

EQ

August 1959

50¢

The Radio Amateur's Journal

**W2SKE visits 4S7YL
and daughter**



GOOD REASONS FOR
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S//LINE

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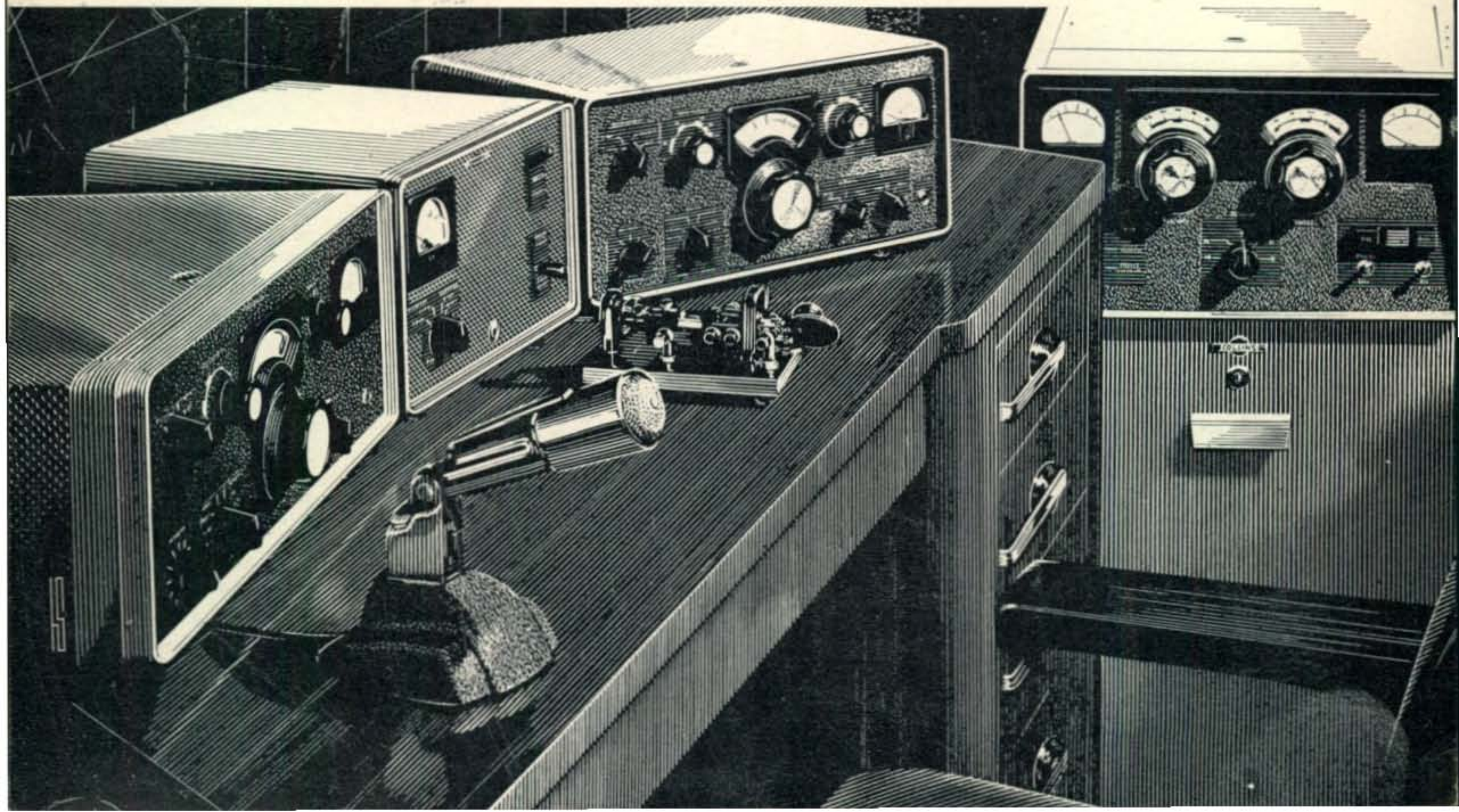
The Collins 32S-1 Transmitter uses a 2.1 kc Mechanical Filter with steep skirted frequency response on *both* sides of the selectivity curve. Limits the bandwidth to only that required for good communication.

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For further information, check number 1 on page 126.



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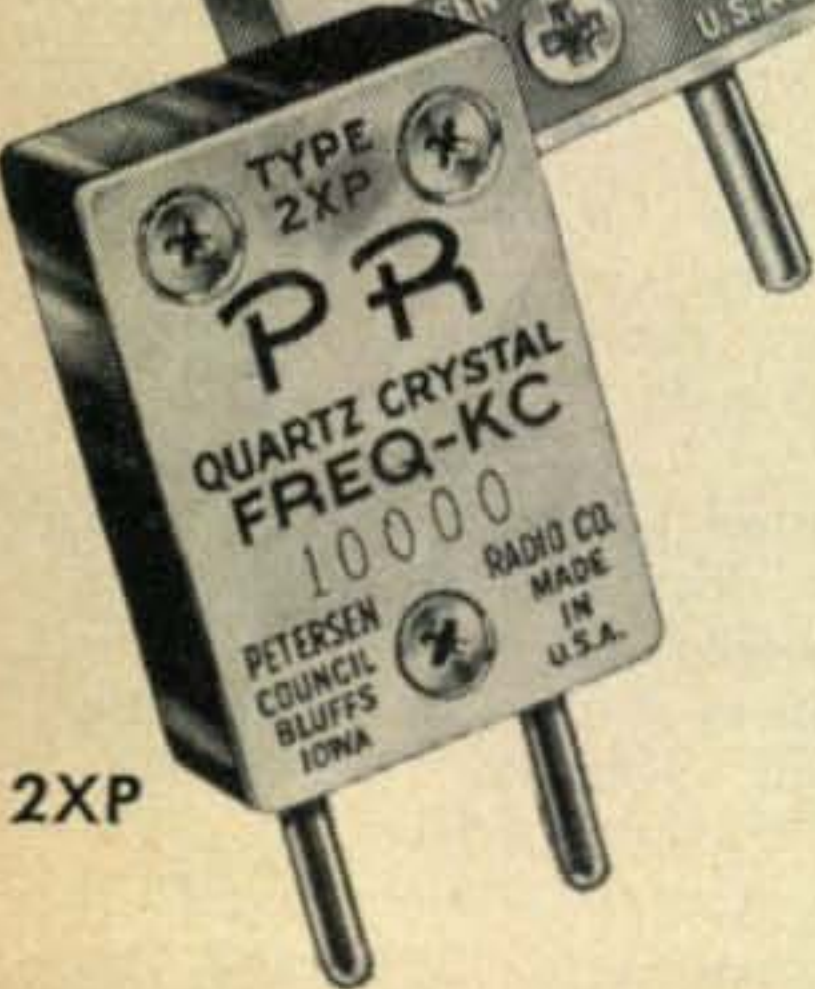
Z-2



Z-9
Z-9A
Z-9R



Z-1



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Type 2XP

Suitable for converters, experimental, etc. Same holder dimensions as Type Z-2.

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Third overtone; multiplies into either 2-meter or 6-meter band; hermetically sealed; calibrated 24 to 27 Mc., ± 3 Kc.; .050" pins. **\$4.95 Net**

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For Lear, Narco and similar equipment operating in the 121 Mc. region, requiring crystals in 30 Mc. range. Each..... **\$4.95 Net**

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To determine band edge. To keep the VFO and receiver properly calibrated. 100 Kc. ... **\$6.95 Net**



Z-6A



PETERSEN RADIO CO., Inc. 2800 W. Broadway
COUNCIL BLUFFS, IOWA

EXPORT SALES: Royal National Corporation, 250 W. 57th Street, New York 19, N. Y., U. S. A.

For further information, check number 3 on page 126.

Designed for



Application



90751

**TONE MODULATOR
FOR GRID DIP METER**

The Millen "Designed For Application" No. 90751 Tone Modulator is a small package, containing a transistor audio oscillator and its mercury battery, which plugs into the 'phone jack of a Grid Dip Meter to modulate the signal at approximately 800 cycles for applications requiring a modulated signal. Modulator is automatically turned on when plugged into a Grid Dip Meter jack.

In addition to its prime use in modulating a Grid Dip Meter, the No. 90751 may be used in other ways. The Tone Modulator has sufficient power output to drive a pair of headphones without amplification. Therefore it may be keyed for code practice or it may be plugged into the mike jack of a 'phone transmitter to provide a tone for modulation checks and for modulated C.W. emission.

Dimensions: only 4 x 1 3/8 x 1 3/8 in.
Weight: 4 1/4 oz.

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MFG. CO., INC.**

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CQ, the Radio Amateurs' Journal is published for active hams by active hams. Not affiliated with any clubs or other political groups, CQ endeavors to be a true and honest reporter for those interested in the hobby. Suggestions for improvement are welcomed.

Authors would do well to send for the CQ Style sheet which will explain our confused system of abbreviations and symbols. The article "Author Author" (October 1952 CQ) tells all about how to write articles for CQ, how much we pay, etc. Reprints of this article are available from CQ if you have been improvident in keeping up your radio library.

CQ CERTIFICATES:

The WPX Award is granted for two-way contact with certain number of amateurs in different prefixes of the world. Full details are contained in the WPX Record Book which is available for 15c from CQ. Application forms are free.

The WAZ Award is granted for contacting all of the amateur zones of the world. Current standings of amateurs working for this award will be found in the DX column. A DX Zone map of the world is available free from CQ. Send stamped envelope.

Special SB Certificates are available from the Sideband Department for operators providing proof of contact (QSL cards) with stations in 50, 75 and 100 countries using two-way sideband. Send cards directly to the SB Editor.

TECHNICAL INFORMATION:

Please check the 11-year cumulative index which was published in the January 1956 CQ for information about articles in past issues of CQ. The December 1956 to 1958 CQ yearly indexes will bring you up to date. Most back issues are available at \$1 from us. Check our "Back Issue" ad for details on those not available. Reprints of the Cumulative Index are available free. For further information see the Ham Clinic column.

DISCLAIMER:

The authors and editors do the best they can to make everything as correct as possible in the articles. If for any reason any of them should happen to goof we hasten to point out that everything is experimental and we guarantee nothing.

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Bill Leonard, W2SKE with Soma, 457YL and her daughter Chitra photographed in Ceylon during Operation Worldwide in May.

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Branch Advertising Offices:

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Charles W. Hoefler, 1664 Emerson Street, Palo Alto, Calif. DAvenport 4-2661.

publisher **S. R. Cowan**
production manager **Bill Gardner, Jr.**
circulation manager **Harold Weisner**
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CQ—(title registered U.S. Post Office) is published monthly by Cowan Publishing Corporation. Executive and editorial offices at 300 West 43rd Street, New York 36, N. Y. Telephone JUdson 2-4460. Second Class Postage paid at New York, N. Y.

SUBSCRIPTION RATES: U.S.A. and Possessions, APO, FPO, Canada and Mexico: one year \$5.00; two years \$9.00; three years \$13.00. Pan-American and foreign: one year \$6.00; two years \$11.00; three years \$16.00.

FOREIGN SUBSCRIPTIONS: Great Britain: RSGB, New Ruskin House, Little Russell St., London WC 1, England. Australia: Technical Book Co., 297 Swanston St., Melbourne C 1, Victoria, Australia.

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Postmaster: Send Form 3579 to CQ, 300 West 43rd Street, New York, N. Y.

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IS DESIGNED BY HAMS
WHO KNOW YOUR
PROBLEMS AND
NEEDS.

PROVEN, "ON THE AIR"
PERFORMANCE



"SENECA" VHF HAM TRANSMITTER KIT

Beautifully styled and a top performer of highest quality throughout. The "Seneca" is a completely self-contained 6 and 2 meter transmitter featuring a built-in VFO for both 6 and 2 meters, and 4 switch-selected crystal positions, 2 power supplies, 5 radio frequency stages, and 2 dual-triode audio stages. Panel controls allow VFO or crystal control, phone or CW operation on both amateur bands. An auxiliary socket provides for receiver muting, remote operation of antenna relay and remote control of the transmitter such as with the Heathkit VX-1 Voice Control. Features up to 120 watts input on phone and 140 watts on CW in the 6 meter band. Ratings slightly reduced in the 2 meter band. Ideal for ham operators wishing to extend transmission into the VHF region. Shpg. Wt. 56 lbs.



HEATHKIT VHF-1 **\$159⁹⁵**




HEATHKIT DX-20 **\$35⁹⁵**

DX-20 CW TRANSMITTER KIT

Designed exclusively for CW work, the DX-20 provides the novice as well as the advanced-class CW operator with a low cost transmitter featuring high operating efficiency. Single-knob bandswitching covers 80, 40, 20, 15 and 10 meters using crystals or an external VFO. Pi network output circuit matches antenna impedances between 50 and 1,000 ohms. Employs a single 6DQ6A tube in the final amplifier stage for plate power input of 50 watts. A 6CL6 serves as the crystal oscillator. The husky power supply uses a heavy duty 5U4GB rectifier and top-quality "potted" transformer for long service life. Easy-to-read panel meter indicates final grid or plate current selected by the panel switch. Complete RF shielding to minimize TVI interference. Easy-to-build with complete instructions provided. Shpg. Wt. 19 lbs.

HEATH COMPANY Benton Harbor, Michigan

 a subsidiary of Daystrom, Inc.

Mobile Gear...for the Ham on the Go!

"CHEYENNE" MOBILE HAM TRANSMITTER KIT

All the fun and excitement . . . plus the convenience of mobile operation are yours in the all-new Heathkit "Cheyenne" transmitter. The neat, compact, and efficient circuitry provides you with high power capability in mobile operation, with low battery drain using carrier controlled modulation. All necessary power is supplied by the model MP-1 described below. Covers 80, 40, 20, 15 and 10 meters with up to 90 watts input on phone. Features built-in VFO, modulator, 4 RF stages, with a 6146 final amplifier and pi network (coaxial) output coupling. High quality components are used for long service life and reliable operation, along with rugged chassis construction to withstand mobile vibrations and shock. Thoughtful circuit layout provides for ease of assembly with complete instructions and detailed pictorial diagrams to insure success. A spotting switch is also provided. A specially designed ceramic microphone is included to insure effective modulation with plenty of "punch". Plan now to enjoy the fun of mobile operation by building this superb transmitter. Shpg. Wt. 19 lbs.



HEATHKIT MT-1

\$99⁹⁵



"COMANCHE" MOBILE HAM RECEIVER KIT

Everything you could ask for in modern design mobile gear is provided in the "Comanche" . . . handsome styling, rugged construction, top quality components . . . and, best of all, a price you can afford. The "Comanche" is an 8-tube superheterodyne ham band receiver operating AM, CW and SSB on the 80, 40, 20, 15 and 10 meter amateur bands. A 3 mc crystal lattice-type IF filter permits the receiver to use single conversion without image interference, and at the same time creates a steep sided 3 kc flat top IF bandpass characteristic comparable to mechanical type filters. The neat, compact and easy-to-assemble circuitry features outstanding sensitivity, stability and selectivity on all bands. Circuit includes an RF stage, converter, 2 IF stages, 2 detectors, noise limiter, 2 audio stages and a voltage regulator. Sensitivity is better than 1 microvolt on all bands and signal-to-noise ratio is better than 10 db down at 1 microvolt input. One of the finest investments you can make in mobile gear. Shpg. Wt. 19 lbs.



HEATHKIT MR-1

\$119⁹⁵

MOBILE SPEAKER KIT

A matching companion speaker for the "Comanche" mobile receiver. Housed in a rugged steel case with brackets provided for easy installation on fire wall or under dashboard, etc. Uses 5 PM speaker with 8 ohm voice coil. Measures 5" H. x 5" W. x 2½" D. Shpg. Wt. 4 lbs.



HEATHKIT AK-7

\$5⁹⁵



HEATHKIT AK-6

\$4⁹⁵

HEATHKIT MP-1

\$44⁹⁵



MOBILE POWER SUPPLY KIT

This heavy duty transistor power supply furnishes all the power required to operate both the MT-1 Transmitter and MR-1 Receiver. It features two 2N442 transistors in a 400 cycle switching circuit, supplying a full 120 watts of DC power. Under intermittent operation it will deliver up to 150 watts. Kit contains everything required for complete installation, including 12' of heavy battery cable, tap-in studs for battery posts, power plug and 15' of connecting cable. Chassis size is 9½" L. x 4¾" W. x 2" H. Operates from 12-14 volt battery source. Circuit convenience provided by self-contained relay which allows push-to-talk mobile operation. Shpg. Wt. 8 lbs.

MOBILE BASE MOUNT KIT

The AK-6 Base Mount is designed to hold both transmitter and receiver conveniently at driver's side. Universal mounting bracket has adjustable legs to fit most automobiles. Shpg. Wt. 5 lbs.

POWER METER KIT

This handy unit picks up energy from your mobile antenna and indicates when your transmitter is tuned for maximum output. A variable sensitivity control is provided. Features a strong magnet on a swivel-mount for holding it on a car dashboard or other suitable spot. Has its own antenna or may be connected to existing antenna. Sensitive 200 ua meter. Shpg. Wt. 2 lbs.

HEATHKIT

PM-2

\$12⁹⁵





COMPANION UNITS



HEATHKIT TX-1 **\$234⁹⁵**

"APACHE" HAM TRANSMITTER KIT

The many features and modern styling of the "Apache" will provide you with just about everything you could ask for in transmitting facilities. Emphasizing high quality the "Apache" operates with a 150 watt phone input and 180 watt CW input. In addition to CW and phone operation, built-in switch selected circuitry provides for single-sideband transmission using the SB-10 External adapter. The newly designed, compact and stable VFO provides low drift frequency control necessary for SSB transmission. A slide rule type illuminated rotating VFO dial with full gear drive vernier tuning provides ample bandspread and precise frequency settings. The bandswitch allows quick selection of the amateur bands on 80, 40, 20, 15 and 10 meters. This unit also has adjustable low-level speech clipping and a low distortion modulator stage employing two of the new 6CA7/EL34 tubes in push-pull class AB operation. Time sequence keying is provided for "chirpless" break-in CW operation. The final amplifier is completely shielded for TVI protection and neutralized for greater stability. A cooling fan is also provided. The formed one-piece cabinet with convenient access hatch provides accessibility to tubes and crystal sockets. Die-cast aluminum knobs and control panel escutcheons add to the attractive styling of the transmitter. Pi network output coupling matches antenna impedances between 50 and 72 ohms. A "spotting" push button enables the operator to "zero beat" an incoming frequency without putting the transmitter on the air. Equip your ham shack now for top transmitting enjoyment with this outstanding unit. Shpg. Wt. 110 lbs. Shipped motor freight unless otherwise specified.

HEATHKIT SB-10 SINGLE SIDEBAND ADAPTER KIT

\$89⁹⁵



Designed as a compatible plug-in adapter unit for the TX-1 "Apache" transmitter, this unit lets you operate on SSB at a minimum of cost, yet does not affect the normal AM and CW functions of the transmitter. By making a few simple circuit modifications, the DX-100 and DX-100-B transmitters can be used, utilizing all existing RF circuitry. Extremely easy to operate and tune, the adapter employs the phasing method for generating a single-sideband signal, thus allowing operation entirely on fundamental frequencies. The critical audio phase shift network is supplied completely preassembled and wired in a sealed plug-in unit. Produces either a USB, LSB or DSB signal, with or without carrier insertion. Covers 80, 40, 20, 15 and 10 meter bands. An easy-to-read panel meter indicates power output to aid in tuning. A built-in electronic voice control with anti-trip circuit is also provided. 10 watts PEP output. Unwanted sideband suppression is in excess of 30 db and carrier suppression is in excess of 40 db. An EL84/6BQ5 tube is used for linear RF output. Shpg. Wt. 12 lbs.

MODIFICATION KIT: Modifies DX-100 and DX-100-B for use with the SB-10 Adapter. Model MK-1. Shpg. Wt. 1 lb. **\$8.95.**



HEATHKIT AR-3

\$29⁹⁵

(less cabinet)

ALL-BAND RECEIVER KIT

A fine receiver for the beginning ham or short wave listener, designed for high circuit efficiency and easy construction. Covers 550 kc to 30 mc in four bands clearly marked on a slide-rule dial. Transformer operated power supply. Features include: bandswitch, bandspread tuning, phone-standby-CW switch, phone jack, antenna trimmer, noise eliminator, RF gain control and AF control. Shpg. Wt. 12 lbs.

CABINET: Opt. extra. No. 91-15A. Shpg. Wt. 5 lbs. **\$4.95.**



HEATHKIT QF-1

\$9⁹⁵

"Q" MULTIPLIER KIT

Useful on crowded phone and CW bands, this kit adds selectivity and signal rejection to your receiver. Use it with any AM receiver having an IF frequency between 450 and 460 kc that is not AC-DC type. Provides an effective "Q" of approximately 4,000 for extremely sharp "peak" or "null". The QF-1 is powered from the receiver with which it is used. Shpg. Wt. 3 lbs.

OF DISTINCTIVE QUALITY

ACCESSORY SPEAKER KIT

Handsomely designed and color styled to match the "Mohawk" receiver this heavy duty 8" speaker with 4.7 ounce magnet provides excellent tone quality. Housed in attractive 3/8" plywood cabinet with perforated metal grille. Speaker impedance is 8 ohms. Shpg. Wt. 7 lbs.



HEATHKIT AK-5
\$9⁹⁵



HEATHKIT RX-1 \$274⁹⁵

"MOHAWK" HAM RECEIVER KIT

Styled to match the "Apache" transmitter the "Mohawk" ham band receiver provides all the functions required for clear, rock-steady reception. Designed especially for ham band operation this 15-tube receiver features double conversion with IF's at 1682 kc and 50 kc and covers all the amateur frequencies from 160 through 10 meters on 7 bands with an extra band calibrated to cover 6 and 2 meters using a converter. Specially designed for single sideband reception with crystal controlled oscillators for upper and lower sideband selection. A completely preassembled wired and aligned front end coil bandswitch assembly assures ease of construction and top performance of the finished unit. Other features include 5 selectivity positions from 5 kc to 500 CPS, bridge T-notch filter for excellent heterodyne rejection, and a built-in 100 kc crystal calibrator. The set provides a 10 db signal-to-noise ratio at less than 1 microvolt input. Each ham band is separately calibrated on a rotating slide rule dial to provide clear frequency settings with more than ample bandspread. Front panel features S-meter, separate RF, IF and AF gain controls, T-notch tuning, T-notch depth, ANL, AVC, BFO, Bandswitch tuning, antenna trimmer, calibrate set, calibrate on, CW-SSB-AM, receive-standby, upper-lower sideband, selectivity, phone jack and illuminated gear driven vernier slide rule tuning dial. Attractively styled with die-cast aluminum control knobs and escutcheons. No external alignment equipment is required for precise calibration of the "Mohawk". All adjustments are easily accomplished using the unique method described in the manual. An outstanding buy in a communications receiver. Shpg. Wt. 66 lbs. Shipped motor freight unless otherwise specified.



HEATHKIT AM-2
\$15⁹⁵

REFLECTED POWER METER KIT

The AM-2 measures forward and reflected power or standing wave ratio. Handles a peak power of well over 1 kilowatt of energy and covers 160 through 6 meters. Input and output impedance provided for 50 or 75 ohm lines. No external power required for operation. Use it also to match impedances between exciters or RF sources and grounded grid amplifiers. Shpg. Wt. 3 lbs.

BALUN COIL KIT

Match unbalanced coaxial lines, found on most modern transmitters, to balanced lines of either 75 or 300 ohms impedance with this handy transmitter accessory. Capable of handling power input up to 200 watts, the B-1 may be used with transmitters and receivers covering 80 through 10 meters. No adjustment required. Shpg. Wt. 4 lbs.



HEATHKIT B-1
\$8⁹⁵



HEATHKIT VX-1
\$23⁹⁵

ELECTRONIC VOICE CONTROL KIT

Eliminate hand switching with this convenient kit. Switch from receiver to transmitter by merely talking into your microphone. Sensitivity controls allow adjustment to all conditions. Power supply is built in and terminal strip on the rear of the chassis accommodates receiver and speaker connections and also a 117 volt antenna relay. Shpg. Wt. 5 lbs.



HEATHKIT VF-1
\$19⁵⁰

VFO KIT

Far below the cost of crystals to obtain the same frequency coverage this variable frequency oscillator covers 160, 80, 40, 20, 15 and 10 meters with three basic oscillator frequencies. Providing better than 10 volt average RF output on fundamentals, the VF-1 is capable of driving the most modern transmitters. Requires only 250 volts DC at 15 to 20 ma, and 6.3 VAC at 0.45 a. Illuminated dial reads direct. Shpg. Wt. 7 lbs.

Save 1/2 or more...with Heathkits



HEATHKIT DX-100-B \$189⁵⁰

DX-100-B PHONE AND CW TRANSMITTER KIT

A long standing favorite in the Heathkit line, the DX-100-B combines modern styling and circuit ingenuity to bring you an exceptionally fine transmitter at an economical price. Panel controls allow VFO or crystal control, phone or CW operation on all amateur bands up to 30 mc. The rugged one-piece formed cabinet features a convenient top-access hatch for changing crystals and making other adjustments. The chassis is punched to accept sideband adapter modifications. Featured are a built-in VFO, modulator, and power supply, complete shielding to minimize TVI, and a pi network output coupling to match impedances from 50 to 72 ohms. RF output is in excess of 100 watts on phone and 120 watts on CW. Band coverage is from 160 through 10 meters. For operating convenience single-knob bandswitching and illuminated VFO dial on meter face are provided. A pair of 6146 tubes in parallel are employed in the output stage modulated by a pair of 1625's. Shpg. Wt. 107 lbs. Shipped motor freight unless otherwise specified.



HEATHKIT DX-40 \$64⁹⁵

DX-40 PHONE AND CW TRANSMITTER KIT

An outstanding buy in its power class the DX-40 provides both phone and CW operation on 80, 40, 20, 15 and 10 meters. A single 6146 tube is used in the final amplifier stage to provide full 75 watt plate power input on CW or controlled carrier modulation peaks up to 60 watts for phone operation. Modulator and power supplies are built in and single-knob bandswitching is combined with the pi network output circuit for complete operating convenience. Features a D'Arsonval movement panel meter. A line filter and liberal shielding provides for high stability and minimum TVI. Provision is made for three crystals easily accessible through a "trap door" in the back of the cabinet. A 4-position switch selects any of the three crystals or jack for external VFO. Power for the VFO is available on the rear apron of the chassis. Easy-to-follow step-by-step instructions let assembly proceed smoothly from start to finish even for an individual who has never built electronic equipment before. Shpg. Wt. 25 lbs.

Free Send now for latest Heathkit Catalog describing in detail over 100 easy-to-assemble kits for the Hi-Fi fan, radio ham, boat owner and technician.



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NAME _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

QUANTITY	KIT NAME	MODEL NO.	PRICE

For further information, check number 5 on page 126.

de W2NSD

never say die

CW vs Phone

In the April CQ I suggested that it might be a good idea for us to take stock of the actual occupancy of our bands with the idea that having facts on this subject available might make us better able to discuss future proposals of changes in the present allocation system. Too many proposals have been made in the past based upon the desires of a special group or on distorted "facts" of amateur band usage.

A few of the CW men are unusually sensitive about this and wrote in to accuse me of trying to finish off CW in the ham bands. While it is possible that a survey of the bands might be embarrassing to the strict CW proponents, I really doubt that there is much to worry about. Certainly the early indications of the survey indicate quite a bit of CW work going on and would not seem to give any substance to the cries of alarm.

Several parts of the country have not been sending in any of the survey cards. If we are to arrive at any valid overall picture of ham activity it will be necessary to cover the entire country on all bands at all hours of the day. This means that we need thousands of observations. How about you taking a few minutes a day to tune across the bands and count how many signals you hear? Make up some slips of paper or 3x5 file cards as outlined in the April editorial and send 'em in to us.

Geneva

Nothing has changed. To reduce the situation to basics, here is the picture: The U.S. is going into the conference with the recommendation that all present amateur frequencies be left as is. Most of Europe and the U.S.S.R. groups are going in with proposals to cut 80, 40 and 10. In this position even the best compromise will result in some losses for us.

Public Service

The amateur radio service has been quite valuable in the United States. It has provided communications for armed forces personnel overseas for personal messages which the regular military radio systems were completely helpless to handle. This morale traffic was particularly valuable for the Antarctica IGY program.

It has further provided communications for thousands of minor emergencies as well as playing a major part in the aftermath of just about every important national calamity. Thousands of mobile and portable stations are ready

for instant use in any part of the country, complete with trained operators.

There are other less direct services of the amateurs too, such as the continually growing pool of interested and experienced radio technicians which not only are of value during war time, but help the country along technically by engendering a deep interest in electronics in thousands of youngsters. Too, though a great many of today's operators are buying commercially built equipment, we still have a large nucleus of experimenters who are making strides in the radio field, as you can see by reading the articles in CQ and the application of these developments in commercial equipment a few months later.

Hams serve on the local level too, participating in or assisting just about every type of civic activity imaginable.

Even on a world-wide basis ham radio is constantly working to spread international good will and understanding. You have but to visit any country in the world and talk to the local amateurs to find out what a good impression most of them have of the U.S. through their radio contacts. You have to look hard to find a foreign ham who does not consider at least one American ham to be a good friend of his. As you look through their shacks you will hear them tell you that W2— sent this over for him, W4— got him this tube, and do you know W8—, a friend he has been contacting every night for months?

Really, considering the minute percentage of spectrum space we amateurs take up when compared with short wave broadcasting and the concomitant jamming, or any of the other "services," we have a strong claim to our channels.

Remember though that it is our rendering of service that entitles us to be on the air.

Peace and Friendship On the Bands

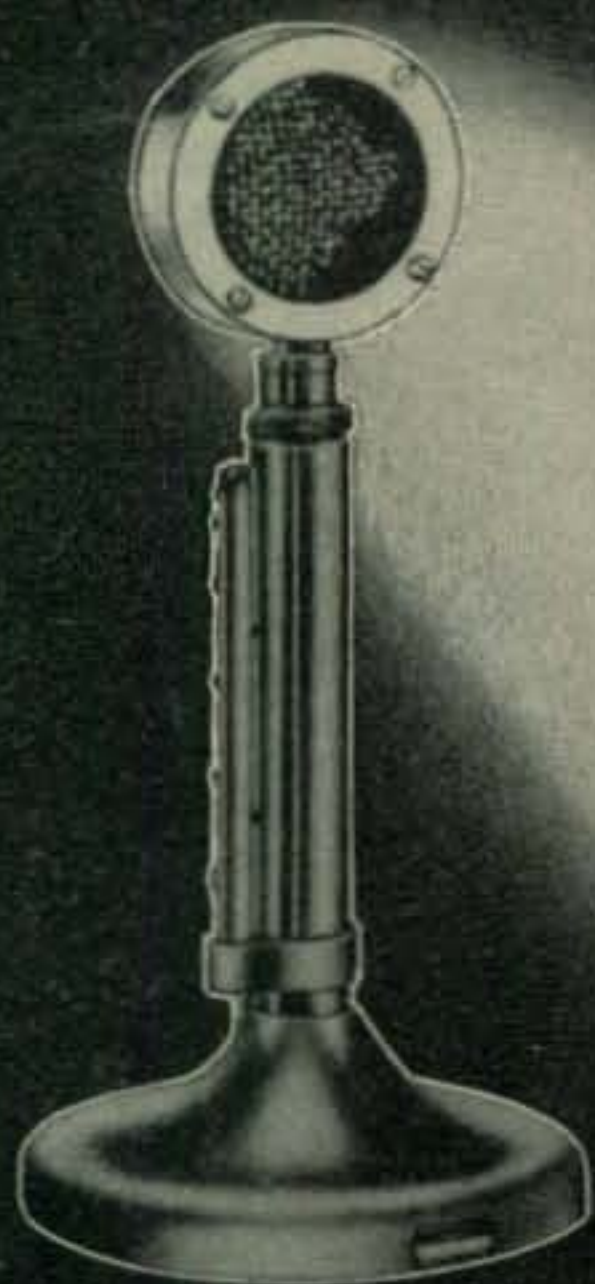
Russian radio amateurs are not allowed to discuss any subject not related to or a part of amateur radio, except the weather. This is a restriction placed on them by their government and is respected by all other amateurs throughout the world. But friendships are not made through 2 minute contacts; for a contact in itself signifies nothing (unless you're going for DXCC). Technical achievements are not measured in "S" units.

World politics, religion and other such subjects are usually controversial and not indulged in by the average radio amateur. Those who try to argue a point, over the air, relative to a subject which is distasteful to another ham (especially if he is a foreigner) are considered uncultured and rude . . . by all hams.

Today the hue and cry is for world peace—no person anywhere in his right mind wants war. But until people get to know each other better and respect each other on the ground of

[Continued on page 12]

**THE ONE MICROPHONE THAT IS A
SYMBOL OF AMATEUR RADIO
THE WORLD OVER**



For more than two decades the Astatic D-104 has been top choice of ham operators everywhere

AND NOW

**ASTATIC BRINGS YOU 2 NEW MIKES DESTINED TO BECOME
EQUALLY FAMOUS IN SINGLE SIDE BAND TRANSMISSION
THE MODEL 10-C CERAMIC AND 10-D DYNAMIC**

You'll prefer the 10-D or 10-C for their more intelligible signal, higher talk power, tailored response, less splatter, greater attenuation of unwanted side band.

MODEL 10-D RECOMMENDED FOR USE WITH HT-32.

Model	Net Price	Model	Net Price
10-C	\$17.82	10-D	\$23.82
G10-C*	\$29.94	G10-D*	\$35.94

*Complete with G-stand

For complete information write for Astatic Microphone Catalog.

THE **Astatic** CORPORATION • CONNEAUT, OHIO
ASTATIC
 In Canada: Canadian Astatic Limited, Toronto, Ontario
 Export Sales: Roburn Agencies Inc., 431 Greenwich St., N.Y. 13, N.Y.
 U. S. A.

**FROM WHAT
YOU HEAR**



**SUPERIOR ENGINEERING IS TYPICAL OF
THE COMPLETE ASTATIC MICROPHONE LINE**

For further information, check number 20 on page 126.



FREE



An FCC License can be Your
Guarantee of Success in Electronics.

Get your FCC Commercial License — or your money back

The Master Course in Electronics will provide you with the mental tools of the electronics technician and prepare you for a First Class FCC License (Commercial) with a radar endorsement. When you successfully complete the Master Course, if you fail to pass the FCC examination, you will receive a full refund of all tuition payments.

HERE'S PROOF:

Name and Address	License	Time
John H. Johnson, Boise City, Okla.	1st	20 weeks
Prentice Harrison, Lewes, Del.	1st	27 weeks
J. A. Niedeck, Bethlehem, Pa.	2nd	8 weeks

WE CAN PROVIDE NAMES IN YOUR AREA ON REQUEST

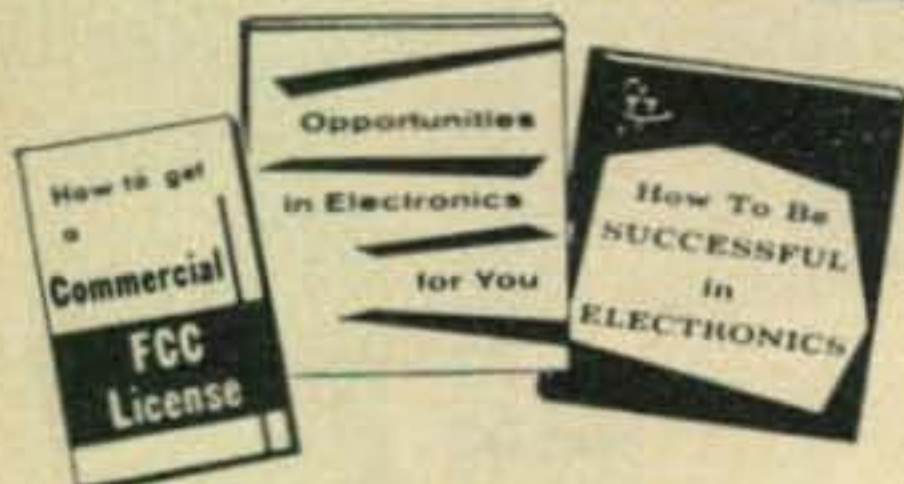
EMPLOYERS MAKE OFFERS LIKE THIS:

Letter from nationally-known Airlines: "Radio Operators and Radio Mechanics are needed for our company. Periodic wage increase with opportunity for advancement. Many company benefits."

OUR TRAINEES GET JOBS LIKE THIS:

"Since enrolling with Cleveland Institute I have received my 1st class license, and am now Chief Engineer of Station WAIN. Thanks to the Institute for making this possible."

Lewis M. Owens, Columbia, Ky.



Mail Coupon Today and Receive all 3 Booklets

FREE



Accredited by National Home Study Council

Cleveland Institute of Radio Electronics
Carl E. Smith, Consulting Engineer, President
Desk CQ-55, 4900 Euclid Ave., Cleveland 3, Ohio

Please send Free Booklets prepared to help me get ahead in Electronics. I have had training or experience in Electronics as indicated below:

- | | |
|---|---|
| <input type="checkbox"/> Military | <input type="checkbox"/> Broadcasting |
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| <input type="checkbox"/> Manufacturing | <input type="checkbox"/> Telephone Company |
| <input type="checkbox"/> Amateur Radio | <input type="checkbox"/> Others |

In what kind of work are you now engaged?.....

In what branch of Electronics are you interested?.....

Name Age.....

Address

City Zone..... State.....

W2NSD [from page 9]

human dignity, the threat of war will continue to be with us.

Amateur radio in addition to being a channel for technical betterment is also a channel for cultural improvement and the cementing of international goodwill and friendship; this is often overlooked by those who clamor for more frequencies at the expense of the amateur.

Most of us hams (internationally) do not want to hear or talk about production quotas, politics, ideologies, military forces or personalities (unless the latter are scientific or technical).

We are sure that all hams throughout the world when talking to their Russian colleagues would like them to tell of their operas, ballets, schools, automobiles, pleasures, families and their progress in amateur radio. Some of us would like to learn to speak Russian too via amateur radio. Perhaps some of the Russian amateurs would like some advanced lessons in English, French, Italian or many other languages. But the way they operate now, this is impossible.

The impression given by the average Russian ham (especially when operating from a club station) is that he has only learned enough of another language to make quick contacts and he operates as if he has been given a "quota" to fill. We hope this will change.

The possibilities of amateur radio as a means for better understanding between all peoples of the world (short of a personal visit) are limitless; much better in fact than a newspaper or shortwave broadcasts. Those who have a voice in frequency allocations should remember this!

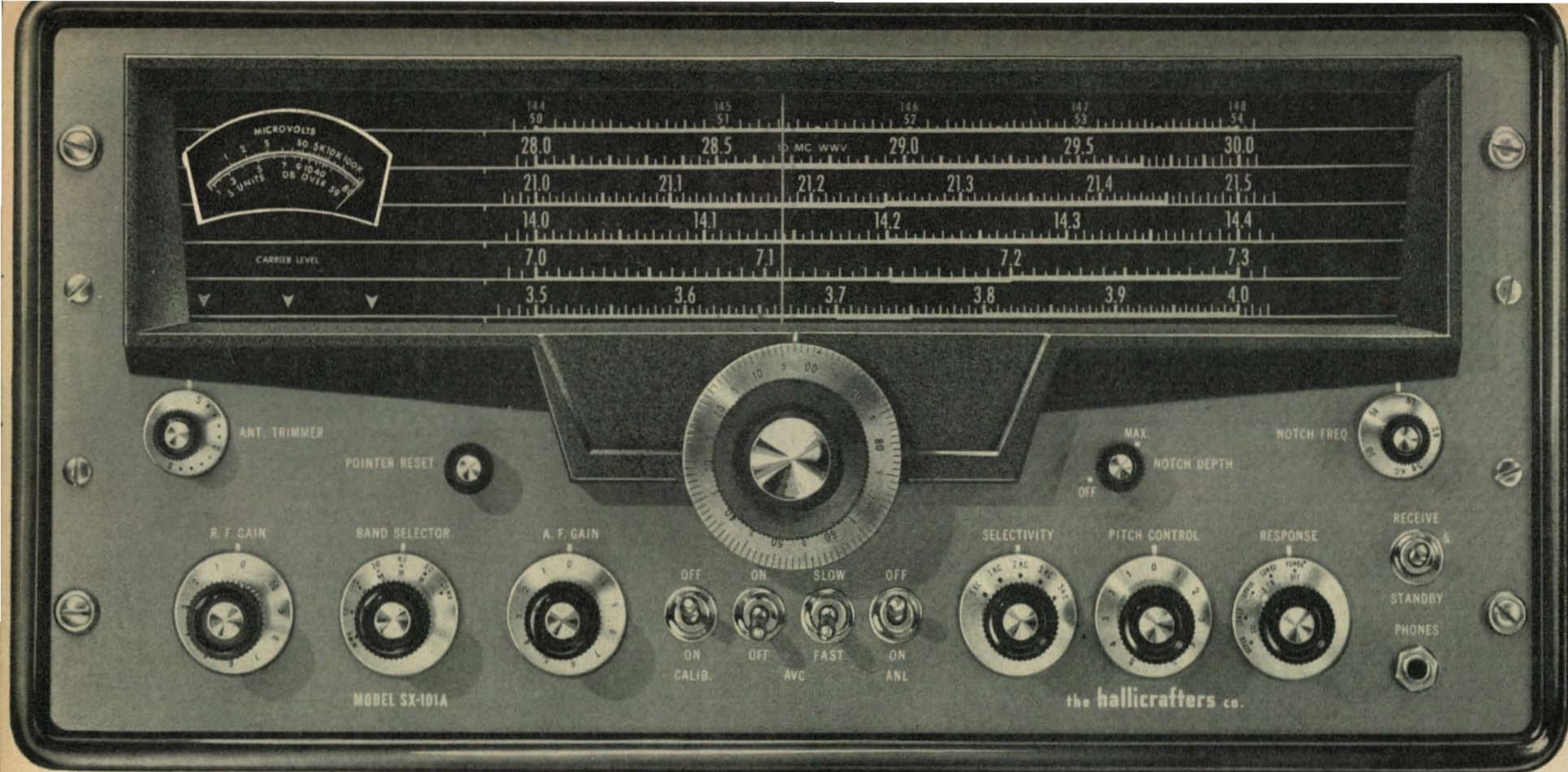
Blind Broadcasting

Wouldn't it be wonderful if an accurate world-wide survey could be conducted to determine if shortwave (commercial) broadcasting is worth the money, time and effort? We feel quite certain that such a survey would in fact show that there are so few people listening that 90% of these stations would close down. But a real survey is not feasible—at this time anyway.

Who do you know, in the United States for example, who listens regularly to commercial shortwave broadcasts in preference to looking at TV or listening to the local medium wave BC station? We bet, not many!

Those blind SW broadcasts emanating from Moscow, Paris, Cairo, Stockholm, Tokyo, Rome and other countries on a 24-hour per day basis have few listeners except the monitoring stations of the news services (if a few facts are considered).

Some of the facts? So-called all-wave receivers cost money, even in the United States where the production of electronic items surpasses



h When great ideas are born . . . leadership is earned. This is a leader. This is the SX-101A, newest and finest expression of unqualified authority in precision receivers. Its predecessor models earned their position overnight with *ideas*. Like the Tee-notch filter . . . upper-lower sideband selection . . . unprecedented sensitivity and stability. But leadership demands progress—still more ideas, more features. You'll find them in the 101A: A new type of product detector . . . two-position AVC . . . full bandspread on 10 . . . band-to-band gain equalization . . . many more. The leader belongs in your shack. **SX-101A** by **hallicrafters**

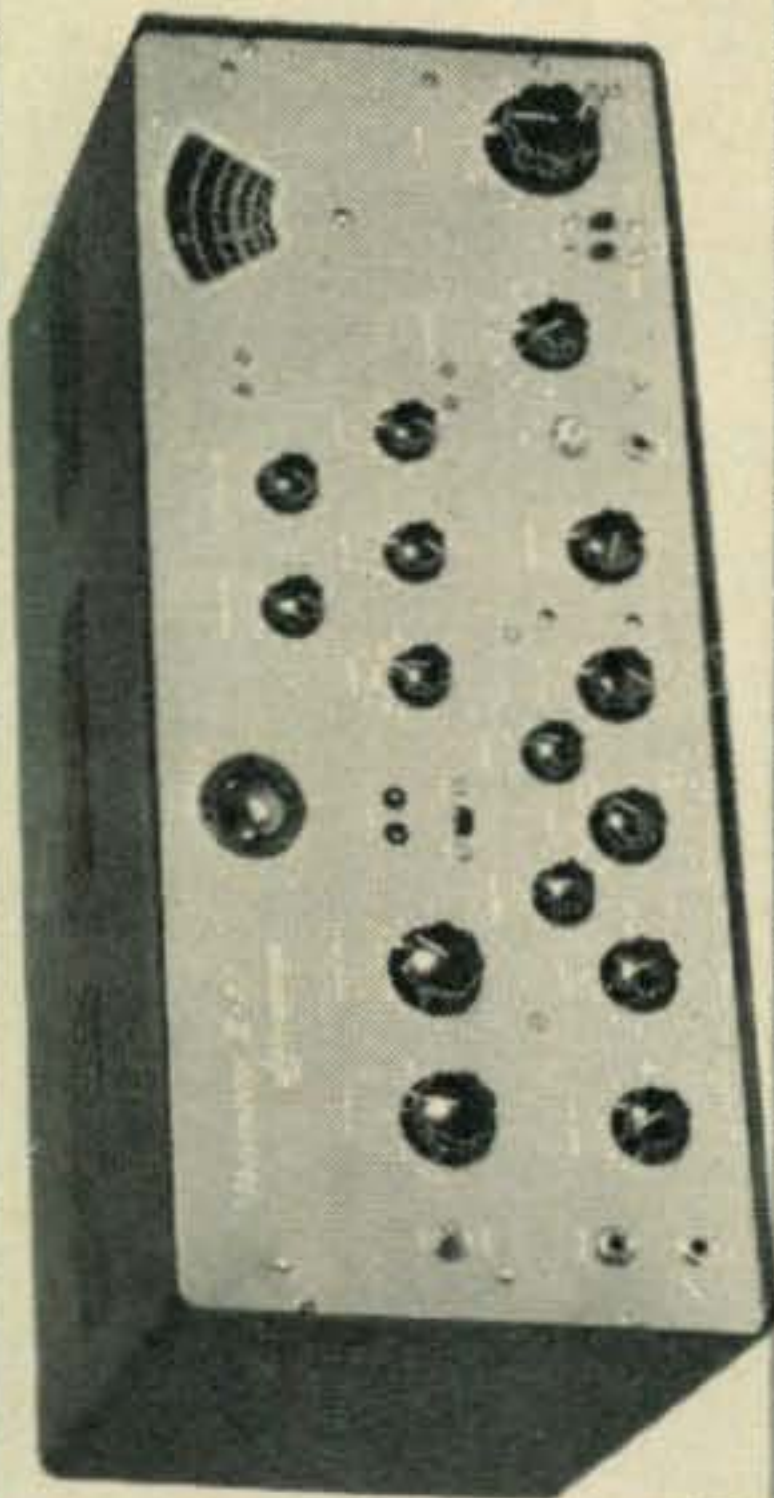
"Phasemaster II-B" \div
AMATEUR NET \$459.00

P-400 GG =
AMATEUR NET \$269.50

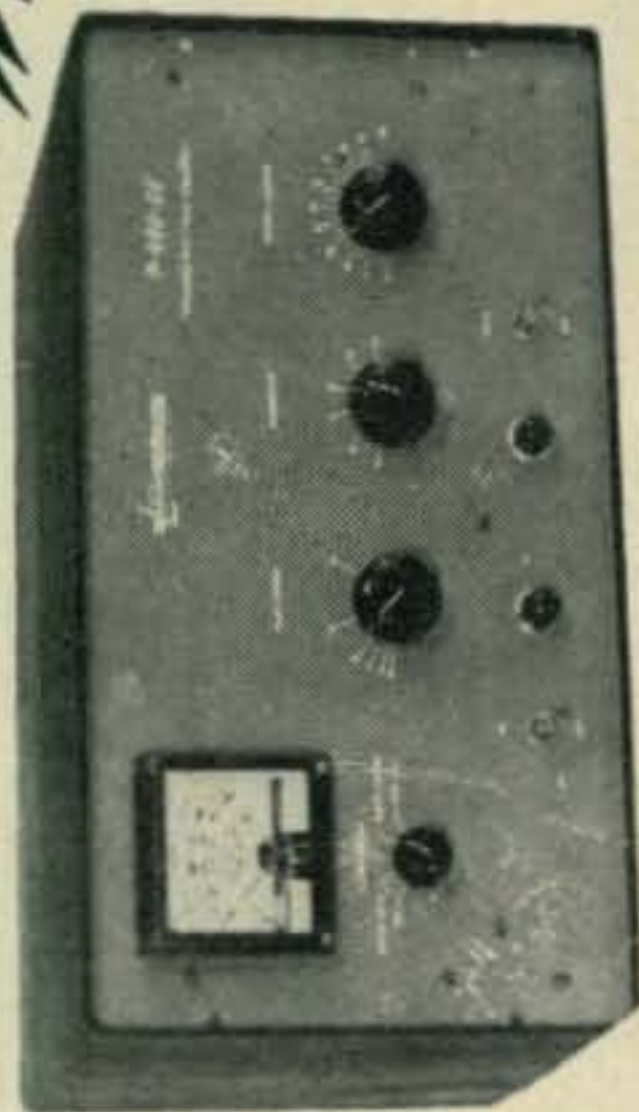
400
watts

\$728.⁵⁰

=



+



COMPLETE WITH BUILT IN V.F.O.

See Your Dealer or Write Us

Lakeshore INDUSTRIES
MANITOWOC, WISCONSIN
MANUFACTURERS OF PRECISION ELECTRONIC EQUIPMENT



every country in the world. Even if the average family throughout the world could afford one they usually only use the medium wave band. In certain countries, consumer type radio receivers are designed and built about local frequency groups; that is, so as not to receive certain international shortwave bands. The same countries with jamming equipment manage to keep those lucky enough to own or operate an all-wave receiver from hearing a large percentage of overseas broadcasts. (They also manage to transmit harmonics into our international hambands.)

Every modern country in the world has shortwave listeners but these are usually outnumbered by their ham population. It is predicted that by 1967 the United States *alone* will have over 300,000 radio amateurs! This is predicated on the *present* rate of growth. Other "technically inclined" countries, such as the USSR, are also experiencing a spectacular rise in the number of on-the-air amateurs.

What does this mean? Just this—the worldwide amateur radio service will need *more*, not less frequencies from 3.5 *mc* to 890 *mc*.

We agree that each country must have a number of shortwave broadcasting stations, even if there are only 100 listeners for each station. At least we know that each government listens to the stations of other governments. It is, after all, one communication medium.

But so is amateur radio! At least the ham knows when he is actually talking to someone and the only blind broadcast he makes is when he calls a "CQ."

We are sure if and when the facts connected with frequency allocation are considered, that there will be some discussion as to the efficacy of SW broadcasting. If this is done on a realistic basis, the world's amateurs will not be forgotten.

We firmly believe that it is better to have a large group of people within a country contributing directly to a nation's welfare (technically and culturally) than a lot of blind broadcasting SW BC stations to which the majority of the world's population do not listen.

The radio amateur *is* the large group. We sincerely hope those who have the responsibility for looking out after our radio amateur interests as well as those who must take a broad view of the situation will remember this.

New England Convention

Incidentally, a few things have taken place in the past month or so that might interest some of our readers, especially one or two who have accused us of being anti-ARRL recently.

A letter came across the desk of our advertising department last month announcing the forthcoming New England Division Convention of the league which will be held in Hartford during the Labor Day weekend this coming September. Primarily this letter was soliciting advertisers for the convention program.

New Citizens Broadcaster

CB-100

11 M TRANSCEIVER
FOR USE BY ANYONE
NO EXAMINATION
Just fill out FCC Form 505



Complete with
Xtals. for One
Channel & Mike

\$129.95

For home, office, car, boat, field, etc. 115VAC or 12V mobile. Exclusive 3-channel selection switch and button light indicators. Squelch control for muting background noise. 10-tube receiver/transmitter, xtal. controlled. AM modulated. Meets all FCC specs. Compact: 3 1/2 x 13 x 10 1/2"; 9 lbs. Carry handle for tilt stand or permanent mounting.

New Globe Champion 350

350w CW, 275w AM
450w (PEP) SSB - DSB (Suppressed Carrier)



W/T: \$495

- ★ All modern design new cabinet
- ★ New filtered keying circuit virtually eliminates key clicks
- ★ Improved VFO circuitry for greater stability
- ★ Tailored for more "power punch" in the voice frequency range
- ★ Improved shielding for TVI-protection and stability, eliminating RF feedback

Revised and tested to perfection, this 10-160M bandswitching transmitter is TVI-suppressed, filtered & bypassed. Built-in VFO. High level Class B modulation with new compression circuit. Pi-Net output, 48-300 ohms. Push-to-talk, antenna changeover relay, time sequence keying. Single knob bandswitching.

Work AM, CW & Double Sideband with the Sidebander DSB-100 100w PEP DSB, Suppressed Carrier

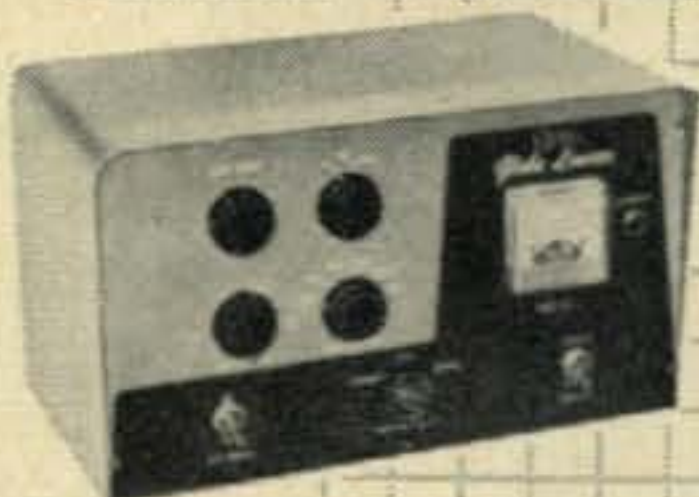


Wired & Tested: \$149.95
In Kit Form: \$119.95

Double Sideband, AM, CW at Low Cost

A complete Xmtr., self-contained, bandswitching 80-10M, 100w PEP DSB Suppressed Carrier, 40w AM, 50w CW. Min. 45db carrier suppression. 3-stage RF section allows straight through operation. Automatic balancing & floating grid circuit. Speech clipping & filtering for min. band width. Accessory socket on chassis rear apron. Use barefoot or as driver for higher power Xmtr. Covers most MARS and CAP frequencies.

Globe Linear LA-1 Grounded Grid, Class B or C



W/T:
\$124.50
Kit:
\$99.50

For 6-80M, complete with well-filtered power supply, 200w input AM Class B, 300w DC or 420w PEP input Class B linear SSB or DSB. 300w Class C for CW. Pi-Net 80-10M; 52 ohm Pi-Link coupled on 6M. Extensively TVI-protected. Meter for monitoring final plate currents also indicates approx. RF output voltage enabling operator to tune for max. efficiency and output.

Globe VFO 755A

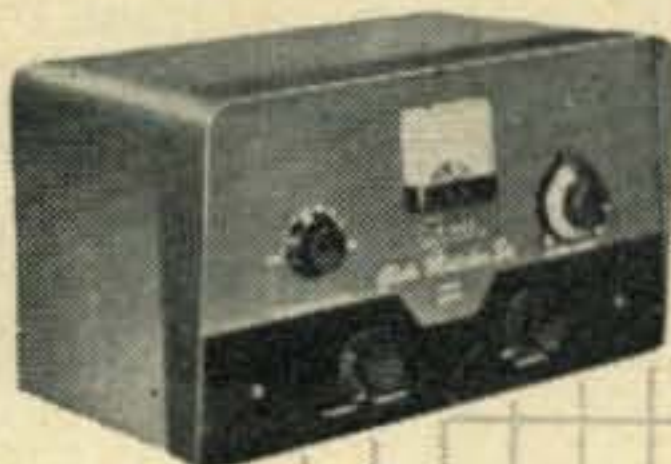


W/T:
\$59.95
Kit:
\$49.95

10-160M

Complete with well-filtered power supply with voltage regulation. Output on 40 & 160M. Vernier drive with shock absorbing features. 13:1 tuning ratio. Approx. 50 RF volts output. Temperature compensated for utmost stability for DSB, AM, CW.

Globe Matcher Sr., AT-4



Wired:
\$79.50
Kit:
\$69.50

Antenna tuner with built-in SWR bridge for any Xmtr. with final RF input up to 600w, 80-10M. Fixed link coupling. Coax input, 2-wire balanced or unbalanced output. Built-in switch allows bypass of tuner circuits for coax input and output. Special calibrated panel meter for monitoring actual SWR. Vernier dial.

Globe Matcher Jr., AT-3



Wired:
\$15.95
Kit:
\$11.95

Antenna tuner for power input 100w CW, 75w tone, or less. Substantial amount of harmonic attenuation when properly tuned. Aids matching Xmtr. output to various antennas. Unbalanced output. Forward Look cabinet of steel for TVI-prevention.



Vox, Model 10

For voice operated control of the DSB-100 as well as the Champ and other similar transmitters. Extra contacts for auxiliary circuits. Simply plugs into rear of DSB-100.

QT-10

An anti-trip accessory for the VOX, Model 10.

VOX, Wired & Tested: \$29.95

Kit: \$19.95 QT-10: \$9.95 Wired



Globe Scout 680A

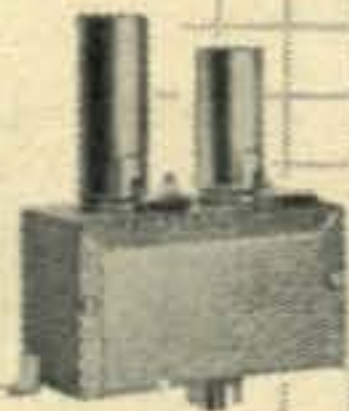
for 6-80
Meters



Wired:
\$119.95
Kit Form:
\$99.95

Plate Modulated - 65w CW, 50w AM. Completely bandswitching, self-contained, with built-in power supply. High level modulation maintained. TVI-shielded cabinet. Pi-Net output on 10-80M, Link-coupled on 6M, matching into low impedance beams. New type, wide view shielded meter. Kit contains all parts, tubes, pre-punched chassis and complete manual.

Power Booster PB-1



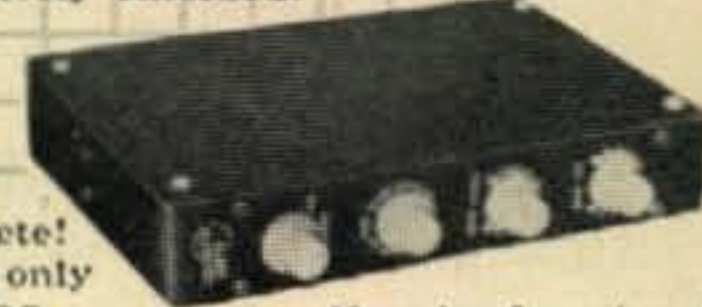
Wired:
\$21.95
Kit Form:
\$14.95

For straight through operation on 6M (Scout 680A or 680 only; plugs internally into Globe Scout). Approx. 50% more power output, while attenuating harmonics and further suppressing TVI.

Globe Patcher

Hybrid, 5 1/2 x 1 1/2 x 9

New phone patch, operates VOX on SB. Push-to-talk on AM, with all popular Amateur Eqpt. Switchable selection 500-8 or 3.2 ohm speaker. Simple to install, operate. Balance control. Standby switch for landline call without energizing the Xmtr. Completely shielded.



Complete!
wired, only
\$29.95

Mounts Anywhere!

Visit Your Favorite Distributor for Details!

OTHER TOP FLIGHT GLOBE PRODUCTS

Globe King, wired \$795.00; Globe Chief, w/t: \$74.50, kit: \$59.95; Hi-Bander, w/t: \$149.95, kit: \$119.95; VFO 6-2, w/t: \$59.95, kit: \$49.95; Power Attenuator, w/t: \$10.95; Plate Modulator UM-1, w/t: \$49.95, kit: \$32.50 (less tubes); Screen Modulator Kit, \$11.95; 6-Meter Converter 6PMC, w/t: \$29.95, kit: \$21.95; Speech Booster, w/t: \$24.95, kit: \$15.95.

GLOBE
electronics

3417 W. BROADWAY
COUNCIL BLUFFS, IOWA

For further information, check number 9 on page 126.

NEW!

Citizens Band Antennas

**Mosley
27 mc. Antennas
are practically
maintenance-free!**

While our advertising department considered the rates a bit high, we decided that this was an opportunity to create good will between the league and CQ. Hence, Dick Cowan, CQ's advertising manager placed a phone call to the league office and spoke to a league official who also happened to be an active committee member for the convention program.

Dick indicated a strong interest in buying advertising in the convention program, and also requested information about getting an exhibitor's booth at the hotel. This was in direct response to a paragraph in the announcement that said, "We feel that these factors will tend to make our convention an unparalleled public relations opportunity for businesses serving the amateur radio field, and we hope that you will take advantage of this opportunity by placing advertising in our convention booklet."

The reply to our sincere gesture of friendship came about five weeks later; it was short

take
your
choice!

\$189⁰⁰



HQ-100

True Hammarlund quality at low cost! General coverage, 540 KCS to 30.0 MCS. 10-tube superheterodyne with automatic noise limiter. Electrical bandspread. Q-multiplier.

Optional Telechron clock-timer \$10

EVERYONE A WINNER!



\$249⁰⁰

HQ-110

A true amateur receiver at a low price! Dual conversion. 6, 10, 15, 20, 40, 80 and 160 meter ham bands. Crystal calibrator. Q-multiplier. Separate linear detector for SSB and CW. Separate BFO.

Optional Telechron clock-timer \$10



\$269⁰⁰

HQ-145

Brand-new general-coverage receiver! 540 KCS to 30.0 MCS. Dual conversion. Adjustable 60 db slot filter. Crystal filter. 11-tube superheterodyne with automatic noise limiter.

Optional Telechron clock-timer \$10
Optional plug-in 100 KCS calibrator \$15.95



\$359⁰⁰

HQ-170

Best for the amateur at any price! Dual and triple conversion 17-tube superheterodyne with automatic noise limiter. 60 db slot filter. Separate vernier tuning. Selectable sideband. Tuned IF amplifier. Crystal calibrator.

Optional Telechron clock-timer \$10



\$379⁰⁰

HQ-160

Everything you could wish for in general-coverage! 13-tube superheterodyne with automatic noise limiter. Dual conversion. 540 KCS to 31.0 MCS. Crystal calibrator. Electrical bandspread. Slot filter. Q-multiplier.



Established 1910

HAMMARLUND

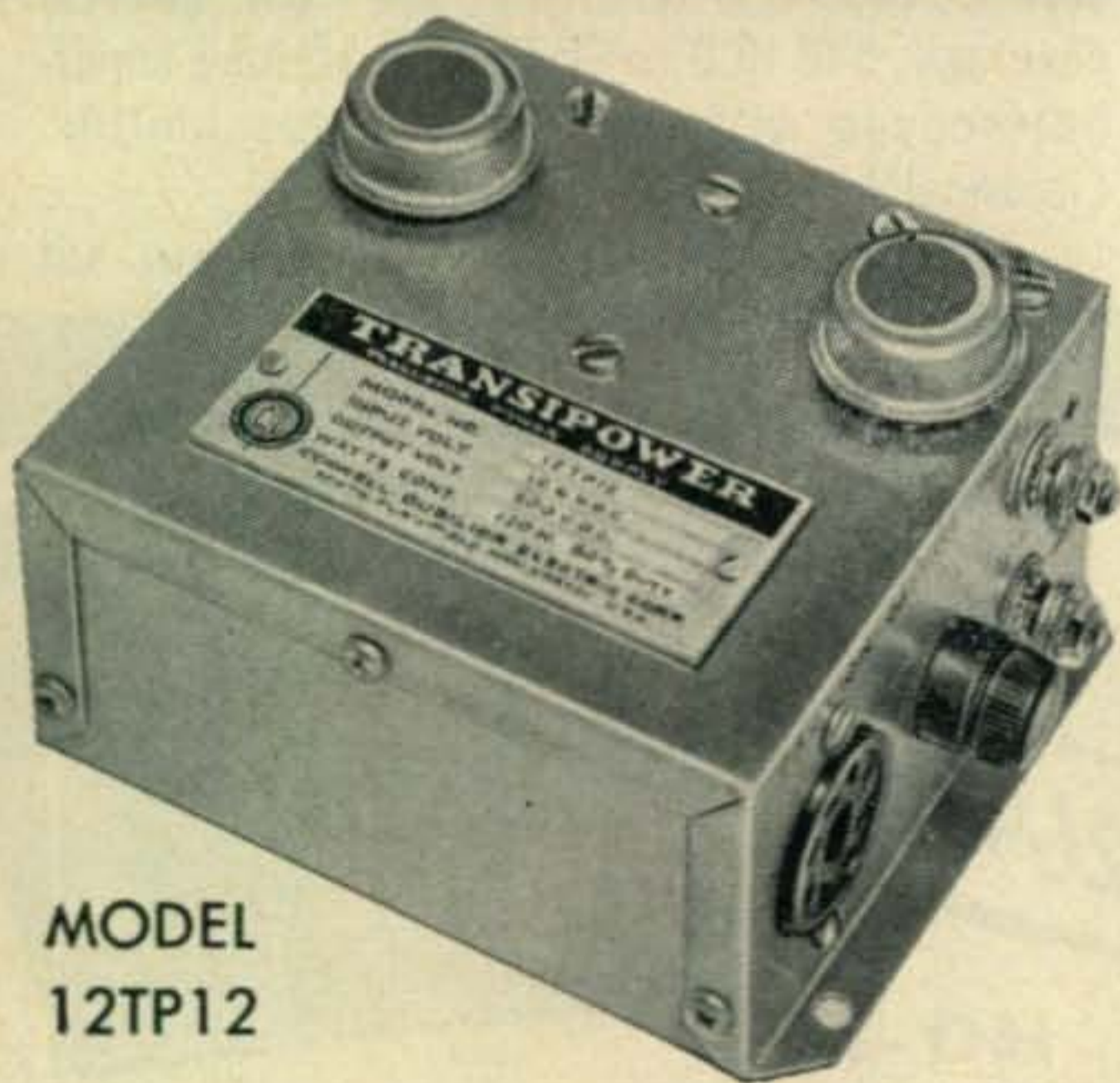
MANUFACTURING COMPANY, INC.

460 West 34th Street, New York 1, N.Y.

In Canada: White Radio, Ltd., 41 West Ave., N. Hamilton, Ont.

For further information, check number 11 on page 126.

NOW, FROM
CDR



MODEL
12TP12

New, Low-Cost TRANSISTORIZED Power Supply

Here's the TRANSISTORIZED POWER SUPPLY, you've been waiting for...quality-built to a new standard in "total-package" design by the company you know you can trust! It's C-D-R's new Model 12TP12 *Transipower*, and it's yours for only \$60, amateur net.

The Model 12TP12 converts a 12.6 VDC nominal input to an output of 500 VDC at 240 MA (120 W). Highly efficient and quiet, this compact (5 1/4" x 4 1/4" x 3") mobile power supply weighs only 1 3/4 pounds. In stock now at your C-D-R distributor. See him today, or write for full details to Radiart Corporation, HAM Dept., Indianapolis, Indiana.

C-D-R also makes the famous HAM-M Rotor

For further information, check number 12 on page 126.

18 • CQ • August, 1959



Feenix, Ariz.

Deer Hon. Ed:

Begging Hon. Pardon, but are reeding resent editorial you writing in Hon. Mag. about us amchoors going to losing more freakwencies, so I are sitting right down and writing you a letter about same. You certainly having burr under your Hon. Saddle on subject. You as eggsited as amchoor making first contact with Hon. Moon on seventy-five fone.

What I meening is like old Hon. Saying, don't crossing bridges until having chance to burning them behind you. Let's eggsamining hole subject calmly. Hokeydoke? Hokeydoke.

You seeming to be worrying that if losing more freakwencies, then not being enuf room for all amchoors to having QSO. Okey, let's starting with number of amchoors we having. Let's assuming there being 300,000 amchoors in world. Maybe there not quite that many licensed, but we can including bootleggers too. Hokay? Hokay.

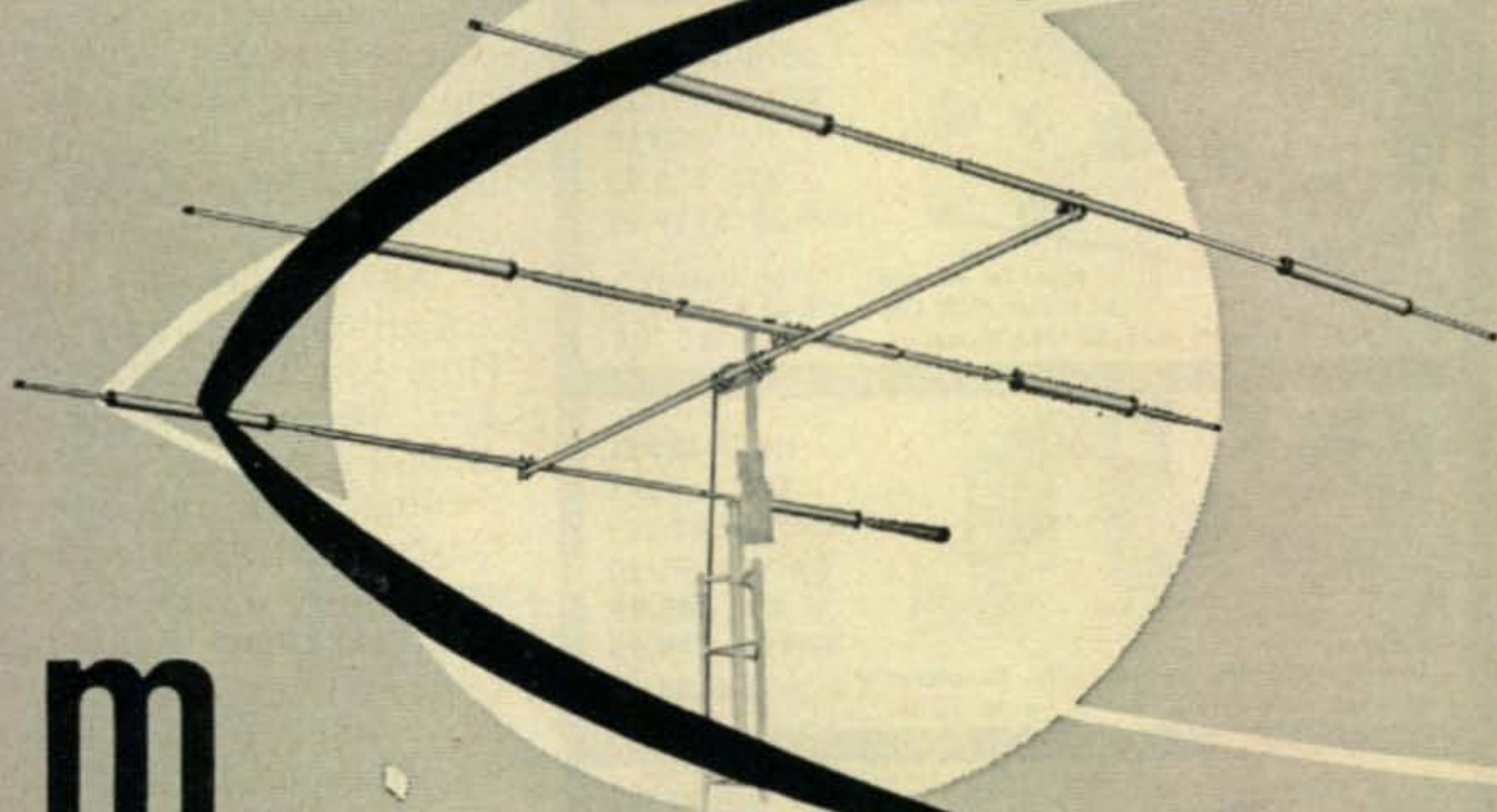
Now you knowing that at least one-third of these are not active. They ether to broke to buying new toob, or not interested anymore, or wateing for new sooper kilowhat to being delivered. So, taking away one-third, or 100,000 from 300,000, we having 200,000 left.

Okay, 200,000 active amchoors. Now, on any one day, in all the world, peeples are sleeping—even amchoors. In 24-hour day, at least 8 hours spent sleeping, so again we taking one-third. Hon. Ed., I not so goods taking one-third on 200,000, so is hokay if taking away 70,000? Close enuf? Hokay. That leeving 130,000.

Now, of coursey, even amchoors having to earning living. And, those that not earning living are going to school so can earning living later on. Generally this are taking 8 hours again. Hokay to taking away another 70,000? Hokay. Taking away 70,000 from 130,000 leeving 60,000 amchoors that can being on air in any one day.

Hon. Ed., you knowing, and I knowing, that even active amchoors can't be on air all the rest of that 8 hours that are left. No, some amchoors are rebuilding their Hon. Rig. Others are putting up new antennas. Some of them even reeding your Hon. Mag. You not denying

10
15
20 m



MOSLEY TRAPMASTER BEAMS

Streamlined grace combines with the look of rugged strength to make MOSLEY Trap Master Antennas pleasing to the eye and completely acceptable to your neighbors.

Trap Master Antennas *perform*, too . . . thousands of Amateurs in the U.S.A.—and almost every corner of the globe—are glad *they* bought a MOSLEY Trap Master!

(Illustrated, is the world-famous TA-33. Rated to maximum legal power, this 3 element beam performs wonderfully on 10, 15 and 20 meter bands. Factory pre-tuned for quick, easy assembly without tedious measuring. AMATEUR NET, \$99.75)

AT YOUR FAVORITE AMATEUR EQUIPMENT DEALER

Mosley Electronics, Inc.

8622 St. Charles Rock Road • St. Louis 14, Mo.

Export Department: 15 Moore St., New York 4, N.Y.

For further information, check number 13 on page 126.

August, 1959 • CQ • 19

in "HAM" GEAR & TEST INSTRUMENTS
your BEST BUY is



U.S. Pat. No. D-184,776



* 90-WATT CW
TRANSMITTER
#720
KIT \$79.95
WIRED \$119.95

Ideal for veteran
or novice. 90W CW,
65W ext. plate mod. 80 thru 10 meters.

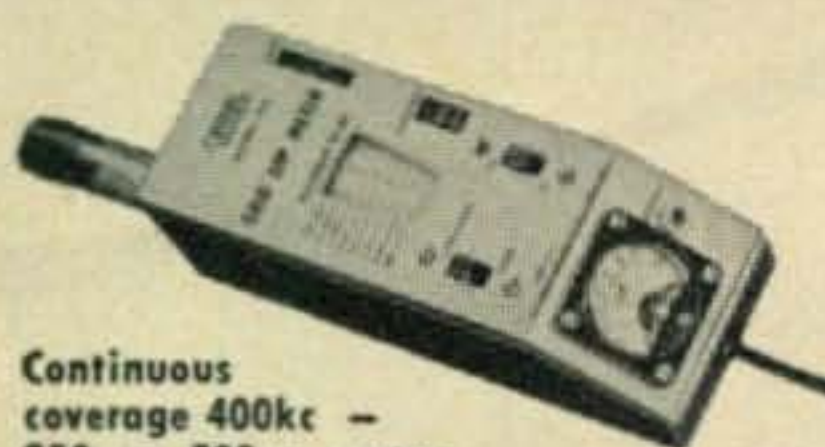
"Top Quality"—
ELECTRONIC
KITS GUIDE



HIGH-LEVEL
UNIVERSAL
MODULATOR-
DRIVER #730
KIT \$49.95
WIRED \$79.95

Delivers 50W undistorted audio. Modulates
xmitters having r.f. inputs up to 100W.

Cover E-5 \$4.50



GRID DIP METER
#710
KIT \$29.95
WIRED \$49.95

Continuous
coverage 400kc —
250mc; 500ua meter.

Includes complete
set of coils for
full band cover-
age.

COLOR & Monochrome DC to
5MC Lab & TV 5" Oscilloscope
#460

KIT \$79.95 WIRED \$129.50

5" Push-Pull Oscilloscope #425
KIT \$44.95 WIRED \$79.95

PEAK-to-PEAK VTVM #232
KIT \$29.95 WIRED \$49.95

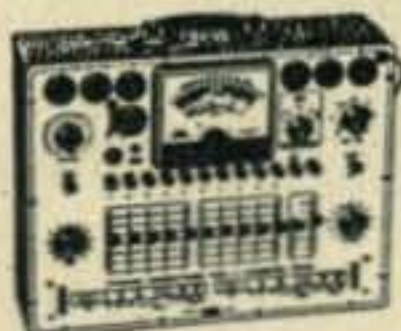
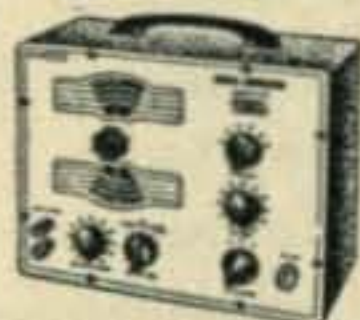
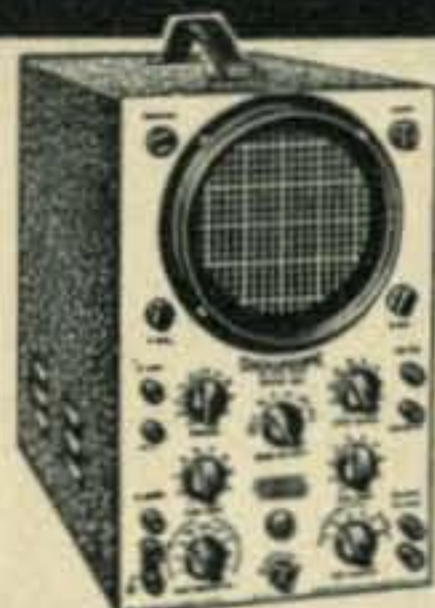
Vacuum Tube Voltmeter #221
KIT \$25.95 WIRED \$39.95

RF Signal Generator #324
(150kc-435mc)
KIT \$26.95 WIRED \$39.95

TV-FM Sweep Generator
& Marker #368
KIT \$69.95 WIRED \$119.95

Dynamic Conductance Tube
& Transistor Tester #666
KIT \$69.95 WIRED \$109.95

Tube Tester #625
KIT \$34.95 WIRED \$49.95



Send for
FREE
catalog

EICO® 33-00 Northern Blvd., L.I.C. 1, N.Y.
Show me how to save 50% on 65 models of
top-quality: Ham Gear Test Instru-
ments Hi-Fi. Send free catalog & name
of neighborhood EICO dealer.

Name _____

Address _____

City _____ Zone _____ State _____

CQ-8

Add 5% in the West

For further information, check number 14 on page 126.

that are you, Hon. Ed? In fact, I thinking
at least one-third of 60,000 doing that sort of
thing. This meaning we taking away 20,000
from 60,000 and having 40,000 left. Not going
to fast for you am I, Hon. Ed?

Now where are we? Having 40,000 amchoors
possibly being on air in any one 8 hour period
of any one day. Now Scratchi not ever seeing
any starving amchoors. That meaning they eat-
ing. Let's say it taking them one hour to eat-
ing. One hour is one-eighth of 8 hours, and
one-eighth of 40,000 being 5,000, so having
35,000 amchoors left.

Certainly also amchoors reeding Hon. Ads in
Hon. Mag. and it taking no less than one hour.
That meaning another 5,000 off 35,000 having
30,000 amchoors left. Also, amchoors have to
reeding male, and other mags, and even Hon.
Newspaper. Another hour all shot. Taking an-
other 5,000 away from 30,000 leeving 25,000.

Leeve us not forgetting QSL cards and Hon.
Log. Taking at least one hour to doing that.
So, 5,000 from 25,000 leeving 20,000. Now,
we also knowing that all amchoors having XYL
or YL. They having to spending some time
with them, you not thinking? Giving them one
hour as being enuf. That meaning 5,000 from
20,000 leeving 15,000 amchoors.

When working amchoors hardly ever heer-
ing them using electric razors when on air.
They therefore need time to shaving, brushing
teeth, and so ons. Taking at least one hour per
day to getting up in morning and going to bed
in evening. So, taking 5,000 from 15,000 leev-
ing 10,000 amchoors.

Most amchoors not living right next to
where they working or going to school. Having
to get there and come back. I being big about
this. Say it taking only one-half hour per day.
Now we taking 2,500 from 10,000, leeving
7,500 amchoors.

How about giving time for rig to heeting up?
Also time for answering tellyfone about TVI?
Also, all good amchoors looking over band be-
fore going on air is not true, Hon. Ed? Saying
each takes six minutes. That three-tenths of
hour, or taking 1500 from 7,500 leeving 6,000
amchoors.

Okey. Having 6,000 amchoors to yewsing
air in 8 hour period. Let's assuming all of them,
every last one, are on air at same time. Of
course, only one-half transmitting—other half
listening. That meaning 3,000 amchoors on
air at same time.

Now, if one-third are on see-w, one-third
on fone, and one-third on SSB, they yewsing,
say one kilocycle each on see-w, six kilocycles
each on fone, and three kilocycles each on
SSB. That are 1,000 times 1 or 1,000 kc., plus
1,000 times 6 or 6,000 kc., plus 1,000 times
3 or 3,000 kc. Total room yewsed are 10,000
kilocycles.

From 80 meter band down thru 2 meter
band are having for amchoors 11,300 kilo-

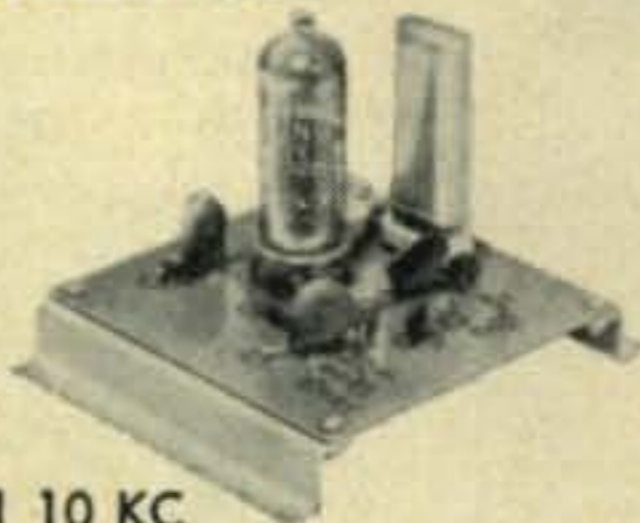
[Continued on page 106]



Hams Everywhere Depend on **QUALITY** International Crystals and Components and **GET 'EM FAST!**

FO-1L 100 KC OSCILLATOR

Kit with tube and crystal **\$12.95**
Wired and tested **\$15.95**
100 KC crystal only **\$8.50**
for use with FMV-1 10 KC multivibrator
Shipping Weight **2 lbs.**



STP-50 6 METER TRANSMITTER

Kit, less tubes & crystal **\$21.50**
Kit, with tubes less crystal **\$26.50**
Wired, with tubes but less crystal **\$32.50**
Crystal, FA-5 12MC **\$4.00**
Shipping Weight **5 lbs.**



FMV-1 MULTIVIBRATOR

for use with FO-1L 100 KC oscillator

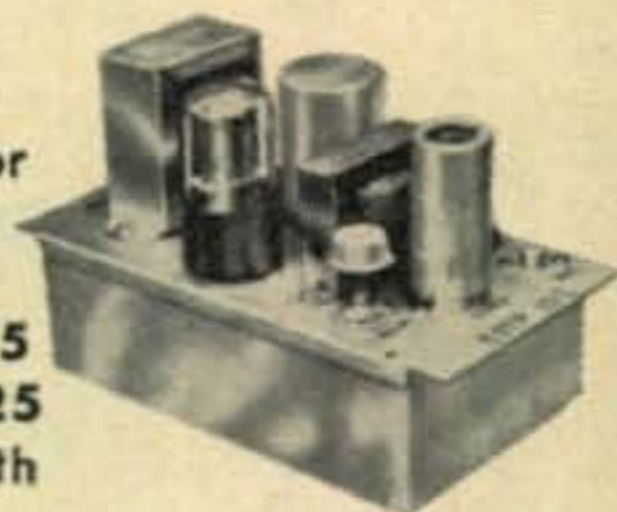
Kit, less tube **\$5.95**
Wired, with tube **\$8.95**
Shipping Weight **2 lbs.**



STP-10 10 WATT MODULATOR

Designed specially for International's STP-50 transmitter.

Kit, less tubes **\$22.75**
Kit, with tubes **\$25.25**
Wired and tested, with tubes **\$30.50**
Shipping weight **3 lbs.**



ONE-DAY SERVICE ON CRYSTALS

for Amateur or Commercial use!
See catalog for crystal prices.



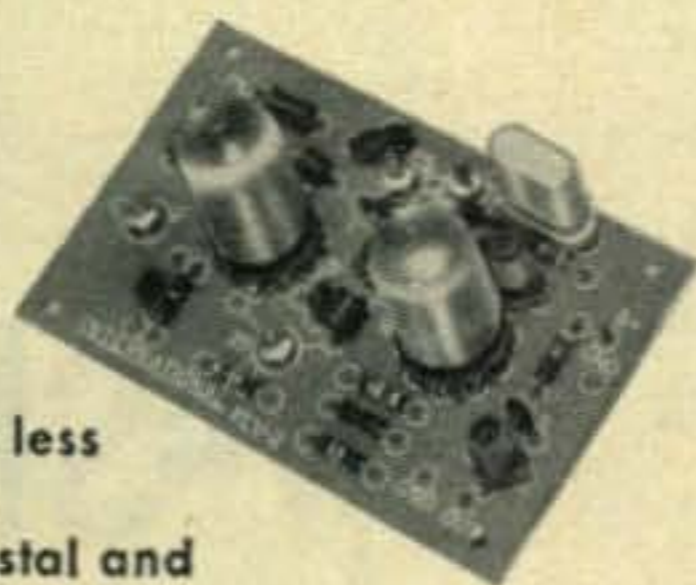
FCV-1 6 METER CONVERTER

Kit with crystal less tubes **\$10.95**
Wired with tubes and crystal **\$15.95**
Shipping Weight **2 lbs.**



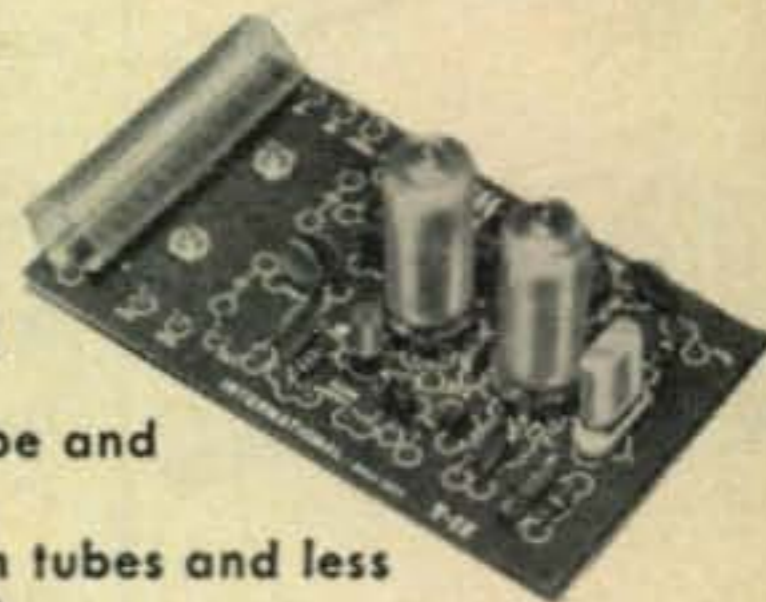
FCV-2 CONVERTER

Model 50,
6 Meters
Model 144,
2 Meters
Kit with crystal less tubes **\$12.95**
Wired with crystal and tubes **\$17.95**
Shipping Weight **2 lbs.**



MODEL T-12 12-WATT CRYSTAL CONTROLLED TRANSMITTER

T-12 kit less tube and crystal **\$8.95**
T-12 wired with tubes and less crystal **\$13.95**
FA-5 crystal (specify frequency) **\$3.00**
Special T-12 kit less tubes with 80 or 40 meter crystal (specify frequency) **\$10.95**
Special T-12 kit wired with tube and 80 or 40 meter crystal (specify frequency) **\$15.95**
Shipping Weight **2 lbs.** For 80 or 40 meters



HOW TO ORDER

Order direct from International Crystal, address below. Terms F.O.B. Oklahoma City. Other shipments C.O.D. On C.O.D. orders of \$25.00 or more, 1/3 down payment with order is required.

COMPLETE
CATALOG
SEND
FOR
YOURS
TODAY!

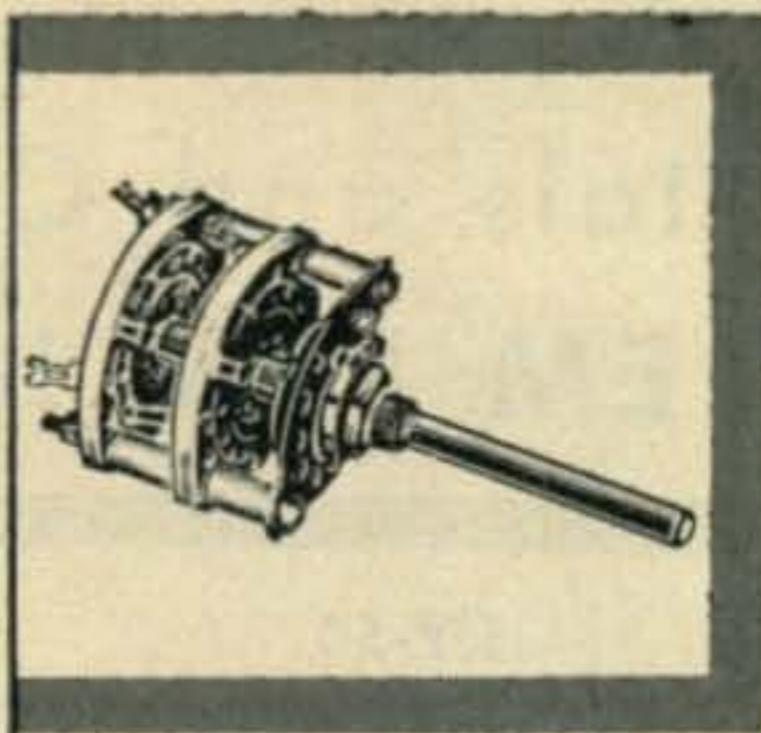


INTERNATIONAL CRYSTAL MFG. CO., INC.

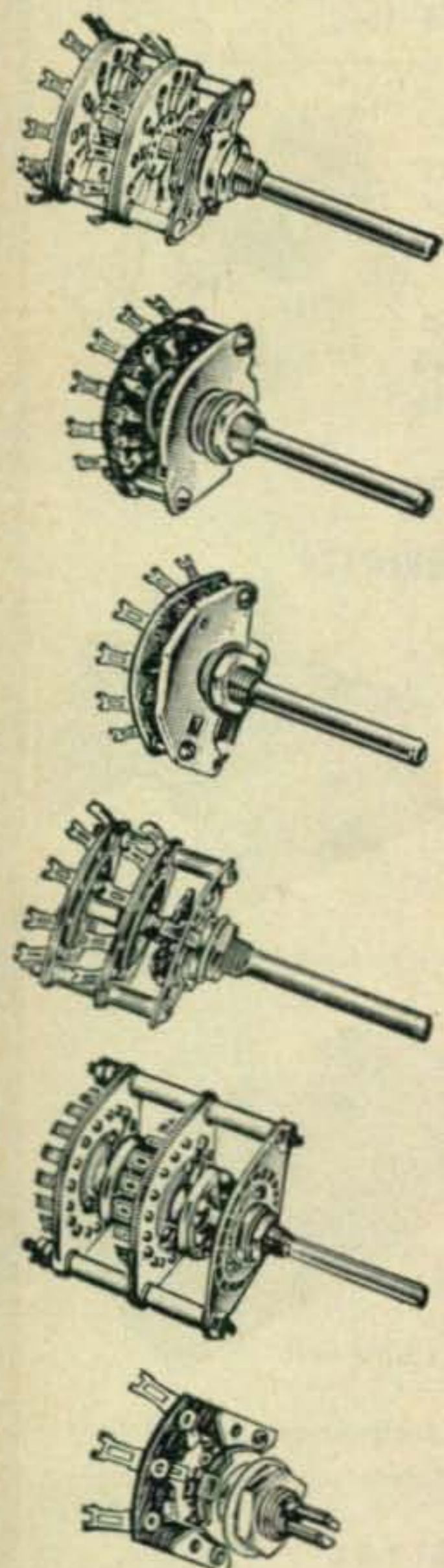
18 N. LEE, OKLAHOMA CITY

For further information, check number 15 on page 126.

The
SWITCH
 you need
 is carried
 by your



Centralab
ERL®
DISTRIBUTOR



• The extensive CENTRALAB line of high reliability switches includes the unit you need. For ham applications, as well as industrial and military uses, you can depend on CENTRALAB switches. Sub-miniature, miniature, standard and heavy duty; rotary and lever action; ceramic and phenolic—your CENTRALAB distributor has them all. You'll find them listed in CENTRALAB's Catalog 30. If you don't have this catalog, write us or ask your distributor for a free copy.

Centralab
ERL®

P-5841

A DIVISION OF GLOBE-UNION, INC.
 954H E. KEEFE AVE. • MILWAUKEE 1, WIS.
 In Canada: 804 Mt. Pleasant Rd., Toronto, Ont.

SWITCHES • CERAMIC CAPACITORS • PACKAGED ELECTRONIC CIRCUITS
 CONTROLS • ENGINEERED CERAMICS • SEMI-CONDUCTOR PRODUCTS

For further information, check number 16 on page 126.

QSL contest

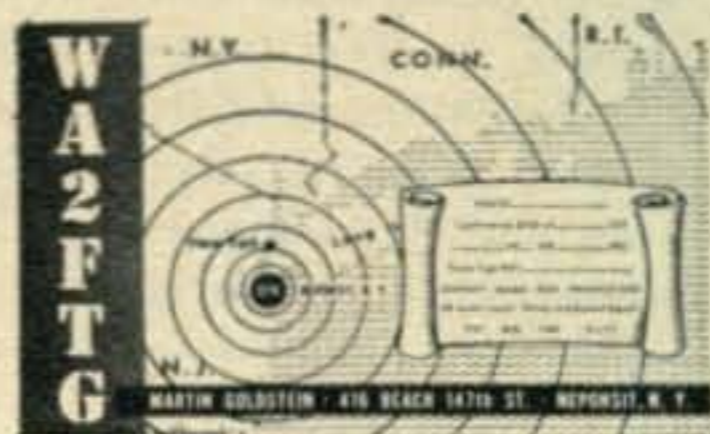
Winner

VE2IJ's flying high with his attractive three color card—the geese (Canadian of course) add an interesting symbol. To Al, a year of CQ "FREE" plus the tons of fame that our winners always enjoy.



Only Second Best

W2SKK, WA6BUX, WA2FTG and K6HLK all have meritable entries. We can't supply any of the green folding stuff, but we're most pleased to reserve a place in our gallery of "Famous Personalities" for them. (And a free copy of CQ.)





THE ANSWER TO DX . . . GONSET SSB EQUIPMENT

Any owner of the Gonset GSB-100 SSB transmitter/exciter and the powerful 1000 watt P.E.P. linear will have the pleasure of answering plenty of DX cards . . . and calls! This is SSB equipment of advanced design—stable, dependable—entirely non-critical, puts every desirable operating convenience at your fingertips.

Consider the GSB-100 transmitter/exciter:

- An exclusive filter-phasing system for improved SSB quality
- Unwanted sideband suppression of 45 db
- Quartz crystal carrier elimination filter avoids need for critical carrier balancing
- SSB with selectable sidebands, AM, PM, CW.
- Excellent CW keying characteristics
- Flexible pi network output and quick band change on 80-40-20-15-10 meters
- Built-in heavy-duty AC power supply
- VOX, voice operated control circuit complete with anti-trip circuit. Biasing voltage available for linear amplifier cutoff when receiving
- Frequency control by fixed quartz crystals and exceptionally stable VFO
- Transmits both sidebands when on AM, avoids distortion present at high modulation percentage when carrier-and-one-sideband signals are received on conventional AM receivers

- and—the GSB-101 linear amplifier:
- 1000 watts P.E.P. input!
 - Grounded grid circuit allows driving power to appear in final output—efficiency up to 65%!
 - Linear is driven easily by GSB-100 or similar transmitter in the 100 watt class
 - full bandswitching with flexible pi network—coverage 80-40-20-15-10 meters.

By themselves—or together as the brightest SSB combination on the market—these fine Gonset units represent BIG, BIG value! See them at your Gonset dealer.

GSB-100 transmitter/exciter . . . #3233 479.50

GSB-101 linear amplifier #3262 439.50

for further information, check number 17 on page 126.



GONSET Division of Young Spring & Wire Corporation

801 SOUTH MAIN ST., BURBANK, CALIFORNIA

NEW! IMPROVED



TOWERS

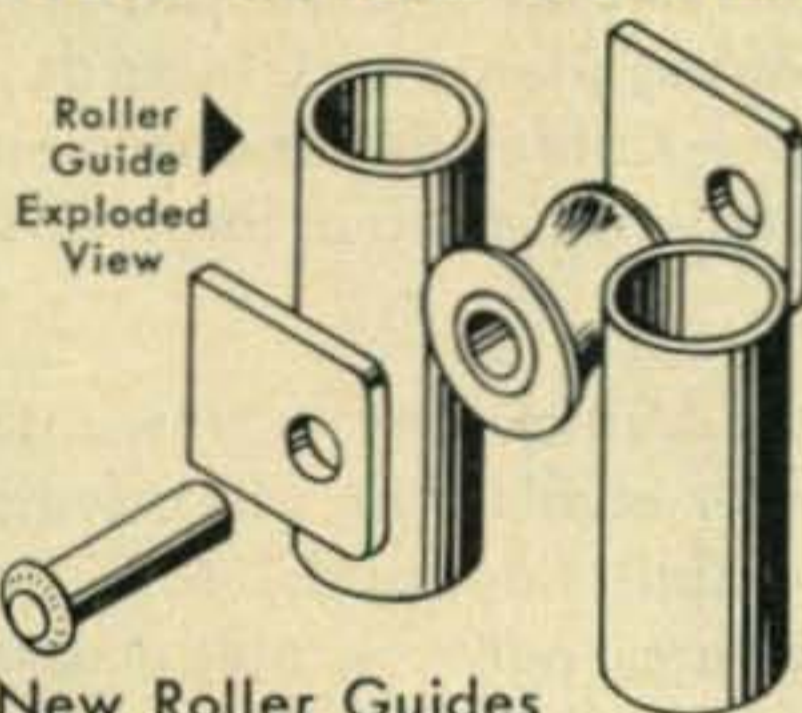
**For AMATEURS—
For INDUSTRY—**

**Triple Coated Finish
for Maximum
Weather Protection!**

- Iron phosphate rust-proof undercoating
- Newly designed, durable epoxy resin prime coat
- Baked auto-type enamel finish coat

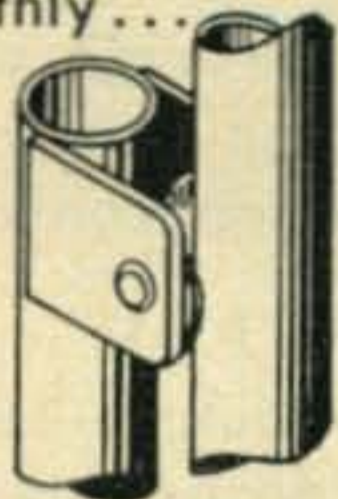
Towers may be completely motorized and remotely controlled with use of Tri-Ex Accessory Kit.

NEW ROLLER GUIDES



New Roller Guides enable towers to be cranked-up to extreme heights... smoothly... silently... easily...

Roller Guide Assembled



Write today for catalog describing and illustrating the most complete line of towers for amateurs and industry... from low-cost economy models to the most deluxe.

TRI-EX TOWER CORPORATION

127 East Inyo Street
Tulare, California

Letters to the Editor

Lamps

Dear Mr. Green:

On Page 61 of your March 1959 issue of CQ, there appears a question-answer item involving the hazards of using a fluorescent lamp for indicating R. F. Several aspects of the answer will, I fear, lead to an erroneous conclusion among your many readers; hence the following comments:

A 40-watt fluorescent lamp has a volume of approximately 1.28 liters. The argon gas present in this volume is under a pressure of 3 mm of mercury. The temperature necessary to induce argon pressure inside the tube to above atmospheric will be several thousand degrees F. This temperature obviously cannot be reached in this manner.

Each 40-watt fluorescent lamp contains about 50 milligrams of liquid mercury. If the entire lamp were kept in an R.F. field for a sufficient length of time to induce a temperature of 160°C (320°F), all the mercury would be converted to the vapor or gaseous phase and, withal, the pressure in the lamp due to the Hg vapor would only be 4 mm of mercury, or 1/190th of an atmosphere. Actually, if only part of the lamp was in the R. F. field, all the mercury would condense out in the colder section of the tube.

As for the constituents of the fluorescent lamp:

The amount of mercury mentioned above is not much more than one would find in a clinical thermometer. Certainly the potential hazard is no greater from the mercury of a fluorescent lamp. True, where large numbers of lamps are involved, a potential hazard may exist during gross breakage indoors and in a poorly ventilated area—but the hazard from one lamp is negligible.

The use of a phosphor containing beryllium was discontinued in June of 1949. The material used since then is a calcium chlor-fluor phosphate, similar to the mineral apatite, which has been conclusively proven to be physiologically inert and non-toxic. Thus, although there is phosphorous present in the form of a phosphate, there is no free phosphorous—no hazard from it.

In view of the above, there appears to be little justification for the serious precautions listed in the printed answer. It would seem that there is ample justification in clarifying these points to your readers.

Very truly yours,
I. Matelsky
Industrial Hygienist, Lamp Division

Power Plant

Dear Editor,

I wish to report to you, the construction of a "Poor Ham's Power Plant" as described in the January, 1959 CQ. It works beautifully—it is built as described and does everything W2EUP says it will do. W2EUP has simplified a subject which has been an impossible mystery to me, in an especially good article. Tnx for publishing it.

W3YPI

Editorial

Dear Wayne,

I read your 'Ham Shaking' article (editorial) in the June 1959 issue of CQ. Believe me it really started me to thinking. I sat down this morning and wrote to my congressman urging him to get me (for our local club) what information in this regard he could, and to give us all the backing he was able to. I pointed out that ham radio has contributed to the MAJOR portion of all the electronic advancements, and that it provides a hobby, beyond compare, to the young people of this country who otherwise might be juvenile delinquents. I also pointed out that there were about

[Continued on page 90]

←For further information, check number 18 on page 126.

THE REVOLUTIONARY NEW CENTRAL ELECTRONICS 100V EXCITER-TRANSMITTER

BROADBAND! ONLY ONE TUNING CONTROL, THE VFO ITSELF.



CENTRAL ELECTRONICS, THE PIONEER OF AMATEUR SSB IS PROUD TO BRING YOU THE FINAL RESULT OF THREE YEARS OF THE KIND OF PATIENT ENGINEERING, TESTING AND IMPROVING THAT MAKES FOR A SUPERIOR PIECE OF ELECTRONIC GEAR.

MANY OF THE TRIED AND TRUE PRINCIPLES AND FEATURES OF THE ORIGINAL MULTIPHASE EXCITERS HAVE BEEN RETAINED IN THE NEW 100V, ALTHOUGH IN VASTLY IMPROVED FORM. THE USE OF PATENTED BROADBAND CIRCUITRY THROUGHOUT PRACTICALLY ELIMINATES "COCK-PIT" TROUBLE.

REGARDLESS OF YOUR PREFERRED MODE OF OPERATION, IT'S ALL IN THE 100V. SSB, DSB, AM, PM, CW and FSK . . . AND ALL AT THE FLIP OF ONE SWITCH. ALTHOUGH THE 100V WILL PROBABLY FIND IT'S GREATEST USE AS A SINGLE SIDEBAND SUPPRESSED CARRIER EXCITER-TRANSMITTER . . . NO ONE HAS BEEN "LEFT OUT IN THE COLD" IN IT'S DESIGN. THIS IS THE KIND OF A RIG THAT HAMS DREAM ABOUT!

CHECK AND COMPARE THESE FEATURES

STABILITY: The new patented two tube permeability tuned VFO circuit is exceedingly stable and is immune to the effects of line voltage fluctuations and tube ageing. Built like a battle ship, it is tuned by a husky precision lead screw assembly running in ball bearings. This is a VFO to end all VFO's.

FREQUENCY COVERAGE: 80 METERS — 3.5 to 4.5 Mc. 40 METERS — 6.5 to 7.5 Mc. 20 METERS — 13.5 to 14.5 Mc. 15 METERS — 20.5 to 21.5 Mc. 10 METERS — 27.7 to 29.7 Mc. A spare X position provides for the installation of broad-band coils for 160 meters, MARS, etc. OR any 1 Mc. portion of the spectrum between 1.5 Mc. and 25.5 Mc. OR any 2 Mc. portion of the spectrum between 25.5 Mc. and 29.7 Mc. YOU DON'T SETTLE FOR HALF A LOAF OF FREQUENCY COVERAGE WHEN YOU HAVE A 100V!

THE TUNING DIAL: Band scales in the large slide rule window change with the band switch and are calibrated at each 100 KC point. Frequency is read directly in 1 KC increments by the circular KC dial without any computation whatever. Approx. 12 feet of bandspread on each band. A smooth running two-speed tuning knob allows fast tuning at 100 KC per turn and slow tuning at 750 CYCLES per turn. Calibration accuracy is 250 cycles between any two 50 KC points.

METERING: Reads POWER INPUT (0-200 watts) RF AMPS OUTPUT, AC LINE VOLTAGE and CARRIER SUPPRESSION IN DB DOWN TO 70 DB.

MONITORING: A 2" scope provides an instantaneous visual check on non-linearity resulting from improper loading. Also indicates proper setting of carrier injection for 100% AM modulation. Scope presents trapezoid pattern.

OTHER INDICATORS: Below the meter a neon indicator provides a check on the operation of the NEW AUDIO LIMITER CIRCUIT. Below the scope a second neon indicator starts operating if you have the antenna or load mis-matched.

NEW AUDIO FILTER-LIMITER: The new filter is composed entirely of R-C components, yet has the steep side response and rejection characteristics of a four toroid tuned filter but without the usual harsh, ringing effects. Bandpass is 200 to 3700 cycles. This filter precedes the phase shift system and will maintain 50 DB SUPPRESSION OF THE UNWANTED SIDEBAND. The new audio limiter maintains audio drive to the balanced modulator WITHIN 1 DB, REGARDLESS OF HOW HARD THE MIKE IS HIT. IT'S IMPOSSIBLE TO OVERDRIVE THE 100V BALANCED MODULATOR! Inverse feedback circuits allow 10 DB OF CLIPPING with negligible distortion.

NEW PS-2 AUDIO PHASE SHIFT NETWORK: A twelve cross-over point network is composed of heat-cycled components having .1% accuracy. Even changing the balanced modulator tubes has no effect on it's maintaining 50 DB OR BETTER suppression!

POWER OUTPUT: The husky, ultra-linear type 6550 tubes in the final of the 100V will deliver 100 WATTS OF SINGLE TONE POWER, EVEN ON TEN METERS! AND WITHOUT GRID CURRENT FLOW. Two tone third order distortion products are down in excess of 40 DB. A new POWER OUTPUT CONTROL eliminates the need for power dividers when driving AB1 or AB2 linears, since power output is continuously variable from 10 watts to full output.

SET AND FORGET CONTROLS: These seldom used controls are all located behind the flip down magnetic doors on the front.

GENERAL CIRCUITRY: Crystal controlled master SSB generation is at 8 MC. VFO injection is 5 to 6 MC. Crystal controlled heterodyne oscillators operate into mixer stages for various bands. This system, originally developed by C. E. is today the standard of the industry. Blocked grid keying of mixers and final amplifier provides perfect CW and PHONE BREAK-IN.

PHYSICAL DATA: Panel is standard 19" width by 8 $\frac{3}{4}$ " high. Finish is smooth grey. Attractive heavy duty rounded corner cabinet is 15" deep, is finished in grey wrinkle and has a latch type access lid. Shipping weight approx. 90 lbs.

MULTIPHASE 100V complete..... Amateur net.....\$695.00

Orders entered prior to June 1, 1959 will be shipped at the original price of \$595.00

COMING UP! MORE SUPERIOR GEAR FROM C. E. THE SSB PIONEER

A NEW COMPANION RECEIVER: Which will TRANSCIEVE THE 100V or separate the two VFO's at the flip of a switch. The 100V has the interlock control sockets built in.

A NEW 2500L BROADBAND LINEAR AMPLIFIER. Big brother to the famous 600L.

A NEW HETERODYNE CONVERTER: To cover all of the 2 and 6 meter bands with the 100V. Interlock control sockets are in the 100V. SORRY: INFORMATION AND DELIVERY DATES ON THESE NEW ITEMS NOT YET AVAILABLE. For further info, check No. 19 on pg. 126.

MULTIPHASE
EQUIPMENT

Central Electronics, Inc.

1247 W. Belmont Ave.

Chicago 13, Illinois

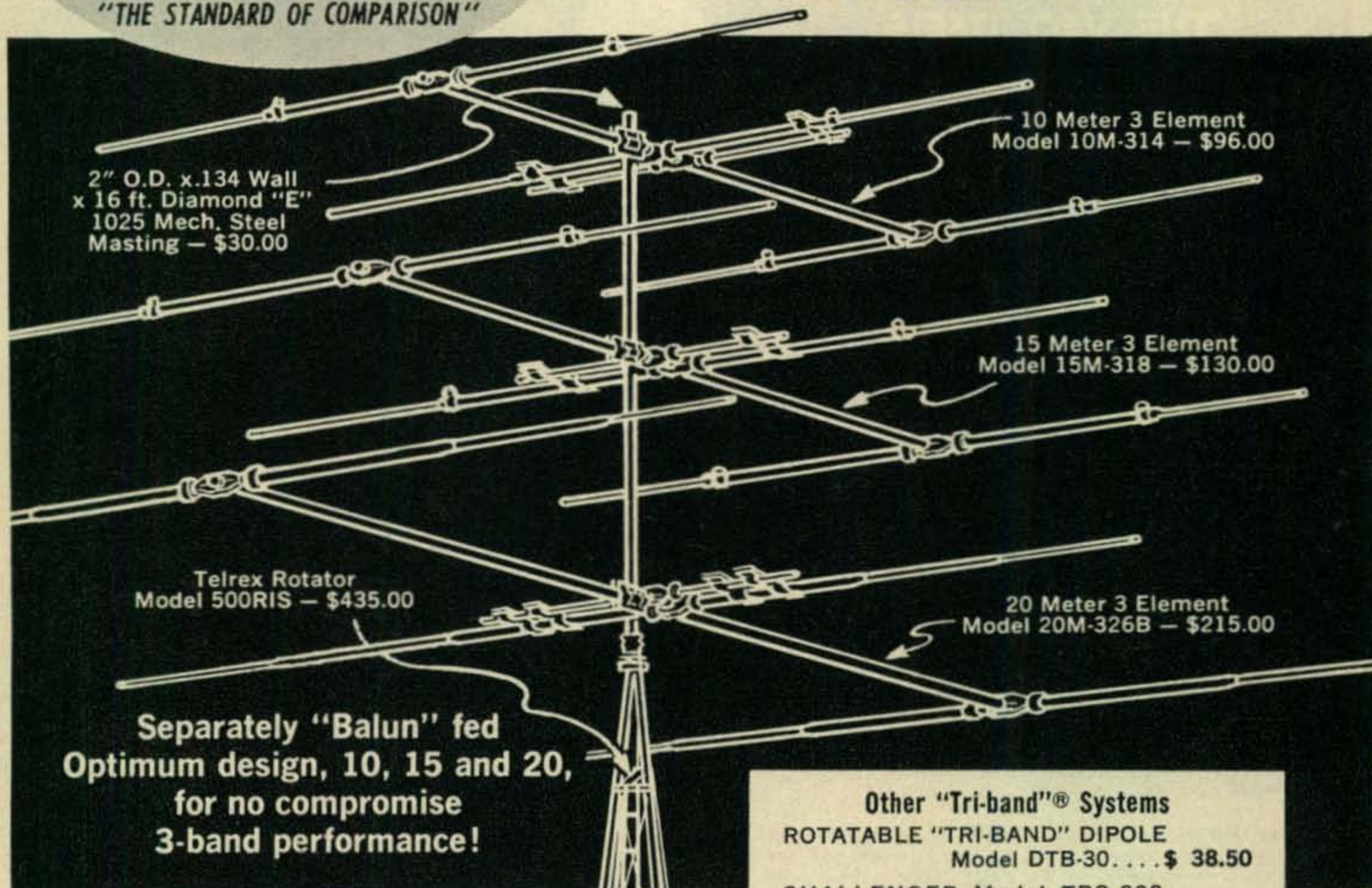
A subsidiary of Zenith Radio Corp.

WRITE FOR
LITERATURE ON
THE COMPLETE
MULTIPHASE LINE

WORLD'S FINEST AND MOST PRACTICAL 3-BAND SYSTEM

telrex "CHRISTMAS TREE"

"THE STANDARD OF COMPARISON"



2" O.D. x .134 Wall
x 16 ft. Diamond "E"
1025 Mech. Steel
Masting - \$30.00

10 Meter 3 Element
Model 10M-314 - \$96.00

15 Meter 3 Element
Model 15M-318 - \$130.00

Telrex Rotator
Model 500RIS - \$435.00

20 Meter 3 Element
Model 20M-326B - \$215.00

Separately "Balun" fed
Optimum design, 10, 15 and 20,
for no compromise
3-band performance!

"Beamed-Power" "Balanced-Pattern"

By far the most powerful and practical 3-element "Tri-band"® System . . . guaranteeing no compromise, 3-band performance, and reliability — rain or shine! "Balun" fed and optimum antenna design assures . . . maximum gain, and impedance bandwidth, plus pattern symmetry with minimum TVI, BCI and harmonic radiation qualities — not possible with so-called "Tri-banders." Install Telrex "Tri-band - Christmas-Tree" for "top-man-on-the-frequency" results!

- Other "Tri-band"® Systems**
- ROTATABLE "TRI-BAND" DIPOLE
Model DTB-30 . . . \$ 38.50
 - CHALLENGER Model TBS-308
"Tri-band", 2 elements on 10,
15 and 20 meters . . . \$ 99.50
 - CHALLENGER Model TBS-416
"Tri-band", 3 elements on 10,
15, and 20 meters . . . \$159.50
 - MONARCH Model TBS-626
"Tri-band", 4 elements on 10,
15; 3 elements on 20 meters . \$259.75

- Broad-band High Efficiency "Baluns"**
- MODEL BBB-1/5 (1½ KW Rating)
Input 50 ohms . . . \$18.50
 - MODEL BBB-1/5 (3 KW Rating)
Input 50 ohms . . . \$24.50
 - MODEL BBB-1/5 (1½ KW Rating)
Input 72 ohms . . . \$18.50

- Rotators-Indicator Systems**
- Model 175-RIS . . . \$198.50
 - Model 500-RIS . . . \$435.00

Other Amateur Antenna Models
Available from \$5.95 to \$560.00

Lower Cost
"Tri-band"
Systems
Available

ANTENNAS

SINCE
1921

Communication and TV Antennas
telrex LABORATORIES

ASBURY PARK 25, NEW JERSEY, U.S.A.

TELREX "BEAMED-POWER"-"BALANCED-PATTERN" ARRAYS COST A LITTLE MORE...WORTH MUCH, MUCH, MORE!

For further information, check number 50 on page 126.

NEW...FROM JOHNSON

Viking

"PHONE PATCH"



- Automatic "Voice or Manual" Operation on SSB, DSB or AM.
- HYBRID-Transformer Type Circuitry.
- Adjustable "line null" Control.
- Rugged and Compact—easy to install and operate.

Brand new—and there's nothing quite like it!! Here's Johnson's newest accessory—the Viking "Phone Patch". . . a rugged, compact, completely automatic HYBRID-transformer type unit. Provides push-to-talk or manual operation in addition to (VOX) voice control operation for SSB, DSB or AM. Adjustable "line null" control gives you excellent null on all telephone circuits with a high degree of isolation for automatic voice operation. Separate gain controls for transmitter and receiver inputs let you set the proper adjustment and balance for critical circuits. In "patch" position—receiver speaker is de-energized and audio is switched to the telephone handset for undistorted, completely hum free audio response. Effectively shielded . . . RF filtering and bypassing prevents RF feedback from your telephone line.

The Viking "Phone Patch" is mounted in a heavy gauge steel enclosure with modern, square corner styling, and a handsome maroon finish. Rubber mounting feet on side and bottom for mounting in either position. Removable etched aluminum front panel permits the "Phone Patch" to be removed from its enclosure, mounted in a station central control or speaker cabinet, and then front panel may be remounted to provide an attractive, professional-looking installation.

CATALOG NO. 250-46

Viking "Phone Patch", wired and tested. Enclosure size: 2" wide, 6" high, 2½" deep.

\$25⁰⁰

AMATEUR NET

For detailed specifications
—write for Data Sheet 715

Write for your free Viking Amateur Catalog and you'll soon see why your best transmitter buy is a Viking!



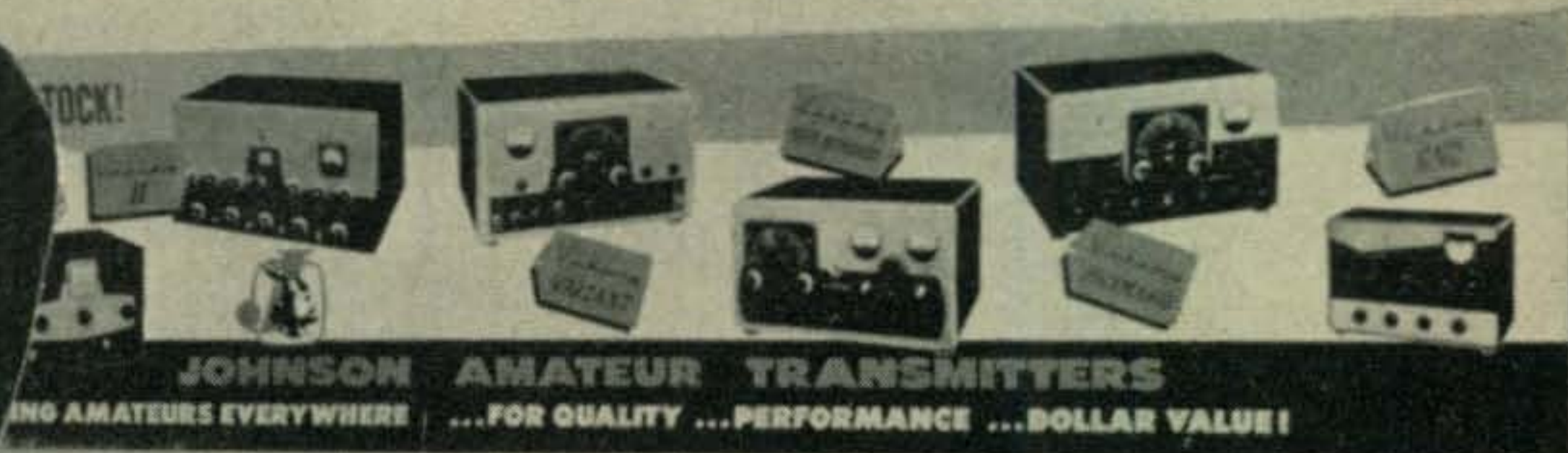
E. F. JOHNSON COMPANY

2910 SECOND AVENUE S.W. • WASECA, MINNESOTA

For further information, check number 20 on page 126.

August, 1959 • CQ • 27

no matter what you expect
from a transmitter...



More than one-half kilowatt of power and operating convenience!

VIKING "FIVE HUNDRED" TRANSMITTER

Rated 600 watts CW input . . . 500 watts phone and SSB (P.E.P. with auxiliary SSB exciter)—instant bandswitching 80 through 10 meters! Compact RF unit designed for desk-top operation—power supply/modulator unit may be placed in any convenient location. All exciter stages ganged to VFO tuning. High gain push-to-talk audio system. Operates by crystal control or highly stable, built-in VFO. Class C 4-400A final amplifier provides plate circuit efficiencies in excess of 70% with unequalled broadcast-type high level amplitude modulation. Wide range pi-network output circuit with silver-plated final tank coil will load virtually any antenna system. Low level audio clipping—effectively TVI suppressed and filtered. Complete with tubes, less crystals.

Cat. No.		Amateur Net
240-500-1 . . . Kit		\$749.50
240-500-2 . . . Wired		\$949.50

you'll get more with a *Viking*



"CHALLENGER" — 70 watts AM input 80 through 6, 120 watts CW input 80 thru 10 — 85 watts on 6. With tubes.
 Cat. No. Amateur Net
 240-182-1..Kit . . . \$114.75
 240-182-2..Wired . \$154.75



"RANGER" — 75 watts CW and 65 watts phone input. Bandswitching 160 through 10. Built-in VFO. With tubes.
 Cat. No. Amateur Net
 240-161-1..Kit . . \$229.50
 240-161-2..Wired \$329.50



"VALIANT" — Instant bandswitching 160 through 10. 275 watts input CW and SSB (P.E.P. with aux. exciter) 200 watts phone. With tubes.
 Cat. No. Amateur Net
 240-104-1. Kit \$349.50
 240-104-2. Wired \$439.50

"KILOWATT" AMPLIFIER — This exciting unit is the only power amplifier available which will deliver full 2000 watts SSB* input and 1000 watts CW and AM! Continuous coverage 3.5 to 30 mcs. Excitation requirements: 30 watts RF and 10 watts audio for AM; 10 watts peak for SSB.

Cat. No. Amateur Net
 240-1000..Wired and tested. . . . \$1595.00
 251-101-1..Matching desk top, back and 3 drawer pedestal. . FOB Corry, Pa. . \$132.00

*The FCC permits a maximum of one kilowatt average power input for the amateur service. In SSB operation under normal conditions this results in peak envelope power inputs of 2000 watts or more depending upon individual voice characteristics.

3 feature-packed amplifiers!



"COURIER" AMPLIFIER — Class "B" linear rated 500 watts P.E.P. input with aux. SSB exciter — 500 watts CW and 200 watts AM! Continuous coverage 3.5 to 30 mcs. Drive requirements: 5 to 35 watts. With tubes.

Cat. No. Amateur Net
 240-352-1 . . Kit . . . \$244.50
 240-352-2 . . Wired . \$289.50



"THUNDERBOLT" AMPLIFIER — Rated 2000 watts P.E.P.* input SSB; 1000 watts CW; 800 watts AM linear! Continuous coverage 3.5 to 30 mcs. May be driven by "Ranger", or other unit of comparable output. With tubes.

Cat. No. Amateur Net
 240-353-1 . . Kit . . . \$524.50
 240-353-2 . . Wired . \$589.50



New Catalog

Yes, dollar-for-dollar and feature-for-feature you'll get more of everything in a Viking transmitter . . . that's why Viking transmitters outsell all others! Write for your free Viking Amateur Catalog and you'll soon see why your best transmitter buy is a Viking!



E. F. JOHNSON CO.

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432 MC Parametric Amplifiers

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A parametric amplifier is a device using a variable reactance to obtain signal gain. Of particular interest to radio amateurs are those using a variable reactance *uhf* diode such as the MA460B diode manufactured by Microwave Associates. The parametric amplifiers described here make use of one of these diodes to obtain radio frequency gain at 432 *mc* with very low noise figures. Low noise figures mean better weak signal reception since even the best of vacuum tubes such as the 416B "gold-plated lighthouse" triode produce more receiver noise at 432 *mc* than can be obtained from an antenna in ordinary locations. The receiver sensitivity for a given amount of noise can be increased from 30% to 200% when using a parametric amplifier as compared to a vacuum tube amplifier ahead of a good 432 *mc* receiver.

Operation

Briefly, a parametric amplifier consists of a variable reactance (a *uhf* variable capacity diode), a pumping *rf* oscillator, an idler circuit and a load as indicated in fig. 1. The pumping oscillator drives the diode reactance over a small range of capacitance and when this is connected across a *vlf* or *uhf* tuned circuit, it is obvious that an effect will be produced on a signal going thru the circuit to a radio receiver. The device is a low noise form of modulator or mixer in which the output frequency can be made the same as the signal frequency. Amplification takes place when "negative resistance" is produced at the signal frequency to partially overcome the normal circuit and diode resistance losses. Too much negative resistance results in oscillation, so the pump power has to be very carefully controlled to get just the correct amount of nega-

tive resistance and regeneration at the signal frequency. Power is taken from the pump oscillator to produce this regenerative effect, some is dissipated in the idler frequency circuit and some in the signal frequency circuit.

Idler Frequency

The idler frequency is the difference frequency generated by the pump oscillator and the signal input just as in an ordinary superheterodyne receiver. The mixer or modulator in the latter always generates more noise than a similar tube amplifier, whereas the modulator diode in the parametric unit generates less noise as an amplifier or as an "up-converter."

Actually there are two idler frequencies since the oscillator produces sum and difference frequencies from the signal frequency. Usually the sum frequency is neglected since it does not contribute any regenerative effect. The writer is not convinced that it should be neglected, since numerous experiments here have shown an improvement in noise figure, or at least made it easier to get smooth regeneration and low noise figure when the other idler frequency has a resonant circuit impedance in the system. The added adjustment complicates the system but does allow the use of a lower value of oscillator frequency for a given noise figure. When neglecting this added idler frequency, the oscillator should be at least 5 to 7 times as high as the signal frequency, but in experiments here, pump frequencies of 2½ to 3½ times the signal frequency gave the same *nf* when making use of the sum frequency idler circuit as well as the more important idler, the difference frequency.

In an up-converter the output is taken from the difference idler frequency tank and the system is less regenerative than as an amplifier and the converter gain is directly proportional to the ratio of oscillator to signal frequencies. To get equivalent overall *nf*, the pump oscillator then has to be several times as high as when the unit is used as a regenerative amplifier. In one viewpoint the latter is an "up converter" and "down converter" using the diode as a regenerative mixer and taking the output from the same tank signal frequency.

Problems

The parametric amplifier is a narrow band, tricky thing to work with, and certainly not

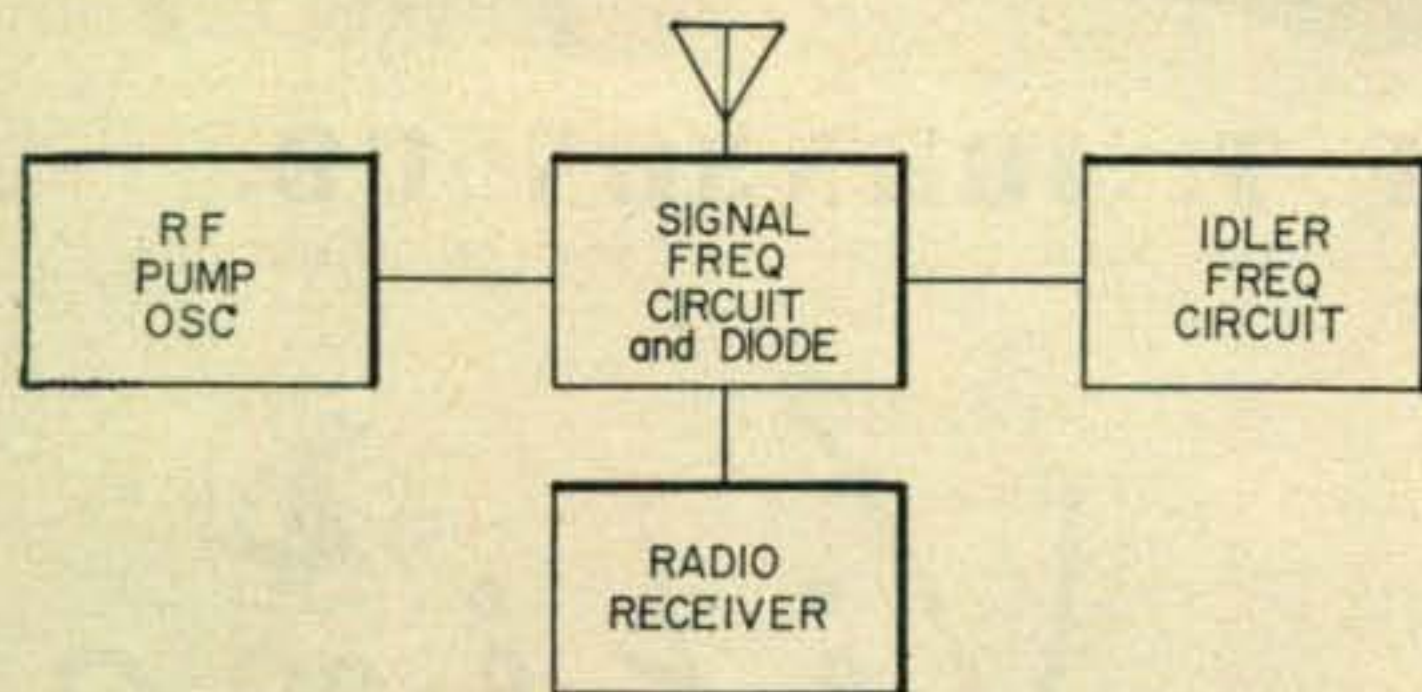


Fig. 1—Block diagram of a basic parametric amplifier system.

for use by amateurs not having lots of patience in adjusting all the controls. If a person had 5 or 6 arms and hands to adjust all controls at once, many hours of work could be eliminated. Fortunately, once in adjustment, day to day changes or aging effects are not troublesome if the pump oscillator is fairly stable with not much warm up drift if the power supply has good regulation. Another factor that can be annoying is due to temperature changes affecting the resonant frequency adjustments in the tank circuits of the amplifier. This effect is not as troublesome as in a *vfo* or receiver tuning oscillator, but is a factor to be considered in constructing the units. The writer has built more than ten 432 *mc* units, most of which oscillated too vigorously and only occasionally could any amplification be had and then often with no improvement in *nf* over a good *rf* tube amplifier. However 4 of these units have been usable, two in particular are described in this article since these two gave 2 to 3 *db* better *nf* than either of my 416B *rf* amplifiers at 432 *mc*.

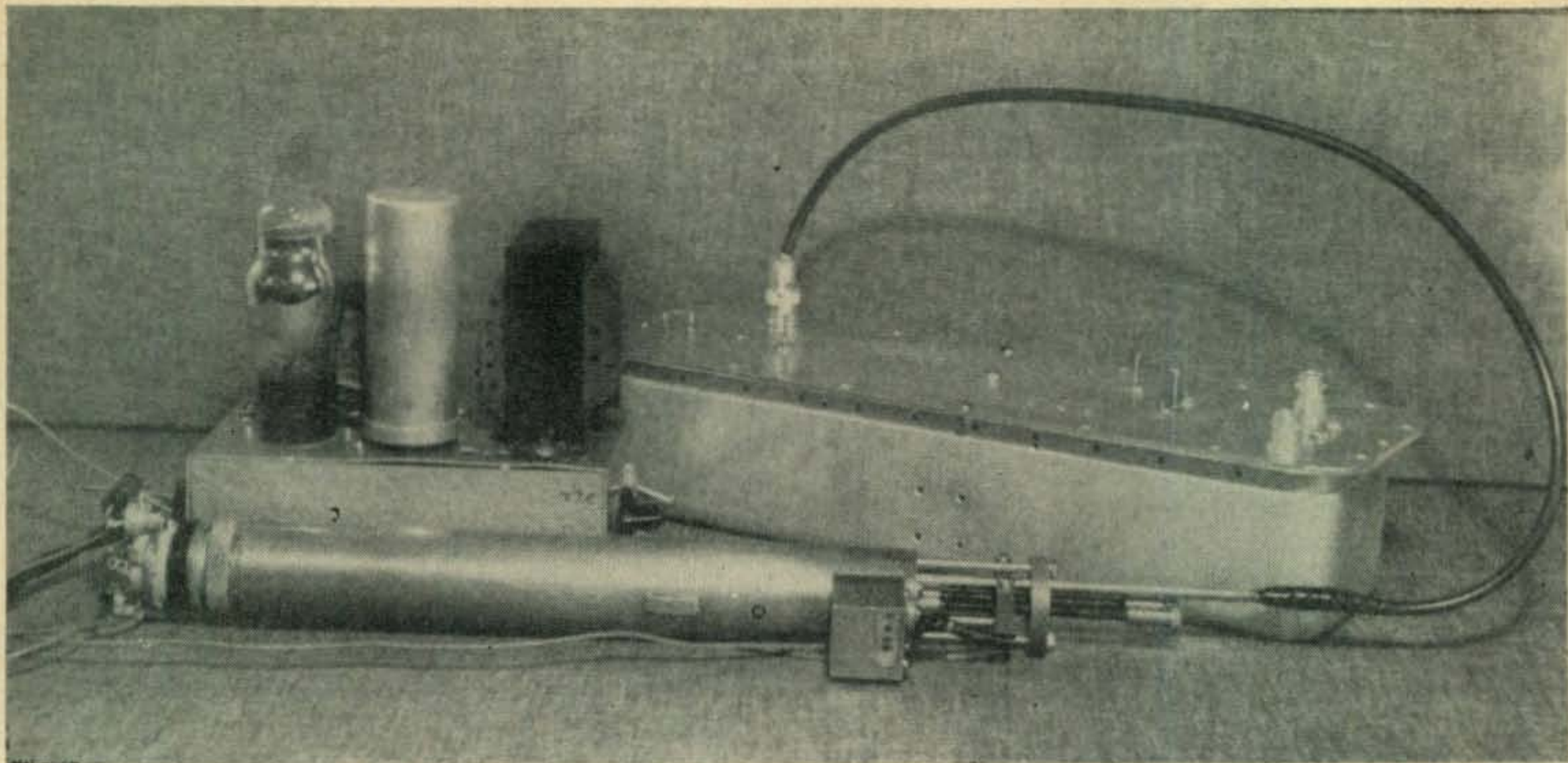
The parametric amplifiers are usable over 300 *kc* at 432 *mc* without touching up a couple of adjustments if maximum gain and signal to noise ratio is desired. The true noise figure, *nf*, is a difficult thing to actually measure at *uhf* but crystal noise generators can be used to compare two amplifiers to note improvements, and to get a parametric amplifier into proper operation.

Construction

Two entirely different types of construction are shown in the photographs. One has the signal frequency tank circuit made an electrical half wave long at 432 *mc* with a round center conductor in a rectangular copper box. The other one has a flat copper strip three quarters wave long and is mounted on a flat sheet of aluminum with a surplus aluminum can as a cover over the whole unit. An aluminum chassis might be used as a cover if fastened securely to the ground plate with many self-tapping screws around the edges. High *Q* circuits are necessary at 432 *mc* which means fairly large sizes of conductors and shields with complete shielding of the inner line circuit. All ground currents must flow back to ground only on the inside of the shield can. This eliminates the use of most low priced plunger type trimmer condensers which snap into the shield walls and have the ground return connected to the outside of the shield. Some types such as the CRL ceramic units can be rebuilt to meet these grounding requirements by filing a small slot on one side of a 6-32 brass nut and then soldering the other side to the inside of the can or shield if it is made of copper or brass. Where aluminum shields are used, a small brass or copper mounting tab may be bent over the top of the nut with a clearance hole at the center. This small strap with the slotted nut soldered in place may then

be fastened to the aluminum sheet with a couple of machine screws. With this modification, the *rf* current flowing down through the trimmer condenser adjusting screw, will flow into the inside shield wall instead of the outside wall.

In general two tank circuits are built into one shielding box, end to end with the varactor diode connected between these circuits. The pump oscillator can be coupled into the idler circuit. The signal frequency circuit being at a lower frequency, is longer and may be made resonant at the high idler frequency with one or two added trimmer condensers or by designing this line to the proper length to be approximately resonant at the higher frequency with the varactor diode and 432 *mc* tuning condenser or condensers in the system. The latter procedure requires a lot of paper work and sheet metal rebuilding to finally arrive at the desired condition. The copper can unit is an illustration of this method. The longer line with all the associated capacities does resonate near the high idler frequency as well as at 432 *mc*. Unfortunately if a varactor diode of quite different capacity is substituted, this unit would be less effective in getting a low noise figure unless a wide frequency range pump oscillator is available to find the magic spot where all desired frequencies have the correct impedance for smooth operation. The pump oscillator with a 2C40 tube in one end shown in one photograph, has a wide range of about 1100 to 1400 *mc* on one mode of oscillation. The frequency is controlled by two plungers which tune the plate and cathode cavities. For those of you who recognize this "gold plated" cavity as an *rf* amplifier, let me say it was modified to become an oscillator by soldering in tiny S shaped coupling loops in the grid cavity wall. One side of the S is in the cathode to grid cavity and the other side in the plate to grid inner cavity. The ends of the S loop are soldered to the grid line in the plane of the line and a small insulating hole surrounds the center of the S to get the loop from one cavity to the other. About 7 or 8 of these loops approximately $\frac{1}{4}$ inch long and $\frac{1}{8}$ inch high on each side were put in at random around the grid line at various points between the tube grid connector and the closest plunger point in order to get good oscillation over a wide frequency limit. With the two plunger tuning (external disks) within $\frac{3}{8}$ of an inch of each other over the whole 2 inch of travel, the higher mode predominates, that is from about 1100 *mc* to nearly 1400 *mc*. With the two disks $\frac{1}{2}$ to $\frac{3}{4}$ inch apart, a lower mode takes over and the oscillator functions in the 300 or 400 *mc*. region, not needed in this service. The particular frequency as checked on a APR-1 receiver was about 1250 *mc* when driving the copper can parametric amplifier. A small silicon rectifier power supply shown in the same photograph with this amplifier and oscillator furnishes 0 to 125 volts by means of



The 432 mc copper box Parametric Amplifier is shown at right rear, the plate supply left rear and the Radiosonde surplus oscillator in the foreground. The Pump oscillator output is approximately 1680 mc.

A $\frac{3}{4} \lambda$ 432 mc Parametric Amplifier made with flat sheet lines and mounted on a ground plane approximately 12 by 4 inches. It is entirely enclosed in an aluminum box. The Varactor crystal mounts in a small fuse clip on the long line with the small end in a spare tube pin clip soldered to the short line. The short line is mounted on $\frac{1}{8}$ " thick poly or a ceramic spacer.

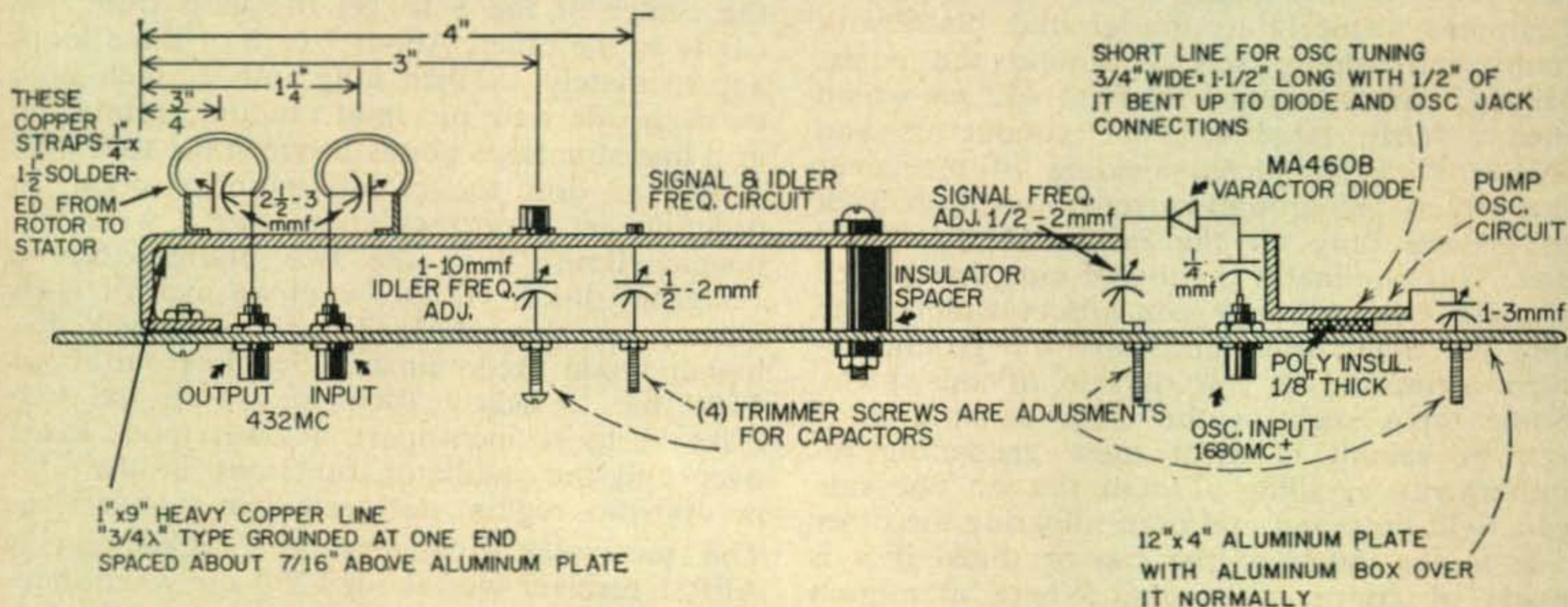
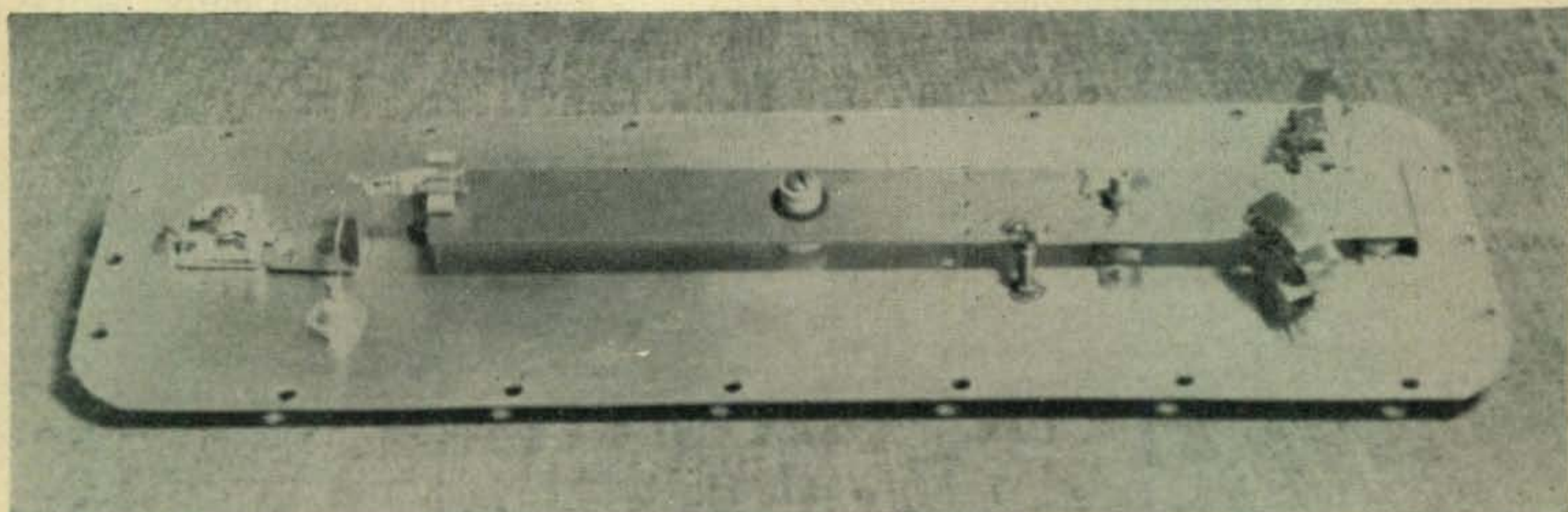


Fig. 2—Construction details for a 432 mc parametric amplifier designed to work in conjunction with the pump oscillator of fig. 3. (Shown in the top photo) Condensers used in tuned circuits may be compression or air type.

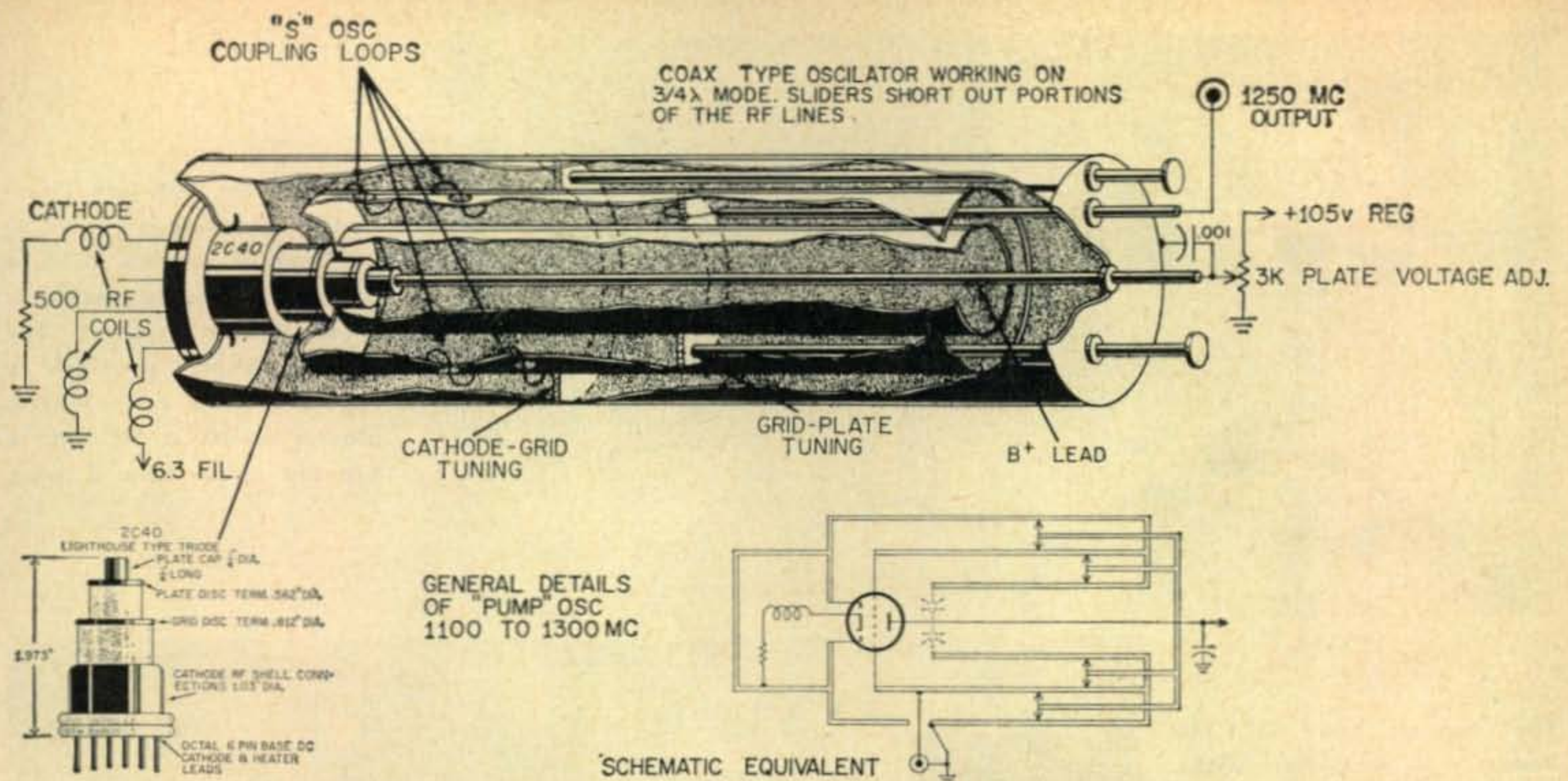


Fig. 3—Construction details for a pump oscillator employing a 2C40 Lighthouse tube. The cavity used was taken from a surplus TPS-1B radar. The rf cavity may be converted to oscillator operation by the addition of the "S" coupling loops shown above. The rf chokes in the filament and cathode leads are 4" of wire coiled up.

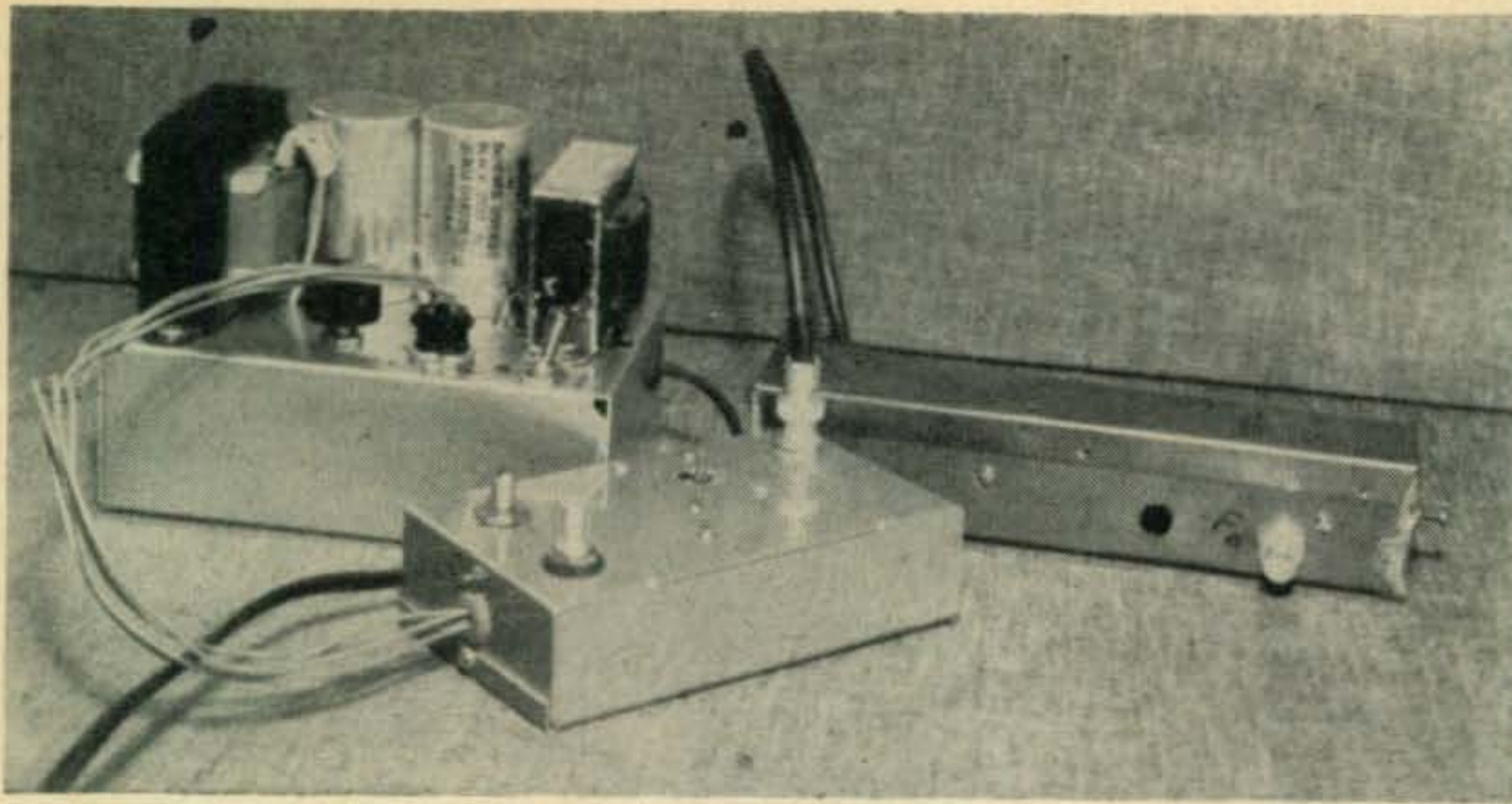
a 3000 ohm 10 watt potentiometer across the filter output. In locations having any degree of ac line voltage changes, a VR105 regulator tube should be connected across these oscillator plate supplies.

In another photograph a reversed polarity 0 to -105 volts was needed for the surplus type radiosonde 1680 mc oscillator which has a 5794 pencil type triode and cavities as an integral part. These little units about 1 inch in diameter and 2 inches long, have an adjusting screw which will change the frequency about ± 12 mc from 1680 mc. The shell connects to the grid and a 2000 to 5000 ohm grid leak must be connected between cathode (B- which is not grounded) and this grid. The tube assembly can be lightly held by two thin sheet metal clamps to a chassis but must be insulated from it by a layer or two of plastic such as .01 inch mylar or plastic bag material. The other end (both ends are insulated from the center cylinder) is the plate and B plus connection which should be grounded to the chassis since the output link and coax line are part of this plate terminal. The center conductor of the small fixed coax line was soldered to the tip of a type BNC coax fitting about 1/2 inch from the end of the outer, grounded coax shell. There is some power loss at this point but the unit supplies more than enough to pump the aluminum can parametric amplifier with less than 75 volts from plate to cathode. These 5794 tubes can be made to last a fair life span if a variable 10 or 15 ohm filament rheostat is connected in the 6.3 volt heater supply lead, and if the plate current is kept down to values of 5 to 15 ma. The plate supply, or rather B- supply to cathode, should have good regulation and be continuously variable from 0 to -90 or -105 volts. This surplus oscillator unit

and a variable grid leak and filament rheostat were mounted in a 5"x3"x1" aluminum box with a good clearance hole around the frequency adjusting screw (which is hot with -dc voltage). All of these uhf oscillators change frequency when the grid leak valve is changed or when the plate voltage is changed gradually for output power control. This is just one reason why two hands are not enough when tuning up a parametric amplifier unless a person has exceptional patience and lots of time.

For those individuals who have incurable experimental natures or a terrific desire for better 432 mc receiver performance on weak signals, a set of dimensional drawings are included as guide in building either of the two parametric amplifiers illustrated in the photographs. From experience in trying different designs, the line impedance at 432 mc can be of value between 100 and 150 ohms. This is determined by the physical size of the round tube or flat strip line and its spacing to the shield box. The writer favors half or three quarter wave lines at 432 mc in order to have more room to place, and replace, and respace the trimmer condensers and coax line fittings. The photographs indicate this process which has mainly been used for Swiss cheese manufacture in the past. As the art progresses, better looking and smoother operating parametric amplifiers will be developed.

The idler circuit impedance should be lower in value such as 35 to 60 ohms, which can be easily made with flat strip line 3/4 inch wide spaced 1/16 to 1/8 inch from the ground shield. If the pump oscillator has a narrow frequency range such as the 1680 mc unit, then the idler tank has to be carefully tuned by a small variable condenser (1 to 3 mmf) to 1248 mc plus or minus a little. The aluminum can unit using



The 432 mc flat line Parametric Amplifier is shown at the rear. A surplus 2C40 in a 1250 mc pump oscillator is in the foreground. The power supply provides a regulated 105 volts that is placed across a 3K pot to provide adjustable B plus.

The copper box 432 mc Parametric Amplifier without the cover showing the poly blocks for line support, end tuning condensers and coax jacks along the sides. The Varactor diode mounts between the long and short line circuits.

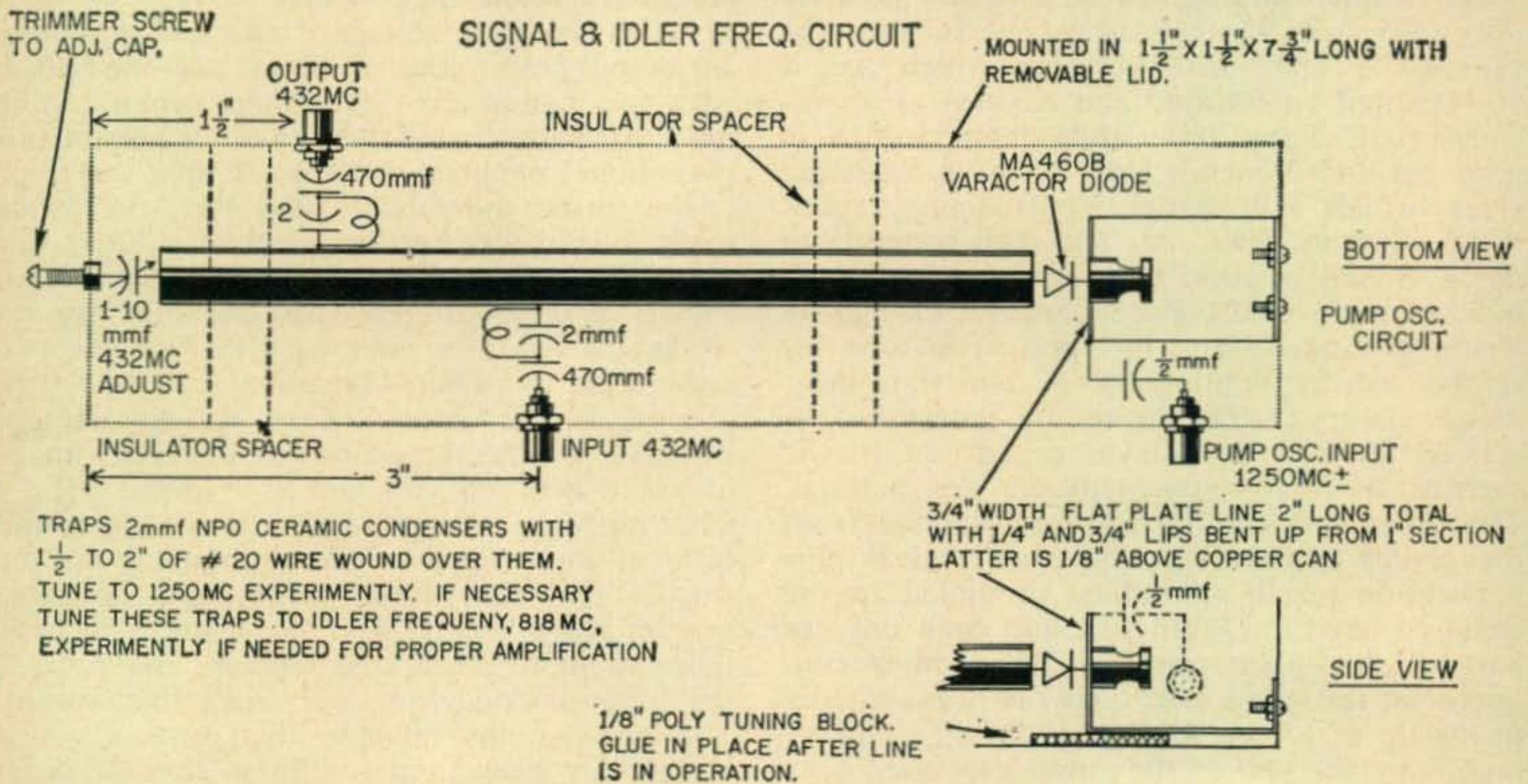
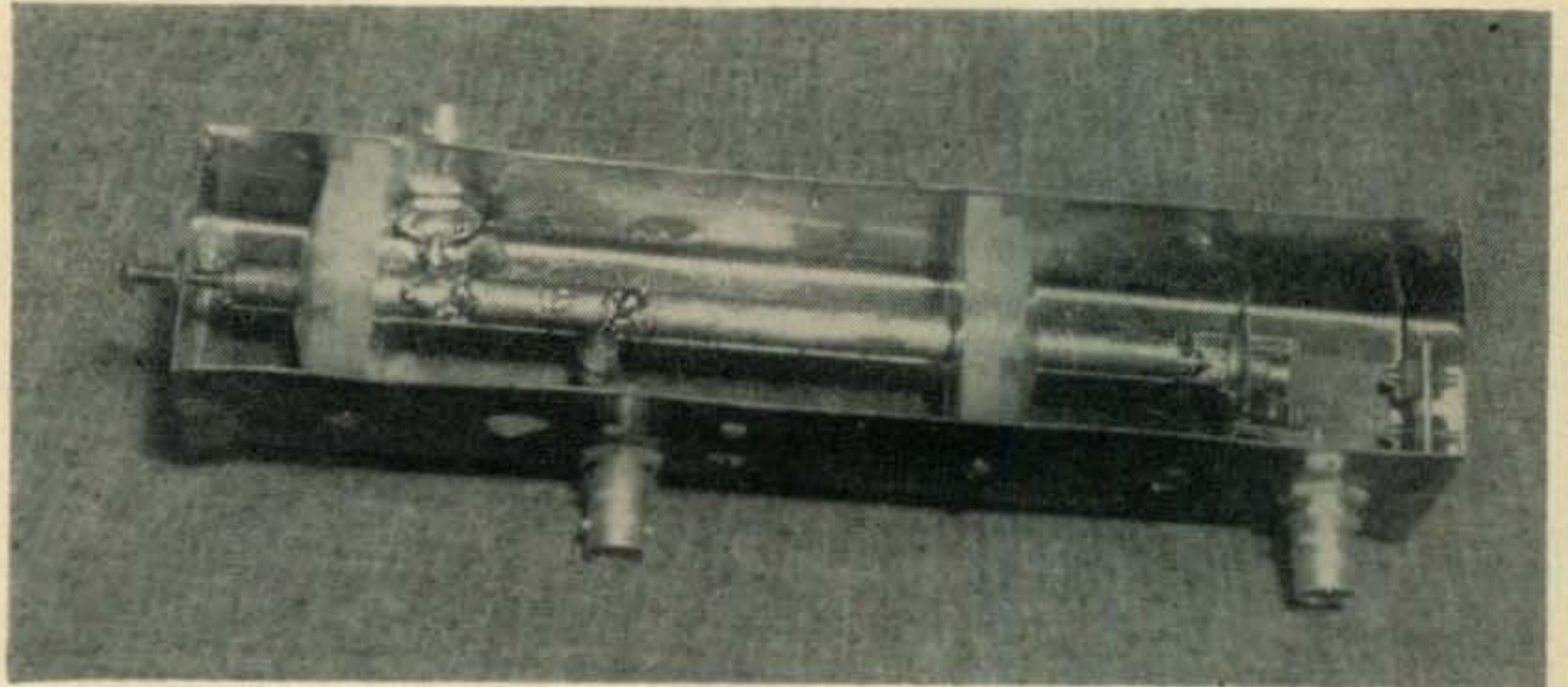


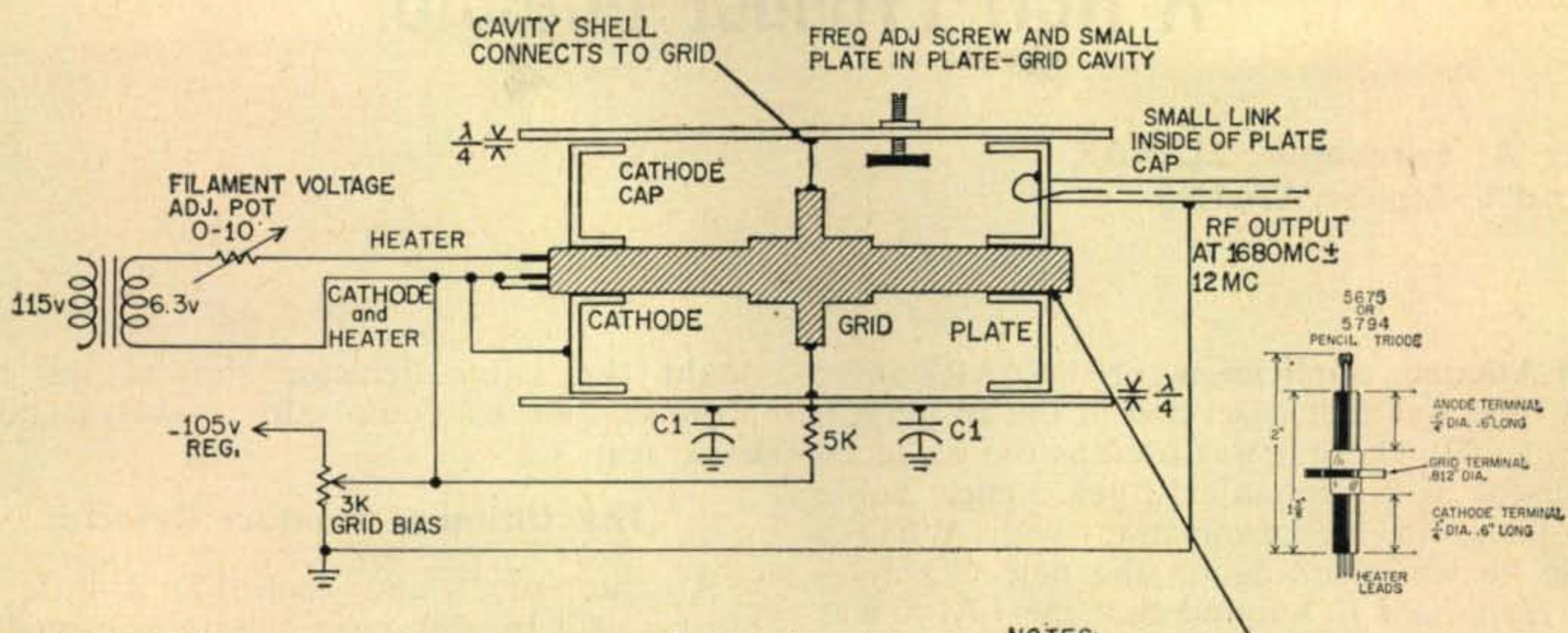
Fig. 4—Construction details for another type of parametric amplifier. This unit is used with the pump oscillator shown in fig. 5.

a half wave line not grounded, insulates the varactor diode from *dc* ground. The Microwave Assoc varactors seem to work best with no *dc* ground return and the pump oscillator power drives the diode into the correct "effective bias" region for parametric amplification. The diodes used here were marked 3.3 mmf at zero bias and about 1+ mmf at overdrive or maximum reverse bias of 8 or 9 volts. It

was estimated that the actual capacity across the diode (less external capacities) was slightly over 2 mmf when operating normally in an amplifier.

The idler tank circuit for a wider range oscillator can be made semi-tuned by sliding a 1/8 inch thick sheet of polystyrene partially under the quarter wave end grounded strip line. The dielectric of the poly sheet is higher than

PLATE AND CATHODE "CAPS" SLIDE ON OVER THE PENCIL TUBE AND ARE INSULATED FROM THE GRID SHELL CAVITY WITH MICA OR MYLAR. GRID CONNECTS TO THE CYLINDRICAL CAVITY.



C1= CAPACITY BETWEEN THE CAVITY AND TWO 1/2" OR 3/8" WIDE CLAMPS WHICH HOLD THE CAVITY AND TUBE INSIDE THE ALUMINUM BOX. PLATE AND B+ ARE GROUNDED TO THE BOX. USE A PIECE OF MYLAR .01" THICK (OR SOME OTHER SUITABLE PLASTIC) BETWEEN THE CLAMP AND CAVITY.

NOTES:
CROSS-HATCHED PART IS 5794 OR 5775 PENCIL TRIODES AS A GROUNDED GRID OSC
These oscillators are on surplus markets for about \$1.50 when you can find them.

Fig. 5—Construction details for a pump oscillator to be used with the parametric amplifier shown in fig. 4. The 5794 Pencil triode and cavity are from a surplus Radiosonde oscillator.

air so a capacity increase results and the line can be tuned roughly to $818 \pm mc$ with a $1250 \pm mc$ oscillator. Once the piece of poly sheet is correctly placed, it can be glued in place with plastic cement. In both amplifiers, this idler line circuit was bent up $\frac{1}{2}$ to $\frac{3}{4}$ inch from the close spaced section in order to provide a mounting part for the varactor diode and to provide a high impedance point for coupling to the pump oscillator coax jack. In the 1680 mc oscillator unit enough coupling was obtained by soldering a $\frac{1}{2}$ to $\frac{1}{8}$ inch copper tab to the coax jack tip and bending the tab over near the varactor diode mounting strip near the diode itself.

The coupling capacity for the lower frequency oscillator was a little greater. A 0.47 mmf tiny ceramic condenser was connected between the end of the idler tank circuit (approximately 818 mc) and the 1250 mc pump oscillator jack tip. Actually a $\frac{1}{2}$ "x $\frac{1}{4}$ " tab of sheet copper or brass could have been used on this unit in place of the 0.47 mmf ceramic condenser.

Traps

In both parametric amplifiers, attempts were made to reduce oscillator radiation into the input and output jacks connected to the 432 mc. lines. Small adjustable trap circuits were soldered between the jacks and the inner line circuit and tuned with adjustable condensers, or by sliding turns in the other unit coils, until minimum S meter readings were obtained in an APR-1 receiver tuned to the pump oscillator frequency. In this test the varactor diode can be out of the unit and the UHF receiver coupled into the input and output jacks respectively of

the amplifier while adjusting each trap for minimum oscillator radiation. This radiation into an antenna (resonant or not) would far exceed the FCC requirements of maximum oscillator radiation unless traps or an additional 432 mc high Q tank is connected between the parametric amplifier and the antenna feeder. The writer has not made enough tests yet to determine which system is best for reducing oscillator radiation as compared to signal power loss. The latter is important since signal loss means a poorer noise figure and less overall signal to noise ratio in the complete receiver.

Operating Suggestions

No complete line-up procedures have been developed yet but some suggestions are in order.

1. Adjust the traps for minimum oscillator radiation as previously outlined.
2. Put varactor diode into unit and turn oscillator plate supply to zero. Connect 432 receiver to the parametric amplifier output jack and a crystal noise generator to the input jack. Align the amplifier for maximum noise into the radio receiver. If this noise reading is less than 50 to 100% of the value obtained when the noise generator is connected directly to the receiver, change the input and output tap connections and line tuning slightly.
3. Gradually raise the plate supply voltage from zero and, if you are lucky, a definite increase of noise will take place. Usually this takes place after an hour or so of adjusting plate supply voltage, oscillator frequency adjustment, idler tank tuning, 432 tank tuning, antenna and receiver coupling and possibly the

[Continued on page 123]

A New Product Detector

Lester A. Earnshaw, ZL1AAX
Donald L. Stoner, W6TNS

An Amateur application for the 6AR8 sheet beam tube was first described in the July 1956 issue of CQ, where it was used as the balanced modulator in a mechanical filter exciter. Some time later, in a conversation with W6TNS (while he was working on the new CQ *Sideband Handbook*), I found that the 6AR8 was in the news again. Don had improved on Bill Orr's original circuit and built it into a rig described in the handbook. When a 6AR8 was sent over to me, in ZL land, my interest knew no bounds.

Though I was tempted to put the tube on the shelf, where I could admire it like one might a ship in a bottle, curiosity got the better of me and it quickly became a balanced modulator. The tube is indeed everything Bill and Don say it is, and then some.

It also occurred to me that the tube offered excellent possibilities as a product detector. No doubt most of you know that product detectors and balanced modulators are just about the same things. However, practical considerations often dictate the use of one circuit instead of another. A ring type of balanced modulator, for example, makes an excellent product detector. But because the *bfo* voltage needs to be high, for proper operation, it is seldom used. It can be appreciated that the harmonics of a powerful *bfo* can well be troublesome. A product detector that requires only a small output from the *bfo* is very desirable. The 6AR8 demands two volts of *rf*, or so.

A product detector is preferred to the conventional diode because it produces output only when the *bfo* is turned on. This may be more important than is generally realized. A diode detector demodulates everything that arrives at its input, even if it is a heterodyne between two stations down the band apiece. But the product detector rejects everything that does not beat with the *bfo*. Thus we may, by measuring just how much signal gets through when the *bfo* is turned off, assess the worth of the product detector.

Quite a bit of time was spent checking the various product detectors and the conclusions brought several interesting points to light. The tests were made on the pentagrid converter type, the double triode cathode coupled circuit, and the balanced modulator configuration using two pentagrid converter tubes. Without

doubt the latter detector showed the most promise, but its complexity makes it take a back seat.

The Ultimate Product Detector

As they say, "into each life a little rain must fall." In this case the rain turned out to be the sad fact that the 6AR8 was destined to become as extinct as the dodo bird. The General Electric Company only made a few of these tubes, it seems, and dealer stocks are dwindling rapidly. A new jug, used in at least 50% of the American TV sets, makes an excellent replacement for the 6AR8 in either the CQ articles, or in the product detector circuit.

The 6BU8 (RCA or Sylvania) has all the advantages of the two tube balanced modulator detector but without all the complexity, and it requires much less drive. The tube will handle 15 volts (or more) from the *if* amplifiers without turning a hair, and has tremendous output. Figure 1 shows how the

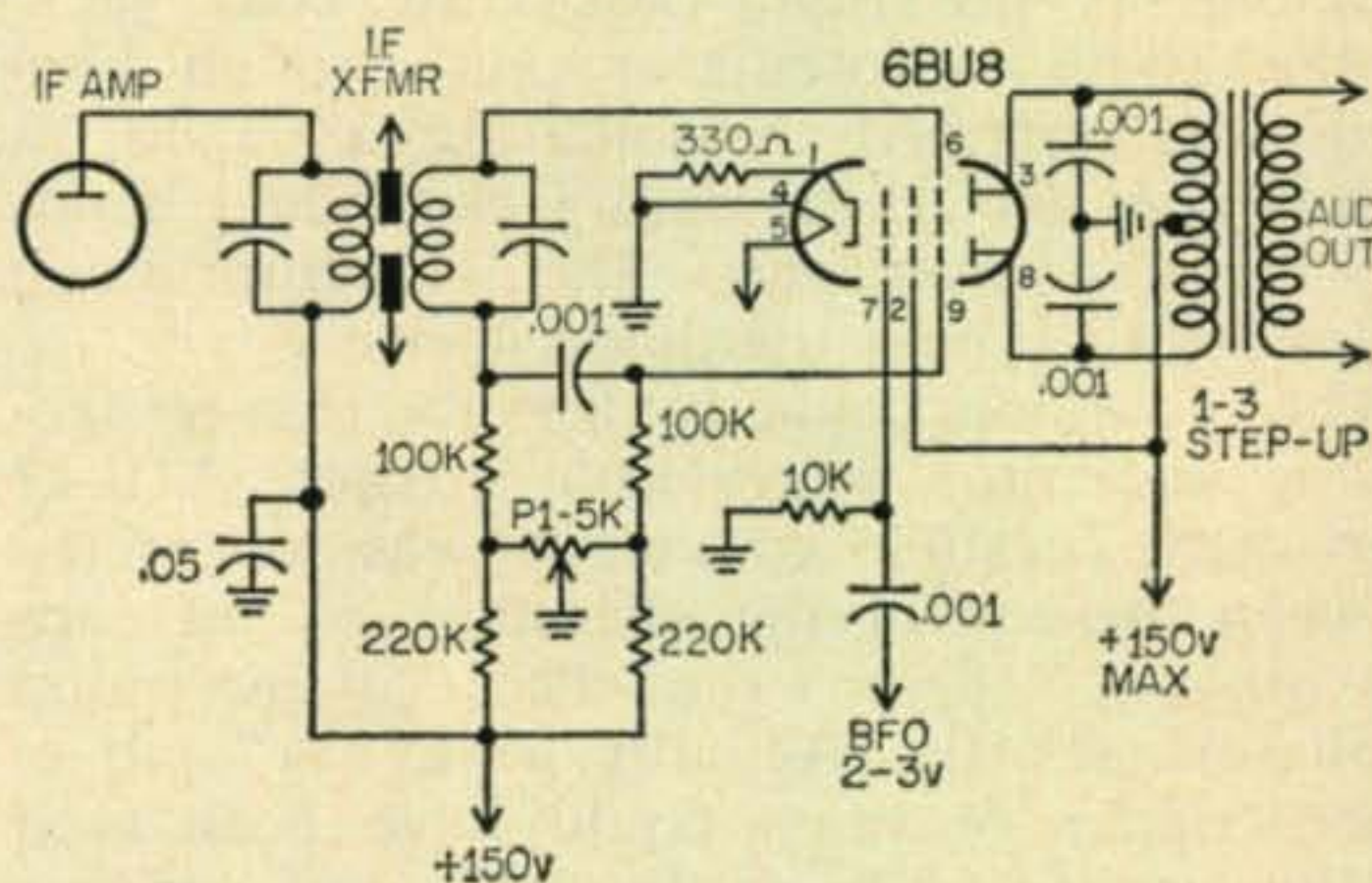


Fig. 1—The potentiometer is adjusted for minimum output when the *bfo* is turned off. The *ift* is the last *if* transformer in the receiver. T1 may be an interstage transformer (see text).

circuit worked out. The *bfo* is fed into the control grid (pin 7) and the signal source is connected to pins 6 and 9 (the suppressor grids). The anodes (pins 3 and 8) are connected to an interstage transformer having a primary centertap and a 3:1 step-up ratio. The potentiometer, P1, balances out the last of the signal when the *bfo* is turned off and may well be left out (fig. 2) if you are not a perfectionist. It was felt, however, that a

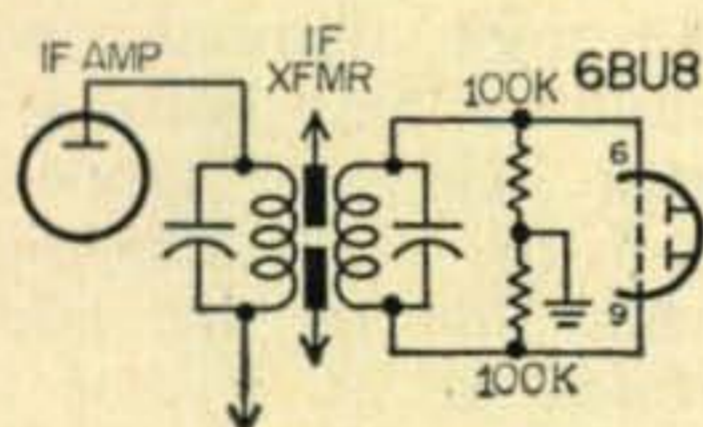
potentiometer is a small price to pay for absolute freedom from intermodulation. Don't be surprised if P1 gives the null near the end of its ranges. Unbalance is not uncommon in these tubes.

The transformer in the plate circuit is a must if you are to get proper operation. However, because it gives the signal a tremendous lift (due to its step-up action) it should not be considered a disadvantage. A plate to push-pull class B grids, with primary and secondary reversed, should be ideal for this application. If you have no push-pull transformer on hand, you may use an untapped unit by feeding each plate with an individual 4.7K resistor from B plus.

Results

Results from the 6BU8 as a product detector are truly amazing. Because the full *if* signal is fed to the product detector, and because of the increase due to the step-up transformer, it is possible to feed a 6AQ5 audio output tube directly from a volume control connected across the secondary of the transformer. Signal leak-through is non-existent from the circuit in fig. 1, even when the *rf* gain control is right up. It is very low from fig. 2, although the tube is not balanced. By-

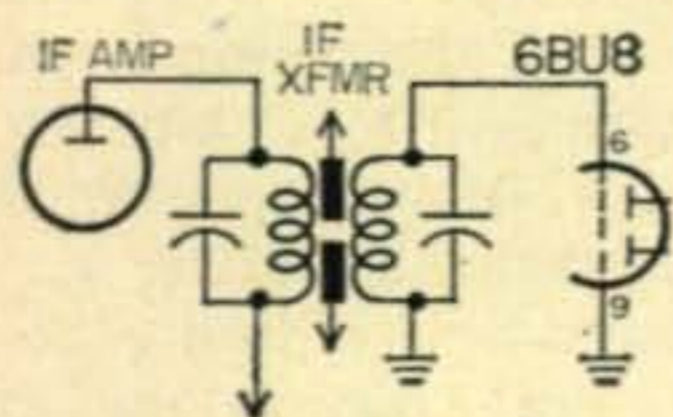
Fig. 2—A circuit without the balancing potentiometer of fig. 1, but giving almost identical performance. See text for explanation of the differences. Component values not shown are the same as in fig. 1.



passing the cathode resistor with a .01 mf capacitor will increase the audio output, but in my case this was undesirable.

Figure 3 shows another variation of the basic circuit. This detector does not require the balanced signal input, nor does it require the balancing potentiometer. The recovered audio is lower than the other circuits, however, but is still very adequate.

Fig. 3—Although the output is lower than fig. 1, it is still satisfactory, and does not require a balanced input. It is a natural for fitting to existing receivers.



Other Applications

Elated with my success, and now feeling quite bold, I looked about for further uses for the 6BU8. Balanced modulator, product detector . . . why not a mixer? After all, there

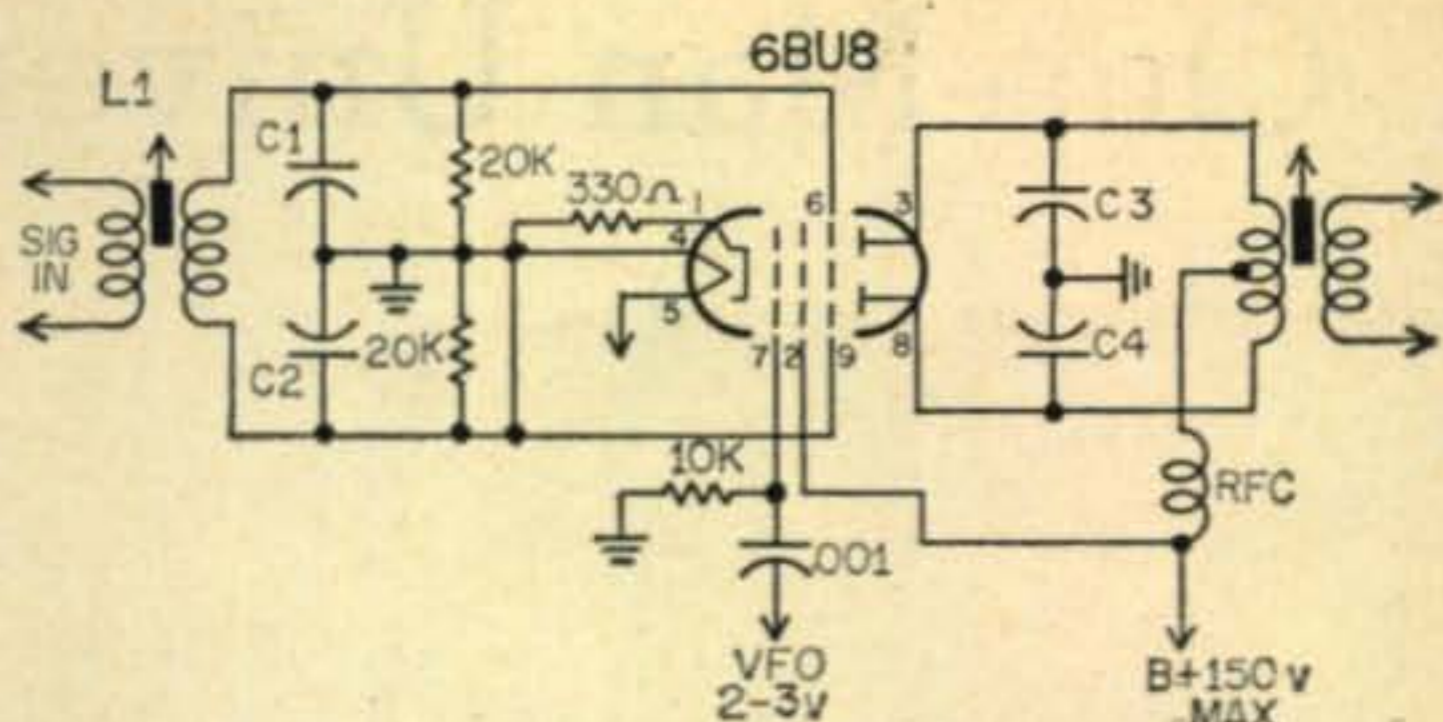
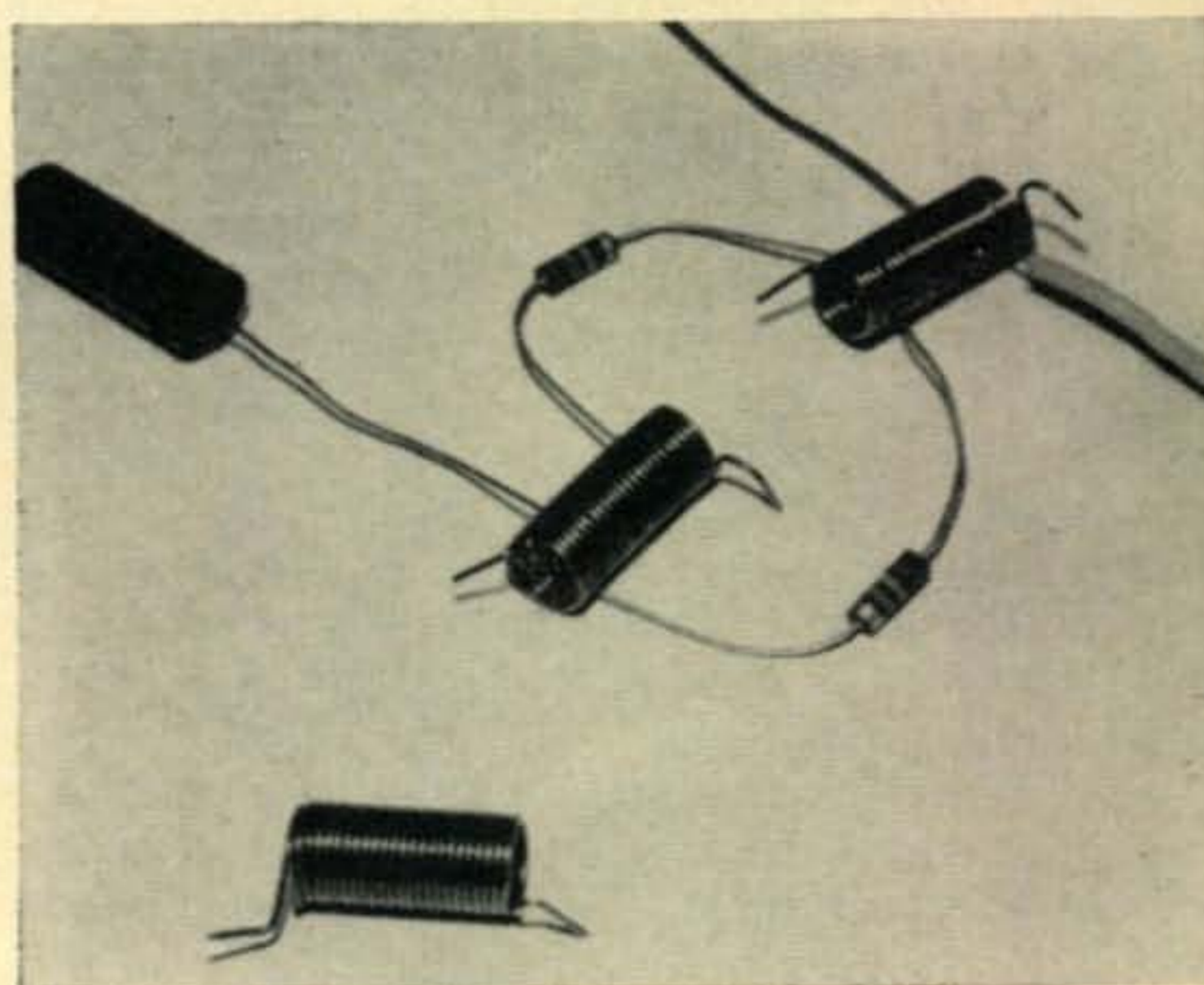


Fig. 4—The ultimate in SSB mixers. L1, C1, C2 tune to the input frequency, while L2, C3 and C4 are tuned to the output frequency. The capacitors can be the mica style.

is really no difference between a balanced modulator, a product detector, or a mixer. Almost every SSB exciter is troubled with *vfo* signal feeding through the amplifiers. This signal might not get through the output circuits (because of selectivity) but it can limit the amount of signal a tube can handle. This is because the grid is already glutted with strong signal from the *vfo*. A balanced mixer is usually used in these cases to cancel the *vfo* voltage. A look at the 6BU8 will show that it is a "natural" for this work. It was tested in place of a 12AT7 and worked "crack out of the box" without the need for "debugging" of any sort. Its output was similar to the 12AT7 but because it will handle considerably larger inputs it may work satisfactorily in higher level applications. VFO requirements are two to three volts, a very easily obtained figure. It is interesting to note that the price of the 6BU8 and 12AT7 are identical! ■

Shop Hints



Temporary Connectors

Small coil springs make handy temporary connectors for low-voltage breadboard circuits. Connect parts in series, parallel, and other combinations by wedging bare leads between spring turns.

One-Man Universal Joint Mount

Ken "Judge" Glanzer, K7GCO

202 S. 124th St.
Seattle 88, Wash.

If you have a new beam you have a problem—getting the monster up on the tower all in one piece. If you have burned out a trap, you have to replace it somehow. Well, fellows, at long last this problem has been solved. No more rounding up half the town, gin poles, bent elements or improperly tuned beams. With this "Universal Joint Mount," one man can now erect the largest 20 or 40-meter beam in 20 minutes time without any outside help. After a little practice you can do it in 15 minutes, or in 10 minutes with one helper. You can change all the element lengths in 5 minutes; with help, 3 minutes. How about that? This is very desirable, of course, if you have a new beam and want to compensate for surrounding objects. Many a beam has gone untouched because it was just too much trouble to change it.

The mount permits the boom to tip down to the tower on both sides and also to twist. The twisting is desirable if you have guy wires or trees that would prevent the beam from being tipped all the way to the tower. To slip the elements in under a guy wire you simply twist the boom about 80° , then tip the boom down to the tower. First, an element end or a coil will be accessible from the tower or roof; then as you tip the boom further the center point of the director or reflector can be reached from the tower for change of spacing, removal or attachment.

The procedure for the erection of the beam by one man is shown as follows in the pictures. The mount can be made for 2, 3 or 4 inch booms with the special type clamp shown. Any size mast can be fitted by using different size muffler clamps available from auto supply houses. Water pipe (1¼ ID) is recommended for a mast supporting light 20 meter beams. It has the advantage of not denting or giving under the pressure of a U-bolt. To prepare the muffler clamps, take a hack saw and cut little grooves in the circular part that goes against the mast pipe. Do the same to the U-bolt. This produces teeth that will bite into the mast and prevent any twisting between the mount and mast. The clamp and U bolt will have to be cadmium plated or galvanized or they will rust. It will cost about \$5.00 for either 2 or 20 clamps as \$5.00 will be about the minimum charge. A 1½ inch clamp will fit perfectly around a 1¼ inch ID water pipe and a 2¼ inch clamp will fit a 2 inch ID water pipe.

The mount can be made for other size booms from 1 to 5 inch at ½ inch steps. A hose type clamp is used and is available from most heating or irrigation supply houses. This clamp is constructed differently but will work very well. They are a cast type clamp and seem to vary in size so pick them out carefully. Take a sample boom size with you and a pair of pliers and try a couple for size. Remember you want the two lips to be parallel or close to it when it is tightened around the boom.

General Construction

An aluminum plate 12 x 9¼ x ¼ inches is the back bone of the mount. The angle aluminum is 1½ x 2 x 9½ inches (two of them) and ⅛ inch thick. A 3/16 inch thickness plate can be used for small 20 meter beams. The pivot bolt hole is the most important to position. It must be so positioned so that when the boom is tipped either way the angle aluminum will not hit either of the muffler clamp bolts. It is drilled with a 17/64 inch drill and tapped with a 5/16-18 tap. A 5/16-18 1 inch bolt is screwed in from the back side or the side the mast will be on. Holes 1, 2, 3 and 4 are drilled with the angle aluminum mounted on the pivot bolt, the clamp tightened around the 3 inch irrigation pipe and held in place with a couple vise grip pliers. This assures that the holes will all line up. Even though the holes will all line up it's a good idea to use a 17/64 inch bit for ¼ inch bolts. Holes 5 and 6 are 3/16. A 10/32 inch bolt holds the muffler clamps in place here.

There are two 10/32-9/16 inch (of thread) bolts per clamp that are very important. One is used as a spacer to prevent the clamp lips from bowing in when the large bolt is tightened. A 5/32 inch hole is drilled at the end of the clamp lip in the center and threaded with a 10/32 tap. It is screwed in the thickness of the clamp lip and a 10/32 nut is used to lock the screw in place. When the large bolt is tightened the clamp is compressed against the boom and the lips against the spacer. It can get only so tight and results in an absolutely rock solid mount. The second 10/32 bolt and nut bolts the top angle aluminum to the clamp. This holds the clamp lips horizontal when you loosen the large bolts to twist the boom. Without these bolts the weight of the beam tends to cant the lips and



Fig. 1—Clamp assembly for 4 inch boom.

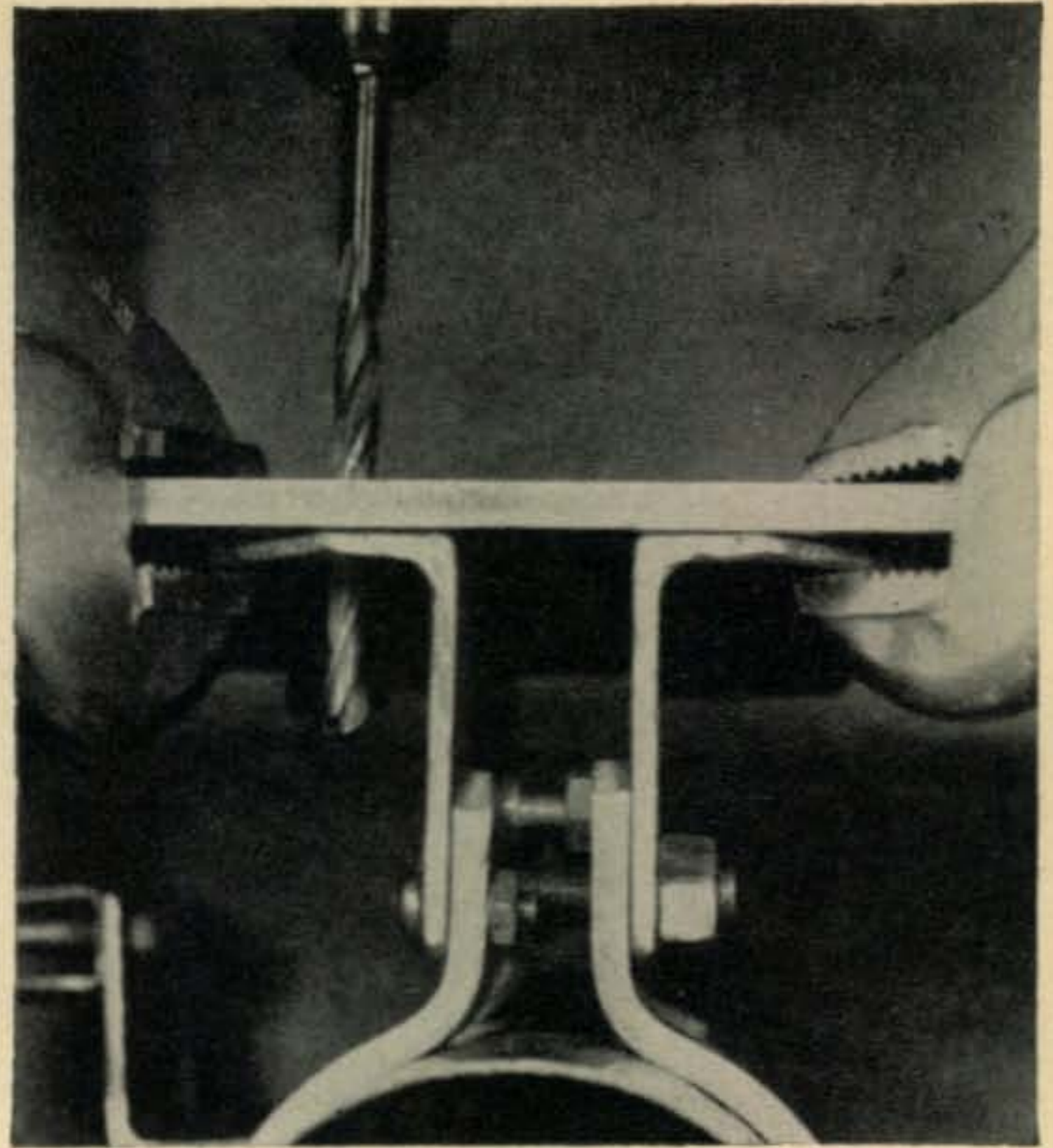


Fig. 3—Proper method of drilling holes.

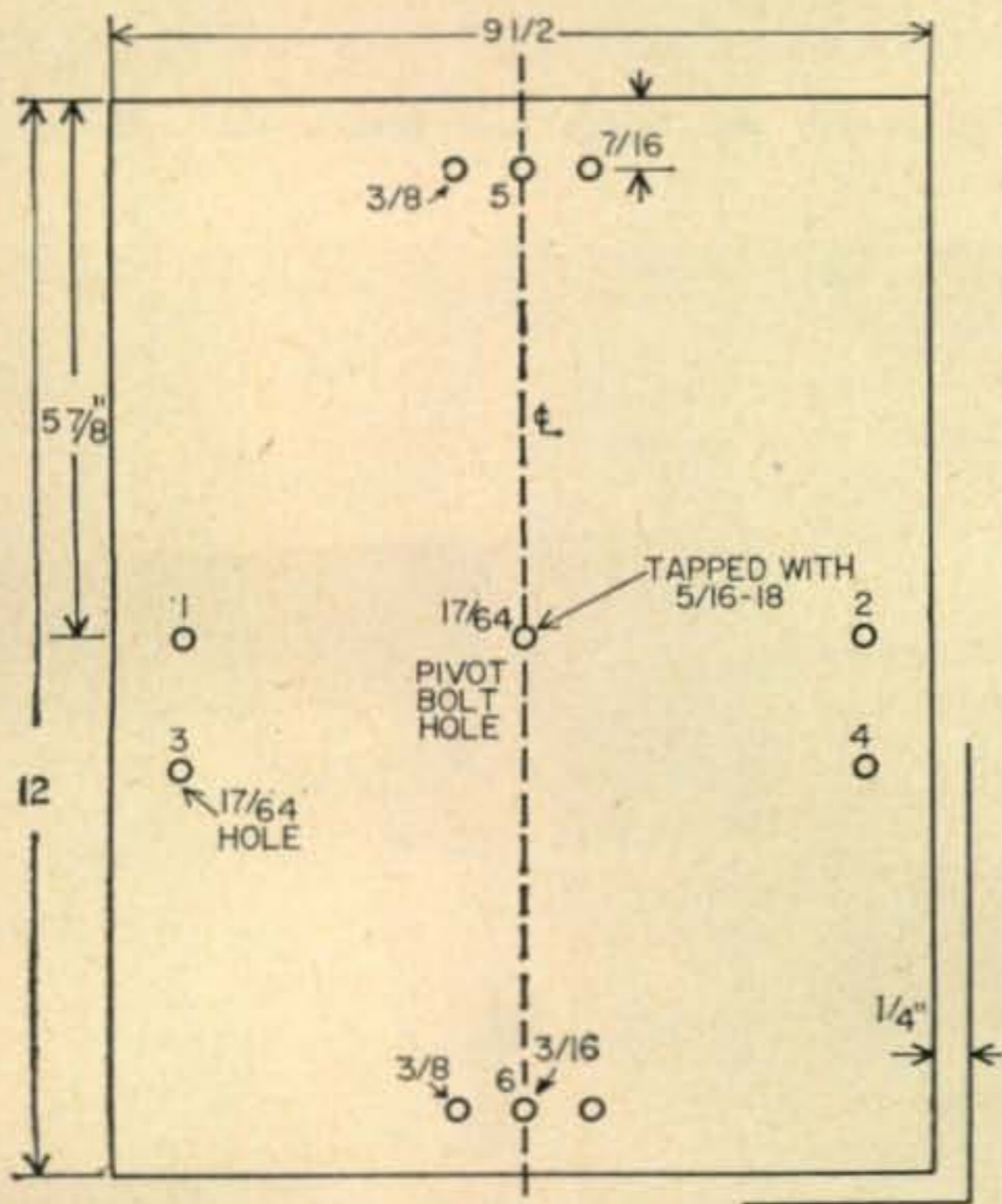


Fig. 2—Plate for full size 20 meter beam. Holes 1, 2, 3 and 4 (for $\frac{1}{4} \times 1$ inch bolts) are drilled with the clamp angle aluminum and boom assembly all tightened and mounted on the pivot bolt and clamped to the aluminum plate with a pair of vise grip pliers as shown in fig. 3. This assures that all four holes will always line up.

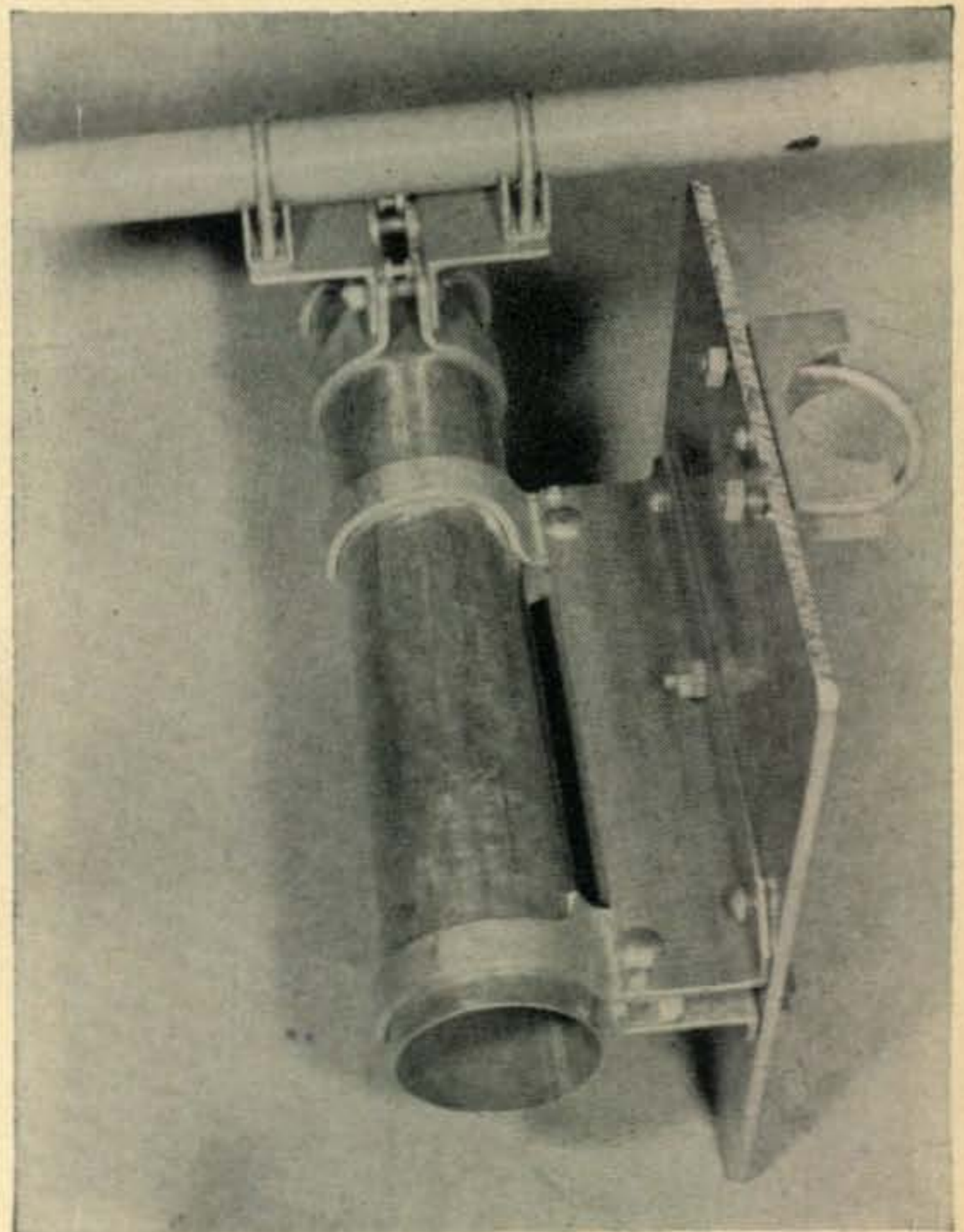


Fig. 4—The finished "Universal Mount."

as a result keeps tension on the clamp. With these two bolts (one in each clamp) it is only necessary to loosen the 2 large nuts a couple of turns. See photo for close up view.

If you use lock washers under the heads of the $4\frac{1}{4}$ inch bolts that are used in holes 1, 2, 3 and 4 it is not necessary to use two hands (one holding a screw driver in the

head and a wrench on the nuts) to tighten or loosen the nuts. You use one hand to hold on to the tower and one holding the wrench this way. The large bolts that secure the clamps are a carriage type, that is they require a square mounting hole for the head. This prevents the bolt from turning when tightening or loosening the nut and is again

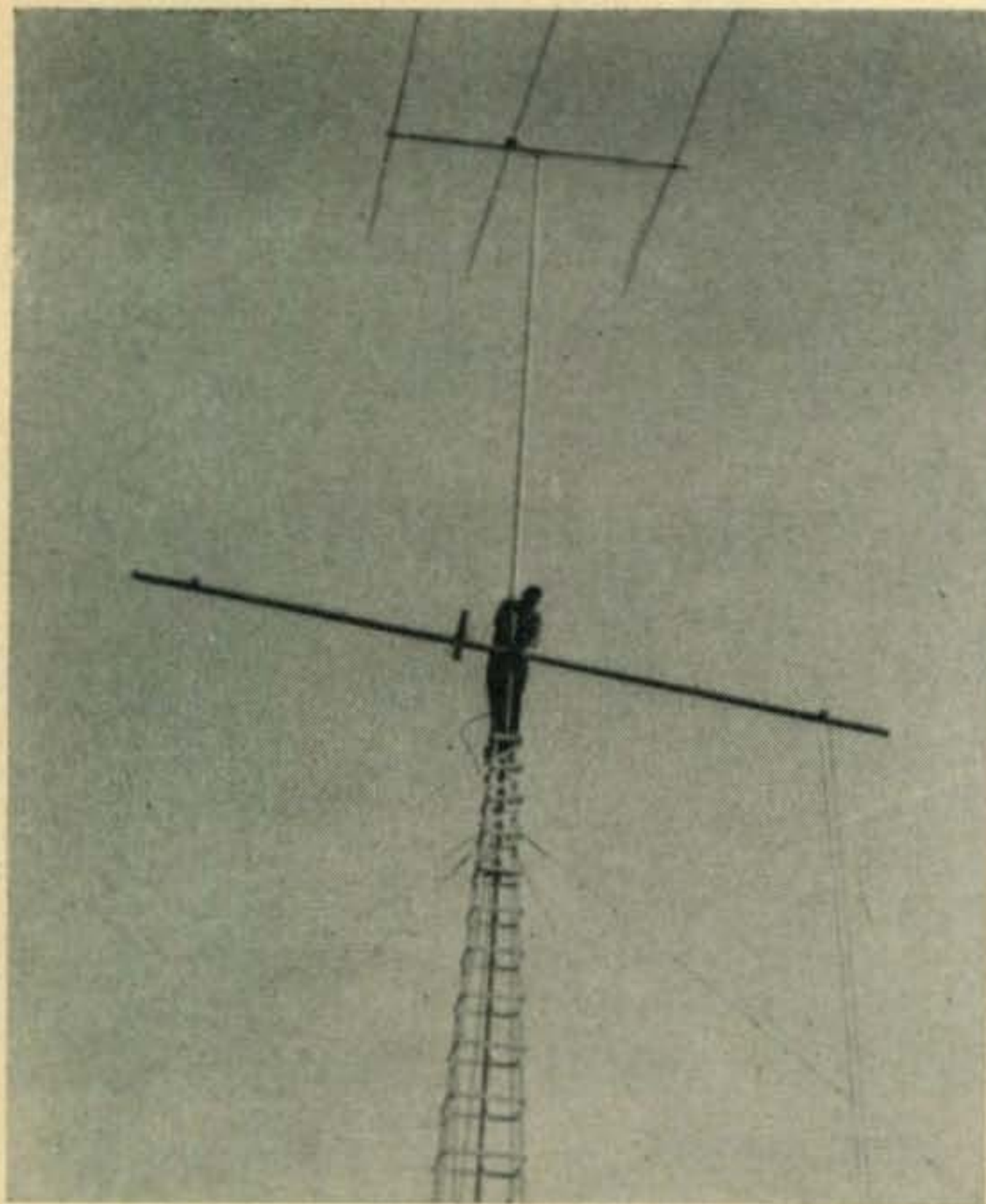


Fig. 5—The boom is first mounted to the mast.

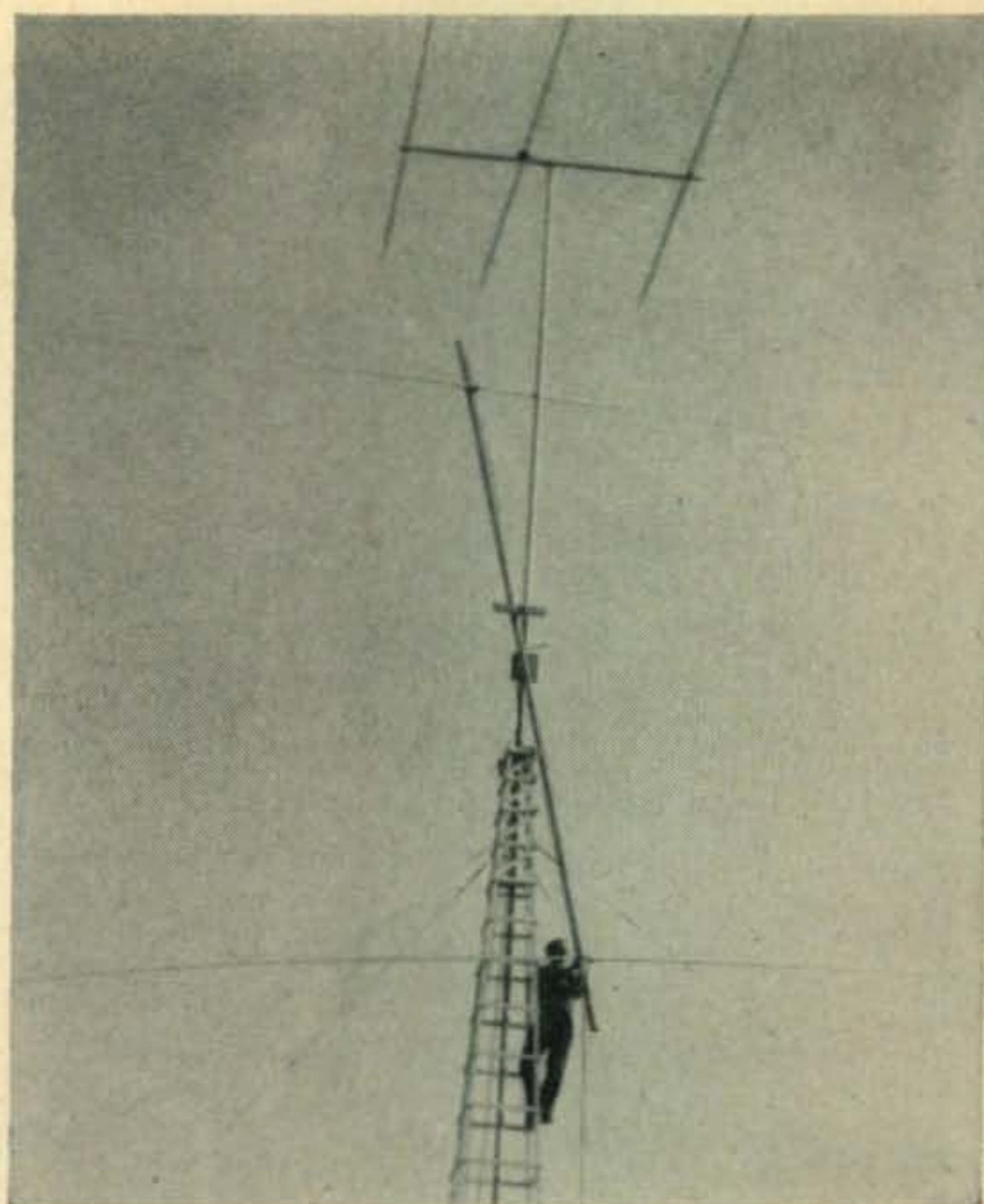


Fig. 7—Tilt the boom and attach the reflector.

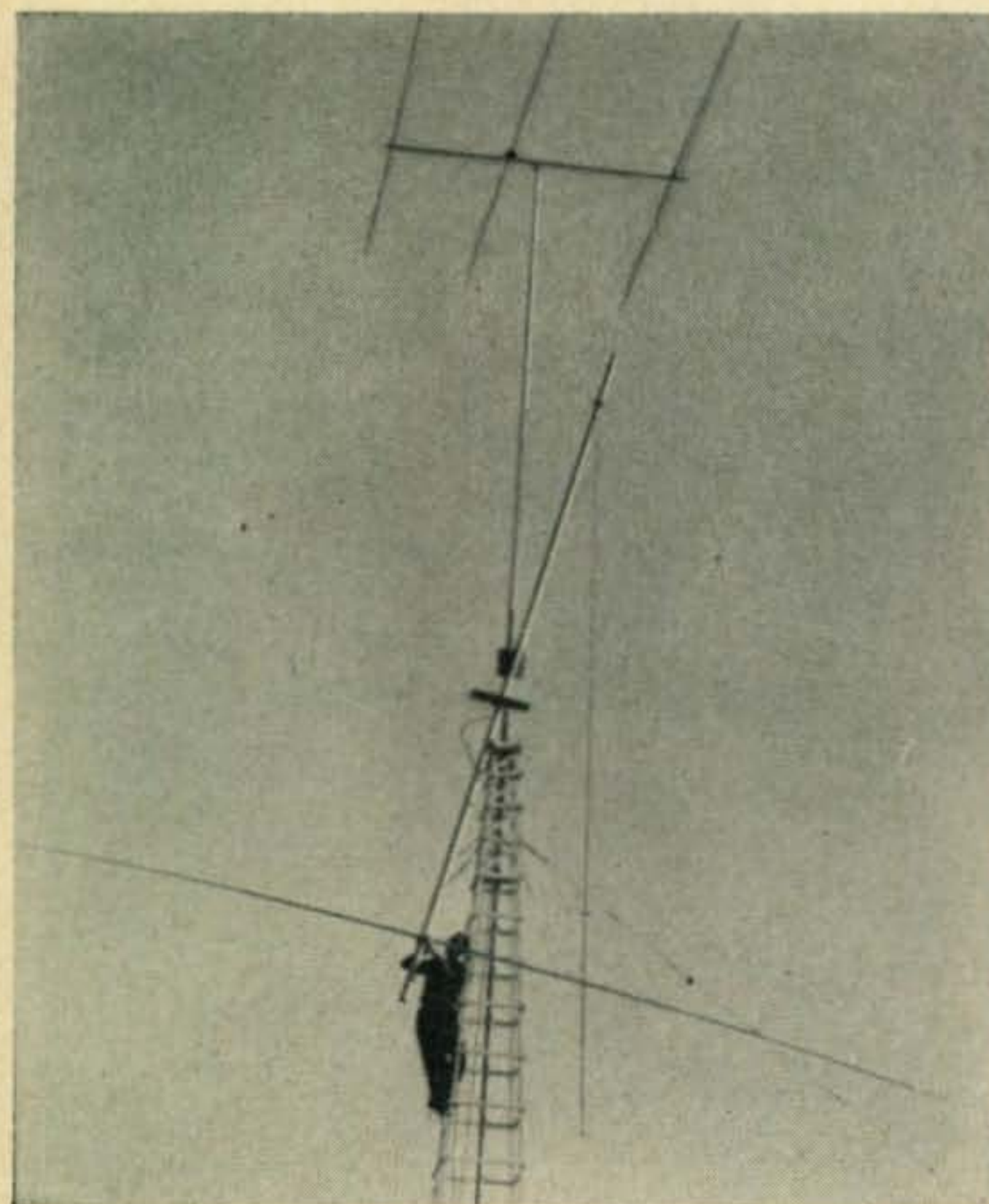


Fig. 6—The boom is then tilted and the director is attached to the end.

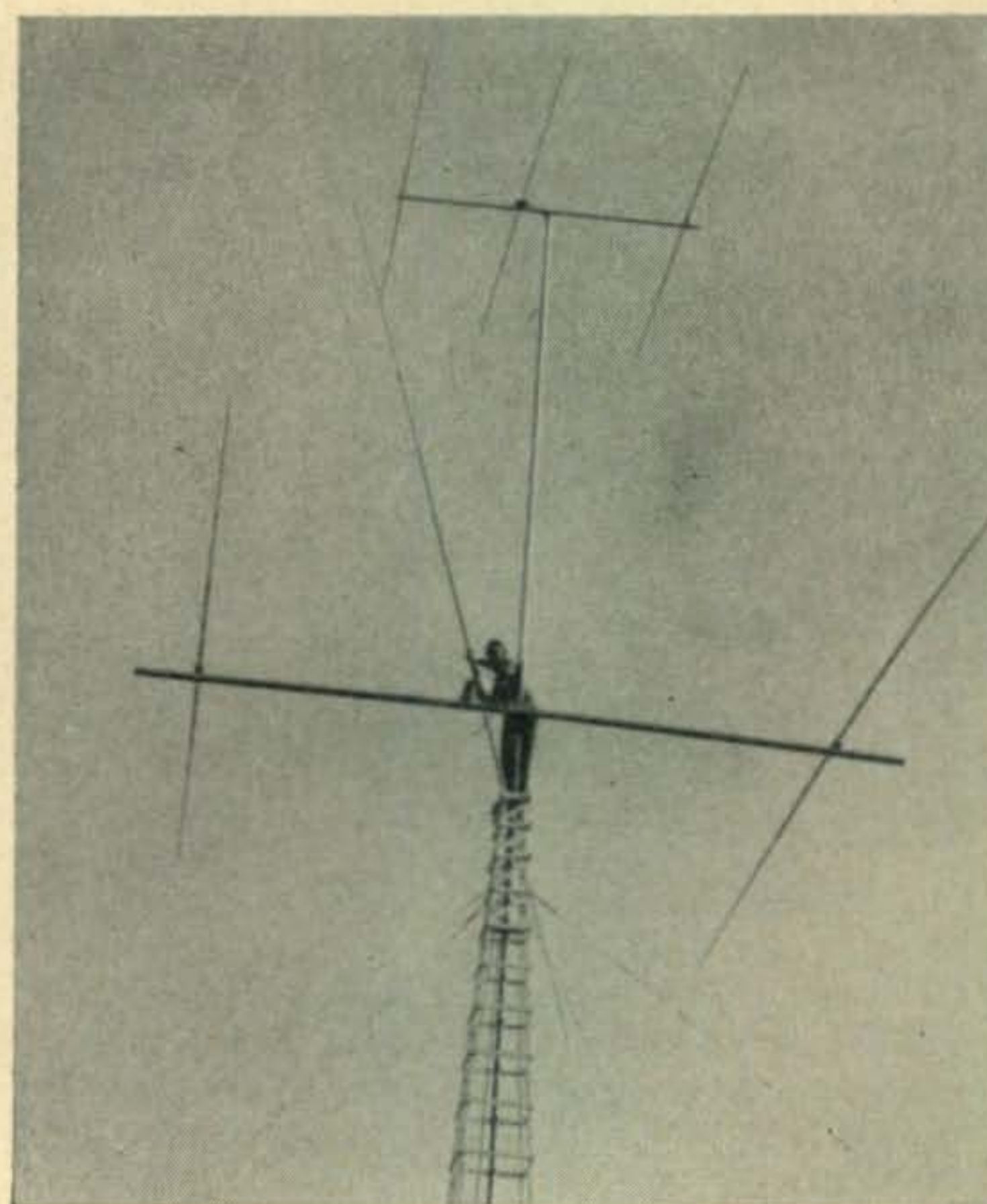


Fig. 8—Return the boom to a horizontal position and attach the driven element.

a one hand operation. Safety first you know. The holes for the carriage bolts are $\frac{3}{4}$ inch from the end of the angle aluminum and $\frac{9}{32}$ inch from the long edge. Use a file to square the top holes. The bottom one remains round. Drill the two angle aluminum clamped back to back with a couple of vise grip pliers

using a $\frac{5}{16}$ inch bit.

Here's a tip I thought of after the pictures were taken. The $\frac{1}{4}$ inch bolts in holes 1, 2, 3 and 4 could be a $\frac{5}{16}$ inch bolts also. This way only one size wrench is needed for the whole operation. The $\frac{1}{4}$ inch bolts are strong

[Continued on page 122]

Stabilizing The 9 Mc Oscillator

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The original 12AU7 9 mc oscillator used in the 10A, 10B and 20A exciters are anything but stable. They not only have excessive warm up drift but they are also extremely sensitive to variations in line and B plus voltages. This sensitivity is what makes it impossible to zero beat (talk yourself on) frequency when using the calibrate level control. Central Electronics changed this original 12AU7 oscillator to their 6U8 oscillator now in use for this reason.

The 6U8 change requires considerable re-wiring both in the 9 mc oscillator and the audio driver section. The stabilized 12AU7 oscillator, (shown in fig. 1) in comparison to the 6U8 oscillator, is as stable in frequency with far fewer changes required in the 9 mc oscillator and

no changes in the audio driver.

A graph of the frequency stability of the original 12AU7, the stabilized 12AU7 and the 6U8 9 mc oscillators is shown in fig. 2. This graph shows the warm up drift over a period of one hour and also the frequency change due to the position of the calibrate level control. The frequency measuring device used to record the frequency changes was a Hewlett Packard Model 524B Electronic Counter.

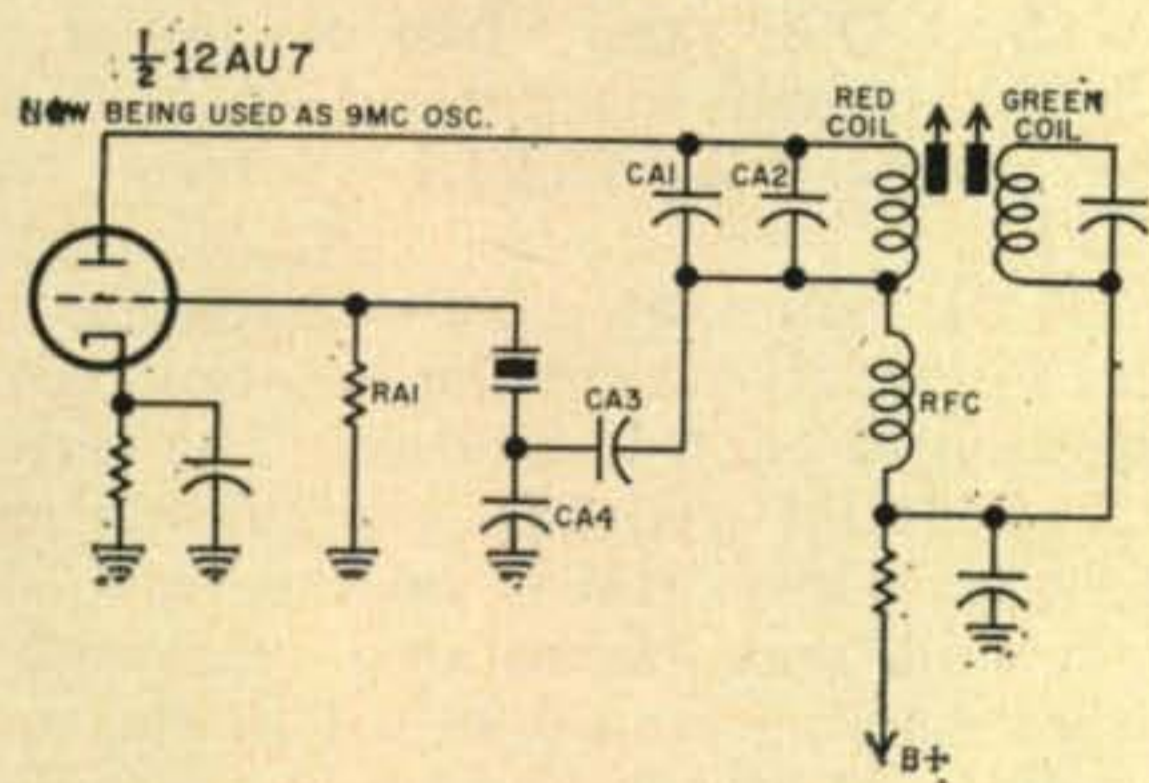


Fig. 1—Circuit of the 9 mc oscillator after modifications designed to reduce drift.

ORIGINAL PARTS ARE NOT LABELED OR LISTED
PARTS LIST

Ca1	50 mmf N750 ceramic temp. compensating capacitor	Centralab TCN 50
Ca2	100 mmf silver mica CM15 type capacitor	Elmenco E101J
Ca3	1000 mmf silver mica CM30 type capacitor	Elmenco 102
Ca4	510 mmf silver mica CM15 type capacitor	Elmenco E511J
Ra1	4700 ohm 1 watt 10% resistor	AB
RFC	25 uh rf choke	Millen 35300-25

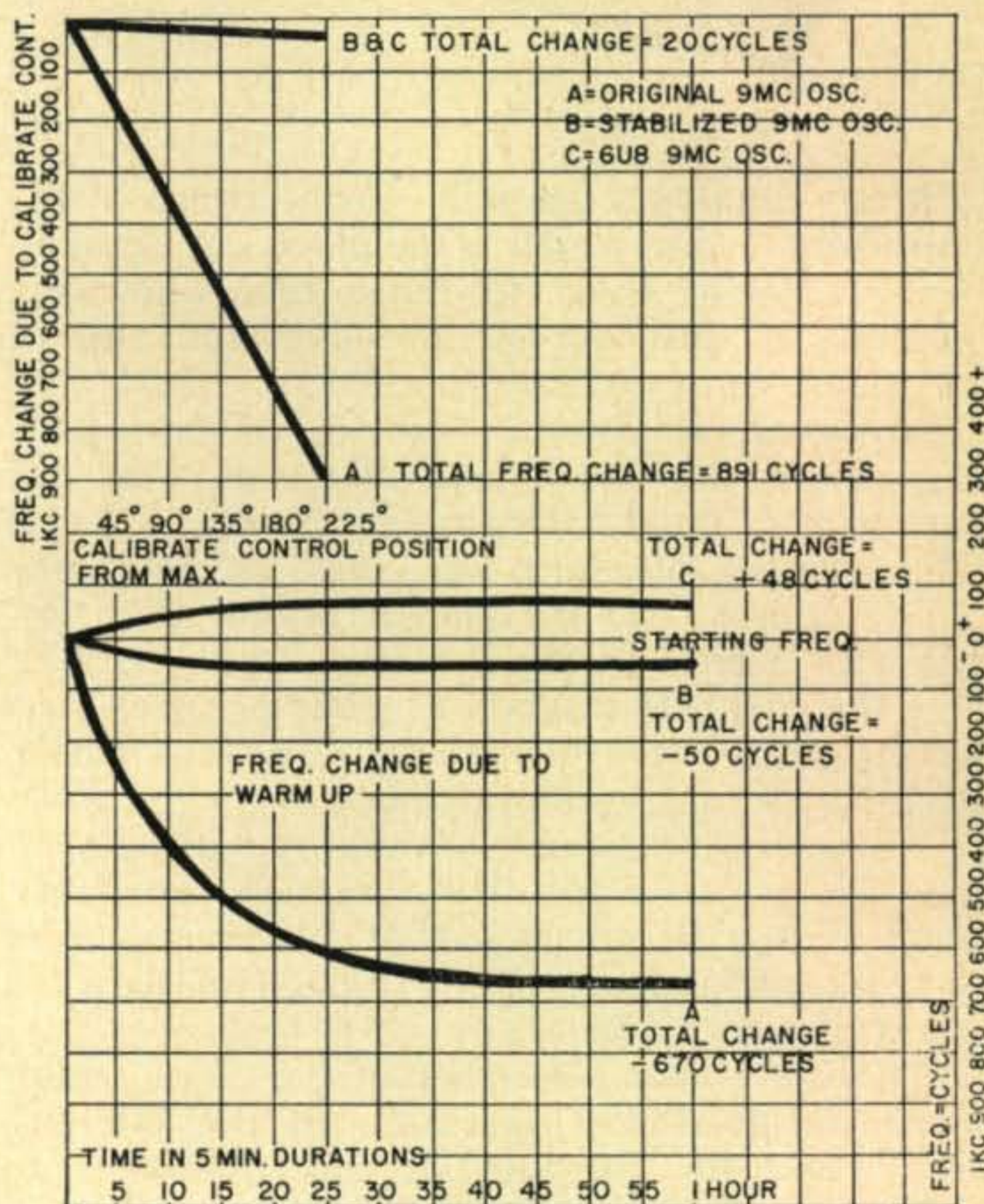


Fig. 2—Comparison of the frequency stability of the three types of 9 mc oscillators, and the effectiveness of the calibrate level control.

The "Citizen Bander" Model CTZ-5

L. W. Aurick, W2QEX



Many amateurs are still hardly aware of the important event which took place on September 11, 1958. Even to those few who were affected, it only served to signal the end of 11 meter ham operation.

However, as communicators, the new FCC regulations that went into effect on that day can bring a great extension to the many facets of operating pleasure we know as amateurs.

Of course, we're talking about the new Class D license in the Citizens Radio Service, and the many thousands of new devotees who have already been attracted by the fascination of 2-way radio communication.

No operators license is required on any of the 22 crystal-controlled channels available, but a station permit is a must. No examination is required, and any U. S. citizen at least 18 years of age is eligible.

There are now a number of pieces of equipment designed for operation in the citizen's band, and the purpose of this review is to examine one of the most recent additions. Many non-technical people will be interested in the features and operation of this gear and every attempt will be made to evaluate operat-

ing convenience and performance in functional terms.

The "Citizen Bander," manufactured by the International Crystal Manufacturing Company, Oklahoma City, Oklahoma is offered in three models. The Custom operates from 115 v ac only while the Deluxe may be operated from 6 or 12 v dc, as well as 115 v ac. The Command has the same 3 way power supply feature, but this unit differs from the other models in that the receiver is fixed crystal tuned to one channel only. The receivers in both Custom and Deluxe units may be manually tuned to any of the 22 citizen frequencies. In all models, the transmitters are crystal controlled and operate at 5 watts input to the final amplifier in accordance with FCC regulations. All receivers are double-conversion super-hetrodynes.

The manufacturer thoughtfully provided two Deluxe models for examination. This proved very helpful in the tests which were conducted.

The "Citizen Bander" is a transceiver in that the power supply and other components are shared when used respectively by the transmitter and receiver. This permits more compact design as well as reduced cost through the elimination of duplicate circuitry.

It was with not a little interest that the transceivers were unpacked and quickly transported to opposite ends of the house and placed in operation. Both units worked immediately, and after a short QSO, and when the initial excitement had subsided, the instruction manual was located amidst the packing material. Sound familiar?

While the uninitiated would require a few minutes longer to master the 4 simple controls, the function of each is obvious. The only control that could require explanation is the SQUELCH. This knob is on the right side of the unit and may be rotated clockwise until the slight rushing sound heard in the speaker is inaudible. This should only be adjusted, however, during actual communication as it is possible to prevent the reception of weak signals that you may wish to hear.

The ON-OFF switch is incorporated with the volume control and operates in the accepted customary fashion.

The TUNE control on the Custom and Deluxe models covers the frequency range from 26.9 mc to 27.3 mc and will receive all the 22 citizen channels between these points.

To transmit, it is only necessary to move
[Continued on page 121]

The Citizens Radio Service

Barry A. Briskman, K2IEG

On September 11th, 1958, the new part 19, Citizens Radio Service Rules went into effect. To follow is a synopsis of the FCC rules and regulations regarding this new service.

General

The Citizens Radio Service is intended for personal or business short distance radio communication and signalling, as well as radio control of devices such as model airplanes. Any citizen of the United States who is 18 or more years of age (or 12 years for a class C station) may obtain a station license in this service if his application meets the requirements of the commission's rules (part 19) . . . Partnerships, associations, trusts or corporations meeting the citizenship requirements of the Communications Act of 1934, including any state, territorial or local governmental entity, or any organization or association, including civil defense organizations, operating by the authority of such governmental entities may also be licensed in this service. Part 19 (be sure to specify the edition effective September 11th, 1958 when ordering), may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. for 10 cents in coin. It is wise to obtain a copy of these rules and read them thoroughly, prior to making application for a license in this service.

Frequencies available to stations in this service are shared among licensees. During periods of normal operation, no protection can be afforded to the communications of any station in this service (even when involv-

ing the safety of life or property) from interference which may be caused by the proper operation of other authorized Citizens Radio Stations or from stations in other services properly operating on frequencies shared with the Citizens Radio Service.

General Restrictions On Use

Citizens Radio Stations may not be used for any purpose contrary to any law or for broadcasting to the public in any way. They likewise may not be used as links in the physical circuits of other radio services although they may be used for the mechanical control of stations in other services. No charge may be made for messages carried over Citizens Radio stations or for any other types of communications transmitted by such stations, or for the use of licensed equipment by persons other than the licensee. The licensee is responsible at all times for the operation of stations licensed to him.

Interference

Citizens Radio station users must expect and tolerate interference not only from other legally operating Citizens Radio stations, but sometimes from stations legally operating in other radio services. Licensees of Class A Stations must apply for a new authorization before shifting frequencies to avoid interference; licensees of Class B, C, or D stations may shift to any frequency available to stations in their respective classes without further authorization.

[Continued on page 115]

Classes Of Stations, Frequencies And Emissions

Class	Use	Frequency Range	Max. Power	Emissions
A	Voice*	460.05-460.95 mcs 462.55-463.20 mcs 464.75-466.45 mcs	60 Watts Input	8A2, 8A3, 40F2, 40F3
B	Voice and Control	465 mc**	5 Watts Input	See Rules
C	Control	26.995-27.255 mcs	5 Watts Input***	8A2 Only
D	Voice	26.965-27.255 mcs	5 Watts Input	8A3 Only

*Other emissions may be authorized upon a showing of need.

**Any Class A frequency in the range 462.55 to 463.20 mc or 464.75 to 466.45 may be used if equipment meets Class A standards. Power is still limited to 5 Watts, however.

***A power of 30 watts may be used on 27.255 mc only.

In The Beginning

F. D. Whitmore, W2AAA

223 W. Holly Ave.
Pitman, N. J.

Part V

Walt Quits the Sea

Walt returned from his first sea voyage overflowing with enthusiasm. At the home-coming celebration that night, he related his wireless exploits so many times that the ten inch spark of the ship's rig became as long as the fisherman's catch that got away.

After this relief trip, Walt sailed as sole operator aboard the *Quantico*. This Merchant and Miners ship plied between Philadelphia and Boston. He stayed with her open spark for many runs before getting assigned to the *John S. Hooper* for the maiden voyage.

This assignment came as a welcome relief. He was tired of the short, monotonous coast-wise run and eager to visit new lands and seas. The *John S. Hooper* came off the ways at Wilmington, Delaware. The schedule for her maiden trip called for a voyage around Cape Horn, South America and up to San Diego, California with a stop at Taltal, Chile. After that they might extend her trip to the state of Washington. She would sail in ballast and return with a cargo of lumber.

The sailing day arrived and Walt clambered over the side. He found the two kilowatt non-synchronous spark in a separate room below the pop deck. His cabin adjoined it. Though probably better than an open spark, the non-synch job put out a rough spark. It merits probably lay in the cooler running electrodes and automatic quenching.

Two experiences befell Walt on this trip; one was *interesting*, the other unpleasant. The interesting one developed after about a week at sea when they crossed the equator. Upon arrival at this point, Walt discovered he no longer was the important "lightening shooter" to the crew; his status had sunk to the lowly level of a pollywog. And that crew sure knew how to handle pollywogs.

A pollywog is a person who has never sailed across the equator. Whenever this situation exists, the ritual of the sea is performed. From out of nowhere King Neptune and his entourage slip aboard—you never see them arrive

—and the solemnity of the occasion is soon felt.

According to Walt's tale, King Neptune, dressed in his kingly regalia of shorts, inside-out coat, and deck-mop wig; held a mop-handle staff. Beside him sat a sooge bucket of anointing lotion in anticipation of the pollywogs pending incorporation into their court (initiation). His assistants, dressed only in shorts to free their bulging muscles from any obstruction, gathered in strategic places about him to *encourage* all pollywogs to join in the fun.

This regal assemblage (trial court) intoned the things in which they found the pending membership lacking, and advised them of the measures for atonement. (You were always guilty; now you knew the punishment.)

Comparison of past pollywog's notes shows that the sea ritual conducted by King Neptune isn't the same aboard all ships. On passenger lines, the indignity of crawling through a gamut of paddlers and getting dunked in the ship's swimming pool may suffice. But it varied *considerably* on cargo vessels. It also varied with the decade in which you suffered this pleasantry. This account tells how it was done before hams were licensed.

Standing before King Neptune and his anointing bucket, Walt heard the charges against him and the punishment that would free him of his nautical sins. He was to be anointed with oil and his body cleansed in the greatest abundance of cleansing fluid in existence—sea water.

With great spirit some of Neptune's attendants *graciously* grabbed him by the back of the neck while others twisted his arms into the best position for the overall application of anointing oil. With slap happy dexterity they applied thick layers of this *soothing* compound of bilge water and grease to all parts of his body. Now he was ready for the cleansing department. This consisted of one's own ingenuity and ability to get the mess off. At this stage you were a shellback and strictly on your own.

During the entire ritual Walt's smiles were forced. When it was over, he would gladly

have forgotten it except that even kerosene wouldn't budge some of the tar specks. It was weeks before his appearance returned to normal. Even then some reddish areas prevailed where persistent rubbing had worn the outside layer of skin pretty thin.

When recounting this event to his family, Walt showed them the diploma he received. Scribbled on a flimsy square of paper from you know where, appeared those dynamic words, "Successfully passed ceremonious tests; is a full fledged Shellback of King Neptune's court." Below were the signatures of the Court and the date.

Walt's experience thrilled his father no end. But his poor mother—she nearly fainted twice.

From the equator to San Diego was a long way. Soon the days seemed endless. The next one was just like the one before. Walt lost his hero enthusiasm and began to long for home. By the time he reached San Diego, he knew he was through with the sea. Hardly had the ship touched dock when Walt was over the side and aboard a train coming home.

The Titanic's SOS

Each year wireless proved its value over and over again. Many stricken vessels reached help through their spark sets and saved thousands of passengers from watery graves. Reliable communication stretched more than a thousand miles.

All this reached the eyes of government controlling agencies. Soon laws appeared in various countries making it mandatory for ships under certain conditions to carry wireless and capable wireless operators. Eventually the United States reached the same decision. On June 24, 1910, Congress passed the Wireless Ship Act making the effective date July 1, 1911.

This Wireless Act forbade ships carrying more than fifty persons—including passengers and crew, and plying between ports over 200 miles apart—from leaving port unless equipped

with wireless and carrying a skilled operator.

American ships coming under this Act had to carry equipment capable of sending 100 miles day or night. A skilled operator meant a person who had passed the Government test and received a certificate of proficiency. One of the qualifying items required the operator to know both Morse and International Morse codes.

In 1912 a bill was before Congress seeking to license wireless operators and their stations and place all wireless transmission under Government regulation. Amateurs protested violently. Piles of conflicting evidence swamped the Congressional Committees. Such was the situation on April 15, 1912 when across the Atlantic waters from the British passenger liner, Titanic, flashed the spine-chilling news, "Ran into iceberg. Sinking fast."

Ships from far away changed course and increased boiler pressures. But they were too far off for a quick rescue. Nearby ships sailed silently past; their closed-down wireless rooms oblivious to the desperate calls for help. Instead of "passengers and crew safe . . . proceeding to port"; the mournful news read, "700 saved; 1500 lost."

Congress undoubtedly felt the aroused public's strong demand for regulation. On August 13, 1912 they passed the Licensing Act giving the Government control of all wireless transmission and licensing of operators and stations. Also, they amended the Wireless Ship Act to require passenger vessels to carry two wireless operators and keep a constant radio watch.

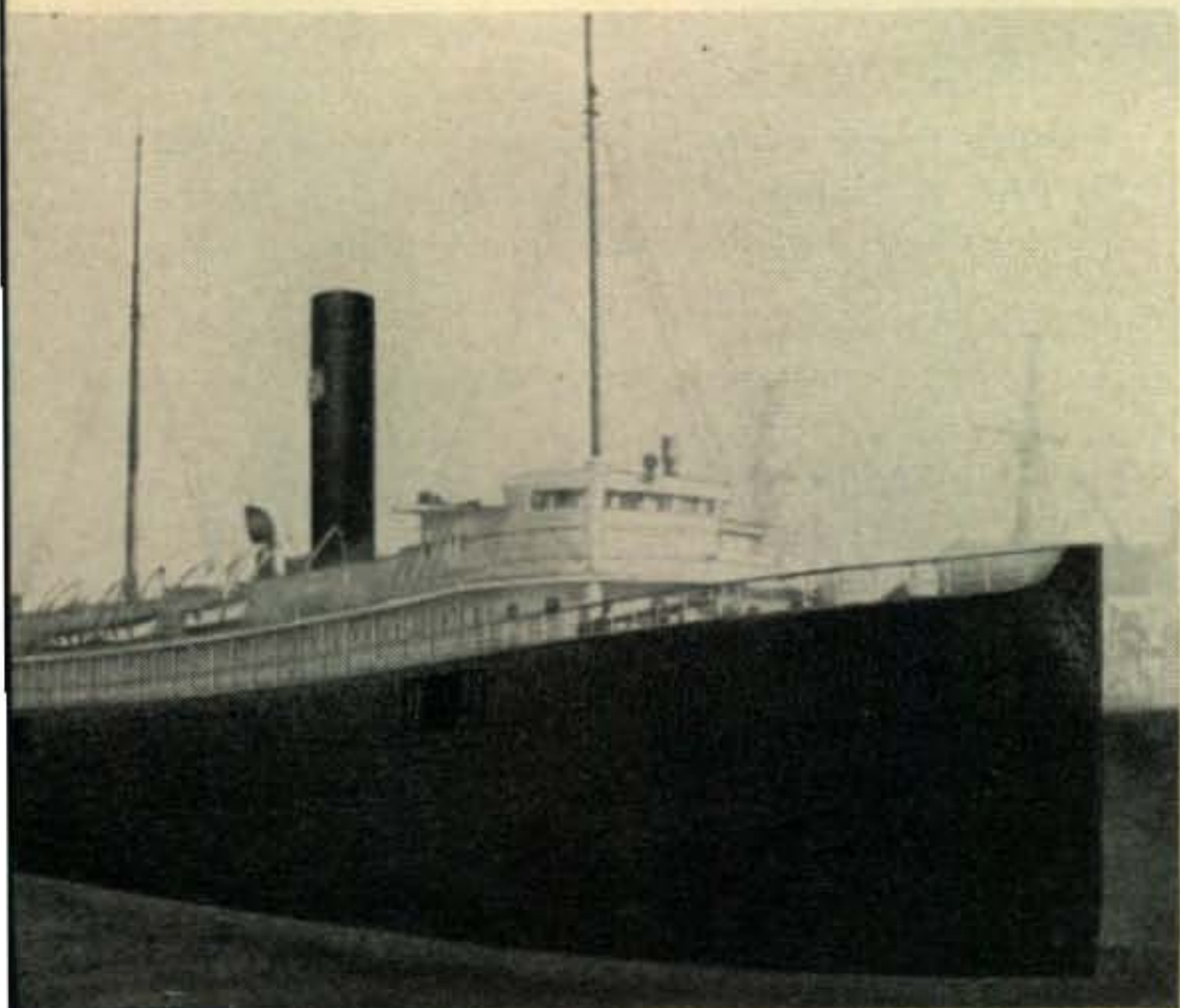
Out of every disaster emerges one or more heroes—sometimes alive; sometimes dead. The Titanic's tragedy saw both. David Sarnoff was one of those equal to his opportunity.

With an early eye on the advertising value of wireless telegraphy, the John Wanamaker stores in 1910 applied to the American Marconi Company for experimental point-to-point wireless stations at their New York and Philadelphia stores. Upon receiving approval they installed the latest and best equipment.

The Philadelphia station, WHE, had a 5KW rotary spark. The rotating disk turned 1800 revolutions a minute and had a diameter across revolving studs of eighteen inches. These studs travelled 9,483 feet a minute which amounted to 110 miles an hour.

A similar station at the New York store operated under the call WHI. Two steel and wooden masts supported the antenna 125 feet above the roof. Both Wanamaker stations accepted sea traffic for their respective ports besides handling their regular point-to-point messages.

Coastwise passenger ship required to carry two operators. These vessels ran between Philadelphia and Boston in the summer, and Philadelphia and Jacksonville, Florida in the winter.



Upon learning that these stations would be the "last word" in wireless, David Sarnoff requested and obtained from the American Marconi Company assignment to the New York store. There he fulfilled the average boy's dream—his keen ears caught the Titanic's desperate SOS.

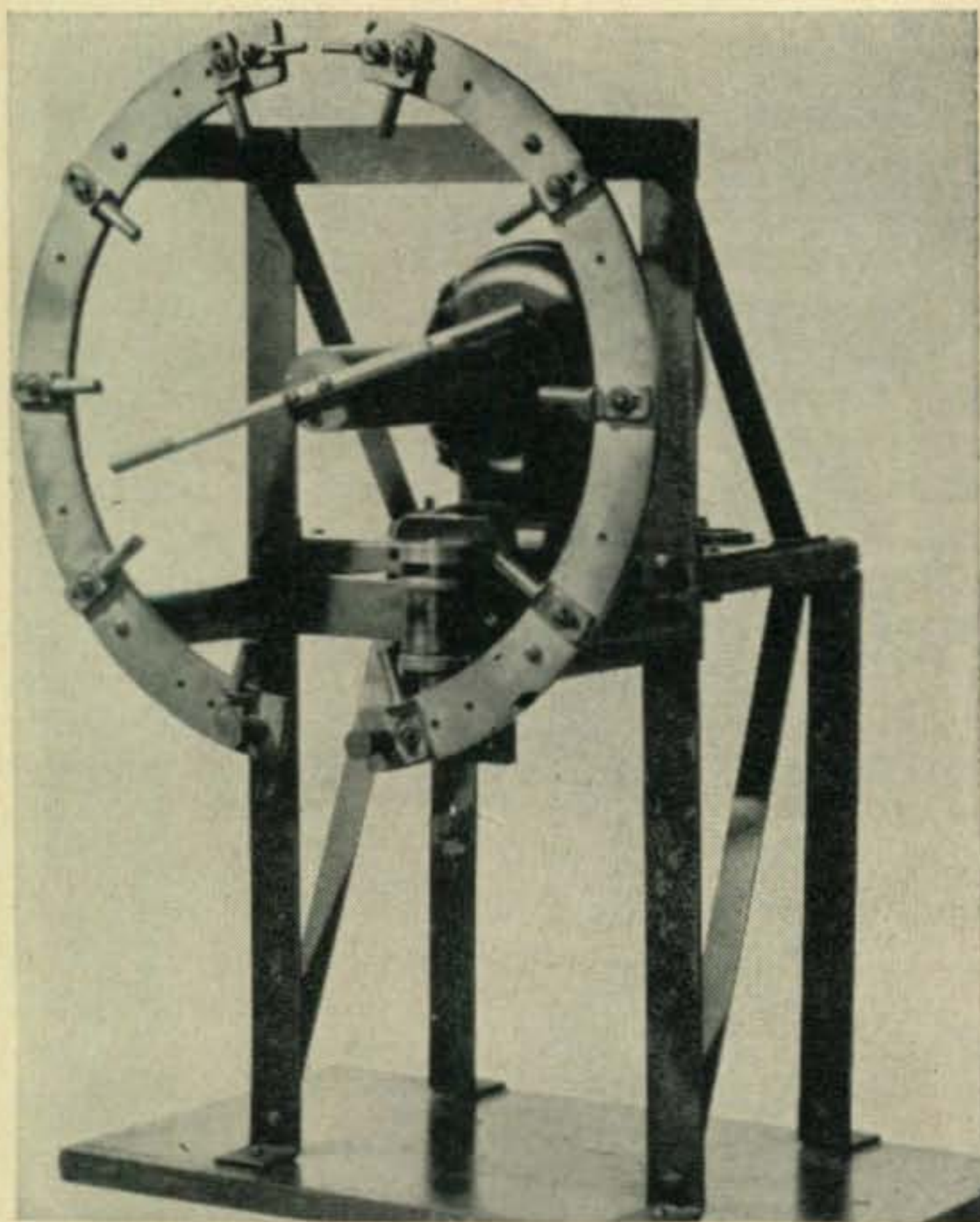
For three days and three nights he stuck to his post copying MGY's signals and those of the rescue ships. Only after the last survivor's name came through was the headset removed and WHI's "big switch" thrown.

One of the names that didn't come through was Jack Phillips, the Titanic's chief wireless operator. Frigid seas engulfed him along with hundreds of others when a final explosion sent the "unsinkable" Titanic beneath the waves. With the arrival of dawn, the Carpathia, on her mission of rescue, hovered into view. Gentle hands raised Phillips' lifeless body from one of the crowded rafts to her decks.

Jack Phillips' heroism didn't go unnoticed. Contributions from sea passengers and a donation from the American Marconi Company paid for erection of a memorial fountain on the tip end of Manhattan Island. This memorial commemorated all wireless operators who had lost their lives at sea. Its shaft contained nine names. Prominently among them appeared Jack Phillips.

Back To Sea

The sea attracted Hal with a Lorelei's strength for a Rhine sailor. Neither his mother's



Commercial rotary spark gap used by the Tidewater Wireless Telegraph Company's Philadelphia station WNW in 1930. Courtesy of The Henry Ford Museum, Dearborn, Michigan.

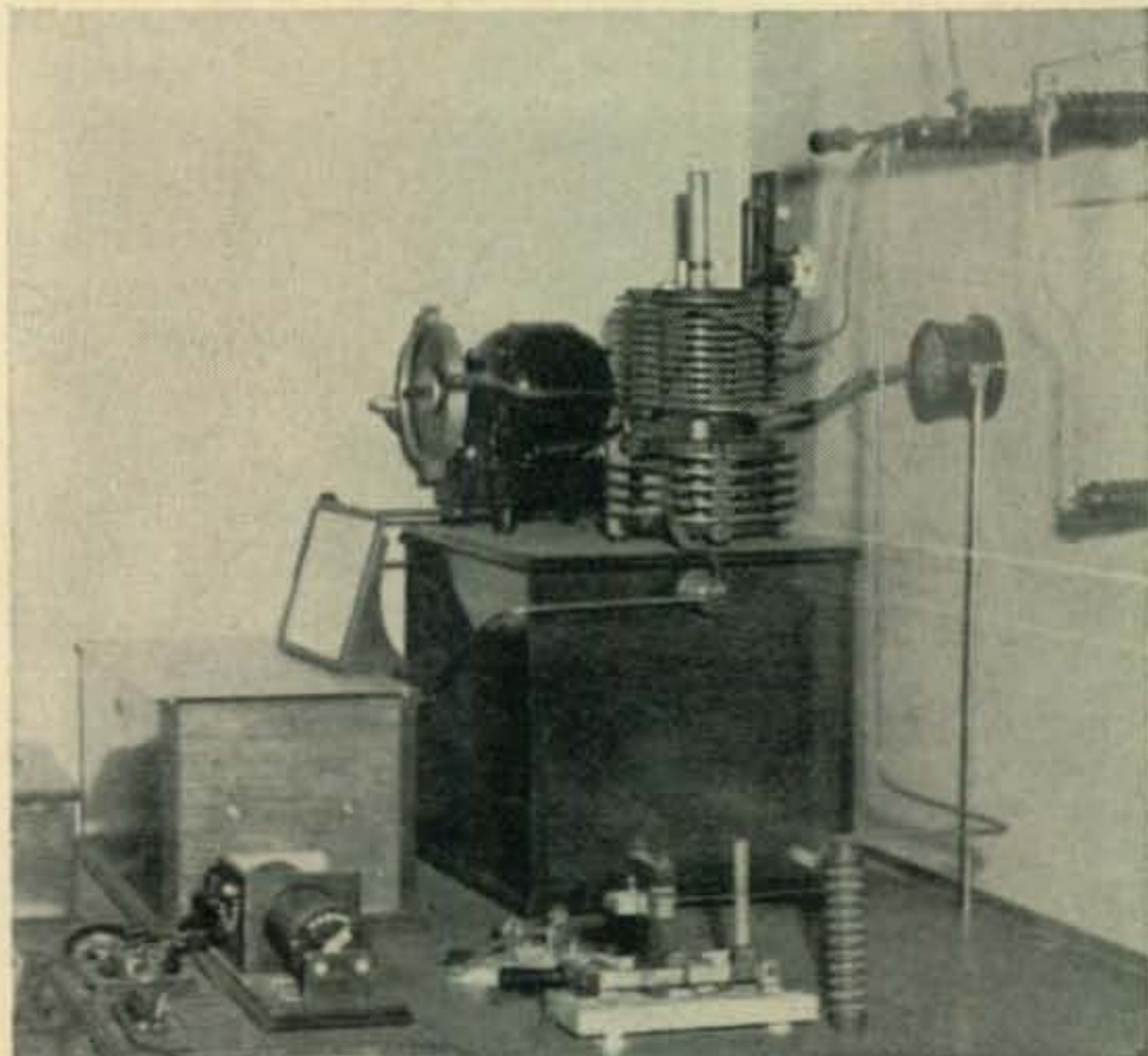
coaxing nor Walt's delusion affected his determination. But he didn't ship out as a wireless operator like his brother. Times had changed. Hal sailed as a radiotelegrapher.

Up to about 1912, wireless meant wireless telegraphy both in England and America. But by now the United States Navy felt the term inadequate because it meant not only telegraphy by Hertz waves, but included all other forms of communication without wires such as by induction and conduction. Therefore, orders went out to the Service stating that the term radiotelegraphy would supplant wireless telegraphy.

The British stuck to their earlier term for both code and sound. So, radiotelegraphy and radiotelephony became the American terms and are entirely synonymous with wireless.

Spread of wireless waves in all directions originated the reference "broadcasting." It didn't apply in point-to-point communications; but a message going to a number of vessels without calling them individually became known as "broadcasting."

Hal rode his first wave in 1913. Immediately after graduating from the Philadelphia Wireless School run by Helig and Appleby, he passed an examination at the Philadelphia Navy



Amateur synchronous rotary spark station used by 3AK of Philadelphia. Courtesy of The Franklin Institute, Philadelphia, Pennsylvania.

Yard and obtained a first class commercial license. Now he had two licenses—this one and an amateur license 3BEP issued in 1912.

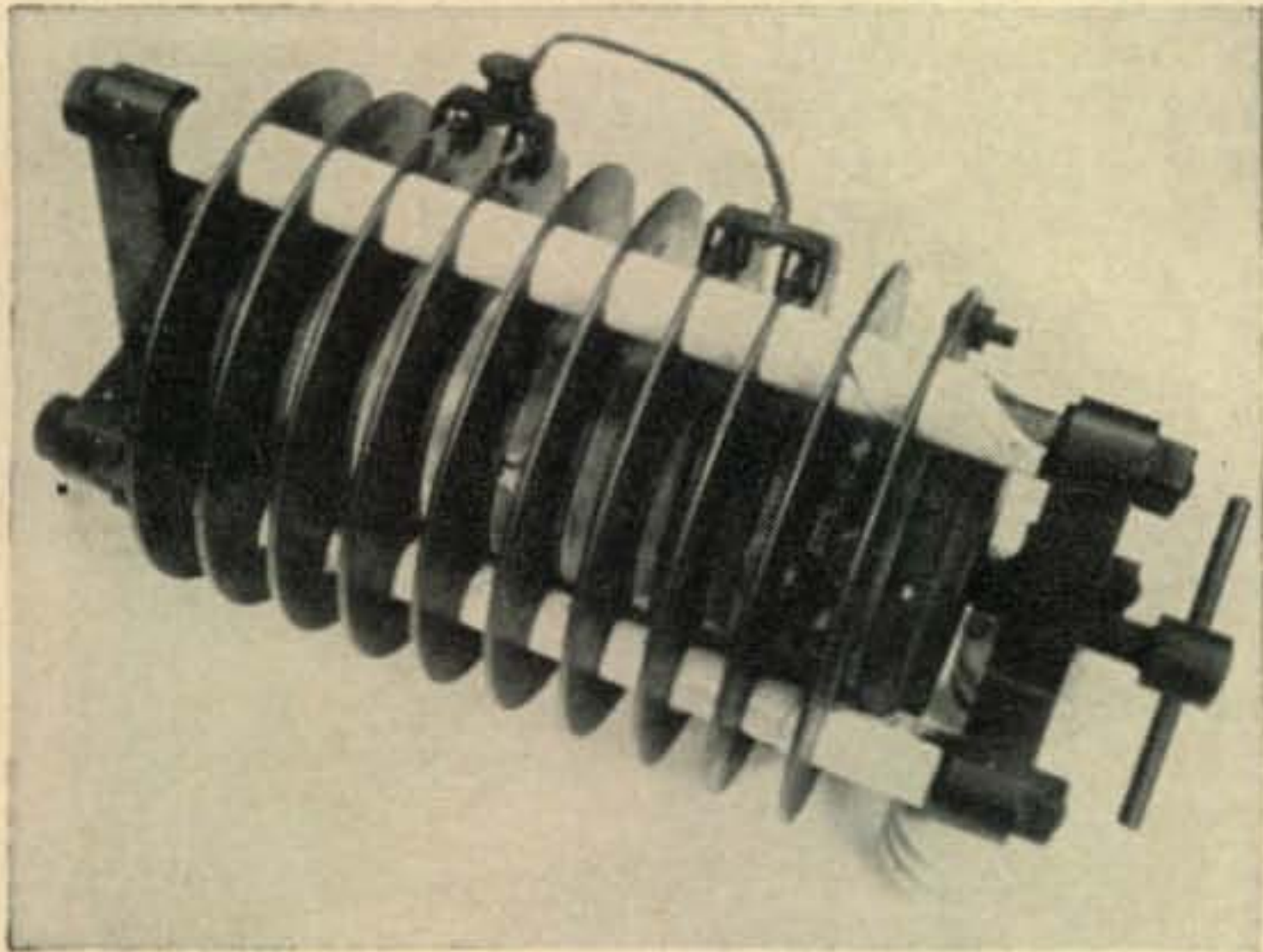
The Merchant and Miner vessel *Indian* carried Hal on his first sea voyage. Promptly he learned wireless operators had only one name when at sea—"sparks." This two-operator job churned the waters between Philadelphia and Boston carrying passengers in summer and freight in winter. She initiated Hal to rotary sparks.

Her 1/2 KW rotary non-synchronous spark dwarfed Hal's one inch amateur splutter-box and was a far cry from the big open-spark in-

duction jobs Walt told about. In several ways they were better than open spark sets; however, having a non-synch rotary didn't guarantee that your note would be better—it depended on how you operated it.

Except for variations in the spark gaps themselves, four major spark transmitter designs existed from Marconi's original induction coil until commercial spark sets died December 31, 1939. In order these sets were: open spark, nonsynchronous rotary, synchronous rotary, and quenched spark gap.

The secret of high operating efficiency with a spark transmitter lay in keeping the electrodes as cool as possible. Sparks between hot electrodes produced mushy sounding signals. Operators couldn't copy "fast stuff" unless the



Circular quenched spark gap from German Telefunken marine transmitter. Courtesy of The Henry Ford Museum, Dearborn, Michigan.

signals sounded sharp and rang clear in the receivers.

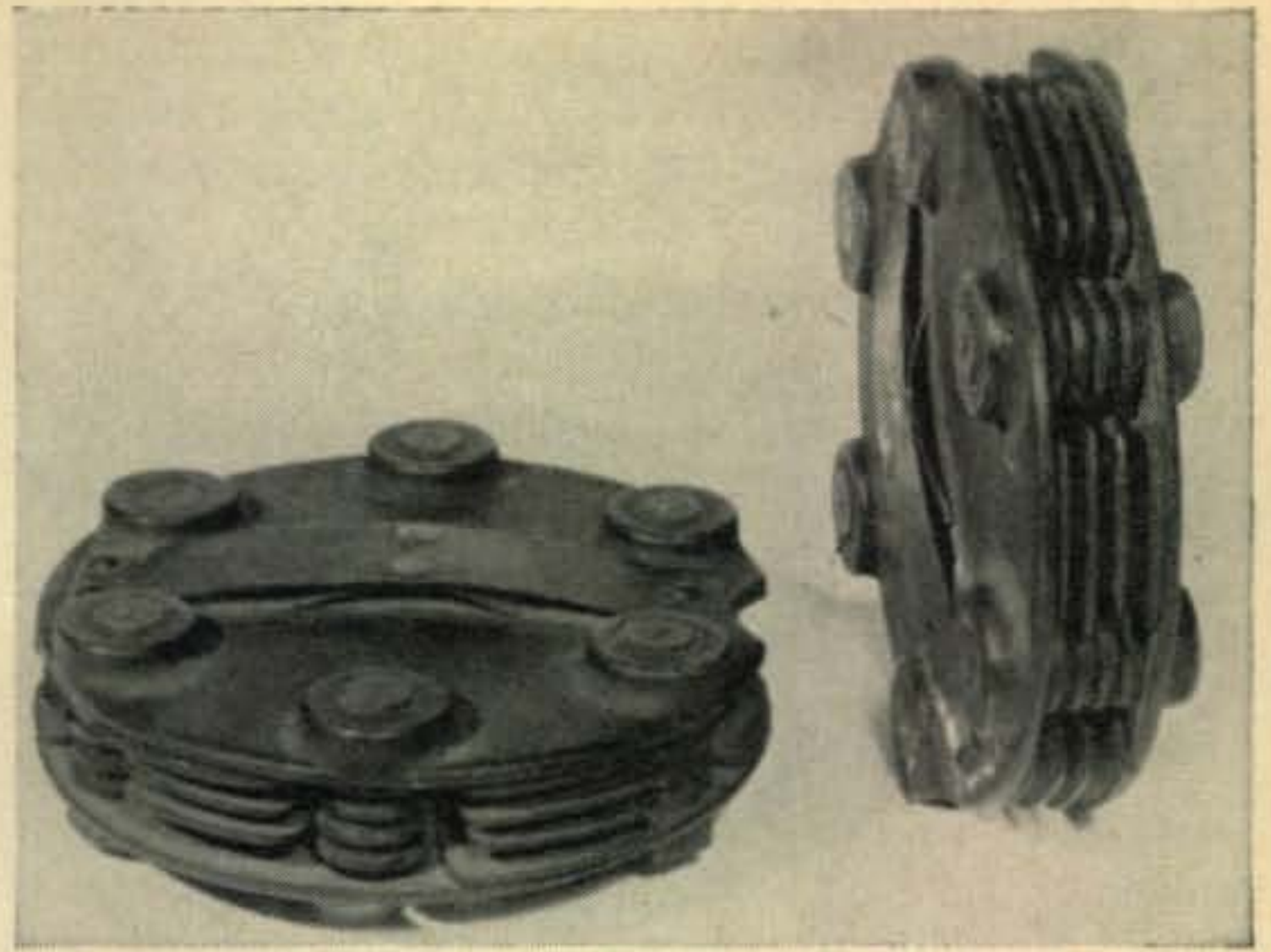
Open Spark Gaps

Spark gaps provided resistance to keep the condenser from discharging until it had absorbed its full charge. Proper adjustment of this important part in the oscillatory circuit helped to determine the distance covered by the station.

Opening the gap to obtain the longest possible spark resulted in poor performance even though the condenser got charged fully. On the other hand, too short a gap allowed an arc to form across the gap which stopped *rf* oscillations and could ruin the induction coil.

Instructions advised increasing the spark gap length until the spark appeared thick and white. Final adjustment was a compromise between a low resistance spark gap and a fully charged condenser. Watching the hot-wire ammeter for highest reading proved the best guide. The ideal condition of course was a high resistance between condenser discharges and a low resistance during discharge. Zinc was the most efficient material for the fixed gap.

Several disadvantages featured open spark



Another form of circular quenched gap. Courtesy of The Henry Ford Museum, Dearborn, Michigan.

gaps: They were noisy, heating of the gap reduced its resistance, and deterioration of the gap electrodes. These faults brought various innovations in gap treatment.

Enclosing the spark gap in padded boxes silenced the sparks. But this brought problems too. Sparks soon converted the oxygen and nitrogen of the air into oxide of nitrogen which produced nitric acid and deteriorated the gap electrodes. Also, the trapped air became ionized and lowered the gap resistance.

To eliminate the ionized air condition with both open spark gaps and enclosed ones, methods developed for applying jets of forced air or other gases. In cases of enclosed sparks, this further required some kind of an exhaust system. While these methods may seem extreme, cooling the gap raised its resistance and improved the characteristic of the radiated wave.

Another improvement used a series spark gap. This constituted several open gaps in series. With this, many hams achieved cooler gaps and better signals though they still had to tolerate the noise. However, open sparks never afforded the possibilities attainable with other types.

Rotary Sparks

Soon rotary sparks demonstrated their superiority over open sparks and became very popular commercially and among the amateur fraternity. And wherever alternating current was available, transformers replaced induction coils for stepping up the voltage. Induction coils produced 20,000 to 300,000 volts at small currents; transformers supplied 15,000 to 20,000 volts at much greater currents thereby developing more powerful and penetrating waves than induction coils. (The U.S. Licensing Act limited amateurs to a maximum power of 1KW.)

Rotary spark gaps featured several advantages: They cooled themselves as they rotated, the whirling disc immediately broke any arcs

that formed, and the resultant high pitched note cut through static beautifully. Rotaries radiated signals over greater distances and their clean notes made copying more dependable.

Synchronized Rotary Gaps

Synchronized rotary spark gaps rendered musical notes. The pitch depended on the number of cycles of the generator supply current. If the generator supplied 240 cycles, a note of 480 cycles resulted. Five hundred cycle generators created 1000 cycle tones.

Rotary spark gaps contained two stationary electrodes diametrically opposite between which revolved a metal disk containing lugs or holes. When a lug or hole on each side of the disk came opposite to the stationary electrodes, a spark occurred. Adjustment of the disk lugs or holes brought them opposite the stationary electrodes at the peak of an *ac* cycle. This condition created maximum charges in condensers before each spark discharge across the gap. More power therefore entered a wave train with consistent timing to cause a strong musical note. Fessenden's design on the U.S.S. Connecticut consisted of a disk three feet in diameter with thirty lugs evenly spaced—one lug for each field coil in the generator.

Nonsynchronous Spark Gaps

An amateur's pocketbook seldom stretched far enough to purchase a motor generator. They therefore resorted to nonsynchronous rotaries. These designs used rotating disks with small motors battery driven or otherwise. The number of the disk electrodes varied from four to about sixteen. The spark frequency depended upon the number of electrodes and the speed of the driving motor.

This method caused the condensers to discharge in unison with the mechanically determined spark frequency regardless of the state of their charge or of the charging frequency. From the nonsynchronous rotary gap came a crackling note whose tone varied with the speed of the motor.

Where hams had electricity in their homes, synchronous induction motors replaced ordinary motors. Adjustment of the rotating electrodes achieved synchronization with the supply current. This arrangement inexpensively produced synchronous rotaries.

Rotaries, too, had disadvantages. Chiefly, they were noisy, took up quite a bit of room according to the power of the station, and the ring of flame around the disk bothered some operators' eyes.

Quenched Spark Gaps

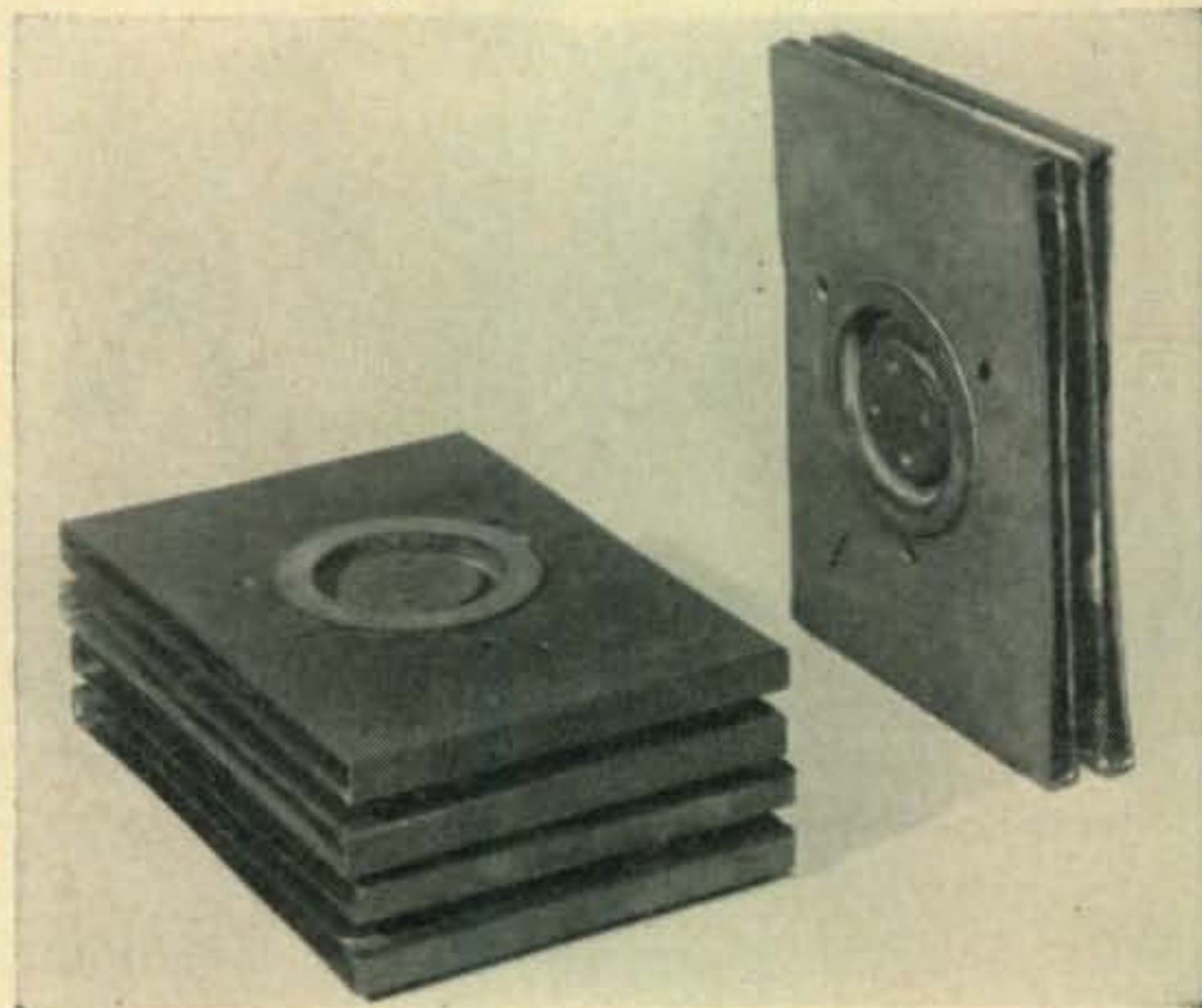
This type gap had good quenching ability. It consisted of a number of disks or squares in series with very small spacing between. Clamps held them tightly in place. The centers formed the sparking surfaces. A raised ridge at the edge fitted the ridge of the next one so that when clamped together, it was airtight. Cooling fans around the flanges radiated the developed heat.

This gap quenched oscillations rapidly in the primary oscillating circuit leaving the antenna to continue oscillating at its natural period until completion of the wave train. Quick quenching prevented re-transfer of energy from the antenna circuit back to the primary circuit through mutual conduction. Therefore, most of the power got radiated.

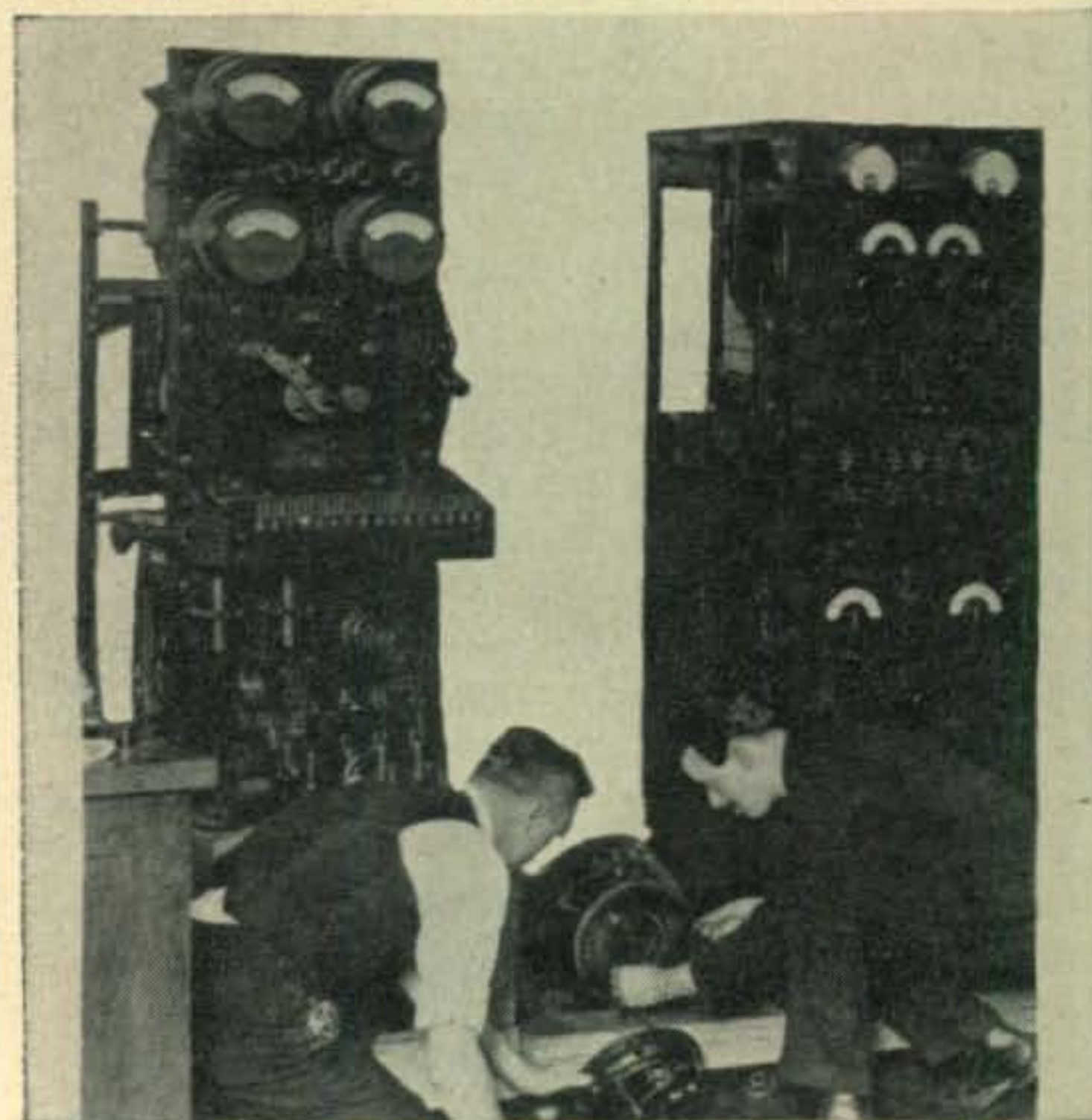
Many ships used the quenched spark gap during the twenties and thirties. This quiet design stayed in use until the death of "sparks" at the end of 1939.

Hal's wireless experiences all centered around rotaries. After his initiation to the nonsynchronous rotary aboard the *Indian*, Hal sailed on the tanker, *SS Toledo*, and the sea-going tug, *SS Rescue*. Both of these ships carried nonsynchronous sparks. Later, he shipped as senior operator on the freighter *SS El Rio* out of New York. This time he discovered the merits of a synchronous spark.

[to be continued]



Square quenched gap sections. Courtesy of The Henry Ford Museum, Dearborn, Michigan.



A 2KW quenched spark ship transmitter, left; and a marine tube transmitter, right.

9 Uses For The 9¢ Wonder

Robert B. Kuehn, WØHKF

641 South Saratoga St.
St. Paul, Minn.

The NE2 is a versatile gadget that may be applied in many phases of Ham radio. Here are just a few. How many more can you think of?

Figure 1. A FB code practice oscillator. Takes at least 67 volts AC or DC. Tone is variable by varying either C1 or R1. Don't try to use it for much of anything else, tho, because the output is anything but a sine wave!

Figure 2. Don't use meters on small transmitters up to 25 watts or so. Here the 1 meg resistor allows plate voltage to ignite the NE2 with an orange glow, while at the same time blocking the flow of *rf* to ground. When the stage is tuned and *rf* appears in the circuit, the NE2's glow changes to a deep purple—the brighter the glow the more *rf*—as simple as that.

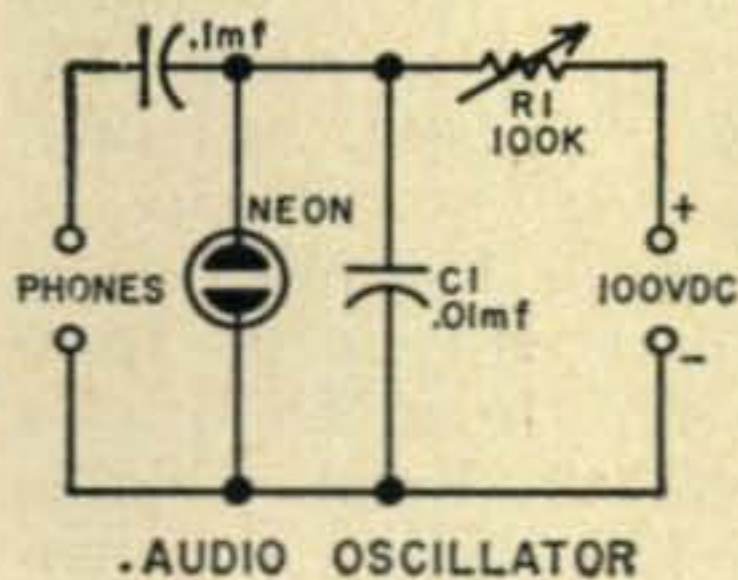
Figure 3. Think up your own applications for this one—The drawing indicated the principle; the same 67 volt minimum applied voltage holds true of course. Since no power is consumed, the NE2 will ignite with only one lead touched to the circuit—No danger of shock by holding the other lead unless the voltage is high enough to jump between the electrodes.

Figure 4. Once the NE2's ignition point of 67 volts is reached, the voltage across it tends to remain constant. Thus it can be used to limit high intensity noise peaks in mobile installations. On home receivers, the same application protects the output transformer from possible breakdown in case the speaker happens to be removed with audio applied.

Figure 5. The *rf* sniffer makes the use of the fact that the NE2 doesn't care if the applied 67 volts is *dc*, *ac* or *rf*. If the variable resistor is adjusted to apply, say, 55 volts of *ac* or *dc*, then only 10 additional volts of *rf* will serve to ignite the lamp, thus making the device a fairly sensitive indicator of small amounts of *rf*. The neon lamp need not be actually connected to an *rf* circuit but merely held close to a coil, tube, tuning capacitor, etc.

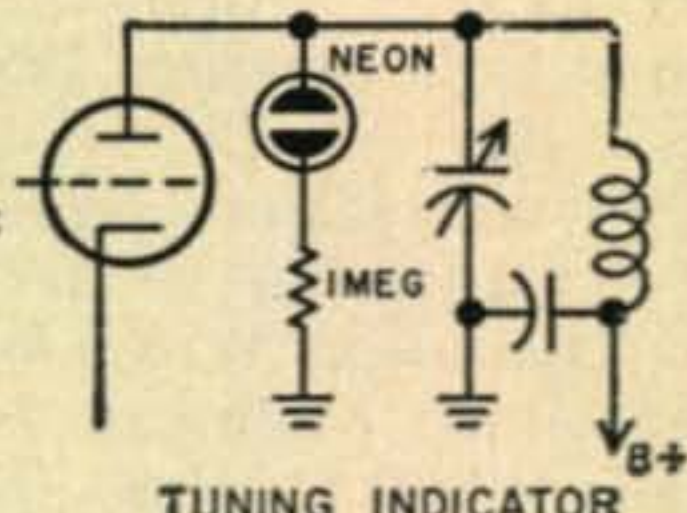
Figure 6. The testing and operating of certain *ac-dc* radio equipment still requires that it be plugged into the AC line one way or the other with respect to the hot or with the grounded side of the line. The little NE2's ruddy glow will ease your mind in this respect when one

[Continued on page 96]



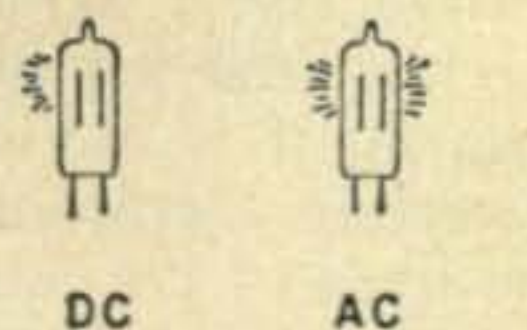
.AUDIO OSCILLATOR

Fig. 1



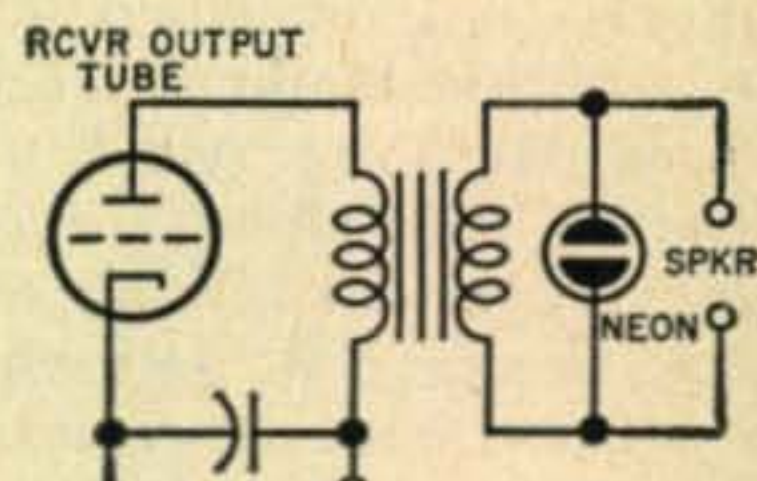
TUNING INDICATOR

Fig. 2



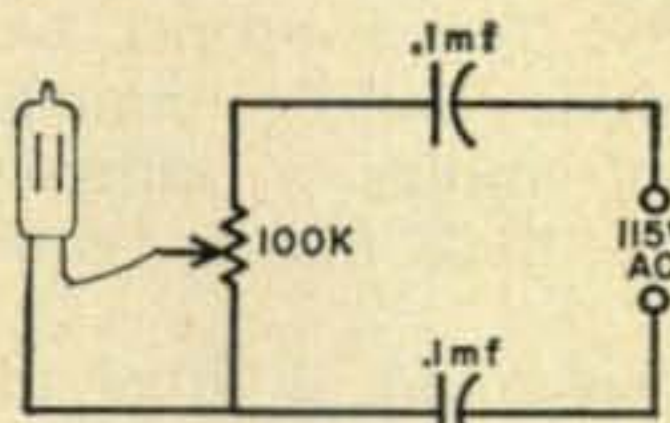
AC OR DC INDICATOR

Fig. 3



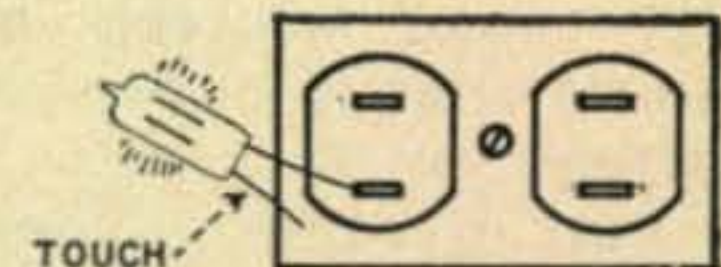
NOISE LIMITER

Fig. 4



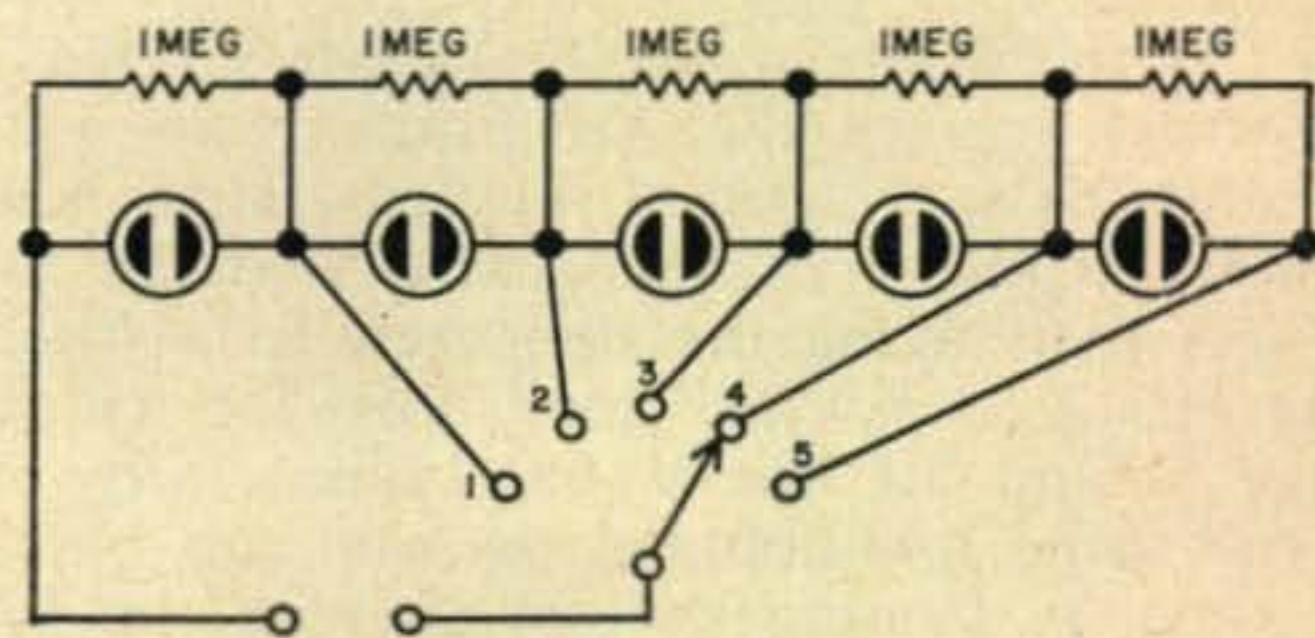
"RF SNIFFER"

Fig. 5



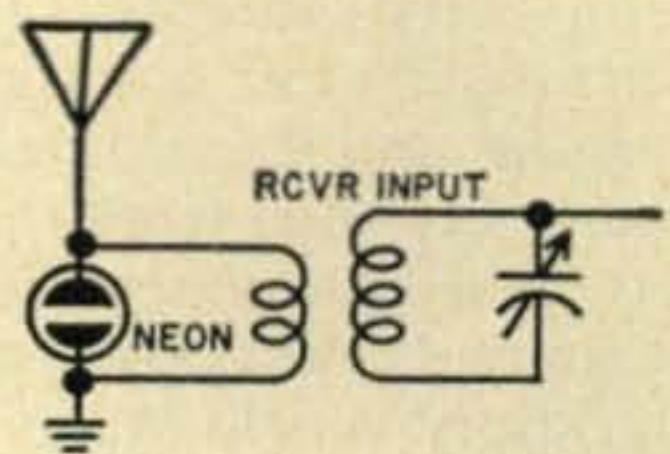
POLARITY INDICATOR

Fig. 6



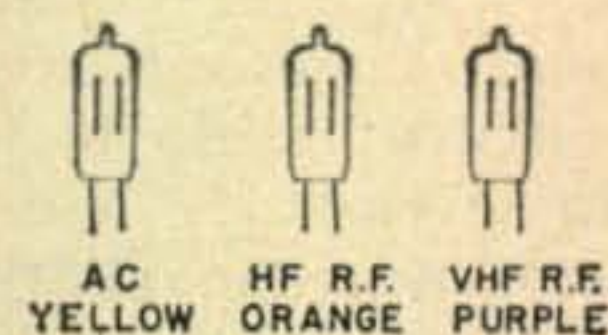
VOLTMETER

Fig. 7



ANTENNA STATIC DRAIN

Fig. 8



FREQUENCY INDICATOR

Fig. 9

Operation Worldwide

Bill Leonard, W2SKE

Breathes there a ham with soul so dead who never to himself hath said, "What I wouldn't give to ham around the world, working DX, being DX, meeting DX . . . and, by golly, some day . . ."

"Someday," or a reasonable facsimile, came to a small group of hams recently in the form of "Operation World-Wide," brain child of a determined Michigan amateur, Ralph Charbeneau, W8OLJ, who—in real life—is the public relations director of the PurPak Division, of the Ex-Cell-O Corporation, of Detroit.

It was almost solely due to Charbeneau's efforts that on April 23 a semi-retired C-54, its interior Hallicrafted to the hilt, took off from McGuire Air Force Base, New Jersey, soaring (but slowly) East on the first leg of a journey which circled the world, if it did not exactly shake it, and which certainly crammed a peck of experience into the lives of the hams and other just plain people aboard.

Many have inquired, before, during and after this flight, just what "Operation World-Wide" was all about, *really*. And unless you are happy with an answer like 'about six weeks' one must take five for a proper explanation. The connection may not be immediately clear between ham radio, a military aircraft, and a company that makes milk cartons.

But, in words of one sideband, it fitted together something like this: Pur-Pak's cartons are used (by the millions) in milk reconstituting plants operated either by or for the Air Force near bases all over the world. Pur-Pak wished to film (a) all these artificial cows and (b) the Military Air Transport Service, an important arm of the Air Force, with which it maintains such cordial relations. How better to make a movie of such activity at the four corners than flying the film crew in a MATS aircraft? And having gone this far (if the brain behind all this is haminded), why not accrue some additional good will and operating time by loading said plane with the kind of ham station most of us only see in store windows.

Charbeneau arranged all this. His company purchased a sizable temporary interest in NBC "Monitor" and arranged for a large amount of material concerning and transmitted by amateur radio to appear on this weekend radio service. He had set up a complete base station near his Detroit home (W8USA) to keep in touch with "Operation World-Wide." He wrote letters to the governors of all the states alerting them to "Operation World-Wide"

and urging their willingness to accept a phone patch from it from overseas, said patch to be recorded and perhaps rebroadcast on NBC.

It must be emphasized that "Operation World-Wide" was not a DXpedition. At no time were we in operation from the ground, so, of course, none of the special commemorative QSLs will count for country credit. Originally we were routed through Djibhouthi, French Somaliland, and thanks to the good offices of F9MH, of the French consulate in New York, permission was obtained to operate on the ground there. But, as it turned out, field facilities were inadequate for our plane, and Aden (where we didn't have permission to operate from the ground) became our alternative stop-over in the Middle East. "Operation World-Wide" received all the international cooperation one could expect—considering the U.S.'s sticky non-reciprocal licensing attitude. We had permission to operate in the air over the entire British Empire, for instance, and were actually granted the special calls SYØLJ (figure that one out, it was Greek to us and we were using it), and W8OLJ/VS9. The special call KR6OLJ enabled us to work 20 meters in the Okinawa area, which was liberally interpreted to include a large part of the Pacific.

Nevertheless, as a ham operation, if not a DXpedition, the junket had its limitations, to such an extent that many U.S. hams, alerted by Hallicrafters full page ads in QST and a subsequent cover in CQ, wondered for a while whether it ever got off the ground at all. The truth is, that except for a few flurries, W8OLJ/AM was not really 'in touch' until our plane headed back from Japan East across the Pacific. The reasons? Most important, the first three weeks, roughly, were spent in and around Europe, much of the time on the ground or over airspace where one could not operate.

Second, our port inboard engine turned out



to be an S9 noise generator, and kept receiving conditions miserable when we would get on the air (it wasn't operated on until Tokyo). Third, conditions could hardly have been worse on 15 much of the trip, and part of the time we were not able to use 20 in the air (look up your FCC regulations). And last—don't forget—even with a KW of SSB it takes a peculiar combination of circumstances to allow a Fareast-USA QSO from a plane . . . you have to be *in the air* and operating during that hour or less that the band is open at all. (We had the additional handicap that ham operation, strangely enough, came second to basic aircraft communication and navigation, and this took away our facilities for perhaps a quarter of our flying time.)

Just the same we talked to hams in almost 50 countries (although we made no ham contacts in 7 countries in which we actually landed). We worked 42 states and just under a thousand stations, all on SSB or SSB-AM.

Operating Set-Up

Our operating set-up was practical and ef-



Soma, 4S7YL, and her beautiful daughter Chitra.

ficient. A large operating table was secured to the plane deck in the main compartment, on the port side just aft of the crew section. Under the operating table was the HT33A final and associated gear for converting 28 v at 400 cycles to 110 at 60. On the operating table itself the FPM-200 and its companion speaker-power supply. (We had two of the five prototype FPM-200's aboard, Hallicrafters answer to practically everything, an extremely compact transceiver, transistorized down to the driver and final 6146's, all bands. There were some difficulties with the gear at first, and for a while a standby HT32 was used as a driver for the HT33A, and an SX101 for receiving. During the latter part of the trip, however, the little FPM200's performed very well indeed. It is enormously flexible and will do just about anything except fill out those QSLs.) A shelf above the operating table contained a tape re-



VS9HA, Robin, being interviewed by Bill Leonard for the VOA Amateur Radio Program.

corder which ran continuously while we were on the air. Somewhere there are 150 reels of tape jumping with QSO's that no one will ever listen to again. The output of the HT33A was fed, via coax to a tuning unit up forward close to the point where the antenna entered the skin of the plane. The sky hook, about 43 feet of wire, ran to the top of the tail fin. The tuning unit caused a peck of trouble and had to be rebuilt in Tokyo.

Personnel

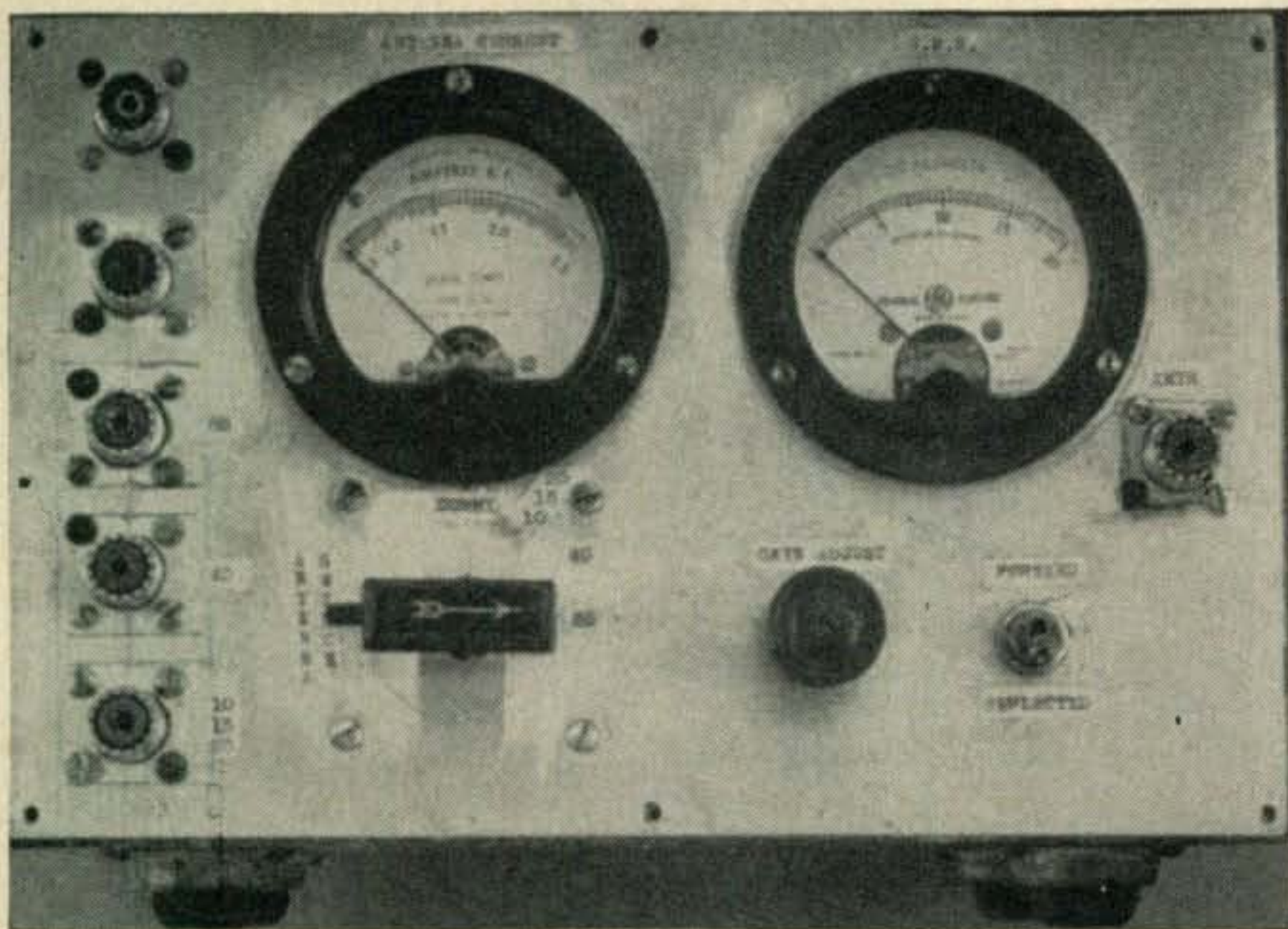
Personnel aboard our plane (MATS 50564) included a crackerjack crew of seven . . . not one but *two* qualified aircraft commanders, both of whom had flown C54's in the Berlin lift, a navigator, radioman, engineer, steward and radio tech (Tom Crawford, W7KTI). The camera crew and executives from the Robert J. Enders Co., who were filming the MATS and the milkplant stories, totaled ten. A Lt. Col. Dick Goss was aboard as "Project Officer for the Air Force." Ralph, W8OLJ, headed the ham contingent, which included Bud Drobish, W9QVA, Hallicrafter's boy fixit, the much travelled CQ Editor, Wayne Green, and the author, who was aboard for the final three and a half weeks only, gathering material for the Voice of America ham program and his nightly radio show on WCBS, New York. A United Press International reporter from Detroit, John Owens, and FitzGerald Smith of NBC Monitor completed the dauntless tribe.

Itinerary

Everytime I count the number of countries we visited I get a different answer, and dizzy . . . but it includes some pretty fair DX, some of it so rare, that, as I say, we never worked it. Here goes—W, VO, GM, CS3, DL, F, OZ, I, SV, TA, SU, VS9, AP2, 4S7, HS, 3W8, DU, KR6, BV1, HL, JA, KG6, KW6, KH6 . . . and back home to mom's apple pi.

[Continued on page 96]

The Gadget Box



Frank A. Mohler, W2IAZ

187 Broad Street
Eatontown, New Jersey

The author proves that carrying most of your eggs in one basket is a lot more convenient and more practical than carrying them one at a time.

If you are the kind of amateur that likes to operate on different bands, it is a good bet that you have two or more antennas at your station. If you are seriously interested in operating convenience and efficiency, chances are that you are using a variety of operating aids like an antenna switch, an antenna tuner, an antenna relay, a dummy antenna that can be switched in or out in the blink of an eye, a low-pass filter, an *rf* wattmeter, and an *swr* meter like the Monimatch.

The value of each of these gadgets is well established and no time will be wasted in repeating words of praise on their behalf. The problem in question is: if you installed each of these gadgets on a one-at-a-time basis then your operating position probably looks like the hot dog and bratwurst counter at Max's delicatessen. When each of these sausages—oops—gadgets is linked together, they spill out from behind the transmitter and use up a lot of the available elbow room. Whether of the commercial variety or home constructed in coffee and beer cans, these gadgets present a disorderly array of odd shapes and sizes which detract from the shipshape appearance of the station. This problem is solved to a great extent by incorporating the gadgets into a single container such as the Gadget Box.

Before making the Gadget Box, the gadgets were arranged in separate containers interconnected with short sections of coaxial cable as shown in fig. 1A. After installing the Gadget

Box, the arrangement was simplified as shown in fig. 1B.

Contents

Inside the Gadget Box are mounted the 6 position antenna selector, a 300 watt dummy antenna, an *rf* wattmeter and a monitor-type *swr* meter. The antenna relay is mounted out of sight inside the transmitter where it automatically grounds the receiver antenna lead when the transmitter is operating. The antenna tuner was eliminated entirely when tests proved that excellent broad-band operation was achieved without the nuisance of this added control. This was true for all bands although adequate loading from 3500 through 4000 *kc* was obtained only after installing a multidoublet. The multidoublet consists of a 120 foot and a 130 foot wire connected to the same coaxial transmission line. The elimination of the antenna tuner is well worth the trouble of putting up a multidoublet antenna unless you have no particular desire to QSY quickly and efficiently.

Construction

A few words on the construction of the Gadget Box might be worthwhile. This particular unit was designed for operation with a 200 watt transmitter, and provides selection of any one of five coaxial-fed antenna systems. Modifications to suit your own needs will

naturally affect some of the components shown in fig. 2.

The parts are mounted on an 11 x 7 inch aluminum panel. The wiring is as simple as it looks in the schematic diagram shown in fig. 2.

Operation

The dummy antenna is composed of three 150-ohm, 100-watt globar resistors. Connected in parallel, these resistors offer a 50-ohm load and can handle a transmitter output power up to 300 watts. Efficient QSY is facilitated since nonradiating transmitter tuning adjustments with the dummy antenna require practically no change when the appropriate 52 ohm coax-fed antenna is switched in by the antenna selector switch.

The *rf* wattmeter, consisting of the 2.5 amp *rf* ammeter and the 50-ohm resistor (dummy antenna), permits a quick measurement of the transmitter output power. Once you become familiar with the normal output power from your rig, any decrease in this value may verify your suspicions that one of those paralleled tubes in the final has gone soft, or those screengrids are wasting a lot of that input power. You can operate without an *rf* wattmeter, but it's like working in the dark or in a smoke-filled room, whichever is appropriate.

The *swr* meter is a scotchman's version of the Monimatch (ARRL Handbook 1958). A pick up wire is inserted under the braid of a 15-inch section of coax. To make room under the braid, slip the rubber-covered braid off the 15-inch section of coax and then with a rough file take off about 1/16" along the insulation around the center conductor. Replace the braid and poke a couple of holes through the braid. Make the holes 8" apart so that a 10-inch length of pickup wire can be threaded through the holes under the braid.

When this is done, loop the 15-inch coax section into a 2 3/4" diameter loop so that the ends of the pickup wire are close together. Secure the overlapping ends of the coax with friction tape to keep the loop from springing open. The coax loop is mounted over the *swr* meter case and the 1 inch leads from the pickup wire are connected to the DPDT switch located below the SWR meter. This DPDT switch merely connects the 1N34 crystal and the 200-ohm carbon resistor to either end of the pick up wire. Forward current is indicated when the 1N34 is connected to the transmitter end of the pickup wire. In this position, the 25,000 ohm potentiometer is used to adjust the meter reading to full scale. Reflected current is read on the SWR meter when the DPDT switch connects the 1N34 rectifier to the antenna end of the pickup wire. If the antenna is matched to the transmission line, the reflected current will be close to zero. A reading of zero reflected current will indicate an *swr* of 1 to 1. Reflected readings of half scale or more indicate a serious mismatch and indicate that the antenna is not accepting the power satisfactorily. When this happens, determine the optimum operating frequency which will be associated with the lowest reading of reflected current. You might even discover that the best frequency is outside the band. If so, vary the antenna length an inch or two at a time until the antenna gives the lowest reflected current at your favorite spot on the band. If the reading is still too high after all this, then the matching system requires adjustment. This can involve varying the capacitor in gamma match systems, changing the height of dipoles (ground reflections influence antenna impedances), and varying the angle of the radial elements of ground-plane antennas. Whatever the case may be, this *swr* meter helps you to get the maximum power up to the antennas where you want it. ■

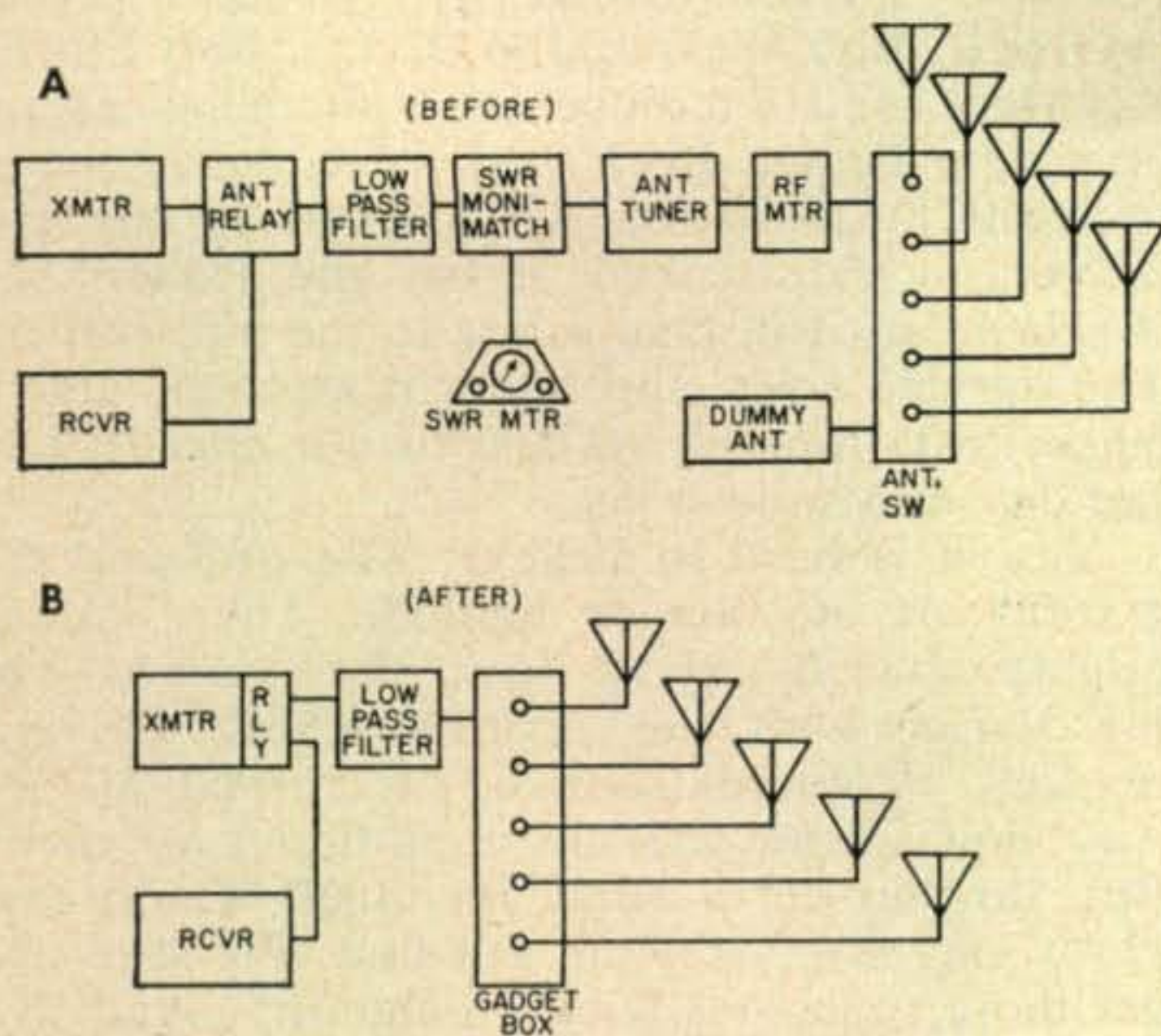


Fig. 1—Connection of components, before and after.

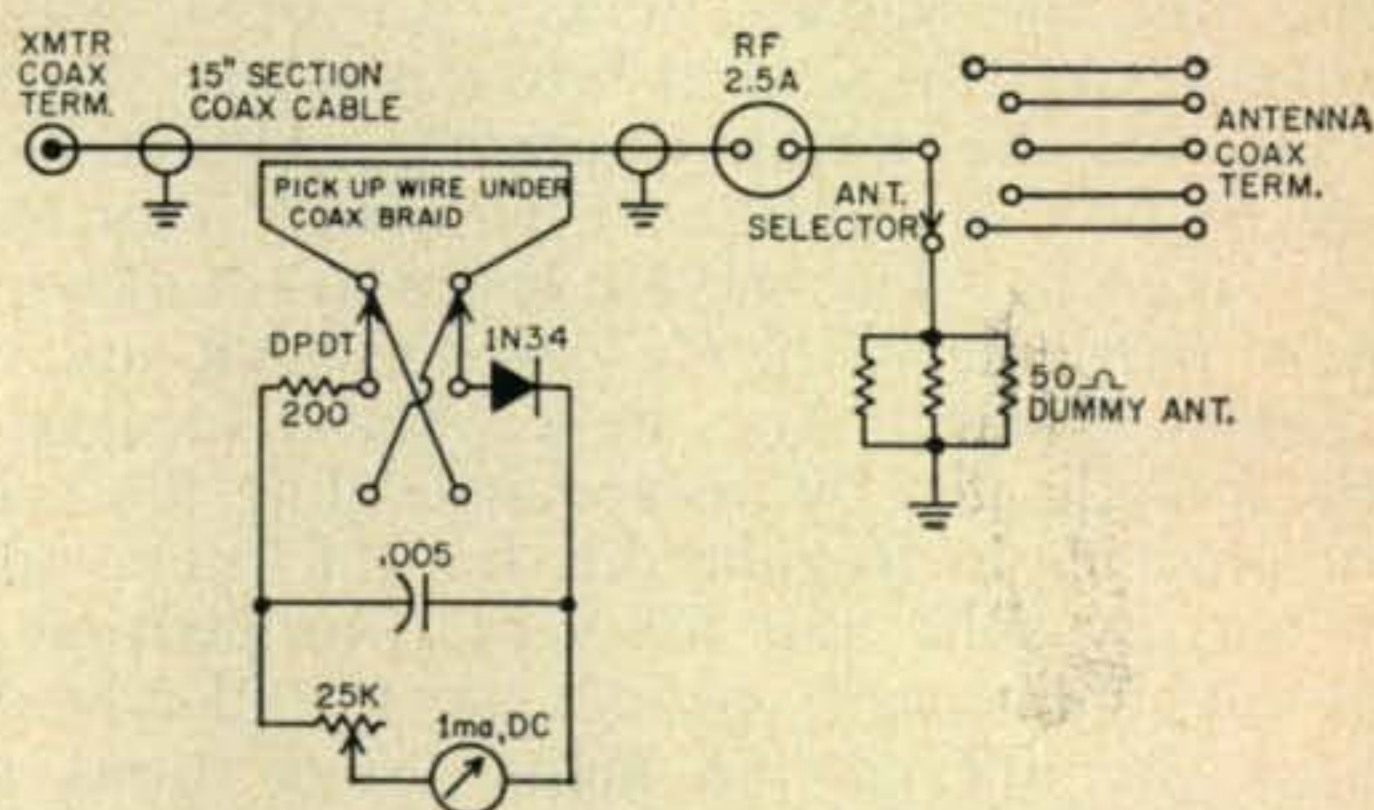


Fig. 2—Wiring diagram of the Gadget Box.

Dummy antenna (three 150-ohm, 100-watt globar resistors)
 RF ammeter, 2.5 amp, 3"
 SWR meter, 1.0 ma dc. 3"
 Crystal diode 1N34
 200 ohm, 1/2-watt carbon resistor
 metal box 11 x 7 x 7

WØBP Killed in Auto Accident

Byron Kretzman, W2JTP/Ø
Minneapolis, Minnesota
June 23, 1959

On June 15, 1959, RTTY's most active proponent, Boyd Phelps, WØBP was killed in an auto accident near Zimapan, Mexico. Also killed was Adolphus A. Emerson, WØITQ, who was accompanying BeeP on this DXpedition south of the border.

We will not try to tabulate all of BeeP's lifetime achievements and awards. We will leave that to another magazine to do for the "unwashed multitude," as he called them. For us, particularly those of us who had personal contact with him here and across the nation at the many RTTY meetings that he key-noted, this is not necessary, as these are just the material things associated with the long and very full life that he led.

Instead I will mention briefly a few of the things he did and said, the things that made him certainly the most beloved RTTYer and probably one of the most outstanding individuals in the history of amateur radio. He didn't "found" RTTY, but he sure gave it life and purpose. But, active as he was on the air (to so many he was the 1st contact on RTTY), he still had time to help those in the same game. One machine was assembled—the other was in parts, packed in several boxes marked "Toys."

Oh yes, he was a Character. Although he was 60 he had more push, vim, and vigor than most men half his age. He loved to tilt at windmills, particularly the FCC and the AR-squared L, as he called it. And, he was fairly successful, too, as indicated by his spear-heading the drive for changes in Regulations for RTTYers, such as narrow shift and his very own petition to permit unlicensed people at the keyboard. While he did receive many "suggestions for improvement of his station" from the FCC, none was for exceeding the power limit. When he won an RTTY Sweepstakes Contest, or came close to it, it was by his own superhuman operating effort. He missed a lot of sleep, but he enjoyed every minute of it.

Yes, he was a Character. I called him an "old goat" once, so at the RTTY Meeting in

Chicago last year he showed up with a neatly trimmed reddish Van Dyke. "Might as well look like one," he told me. "But I deny being old!" He had a grand sense of humor, which was another reason why RTTYers, and some just ordinary hams, traveled many, many, miles to hear him and to talk with him at a Meeting.

My favorite story about BeeP is one he told about himself. This is the one where he was in the Navy during WW II, the CO of a radio station in Iceland. There he had to court martial one of his men for gambling, so he sentenced him to one week on bread and water—with extra duty in the kitchen. Another story was born when I chided him about his drift on 15-meters. "Heck," said BeeP, "you probably notice the same drift on WWV!"

Today we buried 'ole BeeP. The Chapel at the Lakewood Cemetery was crowded with the many friends who could be there at 3 pm. (So many couldn't.) The service was the Masonic Scottish Rite performed by his Brothers. The pall bearers were Harry Nielson WØKKI, Harold T'Kach WØLFI, Bruce Meyer WØHZR, Bob Wesslund WØAUS, Bob Fincke KØAKG, and Clarence W. Labonte, a radio-man who helped BeeP in his frequency measurement business. As we listened to the last prayer, a jet streaked across the leaden sky overhead, as if in final salute to the old warrior. The service over, the heavens opened, and it began to rain as we walked to our cars. It is a sad day in Minneapolis.

Yes, it is hard to believe. The 833 and the 4-1000 are no longer lighted. There is no mighty howl of AFSK from the speaker. The big Variac with the steering wheel, the one marked "Volume Control," is turned all the way down, and the air conditioner is silent. But, do you know what 'ole BeeP would say? He would say, "Hey cut out that silly stuff and get those machines back on the air!" And that is exactly what we must do. Let's keep occupied those holes he punched in the ether for us.

Heath Apache Transmitter

Some time ago, the Heath Company of Benton Harbor, Michigan, brought forth another addition to their now popular line of amateur transmitters; this called the "Apache." Endowed with oodles of interesting features, the Apache is basically a 150 watt AM/180 watt CW transmitter incorporating a high degree of versatility with attractive styling.

In line with CQ's policy of thoroughly testing every new piece of amateur gear prior to reviewing it, we have spent quite a bit of time putting the Apache through the paces. Constructing the unit from kit form to a smoothly operating finished product was a simple, straightforward operation requiring about 50 hours of spare time. By following the clearly presented step-by-step instructions in the technical manual even the most inexperienced person can proudly watch his effort transformed from a box of parts to the exciting end product. The unit is more or less typical with respect to frequency coverage, i.e. you have either crystal or vfo control over the 5 amateur bands . . . CW and Phone. This is readily selectable by means of a front panel control. The VFO circuit consists of a 6AU6 tube operating as a highly stable Clapp Oscillator in the frequency ranges 1750-2000 kcs, 7000 to 7175 kcs and 7000 to 7425 kc. The tube is mounted on the top of a rigid enclosed sub-chassis, thus placing all heat generating components outside the VFO enclosure. This accounts for the above average stability of the variable frequency oscillator.

Circuitry

All circuitry is conventional. The transmitter Apache utilizes a 6CL6 as a modified Pierce Crystal Oscillator or the vfo, described earlier, may be used. The output of either the 6AU6 vfo or 6CL6 is capacitively coupled to the grid of a 5763 which functions as a buffer-multiplier stage. This in turn drives a pair of 6146 operating at 750 volts which make up the Pi-Network final amplifier. This amplifier operates in Class C on CW and AM and Class AB1 for SSB operation. A combination of fixed and automatic bias is employed to establish the operating parameters of the amplifier. In addition to the fixed bias, the screens of the 6146's are clamped by a 6AQ5 during class C operation.

For ssb operation the following provisions are made: Jacks are provided to take the output from the plate circuit of the driver stage, and feed it to an external ssb generator such as the Heath SB-10. Here it is converted to



upper or lower sideband at the operating frequency and fed back to the final amplifier of the Apache where it is boosted to the 160 watt level. The moding switch, besides re-routing the driver output also places the 6146's in Class AB1 operation when the ssb position is selected. During ssb operation, the plate voltage is left on at all times, avoiding excessive switching of primary power.

Modulation

The Apache employs high level plate modulation. Two stages of resistance coupled speech amplification are combined in a single 12AX7 tube, providing for more than adequate gain for either a low level crystal or a dynamic microphone. In view of the fact that a restricted speech range has proven most most satisfactory for amateur communications, the audio circuitry of the Apache has been designed to pass the range 300-3000 cycles. The output of the 12AX7 speech stages is fed to one-half of a 12AU7 which serves as an additional stage of audio amplification. This, in turn, feeds a 6AL5 dual diode which does the clipping. The audio from the clipper stage is fed through a low pass filter which cuts off sharply above 3000 cycles. This serves to remove much of the harmonic content from the clipped waveform, thus reducing distortion, in addition to restricting the high frequency response of the amplifier.

The second half of the 12AU7 is used as another stage of amplification following the low pass filter. After leaving this latter stage, the signal is fed to a 12BY7 audio driver, where

[Continued on page 90]



CQ Reviews the:

Eico Model 720 Transmitter

Eico (Electronics Instrument Co.) is well known in the electronics industry for fine test equipment and hi-fi kits.

Eico recently entered the amateur market with the model 720 Radio Transmitter. This unit is available wired or in kit form. Assembling the kit is a simple, straight forward, step by step operation which is easily accomplished even by persons of limited experience and capabilities. The 720 embodies "low-silhouette" appearance and conventional design features in a relatively compact 90 watt package. While the transmitter is engineered for cw operation, Eico has also produced a companion plate modulator, the addition of which provides high quality phone operation. Both the chassis and cabinet of the 720 are constructed from heavy gauge steel, providing a substantial foundation for mounting the components. It's relatively small size makes the unit a natural portable rig for vacation trip.

The Eico 720 is crystal controlled with the crystal socket located on the front panel for convenient crystal changing. Provision is also made for the addition of an external *vfo*, the output of which is fed into a socket on the rear apron of the chassis. A slide switch, located adjacent to the *vfo* socket, enables the operator to easily select either crystal or *vfo* controlled operation. There is also an accessory socket which contains additional provisions for an antenna change-over relay, modulator input and power for that *vfo*.

The circuitry of the 720 is conventional and reliable. A 6CL6 pentode functions as a colpitts oscillator, driving a 6AQ5 buffer-multiplier. This stage functions as a straight buffer on 80 and 40 meters and as a multiplier on 20, 15, and 10. The 6AQ5 drives a single 6146 power amplifier in a standard pi-network circuit which will match a wide variety of load impedances. As an added feature, Eico has included a second 6AQ5 operating as a clamp tube to protect the final amplifier tube in the event that grid excitation is lost while plate and screen voltages are present.

The keyed signal of the 720 is clean and click-free on all bands. Keying is accomplished in the cathodes of both the oscillator and amplifier stages. The clamp tube keeps a low voltage present on the key terminals at all times, eliminating shock hazard, should the operator accidentally touch the key while the unit is in the transmit position.

The front panel is both symmetrical and attractive. There are seven controls, three of which are used for tuning. The meter is large and easily read. It contains two separate scales which are selected by a meter switch on the front panel of the unit.

All sections of the transmitter are easily accessible for maintenance, merely by removing the top and bottom covers.

It appears that all things considered, Eico has quite a lot to offer in the Model 720 Transmitter. ■

CQ Reviews the: Raypar TE-1 Phone Patch



A good deal of the strength and support mustered by amateur radio has been developed by our record in public service, i.e. our willingness to make our facilities available to the general public in times of emergency and general need. A great deal of the services rendered have been in the line of providing communications between our serviceman overseas and their folks here in the states. To this end the phone patch plays a vital role by eliminating the necessity for third parties to actually be present at the radio station.

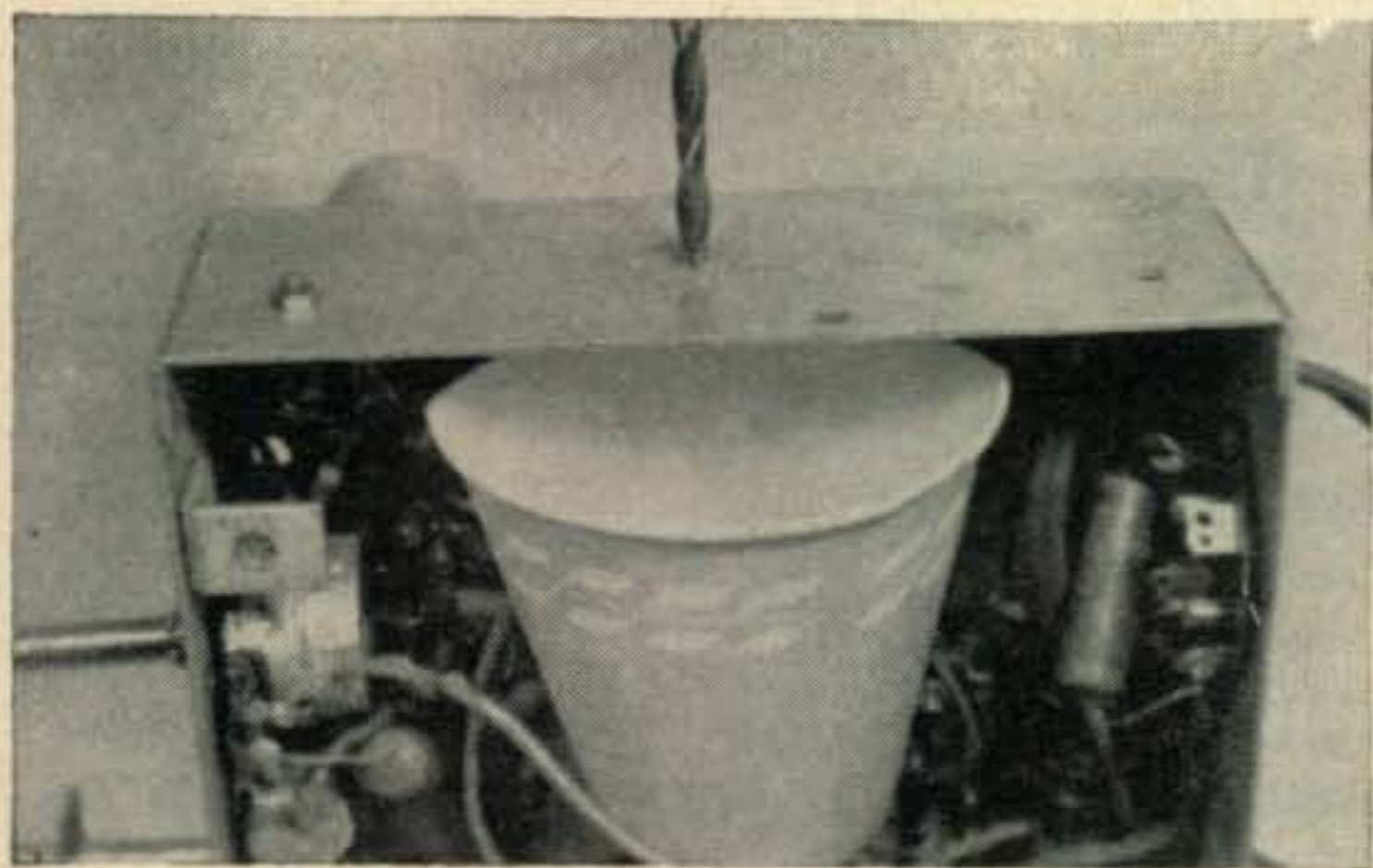
The technology of the phone patch is greatly diversified. There has been a great abundance of patch circuits and commercial models in the past decade. With the advent of single sideband as a superior mode of amateur communications, phone patch mandates have grown more stringent. A patch must now

operate sequentially with automatic voice control circuitry. It must do so with a high degree of reliability.

Raypar, Incorporated of Chicago, Illinois have made their contribution to the fraternity through their Model TE-1 Patch. This is a relatively small, well engineered unit with many interesting features. The hybrid type circuitry allows smooth and efficient tracking with VOX transmitters. Features for use with conventional push-to-talk are also included. There is an output level control which equalizes modulation levels for easy change over from patch to microphone. Of paramount importance is the fact that provisions are included to mute the speaker of the station receiver when the control switch is thrown to the patch position.

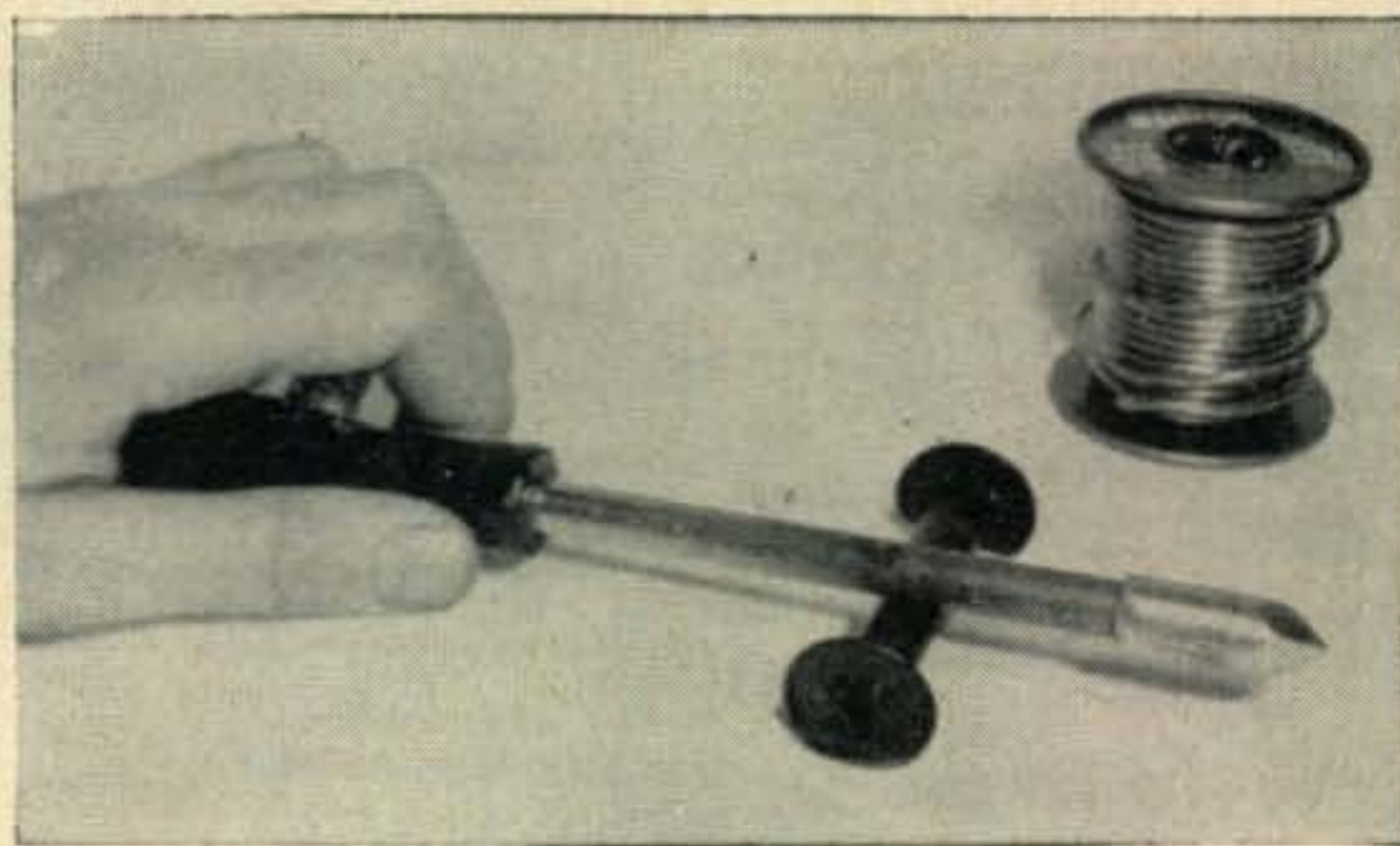
Barry A. Briskman, K2IEG

Hints For Hams



Chip Catcher

When drilling holes in the chassis or ham gear, catch metal chips in a paper drinking cup wedged in amongst parts and wires. Metal chips can cause all sorts of troubles. Use the cup to catch drops of solder the same way.



Emergency Iron Rest

Misplaced your soldering iron rest? Do not rest your iron on tools—heat removes their temper and you just might pick up that tool while it is hot. A metal 120 or 620 film spool makes a good rest. Bend the flanges out along one edge so it will not roll off the bench.

VHF

by Sam Harris, W1FZJ

P.O. Box 334, Medfield, Mass.

50mc. 144mc. 220mc. 420mc. and above

Nobody works harder than a VHFer trying to work dx. When you relagate HIM to the status of "all he wants to work is dx" you are classing him with some of the best that hamdom has to offer. It is true that when he calls a CQ he doesn't appreciate answers from Gonsets 20 miles away. Doesn't mean he won't answer if he hears you but he probably won't. If he is looking for dx he has a good idea what frequency he expects to hear it on. By the time he has checked all the known frequencies and then carefully tuned through the cw band you are in qso with someone else. The first thing he hears from you is complaints about people who don't answer calls from locals. He may fall in this class but if he does it is as much your fault as his. There is a time to call and a time to listen. He has made a study of it and knows when to. How about you?

Perseids Meteor Shower

It doesn't seem possible but it's true. The Perseids are just around the corner. As a matter of fact you have just about got time to make some skeds. (Most likely times are August 12 to 16.) If you are not going to participate in schedules yourself you can get some good listening practice by eavesdropping. A list of good listening frequencies is included in this month's column. They are not all guaranteed but with any luck you should be able to get some good bursts from some of them. If you want guaranteed results you might try picking out a likely suspect or two and send

him a stamped and self addressed envelope requesting definite information on date, time and frequency of his schedules. Most of the activity on the Perseids has been on two meters. It isn't that they don't work on other bands. The 1500 mile range is pretty easy to work on six meters and activity on 220 has not reached the density required to get people interested. That is not so far. Maybe this is the year for 220 to blossom out as a meteor scatter band. I am sure that there are lots of people who will advance all kinds of reasons why meteor scatter won't ever be practical on 220 mc. I am equally sure that no self respecting ham will pay any attention to them and that most certainly will try. In case anyone is interested in skeds with Massachusetts don't hesitate to drop a line to W1FZJ. Be sure to include your



Gene Niemiec (K2KJI) frequently heard working madly during contests.



K6EHR/6 set-up in '58 contest. Bob himself is barely visible. That's Van (K6QXY) in foreground.

exact frequency. Also be sure that you are at least 500 miles or more away.

220 MC Frequency

It seems that the boys on the west coast are making an effort to get the 220 mc band operators to start their activities on 222 mc. The reason is the greatly reduced interference from TV sets. And it's a good reason too. Only one problem. The boys on the east coast claim that they tried that a long time ago and had to give it up because of the increased TVI encountered. As this increased TVI is due to poor image rejection on the part of the TV set it would seem that the trouble could be cured.

So far no one has come up with a cure for radiating TV sets. Sharp beams and isolated locations are a help. If you don't hear any you just better fix up your receiver cause it ain't workin. I am sure that there won't be any conflict between the east and the west coast operators on this matter but there are those guys in the middle who may have some legitimate complaints. If you have any druthers you might speak up. It won't do any good but you can get people mad at you that way.



Jack Harrigan (W1PSG), two meter enthusiast and contest winner (Often) on 144 mc.

Two Meter Frequencies

STATION CALL	FREQUENCY
W9AAG	144,100
W4AIB	144,038
W1AJR	144,338
W0BFB	144,233
W1BU	144,250
W8BKI	144,251
W4BUZ	144,082
W1COT	144,095
W9EGH	144,022
W5DCU	144,010
K0EMQ	144,118
W8GFN	144,148
W3GKP	144,040
W4HJQ	144,055
W0HND	144,110
W5JWL	144,067
W8KAY	144,300
W3KCA	144,193
W5KTD	144,080
K8LOF	144,007
W5LPG	144,152
W1OAX	144,047
W1OBQ	144,056
W9PbP	144,155
W1QAK	144,002
W1QVK	144,184
W5RCI	144,205
W9REM	144,113
W1REZ	144,008
W4RFR	144,082
W1RFU	144,177
K2RLG	144,052
W2RXG	144,022

Well - known Amateur frequently heard talking to BHFers.



STATION CALL	FREQUENCY
W0RYG	144,176
W0SMJ	144,042
W4UMF	144,088
W8URO	144,155
W2WHX	144,021
W9ZIH	144,049

If you don't find your call here I just didn't have your two meter frequency. If you do find your call and it is not correct I just didn't have your two meter frequency. Please advise.

Letters

Arlington, California Some 220 mc news from Bill Locy (K6GTG):

"On May 23rd I pulled down the cushcraft 44 element beam and put up two 13 element long Johns. On Sunday, the 24th, I worked W7LEE, Parker, Arizona. We started contact on cw but signals were so strong we went to phone. W7LEE's signal was 6/8. My signal was 5/9. We had a half hour rag chew like locals."

"Later in the afternoon I worked K6UZC at Oxnard. Signals were 5/7 to 9 (QSB) each way. An hour later I worked W6FZA in Porterville. My signal was 5/7. W6FZA was 5/7/9 on cw. When I finished my contact I had to run home for 15 minutes to get the buttons sewed back on my shirt. You see the ham shack is about 200 feet from the house. My latest set-up on 220 is a 4CX250B with a pair of 100TH's as modulators. From extensive tests made at this QTH under every condition, horizontal has come out tops on every test."

"W7LEE and myself have run tests vertical to vertical, horizontal to horizontal, with the same beams and the same antenna height. Horizontal polarization has made the difference of working Bob, W7LEE on phone instead of cw and has proven out on other contacts as well."

"Would like some schedules with those who are interested in 220 mc, horizontal polarization only." *Welcome to the fold, Bill, and fine business on your two-twenty work.*

Elkins, West Virginia A long way from California, but still more 220 mc news from Al Minke (K8AXU):

"Just a few lines to let you know that I am now on 220.070 mc with a 6360 rig. So far I have four states on 220 mc. I will be at my 4000 foot portable QTH this summer on 220 and 2 meters." *Keep at it Al and from that Portable QTH you may have a lot more by fall.*

Glenallen, Alaska From good ole' 49th and Gary Carlson (KL7CUR) we find another six meter station:

"This is to inform anyone interested that there is now a new six meter station on the air in Glenallen, Alaska, about 200 miles Northeast of Anchorage and 120 miles north of Valdez."

"I converted the eleven meter band in my Viking

HAM Schooling

This interesting picture story shows SM5BJU, a Swedish schoolteacher, presiding over a group of youngsters. . . . This for the purpose of providing future engineers . . . and Radio Amateurs.

The photos show a group of boys, aged 12 to 16, of the Loviselund School, in Hasselby, one of the suburbs of Stockholm. This particular construction project deals with the manufacture of small shortwave receivers which are to be used in "Fox-Hunts," a term describing the Swedish version of our hidden transmitter hunts.

Jan Ulf Fredholm, SM5BJU, is an experienced radio amateur who teaches his students radio techniques one night per week. The town of Stockholm and the school board have placed half a million crowns in different forms of extra-curricular activities, but only Hasselby boys have the opportunity to receive instruction in amateur radio.

An interesting supplementary feature to this educational program is shown in one of the photos. Jan has brought his home-brew 120 watt transmitter and National receiver into the classroom where the boys can actually take part in amateur radio via SM5BJU. Congrats, Jan! Keep up the good work. ■



Presentation of plaque to Gene (W5HOD) and Mina (W5HOI) Hahnel by Will Thompson (W5TYS) in appreciation of their service to the "Six Meter Club of Dallas." Gene and Mina are moving to Amarillo.

Change of officers in "Six Meter Club of Dallas." Top row, outgoing officers. Bottom row, new officers.



Bill Locy, K6GTG, avid 220 mc man at operating position.

Ranger transmitter for six meters according to an article in the April '59 'QST' and will be looking for the other states as soon as we get an opening up here. I would appreciate the other stations keeping an eye out for us up here in the far northland on 50 mc." I'm sure we'll all be only too happy to listen for you in openings Gary, but believe it will probably be quite some time 'til we have that kind of an opening. Glad to welcome you to the 6 meter gang. Gives us all one more to listen for.

Pocatello, Idaho Treat him gently, speak softly, be kind to him—who?, why Jack Butrovich, W6GTJ/7, in Pocatello, Idaho. Jack sez:

"Had Sporadic E openings on the following dates: 5-19-59—worked 14 WØs and W5's. 5-21-59—worked 13

[Continued on page 99]

RULES: 1959 CQ WORLD WIDE DX CONTEST

I. CONTEST PERIOD:

Phone Section—0200 GMT October 24 to 0200 GMT October 26. CW Section—0200 GMT November 28 to 0200 GMT November 30.

II. BANDS:

The contest activity will be in the 1.8, 3.5, 7., 14., 21., and 28. mc amateur bands.

III. TYPE OF COMPETITION:

1. Phone Section. (a) Single Operator. (b) Multi-operator, single transmitter. (c) Multi-operator, multi-transmitter.
2. CW Section. (a) Single Operator. (b) Multi-operator, single transmitter. (c) Multi-operator, multi-transmitter.
3. Inter—Club. (DX Clubs affiliated to a National body.)

IV. EQUIPMENT:

There is no limit to the number of transmitters and receivers allowed and competitors may use the maximum power permitted under the terms of their license.

V. SERIAL NUMBERS:

1. Phone stations will exchange serial numbers consisting of 4 numerals, the first 2 being the RS report and the last 2 their own Zone number.
2. CW stations will exchange serial numbers consisting of 5 numerals, the first 3 being the RST report and the last 2 their own Zone number.
3. Stations in Zones 1 thru 9 will prefix their Zone number with Zero. (01 and etc.)

VI. POINTS:

1. Contacts between stations on different continents will count 3 points.
2. Contacts between stations on the same continent, but not in the same country, will count 1 point.
3. Contacts between stations in the same country will be permitted for the purpose of obtaining a Zone and/or Country multiplier but no QSO points are credited.
4. Only one contact with the same station is permitted per band.

VII. MULTIPLIER:

Two types of multipliers will be used.

1. A multiplier of 1 for each Zone contacted on each band.
2. A multiplier of 1 for each Country worked on each band.

VIII. SCORING:

1. The score of each Single Band is the sum of the Zone and Country multiplier for that band, multiplied by the total contact points on that band.
2. The total All Band score is the sum of the Zone and Country multipliers of all bands, multiplied by the sum of the contact points on all bands.
3. Those sending in logs for a Single Band are eligible for a Single Band award only. If a log is sent in for more than one band, indicate which band is to be judged, otherwise it will be judged as an All Band entry.
5. A station is not eligible for more than one award.
6. Single operator contestants must show a minimum of 12 hours of operating time to be eligible for an award. If a contestant operates more than one band and wishes to be judged for a specific single band, he must show a minimum of 12 hours on that band.
7. Multi-operator stations must show a minimum of 24 hours of operating time to be eligible for an award.

IX. ZONES and COUNTRIES:

The CQ Zone map and the ARRL and WAE country lists will be used as standards. The continental boundaries used for WAC will also be recognized. Should any question arise as to the positive location of a station, the official definition will be final.

X. AWARDS:

Certificates will be awarded in each section as follows:

1. To the highest scoring station on each Single Band in the following areas:
 - a. Each call area of the United States, Canada and Australia.
 - b. All other countries.
2. To the station having the highest All

Band score (more than one band) in the following areas:

- a. Each call area of the United States, Canada and Australia.
- b. All other countries.

XI. SPECIAL AWARDS:

In addition the following special awards will be made:

1. A cup will be awarded to the highest scoring Single Operator, on a Single Band, Phone Station in the world. (Donated by W6AM)
2. A cup will be awarded to the highest scoring Single Operator on a Single Band, CW Station in the world. (Donated by W7KVU)
3. A cup will be awarded to the highest scoring Single Operator, All Band, Phone Station in the world. (Donated by W2SKE)
4. A cup will be awarded to the highest scoring Single Operator, All Band, CW Station in the world. (Donated by W9IOP)
5. A cup will be awarded to the highest scoring Multi-operator, All Band, Phone Station in the world. (Donated by K2AAA)
6. A cup will be awarded to the highest scoring Multi-operator, All Band, CW Station in the world. (Donated by K2GL)
7. A plaque will be awarded to the affiliated DX Club (not a national body) submitting the highest aggregate score of the scores submitted by its members. (Donated by CQ)
 - a. For a club to enter, an officer of the club must submit a list of its participating members and their scores.
 - b. This list may include scores of single operator and multi-operator stations; both phone and CW.
 - c. Stations that are members of a competing club therefore must indicate this fact on their report forms.
8. At the request of the donors, previous winners are not eligible for the 1959 awards. In other words the trophy

WORLD-WIDE DX CONTEST LOG

CALL W1GYE COUNTRY U.S.A. PHONE CW
 LOG FOR 14 MC MC BAND CALL LETTERS OF OTHER OPERATORS ---- NR. OPERATORS 1
 (Use separate log for each band.)

DATE (GMT)	TIME (GMT)	STATION	SERIAL NUMBERS		FILL IN ONLY WHEN QSO IS A MULTIPLIER		POINTS (1 or 3)	
			SENT	RECEIVED	WAR ZONE NR.	NAME OF COUNTRY		
Nov 28	0210	W2JB	56905	55905	5	USA	-	
"	15	1e2FA	59905	58906	6	Mexico	1	
"	20	W6YY	59905	57903	3	- -	-	
"	25	CX2CO	58905	58913	13	Uruguay	3	
"	0310	KV4AA	59905	59908	8	Virgin Isl	1	
"	15	Kh6IJ	57905	56931	31	Hawaii	3	
"	30	CE3AG	57905	57912	12	Chile	3	
"	1200	W4KFC	56905	55904	4	- -	-	
"	05	VE3APT	55905	55904	-	Canada	1	
"	15	4S7WP	55905	55922	22	Ceylon	3	
"	30	JALAA	55905	44925	25	Japan	3	
"	2200	GW3ZV	59905	57914	14	Wales	3	
"	10	F9RS	57905	56914	-	France	3	
"	15	DL7AA	57905	56914	-	Germany	3	
"	20	DJ1BZ	57905	56914	-	- -	3	
Nov 29	0110	4I4RE	56905	55920	20	Israel	3	
"	15	OK1JY	57905	56915	15	Czeck'vkia	3	
					TOTAL NUMBER ZONES, COUNTRIES, POINTS	13	14	36

cannot be won more than once by the same station. This does not apply to the plaque.

9. Also such special or additional awards as the Committee shall choose to make. In countries or sections where the returns justify second and third place certificates will be awarded.

XII. DISQUALIFICATION:

Violation of the rules and regulations pertaining to amateur radio in the country of the contestant or the rules of this contest will be deemed sufficient cause for disqualification.

XIII. LOG INSTRUCTIONS:

1. In keeping a log, fill in Zone number and Country, **ONLY FIRST TIME** it is contacted.

2. Use a separate sheet for each band and a tally sheet or report form.
3. Keep all times in **GMT**.
4. All contestants are expected to compute their scores. Logs should be checked for contact duplications and proper point credit before they are submitted.
5. Make sure name and address is clearly noted on each log. Print or type.
6. Each contestant must sign a pledge that all rules and regulations have been observed and that the report is a true one. Note sample contest report form.
7. If official log forms are not available, use a duplicate form as indicated. The size is 8½" x 11", containing fifty

[Continued on page 98]

All Band Entry Phone Station Call Letters W2BO
 Single Band Entry CW Number of Operators 1

CQ WORLD-WIDE DX CONTEST

Band	QSO'S	Zone Multipliers	Country Multipliers	Points	Score	Band
1.8 MC	2	2 +	2 X	1	4	1.8
3.5 MC	10	5 +	4 X	18	162	3.5
7 MC	15	6 +	10 X	33	528	7
14 MC	18	7 +	13 X	45	900	14
21 MC	20	10 +	12 X	60	1320	21
27 MC		+	X			27
28 MC	30	12 +	18 X	80	2400	28
TOTAL	95	42 +	59 X	237	23,937	All Bands

INSTRUCTIONS: To determine All Band score, total each column with the heavy lines. Single band stations are permitted to operate on more than one band. However, indicate and total **ONLY** the band you wish judged.

Transmitter Description and Power _____

_____ limitations of
 _____ the rules and regulations of the contest.

M. A. McIntire
 M. A. McIntire W2BO
 Name Call
 501 Atlanta Avenue
 Street and Number
 Massapequa, L. I., N. Y.
 City Country

Logs must be postmarked not later than December 1, 1959 for Phone section and January 15, 1960 for CW section.

Submit logs to: CQ Magazine, 300 West 43rd St., New York 36, N.Y. Att: Contest Comm.

URBAN Le JEUNE Jr., W2DEC
416 North 15 St., Kenilworth, N.J.

DX DX DX DX DX DX DX DX

The following certificates were awarded during the period of May 15th to June 15th, 1959:

WAZ CW/PHONE

1029	UA3BN	Nicolaj Stromilov
1030	SM3EP	Gosto Westerlund
1031	W4SXE	Karl P. MacDowell
1032	W7YGN	John Allyn
1033	SM3AGD	Arild Sjolund
1034	W7PB	Milton W. Rice
1035	WØAGO	R. H. Hoffman
1036	W9UX	Roy W. Weisbach
1037	DL6MK	Edgar H. Schnell
1038	KØHGE	Robert Locher
1039	SM5AJU	Leif Lundin
1040	W9WHY	Adolph Jelen
1041	K6OXU	Merrill C. Dean
1042	WØUQY	M. J. McAllister
1043	W6VSS	Dale A. Hoppe
1044	W3ARK	J. C. Kupp, Jr.
1045	DL3LB	Eduard Kuhnle
1046	W6GSL	W. Arthur Root
1047	K6KJR	Lester S. Bernard
1048	W4KWC	Edward R. Brittain
1049	W9WYB	John R. Nord
1050	HB9TT	Perret Serge
1051	K6CQM	Robert T. Murphy
1052	DL6EN	Gunter Heinzen
1053	DJ2AE	Peter Schmid-Burgk
1054	DJ1JW	Hubert Esser
1055	W5LGG	Leonard G. Parsons
1056	W4AZK	David S. Traer
1057	W9EXY	Donald A. Jensen
1058	DJ3KR	Jurgen Rottger
1059	W3EOB	Fred Koeng
1060	UR2BU	Karl Kallemaa
1061	W3CA	Kendall H. Speer
1062	K6AQP	Guy L. Kane
1063	KL4NM	Randolph O. Lusk
1064	W4NBV	Carl M. Smith
1065	W9IWX	Norman F. Schumacher
1066	VE7KJ	Himmy Bow Jang
1067	W6RAN	Bill Elliot
1068	IT1ZGY	Marino Pietro
1069	EI9U	Thomas O'Connor
1070	W6ONK	Russ Smith
1071	WØAZT	Cliff McLoud
1072	W5PM	J. Allen Swanson, Jr.
1073	W5BRR	George T. DeLaMatyr
1074	W8CWY	John E. Hoffer
1075	K4RID	W. R. Tippet, Jr.
1076	W6SIA	Harold G. McRoberts
1077	K5LZO	Chuck Coleman
1078	W9DYG	Fred R. Borchardt
1079	OK1MP	Milos Prostecky

WPX PHONE

5	ZP5CF	Dr. Federico Donna, Jr.
6	W9UZC	James H. Carnett

WPX SSB

8	WØFUH	Leonard H. Guldman
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WPX HONOR ROLL

Confirmed prefixes as of June 15th.

CW WPX

W2HMJ	516	DL7CS	330
W6KG	473	W6YY	330
OK1MB	397	K9EAB	319
W5KC	370	G3EYN	318
W9DYG	367	VK6WT	316
VE3DIF	357	PAØVO	315
W6WO	356	SM5AHK	311
W8JIN	350	W2PTD	311
W9IU	346	W3BQA	311
W8RQ	311	K5LIA	306
PAØLY	310	OK3DG	306
W5DA	310	UA9DN	306
W9BPW	310	W9UXO	306
DJ3BB	308	K4HXF	305
SM5BCE	308	K6SXA	305
W5AFX	308	W5OLG	305
W1EQ	307	W8LY	305
DL1QT	306	VE3BWY	305
W1BFT	304	W5LGG	302
W6RLP	304	LU5AQ	301
OK1AEH	304	W2DGW	301
SM5CCE	304	W4HYW	301
W1FZ	304	WØPGI	301
W2EQS	303	K2PFC	300
W5AWT	303	K4JVE	300
W9VIN	303	K4KOY	300
W3DBX	302	KL7MF	300
W2FXA	300	W4GXB	300
W2MUM	300	W4OPM	300
W3BCY	300	W8KPL	300
W3LMA	300	F9MS	299
		OK1BY	207

WAZ PHONE

33	SM5CO	Alex Alexandersson
34	ON4DM	F. Mouraux
35	W2JT	Earl Lucas

PHONE WPX

W8WT	434	ZP5CF	306
G3DO	385	W9UZC	302
PY2CK	354		
CT1PK	350		

WPX CW

57	W5OLG	Robert J. Stark
58	OK3DG	Jozel Kremerik
59	W9DYG	Fred R. Borchardt
60	W4OPM	C. Joe Hiller
61	K2PFC	Duane H. Harris
62	K4HXF	H. L. Parrish, Jr.

SSB WPX

VE3MR	164	W8YBZ	152
K2MGE	158	K9EAB	151
TI2HP	155	WØFUH	151
WØCVU	155		
W2TP	153		

BV1 Formosa—It looks like APO 140 is ok now as BV1USB is receiving his mail which is sent to this QTH. QSL BV1USC to Navy No. 3840, FPO, San Francisco, California (Tnx W6CQW)

CEØ Easter Island—CEØAC is active on 14 mc CW Wednesdays and Sundays at 0215 to 0300 GMT. QSL via CE3HL or via RCCH. (Tnx CE3AG)

FB8 Kerguelen Island—A new operator by the name of Roger has taken over at FB8XX and has been active on 14039 kc around 1030 GMT. QSL via FB8BC. (Tnx ZL1AIH)

FP8 St. Pierre—Roby, VO1BD, will be operating as FP8AY for the first week in August. A DX40 and skybuddy will be used. QSL to VO1BD, Roland Peddle, 11 Vaughan Place, St. John's, Newfoundland.

JT1 Mongolia—JT1AB has been very active on 14060 kc around 1400 to 1500 GMT. His direct QTH is Box 369, Ulan Bator, Mongolia. W7PB was the first WAZ applicant with a JT1AS QSL.

KB6 Canton Island—The following stations are now active on Canton Island: KB6BK; KB6BL (the XYL of KB6BK); and KB6CB. They can usually be found at the high end of the 21 mc phone band, on SSB, from 0900 to 1030 GMT. (Tnx NCDXC)

VK2 Lord Howe Island—VK2FR has been heard irregularly on 14150 kc AM phone, using a new transmitter. (Tnx NCDXC)

VQ3 Tanganyika—John, VL4HE, will be signing VQ3HE from Dar-Es-Salaam during July and August. QSL to P. O. Box 804, Dar-Es-Salaam, Tanganyika Territory.

VS5 Brunei—Bruce, VS5BY, is now back on the air after considerable equipment troubles. On his return from a vacation in Hong Kong, eager to get back on the air, he found corrosion had attacked his equipment, necessitating the rewinding of two transformers and the replacement of several condensers. W6ZEN (Floyd McPherson, 395 Corsicana Dr., Oxnard, Calif.) will handle his QSL's, for which a self-addressed stamped envelope is required for a direct reply. (Tnx W6ZEN)

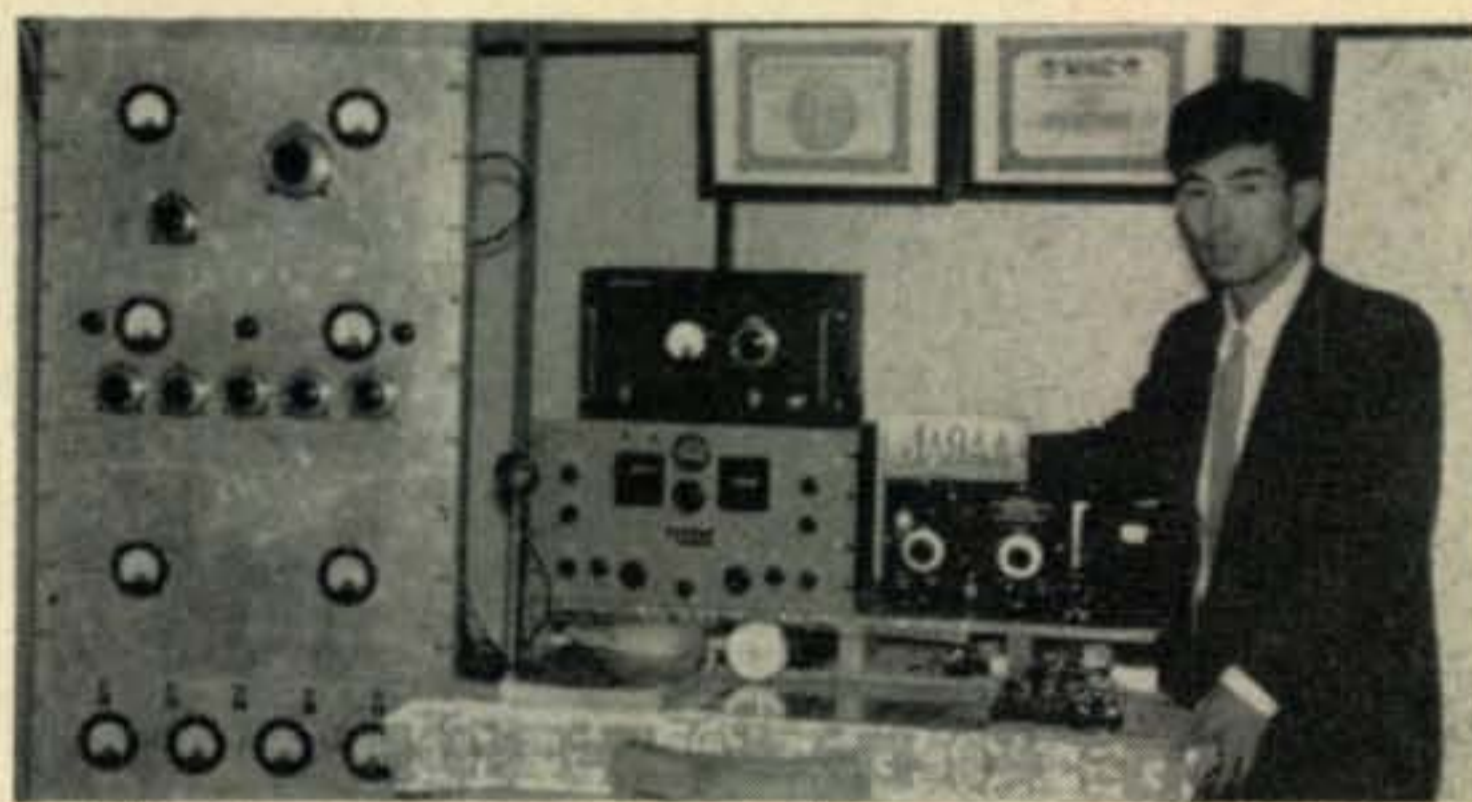
ZC5 Borneo—Mike, VS1BK, should be getting on from Borneo about the time you read this. He is trying to get the call ZC5BK and will be active on 28 mc and 21 mc fone and on 21 mc and 14 mc CW. If he can make a go of it, he will try a little 14 mc fone looking for stateside contacts only. (Tnx W7YEY)

XW8 Laos—Sid, XW8AH has closed down for good and is now in the states. His next assignment will take him to Tunisia for two years with licensing looking very promising. If a license is obtained, he will operate 14 and 21 mc CW and SSB. His stateside QTH is: S. S. Wagoner Jr. W8UT, 16541 Comstock Road, Grand Haven, Michigan.

ZM3 Tonklau—Win, ZL3DX, mentions



Commander Anderson of the atomic submarine Nautilus signs autographs at last year's award night for the "Concorso Genova" contest.



Emma, JA9AA, and his very neat station.



This is where the much sought after SSB signal of Bruce, VS5BY, originates. (Tnx W6ZEN)

This silver caravel is the first prize in the "Concorso Genova" contest. Details in text.



that ZM7 will soon be active for three months out of every year. Equipment is needed for the Tonklau and he mentions the prefix will probably be changed to ZK3. (Tnx Ether Waves) Win should be thanked for the real bang up job he did from VR5, ZK2 and ZM6. He worked long and hard to give everyone who needed these countries a chance to get at them.

ZS2 Marion Island—ZS2MI often skeds ZS6ANE on 14198 kc AM at 1800 GMT Fridays. (Tnx PAØLOU)

ZS8 Basutoland — ZS6IF is planning an expedition to Basutoland sometime during October or November. Lambert may also go to ZS7 and ZS9 on this trip. He extends a cordial invitation to any W/K/VE that would be interested in joining him. Anyone who could bring SSB equipment would be particularly welcome. (Tnx VE3DMU)

4S7 Ceylon — 4S7RD has returned to G3KUD. Frank, 4S7FJ ex VS1FJ is now active. (Tnx W2CDP)

9N1 Nepal—After many months of talk, it looks as though the boys are coming out from under cover. 9N1AA, Bob, was worked by W2DOD and W2DKS on 14091 kc at 0320 GMT. Dick, KV4AA, also got 9N1AA on 14080 at 2330 GMT. There have also been several reports of fellows working 9N1AB. (Tnx W2DOD)

DXpeditions

The following is an account of two recent DXpeditions. First, Bob, ON4QX, tells his story of his trip to Monaco.

"For my 4th expedition, I decided to go to 3A2, Monaco. Passing the different borders with radio equipment is very difficult. It is more work to transfer the equipment across the borders than to get the license itself. My equipment is always the same, a home made transmitter with an 807 in the final running 30 to 40 watts and a Hallicrafters SX 100 receiver. Both of these units are light in weight and ideal for expeditions. My location in 3A2 land was poor but the results were very good. I had over 400 QSO's on 20 meters, worked 62 countries and 26 zones and also WAC. The average report from DX stations was 449 and mostly 589 from Europeans. My antenna was a single wire 30 feet long and only 40 feet high between the walls of two hotels. I was located at Conamine, the lowest part in Monaco, near the little harbour. At first, I thought trying to work DX would be foolhardy, but apparently, the mountains bounce the signal back into the ocean and the results were very FB.

The QRM was terrific. The Grand Prix of Monte Carlo was held while I was there. Moss, the race driver, had a room directly above mine. Even a few days before the race there was training and after the training everybody thought they were a Moss or a Fangio

and drove their sports cars through the streets at 60 mph. I received a terrific workout by that QRM, especially since my room was on a balcony just above the boulevard. The Sunday after the motor car race there was boat racing and more QRM was back.

I feel sorry for the 3A2 boys over there. There is no license required and no one is on CW except 3A2CX. If one of the 3A2 gang call CQ DX, everyone in Europe is down on top of them so they decide not to be on the band, but things are not all bad as the sun is always shining there.

The President of the Monaco Radio Club, 3A2AH, was to my surprise, a Dutchman who spoke fluent Flemish, which is my native language. He has been in Monaco over 28 years. The most active stations there are 3A2BN, BA, and BY on fone and 3A2CX on CW. Bill Orr, W6SAI, was only a few yards from my hotel but I could not reach him as he was always absent. On my way home, I was invited to a meeting of the 4th section of the REF at Nice and was made a member by President F3EG. I may return to Monaco again in a few years because once you get a call it remains your property. I wish to thank 3A2AH for his cooperation and my QSL manager, ONL744, Wim Goossenearts, who is still writing out my cards.

Until next year around April/May for another new DXpedition,

*73 es Dx
Bob, ON4QX"*

As you know, Piero, IT1ZGY, made an expedition to the Pelagian Islands and this, in part, is his story:

"The first idea of an expedition came with my first license when as a novice I began to hear of DXpeditions all over the world. In 1955, I was asked by Rudy, DL7AA, to try an expedition to the Pelagian Islands, which is a separate country for WAE. In 1956 I went



Bjorn, SM1BVQ, will be active during the summer until August 20th. Anyone needing SM1 for WASM or WPX can look for Bjorn after 2300 GMT on 14050.

there to see the possibilities for ham radio operation. Pantelleria Island, which geographically is part of the Pelagic group, is situated nearer to Africa than to Sicily. It has a nice town with a hotel, ac current and a good DX position. Circumstances prevented me from going there until I was given some help by my brother, Dom, ITITAI. First we made a transmitter especially for the trip. Then we tried to have a special prefix assigned so that in case ARRL would not recognize it as a new country, it would have been successful for WAE and WPX. Thanks to our government, we had luck and a distinct prefix IPI was to be used for our expedition. Operators were to have been ITIZWS, ITIGO and myself. However, while skiing in March, ITIZWS had his leg broken, ITIGO became ill and my brother Dom was forced to remain home because of my father's serious illness. On a day before the trip, ITIPA decided to accompany me.

A short air trip and we were in IPI land on April 24th. What crowds! People at the airport, people in the halls, people on the roof



Uncle Dave, W2APF, and Harry, ZS2HX, during Uncle Dave's recent visit to South Africa.

while we were mounting our vertical antenna; all astonished and interested in our work. We had an operating room close to the bedrooms, but sleeping was not easy during our relief. Someone was always knocking at the door, 'Please let me see.'

The first QSO was with F8NI with not too good a report. I decided to use the other antenna we had, a Windom for 21 mc. I gave ITIPA the key and ran away to find something to put up the Windom as high as possible on the roof. I could put it up very fast and high but I lost about an hour in which my second op made only 1 QSO. With the Windom things changed, a lot of Europeans and at evening, the first W's and some Asians started to come through with some good reports. All seemed to be ok until 2400 GMT. Then the ac failed. What happened? Now don't you know that ac is on only from 0600 to 2400



ITIZGY at the operating position of IP1ZGY during his trip to the Pelagic Group in April. (Tnx W1WY)

GMT. We tried a little generator we had and were surprised with the big pile ups our QRP signal caused. At 0143 GMT, I worked W2DEC for the first IPI phone QSO. The next morning, with full power, I worked the first VK-ZL and KC4USA, who had never before been worked by an IT1. I also worked CP2AR, who I still need from ITIZGY, hi.

While we were there we even had movies taken of our expedition, which was shown on TV and I am now a celebrity.

We had about 1250 QSO's in all continents. We are now trying to have IPI recognized as a separate country for DXCC and if it is, I will return there, perhaps before the year ends. Well, that is about all. A long story for a short but hard DXpedition. If you would like a direct QSL, please send one IRC to ITITAI, otherwise, all QSL's received will be answered via the bureaus.

Certificates

The OVA (Ohio Valley Award) is now being issued by the Ohio Valley Amateur Radio Association in order to promote more "all-band" activity. This award will be issued to all radio amateurs showing proof of QSO with club members. Thirty five points must be earned in order to qualify. At least three bands must be used on any mode. Points are earned as follows:

QSO's on 160 and 3.5 mc	3 Points
QSO's on 7 mc	2 Points
QSO's on 14, 21 and 28 mc	1 Point

The same station may be contacted on six bands. QSO's with associated members count 1/2 of normal points allowed. QSO's with Ohio Valley DXpeditions, VP5BH or KC4AF count the same as regular members. Any post-war contact counts.

Send QSL's and list showing call of stations worked and band used, plus points claimed to W8JIN, Jim Ringland, 8705 Batavia Pike, Cincinnati 44, Ohio, along with enough IRC's or
[Continued on page 100]

PROPAGATION

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

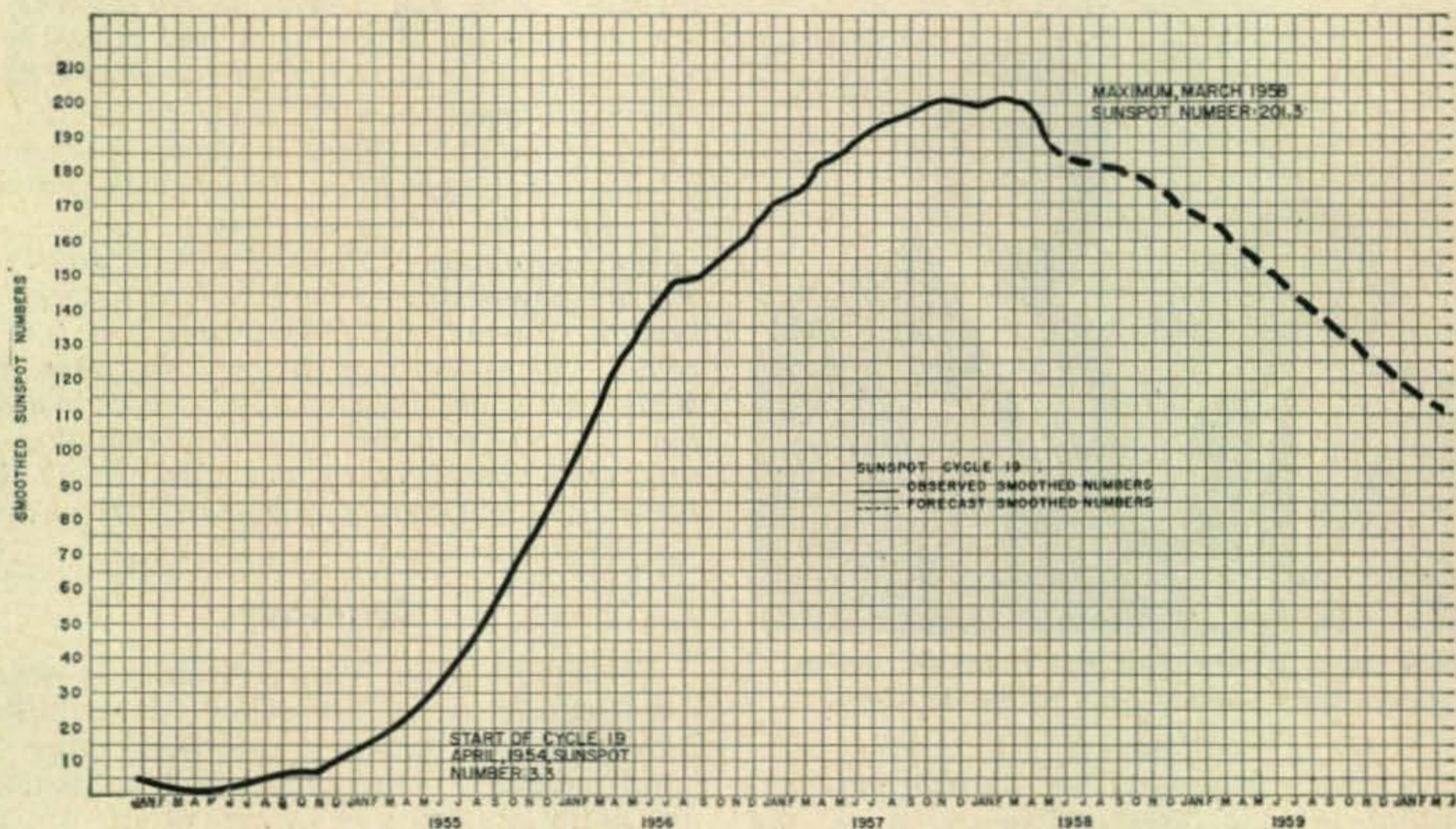
Propagation

Typical summertime shortwave radio propagation conditions will continue through the month of August. *Fifteen-meters* is forecast as the best band for world-wide propagation during the daylight hours, with *20-meters* optimum during the hours of darkness. High static levels will continue during August, being most noticeable on the *160, 80 and 40-meter* bands. Frequent short-skip sporadic-E openings are expected during the

month, being most noticeable on *20, 15 and 10-meters*, but also likely to occur on *6*, and possibly *2-meters*. Towards late August daytime maximum usable frequencies will begin to rise again, and an increase in the number of *10-meter* long-distance openings should begin about then, becoming more and more frequent during the fall months.

Sunspot Cycle Progress

The Zurich Solar Observatory reports a
[Continued on page 102]



Smoothed Sunspot Numbers, Cycle 19

	1954	1955	1956	1957	1958	1959	1960
Jan.	6	14	89	170	199	172*	129*
Feb.	5	16	99	172	201	168*	127*
Mar.	4	20	109	174	201	163*	124*
Apr.	3	23	119	181	197	158*	121*
May	4	29	127	186	191	153*	119*
Jun.	4	35	137	188	187	150*	116*
Jul.	5	40	146	191	185	146*	113*
Aug.	7	47	150	194	184	143*	110*
Sept.	8	56	152	197	183	140*	107*
Oct.	8	64	156	200	181	136*	104*
Nov.	10	73	160	201	179	133*	101*
Dec.	12	81	164	200	176*	131*	98*

* Predicted values

Note: All values are rounded off to nearest whole number.

ALL TIMES IN E. S. T.

EASTERN USA TO:

	10 Meters	15 Meters	20 Meters	40/80* Meters
Western Europe:	10A-1P (1) 1P-3P (2) 3P-5P (1)	7A-1P (2) 1P-3P (3) 3P-6P (4) 6P-9P (3) 9P-12M (2) 12M-7A (1)	6A-1P (1) 1P-3P (2) 3P-10P (4) 10P-6A (2)	6P-8P (2) 8P-2A (3) 9P-12M (1)*
Southern Europe & North Africa	9A-1P (1) 1P-4P (2) 4P-6P (1)	7A-1P (2) 1P-7P (4) 7P-10P (3) 10P-12M (2) 12M-7A (1)	6A-3P (1) 3P-5P (3) 5P-11P (4) 11P-6A (3)	6P-11P (2) 11P-3A (1) 9P-1A (1)*
Eastern Mediterranean	11A-3P (1)	7A-11A (1) 11A-1P (2) 1P-5P (3) 5P-10P (2) 10P-12M (1)	1P-4P (1) 4P-11P (3) 11P-6A (2)	7P-11P (2) 8P-10P (1)*
Central & South Africa	10A-3P (2) 3P-5P (3) 5P-7P (1)	6A-11A (1) 11A-2P (2) 2P-6P (4) 6P-9P (3) 9P-11P (1)	12N-3P (1) 3P-6P (2) 6P-10P (3) 10P-5A (2)	7P-12M (1)
South America	12N-8P (1)** 6A-1P (3) 1P-5P (4) 5P-7P (3) 7P-11P (2)	9A-3P (2) 3P-10P (4) 10P-6A (2) 6A-9A (3)	7A-5P (2) 5P-2A (4) 2A-7A (3)	7P-10P (2) 10P-6A (3) 9P-3A (1)*
Australasia	9A-12N (1) 5P-10P (1)	7A-11A (2) 3P-6P (1) 6P-10P (2) 10P-12M (1)	11P-6A (2) 6A-10A (3) 10A-12N (2) 12N-11P (1)	3A-7A (2) 3A-6A (1)*
Guam & Pacific	NIL	12N-5P (1) 5P-8P (2) 8P-10P (1)	4A-7A (1) 7A-11A (2) 11A-1P (1)	NIL
Japan, Okinawa and Far East	NIL	7A-11A (2) 11A-3P (1) 3P-8P (2) 8P-10P (1)	2A-6A (1) 6A-11A (2) 11A-5P (1)	NIL
Malaya & South-East Asia	NIL	9A-2P (1) 2P-5P (2) 5P-8P (1)	6A-9A (2) 9A-2P (1) 2P-5P (2) 5P-7P (1)	NIL
Philippine Is. & East Indies	NIL	11A-3P (1) 3P-5P (2) 5P-8P (1)	6A-9A (2) 9A-4P (1)	NIL

ALL TIMES IN C. S. T.

CENTRAL USA TO:

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

ALL TIMES IN CST (Cont'd)

CENTRAL USA TO:

	10 Meters	15 Meters	20 Meters	40/80* Meters
Australasia	6P-9P (1)	7A-9A (2) 3P-7P (2) 7P-10P (3) 10P-12M (1)	10P-12M (2) 12M-3A (4) 3A-6A (2) 6A-9A (3) 9A-12N (2) 12N-10P (1)	1A-7A (2) 2A-6A (1)*
McMurdo Sound Antarctica	12N-2P (1) 2P-4P (2) 5P-6P (1)	11A-3P (1) 3P-5P (2) 5P-7P (3) 7P-9P (2)	12N-3P (1) 3P-5P (2) 5P-7P (3) 7P-9P (1)	7P-9P (1) 9P-2A (2) 2A-4A (1) 9P-1A (1)*

ALL TIMES IN PST

WESTERN USA TO:

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

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

The CQ Propagation Charts are based upon a CW 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 September 15, 1959. All forecasts are based upon ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

Last Minute Forecast

Exceptionally good shortwave propagation conditions are expected during the period August 7-12. The remainder of the month is forecast as seasonally normal except for August 3-4, 15-16, and 30-31, when slight to moderate radio storms are likely to occur.

CONTEST CALENDAR

by Frank Anzalone, WIWY
14 Sherwood Road, Stamford, Conn.



Impressive display of trophies that will be given in the Club CAZADORES DX Contest.

August	15-25	C C DX
September	5- 6	LABRE CW
September	12-13	LABRE Phone
September	12-13	Peruano Phone
September	19-20	Peruano CW
September	19-20	SAC CW
September	26-27	SAC Phone
September	26-27	MARC VE/W
October	3- 4	VK/ZL Phone
October	10-11	VK/ZL CW
October	24-26	CQ WW DX Phone
November	28-30	CQ WW DX CW

C C DX

Starts: 00:00 GMT Saturday, August 15th.

Ends: 24:00 GMT Tuesday, August 25th.

The DX Club Cazadores of Beira, Mozambique is sponsoring an International DX contest commemorating a celebration for the city of Beira.

This is a world wide contest and therefore not confined to working CR7s only.

After studying a rather complicated sheet of rules I came up with the following. Hope I haven't left out anything.

1. Each contact counts one point on CW and 1.25 points on Phone.
2. However additional points are given for working CR7s located in Beira. The points vary according to your location. For the North America area they are as follows:
3. Zone 3 (except VE)—CW 3 points, Phone 3.75 points.
Zone 4 & 5 (except FP8, VE & VO)—CW 4 points, Phone 5 points.
Zone 1 & 2; 3, 4 & 5 (FP8, VE & VO)—CW 6 points, Phone 7.5 points.
Zone 6, 7 & 8—CW 7 points, Phone 8.75 points.

4. The multiplier is determined by the number of different countries worked. (ARRL official list.)
5. A station can be worked only *once* and there is a quota of 10 stations per country.
6. Keep your log as follows: Date, time GMT, station worked, reports exchanged, band and type of emission used. (It also stated to mark stations worked for the first time.)
7. Your report sheet should show your name and address and zone. Your final score as computed, points times the country multiplier. Your signature following the customary pledge.

However here is one gimmick I don't savvy. It says that QSLs of stations worked for the first time must be sent with your report.

No serial numbers are involved. Just work as many stations in as many countries as possible, within the 10 per country quota. However it would seem a station can only be worked once regardless of bands. This also seems to apply to your multipliers. A country can be counted only once regardless of how many bands you use.

Cups are awarded to the Top Scorer in the world as well as each Continental leader. Certificates to others.

Your log must reach The Clube dos Cazadores de DX, P.O. Box 875, Beira, Mozambique, Portuguese East Africa, not later than October 31, 1959. Include 10 IRCs and the above mentioned QSLs. (?)

LABRE

CW

Starts: 00:00 GMT Saturday, September 5th.
Ends: 24:00 GMT Sunday, September 6th.

Phone

Starts: 00:00 GMT Saturday, September 12th.

Ends: 24:00 GMT Sunday, September 13th.

Serial Numbers: The usual five and six figures. Signal report plus a progressive three digit number starting with 001.

Points: (a) Between stations in the same country, 0 points; but permitted for purpose of obtaining a multiplier. (b) Between stations of different countries outside the American area, 1 point. (c) Between stations of different countries in the American area, 2 points. (d) Between stations in the American area and all other countries, 3 points.

Multipliers: Two types will be used. (a) One for each American area country worked on each band. (b) One for each Brazilian call area (PY1 to PY9) worked on each band.

Scoring: Single band score is the sum of both multipliers, multiplied by the contact points on that band. The Multi-Band score is the sum of the total multipliers on all bands, multiplied by the total contact points on all bands.

Awards: 1st and 2nd place certificates to leaders in each country in both the Single Band and Multi-Band (3 or more bands) categories. You can use all bands 3.5 thru 50 mc.

The way the rules stack up, it looks to me like anyone can work any station for point credit but you must work a station in the American area or Brazilian call area for your multiplier.

Be sure your report sheet contains a summary of your score, name and address and that you sign the customary pledge that all rules have been observed.

Mail your logs to: The **LABRE** Contest Commission, Caixa Postal 2353, Rio de Janeiro, Brazil.

PERUANO

Phone

Starts: 12:00 EST Saturday, September 12th.
Ends: 24:00 EST Sunday, September 13th.

CW

Starts: 12:00 EST Saturday, September 19th.
Ends: 24:00 EST Sunday, September 20th.

Serial Numbers: The usual five and six figures. Signal report plus a progressive three digit number starting with 001.

Scoring: One point per contact. Multiplier, one for each country worked on each band; Panama and Canal Zone count as one country. One's own country may be worked once per band for multiplier purposes. All logs must contain at least one OA contact.

Awards: There is a trophy for the High Man on Phone. The high scorer in each country and each W/K and VE districts will receive a medal and certificate.

Remember this is a contest limited only to the Americas. Include a summary sheet with your log giving your name, address and final

score. Sign the usual declaration.

Mail within 20 days to: Radio Club Peruano, Att.: Pres. Comission Concursos, Casilla 538, Lima, Peru.

S A C

CW

Starts: 1500 GMT Saturday, September 19th.
Ends: 1800 GMT Sunday, September 20th.

Phone

Starts: 1500 GMT Saturday, September 26th.
Ends: 1800 GMT Sunday, September 27th.

This is a new Scandinavian activity alternately sponsored by countries in the northern group. This year it is being sponsored by the SARL of Finland. A complete coverage was given in last month's column. Your logs go to the **SARL**, P. O. Box 306, Helsinki, Finland.

MARC VE/W

Starts: 18:00 EST Saturday, September 26th.
Ends: 24:00 EST Sunday, September 27th.

Rules same as last year, however we will give a complete run-down next month; which still gives you plenty of time since this is strictly a Canadian/USA affair.

VK/ZL

Phone

Starts: 10:00 GMT Saturday, October 3rd.
Ends: 10:00 GMT Sunday, October 4th.

CW

Starts: 10:00 GMT Saturday, October 10th.
Ends: 10:00 GMT Sunday, October 11th.

Lack of space does not permit us to give the rules as promised last month, however they will positively be in next month's calendar which still gives you plenty of time. Your logs this year go to the W.I.A., Box 2611W, G.P.O. Melbourne, C.1, Victoria, Australia.

Editor's Notes

See this issue for complete set of rules for our own CQ WW DX Contest. Note a reclassification in the Multi-operator division and the elimination of the Novice section.

We will furnish you with log sheets and report forms but you must include a large addressed envelope with sufficient postage to cover your request. Five sheets (1 report form and 4 log sheets) will go for 1 ounce. One log sheet will accommodate 52 contacts, and of course only one report form is needed for each entry.

If you require a large supply, get your request in early so that it can be sent 2nd Class and save you postage.

[Continued on page 74]



by **DONALD L. STONER, W6TNS**
P.O. Box 137, Ontario, Calif.

semiconductors

My early articles on transistor power supplies prompted Al Diem, W3LSZ, to experiment with these fascinating devices. As a result, he has designed, and is currently manufacturing, several ultra-compact supplies that will interest Amateurs and experimenters.

Al's power supplies are aptly called "Mini-Verterers." The supplies use ferrite core switching transformers and operate in the 4 to 5 kc range. They may be short circuited without harm. The small Mini-Verter will deliver up to 2 watts, while the slightly larger Mini-Pak is good for 10 watts output. The units are designed to operate from rechargeable batteries, not carbon-zinc dry cells.

Al specializes in custom built units. You call the shots regarding input and output voltage and he will build them. Regular production units, for the model airplane fan, includes a 250 volt, 20 ma supply for Citizens Band transmitters, and a 30 volt, 10 ma Mini-Verter for the radio control receiver.

Another interesting device from "Mini-Verterers" is a tiny saturable transformer to handle the "switching" for a pair of transistors. The "power" is then handled by any old filament transformer which the experimenter might have around. In other words, you can take a standard 60 cycle power transformer, connect a pair of transistors to the centertap 6.3 volt winding, and wire it up with the saturable switching core. You will be able to obtain 5 volts square-wave, several hundred volts of s.w., and 117 volts of s.w. This should be a handy device for combination 12 volt, dc and 117 volt, ac power supplies.

For more information on the "Mini-Verter's" or "Mini-Pak," drop a line to Al Diem, W3LSZ/6, c/o Philco Western Development Labs, 1881 Austin Ave., Los Altos, California.

Of interest to our QRP Corner readers is

a circuit by Jerry Palmer, W6CWJ, 4535 Camellia Ave., North Hollywood, Calif. Jerry uses the popular T-1324 in a circuit which appeared in this column earlier. The mighty little rig runs about 60 mw input, with 8 volts on the collectors. The constructor should "play around" with R1 and R2 until each transistor draws about 8 ma. W6CWJ says that the transistors are not too uniform and he wound up with 10K and 4.7K. The best way to load the transmitter is to use a field strength meter. Jerry's best DX without pre-arrangement is 650 miles, with a 569. He has best results when he signs QRP W6CWJ. The 'lil bomb is shown in fig. 3.

W7MPQ's QRP Corner

Six meters has attracted Mel Buechel, W9RPH. He is using two 2N384's in his rig, with 80 mw input to the final. Mel reports that his transistor xmitter was loaded to his mobile whip and was received a mile away by another mobile. His best DX is 35 miles with a 5-5 report. This was with the little rig loaded into his five element beam. The modulator is a pair of 2N408's driven by a 2N652. He says the modulator is capable of more power than is needed but it works FB as is.

A six meter receiver, single conversion, fixed-frequency, xtal controlled superhet, is another of Mel's accomplishments. He uses it regularly on transmitter hunts in the Chicago area, and reports that it gives Q5 copy on any signal that is normally S7 or better on his "big" receiver.

A recent letter from Bob Brown, W3RZL relates success with his W6TNS SSS rig. He has worked a number of locals on 10 meters,

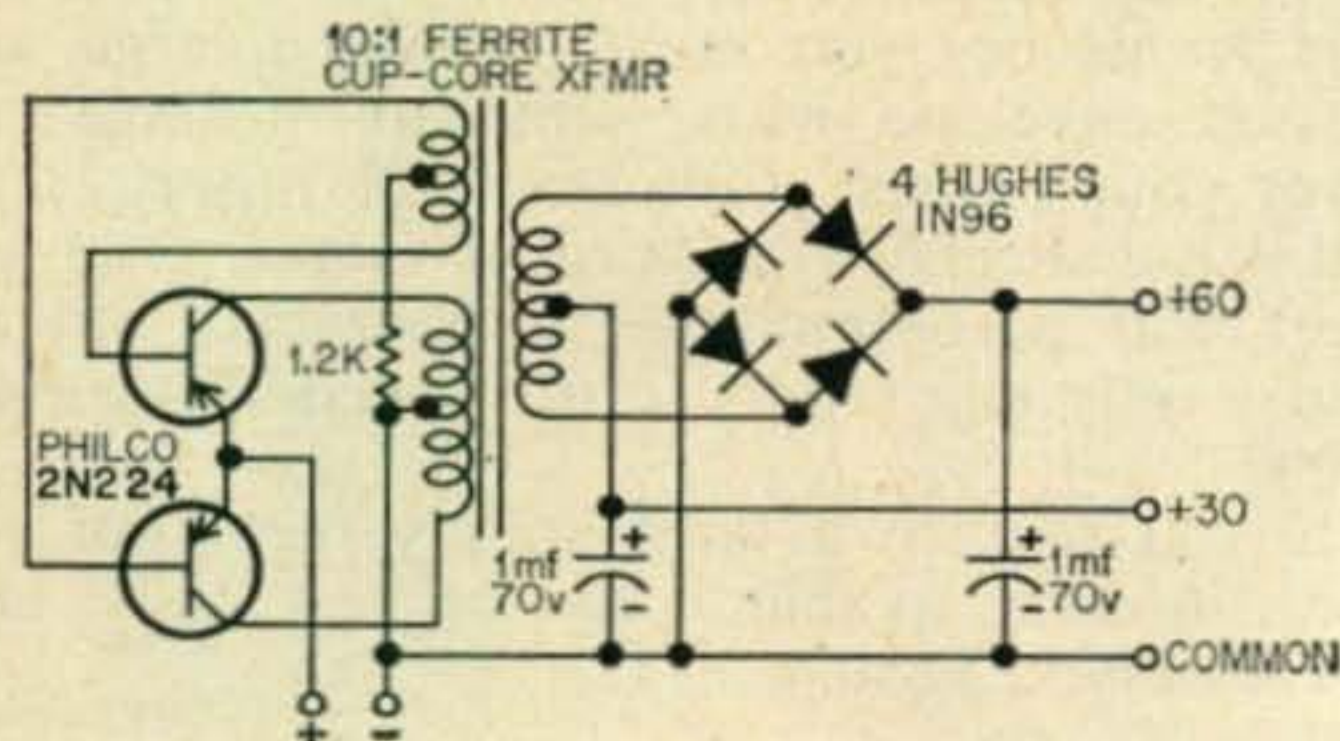


Fig. 1—Circuit of the "Miniverter."

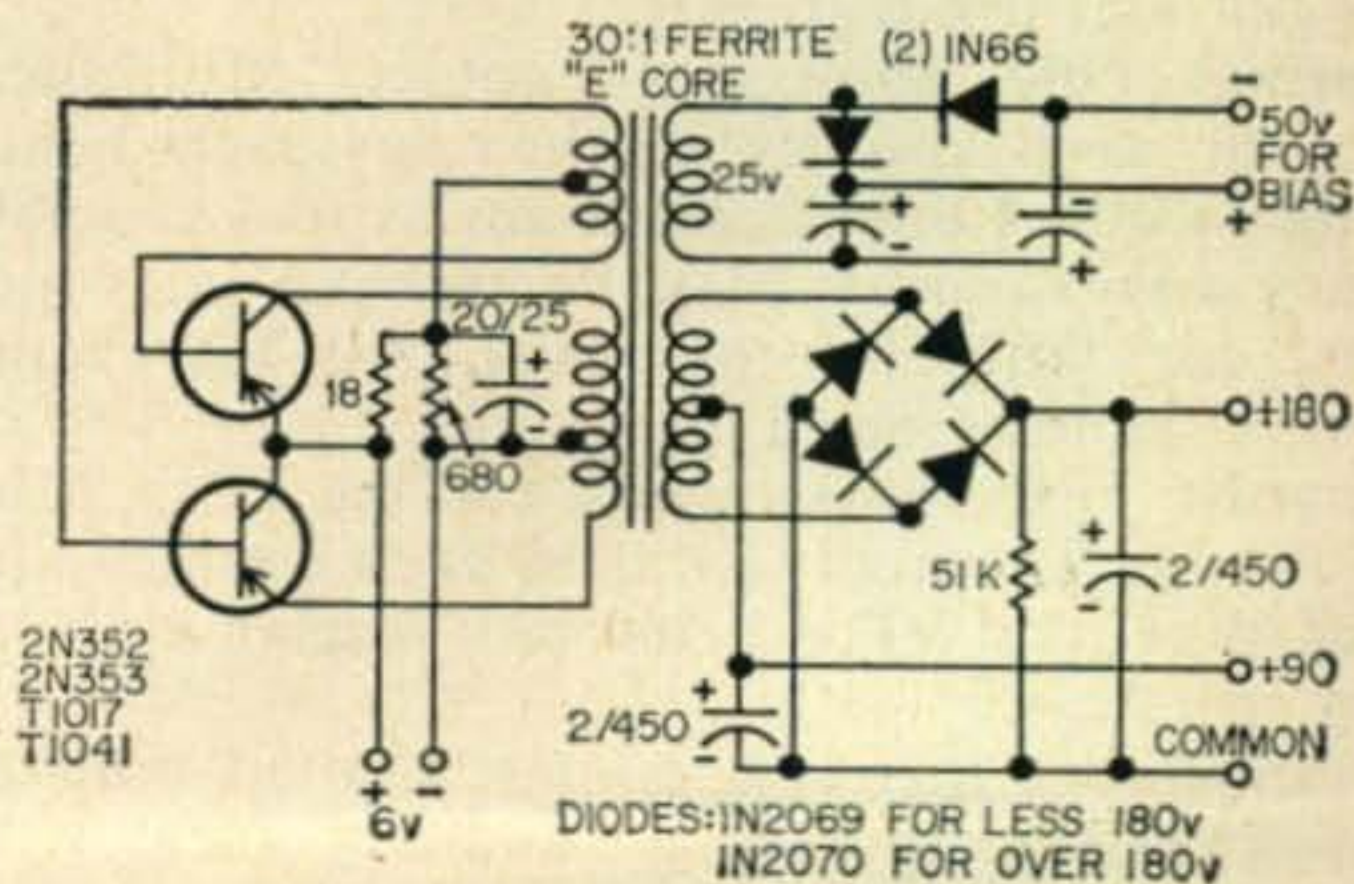


Fig. 2—Circuit of the "Minipack."

and on 20 meters his best contact was to W9QGR with a RST 539. Bob has had the SSS on 15 meters and his report from K4PHY in Tenn. was 449, but let him tell you in his own words. "Now hold your hat—on 21.036 I worked LU8FBH with a report of 599, hi, and I am eagerly awaiting his QSL. At present I am maintaining skeds daily at about 1700 EST with LU8FBH so he will probably direct some South American traffic this way as he is passing the word along down there." Bob's present operating frequencies are 14.061, 21.036, 21.076, and 28.08 mc. He can be found usually on 15 meters after 1500 EST. W3RZL also sends along the news that W3WJD in Upper Darby, Pa. is running about 275 mw, using a 2N599, on 3.5 and 7 mc. Possibly by next month we can give some DX reports from the 2N599 in Upper Darby.

Last, but not least, W6TNS would like to brag about his newly acquired CW-WAC certificate for working all continents, while running 80 mw to the SSS transmitter. 73, DE QRP W7MPQ.

Bill Desnoes, W2HBC, 117 Lorraine Ave., Mt. Vernon, N. Y. advises us that Sonotone Corp., Elmsford, N. Y. also manufactures the rechargeable cadmium batteries.

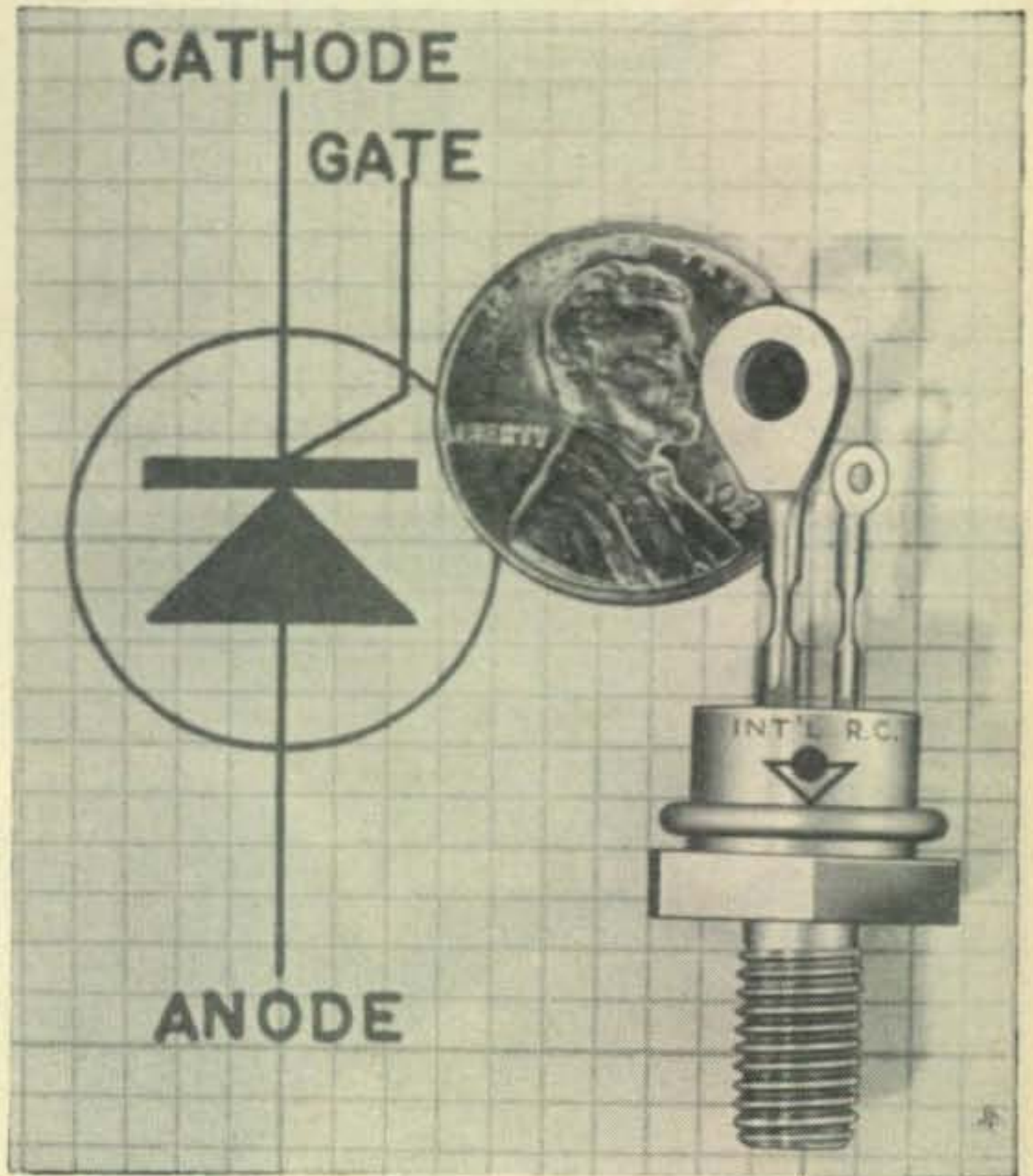
Semiconductor News

A new series of nine power transistors designed for power switching applications has been developed by Bendix. They are said to have the highest *dc* current gain and flattest beta curve of any power transistor on the market. Data sheets are available on the 2N678, 2N1029, 1030, 1031, and 1032. Write Bendix, Red Bank, Long Branch, N. J.

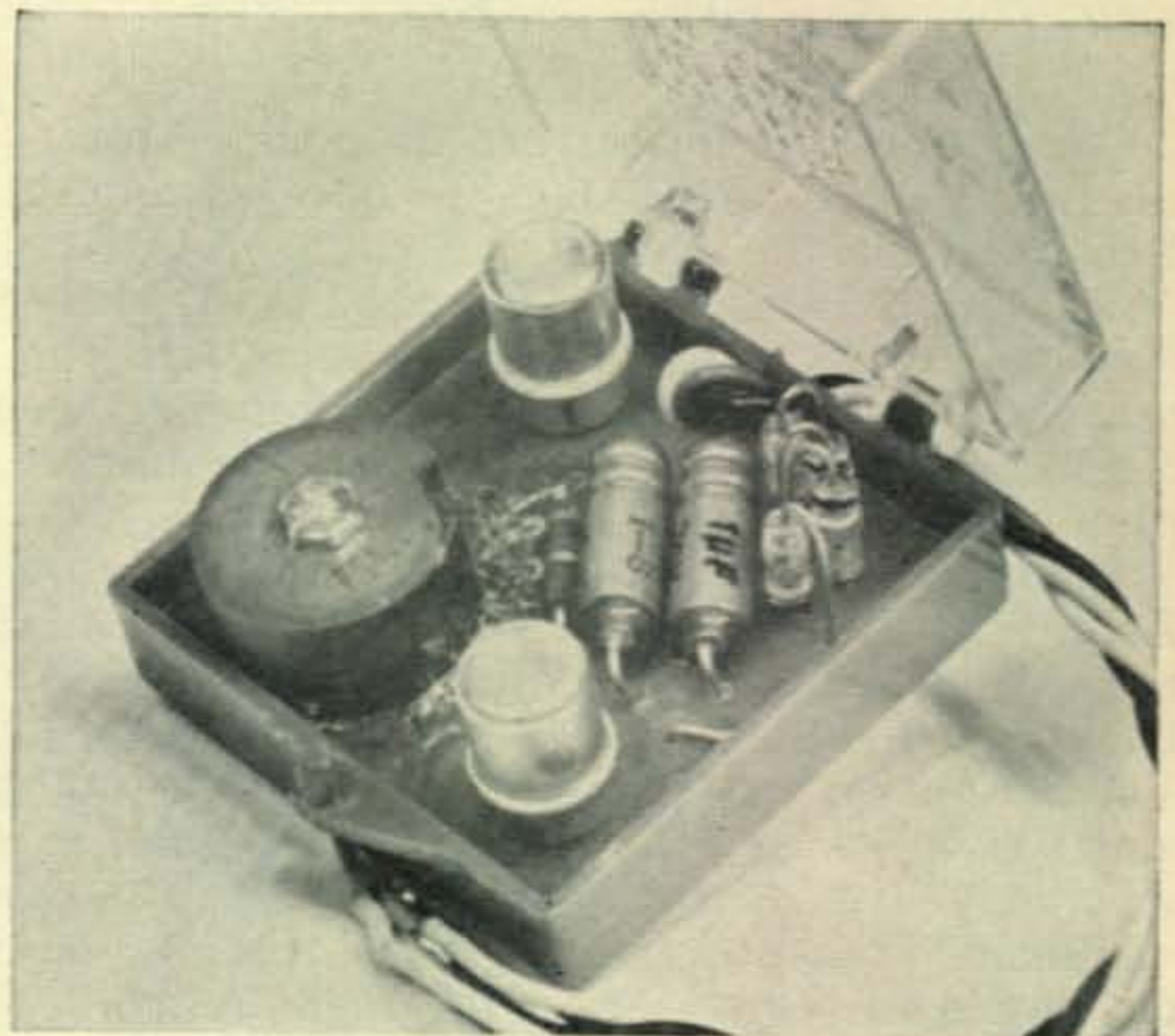
Did you subscribe to the CBS Transistor Course? Students can now obtain a 14 page supplement containing additional projects and information. Send one dollar to CBS Electronics Dept. TC, Danvers, Mass.

The silicon controlled rectifier, a miniature control device that combines the best features of the rectifier and power transistor, is now

being manufactured by International Rectifier Corp. Ratings up to 200 volts and 10 amperes are available. This device is capable of switching rapidly to a conducting state either when a signal is applied to its third terminal (gate), or when its critical forward breakover voltage is exceeded. After it has "fired," the controlled rectifier exhibits the extremely low forward voltage drop of a single junction rectifier. For additional technical data request Bulletin SR-350 from International, El Segundo, California.



The International Rectifier Corp. Silicon Controlled Rectifier combines the features of a high power rectifier and transistor. Its action is very similar to a thyatron tube.



This photo doesn't demonstrate the size of the W3LSZ "Mini-Verter," but it measures 1 1/4" x 1 1/4" x 1", which is about the size of a pack of folder matches! This transistor power converter weighs only 12 grams or 1/2 oz.

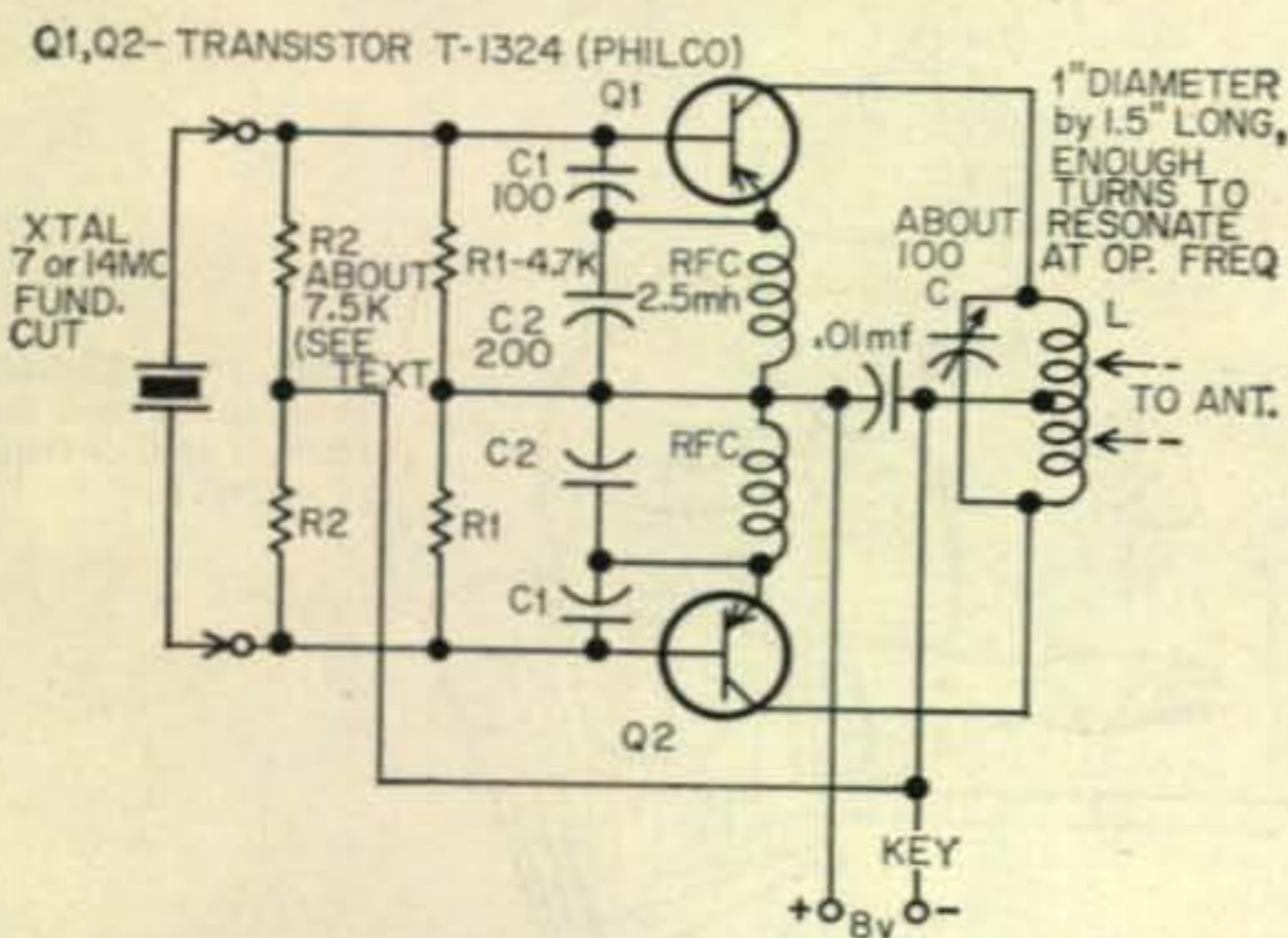
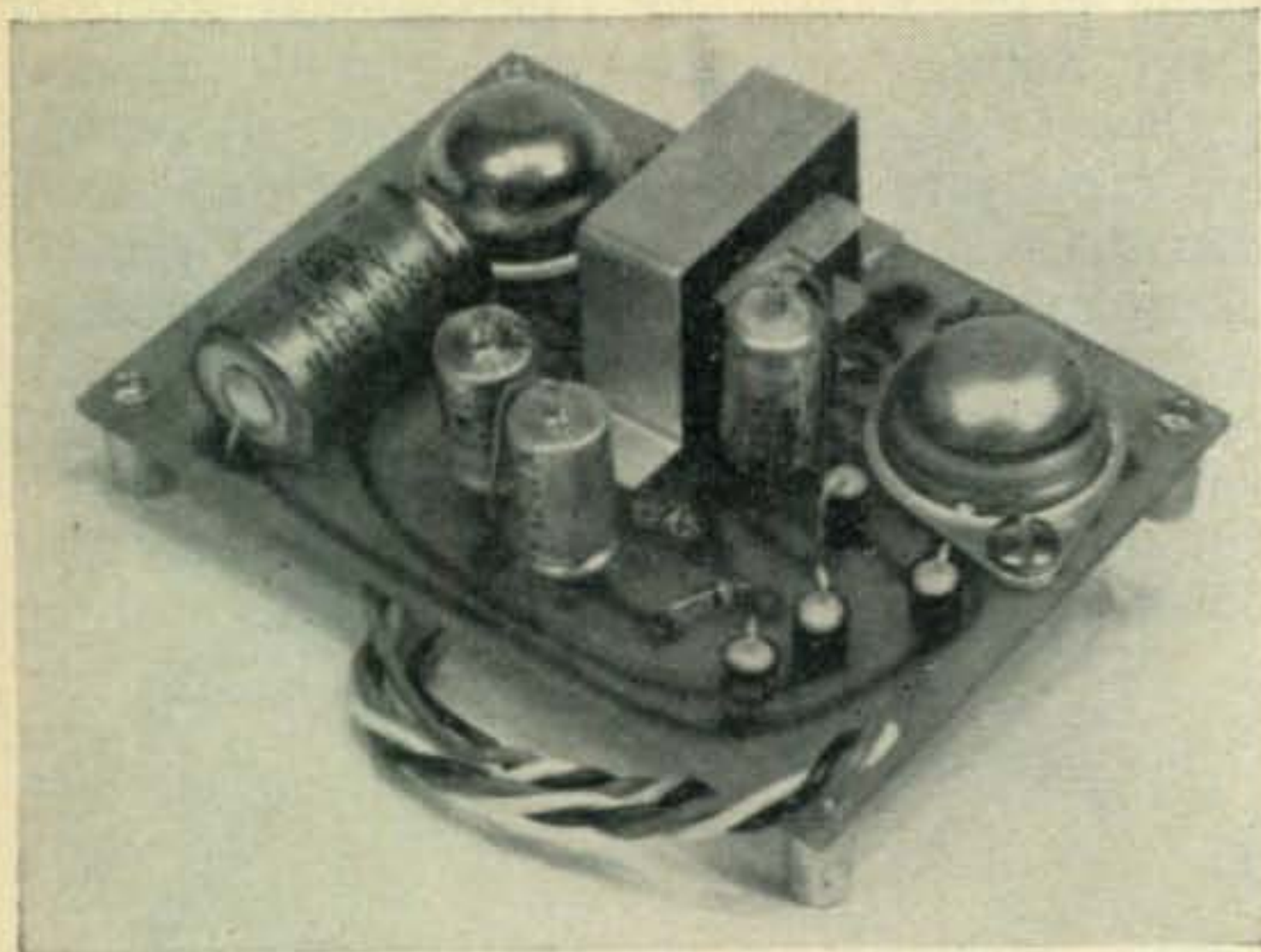


Fig. 3—Circuit of Jerry Palmer's QRP 40 and 20 meter transmitter.



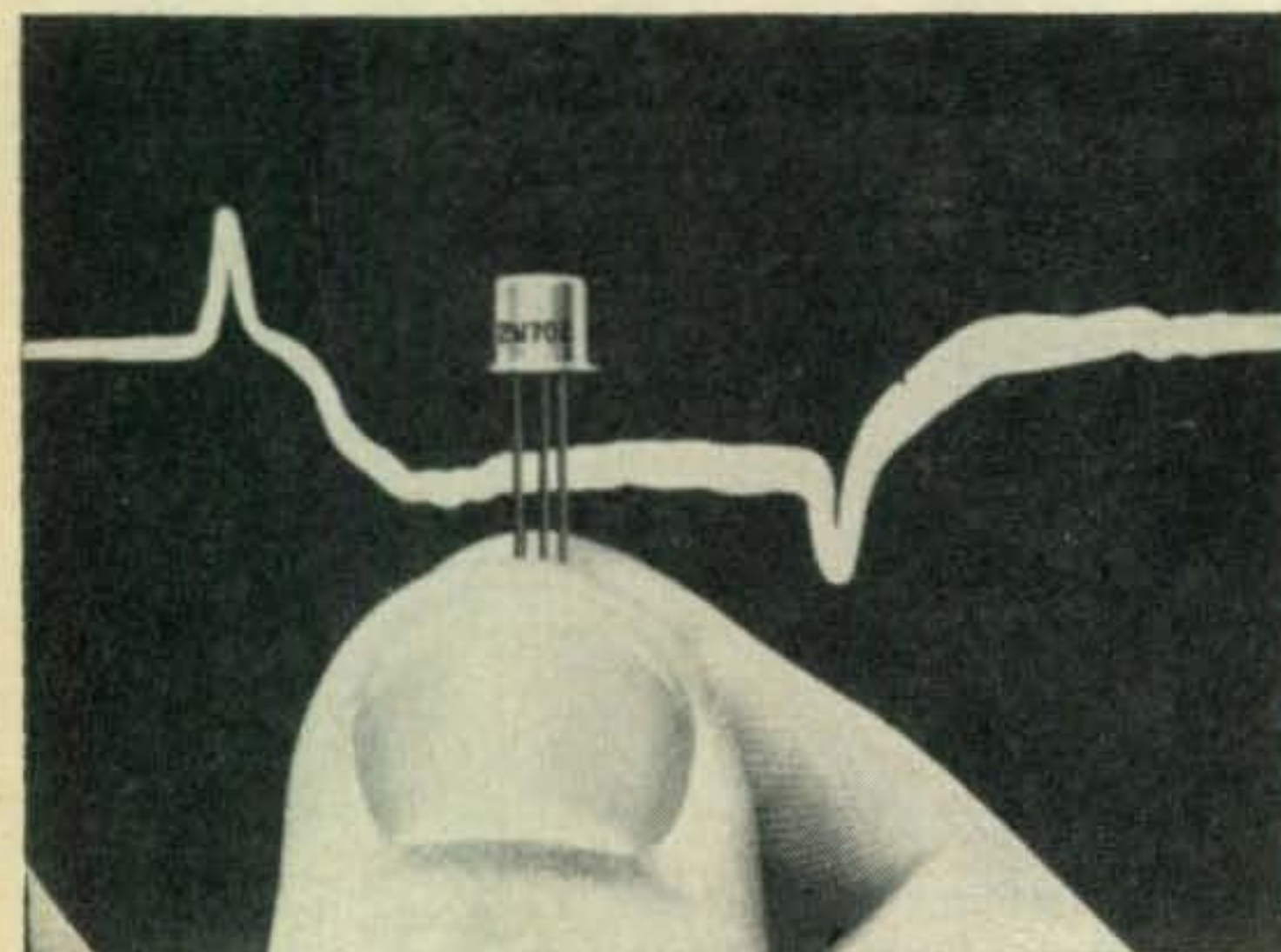
Introducing Al Diem's Mini-Pak transistor power converter. This unit delivers 250 volts at 20 ma., is available for 6 or 12 volts, and sells for under \$20.00. The size is 2 5/8" x 3 5/8" x 1 3/8", or about the size of a 67.5 volt "B" battery.

signed for use in mag. amps. and other industrial applications and have *piv*'s between 100 and 600 volts. All units are capable of one-half ampere at normal temperatures. The 1N536, 537, 538, 439, 540, 1095, and 547 are intended for military and industrial applications. This series has *piv*'s from 50 to 600 volts. Data sheets are available.

Texas Instruments have developed a super high speed switch transistor, the 2N702. This is a "mesa" produced by the gaseous-diffusion process which provides high performance and outstanding reliability through close production control. As shown in the accompanying photograph, the 2N702 has no trouble switching a 25 milli-microsecond pulse.

That is all the news for this month. I am sorry that I did not have room to include the circuit and details for W9RPH's transistorized six meter gear. We'll have it here next month, though, a completely transistorized six meter station!

With 73, De, Don, W6TNS



The Texas Instruments 2N702 "mesa" transistor is shown in front of its 25 milli-microsecond switching waveform.

CONTEST CAL. [from page 71]

You will probably note several conflicts in contest dates. Where the modes are different, no serious damage is done but when two similar contests fall on the same week-end, somebody is bound to suffer. A simple reversal in the Peruanos' Phone/CW would have cleared up the September snafu.

We have the same situation on our WW Phone dates. ARRL continues to hold their CD Phone party on the same week-end. A simple reversal with their CW party would solve the conflict.

With the ever increasing contest activities, a much closer coordination between organizations becomes necessary. We sincerely hope that all interested parties will heed this situation.

73, Frank, W1WY

Mesa transistor prices are dropping. Motorola announces the 2N695 is now priced at \$36.75, while the 2N700 is \$32.25.

Radiation Research Corp., 1114 First Avenue, N. Y. 21, N. Y. is producing Krypton nuclear batteries that can develop more than 5 kilovolts in a volume of less than one-quarter of a cubic inch!

Pacific Semiconductors, 10451 W. Jefferson Blvd. Culver City, Calif., have announced a new series of 10,000 volt silicon rectifiers, E1A type numbers 1N2382 through 1N2358. These units are rated at 4,000, 6,000, 8,000, and 10,000 *piv* at 150, 100, 70, and 70 *ma* respectively.

Silicon Transistor Corp., N. Y., N. Y. has developed a new series of high reliability diodes, which feature fast switching, high temperature operation, with extremely low leakage.

RCA Semiconductors, Somerville, N. J. have introduced two new lines of silicon rectifiers. The 1N440B through 445B are de-



SURPLUS

by **KENNETH B. GRAYSON, W2HDM**

Care of CQ 300 West 43rd Street, N. Y. C. 36, N. Y.

The ARR-2 has been available for many years, but has never been very popular. Perhaps this is due to the fact that it is a misunderstood piece of equipment, and may well remain that way even after this conversion.

As it stands, it is a double conversion receiver with a relatively sharp second *if*. It covers the frequency range of 234 to 258 *mc* although the dial deletes the first digit and reads 34 to 58 giving the wrong impression as to frequency range. From what little has been available in the way of handbooks, this equipment was apparently used with a second unit which supplied a local oscillator signal so necessary in a superheterodyne. Assuming this was a stable frequency, the *rf* stages were "peaked" for maximum output and the "channel" selected by S-101 which tuned the first *if* to one of six frequencies spaced 75 *kc* apart in the 540 to 830 *kc* band. The second *if* was set at 200 *kc*. This system poses a problem. Since the bandwidth of the 200 *kc* *if* is about 10 *kc*, any drift in the high frequency oscillator will effect the signal immediately.

Assuming we are going to operate one fixed channel only, say for point to point operation, we need only to build a stable crystal oscillator and a multiplier to get to the desired frequency, which incidentally is 840 *kc* below the received frequency. The output voltage should be about eight volts to the input of J-105, which is a banana jack on the front panel of the receiver. Don't forget to ground the shield of the wire used to carry this signal from the oscillator at both the oscillator and the receiver. It may even be well to substitute a coaxial connector for the banana jack.

The second conversion, like the first requires an external oscillator. The only difference is that the oscillator is tunable and should cover the range of the band (220 to 225 *mc*) less the *if* frequency of 840 *kc*. This could be built in a mini-box and provided with a suitable dial. By now you will realize that neither of these methods were used, but instead a third method was employed so as to provide a completely self-contained unit.

In the third method we rewired the mixer into an oscillator (V-104) and used V-103 as a mixer. Some loss of gain may be noted, but not too much. The *rf* and filament circuits are all that require reworking. The first

step is to rewire the filament line. Figure 2a shows the original circuit while 2b shows the change to 12 volts. Figure 2c shows the 6 volt conversion. Note that the heavy lines are added wires or changes.

The *rf* can be modified to perform superhet type operation, with oscillator, by removing the wires connected to V-103 pin 5. The 5 mmf ceramic capacitor (C-120) which was disconnected from pin 5 (V-103) should be reconnected to pin 1 (V-103). The other end of C-120 should remain attached to L-104. Disconnect the lead going to pin 5 (V-104) and connect to V-103 pin 5. It may be necessary to lengthen this lead. Since this lead carries B-plus it should be insulated as well.

The screen and grid resistors (R-109, R-110) of V-103 should be changed to 1 megohm $\frac{1}{2}$ watt. The original mixer, V-104, is rewired as an oscillator. This is accomplished by changing the grid resistor, R113 to 10 K ohms $\frac{1}{2}$ watt and joining pins 5 and 6. The grid leak capacitor C-122 should be changed to 50 mmf mica or ceramic, and R114, the plate resistor changed to 100 K ohm $\frac{1}{2}$ watt. The original J-105 now will serve as a test point for oscillator bias.

The last step before alignment is to disconnect the cathode of V-104 (pin 2) from ground and then connect it to the oscillator tank coil L104. Since L-104 is grounded at one end it is necessary to use a Hartley type oscillator. To connect the cathode to this coil it is necessary to use a copper, brass or silver strap about $\frac{1}{8}$ inch wide. The thickness is not critical but 22 or 24 gauge would be fine. The strap should be soldered to pin 2 (V-104) and to the edge of the coil turn nearest the socket of V-104 so that the coil is tapped $\frac{1}{2}$ turn from the ground end. It will be necessary to pre-tin the silver wire of the coil for a good solder joint, but only where the strap will be soldered.

In order to get the equipment to operate it will be necessary to supply power. Figure 3 shows a suitable *ac* power supply. Only about 180 volts is necessary since the 6AK5's should not operate beyond this voltage. Connect B plus to pin 3 of J-103, where the dynamotor plugs in. B minus goes to ground while filament goes to the appropriate place shown in fig. 2. An *rf* gain control of about 1000 ohms can be placed in series with pin 2 of

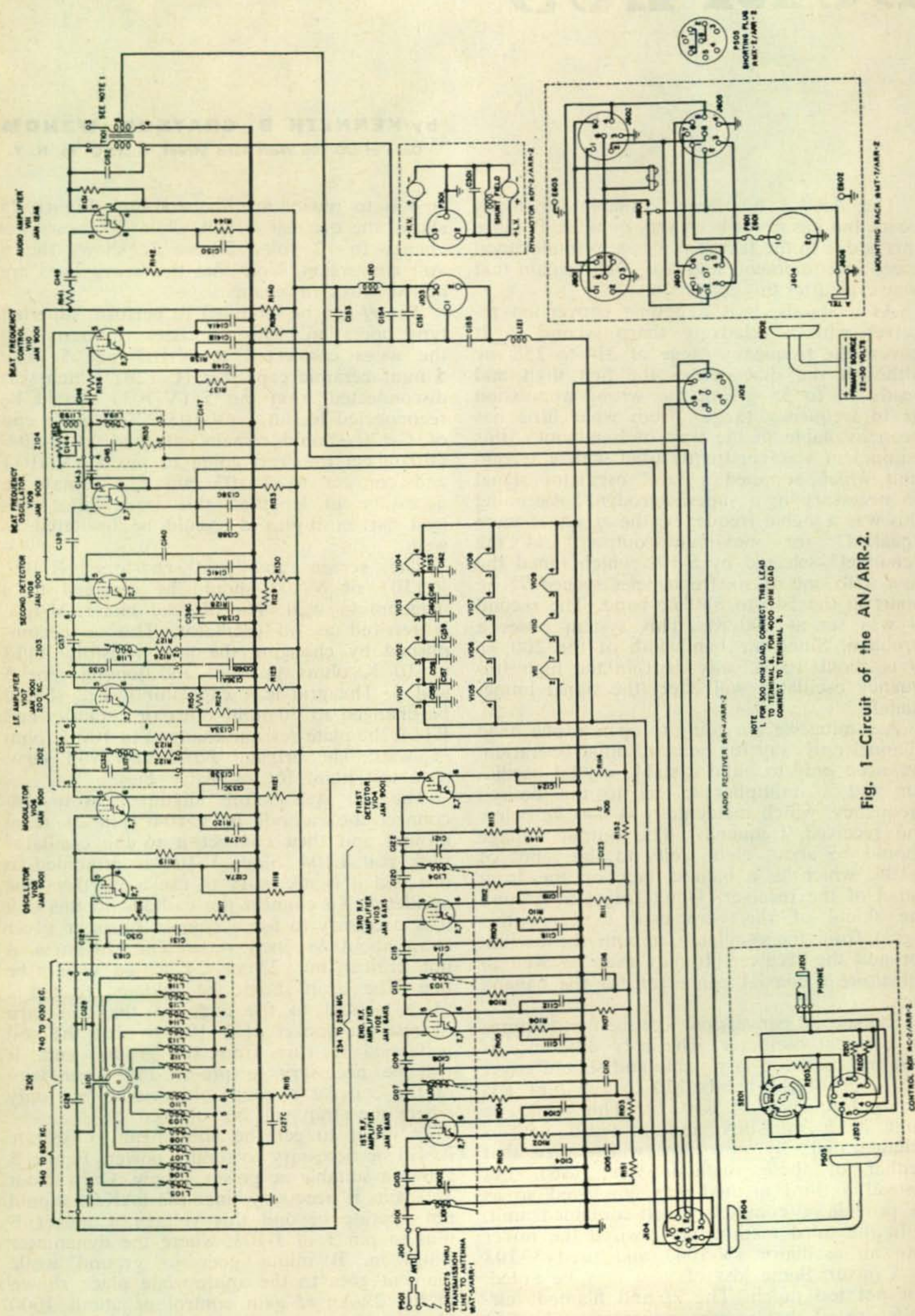


Fig. 1—Circuit of the AN/ARR-2.

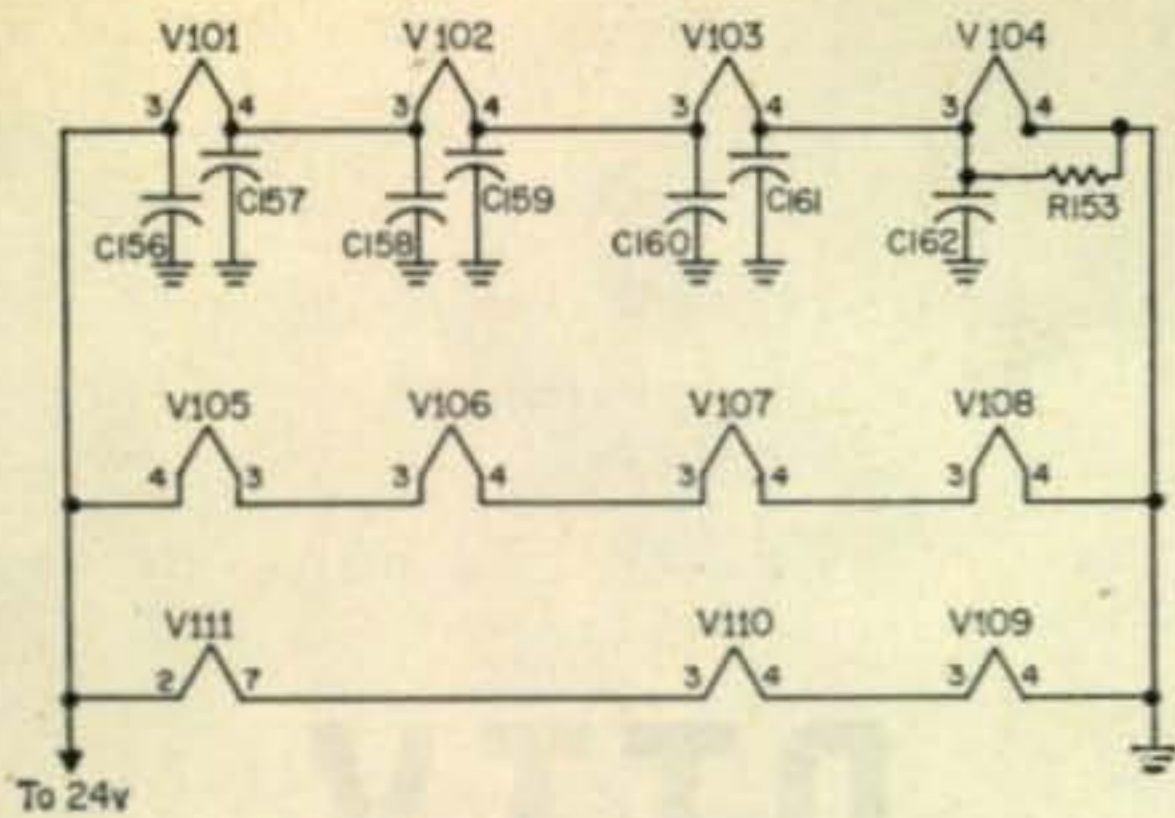


Fig. 2A—Original filament wiring.

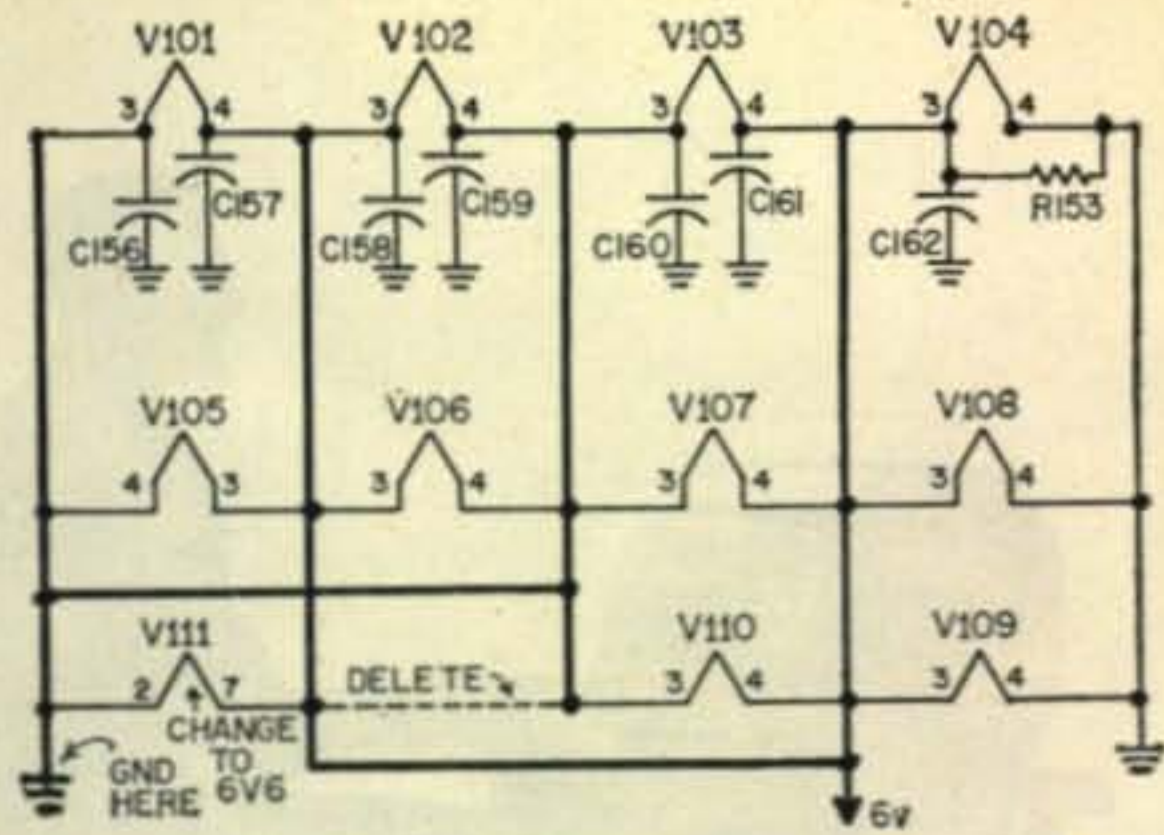


Fig. 2C—Modified for 6 volt operation.

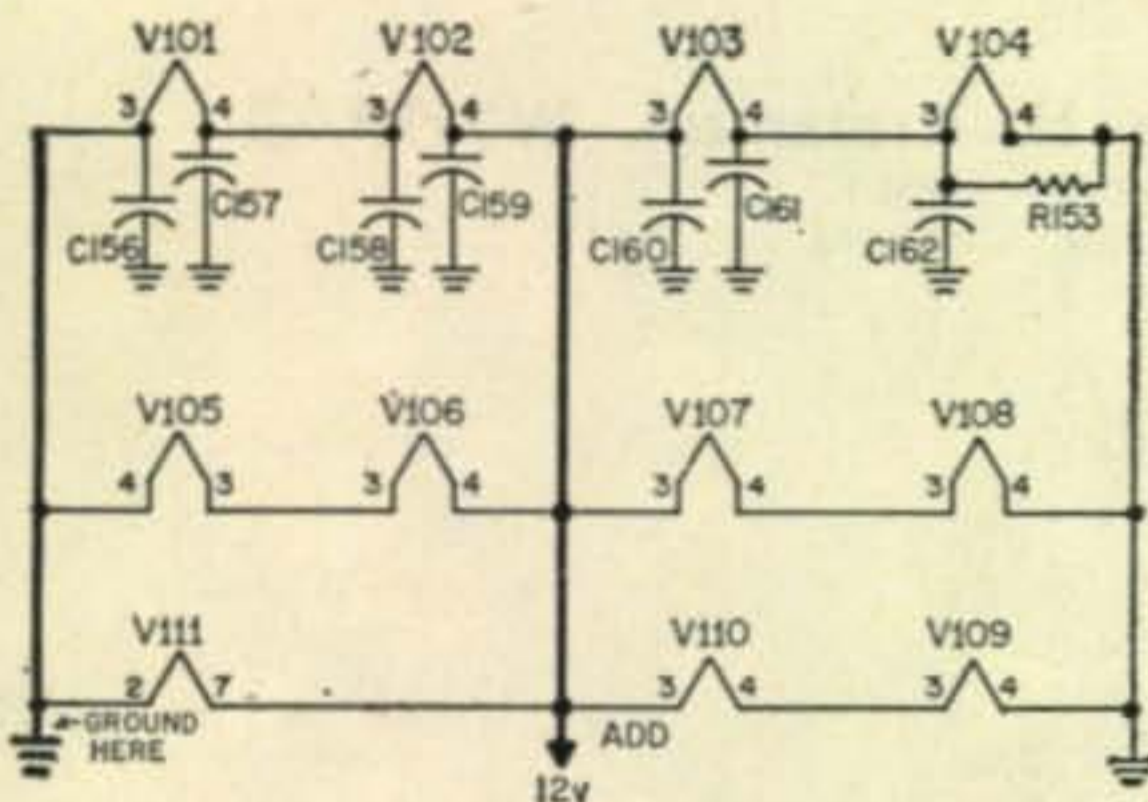


Fig. 2B—Modified for 12 volt operation.

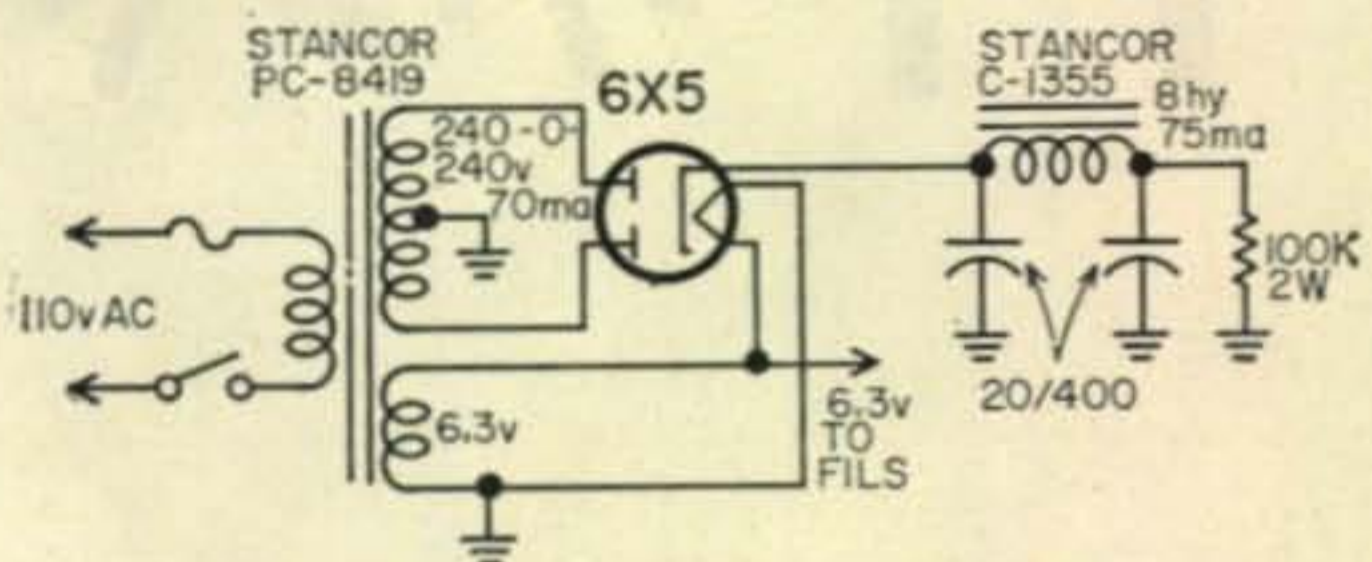


Fig. 3—Typical power supply for use with the AN/ARR-2 receiver.

J-104 and ground, while a *bfo* control of about 50 K can be put in series with pin 3. These take the place of R-201 and R-202 in the control box. A headset can be connected to pin 5 of J-104 and ground.

Alignment is relatively easy. However it is necessary to understand how the tuning works. Each coil is positioned so that a tapered slug can enter the "ground" end. With the slug all the way out the inductance is at maximum. The slug acts as a low loss shorted turn and decreases the inductance. By this means, the resonant frequency is changed and tuning is accomplished. First turn the knob to 34. Alignment merely consists of tuning in a signal, say from a grid dip meter a signal generator, or some other source and adjusting the oscillator trimmer, C-21, to decrease the frequency. This means screwing the plates together using a 5/16" spin-tite wrench. Hold the grid-dipper near L-103, tune C-21 till a loud signal is heard in the headset or loudspeaker. If you use a signal generator connect it across L-103, but since *vhf* signal generators are not easily found in the ham ranks it is assumed that a grid dipper is used. Now rotate the tuning knob to determine the band coverage on the dial. Actually the full dial rotation will cover much more than the 220 *mc* band. This can be remedied by slight spreading of the coils and readjustment of the trimmers. When L-104 is set, proceed to L-103, L102, and L-101 adjusting each trimmer for maximum output over the band. That's all there really is to it.

Oops We Goofed Dep't

Every now and then, for some reason, we goof. Naturally this is not intentional, and we sincerely hope the goof won't cause any hardships, but we found two that were real gems and hope that this will correct the errors made. First, in reference to the BC-620, the *if* is 2.88 *mc* and not 4.3 *mc* as we stated or inferred in the May and June issues. This should be taken into account should you use this for citizens band and find that the receiver doesn't receive on the same frequency as the transmitter is operating. In other words, for the receiver, subtract 2.88 *mc* from the desired frequency and then divide by four to get the crystal frequency.

Our second goof is a little one but nevertheless just as hectic. Referring back to the TNS used with the BC-348 receiver, March 1959, the connections of the 6AL5 are numbered wrong. Otherwise the circuit is correct as it stands. The mistake is in pins 1 and 7 which are reversed. Pin one should be the cathode and pin seven the plate connection. All other connections of the tube are correct.

Occasionally a drafting error will occur and not be caught, but usually these are simple things like the omission of a ground lead which should be obvious. We have to apologize, but then we are human too.

Reflections

Got a nice letter from Pat McKenna, K9MOT who has his home at 2129-A E. Holt
[Continued on page 108]



RTTY

Byron H. Kretzman, W2JTP/Ø
 2260 Matilda Street
 St. Paul 18, Minnesota

RTTYers build! This we have proclaimed many times before. For the benefit of the "unwashed multitude," as WØBP calls 'em, RTTY is the last phase, the last frontier, of amateur radio, where hams still experiment and build the specialized equipment that they use. And, RTTY doesn't cost a fortune, either, as some seem to think. Model 26 and Model 15 machines can be bought from \$35 to \$150 from or through legitimate sources such as W2ZKV, W3CRO, W4EHU, W6AEE, W6VPC, W7HRC, W9GRW, WØAJL, and WØATM; however, beware of that "national society" with "headquarters" in the New York area. (See Wayne's editorial in the April 1958 issue.)

Naturally, you will find RTTYers using the very latest and most efficient electronic techniques to receive this F-1 mode of emission. (This is why jamming attempts by die-hard cw operators is so ineffective.) Converters, to transform the received RTTY signal into *dc* pulses to operate the machine, invariably make use of these new techniques. The classic

W2JAV converter was described in the April 1958 issue, and the RTTY columns in the June '58 and March '59 issues described Phil's transistorized converters.

Now we again describe a transistorized converter, but the design makes use of digital computer techniques. This new approach is by Frank Kline, WØACY, and fig. 1 shows the schematic diagram. All transistors, except Q-3, are operated in a saturated condition when they are conducting. Consequently, the voltage drop across the transistors, collector to emitter, is less than one volt. Therefore little heat dissipation is necessary permitting us to use 50 *mw* to 150 *mw* transistors.

All diodes used are simple, common and inexpensive junction diodes such as the 1N34A and the 1N54G, except the suppression diode in the printer magnet circuit. This particular diode is a GE 1N91, but it is also inexpensive. Transistors Q-1, Q-2, Q-4, Q-5, Q-6, and Q-7 are inexpensive *pnp* transistors such as the Philco 2N1130, Raytheon 2N363, or RCA

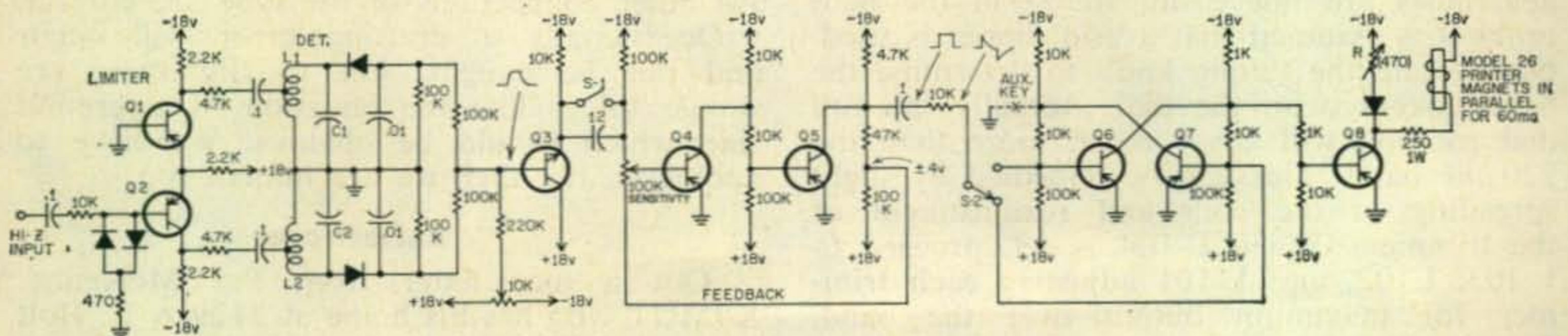


Fig. 1—WØACY Transistorized RTTY Converter.

2N591 or 2N270. The *npn* transistor *Q-3* can be either a *Sylvania* 2N35 or 2N213. The output transistor *Q-8*, the most expensive, is an *RCA* 2N398, costing a little over \$2.

Theory of Operation

Q-1 and *Q-2*, in conjunction with the two diodes, provide excellent limiter action as well as the phase splitting required to feed the tuned circuits *L-1* and *C-1* for *mark*, 2975-cycles; and, *L-2* and *C-2* for *space*, 2125-cycles. (*L-1* and *L-2*, by the way, are the common 88-mhy loading coil toroids.) Not shown on the diagram, a resistor was paralleled with *L-1* to bring its *Q* down to the same value as *L-2*, as indicated by the relative *dc* voltages measured with a *vtm* across the 100k diode detector load resistors.

The switch *S-1* is largely of an experimental nature, permitting either *dc* or *ac* coupling to *Q-3*. Frank usually tunes his receiver with this switch open. The *BIAS* control is used to adjust the no-signal point so that it is half way between the *mark* and *space* voltage, only when *S-1* is closed for *dc* coupling. This turns out to be about plus or minus 3 volts at the base of *Q-3*. The *SENSITIVITY* control in the input (base) circuit of *Q-4* is a 100k pot. This controls the sensitivity of the variable trigger circuit of *Q-4* and *Q-5*. This control is advanced just beyond the point where the flip-flop begins to key the output. The switch *S-2* is simply a reversal switch, which is very handy when a turnover exists. The *AUX. KEY* switch, or push-button, serves to keep the machine quiet on *mark* while the received station goes through the unnecessary but required routine of dual identification.

Transistors *Q-6* and *Q-7* are connected in the usual arrangement of a flip-flop circuit. Its output is used to control the on-off action of the 2N398 output transistor *Q-8* which actually switches the current on and off to the selector magnets of the Model 26. (By the way, Frank has these magnets in parallel for 60 *ma*.) The 1N91 suppression diode, in conjunction with some series resistance, controls the drop-out time on the selector magnets so that it is equal to the pull-in time. The series resistance is adjusted to obtain maximum range on the machine. (Frank's came out to about 470 ohms.)

The power supply used is actually two supplies, one to give -18 volts and the other to give the plus 18 volts required. These should be fairly well filtered and bled supplies capable of supplying about 100 to 250 *ma* with good regulation.

WØIBZ, St. Louis, Mo.

Operator:	Melvon G. Hart
Transmitter:	Modified Viking I/II, on 40
Receiver:	NC-300
Terminal Unit:	W2JAV
Building:	1-kw amplifier, tuning scope, 2-meter gear.

Hits, Bits & Tips

Ray Morrison, W9GRW, has available copies of lubrication tips for the Model 26. He will be glad to send them to any ham upon the receipt of 10¢ in stamps.

K7ABB is on 80 and 40 with 300 watts to an 813. Dave has an extra O-5/FR heterodyne exciter that he will sell for a very reasonable price. W7JLF is now K5SPU in Albuquerque, New Mexico, and Sam offers to help out anyone in the area.

W3NNV is looking for information on a Navy surplus *Press Wireless* Model OCT Frequency Shift Keyer CYV60131. W3PRQ and W3CRO have been putting good signals into W2JTP/Ø on 20, as have been K2MQO, W6OWP, and W6GDO, who also uses narrow shift for dual identification.

WØBP has been operating as XEØBP near Mexico City. DL4GF (W9EAM) has been set up for FSK, but since authorization has not yet been obtained, Dwight will be able to use MAB around 14,340 *kc* if anyone would like a sked.

CE3AGI (W6VQB), ex-CN8FD and ex-5A5TK, is now on 15. QSO's have been had with K6VYJ, W6OWP, K6ZBL and W6VPC. Look around 21,090 *kc*.

Comments

Living and operating RTTY from the mid-west is a very gratifying experience. Fraternalism and interest here is at a high level, such as I found on the west coast last year. These are the fellows who think nothing of traveling 50 to 100 miles for a meeting. As a result, meetings are of high calibre both technically and socially, with an attendance of 25 to 50, not counting the ladies, which the RATS of Minneapolis-St. Paul invite to frequent dinner-meetings.

Your bi-monthly RTTY column will appear again, Wayne willin', in the October issue. Look for it then, and in the meantime, shoot along a picture of *your* RTTY shack, will you?

73, Byron, W2JTP/Ø





Novice

For most people, learning the code is the hardest part of earning an Amateur license. It gave me quite a tussle, I know! In fact, I studied it for about seven years, and if it had not been for the Novice class license, I'd still be SWL'ing!

From my own experience I recommend the following procedure. Learn the code backwards and forwards before ever touching a key. Make up a set of "flash cards." On one side of a piece of white cardboard, print the code symbol in dark black ink. On the reverse side, print the letter or number that the code symbol represents. Although the numerals are not required in the Novice exam, you might just as well learn them too. You'll need them soon enough.

When you complete the full set, have someone "flash" them for you. They do not need to know the code for they can read the correct answer from the backside of the card. When

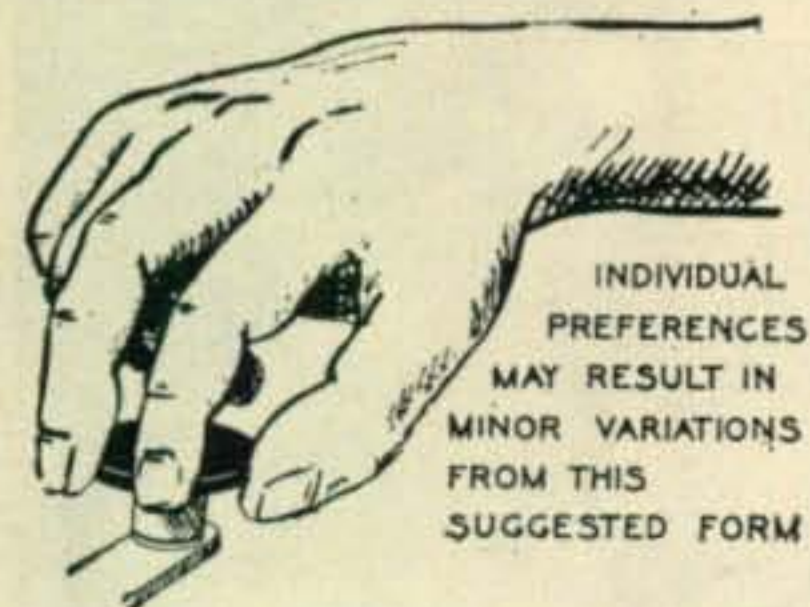
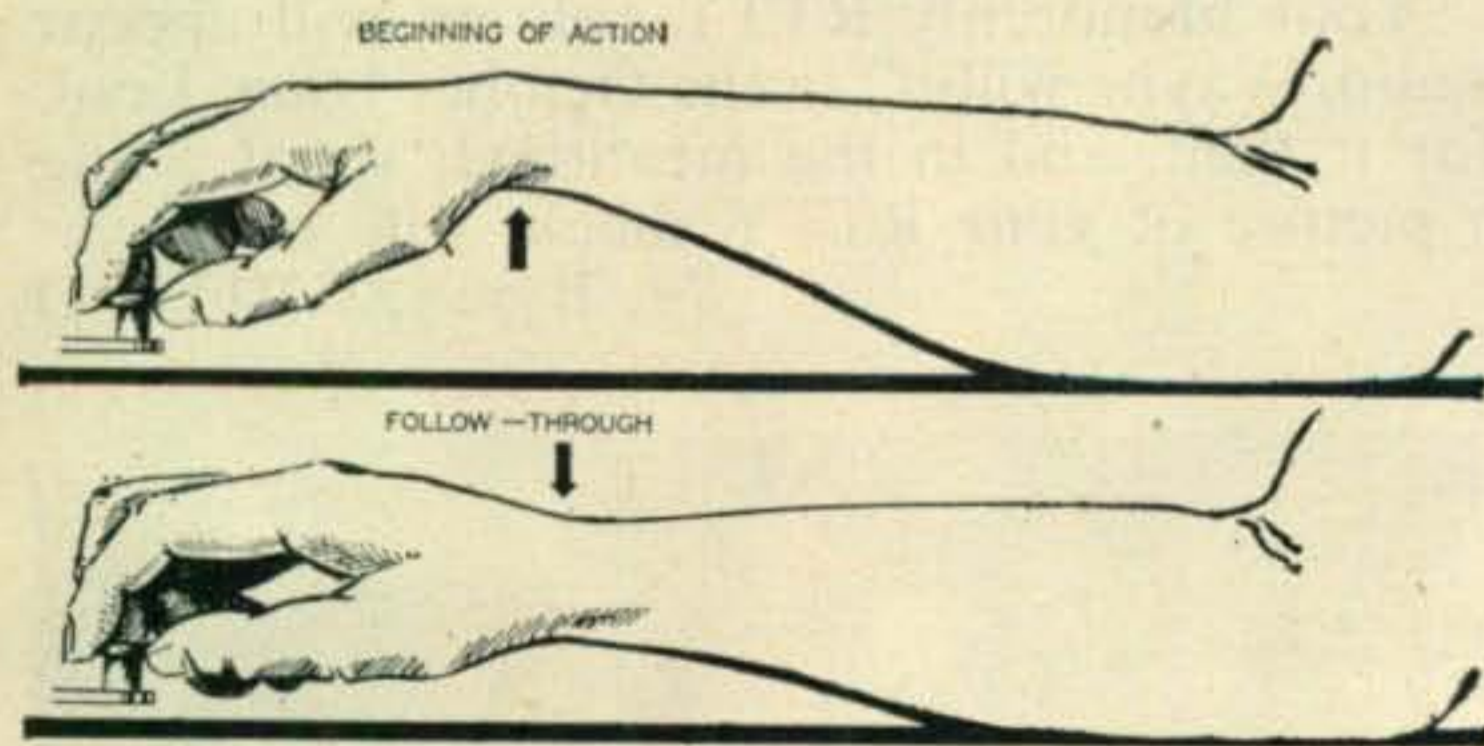
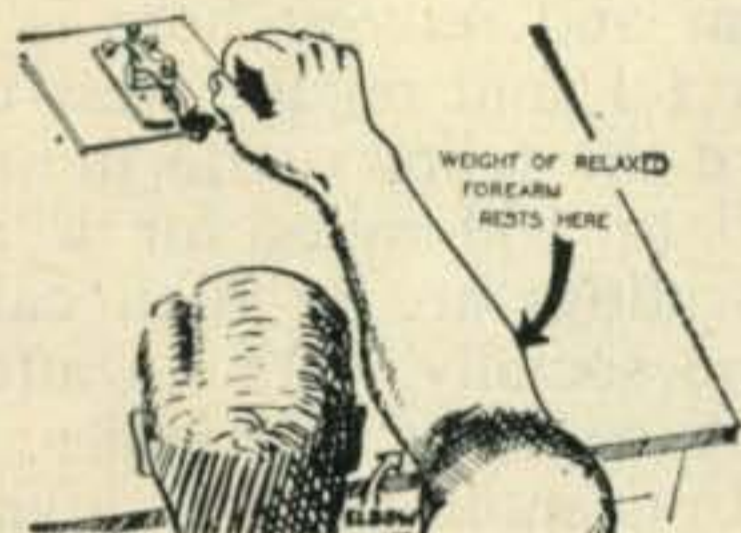
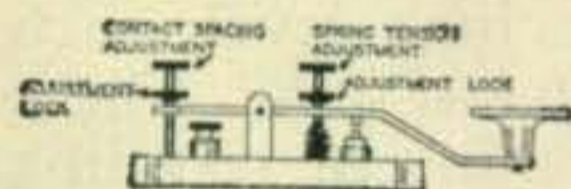
saying the code aloud, don't call the symbols dots and dashes, call them dits and dahs. The sound you make when you say dit and dah sounds much more like the code, than does dot and dash.

Go through the code side of the cards as often as necessary. Then, have your "flipper" turn them over while you recite the sounds that correspond to the code symbols. As soon as you think you are "pretty hot," mix the cards up so that you will not know if a letter or a symbol is going to come up. As soon as you can do this, you are ready to whack away with a code practice oscillator.

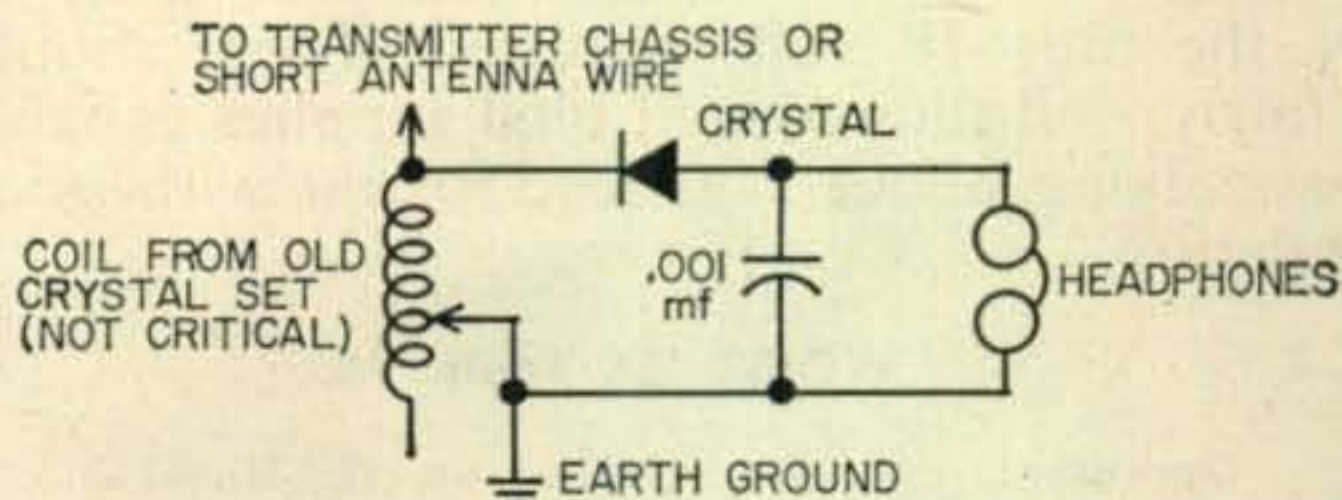
Another trick is to think the code to yourself when you see a sign or other printing. This is a way to practice the code without help from anyone. You will find that it does improve your knowledge too. However, don't start saying the code out loud, or you might be whisked off to the nearest mental institution —Hi.

The Heath CO-1 manual has several interesting tips and drawings on correct sending technique. They say that a firm grip on the key is necessary, but don't squeeze it, or tap it. The entire hand should form an arch with the fingers resting lightly on the key knob, as shown. The action of sending is accomplished by "throwing" the wrist downward, with the hand transferring this energy to the key. Opposition to this movement is afforded by the spring tension adjustment on the key. Adjust this spring tension until the sending feels free and relatively effortless. The contact spacing should be adjusted to approximately the thickness of a business card (twelve-thousandths of an inch).

Speaking of tips, along the same line, Howard Matthews, KN7GQK, has the slickest trick



Some keying hints from the Heath CO-1 manual.



Howard Matthews, KN7GQK, uses this simple crystal detector to monitor his cw transmitter keying. The operation is explained in the text.

for monitoring his sending that I have seen! Howard made a crystal detector and loosely couples it to his transmitter. It works on the theory that the transmitter always has some hum in the power supply. The crystal detector rectifies this hum, and it is reproduced in the headphones. The sound is a low buzz, rather than the high pitched whistle that is usually associated with monitors. However, this unit cost KN7GQK less than a buck to make. You can't beat that! The simple schematic is shown in the accompanying circuit diagram.

Who's DX?

Ronald Hooker, WL7CUW, Box 24, Naval Station, Kodiak, Alaska, reports hearing and calling the following stations during the month of May, on 40 meters: KN4AFI, FOH/4, KN5TTO, USI, UBL, KN8NNK, PHE, KN9JOK, OYR, QHJ, RMV, KNØSVD, and on 80 meters: KN4AVY, KN9PES. Ron runs 70 watts to a home-brew 6146 rig and will be looking for Novices on 40 between 0700 and 1000 GMT.

Roger Burt, KP4A00, Box H-3, Navy 116, FPO NY, NY, is still picking off the Novices and recent ones include WV2CYQ, EEP, FGO, KN3HGD, KN4DFT, KN8NCE, and KNØTDO. Both of Roger's folks are hams, Pop (KN8LHL) and Mom (KN8NGR) have an impressive bit of DX to their credit, too. KP4A00 suggests that a good way of insuring a QSL from an FPO or APO address is to include a self addressed and stamped envelope. Our postage is good for a return from any APO or FPO address.

Ivor Stafford, VK3XB, 16 Byron St., Box Hill S., E11, Victoria, Australia, hears lots of Novices "down under" but is discouraged by the number of replies he receives. During the first part of May, he heard and worked the following stations: May 2, KN1JUQ, KN4BYQ, KN5SLW, WV6CJQ, CRK, DQS, EIK, KN7HLW, KN9OXV, and KNØSVA.

May 9, WV2ATH, KN5SBB, KN7HRW, KN9OXV. May 10, KN4YZY, KN5UKY, WH6FAX, DDZ, CTN, WV6AAR, KN8OIR, KN9RAD. May 11, WV2CDP, KN5STD, WH6DBR, KN7HRW, KN8OIH. May 12, KN5SZV, WV6DUH, KN8MNF. May 13, WV2FHD, KN4BVA, ZUC, KN5UQE, and KN9QXP. May 14, KN4CKL, WV6LWI, KN9QCR. May 15, KN5SAX, WH6CVL, DBY, KN7HRW, KN9QXP, KNØTUH. May 16, KN4BYQ, WH6DBY, KN7HKU, KN8KUD, KN9QDE. May 17, WV2JCS, KN3HAQ, KN4NFI, KN5RVU, WH6DBY, WV6BUH, KN7CPC, HPF, HRW, KN9MWW, KNØSJK. Ivor still needs Nevada for his 40 meter Novice WAS and will be glad to make skeds. Anyone need Australia?

Tima Popovic, YU1-RS-357, Banat Novo Selo, Yugoslavia, reports that band conditions have been very poor during the end of April and the beginning of May. He reports receiving the following stations: April 19, 1900-1940 GMT: KN1HZQ, JRA, KAF, WV2BBH, CBB, EJA, KN2SSZ, UVU, KN3EAJ, GBY, GIQ, KN4DZJ, FNF, FPE, ZDA, ZEO, KN7GGH, KN8KQW, LRW, LPV/8, OKT, KN9OWC. April 20, 1920-2130 GMT: KN1HBM, HFN, HSM, IOG, JAM, JRC, JXU, WV2AXR, CAW, CPL, DES, ESZ, OBO, KN9PRR, QFB, KNØSHS. May 29, 2045-2100 GMT: WV2BLP, KN2UVB, KN3EXM, KN5TSQ, KNØSUB. May 30, 2000-2203 GMT: KN1HVU, HVV, IBX, IRI, IVT, IVY, JGX, JPQ, JTY, TZY, KTX, KVN, WV2ARJ, ASM, CII, CPT, DGN, DHS, EAL, EGS, EKG(?), FKL, KN3GIT, HAP, HGN, HPG, HPS, IAN, WP4AOX, KN4CFT, CPR, FGO, FIY, FMB, FTV, FWJ, KN8LVW, MJN, MPU, NCE, NOV, NXI, OZL, KN9OBD, OGL, OIS, OYD, PLT, QJI, RGG, RJC.

Net News

Dee Rigg, WA6DAU, Fresno, California,
[Continued on page 112]



WV6BUU, 2121 Havemeyer Lane, Redondo Beach, Calif. says that he received lots of good ideas from the photographs in the Novice column and now wants to return the favor. By the time you see this he should have his General ticket.



W1BB sends an interesting picture of David Poulansky, KN1KPD. This shot was taken while Dave was taking the Novice code test by W1BB. He is now on the 80 and 2 meter bands and is active in CD and RACES.

CLUB BULLETINS

Marvin D. Lipton, VE3DQX

311 Rosemary Road, Toronto 10, Ontario, Canada

Three years of intentions and hopes materialized last November when Les Daniels, VE3CIL, published the first copy of VE3SRC CALLING for the Scarborough Amateur Radio Club of Toronto, Ontario. Since then the tabloid has expanded and it now reaches 115 hams in Canada and the U.S. every month. Les, who is no novice at editorial work, reports that the paper serves its purpose excellently and has been a major factor in holding the club's inactive membership together. Like most club papers, VE3SRC CALLING is a non-profit venture without ads, completely subsidized by the club treasury. Having produced a business bulletin in addition to his present enterprise, the editor believes that well written editorials are a real asset to any club journal. I'm sure we all agree.

Les' biggest problem in getting the first few issues rolling was that of obtaining contributions from club members. He overcame this difficulty by frequently quoting certain prospects before approaching them for articles. It seems that once the boys saw their names in print they lost their inhibitions and became in-

spired. Enthusiasm is contagious and I expect it will not be too long before Les has more contributors than he can deal with.

Off the Cuff

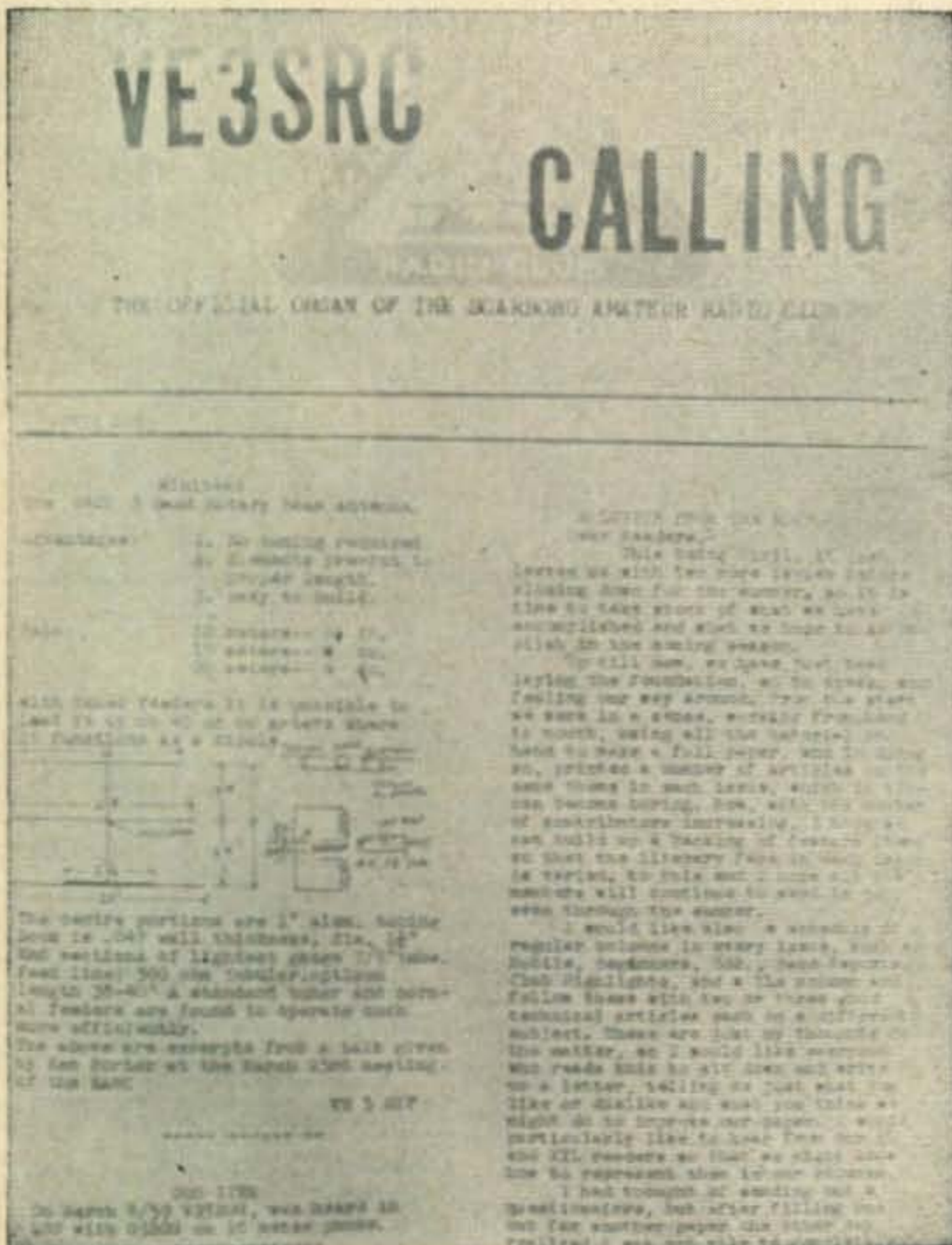
M. Pattie, K9GOL, editor of the HAM HASH, Montgomery County A.R.E.C. Inc., mailed in a clipping from the Hillsboro Journal in which the local amateurs received a bit of free publicity. A similar excerpt was received from John, K6RBB, editor of the FLYSHEET, Stockton A.R.C., who sent me a copy of a newspaper story about phone patches. Nice work gents.

The combined circulation of the 175 papers in the CQ News Service is 57,108 (by survey). Each month CQ NEWS is quoted in 65.24% of these papers.

The newest member on our mailing list is the LEA VALLEY REFLECTOR, Enfield & Dist. Group R.S.G.B., London, England.

There'll be no column next month. C.U. again in October.

73, Marv, VE3DQX



VE3CIL, pounding mill at "city desk" of VE3SRC CALLING. Les' shack serves as editorial office for Scarborough Club's monthly.

Featured monthly in club paper are departments dealing with mobile news, ham equipment reviews and YL matters. The bulletin is offset printed.



ham clinic

by CHARLES J. SCHAUERS, F7FE/W6QLV

CQ Magazine, 300 West 43rd St., New York 36, N. Y.

Frequency Meters

That there is so much out-of-band operation these days is quite surprising when it is such a simple matter to measure frequency AND harmonics. But yet we continue to have with us those who persist in operating below or above band edges or radiating harmonics into other portions of the frequency spectrum.

Every amateur radio station must, according to regulations be equipped to insure that all ham transmissions are confined within the allocated frequency bands. This does not mean that Mr. Average Ham must possess an instrument whose frequency measuring accuracy approaches $\frac{1}{2}$ part in a 1,000,000, but it does mean that he must know whether or not he is *in* or *out* of band and *not* radiating harmonics strong enough to cause interference to other services.

Thank goodness, out-of-band operation usually does not last long because an offender is quickly told by conscientious others who make it a point to tune around band edges frequently. But transmissions of short duration DO bring pink tickets nevertheless.

With modern receivers whose calibration accuracy is very high, there is little excuse for out-of-band operation; even if one does not possess a good frequency meter.

There are a number of ways and means to check one's frequency. Let us discuss a few of them.

Perhaps the most elaborate set one can acquire (if they have enough money) is the frequency counter. This instrument is not only accurate to within a few *readable* cycles (without interpolation) but can (when checked against WWV etc.) be used as a very reliable standard. I doubt that more than 10 ham operators in the world own one of these direct reading marvels.

The crystal controlled frequency meter whose accuracy is extremely high (especially if a crystal oven is used to maintain proper crystal temperature) is to be found in operation in a number of ham shacks. But it too is expensive.

A frequency meter of the heterodyne type with a crystal checker is about the easiest to come by and is as about as accurate as anyone

working with ham radio would desire. This *fm* is available on the surplus market as the BC 221 (Navy version is the LM) and can be purchased for as little as \$40.00 (with calibration book). This very popular *fm* usually takes about 30 minutes to settle down (unless a separate power supply is constructed for it so that it may be operated from the 110 volt ac mains). Then it is simply left on all the time. It is a very reliable set and well worth having.

The simplest *fm* is the calibrated absorption type. It consists of nothing but a coil and condenser. Sometimes a bulb is added in series with these to indicate resonance in transmitter circuits. Resonance is indicated usually by a meter integral to a transmitter.

A grid-dip meter can be used for rough frequency measurement too in conjunction with a good receiver; or it may be used alone (depending upon whether or not a switch is included which will actually allow it to operate as an absorption type instrument). The *gdo* is very effective in determining harmonic radiation, parasitics, etc., but it seldom is really designed for split-hair accuracy.

Modern communication receivers equipped with a crystal calibrator are not to be sneezed at as "frequency checkers." When used as such they should be disconnected from the antenna; that is, when checking transmitter frequency.

But for the ham just starting out it is hard to beat the absorption *fm*. Once calibrated it will remain accurate (unless dropped on the floor or in a pail of water!).

In using the absorption type *fm* be sure and not over-couple to any RF circuit or a broad reading will result. Also make certain that you do not touch any high voltage point in the transmitter when placing the instrument near output coils.

Another thing, make SURE that you are measuring a fundamental when using *any* frequency measuring device. Make it a habit to re-check your frequency often—don't procrastinate—CALIBRATE!

Let's stop out-of-band operation! Read up on frequency measurement in Bill Orr's Radio Handbook or the Handbook of the ARRL.

Observation

In an article in the *Proceedings of the In-*

stitute of Radio Engineers for March 1959, I. Kaufman of *Ramo Wooldridge* discussed a subject which should be of very wide interest to all *uhf* or *shf* minded radio amateurs. His subject: "The Band Between Microwave and Infra-red Regions."

He points out that microwave techniques have been stretched well into the millimeter region, but between 300 to 3000 kilomegacycles (*kmc*)—about 1.0 to 0.1 millimeters, very little has been done in the way of exploration or exploitation because of the lack of *rf* generators.

Mr. Kaufman discusses some of the problems associated with detection, control, transmission and measurement of these extremely high frequencies.

I believe this region presents a challenge to those hams who are inclined to look to the future as did the pioneer hams of yesteryear who contributed so much to today's electronics communications knowhow. Let's hope that it will be a ham (or hams) who "crack" the new region for communications purposes.

Observed: The field is wide open.

Those of you who are interested in the yet fully unexplored region may obtain a copy of the IRE Proceedings and read about it, from the IRE Inc., 1 East 79th St., N. Y. 21, N. Y., for \$2.25.

Book Review

Louis E. Garner, Jr. has certainly made his mark in the technical writing field. If you have read any one of a number of technical magazines on radio-electronics you more than likely have read some of his stuff. Now he has authored a book on transistors which has been published by *Coyne*. Containing 410 pages with 14 chapters, his *Transistor Circuit Handbook* covers the field in a very practical manner. The "expose" is not crammed full of mathematics and circuits without component value. Rather, it "gently" takes the reader by the "mind's hand" and presents him with very readable and understandable material. I like the photos in this book of the equipment the author actually designed and built. I would venture to say that 90% of all hams could buzz through the 1958 edition and end up with good solid, practical information which can be USED. This is not another "story" about Ico. Another thing: Louis tells you who makes what transistor and does not leave the reader guessing.

If you are interested in learning more about transistors and hankering to build up a few projects, this is the book for you. At \$4.95, the book is obtainable from the *Radio Bookshop*, 1379 East 15th St., Brooklyn 30, N. Y.

Questions

On Harmonics

"Is it true that *all* so-called multi-band or

all-band antennas tend to radiate harmonics? If so, how does one go about measuring and suppressing them?"

It is true that a large number of all-band antennas do radiate harmonics. However, the beam type designed for the higher frequencies (10, 15 and 20 meters) are less prone to harmonic radiation than their low-frequency "brothers."

Harmonics are generated in the transmitter and must be KILLED at the transmitter! This is a fact often overlooked. No transmitter (and this includes commercials) are absolutely free of harmonic generation. Harmonics do no harm unless they are strong enough to travel some distance and cause interference. The definition of "harmonic interference" can be interpreted in a number of ways. The ham should be interested in second, third and fourth harmonic radiation, because these will no doubt be stronger than their higher order "brothers."

Here is another little thing to think about: did you know that your antenna may be radiating a harmonic (say at 60 *mc*) and because of propagation conditions cannot be heard anywhere (except very close to your station)? When propagation conditions are "ripe" that little old 1 watt or so of harmonic *rf* can cause a heck of a lot of interference!

EVERY stage in a transmitter (especially the final—if not operating properly) should be suspect. A good grid dip meter will give you the low-down on harmonics in no time flat.

If you do use a multi-band antenna, DO check your transmitter (into a dummy load) for harmonics. Perhaps you may need to install plate and grid traps (parallel tuned circuits) as some commercial transmitters have designed into them.

Watch your bias and grid drive. Don't overdo either of them. Your pi network in the final is no guarantee that you will not radiate strong harmonics (but it helps). Sometimes an antenna tuner alone will clear up the harmonic radiation problem.

Have a fellow ham with a good communications receiver check your transmissions for harmonics. Also, it would be a good idea to borrow a good calibrated field strength meter and re-check for harmonic radiation when you have put the finishing touches on that all-band antenna.

Novices who use one and two tube transmitters should be doubly careful that their little rigs are not radiating interfering harmonics. A number of articles have been written on simple filters for installation on novice rigs to suppress harmonics.

SSB SB 10

Numerous queries have been received relative to the use of the *Heath SB 10* single-sideband adaptor with transmitters such as the *Collins 32V* series, *B&W 5100*, *Viking I* and *II*, etc. Some of those who have written in say that it is very difficult to obtain information re-

garding the compatibility with the transmitter they own. We have also been asked (on the air and via letter) what we really think of this new addition to Heath's ham line. Here then, is some information based on an *owner's* estimation (not yet complete).

First off, I think Heath's engineers did a fine job in designing the SB 10. All good quality parts (as always); easy to assemble; a little harder to tune but it works and works FINE.

PLEASE BELIEVE ME, BEFORE you buy an SB 10 be sure and get a copy of Don Stoner's SSB HANDBOOK. You'll bless the day you did. In fact I'm so strong on this point I RECOMMEND to Heath that they include a copy of it in each kit . . . and charge the wholesale price for it.

When a guy plunks out 90 bucks he should have an idea what he is getting into (it's terrific!).

Back to the SB 10. First of all, parts placement must be done just the way the instruction book says it should. Be careful in soldering shielded wire leads, the insulation does melt fast and allows the wire to contact the shield. This happened to me but I caught the short with an ohmmeter when I made the final check on my wiring.

If you have an Apache to go along with the SB 10 do not be surprised that your audio gain on the latter is higher than on the Apache when the unit is operating properly.

Be careful when you begin tune up operations and loosen the slugs (power off) in the slug-tuned coils (from the rear). If you don't you may break the slug slot screw (as I did on the 80 meter coil). The cores are stiff—be careful.

To do a good sideband suppression job you should have a scope and a 1000 cycle audio generator. A good SSB receiver will also help. I tried tuning the unit with both. I ended up by using a combination technique. It can be done with a receiver alone, but getting the compromise suppression settings takes patience and time.

Contrary to what some SSB "experts" say about the phasing method not allowing full suppression (30 to 45 *db*) on both upper and lower sidebands, it can be done if you have a good scope, some pots and precision condensers, a handful of resistors, time and patience. But be **WARY** of *anyone* suggesting modifications this early in the life of the SB 10. A modification on one set may not work on another.

I do suggest, however, that more ventilation be provided for the SB 10 by drilling holes in the top case cover. But modifications will come, sure as the sun! Especially in the speech circuits.

But the little SB 10 has a powerful voice. "Barefoot" into an antenna I have worked many stations scattered over the globe with good reports.

Modification of an existing transmitter to take the SB10 is not difficult providing you have 350 volts at about 90 mils available and 6.3 volts *ac*. The modification simply consists of running about 3 watts of *rf* driving power from your transmitter's final driving stage to the SB10. Then you provide a coaxial connected *rf* output from the SB10 to your transmitter's final tubes. If they are 6146s there's no worry. Other tubes will take a little figuring. You will have to supply proper regulated screen voltage and perhaps a means for lifting a bias string (in the rig); connect up the mike and you're in business. I would say that adding it to the DX 100, Viking I or II would take about two hours. Of course, you use a ceramic tap switch so that you can switch from SSB to AM, etc.

In the case of 6146s, about 50 volts of negative bias is needed.

HAM CLINIC cannot suggest modifications of transmitters (other than those Heath recommends) for use with the SB10. In the first place, we do not have ALL the transmitters to try the SB10 with, and we are reluctant to recommend "blind" changes without actually testing out a particular setup.

Let us hope Heath "gathers" modification information for other transmitters.

In the meantime we'll continue testing out this little SSB wonder and give you the benefit of our experience with it.

NC 183 D Drift

"What can I do to reduce drift in my NC 183 D?"

National says: "it is possible to appreciably reduce the amount of overall drift of the NC 183 D by changing condensers C67, C69 and C71 from ceramic variable trimmers to air trimmers similar to the *Johnson* 160-110 type. The air trimmer which is placed across the B coil should also be paralleled with a 10 to 15 mmf minus 750 PP/M ceramic fixed capacitor. Remove the ceramic trimmers from the shield partition and punch 1/4" holes in the partition with a Parker Kalon or similar punch. Mount the air trimmers on the partition with the body of the capacitor facing the coils. Wire them in and realign."

I'm sure some of CQ's 90,000 readers will appreciate this information, thank you so much *National!*

Citizens Radio

"How about simple information relative to citizens radio operation in the newly allocated 11 meter band?"

This is the seventh request for this information (from non-hams). I could be "ornery" and say that this is a ham magazine only and we do not honor requests for information relative to a band which did, at one time, belong to us amateurs. But I won't. Perhaps the radio bug will bite you and you'll become a ham.

[Continued on page 113]

SIDEBAND

By: **Bob Adams, W3SW**

P. O. Box 625
Silver Spring Md.

WORKED 100 COUNTRIES

Two-way SSB

(In order of the award)

W6UOU	W8PQQ	PY2JU	W3MAC
W2JXH	ZL3PJ	W6UPP	W1GR
F7AF	K2MGE	W6PXH	W8JXM
K6GMA	W2OQO	WØCVU	W5FDZ
W3SW	W2VZV	W4INL	W1EQ
W4IYC	W6IAL	W8YIN	W8JXY
TI2HP	K2JFV	TG9AD	W2OTZ
W8QNF	W1ADM	W3NKM	W5BGP
W6ITH	TI2RC	W6QFE	W6WNE
VE3MR	W2CFT	W8MG	W6TNS
W8GCN	KØABH	PY4TK	W4HIM
W8EAP	ZL3IA	K9EAB	HB9TL
W8YBZ	W6BAF	W7IAA	W2HEA
WØQVZ	W2TP	VQ4ERR	W7VEU
WØFUH	W6RKP	W8MPW	W4CDY
	W6TOT	W9HP	

Congratulations to W7VEU, W4CDY, W6TOT and W9HP who submitted the necessary cards from at least 100 countries, and have joined the exclusive "Worked 100" Club. There are now sixty-two members who have succeeded in obtaining the required QSLs. We know of many stations who have worked well over the required number of countries, but the QSL situation is rough.

So far to date we have checked through 563 logs from the Third Annual Sideband Contest, and compiled the following list of unofficial leaders. It seems fairly certain that Peter, HB9IE will have his name engraved on the "W3SW Cup" as the winner. Pete shows 612 contacts with 94 prefix multipliers for a smashing total of 57,528 points. HB9IE averaged better than 25 contacts for each of the 24 hours of the Contest, and maintained a very neat and correct log. The photo of my station this month shows the cup which will be sent to HB9IE.

In second place and not too far behind was Ami of 4X4DK who scored 48,866 points by working 461 stations in 106 prefixes. Ami had expected to have a new transmitter in operation during the Contest, but it did not arrive in time. He is going all out to win the next one.

Third place appears to be won by Bill, W2SKE, although he is closely pursued by Dale, W6VSS and Cyril of VK3AEE. All three reported scores of forty thousand plus.

W6VSS's station is shown with Dale operating.

K6LAS, DL1VR, HB9TL and ZL3DX all had scores in the 30,000 bracket with K6LAS and DL1VR each making over four hundred contacts.

In the twenty thousand figures we find the following: W1HKK, KZ5WZ, VQ4ERR, W9EWC, K5LZO, W3SW, KL7CDF and K2USA.

Here are the fifty-five leaders as composed from logs received to date. Most have been cross-checked but will be further scrutinized before the official standings will be announced. Next month we will show all of the country and sectional winners.

Station	Contacts	Prefixes	Total Points
HB9IE	612	94	57,528
4X4DK	461	106	48,866
W2SKE/2	446	104	46,384
W6VSS/6	440	94	41,454
VK3AEE	398	103	40,994
K6LAS	439	83	36,436
DL1VR	423	85	35,955
HB9TL	376	90	32,840
ZL3DX	350	87	30,450
W1HKK	300	98	29,400
KZ5WZ	407	64	26,048
VQ4ERR	303	84	25,452
K2USA	293	89	25,377
W9EWC	242	102	24,684
K5LZO	316	77	24,332
W3SW	278	87	24,186
DJ1BZ	261	82	21,402
KL7CDF	266	79	21,014
K9EAB	232	82	19,024
ON4DM	253	70	17,710
KØITF	231	76	17,556
DL4NP	276	57	15,732
K3BQB	193	78	15,054
K4QIJ	211	67	14,137
VE8NH	245	57	13,965
BV1US	166	69	11,454



W6VSS

WØFUH	164	64	10,496
K7GIE	144	67	9,648
K1KFP/VO1	153	63	9,639
KH6IJ	204	44	8,976
K4USK	222	40	8,880
SM5AQW	119	67	7,973
OQ5IE	132	59	7,906
TG9PS	249	31	7,719
VE2KW	123	62	7,626
ZL3AB	155	47	7,285
W4IYC	86	78	6,708
VE3ES	98	62	6,272
VE6EN	108	55	5,950
OH3NW	100	59	5,900
MP4BBW	105	56	5,880
W6FKZ	122	48	5,857
K4ZJF	127	43	5,461
VE3BJO	98	55	5,390
HB9J	95	53	5,035
W2QKJ	85	59	5,015
W2NXZ	100	44	4,400
K2JGG	90	48	4,320
W4EEU	116	34	3,944
W9ZKB	87	44	3,828
SVØWL	69	51	3,519
W2ZRX/VO1	79	42	3,360
DL1UX	87	38	3,306
DL4ML	176	18	3,168
G2CWL	121	23	2,783
W2FGZ	67	38	2,526

Several stations who seemed to be setting the world on fire during the Contest failed to send in a log. Among them is SVØWB and when last heard appeared to be among the top five in numbers given out.

Many interesting letters were received with the attached logs and it appears that everyone thoroughly enjoyed themselves.

Pete, HB9IE modestly wrote that he "enjoyed working so many stations, with such excellent conditions, but hopes to do much better next year." SM5EY lost his antenna during the Contest just when he was getting a good start. Ken, G2CWL says: "I haven't had so many stations calling me in all my years of hamming." John, K4QIJ said he "liked the new rules and the Contest was lots of fun." Finn, LA6VC writes as follows: "I had bad influenza during the Contest and it was hard to be on the air for the five hours I operated. Had

good time though. See you next year."

Butch the Cheese Man, W9EWC claims he would have had a much better score except that he had to take off two hours to go to a wedding.

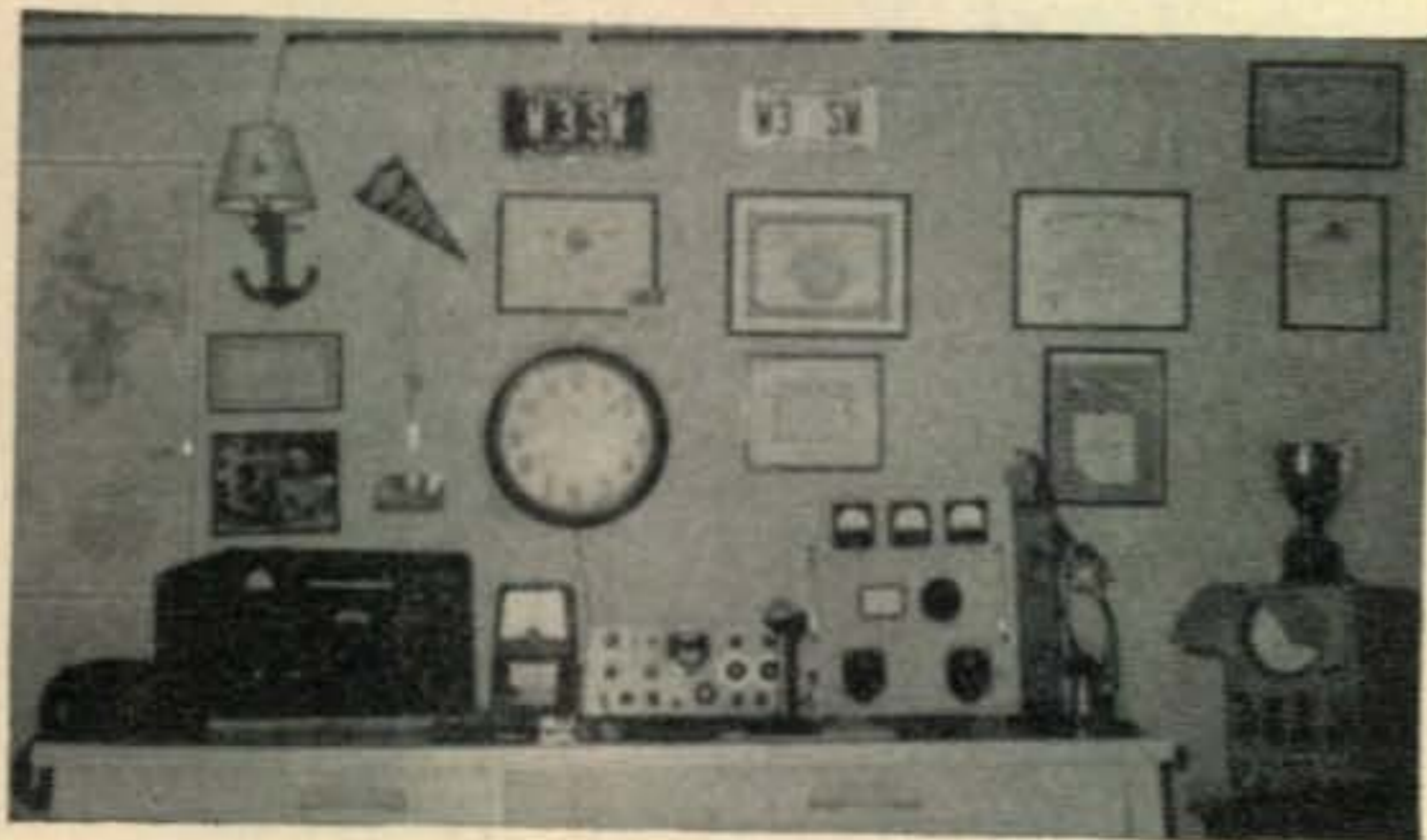
Read, DL4NP sends his log for "the recent rat-race between pile-ups more commonly known as the CQ WW SSB Contest. (May there be many more.) Our former inexperienced operators are now Contest experts and waiting hungrily for next year. Don't know how the rest of the gang found things but 10 and 15 here near the Luxembourg border were of little use. BV1US got on just in time thanks to W4RH who loaned them his KWM-1. 14,307 is the only frequency cleared for 20 SSB operation and on 15 its 21,430. According to Don, K8KLV the boys at BV1US are trying to get their own SSB gear and hope to be on more often, now that they have had a "taste of SSB."

Herb of DL1VR said "it was the best Contest I ever took part in and it was fun to work so many stations in such a short time. So side-band has really spread all over the world. Hope to participate in the next time too." Bill of VE8NH states "As this was the first Contest I ever had the time to enter I thoroughly enjoyed it and am looking forward to the next one."

Robby of VQ4ERR wrote: "excellent Contest with the cream of good operators present. Ethics of most of the stations was the highest ever. How many SSB operators are there now in the USA? I'd say at least fifty thousand. Congratulations to HB9IE and other top scorers and thanks to CQ for twenty-four hours of good entertainment." Thanks Robby, and see you from VQ1ERR in August.

From Jiri, OK1FT: "As OK1FT is a very young license, and with no Contest experiences, the participation was only for gaining some with the SSB mode. OK1JX drove in from Praha in order to help but found some difference against the CW and AM modes, and he was of no help. But very interesting experiences were made and I hope to do better next year. The transmitter used is one of the two identical units developed and built by OK1FT and OK1GV. Incidentally it is serving now as

[continued on page 114]



W3SW (with cup going to HB9IE)



SM5EY



by **Louisa B. Sando, W5RZJ**
212 Sombrio Drive, Santa Fe, N.M.

First Calif. YL Hamfest

Conventions and Hamfests—and how the YLs are turning out for them! The California YL Hamfest at Santa Barbara on May 23 was enjoyed by 72 YLs. Meeting at the Carrillo Hotel for a smorgasbord luncheon, each YL received a badge and cards to play "Howdy," a Ham version of bingo. The game and ceramic prizes for the winners were provided by the 3C's of Sacramento, with the San Diego YLRC furnishing the pencils. Tables were decorated with ferns and hibiscus by W6QBK, Ruth, and using coral collected on the beach of Wake Is. by K6QPG/KW6, Mary, which had been colored by K6MQS, Virginia. Each YL received an orchid in a be-ribboned vial to wear as a corsage. These were made up by W6QBK, Ruth; K6OAD, Gina, and K6KCI, Irma. At each place were many favors provided by various firms and groups.

W6NAZ, Lenore, served as MC. She introduced each YL who in turn told a little about herself. Each then received a door prize—there were enough for every YL! The L.A. YLRC gave four copies of "CQ YL" as prizes. The YLs attending: K6 ANG, BUS, ENK, ENL, ETJ, EXQ, GU, JHA, JCL, JRL, JZA, KCI, KLN, MQS, OAD, OAI, OAO, OQD, OWQ, PFY, PWH, QAG, ROE, SQU, SZT, UAM, VAP, VFE, VUE, YOA, ZCR, ZKH, ZNT, ZRN; W6 AAX, AET, AVF, CEE, DXI, FEA, GGX, HHD, JCA, JZA, LLY, MXU, NAZ, NZP, PJU, QBK, QGX, QOG, QVK, UHA, VWH, WQK, WRT, WSV, YZU/W7YZU; WA6 AOE, BNS, DXZ; WV6 BKM, EVU; K5BNH/6; W7NJS.

Saturday evening 80 YLs and OMs gathered for dinner, dancing, floor show and rag-chewing at historic Restaurante del Paseo. The Hamfest was designed with the idea of having the girls in California become better acquainted. The Camellia Capital Chirps plan to continue it by holding the YL Hamfest at Sacramento next year. Informal gatherings were held at the QTH of K6KCI, Irma, on Friday evening and again on Sunday, and also at Ruth's, W6QBK, on Sunday. W6DXI, Gladys, and K6KCI, Irma, co-chairmen of the Hamfest, express their appreciation to all who helped make it an outstanding weekend.

Midwest YL Convention

The 9th annual Midwest YL Convention held

at Milwaukee, Wis. on the same weekend as the above, May 23, was most successful, according to W9RUJ, Mary, convention chairman. 30 licensed YLs and 20 XYLS attended, with 67 at the banquet (OMs included), and eight states represented. Indiana YLs asked for next year's Midwest convention.

Third YLRL Convention

As announced in the last issue, the YLs of WRONE are sponsoring the 3rd International YLRL Convention in New England next summer. W1ZEN, "Onie," reports the date has been set—the weekend of June 17-19, 1960—so mark it down in your calendar right now!

WRONE YLs are getting into the convention spirit with enthusiasm and are coming up with some fine plans. Item No. 1: a bedspread to be made of squares representing the certificates that the many YL clubs offer. WRONE is sending the material to each club, requesting a member to embroider it with the design of the club's certificate. WRONE girls will put the squares together and add a strip with convention data and the girl-on-the-globe YLRL symbol. The spread will be raffled to help pay the expenses of the convention. Now wouldn't you like to win that one!

W1ZEN and K1IZT, Blanche, plan to make and sell enamel-on-copper earrings with radio calls on them, the proceeds also to go toward convention expenses. About 50 of the N.E. YLs met during the Mass. State Convention at Swampscott May 17; committees are being set up and we'll have more details for you soon.



K9ALP Louis Arnold, placed 1st on phone and 2nd in the cw section of the YL-OM Contest. Lou holds DXCC, WAS, WAC and many other certificates. Come Fall he will be entering Northwestern Univ.

DX Contest

A note from CR7LU, Lucia, tells of the International DX Contest sponsored by C.C. DX, Beira, Mozambique, Portuguese East Africa. Dates are Aug. 15-25, cw and phone, and any fixed station in the world can compete. Lucia adds: "I would like if some YL win a cup—what say?" For details see W1WY's "Contest Calendar" elsewhere in this issue.

Correction, YL-OM Contest

Two corrections in the results of the YL-OM Contest published in this column in June CQ. Under the OM scores, 1st place phone and 2nd cw, K9ALP, is Louis Arnold. 1st cw and 2nd phone, K6SXA, is James Herndon. Apparently we got the K and W calls mixed in getting names from the Call Book. Sorry, fellows! K9ALP adds that he and K6SXA are both teenagers and have been licensed less than four years.

With the Clubs

Latest of the YL clubs to offer a certificate is WRONE, Women Radio Operators of New England. OMs please take note that this certificate is available to Maritime Mobile stations. Here are the rules:

1. Two-way communication must be established with 6 WRONE members; 3 of the New England States must be represented in the 6 contacts.
2. All contacts must be made after May 1, 1959; any band. Contacts must be made at times other than during a WRONE net.
3. QSL cards are to be sent to the custodian, accompanied by a self-addressed envelope with sufficient postage to cover their return and 10¢ to cover cost of mailing certificate.
4. Contacts must be made from one location with the exception of Maritime Mobile stations. MM's need only work the specified number of contacts, as Rule 1 lists, while Maritime Mobile.
5. There will be a sticker for contacting WRONE members in the 3 New England states not listed on the original certificate.
6. Certificate custodian: Isabel Bunney, K1EAV, 47 Pine St., North Billerica, Mass.

New manager for the FLORIDORA phone net is K4IFF, Lin. K4RNS, KN4VNA and
[continued on page 110]



Need Arizona for YL/WAS? Here are some of the YLs at Tucson who met at the home of W7DRU early in 1959. L. to r., W7BFE, W7RCJ, W7INN, KN7EBY, W7DRU, KN7GYQ.



These YLs enjoyed the 12th Annual Michigan State Convention at Grand Rapids April 18, 1959. L. to r., front row: K8KCO, K8LOK, W8ATB, K8JKW; 2nd row: KN8OMH, K8CKE, K8MKG, K8LHF, W8HAV, W8ONI, K8EFG; 3rd row: K8ASC, K8JKP, W8QPT, W8WQE, W8RIR, W8SNB, W8KYE, W8KLZ, W8EIR, KN8KYY; 4th row: K8DTD, W8QOM, K8COX, W8VRH, W8ORP, K8BPQ, K8MZO; 5th row: W9PEX, W8MMB, K8IFI, K8KNN. Attending but not in the photo: W8FPT, W8QOQ, W8SJJ. W8FPT won the main door prize, an SX-101 receiver. Photo courtesy W8ATB.



YL introductions at the California YL Hamfest, Santa Barbara, May 23, 1959. L. to r., K6PWH, W6NAZ, K6KCI, W6QVK, W6AET, W6PJU, K6GU, and Dolly, mother of K6ANG.



W2MWY, Ann Weinstock, high scorer among the YLs in the cw section of this year's YL-OM Contest. Ann works mostly cw, is a member of FOC and A-1 op, and her OM is W2JDR. Licensed in 1939, W2MWY joined YLRL the first year it was founded.



CITIZEN BAND CLASS "D" CRYSTALS

All 22 Frequencies in Stock

3rd overtone, .005% tolerance—to meet all F C C requirements. Hermetically sealed HC6/U holders. 1/2" pin spacing—.050 pins. (.093 pins available, add 15¢ per crystal). Add 5¢ per crystal for postage and handling.

\$2.95 EACH

The following Class "D" Citizen Band frequencies in stock (frequencies listed in megacycles): 26.965, 26.975, 26.985, 27.005, 27.015, 27.025, 27.035, 27.055, 27.065, 27.075, 27.085, 27.105, 27.115, 27.125, 27.135, 27.155, 27.165, 27.175, 27.185, 27.205, 27.215, 27.225.

RADIO CONTROL CRYSTALS IN HC6/U HOLDERS

In stock for immediate delivery (frequencies listed in megacycles) sealed crystals 26.995, 27.045, 27.095, 27.145, 27.195, 27.255, tolerance .005% (1/2" pin spacing) . . . pin diameter .05 (.093 pin diameter, add 15¢) . . . \$2.95 ea.

FUNDAMENTAL FREQ. SEALED CRYSTALS

In HC6/U holders
From 1400 KC to 4000 KC .005% Tolerance . . . \$4.95 ea.
From 4000 KC to 15,000 KC any frequency .005% Tolerance . . . \$3.50 ea.

SEALED OVERTONE CRYSTALS

Supplied in metal HC6/U holders
Pin spacing .486, diameter .050
15 to 30 MC .005 Tolerance . . . \$3.85 ea.
30 to 45 MC .005 Tolerance . . . \$4.10 ea.
45 to 60 MC .005 Tolerance . . . \$4.50 ea.

QUARTZ CRYSTALS FOR EVERY SERVICE

All crystals made from Grade "A" imported quartz—ground and etched to exact frequencies. Unconditionally guaranteed! Supplied in:

FT-243 holders Pin spacing 1/2" Pin diameter .093	MC-7 holders Pin spacing 3/4" Pin diameter .125
DC-34 holders Pin spacing 3/4" Pin diameter .156	FT-171 holders Pin spacing 3/4" Banana pins

MADE TO ORDER CRYSTALS

1001 KC to 2600 KC:	
.01% tolerance	\$2.00 ea.
.005% tolerance	\$2.75 ea.
2601 KC to 9000 KC:	
.005% tolerance	\$2.50 ea.
.005% tolerance	\$3.00 ea.
Specify holder wanted	

Amateur, Novice, Technician Band Crystals

.01% Tolerance . . . \$1.50 ea.—80 meters (3701-3749 KC), 40 meters (7152-7198 KC), 15 meters (7034-7082 KC), 6 meters (8335-8650 KC) within 1 KC
FT-241 Lattice Crystals in all frequencies from 370 KC to 540 KC (all except 455 KC and 500 KC)50¢ ea.
Pin spacing 1/2" Pin diameter .093
Matched pairs ± 15 cycles \$2.50 per pair
200 KC Crystals, \$2.00 ea.; 455 KC Crystals, \$1.50 ea.; 500 KC Crystals, \$1.50 ea.; 100 KC Frequency Standard Crystals in HC6/U holders \$4.50 ea.; Socket for FT-243 crystal 15¢ ea.; Dual socket for FT-243 crystals, 15¢ ea.; Sockets for MC-7 and FT-171 crystals 25¢ ea.; Ceramic socket for HC6/U crystals 20¢ ea.

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For further information, check number 22 on page 126.

LETTERS [from page 24]

1000 amateurs in his district alone that are being affected by any decisions being made. I clipped out your article and sent it along for his review.

I could never write letters to my senators that could explain the whole thing as well as you did. I believe that the other HAMS through out the country could have a profound affect on our future allocations or cancellations as far as frequencies go. After all, a lot of us hams ARE OLD ENOUGH TO VOTE.

Sincerely
JOE VEGH, KOGBS

Delinquents

Dear Wayne:

I have read your stories of hams and prison with real enjoyment; it's a real switch to have a prison guard shown in a good light, even though he might be dumb enough to smuggle a rig into prison for an inmate. Wayne, in my ten years of prison work with thousands of inmates, I have met but one ham. I believe that this points out that hams have been inoculated with something that makes them more or less prison proof. There is no doubt that our hobby can be used effectively to fight juvenile delinquency by having our radio clubs sponsor code and radio theory classes via boys clubs in the under-privileged areas of our large cities for it is here that most of the trouble starts.

Joe WIADW
Danbury, Conn.

HEATH APACHE [from page 55]

it is boosted to a level sufficient to drive the 6CA7/EL34 modulator tubes. It is worth noting that the modulation transformer is graced with a separate 500 ohm winding permitting the unit to serve as an audio driver for a higher powered class B modulator when the Apache is used as an exciter.

Perhaps the most significant feature of the Apache is the excellent design considerations given to the prevention of TVI due to radiation from the unit proper. All critical leads are properly by-passed and the Final Amplifier portion of the transmitter has been enclosed in an rf tight shielded box for additional prevention of radiation.

Here at CQ, our tests indicate that the Apache is most certainly one of the better investments for 1959.

Barry A. Briskman, K2IEG

9¢ WONDER [from page 49]

of its leads is touched to the hot side. There are other ways of doing it of course, but are there any simpler?

Figure 7. No, this voltmeter's accuracy won't begin to compare with that of a Simpson 260, but if you don't have a voltmeter, it's a whale of a lot better than none at all. It will measure dc, audio or ac with an accuracy of plus or minus 35 volts and the range can be extended almost indefinitely by more NE2's, 1 meg resistors and switch contacts.

[Continued on page 96]

Announcements

Fresno, Calif.

The San Joaquin Valley Sectional picnic will be held, Sunday, September 27, at the Government Recreation Grounds at Bess Lake in Madera County. Pre-registration prize, a transistor radio, pre registration must be received by K6EJT, 4795 E. Hammond Ave., Fresno, 2, in writing, on a card, before noon, September 25. No charge. Bring own lunch and refreshments. Picnic at 1130 and drawing and program, round table with director, at 1330. Groups, such as mobile, SSB, traffic and etc., can have their own tables by making arrangements in advance. Further details, San Joaquin Valley net, Monday through Fridays, 1830 Cal. time on 3915 kc.

Peoria, Illinois

The Annual Hamfest to be held by the Peoria-Area Amateur Radio Club, will be held Sunday, September 20, 1959, at Baty's Barn on route 29, up river 3 miles from Peoria, Ill. Registration starts at 8:30 a.m. Bring your lunch or eat on the grounds. Prizes, contests and games for all. Manufacturer's equipment will be on display. Advance Sale \$1.00 or at the gate \$1.50. Mail all advance sales to K9EHF, George Enders, 2915 North Avalon, Peoria, Ill., not later than September 14th.

Findlay, Ohio

The Findlay Radio Club, W8FT, will hold its annual hamfest on Sunday, September 13, at Findlay Riverside Park. Families welcome. Excellent playground and picnic facilities. Mobile talk-in on 3812 kc. Advance registration is \$1.00 per family or \$1.50 at the park. Tickets and information from Fred F. Flowers, W8UGE, 1307 S. Main St., Findlay, Ohio.

Cedar Rapids, Iowa

The 2nd Annual Cedar Valley Hamfest is being sponsored by both the Cedar Valley and Linn Amateur Radio Clubs on Sunday August 30th come rain or shine. Location the same as last year at Hawkeye Downs Fairgrounds on Highways 30 and 218 south of Cedar Rapids. This will be bigger and better than last year with a full day of programs with contests and prizes for both men and women. Program starts at 10 AM and will keep you busy all day with everything from Transmitter Hunts to the Grand Drawing for Prizes. Reasonably priced food will be available served by the XYL's. Tickets at the gate will be \$1.75 for Men and \$1.00 for Women. Pre-registration is \$1.50 for Men and \$1.00 for Women. Both are eligible for the Drawing for Prizes. For information and pre-registration contact Jay Spalti, W0SCM, 3239 Vine St., S.E., Cedar Rapids, Iowa.

Fort Huachuca, Arizona

The Huachuca Amateur Radio Club, an affiliate of ARRL, will hold its fifth annual Hamfest on 5, 6 and 7 Sept., 1959, at Fort Huachuca in Southeastern Arizona. The Hamfest will be in Garden Canyon, one of the most beautiful campgrounds in the Southwest.

Last year there were more than 500 present. This year they look forward to an even larger attendance. A full and interesting program is planned with events for OM Ham, his XYL and Junior Ops.

Alliance, Ohio

The Green Valley Radio Club, of Alliance, Ohio, is holding their second annual "Dr. Lee DeForest Day" celebration, Hamfest and Dealers Display on the 16th of August 1959, at the National Guard Armory, located at 1175½ West Vine Street, Alliance, Ohio.

GAMES, CONTESTS, PRIZES. LOTS of PRIZES.

Advance Registration—\$1.00 At the Hamfest—\$1.25

Address all reservations to HARRY E. POWNELL, R.F.D. No. 2, Alliance, Ohio.

Ohio

The Warren Amateur Radio Association Inc. will hold its second annual picnic and hamfest at the enclosed

shelter house, Packard Park on Sunday, August 23rd. Bring your own lunch for a picnic at noon. There will be swap and shop, ham auction and entertainment. Registration is \$1.50. Activities begin at 11:00 AM. Mobiles will be monitored on 29.6 mc. All amateurs are invited. Plenty of activities for the whole family. For further information contact Don Lovett, K8BXT—3629 Northwood Drive, Warren, Ohio.

York, Pa.

The Fourth Annual Hamfest of the four York County Radio Amateur Clubs:—Pen-Mar Radio Club, Inc., of Hanover; the Hilltop Transmitting Society of Red Lion, York Amateur Radio Club, Inc. of York and the Keystone VHF Club, Inc. of York will be held August 23, 1959 at Altland's Ranch, 10 miles west of York, rain or shine. Registration starts at 10:30 AM. Plenty of free parking adjacent to the picnic grounds. Picnic tables available for basket lunch. Free soda and games for everyone. Auction and prize for best standard size QSL card. Door prizes for the entire family. Talk-in rigs on 145.62 mc, 50.62 mc, 29.5 mc and 75 meters. Swimming facilities available at slight additional charge. Tickets \$1.00 in advance or \$1.25 at the gate per ham including family or guests. For tickets write John A. Zett W3FLD; 2740 Grandview Ave.; York, Penna.

Allied's Novice Course

Allied Radio of Chicago reports a record enrollment in its Novice Code and Theory Course for beginning radio Hams. A record number of 110 students registered for the Winter 14-week session, a gain of almost 50 over the enrollment in the Fall class. This is believed to be the largest Novice course enrollment in the entire country.

Classes are held in Allied's cafeteria on Monday evenings from 7 to 9 p.m. There is no charge, and Allied furnishes telegraph keys, headphones and paper. Tapes and records are used to broadcast the code, and students having difficulty are given special personalized instruction. At the end of the 14 weeks the receiving speed of students averages about 8 words per minute, which is 3 words faster than that required for the FCC Novice license.

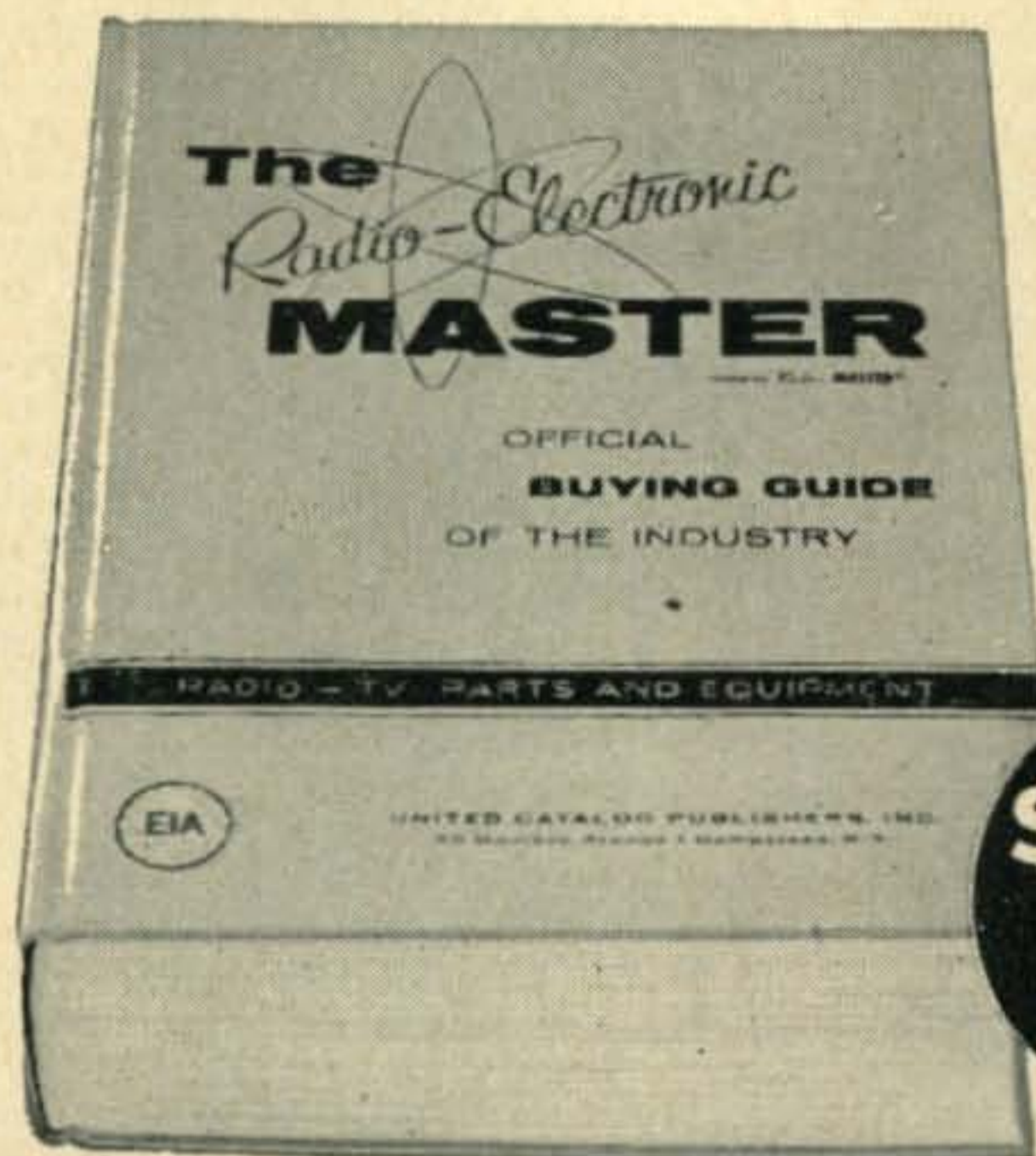


Basic radio theory is taught using the Novice questions given in the ARRL License Manual as a guide. This phase of the course, which includes informal question-and-answer sessions, covers Ohm's Law, schematic symbols, vocabulary, rules and regulations, and operating procedure. Instructors are George Bercos, W9WOV, of Allied Advertising Dept. and Joe Huffman, W9BHD, of the sales force. They report that more than two-thirds of those enrolled in each class complete the course and pass their license exams.

Free Wall Chart

Electronic Instrument Company, Inc. of Long Island City 1, New York has a free wall chart of schematic symbols which measures 22 by 28 inches. If you'd like one, write them a quick note and they'll get it right out to you.

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prices of receivers, transmitters, hi-fi components, cabinets, racks and many hard-to-locate items not usually found in smaller incomplete catalogs. All latest SSB and mobile ham gear included.

No matter what ham gear or component you require . . .

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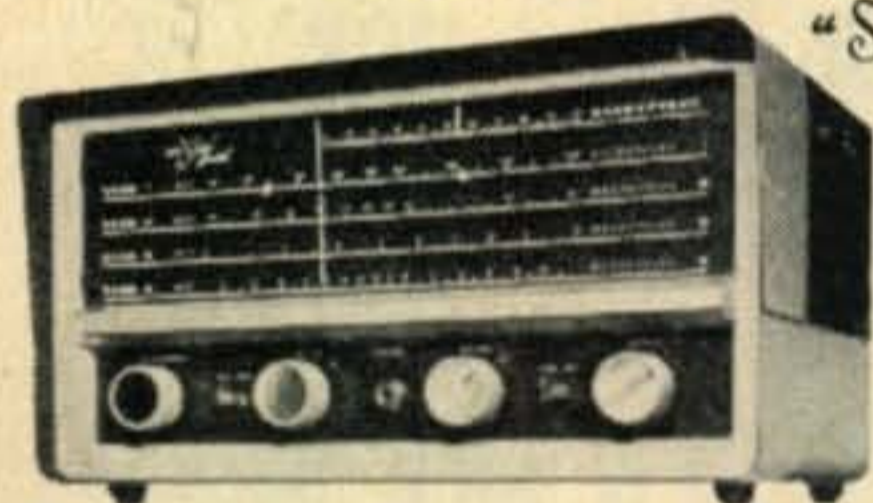
City..... Zone..... State.....



this is "the house the hams built"

Here, Leo I. Meyerson, WØGFQ, and Alan McMillan, WØJJK, discuss the very best terms to be offered a customer on trade in of his present equipment. Top trades can always be given because World Radio's expert Reconditioning Department and ready Used Equipment market insure fast turnover. On new gear, late serial numbers are guaranteed, easy financing is readily available, and promptest, most personalized service is offered. Buy now at World Radio . . . "the house the hams built!"

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YOUR PRESENT EQUIPMENT MAY BE ENOUGH FOR DOWN PAYMENT

Stable! Sensitive! Features 10 dial scales for coverage of 160 to 1¼ meters with National's exclusive new converter provision with receiver scales calibrated for 6, 2 and ¼M, using a special 30-35 tunable IF band. Longest slide rule dial ever; more than 1 ft. Three position IF selector—.5kc, 3.5kc, 8kc—provides super selectivity. Separate linear detector for single sideband. Calibration reset adjustable from front panel to provide exact frequency setting. Dual conversion.

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ADDRESS: _____

CITY & STATE: _____

For further information, check number 23 on page 126.

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UNTIL SEPTEMBER 1**

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**20%
EXTRA
CASH**



**SX-100
\$295 Net**



**SX-101-III A
\$399.50 Net**



**HT-32 A
\$695 Net**



**HT-33A
\$795 Net**



**SR-34
\$395 Net**

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on any of these brand new

hallicrafters

**Think of it! 20% OVER-ALLOWANCE
ON TOP OF RADIO SHACK'S
USUAL UNBEATABLE ALLOWANCE!**

SEE HOW RADIO SHACK SAVES YOU 20% MORE!

Usual liberal \$60 allowances now \$72!

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Usual liberal \$200 allowances now \$240!





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Cash in NOW on the greatest trade-in deal ever offered! Your old gear is worth money to YOU, money to US and money to the NOVICE who can't afford to enter the hobby with more expensive sophisticated equipment. To get your "eye-opening" trade-in deal, just fill in the coupon below, and I'll quote on your package by return mail.

Al Coe

Radio Shack Manager of Amateur Sales

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EXAMPLE: (No Down Payment Required)

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If the price of the equipment you want is	\$200.00
And the trade-in allowance on your equipment is	80.00
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Payments are only \$10 Monthly

IF YOU DO NOT TRADE IN A RECEIVER.

If Equipment price is \$200 Down Payment \$20 Monthly \$13

Small monthly payments while you're enjoying the superb performance of your HALLICRAFTERS that has ALL the newest electronic features!

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SUBSCRIPTION
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BARGAIN BULLETINS

MONTH AFTER MONTH
you get 24 to 36 pages
... 350 jumbo pages
loaded with special
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For further information, check number 24 on page 126.

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**Watts DC Input: 600 on SSB-CW-FM;
300 on AM-PM**

- New BROADBAND untuned input circuit uses 6-watt drive for 600-watt input; for 50-70 ohms.
- New output circuit gives approximately 20 db more harmonic suppression than any other in common use while matching antenna impedances between 25 and 300 ohms.
- New built-in TR switch uses gain and selectivity of output tuned circuit; has approximately 10 db gain, with one 12BH7A tube.



Excellent stability; No parasitics; TVI suppressed. Bypassed RF final in shielded compartment. Designed to work with 600A, 200A, Gonset Communicators, etc.

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- 6 db switchable attenuator for AM-PM (tune for max. input and output . . . just switch in attenuator).
- 3-position meter reads: (1) RF drive voltage input (tune exciter for max. input); (2) Final plate current (shows dc input to final); (3) instantaneous RF amps output (tune for max. output into antenna).

Special frequencies available on request.

Choice of grey table model (14½x10½x8¾ in.) or grey or black rack models. Ship. wt. 50 lbs.

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Also chokes custom designed to your requirements.

See your distributor or write:

P & H ELECTRONICS, INC.

424 Columbia, Lafayette, Ind.

For further information, check number 25 on page 126.

9c Wonder [from page 90]

Figure 8. Ever notice on windy or stormy days how static electricity from your long wire antenna will snap and ARC around your equipment? An NE2 across the Antenna terminals of your receiver will offer some measure of protection by shorting such charges to ground, rather than allowing them to crackle around in the coils and wiring.

Figure 9. The color of a neon lamp's glow changes from orange at very low *ac* frequencies to purple or violet at *vhf* and *uhf*. This characteristic might be useful in a number of ways. For instance, if you're wondering whether the parasitic you've been chasing in your new final is *vlf* or *vhf*, judicious application of an NE2 may very likely clue you in. ■

WORLD WIDE [from page 51]

We were in the air a total of 145 hours and flew 28,500 miles, or somewhat more than if we'd girdled the world at the equator (we never crossed it). That averages a little less than a couple of hundred miles an hour, which is to modern air speeds like the Mayflower to the Spirit of St. Louis. It took us 13 hours to fly from Hawaii to Travis AFB, Cal., where I left the plane and took a commercial 707 across the country to New York in 4 hours and a half! But sell short no C54's—we had no-repeat-no engine trouble all the way round, not one queezy moment. She was slow, but man, how safe, and very comfortable thank you and above all, our own.

The trip was made more fascinating not only by the fact that we felt—at least part of the time, in touch, and because hamming makes long flights seem short—but also because there were warm-hearted, generous hams to meet us almost everywhere we stopped. Sometimes I had the impression that the hams of the world had been better briefed on our arrival than the bases at which we touched down. Robin, VS9AH, made our day in unbelievably hot Aden a pleasure instead of a chore (he had Ted Henry's little Argonaut rig in his bedroom . . . more on that SSB miracle in some other issue). At Ceylon (they can send me back there anytime) the lovely Soma, 4S7YL, her OM and their beautiful daughter were at the airport with car and chauffeur, bursting with questions about her stateside friends. We near missed our plane seeing Colombo, and it wouldn't have bothered me if we had. In Okinawa, where there are, I'm sure, more hams than people, we were entertained royally by a hastily called meeting of the local club, ditto KH6 land, where the FPM200 was off loaded so Bud Drobish could give the gang a close look-see. Harry, JA1ANG, Mr. Ham Radio in Japan, made Tokyo seem just like home, guiding us through a radio row that

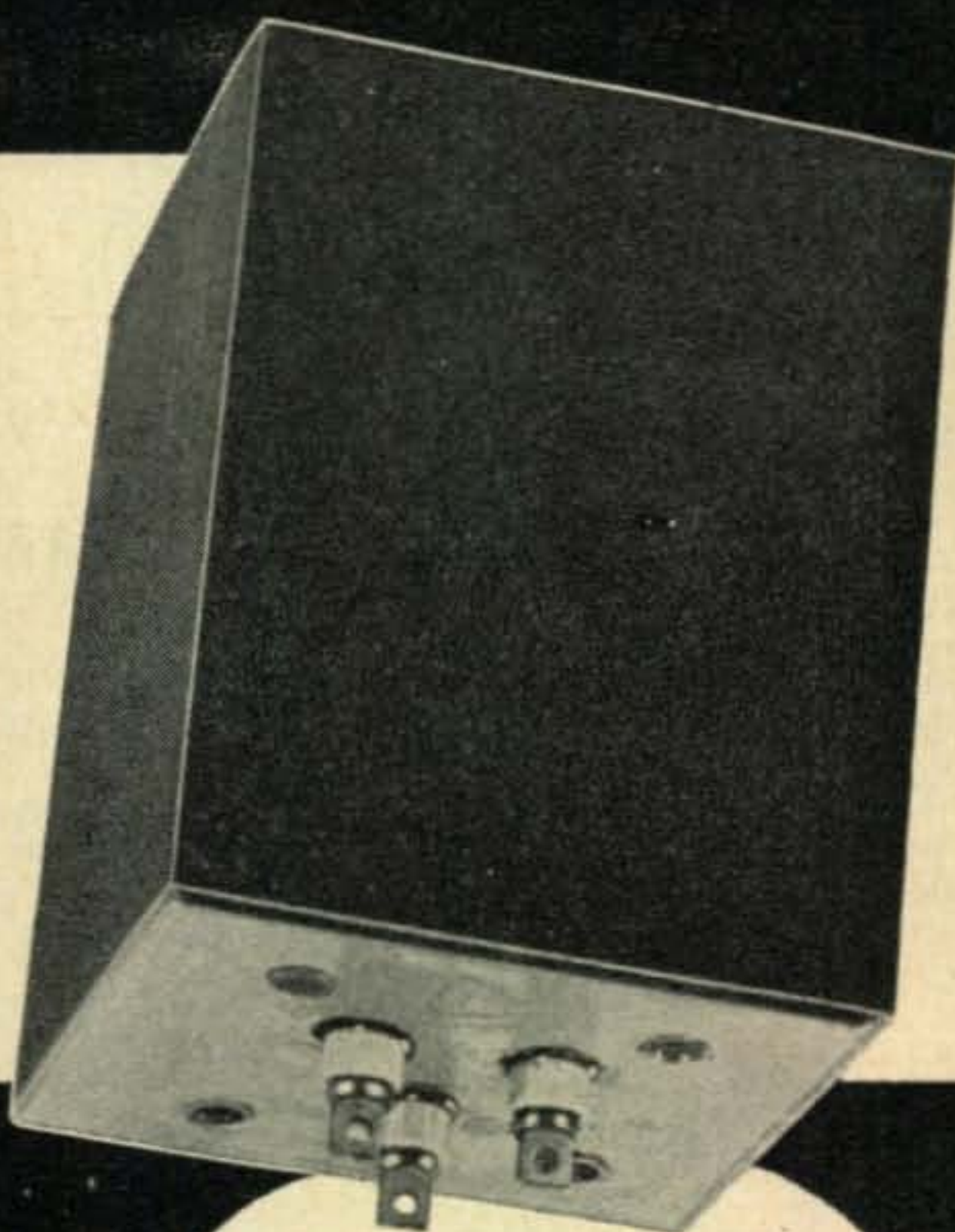
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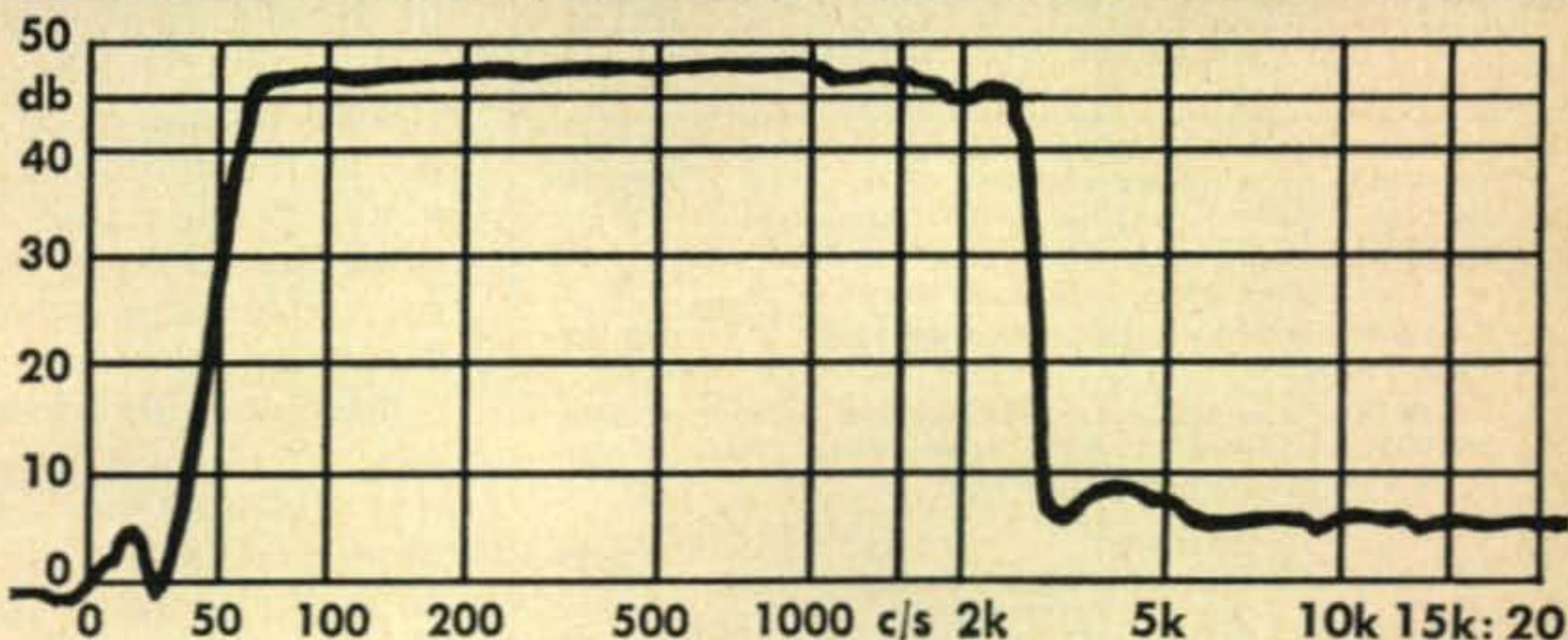
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For further information, check number 26 on page 126.

August, 1959 • CQ • 97

HI, O.M.I

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I-81A Same as above except 3" diameter.....

I-208-D FM SIGNAL GENERATOR. Operates from 12v DC or 115v 60 cyc AC. Freq: 1.9 to 4.5 mc and 19 to 45 mc. Accuracy .03 percent. Generates five audio frequencies. Cost the gov't about \$1800.00. A real must for the mobile shop! Brand New. Latest model. ONLY.....

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For further information, check number 27 on page 126.

makes Cortland St., N.Y.C. seem like a junk-box, and generally making us feel visiting kilowatts. Nothing touched us more than our brief touchdown in sickeningly hot and dirty Karachi. There, at great effort (anything is an effort over there), was a tall breeze from Texas, W5LAK, frustrated for three years that he can't get permission to operate from AP2. Hungry for ham companionship he'd heard via the VOA we were due to stop off, and he'd haunted the control tower until we actually arrived.

Operating was generally real good fun, particularly when we'd driven the noise gremlins from that #2 engine. I had never forgotten the thrill of operating from a plane over Ethiopia back in 1951 for a few short hours and this was all that, and more. There's something particularly appealing in "reverse DX" . . . hearing and talking to the fellows you know back home . . . and sure enough, when conditions finally were right, there was the old gang . . . K2GL, K6DXK, W2BXA, W2CMM, W7KVU, W4ANE, W4CF rolling in right across the world. I think we were all wonderfully proud of the courtesy, cooperation and discipline of U.S. hams. At times there was quite a passel trying to get in their licks . . . but in our hundreds of contacts I can recall only one incident of rudeness. Literally dozens of fellows stood by patiently while we ran personal phone patches. We've come a long way in operating technique and courtesy.

Observations

A few other notes . . . one can't imagine, unless you've experienced it, how precious little ham activity there is from Athens east to Tokyo. The sidebanders can be counted on a couple of hands. If you're planning to ham it up in the middle and far east, be sure to include *cw* and *am*. Be prepared, too, to share those ham bands with Teletype circuits, commercial meat grinders and what have you. Ham bands belong, sadly, to everyone, out thataway.

Most of all, we learned—all us hams along anyway—that the world, in spite of ham radio speed-of-light miracles, in spite of aircraft and atom power and all the other modern tricks—isn't such a small place at all. Yes, I think we exploded that cliché once and for all. You can get around the world . . . by boat, by plane, by radio . . . but it takes some doing . . . some planning, some effort, and some time. Operation World-Wide showed me, for sure . . . that it's a wide, wide world. ■

DX CONTEST [from page 63]

- two contacts on the page.
- 8. Copies of the Zone map, log sheets and report forms are available from CQ, address listed below. Send a self-addressed envelope, large size. Include

sufficient postage, in the case of overseas stations IRC coupons are acceptable. Make sure to indicate how many sheets are needed.

XIV. RULE CHANGES:

1. Under Par. III, Type of Competition. The multi-operator section has been divided into two divisions. (b) single transmitter and (c) multi-transmitter. This does not literally mean that only one transmitter is allowed at a (b) classification station. It means that only one transmitter and of course only one band at a time can be used. In the (c) classification any number of transmitters and operators can be going at the same time. So multi-operator stations make sure you indicate under what classification you are operating.
2. The novice section has been dropped.
3. The minimum operating requirement has been retained, 12 hours for single operator and 24 hours for multi-operator stations. It should not be a hardship to operate 12 hours out of the 48 hour contest period.

XV. DEADLINE:

All logs must be postmarked **NO LATER** than December 1, 1959 for the Phone section and January 15, 1960 for the CW section. In rare isolated places the deadline will be made more flexible. Send all logs directly to:

CQ Magazine
300 West 43rd St.,
New York 36, N. Y.
Att: Contest Committee

VHF [from page 60]

W6's. 5-29-59—worked 10 W6's, 7 W7's, and the day is still young."

"Will be here all summer. Heathkit Senica, ground plane antenna, Gonset G-28 (10 meter communicator with FCU-2 converter.)" *Very, very glad to hear you're in Idaho Jack, as all the east coasters will be. Most certainly hope we hear you on the east coast once in a while.*

Corinth, Mississippi From W5 land and Bill Seiler (K5OQB) we get some more "openings" news:

"We have had several good six meter openings since the rip-snorter on May 8th, when we witnessed our first band opening. States heard were New Mexico, Arizona, California, Missouri, Texas, Oklahoma, Oregon and Colorado. I worked five of these states." *Pretty darned good for a first opening, eh, Bill?*

"The band opened to Canada since, and two locals contacted a trio of stations there. K5UUZ worked VE4BI, VE4SH and VE3AGU; K5UFH worked VE4SH. On May 17th I heard CO2GX at 1300 CST, but didn't manage to contact him."

"Wonder if someone could send me some information on a rhombic for six." *O.K. you rhombicers, get busy*

Bob Henry,
WØARA
Butler, Mo.

Ted Henry,
WØUOU
Los Angeles



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BIGGEST
TRADE-IN**



Write us... get Henry's trade-in offer first... and save money!



HQ-170

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Single Sideband at Its Very Best!

Triple conversion **HQ-170** • 20 monthly payment \$17.77. \$35.90 down. CASH PRICE \$359.00. Radio amateur's ideal for modern SSB reception in performance, tuning techniques, dependability. Clock timer \$10 extra.

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HQ-145 RECEIVER	\$269.00
HQ-110 RECEIVER	\$249.00
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Complete stock of all transmitters, receivers, antennas, rotators, towers, parts, accessories, equipment. Henry has ALL the new equipment first.

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For further information, check number 28 on page 126.

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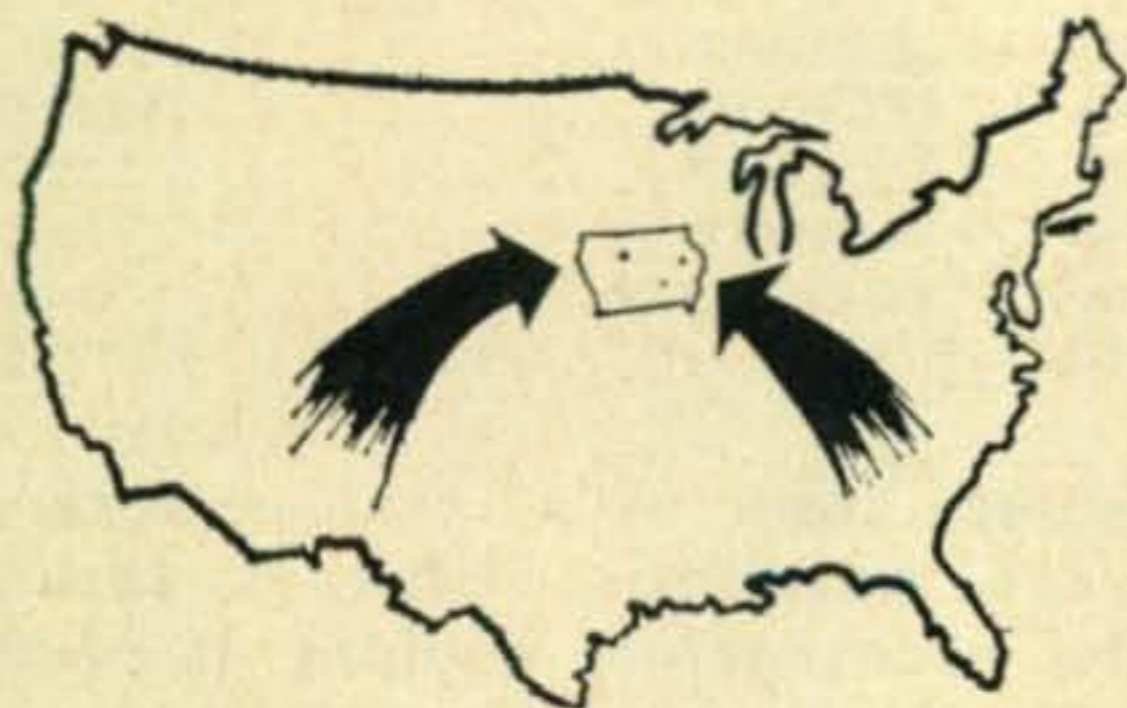


HQ-160
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HQ-170
\$359



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\$269



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67 16th AVE. S.W. CEDAR RAPIDS, IOWA Phone EM 4-1172

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and send Bill the dope. Bill, you might contact W1GKE, Toiva has one in use at the present time.

Richland, Michigan Information picked up via Sporadic E and then verified by the fellow who did it, Andy Galloup (K8ACC):

"On June 6th during the six meter band opening, I worked stations in all of the U.S. call areas in five hours and twenty-eight minutes. It was the greatest opening on six meters in this area that I have experienced in the two and a half years I have been on six meters. A total of twenty states was worked during the same period." *Wouldn't it be wonderful, if they were all new ones, Andy?*

"W1GDH — Massachusetts, K2TEQ — New Jersey, W3CGV — Delaware, W4ZCG — Virginia, K5EBZ — Texas, W6BJI — California, W7EPZ — Montana, K8AEM — Michigan, K9HPB — Illinois, and KØCLJ — Colorado. The foregoing stations are the ones I worked in each area." *Very, very, very interesting Andy, you surely had yourself a field day all your own; although I think everyone enjoyed that opening (if they lasted through it, that is.)*

73, Sam, W1FZJ

DX [from page 67]

stamps to cover the cost of return of your QSL's. Complete membership and other data will be published as soon as possible.

Contest

Here we go into WIWY's territory again, but the following was received too late to get to him. For the benefit of those working for WASM-II the SM boys will have an SM party on August 14th to 16th. They will call CQW de SM7ID/L. The letter after the / indicates the San. This is a very attractive award and well worth chasing.

"Concorso Genova" Competition

The Genoa Section of the A. R. I. (Associazione Radiotecnica Italiana), jointly with Columbus Marathon, has launched a competition amongst regularly authorized radio-amateurs throughout the world. To qualify for entry, amateurs must adhere to the under-mentioned regulations which cover the period 3rd August/12th October of each year.

Foreign radio amateurs: contact as many Italian stations (I1-Is1-It1) as possible and, in particular, stations located in Genoa and in the Province of Genoa.

Italian radio amateurs: contact as many foreign stations as possible and as many stations in Genoa and in the Province of Genoa, as possible.

Points to be calculated as set out in the table bearing in mind that, for contact with stations in Genoa and the Province of Genoa, such points are calculated with the same multiplying factor.

Each Station may be contacted once only in phone or CW and on one only of the frequency bands permitted.

All competitors must, by the 31st December of the years in which contacts were obtained,

For further information, check number 29 on page 126.

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Another **C** and **G** store to serve the **RADIO AMATEUR** and **INDUSTRIAL ELECTRONICS** industry. Full stocks and top equipment lines are featured.

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For further information, check number 30 on page 126.

Sub Survey

An independent survey of amateur radio magazine subscription rates for all amateur radio magazines published on the East coast of the United States with titles of three or less letters shows conclusively that CQ has the lowest subscription rate. For instance, we find that Brand X has a rate of a flat \$5 per year, which runs to approximately \$10 in two years, if our calculations are not in error. For the same period you can subscribe to CQ Magazine for only \$9.00! We are prepared to back this up with positive proof and a one year all inclusive guarantee. Fill out the below form for proof positive that you can get two years of CQ for only \$9.00.

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New York 36, N.Y.

One year, \$5 Two years, \$9 Three years, \$13
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C8

Enclosed is \$..... for a..... year new renewal subscription to CQ, to be sent to:

Name..... Call.....

Address

City..... Zone..... State.....

Pan-America and all other foreign: 1 yr. \$6; 2 yrs. \$11; 3 yrs. \$16.

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FOR A SWELL
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THIS GREAT
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G-43 ALL BAND RECEIVER

Offers peak reception over a wide frequency range . . . sensitivity . . . selectivity . . . highest quality components and materials . . . a fine blend of high performance features

and economical pricing. \$159.50

G33 ALL BAND RECEIVER

Has the same basic features as G-43, but incorporates certain design simplification which permits exceptionally reasonable pricing with little sacrifice in performance.



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GSB-100 SSB TRANSMITTER

The GSB-100 operates on SSB with selectable sidebands. When used on AM, it transmits both sidebands, which makes 100% modulation possible without the distortion that accompanies highly modulated carrier-

and-one-sideband signals when received on a conventional AM receiver. \$49.50

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If you've been reading a lot of claims about input these days, consider what you're really getting in down-to-earth watt-per-dollar output. Only Gonset's GSB-101 Linear Amplifier gives you up to 65% efficiency!



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GONSET HYBRID PHONE PATCH

Gonset's New Hybrid Phone Patch has an exclusive VU meter that permits easy monitoring of phone line levels and eliminates overdriving them, a cause of so much cross-talk and interference in the past. The Gonset Hybrid Phone Patch

gives you a positive method of measuring your level, from -20 db to 3 db. \$44.50



**P.O. Box 746
Watertown, S. Dak.
Turner 6-5749**

For further information, check number 31 on page 126.

	Contact with Stations in the following zones	Points for each contact	Multiplying factor for each contact with Genoa and Province of Genoa
A	14-15-16-20-33	1	1
B	5-8-9-11-13-17-21-34-35	2	2
C	7-10-12-30-32-36-37-38-39	3	3
D	1-2-3-4-6-22-29-40	4	4
E	18-19-23-24-25-26-27-28-31 e stazioni dell' Antartide	5	5

send the following to P. O. Box 347, Genoa, Italy:

—a request for admission to the competition accompanied by a declaration that all the rules pertaining thereto have been observed.

—a list of all contacts with stations in Genoa and the Province of Genoa, including call, date, hours GMT, and the QSL dispatched.

—Total points accumulated.

Requests not complete of all items will be discarded.

On the basis of the requests received, the Judging Committee will invite radio amateurs having the highest accumulation of points to submit the Log covering the period of the competition.

The findings of the Judging Committee are final and no appeal will be entertained.

Amateurs at present operating in the Genoa District are:

II—ABQ, ABR, AFE, AHQ, AOH, ARD, BOB, BSS, BSU, BYH, DAP, DEL, DSS, EP, FGU, FHA, FNI, GCG, GR, KZ, NPS, MAR, MD, MT, MTP, OX, RCI, RGF, RH, RK, RKY, RS, RVF, RU, SKZ, SME, SNO, SYB, SV, SXL, THT, TKB, TCN, WAD, WAJ, WBK, WBY, WCE, WFS, WIA, WND, WMS, ZBN, ZGV, ZHM, ZKU, ZI, ZKX, ZNC, ZNP, ZTC, ZVR, ZWZ, ZYQ, ZZY, WRZ.

In any case the American Call Book of the competition year applies.

As you can see by the photo, the prizes are very attractive and should encourage a lot of activity.

73, Urb, W2EDC

Prop. [from page 69]

monthly sunspot number of 173 for May, 1959. This results in a 12-month running smoothed sunspot number of 179.2 centered on November, 1958.

Cycle 19, the most intense solar cycle ever recorded, is now slowly declining. Figure 1 shows the progress Cycle 19 has made to date, with the author's prediction of sunspot activity for the next year. Cycle 19 began during April, 1954 with a smoothed sunspot number of 3.3, rose to an unprecedented

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HQ-160

Everything you could wish for in general-coverage! 13-tube superheterodyne with automatic noise limiter. Dual conversion 540 KCS to 31.0 MCS. Crystal calibrator. Electrical bandspread. Slot filter. Q-multiplier.



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Best for the amateur at any price! Dual and triple conversion 17-tube superheterodyne with automatic noise limiter. 60 db slot filter. Separate vernier tuning. Selectable sideband. Tuned IF amplifier. Crystal calibrator.



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Brand-new general-coverage receiver! 540 KCS to 30.0 MCS. Dual conversion. Adjustable 60 db slot filter. 11-tube superheterodyne with automatic noise limiter.



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For further information, check number 32 on page 126.

RADIO BOOKSHOP

Check over your library. If you have less than 18.7% of the below books it rates as an Utter Disgrace. From there to 23.9% is an Ordinary Disgrace. 51.3% is the limit for Shamefully Incomplete. Up to 90.6% is rated as Beginner and above this percentage you rate as a Radio Bibliophile.

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1078 pages. One of the most complete radio textbooks ever printed. All theory but not too heavy on math
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1618 pages. Mostly formulas, tables and circuits. With this, #13 & #32 you will have a complete source of data . . . \$10.00
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- 20 **RTTY Handbook by W2JTP**
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- 21 **VHF Handbook by W6QKI**
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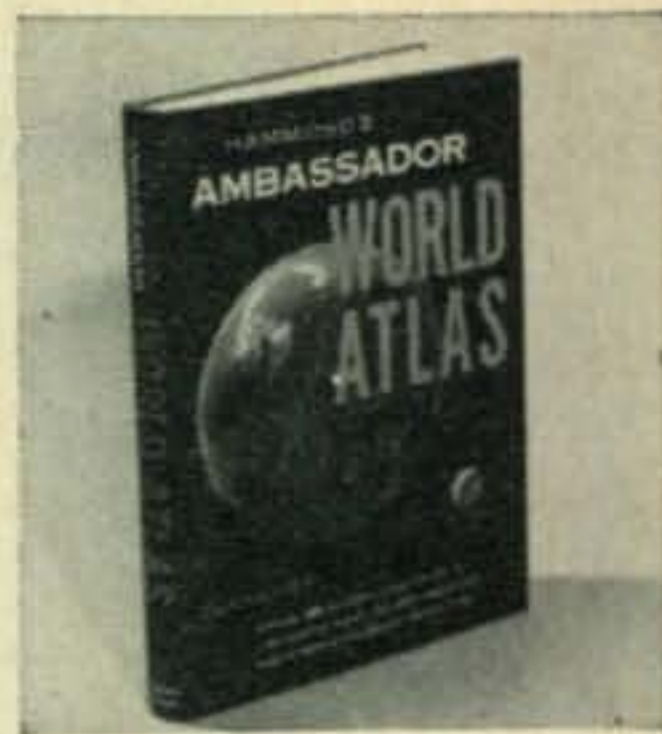


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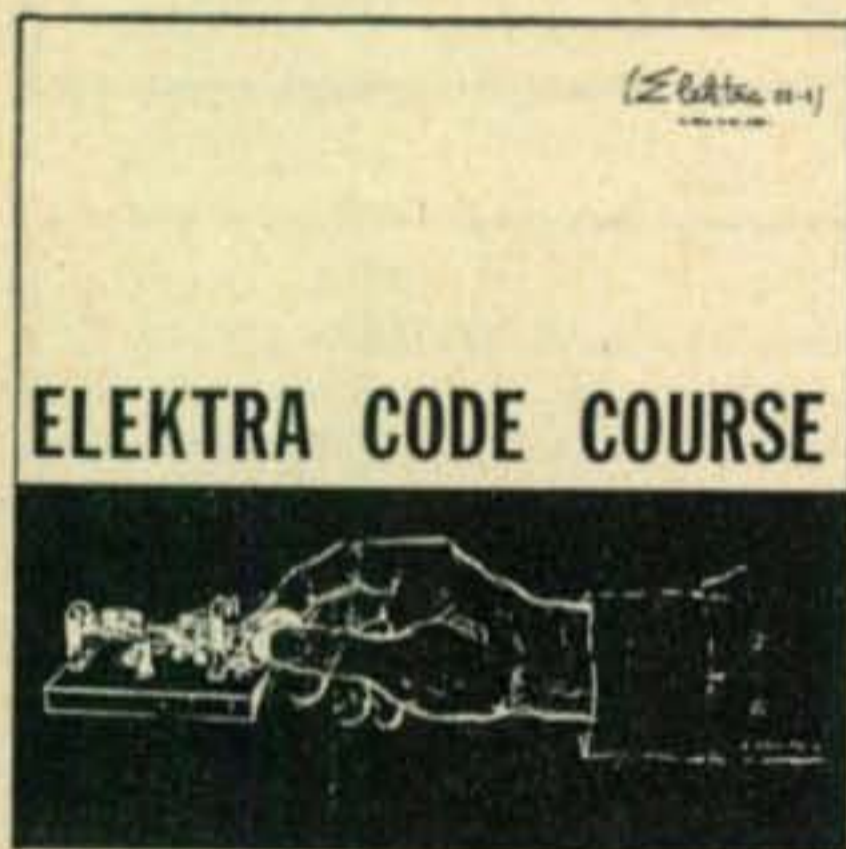
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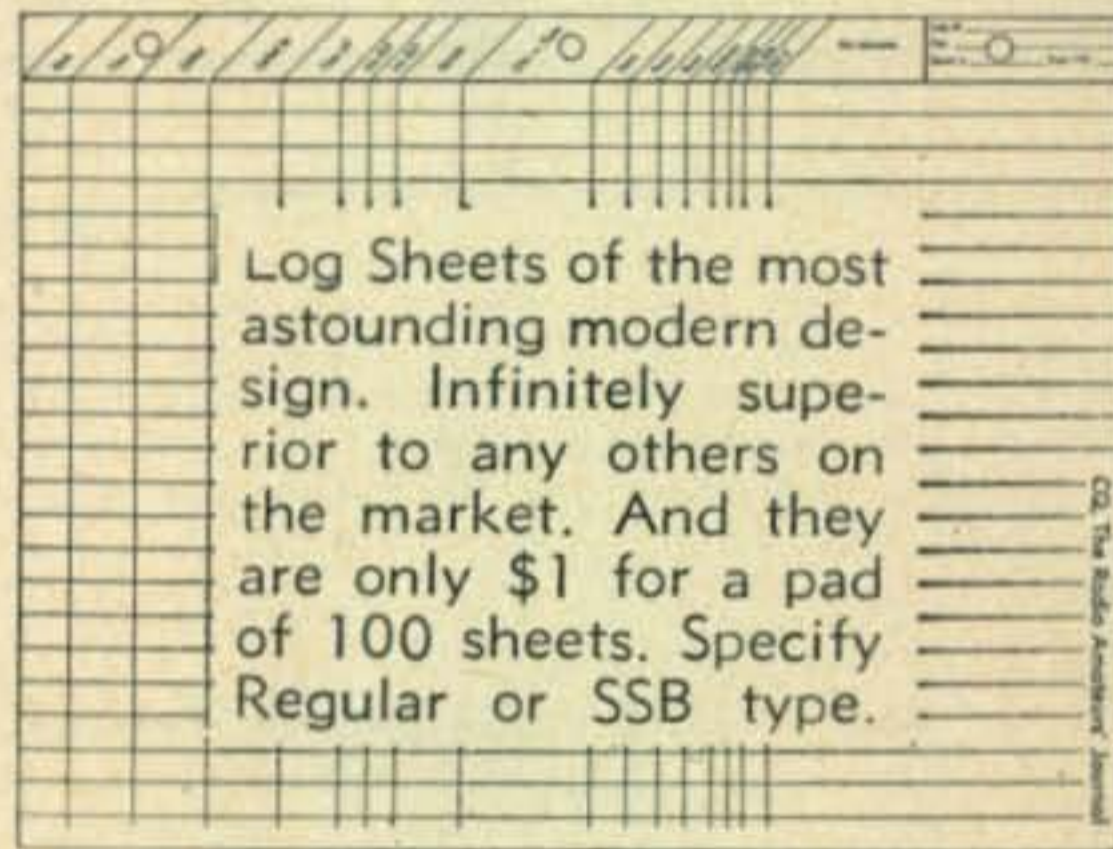
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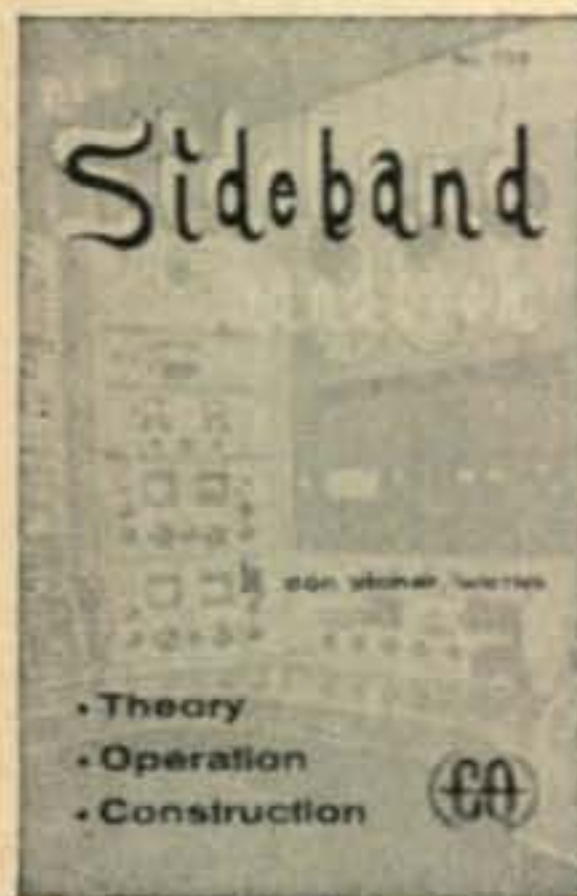
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maximum of 201.3 during March, 1958, and is now declining, with the minimum forecast for late 1964.

This month's CQ forecasts are based upon a smoothed sunspot number of 143 centered on August, 1959.

Mail

Dear George:

I thought I should wait to make sure that I was still to be Hon. Sec. for this year, before I wrote to you about some publicity for the London Members Luncheon Club, but I have the job again now so can now let you have some dope.

We were formed in 1950, at the instigation of G6CL and G2MI, for the main purpose of having a regular meeting place and time, where any overseas visitors could always find a welcome, and the opportunity of being sure of meeting the London gang. We started in a small way with a usual attendance of around 15, and every now and then we managed to attract a visitor. Now thanks to enthusiasm shown by the regular members and publicity from visitors when they get back home, we have a regular attendance of around 35, and during the last 12 months we have entertained over 40 visitors and some of their ladies, from over 19 different countries. You know just what sort of a meeting we have, very informal and friendly, and I know that no visitor leaves the meeting without at least one invitation to visit one of the members at their homes. Apart from the radio side of things we feel we are doing our little bit to foster good international relations.

You might be interested to know that the first Secretary of the Club was G2UV, Bill Corsham, who was the originator of the QSL card, he sending the first written report of an amateur QSO, and so starting, what must be a big headache to some and a great pleasure to others hi.

For the record we meet on the third Friday of every month at the Bedford Corner Hotel, Tottenham Court Road, W. C. L. and my Home phone No. is RUIslip 2763 or of course visitors can phone HQ at HOLborn 7373. I know you are well aware of this but just a memory refresher hi.

You might be interested to know that last Friday we had the company of K2HWX, K2GVQ, K4JKP, VK3HL, ZC4LK and not forgetting the second visit of W2APF.

The other officers of the club are Stan Vanstone, G2AYC our Chairman, and Clem Jardine, G5DJ the Treasurer, both of whom you met and have been re-elected for 1959/60, with yours truly at Sec.

Hope you can give us a bit of publicity as promised. Hope to see you again sometime, and will also be looking for you on 10 or 15.

73, Frank Fletcher, G2FUX
73, George, W3ASK/HB9

SCRATCHI [from page 20]

cycles (figyuring that out on your own, Hon. Ed).

So, this meening that every amchoor have more than one hole channel to himself, even

SSB REL

satisfactions and challenges at

If you are a graduate engineer or amateur with equivalent experience specializing in the design, development, and construction of communications gear, the outstanding Single Sideband design team being built by REL's Eldico division may have a place for you.

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Please address your resumé to *S. E. Piller, W2 KPQ, Group Supervisor, Eldico Electronics Division.*

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For further information, check number 51 on page 126.

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4845	5825	6300	6725	7225	7520	7680	7841	8000	8258	8540	
4852	5840	6306	6740	7240	7525	7683	7850	8005	8260	8541	
4880	5850	6315	6750	7250	7530	7690	7858	8030	8266	8550	
4900	5852	6325	6773	7273	7533	7691	7860	8033	8270	8558	
4930	5860	6335	6775	7275	7540	7696	7866	8040	8273	8560	
4950	5873	6340	6800	7300	7541	7706	7870	8041	8275	8566	
4980	5875	6350	6806	7306	7550	7708	7873	8050	8280	8570	

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For further information, check number 33 on page 126.

under worst condishuns. So, what are big. Hon. Problem?

Wate—I turning on reseever. Hon. Ed!! Hackensaki!! Sumthing wrong. Eleventeen thousand amchoors are on air tonite!! Sacramento Bullyvard!! Calling Hon. Congressman. Calling Hon. F.C.C. Hon. Ed., you gotta doing something. Amchoors needing more freak-wencies. Quick, everybuddies, before it are to late. Doing something!!

Respectively yours,
Hashafisti Scratchi

SURPLUS [from page 77]

Avenue, Milwaukee 7, Wisconsin. Seems he became the owner of a slew of FT-384-A adapters and will sell them for \$4.95 plus postage for 4 pounds. This is the little gadget that plugs into the BC-603, 683 or 923 and allows you to perform the necessary alignment and tests without making the operation haywire. It provides input power leads and terminals for an output meter and vtvm so as to measure sensitivity, limiter adjustments, and other important voltages. Brand new and worth every cent of the money too, especially if you have a few of these to work on. Not only that, it will also save you the trouble of having to find a connector for the back, especially if you want to go mobile.

Another letter in the mail this month came from Paul Griffith, W2SOY, who designed the EE-89 repeater and his comments are well worth reading. I'm trying to have him write an article for publication in an early issue and will reprint a portion of his letter dealing with the EE-89 next month. Incidentally the EE-89 is still available from Metro Electronics, 172 Washington Street, New York 7, N. Y. They still have the 3-A Control Panel in stock as well.

Handbook Requests

By now there are many pieces of surplus converted and written up in back issues of CQ. One of the best and fastest methods of determining which issue a piece of equipment was in is the "Eleven Year Index" published in the January 1956 CQ, but also available from CQ offices upon receipt of a self addressed stamped envelope. It is surprising how many letters are answered merely by referring to this one reference.

From New Zealand, Kevin Hayes, ZL4MD, Blyth St., Cromwell is searching for handbooks and data on the BC-611F handie-talkie. K4HXU needs an ARC-4 conversion to 2 meters, or a reprint of the Nov 1955 CQ with same. Likewise, Chester Staffan, 321 Lamb Avenue, Macon, Missouri has an English or Canadian R-1147A VHF receiver that needs a schematic or handbook to make it work. Edwin Sheldon, P. O. Box 721, Aberdeen,

THE CQ WORLD WIDE VHF CONTEST

August 29th & 30th

Who: All radio amateurs with VHF equipment anywhere, yup, anywhere in this wide, wide world.

When: From 8:00 P.M., local standard time, Saturday, August 29th to 8:00 P.M., local standard time, Sunday, August 30th.

Why: To promote VHF operation throughout the world, and provide VHF'ers with a chance to see if their rigs still work.

How: Just get on and call "CQ-Contest," hang on to your hat, but follow the

Rules: (A) Single-band operation:

(1) Single-band operation on any one of the VHF bands may be considered for award.

(2) Contest contacts on a single band must contain the following information exchange: Section and state (or country), signal report, contact number, and handle. Also, two way acknowledgment must be made.

(3) Sections are as they were in previous contests. That is, a section in the U.S.A. or Canada is the county in which the station is located. In other countries, the equivalent political subdivision (i.e. cantons in Switzerland, etc.) counts as a section.

(4) Scoring is as follows: each contact completed counts two points (Uncompleted contacts count zero); the total number of contact points times your multiplier gives your total score. The multiplier consists of the product of three numbers as follows:

(a) The number of sections;

(b) A multiplier equal to the *total* number of hours of contest operation; (a contest hour will qualify if at least one contact is made during that hour);

(c) A power multiplier of 10 for final power input of under 20 watts, a multiplier of 5 for power input less than 100 watts and greater than 20 watts, a multiplier of 1 for a power input less than 1000 watts and greater than

100 watts, and a multiplier of $\frac{1}{2}$ for power inputs over 1000 watts.

This all means that if you have
200 contacts you have
400 contact points (200 x 2)

and if you operated a total of 16 out of the 24 available hours with a power input of 99 watts and worked a total of 45 sections, your multiplier would be $16 \times 5 \times 45 = 4050$; and now your score would be the product of your multiplier times your contact points, ergo $400 \times 4050 = 1,620,000$.

Now isn't that pretty darn simple?

(5) Awards will be made to the highest scoring stations on each VHF band in every state or province in the U.S.A. and Canada, and to the highest scoring stations on each VHF band in every country from which reports are received. A special gold-plate plaque will be awarded to stations submitting scores in excess of two-million points.

(B) Logs:

(1) Logs should be complete in every detail and should display prominently the itemized score and should be accompanied by a cover sheet on which the total score, name, address, call and state of the stations must be clearly printed.

(2) Logs should be postmarked no later than September 15th, 1959, in order to be counted in the results. Mail all logs to

Log Department
Microwave Associates, Inc.
Burlington, Massachusetts, U.S.A.

(3) Mail all complaints, criticisms, comments and bombs to the Rhododendron Swamp, VHF Society, Attention W1BU, P.O. Box 2502, Medfield, Massachusetts.

Have fun and let's really flog the VHF bands for some real astronomical scores. See you on six, two, two-twenty, four-thirty-two, etc., from W1BU.

73'
SAM, W1FZJ



TRADING POST

This section, called the **TRADING POST**, will be confined only to legitimate ham distributors as a means of announcing the many excellent used items available.

Like new SX-88 \$299.95. Ditto SX-28 \$149.95. SP-44 Panadapter \$49.95. Rebuilt Mims deluxe rotator with cable \$129.95. 3 El Telerex 20M beam \$89.95. Used Ranger, Valiant, Viking II at big savings. See last month's ad for mobile specials. We buy as well as sell or trade. Send for big free list.

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RECONDITIONED OR LIKE-NEW EQUIPMENT: Johnson: Ranger \$229., KW matchbox \$99., Navigator \$129., Valiant \$369. (all factory wired) Collins: 75A-1 \$259., 51J-2 \$475. 51J-3 \$575. 75A-4 \$625. R-390A/URR. Hammarlund: SP-600 \$495. BC-794-B \$159., HQ-160 \$275. National: NC-300 \$249., NC-183-D \$249. NC-98 \$89. Hallicrafters SX-101 \$275., SX-100 \$225. R-274/URR \$255. Teletype printers, perforators, reperforators, receiving converters.

Alltronics-Howard Co., Box 19, Boston 1, Mass.
Write: Tom, WIAFN (Richmond 2-0048)

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Hallicrafters HT-33 Amplifier	\$395.00
Elmac A-54 and A-54H	\$49.50
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20A Exciter. Factory wired	\$179.50
Johnson Viking II Factory wired with VFO.....	\$199.50

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W3DQ Established 1920 K2IUS

Bargains in good used gear. National NC-300 \$259.00, NC-188 \$120.00, RME 4350 \$169.00, DB 23 \$25.00, Meissner 150-B complete with VFO and crystal mike \$95.00, RCA AR-88 \$195.00, Hallicrafters SX-71 \$149.00, SX-100 (used one week) \$239.00, S-105 \$60.00, Heathkit VF-1 \$16.00, Johnson Viking II \$179.00, Two-meter VFO \$26.00, Pacemaker \$349.00, Central Electronics 20A \$195.00, 458 VFO \$20.00, Millen R-9er \$10.00, Globe 755 VFO \$47.00, Chief 90 \$43.00, Scout (Early) \$30.00, Hammarlund HQ-170C \$319.00, HQ-110C \$199.00, HQ-100C \$139.00. For your best deal on new or used equipment write Chef, W9PHK, Chester Electronic Supply Co., 2012 52nd St., Kenosha, Wisconsin.

Bargains: Reconditioned and guaranteed. Shipped on approval. Easy terms available financed by us. Hallicrafters S38 \$29.00, S85 \$89.00, SX99 \$119.00, SX96 \$159.00, S40B, SX71, SX100, SX101, HT32; RME DB23 \$29.00, HF-10-20 \$49.00, VHF152A \$49.00, RME 4350 \$159.00; National SW54 \$29.00, NC98 \$99.00, NC183D \$249.00, NC300 \$279.00, HRO's; GPR-90 \$349.00; Elmac PMR7 \$119.00, AF-67 \$129.00; Johnson Pacemaker \$295.00, Viking II, Ranger, Valiant, Thunderbolt; Heath DX35, DX100; Hammarlund HQ100, HQ110, HQ129, HQ140, HQ150, HQ160, HQ170; Collins 75A1, 75A2, 75A3, 75A4, 32V1, 32V2, 32V3, KWS1, KWMI; Central 10B, 20A 600L; Globe; Gonset; much other equipment. Write for list
HENRY RADIO, BUTLER, MO.

South Dakota got a PE-110B from MARS and wants to know what it is, and where to get a schematic . . . any ideas?

Fred Brandon, W0NWR, 119 Locust, Ottawa, Kansas has a D-116/APG-15 scope indicator and is needs a conversion to a monitor. George E. Owens W3HMY, 135 Powell Road, Springfield, Penna. has a Navy RBC and needs a diagram, schematic or what have you to get it going, and a ceramic wafer switch to replace the cracked one he has. Bob Feigenbaum W2WQD wants to know if there is anything else that you can convert the BC-605D to besides an intercom. Dave Ricketts, P. O. Box 66, Marble Hill, Missouri has a BC-610-c and a BC-611 and wrote in asking for manuals on both.

Perry Remaklus W8VCQ, G-318 Kelsey S.Q.,U of M, Ann Arbor, Michigan wants information concerning the AM-80-TRA-1 Amplifier and PP-130-TRA-1 Power Supply. Richard Solomon, W1KSZ, 569 Talbot Avenue, Dorchester 24, Mass. wants a manual on the RCAF transmitter Ref 100/1267 made by Canadian Marconi. R. M. Grasser, WSRC Labs, 11406 Ingram, Livonia, Michigan wants a handbook on the Navy ABF receiver which is part of the BL-3 IFF set. R. H. Naylor, 961 Parkwood Place, Jackson 6, Mississippi wants to locate a handbook for the Western Electric 27 AA Radio Telephone transmitter and a source for W. E. Type 101 A (or B) tuning units for the same transmitter.

Theodore Warren, 20951 Kelly Rd., East Detroit, Michigan is searching for the R-45/ARR-7 receiver handbook. Stan DeFoe, 129A South 7th Street Salina, Kansas has one of the Mark II, B-19 tank sets and is looking for anyone who has done a conversion on this unit. George Borkowski, 903 Miller St., Marinette, Wisconsin is looking to get a conversion of the BC-611 to citizens band, or at least a schematic of the set. VE6OH Otto Meginir, 1117 17 Street N., Lethbridge, Alta, Canada needs a conversion of the BC-929A Scope. Norman McCourt, KØIPD needs a Tech Manual on the BC-1306 or SCR 694-C. Wallace Gregory, 573 William Street, Newmarket, N. J. has a Navy Capacitor Analyzer made by Clough-Brengle as their 1035. Maybe someone has a manual they can forward to Wally. Joe Wright, W5AN, P. O. Box 1063, Rockport, Texas wants a schematic of the LM-14 Frequency Meter.

73, W2HDM, Ken

YL [from page 89]

KN4ROO are looking forward to seeing many FLORIDORA YLs and their families at the Daytona Beach Hamfest to be held Sept. 6 at the Coquina Hotel.

The YLs are Saying . . .

"I read 'CQ YL' from cover to ditto with great en-

WHY...



In a recent public statement, Arthur S. Flemming, Secretary of Health, Education and Welfare said: "I have just received a preliminary report from the Office of Education on Fall enrollments in engineering. It is a disturbing report. After increasing steadily for 7 years in a row, freshman engineering enrollment in colleges and universities of the United States and its outlying parts fell off sharply at the beginning of this school year. In the Fall of 1957, first-year college enrollments in engineering had climbed to 78,757. Last Fall, such enrollments fell abruptly to 70,129 — a drop of 11 per cent. This is a serious setback in a field of education vital to our national security in a period of revolutionary technological change . . . total

undergraduate enrollment in engineering subjects also went down substantially . . ."

Despite the awakening need for information about missiles, satellites and related subjects, our educational system has not been able to provide adequate information. This is due, in part, to the rapid strides now being made in all of the technological fields concerned in the development of missiles and satellites.

Cowan Publishing Corp. has carefully created "ALL ABOUT MISSILES AND SATELLITES" as a vital reference for High School students, to attract the available technological manpower.

WHAT...

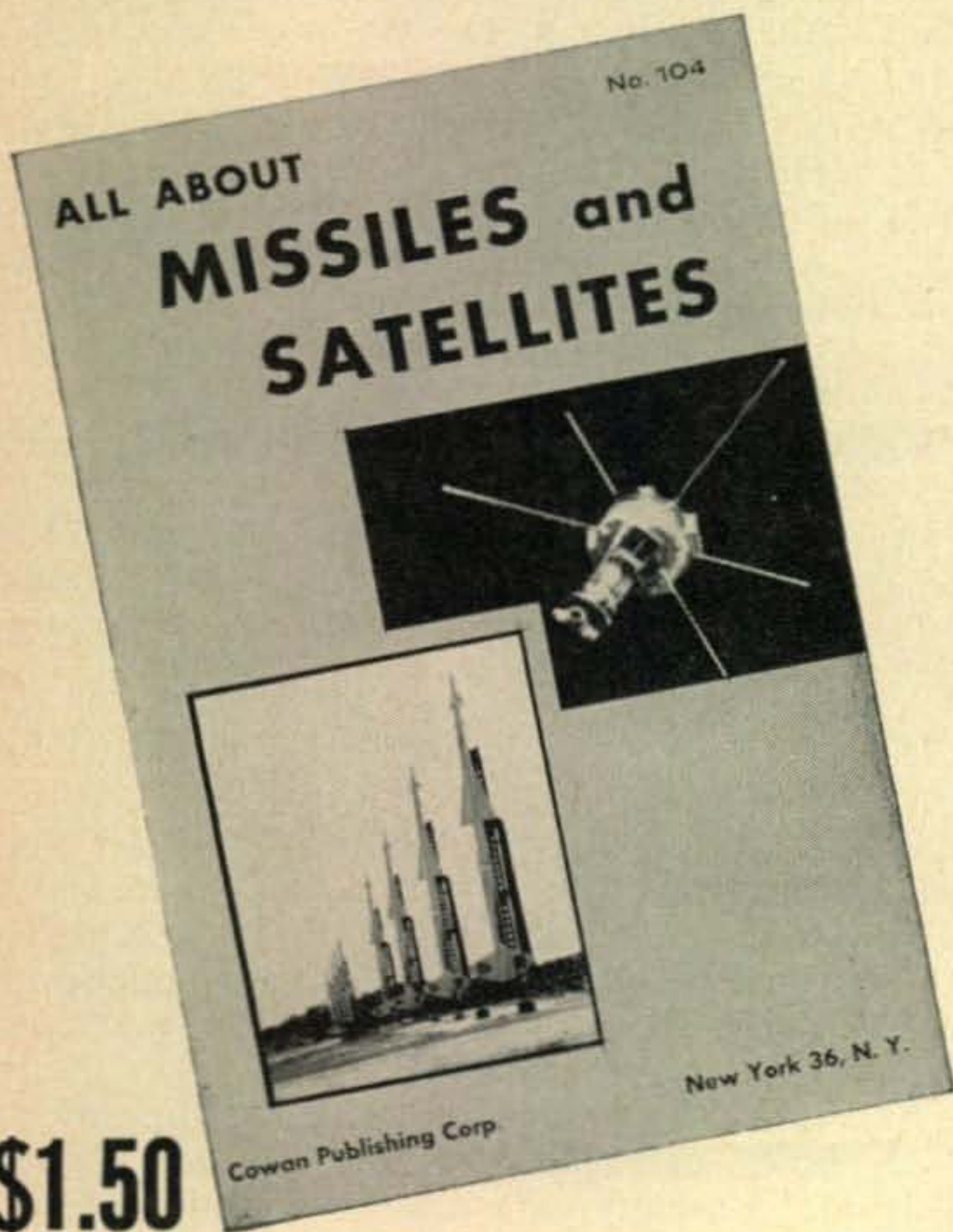


"ALL ABOUT MISSILES and SATELLITES" introduces related subjects such as maintenance, fire control, flight control, tracking, testing, fuels and many other subjects. It is carefully detailed in a manner understandable to all competent, qualified students in the 21,000 High Schools in the U. S. A.

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AN/ART-13 100 WATT TRANSMITTER

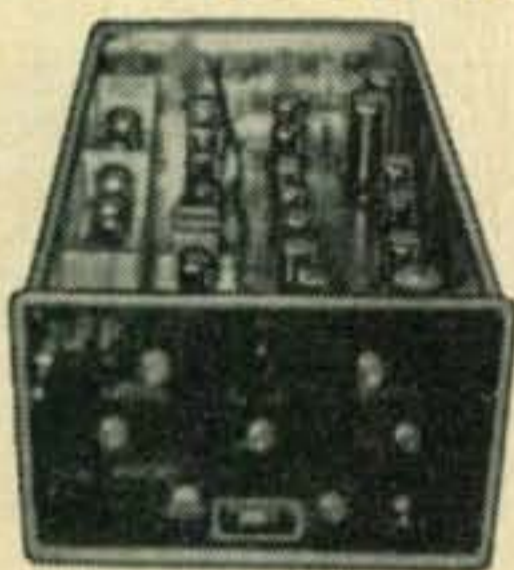
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 EXC.per set

T-17 MICROPHONE **\$5.95**
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 60 cyc AC. BRAND NEW

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For further information, check number 35 on page 126.

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thusiasm. It covers a terrific amount of ground and in addition to being a tribute to 'YL-ity' it shows lots of blood, sweat and tears went into the compilation of such a comprehensive picture of the many fields into which YLs have penetrated. All the gals in our club are thrilled with it."—W6BDE, Esther.

\$3 will bring you your copy of "CQ YL"—autographed and postage paid. The one and only book devoted to the YLs, it contains 169 pages, over 500 photos, and is completely up to date with 1959 YLRL officers, new certificates available, etc. Order from W5RZJ, QTH at head of this column.

33, Louisa, W5RZJ

NOVICE [from page 81]

writes to tell us of the California Slow-Speed Net which meets on 3708 kc. at 1930 PST on Wed., Fri., and Sat. Dee is interested in forming another net. Those interested may write him at P. O. Box 1281, Fresno.

Dick Paschall, Jr., 215 Fenton Pl., Jacksonville, N. C., informs us of the Tri-State Net (for S.C., N.C. and Va.) which meets on 7220 kc. at 1600 EST on Mon., Wed., and Fri., and at 1330 EST on Sun.

Help Wanted

The following people have indicated an interest in obtaining a ham ticket. Can any of you reading this help them?

W1—Earle C. Hopkins, Jr., 7 Randolph St., Arlington, Mass. Philip Brady Jr., 60 Park Avenue, Needham Heights 94, Mass.

W2—Joseph Sweeney, 70-03 252 St., Bellrose 26, N. Y. Fieldstone 35129.

W4—Bill Perry, 8711 Whipps Mill Rd., Lyndon, Ky. Phone TW-35293.

W5—Mr. John W. Daut, Rt. 2, Box 1061, Humble, Texas.

W6—Frank C. Sanchez, 3681 Edenhurst Ave., Los Angeles 39, Calif. PFC Ken Schiele, 1805126 4th 8" How. Btry (SP), For Tps. F.M.F. Pac., 29 Palms, Calif.

W7—Ted Drake, 1422 Granview Dr., Tempe, Arizona, WO 7-4737.

VE8—A/3c James W. Hartwell, AF19608710, 915th Sqd. (ADC), Box 61, Sious Lookout Air Station, Sious Lookout, Ontario, Canada.

Letters

Reginald L. Sharp, KN5UAJ, 102 No. School St., Fayetteville, Ark., has picked off 31 states, with 28 confirmed, using a Knight 50 watt job and a Knight communications receiver. He would like skeds with W1 and W7 districts.

Jim Edward, 18 Circle Drive, Middletown, R. I. holds call letters KN1IMJ and plinks away at 15 meters with a surplus hammerlund

rcvr. and Johnson Adventurer transmitter. His brother Bob lives at 45 Keeler Ave. and holds call KN1KOG.

Ed Grey, KN9SLM, Shangri La Trailer Park, Rochelle, Ill., made his home brew rig like the one shown in the '59 ARRL handbook and has \$9.00 invested in it. His antenna is a vertical, and cost less than \$10.00. His advice; it doesn't cost much to get on the air if you can "scrounge."

Charlie Smith, Jr., W3UJP, 4660 Wilburke, Pittsburgh 36, Pa., has some good words. He feels that the willingness of Novices to use simple home-brew rigs, and to put up with "make-do" receiving gear, insures that the ham spirit will be safe, for at least another genera-
[Continued on page 120]

W2NSD [from page 16]

between the principle character in the May article on Superpower and one of the operators in the DX Contest in the Contest Calendar Column, same issue. Upon investigation we find that due to more comments being made on the FCC Docket that the effective date of the revoking of W6BXL's license was moved up to April 15th, 1959, thus permitting him to operate legally during the DX Contest last year, as reported in CQ.

73, Wayne

HAM CLINIC [from page 85]

This is a possibility you know, and we hams (now that the band has been taken) should assist those who want to use it for "citizens purposes." Let's hope you and many others will realize that there's more enjoyment in all-band ham operation than there is in using radio for "in group" contacts.

No examination is necessary to obtain a permit for citizen band operation. (A form, obtainable from the FCC is merely filled out and mailed in.) Second, there are four classes of stations, A, B, C and D. A and B stations operate in the 460 mc band and C and D in the 26 and 27 mc band. Class D is no doubt the "band" in which you are interested. Stations may be operated between 26.965 and 27.225 mc using am modulation only and with ONLY 5 watts power input to a final rf stage. The transmitter must be crystal controlled. You can only communicate with other stations operating in the "band" in which you are transmitting (and receiving). See the other articles on Citizens Band in this issue for more complete information.

Again, we say, we hope you decide to look a little deeper into ham radio and become one of us. Good luck!

Answers

When a pile of 500 letters arrives from the

NEW





MODEL 381

T-R SWITCH

...with selectable bandswitching

This compact electronic T-R switch (4 $\frac{3}{4}$ " x 4" x 4 $\frac{1}{2}$ ") does a big job in automatic break-in operation on CW-SSB-AM-DSB. Bandswitch covers 80 through 10 meter bands. Integral power supply. For commercial applications, it will handle more than 1KW AM phone and up to 5KW SSB. "Fail-safe" design automatically keeps transmitter connected to antenna when unit is not energized. Matches 52-75 ohm coaxial lines.

This is the switch you've been looking for. See it at your local dealer, or write the factory direct.

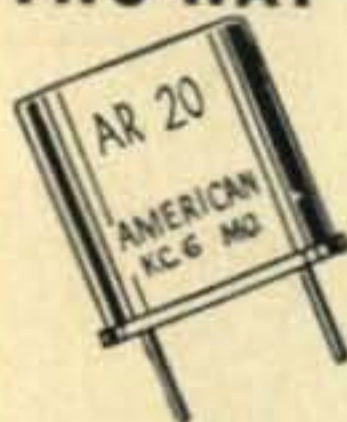
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Bristol, Pennsylvania

For further information, check number 36 on page 126.

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1000 KC to 2000 KC	.002%	\$6.00
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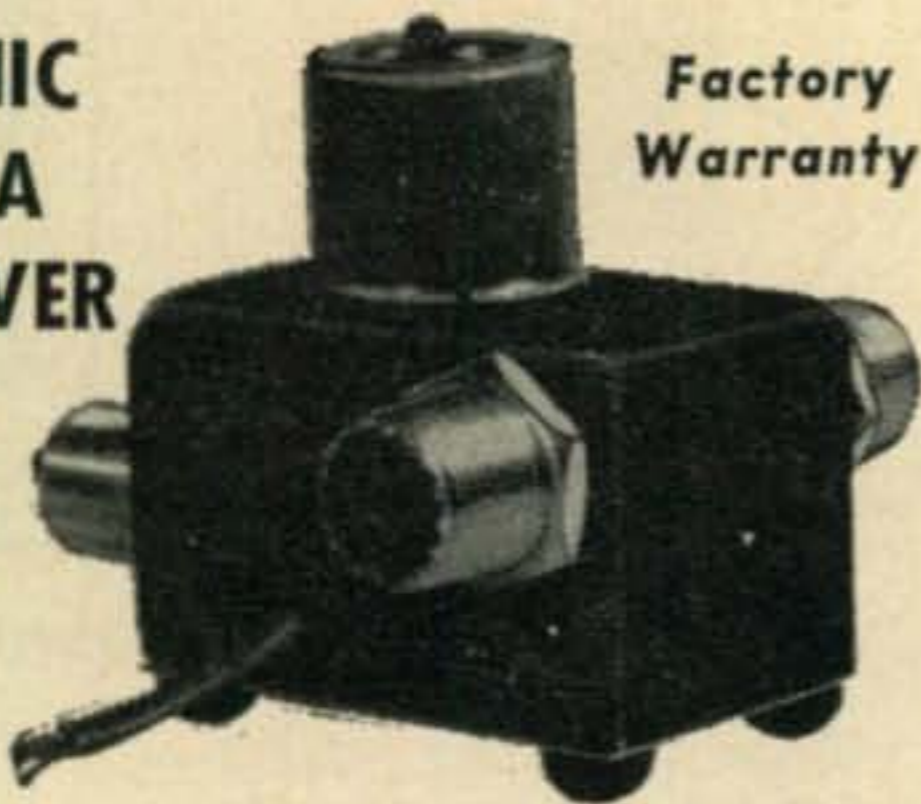
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Provides for signal gain within 1.8 thru 60 mc and 144 to 148 mc range. Gain held close to unity, lower noise level. Both models designed for maximum legal power limits; are excellent, if not necessary, in SSB and AM operation.

(Dropping resistor required for 12v operation)

DOUBLE-MALE CONNECTOR—Rugged, durable, silver plated, precision made, locking type. Each \$1.45 See your electronics dealer . . . or write to:

DKC-TRM-1, 1.8 to 60 mc, DKC-TR2-A, 144 to 148 mc

6CB6 Tube. Instantaneous recovery, excellent receiver isolation. S.W.R. negligible. As TVI proof as power source. Requires B + 125 to 150 v @ 5 ma and heater voltage 6.3 at 3 amps. Either Model.....

\$12.50 each



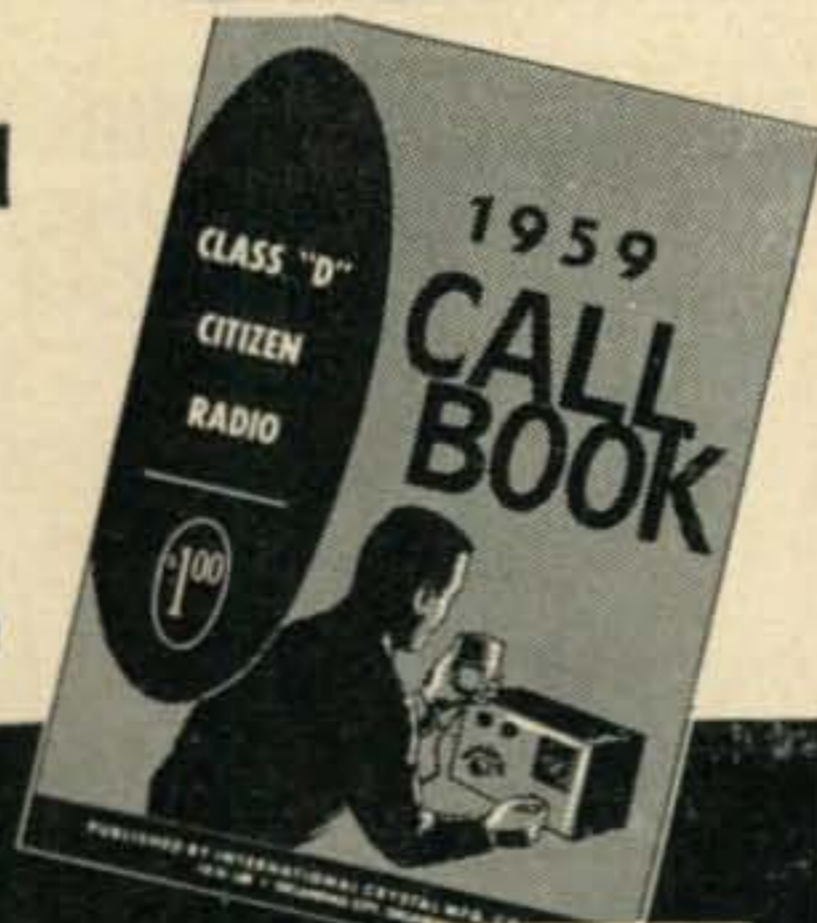
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For further information, check number 37 on page 126.

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First Complete



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- CLASS "D" CALLS
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For further information, check number 38 on page 126.

CQ office (airmail), those containing self-addressed airmail stamped envelopes are answered *first*. Of course, stamp or no, all communications are answered—in due time. If we do not have the information you seek, we *frankly* and briefly tell you so. You may be referred to likely sources of information. Do not ask for complete transmitter, receiver, etc. design information. Time available does not permit us to do it—we're not in the same boat as the ARRL Tech Information Service (Bless 'em), because our sparetime is involved. And do not be like the guy who wrote in and said he had asked another ham magazine for the same information and wanted to see who could produce first—then forgot to include his name and address on his letter! We are in competition with NO ONE; and when we receive letters just like the one mentioned, we file it in File #13 (the wastebasket)!

This column is made possible by the willingness of a group of hams to help the writer **HELP OUT OTHER HAMS**. If you have some information (technical or otherwise), pass it on to us for publication. In so doing you will be helping someone else. The service is **FREE**, there's no **FEE**!

Phonetics, Last Word!

(By George, we've had it! Incidentally, **DO YOU BELONG?** If you don't, get cracking.) Coherent? Not exactly. But after reading the letters on phonetics, fellow hams, I have nothing more to say. Go ahead, use the phonetic alphabet of your choice—and unless I'm operating on MARS you'll only hear me speak phonetics which will please the guy I'm talking to. Maybe "F" will be Frank, or Francis, or France or Fandango. But "W" for Whiskey—will always be Whiskey—it is the same in EVERY language. But if you're drafted, be prepared! It will be ALPHA, BRAVO, etc., and not Annette or Babette! Each man to his own choice!

Thirty

I am now in the process of preparing some good practical usable information on the oscilloscope for hams. Depending on its length, it will either become a special article or be a part of the column. In any event, let's hope you like it.

We look forward to working many of CQ's readers during the approaching fall and winter. Tell us if you read and/or subscribe (we hope) to CQ. If you don't we'll ask you anyway.

73, Chuck, F7FE

SIDEBAND [from page 87]

an exciter in the station OK6CAV which is the official counterpart of the OK7HZ DX expedition."

I wish to thank all of those stations who sent in their logs for only check purposes, and hope that next year you will all join in the competition.

73—Bob—W3SW

CITIZEN SERVICE [from page 43]

Licensing Data

A station license must be obtained from the Federal Communications Commission in Washington, D. C. (Field Offices no longer issue any class of Citizens Radio licenses) for operation of a Citizens Radio station. FCC form 505 is used to apply for a new, renewed, reinstated or modified license. A commercial radio operators license of the proper grade is also required for manually operated telegraphy and for any adjustments to a Citizens Radio transmitter during installation, testing, or servicing, which may cause the transmitter to operate off frequency or otherwise in a manner which would violate the rules. FCC form 505 may also be used for a change of address, a change in the number of transmitters or any other information shown on the license. It may also be used for obtaining the necessary authority to transfer control of the licensee corporation. If your license is lost, a duplicate may be obtained by making application to the FCC on form 505 with a statement telling the circumstances behind the loss. Any applications for license renewal should be filed at least 30 days prior to the expiration of the current license.

Equipment Considerations

To keep interference down as much as possible, the Commission has set up standards for transmitters in the Citizens Radio Service. Provision is made for advance acceptance of these transmitters and licensees may interchange such accepted transmitters to meet their needs. Request a copy of Radio Equipment List, Part C (Available from the commission in Washington or at any FCC field office). The listed specifications will indicate the class of Citizens Radio Service for which the equipment is suitable. Transmitters which do not appear in the list may be licensed provided sufficient data is submitted to show that they meet standards. *In the case of Class C and D transmitters, which are crystal controlled, it is only necessary to indicate that fact on the application form to secure approval of the equipment to be used in a particular station.*

For any other desired data as well as information relating to description and explanation of the above listed emission types, write the Federal Communications Commission, Washington 25, D. C. and request complete data on the Citizens Radio Service. ■

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CASH PRICE \$49.95

BUDGET TERMS \$4.70 A MONTH

THREE BANDS — 10 — 15 — 20 meters
 SINGLE 52 ohm coax transmission line. Weight 29 pounds. Turning radius 14' 11". Handles 500 W. (transmitter input, 100% am modulated.) ELEMENTS: 6061-T6 Aluminum tubing 1" tapering to 3/4".

Cast aluminum fittings used throughout. PRETUNED and easy to install. Uses Hornets' exclusive weather-sealed trap design*.

The TB-600 with larger diameter boom and slightly heavier castings weighs 35 lbs. This is the heavy-duty model for greater wind and ice-loading conditions. Budget-terms \$5.50 a month or \$59.75 cash.

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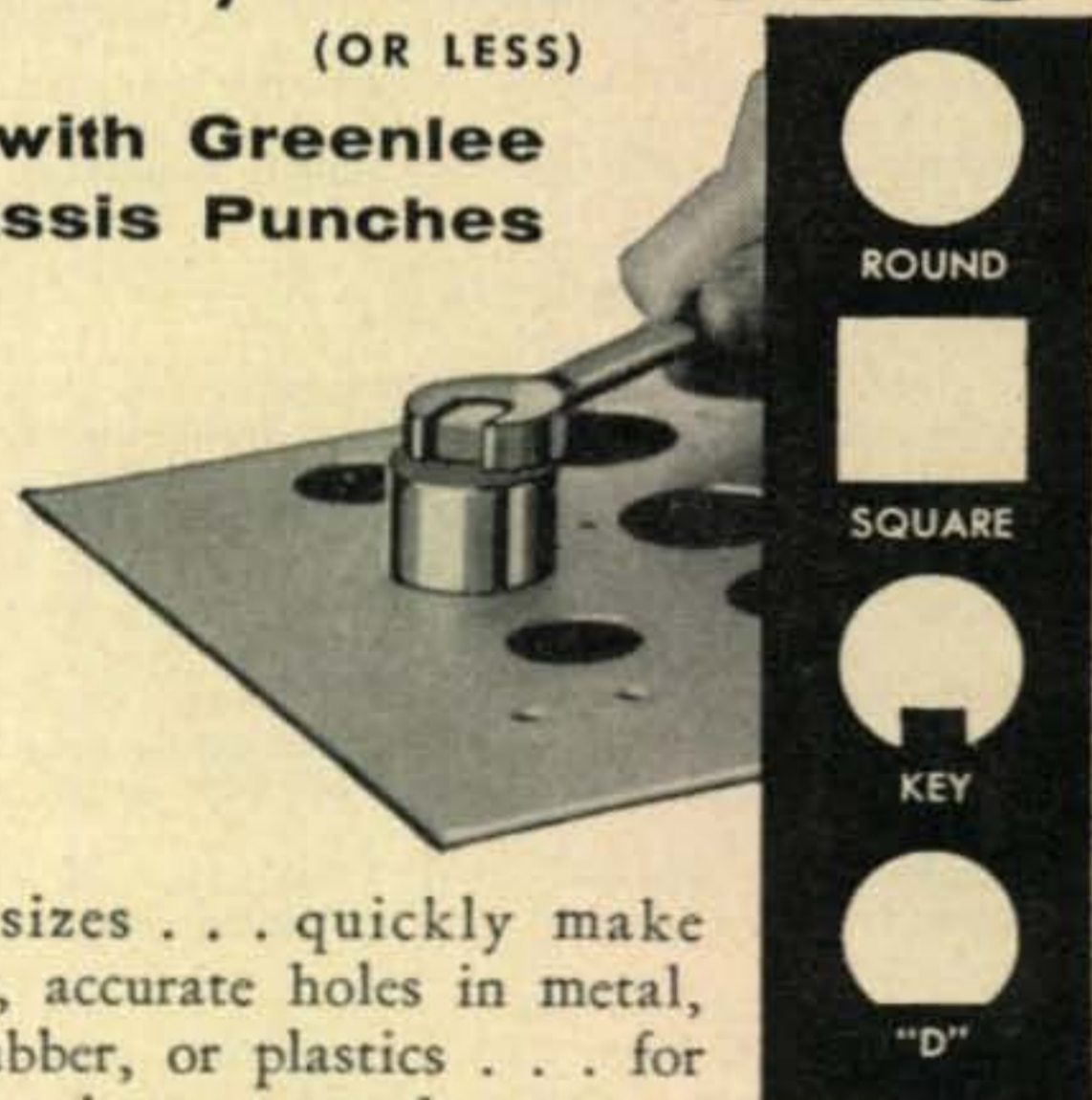
10 DAYS FREE TRIAL

For further information, check number 39 on page 126.

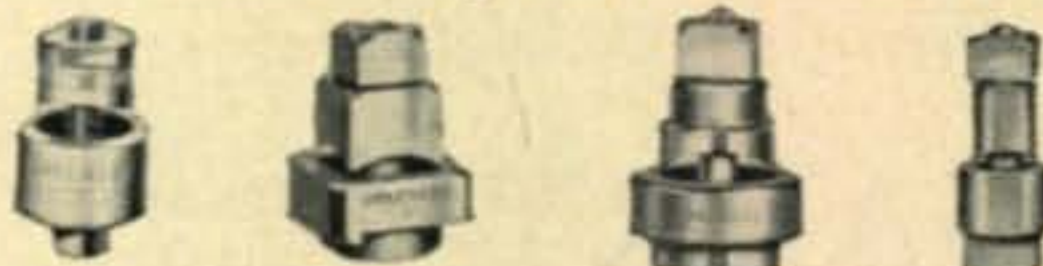
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1783 Columbia Avenue, Rockford, Ill.



For further information, check number 40 on page 126.

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.95¢ each (3 for \$2.50 or 10 for \$7.50)
- **Millen XMTG Socket #33405**—For 803, 4-125A, etc.—Giant 5 Prong Socket—Unused (Reg. \$2.25 Net).....\$1.50
- **RCA RS-151B HiFi Amplifier.** Monaural or Aux. Amplifier for stereo. 45 cps to 20,000 cps. 2-CG7, 2-V6GT, 1-5Y3GT—New, orig. cart. \$19.95 less tubes. Set of tubes \$3.80
- **Marion 2 1/2" Round Hermetically-Sealed 36-Volt D.C. Voltmeter.** Has expanded 18 to 36-volt scale in Half-volt steps. Very clean, removed from equipment. \$2.95
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- **Barker & Williamson** in stock/Eimac factory sealed tubes in stock/Westinghouse Industrial tubes & transistors in stock.
- **M3 Sniperscope w/20 KV Pwr Supply.** Lab tested. Finest unit available today.\$120.00
- **T-126/ARC-5.** 100-146 Mcs VHF Xmtr. W/all tubes. New\$14.95
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COLORADO HAM DIRECTORY—Over 2,000 amateurs cross indexed by call, name, QTH with phone numbers. 64 pages. \$1.00 postpaid. Denver Radio Club, Inc., P. O. Box 356, Denver 1, Colo.

TOROIDS: Uncased 88 mhy like new. Dollar each. Five \$4.00 PP. DePaul, 101 Starview, San Francisco.

COAX—New surplus—RG-54ALL—58 ohm impedance—30' prepaid \$1.00—Bob Farmer, Plainview, Texas.

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SALE: GlobeKing 500C—\$450. 32V3—\$450. Johnson Pacer—\$335. W2PVK Harold Eskin, 416 Barry Road, Rochester, New York.

FOR SALE (cont'd)

1 KW rig, pair 4-125A final, Globe chief driver, Johnson VFO, all rack mounted, 3600 volt Power supply, mike, all Bands, ready to go on air, will crate and ship anywhere, first \$300 takes it. C. Martinez, 1861 Alston St., Shreveport, La.

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SALE: HT-32, New December 1958, used less than five hours, \$550. **WANT: Millen 90672 Antenna Bridge; QST and CQ Binders,** vintage of 1950-1955. Col. A. R. Marcy, 461 3rd Ave., Sea Park, Eau Gallie, Florida.

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For Sale: Modulator—WRL 150-B 4 P. P. Par. 616s Class B. With built in power supply and schematic. Excellent. Best offer. Bob McQueen, WØMOU, Box 128, Sabetha, Kansas.

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DX 40—Extra FB \$49.95 FOB, Gil Severns, W6QR, Hemet, Calif.

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For Sale: One pair Citizen Band Vocaline Transceivers with makes, cables, antennas. In good condition. Ron Jones, 714 Wisconsin, Holton, Kansas.

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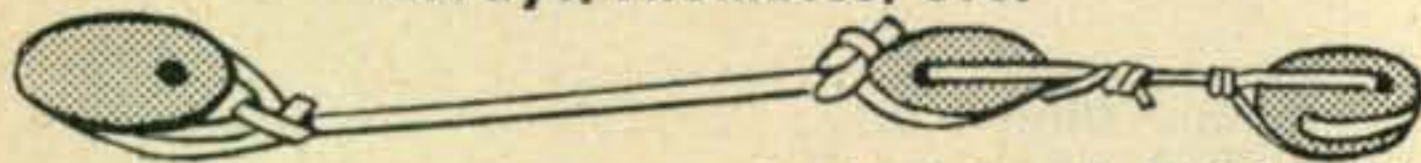
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For further information, check number 34 on page 126.

FOR SALE (cont'd)

For Sale: Pair BC-611-F's, \$70. ARC-3 VHF receiver, \$65. 3 new 250th's, \$10 ea. MB-150 tuner, \$10. J. P. Snow, 9428 Grand, Duluth, Minn.

CRYSTALS for 2, 6, 40 meters and other frequencies. 25¢ each. Send for frequency list. Power transformer. Stancor pc-8414. 1200 vct. with filament windings. \$4.75 each. Ron White, 210 Alden Road, Hayward, Calif.

Under "For Sale": Try Bob Graham, W1KTJ, for the best in new and used ham equipment. We buy—sell—trade—swap—rent—service—install. Graham Company, Reading, Massachusetts. RE 2-4000.

For Sale: CQ Magazines 1948 thru 1956, also 1958 complete, 1945, 1946, 1947, 1957 not complete. Make offer. Wetherell, 9034 West Orchard, West Allis 14, Wisc.

Call letters: engraved on laminate phenolic. Black, Mahogany, Walnut, with white letters. 1 7/8" x 8 x 3/32 only \$7.00 P.P., Jager Products, P. O. Box 3674, Phoenix, Arizona.

HEATH KITS (Assembled), Counter Tube Checker TC-2, \$25.00; VTVM V-7A, \$21.00; Signal Tracer T-4, \$16.00. All as new, prices FOB. Robert A. Fitzgerald, W2GYS, Westerlo, New York.

Make offer—SX42 and factory wired Ranger with ptt and keyer modifications. John T. Hoffman, W4MVN, 1503 N. Jackson St., Tullahoma, Tenn.

ALIGN YOUR BC-603-683-923. Adapter FT-384-A plugs in receptacle at rear of receiver. With INSTRUCTION MANUAL. Shipping weight 4 lbs. NEW. \$4.95 PLUS POSTAGE. PAM Electronics, 2129-A E. Holt Ave., Milwaukee 7, Wisconsin.

GLOBE 680A transmitter \$85. Realigned NC-98 w/speaker \$115. Will ship 150 miles. Norman Bermstein, 1542 Oneida Street, Utica, N. Y.

"For Quick Sale: Johnson Match Stick Antenna, new condition, \$75. K2HNB, 57 Meeting Lane, Hicksville, N. Y. Wells 5-9595."

75A4 wanted, will pay cash. Have 75A3 with product detector, speaker, excellent \$375. WØBNF, Box 105, Kearney, Nebraska.

For Sale SX101-Mark IIIA, Brand New in Carton, \$340. Also HC-10 S.S.B. Converter. New \$110. Harry Webb, 125 Ocean Ave., Jersey City 5, N. J. Phone HE 3-0803.

W8ICD Station for Sale during third week in August, including BC 348, Temco Transmitter Model 75 GA with D104, also "ARC-5 Type" 7 MC Rec and Trans mounted on control panel power supply. Smith, 219 Hill Street, Bucyrus, Ohio.

HT 32 perfect condition \$575, Drake 1A 5 mo. Old \$255, 304TL G.G. Linear Amplifier, and 3600v 300ma Bridge power supply \$135. Must sell. W8LTZ, Frank Tefft, Alma, Mich.

Aluminum for every Ham need. Write to Dick's, 62 Cherry Avenue, Tiffin, Ohio, for list of tubing, angle, channel, castings, plain and perforated sheet, and complete beam kits.

SX-71, Less Speaker, \$150. SUPER-PRO Power Supply, \$25. MEISNER Signal Shifter, \$20. KILOWATT Components. Write fir list. W8JHH, 270 North Olive, Elyria, Ohio.

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WANTED: TELETYPE TG-7 and Model 15 and parts, printers and reperforators, etc.; COMM'NS REC'V'RS AND XMTRS, e.g. BC-610-E, -I, BC-939A, Collins 51J, 17L3, -4; R-388 and R-390/URR; 18S-2, -3; ARN-14 and -30; APR-9, -10, ARC-21, 27, etc.; APS-31, -33; and TEST EQP'T, with TS- or 1- prefix. We pay freight. AMBER INDUSTRIAL CORP., 75 Varick St., N. Y. 13, N. Y.

WANTED: All types of communications receivers, transmitters, test equipment, teletype equipment, factory built amateur gear. Cash or trade for NEW HT-32, Valiant, Thunderbolt, SX-101, NC-303, Fisher HI-FI, etc. Write Tom, W1AFN, Alltronics-Howard Co., Box 19, Boston 1, Mass. (Richmond 2-0048) Store: 60 Spring St., Newport, R. I. (Viking 7-3435, Fred W1JFF)

WANTED (cont'd)

Wanted: Tubes—special purpose and receiving. Top prices for Klystrons, Power Tubes, Thyratrons, T.V. and Receiving Tubes. Tubes must be unused. Also Communication Equipment—aircraft and ground, lab grade test equipment, omnireceivers, Loran, VHF, Marker Beacon, Transceivers, Signal Generators, Oscillographs, Recorders and Counters. Bob Sanett, W6REX, V & H Radio & Electronics, 2053 Venice Blvd., Los Angeles 6, Calif.

WANTED: Gordon Rotator instruction parts manual. WØTGQ, 747 Grant St., Iowa City, Iowa. Needed for overseas ham who has rotator.

WANTED! GPR-90, GSB-1, B&W pi-net inductors, counter dials, KW power supply or components, and crank-up tower. Large inclosed rack. Sockets for 4CX300As. Let's see your list! Joseph Marshall, Jr., 22 Clare Drive, East Northport, L. I., N. Y.

WANTED: Gonset two or six meter communicator. Cash. Graham Company, Reading, Massachusetts.

WANTED: CDR Ham-M Rotator, Heath Q-Meter, Heath AG9 Audio Signal Generator, 4-250A tubes. Larry Kleber, K9LKA, Belvidere, Illinois.

GUNS WANTED. Have mobile and test gear to trade. W2LJU.

WANTED: HRO-60 coil sets and instruction manual. Bob Jensen, 5109 Bond Avenue, Drexel Hill, Penna.

WANTED: Pictoria diagrams of one and two tube phono oscillators. Send information and price right away to Buck Poe, 1008 W. South Street, Raleigh, North Carolina.

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QSL's, SWL's, VHF's, XYL-OM's. (Sample assortment approx. 9¼¢.) Covering designing, planning, printing, arranging, mailing, eye-catching, comic, sedate, fatabulous. DX-attracting, prototypal, snazzy, unparagoned, cards. Rogers KØAAB 737 Lincoln Ave., St. Paul 5, Minn. Also glamorous, pulsating, super-passionate. (Wow!)

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Attenuator 600/600 ohm T pad, Tech Lab, 30 step 1# 2/\$4.95

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For further information, check number 46 on page 126.

QSL (Cont'd)

BARGAIN QSL—\$1.50 per 100. W3IIF Press, 1529 Spring, Bethlehem, Pa.

OUTSTANDING QSL's. Samples free. Write EPC, 3401 W. Broadway, Council Bluffs, Iowa.

QSL's, SWL's Samples 10¢. Onondaga Press, Onondaga, Michigan.

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Heathkit, Bought, Sold, Traded. WØDVN, Box 5938, Kansas City 11, Mo.

"HAM TV Equipment bought and sold, traded. Al Denson, W1BYX, Rockville, Conn."

RADIO MAGAZINES. Buy, sell, trade. Bob Farmer, Plainview, Texas.

MISCELLANEOUS

SILVER ANNIVERSARY HAMFEST OF Hamfesters Radio Club will be held Sunday, August 9, 1959, at Santa Fe Park, near Chicago. See announcements in July CQ or write Betty Sandberg, W9STR, 2957 N. Monitor Ave., Chicago 34.

PRESERVE YOUR HAM TICKET, Social Security Card, small photo, passes and anything else of value that is wallet size. We will laminate it in clear plastic, guaranteed for life. Lamination will prevent it from getting torn, soiled or frayed. Send your ticket or anything of value with \$1 in stamps or cash for each item that you want preserved. 24 hour service. Send to Dept. HW, CQ Magazine, 300 West 43rd St., N. Y. 36, N. Y.

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HAMS. Learn Calculus. Powerful mathematical tool. Easy practical lessons, first four \$1. Mathco, 4256-5 Minmor, Cincinnati 17, Ohio.

FIFTH ANNUAL Syracuse VHF Roundup, October 10, 1959.

QST BACK ISSUES: We have for sale @ 50¢ each: April, May & Sept. 1946; Feb., Mar., April, May, June, Nov. 1947; March, April, May, June, July, Aug., Sept., Oct., Nov., Dec., 1948; January thru December, 1949; Jan., Feb., April thru December, 1950; July, Sept., Nov., 1952; June, July, Nov., 1953; March, 1954; April, June, Aug., Oct., Nov., Dec., 1955; Jan., June, Aug., Nov., Dec., 1956; Jan., April, June thru Dec., 1957; Feb., April, June, Aug. thru Dec., 1958. We need one copy of August, 1946. QST. Write Box 0777, c/o CQ MAGAZINE, 300 W. 43 Street, New York 36, N. Y.

FIFTH ANNUAL York County Hamfest, August 23, 1959. Contact John Zett; W3FLD, 2740 Grandview Ave., York, Penna.

IF YOU HAVE A BACKGROUND IN ELECTRONICS, but are having trouble passing commercial FCC phone exams, my 12 years experience as chief instructor of Electronics School can help you over the hump. Not a course. Write me personally for free information. Wallace Cook, 1614L Morson Road, Jackson 9, Miss.

NOVICE [from page 113]

tion. He has many fond memories of his Novice days.

Tony Gaslin, 1512 Olive St., Louisville 10, Ky. would like a sked with Montana on either 15 or 40 as that is the only state needed

for WAS. He will be glad to make skeds with anyone needing Ky.

Len Busch, WV2EDC, 170 Jones Avenue, New Brunswick, N. J. is 12 years old and operates all the Novice bands. He has 10 states and 2 countries under his belt and will sked anyone, for any reason.

Dennis Marando, 42 Cushing Ave., Nashua, N. H. is an almost Novice and will be on 3721 kc by the time you read this. He would like some help reading schematics in preparation for his General.

Bob Land, KN8OIH, 1805 Race St., Cincinnati 10, Ohio, has one of the new Eico 720 transmitters and along with his SX-71 has worked 15 states on 40. Bob would like skeds with West Coast stations.

Pete Metcalf, KN1IWR, Russell Terrace, Newburyport, Mass., is a Soph. at Colby College and does not have too much time for hamming, as the school is in Maine and the rig is in Mass.—Hi. He would like to correspond with other Novices and will be happy to help prospective Novices.

Clay Wilson, KN1JEI, P. O. Box 176, So. Lancaster, Mass. would like to correspond with other hams interested in experimenting with antennas, or Home-brew specialists.

Paul Roach, KN9RIY, Rt. 1, Junction City, Wis. is just finishing a new Viking Challenger and should have it on the air by this time. To answer your questions Paul, (1) No, but the BC-453 is, and (2) The vertical is "sensitive" but will pick up signals from all directions.

Albert Garcia, better known as KN8MHB, 1504 Fifth St., Moundsville, W. Va., will have a new "Challenger" on soon also, but is now using a home brew 20 watt rig on 80 and 40. His WAS is 18/13, plus a VE3. Al would like skeds with all western states, including Calif.

That brings us down to the end of another stack, this month. Lots of DX and pleasant contacts until we hook up again next month. With 73.

De, Don W6TNS

CITIZENS BANDER [from page 42]

the TRANSMIT-RECEIVE switch to TRANSMIT. No other front panel controls are required for the transmitter section.

The OUTPUT indicator bulb lights when the transmitter is in operation. It is inductively coupled to the transmitter.

The MIC jack is intended to receive the plug from the crystal microphone and the microphone is included with the "Citizen Bander."

A completely assembled whip antenna is included and may be inserted in the coaxial connector on the top of the transceiver. Near the base of the antenna is a coil that acts to electrically lengthen the antenna for maximum radiation efficiency.

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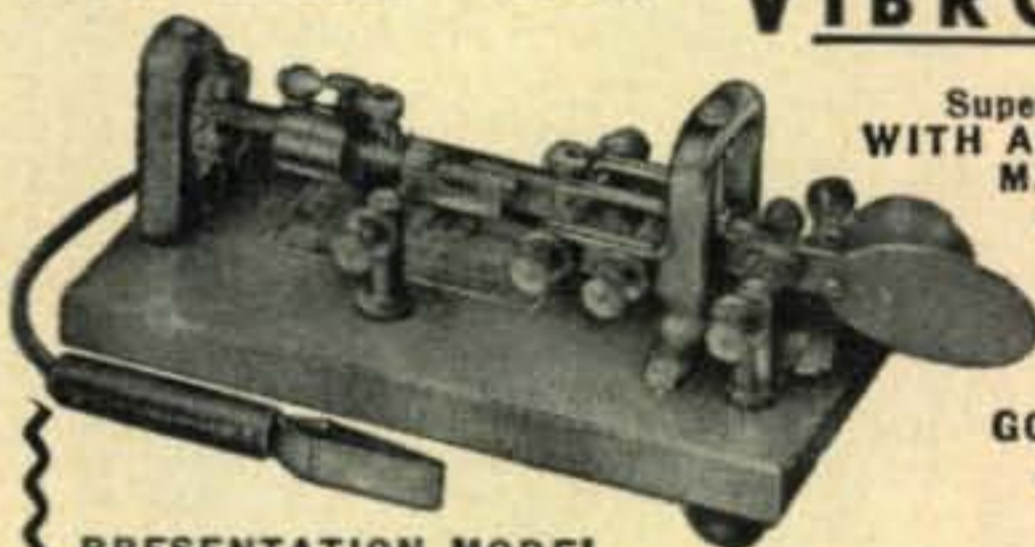
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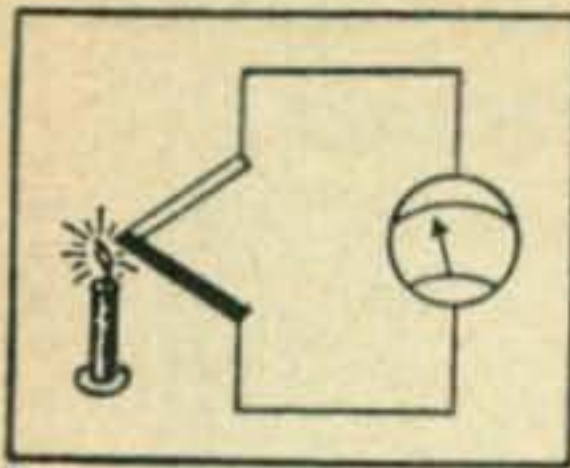
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20-15-10 50 ft. Antenna, assembled\$11.95

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The Deluxe Model is complete with Push-To-Talk and Noise Limiter, with tubes and crystals for one channel, microphone and power cord. **DCBT-1**\$124.50
Specify 6 Volt DC—12 Volt DC—or 110 Volt AC with either model. Size description: 3 1/4" in height, 8" in depth, 9 7/8" in length. Color: Durable platinum grey wrinkle finish.
Tube Lineup: 6BA6-RF, 6U8 Mix-osc, 6BA6 I.F., 6T8 Det, Noise Limiter, and audio preamp, 6AWS 1st audio and squelch, 6AQ5 audio output and mod., 6AU6 RF Osc and RF Amplifier.
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The Deluxe and Command units come with the *ac* line cord only. The plug that connects to the transceiver must either be rewired for 6 or 12 volt operation or the cables for these voltages may be purchased separately. It is probably wise to obtain the cables as you may then operate under any condition, and with only the change of the power cord and plug.

The "Citizen Bander" is 8 3/4" wide x 12 1/2" high x 5 3/4" deep. The Custom model weighs in at 10 pounds (less antenna) while the other models weigh just 4 pounds additional due to the more complex power supply.

Under the restricted range conditions imposed by the whip antennas, and operated indoors, you may still expect to communicate up to 1 mile with two "Citizen Banders." Considerably greater distances may be covered by mounting the antennas on the roof. With yagi-type antennas, minimum ranges of 6 to 10 miles may be expected.

For the OM who has all but despaired of getting the XYL "on-the-air," this could be the answer to communication with the "home office" while driving around town.

Countless other uses exist for these convenient units, and who can tell how many future hams will be attracted to the hobby by way of citizen's radio. If you would like to open the door to a new world of communications, start by getting a copy of the FCC Regulations, Part 19, at your local FCC office; or directly from the U. S. Government Printing Office, Washington 25, D. C. Enclose 10 cents.

See you on 11 meters! ■

UNIV. JOINT [from page 40]

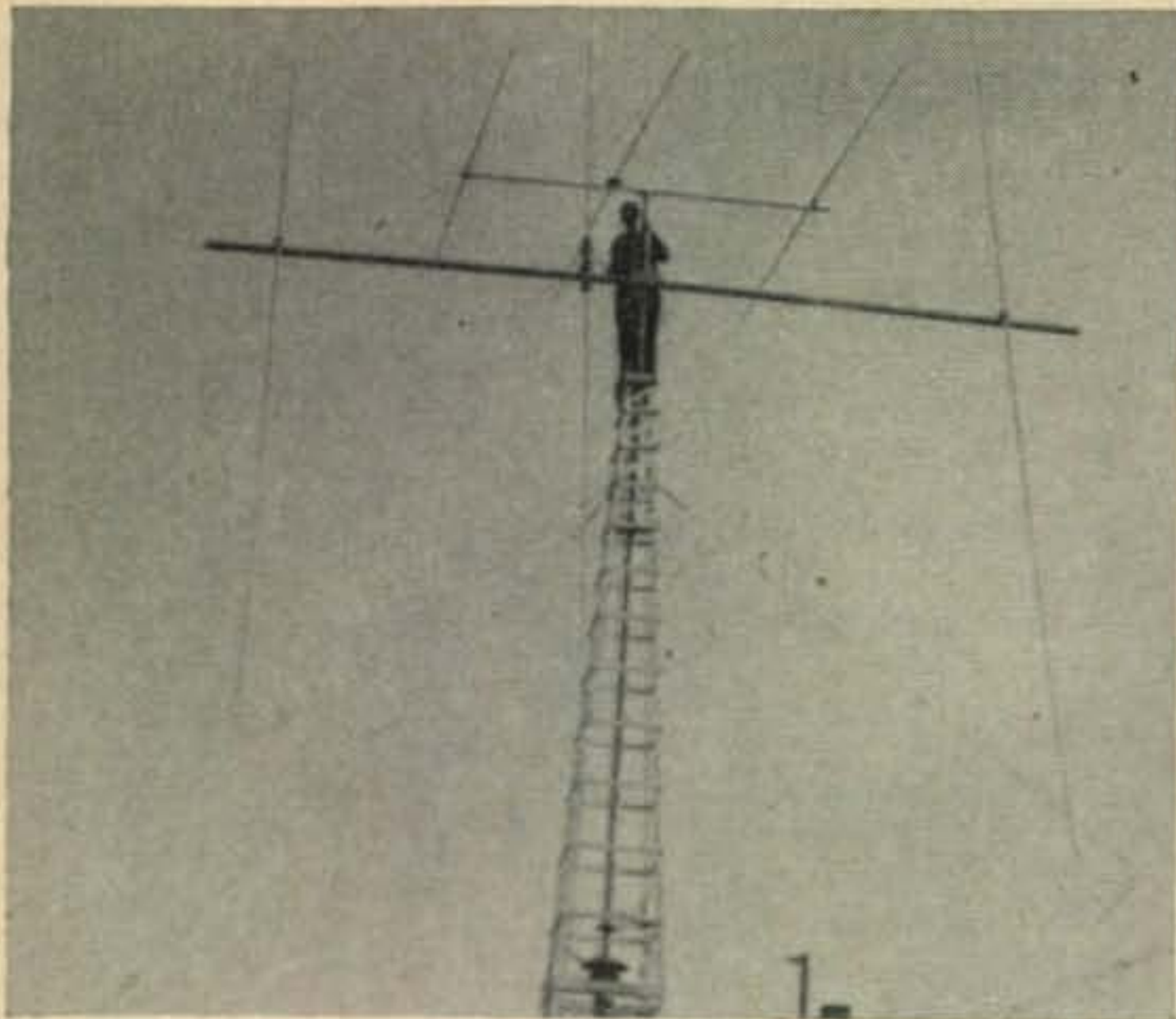
enough but then another wrench is required. A small but important item when your up on the tower.

Element Mounts

The element mounts are absolutely solid also. The pictures are self explanatory. When loosening the large bolts to change the spacing be sure to loosen one U bolt holding element so that the clamp can expand. This is one of the strongest and simplest element mounts. I have ever seen. All the bolts and joints should be coated with Penetrox A, an aluminum anti oxidation compound. If you use a small quantity under the clamps around the boom it will twist very easy.

For a large 30 foot, 3 inch boom, a 3rd clamp is suggested in the middle for easier handling and added strength. The 4 inch clamp is a double one so it is plenty strong and only two are needed per mount and one per element mount.

A 30 foot 3 inch boom only costs about \$15 so to rebuild the beam is quite cheap and easy to construct and assemble with the



The beam can also be tilted for easy repair or adjustment of elements.

hardware described. The mount¹ is a must if you plan any experiments or tuning or if you have to replace or adjust a coil in your present beam. With this mount you won't have to take the whole beam down for each adjustment. ■

¹ The mount and element mounts are available from the author made to order.

432 MC AMP [from page 35]

high frequency idler tuning adjustments plus a liberal amount of profanity.

4. A terrific (several S points in the receiver with *avc* off) sudden noise increase indicates oscillation in the parametric amplifier at or near 432 *mc*. In this case switching the noise generator *dc* current on and off will make no change in the receiver noise reading.

5. The desired "noise increase is the one at a pump frequency slightly to one side of the sudden "loud" condition in most amplifiers. This noise increase should be gradual (after it starts) when the plate supply and pump oscillator output is very slowly changed. When you get this condition after a few days of testing and much black coffee, switching the noise generator on and off will show large changes in the radio receiver noise readings.

6. Then you can start over again with a signal generator, and then the actual antenna connected to the parametric amplifier! The adjustments then are fortunately much easier and are only necessary because the antenna (or signal generator) impedance is not the same as the noise generator impedance at 432 *mc*. However, these changes can seem to be severe enough to drive the optimistic experimenter one step closer to the nut house!

7. It's worth the trouble and added grey hairs when the weak signals that were down in the receiver noise on the old 432 *mc* receiver become readable! ■

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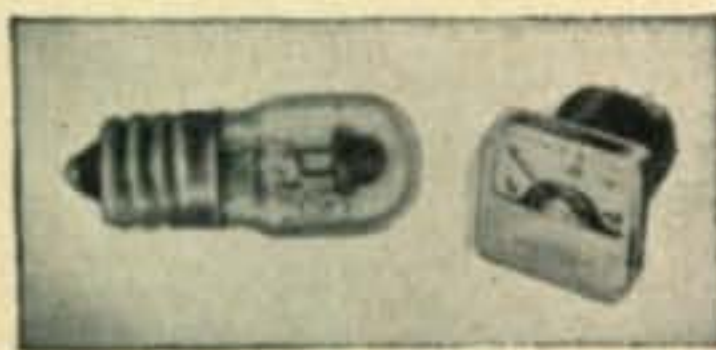
An advanced Hybrid Phone Patch with an exclusive VU meter for monitoring phone line levels has been placed on the market by Gonset. Used with voice-control (VOX) on SSB equipment, the Hybrid Phone Patch does away with the need for manually switching the transmitter on and off throughout a conversation. Other features include separate transmitter and receiver gain controls, and complete shielding and *rf* bypass to eliminate *rf* feedback.

The Gonset Phone Patch works with all popular amateur equipment. It is styled in chrome, wrinkle cabinet, and three-color front. The unit is simple to install and use. Line impedance is 600 ohms, receiver impedance 3.2 to 8 ohms. For more data *diddle D* on page 126.



New Half Inch Panel Meter

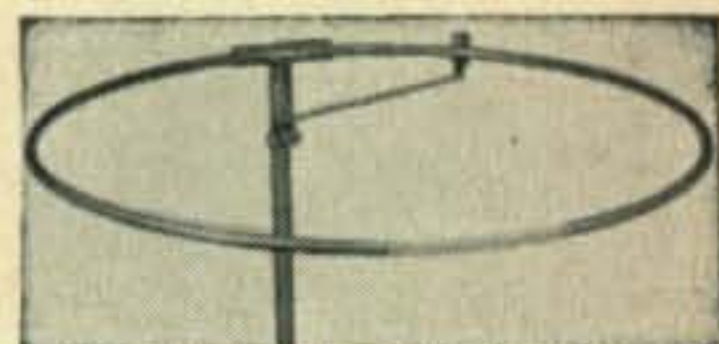
A new sub-miniature panel meter has been introduced by Alco Electronics Manufacturing Company. This extremely small meter, Model S-10, features a "shielded" moving coil movement, and is readily adaptable for miniaturized transistorized circuits for voltage and current indication purposes. This unit has a clear plastic front which measures $\frac{5}{8}$ " by $\frac{5}{8}$ " and a $\frac{1}{2}$ " barrel diameter. It mounts on a panel with a half inch nut and takes about the same amount of space as a pilot lamp assembly. For more data, *mangle B* on page 126.



6 Meter Broadband Ring Antenna

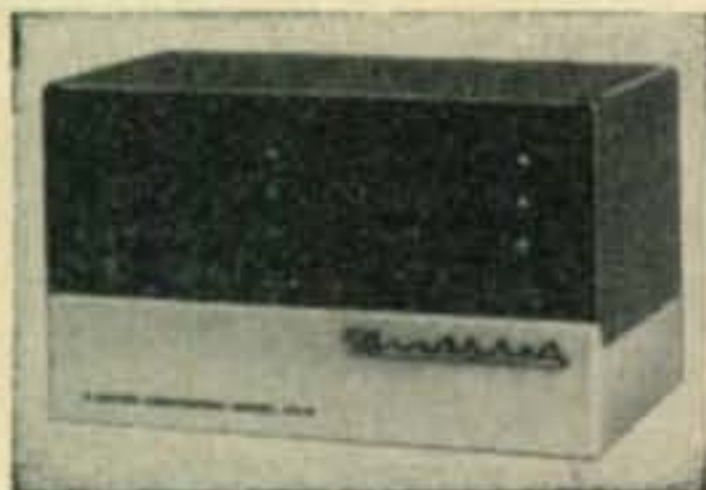
Here's a new 6 meter skywire produced by Hi-Par of Fitchburg, Mass. Dubbed the model 6R, this antenna fills the need for an improved omni-directional antenna for mobile or base station use. The 6R features horizontal polarization, and essentially circular radiation pattern and a 52 ohm feed point impedance. The VSWR can be brought to 1:1 at the center frequency (50.5mc or as specified).

Mechanically, the radiator is formed of one continuous piece of high strength aluminum tubing which is supported by a single aluminum casting. A standard coax connector is provided for easy attachment of the feedline. For additional *dope*, *emulsify A* on page 126 and we'll have them get some literature out to you.



6 Meter Converter Kit

Designed for use with the Heathkit RX-1 "Mohawk" Receiver to extend operation into the 6 meter band, the XC-6 converts 50 to 54 mc energy to 22 to 26 mc. The 3-tube circuit provides two stages of *rf* amplifications, and a low-noise triode mixer. Features a crystal controlled oscillator and provision for external *rf* gain control to prevent overload or cross modulation from extremely strong signals. The XC-6 Converter is completely powered and controlled by the receiver. Power requirements are 210 volts dc at 35 ma and 6.3 volts ac-dc at 650 ma. Signal-to-noise ratio is 8db at 1 microvolt input when used with the RX-1. Fifty-two ohms input and output impedance. For more data, *obliterate C* on page 126.



Modular Consoles

Worthy of a second glance are the new "Modular Console" series of cabinets produced by Premiere Metal Products Co. Streamlined and compact, they represent "really modern" design in cabinetry. Just think of the old 6' relay rack kilowatt re-packaged into one of these units. In this particular model, the power and audio sections could go down below (and be readily accessible for service via the sliding drawers) while the power amplifier would be constructed in the removable sloping cabinet. Takes standard $19\frac{1}{4}$ " rack panels, too. If you are really suffering for more data, *mash F* on page 126.





Leo I. Meyerson, WØGFQ, Says:

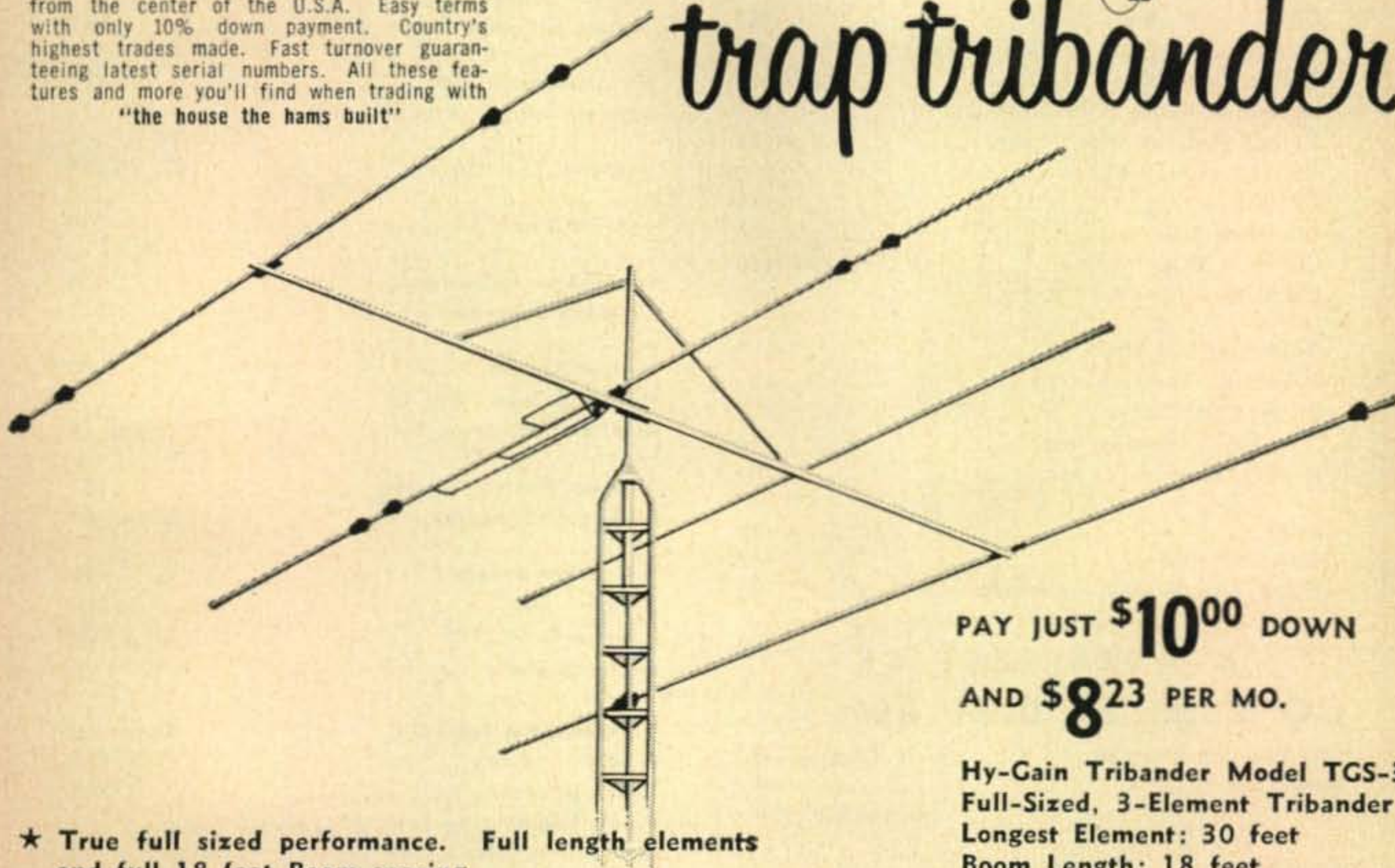
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For further information, check number 22 on page 126.

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0C3	.70	6C6	1.08	50L6	.69
0D3	.50	6C8	1.08	RK59	1.39
0Z4	.60	We Trade!		RK60	1.17
1A7	.90	6CB6	.80	HY69	2.20
1B3	.78	6CD6	1.49	75	.81
1L4	.82	6CF6	.85	HY75	5.00
1R4	5/\$1	6CL6	1.40	83	.95

We Swap Tubes! What Do/U Have?

1R5	.78	6CG7	.89	4PR60A	37.50
1S4	.78	6CG8	1.12	4-125A	27.50
1S5	.68	6CM6	.79	4X150A	2/\$9
1T4	.85	6CS6	.70	4X250B	41.00
1T5	.95	6CU6	1.29	4-400A	41.75
1U4	6/\$1	6D6	.99	4E27A	39.00
1U5	.75	6E5	.79	250TL	19.45
1X2	.99	6F4	2.49	307A	2/\$1
2C39A	9.00	6F5	.63	316A	5/\$1
2C40	5.50	6F6	.99	VR92	5/\$1

Send 25¢ for Catalog!

2C43	6.50	6F7	.99	388A	3/\$1
2C51	2.00	6F8	1.39	350A	2.45
2D21	.65	6H6	.59	350B	1.75
2E22	1.75	6J4	1.72	371B	.95
2E24	1.90	6J5	.59	3146	3.90
2E25	2.50	6J6	.59	416B	16.00
2E26	2.75	6J7	.99	450TH	43.00
2E30	1.70	6J8	1.39	450TL	43.00
2E35	1.60	6K6	.59	460	11.50
2K25	9.75	6K7	.79	701A	3.95

Wanted Receivers and XMTRS

2K26	34.00	6K8	.99	703A	2.00
2K28	30.00	6L6	1.19	707B	3.50
2V3	2/\$1	6SN7	.72	715C	10.90
2X2	.48	6T8	.98	717A	5/\$1
3A4	.70	6V6GT	.90	723AB	5.00
3A5	1.00	6X5	.49	725A	2.75
3AP1	5.95	12A7	.59	801A	5/\$1
3BP1	3.99	12A7	.89	803	3.50
3C24	3.50	12A7	.63	804	8.85
3D23	3.95	12A7	.69	805	6.00

We Buy! We Sell! We Trade!

3E29	6.00	12AX7	.79	807	1.10
3Q4	.68	12AY7	1.29	5/\$5, 10/\$12	
3Q5	.86	12B4	.95	811	3.45
4-65A	13.50	12BA6	.65	811A	4.41
4-125A	27.50	12BA7	.99	812	3.30
4-250A	34.00	12BD6	.59	813	8.00
4X150A	7.00	12BE6	.59	814	2.35
4X250	36.00	12BH6	.79	815	3.15
4X500	37.00	12BH7	.99	826	.59
5AP1	2.95	12BY7	1.00		

Wanted Test Sets and Equipment

5BP1	5.02	12BZ7	.99	828	9.00
5BP4	5.00	12H6	.75	829B	8.00
5CP1	4.99	12J5	.69	832A	6.00
5CP7	9.00	12J7	.69	833A	36.00
5R4	1.00	12J8	1.35	837	2/\$2
5T4	.90	12K8	.89	866A	1.50
5U4	.59	12SA7	.69	954	10/\$1
5V4	.89	12SC7	.89	955	3/\$1
5Y3	.60	12SF5	.69	957	3/\$1
5Z3	.89	12SG7	.89	958A	2/\$1

Send 25¢ for Catalog!

15GP22	89.00	12SH7	.89	991	5/\$1
6A7	1.00	12SJ7	.75	1614	2.00
6A8	.99	12SK7	.75	1619	5/\$1
6AB4	.59	12SL7	.79	1620	2.00
6AC7	.72	12SN7	.69	1625	5/\$1
6AG5	.65	12SQ7	.69	1626	5/\$1
6AG7	.75	12SR7	.69	1629	4/\$1
6AK5	.69	15E	1.19	2050	1.25
6AL5	.59	15R	4/\$1	5517	1.25
6AQ5	.66	FG17	3.49	5608	3.95

Top \$\$\$ Paid for 304TL tubes

6AR6	1.95	19T8	1.16	5618	3.25
6AS7	3.49	24G	3.50	5651	1.35
6AT6	2/\$1	25A6	1.19	5654	1.20
6AU6	.79	25A7	2.19	5656	4.25
6B8	1.35	25C5	.81	5663	1.15
6BA6	.59	25L6	.72	5670	.90
6BE6	.59	25T	4.00	5686	1.75
6BG6	1.49	25Z5	.72	5687	1.15
6BH6	.79	25Z6	.75	5691	4.70
6BJ6	.72	26A7	3.69	5725	1.95

Top \$\$\$ Paid for XMTIR Tubes!

6BK7	.99	FG27	8.28	5732	2.00
6BL7	1.35	HV27	19.39	5736	85.00
6BN4	.69	28D7	.89	5749	1.95
6BN6	1.08	FG33	15.00	5750	2.75
6BN7	1.99	EL34	3.49	5751	1.25
6BQ6	1.19	35A5	.69	5814	1.20
6BQ7	.99	35L6	.59	5879	1.20
6BX7	1.11	35T	4.49	5894	12.00
6BY5	1.19	35Z5	.89		
6BZ6	.91	RK39	2.99		

"TAB" TERMS: Min Order \$3—25% with order F.O.B. New York. Ten day guarantee, price of mdse. only. Our 14th year. Prices shown are subject to change. 111CL Liberty St., N.Y. 6, N.Y., RE 2-6245

New "TABTRAN" Rectifier Xfmrs

Sec'd Volts (DUAL†) 0-9-15-18-&-0-9-15-18. Series Sec'ds 0-3-6-9-12-15-18-21-24-27-30-33-36 Volts. Write for Rectifier Catalog

TR4001 @ 1 Amp ea/sec/winding	\$5.15
TR4002 @ 2 Amp ea/sec/winding	\$7.15
TR4003 @ 5 Amp ea/sec/winding	\$9.90

†Wdgs in Series at Ratings shown: Parallel 2X Current. Voltage output. 0-9-15-18

SELENIUM F.W. BRIDGE RECTIFIERS

DC AMP	18VAC 14VDC	36VAC 28VDC	72VAC 54VDC	130VAC 100VDC
1/2	\$1.00	\$1.90	\$3.85	\$5.00
1	1.30	2.00	4.90	8.15
2	2.15	3.00	6.25	11.10
3	2.90	4.00	8.60	13.45
6	4.15	8.00	18.75	31.90
10	6.10	12.15	26.30	41.60
12	7.75	14.90	30.95	43.45
20	12.85	24.60	49.90	76.75
24	15.00	29.45	57.50	81.15

Tophat Silicon 500MA Rectifiers Complete Range RMS ACV Input

rms/piv	rms/piv	rms/piv	rms/piv	rms/piv
35/50	70/100	140/200	210/300	280/400
36¢	54¢	63¢	81¢	99¢

Buy Qty's Deduct 20% on \$10 Orders Use in Bridge or C.T. up to 750ma dc Postpaid 48 States order \$10

RECTIFIERS 130V/RMS HALF-WAVE
75Ma 49c, 5 for \$2; 100Ma 59c, 6 for \$3
150Ma 70c, 8 for \$5; 250Ma 79c, 6 for \$4
300Ma 88c, 5 for \$4; 350Ma \$1.00, 8 for \$7
400Ma \$1.10, 5 for \$5; 500Ma \$1.35, 5 for \$5
Postpaid 48 states orders \$10.

New Silicon 500ma./ 280V RMS/400 P.I.V. 100°C Hmt Sealed \$1.50 @, 4/\$5, 24/\$25 Postpaid 48 states orders \$10

"TAB"—THAT'S A BUY!—BARGAINS!!
IRISH/MYLAR Tape 2400 ft.....3/\$1
CONDOR Oil/W.E. 2mfd@600WVDC 6/\$1
SNOOPERSCOPE TUBE 2".....\$5@ 2/\$9
MILLEN 1007/KNOB 1 1/2" Chrome 3/\$1
RF LINE FILTER 10A \$1.50, 50A/\$10
MINI-FAN 6 or 12VAC/60Cys \$2@, 3/\$5
5" USN-MUMETAL Scope Shield \$ 4.00
NEW PRINT CKT-PANEL, 11x12x.062" \$2
IRISH TAPE 1200" HIQty.....3 for \$5
BANDPASS 60 or 90 or 150 Cys each \$2
1N34A 45¢@, 15/\$5; 1N35 \$1; IN38 70¢@;
XTAL OVEN—115V&Thermostat.....\$2
Blower 24VDC/100CFM.....\$3.98
Blower AC/Miniature 6&12VAC.....\$1.00
Xmitting Mica's .006 @ 2500V, 5 for \$1.00
Miller 2.5MH/2.5&5Mtr Chokes.....8/\$1.00
Vibrators 6 or 12VDC \$1.49@; 4/.....\$5.00
New Variacs/or equiv 0-135V/7.5A \$15.30
New Variacs/or equiv 0-132V/1.25A \$7.25
RF-MTR GE/475 Ma & 5 Amp \$4@, 2/\$5
DC-METER Dejur 800 Ma/3 1/2" \$3@, 2/\$5
DC-METER One Ma/4" Rd. \$5@, 2/\$8
RF-MTR Weston 750Ma/TC \$4@, 2/\$6
DC MTR 100Ma/2 1/2" \$3@, 2/\$5
BC696/3 to 4 mc's good condition \$5.95
AN-ARR2/RCVR less tubes A-1 endtn \$1.95
RDZ/USN 200-400 Mcs Rcvrs As Is \$25
RAX/MPN rcvr covers 4 bands 1.5 to 9 mc's 8 tubes has BFO Vernier.....\$24.00
60Mc's/IF-Strip.....\$5.00
LM-7 Navy Freq-Mtr to 20 mc's.....\$72
BC221 Freq Mtr—gd endtn.....\$90
G.E./YRS-1 Side Band Selector.....\$45
829B Socket 85¢, 2/\$1.50, 813 Socket \$1
4x150 Ceramic/LOKTAL.....2 for \$1.00

TRANSFORMERS all 115V/60cy/1Ø
6V @ 8A, 5V @ 3A & 1200VCT@200ma \$5
TPF/540VCT @ 30ma/6.3V @ 2A.....\$2
TPF61/500VCT @ 70ma & 6.3V @ 4A \$3
TPF62/550VCT @ 250ma & 6.3VCT @ 2.5A & 12.6V @ 3.5A & 5V @ 2A \$5
TF02/2.5VCT @ 10A/5KV.....\$4
TR400R/2x16V @ 1A ea.....\$3.45
TF27 Is 10VCT/5A or 220V Pri 20V @ 5A Kenyon H'sld.....Special \$4.95, 2 for \$9
TF30/10VCT@10A, 680VCT@40MA \$4.95
TF31/10VCT@10A, Pri 105/15/25V \$4.00
TF35/2x5V@10A each or 10VCT/10A \$4.50
TFM35/6.3VCT@15.5A&6.3VCT@2A \$3.50
CHI052/2.2Hy@450Ma/DCR26Q/2KV\$4.50

807 Tubes \$1.10 each.....	5 for \$5
826 Tubes 59¢ each.....	6 for \$3
1625 Tubes 25¢ each.....	5 for \$1
316A Tubes 25¢ each.....	5 for \$1
7193 Tubes 20¢ each.....	10 for \$1

WE BUY! SELL & TRADE
Send 25¢ for Bonus Catalog!

Output 450 & TAP 250VDC at up to 150 MA/Up to 70 Watts 80% efficiency: ripple 0.2%; low idle current one amp silicon rectifiers, oil condensers, toroid transf. fused & short circuit proof. Regulation 5% at 20 to 100% load!! Small in size! Quiet! Light wgt! Lo-priced gtd "TABSTAT" TR1245CB built \$35. Pre-Assembled U-Build kit TR1245CK Only \$30. Six V Inpt-TR645CB \$35 or Kit TR645CK \$30. "TABSTAT" 250VDC @ 100MA/12V in TR1225CB \$27, Kit TR1225CK \$24, 6V inpt TR625CB \$27, Kit TR625CK \$24.

Wanted 304TL Tubes & ALL TYPES!!!

"TAB" FOR THE BEST KITS!

- Kit 5 Myalex Glass/HF Strips
- Kit 35 Precision Resistors
- Kit 10 Switches
- Kit 75 Resistors 1/2/1/2W
- Kit 150 Carbon Resistors
- Kit 25 Panel Lamps
- Kit 12 Electrolytic Cond's
- Kit 15 Volume Controls
- Kit 56 Tube Sockets
- Kit 65 Tubular Condensers
- Kit 500 Lugs & Eyelets
- Kit 10 Bathing Oil Cond's
- Kit 5 lbs. Surprise Package
- Kit 10 Transmitt Mica Cond's
- Kit Glyptal & Cement
- Kit 3 Phone/Patch Xfms
- Kit 3 Searchlights
- Kit 4 AN/Reflector Lites
- Kit 6 Insid Tuning Tools
- Kit 5 AN Plugs & conets
- Kit 5 Asstd Screw Drivers
- Kit 5 Sub-Min Tubes
- Kit 40 Standoff Insulators
- Kit 35 Power Resistors
- Kit 75 Mica Condensers
- Kit 5 Crystal Diodes
- Kit 200ft Hook Up Wire, 4 Rolls, 50ft/ea. Asstd. Color
- Kit 100 Fuses, assorted types
- Kit 100 Ceramic Condensers
- Kit 50 Coil Forms
- Kit 5 FT243 Xtal Holders
- Kit 65 Inductors & Coils
- Kit 5 Microswitches
- Kit 10 Wheat Lamps
- Kit 3 Transistor Xfms
- Kit 8 Xtal Osc-Blanks
- Kit 4 Asstd Rectifiers
- Kit 12 Alligator Clips Asst
- Kit 5 UG/Connectors
- Kit 100 Self-Tap Screws
- Kit Adj Wirt Stripper & Cut
- Kit 5 pcs Bakelite Panels 6x12"
- Kit 8 pcs Wrench Set
- Kit 5 Nut Driver Set
- Kit Hi Gain Xtal Mike
- Kit 5 Jewelers Screwdrivers
- Kit 6 ea Phonoplugs & Jacks
- Kit Silver Conducl Paint
- Kit 6 Multi-Color Ball Pens
- Kit 25 ft Lo-Cap 2 Cond M-Cable
- Kit 18" Lo-Cap 2 Cond M-Cable
- Kit 20 ft RG59U Coax Cable
- Kit 15 ft RG11U Coax Cable
- Kit 2 pair SO239 & PL59
- Kit 12 Blinding Posts Asstd
- Kit 5 Phone Jacks Asstd
- Kit 5 Xtal Nose Plier
- Kit Side Cutter Plier
- Kit 2 Xmitter Variables
- Kit 5 of 2mld @ 600wvdc/oll

NEW DC POWER FOR TRANSISTORS!!
New low-cost 25 volt one amp filtered 1% ripple power supply. Same as specified CBS, G.E., RCA. Ideal for powering transistor circuits. Pre-assembled kit U-build B25V1ACK \$10, or assembled B25V1AC \$12.

"TAB" for NEW TRANSISTORS!

2N38	\$.98	2N442	\$5.00	2N441	\$3.00
2N155	3.25	2N256	1.45	2N234A	1.36
2N156	4.45	2N277	4.50	2N422	5.00
2N174	12.00	2N278	5.50	CK722	.95

Postpaid 48 States Orders \$10

W.E. 416B Microwave Triode up to 4000 Mcs. High Transconductance 25 to 50000 mhos use as pre-amp, mixer or oscillator HIMu—Low Noise, (Gvt Cost \$58) Tubes removed from Equipment & Tested! SPECIAL \$6 ea, 2/\$10

W.E. 388A HIFreq Doorknob Tube up to 700Mc's Special...3 for \$1

4X150A Special \$5.00 ea, 2 for \$9.00
4X150A & Eimac Air System Socket & Chimney.....\$8.00
Eimac Teflon Socket \$4.00, Dual \$7.00

TRANSISTORIZED DC POWER! HI-EFFICIENCY DC to DC to 450 VDC "TABSTAT" KIT or BUILT!

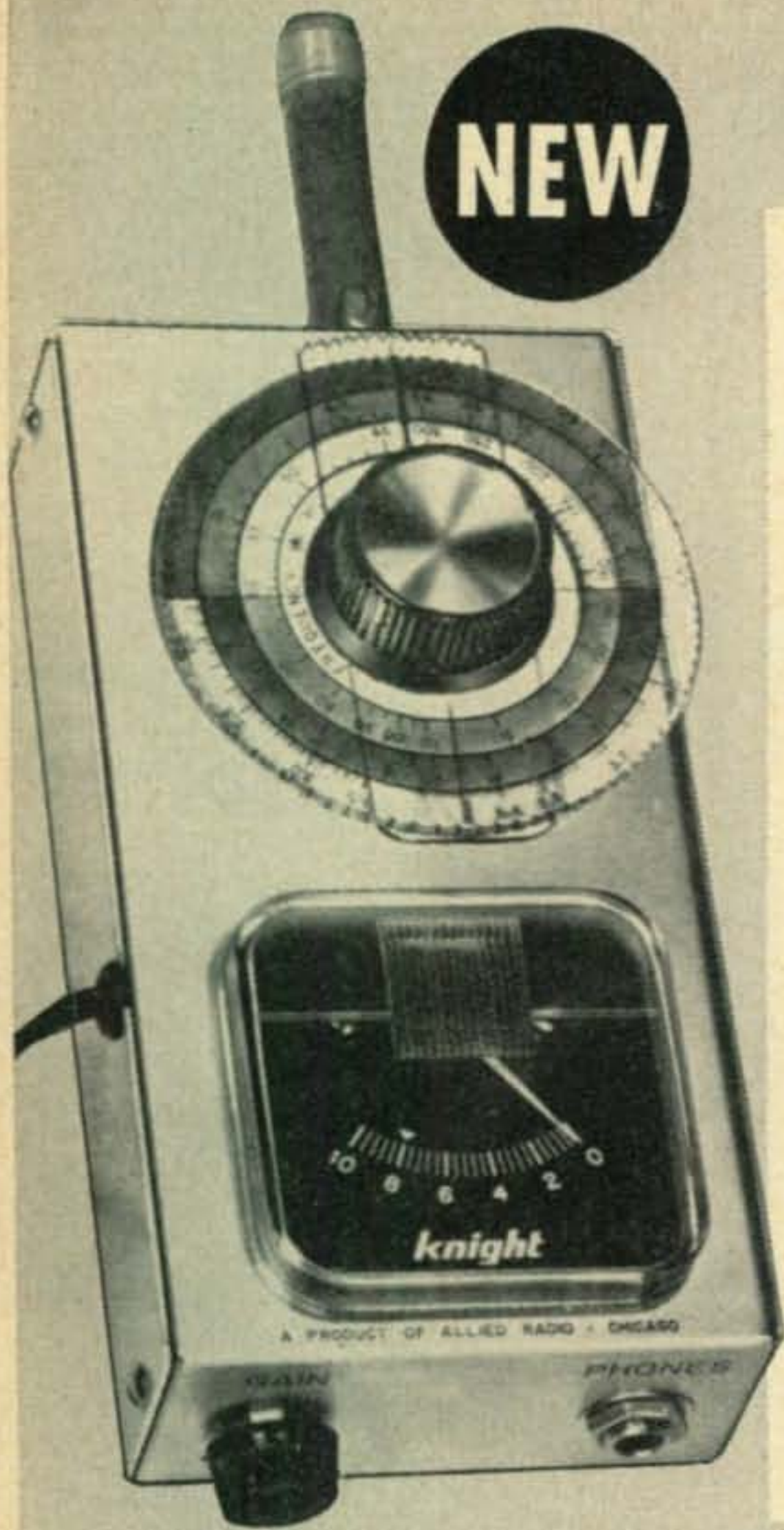
Output 450 & TAP 250VDC at up to 150 MA/Up to 70 Watts 80% efficiency: ripple 0.2%; low idle current one amp silicon rectifiers, oil condensers, toroid transf. fused & short circuit proof. Regulation 5% at 20 to 100% load!! Small in size! Quiet! Light wgt! Lo-priced gtd "TABSTAT" TR1245CB built \$35. Pre-Assembled U-Build kit TR1245CK Only \$30. Six V Inpt-TR645CB \$35 or Kit TR645CK \$30. "TABSTAT" 250VDC @ 100MA/12V in TR1225CB \$27, Kit TR1225CK \$24, 6V inpt TR625CB \$27, Kit TR625CK \$24.

Wanted 304TL Tubes & ALL TYPES!!!

For further information, check number 48 on page 126.

NEW

ALLIED ham kit value



knight-kit MODEL G-30

A PRODUCT OF ALLIED RADIO

GRID DIP METER KIT

ONLY
\$22⁹⁵
\$2.30 down

Gives You Most for Your Money

- 1.5 to 300 mc continuous coverage
- Variable hairline for accuracy
- Minimum control readjustment
- Molded socket for long-life service

Helps keep your rig in peak operating condition. Measures resonance of RF circuits; also serves as absorption wave meter, oscillating detector, etc. Has highest frequency range in its price class, all the way out to 300 mc (continuous overlapping coverage in 6 ranges). Has variable hairline for top accuracy; hairline is printed on easily adjustable separate cursor, for precise calibration. Unique construction brings nearly constant oscillation across entire board. Easy, one-hand operation; fast-reading scales colored to match coils (color code printed on case identifies right coil instantly); blackface meter is easy to read—has quick response movement. Easy to assemble. Quality parts throughout. Case is sturdy satin-finish aluminum. All coils included in clear plastic box. Shpg. wt., 3 lbs. Order yours now.

Y-721. Grid Dip Meter Kit, only..... **\$22⁹⁵**



knight-kit R-100

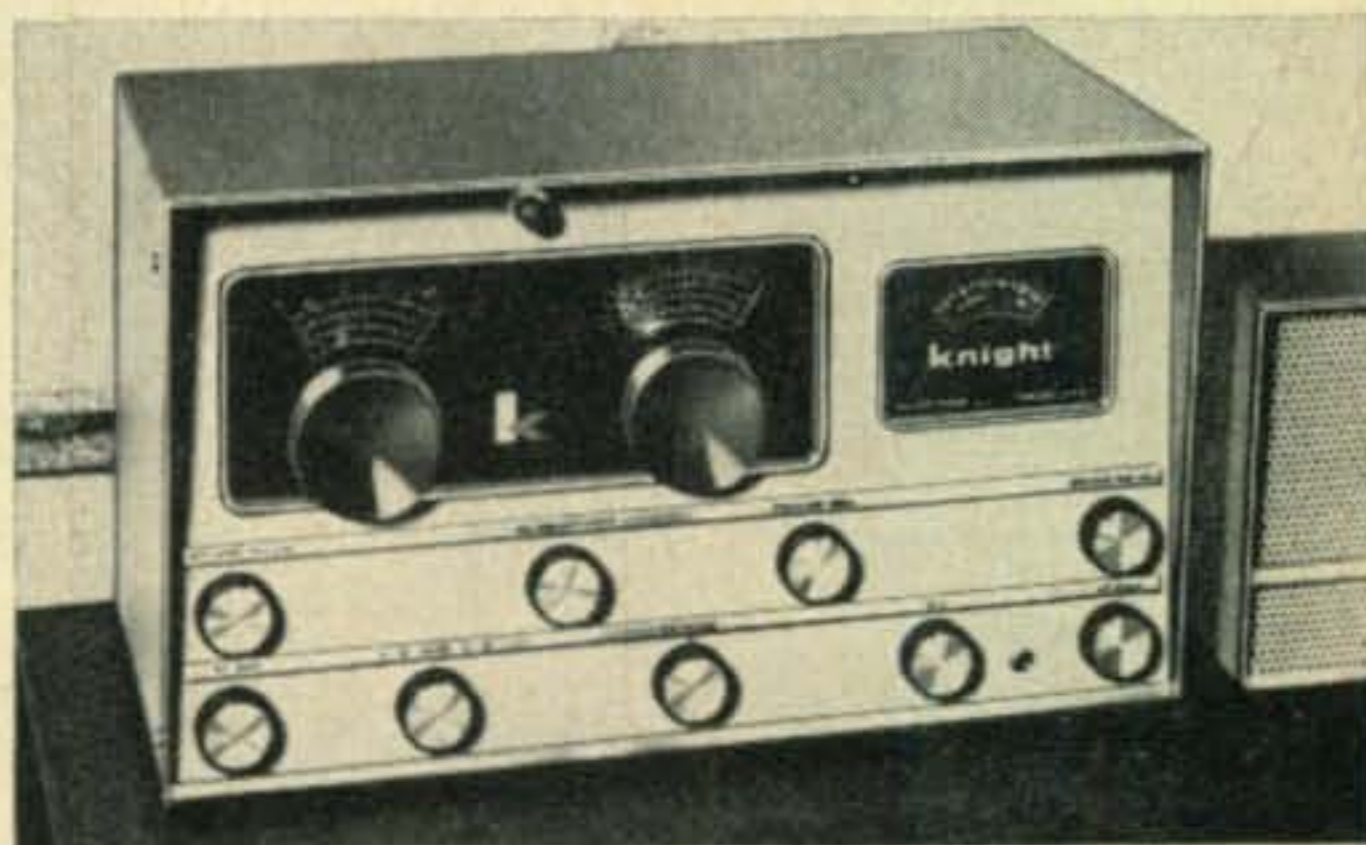
COMMUNICATIONS RECEIVER KIT

Unexcelled Amateur Receiver Value

ONLY
\$104⁵⁰

This incomparable receiver kit is truly worthy of the advanced Ham. It has all the features, selectivity and sensitivity of high-priced commercial units to meet the highest standards of Amateur performance. Yet, for all its advanced design, it's a marvel of easy assembly, made possible by exclusive plug-in bandswitch and printed circuits. Here is true Amateur kit superiority (see highlights at right) at tremendous savings. Includes tubes, all parts, handsome metal cabinet (10 x 10³/₄ x 16") and step-by-step instruction manual. (Less phones, speaker and S-meter.) Shpg. wt., 30 lbs.

- Y-726. Amateur Receiver Kit, only..... **\$104.50**
- Y-727. S-Meter Kit for above, only..... **10.75**
- Y-728. 4" Matching Speaker, only..... **7.50**
- Y-256. 100 KC Crystal Calibrator Kit, only. **10.95**



OUTSTANDING FEATURES

- Better than 1.5 μ V sensitivity on all SW bands
- Printed circuit bandswitch—exclusive feature
- Printed circuitry used throughout
- Tunes 540 kc to 30 mc in 4 bands
- Selectivity from 300 cps to 4.5 kc
- Bandsread on all Amateur bands
- Built-in Q-Multiplier
- Vernier dials—no strings used
- Minimum drift; volt. reg. B applied to HF osc.
- Constant-running HF oscillator
- Exalted BFO injection for SSB
- Heavy-gauge steel chassis

BUY ON ALLIED'S
EASY TERMS

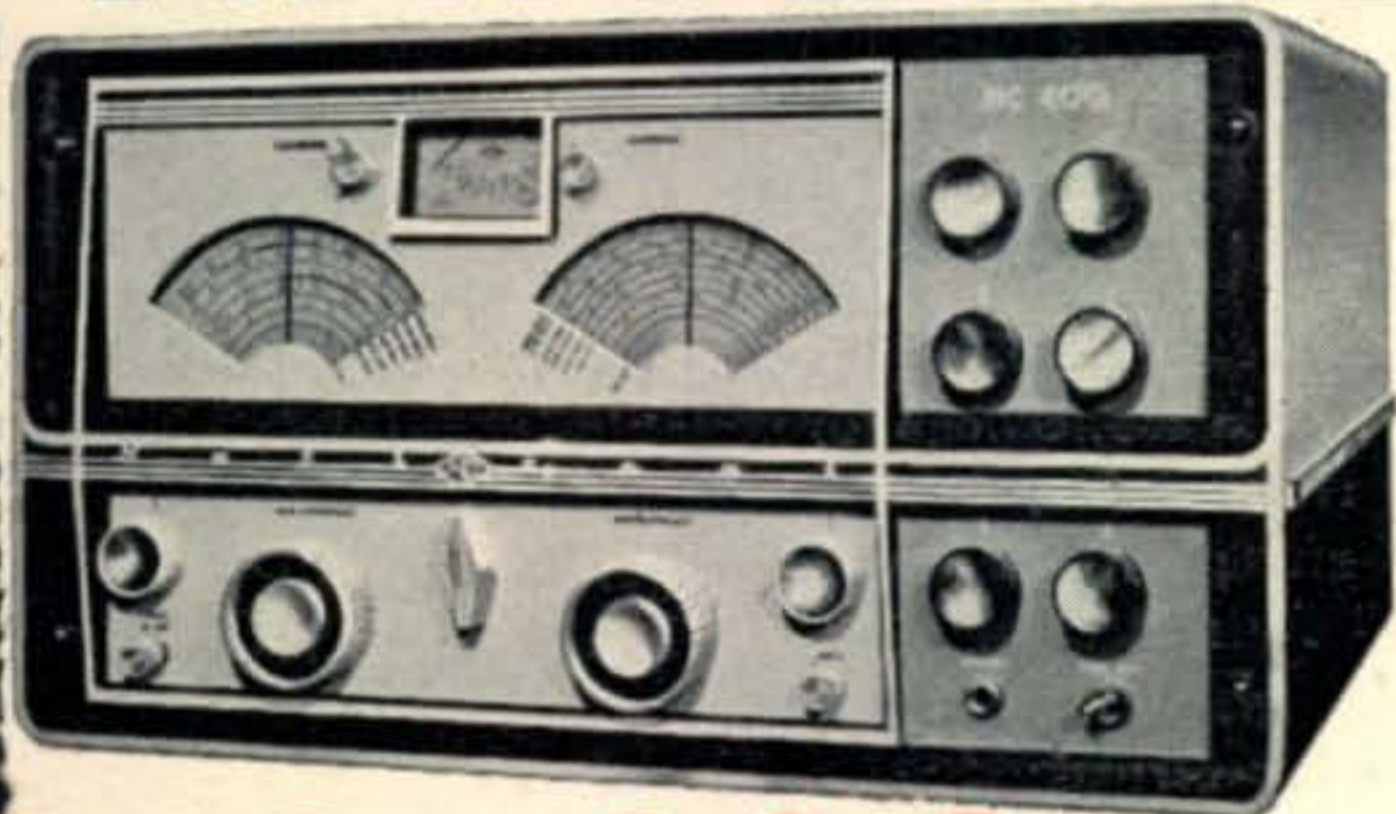
ORDER FROM **ALLIED RADIO**

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OUR 39TH YEAR

For further information, check number 49 on page 126.

NEW FROM NATIONAL



NC-400

The Most Versatile
Communications Receiver
Ever Designed

Instruction Manual

Available: \$1.

For further information, check number 2 on page 126.

National



NATIONAL RADIO CO., INC.
MELROSE 76, MASSACHUSETTS

The NC-400 is a modern, multiple purpose, general coverage receiver. Tuning range is 540 kc to 31 mc in 7 bands, with dual conversion on all frequencies above 7 mc. Its unique design provides maximum flexibility of operation to satisfy a wide variety of communications requirements.

The NC-400 may be used as a self-contained unit, either manually tuned or crystal controlled on pre-selected frequencies. In addition, external master oscillator provisions make possible use of modern synthesizer techniques for applications where extreme frequency stability is required. It may be operated in space or frequency diversity applications. Provisions are made for interconnection of any required outputs or for feed to external loads or combiners. All frequency determining circuits may be internally or externally controlled. The NC-400 also provides optimum versatility of bandwidth, either through the use of internal IF circuits or the use of optional mechanical filters.

FREQUENCY RANGE:	GENERAL COVERAGE
Band 1	.54— 1.1 MC
Band 2	1.1 — 2.1 MC
Band 3	2.1 — 4.1 MC
Band 4	4.1 — 7.0 MC
Band 5	6.9 —12.2 MC
Band 6	11.8 —20.4 MC
Band 7	19.6 —31.0 MC

NOTE: Bandsread dial provided with 0-100 logging scale and calibrated for 80, 40, 20, 15 and 10 meter amateur bands.

FREQUENCY STABILITY: Long term stability after warm-up —.002%

SENSITIVITY: 1 microvolt for 10 db signal/noise ratio

SELECTIVITY: 4, 8 and 16 kc positions provided with 6 tuned circuits. 3.5 kc wide upper and lower sideband positions provided with 14 tuned circuits. 3.5 kc sharp position activates plug-in crystal filter providing 5 additional degrees of selectivity below 3 kc plus phasing notch. Plug-in accessory available which will provide front panel selection of three mechanical filters without modification of receiver. Proper choice of filters will enable selection of bandwidths from 500 cycles to 16 kc, or will enable filter type of sideband selection from front panel.

SSB PROVISIONS: Separate SSB heterodyne detector uses pentagrid converter and separate beat oscillator. Beat oscillator may be crystal controlled. Special "fast-attack-slow release" AGC circuit. Sideband selection accomplished by exclusive, new National passband switching techniques. In the event of commercial-type SSB reception, single sideband mechanical filters may be installed and switched from front panel.

FIXED CHANNEL OPERATION: HF oscillator has 5 crystal sockets for use in fixed channel operation. Channels may be selected by front panel switch. In addition, HF oscillator may be controlled from external master oscillator selected by front panel switch. "S" meter "Tune" position permits rapid tuning of receiver to crystal controlled channel.

DIVERSITY PROVISIONS: Basic receiver may be operated from master oscillator as noted above. An accessory Diversity Modification Kit (NC-400 DMK) allows choice of internal or external control of all oscillators. Rear panel selector provisions make possible use of any receiver either as master control, or slave fed from other oscillator sources. IF, detector and AGC outputs available for feed to external loads or combiners.

POWER REQUIREMENTS: 110-220 volts, 50-60 cycles AC
MANUFACTURER'S SUGGESTED LIST PRICE: \$895.

OPTIONAL ACCESSORIES:

1. XCU-400 crystal calibrator. Output frequencies of 100 kc. and 1 mc.
2. NTS-2 matching speaker
3. NC-400 DMK diversity modification kit
4. NC-400 FH mechanical filter housing

*Manufacturer's suggested list price. Sold only by National Co. Franchised Distributors

In Canada by Canadian Marconi Inc., 830 Bayview Ave., Toronto, Ontario

Export by Ad Auriema, Inc., 80 Broad St., New York City.

**1959 RADIO
HANDBOOK**

features
RCA-7094
in its "DeLuxe"
500-Watt
Transmitter



RADIO HANDBOOK
all-new 500-watt
rig uses an RCA-7094
in the final, an
RCA-2E26 driver, and 2
RCA-811-A power triodes
in the modulator.



RCA-7094

Has What It Takes for Beam Power QRO

- Gold-plated control grid minimizes grid emission
- Triple base-pin connections for screen grid to permit effective rf grounding
- Internal multiple plate leads (copper brazed) for improved thermal conductivity and reduced plate-lead inductance
- High-alumina ceramic spacers strengthen electrode structure, reduce rf losses, increase tube life
- Larger integral radiating fins on plate for effective cooling
- Large cathode area and low cathode-current density provide high perveance and long tube life
- Rugged button stem with tungsten leads for reduced rf losses
- Hard-glass bulb withstands higher temperatures, permits tube to handle more watts per cubic inch
- Carbon-coated screen-grid wires—for higher thermal radiation, reduced screen emission

Again, it's RADIO HANDBOOK time—and this time the big transmitter news is the deluxe 500-watt band-switching rig covering the bands from 10 to 80. For this "transmitter of the year", the RADIO HANDBOOK editors selected an RCA-7094 beam power final—and here's what the RADIO HANDBOOK says:

"This compact tube has high perveance and high power gain. It can be operated at full input to 60 Mc., and has a maximum plate dissipation of 125 watts. In addition, it has triple base-pin connections for the screen grid to permit good r-f grounding and large plate radiating fins for effective cooling. The compact size makes it especially effective in the high-frequency portions of the communications spectrum. Driving requirements are modest and permit the use of a simplified bandswitching exciter."

RCA-7094 high-perveance beam power tubes are available through all RCA Industrial Tube Distributors. Drop a card for technical bulletin on this type to RCA Commercial Engineering, Section H-15-M, Harrison, N. J.

Typical Operating Values for Amateurs			
TYPE OF SERVICE	CW	AM	SSB
DC Plate Volts	1500	1200	2000
DC Grid-No. 2 Volts	400	400	400
DC Grid-No. 1 Volts	-100	-130	-100
DC Plate Ma.	330	275	275
DC Grid-No. 2 Ma. (approx.)	20	20	20
Required Driver Power Output Watts (approx.)**	4	5	5
Useful Output Watts (approx.)†	340	240	240

*Maximum-Signal Value **At 60 Mc.
†90% Output-Circuit Efficiency



RADIO CORPORATION OF AMERICA
Electron Tube Division
Harrison, N. J.



For the name of your nearest Industrial Tube Distributor, contact Western Union by 'phone number and ask for Operator 25.