, West Gulf Bulletin and W8EV.

DX'ploits

Al, W8PQQ, adds OQØDZ and IT1TAI for 265 while Lindy, W8BHW, adds the same plus YA1AM and SVØWN (Crete) to reach 263 . . . John, W7GUV, rises to 255 with ZD1FG, IT1AGA, OQØVN and FR7ZC as Van, W9HUZ, brought down UM8KAA for No. 250 . . . Norm, W6NNV, went to 248 with VS4FC and ZC3AC while Bill, ZL1BY, snagged ZS8I, CR4AH, ZS2MI, CR5SP and ZD1FG to reach 247 . . . Ed, W6LDD, went to 241 thanks to ZC3AC, I5RAM, UL7KBA and EA9AP as Ray, WØDU, keyed with YA1AM, FL8AB, VS2FE, ZD1FG and ZD9AF for 237 . . . Doc, W8WZ, came up with XE4A, YI2AM, VS9AS and FB8ZZ for 227 while Bob, W6NGA, was garnering 15 new ones which included VQ5GC, UI8KAA, VR6AC, UR6KAF, 3A2BH and VK9TW . . . Clay, W6LGD, cracked 200 with ZC5JM and went on to add VP2LU for 201 as Bob, W3EPV, hit 252 with such as XE4A, OQ5CZ, VR4AA, VK9TW, YVØAA, YJ1RF and IT1SEM . . . Art, W9LNM, also went to 252 with IT1AGA, OQØDZ, 3A2BH and ZC5SF while Stan, W1CLX, added YVØAA and FL8AB to reach 250 . . . John, W1BIH, goes to 249 with XE4A, VK9TW, PJ2MC, VK1IJ, FL8AB, OQØVN and IT1TAI as Howy, W2QHH, hooked ZS2MI for No. 247 . . . Weldon, W2NSZ, added IT1AGA for 245 while Bob, W4GG, hit 239 with SVØWN, YVØAA, XE4A, PJ2MC, VK9TW, IT1AGA and LA9LF/P . . . John, W4HA, goes to 228 with OQØDZ and I1AXV/IT as Ren, W3KDP, rises to 226 with IT1TAI and UL7KBK . . . Andy, GM3EST, adds 17 including such as OQØDZ, YVØAA, JZØACK, ZD8SC, HC8GI and SM8KV/LA for a 222 total while EV, KP4KD, goes to 221 with IT1AGA and FB8BR . . . Hal, W6TXL, hits 221 with HB1MX/HE, UI8KAA, ZS9R, ZD2GWS, FE8AE, EA9AP, UD6DD, UF6KAF and FR7ZC as Bob, WØQVZ, makes it 220 thanks to VK9AJ, OY7ML and UH8KAA . . . Rip, W4EPA, ups to 219 with IT1ZIW, UJ8AF, ZD9AF, XZ2OM, UP2AC,



PAØAU, P. Aubroeck, rattles the ether from Rotterdam, Holland.

UI8KAA, UR2KAA, UD6BM, YVØAA, ZD1FG and YK1DF while Pat, W2GVZ, adds SV1LP (Rhodes) for No. 217 . . . Vern, W7CNM, adds 14 which include 3A2BH, UR2KAA, PJ2ME, UN1AB, HH2Y, ZS2MI and SM8KV/LA for 206 as Bob, W6DBP, made it an even 200 with HC8GC, HB1MX/HE, UP2AC, ET2LB and VQ8AB . . . John, W9WCE, goes to 194 with YVØAA, UQ2KAA, VK9TW, UR2AK, PX1EX, ZM6AJ, VR4AA, YA1AM, UD6BM, CR4AG, UO5KBR, FK8AS and SV1LP while W7NFE/6, now K6UYC, upped to 179 with such as UD6DD, ZB1BF, YS1O, CEØAC, CR5SP, FG7XD, FF8AP and UL7KBK . . . Carl, W4NBV, hooked XW8AB for his 39th zone and went on to add ZD1FG, UB5KBA, IT1AGA and OQØDZ for a 173 total as Eddy, W2SHZ, added ZD1FG, OQØVN, ZD6BX, VR4AA, VR3B, PX1EX, SM8KV/LA, PJ2MC, YVØAA, XE4A and HI8FR for 202 . . . Skip, W6JQJ, goes to 196 with UN1AA, VP5DX and FP8AP while Paul, W9KXK, nicked UR2KAA, UP2AA, SU1IM,

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UD6DD, UL7DA, YVØAA and PJ2MC for a 186 total . . . Tony, LU5AQ, added three Russian zones plus YVØAA, FE8AE, VS2CR, AP2RH, UP2KBC, UA9KAB, UC2AA and UR2AO to rest on 179 as Bob, W6YMH, made it 154 with such as ZD6BX, ZK1BS, UF6KAF, UI8KBA, UL7KBA, LZ2KRS, UQ2KAA and UA9CM . . . Aleta, K6ENL, reports ET2RP, W2JNA/ZD4 and UP2AC for 145 while Frank, OE1FF, goes to 166 with such as XW8AB, ZD3A, ZS3E, W6OXS/VP2, KW6CA and VQ5FS . . . On phone, Bert, G8IG, went to 199 with ZD8SC as Don, W6AM, hit 215 mike-wise with UP2AS . . . Fred, W8KML, made it 216 on phone with UAØKJA and CR5AC . . . John, W4HA, raised his phone to 214 with OQØDZ and I1AXV/IT while Ray, WØNCG, miked with FY7YE, ZK1BL, ZS2MI and OQØDZ for 178 . . . Mike,

DX'er Akira Kurokawa, JA1AG, of Kawasaki-Shi, Japan, awaits a couple of QSL's which may make him the first JA WAZ member.

YV5AB, rose to 181 on A3 with such as UB5BK, VP5BM, LU2ZY, VQ6LQ, VR4AA, FS7RT, FB8BC and UQ2AN as George, W2GHV, came up to date with 25 phone additions for a 163 total . . . KV4AA was No. 70 for W7VOL while W7FAW went to 190 with FR7ZC and CR4AH . . . W2QHH raised PJ2ME in 3502 for his 117th 3.5 country . . . VK3CX went to 223 with CEØAC and UL7KBA . . .

HONOR ROLL ENDORSEMENTS

(To December 15th, 1956)

W8PQQ	40-265	W2NSZ	39-245	W5RIO	38-179
W6CUQ	40-263	W4GG	39-239	LU5AQ	38-179
W8BHW	40-260	W4HA	39-228	W5RUT	38-164
W7GUV	40-255	W3KDP	39-226	W6YMH	38-154
W9HUZ	40-250	GM3EST	39-222	W9SYX	37-158
GM3DHD	40-250	KP4KD	39-221	K6ENL	37-145
W6NNV	40-248	W6TXL	39-221	CO2BL	36-215
ZL1BY	40-247	WØQVZ	39-220	W8EUP	36-118
W6LDD	40-241	W4EPA	39-219	W8LY	35-130
WØDU	40-237	W2GVZ	39-217	PHONE ONLY	
W8WZ	40-227	W7CNM	39-206	G8IG	40-199
W6NGA	40-220	W6DBP	39-200	W6AM	39-215
W6LGD	40-201	W9WCE	39-194	W8KML	38-216
W4AH	40-190	W7EJD	39-191	W4HA	36-214
G3DOG	40-173	K6IIYC	39-179	WØNCG	36-178
W3EPV	39-252	W4NBV	39-173	CO2BL	35-210
W9LNM	39-252	W6GMC	39-170	YV5AB	35-181
W1CLX	39-250	W2SHZ	38-202	W2GHV	35-163
W1BIH	39-249	K6JQJ	38-196		
W2QHH	39-247	W9KXK	38-168		

Last complete HONOR ROLL appeared in the January issue.

Next complete HONOR ROLL will appear in the May issue.

Here and There

Reeve, W2YW, is now K4AW . . . Van, of BV1US, spent some time with W3VKD and advises that Col. Yong, C3MY, is temporarily in USA . . . Doug, WØVCQ, is on from Fargo, North Dakota, each weekend 21010 to 21090 for those needing that state. A DX-100 and 3 element beam is used . . . Glenn, CN8JX ex-W7GGO/AM/W5RIQ, says anyone needing CN8 shouldn't have a very tough job picking up CN8FT, CN8JG, CN8JP, CN8JQ or himself. All are very active from the Sidi Slimane AB and have around 65 countries each. See QTH's . . . Joe, KL7PI, won't be active again for several months and it seems someone was using his call as he has received QSL's claiming QSO's during October. He went QRT on September 20th. New QTH is: Joe Paquette, Annette, Alaska . . . Robbie, VQ4ERR, plans VQ9 trip this year but won't go unless Aldabra (VQ7) can be covered also. Seems trip to Aldabra is quite hazardous and many wrecks occur in those waters each year . . . KV4AA was happy to log visits from KØDLC/MM and VP2VE . . . Bernie, ex W3EKK/VK9, now holds K2SWZ . . . 4S7GE left Colombo and now operates from the Trincomalee Base in North Ceylon . . . Al, W8PQQ, wishes it known that QSL's for XZ2OM, FB8BR, MP4QAL, ZD2DCP, 4S7YL and OY7ML should be mailed directly to these stations. He will distribute cards FROM them . . . News re the progress of Danny ex-VR1B etc. towards new expedition will be carried in "last minute items".

New Certificate

The "599" CW, ALL CONTINENT AWARD is available to any amateur station submitting proof of contact with SIX different continents in which a 599 reports was given by each contact. Post to W4ML, Tom S. Stuart, Jakeman St., Bayside, Virginia.

160 Meters

(Via W1BB)

The first 160 meter 1956/1957 test got off to an excellent start on December 10th (WWV N7). G5JU came through first, starting at 339 and peaking at 579 at times, for the first transatlantic contact, a 0540 GMT, when he reported W1BB as 569. This was followed, at 0707, with a contact between W1BB and G3ERN and at 0715 with GM2BUD. W2EQS worked G5JU at about 0740 after which G5JU gradually faded out. W2UWD was also heard by G5JU and G3ERN and SWL Norman Smith. HB9CM will be around again this season and hope to repeat his Liechtenstein trip of last year. George Allen, BSWL 4588 writes:—for a long time I have felt that a good part of the available time was being wasted by sticking to the 0500/0800 GMT schedules. When we can hear W BC stations all over the medium wave band at good strength

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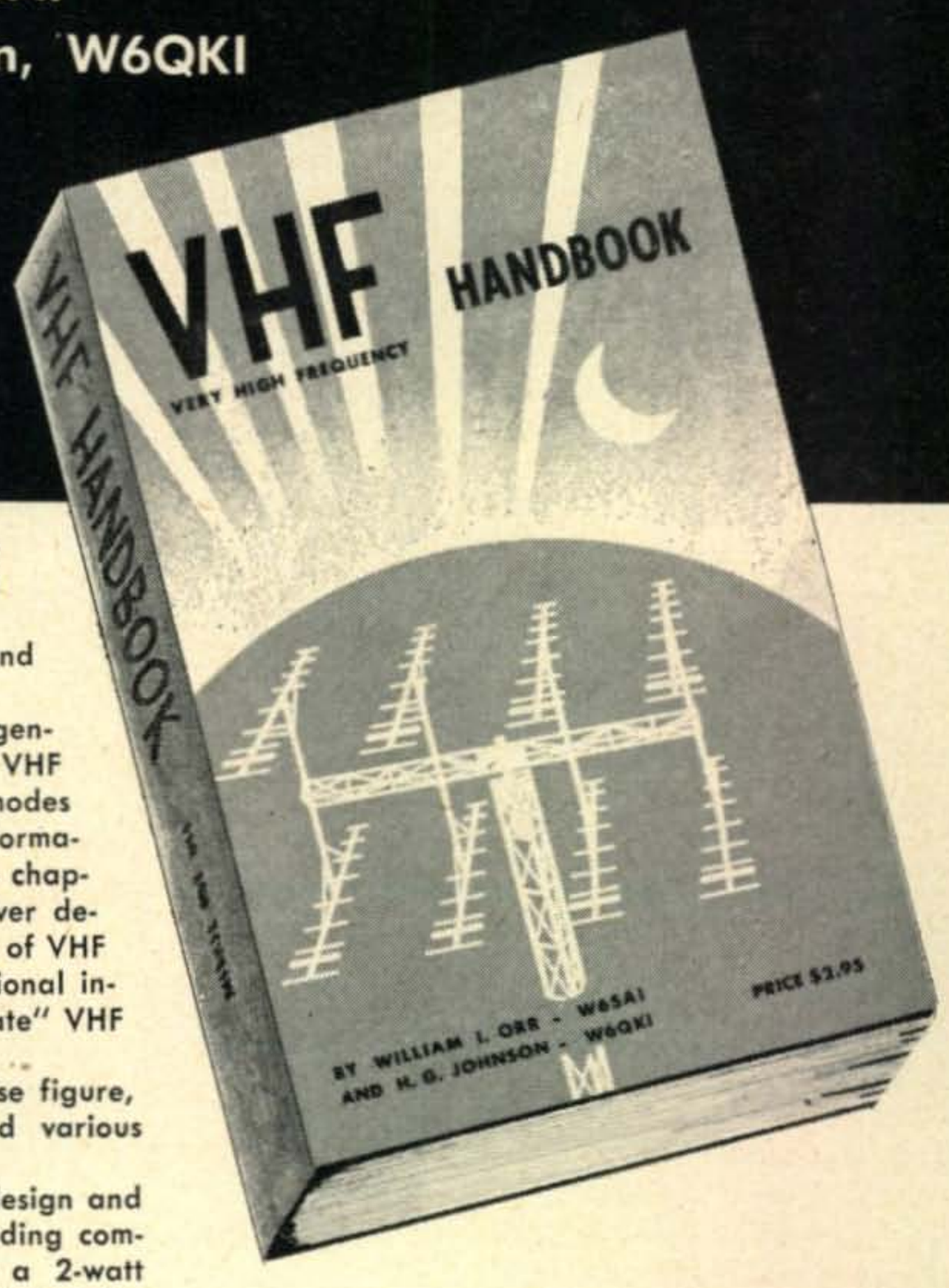

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For further information, check number 38 on page 128.

from about 2200 GMT it is obvious that 160 must be open. I have heard W1BB around 2330 and have copied the late VE1EA at 0130 GMT.

A notable "FIRST" was made on July 22nd at 0810 GMT when CP5EQ, running 50 watts to an Elmac AF67 rig worked W1BB. Reports peaked 349 and 449. Les, CP5EQ, was formerly W1HQM and he has now been transferred from Bolivia. KØHEM hopes, by now, to be using a half mile per leg rhombic which he and WØCWZ have installed on CWZ's farm a few miles north of St. Louis.

Barbed Wire

As a steady habitué of the 14 mc c-w band we feel emboldened to again "sound off" on what appears to be an increase in thoughtless operating tactics which do much to remove the pleasure of brass-pounding on the DX bands.

While most of these offenders are recent graduates from the Novice bands, and are easily recognized by the double or triple "de" preceding their calls plus frequent use of dit-dah-dit-dah-dit-dah, a goodly number of those who should know better are included in this category.

You may recall the old "They are making the Model 'T' three inches shorter this year so that they can get more on the road". With the advent of terrific DX conditions and its attendant increase in c-w activity this simile can apply as, an effort towards intelligent c-w operating, would shorten the Model "T" by three feet if applied c.w.-wise.

We continue on the assumption that most strive for efficiency, pursuit of the Golden Rule etc. in radio operating as well as in other fields of endeavor.

As far as we are concerned the most beautiful thing in the world is an efficient, well keyed and not overlong c-w contact with full use of available Q signals, abbreviations less unnecessary repeats or QSZ. Such contacts result in a minimum of interference to others.

Much has been said (without noticeable results) regarding the unnecessary QRM caused by lengthy testing or tuning-up processes. The persistent occurrence of this type of interference is positively sickening. Proof of the pudding may easily be had by placing your receiver on any c-w frequency and it's even money that one of these characters will show up post haste. To these we can only say: REMEMBER WHEN YOU TEST OR TUNE UP YOU ARE PROBABLY CAUSING INTERFERENCE TO A QSO IN PROGRESS. IF THIS MUST BE DONE KEEP IT TO A BARE MINIMUM!

Intelligent use of frequencies is another prime factor in making the DX bands livable. Extensive use of VFO makes this possible. Towards this we suggest that all stations should listen on the band for five minutes before putting their rig on the air. This will enable you to hear either end of any QSO which might be going on at the time and allow you to QSY to avoid interfering with it. Crowded as the bands are one can usually find a clear spot outside of contest times.

For DX beginners we entreat them to give the following a try:

1. Never call CQ more than three times and sign three times (If no result you can repeat this after a minute).
2. Never call any station more than three times and sign three times (A longer call, especially to a DX station, will inevitably have the result that he will answer another station which signed before you did).
3. The DX bands are for DX. Let them have the right of way. A cardinal sin is to operate on a DX station's frequency. If you call DX stay four or five kc away from their frequency.
4. Keep DX contacts SHORT as many others are waiting to QSO. All info re QTH etc. can be obtained from the book or other sources. Keep USA QSO's short and to the point. You will meet more people that way and not clutter up the band.
5. When a station gives you 569, or over, he indicates he can copy you solid. There's no need to send anything twice. Especially if you live in Minneapolis, Philadelphia, Schenectady or Punxsutawney.
6. PAUSE after signing your call. Anyone has a tough job figuring it out if he hears you in the middle of your call ie: don't run it together.
7. Keep your code crisp and decipherable even tho slow (Nothing sounds sillier than a "speed demon" on a bug which is set 20 dots to a dash).
8. Never call a station who has just called someone else. Wait till he is through with his contact (A quick "K2XXX QRX hr" might be permissible).
9. Cultivate the art of LISTENING. Imitate the tactics of the top DX'ers you hear.

Ben, UC2AA, is very active from Minsk, White Russia. (Courtesy W3MFW)

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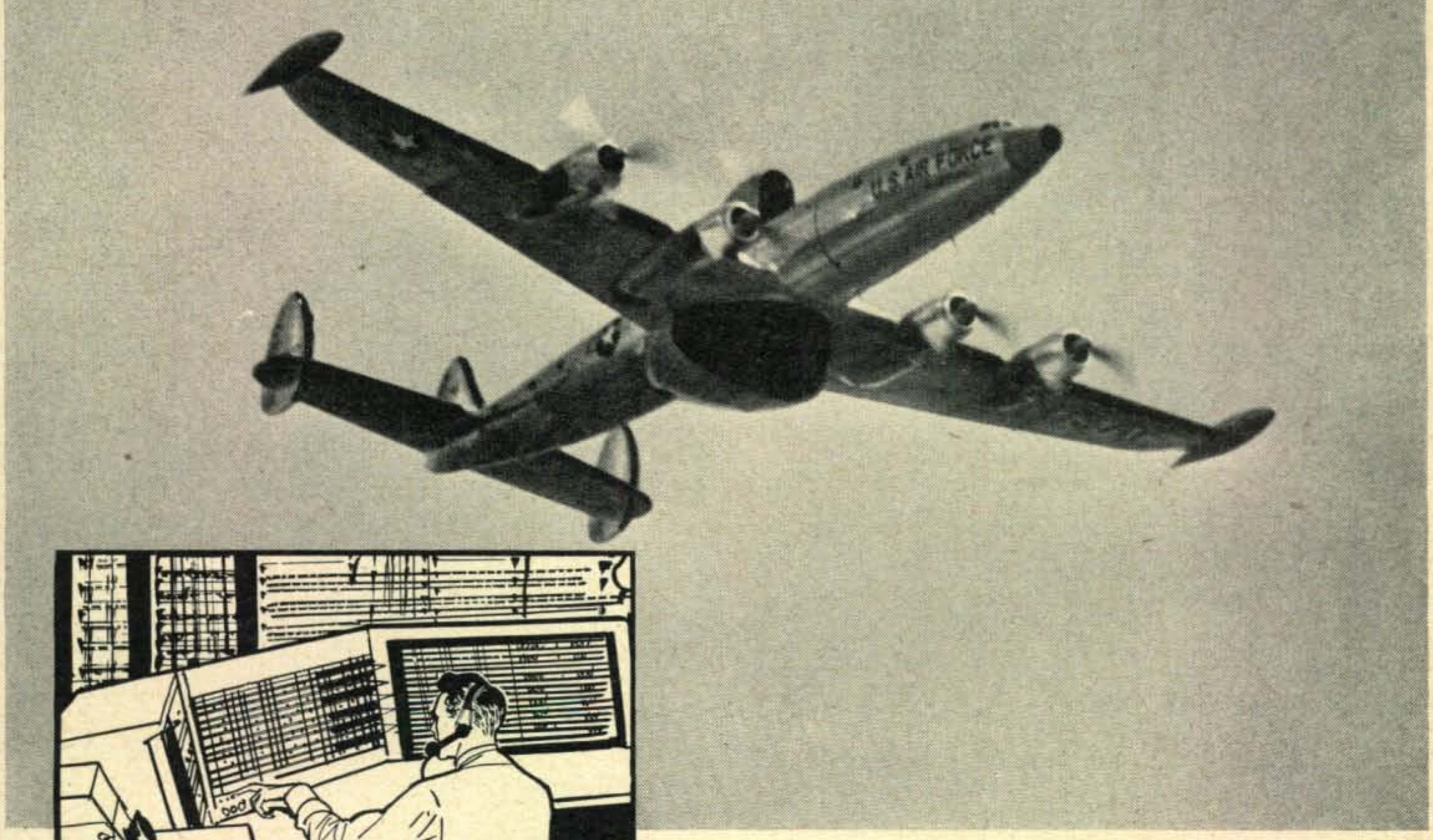

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I1AOF, Gio Loreti, of Rome, Italy, runs 300 watts to a 3 element beam.

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10. The sign-off *"VA"* means just that. No more will be sent or RECEIVED. It is not necessary to acknowledge this with another call and sign-off of your own. Just two dits will convey the intelligence. The big point here is that the frequency will be clear and allow the signing station to hear other calls directed at him which immediately follow his *"VA"*.

The above may be received with varying opinions and we hasten to add that we do not always practice what we preach. However we feel that reasonable adherence to these suggestions will make for happier operating and less congestion.

Last Minute Items

Charles Lebailly, FW8AA, Wallis Island, is now active and comes on around 0700 GMT. Frequency most used seems to be 14342 CW and phone (low modulation). FW8AA has also been heard on 14140. QSL's go via Noumea, New Caledonia . . . ZK2AD (Niue) is active on 14045 usually starting up around 0400 GMT. George is ZL1DA and cards should go via home QTH. Reports have it that he will be on Niue for three months . . . AC4NC was heard on 14035 at 1400 GMT . . . W6VSS nabbed UAØKTX, giving QTH as Kyzyl, Tannu Tuva, Nov. 1st, 1535 GMT . . . Via VK3CX we hear that ZC3AA is also active. QTH Jack Mortland, via Phosphate Co., Christmas Island, Via Singapore. ZC3AC, also Christmas, appeared on Dec. 20th, 14130, and was promptly nailed by W3GHD, W8GZ, W2AGW, W8JIN and W8BHW (1300 GMT). QSL via Box 600, Penang, Malaya . . . SG2DF, Sudan, says he uses that prefix by virtue of being an army station (RAF) . . . EA9AP reports an IFNI expedition very soon (may have come to pass as this is read) . . . AC5PN was No. 193 for W6OME on Dec. 22nd at 0400 GMT . . . KG1AR (Thule) is now W2DPM/4, 33 Huffman Drive, Hampton, Va. . . . Hal, W2UNR, just visited Nepal and Sikkim, says he regretted he had no rig with him (SO DO WE). Another trip to these spots is probable and something will be done about it. . . . Rumors have it that UP2AS may be on as UAØKTT in January or February . . . Correction on ZK2AB QTH (If he is good) is Box 41, Rarotonga, Cook Islands . . . YO3RF worked UAØKSI, Wrangel Island, 14060 kc. OK1MB says he is not on Wrangel (Take your choice!) . . .

Newly licensed for the British Virgin Islands is Bill Bailey, VP2VG, (No rig as yet) . . . On December 25th VP2VE, came on the air from Tortola and made 58 contacts on 14150 phone. Hank, VP2VE, is W4ZHL, and makes periodic visits to Tortola where his parents own an estate. QSL's go to Henry Howell, Box 286, Naval Station, New Haven, Conn. . . . W6CUQ reports Mexican plans to colonize the Revilla Gigedo group of islands which may result in some XE4 activity for those who missed XE4A . . . We have, to now, no dope on VP2AH who claims to be in the Windwards. This is an Antigua Island call and, hence, should count as the Leewards . . . K6EIV reports QSO with KS6AO, Dec. 16th, 14055, 1730 GMT, who said he would be active for two weeks (?) . . . The call SVØWX was reissued to Ray, WØWVS; he QSL's for all contacts after Nov. 1st 1956. He is home now and cards go to WØWVS, Box 34, Farley, Mo. . . . Danny of YASME fame will stay in Los Angeles until the latter part of February. He is being amply taken care of by South Calif. Club members W6YMD, K6EWL, W6YY, W6VUP etc. Things look very favorable towards continuance of his trip. . . . New QTH of FG7XD is: Serge Gaydu, Faubourg Victor Hugo, Pointe-a-Pitre, Guadeloupe, FWI.

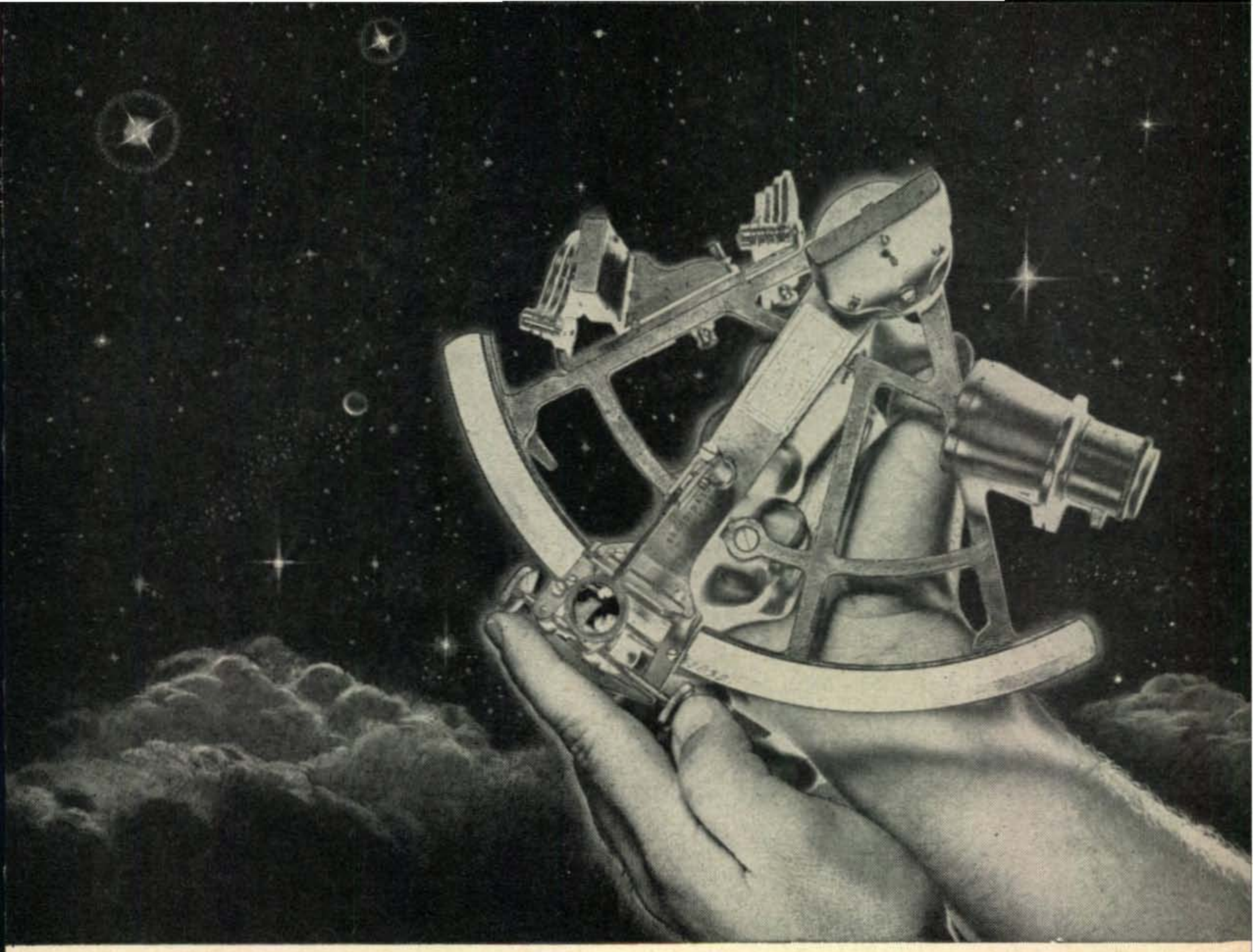
73, Dick, KV4AA

NEW COUNTRIES

As the BRITISH VIRGIN ISLANDS are now a Crown Colony and have no connection administratively with the LEEWARD ISLANDS we now accept them as a separate country for WAZ credit. This status took effect from July 1st 1956 when the other islands were federated. The British Virgin Islands comprise the islands of TORTOLA, ANEGADA, VIRGIN GORDA and associated smaller islands. Credit for this country will date from July 1st 1956.

Following QST's December announcement we also add the AALAND ISLANDS, OHØ, to the CQ list. QSO retroactive to 1946.

For further information, check number 40 on page 128. →



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P. O. Box 2502, Medfield, Mass.

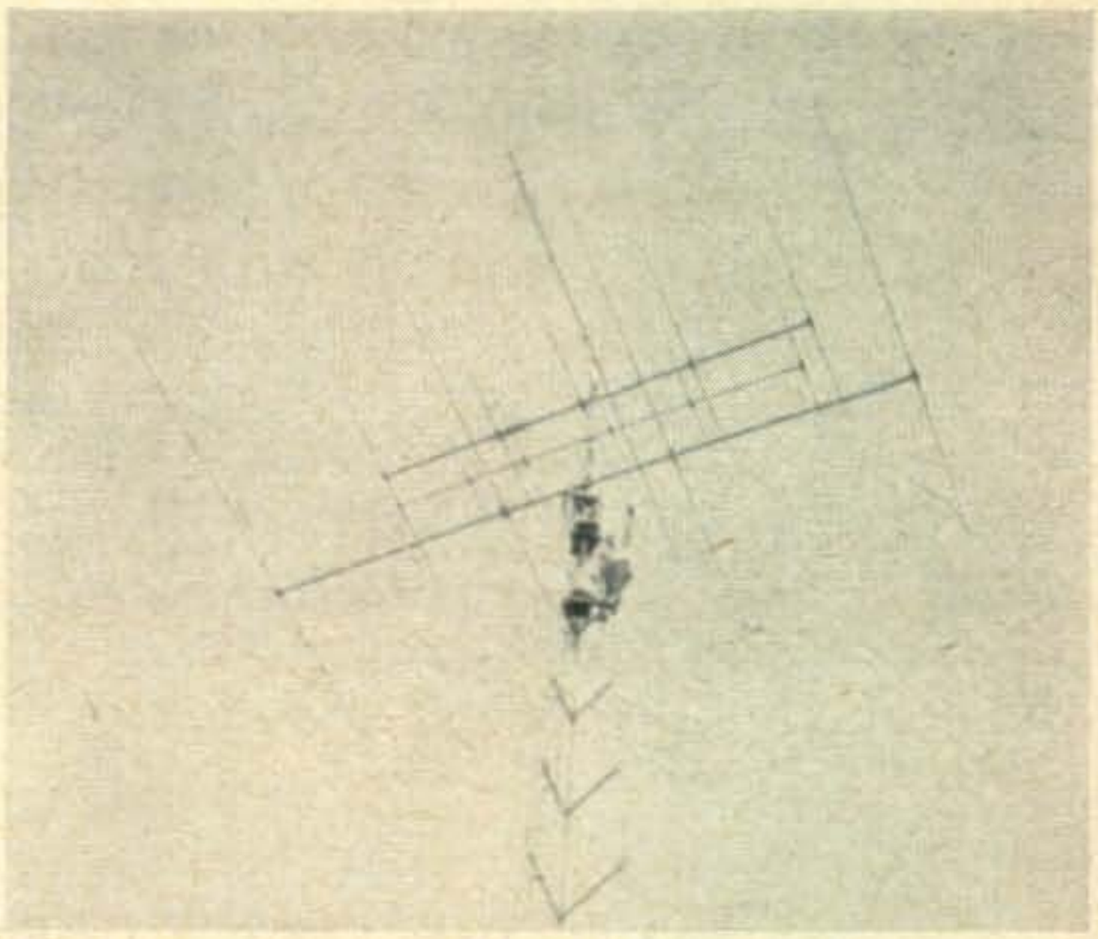
Six Meters

Six meters continued to supply the news during the last month. Starting on December first with crossband contacts between W1MB, W1HDQ and G6DH; EI2W and W1FOS (first Ireland-United States crossband, 28-50 Mc contact.) The band opened up for either trans-atlantic or trans-continental contacts better than 80% of the days. Many days the mornings were spent working crossband (28-50 Mc) to England, Ireland and the Isle of Mann, and the afternoons afforded contacts with the west coast from Mexico to British Columbia. Stations like G5BD and GD3GMH deserve special mention for their yeoman-like efforts to supply everyone who could tune ten meters with a crossband contact. Day after day Arthur and Jeff are in there trying for all they are worth. (I don't know what Jeff does in his spare time but we had a nice contact with Arthur the other night on 80 meter CW.) Certainly they and all the other boys in the British Isles, deserve a note of thanks from all the six meter W's.

Two Meters

Two meters (not to be outdone in gallantry) provided some beautiful contacts and near contacts via the Geminids meteor shower. As usual, of late, Walt (W4LTU) provided more than his share of contacts.

Among the lucky ones to get Florida for a new state were W9GAB, W9KLR, W8ILC, W3TDF, W1REZ, W1KCS, W2AZL and VE3DIR. Reports on the results of western schedules were not received in time for this issue. Leroy May (W5AJG) sent a report of his schedules with John (W9WOK). Apparently John's signals were coming in with great regularity and a contact should have been made. Leroy, however, had not been advised of the accepted technique in use for meteor scatter contacts. To quote an excerpt from Leroy's letter: "It was at the start that signals appeared good enough for a QSO as complete call signs were distinguished at once. I received his (W9WOK) R to my call at 63845 and gave him my R; however, I don't believe I gave him a report. During the periods 64445, 64755 and 64930 his signals were very good with positive copy of call letters received and his R's to my signals. At 65135 and 65435 heard him calling and giving K's. It was at this time that I became aware of a "lost" feeling, not knowing just what to do next or the proper procedure to follow to wrap up the QSO." (More of Leroy's letter in the letter section.)



John Madey (K2KGH) on his tower. 4 element Telrex 20 meter beam—6 element Telrex 6 meter beam—5 element Telrex 10 meter beam—15 element Telrex 2 meter long john. Height to top of tower 130 feet—tower, Aermoter 3 post self-supporting.

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For further information, check number 27 on page 128.

Meteor Scatter Techniques

I don't propose to set myself up as an expert on meteor scatter techniques. On the contacts which we made with W4HHK and W9WOK we used a system recommended by Paul Wilson (W4HHK). This system made maximum use of long bursts but allowed no contact on pings and short bursts. I have always felt that contacts made using Paul's system were sufficiently good to claim a new state. (A complete exchange of reports, acknowledgements, and sign-offs having been made in one consecutive string.) The fact that I had been able to hear John's call and my call on one burst, a report and my call ten minutes later and so forth, didn't strike me as constituting a contact.

However, after examining the brute force, hammer and tong method (also originated by Paul and Tommy) of exchanging information, it seems to me that I must revise my thinking. Predicated on the assumption that an exchange of information constitutes a contact, this system appears to have the most to offer. In order to set up such a schedule, the following procedure should be followed:

Ye honorable Ed (W1HDQ) obviously flushing some rare DX.

Both stations must synchronize their time with WWV to the second. One station is assigned the first thirty seconds of each minute, the other station takes the second thirty seconds. (It is obvious that a sweep second hand is an absolute necessity.)

The first station sends your call de his call for thirty seconds without a break. He then listens for thirty seconds while you do likewise. If you identified him you send his call de your call R,R,R, the R's to indicate that you are receiving his signals.

If he continues to send only your call and his call with no R's you must stick to sending his call de your call RRR. As soon as he receives your R's to his call he will send R's to your call and the first phase of the contact is over.

The second step after receiving his R's to your call is to send his report. The accepted reporting system for meteor signals is S1 Pings, S2 characters, S3 Calls and ID's, S4 copy, and S5 Solid. If the signal report is S1 or S2 it is obvious that it is pointless to send a report, as you couldn't have gotten either his call or yours. (This holds true if the intent is to establish contact with a station for the purpose of adding to your states worked list. Daily schedules held for the purpose of examining the meteor content over a given path require slightly different treatment.)

The first station to send a report sends the report only for his full thirty second period. If the second station got his report he replys with his report and a Roger. For instance, if you heard your report on your listening period you would reply, S3, R, S3, R, S3, R, for your thirty seconds. (Assuming that his report was S3.) The second phase ends when you receive your report plus the R's. If you do not get the R's from him it indicates that he has not gotten his report from you and the schedule remains in the second phase until he does and you know it because you heard him say so.

It is extremely important that the second phase of the schedule be carried out to a mutual exchange of R's. It is this phase of the operation which constitutes the exchange of information required for a bona fide contact. Switching to the third phase too soon can cost you a contact. Be positive of your report, roger, before going on.

The third phase of the contact is the sign off. This may sound easy, but the idea is to have the other guy know that you are signing off and acknowledge it. The proper procedure should be: His call de your call SK, SK, SK, SK, SK, SK; the SK's to continue for the balance of your thirty seconds. If he receives your SK he replies: Your call de his call SK, R, SK, R, SK, R, for his thirty seconds. When you have received his SK, R, to your SK, R, you've got it made.

Phase four consists of waking up the family and neighbors with your screams of joy and droping a card to Ed Tilton advising him of your unique accomplishment. (Incidentally, I'd like to know about it, too.)

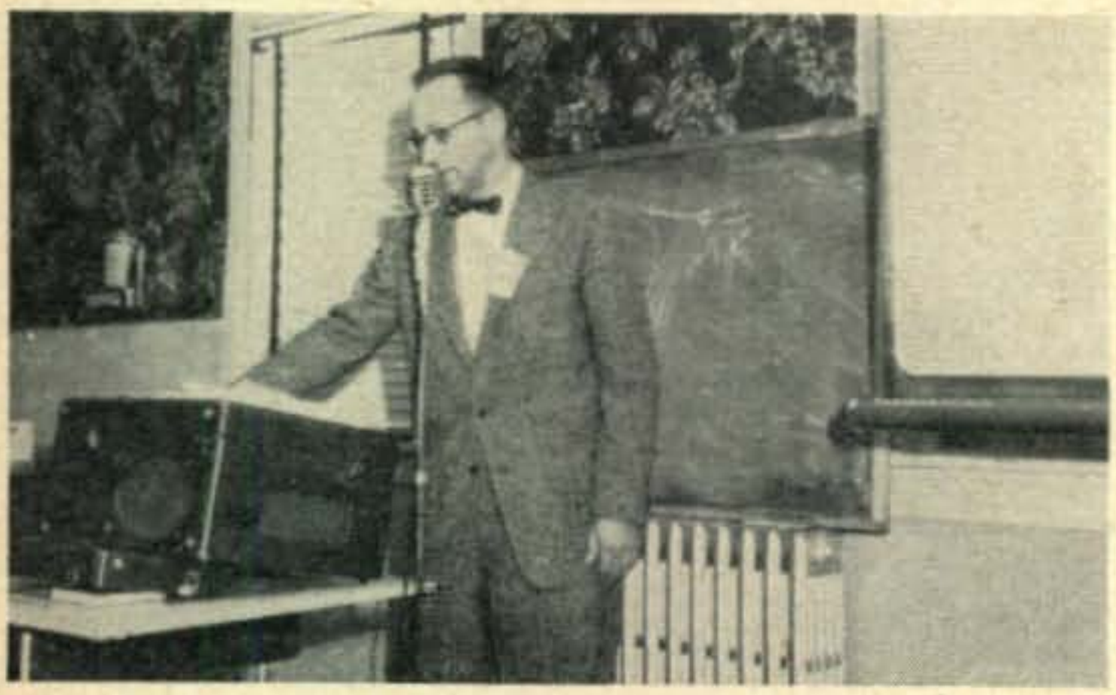
Schedules

The question now arises as to when the meteor showers occur and who should you schedule: The table below lists the major meteor showers together with their hourly rates, average speed and dates of occurrence. The optimum time of day for your schedule cannot be predicted unless the direction of the schedule and the particular shower under consideration is known. The Geminids for instance, pick up in the late evening (Before 2400) in one direction and in the early daylight hours (0600) in another. The path distance of the schedule is of little importance. If the path is in excess of 1400 or 1500 miles, you will be pioneering over a distance which heretofore no amateur meteor scatter contacts have been made. If the distance is less than 400 miles, there are lots of easier ways to make contact.

Prime sources for meteor scatter information are W4HHK, W9WOK or W4LTU. If they can't answer your questions, you've had it.

Chart is for any year.

	Date of Max.	Hourly Rate	Velocity
Perseids	Aug. 10-14	50	61
Orinids	Oct. 20-23	15	68
Taurids	Nov. 3-10	10	27
Leonids	Nov. 16-17	12	72
Geminids	Dec. 13-14	16	35
Ursids	Dec. 22	13	38
Quadrantids	Jan. 2-5	35	39
Lyrids	Apr. 20-22	8	51
Aquarids	May 5-7	12	66
Aquarids	July 27-29	10	50
Daytime Showers (Not Visible)			
Perseids	June 3	40	29
Arietids	June 8	60	38
Taurids	July 2	30	32



Old John Landeck (W9WOK) at lecturing position.

Letters

Seattle, Washington A missile containing lots of information from Ernest P. Manley (W7LHL):

"My latest project has been SSB on two meters. Built up a complete phasing type ending up with a 6360 in output. That in turn drives the two 826s to a KW input, using 67½ volts bias. Plate voltage not talking, 23000; talking 2050 volts, hold the work to see where the plate current hangs at 450 ma. No grid current. One should stop talking at times and let the tubes cool a little. But the output is only 35 per cent. I have 4-125a's final just about finished but it is not just what I want. I'd like to get my hands on some big tubes. California type KW.

"On 432 mc, running a 4X150a tripler, 30 watts out, sixty element beam. 416B's cavity type conv. Just waiting for the air cooled socket so I can fire up the straight thru 4X150a.

"Don't give up on the moon bounce project. You are just a little ahead of us, this coming summer is big antennas year. New one for two meters so I can track the moon. Also big one for 432 mc.

"I have been waiting for some good aurora. I think that about the best way working toward East. I received tape from W8ILC with aurora signals. You were one of the boys he recorded.

"Not much time for six meters. Too many other projects on higher up frequencies." *Fine business, Ernie, you're really in there pitching for good old VHF.*

We also heard from Warner Bollmann, (W7WTG) of Seattle who says that six meters is becoming more popular in his area. "Here in the Puget Sound Area, there are about fifty stations on the band." *Keep 'em comin' Warner.*

Abbotsford, B.C. Canada Jim Fraser (VE7AFB) came through with a be-oo-ti-ful QSL (to W1HOY-6 meters) and some information.

"I haven't been very active on six meters in recent years because of location problems, however that has been solved and I expect to be on regularly from now on. (*Eureka*)

"W1HOY is my first confirmed eastern state, although I worked W4AZC, W4EQM and W1PWW also on December 1, 1956.

"I also just received a QSL from JA1ASG, whom I worked on six meters on November 25th, 1956. He was my first and only, so far, contact with Japan on six, and as far as I know the first Japan—Canada contact on six meters! *I agree, as far as I've heard, that's true.*

"I am only running ten watts to a 5763 (3 element beam) but expect to run 100 watts by spring. I also work two meters here, but this area is not particularly good for two. The best DX so far has been Portland, Oregon, two or three hundred miles from here. I am building a 700 watt cw rig for two in order to try to get out a little farther, and also try some scatter work." *Good to hear from you Jim, we'll probably be seeing more of you on six.*

Cedar Rapids, Iowa Marshall B. Turner (KØADM) sends information about activity in his area:

"A word about the activity in this area. Since moving into our new house on the hill, we are able to work the gang in the Quad Cities any time we want. Mostly on 50.4. We also have good luck into the Des Moines area with WØSNJ. We have about fifteen or twenty active here in Cedar Rapids and Marion on 50.4 and 50.1. The local net (CD) meets on Monday and Wednesday at 8:00 P.M. on 50.4. I managed to snag off PZ1AE not long ago for a nice fifteen minute QSO.

"Sam, how about some information about six meter SSB? I, and I am sure many others, would like to see what others are using to make the Monkey talk on six meters. Might I suggest that W1CLS might have information with which he would part? (*How about it, fella?*) I am sure that if we could ever get our neighbor, Art Collins to stay home long enough to check the activity on six, that we might have some of that famous commercial equipment show up on the market, but until such time, we will have to build our own." *Thanks for the letter, Marshall, we'll see what we can dig up.*

Defiance, Ohio From the "Buckeye State" we have received a request for information from Ralph Bischoff (K8BPK).

"There will be a new six meter station in Northwestern Ohio soon, providing I can get some information on some reasonable equipment. Reasonable not only in condition but more especially in price.

"I have followed your column with interest and feel that you are in a position, or maybe some of your readers, to fill me in on some of the best and most economical equipment available. *All right you six-meter boys, load Ralph down with information.*

"I am one of those 'tin can hams'. I live in a house trailer and as you know we are somewhat crowded for space; therefore this fact must be taken into consideration. In the camp here, there are two other hams, man and wife, and I feel sure that they are just as much interested in the six meter situation as I am.

"After chewing my finger nails to the elbow for seventy-four days, I can now relax and concentrate on getting K8BPK on six meters. So help, HELP, *HELP!!!!*" *Hope you get lots of dope that will help you out Ralph.*

Patuxent River, Maryland We have received a promise of future cooperation from Bob (K9AAU).

"At present I am in the military service and can't do much to help now. However in nine months I should be back to my shack in Chicago and ready to go on experimental projects.

"Project Moon-Bounce has always been of considerable interest to me and would like to help out if possible. *You sure can, Bob.*

"Field of study is Physics. Sideline, Astronomy.

"Usually handling phone patch traffic from W3PQT to K3NAK/VO2. The latter station being approximately 14320 to 14330 kc. We are on 14260 to 14270 all day Saturday and Sunday.

"Break us anytime (and be sure to QSL)." *Thanks Bob for the information. Nice to know there will soon be another "Moon-bouncer" available.*

Bellingham, Washington Ken Bale (W7VCB) comes forth with:

"Would like to announce that we expect to be on six meters soon with about 150 watts. Hope to get at least a three element beam too. The receiving will be with a CML 50-54 mc broad band converter. (Anyone ever hear of the COMMUNICATION MEASUREMENTS LAB INC.) It's a model BB-50, will run it through the NC 183D.

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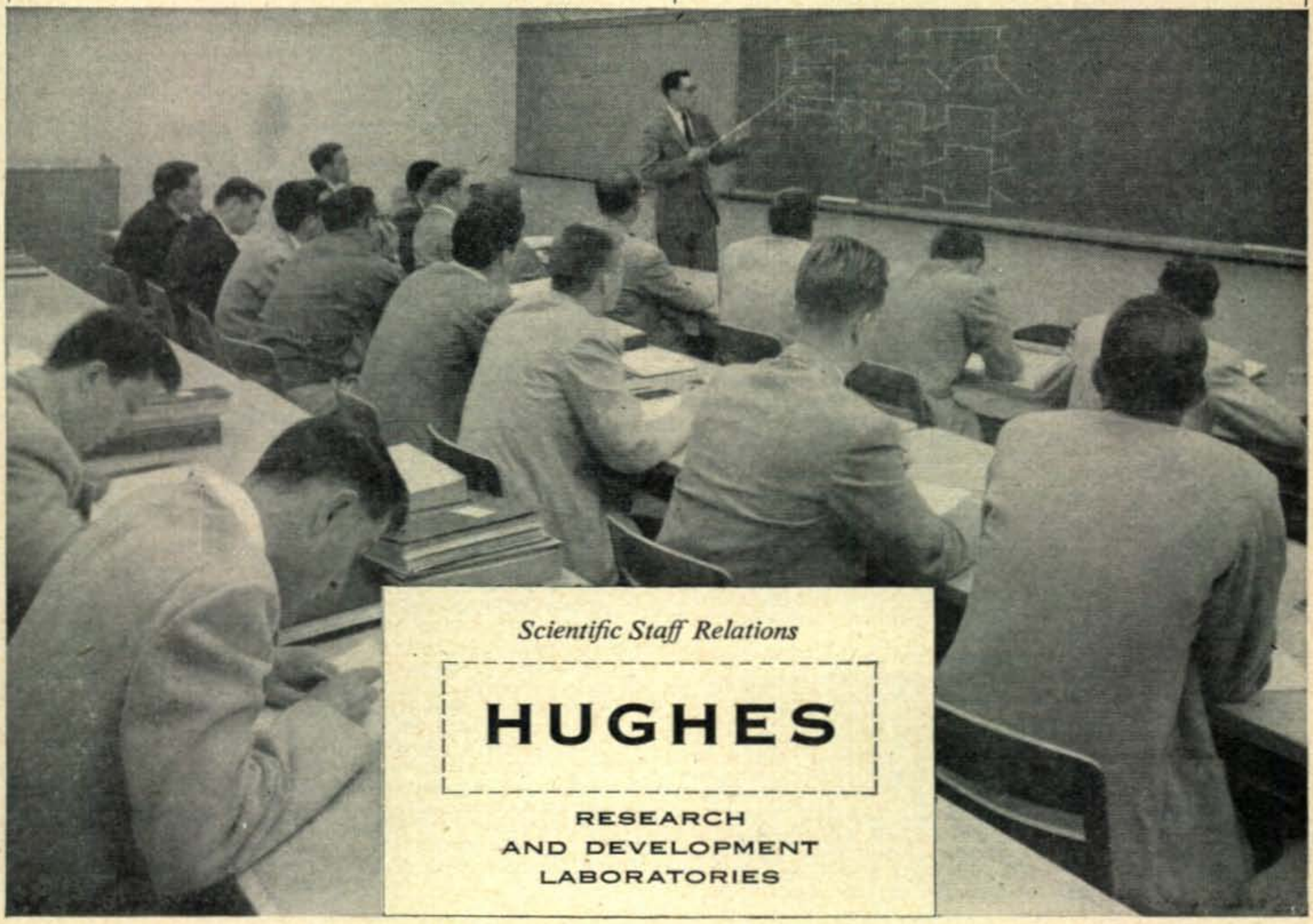

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"We also like to go on DX-Peditions and have a 700 watt a.c. generator. Our location is just a stone's throw from British Columbia, Canada in northwest Washington. Would like to hear from anyone who would like to drop us a card and give with some points on six meters." *Thanks for the dope, Ken, glad to welcome you to six meters.*

Clark, New Jersey Julius Madey (K2KGJ) contributes the following:

"I am sixteen years old and attend the new Arthur L. Johnson Regional High School in Clark, New Jersey. The tower is within two blocks of the school, and I can gaze longingly at its 130' of steel and aluminum whilest I fill my scholastic obligations. *Just how many of those obligations are taken care of with the tower in sight, Julius?* My brother, John, is thirteen years old, and an avid, dyed-in-the-wool six-meter boy. However, he occasionally forces his interests upon the KWS-1 and 75A-3 for cw and SSB.

"Until two months ago, we had been using Gonsets on both six and two meters for our VHF work. It was with the Gonset that I copped top New Jersey six meter score in the 'CQ Summer VHF Contest.' Things are vastly different now with the purchase of an NC-300 and its converters. Brother John also designed and built a 150 watt 6-10-2 meter rig. *We're waiting for an article, John.*

"The main theme of the letter however, is to inform you and the boys that I am now active on 220 mc SSB! Heterodyning up from the 26.4-30.0 mc signal of the KWS-1 with the following tube lineup—12AU7, 12AX7, and 6J6—puts me on 220 with A1, A3, and SSB. An 832-A linear gives me 20 watts to a poor dipole. See you on 220 SSB." *Three cheers, Julius. A first, I do believe.*

Hanover, Pennsylvania Mark Lawyer (W3FTL) also needs help:

"I would like to know some information about a low power six meter transmitter and antenna. I'm very interested in getting on soon and get some DX in the log book . . . Would like to hear from some of the boys." *Fine, Mark, hope to see you on six soon.*

Jersey City, New Jersey Frank Scaglione (KN2RLG) emits with:

"I run a Gonset to a fourteen element horizontal beam, my receiver is a Tecraft converter into a S-85. I've worked eleven states on two meters, and have had many long QRM free QSO's that I'm sure couldn't be had on the lower bands. *Atta Boy!*

"Recently I heard an aurora opening with W9's, W5's and W8's coming through in fine shape." *Aurora and openings on the VHF bands make things quite interesting, don't they Frank?*

Shelley, Idaho Louis B. Cox (W7ACD) reports activity at his QTH:

"In regards to scatter reception you know a number of W6 stations were on in the A.M. (50 mc) six to eight a.m., M.S.T. during June, July and August.

"I listened for them for three weeks starting July 18th to August 10th. I heard one or all four each morning at intervals, sometimes good copy. (This was on CW.) The stations were W6BAZ, W6UOV, W6VDG and W6AJF. W6BAZ and W6UOV was the most consistent.

"My antenna is a five element beam forty feet high, signals usually come in best with the beam pointed fifteen to twenty degrees north of their actual location, my transmitter only running 120 watts so I could not QSO them most of the time, but did work all four of them on scatter 50 mc. After August 10th, I was off of six for quite a while.

"In October I started listening again. Starting November 1st the 50 mc band seemed to be open at times but no one on, heard harmonics, teletype, etc. FM phones on 48 to 50 mc throughout the day at times. November 5th, strong teletype, direction, across Alaska, 1500 to 1630 M.S.T.

"November 6—1400 M.S.T. teletype and FM phones on 49-50 mc getting stronger as time went on. November 6, at 1604 M.S.T., JA1AU came on calling CQ DX, long call on phone. I called and made contact with him at 1610 but he soon faded out at 1617 M.S.T. November 7th, 1657 M.S.T., JA8CF called CQ on phone, I called and worked him with S5 to 8 signals both ways, fading out at 1720. November 8th at 1550 M.S.T. JA1ALZ came in with good signals calling CQ DX. I worked him; then next at 1610 I called and worked JA7GB with good report. Four JA's were in for twenty minutes, they were JA1ALZ, JA8CF, JA1AGF and JA7GB. I think all four called and QSO'd with W7FVN, W7IGS and W7INX. JA8CF stayed in until 1650 before fading out. Others faded out about 1625 M.S.T.

"Also same day at 1406 I called CQ on my cw and a weak station came back to me but I never copied the complete call, in and out too fast. I got the letters C O X Z and believe it was CO2XZ or CO2ZX, not sure. I've been active on 50 mc since 1938 and like it very much." *Wonderful letter, Louie, the boys back this-a-way will be happy to know just what you're hearing and working on six meters. Letters to the column are the best way for them to find out.*

Montgomery, Alabama Jim Lanterman (K4GOM) points out an error in print in the December '56 VHF column, mentioned W5HRZ several times and it should have been W5HEZ. He also comments:

"Kept hearing you and Helen on six meters last summer but you always seemed to be so busy I never tried to work you with my less than ten watts. *Makes not much difference during openings, Jim.*

"Six Meters has been catching on here in Montgomery for the past few months, not so much for DX but trying to establish a band to use for night and day mobile and fixed. I'll try to let you know how it works out and ma be more news next time." *We'll be looking forward to hearing from you again, Jim. Six meter mobile is quite popular in this vicinity.*

Lexington, Kentucky Bill Seale (K4CHX) comes through from Kentucky:

"VHF activity in central Kentucky is so low I don't think the rest of the world knows we are operating on two and six meters. Breck (K4CHE) will soon have up his twelve element two meter beam. I have my fifty watts on six now and Bernie in Versailles will soon be on six. Frank (W4VKR) is on six but I haven't heard him yet. He's over in Nicholasville (12 miles away). One of your old buddies, Shelby (W4WNH) from Elizabethtown is up here in Lexington going to college.

"We lost several boys that used to be VHF because of lack of activity here. We are hoping to get it up. Tell the boys in Cincinnati and Dayton that Lexington is on the air." *Haven't heard from Shelby recently so your contribution is more than welcome, Bill. Glad to know that your working on the activity end of VHF. We always need that.*

Arlington, California Wm. Locy (K6GTG) has a request also:

"Will you run my scatter sked in 'CQ' for me? *Why Sure.*

"I run my code-wheel seven days a week from 0130 to 0630 P.S.T. east. From 0630 to 0700 P.S.T. north. Frequency 50.134 mc, 960 watts to a pair of telrex 6-over-6 beams, 90 feet up. Any station that copies this station please inform me. Will be glad to set up sked with you."

"Code wheel is (V DE K6GTG)." *All right you scatter-boys, start listening.*

Dallas, Texas Leroy May (W5AJG) sez the following:

"Received another letter from W9WOK written on the 15th and got to me the 17th at 9:00 a.m. This letter states that he copied lots of my stuff and got R's, SK's etc., but did not receive his reports. He is going to listen to the tapes of my signals but is afraid he won't find the reports. This may well be as I didn't hammer the repeats on this particular phase of the transmissons. Reports have meant little to me in the years past and I very seldom ever give a positive report of S units. In this case I did send reports now and then but just didn't incessantly repeat them. I find out from W5HXK that the following is in use by some meteor men. S1, pings, S2 characters, S3 Call and ID's. S4 copy and S5 solid.

"W9WOK states that each phase of the system or procedure shall be R'ed by each station and then proceed on to the next item and so on.

"This may have been written up in the mags but since I never engaged in this type work before, I was ignorant of the system used. I believe a repeat or a summary of this system would find good favor if published again.

"Am open for morning skeds in any direction on future meteor showers. My night operating time is limited and uncertain to the extent that I cannot guarantee meeting skeds each time.

"I believe a short article on meteor scatter methods as used by leading amateurs would sure help the cause along." *We're with you all the way, Leroy.*

73, Sam, W1FZJ

For further information, check number 11A on page 128.

Editorial [*from page 12*]

Ralph V. Anderson, W3NL, 2509 32nd Street, S.E., Washington 20, D.C. and make sure you keep him on the list.

Stamp Collectors

Monday nights, 8 p.m., 3645 kc, you will find VE3AEJ, VE3DPO, and others talking about stamps. If you are interested why not call in or drop a note to AEJ, O. Anderson, 102 Church Avenue, Willowdale, Ontario, Canada.

The Helping Ham

We hams are always so anxious to jump in and help anyone that asks us, that now and then we are liable to jump the wrong way. I have recently heard of an interesting misuse of hams by some of the short wave broadcasting gang.

A foreign embassy, using a Callbook, phones a local ham and asks him to help them determine if the short wave broadcasts from their country are being received here all OK. The ham gladly listens in and drops a note to the embassy. The embassy then can send these notes back home to prove that there is a large listening audience in this country and give them more ammunition for the next frequency allocation conference.

Who Does Listen

These broadcasters are fighting real hard for frequencies, but who is really listening? Sure, there are a few hundred high school kids who tune the short wave bands in order to get verifications from the short wave stations, but does anyone ever turn on a foreign broadcast station and sit down to listen? I have never heard of anyone who did. None of the 7000 CQ readers who sent in their cards admitted being short wave listeners. Perhaps, if the small size of the audiences for these broadcasts were known, we could open the 19 and 25 meter bands for ham use.

Shame on us. Here a dozen or so countries are spending millions of dollars and fighting desperately for more and more frequencies to send political broadcasts to us that we aren't listening to.

2 (π^{π}) Wayne

Marathon QSO

The longest windfest on record so far was between K2DXV and K2DSR: 10 hours even. Can anyone beat that?

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For further information, check number 39 on page 128.

[*from page 82*]

Correction

Dear Wayne:

Real Power on 2 in Nov. CQ by W6ZYH has two errors in modulator print Page 59. The Rectifier SL1 is hooked up backwards furnishing Pos. and not Neg. bias to the PL6549s. The heaters of the tubes (6549s) are not returned to ground to complete the DC path.

Vance Gildersleeve, W6ZZL

More Power from ARC-5's

Sirs:

To get a increase of about 15 watts input plus greater output like 90 watts to 105 watts add a 47,000 ohm 1 watt resistor from grid to ground of the 1625's final. This resistor in parallel gives us a total grid leak resistor value of 10,000 ohms which is proper for two 1625's in parallel hence shifting the bias for better efficency without effecting grid drive.

G. P. Oberto, K4GRY
Richmond, Va.
November 30, 1956

They like our Articles

Dear Wayne:

Just mailed a "TU" to W6THN for his "Letter to Editor" in November issue. It was worth a year's subscription. I just added the "Q-Mult" to my BC348 per W6THN's dope, and it worked FB first time. This will set back my purchase of a new receiver for some time. I agree with W6THN that the "Q-Mult" is fantastic! About 10 to 20 DB improvement with additional noise level reduction. Tnx for publishing this dope.

73, K2AWA/1

Dear Sir:

I think it is about time I wrote thanking all of you at CQ for the FB magazine you are putting out.

I enjoy all articles very much, and especially those regarding improved reception with an old receiver, mine is an S40A also have a Skyrider 5-10.

The articles which I have built and am using at present are the Q Multiplier, S 9er and the Product Detector which is doing everything you said it would, I am using a 6SN7 mounted on top of an old IF can (1½" x 1¾" x 3½") total height 5½" which will just fit on top of the chassis above the BFO coil by drilling three holes, two small holes for the mounting studs and one about 7/16" with rubber grommet for the leads, all wiring is done before mounting in the shield then it is slid into the shield can through the socket hole and the socket fastened with sheet metal screws, by using colored leads it is a very simple job to do the wiring underneath the chassis.

I did not change any of the wiring in the receiver, I fastened the input circuit directly to the plate of the detector socket, BFO input to BFO plate no coupling condenser in S40A just twisted wire which I removed and the audio output to the volume control through a .01 cond.

G. W. Eastman, W8UGD
Ossineke, Michigan

P.S. Oh yes besides the S9er I have 1852 tubes in the IFs, 6AL5 Dect. and ANL-AVC in place of the 6SQ7, VR150 in the 6H6 socket for oscillator and BFO plate supply and 6SN7 BFO and 1st audio. sum S40A HI.

Two for one

Gentlemen:

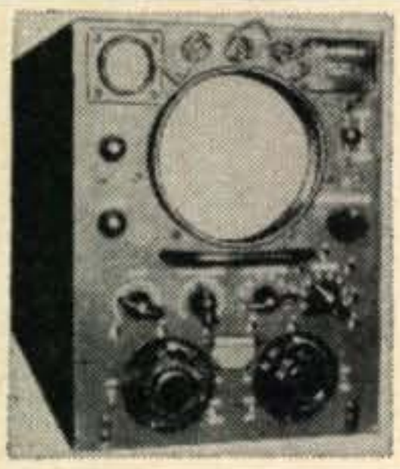
Often it is desirable to modify a piece of existing electronic equipment to incorporate new functions. Very often this modification involves the addition of new controls to the front panel, and there is a problem of how to mount them. New holes can be drilled, but this would often mar the appearance of the unit, especially if it is commercially made. If the new control is a pot, a better solution is to replace one of the existing pots with a concentric dual control, with one of the sections the value of the existing pot, and the other section the value of the new pot. This is a neat and convenient solution, and preserves the appearance of the unit.

Charles Erwin Cohn,
Chicago, Ill.

[*Continued on next page*]

ASB-5 RECEIVER for 420 Mc BAND!

As featured in "CQ" for October 1956. Easily converted, makes a marvelous receiver for 420 band, with RF Amplifier! Supplied complete with all tubes, OUR LOW PRICE..... **$14.95**



LORAN APN/4 OSCILLOSCOPE

Easily converted for use on radio-TV Service Bench!

BRAND NEW

Completely Assembled

Supplied complete with 5" Scope type 5CP1 and RCA 100 Kc. Crystal Unit..... **$14.95**

DYNAMIC HANDMIKE with "Press-to-talk" Switch, cord and plug—**BRAND NEW**, ... only **$2.95**

HI-FI DYNAMIC HEADSET WITH RUBBER CUSHIONS
Freq. Range: 40-14,000 CPS. No distortion.
BRAND NEW **$5.95**

DYNAMIC Headphone with Dynamic Mike, BRAND NEW, complete **$3.95**

MICROPHONES

Model		Excellent Used	BRAND NEW
T-17	Carbon Hand Mike	5.45	$7.95

CD-307A Cords, with PL55 plug and JK26 Jack ..... .99

DYNAMIC HEADPHONES, 600-ohm impedance, with large earphone cushions, cord and phone plug.
BRAND NEW, special **$2.95**

BC-1206-C BEACON RECEIVER

195 to 420 Kc. made by Setchel-Carlson. Works on 24-28 volts DC. 135 Kc. IF. Complete with 5 tubes. Size 4" x 4" x 6". Wt. 4 lbs.
BRAND NEW **$8.88**

Brand New, less tubes $5.95
USED, with tubes $5.95
USED, less tubes $2.95

ARC-5/T-23 2-METER TRANSMITTER

Includes 2-832A, 2-1625 tubes.
Excel. Used **$14.95**
BRAND NEW $21.50

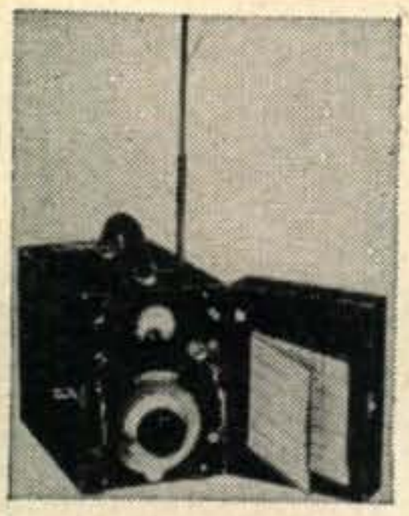
ARC-5 MARINE RECEIVER-TRANSMITTER

Navy Type Comm. Receiver 1.5 to 3 Mc
BRAND NEW with 6 tubes **$16.95**
Navy Type Comm. Transmitter 2.1-3 Mc
BRAND NEW with 4 tubes and Xtal **$12.45**

BRAND NEW CATHODE RAY TUBES

3CP1	$ .88	5BP4	$2.22
3FP7	.88	5CP1	2.45
5BP1	2.22	9LP7	1.88

RCA 826 Transmitting Tubes, New ..... Each 44¢



BC-906 FREQ. METER— VALUE $200.00!

Made by PHILCO

Cavity type, 145 to 235 Mc. BRAND NEW in original factory packing, complete with antenna and operating manual.
OUR LOW PRICE..... **$8.88**

VOLTAGE REGULATOR for gas-driven generators. Type B, 21-30 Volts input, Load 5 Amps. Made by Leland Electric Co. Reg. Volts: 18-25. Featured in CQ May 56.
BRAND NEW **$2.95**

FL8-A RADIO FILTER $1.79

BRAND NEW WOBBULATOR, Special! $4.95

WRITE FOR FREE CATALOG!

Please include 25% Deposit with order — Balance C.O.D. MINIMUM ORDER $3.00. All Shipments F.O.B. Our Warehouse N.Y.C.

G & G Radio Supply Co.
Dept. C-1
53 Vesey St., New York 7, N.Y., CO 7-4605
Branch: 5009 N. Neva Ave., Chicago 31, Ill.

Ham Special! Famous BC-645 Transceiver

BRAND NEW

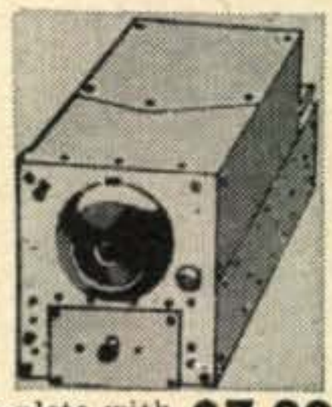
With MANUAL for Easy Conversion to CITIZENS' BAND!

Makes wonderful mobile rig for 420-500 Mc. Easy to convert for phone or CW 2-way communication. This swell rig originally cost over $1000—yours for practically a song! You get it all, in original factory carton, BRAND NEW, complete with 17 tubes, less power supply. **Conversion Instructions Included.** **$29.50**
Shpg. wt. 25 lbs.
PE-101C DYNAMOTOR for BC-645, has 12-24V input (easy to convert for 6V Battery operation) ..... only **$7.95**
UHF ANTENNA ASSEMBLY, for BC-645 ..... $2.45
Complete set of 10 Plugs for BC-645 ..... **$5.50**
CONTROL BOX for above $2.25
SHOCK MOUNT for above 1.25

CONVERSION BOOKLET. Instructions for most useful surplus rigs **$2.50**

R24-ARC/5 NAVY TYPE
(Similar to BC-946)

BROADCAST RECEIVER



520 to 1500 Kc. 6 tubes: 3—12SK7, 12SR7, 12A6, 12K8. For dynamotor operation. Easily converted to 110 or 32 Volt. 2—IF stages, 3-gang tuning cond. Complete with all tubes, in original sealed carton.
BRAND NEW **$19.95**

BC-457 TRANSMITTER—4-5.3 Mc, complete with all tubes and crystal. BRAND NEW **$7.88**
BC-458 TRANSMITTER—5.3 to 7 Mc, complete with all tubes and crystal. BRAND NEW **$7.88**
BC-459 TRANSMITTER—7-9.1 Mc, complete with all tubes and crystal. BRAND NEW **$11.95**
BC-696 TRANSMITTER—3 to 4 Mc. BRAND NEW, complete with all tubes & crystal **$8.88**

SCR-274 COMMAND EQUIPMENT

ALL COMPLETE WITH TUBES

Type	Description	Used	Excellent Used	Brand NEW
BC-453	Receiver 190-550 KC	$9.95	$11.95	$14.95
BC-454	Receiver 3-6 Mc	7.19	8.29	11.95
BC-455	Receiver 6-9 Mc	5.25	7.95	9.95
BC-456	Modulator	2.24	2.75	4.24
BC-450	3 Receiver Control Box		1.49	1.95
BC-451	Transmitter Control Box		1.25	1.49
BC-696	Xmtr 3-4 Mc (like new)		6.95	8.88

110-VOLT AC POWER SUPPLY KIT

FOR ALL 274-N and ARC-5 RECEIVERS

Can be assembled quickly and easily, on pre-drilled chassis. Plugs into the rear of any model 274-N receiver and delivers 24 volts as well as "B" voltage. No wiring changes needed. Complete kit of parts with metal case, instructions **$7.95**
SPLINED TUNING KNOB for 274-N RECEIVERS. Fits BC-453 BC-454 and others. Only **49c**

AN/ARR-2 RECEIVER

BRAND NEW—A Terrific Value! Tuning Range 234 to 258 MC. Tubes: 7-9001, 3-6AK5, 1-12A6. Only a few at this low price!
Complete **$8.88**
With 28V 1.6A Dynamotor, complete $12.98
110 VOLT AC POWER SUPPLY KIT for above $7.95

SCR-522 FINEST 2-METER RIG!

Terrific buy! VHF Transmitter-Receiver, complete with all components. 100-156 Mc. 4 channels. Xtal-controlled. Amplitude modulated voice. They're going fast! Excellent condition.
SCR-522 Transmitter-Receiver, complete with all 18 tubes. COMBINATION ..... **Special $33.33**
Receiver Only, with all tubes $19.50
Transmitter Only, with all tubes $22.25

2 VOLT BATTERY "PACKAGE"

1—2V. 20 Amp. Hr. Willard Storage Battery **$2.45**
1—2V. 7 prong Synchronous Plug-in Vibrator **$1.49**
1—Quart Bottle Electrolyte (for 2 cells) **$1.45**
ALL BRAND NEW! Combination Price **$4.99**

WILLARD 6-VOLT MIDGET STORAGE BATTERY

3 Amp. Hour. **BRAND NEW.** 3⅝" x 1-13/16" x 2⅜"
Uses Standard Electrolyte ..... Only **$2.22**

For further information, check number 22 on page 128.

Conduct

Dear OM:

Over the years, there has built up among communicators a feeling of fellowship and cooperation that is particularly apparent among amateur radio operators.

The things which have made me "feel good" in twenty-five years of hamming have been the instances where fellows have been willing to share a frequency, move for an emergency net, join in round-robin qso's instead of qrm-ing, and of equal importance—readiness to obey the rules of the air and Commission regulations.

Most of us are also automobile drivers—our own or someone else's—and a lot of us sport our call letters on the cars in one form or another.

So, I'd like to urge an editorial suggesting we take this "Code of the Air, and make it the Code of the Road". If we can show by example a willingness to share the road, look out for the other fellow, laugh off rather than get mad about his mistakes, and take to heart the driving rules which have been legislated for our own protection—it would be one of the greatest public service projects undertaken by hams, I think, because the very things that make ham radio fun are also the things that would and do make car driving safer and more enjoyable.

Dean Cortright, W9NOE
Niles, Illinois

Mobile Home

Dear Sir:

To start with, we live in a Trailer House. As you know there is very little room for all the gear a ham would like to have.

We are running 250 watts in and we needed a 20 meter beam of some kind. The smallest on the market looked as if it were as long as the 40 foot trailer. So we went to work with some of the "Junk Box" gear we had on hand, and came up with two old mobile loading coils. To each of these we attached 90" fiber glass whips. Then we pruned the drive element to dip at 14.250 mc. The reflector to dip at 13.6 mc.

Howard Bowers W7UWR/5 built a very nice light boom of Redwood. Then we raised it to 12'. At this height our reports have been much more than expected. The front to back ratio is very good.

We have 30' of Alpradco aluminum tower which we plan to attach to the trailer as soon as time permits. We will then give you more accurate reports if you are interested.

Archie Jones, W5TSS
Corpus Christi, Texas

Hidden Transmitter Hunting (Texas Style)

Located right in the big middle of a thorny briar patch in the heavily thicketed area south of Burleson, Texas is Bob Bransom, W5BSX. With the ingenuity of a devil's own son Bob located his hidden xmtr in the center of the patch so that the hunters would have at least 100' of briars to fight no matter which direction they approached in. The antenna was located 150' away in the top of a practically inaccessible tree. It will be noted that Bob is definitely "Mobile" with the use of his son's red coaster wagon.

W5BSX

This hunt was staged on unfamiliar territory (Johnson County) for the benefit of all members of the Fort Worth Ten Meter Net on the afternoon of Sunday, October 28th.

SAVE!...BARGAINS GALORE!...SAVE!

NEW LOW PRICES! — EFFECTIVE FEBRUARY 1st

COMMAND TRANSMITTERS & RECEIVERS

ARC-5 and SCR274 as available

BC 455

XLNT.... $5.95

NEW.....$7.95

Receivers, w/o dynamotors

R-25 Marine, 1.5-3 MC, used **$5.95**, new 10.95
R-26 or BC-454, 3-6 MC, used **$6.95**. New 7.95
R-27 or BC-455, 6-9.1 Mc, used **$5.95**. New 7.95
R-28, 100-156 MC, Exlt 13.95
R-4/ARR-2, 234-258 MC, as is w/o tubes, **$2.95**, w/tubes, used 4.95

Transmitters, w/o modulator or dynamotor

T-18 Marine, 2.1-3 Mc, as is, w/tubes, **3.95**, used **4.95**, boxed 7.95
T-19 or BC-696, 3-4 Mc, as is w/tubes, **6.95**, used **7.95**, new 8.95
T-20 or BC-457, 4-5.3 Mc, as is w/tubes **2.95**, used **3.95**, boxed 5.95
T-21 or BC-458, 5.3-7 Mc, as is w/tubes, **2.95**, used **3.95**, boxed by depot 4.95
T-22 or BC-459, 7-9.1 Mc, as is w/tubes **3.95**, used **5.95**, boxed 8.95
T-23, 100-156 Mc, xmitter used, **13.95**, xlnt 14.95
Special—1 R-28 Rec. & 1 T-23 xmitter both 25.95

Misc. Command Equipment as available

Receiver dynamotors 28V, used ..... $ 1.00
BC-456 SC Mod. w/tubes, new **4.95**, used 3.95
MD-7 ARC-5 Pl Mod w/tubes less dyn. Xlnt 8.95
28 v dynamotors for above unit 3.00
3-Rec. Rack, used, **1.49**, new 2.49
New 2-Trans. Rack 2.95
New 24V Trans, 1A 3.50
Plugs for rear of receiver 1.00

110 VAC power supply for ARC-5 & 274N Recvrs kit **8.95**, Wired & tested **12.95**

Receiver Conversion kit: cont. schematic, BFO Sw, 25 K Pot. phone jack and at knob, with inructions.... 1.95

1625 Tubes, for trans # mod, 50¢ 3/1.00

Popular Dynamotor Specials

DM-34 Recvr. Dyna, 12 V in 220 @ 80 ma Out. new.... 4.95
DM-36 Same as above, 28 V. new 4.95
either of above, used 3.95

PE-101C Dynamotor, 12 or 24 v input, 500 v at 200 Ma out, (300 v 6v in) new..... 8.95
DM-42, 12 V in. out 1000 and 500, ea at 215 Ma. used 12.95
DM-35, 12V in, 600 at 200 Ma out, Like New 12.95

Wincharger Dyna. 12 v in 440 @ 220 MA Out. new 12.95
BD-69 Rec. Dyna. 14 v in, 220 at 80 MA out, new 9.95
PE-73, 24 v in 1000 at 350 Ma out. New **8.95**, used 6.95
PE-94, 28 v in, for 522, 300 at 250 Ma, 150 bias, and 12 V 10 A, new 4.95
RK-65 Tetrodes, 500 watts each, 6 watts drive, special 2 for 11.90

Jennings Vacuum Condensers

VC-40 or VC-50, 15KV 7.95

Cathode Ray Tubes

5HP4 or 5CP1 ..... New 1.98
7BP7 ..... New 2.98

WESTON—SANGAMO—YOUR CHOICE

METERS.		ALL NEW.	
0-2	Ma	0-300	Ma
0-5	Ma	0-500	Ma
0-15	Ma	0-20	VDC
0-50	Ma	0-40	VDC
0-100	Ma	0-300	VDC
0-200	Ma		

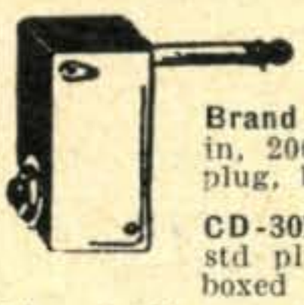
$3.29 ea.
SPECIAL
3 for $9.00

Heavy Duty Collins choke 4 Hy-300 Ma can take 500 Ma peaks, new 3.95
Bantam 1-watter, BC-746 plug-in transmitter tuning unit from **WALKIE TALKIE.** 140 mmfd APC type variable cond. plus assorted parts including chassis. Builds into low power transmitter (See CQ March '54) ..... **New, $1.29**

OIL CONDENSERS

2 mfd 5000 vdc new $5.95
4 mfd 5600 vdc 2.25
2 mfd 2500 vdc new 2.95
2 mfd 1000 vdc new 1.95
10 mfd 600 vdc new 1.49
8 mfd 600 vdc new 1.49
4 mfd 600 vdc new 3 for 1.00
2 mfd 600 vdc new 3 for 59¢

Mobile Microphones, newly assembled, W.E. D173015 similar to the TC-128, push-to-talk switch, 3 cond. 5' curl, cord, new **$3.95**
Chest Mike T-26 w/Fl Button New $1.49
F-1 Carbon Mike Element ..... 59¢
Sigma 4F 8000 ohm Sensitive Relay. Pulls in at 1.6Ma release at .75 MA. SPDT 2 Amp. Contacts spare removed from new equip. Guaranteed ..... $2.95 ea.
BC 655 Signal Generator Range 17.5 to 160 Mc. good for T.V. set alignment, use as transmitter freq. checker, built in 0-200 Ua. Triplett 2" round Meter New $19.95
Brand New Headphones, HS-23, 2000 ohms, $3.95 HS-33, 600 ohms, complete with brand new rubber cushions **$4.95**
Used HS-23, w/o cushions 1.95
New small cushions, pr. ..... .49
Used chamois cushions, pr. ..... .49
New lg rubber cushions, pr ..... .29



Brand new Impedance matching transformer, plug in, 2000 ohms to 600 ohms, takes std plug, boxed 69¢ each, 3 for **$1.95**

CD-307A cords, has JK-26 on one end for phones, std plug other end brand new, boxed ..... **$ .97**

Stewart Warner Ammeter, 60-0-60 Amps, brand new, 95¢ 6 for 5.00
Phone-CW Filters, 1020 cycles, new, FL-5, 69¢ FL-8 with switch 1.89
GP-7 transmitter with all tubes less 803 tube and 80 meter coil unit only 13.95
less tubes and coil unit 7.95
TU-7, 4.5-6.2 MC; **TU-8**, 6.2-7.7 Mc; **TU-9**, 7.7-10 MC; **TU-10** 10-12.5 MC; **TU-26**, 200-500 Kc, choice, used, for BC 375 transmitter, each 2.29
T-30 Throat Mikes, used, 5 for 1.00
3' Mast Sections, MS-49 thru 52, **50¢** each, 53 and above, **75¢** each. Special 1 each MS-49 thru 54, makes 18' vertical 2.95

MN-26C direction finding Equipment

MN-26C Receiver w. dyna 10.95
MN-20E Loop 4.95
MN-52H Az Cont Box 2.95
All above new, special, 1 each for ... 17.95

Antenna Insulators, Bendix MT-48C, plated end caps, new **15¢** ea., 10 for 1.25
Control Box w/5 Ma S meter, special ... 1.98
SCR-522, exc. condition. Contains Receiver, Transmitter, Modulator, tubes, tunes 100-156 MC, covers 2 m w/o modification 29.50
New transmitters, GF-11 for 12 volts, or GF 12 for 24 volts, with tubes and built in modulator—less tuning unit, GF-11, **$6.95** GF-12 5.95
Tuning Unit for above 1.95

TG34 or TG10, 1 Hour Code Tapes

No. 10, No. 13 ..... New, ea. 1.25

2.00 Minimum Order. All prices Subject to Change without Notice. Canada & Mexico minimum 10.00. Cash with Order. Sorry, no COD. California Orders Include 4% tax. Prices FOB Los Angeles

SAM'S SURPLUS, 1306 Bond St., Los Angeles 15, California

For further information, check number 42 on page 128.

Still picking prickly pear spines out of their feet were the lucky (?) mobileers who located the xmtr before the one hour deadline. W5RHW with QFN as co-pilot arrived first with YUO, BMR and THI following in order.

L. D. Lakin, W5BMR
Fort Worth, Texas

THANKS

Dear Wayne:

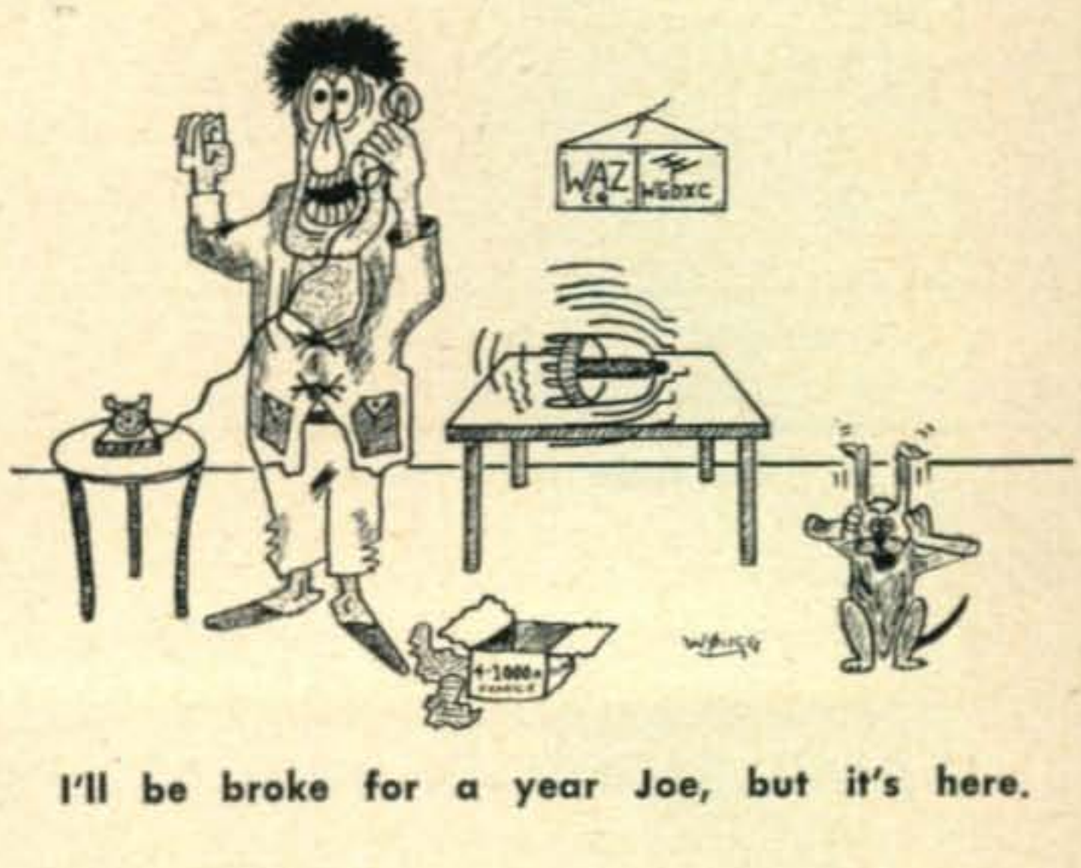
I noticed that recently many articles in CQ have been written in a much lighter vein than usual. I don't know whether their authors have a severe case of the giggles or what, but I think it's a much better way to do it. Technical articles need not be so dead serious that it's hard to swallor them. It goes down easier when it's well oiled with laffs. Keep it up—doubtlessly I'm not the only one who likes it.

Eric K. Albrecht, K8BFH
Cleveland Heights 21, Ohio

Ham radio provides useful communication for many civic events in addition to the usual service in emergencies. Just recently helped out considerably when the Midwest open golf tournament of the National Industrial Recreation Association had so many players (114 four man teams) that they had to use two golf courses that were six miles apart.

Six and ten meter communication was set up by the West Allis Amateur Radio Club (W9FLP) and was carried on from the first tee off until the last round two days later.

Left to right: Ed Grunowski, W9QMX; a runner for the tournament; Ottmar W. Noeske, W9LGO; Fred Wendt, W9ZAG.



I'll be broke for a year Joe, but it's here.

Stolen, as usual, from

AUTOCALL

The bulletin of the
Washington, D. C. Mobile Radio Club

The #1 January Puzzler works out to 41.6 miles for the messenger while the troups marched 30 miles. #2 Puzzler should result in the candles being 9 inches and 8 inches. The extra, unnumbered query; $e^{i\pi} = -1$

WØWEU submits the following: (#1) A sergeant was asked how many men he had in his charge. He said he did not know the number, except that during formations the only way he could get them in even groups was to have them count off by 7's. When they counted off by 2's, 3's, 4's, 5's, or 6's there was always an extra man. The question is what is the least number of men he could have had in his charge? Problem #2 is a head scratcher. It may look impossible at first glance, but even W2NSD solved it, so it can't be too hard. Let the x's represent any digits.

```
          x x 8 x x
      ------------
xxx ) x x x x x x x x
        x x x
      ------------
          x x x x
            x x x
      ------------
              x x x x
              x x x x
```

Since February has two holidays in it we will throw in one more Puzzler to help fill in the extra time. Puzzler #3: On a train are three passengers whose names are Mr. Robinson, Mr. Simth, and Mr. Jones. The Brakeman, Fireman and Engineer also have the same last names (distinguished in the problem by no "Mr.") but not necessarily in that order.

1. Mr. Robinson lives in Detroit.
2. The Brakesman lives half-way between Chicago and Detroit.
3. Smith beats the Fireman at pool.
4. Mr. Jones makes $6.00 per year. (This must be a very old problem)
5. The passenger that has the same name as the Brakeman lives in Chicago.
6. The Brakesman's nearest neighbor is the passenger who earns three times as much as the Brakeman, who earns $1000.
7. Who is the Engineer? ■

NOTICE

Due to the holidays and such the January *CQ* was mailed on January 3rd, about one week later than usual. By now you should have gotten it, if not, let us know as we are not answering the thousands of letters received telling us *"I haven't got my Jan* CQ."

the two co-ax connectors. Connect one side of the 6 volt coil to terminal #7 on the power-control socket on the rear of the chassis. (*This lead goes to the push-to-talk switch or to a foot operated switch to turn on the relay controlling the transmitter high voltage.*) Connect the other side of the 6 volt coil to terminal #1, 6 volts from the battery. (For 12 volt operation, put in a series resistor to drop the 12 volts to 6 volts in this same lead.) Note that the AF-67 has provisions for operating from either 6 or 12 volts.

Connect the wire that was removed from the original co-ax connector to the normally open-contact of the relay that is nearest the top side of the chassis. The original co-ax chassis connector (to antenna) is now connected to the movable arm of the relay. Form a loop in the wire to make it flexible. Connect a wire from the new co-ax chassis connector to the normally closed-contact of the relay. This feeds the antenna through the relay to the receiver. See diagram and photograph.

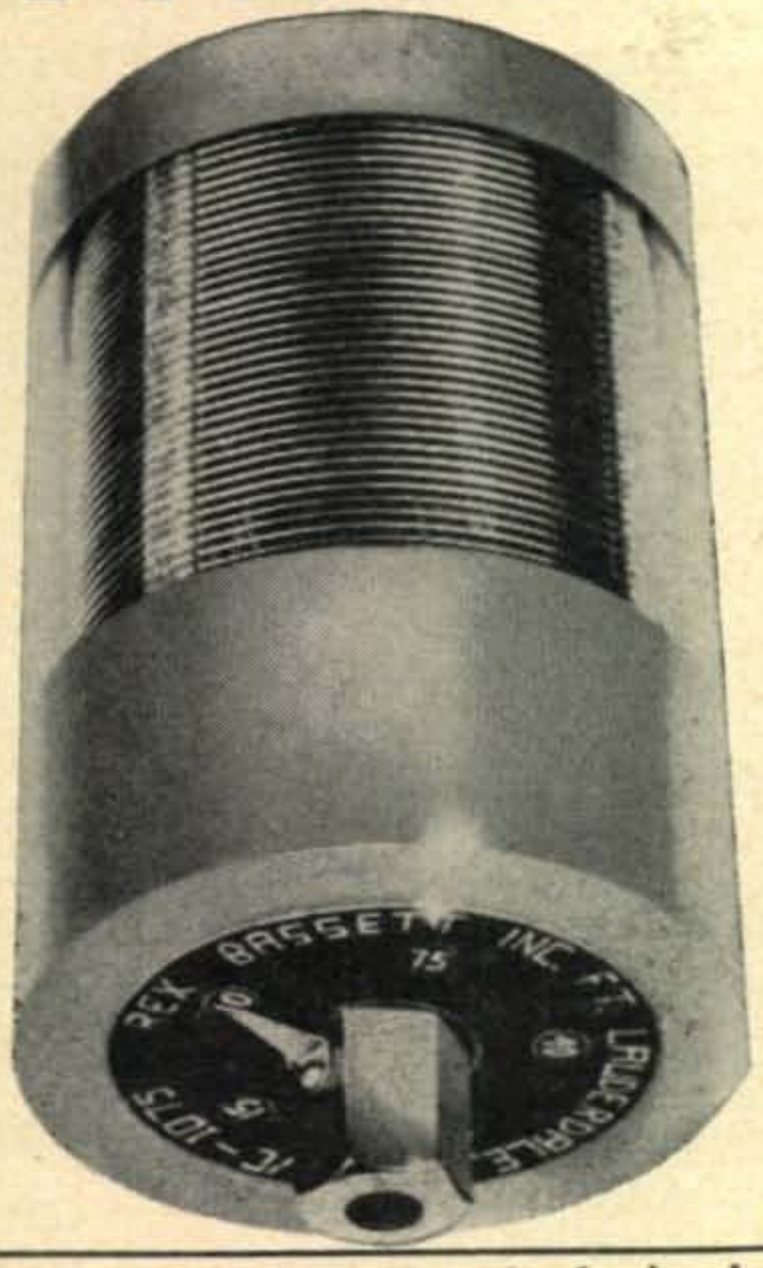
The other set of contacts on the relay is used to mute the receiver while transmitting, as well as to provide the AF-67 with 250 volts for the low voltage stages. Connect a wire from the movable arm of the relay to Pin #8 of the power-control socket. (Pin #8 is supplied +250 volts from a receiver power pack or separate power pack through the power cable.) Connect a wire from the normally open-contact on the relay to Pin #11 of the power-control socket. (Pin 11 supplies the +250 volts to the low voltage stages.) Connect a wire from the normally closed-contact on the relay to Pin 9 of the power-control socket. (Pin 9 supplies the +250 volts to the receiver.)

For purposes of getting more signal from the exciter stages into your receiver, making it possible to read SSB on your receiver or making it easier to zero in on a signal, solder a wire about 6″ long from the new co-ax chassis connector (receiver antenna lead) and extend past the baffle shield and make an insulated one turn loop around the bus wire of the 6146 grid tuning condenser.

We highly recommend the use of a light dimmer switch mounted on the floor board near the light dimmer switch of the car as a "push-to-talk" switch. Also a small carbon mike (we use a telephone company 52BW supervisory headset mike) should be mounted on a piece of #8 wire formed so that it will hook around the neck with the mike in front of the mouth. A piece of plastic spaghetti tubing may be slipped over the wire to protect white shirts from becoming soiled.

The time-worn phrase, "Look Ma, no hands" can mean safer driving and a longer, happier life, even while driving in heavy traffic. ■

NEW!



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YL [*from page 79*]

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33, Louisa, W5RZJ

Slicer [*from page 22*]

carrier, as monitored in the slicer headphone jack. Now, switch *S2* to the opposite sideband and tune the trimmer for this position to again produce zero beat. When exact zero beat is obtained on both LSB and HSB positions, then the i-f oscillator is positioned exactly correct.

The front panel trimmer is useful for tuning in signals precisely, in lieu of the main tuning control on the receiver. Remember that when using an adapter of this sort the receiver B.F.O. must always be off for any type of reception.

The receiver with which this slicer was tested was a *Hammarlund SP-600* having a low impedance i.f. take-off (70 ohms). Such a coupling is desirable because it drives the low impedance base of the transistor mixer, *TR1*, quite nicely. If the coupling to the receiver is at high impedance, then it may be necessary to reduce the value of *C1, 100 μμfd.*, so as not to unduly shunt the last receiver i.f. Usually there will be sufficient gain available to overlook any mismatch at this point.

The audio output of the slicer is coupled back into the grid of the first audio amplifier in the receiver in such a way that the audio gain control on the receiver is operative on the signals from the slicer.

As far as selectivity is concerned, the addition of the slicer will make almost any receiver perform as well as the most expensive receivers. However, the stability of the receiver H.F. oscillator must not be overlooked. If it is unstable then the addition of a highly selective unit, like this one, will make tuning very difficult.

But then, if one tolerates such an unstable receiving oscillator, one isn't going to get much enjoyment out of single sideband anyway! ■

Meter [*from page 29*]

capacitor and the phone jack. The main tuning capacitor *C9*, is mounted on an aluminum bracket that is bolted to the bottom cabinet plate. The slug for adjustment of *L1* is bolted to the side of the cabinet immediately above the coil. The output feed through *J2* is on the back of the cabinet and serves as a support for the output coupling capacitor.

The emitter and collector voltages are supplied by separate batteries. The emitter dropping resistor can be chosen by trial: adjusting it for a collector current of approximately 450 microamperes. The tuned circuit uses a tapped inductance to provide band spread and complete utilization of the dial's calibration.

The slug for adjustment of *L1* was made from a brass coax fitting soldered onto a machine screw. The brass slug is a valuable adjustment for correction and calibration after any circuit changes.

The output lead serves as the output when the meter is coupled into the receiver input and as the input when the meter is used to measure local transmitter frequency. The diode 1N34A is utilized as an untuned mixer: mixing the received signal and the signal from the meter's oscillator. The audio beat is amplified by the 2N35 and heard in the phones.

When measuring the fequency of a received signal on a receiver, it is best to use the receiver with the BFO off. The frequency meter should be coupled to the receiver antenna, either directly or capacitively, and the frequency meter dial turned until a beat is heard in the receiver. Tune the freq meter dial to zero beat, read the frequency meter dial and obtain the frequency from the calibration book. If other than 80 meters, multiply by proper multiple.

For measuring or monitoring the transmitter very little pickup antenna is required on the meter.

All parts of the oscillator, mixer and audio amplifier are mounted on the component soldering lugs and tie points bolted to the base plate. The flashlights are held in position with a small curved aluminum plate. The plate is held tight against the batteries with an inch-long machine screw between the two batteries and through the base plate.

The transistors may be either used with small sockets or soldered directly into the circuits. If the transistors are soldered directly in the circuits, observe the warning about shunting the heat away from the transistor's leads.

The features of this transistor frequency meter make it a cheap, yet valuable, instrument. It's compact, the calibration book is easy to use, it's stable, has negligible drift and you can't beat two years' power for 30 cents. ■

Receiver Modifications

[*from page 26*]

circuit shown in fig *5* is merely a guide or example. The important thing is the principle involved which is that of the mixer-type second detector for SSB, not the type of components used.

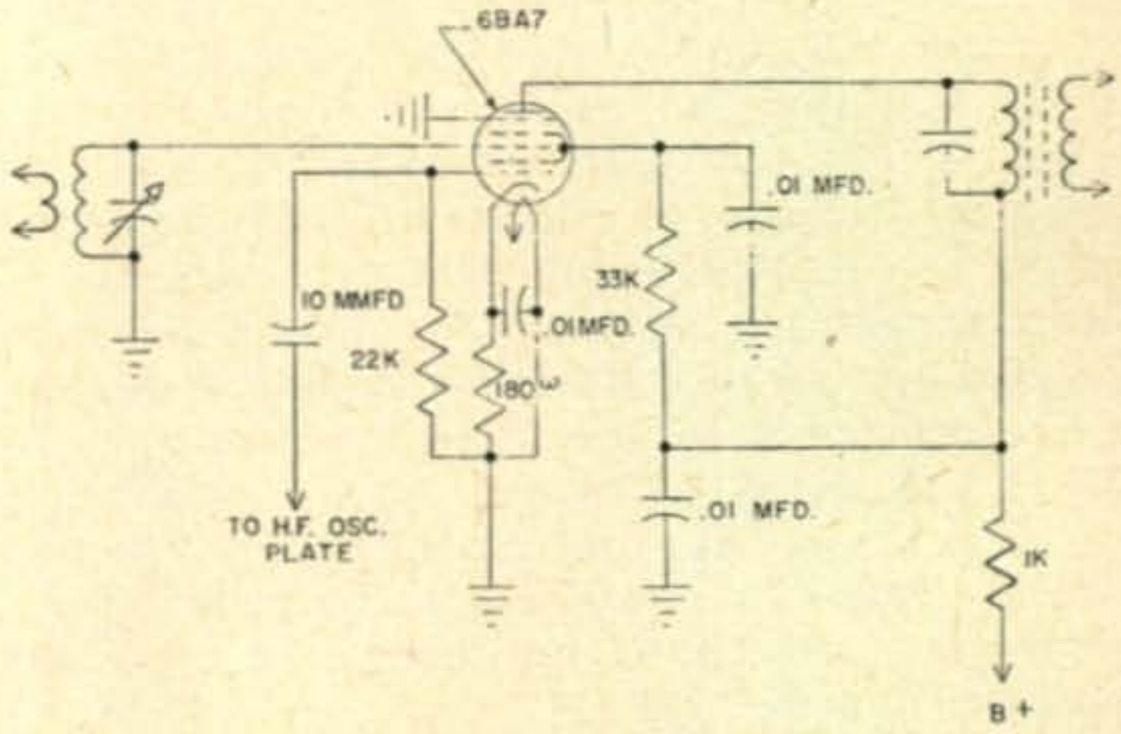

Fig. 5. New H.F. Mixer

In addition to all of the above, in our CR-88A we replaced the 6SG7 second r-f tube and the three 6SG7 i-f tubes with 6BA6's with no circuit changes, which improved the gain somewhat. A further modification which improved operation still more was the substitution of a 6BA7 tube for the h-f mixer. The 6BA7 is a new, improved type of mixer tube, designed for high conversion efficiency and low noise level. The circuit of the new 6BA7 mixer is shown in *fig 5*. There is nothing tricky about it and circuit values are those recommended in tube manuals. A 9-pin miniature socket is used. Of course, re-alignment of the receiver will be required after all of the above changes.

Conclusion

These modifications greatly enhanced the value of the CR-88A to us, and almost made us forget that it had no calibrated band-spread for amateur use. However, we received much pleasure from SWL-ing, listening to our favorite programs in the evening on AFRTS, the BBC, and WRUL, because English language programs on the local Venezuelan broadcast stations were few and far between. We spent a lot of time monitoring QSO's on the ham bands, though, and heard many calls familiar to us from back home on 14 and 21 mc. The CR-88A with its new tube line-up really dug down into the QRM and pulled them in. One result of these modifications was the inclusion of the 6BK7A triode first r-f stage in a large number of CR-88A's (DR-89A's) which we were installing in Venezuela for international commercial point-to-point service. The improvement in operation was well worth the effort. ■

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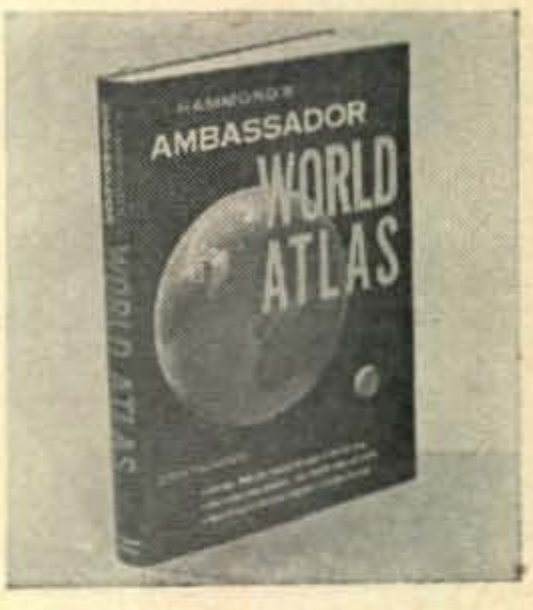

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SELL: RME-45 receiver with matching speaker $80.00. Viking Adventurer $40.00. Both $110.00. Good condition. All offers considered. K9BFI, 125 Hillcrest, Hinsdale, Ill.

SELL: Bargain Brand new ElectroVoice 664 Variable D Cardioid Microphone less stand for only $25.00. Contact Reeve Strock, K4AW, 132 Rutledge Drive, Hendersonville, North Carolina.

FOR SALE: Adams Electronics Model 1010 kilowatt linear amplifier and power supply. Perfect. Must sell. Best offer. Hear it on 20 meters. Elliot Adler, K2GLG, LY 9-1057 or MU 2-8002.

FOR SALE: Tubes, brand new, not surplus, original cartons, RCA 6146, $4.00; RCA 816, 5763, GE 12AY7, $1.50 each; CBS 5514 $5.00; Amprex 4-250A $28.00; RCA OB2 $1.00; RCA 866 $2.00. Limited quantity. Will send C.O.D. plus postage to first come. Shure CB11 push to talk mic $5.00. Jackson Model 652 Audio signal generator $25.00, Simpson 260 $28.00. 1/3HP Washing machine motor $6.00, Bendix Scintilla Ohmmeter $6.00, Hylite 3 element 20 meter beam $40.00, S38B $20.00, Power supply rack mounted 1500 volt @ 300 Ma. $50.00; 100 boxed assorted receiving tubes $15.00, 813 $5.00, NC-98 $100.00, TV tuners $2.00, TV power transformers $3.00, Gonset 3-30 converter $25.00; Clinton ¾ HP Gasoline engine $10.00; Slightly used tubes, all guaranteed 807 50¢, 811 75¢, 866 50¢. No trades, W4FXQ, 5208 Birkenhead Road, Jacksonville 10, Fla.

TUBES for Hi Eff. Batt. portable VHF Xmitter. 3B4A $1.10, 3A5 $.40. See Aug. 1949 Radio & T.V. News, Page 34. M. Frost, 663 Broad Blvd., Dayton, Ohio.

BARGAINS—WITH NEW GUARANTEE: S-38C $30.00; SX-28 rack $99.00; S-27 VHF $79.00; HT18 VFO $39.00; Lysco 600 $69.00; Eldico TR75TV $30.00; Meissner EX VFO $25.00; NC-57 $65.00; Millen 90800 $14.95; Johnson VFO $24.95; Viking II $219.00; Ranger $175.00; RME-84 $65.00; Gonset TriBand $29.95; Sonar SRT-120 $99.00; Globe Trotter $39.00; Scout 40 $49.00; Scout 40A $59.00; Globe Champ 165 $160.00; Globe King 275 $225.00; Heath AT-1 $24.50; Heath AR-2 $22.50; BC-779 w/p.s. (rack) $119.00; and many others. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deals to World Radio Laboratories, 3415 West Broadway, Council Bluffs, Iowa.

FOR SALE: Complete mobile rig. Elmac A54H, Gonset super 6, pe103, 6000DL mike, all cables excellent condition. Write Dick Kesler, Olney, Illinois.

FOR SALE *(Cont'd)*

BARGAINS: Reconditioned with new guarantee. Shipped on approval. Hallicrafters S38 $29.00; S40A $59.00; SX43 $99.00; SX99 $119.00; SX71 $149.00; SX96 $189.00; SX100 $229.00; NC98 $119.00; NC183 $169.00; HRO5TA1 $129.00; Viking Adventurer $39.00; Viking II $199.00; S40B; S85; SX88; NC300; HQ129X; HQ140X; HQ140-XA; Gonset G66; GPR-90; B & W 51SB; 5100; L1000A; Viking KW and desk; A54, AF-67, VHF152A, HF-10-20; HT9, HT-18, HT-19; Collins 75A1, 75A2, 75A3, 75A4, 32V3; many other items. Easy terms. Write for list. Henry Radio, Butler, Mo.

PHILADELPHIA DISTRIBUTOR: Technical Material Corporation Receiver GPR-90 $495.00, Literature. Antrim Communications, 4022 Woodruff Road, Lafayette Hill, Pa. TAylor 8-9604.

WANTED

SELL YOUR WAY TO WEALTH! WANTED: Surplus military and commercial aircraft electronics: ARN-7, ARC-3, 51R-3, APN-9, BC-348, RTA-1B, BC-788, I-152, L-5, MN-53 18S-4 BC-610, CW-3, test equipment and ALL VACUUM TUBES. Top prices paid! For fattest checks—sell to REX! Robert Sanett, W6REX, 1524 S. Edris Drive, Los Angeles 35, California. Phone: REpublic 5-0215.

WANTED: GE Tungar, or Westinghouse Rectigon, 2 or 6 AMP, 6 Volt battery chargers. Advise condition and price. W1BB.

WANTED: BC-221, BC-348, BC-312, BC-342, BC-610-E, ARN-7, BC-788, ARN-6, APR-4, ARC-1, ARC-3, ART-13. All types surplus or amateur transmitters, receivers, test equipment taken in trade for New Johnson Viking Ranger, Pacemaker, Valiant, Hallicrafters, Hammarlund, National, B&W, Gonset, Elmac, Telrex, Fisher Hi-Fi, etc. Write Tom W1AFN, Alltronics, Box 19, Boston 1, Mass. Tel. RIchmond 2-0048.

QST's WANTED: Will pay good prices for QST's from 1923 and prior. State condition and price. Joseph Mullan W3RLR, 217 Northway, Baltimore, Maryland.

WANTED: Used receivers and transmitters! Will pay you cash or take in on trade. 10% down, with up to 24 months to pay. Have in stock new 75A3, 75A4, KWS1 Collins, Johnson, B & W, National, Hallicrafters, Morrow, Conelrad CM-1 $39.50; Elmac, Hammarlund, Gonset, Central Electronics; 10-15-20 Hi-Gain Beams $99.75; 20 meter short beam $54.95; 20 meter beam $49.95; 15 meter beam $27.95; 10 meter beam $18.95; also Mosley and Gotham Beams. Write Ken, WØZCN, or Glen, WØZKD, Ken-Els Radio Suppiy Co., 501 1st Avenue North, Fort Dodge, Iowa.

AN/APR-4 Tuning Units, Airborne Electronics, Test Equipment, also Surplus and Commercial laboratory items wanted. Engineering Associates, 434 Patterson Road, Dayton 9, Ohio.

SELL OR TRADE

KW-1 WANTED. Will trade almost new XK-120 1952 Jaguar Sports Roadster, red with green leather upholstery, twin Douglas mufflers, full wrap around rear bumper, wind wings side view mirrors, radio and heater, cost well over $5,000, only 15,000 miles. Been sick, unable to use car, so will trade even for clean, unmodified KW-1. Here is a chance for you to get a real dream car. Thomas A. Brown, W3AKP, B-60 Ranch, Crownsville, Maryland.

For further information, check number 6 on page 128.

QSL

OUTSTANDING QSL, SWL samples 25¢ (refunded). Callbooks (winter) $4.50. "Rus" Sackers, W8DED, P.O. Box 218, Holland, Michigan.

QSLs. Samples, dime. Print Shop, Corwith, Iowa.

NOVICES! GENERALS! Want reasonably priced "tacked-up-type" different, unique, comic, sedate, infrequent, uncommon, curious, incomparable, unprecedented, extraordinary, remarkable, unusual QSL's, SWL's, YL-OM's? (Samples 9¾¢) Rogers, KØAAB, 737-B Lincoln Avenue, St. Paul 5, Minnesota.

QSLs "Eventually, why not now?" Ham's "Super-Speed Specials" will please your contacts and your wallet. Samples dime. Robinson W9AYH, 12811 Sacramento, Blue Island 8, Illinois.

RUSPRINT SPECIAL, QSL's, SWL's, .01 each, Samples 10 cents, Rusprint, Box 7507, Kansas City 16, Missouri.

QSLs. Glossy. Samples 10¢. W10LU Press, 30 Magoun Ave., Medford, Mass.

QSL SAMPLES. Dime, refundable. Roy Gale, Waterford, Conn.

QSL's—"Brownie" W3CJI, 3110 Lehigh, Allentown, Pa. Samples, 10¢, with catalogue, 25¢.

QUALITY QSL's. Samples. 10¢. Lee, W5CZA, Box 7171, Oklahoma City, Oklahoma.

QSL's in 3 or 4 colors on glossy stock, $3.00 per 100, or $5.00 for 200. Order now and get surprise of your life. 24 hour service. Constantine Press, Bladensburg, Md.

QSL's. Nice designs. Samples. Ted Besesparis, W3QCC, Frackville, Pa.

MISCELLANEOUS

UHF—VHF Transmitters and receivers designed, constructed or repaired. Electronic Service Engineers, Poteau, Oklahoma.

2-6 BROADBAND CONVERTERS CONSTRUCTED. Complete service on all types of electronic equipment. Two generations of Electronic Service. Electronic Service Engineers, Poteau, Oklahoma.

FLORIDA VACATIONING? Ham facilities available on premises, Wigwam Village Motel Tepees, South Orange Blossom Trail, Orlando, Florida. Johnny Southerland, Jr., W4TBH.

RECEIVERS—repaired and aligned by competent engineers, using factory standard instruments. Authorized Factory Service Station for Collins, Hallicrafters, Hammarlund, National. Our 21st year. Douglas Instrument Laboratory, 176 Norfolk Avenue, Boston 19, Mass.

RADIO MAGAZINES—Buy, Sell, Trade. Bob Farmer, Plainview, Texas.

INSTRUCTION

NOVICE CODE COURSE, to 8 WPM, $5.95. Advanced course—9 to 18 WPM, $4.95. Both together $9.95. 7" magnetic recording tape, slow speed (3¾ IPS). Unbeatable. Rush your order today to Tapedcode, Box 31-F, Langhorne, Pa.

KNOW MORSE CODE in minutes. Revolutionary code teacher proved 10 years. 50c and self-addressed stamped envelope to "PHILKODA-C," 7120 Lahser, Birmingham, Michigan.

not standard equipment on these popular transmitters. Bill, who bears the well-deserved title of "Hon Tech" in local ham circles, propped his feet up on the workbench, pondered a bit, and said, "Sure, that's simple."

And simple it turned out to be:

Installation

1. Remove existing microphone connector and install a suitable connector for a P-T-T circuit. *Caution:* While a regular socket punch may be used to enlarge the original mounting hole it is necessary to use care in doing this job. The metal cabinet of the Viking II is of sturdy material and it is possible to snap the bolt of the socket punch.

2. Replace the original mike connections in one side of the new mike jack.

3. Mount a single puncheon (one insulated terminal) tie point under one of the screws holding the modulation transformer just to the left of terminal strip *X18* (See illustration). Tie-points generally come with #6 mounting holes so it may be necessary to enlarge the tie-point mounting hole to accommodate the #8 screw holding the modulation transformer.

4. Relay (Potter-Brumfield LM-11 10,000 ohms) mounts between *R13* and *C12-13*. The mounting hole for the relay should be carefully drilled from the "top" so as to insure clearance of the rotary coil. Take your time and you should have no difficulty.

5. The normally open contacts of the relay are wired in parallel with the existing plate switch, providing "over-ride" of the push-to-talk circuit.

6. One side of the relay coil goes to a blank terminal on *X18* and from there through an Ohmite Z50 r-f choke to the remaining side of the new microphone jack. Both sides of the choke are bypassed to ground with .0047 μfd. ceramic condensers (See illustration).

7. The other side of the relay coil goes to the insulated terminal of the added tie-point. From this terminal a 20,000 ohm 10 watt resistor is connected to low voltage B plus (Center terminal, usually, of *X18*).

8. A foot switch may be hooked to the push-to-talk side of the microphone jack with the other side of the foot switch going to ground.

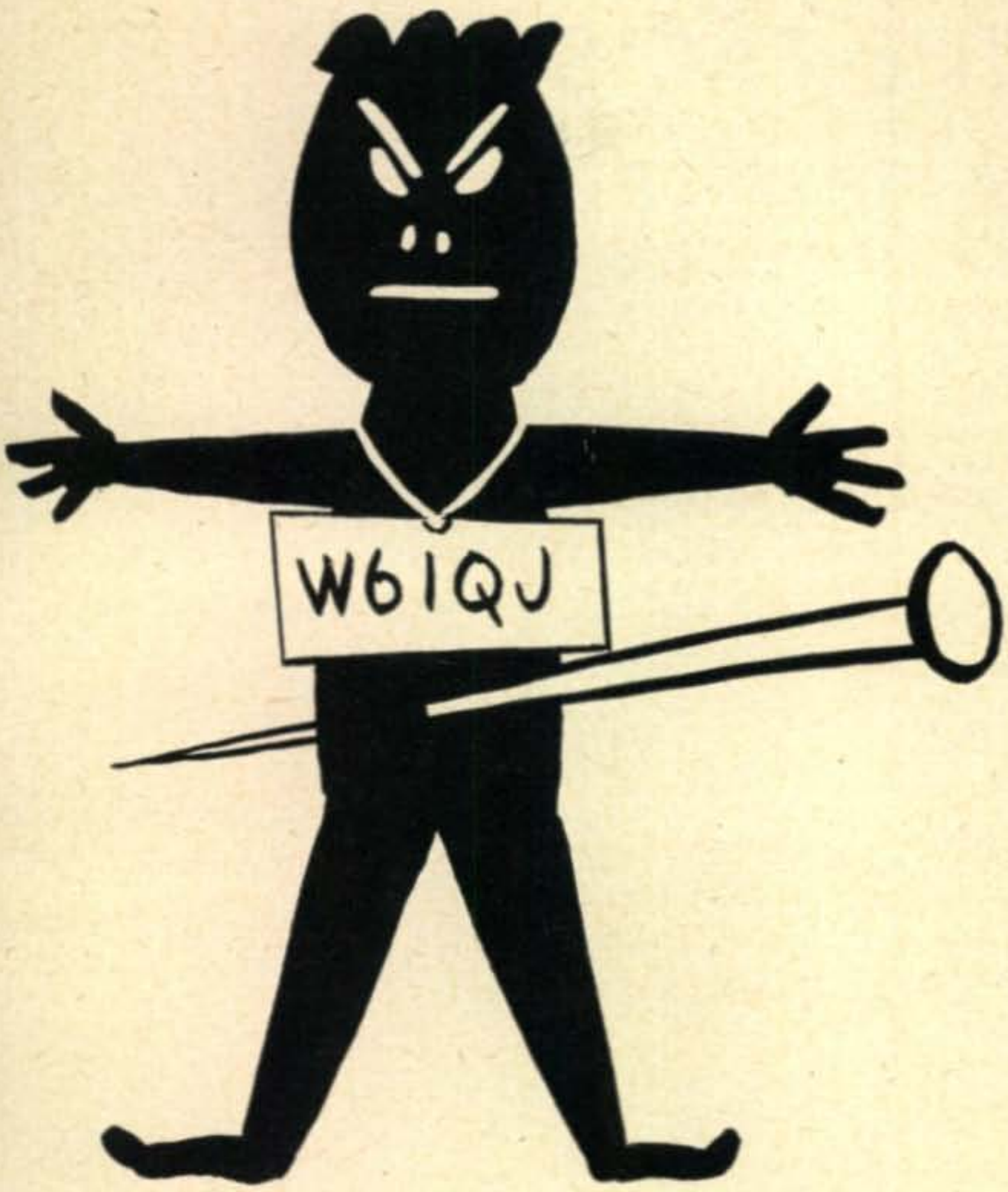
That is all there is to it. This system is great for traffic men, casual rag-chewer, dx-hound, or fast-break operator. It works wonders in both 'phone and CW operation. Both hands are now free to handle receiver controls, service messages, or chase the cat away from the a-c lines. If you are in a hurry. . . . just step on it. ■

Parts List

1—Amphenol mike connector 80-PC2F (or similar)
1—single puncheon tie-point
1—Relay, Potter Brumfield LM-11 10,000 ohms
2—.0047 mfd. ceramic condensers
1—20,000 ohm 10 watt resistor

For further information, check number 45 on page 128.

CQ Ad Index



Say, all you non-subscribers, have you been noticing any strange pains lately? I'll bet you have been wondering what was happening. Here is the inside story.

CQ has gotten a splendid buy on a group of genuine voo-doo dolls from Haiti, complete with special pins. We are setting them up as fast as we can with the call letters of non-subscribers on them and fiendishly pushing pins through particularly painful spots every other day or so. I'll bet you thought that was lumbago hitting you. Heh, heh, heh. We will take the call letters off the dolls as the subscriptions come in, so why take a chance? Get that little old check book out and be generous. Keep our editor from having to eat at the Automat for lunch. Use coupon below.

CQ Magazine
300 West 43rd St.
New York 36, N.Y.

One year, $4 **Two years, $7** **Three years, $10** CQ-2

in U.S. Possessions, APO & FPO, Canada & Mexico
Pan-America and all other foreign: 1 yr. $6; 2 yrs. $11; 3 yrs. $16.

Enclosed is $..... for a.....year ☐ new ☐ renewal subscription to *CQ*, to be sent to:

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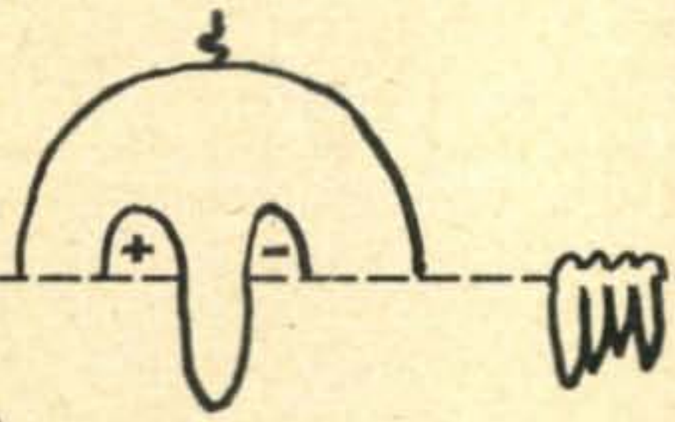
GET THE FACTS DEPARTMENT

Most of the ads offering literature or catalogs in this issue of CQ are keyed. For additional information simply circle that key number below, tear out the form and send it to CQ. . . . We'll do the rest. If you have an aversion to chopping up your CQ then write the numbers on a post-card and send them to us. In this way you can do all your literature requesting at one time with one stamp, and no letters to write.

— You getting the facts, Mac?



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Readers Service Coupon B
Void after April 1, 1957

Please send me information on your ads in the February 1957 CQ keyed as follows:

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48	49	50										

Name_____ Call_____
(Please Print)

Address_____

City_____ Zone_____ State_____

For further information, check number 34 on page 128. →

NEW

national

3 NEW FROM NATIONAL

Coming soon, and very soon are 3 new receivers from National.

Price scaled for any ham budget, each offers complete new styling and many new features . . . so new they will be the most talked about receivers on the air.

You'll want to see them, you'll want to admire them . . . and you'll want to own at least one. So if you plan to buy a receiver in the $100 to $200 price bracket, **WAIT!** Don't buy any until you see the **3 new receivers from National!**

tuned to tomorrow National Malden 48, Mass.

8 out of every 10 U. S. Navy ships use National receivers

Inside view of the Gonset G-77 showing the RCA-6146 in the "final".

Gonset G-77 One of amateur radio's outstanding multi-band mobile transmitters.

Leading Amateur Designs

...USE RCA TUBES

RCA-6146 Amateur radio's most popular beam power tube. 90 watts input, CW; 67.5 watts, 'phone.

Next time you QSO a mobile station and you ask him what's behind that solid signal, don't be surprised if you get this answer: "A Gonset G-77—with an RCA-6146 in the final."

Why do more and more amateur and commercial designs specify RCA beam power tubes such as the 6146 pictured here?

Beam power tubes—an original RCA development—offer better results with fewer stages, fewer tubes, fewer controls. RCA beam power tubes make it practicable to get the power you want with lower plate voltage.

There are RCA beam power tubes to meet your power requirements at any frequency up through 450 Mc. Your RCA Tube Distributor handles the entire line. For technical data on any type of RCA beam power tube, write RCA Commercial Engineering, Section B15M, Harrison, N. J.

TUBES FOR AMATEURS

RADIO CORPORATION OF AMERICA

Tube Division Harrison, N. J.

For further information, check number 37 on page 128.