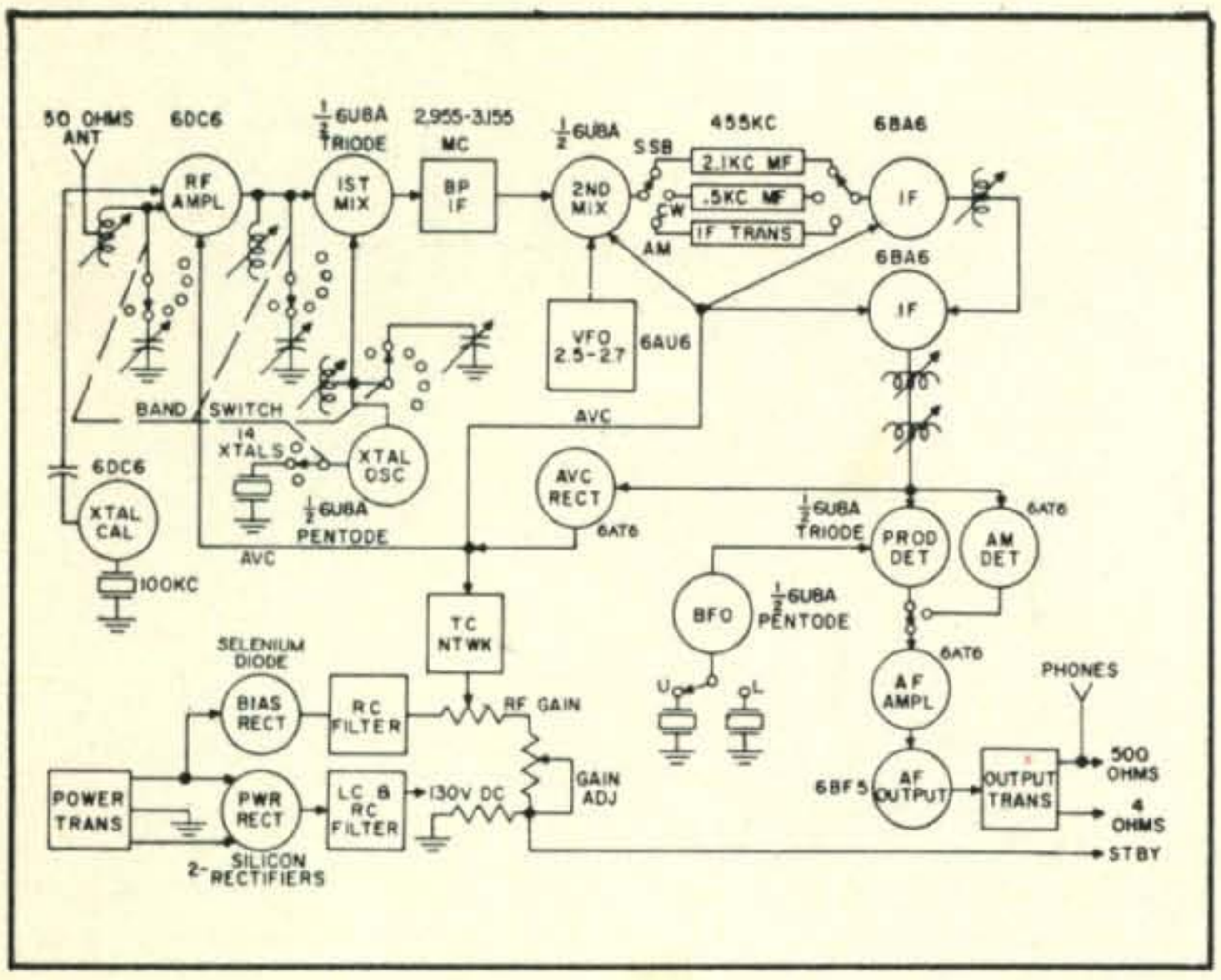
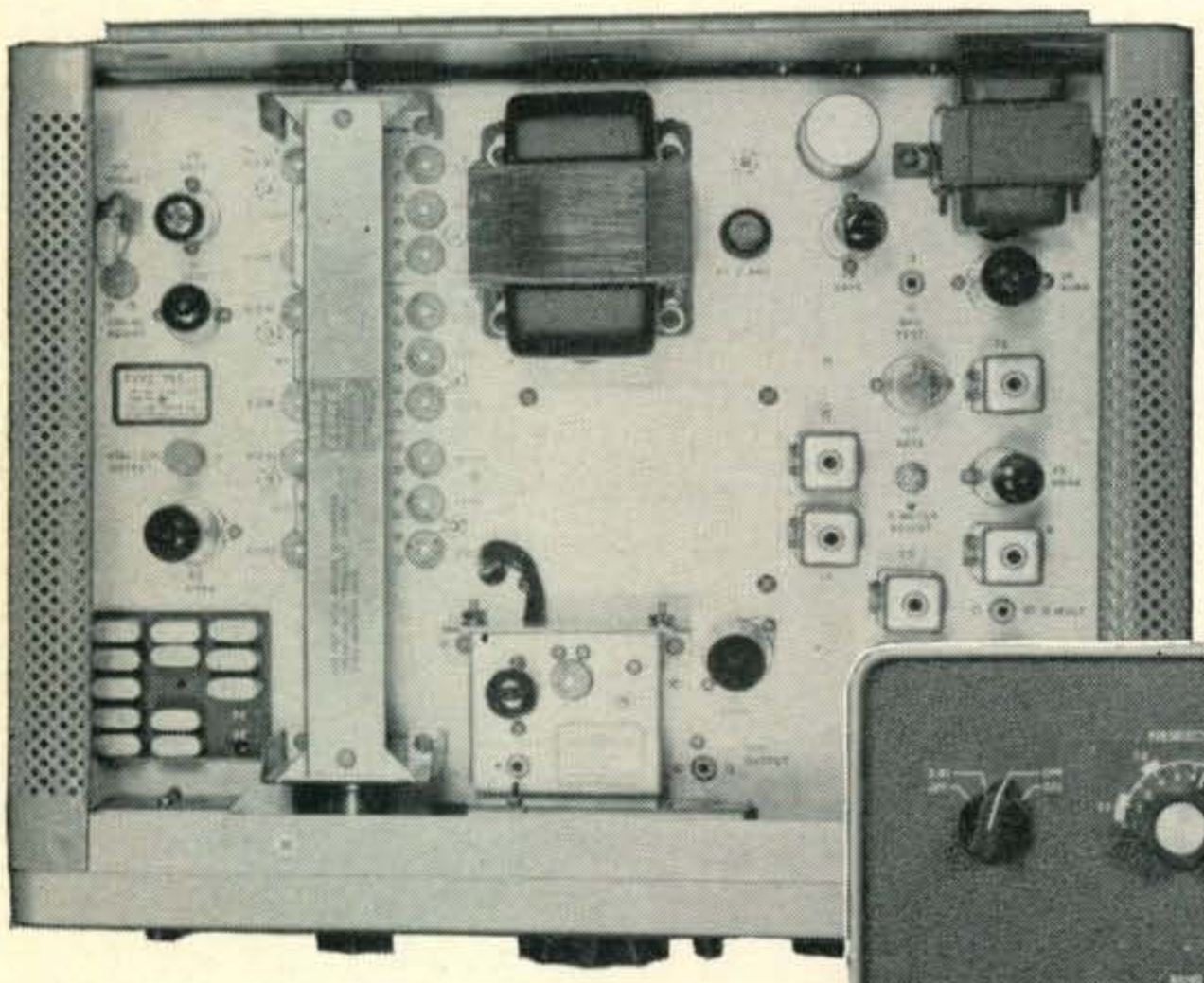
CQ

July 1959
50¢

Special Antenna Issue



Circuits include new design low noise mixers for improved S/N ratio, HF crystal oscillator and low frequency VFO for maximum frequency stability, and Mechanical Filters for optimum selectivity.



Major components are arranged in an orderly manner with attention given to heat dissipation, a major requirement for high reliability. Note the pleasing appearance and simplified front panel arrangement.

Collins 75S-1 Receiver

Surpassing in Performance . . . Simplified in Operation

New criteria of performance, compactness and operational simplicity have been achieved in the new Collins S/Line Receiver — the 75S-1. The highly accurate linear dial, coupled with extremely stable circuits, provides maximum ease in tuning in the frequency you want for keeping a sked or checking into a net. A bonus feature of the S/Line enables the 75S-1 to control the frequency of its companion 32S-1 Transmitter, putting the transmitter right on the received signal frequency without zero beating.

Other new highlights of the 75S-1 design include AVC with a very flat characteristic for optimum SSB performance; 150 volts on vacuum tube plates for reduced heat dissipation and increased reliability; silicon power rectifiers; control of three degrees of selectivity — 2.1 or optional 0.5 kc with Mechanical Filters, or 4.0 kc conventional IF transformers for AM.

Time-proven features of its Collins predecessors incorporated in the new receiver include dual conversion with a crystal controlled first injection oscillator; bandpass first IF; RF amplifier with low cross modulation products; stable, permeability-tuned VFO, product detector for SSB, and diode detector for AM.

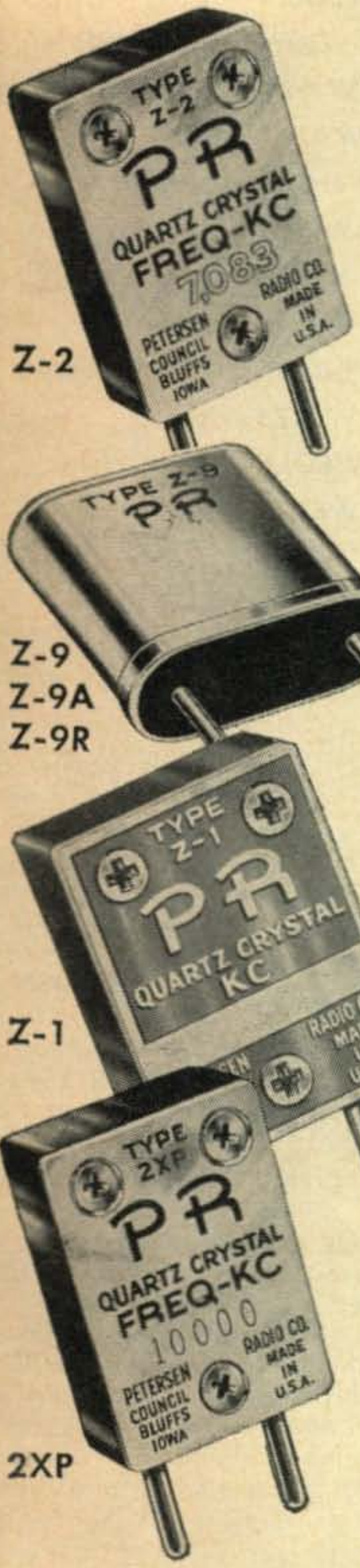
The 75S-1 offers reception of SSB, CW or AM signals on all amateur bands between 3.5 and 29.7 mc, with coverage of any frequency in the 3.5 to 30 mc range, except 5.0 to 6.5 mc, possible by substituting crystals.

See the 75S-1 and other units of the S/Line — 32S-1 Transmitter, 30S-1 1 kw (Average Plate Input) Linear Amplifier and accessories — on display by your Collins distributor.

COLLINS

It pays to insist on PR *crystals*

STANDARD OF EXCELLENCE SINCE 1934



Z-2

Z-9
Z-9A
Z-9R

Z-1

2XP

AMATEUR TYPES

40, 80 and 160 Meters, PR Type Z-2

Rugged. Low drift, fundamental oscillators. High activity and power output. Stands up under maximum crystal currents. Stable, long-lasting, hermetically sealed; ±500 cycles..... **$2.95** Net

24 to 27 Mc., PR Type Z-9A

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

50 to 54 Mc., PR Type Z-9A

Fifth overtone; for operating directly in 6-meter band; hermetically sealed; calibrated 50 to 54 Mc., ±15 Kc.; .050" pins. **$6.95** Net

COMMERCIAL TYPES

Commercial Crystals available from 100 Kc. to 70 Mc. Prices on Request.

SPECIAL TYPES

Type Z-1 Aircraft

3023.5 Kc., .005%..... **$3.45** Net

Type Z-1, MARS and CAP

Official assigned frequencies in the range. Calibrated to .005%.
1600 to 10000 Kc..... **$3.45** Net

Type Z 1, TV Marker

Channels 2 thru 13.... **$6.45** Net

4.5 Mc. Intercarrier, .01%..... **$2.95** Net

5.0 Mc. Signal Generator, .01%..... **$2.95** Net

10.7 Mc. FM, IF, .01%..... **$2.95** Net

Type 2XP

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

1600 to 12000 Kc., (Fund.) ±5 Kc..... **$3.45** Net

12001 to 25000 Kc. (3rd Overtone) ±10 Kc..... **$4.45** Net

ALL PR CRYSTALS ARE UNCONDITIONALLY GUARANTEED. ORDER FROM YOUR JOBBER.

Type Z-9R, Citizens' Band and Radio-Controlled Objects

Official frequencies in Citizens' band (27 Mc. range) and for Radio-Controlled objects. Calibrated to .005%..... **$2.95** Net

VHF Type Z-9R, Aircraft

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

Type Z-6A, Frequency Standard

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

Z-6A

Silver Anniversary Year 1934-1959

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.

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department editors

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Byron Kretzman, W2JTP — *rtty*

Marvin Lipton, VE3DQX — *club bulletins*

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

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

CQ CERTIFICATES:

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

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

Special SB Certificates are available from the Sid band Department for operators providing proof contact (QSL cards) with stations in 50, 75 and 1 countries using two-way sideband. Send cards direct to the SB Editor.

TECHNICAL INFORMATION:

Please check the 11-year cumulative index which w published in the January 1956 CQ for informati about articles in past issues of CQ. The Decemb 1956 to 1958 CQ yearly indexes will bring you up date. Most back issues are available at $1 from u Check our "Back Issue" ad for details on those n available. Reprints of the Cumulative Index are ava able free. For further information see the Ham Clin column.

DISCLAIMER:

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

◀For further information, check number 4 on page 12

CQ—The Radio Amateur's Journal

July 1959
vol. 15, no. 7

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BUILD YOUR OWN HAM GEAR

HEATHKIT®

HEATHKIT HAM EQUIPMENT 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 **$159.95**

HEATHKIT DX-20 **$35.95**

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.

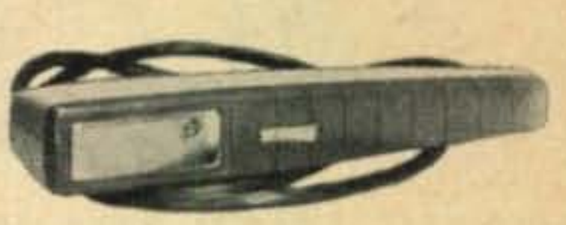
HEATH COMPANY Benton Harbor, Michigan — a subsidiary of Daystrom, Inc.

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
$99.95



"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
$119.95

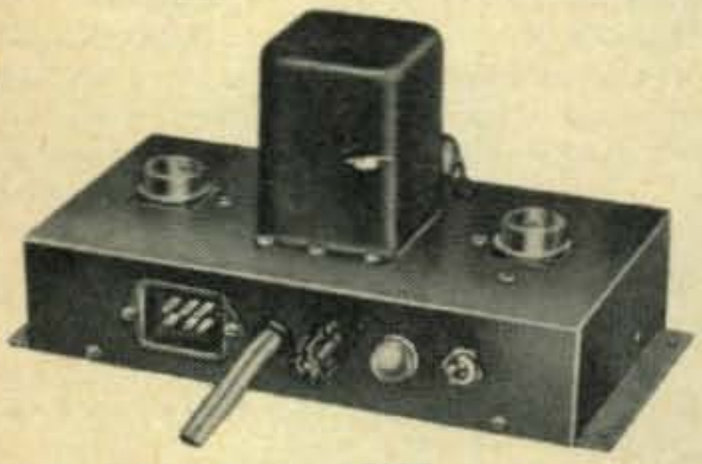
MOBILE SPEAKER KIT

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
$5.95

HEATHKIT AK-6
$4.95

HEATHKIT MP-1
$44.95



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.

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 9 1/16" 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.

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
$12.95

HEATHKIT®

COMPANION UNITS

HEATHKIT TX-1 **$234.95**

"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
$89.95

SINGLE SIDEBAND ADAPTER KIT

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
$29.95
(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
$9.95

"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
$9.95

HEATHKIT RX-1 $274.95

"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.

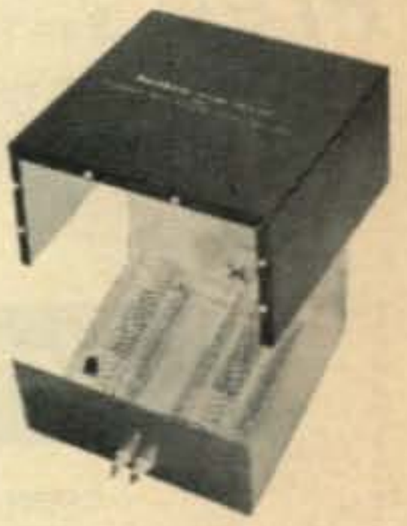
HEATHKIT AM-2
$15.95

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
$8.95

HEATHKIT VX-1
$23.95

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
$19.50

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 **$189.50**

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 **$64.95**

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.

HEATHKIT

HEATH COMPANY BENTON HARBOR 12, MICH.

pioneer in do-it-yourself electronics

a subsidiary of Daystrom, Inc.

Send latest Free Heathkit Catalog.

All prices and specifications subject to change without notice. Please include postage on orders to be shipped parcel post. 20% deposit is required on all C.O.D. orders. All prices are NET F.O.B. Benton Harbor, Mich., and apply to Continental U.S. and Possessions only.

NAME

ADDRESS

CITY ZONE STATE

QUANTITY	KIT NAME	MODEL NO.	PRICE

For further information, check number 5 on page 126.

AMATEURS IN ALASKA . . .
HAWAII . . . *everywhere*

are telling each other about the fine-sounding patches put on by stations using the new GONSET

Hybrid-balanced
PHONE PATCH

Here . . . in one compact, industrial-designer-styled unit . . . the ideal "patch" between amateur station transmitting/receiving equipment and land-line telephone circuits.

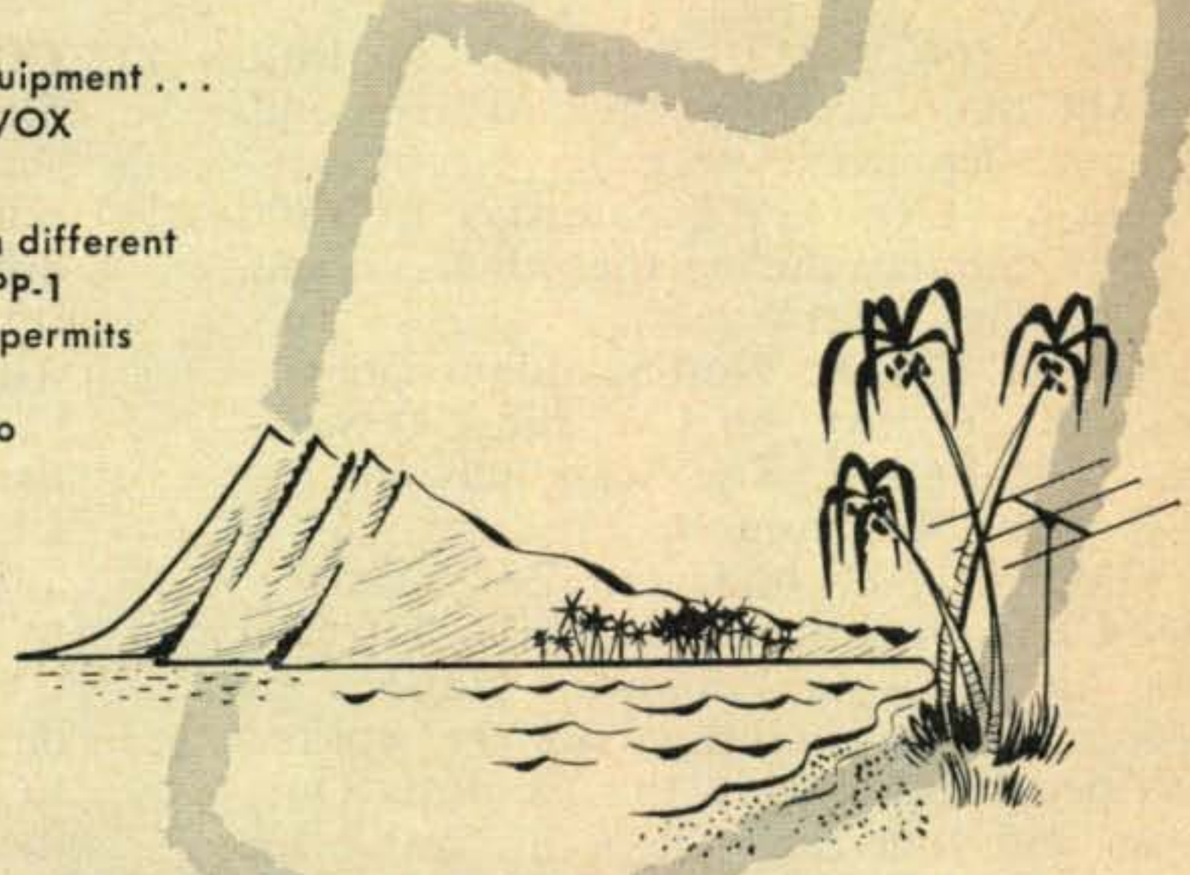
Use GPP-1 with any transmitting/receiving equipment . . . use it to particularly fine advantage with the VOX circuits in Gonset and other SSB equipment.

Required fone line balance often changes with different circuits and varying line conditions. Gonset GPP-1 incorporates adjustable hybrid balancing . . . permits you to optimize balance for any particular set of conditions . . . and has a panel instrument to show you when balance is correct!

Meter also switches to indicate line level under actual patch conditions. Now, you can completely avoid line overload with consequent crosstalk . . . at the same time assuring proper voice level for clearest conversation.

Simple indeed to install . . . equally simple to operate.

For further information, check number 6 on page 126.



Model #3273 . . . . 44.50

GONSET **GONSET** *Division of Young Spring & Wire Corporation*

801 SOUTH MAIN ST., BURBANK, CALIFORNIA

CONTEST CALENDAR

by Frank Anzalone, W1WY
14 Sherwood Road, Stamford, Conn.

September	12-13	Peruano Phone
September	19-20	Peruano CW
September	19-20	SAC CW
September	26-27	SAC Phone
October	3-4	VK/ZL Phone
October	10-11	VK/ZL CW
October	23-25	CQ WW DX Phone
November	27-29	CQ WW DX CW

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.

This is a Panamerican contest and activity is of course limited to the American continents. In the past most of the operation seemed to be concentrated in the Phone section. However more CW activity is promised for this year's contest. Maybe a few CQs from this side of the border will stir up some interest, so give it a try fellows. We will try to have more details for you next month.

Logs should be mailed to: The Radio Club Peruano, Casilla 538, Lima, Peru.

The Scandinavian Activity Contest

General rules for non-Scandinavians

1. **CONTEST PERIODS:**

   CW—1500 GMT Saturday to 1800 GMT Sunday during the 3rd week-end, September, every year.
   FONE—1500 GMT Saturday to 1800 GMT Sunday during the 4th week-end, September, every year.
2. **CONTEST CALL:** Non-Scandinavian stations call CQ SAC on CW and CQ Scandinavia on FONE. The Scandinavians use CQ-test and CQ-contest.
3. **BANDS:** 3, 5-7-14-21 and 28 mc/s.
4. **OBJECTS:** Non-Scandinavians will try to work as many Scandinavian stations as possible. The same station may be worked once per band during the Contest. Only cw-cw and fone-fone QSOs are valid for the Contest. The prefixes used in Scandinavia are: LA (Norway) LA/p's (Jan Mayen, Svalbard and Bear Island), OH (Finland), OHØ (Aaland Islands), OX (Greenland), OY (Faeroes Islands), OZ (Denmark) and SM/SL (Sweden). Actually all of these prefixes are not geographically Scandinavian, but they are considered so during the Contest.
5. **OPERATING CLASSES:** Single-operator and multi-operator classes. The club stations, even if operated by one operator during the Contest are in multi-operator class. Multi-operator stations may use one or more bands at the same time but the exchange number must flow in chronological order.
6. **SERIAL NUMBERS:** The serial exchange consists of six-digit (CW) or five-digit (FONE) number: RS(T)+NR, e.g. 599001 or 59001 etc. Every contestant must start from 001.
7. **POINTS:** One point for every *complete* contest QSO.
8. **MULTIPLIERS:** Maximum of 8 per band, consisting of the prefixes listed in the paragraph 4. LA/p's are counted as one and the same multiplier.
9. **FINAL SCORNG:** The sum of complete QSOs on each band multiplied by the sum of multipliers on each band.
10. **CERTIFICATES:** Two highest scoring stations in both operating classes separately on CW and FONE will receive the Contest Award in each participating country as well as in each participating U. S. call-area. Depending on the number of the contestants in each country the Contest Committee will consider more certifications.
11. **CONTEST LOGS:** The logs are to be filled in following order: date, GMT, station worked, sent nr., received nr., band, note of NEW multiplier. Separate logs for different bands are not necessary, but a summary sheet for each band is required with information of the scores on the bands involved. On this summary sheet the contestant will plainly write (BLOCK LETTERS, pse) his/her call-sign name and full address. Also the operating class to be stated. Separate logs for FONE and CW are required. The rest of the space on the summary sheet is recommended to be used for personal comments. Finally, the signature of the contestant certifies that he/she fully agrees to the rules, has been working according to the unwritten amateur radio law and agrees to the final

[Continued on page 22]

Feenix, Ariz.

Dear Hon. Ed:

Are you knowing when you are licked? Well, I knowing when I being licked, yes indeedy. I not being licked very often, but when I being licked, I reely being licked. Like you taking last Sattidy. You knowing Hon. Saying about the harder the Hon. Storm, the Hon. Sooner it being over? You not buleeving it.

It all starting Sattidy morning. Not having much to do, just sitting around waiting for QSL cards to coming in male from last cupple dee-x countries I working. Trying to think of some odd little job to doing what not taking more than cupple minutes, on acct. not want to wasting time. Remembering that mobile unit in trunk of car are kinda loose, so desiding to tightening bolts that holding it.

Backing car part way out of garage so getting more light, and getting bumber jack out and jacking up rear of car. Next, getting Hon. Tightening Tool and sliding under car. After getting all way under, remembering that not using nuts, but are drilling and tapping bolts into car. So, getting in trunk of car, and tightening bolts. First three no problums. Getting tight reel slicky. Last on going fine until taking that last little twist.

CRACK!! You gessing it, Hon. Ed. Braking head off bolt. Looking around, and not finding any other bolts same size, so borrowing Hon. Brother Itchi's car and off to hardware store. Getting bolt and coming back. Leening over trunk and PLOP!! bolt are coming out of shirt pocket and down into part of trunk that nobuddys can getting into.

Back to hardware store, getting another bolt. Coming back, carefooly putting bolt on floor. Trying to taking out bolt that already in hole, and having no luck. Desiding that Scratchi needing Hon. Screw Eggstractor. Picking up bolt, going back to hardware store, matching bolt to right size eggstractor, bringing Hon. Eggstractor home. Just getting there when phone ringing.

It hardware store calling. Seeming I leeving bolt on counter, and they wanting to know if wanting it. So, back to hardware store and getting bolt. Coming home and counting Hon.

[*Continued on page 26*]

a man named OHM...

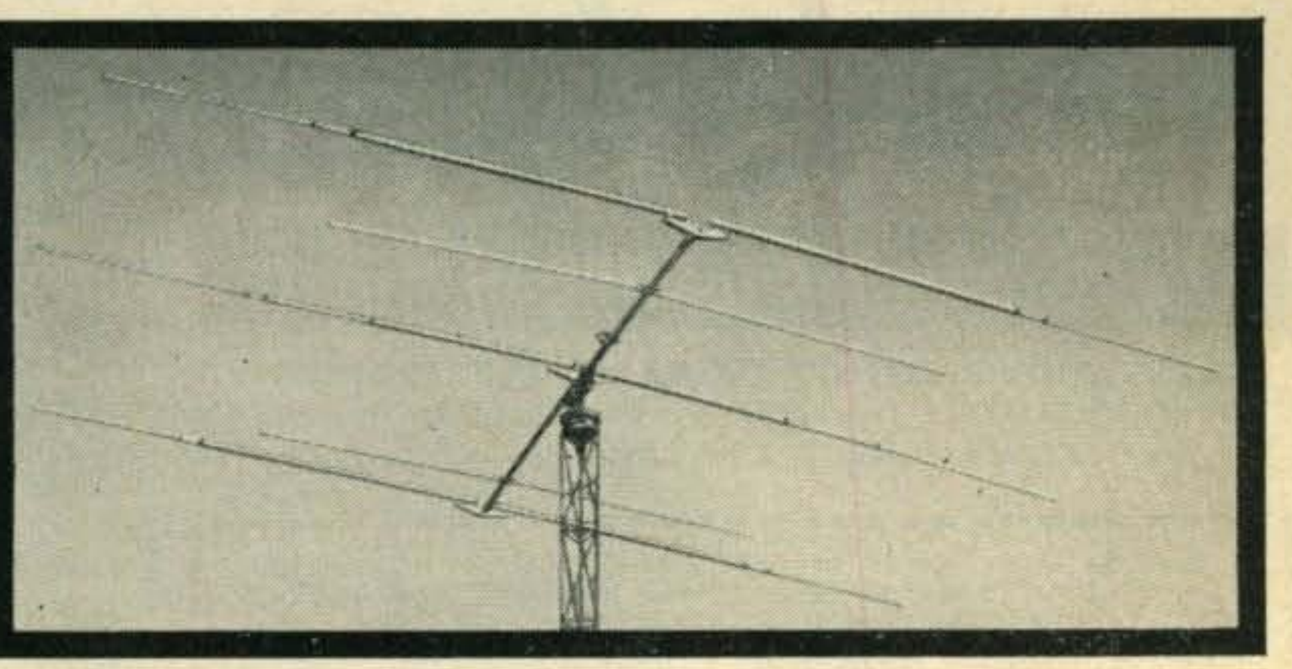
an astute scientist . . . long ago proved conclusively that all wire has some resistance . . . and loss. Wind it into the form of a coil and you have greater length of wire, greater loss . . . a fact of vital interest to any prospective buyer of a 3-band beam. Why? George Simon Ohm's law can be applied to show that even the finest coil has some loss . . . the losses in a poor coil can be very high! But Gonset 3-Bander beams have no coil loss at all because no coils are used.

Consider . . . NO COILS . . .

no arcing between turns . . . no humidity or wet weather changes . . . no element droop or sag due to heavy coils! Exclusive Gonset multiple concentric sleeve design gives you full length, full gain beam for superior 3-band, 10-15-20 meter operation . . . low SWR . . . a single RG-8/U concentric feed line.

NO COILS

and now with extra-reinforced mechanical construction.



3-element beam	#3220	124.50
2-element beam	#3219	84.50

For further information, check number 7 on page 126.

GONSET **GONSET** *Division of Young Spring & Wire Corporation*

801 SOUTH MAIN ST., BURBANK, CALIFORNIA

the Big Signal...

this one puts out "rocking chair copy" without half trying!

HT-33A
linear amplifier

There's more than one reason why the HT-33A was designed to be *rated conservatively at the maximum legal input. Talk-power* was part of it—enough to provide output to the antenna that guarantees you one of the really big signals on the band. But way beyond that was a need for *reserve-power* . . . to insure the effortless operation that means so much to efficiency and component life. Your distributor is ready to give you a convincing demonstration.

Available with convenient terms from your radio parts distributor.

FEATURES

- **Maximum legal input.**
- **Certified for FCDA matching funds.**
- **Third and fifth order distortion products down in excess of 30 db.**
- **Passive grid circuit. 50 to 75 ohms input.**
- **Built-in r.f. output meter to simplify tune up.**
- **Complete coverage of 80 thru 10 meter amateur bands.**
- **Pi-network for maximum harmonic suppression.**
- **Variable output loading.**
- **All important circuits metered.**
- **Circuit breaker assures protection of power supply.**
- **Perfect match to HT-32 in size, appearance, and drive requirements.**
- **Tubes: (1) PL-172 high power pentode; (2) 3B28 rectifiers; (4) OA2 screen regulators.**
- **Front panel controls: Meter selector; Filament switch; High Voltage switch; Bias adjustment; Band switch; Plate tuning; Plate loading.**

hallicrafters

Chicago 24, Ill.

Where the new ideas in
Amateur Radio are born.

**Export Sales: International Division
Raytheon Manufacturing Co., Waltham, Mass.**

For further information, check number 9 on page 126.

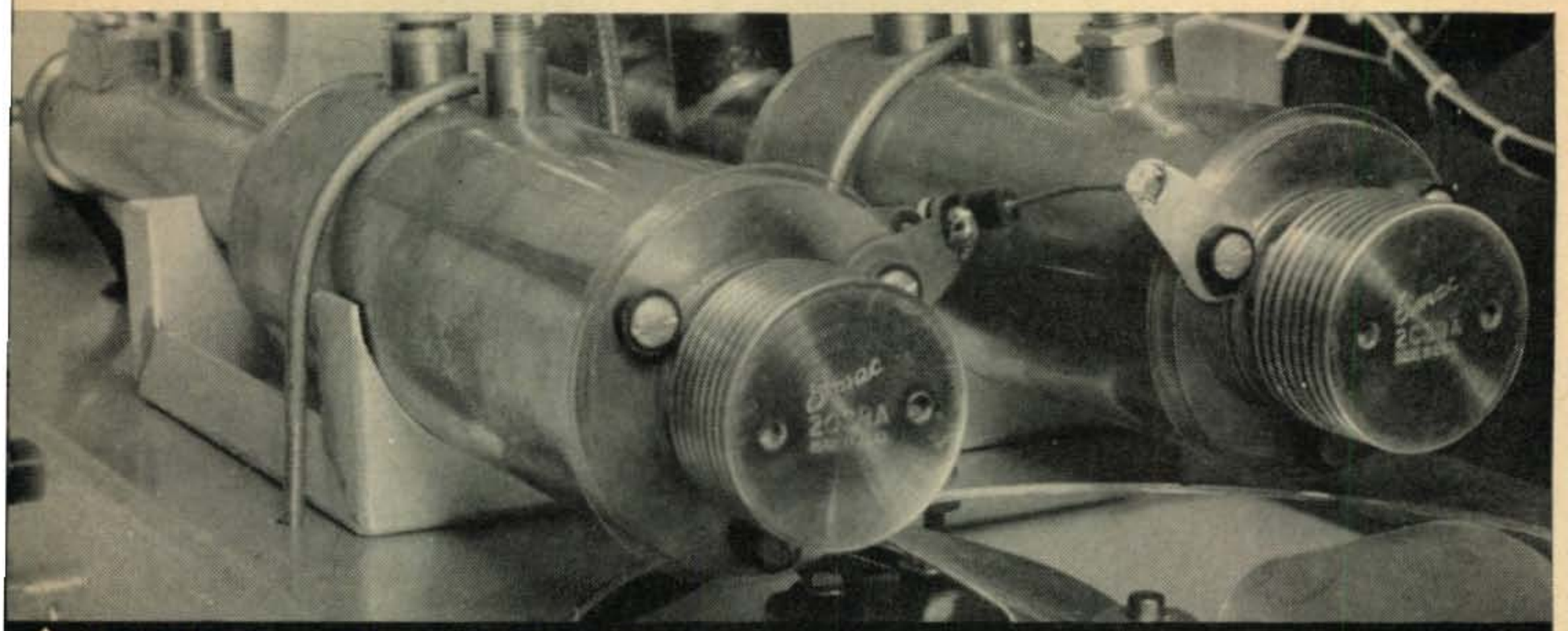
QSL contest

Winner

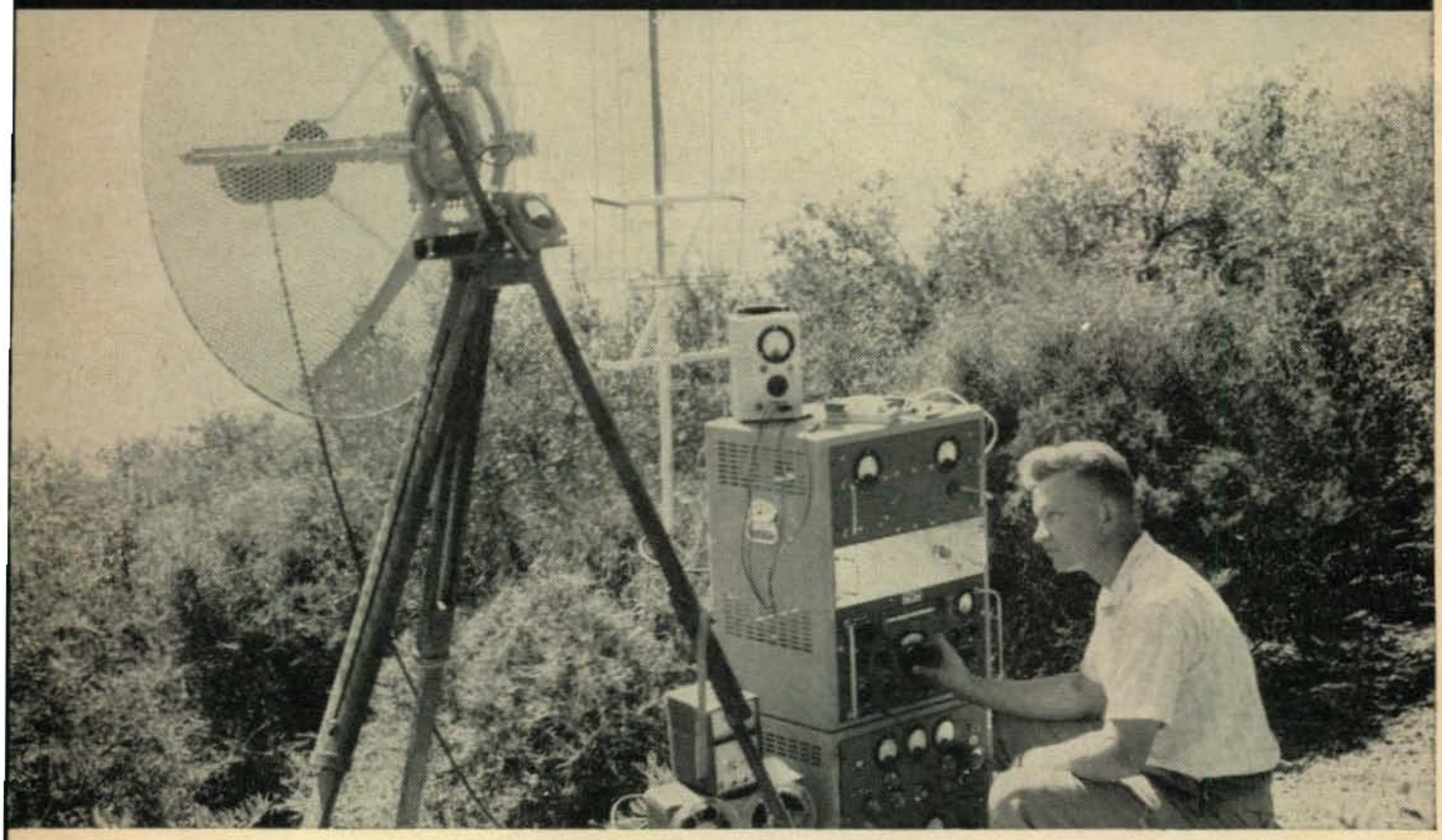
George, K1EEB wins this month's coveted award with his symbolic parabolic. Yes, George is a VHF man.

Losers

K2RDA, OH2TK and K5INE also submitted novel and outstanding entries. While they don't get rich, they are the recipients of gobs and gobs of everlasting fame. What a way to be a loser.



▲ EIMAC 2C39A's in tripler and amplifier cavities



Four Eimac Tubes Help K6AXN/6 and W6MMU/6 Set New Amateur Microwave DX Record

On September 21, 1958, Mike Krivohlavek, K6AXN/6 and Donald K. Goshay, W6MMU/6 set a new DX record on the 1215 to 1300-megacycle band with a two-hour contact over a 270-mile path. Two-way CW contact was established at 8:00 a.m. between Mt. Diablo near Oakland, California and Mt. Pinos near Bakersfield, California and maintained until 10:00 a.m.

As in many amateur radio firsts, Eimac tubes played an important part. K6AXN/6 used an Eimac 4X150A to triple from 144 to 432 megacycles, and an Eimac 2C39A to triple from 432 to 1296 megacycles. Another Eimac 2C39A was used as a straight-through amplifier, with an input of 600 volts at 80 ma and an output power of 16 watts. W6MMU/6 also used an Eimac 2C39A tripler, without further amplification, delivering an output power of 6 watts.

Whether breaking records, exploring new bands, or just enjoying solid QSO's, there's a member of the Eimac transmitting tube family for the discriminating amateur radio operator. For information, write to our Amateur Service Department.

EITEL-McCULLOUGH, INC.

Eimac

SAN CARLOS, CALIFORNIA

For further information, check number 11 on page 126.

Announcements

Wyo., Ida., Mont., Utah

WIMU HAMFEST July 31, August 1 & 2, at Big Springs, Idaho. Events of interest for OMs YLs and XYLs. Cabins and good campgrounds available.

(Mrs.) Helen M. Maillet W7GGV
V. Pres. WIMU Hamfest 1959
Route #1 South
Pocatello, Idaho

Uniontown, Pa.

The Uniontown Amateur Radio Club will hold its 10th Annual Gabfest, Saturday afternoon and evening on 11 July 1959. It will be on the Club grounds, 2 miles North of Uniontown, Pa. just off Route 51 on the Old Pittsburgh Road. A Stag Affair, with $2.00 registration fee. Movies after Prize Drawing in the evening. Club station will be on the air (W3PIE).

Sheridan, Wyoming

The Sheridan Radio Amateur League is again sponsoring the Annual Wyoming Hamfest. A banquet, contests, transmitter hunts and valuable prizes will be part of the program to be held in the Caribou Recreational Area of the Big Horn Mountains, 28 miles west of Buffalo, Wyoming, on July 25-26. Registration, including banquet, $5.00. Tourist mobiles in route to or from Yellowstone National Park welcome. Register with W7QPP, 362 E. Loucks St., Sheridan, Wyoming, or contact any Wyoming ham for further details.

Santa Barbara, Calif.

The Santa Barbara Amateur Radio Club will hold its annual Hamfest on August 23 in Tucker's Grove. Come one and all for a good time.

Irma Weber, K6KCI

Wyoming QSL

Does anyone need a Wyoming QSL? The Big Horn Basin Hams of Gebo, Worland and Riverton Wyoming will be prepared to supply QSL's *after* Big Horn Mountain Expedition August 1st and August 2nd, 1959, *Weather permitting, or* August 8th and August 9th, 1959.

The following Hams: W7ABO, BKI, DTD, K7AHO, CMF and CRL will be working 80, 40, 20, 15, 10 and 6 on CW or Fone as conditions permit.

Teen-age Ham Club

A teen-age ham club, the Teen Hams of the Deep South, has been formed and is serving the area of Hattiesburg, Mississippi. Officers are:

President	K5QNE
Vice President	K5RSS
Secretary-Treasurer	K5SNO
Activities Manager	KN5SVR
Executive Committeemen	K5RDN
	KN5TOB

Weekly meetings are being held at homes of members until a club house, which is under construction, is completed.

Hershey Park, Pa.

The Pennsylvania Fone Net and Eastern Pennsylvania CW Net will hold their annual Hamfest on Sunday, August 23rd, at Hershey Park, Pennsylvania. This will be a family affair. Bring your own picnic lunch or purchase your eats from park concession. Registration from 8 am on. Registration fee one dollar per ham call. Prizes.

Alberta

Stampeder Hotel, Calgary, August 1 and August 2.

best by far!

HAMMARLUND

HQ-170

For once—everyone agrees, experts, amateurs, dealers—there is no amateur receiver that approaches the Hammarlund HQ-170 in performance and features. Even receivers costing much more, cannot offer everything the HQ-170 offers....

- ★ Dual and triple conversion—17-tube superheterodyne.
- ★ Full dial coverage of 6, 10, 15, 20, 40, 80 and 160 meter amateur bands.
- ★ Razor-sharp slot filter, adjustable ± 5 KCS over passband with up to 60 db attenuation.
- ★ Separate vernier tuning ± 3 KCS for easy SSB tuning.
- ★ Separate linear detector for CW and SSB reception.
- ★ Tuned IF amplifier with seven selectivity positions for skirt selectivity.
- ★ Selectable sideband, upper, lower or both.
- ★ 100 KCS crystal calibrator.

$359.00

Telechron clock-timer, $10 extra.

ADD SSB/CW AND AM/MCW TO YOUR PRESENT RECEIVER

HC-10

The biggest box of tuning tricks ever offered! Provides all modes of tuning for perfect SSB reception. Takes seconds to connect to any receiver having an IF from 450 kcs to 500 kcs. Has own audio system and power supply. You must try it to believe it... **$149.00**

Write for details...

Established 1910

HAMMARLUND

HAMMARLUND MANUFACTURING COMPANY, INC., 460 W. 34th ST., N. Y. 1, N. Y.

Export: Rocke International, 13 E. 40th St., N. Y. 16, N. Y.
Canada: White Radio, Ltd., 41 West Ave. N., Hamilton, Can.

For further information, check number 13 on page 126.

For further information, check number 14 on page 126.

Registration Saturday, August 1, 9:00. 28,258 kc, 3,740 kc and 146.7 mcs for further announcements.

VE6NQ

Chaffee, New York

The annual Southwestern New York H. F. Association picnic will be held on July 12 at Great Valley, New York. There will be activities for the whole family. Admission is free. For further information contact K2IAX, Dave Reinhart, Chaffee, New York.

Erie, Pa.

The Radio Association of Erie is holding its Annual Summer Hamfest on Saturday, July 18 at the Beachcomber's on the Peninsular.

Chicago, Ill.

The Hamfesters Radio Club of Chicago is celebrating its Silver Anniversary at Santa Fe Park, 9100 South Wolf Road, on Sunday, August 9.

Leading manufacturers will display new equipment and there will be lectures, swap tables, food and refreshments, events and prizes. Advanced tickets $1.10 or $1.60 at the gate. For further info write Betty Sandberg, W9STR, 2957 N. Monitor Ave., Chicago 34.

Contest, Port Moresby, New Guinea

I have been instructed by the Council of the Papua and New Guinea Division of the W.I.A., to write to you, about details of a contest to be conducted by this division.

The contest is being organized as an effort to encourage the use of one of our sparsely occupied bands, the 3.5 mc amateur band. I would mention, no prizes are being offered for this contest, but QSL cards will be sent out by those stations contacted. As QSL's are quite rare from Papua and New Guinea on 3.5 mc at present, we hope many amateurs will take this opportunity to acquire one or more of these cards.

The contest will run from 1st to 31st July 1959 and will be for either phone or CW, or both. Only one contact per station (either phone or CW) per day will be permitted.

Roy Taylor, Hon. Sec. VK9 Division

Munising, Mich. Certificate

The Pictured Rock's Radio Club of Munising, Michigan announces a certificate that will be available for a short period of time. From June 15, 1959 to August 1, 1959 any station that has contact with 10 (ten) members of the Pictured Rock's Radio Club will be eligible for a certificate to be awarded at the time of the Upper Peninsula of Michigan Ham fest being held in Munising, Michigan August 1st and 2nd 1959. Cards verifying contacts may be presented at the Hamfest or mailed to the secretary of the club, K8EXX, Bill Chevrette, P.O. Box 228, Munising, Michigan.

Munising, Mich. Hamfest

The Pictured Rock's Radio Club will sponsor the annual Upper Peninsula of Michigan Hamfest to be held in Munising, Michigan starting at 1200 Saturday August 1st and running thru Sunday August 2nd. There will be a transmitter hunt, mobile contest, free swap and shop, scavenger hunt, informal dinner and dance, and PRIZES. Mobile talk-in on 3920 kcs. Registration $1.00. Reservations may be made thru W8CQU, C. Runard Seglund, City Water Department, Munising, Michigan.

San Gabriel, Calif.

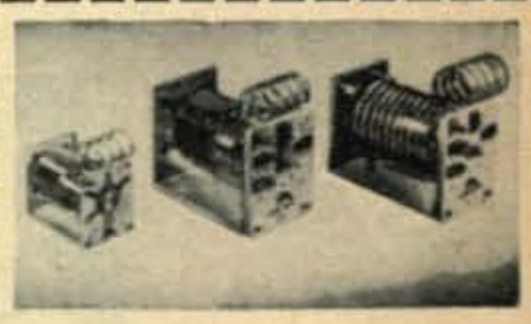
The San Gabriel Valley Radio Club is having a QSO Party on Sunday, July 12—8:00 A.M. to 12 noon (PDST) on 10 thru 80 Meters.

With the whole club participating, it will be easy for the hams to make the necessary 10 member SGVRC contacts which entitle them to the SGVRC Satellite Tracking Station Certificate.

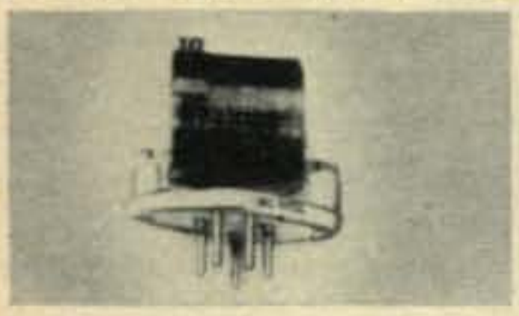
When it comes to coils, B&W are experts at keeping amateurs happy

No one has more experience, more knowledge of amateur coil requirements. From stock coil lengths to complete bandswitching turret and pi-network inductor assemblies, you will find that B&W has designed the *right* coil for you. See the complete line at your local dealer, or write B&W for information.

BAND-SWITCHING TURRETS
Bandswitching turrets provide a compact assembly for link coupling between driver and final stages.

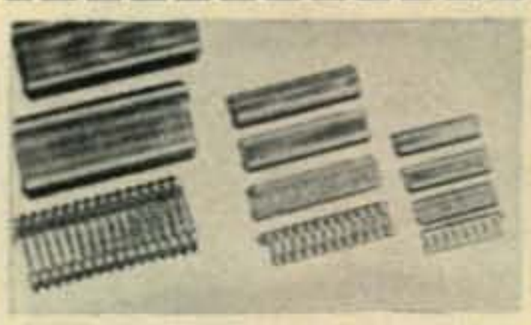


BAND-SWITCHING PI-NETWORKS
For high efficiency and simplicity in construction of wide range band-switching amplifiers operating from 3.5 through 30 mc's. Designed for maximum "Q". Stock items.

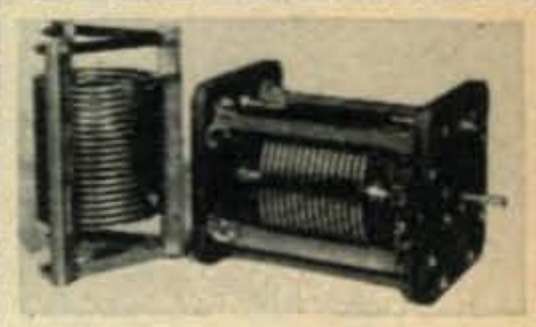


TYPE "M" INDUCTORS
Sturdy construction. Rated for 35 watts. Available in end linked or center linked center tapped types.

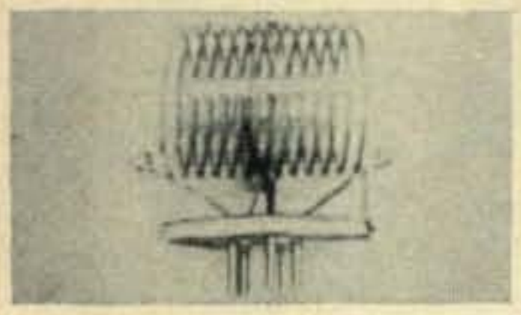
TYPE "T" INDUCTORS
Rated to 500 watts for medium high powered buffer stages and final amplifiers. Available in center link center tapped, variable link center tapped.



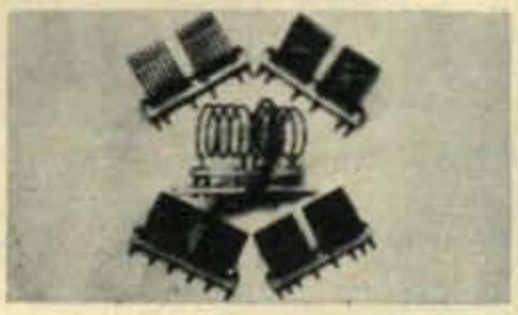
MINIDUCTORS
From ½" to 1¾" dia., 4 to 32 turns per inch provides low loss characteristics, saves space.



ROTARY AND FIXED EDGEWOUND INDUCTORS
For high power transmitters and antenna phasing networks. Ranges 10 to 150 uh.

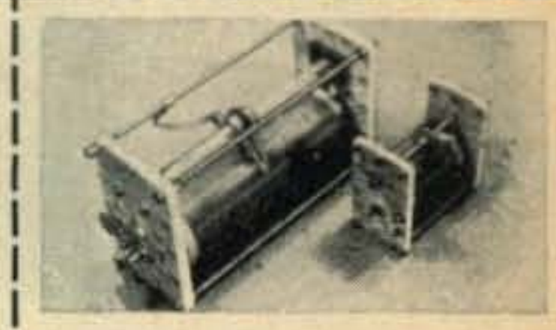


TYPE "J" INDUCTORS
Similar to Type "M" except heavier. Rated for 75 watts. Available in end linked, center linked center tapped, variable link center tapped.



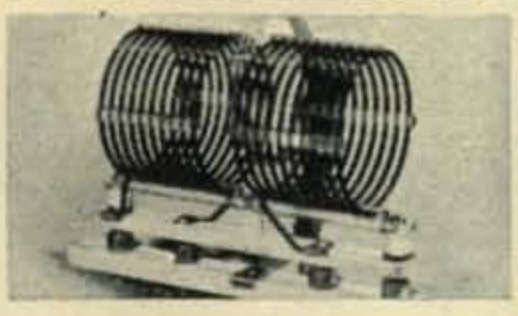
TYPE "TVH" INDUCTORS
Rated to 500 watts. Variable center linked coils. Eight plug mounting bar. Provides for simplicity in switching fixed or multisection capacitors in final tank circuits.

ANTENNA INDUCTORS
Fixed center link for antenna coupling networks and feedline impedance matching. Available in ratings of 500 and 1000 watts

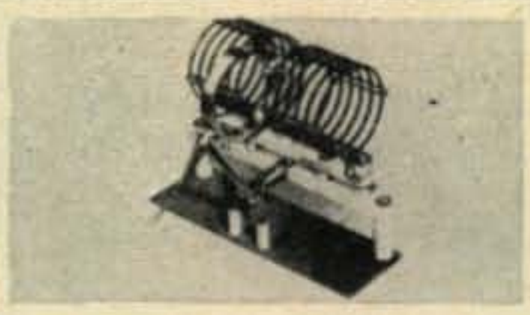


ROTARY INDUCTORS
These inductors, fabricated of wire, tubing or edgewound strip, have found wide application in induction and dielectric heaters, antenna phasing networks and radio transmitters.

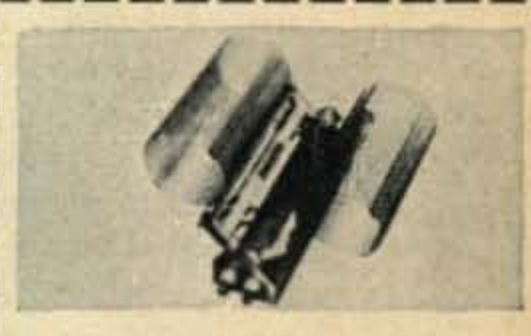
TYPE "B" INDUCTORS
For buffer and final stages. Rated for 150 watts. Available in end linked, center linked center tapped, variable link center tapped.



TYPE "HD" INDUCTORS
Rugged construction handles maximum legal power limit. Available in center link center tapped, variable link center tapped.



FARADAY SHIELDED LINKS
Reduce harmonic or spurious signal radiation. For any conventional link coupled circuit. Reduces TV and BC interference.



BALUN COILS
Broad band impedance matching baluns and Balun Coil Kits for impedance matching and transformation from unbalanced power source to balanced load.

B&W

Barker & Williamson, Inc.

Canal Street and Beaver Dam Road • Bristol, Penna.

OTHER B&W AMATEUR EQUIPMENT: Transmitters AM-CW-SSB • Single Sideband Generators • Single Sideband Receiving Adapters • Dip Meters • Match Masters • Frequency Multipliers • Low-Pass Filters • T-R Switches • R.F. Filament Chokes • Transmitting R.F. Plate Chokes • Audio Phase Shift Networks • Band Switching Pi-Networks • Cyclometer-type Counters • Antenna Co-axial Connectors • Baluns • Variable Capacitors • Fixed and Rotary Type Coils • Band Switching Turrets • Standard Inductor Materials • Miniductors • Complete line of Amateur Air-wound Plug-in Coils • Variable Plug-in Links • Faraday Shielded Links • Misc. Coil Mounting Assemblies • Misc. Frequency Marked Dial Plates • Misc. Knobs • Ceramic Jack and Plug Bars

For further information, check number 15 on page 126.

Baltimore, Md.

The Annual Picnic and Hamfest of the Maryland Emergency Phone Net will be held on Sunday, July 12th at the Braddock Heights Park, Braddock Heights, Maryland, approximately 5 miles west of Frederick Maryland, on US Route 40-A. There will be contests with prizes, a ham auction, a rummage sale, a ladies program, and plenty of activities for the children. Registration will be 75c per person, including tickets for soft drinks,—children under 12 free. Parking will be 25c per car, parking and picnic space reserved for the M.E.P.N. Communications on 3820 kc, 29.64 mc and 145.68 mc guarded from 10 am on to talk-in any mobilers. Bring a picnic lunch.

Columbus, Ohio

Again this year, Columbus Amateur Radio Association, Inc. is holding their annual Hamfest on July 19, 1959, at the WRFD picnic grounds. Anyone interested in amateur radio is cordially invited to attend the picnic. There was a large turnout last year, and we are anticipting an even larger group this year.

Barbara F. Willey, W8EOU

Code Practice

Efficient operation of Naval Reserve Communications Facilities are of vital importance to the Navy Department. The ability to send and receive Morse code (International) is, of course a major requirement in both amateur and reserve activities. In order to assist those interested in becoming better operators, the Naval Reserve Twelfth Naval District, through radio station K6USN and NDW broadcast code practice drills on the schedules as listed below.

K6USN—Monday through Thursday. 1830-1930 local time. Speeds from 5 through 45 W.P.M. Five minutes at each speed. Frequencies are simultaneous keying on three transmitters.

1978 kcs.
3590 kcs.
7136 kcs.

K6USN—Friday evenings only 1900-2030 local time. Speeds begin at 20 W.P.M. and run through 45 W.P.M. with fifteen minutes at each speed. Frequencies are simultaneous keying of three transmitters.

1978 kcs.
3590 kcs.
7136 kcs.

NDW—Monday through Thursday evenings on 4045 kcs.

1930-2100 8 W.P.M.
2100-2130 10 W.P.M.
2130-2200 12 W.P.M.

This very excellent tape is run on a Navy Boehme keying head and is quite outstanding, being mostly plain language. West coast people especially will find this info very helpful I am sure. Thank you. Gud luck es keep that code speed up Hi! With 73,

R. B. Smith (W6ONK)
NRSG 12-6 USNR*R
605 W. Andrews Av.
Fresno 5, Calif.

Corrections

"Updating The SX-28," May '58, page 48. Listed below are several further modifications for improving the receiver performance.

1. In the Stability section, R 71 (4.7K) should be replaced with a 5 or 10 watt wirewound resistor of equivalent value. Since the VR tube draws about 30 *ma*, this resistor will overheat if not replaced as stated.
2. In the *bfo* section, R45 has been replaced with a 100 ohm resistor which is run directly to the plate of the OB2 regulator. As stated in the article, the switch is bypassed

THE REVOLUTIONARY NEW CENTRAL ELECTRONICS 100V EXCITER-TRANSMITTER

BROADBANDED! 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 8¾" 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 TRANSCEIVE 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.

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

and the *bfo* runs all the time. Run the lead from the 100 ohm resistor to the hot side of the *bfo* switch (SW2) and run the other side of the switch to pin 3 of the 6J5.

3. In the section *avc* Modifications, the switch section referred to as SW3A should read SW1. As the receiver is, this switch is open only when the mode switch is in the *avc* position. In *avc off* and *bfo*, this section shorts the *avc* line from the 6B8 *avc* Amplifier to ground. Rewire the switch so that the contact for *bfo* is connected to the contact for *avc* ON rather than grounded. This will keep *avc* on the receiver for SSB and CW recepion.
4. The condenser left unmarked in fig. 4 (Product Detector) should be a .001 disc ceramic type. This is located in the B plus line of the second 12AU7 stage.

CONTEST CAL. [*from page 10*]

decision of the Contest Committee. The Contest Logs must be mailed not later than October 15th 1959 to The Contest Committee, SRAL, P. O. Box 306, Helsinki, Finland.

12. The decisions of the Contest Committee are final and definite. Right to changes in these rules is reserved.

VK/ZL

This year's contest is sponsored by the Wireless Institute of Australia and therefore the rules revert back to the pattern used by the W.I.A. in 1957. The N.Z.A.R.T. and the W.I.A. alternate in the sponsorship.

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.

Full details of rules next month. Send your logs to: The Federal Contest Committee W.I.A., Box 2611W, G.P.O. Melbourne, C.1, Victoria, Australia.

CQ WW DX

Complete rules next month. No major changes expected and the scoring will remain the same, however you can expect a reclassification in the multi-operator division.

Editor's Notes

The Scandinavian contest is a new one and should prove popular. It is alternately sponsored by Finland, Sweden, Norway and Denmark.

[*Continued on page 94*]

Known World-Wide by its Audio

Globe King 500C

Built-in antenna relay, built-in VFO, separate power supply for modulator. Commercial type compression circuit. Grid block keying for signal clarity. Pi-Net matches most antennas 52-300 ohms. Optional crystal operation. SSB input & operation with 15-20w external exciter. 31x22x14¾" cabinet designed for TVI-suppression.

Wired & Tested:
$795.00

Completely Bandswitching, 10-160M. 540w AM & CW; 700w max. on DSB or SSB (PEP), with 15-20w external exciter.

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: 3½x13x10½"; 9 lbs. Carry handle for tilt stand or permanent mounting.

Speech Booster FCL-1

Wired & Tested:
$24.95

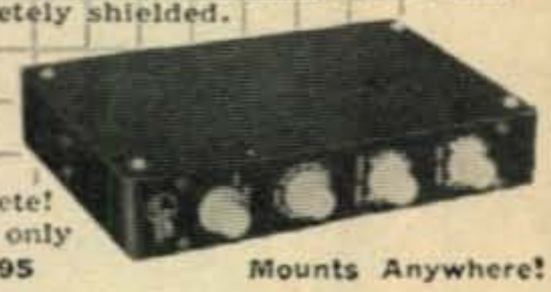
In Kit Form:
$15.95

Peak limiting audio preamplifier that clips and filters speech frequencies exceeding pre-set amplitude. Increases modulation intensity for most penetrating audio. Includes harmonic suppression. Plugs directly into Scout & Hi-Bander. Adaptable to other Xmttrs.

Globe Patcher

Hybrid, 5⅜x1⅝x9

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 Xmttr . . . Completely shielded.



Complete! wired, only
$29.95

Mounts Anywhere!

Tops on 6 and 2M

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$149.95

In Kit Form:
$119.95

Globe Hi-Bander

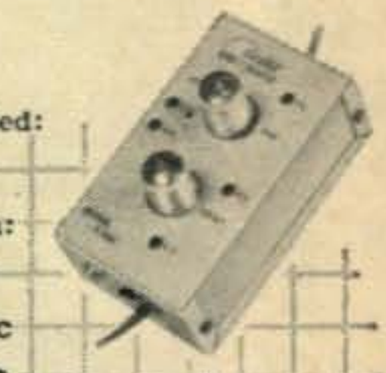
60w CW, 55w AM input on both 6 & 2M. Single control bandswitching. 4-stage RF section allowing straight through operation. Good harmonic and TVI-suppression. RF stages metered. Provisions for mobile use. 52-72-ohm coax output. New duo-band final tank circuit eliminates switching. Variable antenna loading control. Reserve power socket on rear chassis apron for accessories.

Wired & Tested:
$59.95

In Kit Form:
$49.95

Globe VFO 6-2

Perfect zero beat. Built-in power supply with voltage regulation. Ideal for driving 6 and 2 meter transmitters. Temperature compensated for utmost stability. Excellent for use with Hi-Bander. Approx. 50V RF output in 8-9 mc. range. 13:1 tuning ratio, king-size tuning scale. Sideband stability.



Wired & Tested:
$29.95

In Kit Form:
$21.95

Model 6PMC

6M Converter

New, improved circuit for higher gain, greater signal/noise ratio. Printed circuit for ease in kit assembly. Models for fixed or mobile stations or 12 volt filaments. I.F. output of 10-14 mc. on fixed, 600-1600 kc. on mobile model. Highly stable, completely shielded, crystal controlled, complete with tubes, crystal, cables. 3x5½x4½".

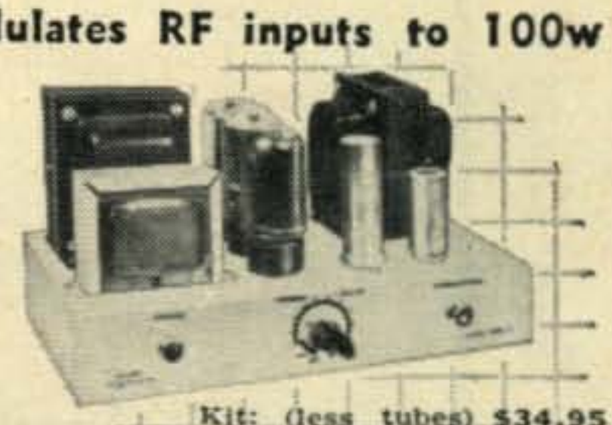
90w CW

Wired & Tested: **$74.50**
In Kit Form: **$59.95**

Globe Chief 90A

Completely bandswitching 10-160M. Compact (8x14x9"), well-filtered, with built-in power supply. Pi-Net matches most antennas 52-600 ohms. Modified Grid-Block keying. Provisions for VFO input & operation. Can be converted to fone with Globe Models UM-1 or SM-90 Modulators. Shielded for TVI-reduction. Kit contains all tubes, pre-punched chassis, etc.

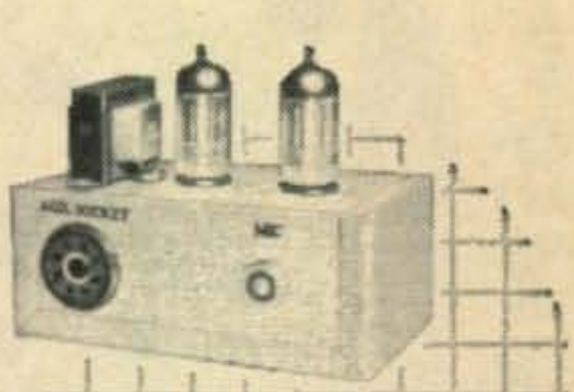
Modulates RF inputs to 100w



Kit: (less tubes) **$34.95**
In Wired Form: **$49.95**

Universal Modulator UM-1

Class A or AB-2 modulator, driver for higher power modulator, or PA amplifier. Matches output impedances 500-20,000 ohms. Carbon or crystal mike usable. Supplies up to 45w audio with proper output tubes. Provisions for addition of external meter for monitoring modulator cathode currents; for remote control of modulator. Perforated steel cover, $3.00 extra.



In Kit Form only: **$11.95.**

Screen Modulator SM-90

Ideal for use with Chief, but instructions for use with similar CW Xmttrs. Permits radio-telephone operation at minimum cost. Self-contained. Printed circuit board, all parts and complete instructions.

Visit Your Favorite Distributor for Details!

OTHER TOP FLIGHT GLOBE PRODUCTS

globe champ, w/t: **$495.00**; sidebander dsb-100, w/t: **$149.95**, kit: $119.95; globe linear la-1, w/t: **$124.50**, kit: **$99.50**; vfo-755a, w/t: **$59.95**, kit: **$49.95**; vox, w/t: **$29.95**, kit; **$19.95**; qt-10, w/t: **$9.95**; globe matcher sr. at-4, w/t: **$79.50**, kit: **$69.50**; globe matcher jr. at-3, w/t: **$15.95**, kit: **$11.95**; globe scout 680a, w/t: **$119.95**, kit: **$99.95**; power booster pb-1, w/t: **$21.95**, kit: **$14.95.**

GLOBE electronics
3417 W. BROADWAY
COUNCIL BLUFFS, IOWA

For further information, check number 19 on page 126.

CLUB BULLETINS

Marvin D. Lipton, VE3DQX
311 Rosemary Road, Toronto 10, Ontario, Canada

Club bulletin editors affiliated with this department had an opportunity to voice suggestions and criticism in a recent survey conducted in CQ NEWS, our monthly news bulletin. The results of the poll were contained in the June CQ NEWS, with the exception of a few comments that were reserved for presentation now.

The Readers Write

Doris "Butch" Singer, K9IXD, writes, "I disapprove of controversial articles in CQ NEWS lifted from ham papers. Let's have more ham poetry and short stories." Similar remarks were made by Clem Mudd, Jr., W9JMY, who stated, "I found that when editorials were used in our club paper, no one was interested." On the other side of the fence is Margaret B. Pattie, K9GOL, who says, "The editorials are good! Keep them coming." In agreement with her is Ed Piller, W2KPQ. "I want to congratulate you for carrying W8MGQ's editorial. I think that you should publish editorial material in every issue of CQ NEWS." The majority of club bulletin editors seem to agree with the last two views: 83% favored more or at least the same number of editorials, 17% perferred less.

When asked what they would like to see in this column every month, associated editors had this to say: "If possible would like to see more of Canadian interest even though we are a minority,"—VE6HY. "Pass along advice to new bulletin editors. Tell us how to work with newspapers to place good publicity stories."—K6RBB & K6LNZ. "How about a monthly review of each outstanding club bulletin?"—K2ZSQ. "Include tips on improvement of club bulletins and an editorial from a selected paper."—W2QCI. "How about a picture of the editor of CQ NEWS and pictures of other editors?"—K2BIG. "Print pictures of various editors busy at work on their bulletins."—W9UTV. From VE3CIL, "Reproduce short items of news taken from club papers and the best editorial. You be the judge." The one that I liked best was from W3TXO "You are welcome to stay for dinner if you stop here; providing that you don't mind pot luck."

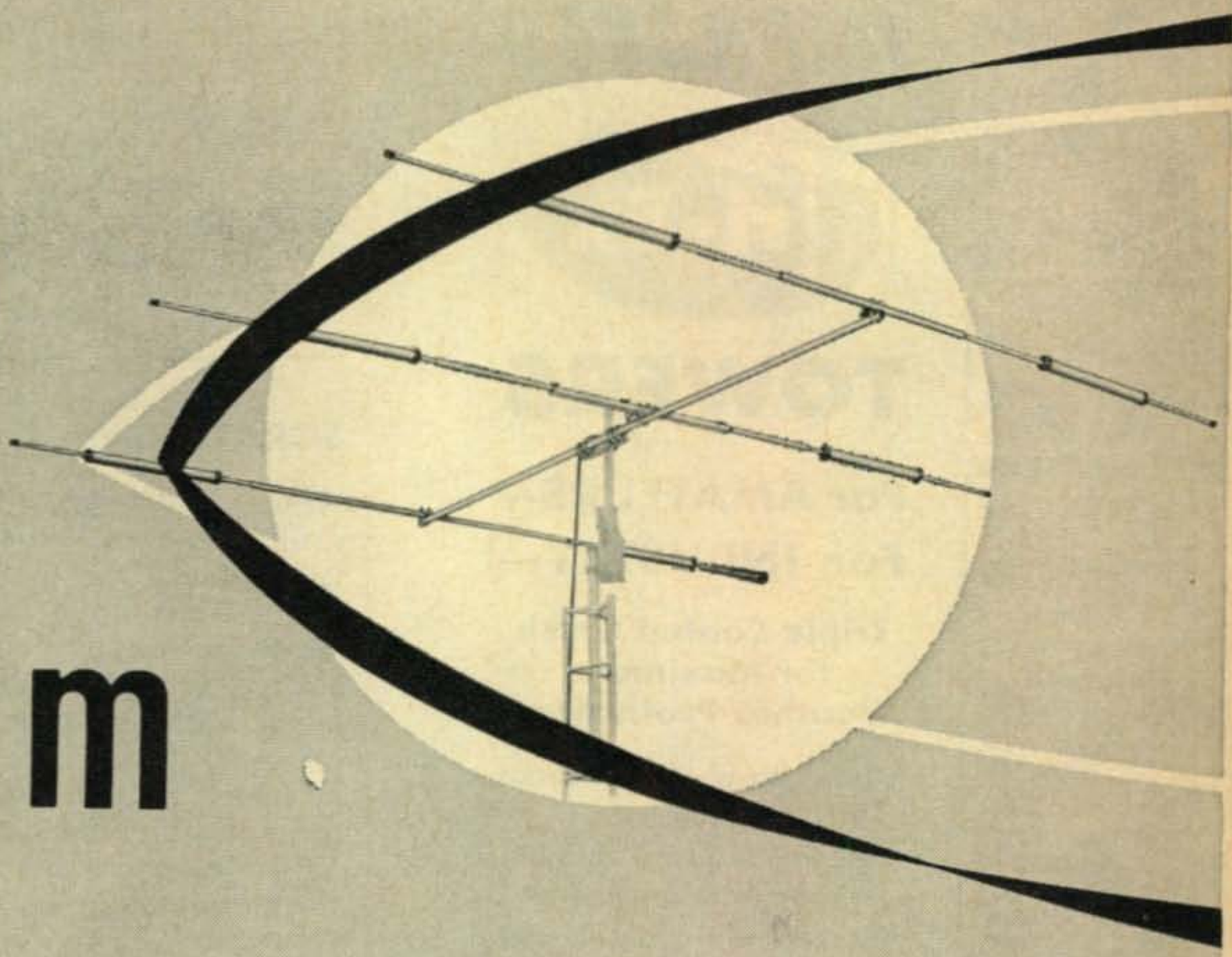
Sparkles of Happiness

In passing I would like to say a few words about a charitable organization even though it's not entirely composed of radio amateurs. The Sparkles of Happiness Club, a non-profit, non-sectarian group, exists for the sole purpose of aiding crippled children and handicapped persons. I first learned of the club through its bulletin, SPARKLES OF HAPPINESS, which is mailed free to all who make a contribution to the S.O.H.C. charity fund. A large portion of the membership is made up of U. S. and Canadian hams headed by their president, Dell, VE3AJR, P. O. Box 40, Ruthven, Ontario. Congratulations!

New Members

This month we are delighted to announce the names of these six new members who

10 15 20 m



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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 21 on page 126.

will be sharing the contests of CQ NEWS with the other editors in our syndicate: CHIRPS FROM CAMELLIA CAPITAL, Camellia Capital Chirps R. C., THE OLD DOG'S VOICE, Bayonne A.R.C., RADIO CLUB BELGRANO, Assoc. member, Argentina, STANDING WAVE NEWS OF SCARS, South County A. R. Soc. Inc., SCEDS A.R.C., Assoc. member, and THE NEW LINK, Cornish Radio and Television Club, England.

73, Marv, VE3DQX

SCRATCHI [*from page 12*]

Noses. Bolt—yep. Eggstractor—yep. Drill for drilling hole in bolt so can using eggstractor—yep (fooled you there, didn't I, Hon Ed?)

So, whistling a bit despite all the trips to hardware store, I going to tool chest to getting electric drill. No drill. Suddenly remembering feller what borrowing it—new amchoor living on other side town. Calling him up, finding he has it, so into car and driving to other side town. Getting electric drill, coming home.

By this time Scratchi are getting wee bit weary of hole idea, but you remembering old Hon. Saying: He Who Riding the Tiger Not Dismounting Easily. So, putting drill bit in drill, plugging in drill, and starting to drilling hole in hedless bolt.

Everything like peeches and creem until creem suddenly getting sour. There are sound like drill stripping geers, then drill suddenly starts to taking off to eleventeen thousand RPM's. This evidently cawsing all sorts problems in a-c line, on account suddenly automatic garage door opener and closer which using thyratron control are triggering and garage door suddenly starting to come down.

Hackensake!! Hon. Ed., you not buleeving what going on. Garage door hitting ten-foots long whip antenna which on rear of car, and whip antenna bending, and bending, and just as I getting to door-opener switch, antenna getting caught in chain which pulling door down.

I quick-like reversing direckshun of door, making it open again. But whip antenna still caught, so as door going up, so is whip antenna. So is hole car, as matter of fackly. Before I can reversing switch again, car is up high enough so bumber jack is falling off bumber. As it falling it crashing into Hon. Battry Charger.

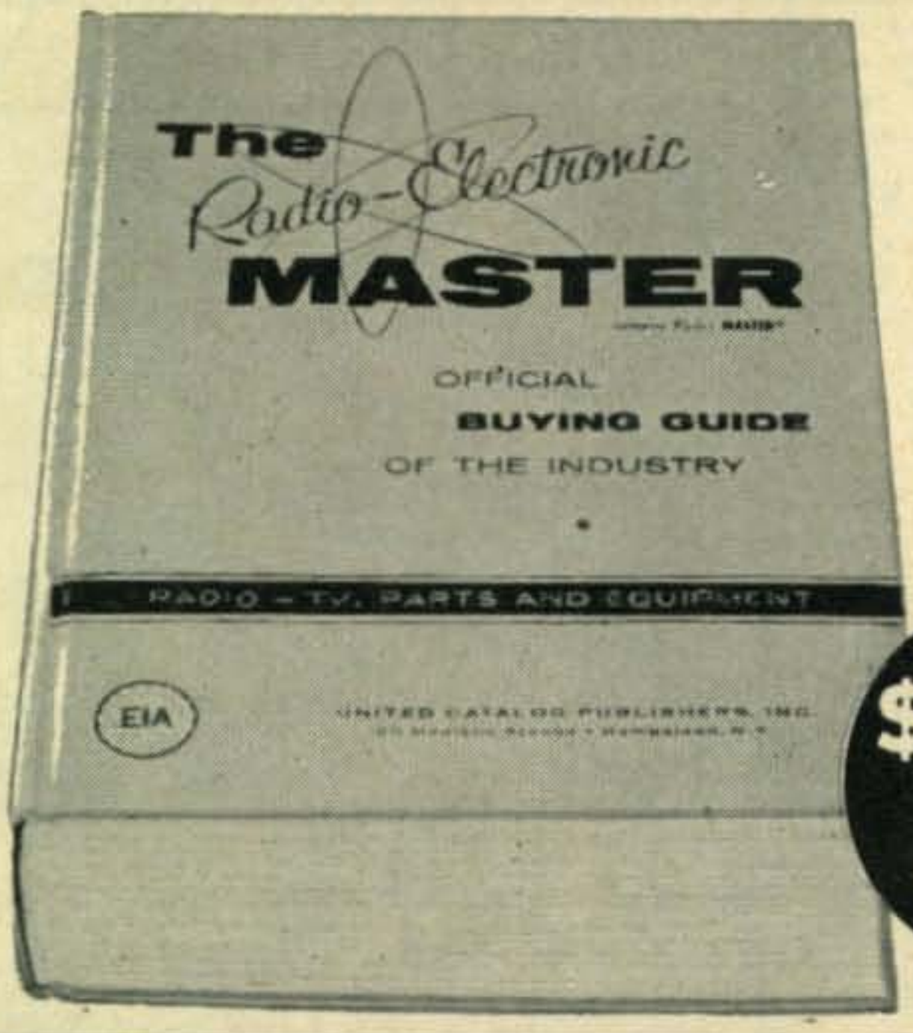
Hon. Battry what are being charged falling off shelf, with Hon. Charger charging close behind. Just before fuse blowing leads from charger shorting as acid from battry flowing all over floor.

All I having to say is, Hon. Ed., Sattidy not being my day. The QSL cards?? They coming okeh. One XE and one VE.

Respectively yours,
Hashafisti Scratchi

←For further information, check number 22 on page 126.

NOW AVAILABLE
at your local distributor



1,536 pages

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$4.50 in Canada

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WORLD'S LARGEST BUYING GUIDE OF TV-RADIO-ELECTRONIC-AUDIO PRODUCTS

1536 pages of complete descriptions, specs, illustrations, prices for **150,000** items including all latest products of **350** manufacturers systematically arranged in **18** product sections for easy reference

SAVES TIME AND MONEY FOR AMATEURS AND EXPERIMENTERS

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No matter what ham gear or component you require . . .

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At your local parts distributor, or write for list.

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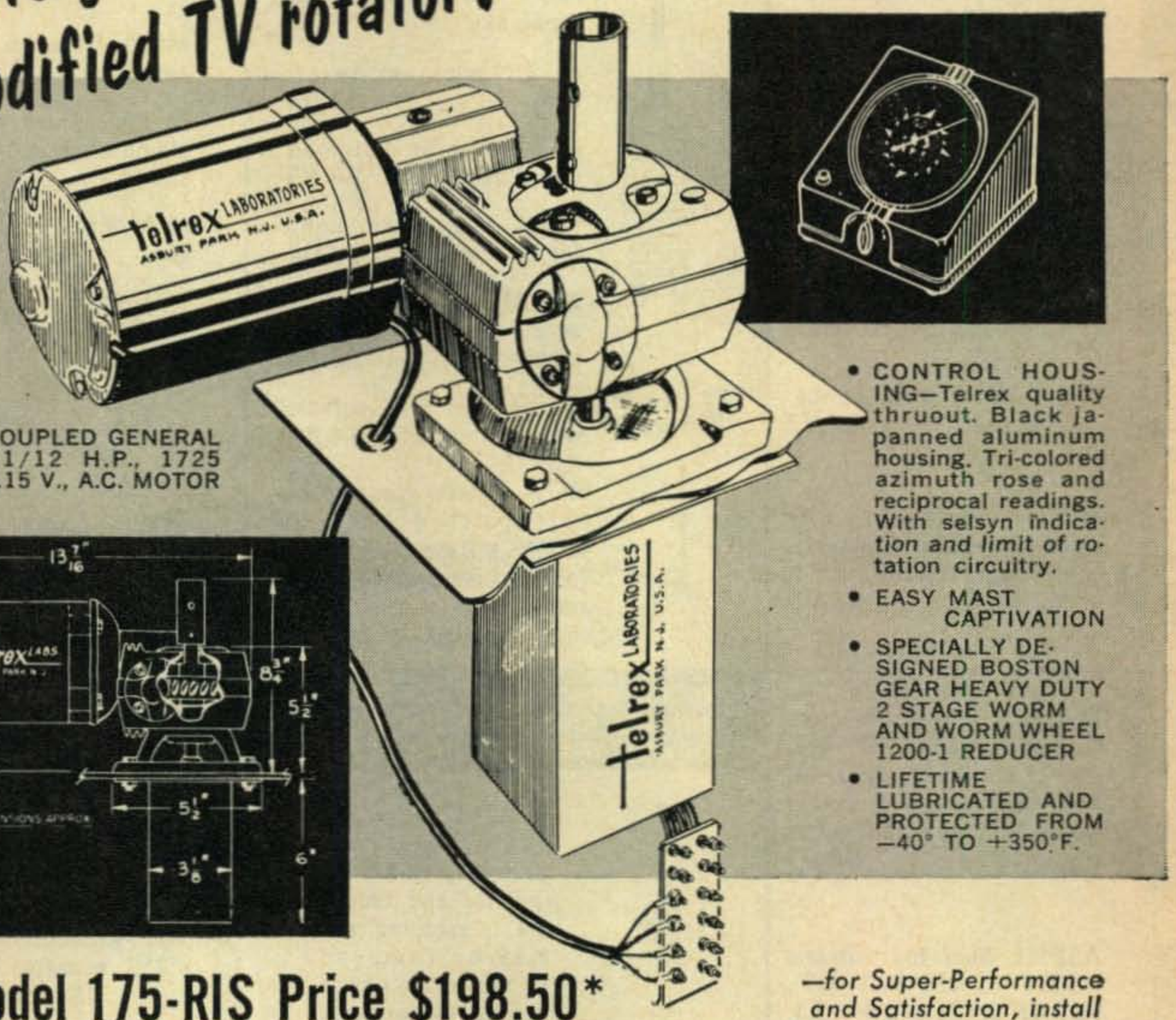
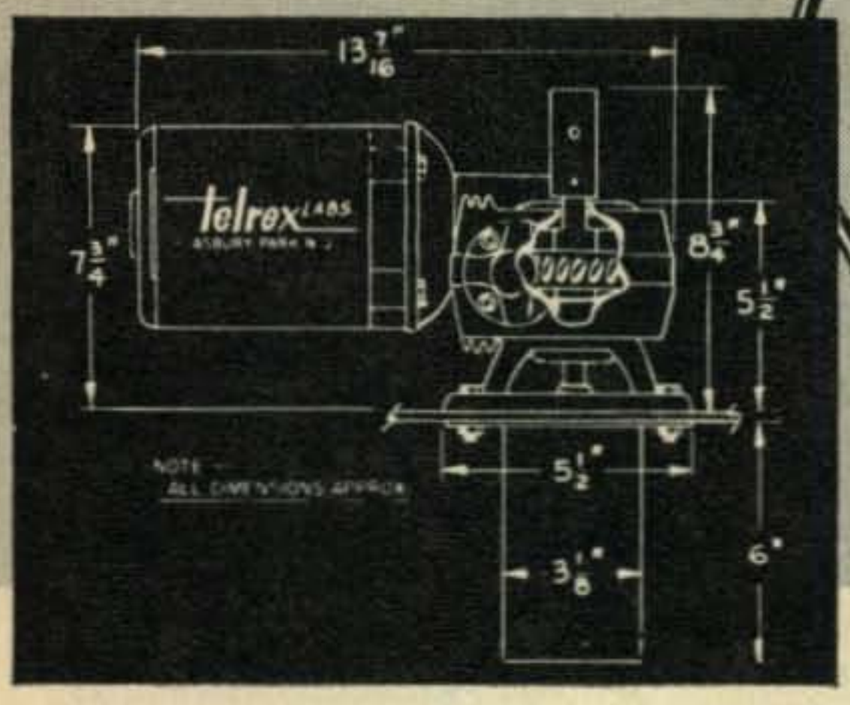
THIS IS IT! WORLD'S FINEST LOW COST ROTATOR/INDICATOR SYSTEM

Telrex Model 175-RIS DE-LUXE MEDIUM DUTY ROTATOR

Definitely not a modified TV rotator!



DIRECTLY COUPLED GENERAL ELECTRIC 1/12 H.P., 1725 R.P.M., SP, 115 V., A.C. MOTOR



- CONTROL HOUSING—Telrex quality thruout. Black japanned aluminum housing. Tri-colored azimuth rose and reciprocal readings. With selsyn indication and limit of rotation circuitry.
- EASY MAST CAPTIVATION
- SPECIALLY DESIGNED BOSTON GEAR HEAVY DUTY 2 STAGE WORM AND WORM WHEEL 1200-1 REDUCER
- LIFETIME LUBRICATED AND PROTECTED FROM —40° TO +350°F.

Telrex Model 175-RIS Price $198.50*

Here's real Telrex construction and value! Designed to outperform, and outlast *any* beam rotator on the market regardless of price (larger Telrex rotators excepted of course!). Provides over 1800 in/lbs. of rotating torque at 1.5 R.P.M. . . . enough muscle to rotate and hold very large single boom "Tri-Band"® arrays such as the Telrex model TBS-626, or a medium size Telrex Christmas-tree installation without *damage or drifting* in hurricane winds.

—for Super-Performance and Satisfaction, install

Telrex "Beamed-Power" "Balanced-Pattern" Arrays

118 MODELS FROM 3/4 to 40 METERS
$5.95 to $590.00
ROTATOR/INDICATOR SYSTEMS
$198.00 to $7000.00

* F.O.B. ASBURY PARK, N. J., U.S.A.

Specify and buy TELREX . . . There's a MATERIAL Difference!

ANTENNAS SINCE 1921

Communication and TV Antennas

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For further information, check number 24 on page 126.

NEW! Amateur and Citizens Band Antennas

M-3B 60" S. S. Whip with removable adaptor (can be cut to length) **$4.35**
Whips up to 108" at the same price

M-25 Mini-Spring. Reduces shock to coil if whip strikes object..... **$1.98**

M-19 10-15-20 meters. Automatic coil. No adjustment necessary. Weather-proof. Compact. **$14.95**

M5-36 36" chrome plated, solid mast extension with coupling nut. **$4.55**
Available in 6 lengths either chrome or S.S. (both solid).

M-9A Heavy duty spring. Cad. plated..... **$4.77**

M-3 Aluminum base with black Polyester Fiberglas, one piece insulator. Hardware included..... **$3.03**

ONLY **$8.97** complete.

M-1 Professional size base, spring and 96" cutable stainless steel whip with removable adaptor. (list $14.95) **$8.97**

Also available with bright mirror polished base and spring (spring has chrome end mounts) as **M-1D**.... ..... **$11.97** complete

M-1 and **M-1D** components may be purchased separately.

M-3 Aluminum swivel base **$3.03**

M-3D Mirror polished swivel base **$4.83**

M-3A Cad. plated spring for 96" whip **$2.04**

M-3AD Chrome plated spring with chrome end mounts. **$3.24**

M-3B S.S. 96" cutable whip with adaptor.. **$4.35**

M-7A 2 meter ground plane antenna (144-172, 450-470 MC) Base accepts PL-259. Stainless steel, brass and chrome parts. Cutting chart supplied. **$5.40**

BASES

M-13 Same as M-3 but with coax fitting..... **$6.00**

M-14 Same as M-13 but fitted for outside mounting..... **$6.90**

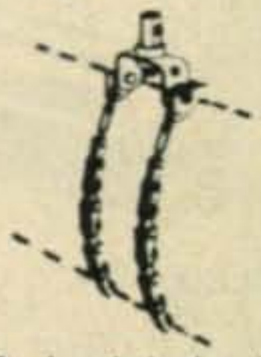
M-15 Coax adaptor converts base from solder-lug type. **$2.25**

SPRINGS

M-8A Heavy duty standard spring..... **$3.65**

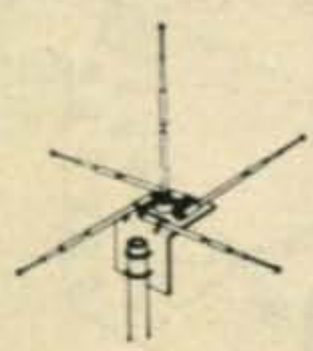
M-9AS Deluxe polished stainless steel heavy duty spring. **$8.95**

M-4 Whip hold-down clip..... **$.75**



ASP-143 Double Chain Bumper Mount
Cad. plated, alloy steel interlocking "Z" links assure a secure mounting for spring, extension, coil and whip. Mount accepts ⅜"-24 thread of spring or whip..... **$7.95**

For the new 27 MC (11 meter) Citizens Band. For mobile, portable and base station use. 14 models available. (4 shown) Write for free catalog on entire 27 MC line.



M-22 27 mc ground plane antenna. Chrome plated brass radiator and radials are telescoping and may be removed from mounting bracket. All hardware supplied. Accepts PL-259 connector..... ..... **$15.95**

M-27 Same as M-22 except vertical radiator and radials are 108" stainless steel. **$28.50**

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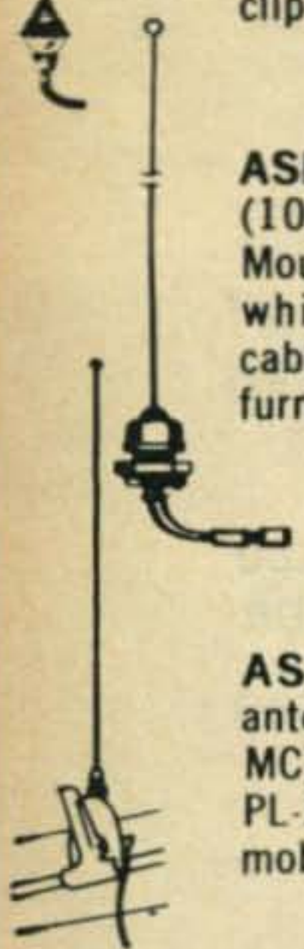
M-85 6 meter Antenna. Cowl mount with 59" flexible S.S. whip. Ideal for neat appearing 6 meter work. 54" lead and gutter clip included..... **$8.97**



ASPR1 Roof top antenna (108-176, 450-470 MC). Mounts in ¾" hole. S.S. whip has solderless type cable connector. No lead furnished. **$2.85**

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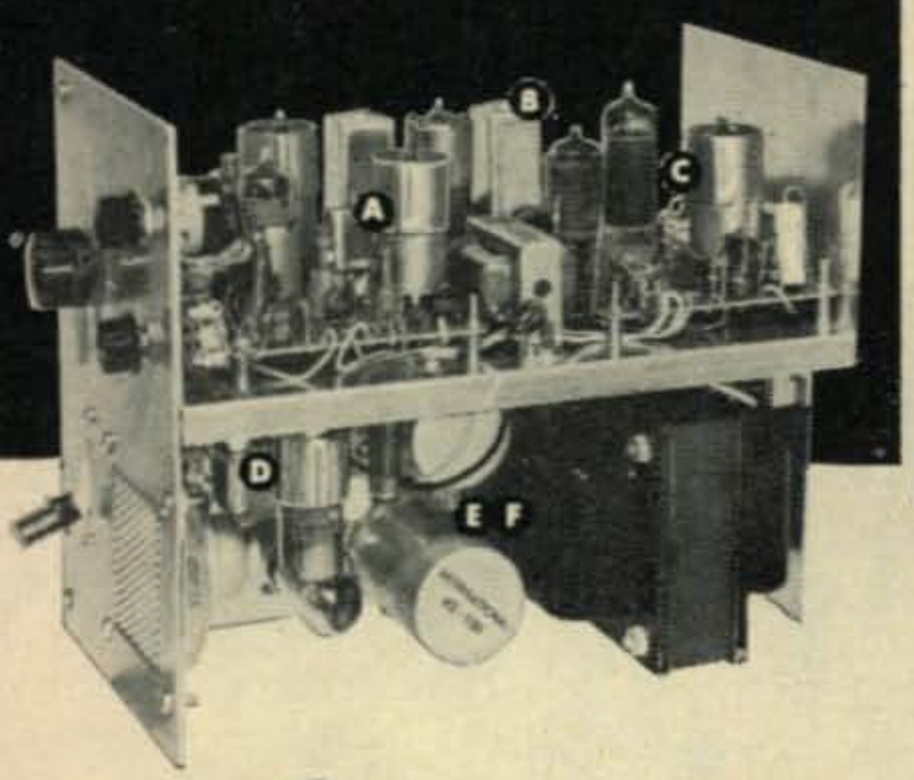

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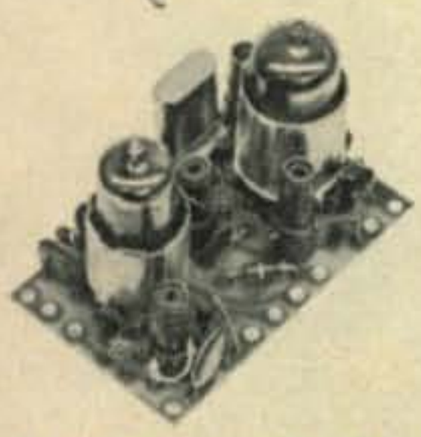
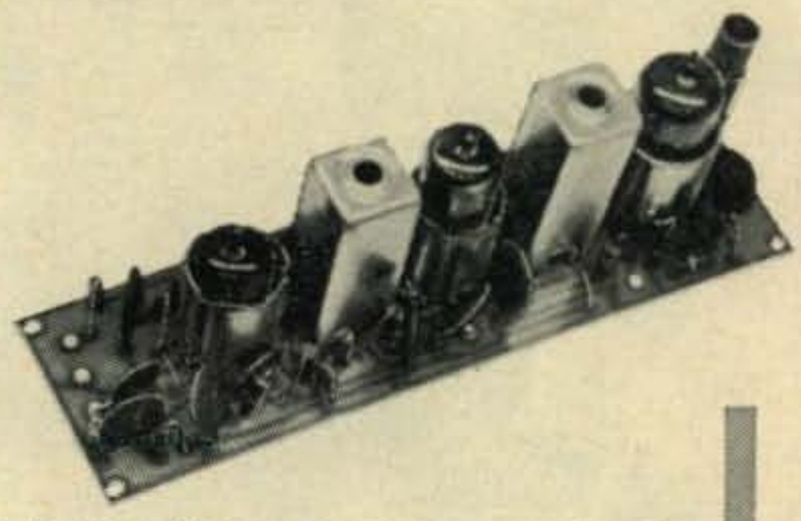
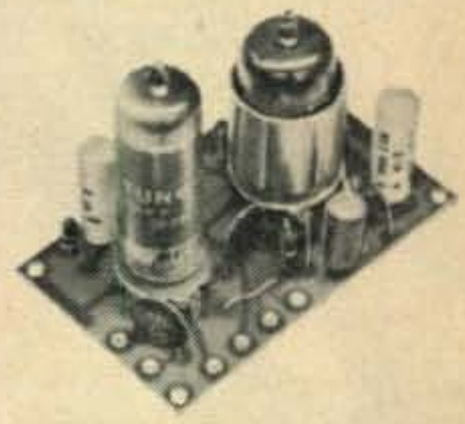


A RF Converter Unit (Printed circuit prewired) Two-tube crystal controlled converter. Converts Ham* frequencies to range of tunable IF. Can be used with IF unit (B) or any communication receiver. 6BA6 RF and 12AT7 mixer-oscillator. Shipping weight 2 lbs. $14.00.

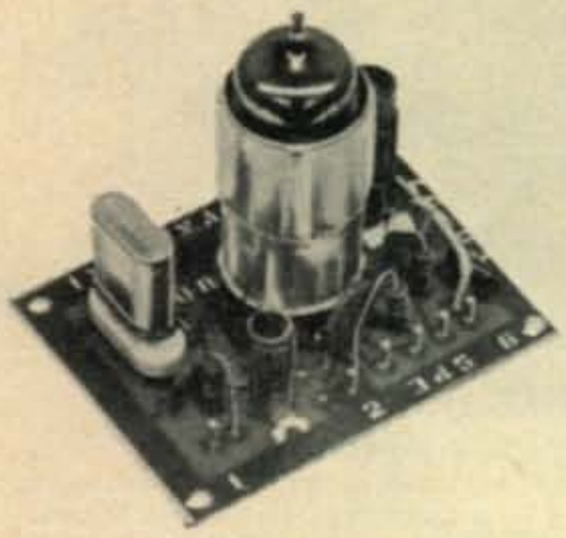
*20 meters, 10 meters, 6 meters.



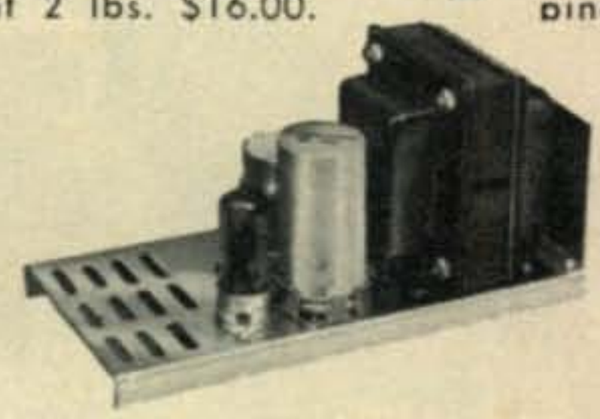
B IF Unit (Printed circuit prewired) Consists of mixer and tunable local oscillator feeding 262 KC IF stage. Includes noise-limiter and squelch circuits. 6AN8 mixer-oscillator, 6BA6 IF amplifier, diode detector, 6AL5 noise-limiter/squelch. Designed to work with units A and C. Makes dual conversion receiver. Shipping weight 2 lbs. $16.00.



C Audio Unit (Printed circuit prewired) Consists of speech amplifier for crystal microphone, first audio for receiver and power amplifier/modulator stage. Designed to follow unit B. 6AN8 speech amplifier/audio, 6AQ5 power amplifier modulator. Includes output transformer but not speaker. Shipping weight 2 lbs. $13.50.



D Transmitter Unit (Printed circuit prewired) Oscillator and amplifier. Crystal controlled. Requires Unit C for modulation. 6AU8 tube. Shipping weight 2 lbs. Complete with crystal and tube. $14.50.



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A Lazy-Quad Antenna for the 21 mc Novice

William I. Orr, W6SAI/3A2AF

Why Use A Beam Antenna?

World wide communication is possible on the higher radio frequencies because of the presence of a tenuous layer of ionized air hovering 150-250 miles above the surface of the earth. A product of the action of ultra-violet radiations of the sun upon the atmosphere, the *ionosphere* acts as a mirror-reflector, returning radio signals to earth over spans of thousands of miles.

The use of a beam antenna for transmission and reception concentrates the greater portion of radio energy at those angles which are most readily reflected by the sky-mirror. The radio signal transmitted directly upwards towards the ionosphere is often lost through the layer into outer space, or is reflected to a nearby point on the surface of the globe. Signals arriving at lower angles are reflected to far-away earth points with but little loss of strength. The beam antenna concentrates the radio signal in one direction, much as in the manner an automobile headlight throws the light beam before the car. Radiations in unwanted directions are thereby suppressed, and the radio signal in the desired direction is enhanced, thereby making full use of the reflective properties of the ionosphere for long distance transmission. (See fig. 1.)

The beam antenna described in this article provides an actual power gain of approximately three (4 decibels) as compared to a simple dipole. Using this antenna, the 75-watt Novice transmitter is comparable to a 225 watt transmitter using a dipole radiator. Best of all, the power gain of the antenna is available for reception, where the extra boost in signal strength may make all the difference between copying a signal and not being able to read it at all!

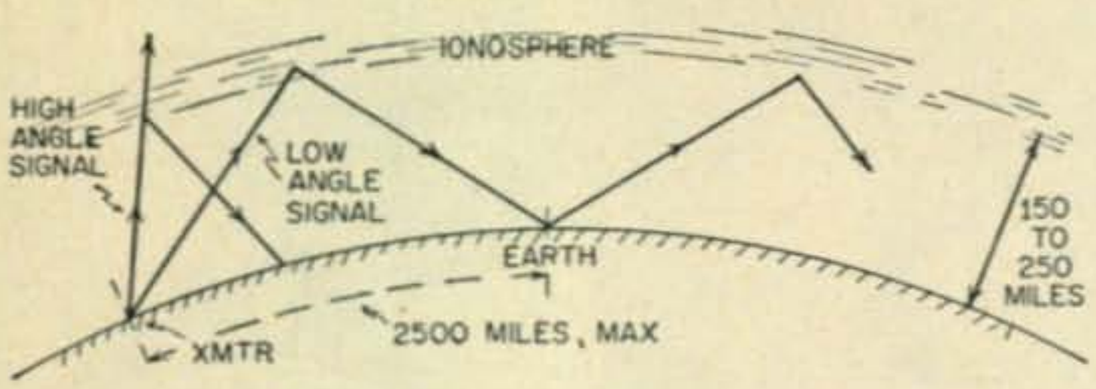

Fig. 1—Radio signals radiated at unusually high angles pass through ionosphere or are returned to earth at nearby points. Energy concentrated at lower angles reaches maximum range of about 2500 miles. Multiple "hop" reflection permits signals to cover the globe. Silent zones between the "hop" points may be noticed.

A beam antenna serves a double purpose for the Novice amateur. It enhances the strength of his signals and at the same time boosts the signals of the far-distant amateurs he is trying to contact. Without a doubt, every dollar invested in a beam antenna system will bring large dividends to the owner of a Novice station.

Designed particularly for the 21 *mc* amateur, the "Lazy Quad" antenna shown in figs. 2 and 3 is a 1959 version of the "W8JK" beam, orig-

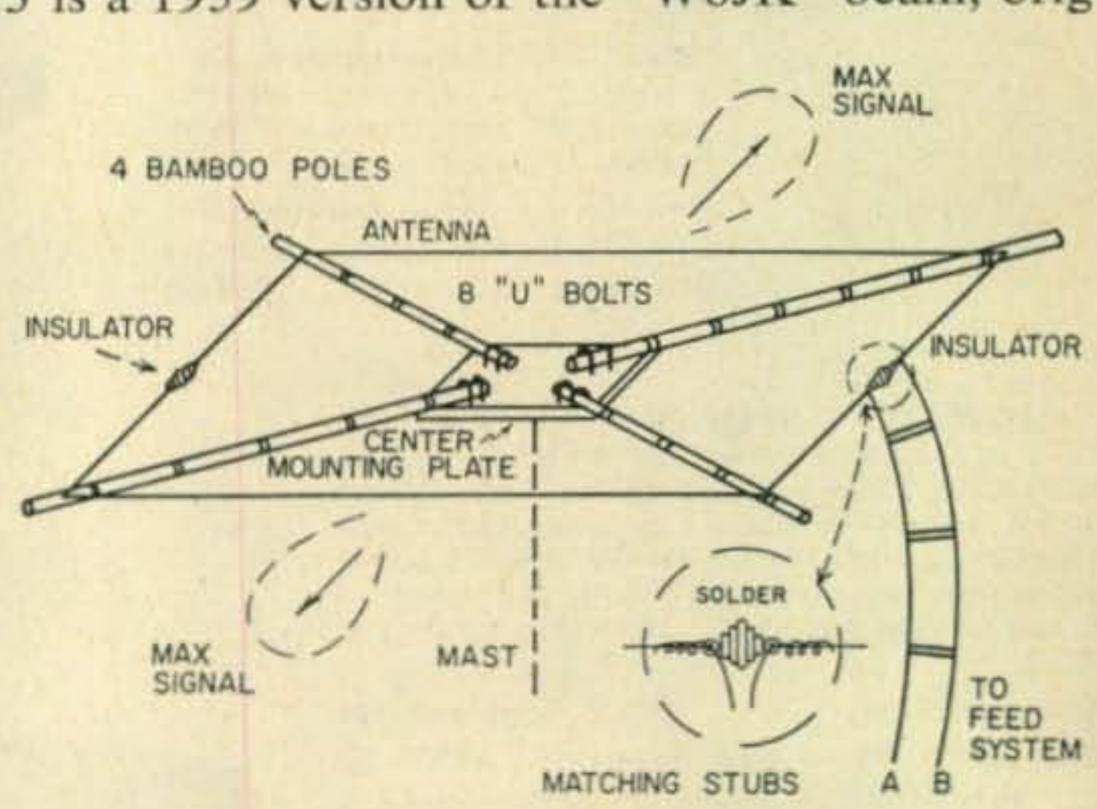

Fig. 2—The Lazy-Quad beam antenna for 21 megacycle Novice band consists of a horizontal loop of wire strung around the tips of a bamboo framework. The loop is 16'4" long and 6'6" wide, considerably smaller than any comparable beam antenna. It is made up of two pieces of wire, each 23'8" long. The excess wire is used to make connection to the insulators placed at centers of short sides. Impedance matching stub is made of thirteen foot length of "open wire" TV-line. Feed system is connected to points A-B on stub.

Bamboo poles are 10' long, and mounted to plywood center block with U-bolts. Center block measures 24"x10"x½". The center block may be affixed to the mast or supporting structure with metal angle brackets. Entire antenna should be mounted well in the clear, free of nearby metallic objects, such as gutters, drain pipes, TV antennas, etc.

inated by Dr. John Kraus of Ohio State University. This beam antenna has a "figure-8" pattern much like a simple dipole but it will make the 75-watt Novice transmitter sound like a quarter kilowatt to the DX station! Reception will be improved a like amount when the beam is used with the receiver. Results obtained with this ten dollar antenna are well worth the few hours' construction and adjustment time required for top performance! The beam will work with any standard Novice transmitter or receiver.

Building the Lazy-Quad Antenna

The Lazy-Quad consists of a resonant wire loop broken at the centers of the short sides by insulators. The loop is supported parallel to the ground by a simple lightweight bamboo framework. Four ten foot bamboo poles are required, attached at their butt ends to a wooden mounting plate. Suitable poles may be obtained at a nursery, rug cleaning establishment, or bamboo shop. Clean, straight pieces having no splits are required, and the poles should be given several coats of clear varnish before they are fastened to the mounting plate by means of galvanized U-bolts. The center mounting plate is a piece of ½-inch plywood, well painted to protect the edges from weathering.

The bamboo and wood frame is assembled in the yard and two sections of copper antenna wire each 23'8" long are cut and temporarily laid over the bamboo poles in the approximate position they will finally assume. Scrape the enamel insulation from each end of the wires for about a foot, and temporarily pass the wire ends through the porcelain insulator holes to form a square loop having 22'3" of wire on each side of the insulators. Stretch the loop over the bamboo frame, holding it in position over the poles by means of small wooden pegs driven into the ground, acting as

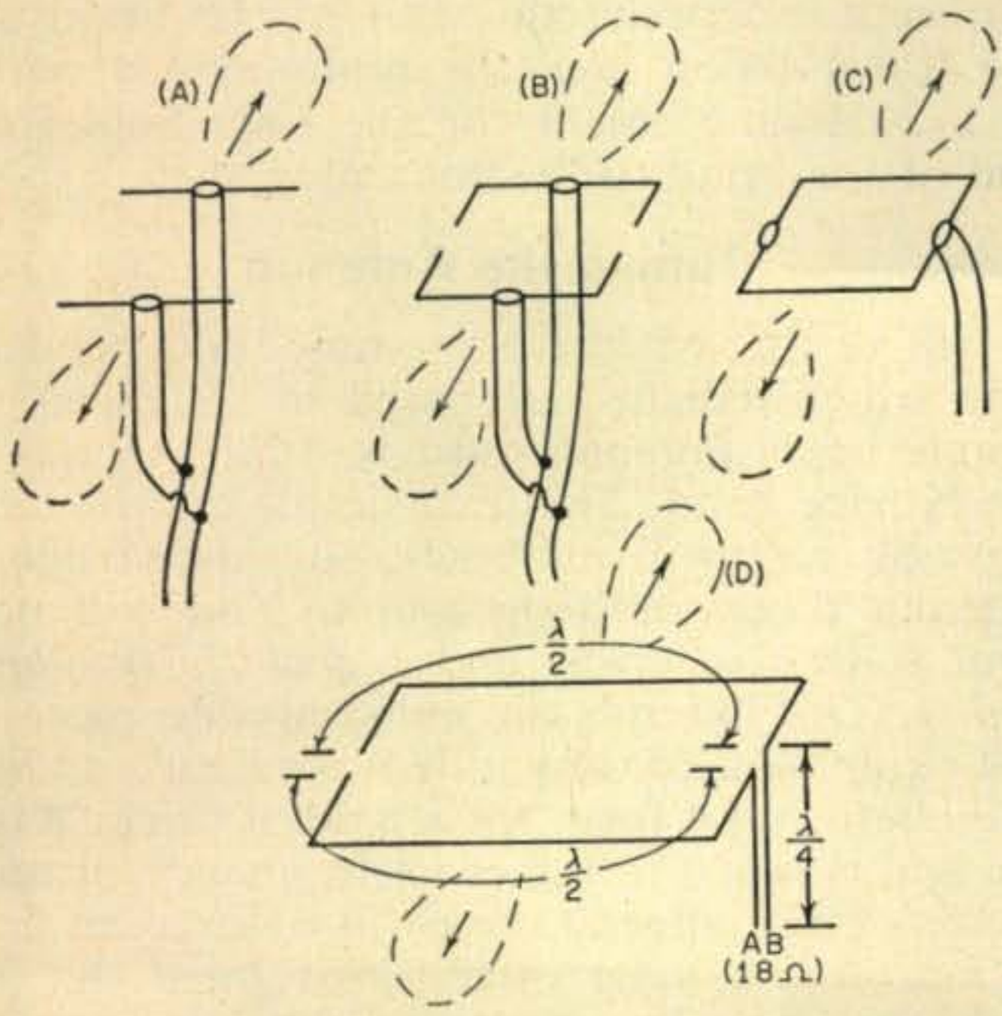

Figure 3 — Electrical diagrams of Lazy-Quad antenna.

A—Two half-wave antennas (dipoles) may be placed parallel to each other to form a simple beam antenna. Feed wires are cross-connected to provide proper energy distribution.

B—Ends of antennas may be folded back to conserve space without affecting antenna operation.

C—Single stub replaces dual feed system of A and B for ultimate in simplicity.

D—Complete Lazy-Quad beam is adjusted for optimum results by varying length of quarter-wave stub. Impedance of antenna at point A-B is approximately 18 ohms. Simple matching system is placed at A-B to permit use of 75 ohm "TV-type" balanced line with antenna. Matching system is shown in fig. 4.

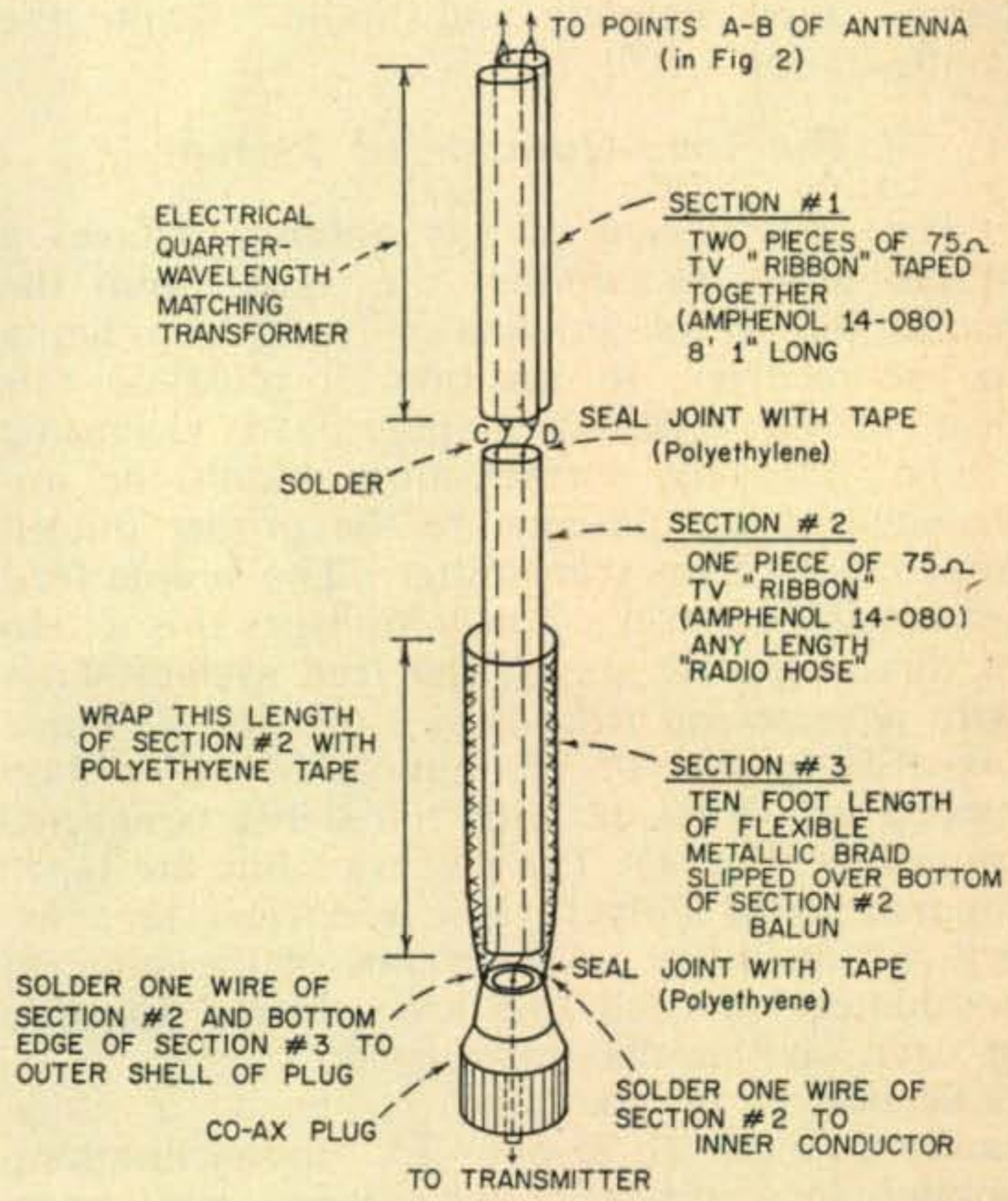

Fig. 4—The matching system for Lazy-Quad antenna. Impedance at point A-B of antenna (figs. 2 and 3) is 18 ohms. Section #1 of matching system is quarter wavelength transformer having impedance of 36 ohms. Impedance transformation resulting in termination of 72 at point C-D takes place in this section. Transformer is 8'1" long, made of two pieces of 75 ohm TV-"ribbon" line connected in parallel and taped together every few inches.

Section #2 is one piece of 75-ohm TV-"ribbon" long enough to reach from the antenna to the transmitter. Keep the line clear of nearby metallic objects.

Section #3 is a ten foot length of flexible, metallic braid slipped over the bottom of section #2, which is wrapped with polyethylene insulating tape before the braid is applied. Several wrappings of tape around the braid will hold it securely in place. Bottom end of braid is soldered to shell of coaxial antenna plug.

"corner posts". You will see that small holes must be drilled in the bamboo poles about nine feet from the center of the plywood plate to pass the antenna wires. Mark the position of the holes, remove the "corner pegs", drill the holes and "thread" the halves of the antenna through the holes. Reattach the wires permanently to the insulators and solder the joints. Finally, adjust the position of the bamboo poles in the U-bolts until the wires are taut.

The last step is to solder the *matching stub* across one insulator. The stub is made of a thirteen foot length of "UHF-VHF open line" of 400 ohms nominal impedance. Solder each wire of the stub to one side of the antenna, across a porcelain insulator as shown in the drawing. Scrape the insulation off the opposite ends of the wire for a foot or two. The antenna is now complete, and should resemble the configuration of fig. 2.

The Lazy-Quad Feed System

The *feed system* of any antenna acts as a "radio hose" to conduct the signal from the transmitter to the antenna or from the antenna to the receiver. In addition, it must do this task in an efficient manner. (In electronic "lingo" the feed system must match the impedance of the antenna to the proper output impedance of the transmitter.) The simple feed system shown in fig. 4 accomplishes this action in three separate steps. The feed system starts with a *matching transformer* (section 1) made two 8'1" lengths of 75-ohm "TV-type" ribbon placed side by side with the wires connected in parallel (fig. 4). The pieces of line are taped together with Polyethylene electrical tape every two inches or so. The ends of the adjacent conductors in each line are soldered together at each end of the transformer.

Section 2 of the feed system is a single random length of 75-ohm TV ribbon line long enough to reach from the antenna position to your radio equipment. It should be kept clear of metallic objects such as rain gutters, drain pipes and nearby television antennas. This section is the "radio hose" reaching from the antenna to the transmitter.

Section 3 is a simple *balancing transformer* (Balun) which permits the electrical balanced, two conductor "radio hose" to be efficiently connected to a transmitter having an unbalanced coaxial-type antenna output circuit. The balun is made of a ten foot length of tubular, flexible metallic braid passed over the lower section of the "radio hose". In preparation for this operation, the last ten feet of the transmission line (section 2) are wrapped with a spiral winding of Polyethylene electrical tape to protect the line against physical abrasion by the metallic braid which is carefully slid over the line. A coaxial plug is attached to the end of section 2, one wire of the line connecting to the center terminal of the plug and the outer wire being soldered to the outer shell of the plug. Do the soldering operation carefully so that you will not melt the plastic tape or the insulation of the transmission line.

The final step is to smooth out the braid towards the free end and to cut it off exactly ten feet from the coaxial plug. Tape the braid every foot or so to hold it in position over the line. At the open end carefully tape the braid to cover up the "whiskers" of wire. There is no connection between this end of the braid and the transmission line, the braid merely acting as a balancing shield for the line. Solder the end of the braid to the coax plug shell.

Parts List, Lazy Quad Antenna

50 feet #14 enameled, soft drawn copper wire
13 foot length open wire "400 ohm" TV-type transmission line
4—Bamboo poles, ten feet long, clear, with no splits
1—Plywood plate, 24" x 10" x ½"
8—U-bolts, with washers and hardware to clamp bamboo poles to center plate. Use only galvanized hardware to prevent rust.
2—Glass or porcelain antenna insulators, 3" long
1—Length of 75 ohm balanced TV "ribbon" line (Amphenol 14-080) sufficiently long enough to construct sections #1 & #2, fig. 4.
10' length of ½" diameter flexible metallic braid, Belden 8661
1—Coaxial plug to match coaxial antenna receptacle of transmitter
1—Roll of Polyethylene electrical tape (Minnesota Mining & Mfg. Co. "Scotch #33")
Small can of outdoor paint to coat center plate

Tuning the Antenna

Unlike the expensive pre-tuned all metal arrays which can be purchased in kit form this simple beam antenna must be tuned to the 21 *mc* Novice band. This is a simple and interesting task and will increase your knowledge of antenna theory and operation. You will need your station receiver, and a *grid-dip oscillator* (*gdo*). The latter is an indispensable piece of test equipment for any ardent amateur and may be bought in kit form for a modest price. When the *gdo* is tuned to the exact frequency of resonance of the antenna, you will observe an indication on the meter of the instrument. As you make tuning adjustments to the antenna you can readily determine the new resonant frequency merely by holding the *gdo* in proximity to the antenna, varying the tuning dial of the instrument and watching the indicating meter. In order to couple the *gdo* to the antenna you must place a moveable shorting jumper at *point A-B* on the matching stub. The exact position of this jumper along the stub determines the frequency of resonance of the whole antenna. The jumper should be adjusted for antenna resonance near the middle of the Novice band (approximately 21.15 *mc*). This is how you do it:

Two long-nose "alligator" clips are connected back-to-back with a very short length of wire, forming a moveable jumper easily affixed to the two bottom wires of the antenna matching stub. Each clip is attached to one wire (fig. 5).

The next step is to temporarily raise the antenna so that it is clear of nearby objects, yet low enough so that you can reach the moveable jumper from the ground or a short ladder. Place the coil of the *gdo* adjacent to the jumper and tune the dial of the instrument until an indication is observed on the meter. The *gdo* is now tuned to the resonant frequency of the antenna and you must now find the exact operating frequency of the *gdo*.

It is easy to determine the frequency of your crystal controlled transmitter on the dial of the station receiver. In addition, the edge of the American phone band can easily be found at 21.25 *mc*. It is possible to plot a dial calibration curve so that the desired antenna resonant frequency of 21.15 *mc* can be "spotted" on the receiver. Once this frequency is noted, the *rf* gain control of the receiver is retarded, the beat oscillator is turned on and the signal of the *gdo* is tuned in. It can be heard quite a distance from the receiver. A good idea is to have a friend tune the receiver to the *gdo* while you are in the yard, adjusting the "alligator" clips and moving the antenna resonant point indicated by the *gdo*.

[*Continued on page 115*]

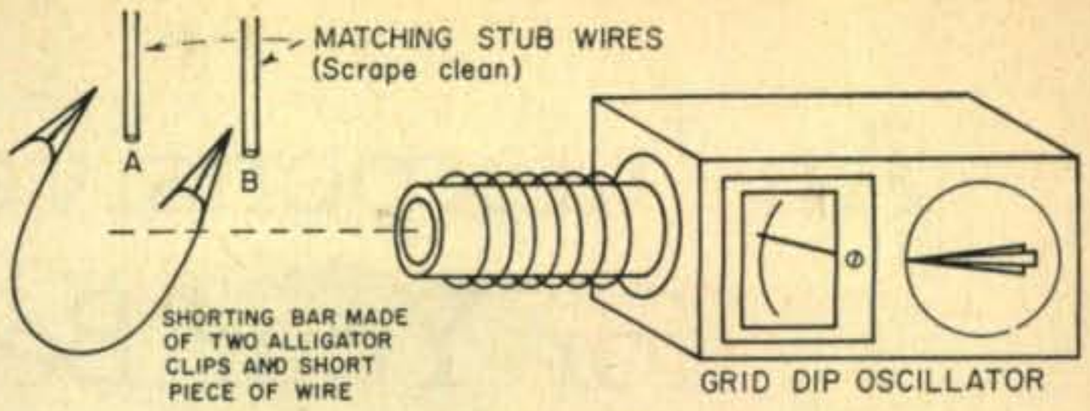

Fig. 5—Temporary shorting bar is placed across ends A-B of matching stub. Position of the stub determines the resonant frequency of the antenna. Measurement of the frequency may be made with a grid dip meter and station receiver as explained in the text.

Definition of Some Common Antenna Terms

"Balancing Transformer" —In many instances it is necessary to join a coaxial (unbalanced) line to a two-wire (balanced) line. Such a transition cannot be made directly since the junction of the dissimilar lines presents a discontinuity in the electrical characteristics of the system. Such a discontinuity would result in loss of radio energy and transmitter tuning problems. A balancing transformer is a special segment of transmission line that is placed between dissimilar lines to effect an efficient junction and to reduce unwanted effects to a minimum.

"Dipole Antenna"—The dipole is an antenna used for reception or transmission that is approximately one-half as long as the radio wave it is designed to receive. It is a simple resonant antenna.

"Feed System"—The feed system is a transmission line, or "radio hose" used for the conduction of radio energy with little loss. All antennas must be coupled to receivers and transmitters by means of transmission lines of one type or another. Balancing transformers may be included in the feed system.

"Great Circle Route"—Radio transmission between two points follows the shortest path consistent with its reflections back and forth between the earth and the ionosphere. This path is the shortest distance between two points on the surface of a sphere and is called the Great Circle Route, appearing as a curved line on regular maps, and as a straight line on a Great Circle Map.

"Grid-dip oscillator"—The g.d.o. is a miniature transmitter capable of being tuned across a large portion of the high frequency radio spectrum. It employs plug-in coils which are so arranged that they may be brought in close proximity to various radio circuits. When the g.d.o. is tuned to the resonant frequency of the radio circuit, an indication may be seen on the self-contained meter of the g.d.o. In this manner, radio circuits and antennas may be brought into alignment by varying the adjustments and noting the resonant frequency shown on the g.d.o.

"Impedance of an antenna or transmission line" —The transmission line has an inherent property termed impedance which is determined by the physical and electrical characteristics of the line. The size of the conductors, the spacing between them, the material used to hold the conductors apart determine the impedance of the line, expressed in ohms. Values between 52-300 ohms are common in amateur service.

The impedance or radiation resistance of any antenna may be defined as that value of ohmic resistance which, when substituted for the antenna, will dissipate the same amount of power as is radiated by the antenna. Values between 10—300 ohms are common in amateur service.

"Matching Transformer"—A matching transformer is a special segment of transmission line placed between two similar lines of different impedance values to prevent a discontinuity in the electrical characteristics of the line. A balancing transformer is one type of matching transformer.

"Resonant Antenna"—Resonance is a condition established in an antenna when the length of the antenna bears some specific relationship to the length of one cycle of the radio wave. In a simple antenna, a resonant condition may be found at multiples of one-quarter wavelength (¼, ½, ¾ wavelength, etc.). A maximum value of radio signal may be emitted or received when the antenna is in a resonant state. ■

An Inexpensive Feeder System for Your Beam Antenna

William I. Orr, W6SAI/3A2AF

It was quite a blow to the nervous system to go into the radio store the other day and discover the price of brand-new RG-8/U coaxial cable.

"That will be eighteen dollars for one hundred and fifty feet of cable," said the salesman, twirling his moustache and blowing a speck of dust from his diamond stick-pin.

"EIGHTEEN DOLLARS," I screamed and staggered back from the counter. "What about all the surplus coaxial cable you had for two cents a foot? Sell me some of that!"

"I'm sorry, Sir," replied the salesman, "The surplus cable has been sold out for some months now. Would you prefer some new, low-loss RG-119/U cable at four dollars and thirty-four cents a foot?"

I felt dizzy. A Sterba curtain fell before my eyes and I blindly felt my way to the door of the store. Certainly there must be a cheaper means of conducting my precious rf from the rig to the antenna!

"Naw—just remembered important appointment," I mumbled. "Be back later—maybe."

* * * *

Pocket book troubles? Well, here's an inexpensive antenna feed system that is kind to thin purses. Like myself, many hams have found out that the process of buying or building a rotary beam, buying or building a tower, and getting everything in ship-shape condition takes a good-sized chunk of money. The heyday of inexpensive surplus material is waning, the flood of inexpensive coaxial line—the life blood of the rotary beam feeder system—has dried up, following the nineteen dollar BC-221 and sixty cent 304-TL into Limbo.

Then too, many an amateur has had hard luck with some of the more aged species of surplus coaxial line. Subject to faulty storage and occasional dunkings in sea water a lot of surplus coaxial cable was found to be useless, having questionable impedance and high dielectric losses.

This interesting feed system applies to the simple three element beam which is designed for single band operation (usually 6, 10, 15, or 20 meters). The radiation resistance of the driven element of such a beam falls within the range of eighteen to twenty ohms in the majority of cases. This impedance is measured at the center of the split dipole. The writer has "shinned" up more towers and poles, measuring more three element beams than he cares to admit, and every single one fell within this range of radiation resistance, or extremely close to it. Folded dipole elements, Gamma matches, and other matching devices affixed to the driven element of the array are another kettle of fish, as the saying goes. Their purpose is to transform the radiation resistance of the driven element to some higher value, generally in the 50, 70, or 300-ohm region, suitable for matching to the transmission line. We'll pass by these devices right now, as we are only concerned with beam antennas having a split driven element.

The problem at hand, therefore, is to match this balanced impedance of eighteen to twenty ohms to a distant transmitter having a coaxial output system designed for use with 50-70-ohm coaxial lines. This arrangement is the usual configuration of most commercially built amateur transmitters. (*Nobody* builds their transmitters anymore! — *Ed.*). The expensive way to solve this little problem is to place a *Gamma Match* or an *Omega Match* at the antenna and to employ 52- or 75-ohm coaxial transmission line for the feeder system. (*Editor's Note*: Read all about it in the *Beam Antenna Handbook*, by the author. Available at most radio stores, or on order from the Radio Bookshop!)

The following design comprises a simple feed system that has worked well in a number of cases where coaxial line was either unobtainable or judged to be too expensive. The virtues of the system are that it is inexpensive, efficient, and easy to construct. Low cost "TV-type" 300-ohm balanced line is employed for the major portion of the transmission line, together with balancing and impedance matching devices at each end of the line. The "TV-line" costs from two cents to six cents a foot, depending upon the make and style used, and the transmission loss of this line is about one-half that of the usual 52-ohm coaxial cable. The system is to be used with pi-network type transmitters having an output impedance range of 50-70-ohms.

Here's How It Works!

At first thought it might seem odd to use

300-ohm "TV-line" to serve as a feedline between a low impedance antenna and a transmitter having a low impedance output circuit! The explanation lies in the sketch of fig. 1. This is a drawing of the complete matching system, from antenna to transmitter.

Starting at the antenna end of the system, the pieces can be put together like a crossword puzzle. The impedance at the center of the split radiator of a simple three element parasitic beam antenna falls in the region of eighteen to twenty ohms. For this discussion, let us assume a nominal value of nineteen ohms at points A-B. A matching transformer (Q-section) is attached at this point. This transformer is made of an electrical quarter-wavelength section of 75 ohm "TV-type" balanced line. The Q-section has the unique property of transforming impedances, the ratio of transformation being a function of the antenna impedance at points A-B, and the surge impedance (75-ohms) of the Q-section, as shown in formula 1, fig. 2. In this particular case, the nineteen ohm impedance at points A-B is transformed by the Q-section to an impedance of approximately 295-ohms at the "bottom" end of the section (points C-D). This value is an almost perfect impedance match to a balanced 300-ohm line, which may take the form of a random length of "TV-type 300-ohm ribbon." For a few cents a foot this inexpensive and efficient transmission line can be run from the antenna position to the location of your transmitter.

The last requirement is to transform the (approximately) 300-ohm balanced impedance at the "bottom" end of the "TV-type" transmission line (points E-F) to an unbalanced impedance of 50-75-ohms which can be accepted by the great majority of amateur transmitters.

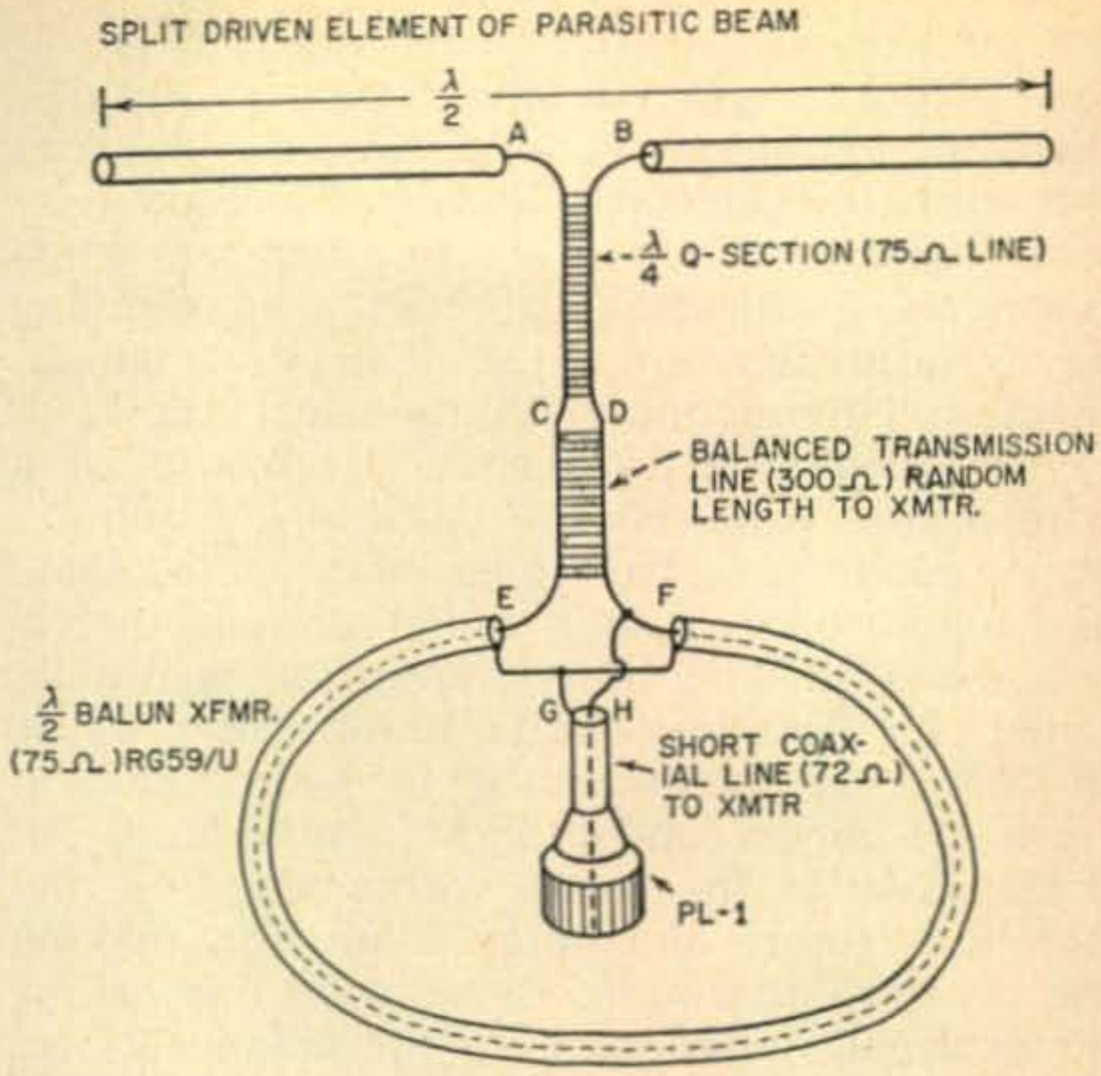

Fig. 1—Inexpensive feed system for 3-element rotary beam makes use of 300-ohm transmission line, used in conjunction with Q-section (at antenna) and ½-wave Balun transformer (at transmitter). Heavy-duty transmitting-type line and RG-11/U coax should be employed for transmitters of more than 250 watts.

Balance to Unbalance in One Step

At points E-F two operations must be performed in order to solve this problem. The line impedance of 300 ohms must be transformed to the proper value, and the balanced line must be converted to an unbalanced (coaxial) state. It would be well to pause for a second and investigate the terms *"balanced"* and *"unbalanced"* as applied to transmission systems.

A *balanced line* consists of two parallel conductors which are separated a fixed distance by some low loss material. When the *rf* currents in each wire of the line are of equal magnitude and opposite phase the field around the line is small, and a very minimum of power escapes from the line in the form of radiation. On the other hand, the electrical field surrounding a line having unequal or improperly phased currents will be large. The field of the line may interact with that of the antenna, distorting the pattern of the antenna. In any event, the radiated field of the

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75-OHM Q-SECTION (λ/4)

$$\text{LENGTH (FEET)} = \frac{246 \times V}{f\,(mc)}$$

V= 0.68 for Amphenol #14-080 line
V= 0.71 for Amphenol #14-023 line
f= resonant frequency of antenna in *mc*

HALF-WAVE COAXIAL BALUN FOR RG-59/u or RG-11/u

$$\text{LENGTH (FEET)} = \frac{324.6}{f\,(mc)}$$

f= resonant frequency of antenna in *mc*

Fig. 2—The length of the Q-section and Balun may be computed from these formulas. The resonant frequency (f) may be taken as 14.15 mc for 20 meters, 21.2 mc for 15 meters, 28.7 mc for 10 meters, and 50.1 mc for 6 meters. If desired, both the Q-section and Balun may be grid-dipped to the frequency (f). One end of the Q-section is shorted with a small, l-turn loop coupled to the grid-dip oscillator. The section is trimmed at the opposite end until the gdo indicates resonance at the proper frequency. Same method is followed for Balun, except far end of Balun is shorted out when measurements are made.

line may be considered to be valuable power lost before it reaches the antenna. Because there is a minimum of solid dielectric between the wires the dielectric lossen of a good two-wire balanced transmission line are low when compared to the loss figure of a coaxial line having a greater amount of dielectric material in close conjunction with the electrical field.

An *unbalanced line* (coaxial) consists of a wire inside—and coaxial with — a tubular outer conductor. The inner wire is insulated and supported by a solid and continuous dielectric material. The outer conductor is usually made of a flexible, metallic braid. The purpose of the outer conductor is to keep radiation from the inner conductor at a minimum. All fields exist in the space within the line, between the inner and outer conductor, making the coaxial line a perfectly shielded line having no external radiation. Like the balanced line, the currents in the center conductor and shield are of equal magnitude and opposite phase. The shield current flows only on the *inner surface* of the shield. The outer surface is "cold". The higher value of dielectric loss of the coaxial line (compared to the balanced line) is compensated by the fact that the coaxial line has no radiation loss, as does the balanced line.

This is all very jolly and everything seems fine, but headaches will surely arise when the two types of line are used together without proper care. It is also bad practice to feed a balanced radiator (split dipole) with an unbalanced coaxial line. This is to say, some form of *balancing device* must be used when changing from an unbalanced transmission system to a balanced one. Referring again to fig. 1: The balanced driven element is conected to a balanced Q-section, which is in turn connected to a balanced transmission line running to the transmitter. At this point a balance-to-unbalance device must be employed to convert the transmision system to a coaxial state suitable for use with the transmitter. In addition, an impedance transformation must take place.

The Simple Half-wave Balun

The dual problem existing at points E-F of fig. 1 is to achieve a balance-to-unbalance condition, and at the same time to effect an impedance step-down ratio of four to one. These two actions may be neatly and efficiently accomplished by a single device—the *Half-wave Balun transformer*. The Balun converts the nominal 300 ohm balanced impedance existing at points E-F to a 75 ohm unbalanced impedance at points G-H. The pi-network transmitter can be connected to points G-H by means of a short length of 75 ohm coaxial line and coaxial plug as shown in the illustration. The required length of coaxial line will put only a small dent in your pocketbook! The line may be coiled up in a roll and placed out of sight behind the transmitter. Correct operation of this system is a function of the electrical length of both the Balun transformer and the Q-section so the dimensions given in fig. 2 should be followed closely. Auxiliary devices such as TVI filters, coaxial antenna relays, etc. should be placed in the short length of transmission line running from points G-H to transmitter plug PL-1.

Construction and Installation of the Feed System

This feed system is simple to build and easy to install. The Q-section is cut to length from the dimensions given in fig. 2 and one end is attached to the center terminals of the driven element of the antenna. This joint (points A-B) should be securely wrapped with Polyethylene tape to prevent water from runing down the conductors of the line at the point the dielectric is split to make connections to the element. The *Q-section* should drop vertically from the antenna, parallel to the boom and should be kept free of nearby metallic objects. The bottom of the section (points C-D) may be looped up and attached to the tower by a short length of heavy cord, permitting the beam to rotate about without winding the section about the tower, or twisting it about the supporting structure of the antenna. The Q-section is soldered to the 300-ohm feedline at points C-D, and the connection is well wrapped with Polyethylene tape.

The 300-ohm feedline is now run from the antenna assembly to the transmitter. The line should be kept clear of nearby metallic objects (the tower, gutters, drain pipes, etc.) and preferably should drop down vertically for fifteen or twenty feet before it is led away from the tower. Balanced transmission lines running parallel to and in proximity to antenna elements are bad medicine, and can cause distortion of the antenna pattern and other such nasty phenomena. The end of the 300-ohm line points (E-F) should terminate within a few inches of the coaxial receptacle of the transmitter.

Your last step is to cut the coaxial Balun to the correct dimensions and to attach it to the "bottom" end of the transmission line as shown in fig 1. Each end of the center conductor of the Balun is soldered to one wire of the balanced line. The ends of the Balun shield are connected together, but no direct connection is made between the shields and the balanced line. The short length of 75 ohm coaxial line reaching from the Balun to the transmitter antenna receptacle is attached across one end of the Balun, the shield of the line being soldered to the Balun shield, and the center conductor of the Balun being soldered to the center conductor of the line. A little care and time spent with this connection will produce a neat joint. Cover it with Polyethylene tape to prevent shorted connections.

[*Continued on page 115*]

The All-Band Dipoler

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Manheulles (Meuse) France

About the only antenna I have never tried in my nearly 25 years in amateur radio is the extremely broadband "Uni-directional-Logarithmically Periodic Antenna" produced by *Collins Radio Co.* This is about the "newest" communications antenna that I know of. Belonging to the logarithmically periodic class of antennas for which the radiation patterns and input impedance are essentially independent of frequency, it obviates the need for several structures to cover a full range of frequencies. For example, one antenna would cover 6.5 to 60 megacycles with an average gain of 8*db* over an isotropic antenna. If it were not for the price, the antenna will no doubt find its way into the backyards of the serious ham. Of course, it is built to handle a peak power of 50KW—and the average ham would find it a little cumbersome to handle—along with the price of from $12,000 to $15,000.

Now I would be mighty satisfied with one of these fine antennas but not having the money or a 50KW transmitter, I, like thousands of other hams must settle for much less. And this is what I have done.

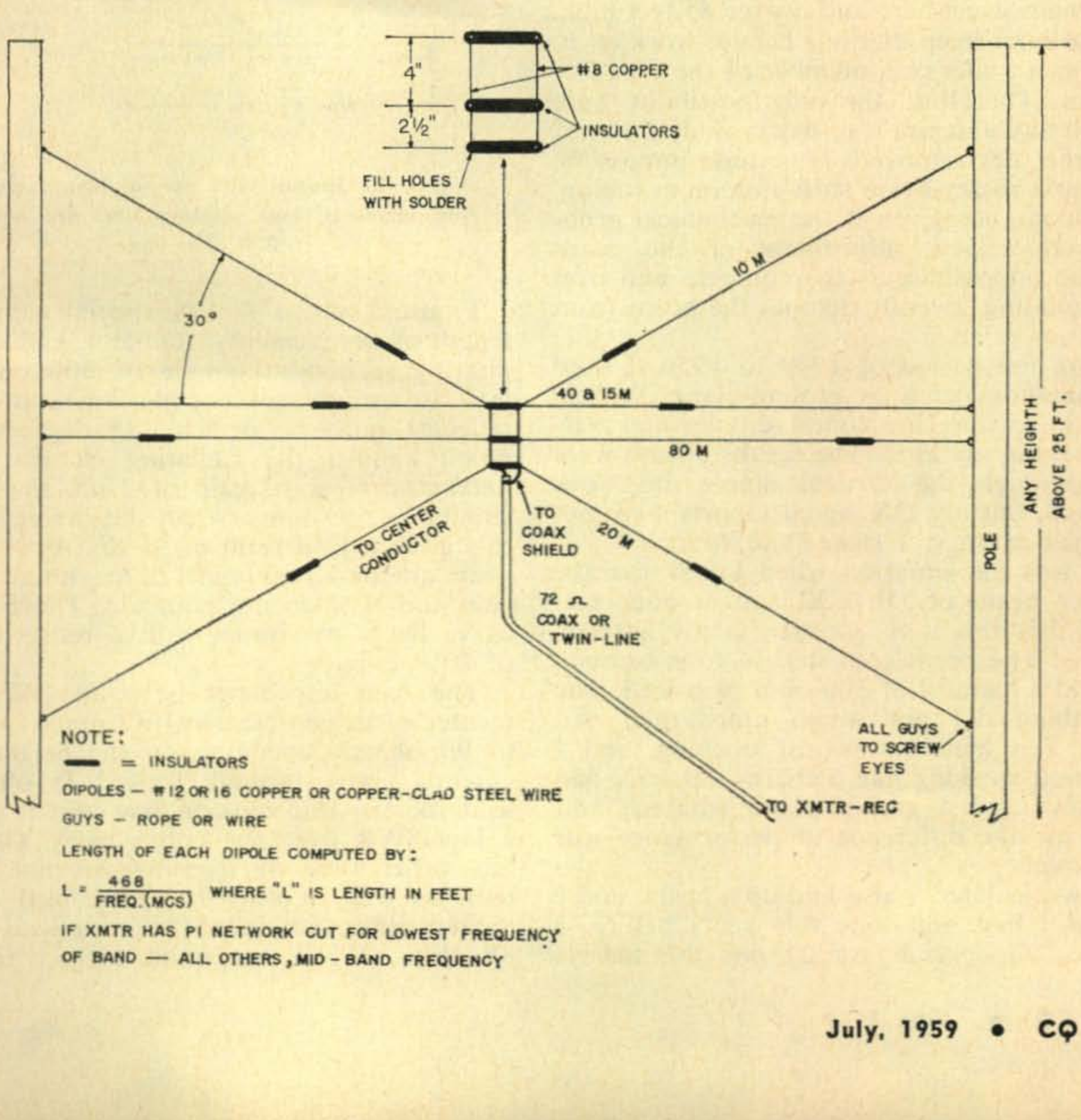
Upon setting up a station at a new location —and the latest, here in France is no exception —I usually fall back on the good old reliable dipole antenna.

Going through all the books I could lay my hands on, I searched for design data relative to broadband antennas and came up with the usual information which has changed relatively little during the last decade.

After about two weeks of experimentation I came up with an antenna (or configuration of antennas) which works exceptionally fine tied to a low power transmitter such as the *Ranger*, *Viking II* or *Apache*.

The antenna itself is simple and requires neither elaborate calculations (except length) or special equipment. However, for best results in a given direction, the antenna should be oriented so that its center is "pointed" toward the area in which one is most interested.

[*Continued on page 114*]



A Shortened ZL-Special Beam

Rolf Schick, DL3AO
Esslingen
Plochingerstr, 43
Germany

The antenna described here is not the "non plus ultra" in amateur beam arrays, but it has some features which make it very advantageous in certain locations. The gain with this 2 element ZL-special beam is 7 *db*, a little better than a 2 element parasitic beam, but not quite as good as a 3 element parasitic beam.

This article is not written for those who already have good results with their rotary beams, cubical quads, V beams, or what have you. It is written for those who think they cannot put up a "rotary", because of its weight, cost, size, etc.

I have often been asked; "Why do you use a 'ZL-special' and not a parasitic type beam antenna"? To answer this, I first must say a few words about my QTH. Our house stands right on the main street here and is over 85 feet high. The roof is so steep that one cannot work on it, unless he is a tiler or a member of the Fire Department. Therefore, the only possibility here to install any antenna is to work inside the roof with some tiles removed. It is quite impossible to put up a rotary-beam with aluminum tubing, heavy boom, etc. Even if the mechanical problems were solved, adjustment of the beam would be impossible, as the concrete and iron of the building severely detunes the beam from any pre-set value.

During the period of 1949 to 1956, I tried many antennas such as ground-plane, vertical dipole, longwires, horizontal dipole, and various others in my attic. The results always were poor, although the vertical dipole did work fairly well, but my DX signal reports were not more than average. I lacked the "punch"!

That was the situation when I first saw the 10 meter beam of DL1CX, and at once recognized that this is the answer to my antenna problems! The beam consisted of four bamboo poles and a handful of 300 ohm twin-lead. The whole thing did not weigh more than two pounds. Ten meters was just opening, and I could see it working like a charm. DL1CX had previously used a ground-plane antenna, and he told me the difference in performance was remarkable!

Two weeks later, I also had up a beam, and I regretted I had not done this years before. I built the "ZL-special" for 21 *mc*; this always having been my favorite band. My power never exceeded 100 watts in the two years I have now used this beam, I have worked a lot more DX (and a lot easier, too) than ever before. In fact, the antenna proved so excellent that only a few minor changes were made since I first put it up. However, it was found some time later, that the lengths of the elements could be shortened to ⅜ wavelength instead of the usual ½ wavelength. Further details are as follows . . .

First I shall describe the type with the normal antenna lengths, and then the type with the shortened elements.

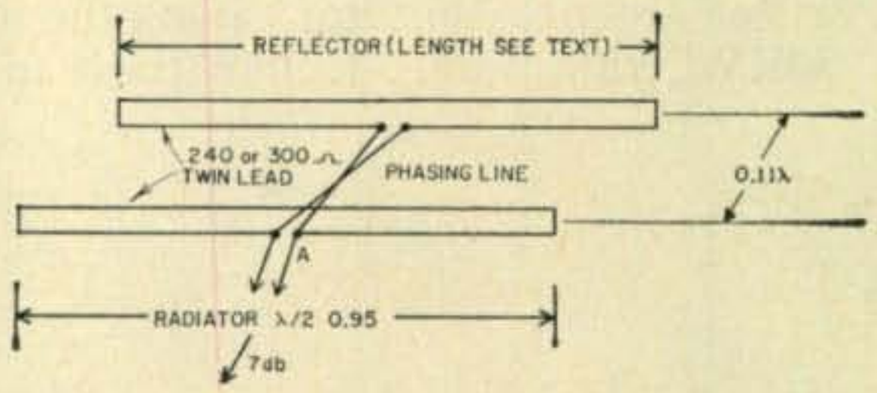


Fig. 1—ZL Special with normal length elements. The elements and phasing line are made of 300 ohm line.

Figure 1 shows the ZL-special with normal length of the elements. Radiator, reflector, and phasing section are made of 300 ohm twin-lead. Be sure to cross the phasing-section, as the reflector must be driven 135 degrees out of phase against the radiating element. For a maximum forward gain of 7 *db*, the reflector should be 6% longer than the driven element; this gives a F/B ratio of 25 *db*. As usual with beam antennas, the points of maximum forward gain and F/B do not coincide. The F/B ratio curve has a maximum with a reflector length of 10% longer.

The feed impedance at point "A" (fig. 1) (center of driven element) is approximately 80 to 90 ohms, depending on the height of the antenna above ground. I used 75 ohm twin-lead for the transmission line and it gave me a low SWR over the entire band. Of course any other type of transmission line can be used as well, it only being realized that the antenna offers a balanced resistive load of some 85 ohms. While not quite correct from the

theoretical view-point, the antenna can also be fed with 72 ohm coaxial-line without using a balun or line-balance converter.

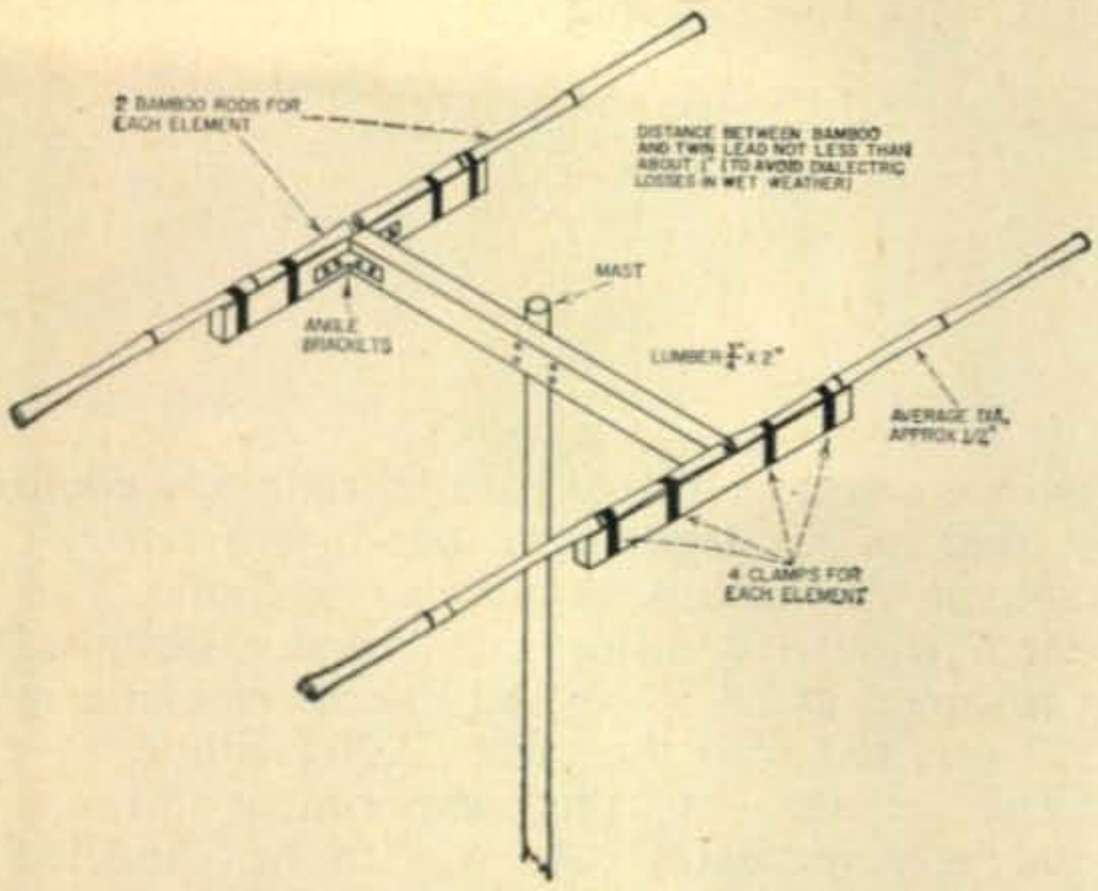


Fig. 2—Construction of the framework carrying the twin-lead antenna.

Antenna Construction

Bamboo rods carry the twin-lead elements. Figure 2 shows the construction. The twin-lead is fastened with cord to the bamboo rods. However, there should be at least one inch between the bamboo and the twin lead to avoid dielectric losses when the rods are wet or covered with snow. For 21 *mc* the beam is light enough to be turned by nearly any TV rotator.

Shortened Elements

Before putting up this original beam, I told the family I would soon have something on the roof, "not much larger than a TV-antenna", and it would hardly be seen from the street. I need not go into details, but I assure you the shock was considerable, when I had the antenna up and it took me several days to convince the family and my neighbors that any other antenna would probably cause severe TVI !!!! It even surprised me how far one could see the thin bamboo rods.

It was therefore out of the question that I could use a full-size 14 *mc* ZL-special in this

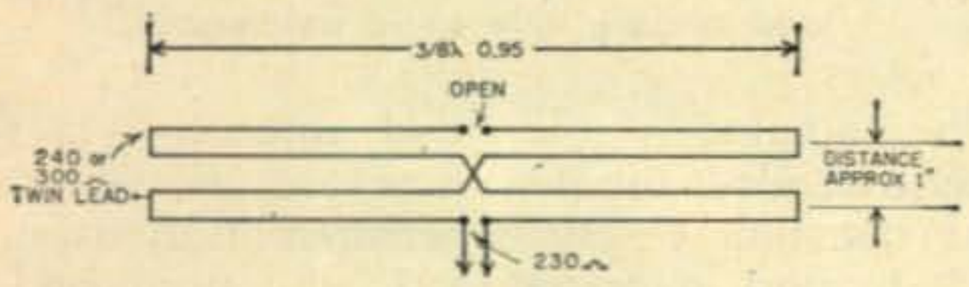


Fig. 3—⅜ wavelength version replacing the usual ½ or ⅝ antenna.

QTH. It was taken into consideration there are many miniature beams on the market with their aluminum elements and coils, and their sacrifice in antenna gain and bandwidth. Giving the problem some thought, it was recalled there is a type of a folded dipole which only needs to be ⅜ wavelength long, instead of the usual 4/8 or ½ wavelength which possibly could be used. (Figure 3). In other words, such a dipole for 14 *mc* only needed the length for 21 *mc* and, that without using coils or some fancy tricks.

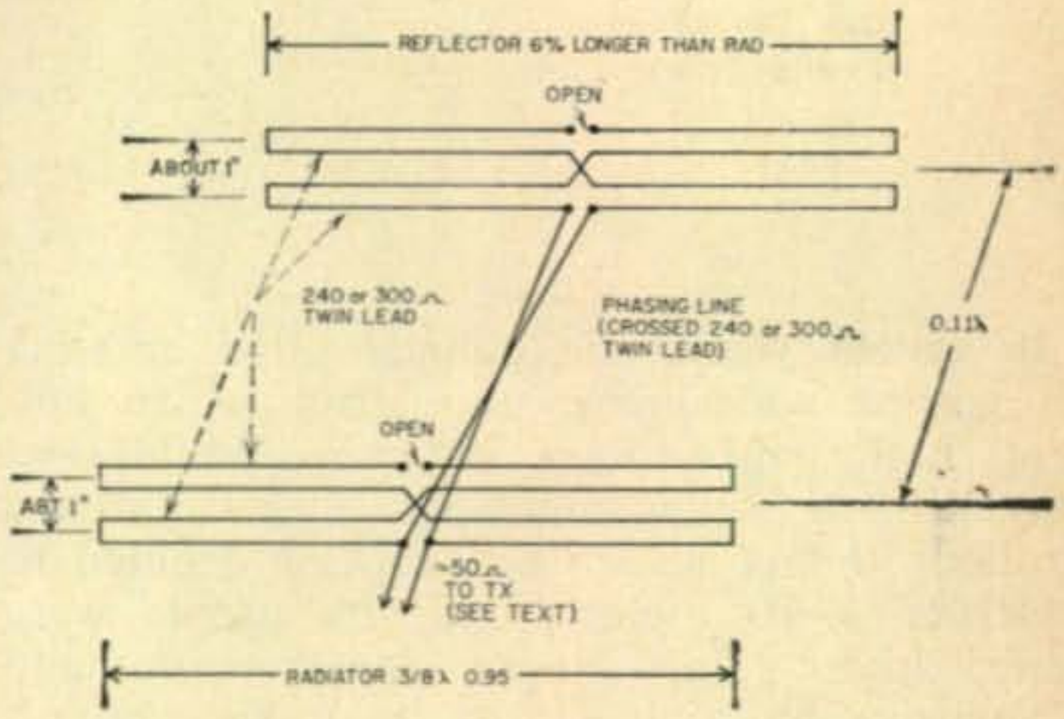


Fig. 4—The shortened ZL Special. This particular antenna was constructed for 29.6 mc.

The impedance at the feed point is 230 ohms, which is rather close to the 280 ohms of a "normal" folded dipole. The next step was to apply this to the ZL-special. To test this shortened array (fig. 4) I built one for 29 *mc* and checked it against the 3 element parasitic beam of a local DL4 friend. The antenna at once loaded well with a low SWR, from 28 to 29.6 *mc*. This shortened ZL-special was placed about 15 feet from the 3 element beam and switching was so arranged that antennas could be changed in seconds. In 90% of the QSO's, reports indicated that both antennas produced the same signal-strength.

Only the F/B ratio of the 3 element beam was better, though that of the ZL-special was between 15 to 20 db. Since the reflector was 6% longer than the radiator, the F/B ratio probably could have been improved if the reflector was made some 10 to 12% longer than the radiator. Unfortunately, the inclement weather at the time of the experiments prevented trying this. The antenna was fed with 52 ohm coaxial-line and this gave a low SWR. No balun was used to transform the unbalanced transmission line to the balanced feed point. All details of the mechanical construction, are the same as shown in fig. 2.

There is however one disadvantage with all the ZL-special beams; they can be used only on one band. There might be a way to apply one of the many 3 band rotary-beam techniques to this system also, but it would probably be complicated.

As I have said, while this article has not been written for those already enjoying the many advantages of a rotary-beam, it might give an answer to those who still don't know what Hamlet said: To beam or not to beam, that is the question! ■

A Broadband Cubical Quad Antenna

Richard A. Lodwig, K2ODT
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Franklin Square, L. I.

In recent years, the cubical quad antenna has gained widespread popularity as an efficient, high gain, rotary antenna. While contemplating a replacement for a TV antenna perched 50 feet up on our roof, I decided to construct a 10 meter quad. Its merits were many; high gain, simple construction, and inexpensive materials. Off to the drawing board!

Theory

A quad antenna is basically an extended dipole antenna (see fig. 1). Due to the relatively thin diameter of the wire used for a radiator, the antenna is usually quite critical as to its resonant frequency. The SWR rises quite sharply once you depart from the resonant frequency, making it useful over only about 300 *kc* of the 10 meter band. This is decidedly a disadvantage since the antenna would only be a compromise over the entire band.

The system of parallel dipoles provides a possible solution. If two parallel radiators could be used on the teen meter band, two separate resonant frequencies should also be found. This system was tried, using one radiator designed to resonate at 28.3 *mc* and one to resonate at 29.2 *mc*, fed with the same 75Ω feedline.

The results of this experiment proved amazingly successful. As was to be expected the antenna has an excellent 1:1 SWR at the two resonant frequencies, but on all frequencies between 28.3 *mc* and 29.2 *mc*, the SWR is below 1.15:1! By using these two radiators, an extremely broadband antenna is achieved, with outstanding performance over the entire 10 meter band. See fig. 2.

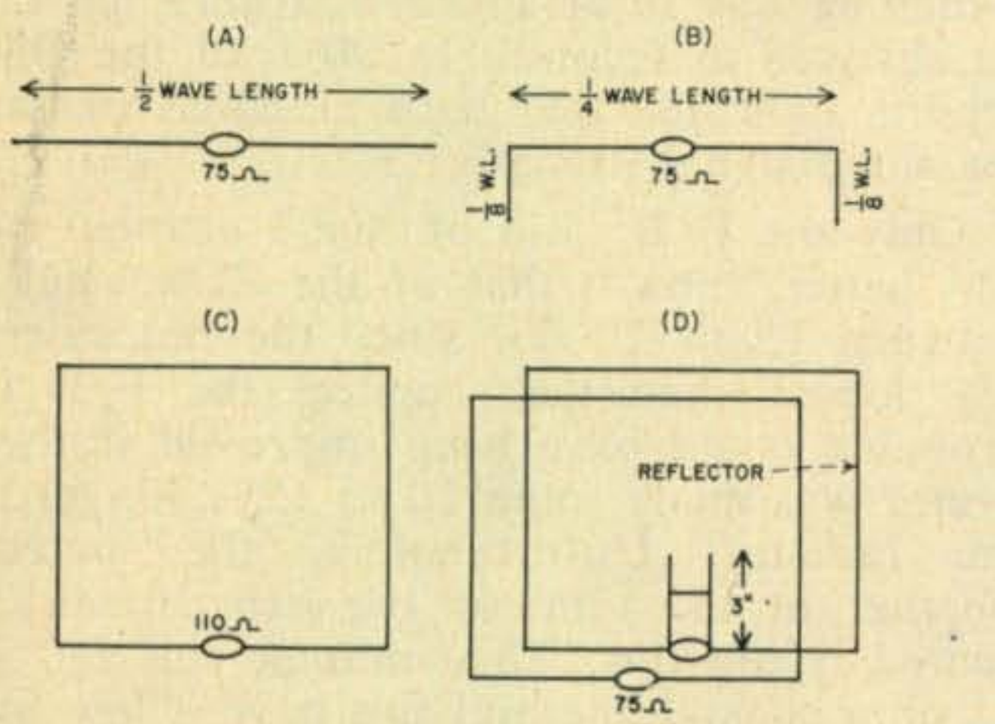


Fig. 1—Evolution of the quad radiator loop from a dipole antenna

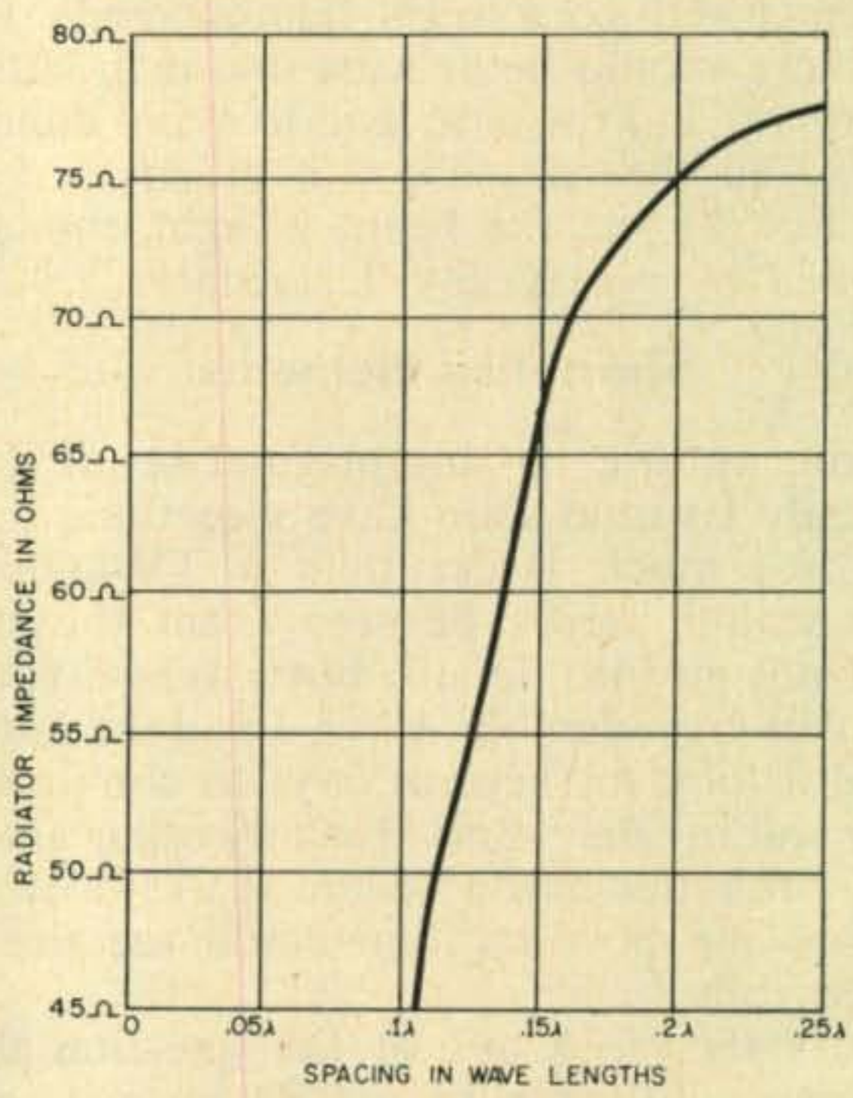


Fig. 3—Relationship between radiator impedance and spacing in a quad antenna.

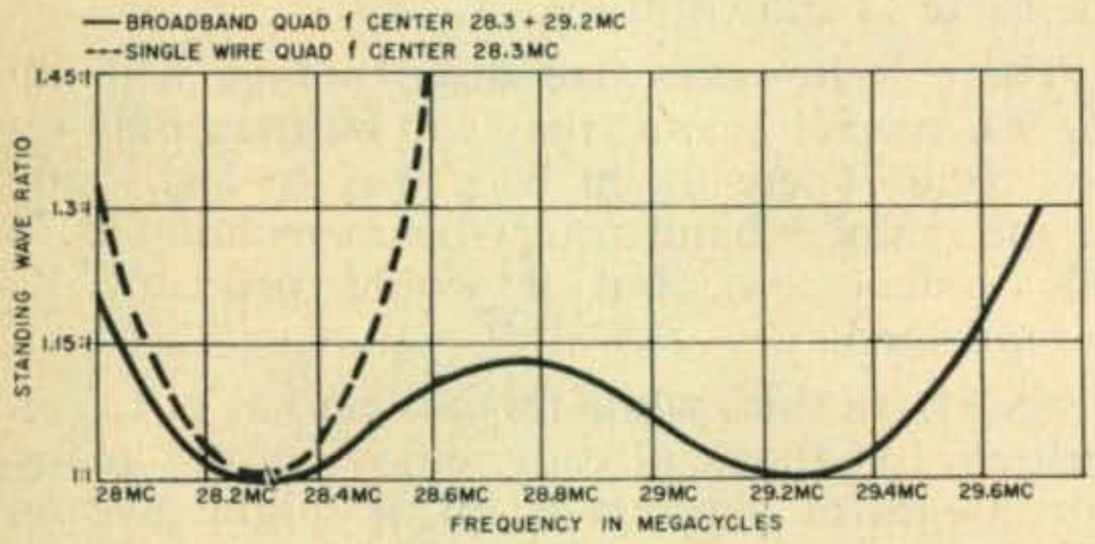


Fig. 2—Relationship between the standing wave ratio and the frequency for a broad band and single wire quad.

The radiator of the quad antenna is a full wave extended dipole, therefore the length= some constant F. By experimentation using a fixed L and a variable F, I established a constant of 960 for this antenna.

$$L = \frac{960}{F}$$

where L = total length of radiator in feet
F = frequency in megacycles

This formula held true when the antenna was placed at multiples of ¼ wave lengths high, but varied slightly when the antenna was mounted at a different elevation.

Several methods have been developed to properly resonate the reflector of the quad antenna, such as adjustable tuning stubs, and remote tuning.[1] While these methods are satisfactory, the majority require a great deal of trial and error to obtain satisfactory forward gain. I found by experimenting that the reflector length for this antenna could be calculated in advance using the formula

$$L = \frac{990}{F}$$

Where L = total length in feet

F = operating frequency in *mc*

The use of this formula saves considerable trial and error in adjusting for maximum gain.

A short tuning stub (approximately 3 feet) should also be used in order to compensate for variations in height above ground. Details of adjustment are given later.

The optimum spacing between reflector and radiator has been the subject of considerable discussion, for it involves several related variables. As the graphs of fig. 3 and 4 show,

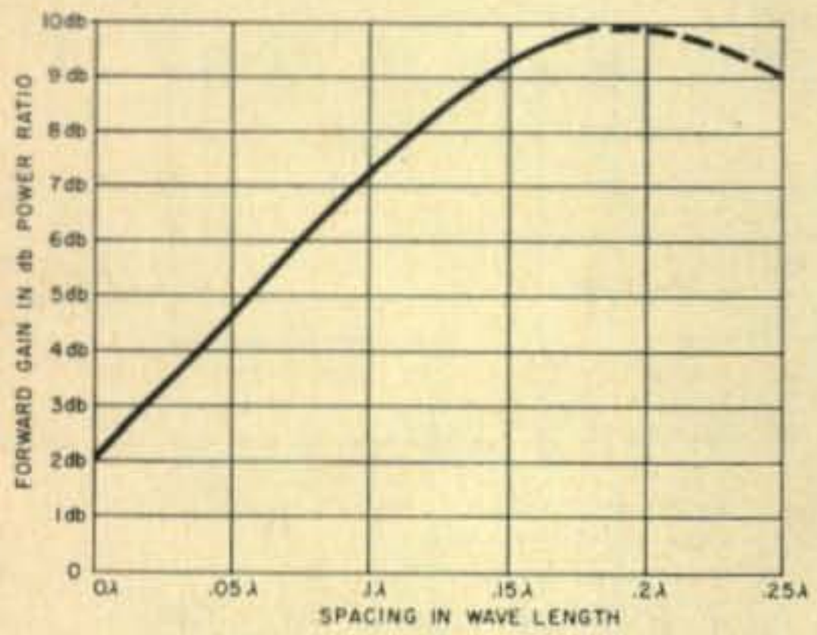


Fig. 4—Relationship between forward gain and spacing in a quad antenna.

both forward gain and impedance at the feedpoint of the radiator change as the spacing between radiator and reflector are changed. I found a .2 wavelength spacing as a good compromise for this antenna. The gain at this point is high (10 *db*) and the feedpoint impedance is low (75 ohms, providing an excellent match for RG-11 U coax cable). The adjustment of the reflector at this spacing changes the resonant frequency of the radiator very little. I highly recommended this spacing.

By combining the features of the parallel conductor radiator, pre-calculated reflector, and .2 wavelength spacing, a cubical quad can be built which will equal or surpass a good 3 or 4 element beam in performance, and cost considerably less in time as well as materials.

Construction

Once the antenna has been designed, the job of construction begins. The difference between a mediocre antenna which will last for a considerable period of time, lies in the methods and the materials used in taking the antenna off the drawing board and putting it into the air.

[1]Hagen, Hints & Kinks, QST Feb. 1958, p. 69.

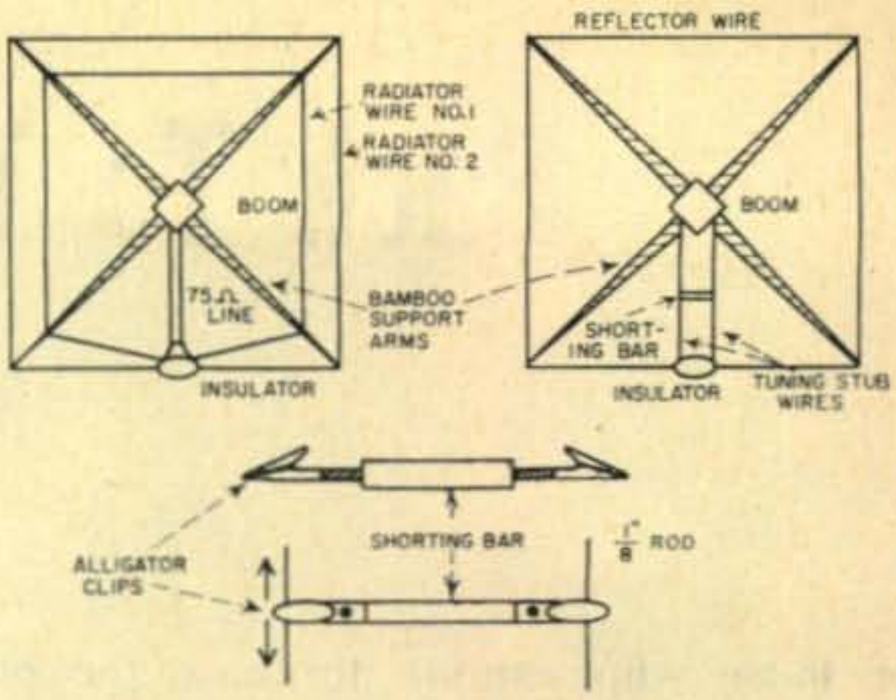


Fig. 5—Broad band Cubical Quad. See text for dimensions.

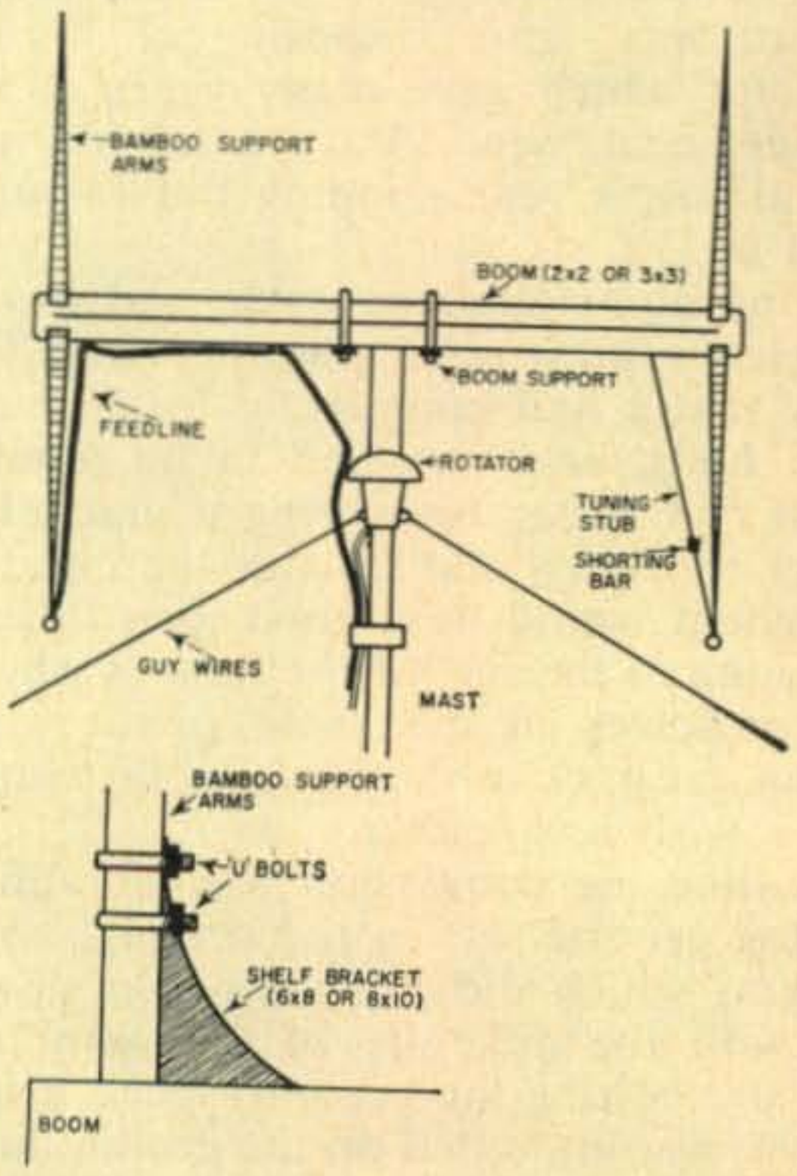


Fig. 6—Side view showing boom and details of attaching support arms to boom.

All of the weight of the antenna and strain from wind is concentrated at the mechanical connection between the boom and the mast. This is the critical part of the antenna, and should be properly made. This can be made by using a pipe flange and 2 "U" bolts, which can be purchased in a hardware store (See fig. 6).

Standard shelf brackets (6" x 8" or 8" x 10") make a simple and strong means of support for the arms of the quad (see fig. 6). These shelf brackets can be bolted or screwed to the boom and the arms fastened to the brackets with 2 small U bolts (¾").[2]

[*Continued on page 113*]

[2] Hardware for connecting the boom to the mast is now being made by Cesco for $5.95 and heavy duty for $8.95. Quad mounts for the bamboo or fiberglass arms are $6.95 each in cast duraluminum. See ad in November 1958 CQ, page 20-21.

Back To The Prop Rotor

E. H. Marriner, W6BLZ
528 Colima Street
La Jolla, California

For those who cannot purchase the proper heavy duty commercial rotator for turning 20 meter beams, the prop pitch motor is still king.

The author found how good it actually was the hard way, after disposing of his surplus prop rotor which gave many years of service. The nice, neat, new TV type rotator installed lasted almost a year grinding the 14 *mc* beam around at DX.

Having completed the cycle and having repurchased a prop pitch motor, I found to my dismay that I had completely forgotten which screws, bolts, and nuts had to be removed to make it run. After borrowing a manual which was not too clear and tracing the circuits out, I thought it would be a good idea to pass the word along to the rest of the fellows who might find themselves in the same predicament, so they can get back in the business of turning the antenna with less bother.

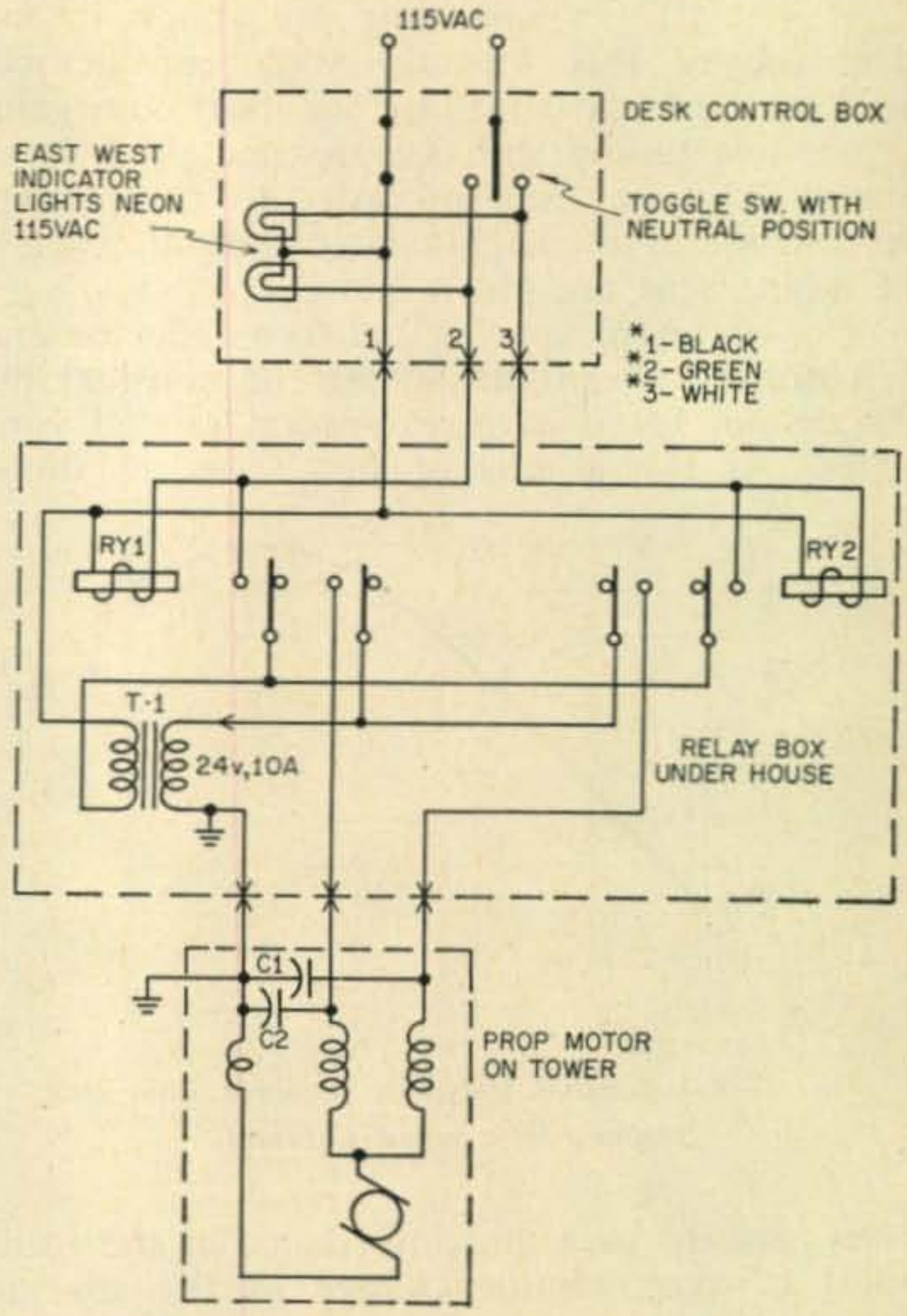
This time the conversion was simplified and the rotor gearing left in the original condition at 1 rpm, which did not seem too slow compared with the difficulty of disassembling the motor and bolting the gears to speed it up. The rotor was also mounted on the ground and pipe run up the tower, letting the pipe twist instead of the tower.

If you are interested in something that will last a lifetime—follow me. This is how to go about making the conversion.

Conversion

First the motor must be made to turn, and some of the parts will have to be removed before it will. The bottom shell is taken off by removing the three screws around the base and prying up the thin cover with a screwdriver. Once it is removed you will see a large nut on the shaft (shown in fig. 1). To get this nut off it will be necessary to prevent the shaft from turning. This can be done by putting a small "C" clamp on the brake dish to form a stop as you twist the nut. Next, remove the magnetic clutch parts and short the clutch coil (two brass screws) with bare wire. The unit will now look like fig. 1 and the cover can be slipped back on.

Before we can apply power there is a lead slug stop stuck in the side of the motor for shipping which must be removed. This is held by two bolts. The wires used to apply power can now be removed. (See fig. 2). By applying



Parts List

RY-1, RY-2	115 volt ac DPDT relays large contacts
T-1	24 V 10 amp Atlas Sales, 1046-48 Venice Blvd. Los Angeles, Calif. (Also see Barry Electronic)
C1-C2	.1 mf dual oil condenser 600 V dc

A control circuit for use with a prop pitch motor.

24 volts *ac*, or less, between the metal case and any wire the motor will turn and the cam stops may now be removed. At this time touch the other wires to locate the wire which will reverse the direction of the motor and tag it. Now, taking out the second screw, which is located under the one holding the wire, loosen the stop. Rotating the motor to the narrow part of the cam, a pair of long-nosed pliers will easily pull the stop out once you have driven out the pin to which it is hinged. This pin is located on the outside of the motor case. The fibre contacts will also pull free once the stops have been removed.

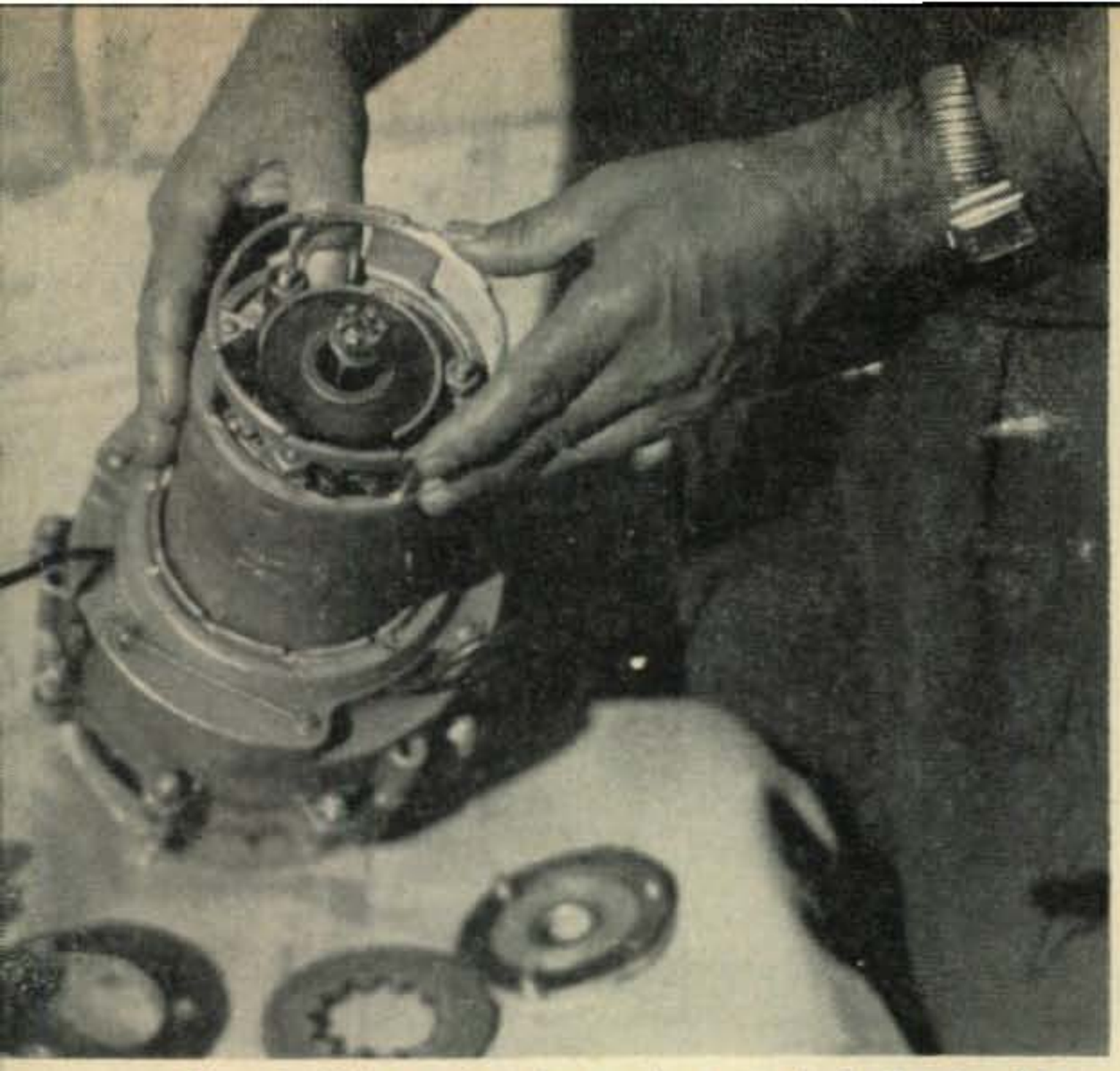


Fig. 1—View showing what end bell should look like when magnetic brake is removed. Opening by left forefinger shows two connections to be shorted.

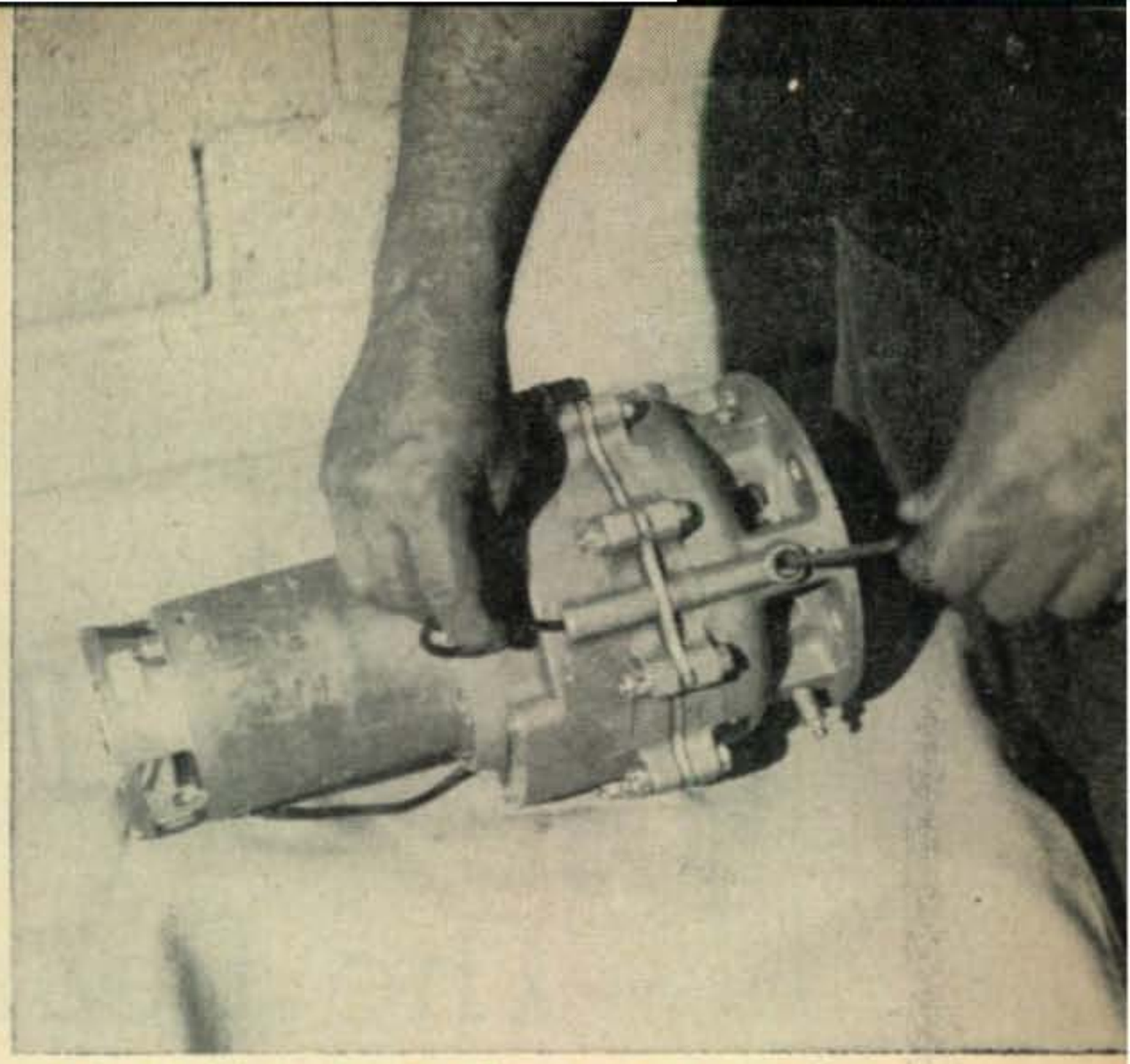


Fig. 2—View showing how to remove wires so that 25v ac can be connected.

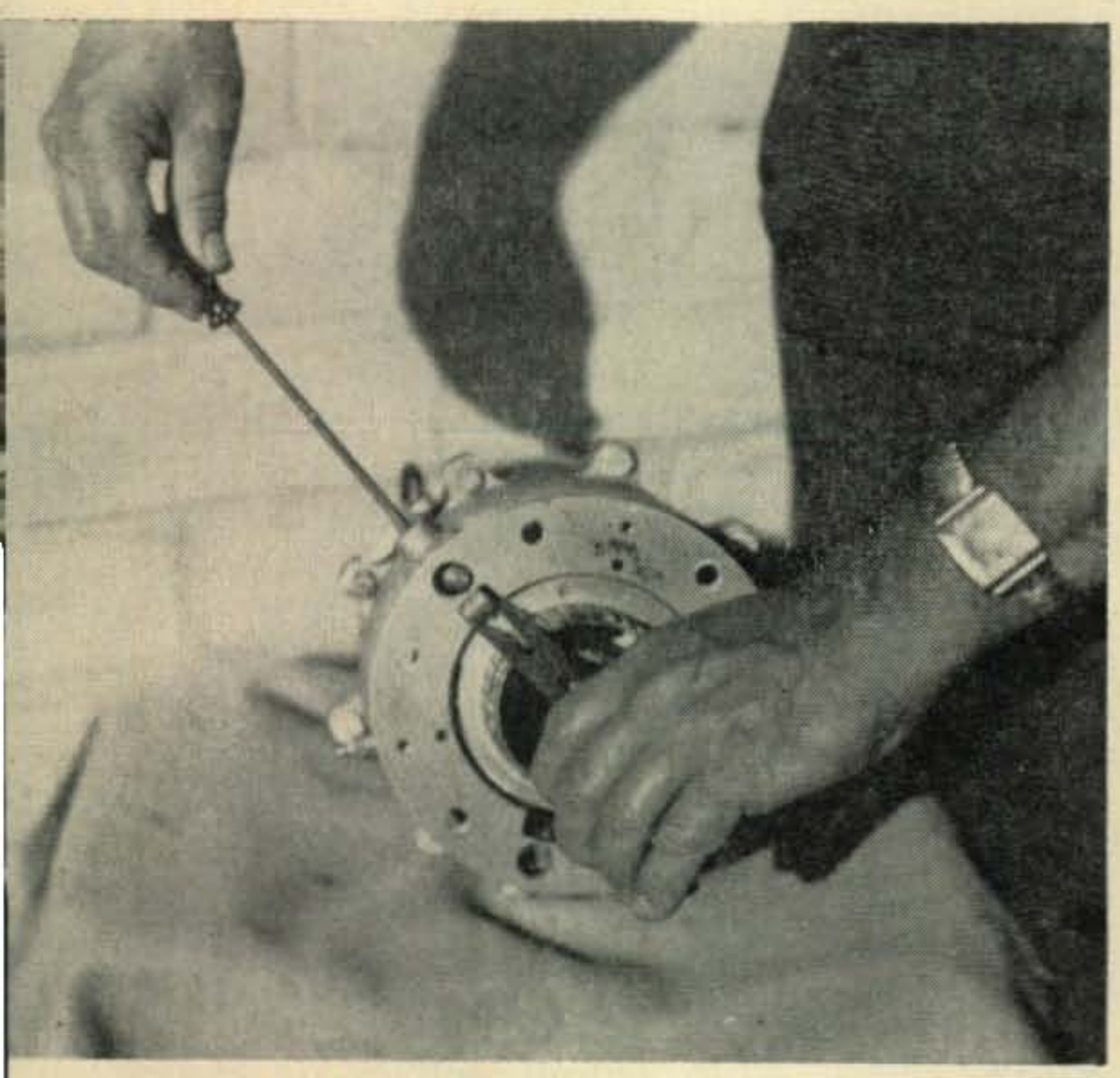


Fig. 3—After the wires are out, remove the second screw underneath. After driving the pins which hinge the cam stops out, insert a long nose pliers and pull the cams free. The motor may have to be turned on and the cams rotated for proper clearance. Don't forget to remove the lead shipping stop on the side of the motor before applying voltage.

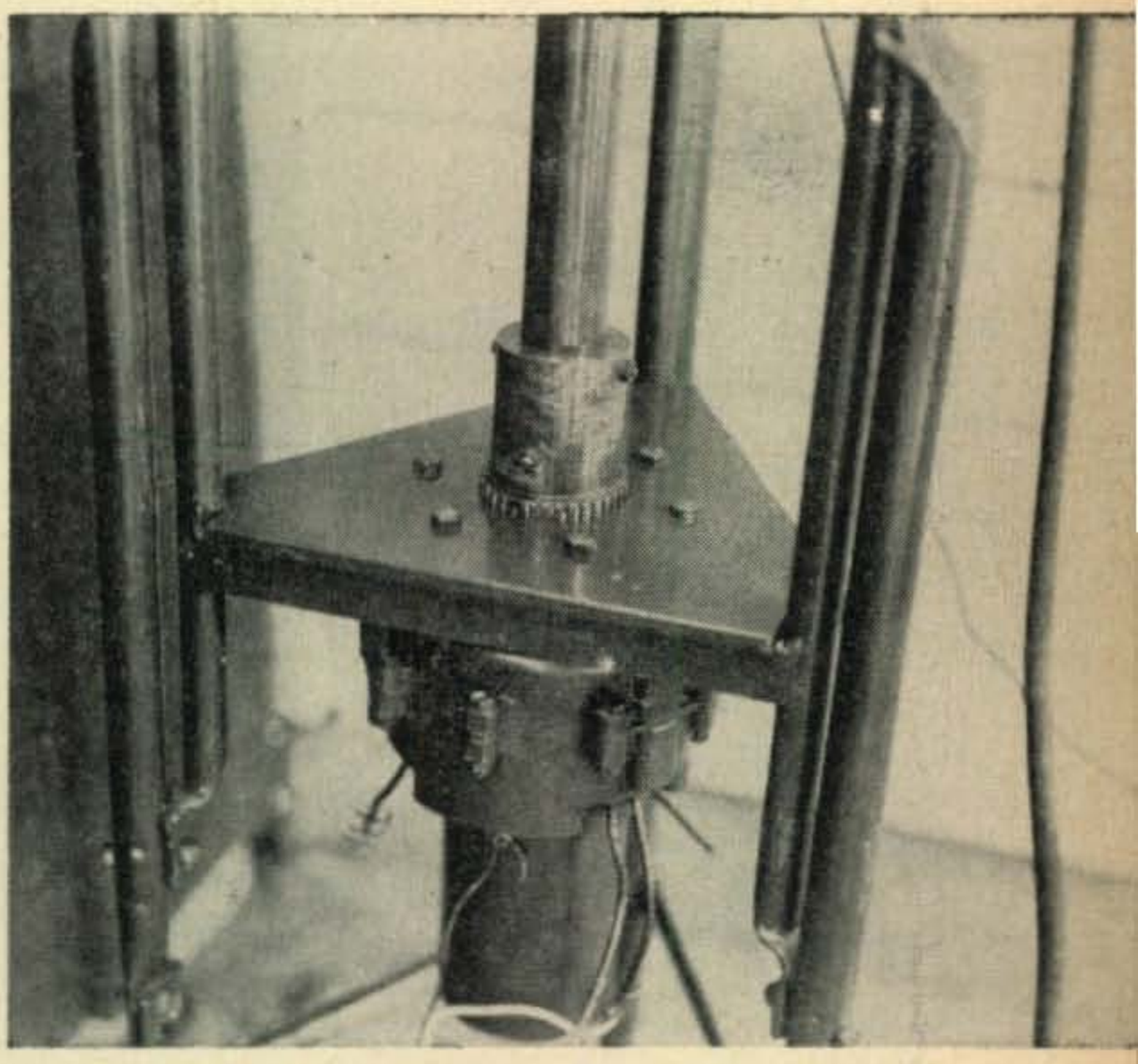


Fig. 4—This view shows how the motor is mounted to the triangular plate set in the base of the tower. Note the solid aluminum plug pinned into the spline gear.

Mounting

The conversion is almost complete. The motor can be mounted on a plate in the base of the tower. Fit a round piece of aluminum in the center of the spline shaft gear (see fig. 4). Next insert a piece of 1½" thin wall conduit pipe into a hole which has been drilled to receive it. It is possible to hold the pipe several different ways: a block of maple or oak wood can be forced into the hole, or a pipe flange welded on top of the gear. The author froze a block of machined aluminum, dropped it in the hole and after it expanded, drove a drift-pin through the gear into the aluminum block. I might mention the gear is case hardened metal and is very difficult to drill unless special drills are used. A machine shop can easily accomplish this.

The bottom length of the pipe is 1½" in diameter; the next pipe up the tower is telescoped 1¼" into it and held with two bolts. From this point on the tower up 1¼" conduit is used and is joined together with a sleeve one foot long of 1½" tubing, slipped over the two.

[*Continued on page 112*]

Tom Lamb, K8ERV
1066 Larchwood Road
Mansfield, Ohio

The Beam Pointer

This article describes a simple method for bringing a beam to a desired direction automatically and without attention from the operator.

Rotating a beam usually involves throwing a switch, then waiting and watching while the Selysn indicator slowly creeps around. While your attention is thus occupied the desired station rapidly signs his call (where *is* that pencil) and disappears. Or, if you do get his call, you grab the mike and start calling—while the beam ties neat knots in the feedline. Being born with a physical deformity (only one head and two hands) and an innate laziness, I decided the beam should stop automatically. After all, if the TV boys can do it, why shouldn't we?

After much unsuccessful experimenting with bridge circuits using *Variacs* and potentiometers geared to the antenna mast, I decided there *must* be an easier way. As usual, the back pages of CQ had the answer—an excellent system by W2JKH[1], using Synchros. Only it seemed that since Synchros develop considerable power a much simpler circuit should work. The following unit uses no tubes or transistors yet has more than adequate sensitivity. A control Synchro is simply set to a direction and the beam will follow it through the smaller angle, then stop.

Figure 1 shows the basic system. The Synchro transmitter and indicator (S-1 and S-2) comprise the standard system you probably already have in the shack. They may be either the 60 cycle type, or the 400 cycle units operating at reduced voltage. My rotor is a prop-pitch motor controlled by relays 2 and 3.

The controller is a 60- or 400-cycle Synchro connected as a *control transformer*. The shaft is manually rotated to the desired beam position. The Synchro transmitter produces a set of field voltages and phases that correspond to the present beam position. These voltages act through the rotated controller armature to produce an error voltage. This error signal is proportional, in both magnitude and phase, to the difference between the *mechanical* shaft and *electrical* field positions.

Figure 2 shows this action. Assume that both the beam and the controller are positioned North. There is no output voltage developed in the control transformer rotor. If the controller is turned to the East, an error voltage is produced. If the controller is turned to the West, again a voltage is produced, but now opposite in phase. Thus, the magnitude of the controller voltage tells how far the beam must turn, and the phase tells in which direction.

If your beam will rotate in only one direction, then a sensitive ac relay could be connected across the controller rotor. Any error voltage would close this relay and turn the beam to the proper bearing. However, it is always convenient to have the beam turn through the smaller angle to its new direction. This requires a phase sensitive detector.

Figure 3 shows the final circuit. The controller may be any small 60- or 400-cycle Synchro, or it may be your present indicator Synchro. The resistors R1, R2, and R3 are

1 Elwell, Henry. Antenna Rotation With A Servo-Mechanism. CQ Nov. 53

about 100 ohms 20W for the 400 cycle units. They may be as high as will produce adequate system sensitivity. They are not required on the 60 cycle Synchros, but may be used to lower any mechanical hum. It may be necessary to load the shaft with a felt washer to prevent self rotation. A small map or compass rose is placed in front of the controller and a pointer knob put on the shaft.

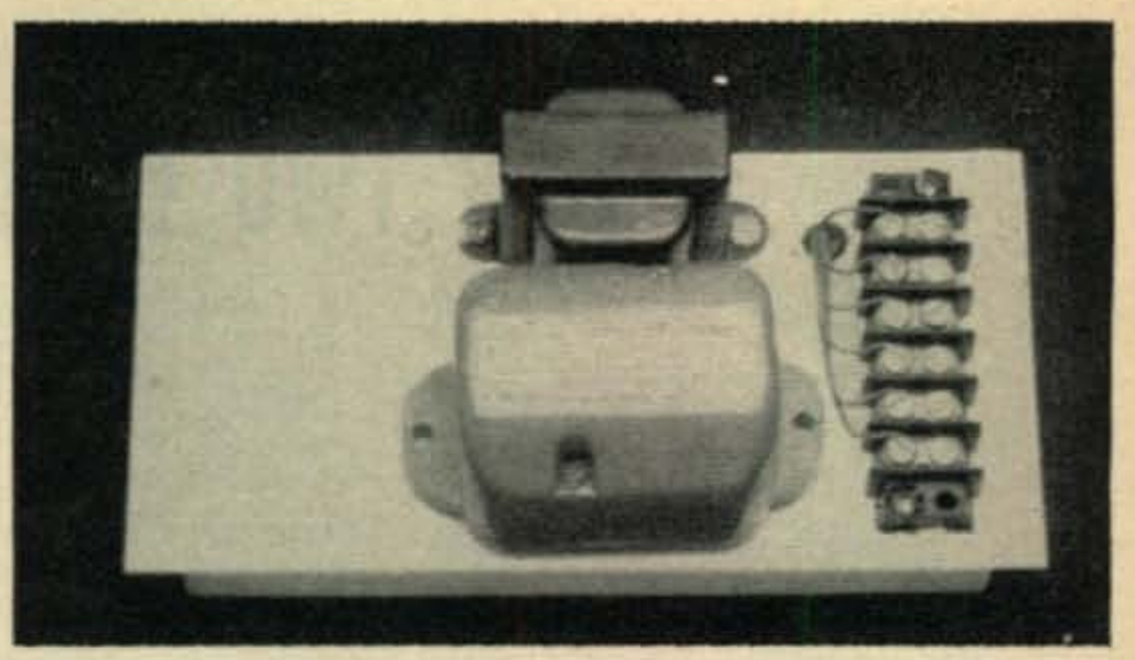
Detector Operation

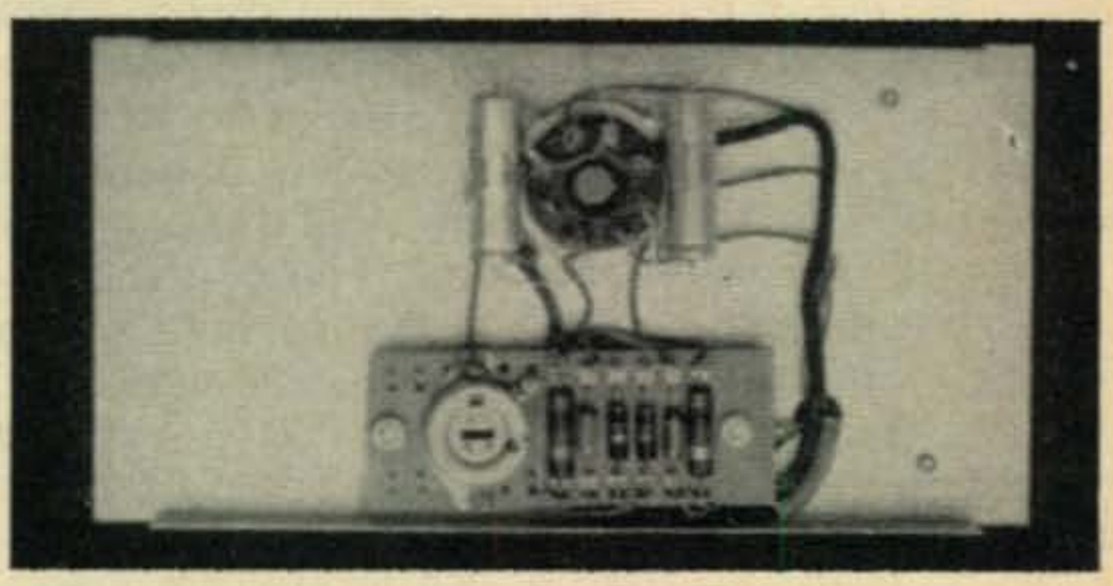
I will only briefly describe the operation of the detector, as it is well covered in other literature. A reference voltage is produced by T-1. This voltage is exactly in (or out of) phase with the voltage on the Synchro transmitter rotor winding. The reference voltage develops no output current in Ry-1 because the outputs of both diode rectifiers exactly cancel. An input signal will unbalance the rectifiers, adding voltage to one and subtracting from the other. A signal *in phase* with the reference voltage will aid (say) the upper diode, and *vice versa*. Since the unequal rectified currents no longer cancel, there will flow through Ry-1 an output current, whose direction again depends on the phase of the input signal.

Now all we need is a relay with two normally open contacts, one to close on a positive input, and the other to close with a negative input. A *Micropositioner* is such a device. Mine is a surplus unit having a 900 ohm coil and a one volt sensitivity. These relays are expensive, but make a very simple circuit possible.

Adjustment

It is not necessary to understand all of this explanation to build the "Pointer." The construction and adjustment are very simple. First, connect a *dc* voltmeter across the coil of Ry-1. Disconnect the controller and energize T-1. If the detector is balanced, there will be no meter reading. Slight unbalances may be ignored or corrected by padding R5 or R6. Set R4 to maximum resistance, and connect the controller to the detector and to the main Synchro system. Manually position the beam North. Rotate the controller until there is no voltmeter reading and set the controller pointer North. Turn the controller to the East, and observe which contact on Ry-1 closes. Connect this to turn to beam to the East, etc. The beam should now turn to the East, and stop at the same bearing as the pointer on the controller. If it doesn't stop, reverse any two of the three controller field connections. The sensitivity control is adjusted so that the beam coasts to a stop just as the voltmeter indicates zero. Unbalance in the detector (or relay) will cause the CW and CCW coasting to be unequal. The voltmeter may now be removed, or left as a permanent indication of any error in the beam position. ■





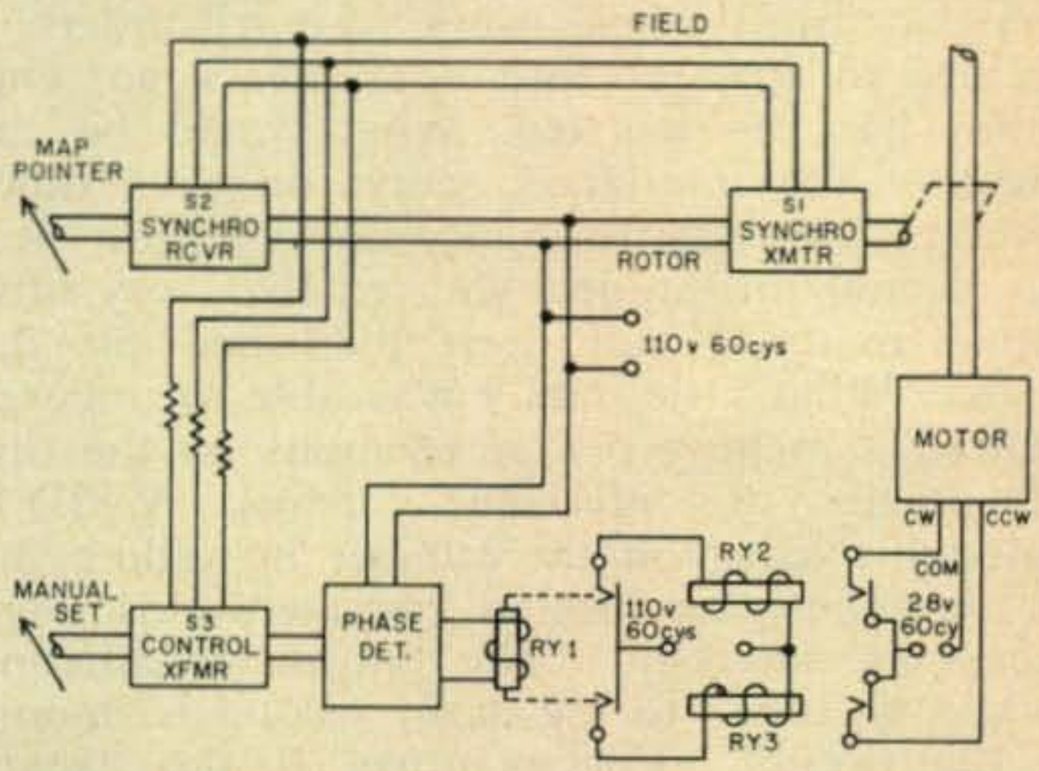


Fig. 1—Block of the beam pointer. Components S1, S2, RY1, and RY2 form a standard beam control system.

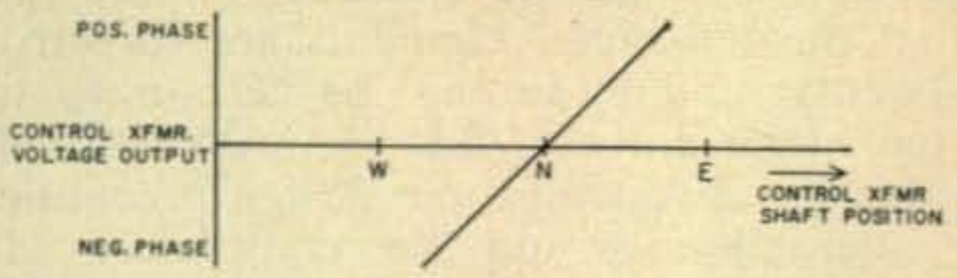


Fig. 2—Control transformer action for a North pointing synchro transmitter. Output phase is relative to voltage on the transmitter rotor.

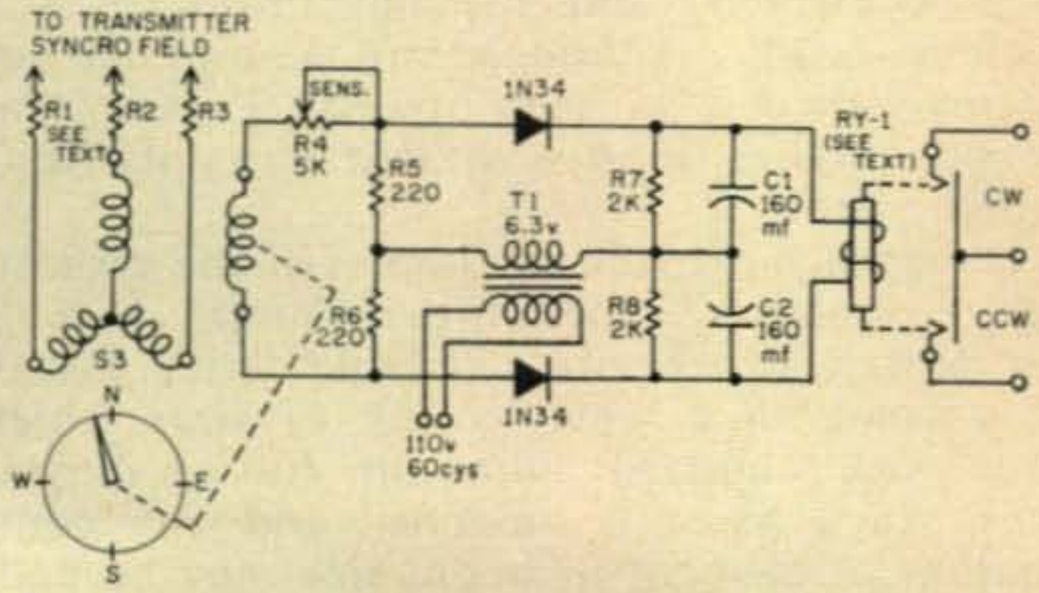


Fig. 3—Schematic of the beam pointer.

A New Two Band Interlaced Rotary

Barry A. Briskman, K2IEG

Some time ago, Continental Electronics & Sound Company (CESCO) of Dayton, Ohio, marketed a new line of cast aluminum hardware for use in the construction of rotary beam antennas. Aaron C. Self, W8FYR, Chief Engineer of Cesco, was kind enough to provide me with enough hardware to construct a 4 element Ten and three element Twenty meter beam. He also suggested that I design the antenna around his "Dual-Fyre" array, which consists of three elements on twenty and four on ten, interlaced on a twenty foot 3 inch *od* irrigation pipe boom. Since I wanted to have a beam for both ten and twenty meter operation, without running the risk of TVI sometimes incurred when using trap tribanders, I decided to give the interlaced idea a go. One factor had me worried! What would be the effect of the interlaced arrays on each other with respect to performance deterioration? Research into this subject showed that very little actual material had been published on the matter. What little data I was able to uncover showed a melting pot of opinions on the disadvantages of interlaced arrays. W8FYR stated his ideas on the subject by telling me that certain basic design considerations were necessary. He said, "The ten meter antenna should be tuned to the exact second harmonic of the twenty." For example, If the twenty meter beam is tuned for 14,250 *kc*, the ten should be resonated at 28,500 *kc*. He said further, "In the physical layout of the antenna, be sure to arrange the elements on the boom so that the ten meter elements are forward of the twenty, and in tuning, be certain to tune the ten meter antenna first." Aaron seemed to feel that by observing these design precautions, the interaction would be completely eliminated. It was also his opinion that this design would result in an actual improvement of each beam to the point that the twenty meter section would exhibit the gain characteristics of a 4 element and the ten those of a 5 element beam. Although my knowledge of antenna theory is very basic, I felt that the possibilities of this system certainly warranted a try.

The photos provide a synopsis of the project. Figure 1 shows some of the clamps, U-bolts and Yokes which are available from Cesco. They come in a wide variety of sizes which agree with standard aluminum tubing dimensions. Each piece is universal and any combination of element to boom size may be had.

It should be quite obvious from the photos, that my property in Brooklyn is rather small; 35′ by 145′ to be exact. It is also no secret that this can hardly be considered a "Mini-Beam." I had suffered many days of anxiety with regard to assembling the beam on the ground and being able to get it up to the top of the tower when fully assembled. In the final analysis it turned out to be a rather simple job at that, especially so since the beam only weighs about 65 pounds when completed. This is pretty light when you consider that there are seven elements on the twenty foot boom. Fortunately, that light irrigation pipe boom weighs in at only 9.3 pounds.

Somehow or other I managed to get all the elements mounted in the clamps and measured according to Aarons' dimensions for beams with wide spaced reflectors. He also supplied alternate dimensions for those who prefer an array featuring a wide spaced director. Figure 2 shows the seven elements and the boom lying fully assembled prior to mounting. If the elements are laid out in this manner, i.e. in the order they will be mounted on the boom, it will be much easier to perform the assembly. Figure 3 shows a closeup view of the element clamps with the oxen yokes in place. The unusual construction of this clamp is certainly something to behold. The action is positive and all the parts fit together without a hitch.

Another interesting and vital component Aaron supplied for me were two of his "Reactance Gamma Matches." While there is nothing extraordinary about a Gamma in itself, Cesco has packaged a wide spaced capacitor in a completely sealed box. The capacitor has a maximum of 125 mmf and a very low minimum. The same gamma, therefore, can be used on beams for any band 20 thru 6 meters. After I mounted the elements on the boom, I proceeded to install the two gamma matches under their respective driven elements. Figure 4 shows these in place before the gamma rods were installed. Dimensions are printed on the side of each match. They give you the proper length for the rods. These are measured from the center of the boom. Figure 5 shows how the assembly looks once the ½ inch gamma rods have been mounted in place.

Figure 6 shows the Universal Boom Mount in place between the two driven elements at the center of the boom. This photo also shows the standard SO-239/831R Coaxial Connector on the gamma box to which the feedline is connected. Figure 7 shows the moment we

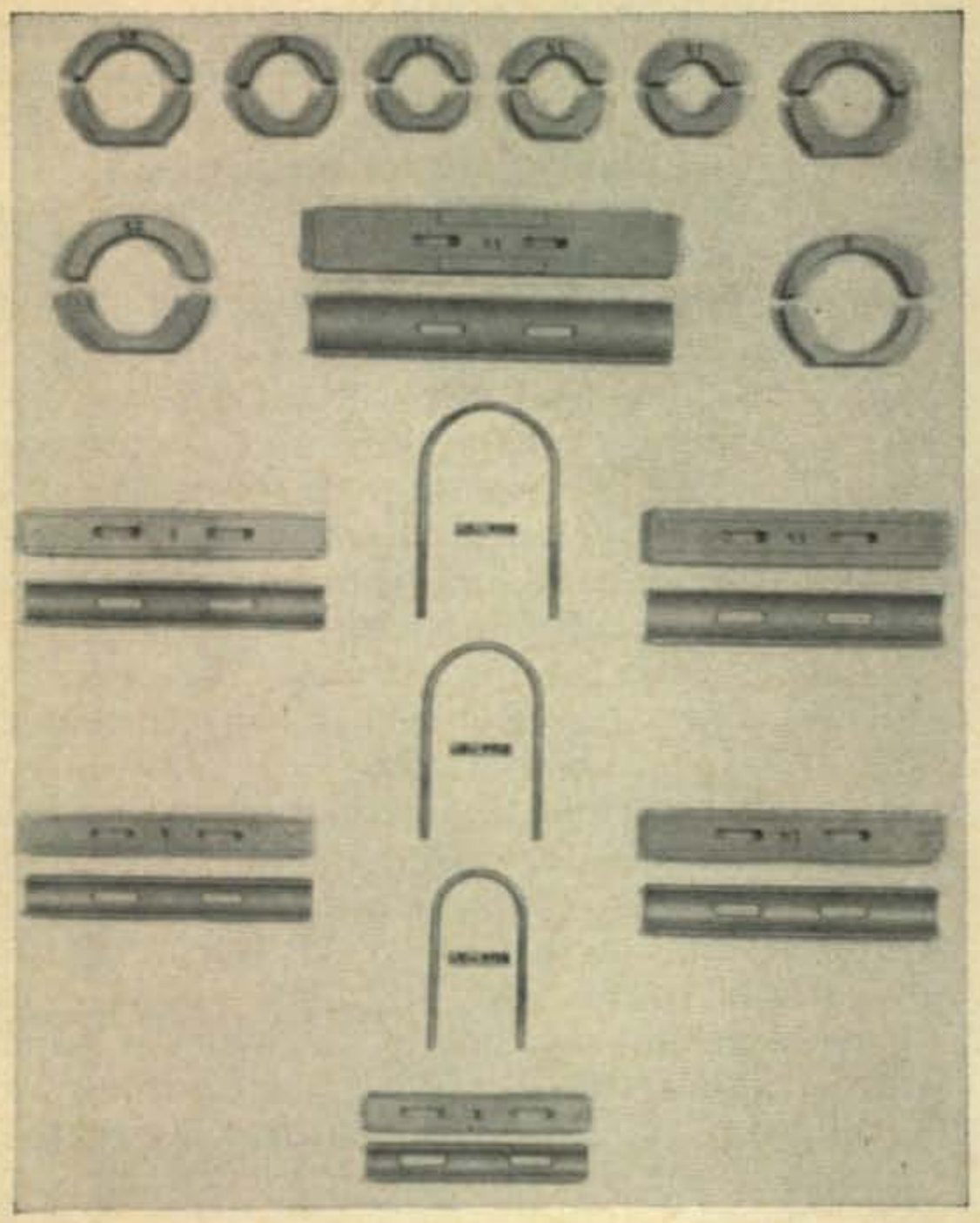


Fig. 1—Element clamps, U bolts and yokes.

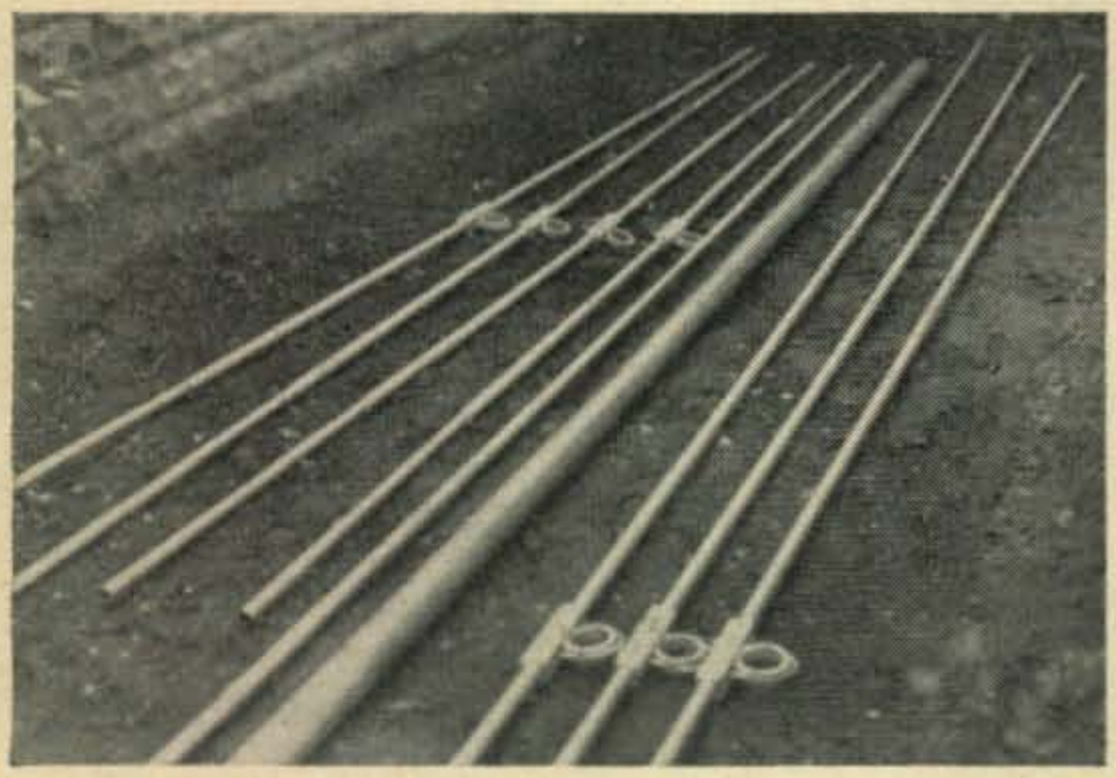


Fig. 2—Elements and clamps are assembled and ready for mounting on the boom.

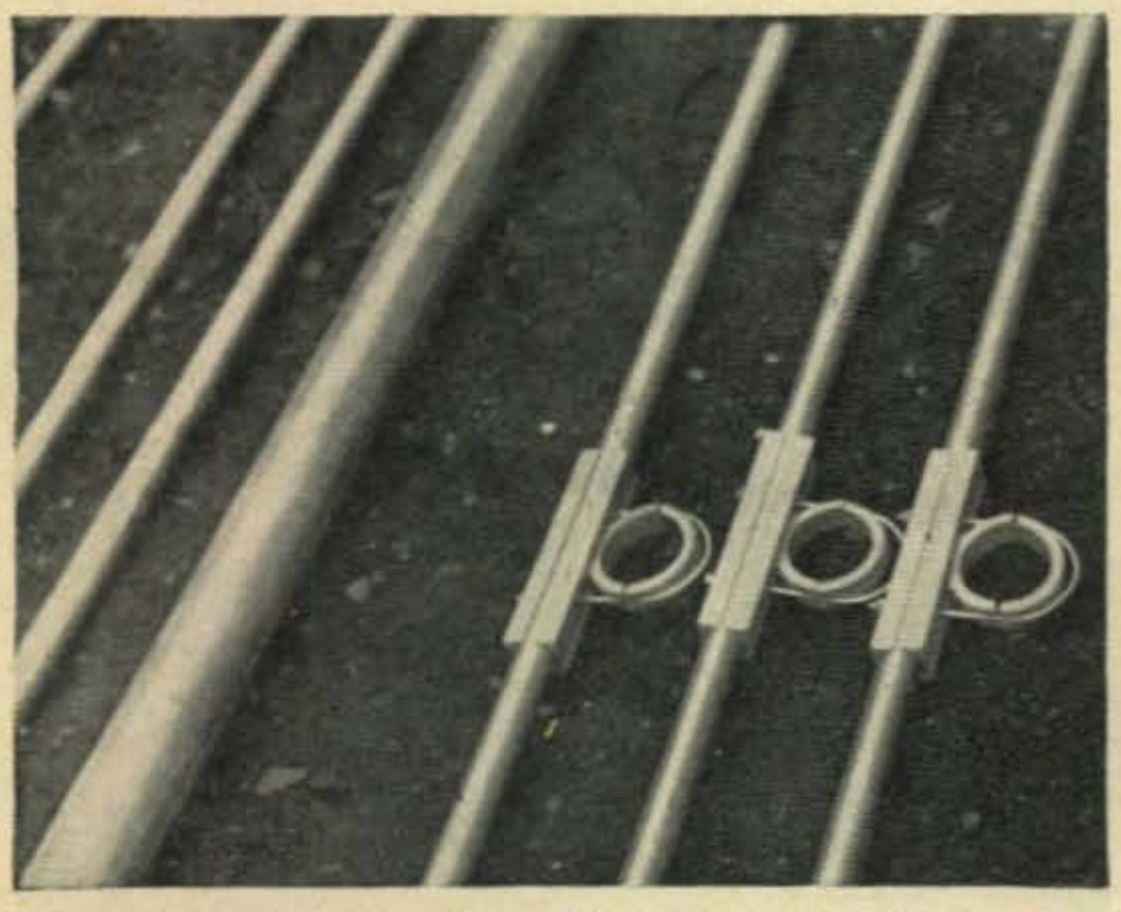


Fig. 3—Closeup view of the mounted clamp system.

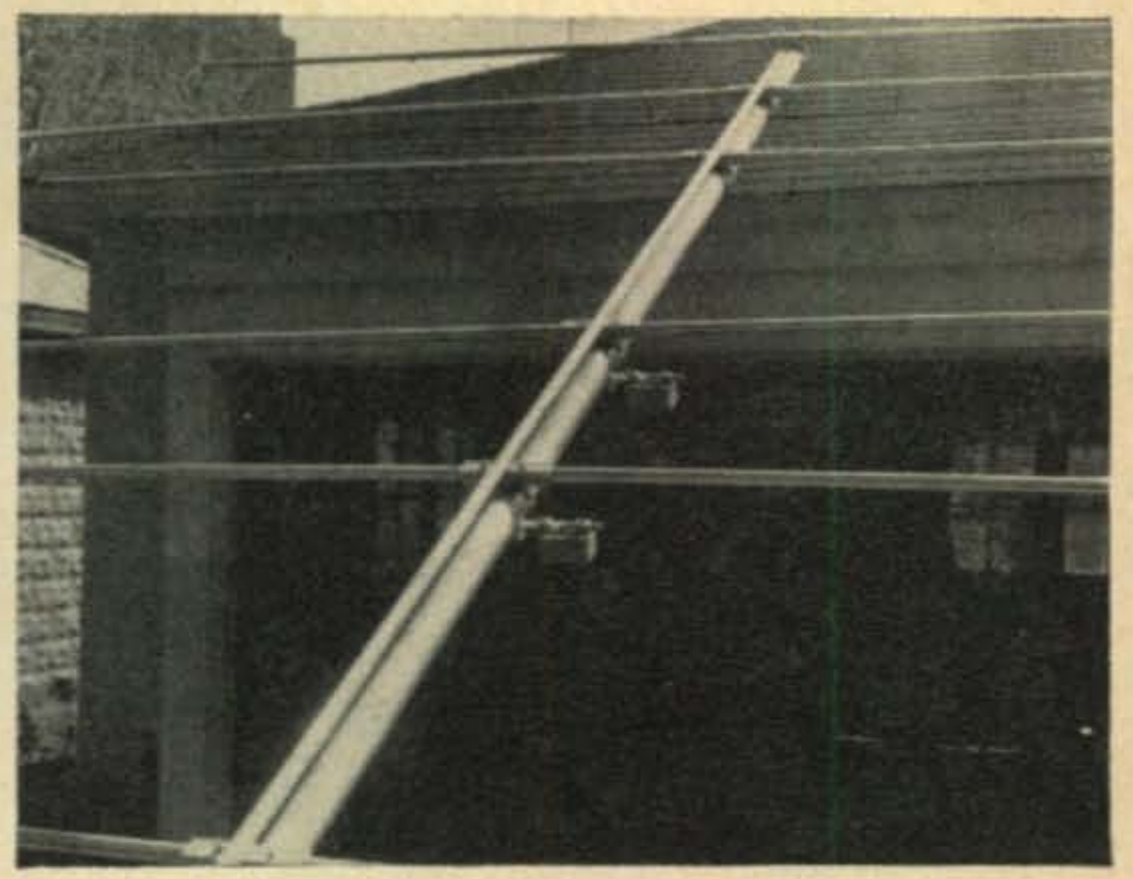


Fig. 4—The Gamma boxes are installed on the boom after the elements are mounted.

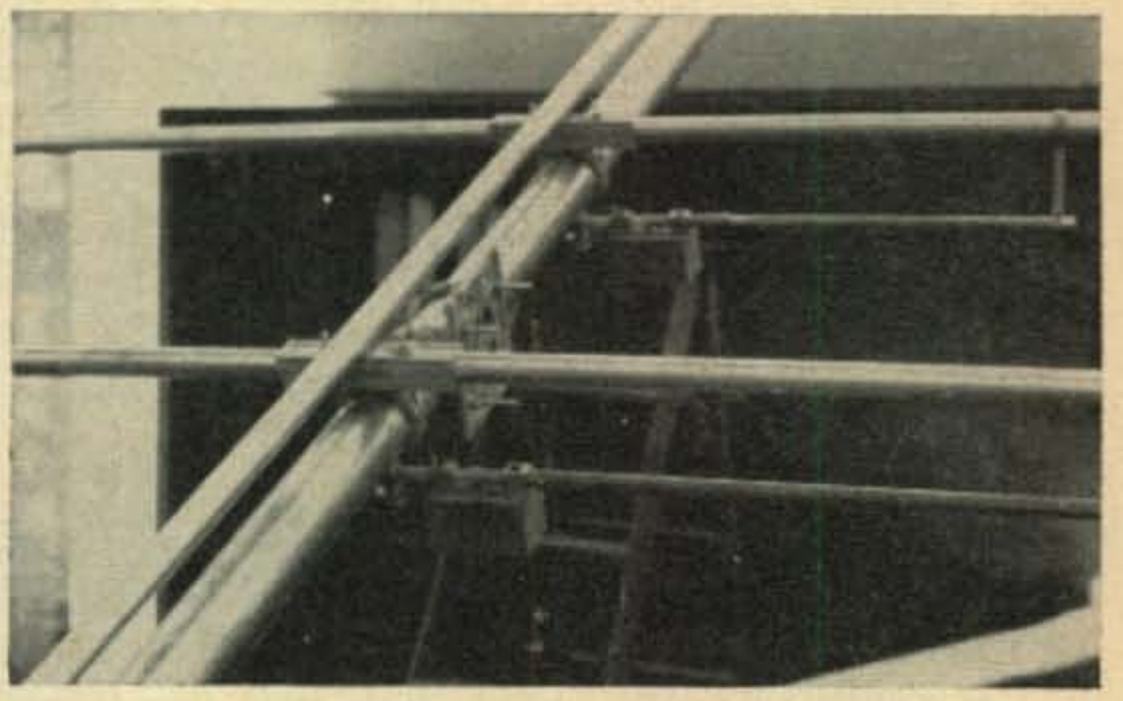


Fig. 5—Gamma rods are installed. The necessary lengths for all bands are listed on the box.

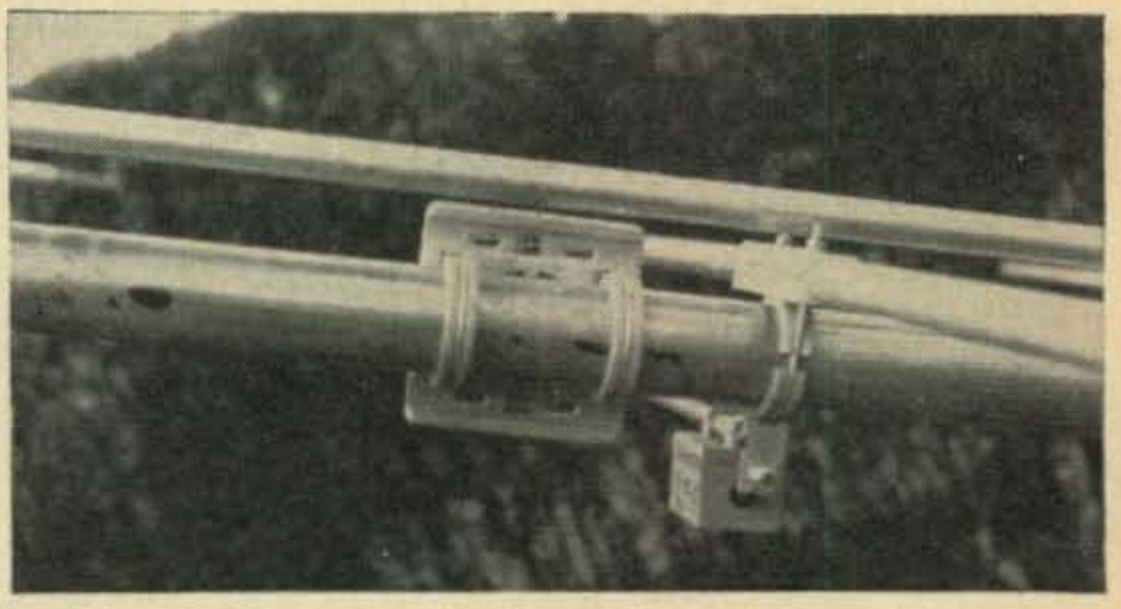


Fig. 6—Closeup of the universal boom mount and Gamma Box mount on 3" od boom.

Fig. 7—Aside from mounting the "Piggy Back" boom and lining up the elements she's ready to go.

builders wait for. Here, the array is completely mounted and ready for installation on the tower. I had jumped the gun a little in order to make publication deadlines. The tower was installed after the beam had been constructed. This tower (65′ E-Z Way) is mounted just to the left of the garage. The complete installation of beam on tower is a sight to behold. Note the lack of element droop.

Results & Conclusions

The test of any beam is in the operation. I have had two or three popular commercially available antennas at this QTH over the past four years. There have also been a few K2IEG home brew affairs mounted on one tower or another in the same period. While I require more time to actually make definite comparisons, I can say that the antenna is fabulous. The SWR of the 20 meter antenna ranges something like this: 14,000 *kc*—1.35-1 14,250 *kc*—1:1 14,350 *kc*—1.3-1. While the ten meter section is a little sharper due to the additional element, it is still within the range 1.2:1 over 250 *kc* of the tuned center frequency 28.500 *mc*. There is no interaction that is detectable.

The front to back ratio of the twenty meter beam has averaged out to better than 32 *db*. On ten meters, it is in excess of 35 *db*. Forward gain is tricky to determine. I have neither the room or the equipment to perform these measurements at my QTH, however the beam appears to be better than commercial antennas I have used with known forward gains of about 8.5 *db* over a reference dipole. This would tend to indicate that the gain figures of 9.8 *db* for 20 and 11.5 *db* for ten are correct. The antennas are quite broadband as demonstrated by the *vswr*'s indicated above. Of course the proof of the pudding is in the eating. . . . listen for K2IEG on twenty ssb after 2330 EDST and judge for yourself.

Should you desire to construct the "Dual Fyre Miracle," drop a letter to Aaron C. Self, Cesco, 6151 Dayton Liberty Road, Dayton 18, Ohio and he'll get all the dope and pricing out to you. I might mention that the price for this antenna is well below that of two equivalent beams currently available from any number of sources. Aaron can supply the hardware, the elements and the gamma matches,[1] the boom is available from Sears Roebuck Farm Catalogue order at a very nominal cost.

It is also possible to interlace elements for 20 and 15, or 20, 15 and 10 should you find these more attractive. Data can be supplied by writing Cesco, or K2IEG, 521 Ocean Parkway, Brooklyn 18, New York.

I have taken the liberty to include some data concerning the elements and feedlines on the following page as well as a drawing of the particular model I am using.

Aluminum Tubing Requirements

20 Meter Tubing
- 1¼″ diameter aluminum center structure
- 1″ diameter aluminum end sections

[*Continued on page 111*]

[1] Packaged as a hardware and gamma kit for the Dual Fyre.

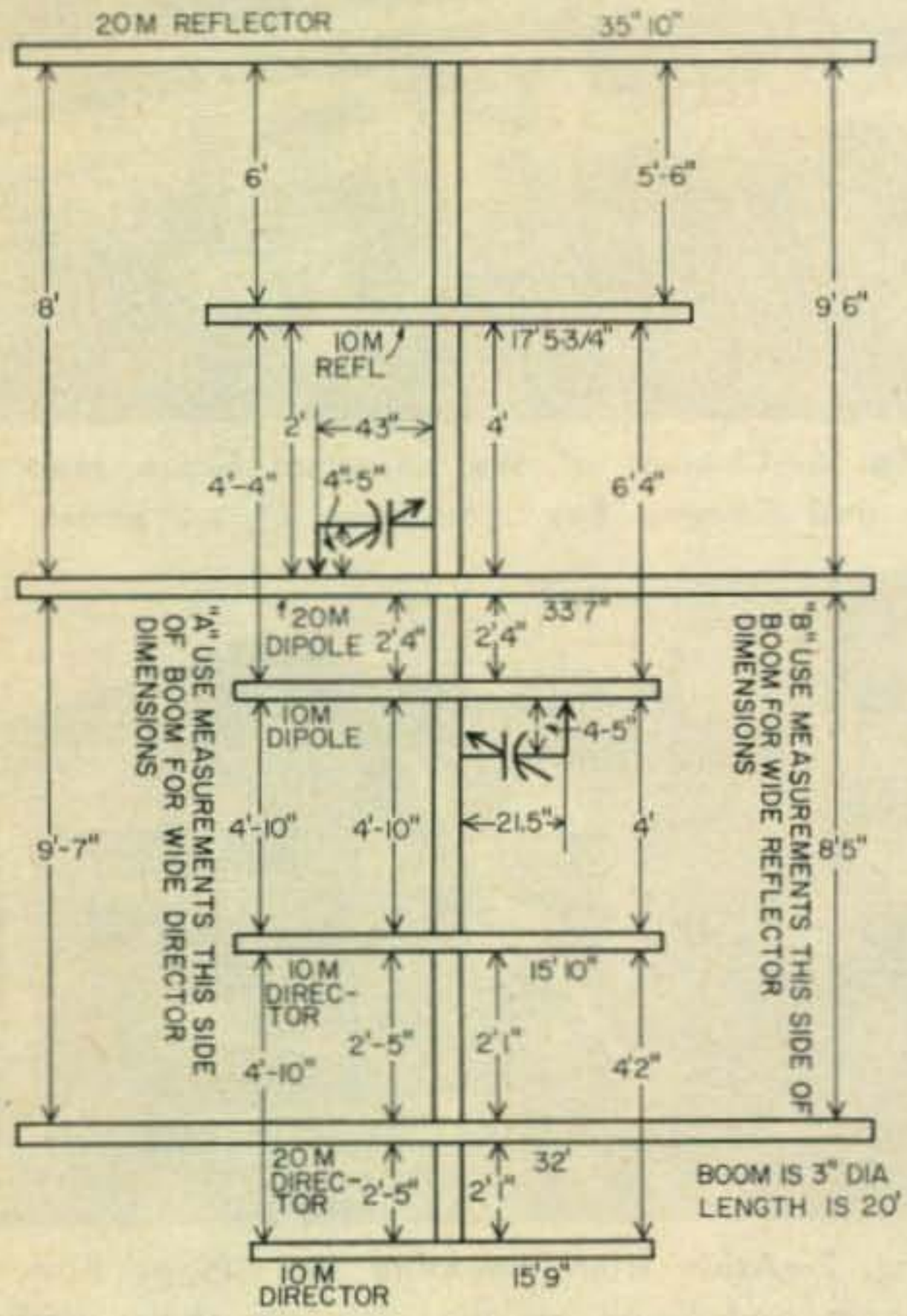


Fig. 8—Boom dimensions and spacing.

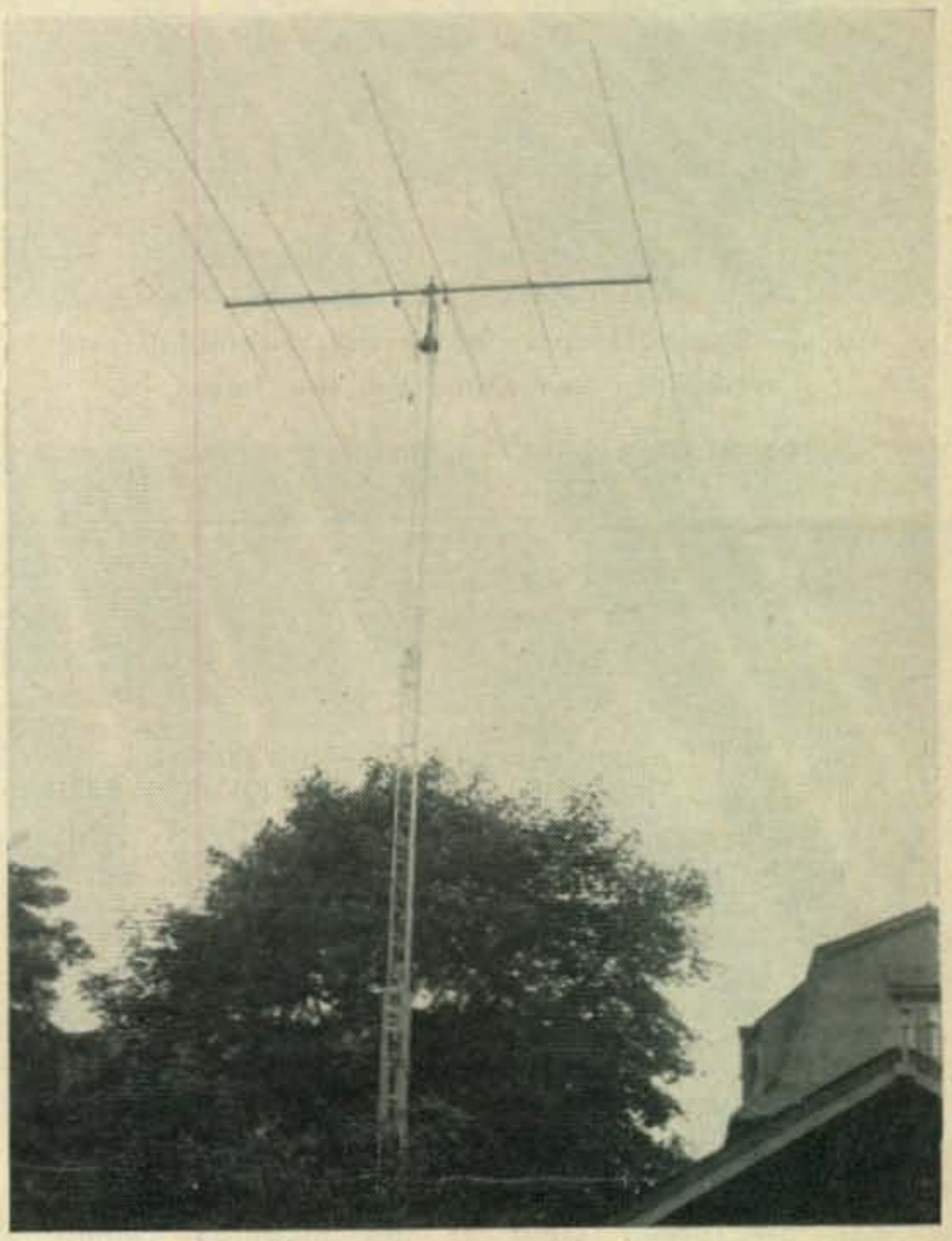
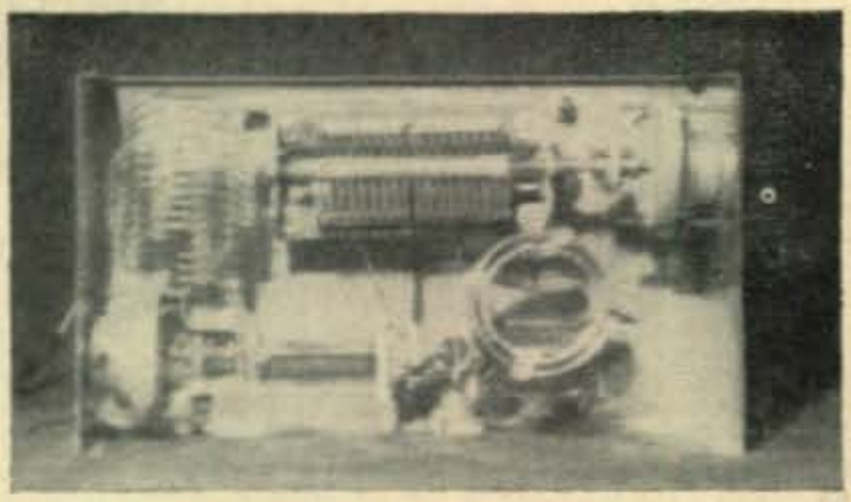


Fig. 9—Antenna mounted on EZway mast.

A Motor Tuned Beam

R. Lynn Kalmbach, W4IW
Hopkins, S. C.



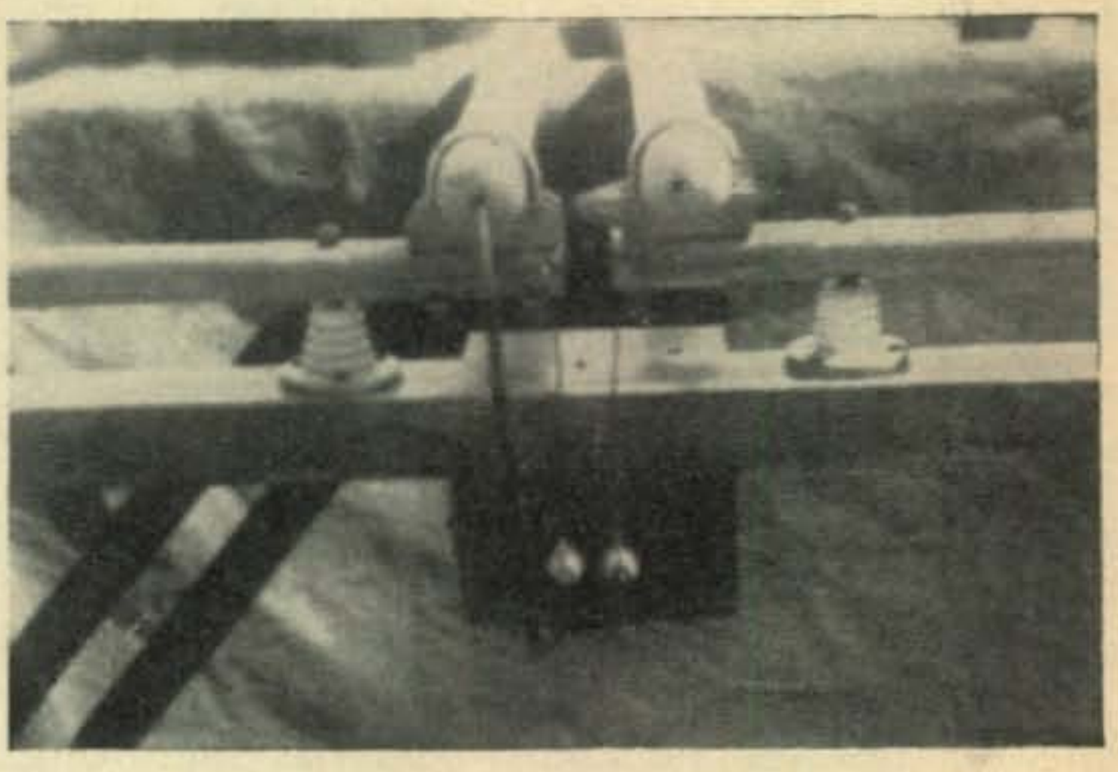
After using a G4ZU beam as described in the March 1957 CQ, I was impressed with the possibility of using one *rpm* motors to give the beam more flexibility with respect to band width and to enable adjustments from the operating position. After studying the work of K9GEX in this field, the feasibility of the plan was no longer in doubt.

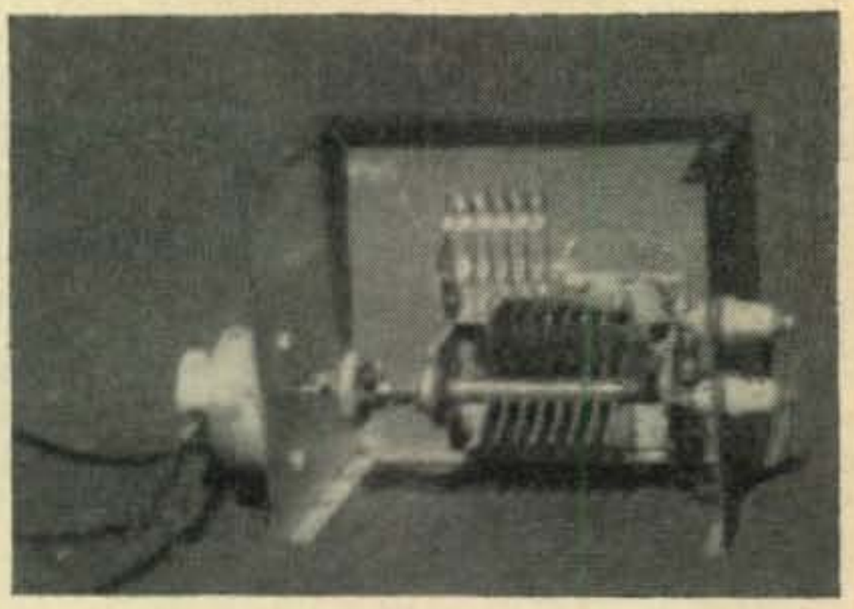
The quarter wave open stubs which are located in the boom of the original model were replaced with a coil and condenser in series as illustrated in fig. 1. The condenser in turn was connected to a small one *rpm* motor. (This motor was advertised by the Boston Radio Shack for $1.49.) Two such units are required; one for the director, and one for the reflector. Photo number I shows the construction of these units. Photo number II shows the unit in place on the beam with the RG59U cable entering the boom. This cable is used to bring the 110 to the motor from the top of the tower and TV rotor cable is used to bring power from this point to the operating table.

With the beam completed and push buttons installed at the operating position the antenna is turned away from the reference dipole located about three wave lengths away. A grid dip meter or field strength meter is coupled to a small coil at the dipole lead-in and the director motor tuned for minimum radiation off the back. When you see how critical this is, you will wonder how you ever got a beam tuned at a height lower than operating height. The same procedure is followed for the reflector. The author uses both the high and the low end of ten, and it is possible to maintain a standing wave ratio of less than 1.2 to 1 over the whole band. While waiting for the motor control lines to be installed, the author tuned his beam by hand at the 15 foot level, then raised it to the 40 foot level. Signal reports were obtained and front to back ratios judged from different reports. After tuning the beam at full height, the signal reports, front to back, and contacts completed immediately rose.

This being successful, it was decided to place the match-box at the point where we could utilize 33 foot feeders. A match-box described on page 353 of the 1958 ARRL Handbook was constructed. Motors were connected to the condensers of this device. This worked very nicely; however, the main match-box control has been changed to a selsyn since it is reversible. See photo 3.

[*Continued on page 111*]





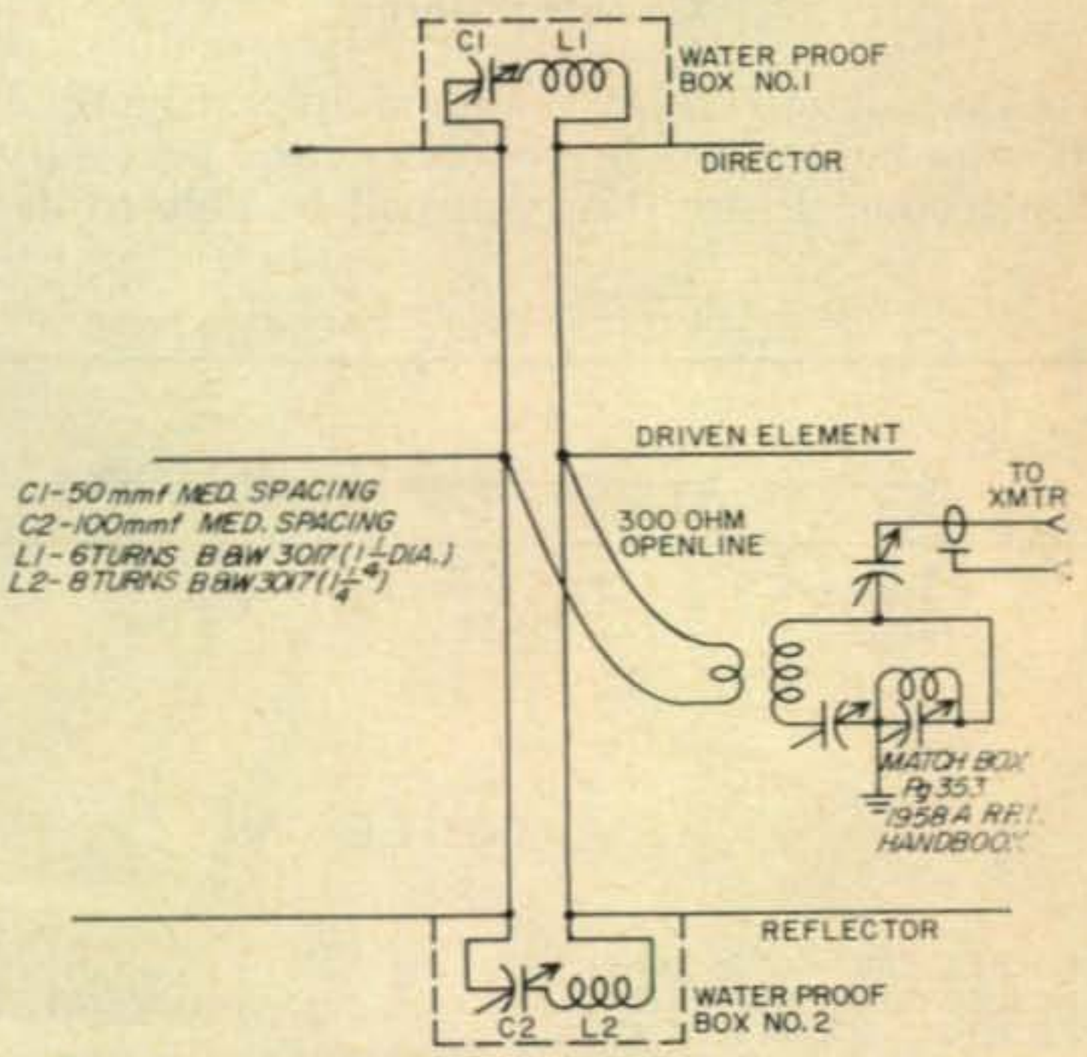


Fig. 1 — Installation of tuned circuits controlled by the remote 1 rpm motors.

A 6 Input Coaxial Switch

Ken "Judge" Glanzer, K7GCO
202 S. 124th
Seattle, Washington

Another interesting amateur project constructed around a surplus unit presents itself in the form of this coaxial antenna switch. By obtaining a switch from one of the surplus BC-375-E tuning units, and scrounging an empty coffee can, you can whip up this little workshop dandy with a bare minimum of time and labor. This switch is particularly well suited for *rf* applications as it operates under a good deal of tension, allowing for positive contact in all positions.

Most coffee cans are standardized for a ½ *lb* size and although I constructed this particular model of the unit in a Floger's can, just about any type will work out quite adequately. Aside from the switch and the can, you will need 7 type SO-239 female coaxial chassis mounting connectors. If these are purchased from new Amphenol stock, they will run in the neighborhood of a dollar and change apiece. It is, therefore, advisable to buy them on the surplus market, where they are available in quantity at about 39 cents per. You will most probably find that the spring supplied with the switch is too stiff for easy changing. By replacing this with a spring such as is used with dial cord assemblies, the action of the switch will be considerably softer, while the positive contact features will be retained.

Construction

Construction is fast and simple. Figure 1 shows a layout which provides all the necessary dimensions. From this, you will be able to determine exactly where and what size holes must be provided in the side of the coffee can.

The first step in the operation is to scribe the center line on the outside circumference of the can, 1¼ inches from the open top. Note the construction of the can. It was originally a flat piece of tin, which has been formed into a circle and spliced. This wrap around splice shows up as a seam in the side of the can. Measure a distance of 1⅞ inches from this splice and center punch on the center line. This will be the first hole. Proceed further, by center-punching additional holes, 2, 3, 4, 5 and 6 exactly 1 1/16 inches apart along this center line. Measure an additional 3½ inches from mark number 6 and center punch this last spot. Be careful to get these center punch points exact, as the coaxial connectors will not line up with the switch contacts unless you do. After the can has been centerpunched, drill through each point with a very small bit to establish the holes. Now drill through these points with a ¼" drill.

You are now ready to punch out the holes for the coax fittings. This should be done with a standard ⅝" round chassis punch . . . the same one used for 7 pin miniature sockets.

Figure 2 illustrates the method employed in drilling the four mounting holes for each coaxial fitting. Simply set the fitting into the hole, grasp it with a pair of gas pliers and drill to take 4-40 hardware. f you want to use 6-32 nuts and bolts, it will be necessary to drill out the holes in the fitting as they are designed to

[*Continued on page 110*]

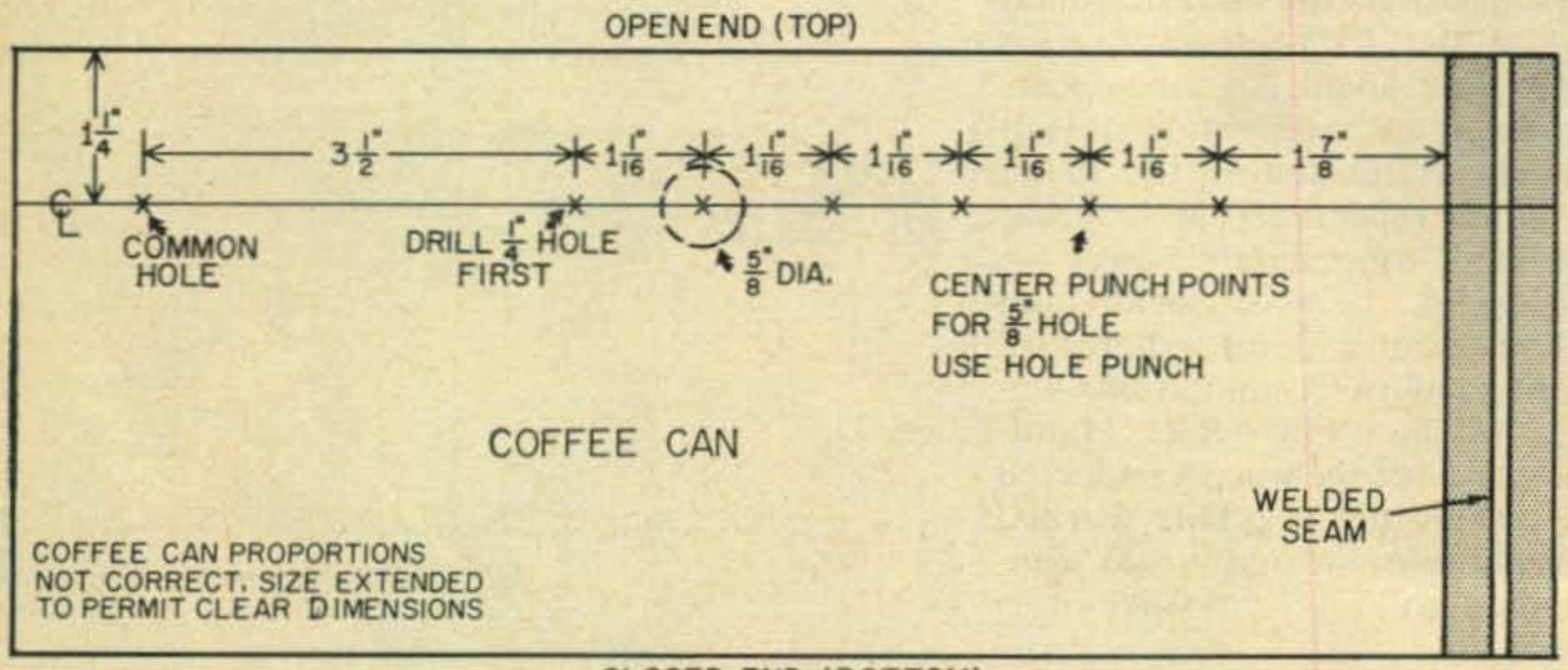


Fig. 1—Location of holes in coffee can.

Gamma Matched 6 Meter Ground Plane

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North Park Manor
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Ground plane type antennas have enjoyed considerable popularity in ham circles for many years. The only way in which the gamma matched ground plane differs from the conventional ground plane is in the method of impedance matching. While the antenna to be described is designed for 6 meters, the idea involved can be used in construction of ground plane antennas for other bands.

Construction

Figure 1 shows a 10 foot length of unpainted aluminum or galvanized steel TV mast section used as the vertical staff. Ground plane elements are attached 5 feet from the top of the staff using TV type U bolt assemblies. Aluminum or galvanized clothes line wire is used for the drooping ground plane elements. The ground plane elements should droop about 45 degrees and be 5 feet long on each leg. An L-shaped bracket to support the chassis type coaxial fitting should be secured to one of the U-bolt assemblies which support the ground plane elements. Another U-bolt assembly is secured to the staff 12 inches above the U-bolt assemblies which support the ground plane elements. The gamma impedance matching device is made of number 10 copper wire 15 inches long. A 90 degree bend is made 4 inches from one end of the 15 inch length of copper wire. The end which is closer to the 90 degree bend is secured to the U-bolt assembly which is 12 inches above the ground plane. The other end of the copper wire should point down toward the coaxial fitting. This lower end should be soldered to one side of a 5-50 mmf trimmer capacitor. The other side of the trimmer should be soldered to the center conductor of the coaxial fitting. Dimensions given are for use with 50 ohm coaxial cable transmission line.

Although the discussion above indicates a continuous staff, the antenna can be constructed using a 4 foot automobile whip above the junction of the gamma tap and staff. For any given height the use of a whip will make a lighter antenna. U-bolts can be used to secure the whip to the mast section. The author's first attempt at construction of the gamma matched ground plane utilized a whip in this manner as can be seen in the photographs.

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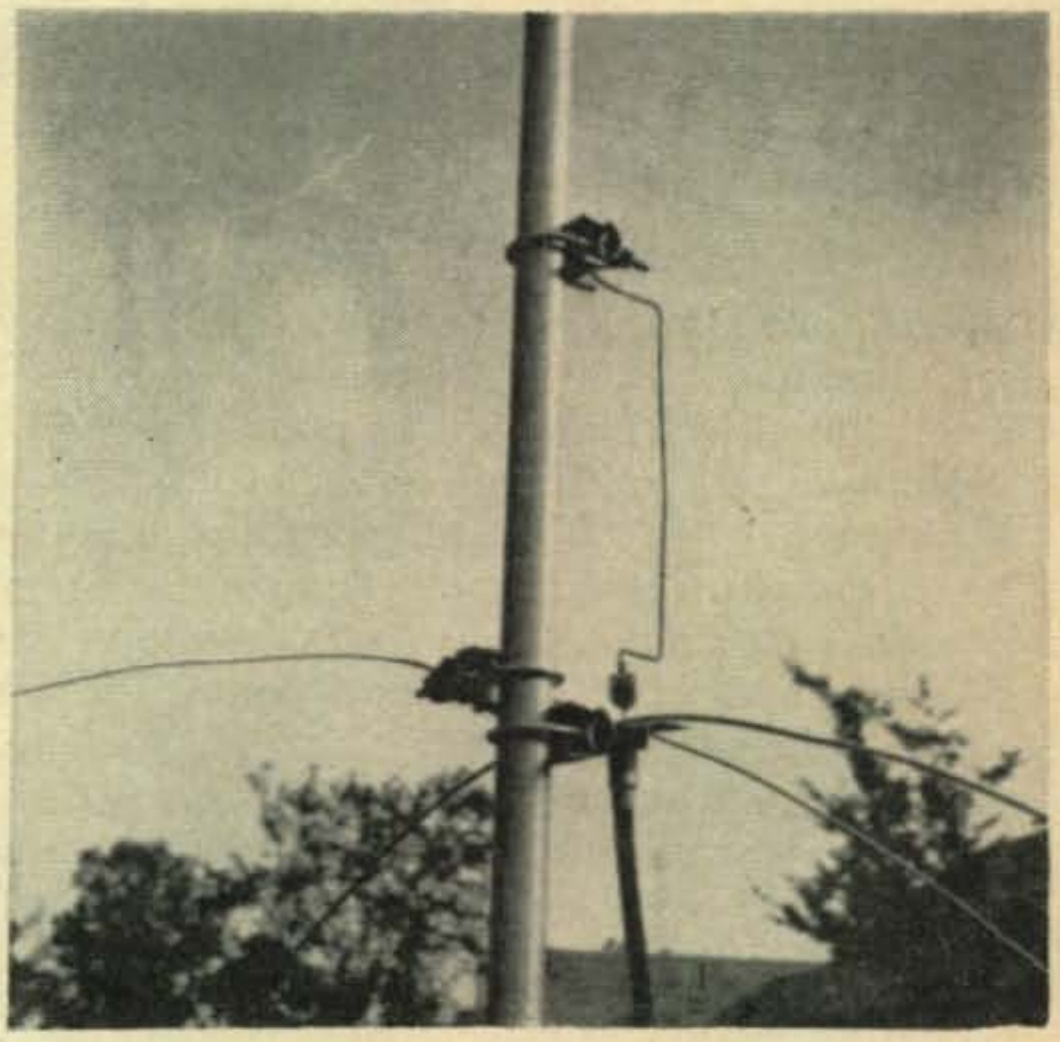

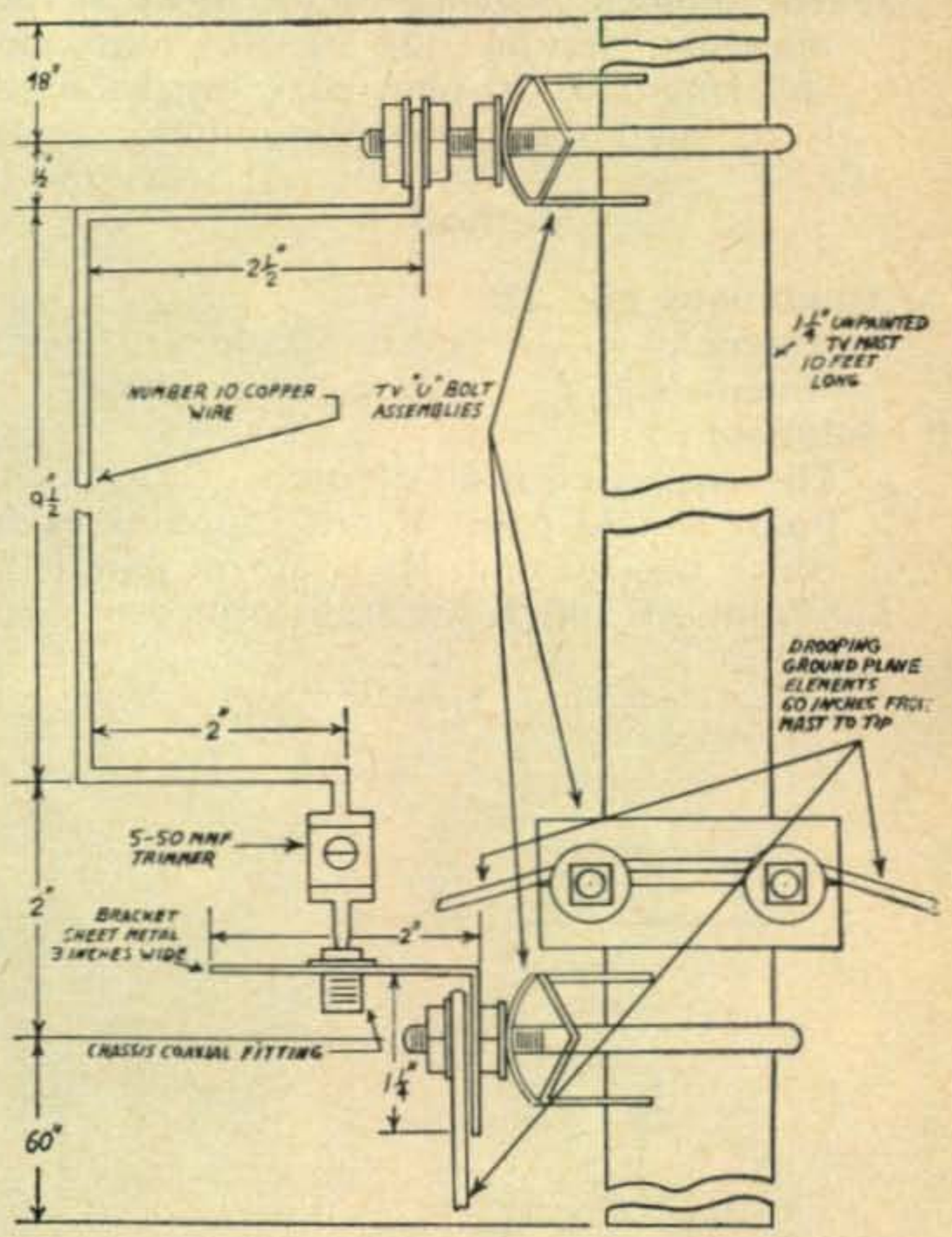

Fig. 1—Details of the positioning of the drooping ground planes and the gamma impedance matching device.

Matching Stacked Beams With Coax

Thomas E. White, K5AON
867 Berkenshire
Dallas 18, Texas

This article is written for the benefit of those of you who have searched in vain, as I have, for the answer to the problem of stacking and matching 50 ohm beams. I have used the following methods with success:

Method I

A. **Conditions (fig. 1):**
1. Antennas 1, 2 are 50 ohms.
2. Antennas 1, 2 are fed in phase.

B. **Solution:**
1. Antennas 1, 2 are connected together with a full electrical wavelength of 50 ohm coax, (physically ⅝ wavelength distance between antennas), making the impedance of the stacked array at Antenna No. 2, 25 ohms.
2. This 25 ohm impedance is transformed to 50 ohms by a ¼ wavelength matching section (two pieces of 72 ohm coax in parallel).
3. The input impedance of the array at the matching section now is 50 ohms and any length of 50 ohm coax can be used from this point to the transmitter.

Method II

A. **Conditions (fig. 2):**
1. Antennas 1, 2, 3, 4, are 50 ohms
2. Antennas 1, 2, 3, 4, are fed in phase.

B. **Solution:**
1. The coax used is all 50 ohms
2. Point A and point B are 25 ohms each (since two 50 ohm leads are in parallel).
3. Points A and B are transformed to 100 ohms by the ¾ wavelength of 50 ohm cable.
4. Point C is now 50 ohms (paralleled 100 ohm load).

In cutting coax for matching sections the velocity of propagation of the coax must be considered. For solid Polyethylenes coax such as RG8/U, 9/U, 58/U, and 59/U the velocity of propagation is 66% of the velocity of propagation in free space.

Example:

Free space wavelength in feet $= \frac{66300 \times 3.28}{f \text{ in megacycles}}$

Wavelength in feet for coax with a velocity of propagation of 66% $= \frac{.66 \times 300 \times 3.28}{f \text{ in megacycles}}$

Why Stack Beams?

Some people may ask why stack 'em? Well, here's one good reason. The stacking of two like beams will increase the effective radiated power 3 *db* and will also increase the received signal by 3 *db*. Stacking four like beams will give an effective radiated power of four times one beam. This will also help the reception by one "s" unit or 6 *db*. These methods of increasing the effective radiated power are sometimes more desirable than raising the transmitter power, or increasing receiver sensitivity, since the latter is sometimes more difficult to obtain, due to inherent noise in tubes at higher frequencies.

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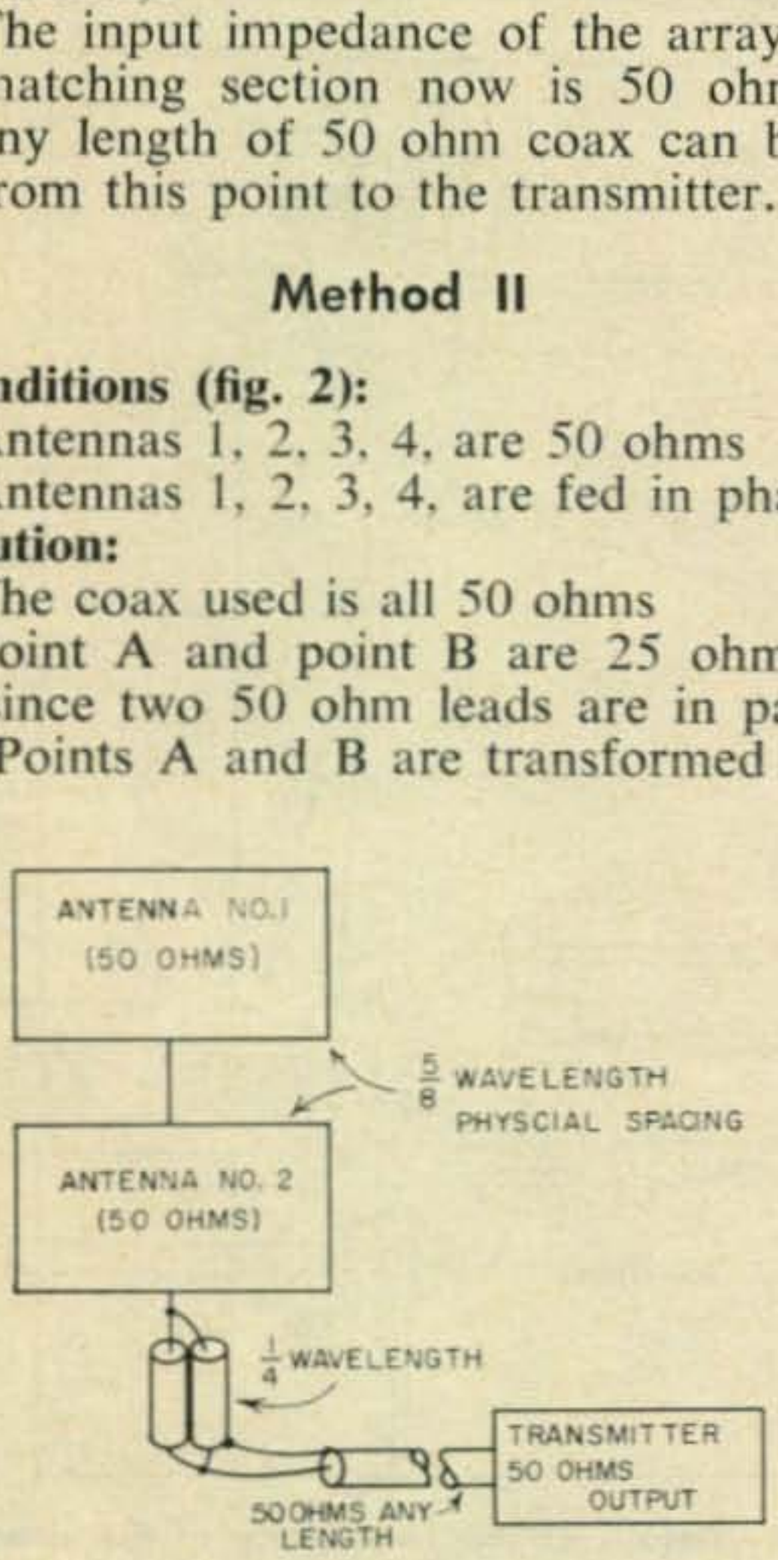

Fig. 1

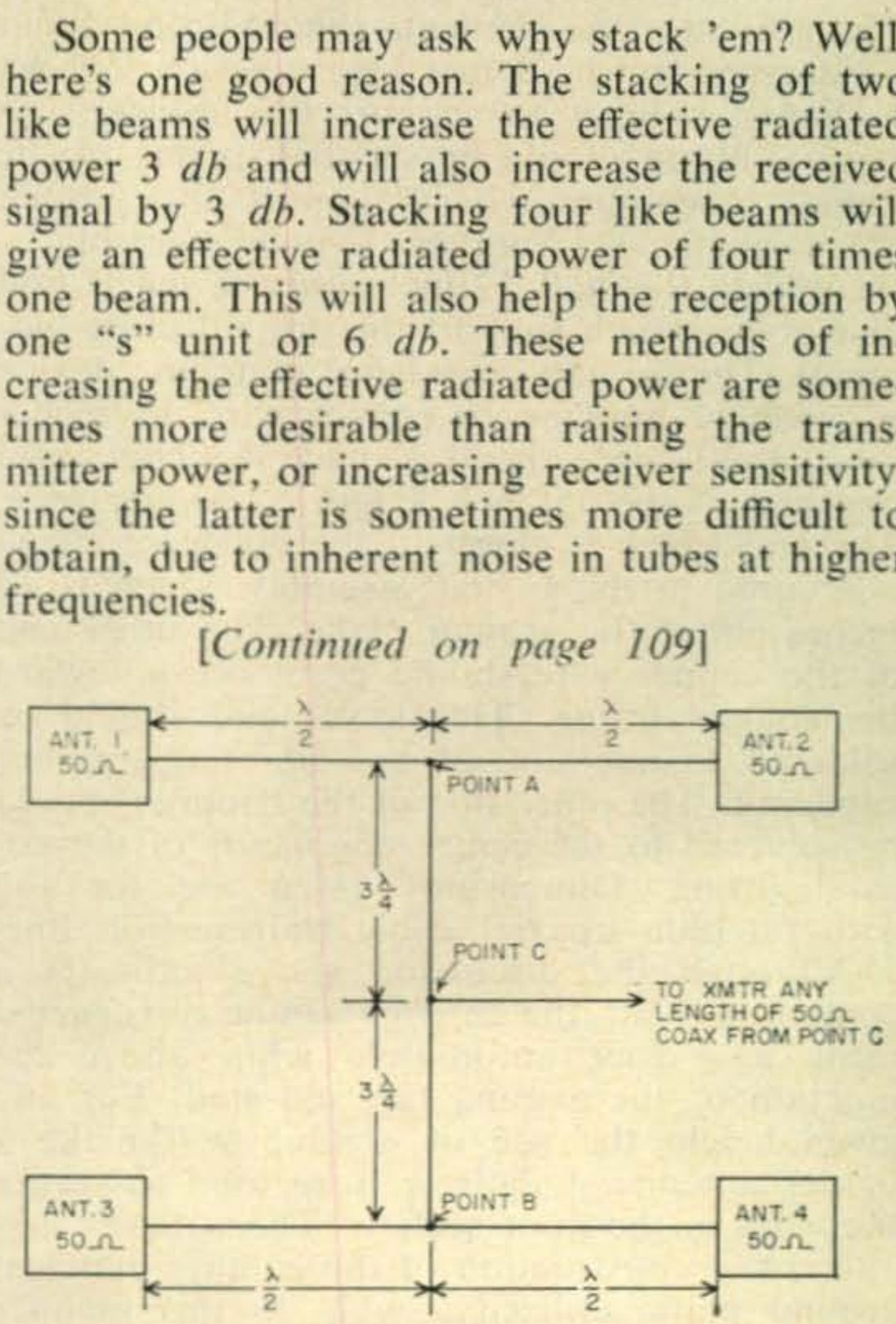

Fig. 2

Keep It Simple

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209 Conti St.
Jackson, Miss.

How many hams have said this, "I can't get on 3.5 *mc*, I don't have a big antenna"?

I suppose they think you have to get a complicated antenna like a folded dipole 132 feet long to get on that band. Fortunately anyone can make a satisfactory antenna in a few minutes for 3.5 *mc* or any other band.

There is a certain length of wire that will hook on any pi-network output (or link coupled output), and load right up without an antenna tuner. If your length is right you don't need a feed line, tuner, or gadgets.

Frequency Band	Antenna Length
1.8	132 feet
3.5	66 feet
7.0	33 feet
14.0	16 feet
21.0	11 feet
28.0	8 feet

These antennas are intended for ordinary purposes, not competitive sports like DX contests. Fifty watts or so will be plenty of power for good contacts. These simple antennas don't insure against TVI or harmonic radiation but with a clean transmitter of modern design they are satisfactory.

Here's how simple you can get. The wire can be any conductive material, insulated, non-insulated or it can be half-insulated. Wire from a burned out transformer will work as good as brand new wire even if it has half-charred insulation. A cheap roll of clothes line wire is good. It can be small scraps soldered together.

The only requirement is that the length be approximately right and the wire not be coiled up in a roll, and that the wire not touch itself if it folds back toward the beginning. Stretched out in a straight line is ideal, but it can bend back or go around in a circle.

Where to put it? Outside is best, but if you live in a wood or brick house it will work inside, or in the attic. Inside the house it can run under a rug, along the wall, across the ceiling or all of these. Touching the remote end of the wire may produce enough arc to burn the finger, so keep it where people won't touch it, or use insulated wire. Don't let the bare wire touch metal objects, especially if the contact is intermittent.

If the wire runs outside, get it high enough off the ground so that people won't trip over it. That is high enough. As high as your house is ideal. It probably won't help to get it higher. Do you need insulators at each end? If it is raining you probably need an insulator. If it is dry you won't know the difference. Even then you only need to insulate the far end.

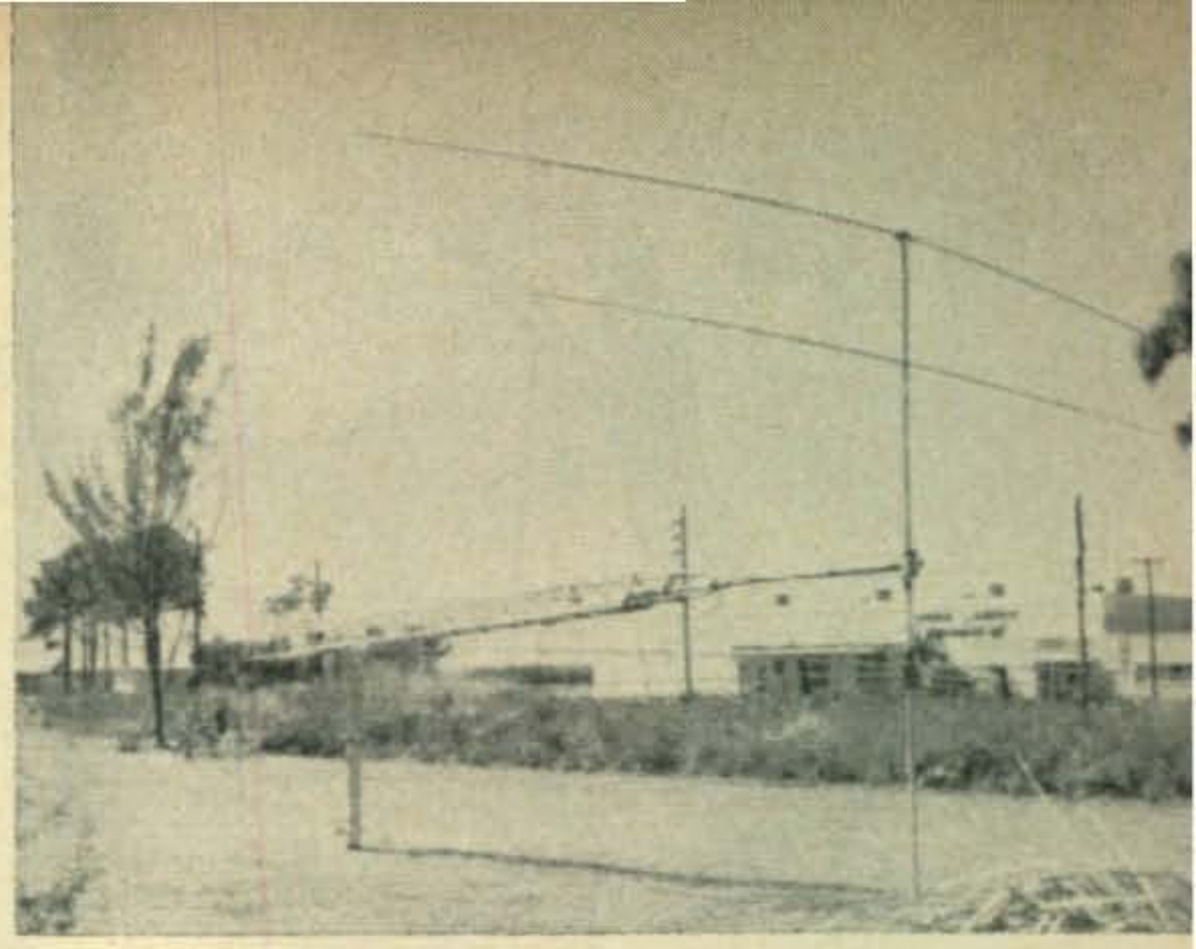
What will simple antennas like this do for you? As far as 50 watts is concerned, I might venture the statement that you could probably work more DX on 3.5 *mc* than you could work on 14.0 *mc* if the time is a good winter night. The reason is simply that under good conditions you can put a signal into Europe or New Zealand with 50 watts on 3.5 *mc* and you probably won't be bothered with high power competition like you will on 14 *mc*. You can also work all over the USA most nights.

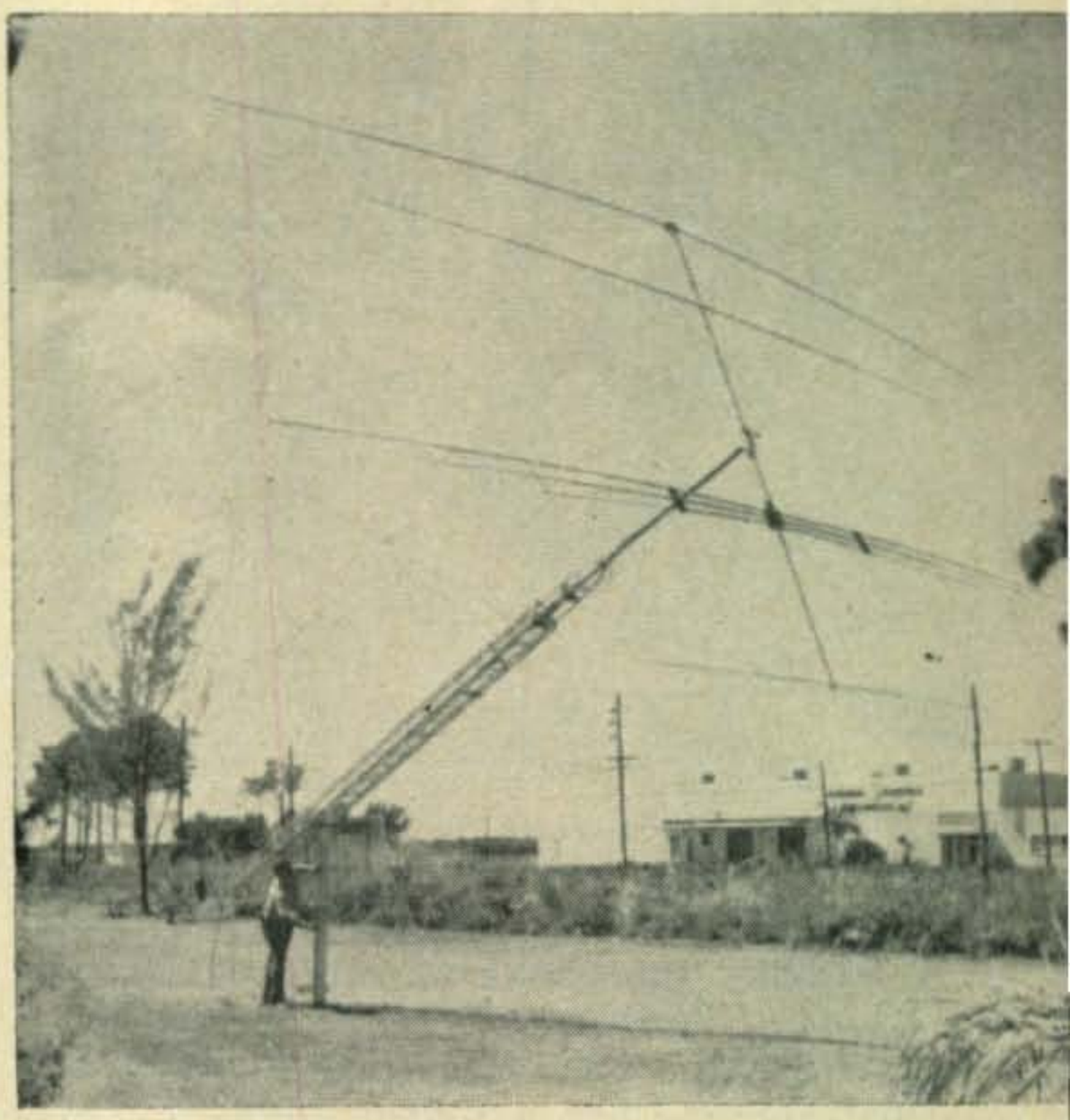
The antenna lengths in the table are about ¼ wave long for the respective frequencies. The 33 foot long antenna can be used on both 7.0 *mc* and 21.0 *mc*. If your transmitter won't load into these wires, it may need a ground. If the ground wire is long and it won't work, put a second wire of the same length in place of the ground. Run the second wire in generally the opposite direction to the antenna.

On the higher frequencies these simple antennas may not get out very well, especially if there are a lot of trees or obstructions around. However on the lower frequency bands there won't be a lot of difference between a piece of wire and a good antenna, for practical purposes. ■

CQ Reports On

Ham Towers by E-Z Way





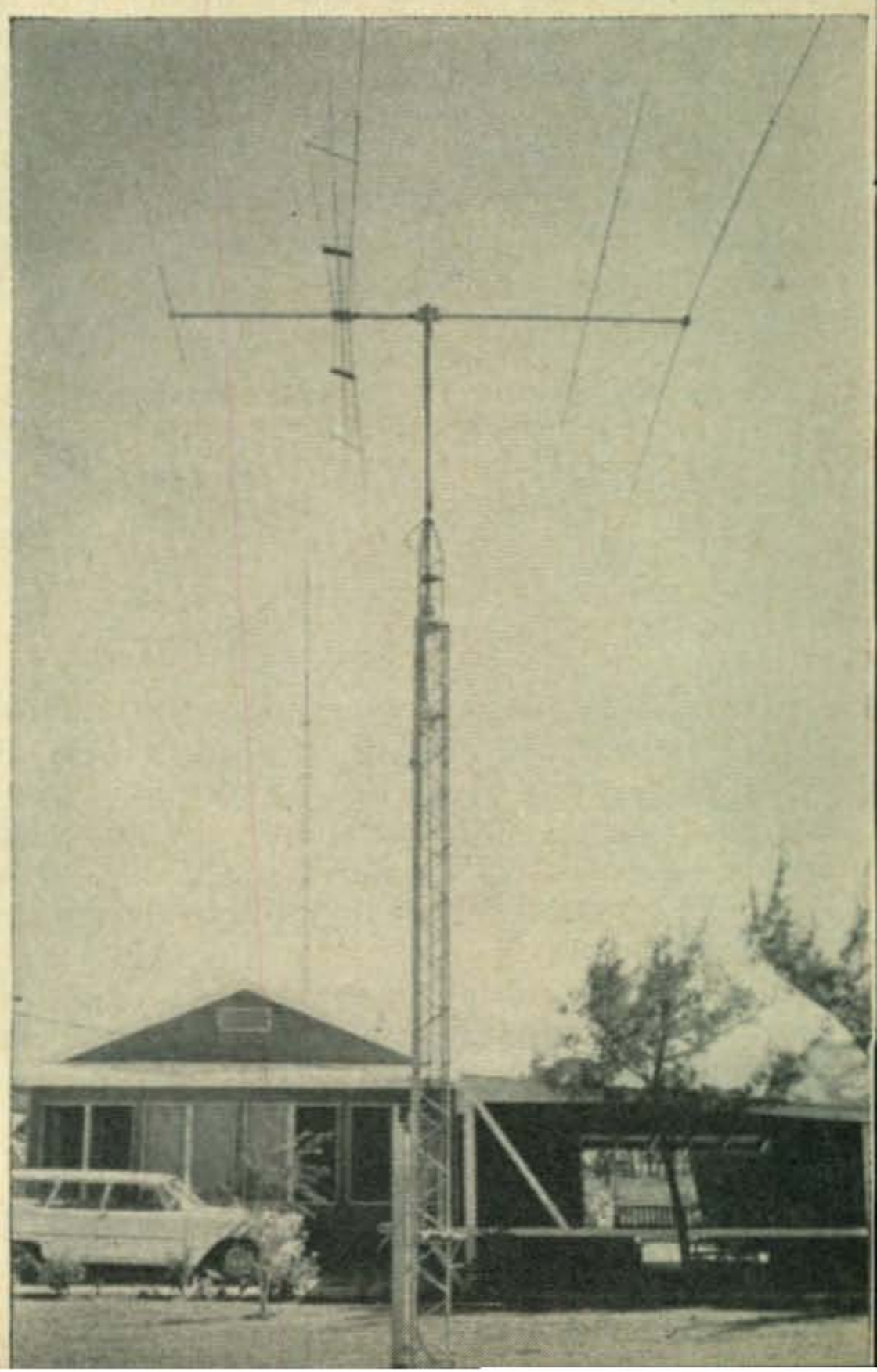
With the high frequency bands becoming more and more popular every day, and with rotary beams being so desirable, the necessity of getting our arrays up and in the clear is always a major consideration. The E-Z Way people of Tampa, Florida who are well known in commercial and governmental circles as manufacturers of high quality antenna structures, have taken the demands of the amateur market in stride and provided an interesting and versatile line of towers for amateur applications.

Since the E-Z way line is a large one, we can't begin to give detailed descriptions of all the different models available, in the alloted space. We have, however, selected one model in particular which we feel is fairly representative of the E-Z Way line and present, herewith, a report on this model. (Model GP RBX 40).

The Model GP RBX 40 is a forty foot tower which has two interesting features in particular. Firstly, you can crank the tower from a fully extended forty feet to 24 and then tilt it over to allow servicing the beam or rotator without the need of putting on the safety belt and going to the top. Photo 1 shows the tower cranked down and tilted over with a Telrex Tri-Bander installed. Note that the base of the tower is hinged to a solid ground post which serves as a pivot point as well as a support. Photo 2 shows how one man, alone and unaided can easily crank the tower from a horizontal to a vertical position with the beam and rotator installed. Photo 3 shows the tower in the vertical position. It may now be raised to the maximum height, 40 feet. This installation, free standing, will take the indicated load at winds of 90 miles per hour. In spite of the indicated maximum figure on an E-Z Way tower, a generous safety factor has been included in the design. Also worth mention, is the fact that the tower requires less than ¼ of a square foot of space for the base.

E-Z Way, Inc. produces a complete line of towers for ham and commercial applications in heights up to 175 feet, fully mechanically actuated. The tower in the illustrations, graces the QTH of K4SQI, William M. Reigner Jr. at Tampa, Florida.

B. A. Briskman, K2IEG

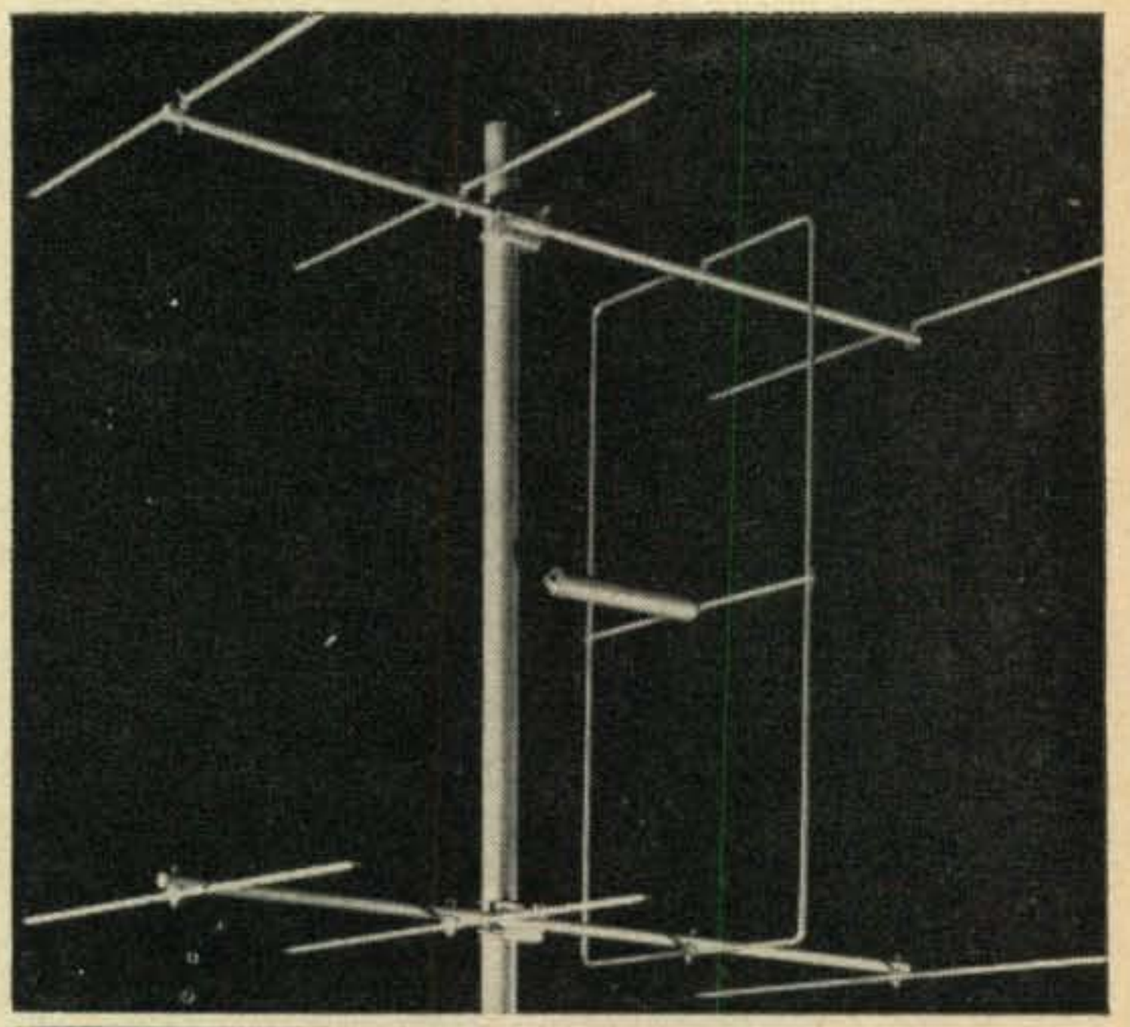


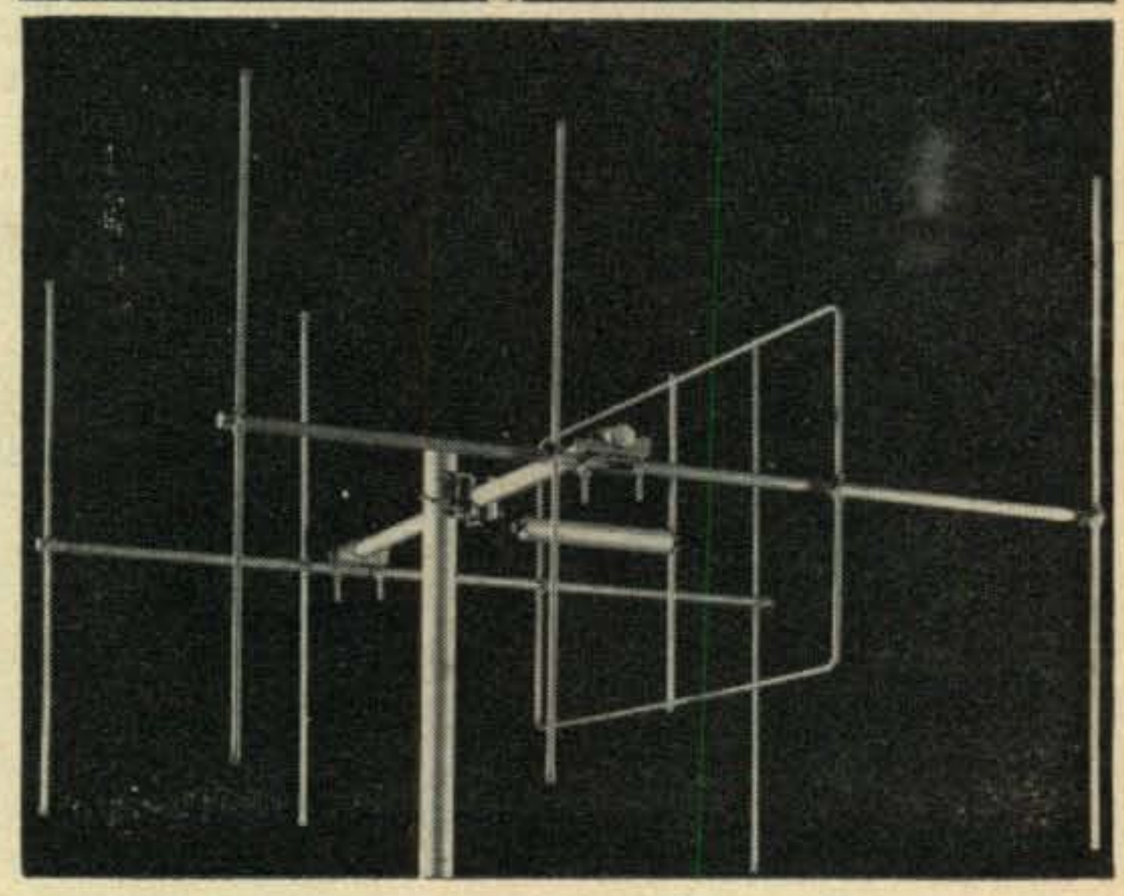
The "J" - Beam Antenna

About eight weeks ago a gentleman from England walked into the office and suggested that we might be interested in a new type of two meter beam which is currently popular in Great Britain. The name of the company he represented was "J"-Beam Ltd. About two weeks after our conversation, two of these beams were delivered to CQ labs for test and evaluation purposes. One was installed at K2IEG and one at K2RBM. Alternate polarizations were selected. Note the two photos. The antenna may be mounted either horizontally or vertically.

The thing that suprised me most about the "J"-Beam was the extra rugged mechanical design features it embodied. The aluminum tubing, for instance, is seamless and has a much heavier wall than the average two meter array of comparable value. The clamps that hold the elements to the boom are heavy molded types which are merely moved into position and tightened by means of a wing nut assembly. (The beam is shipped with the matching bars off and the elements folded back onto the booms). Our neighbors from across the pond have even gone as far as to provide tight fitting plastic plugs which are inserted into the ends of the booms to provide a watertight fit.

Electrically, this antenna functions extremely well. It has a F/B ratio of 21.5 *db* and a forward gain of approximately 13.8 *db* over a reference dipole. While the nominal feed point impedance is in the neighborhood of 210 ohms, a coaxial balun assembly can be supplied with the antenna. By fastening this where the 300 ohm line would normally be attached, and connecting a coaxial line to the SO-239/83-1R connector on the other end of the balun, you may select a 52 ohm coaxial feedline. It's nice to have a choice in matters such as these. This balun is sealed in a waterproof tube and perfectly fits the mounting on the "J" Match assembly.





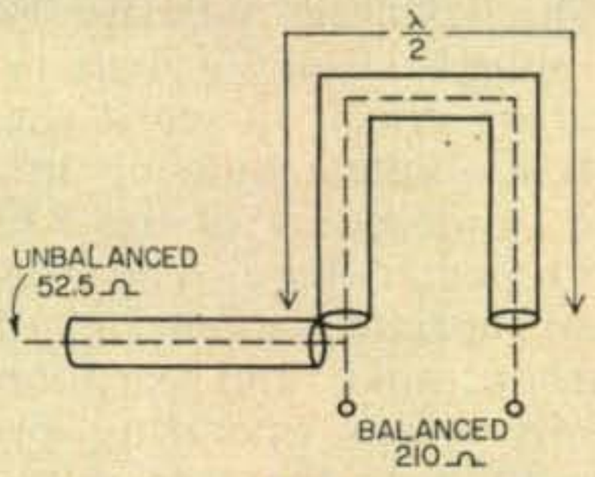


Fig. 1—In this type of Balun the phase inverting properties of a half wave-length of line are used to effect a line balance converter, but with an impedance transformation of 4 to 1.

Results

Both Stu, K2RBM and Barry, K2IEG put the two antennas through the paces for several weeks, using opposing polarizations. Stu found that contacts in the local area were much improved over the 4 element vertical he had been using, and Barry reported great success with skip contacts. The antenna is extremely light weight and can be turned with the smallest TV rotator.

This unit will be on the market in the very near future and will be available through distributors. Further information can be obtained by writing: Interlab, Inc. 437 Fifth Avenue, New York 16, New York. ■

SURPLUS

by **KENNETH B. GRAYSON, W2HDM**
Care of CQ 300 West 43rd Street, N. Y. C. 36, N. Y.

The BC-1335 is one of the series of equipment's that can be used on the new citizens band with only minor modifications. It is unsuited in its original form because it is *fm* and uses a *vfo* for its transmitter (and therefore cannot comply with the technical requirements of the law). The same thing is true of the BC-659 converted last month. Perhaps the most notable feature of the BC-1335 is that it can be changed from six to twelve volts merely by turning one switch and applying the power to the correct power plug pins. The fact that it already covers the ten and eleven meter bands is pure luck as far as we are concerned.

The actual conversion can be accomplished in one evening. Figure 1 is the complete schematic of the original equipment. A complete article on how to convert and use the equipment as an *fm* transceiver was published in CQ, December 1957. Note that the power supply requires a negative ground. If your car has a positive ground (and it probably does) it will be necessary to reverse the high voltage secondary connections of the power transformer to the vibrator. Since the vibrator is of the synchronous type (self-rectifying), reversing the input polarity of the power will reverse the high voltage polarity as well. Once power is applied (using a battery or a battery eliminator) check to see if the equipment works at all. Complete tune up information is given in the inside cover of the 1335 case and will not be repeated here. The crystals should be in the appropriate sockets in order to function. A carbon mike and earphone must be used as well. When operating properly you will be able to hear the transmitted signal in the headset, since the receiver is always monitoring the output. A word about transmitting is in order here. No on the air testing is allowed without a valid license. This means you can't operate on ten meters without an amateur general class license. Likewise, operating on the citizen's band without the citizen's band license is also illegal.

Having decided the unit works, disconnect power and start the conversion.

Receiver Conversion

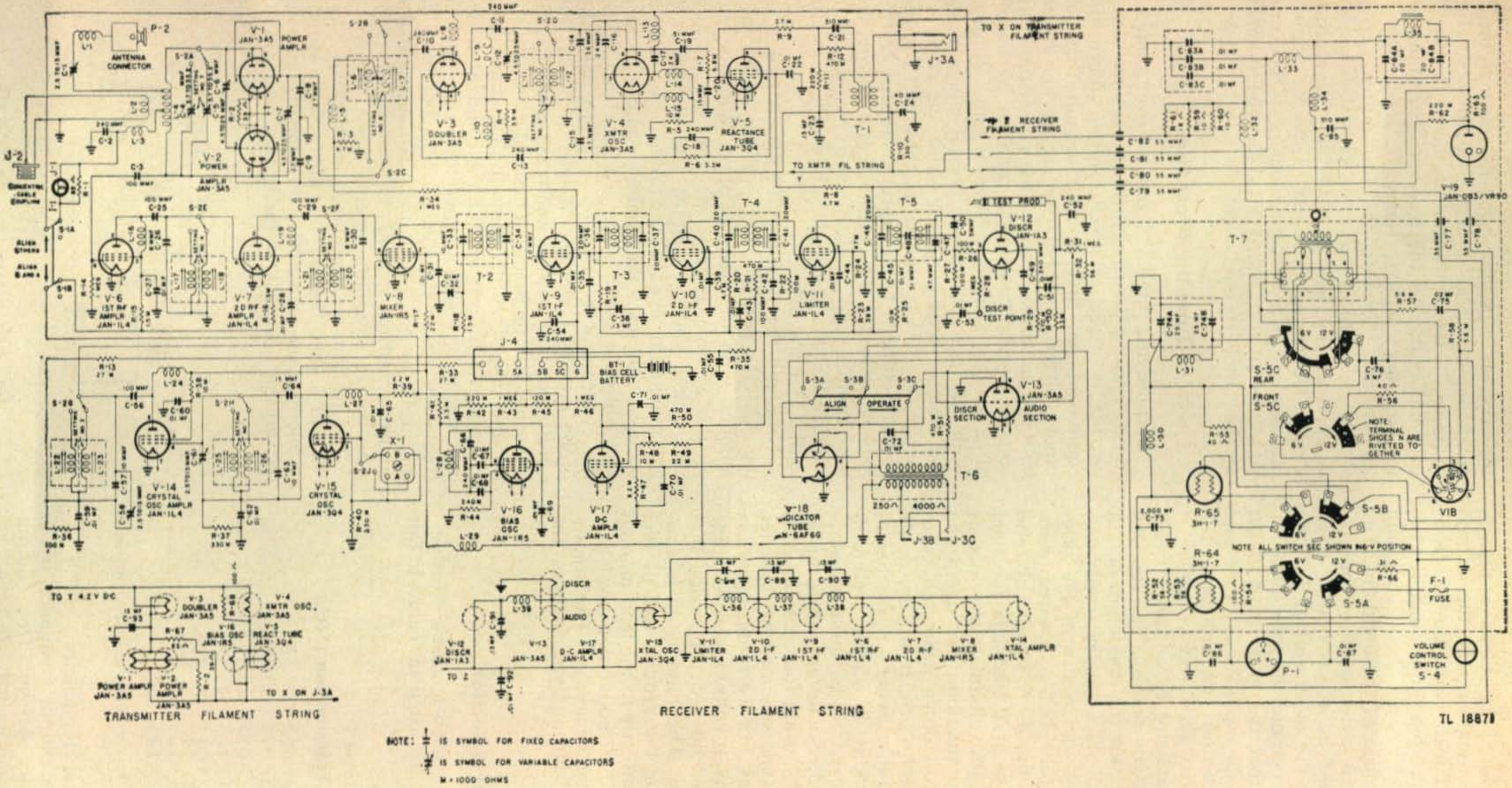
The only real change made in the receiver is to the detector. The 1L5 (V-11) is rewired to a diode detector, first audio amplifier. This is done by substituting a 1U5 for the 1L5 (V-11). In order to wire the socket properly we have to add a .01 mf disc capacitor to ground from pin 3 and remove the wire connected to pin 6 and reconnect it to pin 4. Connect a ten megohm one-half watt resistor from pin 6 to ground and add a .001 mf disc capacitor between pin 6 and R-22 as shown in fig. 2. Remove the green wire at pin 3 of V-12 and reconnect it to pin 2 of the 1U5. This is the complete receiver conversion, and you will see that we have added an *am* detector in place of the original *fm* detector and an additional stage of audio amplification to provide more earphone volume.

Several tubes have been left unused and should be left in their sockets, otherwise, the filament wiring will be effected. We could have substituted resistors, but the additional expense didn't seem worth while, since the equipment works perfectly fine as it stands.

The 1A3 (V-12), which is unused, can be converted into a noise limiter if desired (see any handbook). AVC was not employed because the 1L5 type tube is a sharp cut-off type and must be replaced by a remote-cut-off type such as a 1T4. This would also necessitate many additional circuit changes which were not justified by the additional cost of the tubes, considering the fact that this is a simple conversion. We'll add *avc* later on, if we find it necessary.

Transmitter Conversion

The transmitter modification proved to be a little more difficult due mainly to the type of oscillator employed in the BC-1335. The original oscillator was a push-pull type using a 3A5 twin triode. We paralleled the two sections making one triode crystal oscillator. The



TL 18871

Fig. 1—Schematic of the BC-1335.

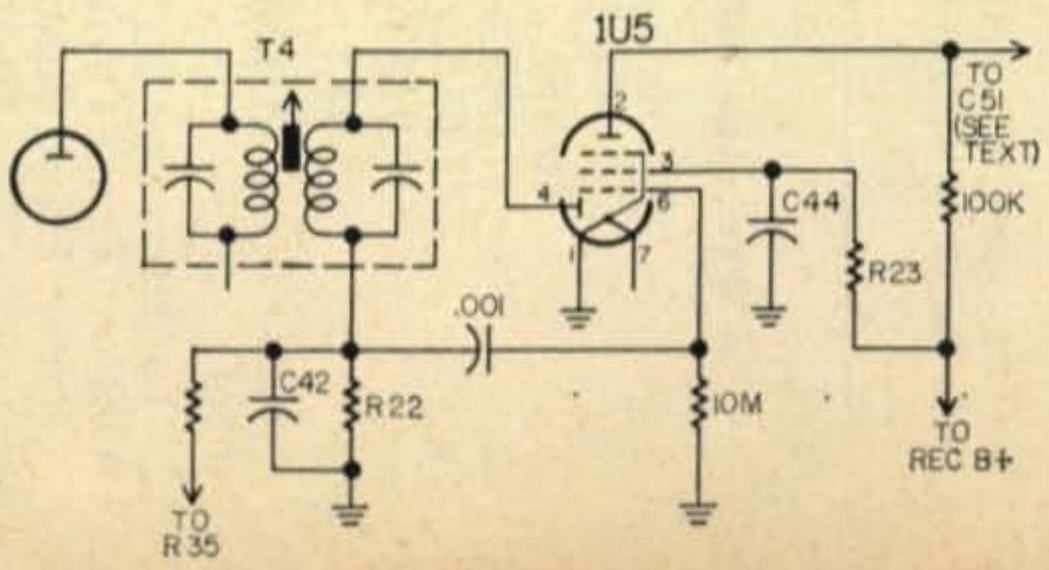
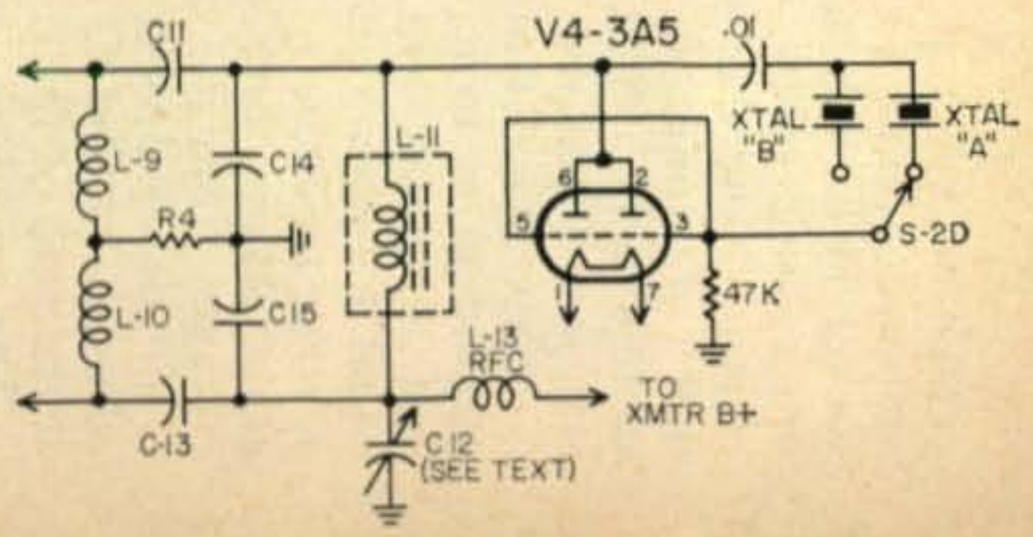


Fig. 2—AM detector and first audio.

Fig. 3—Transmitter crystal oscillator.



crystal socket was wired as shown in fig. 3, and we found we could mount the crystal socket (which is a Cinch part number 2K4) on a long screw, to, but not touching, the chassis. Note that L-12 is not used at all, and that L-11 tunes the plate of the oscillator. The switch section S-2D is used to select the crystal instead of the coil as it was before. C-12 is reconnected from the other end of L-11 to ground so as to balance out the tube capacity, and to make sure that the grids of V-3 get equal voltage. You can use a diode probe and a *vtvm* to actually measure the voltage at the grids. Make sure that they receive equal *rf* voltages from the oscillator by adjusting C-12. If no diode probe *vtvm* is available, you can adjust L-11 and C-12 for the maximum output at the grid of the final stage, as described later.

The *am* modulator makes use of the original *fm* modulator tube but is rewired completely as shown in fig. 4. A small 1:3 ratio transformer is used to grid modulate the final stage. Theoretically grid modulation is not as efficient as plate modulation, but again the desire to keep the cost down prompted us to use the economical approach. It will no doubt make things considerably easier for the beginner in the field of radio. It worked well with the BC-659 and proved to be quite satisfactory in the BC-1335. Some improvement in quality was noticed by using four pen-lite cells (6 volts) for bias. Some sets may work better with more or less bias, but we found that ours worked fine with only 6 volts. Likewise, some bias was also required on V-5. The same bias cells were used here. The modulator is connected by unsoldering the ground end of R-3 and connecting R-3 directly to the lead marked "to R-3" on fig. 4). No modulation level control was found to be necessary. The microphone is a standard carbon type such as the T-17.

Crystal Selection

The various frequencies available for citizens band operation are listed in Table I. For the receiver it is necessary to subtract the *if* frequency of 4.300 *kc* and divide by four. For example, 27.075 *kc* would require a frequency of 5.69375 *mc* for the receiver. The transmitter frequency is four times the frequency of the crystal, therefore the transmitter crystal should be 6.76875 *mc*. The crystal tolerance is specified by law as 0.005%. V-precision Crystal Company, Elmhurst 73, N. Y. supplied our crystals at a very nominal cost. The crystals are in a standard FT-243 type holders, or their modern equivalent.

Table I

Frequency of Transmission (MC.)

26.965	27.055	27.155
26.975	27.075	27.165
26.985	27.085	27.175
27.005	27.105	27.185
27.015	27.115	27.205
27.025	27.125	27.215
27.035	27.135	27.225*

*(Used on a shared basis with control equipment)

To determine crystal frequencies:

Xmitter Freq: Divide output frequency by 4.

Recvr Freq: Subtract 4.3 *mc* from output frequency and divide by 4.

Tune-Up Procedure

Because the BC-1335 has its own built in tuning eye, the adjustment of the various tuned circuits is made relatively simple. Turn the equipment on, first making certain that the input voltages and polarity are in agreement with the pin connections of the power plug and voltage switch. Power is turned on by means of a switch gauged to the volume control. With the correct receive crystal plugged in, the table of settings found inside the cover of the BC-1335 case should be consulted for the proper settings. To interpret channels as frequency, consider the decimal point before the last number and read it as a frequency in megacycles. For example, channel 271 is actually 27.1 mc, etc.

Now, put the ALIGN-OPERATE switch in the ALIGN position and put the probe into number 1 on the terminal strip. With the aid of the volume control set the eye to just about close and then adjust setting number 1 for maximum eye closure. You may find it necessary to reset the volume control so that you will have more of the eye to close. When the eye cannot be closed any more, take the probe out of 1 and put it into 2. Make this adjustment with setting number 2 and proceed the same way as before. These adjustments are for the crystal oscillator-multiplier stages and are not overly critical. With the aid of a decent signal, or a signal generator on the correct frequency, make the eye close as before with the probe in pin 5A of the terminal strip, by adjusting settings 3 and 4. That is all there is to our receiver adjustments.

The transmitter is adjusted in a similar way, but will require the use of a microphone switch to energize the transmitter. Put the crystal into the crystal socket and the probe into pin 6.

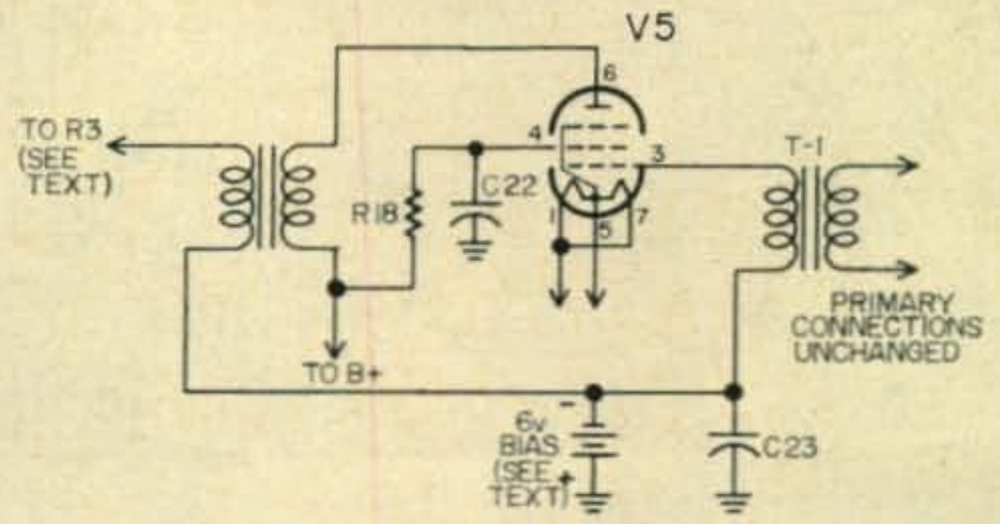


Fig. 4—Modulator for the BC-1335.

For this adjustment it will be necessary to put the ALIGN OTHERS-ALIGN 5 & 6 switch into the ALIGN 5 & 6 position and use the eye in the same manner. The setting found on the chart will have no relationship to the final setting of number 5. Actually ours came out to be about H-8 on setting number 5 but yours may be different, depending upon the setting of C-12 as well as your exact frequency. The grid current of the doubler stage is monitored by this operation and should be maximum for best results. This is also an indication of the crystal activity and should be adjusted for maximum eye closure, with continuous adjustment of the volume control so as to make sure you have the eye closed fully. When this is done, put the probe into pin 6 on the terminal strip and again adjust setting 6 for maximum eye closure as before. This is the grid current reading and should be maximum. Also im-returned to ground—just for this adjustment. for this adjustment and the bottom of R-3 returned to ground-just for this adjustment. When the adjustment is complete, reconnect R-3 as before and note the effect of the additional bias so as to be able to make this adjustment later without the removal of the bias. The last adjustment to make is the loading of the final plate. This is done by first making sure that there is no load (antenna) on the output, and then adjusting setting number 7, which is the final tank tuning capacitor to minimum lamp brilliance. Don't forget to return the toggle switch to the ALIGN OTHERS position. According to the manual, no other adjustments are necessary in adjusting the antenna loading. From personal experience I suggest the use of a field strength indicator or a receiver with an S meter to make sure that the loading is right . . . this will also mean an increase in power output if you increase the field strength by any amount.

When the alignment is complete, return the lever switch to the OPERATE position and you will be able to use the headset again. Talking into the mike with the mike button depressed will allow you to monitor what is being said and at the same time go on the air. There are no relays in this equipment. Transmitting is accomplished by turning the filaments of the transmitter on. The power output level is low enough to prevent overloading of the receiver and the receiver is connected to the antenna at all times.

In as much as the BC-1335 is dual channel in operation, the alignment procedure for the second channel is identical as described, except that there is no need to readjust setting 5, which is L-11. This is used in the plate of the oscillator and is broad enough to allow operation on both channels.

That there are enough of the ARR-2 receivers in shacks around the country seems to indicate the need for a conversion of that equipment. A fast check of the advertising available seems to tell us that there are enough to go around to all of the shacks that don't have one yet . . . and at a good price. Soooo, that will be the topic of next months column, just in case you wanted to know.

Mail

As for the mail this month, seems that there are still a lot of people looking over the field for handbooks. We seem to be somewhat successful in making people happy by passing the word. Should you need a handbook, just drop a line to CQ and we will be glad to help you get it. For instance, Warren Schroeder, 1230 N/W 33 Ave., Miami, Fla. is searching for a Hallicrafters HT-9 handbook and coils, surplus of course. Stan Ogrydziak K2HOT/5 at 1025 Holly Lane, Midwest City, Oklahoma is looking for the BC-610 handbook. W7KOL has an RAK-8 and needs the instruction book. K7IWB wants the instruction book for the National NC-156-1 made in '43 and used by the services. The BC-1338 Bearing Indicator is driving Pieter Fritz at 1027 Fourth Avenue, Anchorage, Alaska to desperation and if you know of any manuals on this please contact him. W5AQN wants LM-14 information. K1GVA needs the RCK and BC-950 handbooks as well as a source of supply for one antenna (number 66147) for the RDZ. K8DXZ has a TN-79/UP scope with no information as to the hookup or power, and would like a conversion. K2MIV just got a Navy model of the National NC-100XA and wants the manual. He isn't in the call book yet so contact him at 36 Beechwood Drive, Wayne, N. J.

A request for the APN-4 Loran Tech Manual is made by KN7GGJ. From Texas, K5DNQ asks for the manuals on the BC-1306, BC-659, and BC-638A equipments. Dick Gaetz, 2211 Jonathan Avenue, Rockford, Illinois is in need of the AN/ARC-3 conversion data.

K5MRQ is in need of a Super Pro BC-794B handbook and the Navy RDP panoramic adapter handbook so he can make repairs. Wallace N. Gregory, 573 William Street, New Market, N. J. wants a schematic of the Coast Guard R-115 receiver made by National. If you have a handbook or a conversion on the ID-93-/APG-13A please contact W5ZCU. Fred Hazzard, 1305 Fee Avenue, Melbourne, Florida wants a manual on the ARB receiver. Anyone with an APS-15 manual should get in touch with W8ZWL.

Gordon Taylor, Pine Bluff, RFD #1, Middleboro, Mass. would like a circuit diagram and conversion on the Navy RBM-3 receiver. Loren Buchannan, 148 Riverside Drive, Troy, Ohio has a lifeboat transmitter and would like to get a manual. It was made by the Taybern Equipment Co. and is model T-600-PB. If you have any information, please contact him directly.

73, Ken, W2HDM

sideband sideband sideband

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	
WØFUH	W6RKP	W8MPW	

The postmaster at Silver Spring had to put on extra help to handle the large volume of mail addressed to this Editor during the past three weeks. This increase in my normal mail was due to the hundreds of logs from CQ's Third Annual DX Contest held last month and also from numerous cards and letters of protest to the change in the Sideband columns' format, in the May issue.

Six more sidebanders have joined the "charmed circle" and have submitted proof of contacts by two-way SSB with one hundred or more countries. These are W5BGP, who needs very little introduction because of his outstanding DX accomplishments, W6WNE, XYL of Ted W6UOU who leads the list, W6TNS, Don Stoner who is our Novice Editor, W4HIM, HB9TL and W2HEA. Walt, W4HIM is a brother of Ted W6UOU and this makes three of the Henry clan to qualify for this award. Walt will leave Norfolk shortly and become Commander of the US Naval Station at Adak in the Aleutian Islands. Walt is a Navy Captain and will sign W4HIM/KL7. According to W4HIM, he and Meridith, W6WNE and a private race for the 100 Countries Award and Meridith won by six days. Evidently she is the main reason for the remarkable QSL percentage of W6UOU. Irv, W2HEA is the OM of Dorothy, K2MGE. In this instance, the female species was the first in the family to get the one hundred cards. There are four junior ops in this family, so look out fellows.

It is good to see HB9TL become a member of the "club" as he is responsible for many of us receiving cards from the Principality of Liechtenstein when he operated there as HB1TL/FL last year.

Bill Leonard, W2SKE advises that WAS albumns have been sent to all section leaders in our SSB Worked All States Contest. The lucky winners include: W1HKK, W7IAA, TI2HP, W5KFT, K4LPW, W6ONP, KØITF, K9EAB, W3BQB, VE3MR, K2LOC and W8EGB. Bill was joining the MATS dx/pedition of W8OL/JAM in Egypt and is expected to do some of the operating when they are flying over the Pacific. The FL8QLJ operations were cancelled due to a change in the itinerary.

Martin, VE3MR who with Humberto, TI2HP, conducted a very successful dx/pedition to Cocos Island as TI9SB and participated from this rare spot during our SSB DX Contest, continued on to the Guianas and operating as PZ1MR, FY7YF and VP3MR worked hundreds of the SSB brethern. Our hats are off to you Martin for your many contributions to new DX country lists, and we hope you catch up on some of the many sleepless hours you spent in giving us those new ones.

One of the biggest pile-ups occurred this week when George, OK7HZ opened up as OK7HZ/ZA from Albania. The twenty meter band was piled dozens deep for fifty kilocycles with stations in all parts of the world calling

W2EWL and W2CFT at the SSB Dinner. (Courtesy of K2MGE)

him. It is a miracle that George was able to pick out any callers from that avalanch of stations. At least he can rest up for a while between countries as this will be a five year dx/pedition.

Talking about pile-ups! When Win, ZL3DZ unexpectedly came on as VR2CG you would have thought another DX Contest had started. Win continued on to his scheduled stop at British Samoa, and signing ZM6AC he worked over 500 stations, when your Editor finally contacted him on May 16th. The boat that took Win from the Fiji Islands to British Samoa was two days behind schedule. He will next appear from the Friendly Islands as VR5AC. QSLs go to Randy, K4LNM who has personally financed some of the costs of the trip. For such a good cause I believe you will all respond with a small donation when you send your QSL card to Randy. Be sure to send a self addressed, stamped envelope.

Because of these dx/peditions many sidebanders have qualified for the "Worked 125" and "Worked 150" awards. We are dispatching the new stickers to them. Several are near to the "Worked 175" countries including the following: W6UOU, W4IYC, TI2HP, TI2RC, TG9AD, W8GCN, W8YBZ, W8PQQ, W2JXH VK3AEE and PY4TK.

An old friend turned up on SSB the other day and wondered why he had been so long in discovering the advantages of this mode of communication. I refer to Don, XE1DE who is a real old timer. Don, who is an early riser can be worked every morning from 1000 GMT.

From Frank, W6IAL we learn the HL9KR, Yong Dong Po, in Korea has been "de-licensed" and is no longer on the air. There is still a chance of obtaining a QSL card for contacts made during the year of the station's activity. All of the cards that Frank, W6IAL was unable to process, because of non-entry in HL9KR's log will be picked up by Cal Dow, the station custodian when he returns to the States in a few weeks. Write to A/2c Wayne "Cal" Dow, at Donaldson Air Force Base, South Carolina.

Jim of VS4JT has been putting a tremendous signal into the East Coast during the past several weeks. He is usually on 14,306 and looks for callers around 14,275. QSL to Walt, K6GMA. His operating times are 1000 GMT to 1200 GMT.

Mick, ZL3PJ told me the other day that he had 146 confirmed. He also said that Syd, ZL3IA had been in bed with the flu. Get well quickly, Syd as we all miss you. Have you noticed the large increase in the number of VK and ZL stations now on SSB?

Two of the most consistent and popular operators in the Pacific will soon be secured and on the way home to the States for reassignment. These are Mac and Rita of KM6BL. We will sure miss hearing these wonderful operators. Hope you are sent to another remote spot with as good a location for ham radio, as Midway Island was. During Rita's and Mac's transition please send all QSLs to Kirk of KØGZN at Harper, Kansas.

Watch for some SSB activity from a real rare country, Nepal. The Nepalese King has granted permission to several members of the Cook Electric Company (who are in Nepal to install a modern telephone system) to operate on the ham bands possibly with a 9N4 or NE7 prefix. These engineers are all licensed US amateurs and have with them some very fine SSB gear.

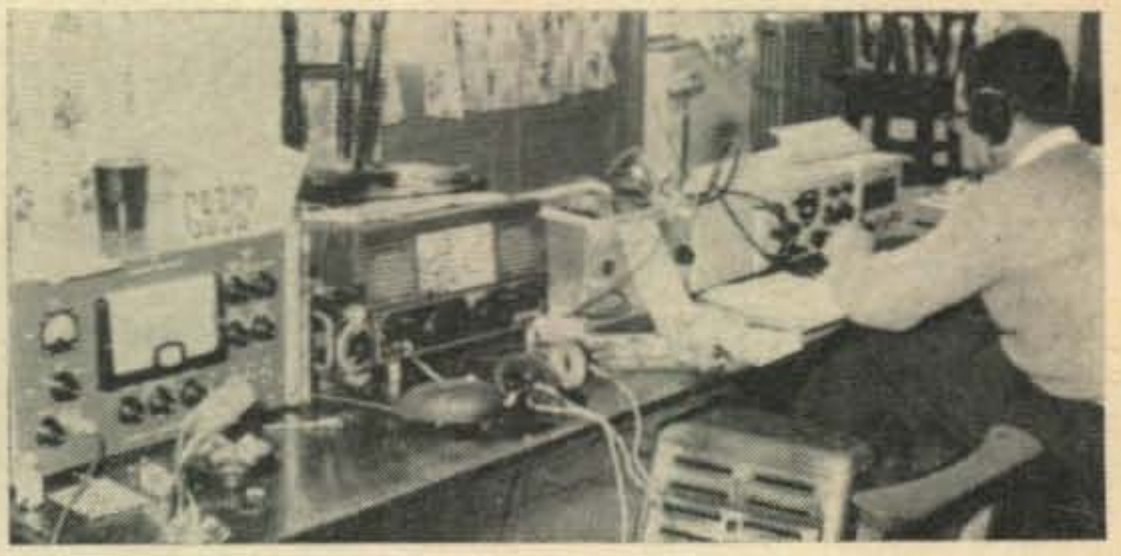
Although we are still in the process of determining the winners of the recent SSB DX Contest, we are already looking ahead to another one. Will you please drop me a line and let me have your ideas and suggestions for the next Contest? Do you want it to remain as a one week-end affair? Was the last method of scoring satisfactory? What part of the calendar year do you suggest we hold another one? Should we again work other stations in the USA?

We should be able to complete the totalling and cross-checking of logs this month and have the official winners for you in the next issue. So far, however, Peter, HB9IE looks like a sure winner. He has over 60,000 points claimed.

How about some pictures of you and or your stations? Let the fellows see what you look like and what is behind the signal you put out.

73, Bob, W3SW

The deluxe station of Roberto, TG9AD. W2EWL and W2CFT at the SSB Dinner.



G3IOR working as GB3GD, courtesy of WØCVU.

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

DX DX DX DX DX DX DX DX

The following certificates were issued between April 15th and May 15th, 1959:

WAZ

#981 VE2NV, John Ravenscroft
#982 W3DWY, R. P. Dutton
#983 K2LWR, John J. Gradl
#984 OH7OU, Reino Sallinen
#985 W2AYU, Walter V. Turner
#986 W6NWI, Bill Jago
#987 W1DHO, Guiles Flower, Jr.
#988 W4UXI, Fredrick L. Thurstone
#989 W9QGR, Raymond J. Bayer
#990 DL1LZ, Wihelm Schafer
#991 VE3RE, Phil Wharton
#992 K4GSU, Bill Maxson
#993 W6KIQ, Clyde Shaler
#994 K4AW, Reeve O. Strock
#995 GW3BNQ, Norman L. Carpenter
#996 W6OSU, Richard Reimer
#997 F8TM, Lucien Aubry
#998 W1EQ, George R. Caron
#999 I1ALU, Luigi Franceschi
#1000 W1WY, Frank Anzalone
#1001 LA1K, Akademisk Radioklubb
#1002 EI9Y, Sim G. Farrelly
#1003 OH1TM, Pekka Palmu
#1004 SM5WI, Harry Akesson
#1005 W7IWH, Wendell W. Motter
#1006 K2KCE, William C. Cash
#1007 W6PLK, William C. Martin
#1008 UA4IF, Alexander F. Kamalagin
#1009 SM5AQB, Klas Eriksson
#1010 W5KLB, Robert W. Tidwell
#1011 9S4AX, Alfred Woerner
#1012 W6KYT, Bill Nielsen
#1013 W3IPO, H. M. Austin
#1014 SM5WZ, Reimar Stridh
#1015 W4PLL, Doyle D. Thompson
#1016 W4OPM, Charles J. Hiller
#1017 W4CYR, E. F. Jones
#1018 SM5AQV, Ake Andersson
#1019 W3MFW, Russel E. Martin
#1020 W2TVR, Fred Spinning
#1021 W4DHZ, Haywood N. Perry
#1022 W7EJD, Fred Reid, Jr.
#1023 W5DRU, Edgell D. Bales
#1024 W3JKO, Charles R. Shaffer
#1025 W6WO, Leonard T. Robinson
#1026 K5LIA, Clem Coleman
#1027 W4JV, L. A. Delson
1028W3OP, E. J. Knoll, Jr.

In a previous issue Bert M. Moroz W8QFR WAZ #938 was incorrectly listed as W8QFE. Sorry.

All-Phone WAZ

#28 W9WHM, John R. Leary
#29 ZL1KG, Roy C. Needham
#30 G8GP, Eric V. Neal
#31 W9YSQ, Harry R. Franke
#32 W9YSX, M. R. Franke

CW WPX

#44 W5AWT, M. E. Boatman
#45 W2FXA, Eugene W. Nadolny
#46 PAØLY, W. Blommaart
#47 W2EQS, Charles M. O'Brien
#48 K5LIA, Clem Coleman
#49 W8RQ, Roger F. Hathaway
#50 K4KOY, Frank Booth
#51 W3DBX, Samuel Proud
#52 W8JIN, James W. Ringland
#53 K9EAB, Cliff Corne
#54 W3BQA, Charles T. Vogelsong
#55 K6SXA, James Herndon
#56 OK1AEH, Emil Hlom

SSB WPX

#6 K2MGE, Dorothy Strauber
#7 K9EAB, Cliff Corne

Set forth below are the Honor Roll listings for WPX:

CW WPX

Prefixes Confirmed	Call	Certificate Number
516	W2HMJ	#2
411	W6KG	#1
397	OK1MB	#12
370	W5KC	#4
357	VE3DIF	#20
356	W6WO	#14
349	W8JIN	#52
346	W9IU	#7
330	DL7CS	#33
330	W6YY	#35
319	K9EAB	#53
318	G3EYN	#18
316	VK6WT	#42
315	PAØVO	#40
311	SM5AHK	#6
311	W2PTD	#31
311	W3BQA	#54
311	W8RQ	#49
310	PAØLY	#46
310	W5DA	#37
310	W9BPW	#10
308	DJ3BB	#39
308	SM5BCE	#41
308	W5AFX	#5

307	W1EQ	‡28
306	DL1QT	‡30
306	K5LIA	‡48
306	UA9DN	‡36
306	W9UXO	‡17
305	K6SXA	‡55
305	VE3BWY	‡43
304	W1BFT	‡3
305	W8LY	‡24
304	W6RLP	‡25
304	OK1AEH	‡56
304	SM5CCE	‡15
304	W1FZ	‡29
303	W1NLM	‡19
303	W2EQS	‡47
303	W5AWT	‡44
303	W9VIN	‡22
302	W3DBX	‡51
302	W5LGG	‡27
301	LU5AQ	‡9
301	W2DGW	‡11
301	W4HYW	‡16
301	WØPGI	‡21
300	K4JVE	‡32
300	K4KOY	‡50
300	KL7MF	‡23
300	W2FXA	‡45
300	W2MUM	‡26
300	W3BCY	‡38
300	W3LMA	‡34
300	W4GXB	‡13
300	W8KPL	‡8

Phone WPX

426	W8WT	‡1
383	G3DO	‡2
350	CT1PK	‡3
300	PY2CK	‡4

SSB WPX

164	VE3MR	‡2
158	K2MGE	‡6
155	TI2HP	‡1
155	WØCVU	‡4
153	W2TP	‡5
152	W8YBZ	‡3
151	K9EAB	‡7

Dayton Convention

I am trying to recover from the Dayton Convention and write this column at the same time, and the recovery job is by far the hardest. For the benefit of those who have never been to the Convention, it is one of the largest, if not *the* largest, gatherings of the amateur fraternity. There were over 2500 people registered and tickets to the grand banquet were sold out by 12 o'clock Saturday.

The program was divided into sessions, ranging from design considerations of parametric amplifiers (Sam Harris, our VHF Editor at the helm) to the KS4BB DXpedition. The DX session is always well planned and very interesting. This year a movie was shown of the gang at W6YMD in action during a DX contest and that is quite a station, to say the least. Sax, W2SAW, gave a very interesting dissertation on the fine art of extracting QSL's from DX stations. Don, W4KVX, told of his recent KS4BB expedition and showed beautiful color slides of the trip. Don already has a spot selected for next year, however, at this time all he will say is that it is not in the Caribbean. If any of you work 40 meters, I'm sure you know Jake, W8FGX, who was the next speaker. Jake told of DXing on 40 meters and had slides of his and other 40-meter beams. His beam is 85 feet up . . . The last speaker was none other than Danny, VP2VB. Dave, ZLIAV, who will be Danny's new traveling partner when a new boat is obtained, was also at the Convention. The last event on the agenda was the annual DX quiz. It was a very hard quiz and the highest mark was 88% . . . and this, with close to 400 avid DXers in attendance. The first prize was a Jennings variable vacuum condenser. Yours Truly walked off with a 4X250B. (Writing the DX column does have its compensations) The prizes are one of the main attractions at this Convention. This year the first prize was a complete Collins S line rig,

Cliff, K9EAB, the first double WPX winner, ‡53 on CW and ‡7 on SSB. As you can see, Cliff is an enthusiastic certificate collector.

Gladys, KH6BTX and Clyde, KH6BLX. Wonder if they are the first OM-XYL team to both make WAZ. Present score at BTX is 135/122 and at BLX 182/162.

Ken, VP2DM and Bill, VP2DA.

Bill, Ken, and Mr. Daltymple, the airport engineer.

When the new Dominica airport was opened for operation, air to ground communications had not been finished, so ham radio was called to the rescue. VP2DA and VP2DM set up equipment in a temporary air control shack and, although the transmitter had not been used in five years, everything worked beautifully. One of the passengers on the first plane to land was VP2MY.

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receiver, transmitter, speaker, and control unit. There must have been over a hundred prizes worth many thousands of dollars given away during the course of the day.

The main speaker at the banquet was General "Butch" Grizwall, KØIWC. He had many of the gang drooling while talking about SAC's 45KW SSB transmitter.

That fellows, is the end of the formality at the Convention. However, to the DXer, the informal sessions are just as interesting and a lot of fun . . . The North Jersey DX Association reserves a suite of rooms and this is where the DX gang congregates. It isn't necessary to ask the room clerk the location of this suite . . . just listen for the most noise. You would never think a group of CW men could find so much to talk about. Naturally, hip boots are standard equipment for these sessions, which reach into the wee small hours on both Friday and Saturday.

If any of you receive Don Chesser's, W4KVX, very excellent DX bulletin, I'm sure you have seen the pictures that Bill, W8OCT, has taken at these sessions in the past. Bill is a professional photographer and his pictures are really terrific. He has promised us a few for an early issue.

Some of the gang present at these sessions included W2AGW, W2GUM, K2GMO, W2HTI, W2SAW, W2QJM, K2DSW, W2BDS, W2BOK, W3GHD, W3CRA, W3CXX, W3BSF, W3ZOA, W3KPI, W4KVX, K4LNM, W4EPA, W5FXN, W8PQQ, W8YBZ, W8CWY, W8BRA, W8DUS, W8WZ, W8KIA, W8UAS, W8LOF, W8ZY, WIOCT, W8BKP, W8HRV, W8FGX, W8CQ, W9JJF, VP2VB, and ZL1AV. There was a surprising lack of QRM that week end and the power companies had a hard time stabilizing the line voltage with such small loads.

Every year you can count on something good showing up the week end the Dayton Convention is on. Last year it was VSIBB/VS9 and this year it was OK7HZ/ZA. All in all, the gang says they would rather miss a new one than miss Dayton. So, if you're not doing anything the first weekend in May next year, go to Dayton and have the time of your life . . .

AC3 SIKKIM—AC4NC has been licensed as AC3NC and is on 14 *mc* cw.

AC4 TIBET—AC4AX was forced to close down and has left the country. (Tnx VU2AY)

AC5 BHUTAN—UA4IF and UB5TV report they have worked AC5PN on 14 *mc* CW at 10:00 GMT.

CR8 PORTUGUESE INDIA — Raul, CR8AC, occasionaly sticks his head out on 14047 around 20:00 GMT. (Tnx W2TVR)

DANNY—Danny, VP2VB, was at the Dayton Convention, as previously mentioned, and he gave a little talk about the loss of his boat. At that time, he had $6,000 toward the purchase of a new boat. Danny is going to tour the country and lecture about his trip in order that an additional $6,000 may be raised, which is the amount required for a new boat. Dave, ZL1AV, will join Danny when they go out to sea. They are also looking for an American to join them.

I1 ITALY—The following are American Military Amateur Radio Stations now licensed in Italy: I1AFS Naples, I1DFA Naples, I1DFB Leghorn, I1DFC Verona, I1DFD Vicenza, I1DFE Aviano. (See QTH section.) (Tnx I1DEB/W7AMM)

LA/P SPITZBERGEN — Murchison Bay's SM5WN/LA/P who has been very inactive

since the beginning of May, due to a fuel shortage, is expecting the supply boat about the time you read this. (Tnx W5PSB)

U.S.S.R.—The following Russians have fone equipment and are good ones to look for if you are chasing fone WAZ.

Zone 17—UA9AA, UA9CM, UA9KCC, UI8KAA, UH8KAA and UA9KCE.

Zone 18—UA9VB, UA9OB, UA9OI, UA9OK, UAØOE and UAØKAR.

Zone 19—UAØLA, UAØLC, UAØKDA, UAØGF, UAØKQB, and UAØKBB. (Tnx to RAEM for the above)

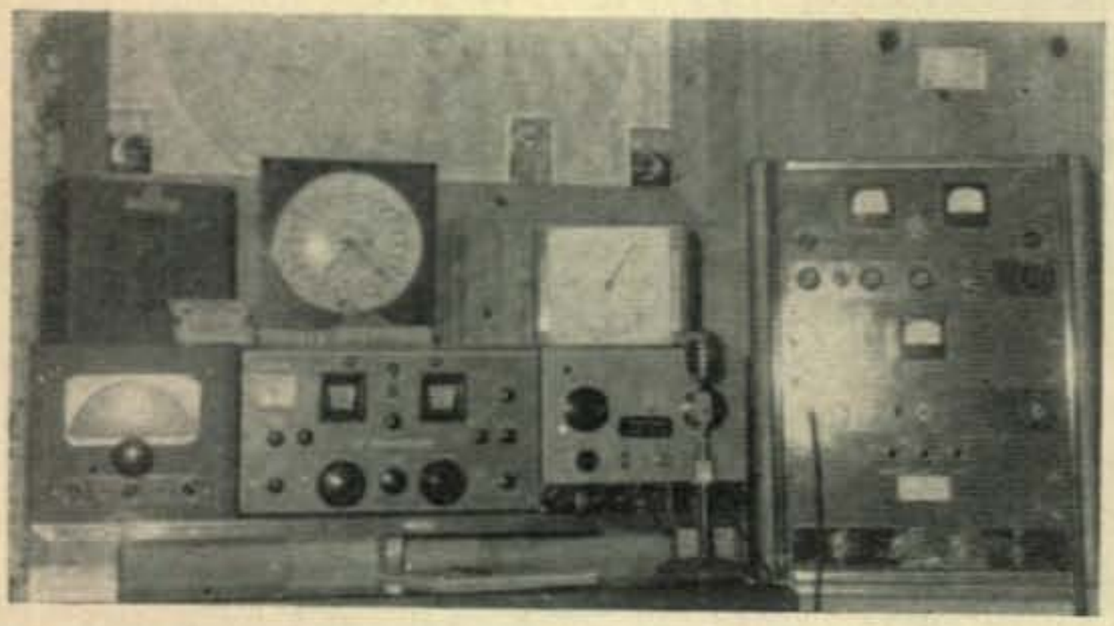
UO5AA and UA9CM are both very active on 21 *mc* phone around 0330 GMT. (Tnx W9WHM)

YA AFGHANISTAN — YA1IW continues to be active on 21 *mc* fone, but he is very weak in the states. He is QRV around 16.00 to 17.00 GMT. W9OKM informs us that he knows of a group of W's located at the Afghanistan Institute of Technology in Kabut that have a rig complete with DX1OO, however, they haven't been able to obtain operating permission yet.

ZC6 PALESTINE—The picture here looks sad, if you don't already have it. ZC6UNJ (Paul) is now in Pakistan and all equipment from the station has been moved to Lebanon. Only UN personnel are allowed to operate there even though three 4 x 4 hams live within a 1½ mile radius. At other UN installations, all licensed amateurs were allowed to operate. I don't understand why such is not the case here. (Tnx W9WHM)

ZM7 TOKELAU—There is a very good chance that a VR2 may be going there around the beginning of September. Will keep you posted.

ZD8 NYASSALAND—ZE8JJ and ZE3JO will journey to this spot during the last 10 days of July. A 35 watt CW rig will be used on all bands; conditions and openings determining the band to be used. They will operate using the calls ZE8JJ/ZD6 and ZE3JO/ZD6 and will be on the air for a full six days. No zero beat calls will be answered. (Tnx W6UNP)



W9WHM, John Leary, a Phone WAZ winner. John has a 255/248 record on phone.

3A2 MONACO—Received a nice letter from Bob, ON4QX, while he was in Monaco. He was licensed as 3A2CZ and had several hundred QSO's, including WAC the very first day. Bob goes on an expedition every year and has one selected for next year that has separate country possibilities. If he doesn't make it there, he will try and go to Andorra.

HERE AND THERE—The world wide Boy Scout Jamboree will be held in the Phillipine Islands between July 17th and 26th. A station will be set up using a BC610. Third party traffic between scouts and their families will be permitted. The call DU1PAR will be used. (Tnx W6IWJ)

A QSO with GB3ENT, set up during the Erith Borough Council Show and Sports, on August 3rd, will bring a special QSL bearing the coat of arms of the Borough of Erith. (Tnx G3HKX)

Alex, UA4IF, a new WAZ member, has 197 countries worked and had 207 as UH8AF postwar; pre war he had 87 as UA1AP.

ULK2R is a good catch for WPX, counting as UL2. His name is Sevgral and is located in the Soviet Embassy in San Jose, Costa Rica! Look for him on 21,061 around 0130 GMT. (Tnx K3ATX)

Certificate Corner

The following new certificates have been announced.

1959 Low Frequency Band Award — The "A. M. P. DX-Club" has decided to issue a certificate obtainable by licensed amateurs everywhere in the world. Participants shall with QSL's or other written verifications prove having reached a total of at least *50 points during the year of 1959*. Valid for this award are only QSO's made in the *80 and 40 meter bands*. One point will be given for each country (see ARRL country list) worked and in the case 3 different stations in the same country have been QSO'ed one extra point will be given (vis. max 2 points/country). The awards will be numbered and the participant reaching the highest number of points will get award nr. 1, etc.

Instead of sending all QSL's along with your application, a list of your verifications with all necessary details will be accepted if checked and signed by a representative of your country's amateur radio society. Applications for this award must be received by:

SM5CQH, Mr. S. Hector, Hjalmstalund, *Vallentuna*, Sweden, before August 1st, 1960 and should be sent by registered mail.

Costs: Swedish kronor 4:- (or 10 IRC's) + return postage for QSL's. In case a check is sent, *it must be payable to Mr. S. Hector.*

The highest scorer will also get a medal for outstanding performance. (Tnx W1WY)

Shizouka—A for working five stations in

Shizouka prefecture (Japan) including 2 or more members of the S.A.R.C. members. Members are J A2AP, BP, BY, CQ, DK, DW, FR, GL, HE, JW, JZ, KB, MZ, NH, RW, SG, TE, TH, UJ, WB, XZ, YB. Send QSL to Yoh Hoshiyama, JA2JW, 20331 Kusanagi, Shimizu City, Shizouka, Japan. (Tnx K6SDR)

S6S Award—The Central Radio Club of Czechoslovakia issues S6S (Worked Six Continents) certificates to all licensed radio amateurs who submit proof of two-way communications with at least one amateur station in each of the six continents-Europe, Asia, Africa, North America, South America and Oceania.

ACW and Phone certificates are available. Also, special endorsements for affixing to certicates are available upon receipt of request, accompanied by proof of having worked all continents on 3, 5, 7, 14, 21 or 28 *mc.*

Address all applications and confirmations to the Central Radio Club, P. O. Box 69, Praha 3, Czechoslovakia. There is no charge for the certificate.

ZMT Award—The award will be issued to any licensed amateur station applying for it and fulfilling the following conditions:

1. Submission of confirmation (QSL's or other) of two-way communications with licensed radio-amateur transmitting stations of the following 39 regions: QK1, OK2, OK3, HA, LZ, UA1, UA2, UA3, UA4, UA6, UA9, UAØ, UB5, UC2, UD6, UF6, UG6, UH8, UI8, UJ8, UL7, UM8, UN1, UO5, UP2, UQ2, UR2;

DM—three different regions (e.g. DM2ABB, DM2ABD, DM2ABG, etc.—the regions are differentiated by the last letter of the call signal);

SP—three different regions (e.g. SP2, SP3, SP9, etc.);

YO—three different regions (e.g. YO2, YO3, YO6, etc.);

YU—three different regions (e.g. YU1, YU3, YU6, etc.);

2. Only confirmations of communications realized after April 26th, 1949, i.e. after the day of the First World Peace Congress at Paris and at Praha, on any band, cw or fone, are valid. A special, "SMT 24" Award will be issued for certified communications established during 24 hours.

There have been changes in the requirements for the WAZL award and they are as follows:

35 ZL1 stations
35 ZL2 stations
20 ZL3 stations
10 ZL4 stations plus 1 overseas ZL (Kermadecs, Chatham, etc.)

OR

20 ZL cards other than the original 100.

Applications under old rules still acceptable through 1959. Awards under new rules issued immediately. (Tnx W5OVE)

While on the subject of certificates, may I suggest the Directory of Certificates and Awards which is published by W3RPG. It is one of the most complete and comprehensive of any that I have ever seen. It lists over 200 awards, representing over fifty countries. Bill will be glad to furnish details to interested parties.

The time for a little soap box has come again, however, this time I'm turning the pen over to Dave, W3LSG, who wrote us a few lines on a very timely subject.

"What Price DX?

From early cw indoctrination the fledgling ham learns that K means over and KN means 'all you other guys be quiet.' Aside from the many other accepted procedures, common courtesy seems to be one item that either was never mentioned or gets pushed aside as the fledgling grows.

Many of us can recite all too many incidents of inconsiderate and highly unethical operating procedures, especially when 'in a pile up' chasing a rare one. It is odd to see just how many guys don't even know their own call letters: just the other nite, an elusive ZK2 returned a call to a W2—and signed with a KN after the initial transmission. At that instant there appeared to be a few dozen claimants to that W2 call—all with different call letters!

Now, this phenomenon is hard for a non-ham to understand, but not especially difficult for some 'experienced' cw operators to understand. Indiscriminate 'break-in' and general bad manners on the part of all too many W/K hams where DX hunting is concerned destroys the spirit of mutual enjoyment of ham radio and replaces it with a non-enjoyable type of cut-throat commercialism.

Let's try every ethical trick 'in the book' to snag the rare ones, but let's throw that chapter on 'unethical practices' away."

A quick glance at the Honor Roll will show that the WPX award is really catching on. Honor Roll listing is for confirmed prefixes only. If you have less than 300 prefixes and desire Honor Roll listing, a list of confirmed prefixes is all that is necessary. No one will be listed at 300 or more unless the necessary cards are submitted. All cards, either for the original certificate or for endorsement stickers, should be sent directly to me. If you send them to the CQ office, they are forwarded to me, however, a few days are wasted.

You will notice there is no CW/Phone WPX. There were some such applications submitted and they had to be returned. Several questions are usually asked as to what constitutes a prefix. Any prefix will be counted as being legitimate if its use was licensed or permitted by the governing authority. There is a difference between a prefix and a suffix and this is best illustrated by a few examples. FF8AC/GN and HA5AM/ZA. The /GN is a suffix and would onyl count as FF8. The ZA is a prefix and since no number is used, it is picked up

[Continued on page 94]

ham clinic

by CHARLES J. SCHAUERS, F7FE/W6QLV

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

Receivers now available to the average amateur have antenna input impedances ranging from 52 to 600 ohms. Obtaining maximum input signal to any one of these receivers connected to a coaxial (or unbalanced) line cannot always be readily accomplished at top efficiency without some sort of matching device at the receiver itself. This is not true, of course, if you have a single frequency receiver, an antenna cut for its frequency and a line which matches receiver input perfectly. Then most of your problems are little ones—nearly.

Matching becomes critical on the higher frequencies (14 *mc* up) and becomes an important consideration if one wants to "snag" those weak signals "hitting" his antenna.

Numerous articles have appeared on various receiver input matching techniques.[1] However, the *practical* approach at minimum expense is what most hams are looking for.

It *is* true that the majority of reciever manufacturers include an antenna trimmer (capacitor) in all communications type receivers. This trimmer may be adjusted for maximum receiver input signal by "handling" *some* of the reactance present at the various frequencies encountered. But you will find that this trimmer is usually used only on the higher frequencies—there being little need for it at 160 meters and down.

You cannot couple a transmission line having a characteristic end-impedance of say 600 ohms to a receiver whose nominal input impedance has been designed for 72 ohms and expect maximum antenna-to-receiver signal transfer.

It may be argued that with modern all-band receivers there is little need for any antenna matching system. Just hook her up to any old sky-wire and you're in business. Bunk!

One day it may be achieved but no receiver manufacturer (to this writer's knowledge) has ever come up with a wholly *flat* input system where gain at *all* frequencies is *exactly* equal. Yes, reactance can be tuned out so that the input "effect" is *nearly* all resistive, and a certain amount of gain equalization obtained by top capacitive tuning of the (*rf*) antenna transformer primary and secondary windings. But what are you going to do when the impedance mismatch between antenna and receiver is very large? Modified baluns? Perhaps.

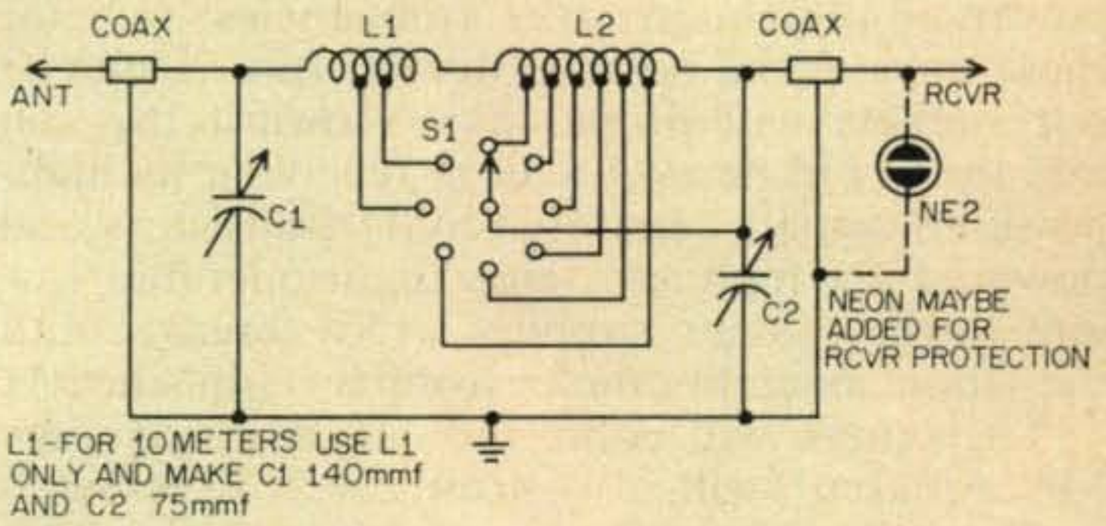
If a receiver manufacturer says his receiver has an input of up to 600 ohms he is implying that the tuning system incorporated in it will *usually* take care of impedance differences encountered in the average ham antenna installation. However, he may also state that for best results, the receiver should be terminated by a 50 or 72 ohm line (as *Hallicrafters* suggest for their SX100-Mk III).

Most hams today use coaxial cable as I do, and few (especially those with transmitters like the series manufactured by *Johnson, Heath, Collins, Hallicrafters, Globe, Lakeshore, Eico, CE* and *Gonset*) fool around with open tuned lines. In most cases, transmitter matching is no problem at any ham frequency because efficient Pi-L or Pi-Z output networks take care of the impedance differences encountered by the average ham—and they do this with maximum harmonic attenuation too.

But the receiver matching problem is another story.

Matching Device

One approach to achieving proper antenna-



L1 #18 copper wire—6 turns, 1 inch dia. (8 Turns Per Inch) Tapped on 2nd and 4th Turns (Coil B & W 3014)
L2 #22 Copper Wire—44 turns (32 turns per inch) tapped every 5 turns. (Coil Airdux 832T)
C1 Midget dual BC Vaiable Condenser (Sections in parallel for up to 950 mmf)
C2 Midget Variable (National HFA 140)
S1 Tap switch ceramic, Centralab, type PA 1000 (11 Poles single section—shorting)

Fig. 1—Antenna impedance matching device to be located between the antenna and receiver input.

[1] CQ Aug. 1954.

to-receiver matching is by using a "double" tapped *rf* auto-transformer (taps on alternate windings facing in and out). But this is not as efficient as an L or Pi tuned section similar to those found in transmitters.

Various types of matching systems were tried out (including special input and output circuits in different types of "wide-wide band" preselectors). After some experimentation the circuit in fig. 1 turned out to be just about the best obtainable for all-band operation when coaxial transmission line is used.

It was considered best because it worked very well with a number of different receivers having different antenna input impedances. Its effectiveness was very apparent, especially on 10, 15 and 20 meters.

Construction and Operation

Construction is very simple and can be varied to suit the individual. A ceramic switch should be used because of its inherent low-loss. A small aluminum box is used to house all parts and coax connectors.

Upon installation, the receiver is tuned to a station and all controls adjusted for maximum signal. The receiver's antenna trimmer can be used for final peaking of the received signal.

To simplify tuning, dials can be added and readings for each band noted. Retuning for each band will then consist of setting each knob to its precalibrated position.

Any matching regardless of the type is a compromise and better than none—but match you must, if you want top receiver performance.

Observation

The progress in the United States in rocketry and the sub-miniaturization of radio equipment continues to occupy the scientific limelight of our time. Gigantic strides are being made in the perfection of solar excited power equipment and transistors capable of high power amplification at *rf* frequencies. One of these days in the not too distant future, one of our rockets will propel itself toward the sun and there will be *no* break in receiving its high-powered signals generated by *rf* transistors and powered by high efficiency light-operated low and high voltage supplies. (No break, until the whole assembly melts from the sun's heat!)

Then there will come the day when average Mr. Amateur will also profit by this research and communications equipment perfection too. His 144 *mc* signals will be relayed from an orbiting satellite! Communications records unheard of before at *vhf* and *shf* frequencies will be made. Multiplex techniques will make it possible for as many as a hundred amateurs to transmit and receive via the equipment buzzing over their heads thousands of miles up, at the *same time*. Far fetched? I don't think so. Think back a little to 50 years ago and you'll get the idea.

Observed: electronic progress benefits everyone—especially the amateur; and we must not forget that many hams are contributing their technical know-how, sweat and tears to assist in making the world's "communications dreams" come true!

Questions

Transformers

During the last 19 months many, many letters have been received from readers relative to determining transformer characteristics for which they could not find data sheets or connection diagrams. Our stock answer, though not always satisfactory to *some* can be summarized as follows (thanks to some tips from J. B. Nichols of UTC).

Audio Transformers: If an unknown (surplus) audio transformer is obtained, measure the *dc* resistance of one winding—the primary if known. For its original frequency range, it should be usable with a source impedance of approximately ten times this value; e.g., if primary resistance is 43 ohms, it is logical for use from a 500 ohm source. It can also be used from a 200 ohm source, since this factor is critical only in relationship to frequency response. If the voltage ratio is measured on a *vtvm*, the secondary impedance would be the square of this voltage ratio times the primary impedance. Primary and secondary are customarily reversible; e.g., if the resistance of one winding was 600 ohms, making it suitable for a 6,000 ohm source, and the voltage ratio was 20:1 stepdown, the secondary impedance would be 6000 ohms divided by 20 squared or 15 ohms.

Power Transformers: Assuming that the typical unknown (surplus) transformer has a regulation of approximately 7%, and with normally a reasonably equal portion of this being divided between primary and secondary, we can determine the approximate current rating of a winding if we know its voltage and if we measure its *dc* resistance. In formula form, the current rating in amperes would then be volts divided by *dcr* times .035; e.g., if we have a 1,000 volt winding whose *dc* resistance is 100 ohms, the current rating would be approximately 350 mils. Of course to determine this exactly, would require load testing and perhaps even unwinding and rewinding the transformer to obtain the exact parameters, e.g. size of wire, number of turns, core size, etc. But if you follow the information given above you cannot go too far wrong. Personally, I steer away from surplus transformers for which there is no factual technical information. Why buy a "pig-in-a-poke"?

SSB vs DSB (SC)

"Don't 'beat around the bush' just give me a straight unbiased answer. Tell me, what do you think of DSB as compared to SSB?"

Look esteemed reader, I don't want any

arguments with Costas or Collins! Personally, I think both (SSB & DSB) have their place in the communications scheme. I have used and do use both. From a cost standpoint (transmitting only) DSB wins my personal vote. For less spectrum space I'll take SSB. Take a "gander" at TIME magazine's Science Page in the Feb. 16, 1959 issue relative to SSB; this will give you an idea of some of its merits. However, I'll bet DSB would "hold its own" in many situations too. The day a manufacturer comes out with a good DSB receiver is the day when *real* interest will pick up in it. Now I'm not talking about the laboratory receivers which cost oodles of money, but the ordinary variety with a foolproof sync detection system.

What I would like to see (like every other ham) are actual side-by-side tests of both made, under identical conditions and the data published in a straight-forward manner so it can be understood by us hams. Then perhaps arguments will cease (we hope) and this business of "difference" will be settled once and for all!

Scope

"Would you please recommend an oscilloscope to me for ham use, costing in the vicinity of about $45.00?"

Sure. I like *Allied Radio's* Knight 5 inch scope which sells for around $42.00. It comes in kit form and has a sensitivity of 25 millivolts per inch (which is good for such a low price). It has a built in calibrator (1 volt peak-to-peak) and stable sync circuits. *Allied's* wideband scope is a wonderful buy too at $69.00 and this is the one I would take if I had the choice—would not mind having one of these at all.

HT 32

"I am feeding a homemade Class B high power final with my *Hallicrafters* HT 32. I receive reports that my carrier suppression is not exactly right. When the HT 32 is operated 'barefooted,' reports are fine. Any hints?"

According to *Hallicrafters*, the HT 32 should be carefully loaded close to its peak power output and should be terminated in a 50 ohm load. Just because you have good carrier suppression in the HT 32 does not mean that you do not have to maintain *proper* final amplifier linearity and load properly. If your final uses a tetrode, is the screen voltage *properly* regulated? How about parasitics? Send a copy of your final circuit diagram and we'll try to help you further.

Hi-FI "I"

"How do I keep my transmitter's signal from getting into my parents' new hi-fi set? They won't let us touch it! (Hi!)"

Boy you do have troubles! Seriously though, this is no difficult matter. A pi type filter right at the hi-fi set (between 110V *ac* outlet and set) properly grounded will sometimes do the trick. But if this does not, then perhaps you better check the shielding coming up to the cartridge. There is rectification taking place (and this usually does—at the first amplifier). See Bill Orr's 15th edition of his new Handbook or the ARRL Handbook, 36th edition. Both of these contain information on stopping the rectification action. Choking, by-passing and resistor filtering the grids of offending tubes will no doubt clear up your trouble. However, you did not tell us which band is the offensive one. If you come in on the hi-fi when on 40 or 80 meters you no doubt have *ac* line "leak-through." . . . especially if your amplifier is of the *ac-dc* (transformerless) type. If there is audio interference when you're on 10 meters or higher vary the length of your hi-fi *ac* cord (and you might think about using a stub). BE SURE to make certain that you have a good ground at your station *as well* as the hi-fi set. (Make sure your hi-fi set is not *ac-dc* before putting on a ground!)

APACHE, Again

"Understand you have an APACHE transmitter by *Heath*. Tell me, how long did it take you to put it together and do you have any hints you picked up as you put it together? Still think it is tops?"

Yes on both counts. I took my time and I found that about 57 hours were needed to assemble and calibrate the TX-1. First of all, **FOLLOW** *Heath's* advice in checking and assorting parts and **DO NOT** try to wire it up with the diagram alone. Be real careful when attaching the last harness wires to the meter switch—connections are close—and be sure to leave all the slack in these wires that you can. (You may need to remove the panel again to work on the dial drive mechanism) When neutralizing the final, the 6½" of wire is not enough (if you want to pull out the 6AQ5 without disturbing the neutralization). I soldered a one inch piece of #18 to the top of this neutralizing wire—and it IS better—easier to neutralize (in my case anyway). Oil or grease the moving parts (and bushings) lightly *before* installation (use "Lubri-Plate"). I am changing the bandchange knob to the lever type for easier operation. If you have trouble with the dial roll (frequency dial) canting, a little reaming of the dial roll bracket (screw holes) up or down will fix this pronto. (80 meter centering takes patience)

I installed the fan in such a way that I will not need to unsolder the wires at the motor itself. I simply mounted a small two terminal tie point opposite the motor, ran up the 110V *ac* (yellow) lines and used screw terminals. I picked up other little things too but space does not permit me to ramble on. All I can say is: *thanks* loads to the ham gang at *Heath* for a fine piece of equipment; I hope that the SB10 SSB adaptor turns out as well.

Tube Blowouts

"Boy, I hope you can help me. Seldom a

[*Continued on page 98*]

Last Minute Forecast

Generally good short wave reception conditions are expected during July except for July 1, July 13-14, and July 24-25, which are likely to be moderately disturbed.

PROPAGATION

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

July's Highlights

Ionospheric conditions are generally more stable during July than during any other month of the year. With long hours of daylight, and with the sun high in the northern sky, there is little variation between the daytime and night time optimum usable frequencies during July. *Fifteen meters* is forecast as the best band for long-distance propagation during the daylight hours, with the band remaining open to many areas of the world throughout the hours of darkness. From late afternoon, throughout the hours of darkness, and until a few hours after sunrise, optimum propagation conditions to most areas of the world are predicted for the *20-meter* band. As a result of the seasonal decrease in daytime ionization of the earth's upper atmosphere, and the decline in solar activity, *10-meters* is forecast to open to only a few areas of the world during July. During the hours of darkness the *40-meter* band is expected to open to several areas of the world from the United States, but seasonally high static levels will often make reception difficult. The high static levels are also expected to severely limit openings on both *80* and *160-meters*.

Sporadic-E propagation usually reaches a peak during July, with almost daily short-skip openings expected on *10*, *15*, and *20-meters*. During periods of intense sporadic-E ionization, openings up to 1400 miles may also occur on *6*, and possibly *2-meters*. Meteor type ionospheric openings are very likely to occur on the *vhf* bands during the last week of July when the Perseids and Aquarids meteor showers take place.

Moon Relay

The U. S Navy recently announced that it soon plans to use the moon as a passive relay for *vhf* and *uhf* radio communications between Washington, D. C. and Pearl Harbor, Hawaii. Transmitting and receiving stations for the moon relay system are now under construction, and the Navy hopes to have at least a "pilot operation" going by the end of this year. Exceptionally high power transmitters will be used in the moon relay system since the signal will have to travel nearly 460,000 miles to the moon and back in bridging the great circle distance of slightly more than 4,500 miles between Washington and Pearl Harbor. It is reported that self-tracking saucer-shaped antennas, 84 feet in diameter, will be used to continuously focus a beam of radiation on the moon.

Navy communication officials expect the moon relay circuit to be highly reliable (except of course when the moon is out of view from the earth), and to have considerably wider bandwidth, and much greater channel capacity, than *hf* radio links now in operation between Washington and Pearl Harbor.

The Naval Research Laboratory has been experimenting with moon relay communications for the past nine years. In October 1951, the Navy first announced that pulses from a one megawatt transmitter operating on 200 megacycles had been successfully reflected off the surface of the moon.

These early experiments proved that the moon was a comparatively good reflector of *vhf* and *uhf* radio waves despite its rough appearance optically. Additional experiments over the past few years in both the *vhf* and *uhf* range, including the transmission of voice modulation, further confirmed the initial results and have led to the development of the moon relay system the Navy is planning to have in operation between Washington, D. C. and Pearl Harbor, Hawaii later this year. Thus that part of the radio spectrum which just a few short years ago was considered to be limited to slightly more than line-of-sight transmission will soon be used for spanning great distances between space and earth.

Solar Cycle

The Zurich Observatory reports a monthly mean sunspot number of 159 centered on April, 1959. This results in a 12-month running

[*Continued on page 106*]

JULY, 1959

ALL TIME IN P. S. T.

WESTERN USA TO:

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

JULY, 1959

CQ PROPAGATION CHART (SHORT SKIP)

BAND (Meters)	DISTANCE (Miles			
	50 - 250	250-600	600-1200	1200-2200
10	NIL	NIL	8A-2P (1-2) 2P-8P (2-3) 8P-12M (1-2) 12M-8A (1)	8A-2P (2-1) 2P-8P (2) 8P-12M (2-1) 12M-8A (1)
15	NIL	8A-12N(0-1) 12N-4P(0-2) 4P-8P(0-1)	8A-4P(2-3) 4P-7P(3-4) 7P-12M (2) 12M-7A (1)	8A-4P (3-4) 4P-7P (4) 7P-12M(2-3) 12M-7A (1-2)
20	NIL	6A-11A(1-2) 11A-3P(1-3) 3P-8P(1-2) 8P-6A(0-1)	6A-10A(3-4) 10A-4P (4) 4P-9P(4-5) 9P-6A(2-3)	6A-10A (4) 10A-4P (4-3) 4P-9P (5) 9P-6A (3-4)
40	6A-10A(2-3) 10A-8P (5) 8P-10P(3-4) 10P-6A(2-3)	6A-9A(5-4) 9A-5P(4-2) 5P-12M (5) 12M-6A(2-4)	7P-2A (5) 2A-5A (4) 5A-8A(3-2) 8A-5P(2-1) 5P-7P(4-3)	5P-8P(3-2) 8P-5A(5-4) 5A-7A(2-1) 7A-5P(1-0)
80	8A-11A(5-3) 11A-6P(4-2) 6P-5A (5)	8A-7P(2-1) 7P-9P(3-2) 9P-5A (5) 5A-8A(3-2)	8P-10P(2-1) 10P-4A (4) 4A-7A(3-1)	8P-10P (1) 10P-4A(4-3) 4A-6A(2-1)
160	6P-8P(3-2) 8P-5A (5) 5A-8A(3-2)	7P-9P(2-1) 9P-4A(5-3) 4A-6A(4-2) 6A-8A(2-0)	9P-4A(3-2) 4A-6A(2-0)	9P-4A(2-1)

SYMBOLS FOR NUMBER OF DAYS CIRCUIT FORECAST TO OPEN:

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

(5) over 26 days

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

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

The CQ DX Propagation Charts are based upon a radiated 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 August 15, 1959. The CQ Short Skip Propagation Chart is based upon a radiated CW power of 75 watts, using a dipole antenna a half-wave length above ground. It is valid through August 31, 1959. All forecasts are based upon ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

JULY, 1959

ALL TIME IN E. S. T.

EASTERN USA TO:

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

ALL TIME IN C. S. T.

CENTRAL USA TO:

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

VHF

by Sam Harris, W1FZJ
P.O. Box 334, Medfield, Mass.

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

Panadaptors

Since I mentioned the APA-38 panadaptor, two things have happened. First, a bunch of VHFers have bought up the supply, and second, I have a whole passel of letters asking how to convert them. Apparently everyone did not get the instruction manual entitled "Handbook of maintenance instruction for AN/APA-38 Panoramic Adaptor." I hasten to point out that I do not have the slightest idea how you can get this handbook. I received mine with the panadaptor and the information in the book, on obtaining additional copies, suggests addressing the Commanding General in accordance with A.A.F. regulation ♯5-9. (I gather that you will first have to join the armed forces and get assigned to some duty where you can show a need. If you are going to do this you might send the APA-38 to me and I'll take care of it for you while you finish out your hitch.)

A circuit diagram of the unit is shown in fig. 1. The modifications to the circuit are very simple. The first step of course is to change the power transformer as indicated in the instructions received with the panadaptor. The second step is to remove the loading resistor (R-4) on the secondary of Z102-11 (15,000 ohms). The third step is to insert a 6 *mc* crystal between terminal ♯4 on Z102-11 and the grid pin of V-103. (Pin 4.) This connection was made by removing the bare wire lead between the two terminals (♯4 on Z102 and pin 4 on V-103) and soldering the crystal in place of it. If you feel diffident about soldering directly to the crystal pins, I guess you can install a crystal holder and plug the crystal in. The crystal frequency can be anywhere in the 6.0 *mc* to 6.8 *mc* range. The fourth step is to install another crystal between the grid of V-103 (pin 4) and the bottom tuning slug of Z102-11. This crystal must be within a few *kc* of the series crystal. (On the high side.) The crystals can be as high as sixty or seventy *kc* apart but best results will be obtained if they are more than 2 *kc* and less than 10 *kc* apart. After installing the crystals, the *if* transformers Z102-11 and Z103-11 must be realigned to the crystal frequencies. This is best accomplished by operating the panadaptor in a normal manner; supply a 30 *mc* signal to the input; peak up the transformers (with the tuning tool supplied) for a symmetrical pip on the display tube.

Input Frequency Range

The APA-38 was designed to work out of a 30 *mc if* amplifier. The input transformers (Z101-11 and Z102-11) are arranged to provide a small tuning range at this frequency. They are tuned to compensate for the falling response of the *if* and *rf* in the accompanying receiver. Their bandwidth is about 10 *mc* and any attempt to move the center frequency more than a nominal 5 or 10 *mc* will result in all kinds of problems. If you feel that you just have to use this gadget at some other frequency, your best bet is to construct a converter using any good converter tube. (6K8, 6BE6, etc.)

As supplied, the APA-38 works fine with any converter whose output is in the 25 *mc* to 35 *mc* range. A suggested hook-up is shown in fig. 2.

Using the panadaptor in this manner takes a little "getting used to." The signals appearing on the screen do not move when you tune the band as they do when using an ordinary panadapter. However, one becomes accustomed to reading frequency on the scope tube and stations are soon readily identified. The big advantage is that the *if* receiver can be used anywhere and the monitor will still show activity on the band. Switching the panadaptor from one converter to another gives an instantaneous picture of activity over the whole band. Like I said; what a fellow needs is one of these things on each band.

Dayton Hamvention

Well, "Dayton Hamvention" time has done come and gone and as usual the Dayton gang outdid themselves. It just isn't possible for them to do all that work year after year and still make each "Hamvention" more memorable than the previous one. But they keep doing it!

One of the several new things started last year and continued this year was the "VHF Suite" at the Biltmore; a gathering place for VHFers which was kept well occupied during the entire "Hamvention." Last year it was maintained by the "Miami Valley VHF Club," but this year due to the ingenuity of W8NAF and the kindness of "Eimac," the Eimac Company maintained the suite. All of the VHFers who had the use of this suite are deeply grateful to "Eimac."

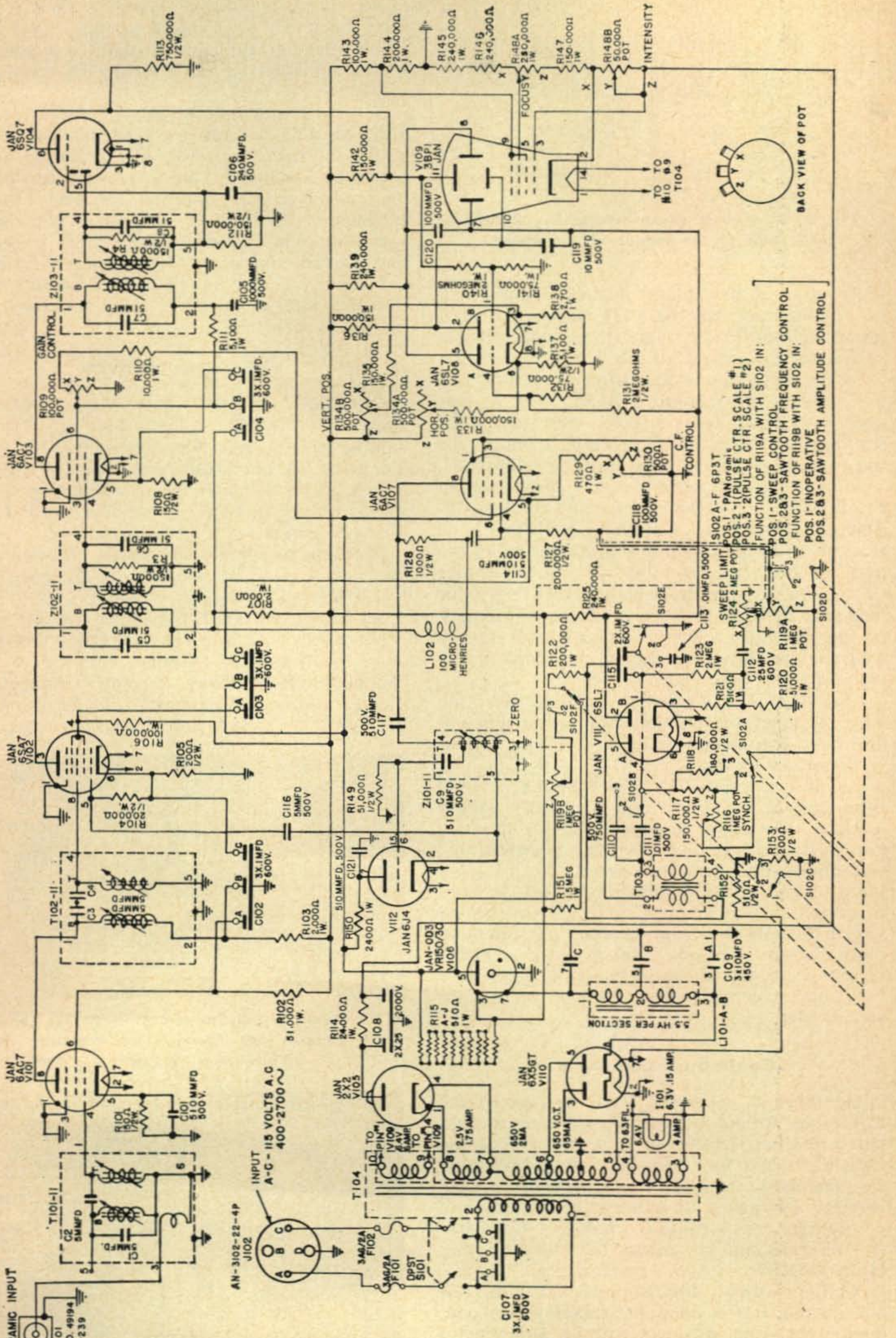


Fig. 1. Panadaptor APA-38. Circuit Diagram.

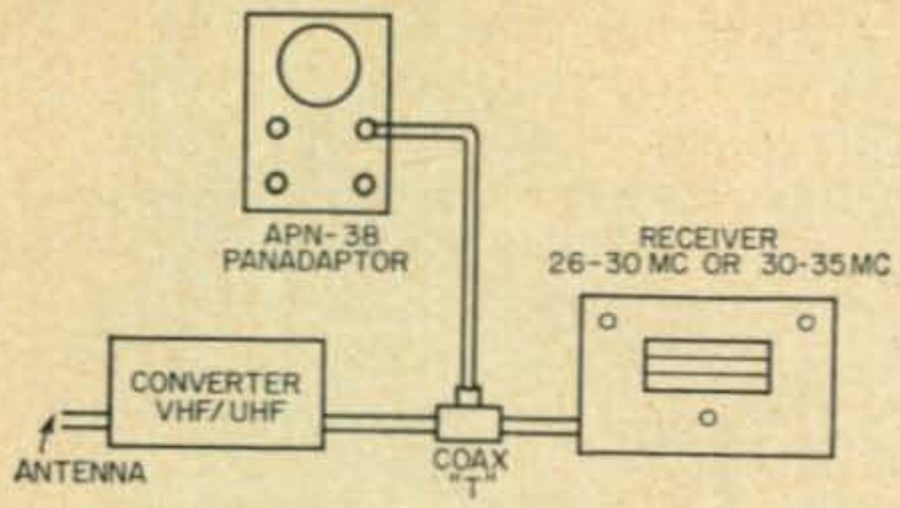


Fig. 2. A method of connecting the APA-38 panadaptor to the output of a converter

Another of the things that apparently will be "traditional" was the VHF banquet. Served buffet style on Friday night, there was a choice of fish or turkey and all the fixin's.

At the VHF dinner the "Microwave Trophy" was presented to John, W8LPD, for permanent possession. John received this trophy for winning the August "CQ VHF" contest for the past three years, as a multi-band entry.

Microwave Plaques were presented to Frank Miller (K9HMB) for being the first all-time member of the "Century Club"; to Elaine Busson (W8WRH) (in absentia) for being the first all-time YL member of the "Century Club"; and to Kay Brandenburg (K8IYW) for being the first YL in 1958 to become a member of the "Century Club." They all took it very well, having given up hope of receiving the plaques some time ago.

"Puevom" had it's initial initiation after the VHF banquet and we understand that this will also be a permanent "fixture" at future "Hamventions" in Dayton.

Thanks to Ev Taylor, W8NAF; Larry Brandenburg, W8TEK; and the many willing workers they drove and hounded for months, the VHF part of the "Dayton Hamvention" was one to be long remembered. We just dare them to try to outdo this latest effort. It can't be done!!

For those of you who have a 1960 calendar, mark it now—May 6, 1960 is the next Hamvention date. For those of you who don't have your new calendar—don't worry, we'll warn you in plenty of time!!

Columbus, Ohio—T.V.

On April 8, 1959 the VHF Section of the Columbus Amateur Radio Association participated in what is believed to be a "first" in the United States. On this memorable occasion the members held their regularly scheduled meeting by means of amateur television, half of the members visiting the home of Bill Parker, W8DMR and the others the home of John Hull, W8RRJ.

VHF Chairman Jim Nichols, W8VOF, was put on camera to open the meeting. He conducted the usual business without any hint of being under pressure and then turned it over to W8RRJ at Worthington, about ten miles north. John put Ken Myers, W8WRN, the VHF Secretary on Camera for his report. The whole meeting came off without a hitch and it was followed by the showing of some pictures.

W8DMR uses a home made camera feeding a rig on 432 *mc* into a 13 element Yagi and a TV set for a monitor. His receiving setup uses the 13 element Yagi, a pre-selector, a 432 *mc* converter into another TV set. The arrangement at W8RRJ is similar with some variation. The picture quality was excellent and was running about 350 lines at the time.

Needless to say, the 39 fellows who attended this new kind of meeting got a real thrill out of this experiment.

VHF Arctic Activity

On April 18, 1959, Bob Mellen, W1IJD, arrived at Fletcher's Ice Island (T-3) and will be there until September. He has with him, now in operation, a Johnson Viking II with a 20-15-10 meter beam, *a Johnson 6 N 2 VHF rig and a GPR-90 receiver with Tapetone converters for 6 and 2 meters.*

He plans to operate *vhf* mostly on week ends and has a code wheel with his assigned call KG1FN.

Schedules at other times can be arranged either direct with Bob via KG1DT or KG1FN or by mail to Carl Milner, W1FVY at 221 Shennecossett Parkway, Groton, Connecticut. Please address all reports of reception to W1FVY.

T.V. Setup at Bill Parker's, W8DMR. Bill Parker at extreme left listening to President Jim Nichols, W8VOF.

Set-up at John Hull's, W8RRJ. John with mike.

On 6 meters Bob has crystals on 50.04, 50.1, 50.16 and 50.4 *mc*.

On 2 meters Bob has a crystal on 145.8 *mc*, our local net frequency.

One objective of this expedition is to see whether it may be possible to forward scatter from the aurora into Canada and the United States. When aurora is indicated, Bob will try to run code wheel continuously and any reports of reception will be much appreciated. Please include best bearing, signal character, strength, and time of reception in your reports.

We will soon have a second operator joining Bob, so scheduled operation time may be extended if results show this desirable. The second operator will be W1WFJ, Fred Williams. *The foregoing bulletin was kindly sent us by Carl, W1FVY. Thanks a million, we'll all be looking for Bob.*

Club News

A meeting of the "Mobile Amateur Communications System" club was held March 29th, 1959, at the home of W7YKA. Most of the evening was devoted to reviewing the proposed Constitution of the Club and after some revisions the Constitution was approved and adopted.

The purpose of the club is quoted in part from the Preamble to the Constitution. "It shall be our purpose to establish a reliable VHF-FM communication system which will be available in event of a local civil emergency, to facilitate the exchange of information and general cooperation between members, to promote radio knowledge, fraternalism and individual operating efficiency, and to so conduct club activities as to advance the general interest of amateur radio in the general community."

Present count shows that twenty-two amateurs in the Seattle area now have two meter *fm* equipment and considerable interest is generating.

Gene Colson, W7UVH, and four other amateurs at Olympia, Washington, are getting on 2 meter *fm* on the same net frequency and some interest is being shown east of the Cascades at Yakima and Spokane. *Good idea, fellas. Good luck!*

Blackburn, Victoria, Australia Mac Hilliard, VK3/SWL was kind enough to send us the following information concerning DX etc., from Australia. "Although I am not a ham as yet, I am never the less a keen 50 *mc swl*. Receiver in use here is an Eddytone 888 with crystal converter for 50 *mc*, to a four element 50 *mc* beam, thirty feet high. I'm using 28 *mc* as the *if* and tuning 50 to 52 *mc*."

At the present time (April 8, 1959) we here in VK3 are impatiently waiting for a good break through to JA. So far the band has not been as good F2 and TE DX as last year, although the Sporadic E season in VK which is now over was very good."

"Last night ZL4GY came through for a short time, and this was quite a surprise."

"Down here in VK3 we don't often get the good conditions that the VK4 boys experience in the northern part of Eastern Australia."

"No one here has ever heard a European signal on 50 *mc* although the BBC TV signal on 49 *mc* has been heard. I think also that you experience far better auroral conditions in your part of the world."

"The best opening to JA that we have had was on the 18th of last November, signals were S9++"

"Last year VK3ALZ heard W6NLZ on cw working ZLs but could not attract his attention. Last December VK3PG heard a couple of W6's talking amongst themselves for a few moments."

"So far no reports of W's this season although the VK4 boys may be hearing them."

"KR6AK has worked VK4 and heard a VK3."

"The ZLs certainly had some good openings to W land last year, also to Mexico, and I think a KP4 was also worked from ZL."

"Last Thursday a few JAs were heard weakly but signals were mostly S2 to 3."

"At present am constructing a receiver to tune from 30 *mc* to 100 *mc* and hope to get it going while we have a chance to hear some rare DX on 50 *mc*."

"We may lose the 50 *mc* band to TV at the end of the year, although efforts are being made to retain the band." *We're all most grateful Mac, for the information contained in your letter. Seems to me you should have your own license with all that listening you're doing. Hope to see you on six and maybe in person also.*

Woodberry Forest, Virginia Lynn (K4KLC) wants some activity information. He asks: "I would like to know if there is any activity on two meters in the Roanoke, Virginia area. I cannot get out to the south because I live on the wrong side of a mountain for that. *What's wrong with the top of the mountain Lynn?* However, since I live almost all the way up the mountain, I have a clear shot from southwest to east, the long way around. I am also interested in meteor scatter, but know nothing about it. I'd appreciate it if some of the fellows could tell me all about it."

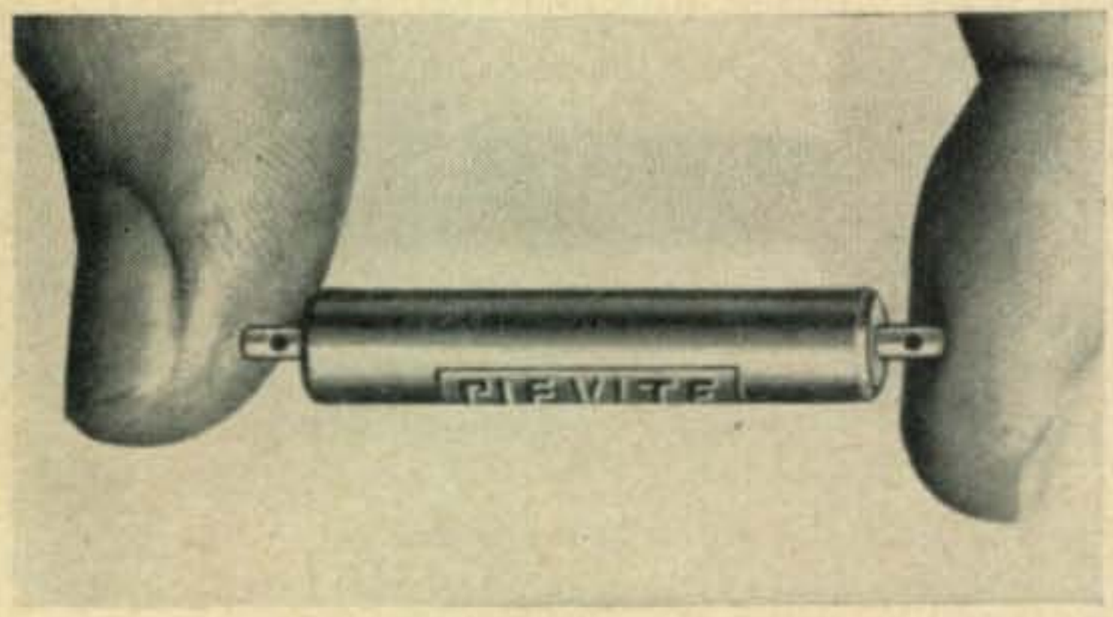
"Six meter activity in the Roanoke area has really mushroomed. We now have a net, the 'Wind-Bag Net' which meets each Saturday at 2035 EST on 50.75 *mc*. Net control is K4UMK." *Good to hear from Woodberry Forest again Lynn, hope you get replies from the gang in that area.*

Spartanburg, South Carolina From Russ

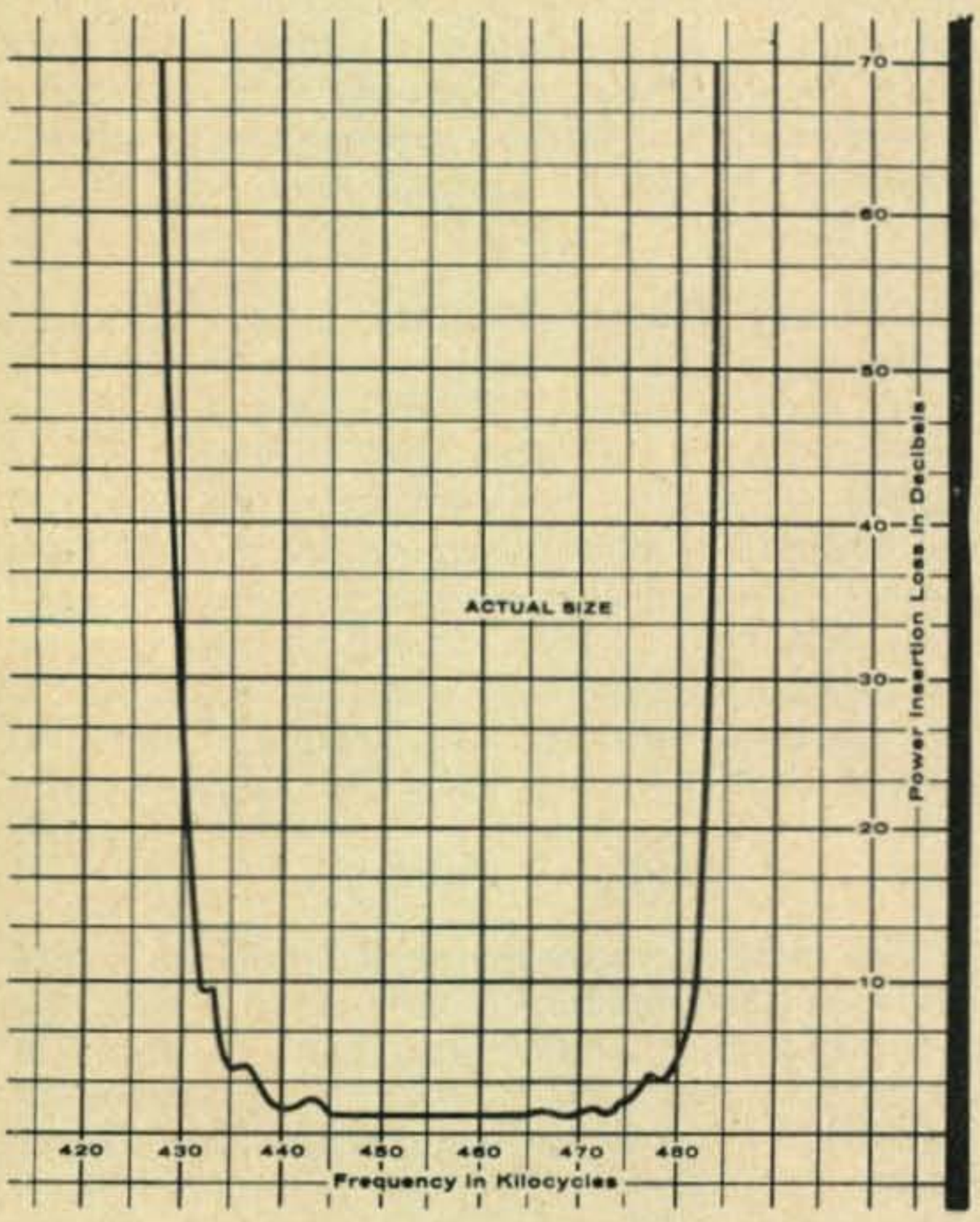
[*Continued on page 106*]

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

semiconductors



The Clevite ceramic filter is certainly a tiny handful. The unit is 1½ inches long, and 5/16 inches in diameter! Filters are available at 455 kc. with a 4 kc. bandwidth.



Frequency response of one of the wider Clevite ceramic filters. Note the extremely sharp skirts and complete freedom from "pop-up."

The big news this month is a new line of selective ceramic *if* ladder filters, designed to be used in transistorized communications equipments. Units with a center frequency of 455 *kc* and 6 *db* bandwidth ranging from 4 to 50 *kc* have very little insertion loss and high frequency stability. Rejection outside the pass-band can go as high as 90 *db*. These filters have a medium input impedance and a low output impedance, making them a "natural" for transistorized communications receivers and SSB exciters.

Physically, here is what the new ceramic filters look like. They are made up from small ceramic discs that resonate within the pass-band frequency. Electrodes are plated on the discs at the proper impedance point and the discs are *electrically* (not mechanically) coupled. The resonant discs are packaged in a plated brass cylinder with glass seals and pig-tail leads. The filter measures 1½" long and 5/16" diameter.

Electrically, the discs are radial mode resonators. Particle motion lies almost entirely along the radius and spurious responses are not harmonics of the fundamental frequency. They do not exist within plus or minus 50% of the central frequency.

The piezoelectric filter material is a ceramic called PZT which exhibits a dielectric constant of approximately 1,000 and a mechanical Q of over 400. The resonant and anti-resonant frequencies are stable to within plus or minus 0.6% from minus 40 to plus 85C. The long term stability is 0.1 percent for every 10 years of service.

Shape factor and power insertion loss are dependent on the bandwidth and the degree of rejection desired. In narrow band filters (such as the 455 *kc*, 4 *kc* filter suitable for SSB) the shape factor is less than 2 to 1. In broad filters it can be as low as 1.2- to 1. A wide range of characteristics can be obtained with the filters. Center frequencies between 100 kc. and 1,000 kc. are available and bandwidths of 1 to 10% are practical.

Of particular interest to hams, is the 455 *kc*

filter that is 4 kc. wide at 6 *db* down from the "nose." The price is not known at this writing but is believed to be between $35.00 and $40.00. Although this filter is just a little wide for SSB receivers, it is ideal for SSB exciters. In this application, the shape factor is more important than the bandwidth in as much as the audio above 2- 3 *kc* can be attenuated in the speech circuitry.

If you are interested in learning more about this filter, drop a line to: Mr. Gordon E. Eubanks, Product Sales Manager, Clevite Electronic Components, 3311 Perkins Avenue, Cleveland 14, Ohio and you will be sent all the available information.

A very interesting variation of this filter is Clevite's "Transfilters" and resonant by-pass capacitors. A single section of the filter is packaged in a tiny can, with terminals, and this becomes an *if* transformer! Since the resonant frequency of this disc is controlled, there is no alignment problem. I understand the portable radio manufacturers are really sold on these devices. The resonant disc can also be used as an emitter bypass, and will have about 15 ohms reactance at 455 *kc*, thereby reducing the degeneration in a stage. A *single* transistor stage using both the "transfilter" and the resonant bypass will have about 10 *kc* bandwidth, which is better than the selectivity of three *if* transformers in a portable radio! I believe that if the "Transfilters" and resonant bypass's were used in conjunction with the 4 *kc* bandwidth filter, that a combined bandwidth of approximately 2 *kc* would result.

The "Transfilter" carries part number TO-01A and sells for $1.25. The ceramic bypass is TF-01A and costs $1.10. Both of these items are available from Ace Radio Control, 1107 Main St., Higginsville, Mo. Minimum order is $3.00.

On an entirely different subject, for a moment. An RCA press release briefly mentions a gallium arsenide "tunnel" diode that is capable of generating high frequency radio signals. The device, along with a gallium arsenide solar battery, was shown at the National Aeronautical Electronics Conference in Miami, in a model satellite. This is a new development that "snuck up" on me. I will try to get more information.

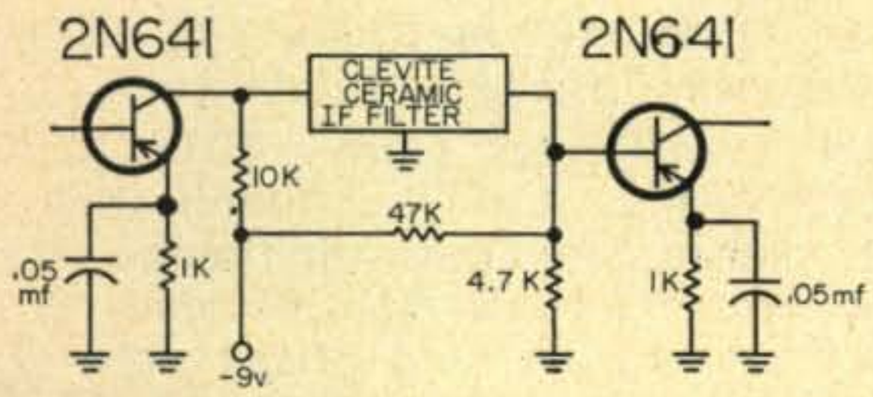


Fig. 1—Clevite Ceramic Filter used as an interstage coupling element.

W7MPQ—QRP Corner

Bob Brown, W3RZL, writes that he is about to go on the air with a rig patterned after W6TNS's "SSS." By the time this is in print it is likely that Bob will have had some good QSO's with his milliwatts. Bob says "Very glad to see that there will be a QRP Corner." He adds that he expects to operate on 28.080 *mc* and later possibly 21.070 *mc*, feeding the low power into his Mosley 3-el tri-bander.

Neal Brown, W7SLO, has had good success with a very small transceiver on 10 meters. He uses RCA transistors in the transmitter and some by Philco in the receiver. His antenna is a very short center-loaded whip. So far his QSO's have been tests on 29 *mc* to similar equipment a block or two away.

The modulation from Neal's small handful of gear comes through the Saturday afternoon QRM just fine. He expects to go to both 6 and 2 meters with similar rigs, and we hope to have some good reports of QSO's from him before long.

Let's hear from more of you QRP operators. Be sure to give us a suggestion of frequencies we can use for monitoring. When making your tests on the air, it helps to know someone is likely to be listening for you. 73 Dick, W7MPQ, P. O. Box 925, Tucson, Arizona.

Semiconductor News

Bradley Semiconductor Corp., New Haven 11, Conn., has a new series of low cost selenium diodes, with pig-tail leads. PIV's run from 37 to 296 volts, at 100 *ma*.

CBS-Hytron has expanded their semiconductor operations and changed the name to CBS Electronics Division. One of the newest items from CBS Electronics is a line of NPN (yes, NPN) power transistors designed for *dc* amplifiers and complementary symmetry circuits. Bulletin E-332 describes the seven NPN power transistors. You can still obtain a copy of "Transformer Design Notes For Transistorized Power Supplies," written by Bud Tomer, by requesting it from CBS Hytron Advertising Service, Parker St., Newburyport, Mass. Bulletin E-332 is available from the same place.

Continental Device Corp., 12911 Cerise Ave., Hawthorne, Calif., is marketing a line of silicon diodes manufactured by controlled

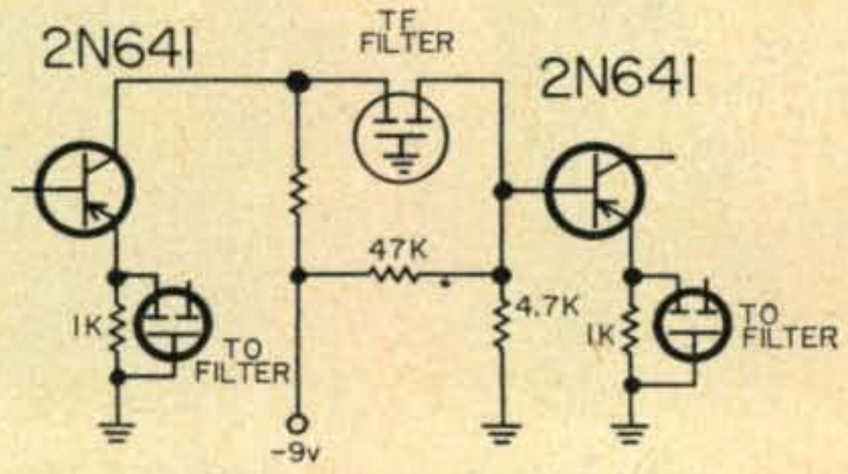
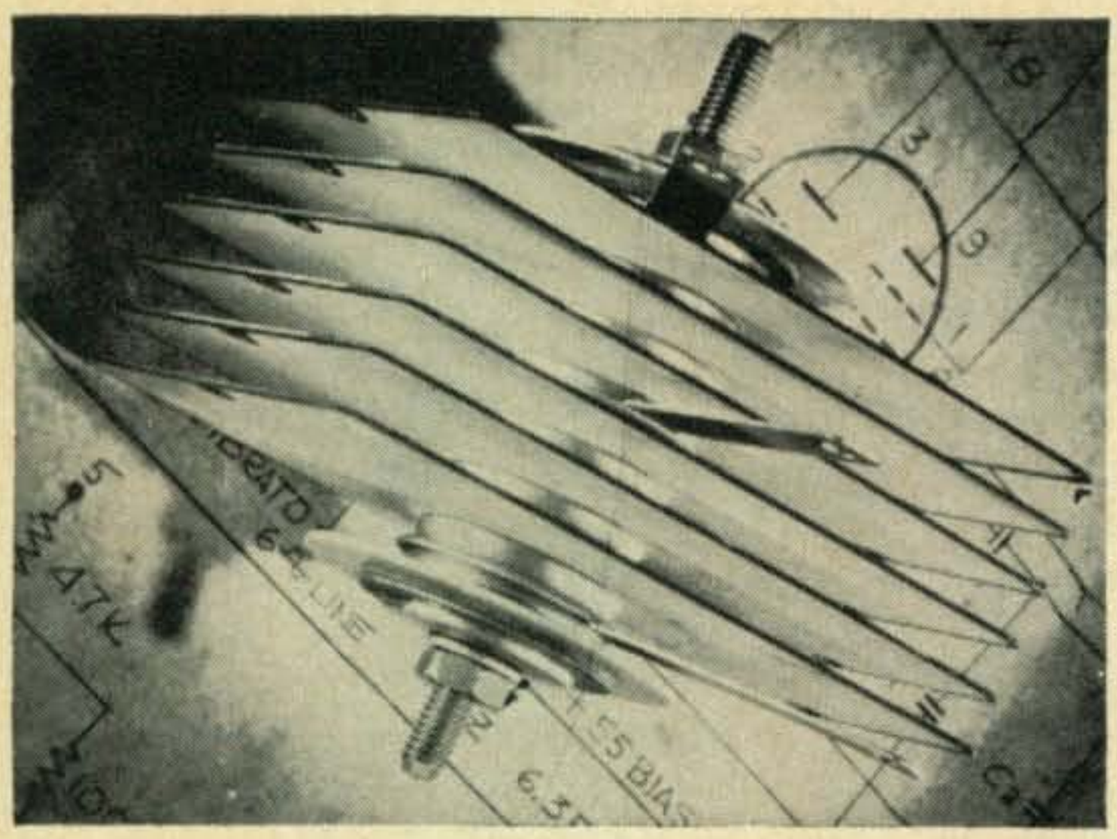
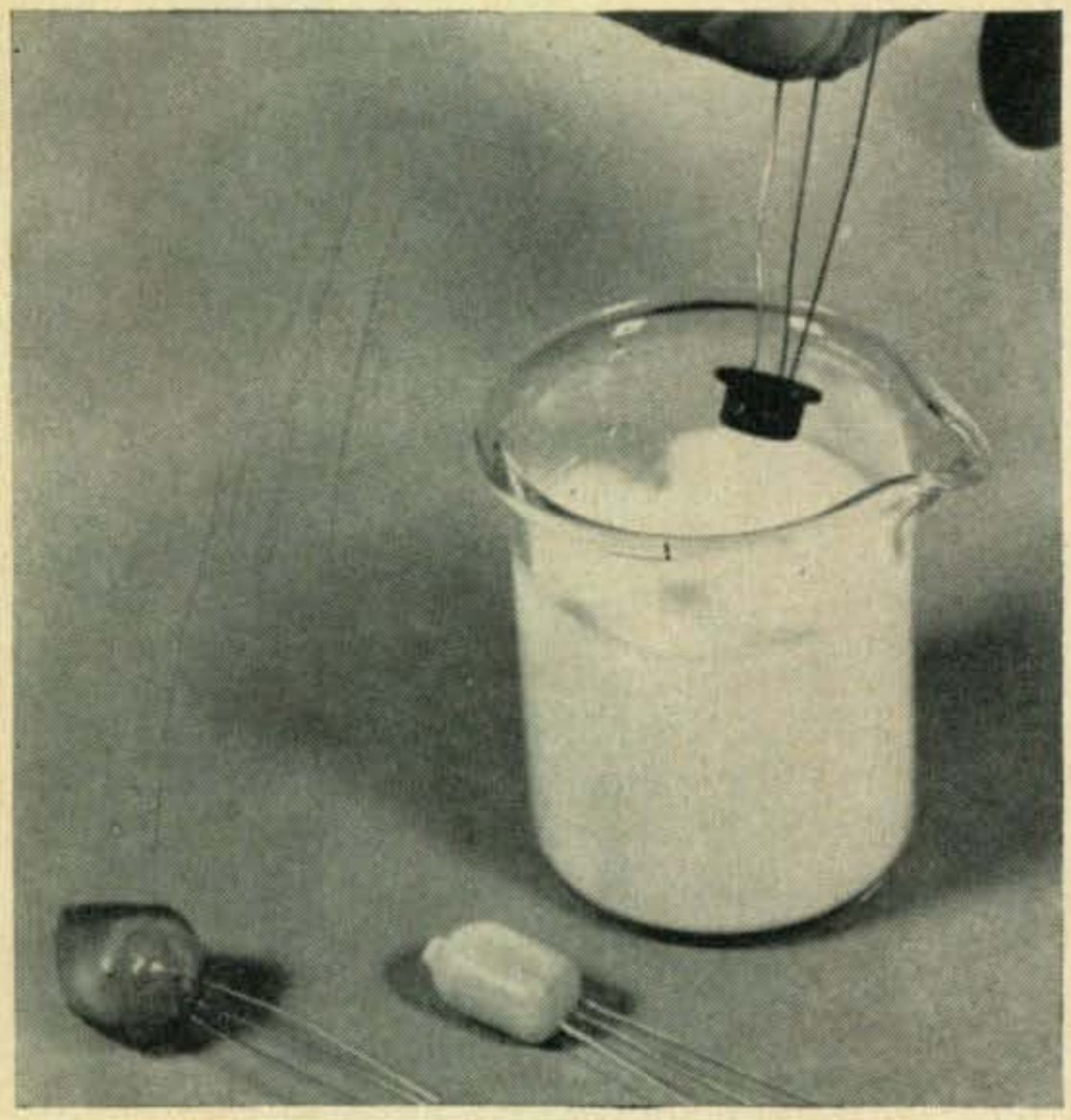


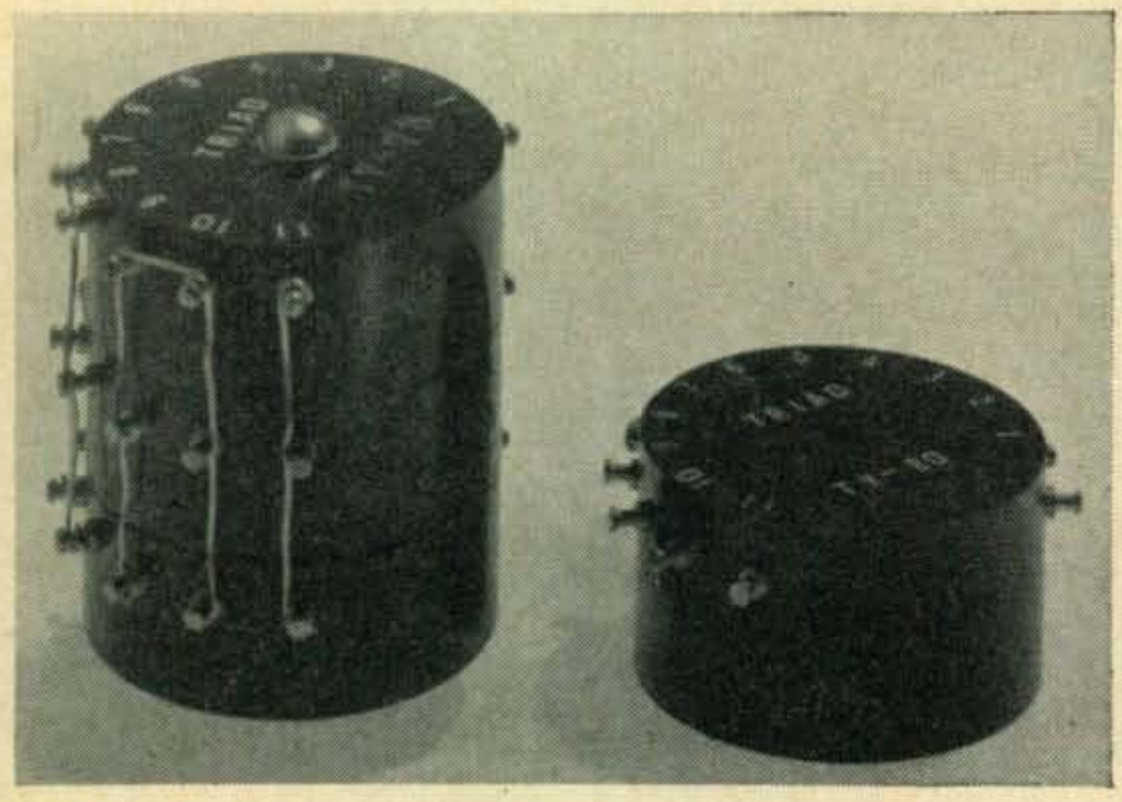
Fig. 2—A portion of a 455 kc if amplifier showing an application of the Clevite "Transfilters."



Introducing General Electric's new large plate selenium rectifier stacks, capable of withstanding high current surges.



A new potting solution is available for encapsulating transistors and components. See text.



The new Triad Transformer transistor switching toroids. Note that they can be connected in parallel for higher current applications.

fusion technique. They are available through 300 volts at 250 *ma.*

General Electric has a new improved selenium rectifier stack capable of withstanding surge currents 150% higher than previous models. A cup washer design has improved the electrical contact area to each cell. These rectifiers have individual VAC-U-SEL (Vacuum deposited selenium evenly over the entire surface) units. GE has also introduced a new concept in packaged circuitry. TIMM, short for "Thermonic integrated micromodules" is an entire electronic circuit packaged in a ceramic stack. A complete circuit, such as a multivibrator, occupies no more space than a pencil eraser! It can operate at near red-hot temperatures!

International Rectifier Corp. has a miniaturized voltage reference pack containing a zener diode current regulator and silicon reference element. The unit will provide 8.4 volts, ± 5% with a 10% input variation at 28 *vdc.*

Want to get potted? Plastic Associate's, 185 Mountain Rd., Laguna Beach, Calif. has color coded silicone rubber compounds for encapsulating and potting materials. A variety of colors, plus white, makes the identification of components easy.

Radio Corp. of America reduced prices on the 2N404, 2N582, 2N584 and 2N269 on April 29. A multitude of new transistors from RCA include: 2N404 (computer switch), 2N456 and 2N457 (audio power amp., power switch), 2N561, 2N1014 (power audio and switching), 2N640, 641, and 642 (auto radio drift, rf amp., if amp., and converter), 2N643, 644, and 645 (computer switch, drift type), 2N649 (NPN type for complementary symmetry matching of 2N217), 2N1067, 1068 (silicon audio power and switching) 2N1069, 1070 (silicon power audio and switching), 2N1090 (germanium NPN audio/computer alpha 5 *mc*), 2N1091 (germanium NPN audio/computer alpha 10 *mc*).

Fabulous is the word for the RCA booklet "Transistor Fundamentals and Applications." This is a complete (and excellent) transistor course covering both the theoretical and practical aspects of transistors. A set of review questions are included at the end. The price is only 50 cents and it can be obtained at your RCA distributor.

Texas Instruments has an interesting line of MESA transistors: the 2N1141 (Fco 750 *mc*), 2N1142 (FcØ 600 *mc*), 2N1143 (Fco 480 *mc*), the last is priced at $12.00 each.

Triad Transformer Corp., 4055 Redwood Avenue, Venice, Calif., is duplicating their powdered iron core transistor transformer line in tape wound toroids. The efficiency is higher, they are smaller, and priced only slightly higher. Write them for data and applications sheets.

73, De, W6TNS

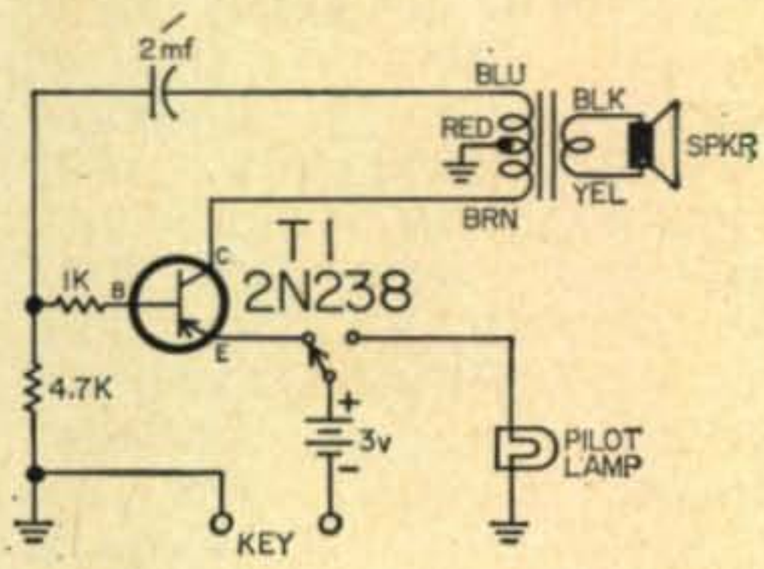
Novice

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

The new Heath CO-1 code practice oscillator is an ideal project for the beginning Novice or experimenter. You can assemble it in one evening without special tools.

Novices in particular are inclined to complain about the code requirement for obtaining their amateur license. One often hears this thought expressed, "I only want to operate voice, so why should I have to monkey around, learning the code?" Actually the FCC doesn't care if you want to operate phone, c.w., or ham TV. The code requirement is simply a way to "separate the men from the boys," as the saying goes. Imagine what the bands would be like if anyone could get a ham license simply by memorizing a few questions and answers. It would be about ten times worse than the 40 meter Novice band, on Saturday afternoon!

And even though I am what you would call a phone-man I still find that the code comes in mighty handy at times. When I am chasing a rare one (DX) I can slip out of the American phone band and give him a snappy call on Charlie William. After contact is established, a request to look for me on phone is usually complied with. I have picked a lot of new ones this way.



CO-1 Oscillator Circuit

Code Practice Oscillator

One of the basic tools for learning to send and receive code is a suitable oscillator. When the key is pressed, it emits a squawk that can be formed into dots and dashes (more correctly dits and dahs).

The new Heath CO-1 code practice oscillator is such an instrument. It provides a keyed tone, or a flashing light which can be used when someone is asleep. The CO-1 also will provide the Novice with an opportunity to gain some experience with transistor circuitry. The unit uses a PNP transistor in a common emitter blocking oscillator circuit and is powered by two medium sized flashlight cells. The transformer, T1 in the schematic, couples some of the output energy from the collector to the base through the RC network C1, R2. With a feedback path established, the transistor circuit will oscillate at a frequency (tone) determined by C1 and R2. A slide switch connects the battery to the oscillator or the lamp. The energy in T1 is also coupled to a 2½ inch speaker, mounted on the front panel.

The CO-1 is mounted in a bakelite case and measures 6″ x 3″ x 2⅛″. The tone will be around 1000 cycles (1 kc.) and sounds very pleasing. Since the oscillator draws only 10 *ma* (0.01 amperes) the batteries should last for many months (probably "shelf life"). This is a wonderful project for the beginner and can

be built by anyone. It is available from Heath for $7.95, including the batteries.

Who's DX?

Want to work some DX? Dick Milligan, KN5RCG/KG6 writes to say that he is active from Guam and is looking for skeds on 15 meters. He runs 50 watts to a 40 meter dipole, 50 feet up and overlooking the Pacific. Dick's QTH is: T/Sgt. R. R. Milligan, 3960th Hq. SQ. A.B.G. Box 169, APO 334, San Francisco, California.

From the beautiful land of Australia, Ivor Stafford, VK3XB, 16 Byron St., Box Hill SL, E11, Victoria, Aust., writes to tell of stations called and worked. As you may know, Ivor operates on 7150 and is always looking for Novice contacts. The calls in itallics were worked by Ivor and the rest were called but did not hear him. Mar. 18, KN3HKE, WV6CIX. Mar. 19, *WV2CIA*, KN8NCW. Mar. 20, *WV2CIA*, *KN3DQH*, KN4DBM, ZHB, KN5SZV, KN7DOH, KN8MNF, NCW, KNØSNV. Mar. 21, *WV6ATY*. Mar. 22, Kn8NCW, *KN9MRI*. Mar. 23, *KN3DQH*, KN5TAH, *WV6AJF*, KN8LCP/8, MNF, KNØRKF. Mar. 24, *KN3DQH*, HSI, KN4ZCT, KN8MNF, MWC, KN9PDZ, KNØRDA. Mar. 25, *KN3DQH*, EXB, KN5TAH, TVC, KN6RCA, WV6CPV, DDH, KN8MNF, NOJ, KN9PDZ, KNØSCK. Mar. 26, KN3HWJ, WN4CCL, WH6DAC, WV6CFT, DOS, DQS, SAK, Mar. 27, KN5NAH, TPD, WV6AJD. Mar. 31, *KN3DQH* (wadda pipeline), April 2, KN3HSI, KN4FNY, YTR, KN5SZV, WH6DDB, WV6DOS, DSD, KNØPLQ. April 3, *KN5SXU*, KN7DIW. April 5, *WV6ATY BUH*. April 8, KN3HSE, KN8MNF, KN9PDZ. On Mar. 21, Ivor's XYL worked *KN5SZV*. Her call is VK3KS.

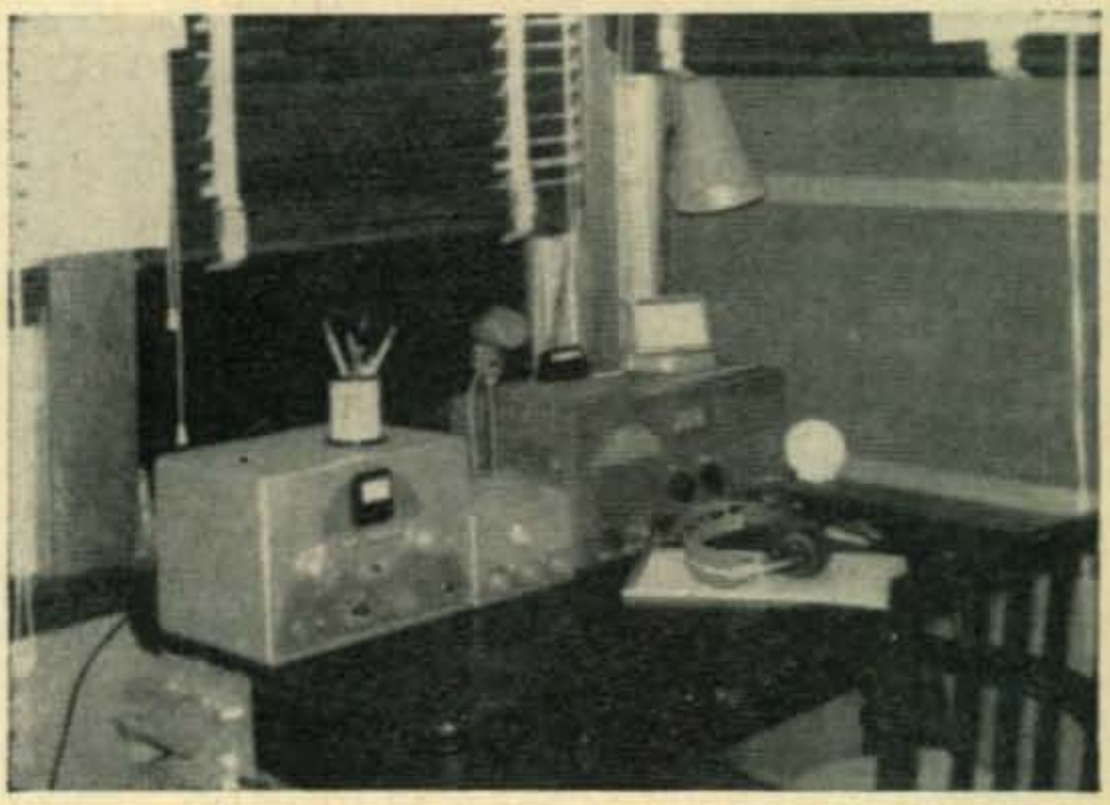
Also from the Land Down Under, Don Grantley, BERS 1002, Spring Valley, Holbrook, NSW, Australia sends a list of Novices received on the 40 m. band, during the last few months. Mar. 21, *WH6CWV* (599) working KN7GDV (579). Mar. 22, WH6CZI (579), KN7EOK (579). Mar. 24, WV6EJE (579), KN ØTDF (459). Mar. 27, KN5TLO (569) working KN7GHJ (569), WV6EBI (589) working WH6CWM (579), WV6ECG, EIB. Mar. 29, WV6ATY (589), DPA (569), DYG (569), EHG (359), KN7GKB (459). Apr. 5, WV6EMC (459). Don will confirm reception by surface mail, on a card for a card basis. If you would like an airmail reply, include six IRC's (available at any post office).

On April 13, David Knepper, AF13588607, USAF, 1230th Airways and Air Comm. Servide, APO 378, New York, was scanning the 40 meter Novice band and received the following stations in England: KN2SNQ, KN3IAO, IFR, KN4DFT, EDS, KN8LEV, KN9RMU. Dave holds the call W3BJZ.

George Haylock, G2DHV, in London, England reports hearing the following Novices sometime during April: KN1IIK, JIU,

Bill, KN9PXU, and Wayne, KN9PXV of 2366 30th St., Moline, Ill. are a father and son team, sharing the same gear. Dad has a WAS of 44 while Wayne is plugging away at 33. Look for them on 40 and 15 meters.

Jeff Smith, WV2CBQ, 14 Crosby Pl., Huntington, N. Y. just acquired a new SX-99 receiver. He will be glad to sked anyone, anywhere and will QSL 100% (don't we all?). Jeff recommends the special QSL that can be obtained from Walter Ashe Radio at $1.25 per hundred.



Ralph Blour, KN4DTU, 255 W. Brainerd, Pensacola, Fla., has a WAS of 11 worked with 9 confirmed in about 2 months. He QSL's 100%.

KN2RTE, KN4VOX, KN6 BJR, and KNØSAJ.

Tima Popovic, YU1-RS-357/YU1FR, Banat Novo Selo, Yugoslavia sends in his regular list of Novice stations heard in Yugoslavia. April 11, 1715 to 2125 GMT: KN1HTQ, IJW, ILP, IVR, JLN, JUV, JJXT, JXU, LUZ, WV2BEX, BFF, CGL, CHD, CPL, DLO, EDD, ELP, ENE, KN2RNP, SHO, KN3EFX, ESS, EXM, GAE, GKB, GRY, GVK, HEO, HLJ, HLU, HMV, HPT, HTK, HUA, HWR, HWT, KN4CPQ, DPR, EDF, ELF, FJO, FNS, FQC, FTR, YYC, ZED, ZET, ZZI, KN5QHR, RFR, SVU, TFA, TIQ, TPD, TZW, KN7ARW, KN8GVK, KCX, KQW, LRK, MYF, NEI, NFM, NWK, OFM, PPW, PVM, KN9MAU, OUN, OUR, PAV, PGC, PYL, QEB, QKY, QMX, RGG, KNØ, RCC, SPL, TQH. April 12, 1930-2000 GMT: KN1HPA, HTY, WV2BUH, CJC, KN2UNP, KN3GBY, GIT, GSA, HEO, IAN, KN4DSV, EQT, KN5SCM, TON, KN8LHT, NNG, KN9LPI, PFH, PFO, RPL. April 14, 1900-2100 GMT: KN1HMS, HQA, 11K, KN3EMO, EVF, KN4FOP, FTS, VOX, KN8LCG, LVC, MJI, OGB, KN9LHT, OPB, PEI, PFI, PNV, QCV, QYF, QNN, RII, RQA, KNØQJG, SVD. April 15, 1930-2040 GMT: KN1JKS, JOV, JRC, JUR, KHC, WV2AXR, BKA, BLY, KN3ELX, EST, GIQ, HDV, HJA, KN4BLV/4, FIE, ZEO, KN5TPD, TUP, UAI, WV6AAX, KN8LPF/8, KN9PXM, KNØHPT. April 16, 1710-2040 GMT: KN1IOG, JAM, JGM, JGO, JKA, JXQ, SHV, WV2CIO, DES, DYG, EAL, HYW, KN2URP, KN3HBZ, KN4BVP, EGY, FJT, MFK, NRJ, YWZ, ZNK, KN9PGE, QVB.

Net News

Bob Zale, K9LTU, 10219 S. Green St., Chicago 43, Ill., calls our attention to the teen-age Traffic & Ragchew Net which meets weekdays at 1530 Chicago time on 3885. Members of all ages are invited to join in.

John Egger, KN3GHH, 1018 Alden St., Meadville, Pa., advises us of a new net called The Meadville Area Slow Speeders. This net meets every Sunday at 1830 EST on 3725 *kc.* Traffic is given priority over ragchewing and the net operates about 10 *wpm.*

Help Wanted

Edwin Lake, 1930 Ottawa Beach Rd., Holland, Mich., is working with a group of handicapped boys between 8 and 15 and could use a helping hand. Ed would like to obtain some old receiving gear that the boys can rebuild into receivers and transmitters. The boys are learning the code and expect to get their licenses soon. Any equipment you would care to donate would be sincerely appreciated.

Frank Friedman, K9IKT, writes to say that his club, SCEDS ARC, is always willing to help new hams in the Lincolnwood, Ill. area. The club is basically for teen-agers, but all hams are welcome. Contact Fred at Lincolnwood, Phone ORchard 6-3766.

The following persons have expressed a desire for help on the license preparation. Can *you* give them a helping hand?

W2—Elvin P. Cohen, 3962 Wolkow Avenue, Seaford, L. I., N.Y.
W3—Ray Pisaneschi, Jr., 123 Simpson St., Swoyerville, Pa. BU 74404.
W4—Howard P. Holman, Box 1018, Pahokee, Fla.
W5—Bobby Quinn, 1007 South 17½ St., Corsicana, Texas.
Luther A. Phillips, 417 Elmwood St., San Antonio, Texas. Phone PE 4-0452.
W6—Thomas Orzech, 3 Bayview St., San Rafael, Calif.
Larry Burkett, 7925 La Carta Circle, Buena Park, Calif. LA 27452.
W7—Leo L. Bowman, Frenchtown, Montana. Phone TA 3-4441.
Lee Spears, Crow Rock Route, Miles City, Montana.
Kip Edwards, 1226- 167th S.E., Bellevue, Wash.
W8—Bill Klima, 2984 E. 116 St., Cleveland 20, Ohio. GA 1-2385.
W9—Dennis Ciborowski, St. Henry's Pre. Seminary, 5901 N. Main St., Belleville, Illinois.
WØ—Guy L. Peterson, 810 9th Ave. S., Minneapolis 4, Minn. FE 8-4990.

Letters

Howard Bentley, KN5SXU, P. O. Box 526, Wylie, Texas, does pretty good with his DX-20 and SX-71 hooked to a 40 meter dipole. Two hundred and seventy nine QSO's have resulted in 38 states and an impressive list of DX (KG6, VK3, ZL2, KZ5, and HK4, among others. Howard expects to operate 15 meters QRP with a TNS special Semiconductor Space Spanner (PE Nov. '58).

Larry Wilson, 1455 So. Barnes, Springfield, Mo. has held call KNØRWL since Oct. '58) and has worked 20 states, with 16 confirmed. Larry would like a list of bureaus for Novice QSL's. I'll try to get them in next month, Larry, along with an explanation of how to use them.

Earl R. Spencer, KN4FQU, 1413 Davis Dr., Ft. Myers, Fla., writes an interesting letter. He recommends using a Heath AM-2 SWR indicator in the transmission line at all times. Tunes the transmitter for maximum output and best efficiency.

Norm Simpson, K7BHO, 3104 W. Eloika, Spokane 15, Wash., a 54 year old grandpa, has a Globe Chief that he would like to put the latest modifications in. Anyone have any information?

Steve Starkes, WV2DXV, 1024 E. 12th St., Brooklyn 30 N. Y., would like skeds with 7's and 8's on 15 and 3's on 80 meters. Steve has 16 states confirmed, plus WP4, HK3, and a G5 that talked to him on phone. Sorry I couldn't print the picture, Steve, too fuzzy.

[*Continued on page 107*]

YL

by Louisa B. Sando, W5RZJ
212 Sombrio Drive, Santa Fe, N.M.

K6HOI, Pat Grafe, has been handling Moonwatch traffic since the first Sputnik was launched in Oct. '57.

YLs attending the OARA convention at Roseburg, Ore. May 2-3, 1959. L. to r., front row: W7RIC, K7AJB, W7GWG, W7DIF, W7AZC, W7DVH, W7VLG, W7WFO, W7IGY, W7CPV, K6QJQ, K7BII. Second row: W7CSQ, W7GNC, W7ZLT, W7RAX, W7DAT, K7DMH, W7DIC, Kn7HKX, Kn7HRV, W7SBS, W7WTK, W7NJS, W7ITZ, Kn7HKS. Back row (center to right): W7NTT, W7BCZ, W7HHH, W7IRF, W7SBX, W7ZLS.

3rd International YLRL Convention

That's right, gals—it's in the works! You'd better start planning right now to take next year's vacation the latter part of June in New England.

Last Fall YLRL's Board of Directors approved another International Convention. A satisfactory date for 1959 (YLRL's 20th anniversary) could not be selected, so the convention was postponed until 1960. With the okay from YLRL, the Women Radio Operators of New England (WRONE) at their spring luncheon meeting held May 2 voted to sponsor the convention. All 59 gals attending the luncheon expressed their enthusiasm for it and selected these YLs to be general co-chairmen: W1ZEN, "Onie" Woodward, and W1SVN, Millie Doremus. More details—definite date and place, etc.—as planning develops.

Moonwatch Net

Many are the ways in which Ham Radio provides "public service." One such useful endeavor in which several YLs are participating is the "Moonwatch Net" by means of which information is passed between the various Moonwatch teams throughout the country.

The most active YL in the net is K6HOI, Pat Grafe, at Sacramento. She has been passing Moonwatch traffic since the first Sputnik was launched in Oct. '57. One reason for Pat's intense interest is that 17-year old son, John, is an amateur astronomer and has been since he was 9. At the beginning the Moonwatch Net was only between Moonwatch stations and observatories in California. But since Jan. '59 stations from other states have been checking in. K6HOI also keeps a cw sked every Tuesday and Thursday to Washington, D.C. with W3UCT, Nelson Griggs, who is editor of "The Amateur Scientist," for scientific or satellite data.

Every weekday K6HOI has a sked at 1930 on 3905 with W6PJF, Rosemary Robin, for the Stockton group. At 1300 every day she skeds W5YSJ, Jennie Lathrop, on 14,225 for traffic from the several Albuquerque, N.M. Moonwatch teams. Then at 2300 every day K6HOI skeds K6LEO, Dick, at Davis, Calif. on 2 meters. He takes her traffic and passes it to Dr. Arthur S. Leonard, captain of the Sacramento Moonwatch team via phone and gets latest data on satellites in return for Pat to pass on her nets the following day. (Quite a busy day, especially on Wednesdays when Pat has 3 MARS nets!) Traffic concerns satellite tracking and predictions of passages.

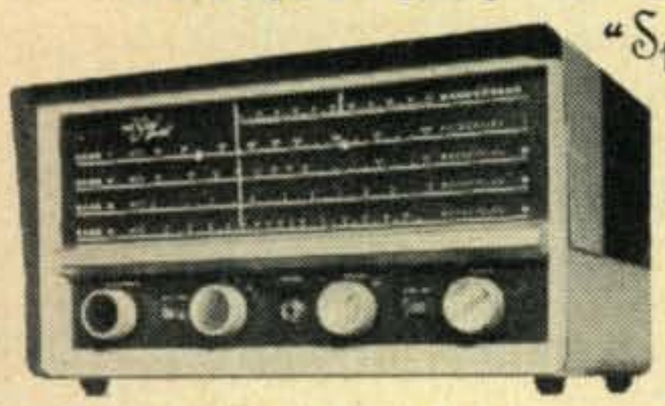
The Moonwatch teams get information direct from the Smithsonian Astrophysical Observatory and Space Track, but since it goes through the mail it often is "old" by the time

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!"

National NC-60

"Special"



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For further information, check number 61 on page 126.

it arrives, whereas through Ham radio it is just a matter of hours. For example, information of sightings passed on their net Feb. 23 from Albuquerque via W5YSJ and Feb. 25 from China Lake via K6ARM was instrumental in Dr. Leonard's plotting the orbit of 59 Alpha II" the rocket carrier of Vanguard II launched Feb. 17, '59. (The instrumented sphere was dumped and the third stage rocket carrier continued out in space for another 232 miles which put it in a higher orbit than the instrumented sphere. Teams saw the sphere but did not know what happened to the last rocket stage until Dr. Leonard received information through Ham radio. The result was the recovery of Vanguard II third stage carrier.)

The Smithsonian Astrophysical Observatory also credits Dr. Leonard with working out the orbit of "1959 Beta I," which was made possible by sightings made by the Moonwatch teams in Albuquerque and sent via W5YSJ to K6HOI on May 6. Computations and subsequent sightings in Albuquerque and Sacramento confirmed the orbital data. Prior to this Beta I had been "lost" for a year.

Pat has received a Certificate of Appreciation awarded for support of the Moonwatch Project, Satellite Optical Tracking Program. IGY, 1957-58 by the Smithsonian Astrophysical Observatory. She also wears with pride an IGY pin which she earned for help in the IGY.

Many OMs participate in the Moonwatch Net, such as W6PIV, W6CXK, K6SFJ, and others. W6PJF, Rosemary, handles traffic for the Stockton Astronomical Society Moonwatch Station. W5YSJ, Jennie, has received an Albuquerque High School Moonwatch Team patch for 40 hours of service. All of Jennie's family—herself, OM, son and daughter—go out with an Albuquerque Moonwatch team.

In addition to their weekday skeds, on weekends K6HOI and W5YSJ monitor 14,225 at 1300 MST in case pertinent information comes through. Obviously the Moonwatch work is very time consuming, but it is also a very real contribution!

Merit Award to W6NAZ

No doubt most of you heard that Dinah Shore was acclaimed the outstanding woman of the year in TV and was presented the 1959 Genii Award by the Radio & TV Women of Southern California at this group's fifth annual dinner-dance in Beverly Hills on April 22. But did you know that at this same gala affair (attended by some 500 people including many radio and TV celebrities) actress Lenore Kingston was presented with a merit award for "public service both in her career and habby"? Her career is in TV for which she does a program called "Purely Personal." Her hobby, as W6NAZ, Lenore Conn, is running phone patches for GIs, mainly to Greenland and the Ice Island T-3, and to some isolated Alaskans. Her award was a gold cigarette box

For further information, check number 29 on page 126.

engraved "1959 Merit Award to Lenore Kingston." Congrats, W6NAZ!

Congratulations also to W2QHH, Howy. On Mar. 19, '59 he qualified for YLCC/1000—which means he has had confirmed contacts with 1,000 different YL ops. Quite a feat! We know the gals are there, but to hook them is another matter. Howy runs low power, too.

Now here's an SOS from an OM looking for a YL in Wyoming. W8EIC, Steve Solo, in Detroit would be grateful for a sked with a Wyo. YL on 15, 20 or 40 meters, phone or cw. On Sunday he'll make a sked for any time; other days any time after 1600 EST.

With the Clubs

As mentioned in the lead, WRONE held its spring luncheon on May 2 with 59 attending. The YLs came from Maine, Mass., R.I., and Conn. and K2DKL, Bonnie, flew in for it from Corinth, N.Y. The WRONE gals are going to offer a certificate for working members; rules to be announced soon.

WHO of Tarrant Co. has a new certificate custodian: Miss Mary Brewer, 7101 Robinhood Lane, Ft. Worth, Tex. Requirements for the certificate have been changed from contacts with 5 members to only 3 contacts. Send no QSLs; only a copy of the log is required.

The Los Angeles YLRC has revised its rules for earning their certificate, to become ef-

[*Continued on page 108*]

W5YSJ, Jennie Lathrop, relays traffic daily from the Albuquerque Moonwatch teams to K6HOI at Sacramento.

W6PJF, Rosemary Robin, at Stockton is another faithful member of the Moonwatch Net.

Letters . . . . . to the Editor

14 Mc

Dear Wayne:

Of course your editorial labeled "Modernizing the Amateur Bands" was designed to be used as a reader survey, so I thought I would write in with my two cents worth.

I have had a scope on 14 Mcs for many years, and can say that your statement that the CW portion is "relatively unoccupied" is erroneous.

I would, however, like to see the domestic Phone band extended upwards to 14,350. This would tend to force more foreign fone stations between 14,000 and 14,200 kc, but I believe the CW men can take care of that.

Roger D. Mace, W6RW

Help Wanted

Dear Radio Friend:

It has been more than six months that I have wanted to be a part of the great chain of radio Hams, but my small economic resources have only permitted me to get a Hallicrafters receiver S-40B. That's why I am writing you hoping that you, together with some of the other radio Hams in your country, might be able to give me a transmitter. I know it is indiscreet on my part to make this request but my urge is very strong and I have to use all means of satisfying it.

I am willing to pay what it might cost to send this transmitter, in case my desires are granted.

Thank you for your cooperation and I close wishing you a Happy and Prosperous 1959.

73 & DX,
Gabriel Ossa Lema
Banco Popular
Medellin, Colombia

Rascals?

Dear Wayne:

Just thought I'd drop you a card and let you know that you rascals down there at CQ are doing a wonderful job. Okay, so modernize the magazine, but keep it informal and don't lose the human-interest touch which your competitor lacks. Also, notice plug for CQ on p. 232 of Popular Science, May '59, re: W6TNS' Radar Speedmaster Detector!

Keep up the humor, and those good editorials.

73,
Jim, WV6DLM

He's Happy

Dear Hon. Ed:

Some months ago, through the (voluntary!) good offices of W3PGB I won your QSL contest. I'm writing now to thank you for the prize. It is a prize too. I had not seen CQ before—and it came as a revelation. My one regret is that there was a bug in your first gratis copy, and it bit so hard that I can see no other course than to renew my subscription when the time comes. It is never a pleasure to spend my hard earned cash, but buying CQ is the nearest thing to it, HI.

My main pleasure in your magazine is the high technical/guff ratio, although most of it is a bit elementary, but not as bad as ours over here.

Thanks again for an excellent magazine.

73 & DX
T. R. Mortimer, G3JZV

Tip Top Receiver

Sir:

I built the receiver by WØEXC and KNØJLO and am more than pleased with it. On 15 meters I have heard more DX than I've ever heard before. It performs equally as well on the other bands—one suggestion! To those who have built this receiver, "put a

6CB6 in the RF stage instead of a 6BA6" (no circuit changes needed) and see the "S" meter increase on all bands. It really brings the weak ones up.

73,
E. L. Felder, W5FSS

Vow!

Dear Wayne—W2NSD

"Once in a Lifetime" on January 28, 1959 at 1402 CST I came back to K6HFF's CQ: her name was Vera. During our QSO, KL7AV broke in and his name was Verne. His XYL who is KL7AX, came in on frequency and her name was Verna. My name is Vern; you can imagine the confusion when it came time to turn it over to Vern, Vera, Verne, and Verna. QSO ended 1445.

Yours very truly & 73
Vern, W9JWW

Police Frequencies

Dear Wayne:

In reference to the letter from Irving Davis, W8KJ (March CQ), I might mention an incident which occurred in the Los Angeles area some time ago.

A man who arrived at the scene of an accident before the police, received a citation for having radio gear in his car, tuned to the police frequency. The matter was brought to court, and the judge ruled that restrictions in this respect were unconstitutional, and that any radio broadcasts on any frequency, could be received by anyone having the necessary equipment without violating any law, and without requiring any special licenses or permits.

Ben Favrholdt, K6EKS

Malayan Amateurs

Many DX'ers have recently worked the Malayan prefix 9M2, which became a federation the first of 1959. The Malayan Amateur Radio Transmitter's Society are a very active group and have an extremely interesting publication called *The Malayan Radio Amateur.* The magazine, sparked by Stuart Faulkner (9M2DB of SSB fame), gives all the Far East News (DX and otherwise) in addition to reprinting popular articles from the world's leading ham publications.

Associate membership in MARTS runs two dollars in this country and will bring the magazine bi-monthly. The stamps alone are worth the price of the membership, especially if you have a collector in the family.

Stuart has offered to help locate those hard to get Far East QSL's whenever possible. If you care to help the magazine along, drop a line to S. A. Faulkner, 9M2DB, Malayan Amateur Radio Transmitter's Society, P. O. Box 777 Kuala Lumpur, Malaya.

Dispute

Dear Wayne:

Thanks for your memo with attachment concerning Marconi. I agree with Arthur E. Ericson, W1NF—Marconi did *not* invent wireless.

Marconi took the scant knowledge known at the time and developed it through experiments into a system of wireless that met an urgent commercial need—communication over long distances. Therefore, he "really invented *commercial* wireless".

To say that Marconi invented wireless, is a sure way to start a debate. I was well aware of this sore point when preparing my article. Probably I should have developed the Marconi portion more fully, or, said specifically, "Marconi did not invent wireless; he really invented commercial wireless." Or, I could have ducked the issue entirely by using "developed" in place of "invented".

After getting radio waves to travel minor distances, much work went into aerials, power equipment, and tuned circuits before Marconi succeeded in spanning great distances and finally the Atlantic. Great effort also went into the problems of financing each progressive step of wireless. In this latter, Marconi truly was also a promoter.

I'm sorry if my wording wasn't clear and I revived an argument of the early days of wireless still vivid in the memories of all old-timers.

Frank Whitman, W2AAA
Pitman, N.J.

POLY-COMM CITIZENS BAND TRANSCEIVER

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MOBILE UNIT TO BASE

Everything you want . . . everything you need for effective Citizens Band transmission and reception can be found in this two-way radio package designed and manufactured by Polytronics Laboratories, Inc. It is as easy to use as the telephone — operates on 4 channels at the flick of a switch.

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Poly-Comm gives you the choice of 22 newly created 27 MC Citizens Band frequencies. Its design features a super-sensitive dual conversion 10-tube superhet receiver which incorporates—

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Sensitivity: Better than .5 uv for 10 db. S+N to N ratio @ 30% @ 1000 cps (for any eight adjacent channels)

Squelch: (Adjustable); @ Threshold Receiver will awaken for carriers of .1 uv. or greater @ stop receiver will awaken for carriers of 2 uv. or greater.

Noise Limiter: Floating series gate operates on all noise peaks. Operates on both 115V. A.C. and 12V. D.C. or 115V. A.C. and 6V. D.C.

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For further information, check number 33 on page 126.

CONTEST CAL. [*from page 22*]

It is unfortunate that on their first contest they have a conflict of dates with other established activities.

Several letters of criticism have been received regarding W6BXL, one of the operators at W6YMD in the Phone Section of our contest. According to the article "Superpower" in the May issue, W6BXL's station license was under suspension at the time he was operating at W6YMD. I was unaware of the FCC decision when the Phone results report was made up. However, not having all the facts, the Contest Committee is not ready to hand down a decision at this time.

The Astoria Amateur Radio Club of Oregon have something going to coincide with Oregon's 100th Anniversary of Statehood. One hundred contact points with different Oregon hams earns you an attractive two color certificate.

Figure your score as follows: Multiply your number of contacts by 222, add kilometers you are distant from Oregon's state line and divide all by 22. If it equals 100 or more you are eligible for a certificate. They figure a W2 will have to make 78 QSOs. Are they kidding? Anyway there are more details and even W2DEC's announcement last month did not make it clear to me. Suggest you write to: R. T. Carruthers Jr., KN7HDB, P. O. Box 1231, Warrenton, Oregon and have him send you a log from which also includes the rules.

The South Miami Radio Club is offering a certificate which requires much less effort.

Only 5 contacts with Club members will make you eligible. You can make your application by sending a list of members worked to: The South Miami Radio Club, P. O. Box 81, South Miami, Fla. Give the time, date, report and other standard OSL information.

73, Frank, W1WY

DX [*from page 72*]

from the original call. In this case, credit is allowed for ZA5. Such is the case in SM8UU/MM. The /MM is a suffix and credit is allowed for only SM8. Only the first two or three letter/numeral combinations count. As in CR1ØAA, credit would be given for CR1; UPOL-6 would be credit for UP6. A call with no number has zero assigned. RAEM credit RAØ, WAR credit WAØ. I hope this clarifies matters. If you have any questions, drop me a line.

The fourth annual DX get together of the Vancouver, B. C., Seattle, Washington and

[*Continued on page 98*]

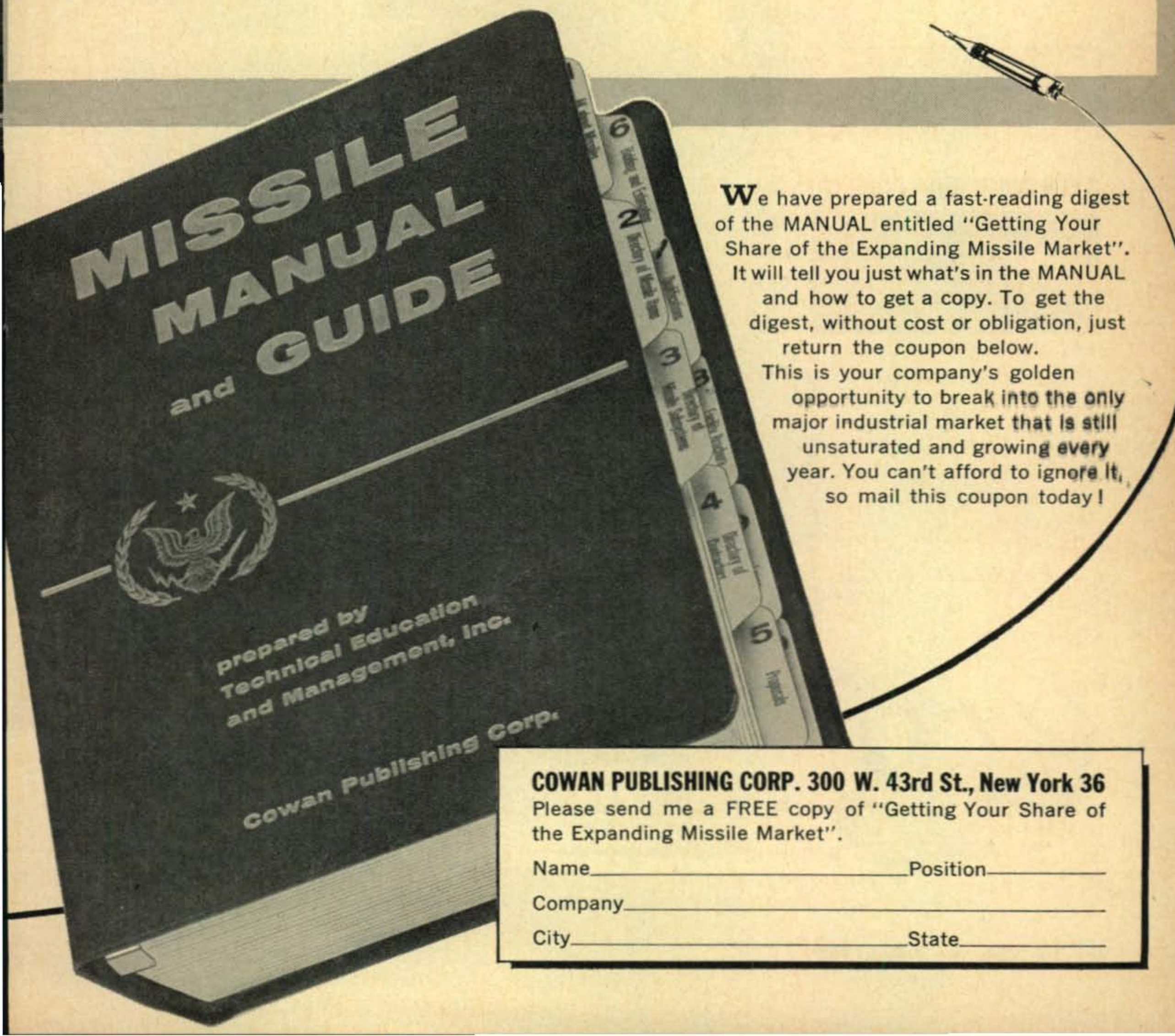
HOW TO GET YOUR SHARE OF THE 6½ BILLION DOLLAR MISSILE MARKET

During the coming year only 500 American companies will slice up the government's 6½ billion dollar missile development budget!

Yet it is estimated that more than 100,000 companies, making almost as many different products, qualify as suppliers to the missile program. Yours may be one of them.

The government, anxious to increase the number of companies supplying missile development products and services, has ordered all procurement agencies to encourage bids from every possible contractor, subcontractor or supplier. In other words, this 6½ billion dollar market is wide open!

And now there's a comprehensive, understandable "how to" GUIDE to help you get missile business—even if you've never sold to the government before! The Technical Education and Management, Inc. division of Cowan Publishing Corp. spent more than two years compiling the data for this book, THE MISSILE MANUAL AND GUIDE. It tells exactly what the government needs—paste, paper clips, paints, potentiometers, piping, and many thousands of other products—how to qualify, how to make up and submit proposals, how to bid and estimate, how to make up a facilities brochure, how to get government financing...and much, much more.



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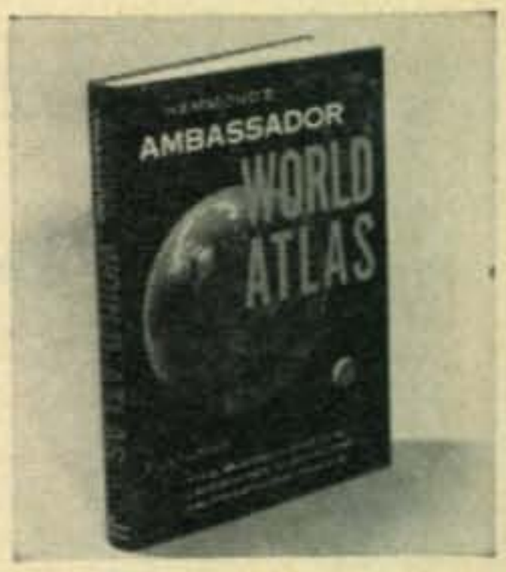
ATLAS

Come on, get with it. Don't pull a blank when some one asks you for the capital of Honduras. For only $12.50 you can own 7 lbs. of full-color maps and a complete gazeteer. Send for this Hammond Atlas. PLUS a one year subscription to CQ.

only $12.50



COMMAND SETS

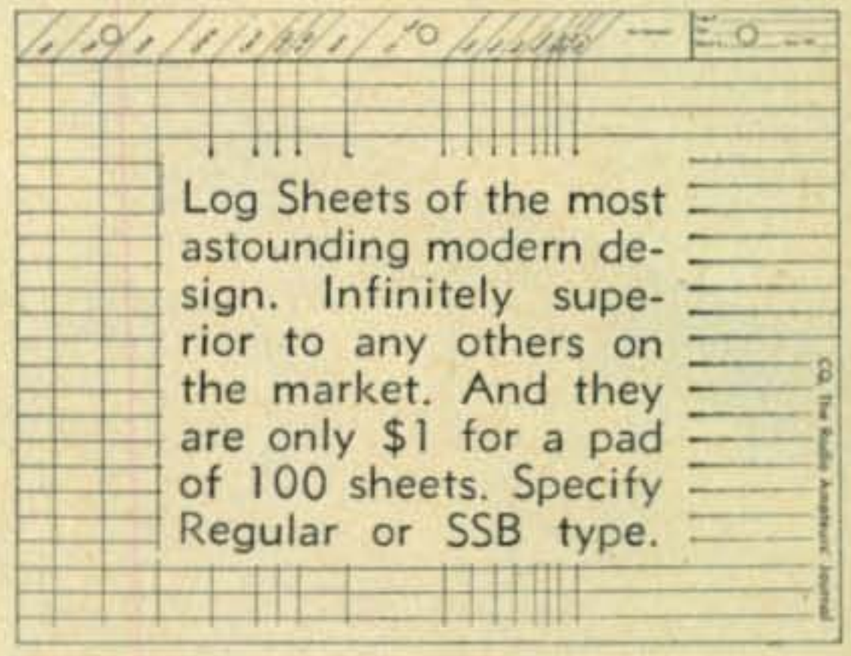
This IS a collection of reprints, containing all of the available information on the conversion of the popular "Command" transmitters and receivers into good ham transmitters and receivers. Invaluable for Novice, Technician, General, Advanced and Extra class operators. 136 fabulous amazing terrific pages for only $1.50 PPD.

MOBILE HANDBOOK

This new Mobile Handbook by Bill Orr, W6SAI, has been getting raves from all of the experienced mobile operators. There is all sorts of information in here that cannot be found anywhere else. This is NOT a collection of reprints. $2.95 postpaid.

CODE RECORD

Learning code is a snap with this record. Speeds from 3 to 16 WPM, depending upon turntable speed. This 12" LP record has on it all you need to learn the code for both the Novice and General license. $3.50 each.



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HAM'S INTERPRETER

Now you can talk in broken French, Spanish, Italian, German, Swedish and Finnish. This handy little book gives all the popular ham conversation in seven languages, including letters and numbers. Only $1.50 postpaid.

TVI HANDBOOK

W1DBM's newly written TVI book (no reprints) covers all aspects of curing TVI from both the Ham's viewpoint and that of the TV viewer or the TV serviceman. It includes 2 and 6 meter TVI as well as Industrial, Medical and Utility TVI. Profusely illustrated with diagrams, photos, charts, tables and FCC regulations pertaining to radio and television interference. Price: $1.75 postpaid, USA. $2.00 Foreign.

BINDER

There is no other good way to keep your back issues. Make 'em neat. We supply the binder, with the year embossed in gold, not merely a sticker which will come off later. Specify what year you want stamped on your binder. $3.50 each

BOUND VOLUME

By far the handiest way to keep your library. Why not go first class? This impressive volume is only $10.00. We only made a few of them this year, so don't expect to get one later. 1958 still available, released Jan. 1st.

CQ ANTHOLOGY

Down through the years CQ has had the honor of being there first with just about every major discovery in the amateur radio field. Unfortunately most amateurs do not have a good file of back issues of CQ to fall back on when they are interested in building up something or in improving their equipment. So we've looked back through the years 1945-1952 and assembled all in one place the articles that have made a lasting stir. The issues containing most of these articles have long ago been sold out and are unavailable. The price is a paltry $2.00.

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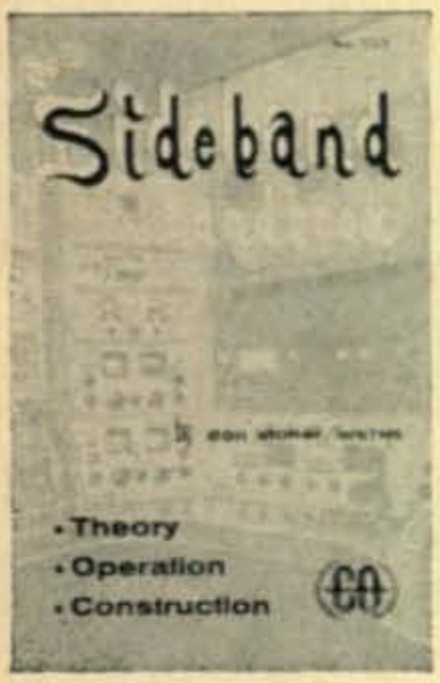

SIDEBAND HANDBOOK

Written by Don Stoner, W6TNS, was almost one full year in the preparation of this terrific volume. This is not a **technical** book. It explains sideband, showing you how to get along with it . . . how to keep your rig working right . . . how to know when it isn't . . . and lots of how to build-it stuff, gadgets, receiving adaptors, exciters, amplifiers. Price, only $3.00.

C-7

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DX [*from page 94*]

Willamette Valley DX Clubs will be held at the Mallory Hotel in Portland, Oregon on August 22nd and 23rd. All the VE7 and W7 "big guns" will be there. I understand they're try to make this event the "Dayton of the West, A.A." Please note—If you're in the area, stop in for a great time. . . .

73, Urb, W2DEC

QTH's

Tnx to K6TAY, W3GJY, K2QXG, K2QYA, W6KG, K2UYG and W1EQ for the following:

HHTAE P. O. Box 1183, Port-Au-Prince, Haiti
HP1AC P. O. Box 354, Panama City, Panama
I1AFS (Naples) Chief Communications Center, Bldg L, Hqs Allied Forces Southern Europe (AFSOUTH) FPO 510 N. Y., N. Y.
I1DFA (Naples) Signal Officer, HQs, Allied Forces Southern Europe (AFSOUTH) FPO 510 N. Y., N. Y.
I1DFB (Leghorn) Signal Supply Officer, Signal Division Logistical Command, USASETAF, Supply & Maintenance Area, APO 19, New York, N. Y.
I1DFC (Verona) Signal Officer, Hqs USASETAF, APO 168, New York, N. Y.
I1DFD (Vicenza) Signal Officer, US Army Garrison, Vicenza Military Post, USASETAF, APO 221, New York, N. Y.
I1DFE (Aviano) Commander, 7227th Support Group, USAF AFB5682, APO 293, New York, New York.
IP1ZGY via IT1TAI
KX6CO via KX6AF
OQ5BC Nestor Legrand, P. O. Box 1650, Jadotville, Belgian Congo.
ZC4CS via RSGB
ZE8JB E. Bond, Box 240, Bulawayo, Southern Rhodesia
5A5TO Box 638, Tripoli, Libya

HAM CLINIC [*from page 73*]

week goes by that I don't have to replace a tube in my receiver. All bad tubes have blown filaments. I live in a mining town where the voltage goes between 90 and 140 volts and averages about 120. What do I do? (Besides buying tubes)"

Every week? Each and every week?! How long has this been going on? My first inclination is to tell you to move but actually an auto transformer with a good AC voltmeter and a good tap switch are what you need. It is usually the *initial* line surge which "cooks" your bottles. Do this: send Allied Radio Corp. for a *Wuerth* Surgistor (Catalog # 80G144) 100 N. Western Ave., Chicago 80, Ill. 97c plus postage, and try this amazing little gadget out. Its starting (cold) resistance is 100 ohms and limits the voltage to your set. When hot it has a resistance of .2 of an ohm. It's good for between 100-300 watts. Taking the initial shock off filaments this little gem SAVES your tubes. I use it in all of my equipment and have more ordered. Try it, but you may still have to resort to a regulated (manually) auto-transformer.

Book Review

The RADIO HANDBOOK, 15th Edition

[*Continued on page 104*]

New Amateur Equipment

NEW QUAD BY CUBEX

Cubex Company, Altadena, California, announces a new, improved model 3-Band Cubical Quad Beam Antenna for 10-15-20 meter amateur service. This new model, the Mk III DeLuxe Quad, features a completely redesigned support structure intended to withstand severe environmental conditions. The end assembly "spiders" are husky heat-treated aluminum alloy castings. The boom is full 2 inch O.D. x 8 foot tubular aluminum (.050" wall). A heavy formed aluminum alloy boom-to-mast coupler joins the boom to a mast stub (furnished) for mounting directly to a rotator. The total weight is only 27 pounds and the wind resistance is very low. Turning radius is only 9.5 feet and any good TV type rotor will turn the Quad.

Electrically the Mk III Quad features high gain (10 db on 10 and 15 meters; 8 db on 20 meters), high front-to-back and front-to-side ratios, low SWR, low radiation angle, and low harmonic radiation. The 3-band quad holds an advantage over conventional "tri-band" beam antennas in that it employs separate full wave elements on each band while requiring only half the horizontal space. Don't hunger for more data, merely circle F on page 126.

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 enrollement 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.

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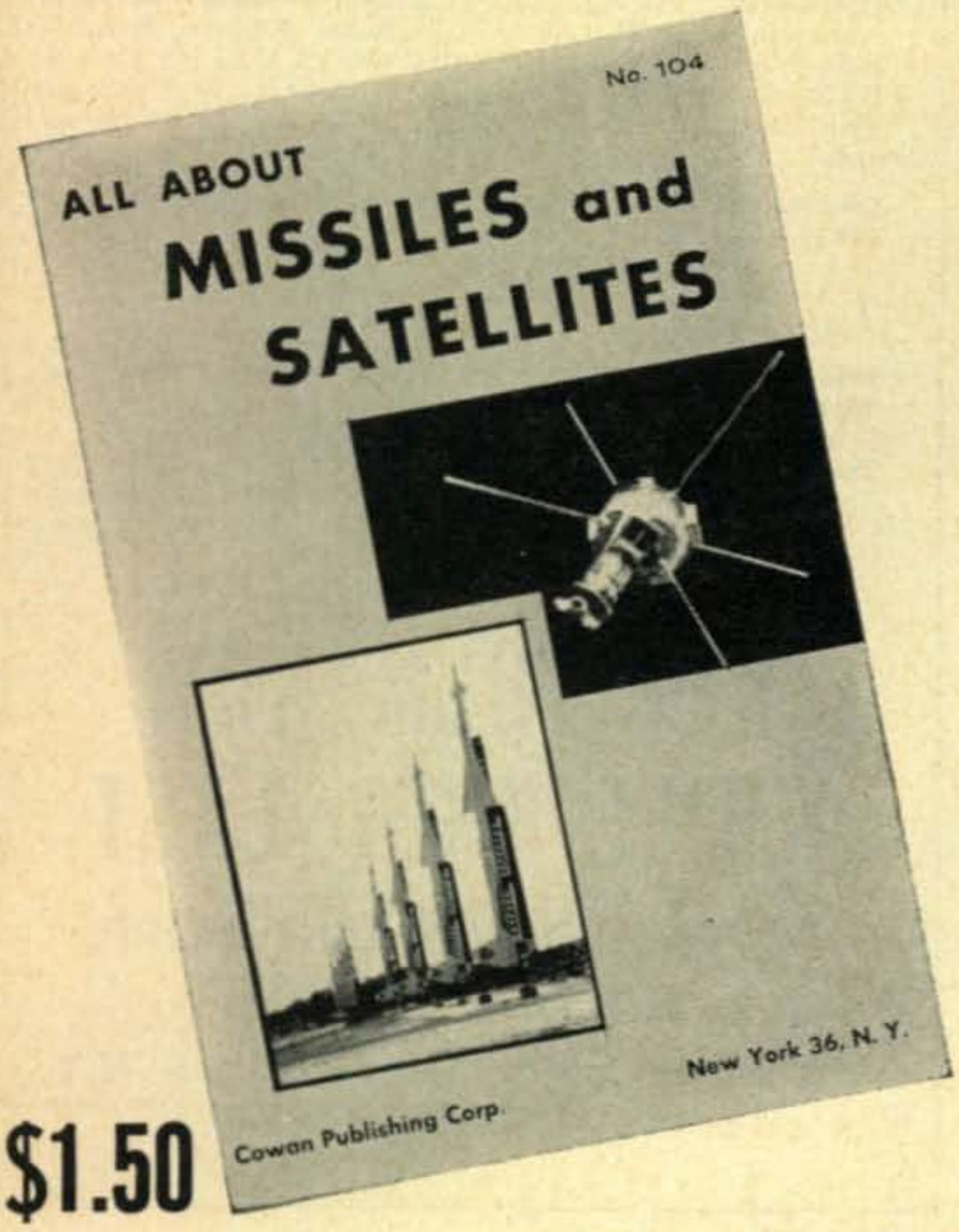
"ALL ABOUT MISSILES and SATELLITES" introduces related subjects such as maintenance, fire control, flight control, tracking, testing, fuels and many other subjects. It is carefully detailed in a manner understandable to all competent, qualified students in the 21,000 High Schools in the U. S. A.

Its 96 pages are written and illustrated to attract and arouse the interest of High School students in the many avenues of technological studies open to qualified students.

It is, therefore, most imperative to the nation and to the missile industry that High School and College Preparatory students of 1959, receive every encouragement possible, to prepare for future opportunities in the field of Missiles, Rockets and Satellites.

ORDER YOUR COPY TODAY!



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New York City Residents Add 3% Sales Tax

For further information, check number 8 on page 126.

Again in this issue a new section appears in CQ where distributors may advertise trade-in and reconditioned equipment. 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.

HAM CLINIC [*from page 98*]

compiled by Bill Orr is a masterpiece! Its 798 pages (35 chapters) are crammed full of good useable, practical information. Compared to similar books whose brevity sometimes leaves one up in the air on various subjects, Bill's Handbook swings into a subject and not only highlights the most important points but usually ends up with good solid and *new* construction information as well. New chapters in this edition include electronic computers and high fidelity techniques and are excellent. This is the book for the real serious minded or nonchalant amateur and/or practical electronics engineer or technician. To me, the second most interesting section (28-2 Page 574) in the book deals with a mobile transistorized SSB exciter. *This* is *design* and *construction!* The chapter Chapter 27—Receivers and Transceivers. Space does not permit more lavish praise of this real fine book. Just let me say that it is worth which! interested me most on first reading was more than $7.50. To you who want up-to-date technical information presented so that *everyone* connected with radio-electronics can understand it—this is your book. Drop your check in the mail to *Radio Bookshop* 1379 East 15th St. Brooklyn 30, N. Y. for a copy—it's *tops!*
708A Info

CQ is read by the finest people! One of them is Vince Barden (K6KIE) of *Sylvania Electric Products Inc.* He supplies us with the following info on the 708A UHF receiving triode about which so many readers have asked. Thanks Vince for helping out some of your fellow hams—you have the real HAM SPIRIT!

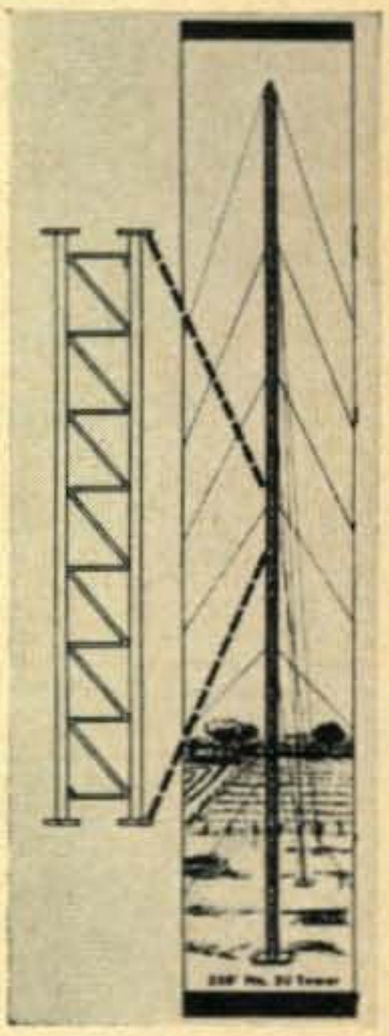
708A: Plate to grid capacitance: 2.8—3.4 mmf.; capacity in, 2—30 mmf.; capacity out .2 mmf.; Mu, 7.1—16; transconductance 1425—3500 micro-mhos; grid current, 0 to 5 microamps; filament 2 amps; filament 1.7 volts; plate voltage, 350 volts (max); plate current, 50 mils; Pd—15 watts. Socket connections, see fig. 2. For more information consult Spec. Sheets, Mil. ‡E 1/697 dated 3 May 1954.

Please!

It is impossible for us to find sufficient space to file all cards and letters received from readers. Therefore, if you write in *again* about an old problem — *restate* it! Letters accompanied by self-addressed airmail stamped envelopes are answered FIRST.

[*continued on page 106*]

New Amateur Equipment



New Rohn Tower

Note this new heavy duty steel tower #50 by Rohn Mfg. Co., Peoria, Ill. This tower utilizes the No. 5 section of the Rohn "Self-Supporting" Tower and can provide outstanding rigidity and strength in heights up to 450 feet when properly guyed. The rugged strength of this baby deems it eligible to support the heaviest stacks of arrays, for amateur or commercial applications. All tower sections are "hot-dipped" galvanized after construction to permanently protect all points of welding and construction against corrosion. For further data, circle C on page 126.

HAM CLINIC *[from page 104]*

Special

If you come to Europe be sure and try to make one of the French Reunions (ham-fests). Check with the REF in Paris; they will more than likely be able to put you on the trail of one. For fun at its best, food out of this world and a really fine time with a bunch of very fine hams, try a French ham-fest! I attended one recently and will never forget the real HAM SPIRIT exhibited by so many Frenchmen in welcoming one lonely American. The 21st Section of the REF at Nancy *know* how to make a stranger feel right at home.

Thirty

My copy of CQ ANTHOLOGY arrived and I was surprised to find that it contains articles about which HAM CLINIC receives many, many queries. This collection of technical material (for $2.00 from CQ) is worth three times the price. The article on the T'9r is worth more than the price of the entire book! My compliments to the CQ Office Staff for a fine compilation job!

Happy vacation to all of you fine people—and I shall never mention phonetics again. Go ahead and use whatever comes to mind—everyone seems to be doing this anyway. I may not agree with you, but by a "smoking triode," I'll defend your right to say whatever you please. 73, Charley,

W6QLV/F7FE

PROP *[from page 74]*

smoothed sunspot number of 181 centered on October, 1958. The present sunspot cycle continues to *decline* at a very slow rate. This month's CQ forecasts are based on a predicted smoothed sunspot number of 146 centered on July, 1959.

A limited number of copies of all sunspot numbers recorded since 1750 (monthly means, yearly averages, and monthly smoothed values), and predictions for the next five years, are still available directly from the Editor of this column at $1 a copy, postpaid.

Beginning next month, this column will be prepared in Geneva, Switzerland, where the author will be attending the International Radio Conferences of the International Telecommunications Union as a member of the official U. S. Delegation.

73, George, W3ASK

VHF *[from page 79]*

Brown (W4FAN ex-K9DYE) we hear: "There have been very few good six meter openings lately. The last good opening was to Oklahoma on January 11th. There was an auroral open-

ing March 26th to W2 area, but we're all looking forward to May and June for short skip."

"Spartanburg has a six meter local area net now, it handles traffic and meets nearly every evening at 1930 EST at 50.20 *mc*. There are nine local area members so far on the net." *Been some time since we've heard from you Russ, keep the news coming from your vicinity.*

Baldwinsville, New York From Gordon Hullin (K2ZBU) we hear that: "For the past year I have been keeping a schedule once a week with K2RRG. During the warm months signals both ways run between about S7 to 9+20 *db*. In the cold months signals run between S1 and S4. We have never made contact at schedule time when it was snowing. In the past year we have only missed making contact about half a dozen times due to poor conditions. Contacts are on phone with lots of speech clipping being used at each end. The path is only about two hundred miles long but the mountains between us are really something."

"Two months ago K2UFZ, W2EJZ, K2HBV and myself started a VHF Technical Information Net' on 50.7 *mc* here in the Syracuse area, on the first and third Thursdays of each month. My station and call are used for net control. The purpose of the net is to help anyone who may have a technical problem or any problems pertaining to ham radio. Response so far has been good and as long as the problems hold out, so will the net. *That's wonderful, Gordon, should be more of that kind of net around.*

73, Sam, W1FZJ

NOVICE [*from page 85*]

Ed, KN4ZEO, 5711 N. Fairfax Dr., Arlington 5, Va., chases DX with a DX-40 and a Collins 51-J-3 (drool!). They must work, 'cause he has so many exotic calls, they are too numerous to list! So far he has worked 40 countries, with 16 confirmed. Sounds like another KN4RID in the making! HI

Dan Ehrlich, WV6CKT, 4540 Cahuenga Blvd., North Hollywood, California, runs a DX-35 exhaler and a S-85 inhaler, feeding a folded dipole. His best distance in four months on 15 meters is Japan. Dan would like skeds with the 1st call area.

Richard Turk, KN4FLR, Gainesville, Ga., is the Editor of *LID*, the radio bulletin of the Hall County Amateur Radio Club. Dick runs a Globe Chief 90A and a Ocean Hopper on the 80 meter band. Look for him on 15 this summer.

Stuart Looney, KN4YGB, Box 1043, Grundy, Va., has taken his Conditonal (whee!) and is "expecting." He has had about 150 contacts with 24 states with his best DX as Calif., on 15. Look for him on 80 these days.

John Fassett, WV6FHG, 5249 Sereno Dr., Temple City, Calif. just got his ticket. John will

be on 40 and 15 and would like skeds with anyone.

Etta Mason, KN1JUW, 225 Elm St., North Reading, Mass., works 'em on 80 with a TBS-50 and an HRO-50. She hopes to get on 40 meters soon.

Phillip Bressinck, KN5SGE, 1301 Garland Avenue, North Little Rock, Ark., needs Colorado, Nev., Mont., and N. Dakota and would appreciate skeds. Phil can be found on 15 with his DX-40 and S-85.

Dick Snyder, KN9RVB, 607 N. 26th St., Lafayette, Ind., has the same set up as Phil but uses a QF-1 for the whistles. He has folded dipoles for 40 and 15. Dick has been on three weeks and puffs his chest with 8 states.

Dave Flanagan, 1600 W. 27th St., San Pedro, Calif., cranks away with an AT-1 running 30 watts, and a BC-348 receiver. Dave has worked 3 states out of 93 contacts in one month! He hides out on 80 and 40.

Tommy Murphy, KN5UKH, Route 1, Kosciusko, Miss., will sked anyone needing his state on 7158 or 7188. Tom has a homebrew 50 watter and an SX-99 but would like to see an article on a 40 and 15 meter Novice rig.

Fred Race, Ex KN8IUA (now General), 713 Colima Drive, Toledo 9, Ohio, claims to have worked the Antarctica before Craig Burnett. Fred worked him Sept. '58, and received a 579 report. Anyone earlier?

And on that cheerie note, we close up shop for another month. It's a good day to cut the lawn, here in Smogville, so that's next.

73, De, W6TNS

YL [*from page 90*]

fective July 1, 1959: Work 10 members of the Los Angeles YLRC since Jan. 1, 1952. After July 1, 1959, a contact made during any YL net shall not count toward earning the Lads 'N' Lassies Certificate. Log copy showing name, call, date and time, band, and type of emission may be submitted in lieu of QSLs. Special recognition will be shown on the certificate if all contacts are A-1 emission. Certificate custodian is W6WRT, Ruby Word. . . . At their May meeting the L.A. YLRC elected these officers who will be installed in June: Pres., K6BUS, Midge; V.P., K6ANG, Billie; recording secy, K6MQS, Virginia; corresponding secy, WA6AOE, Maxine; treas., K6OAI, Anita.

The Georgia Peaches voted to extend their membership to any licensed YL in neighboring states (N. Car., S. Car., Tenn., Ala. & Fla.) Non-resident YLs will become honorary members and may be credited as one-half point toward the Georgia Peach certificate.

The YLs Are Saying . . .

"I enjoy 'CQ YL' so much. Have 45 YL autographs in it besides yours and have talked with so many of the girls who are pictured in

it."—W5UXW, Opal.

"Had a long QSO on 10 with W9RUJ, Mary, the other day and just found her picture in 'CQ YL.' Your book is becoming a necessary piece of Ham gear!"—K6JHA, Mae.

The Los Angeles YLRC ordered copies of "CQ YL" for all of their "adopted" YLs — EA7EV, OQ5FH, ZL2JO, ZS6KK, F3YL, G3LWY. This is an idea for other clubs who have not yet sent a book to their "adoptees."

"CQ YL"—the one and only book devoted to the YLs—contains 169 pages, over 500 photos, 18 chapters each of which describes a fascinating part YLs have played in Ham radio. Completely up to date with two new pages added, "CQ YL" is now only $3, postpaid. Order from your column editor, W5RZJ, address at beginning of column.

33—W5RZJ

STACKED BEAMS *[from page 56]*

The stacking of beams vertically will not have much effect on the horizontal pattern. Adding beams on a horizontal plane will decrease the horizontally radiated pattern width of the array. Anything that is done to increase directivity from an array will help to minimize QRM on a crowded band and for every 3 *db* increase in effective radiated power, a 25% increase in ground wave coverage can be expected. ■

6 MTR GROUND PLANE *[from page 55]*

Adjustment

Adjustment of the gamma matched ground plane is not critical. However for optimum performance the antenna should be adjusted for minimum *vswr*. In the absence of a reflectometer or impedance bridge the antenna can be adjusted for satisfactory operation by adjusting the trimmer for proper load on the transmitter. Should a reflectometer be available it should be inserted in the transmission line between the transmitter and antenna. First adjust the trimmer capacitor for proper load on transmitter. Slide the gamma impedance tap about the 12 inch mark to obtain minimum *vswr*. Readjust the trimmer for minimum *vswr*. Repeat the above steps until the *vswr* can no longer be reduced. A *vswr* of about 1.2 to 1 should be obtainable.

After the antenna has been adjusted it will be necessary to weather-proof the coaxial fitting and trimmer capacitor. The author has found plastic asphalt roofing compound to be satisfactory for this purpose. The plastic compound will cause a slight detuning so it will be necessary to readjust only the trimmer capacitor for minimum *vswr*. All metal parts associated with the gamma matching section should be given a coat of aluminum paint.

Conclusion

Ground plane antennas which are gamma matched provide many advantages over the conventional ground plane. The vertical mast section is in one piece and 10 feet long with as many sections under it as are necessary to reach the desired height. No insulator is required and the mast is completely grounded for lightning protection purposes. When the antenna is to be mounted on a chimney a suitable ground system should be provided.

The gamma matching section provides a poor impedance match for signals outside the design frequency band. This characteristic provides considerable attenuation of signals outside the band, thus reducing converter feedthrough. Construction of the gamma matched ground plane requires about 2 hours and somewhat less than $5.00. ■

ANT. SWITCH [*from page 54*]

clear only 4-40 hardware as supplied. Use a 9/64 drill for this latter operation. This procedure will result in perfect alignment of all mounting holes. Be sure to use lock washers under the heads of the screws as the nuts on the inside of the can are almost impossible to grasp with any tool.

On the exact center of the bottom of the can, drill a ½" hole for the shaft of the switch. Carefully position the switch to line up its contacts with the connectors. Now center punch four holes in which to fasten the switch. Do this with a thin nail. Drill the holes and mount the switch with 6-32 hardware, solder the contacts to the connectors with thin strips of copper strap or heavy buss wire, add a pointer knob, and you're ready to go.

Fig. 2—Hold coax jack in place with pliers and drill the four mounting holes for 4-40 screws.

Incidentally, it will be a good idea to put a little 3 in 1 oil on the positioning roller and main shaft of the switch.

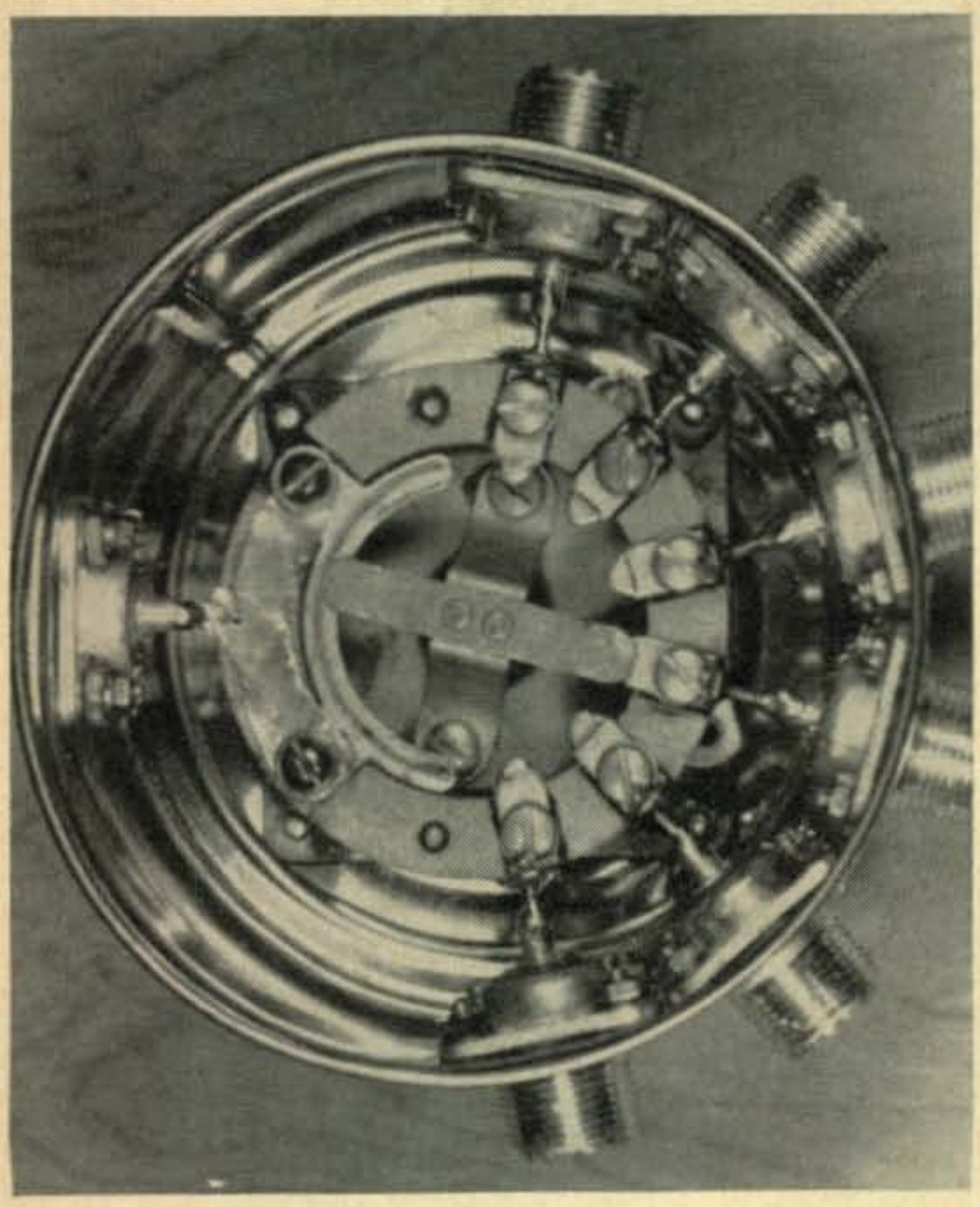


Fig. 3—Back view of switch. Note how each connector lines up with the switch terminal.

After construction, I checked the switch with a VSWR bridge in order to determine whether or not it would upset the SWR of the system. Results indicate that the switch raised the VSWR only .1 at its worst and that inserting the unit in the line had no visible effect on most bands. ■

MOTOR TUNED BEAM [*from page 53*]

During our 1958 summer antenna experiments, we worked with both gamma and omega match systems, utilizing motor controls. We found that K9GEX was manufacturing these commercially and our correspondence with him was most helpful in the final construction of our system.

If you want to escape the QRM on the low end of ten, motorize this summer. See you on 29.697. ■

INTERLACED BEAM [*from page 52*]

Recommended:

1¼" x 10' lengths of aluminum tubing as supplied by Channel Master through Radio & T.V. Parts Jobber. Butt ends together in clamp at center using Dowell wood insert 3' long. Ends are tapper-swagged and when split will clamp tight to 1" diameter and inserts.

10 Meter Tubing

¾" diameter 12 ft. lengths .058 wall

⅝" diameter end sections

Procure from aluminum supply house. If .058 not available use .065.

Split ends 3″ to insert ⅝″ ends.

Boom Requirements:

20 ft. length x 3″ diameter .049 to .065 wall

Source: Irrigation tubing from—

Sears Roebuck & Co.

Catalogue Order

Cut round Dowell blocks from ¾″ thick wood and insert in each end of boom to prevent crushing boom with clamps at ends. Inserts should have breather hole ½″ covered with screen wire. This is obtainable at any lumber yard.

Strengthening Boom:

After antenna is completely assembled lay 1¼″ tubing inside of "U"-bolts, length of boom. Use conduit clamps over 1¼″ tubing, bolting to "U"-bolt. Drill through over clamps and tubing and use sheet metal screws. It may be necessary to repunch or drill holes in conduit clamps. Cesco refers to this system as their Piggy-Back Boom.

Transmission Line Requirements

Use separate feed lines of 52 ohm coaxial cable.

For power not exceeding 250 watts RG-58-U may be used.

For power in excess of 300 watts use RG-8-U.

Feed lines may be any required length. Pruning to match line input impedance may be necessary with link coupled finals. A one turn link, 3/16″ diameter wire is recommended for 10 meters. Two turn link 3/16″ diameter wire is recommended for 20 meters.

Excessive line reactance may be removed with a series capacitor. Use capacitor only where line is of length that correct loading cannot be accomplished.

Tape the coax connectors at Gamma units thoroughly with plastic tape.

PROP-ROTOR [*from page 47*]

The author put a thrust bearing at the top of the tower so that the weight of the pipe is on the bearing rather than the motor and tower rungs.

Noise from the motor brushes can be eliminated by by-passing them with .1 mf condensers to ground and using shielded control cable.

While the control circuit appears bulky, the transformers and relays may be mounted under the house and three wires run up to the control toggle switch at the operating position. Further refinement, using Selsyn indicators, may be installed at the discretion of the constructor. If the tower is outside the window an arrow can be clamped on the rotating pipe for visual direction indication. The author does *not* find the motor noise, or slow speed, objectionable. ■

CUBICAL QUAD *[from page 45]*

An excellent material to use in the arms of the antenna are fiberglass fishing rod blanks. Although they are relatively more expensive in initial cost, they will outlast standard bamboo arms several times, and are impervious to moisture and heat. If fiberglass is too expensive for the antenna budget, the old standby, bamboo, will do a good job. If bamboo is used, several coats of weatherproofing compound should be used to protect the bamboo from the harsh effects of temperature and moisture.

After the antenna has been constructed on the ground, and the neighbors begin to question your sanity (the little girl next door asked if it was a big bird cage), give all the exposed metallic parts, except the radiator wire, two or three coats of aluminum paint (Rust-O-leum works well) to prevent rust and corrosion. install the feedline to the insulator in the radiator, and recruit your most trusted friends for an antenna raising party (emphasing the word "party").

Four persons held each of the four guy wires, while two people lifted the antenna and mast from the bottom and raised it to its resting place on the roof. The guy wires were then secured and adjusted to make the mast appear reasonably vertical. The situation was helped by the fact that the mast only weighed 8 pounds. Of course, as soon as we started raising the antenna, a brisk wind arose where there was previously none, complicating matters, and wires were swaying precariously all over the roof (it is a good thing our insurance agent didn't hear of this episode).

Adjustment

Adjustment of the antenna is not difficult if is undertaken properly. One of the easiest ways to accomplish this adjustment is to have one person at the base of the antenna with a long pole to move the slider on the reflector stub, one person operating the transmitter and receiver, and a distant local ham (1 to 10 miles) with an S=meter to serve as a guide to adjustment. Using voice break in, a smooth system was devised whereby the distant ham would call off the S=meter readings and I would shout these up to the man on the roof. The man on the roof just moves the slider for maximum S=meter readings, with the quad pointed at the distant ham, naturally. If the antenna was designed properly, the whole job of adjustment takes less than 10 minutes.

Performance

The most important characteristic of any antenna is its performance. The standing wave ratio of the broadband quad is much lower over the entire band than a single wire quad antenna (fig. 2), much greater freedom of

frequency movement is available with the broadband quad. There is ample forward gain, averaging 10 *db* over the band, which represents an increase in radiated power of 10 times. A 30 watt transmitter with a quad will far outperform a 150 or 200 watt transmitter using a dipole. The directional characteristics of the antenna help considerably in reducing unwanted QRM.

The actual signal reports which I have received from foreign stations ranging in distance from 3,000 to 11,000 miles away have more than justified the construction of the antenna. These reports have ranged from 10 to 20 *db* better than a ground plane antenna previously in use at my station. DX becomes a pleasure rather than a rat race competition with the kilowatt stations.

I feel that this antenna is a worthwhile project for anyone interested in improving his signal on any high frequency.

I would like to thank Erwin Lodwig K2ODS, my father, for his cooperation in helping me prepare this article. ■

DIPOLE [*from page 41*]

Impedance matching is no problem because either 72 ohm coaxial cable or 72 ohm twin-lead line will do.

I tried various configurations of the dipoles (including those shown in amateur radio handbooks) and came up with the one shown in fig. 1. I found this configuration to give me the *best overall* on-the-air results. Reflectors were tried too but their construction was not worth the effort.

Referring to fig. 1, you will see that there is one dipole for each band except the 15 meter band. The antenna cut for 40 meters operates exceptionally well on 15. All dipoles (connected in parallel) are cut for mid-band operation and are ½ wavelength long.

Construction of the three insulator divider is not difficult. The insulators are arranged as shown using number 8 copper wire. The 40 and 80 meter dipoles are first attached to their insulators in the regular manner and then the separator wires are inserted. Solder is then poured into the insulator holes (with the bottoms blocked). The resultant connection is sturdy and electrically excellent. (Remember to tin all wires before pouring the solder into the holes!)

Coax cable connection is easily accomplished by using a medium to heavy piece of braid (shield) which is wrapped and soldered to the coaxial shield. The braid is then soldered to one side of the copper thru-wire. The center connection is simply brought up to the other side of the center separator and soldered. Plastic tape is used to seal off the end and to prevent moisture from accumulating between the coax shield and the center conductor.

The overall bandwidth of this antenna is

quite surprising. (Perhaps it possesses some of the characteristics of the folded dipole which is noted for having better bandwidth.)

My Dipoler is oriented on the Eastcoast of the USA and I consistently receive good reports with only 40 to 50 watts input.

I am mighty satisfied with this antenna on 10, 15, 20, 40 and 80 meters. I am sure you will be too if you put it together as I have outlined here. Listen for F7FE, the signal will convince you! ■

FEEDER SYSTEM [*from page 40*]

System Measurements

Operation of the antenna system as a whole may be checked by placing a SWR meter in series with the 75 ohm coaxial line to the transmitter. The instrument must be capable of operation with a line having this nominal impedance value. In general, the matching system is capable of a better-than 2/1 SWR at the extremities of an amateur band, with better than 1.5/1 SWR at the resonant frequency of the antenna. The system has produced SWR values of 1.2/1 or so with the antenna at resonance when employed with various commercial antennas having split dipole elements.■

21 MC BEAM [*from page 37*]

Once the antenna resonance is established near 21.15 *mc*, the shorting bar may be removed, the excess stub wire is cut off and the wires of the matching transformer are soldered to the stub at point A-B. The antenna is now properly tuned, and may be placed in the final operating position.

Using the Lazy-Quad Antenna

The radiation pattern of this simple beam antenna is at right angles to the long wires of the array. Since the pattern is bidirectional it is only necessary to turn the antenna through a half-circle to obtain world wide coverage. The actual direction to distant points is often deceptive, and the use of a "great circle map"[1] to plot antenna headings is highly desirable. For maximum results the antenna should be employed for reception as well as transmission, and the use of an "antenna change-over" relay or switch to disconnect the feed system from the transmitter and connect it to the receiver is highly recommended.

Erected well in the clear, this simple antenna will provide many hours of QRM-free contacts and is a worth-while addition to any 21 *mc* amateur station. ■

[1] Six great circle maps covering the entire world from the U. S. A. may be found in the "Better Shortwave Reception" Handbook, obtainable from Radio Publications, Inc., Wilton, Conn. ($2.85 plus 15¢ postage), or from your local radio dealer.

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FOR SALE: 75A3 clean excellent condition $360.00 cash. WØBNF, Box 105, Kearney, Nebraska.

ELDICO SSB-100-MIL (Military version 100F with two new 4-400A's for linear, $550; Panadaptor PR-1 (3") LN, $95; ERECO HD Rotator, complete, $50; New Matchstick, $90; MILLEN Gridip Meter, $40; Central Electronics RF Analyzer, $85; Heathkit Lab Generator, LB-1, $35; 75A4 1.6 Filter, $25; Mobile antenna, bug, mike, etc cheap. Spitz, 1420 South Randolph, Arlington, Virginia.

HALLICRAFTERS S-107, (New model S-53A) two months old, $79. New DB-23 $40. Cecil A. Moore, W5DXP, 2606 Todd, Bryan, Texas.

SELL: NC300 with speaker $260.00, W1BYP, Wallace Paquette, Fairfield, Maine.

G4ZU Beams 9.5 db on ten 8.5 on fifteen No traps. Made in England. $79.50 FOB Chicago Master Service, 1153 E. 82nd St.

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For further information, check number 52 on page 126.

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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.

FOR SALE: Globe Scout Model #65B, f/w. Condition-like new including new 6146 tube plus crystal. Also code practice oscillator Gonset 2 weeks old. Sell all for $75 firm. Hyacinth 7-8221, Frank Alessi, 234 Troutman St., Brooklyn 37, N. Y.

CLEANING SHACK—2 FM Rcvrs. 152-175 mc, R-28 Rcvr, Pr. 813, Parts etc. Photo Equip. Stamp for list. KØIQF, 912 W. 2nd St., Willmar, Minn.

SELL: 20 watt mobile transmitter, 75-40 meters, built-in dynamotor, microphone, crystal and 30 feet of new coax. Equipment in spotless A-1 condition. Everything $60. Specify:— 6 or 12 volt model. Stan., 2748 Meade St., Detroit 12, Mich.

NC-183D—Excellent—$250—W5FHU, 2509 Terrace Ave., Midland, Texas.

GONSET OWNERS. Rack for mounting Communicator I, II, or III over transmission hump. Just the right position for convenient operation. No bolts or adjustment, in and out in seconds. $4.50 Shipping weight 4 Lbs. Strid Electronics, 234 Washington St., North Easton, Mass.

FOR SALE: 4x5 Crown Graphic 162mm lens, Graphic rangefinder, flash unit and 4 film holders. Ted Anderson WØKQC, Box 354, Phillipsburg, Kansas.

KWM-1 FOR SALE: new condn. ser. 752 $600.00 W9PQO 937 Lombardy Dr., South Bend 19, Ind.

GENERAL Radio 650 bridge in good condition, $150.00. Herbert W. Gordon, W1IBY Harvard, Mass.

FOR SALE: SX-99 s-w Rcvr, good condition—$100 K6YXB Jon Evers, 124 N. Whittier Ave., Whittier, California, Ox 4-4148.

SELL HAMMARLUND HQ120X, $90 vy gud condx. Local deal only, please! H. I. Griffiths, W2OQR, 39-82 65th Place, Woodside 77, L. I., N. Y. Tel. Illinois 7-1549.

FOR SALE: Very nice National NC-2-40D with speaker, $150. W8SWN, John Jellema, Zeeland, Michigan.

SELLING OUT! SEND FOR LIST. WØOMH, RFD #2, HASTINGS, NEBRASKA.

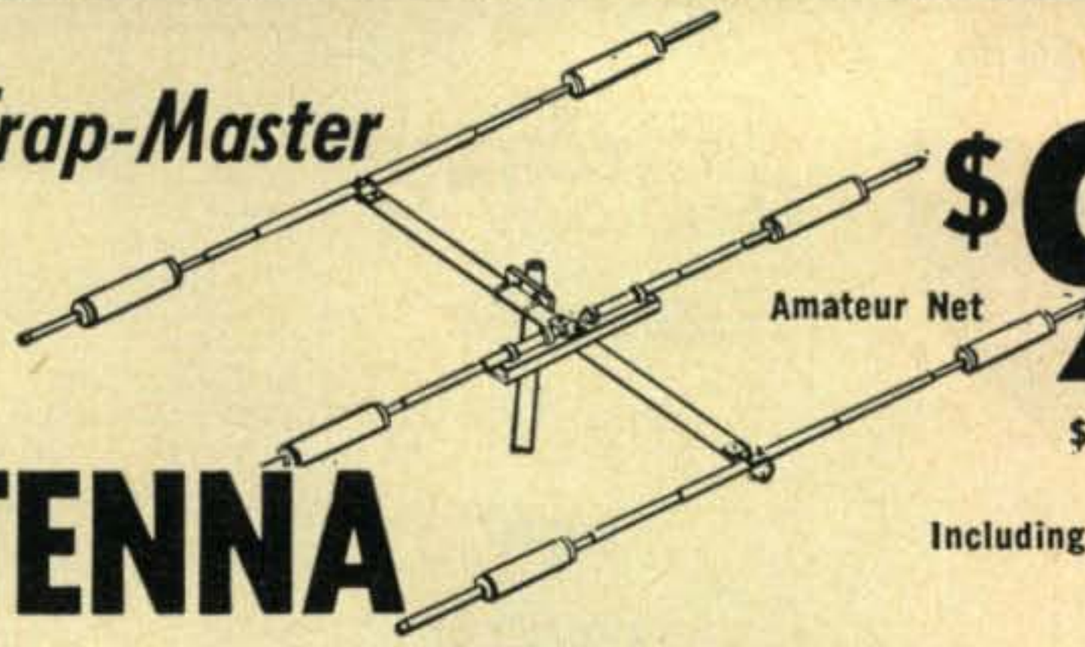
NC57 excellent condition sell $65 or trade on Collins receiver older type. Glen Byars, Box 105, Kearney, Nebraska.

75A4, speaker, calibrator, vernier, like new. Don't confuse this with a 75S1—there's a difference, and this receiver is worth $595. Have a like new KWS1. Glen Byars, Box 105, Kearney, Nebraska.

RADIO SHACK SAVES YOU UP TO $100!

Powerful MOSLEY Trap-Master

3-BAND BEAM ANTENNA



Model TA-33

$99.75 Amateur Net

$10 Down, $8 Monthly

Including Elements AND Boom!

Maximum Gain and Low SWR Over Full 10-15-20M Bandwidth — Rain or Shine!

3 single-banders could easily cost you $200 and not work any better! Full KW rated (AM). Up to 8 db. forward gain; 25 db. or better, front-to-back ratio. SWR 1.1/1, or less. Exclusive trap design assures all-weather resonant frequency stability. Element center sections are double-thick 61ST6 aluminum to cut sag. 1½" x 14' boom needs no bracing. Maximum element length, 28'

Order No. 29D296, Sh. Wt. 53 lbs.

Automatic Bandswitching

10-15-20 METER VERTICALS

Model V-3 **$22.95** Amateur Net

- Rated to a full KW!
- Low SWR!
- 61ST6 Aluminum!

$5 Down, $5 Monthly

Easy to assemble; no tuning or adjusting! Rated to 1 full KW, the V-3 features rugged aluminum construction, automatic bandswitching and low angle radiation. Maintains an electrical quarter wave-length over entire bandwidth. 11' 6" base-tip. Includes baseplate, guy line, hardware, instructions. **Order No. 29D294 Sh. Wt. 8 lbs.**

V-3 "Jr."

Amateur Net **$17.95** Complete

$5 Down, $5 Monthly

- **RATED to 300 WATTS**

Perfect for your low or medium power transmitter! Performs like V-3. Rugged 61ST6 aluminum weatherproof traps. Includes base plate, guy lines, hardware, instructions.

Order No. 29D295. Sh. Wt. 6 lbs.

Junior "Trap Master"

3-BAND BEAM SYSTEMS 10M 15M 20M

3-ELEMENT Model TA-33 Jr.

$69.50 Amateur Net $5 Down, $5 Monthly

Big money-saver for hams who run reduced power! Rated at 300 watts, AM. Up to 8 db. forward gain, 25 db. (or better!) front-to-back ratio. SWR under 1.5/1. Boom is 1¼" x 12'. Max. element length, 26' 8". **Order No. 29D291. Sh. Wt. 22 lbs.**

2-ELEMENT Model TA-32 Jr.

$49.50 Amateur Net $5 Down, $5 Monthly

Unbeatable construction and performance at this price! Handles 300 watts, AM. Provides 5.5 db forward gain with 20 db front-to-back. Boom is 6' long, maximum element length 26' 8" **Order No. 29D292. Sh. Wt. 22 lbs.**

FREE! 12 MONTHS SUBSCRIPTION TO RADIO SHACK BARGAIN BULLETINS

MONTH AFTER MONTH you get 24 to 36 pages . . . 350 jumbo pages loaded with special purchases that save you money on AMATEUR RADIO! HI-FI and STEREO! POWER TOOLS! Thousands of exclusive items!

1960 CATALOG and GUIDE TO ELECTRONIC BUYING!

Your biggest 35¢ buy!

250 profusely illustrated pages (size 8½ x 11"), with up-to-date articles, engineering charts and data by outstanding engineers, **plus** complete buying section of over 30,000 different items with lowest net prices.

FILL IN— CLIP — MAIL TODAY!

RADIO SHACK CORPORATION Dept. 7C
730 Commonwealth Ave., Boston 17, Mass.
Please send me:

- ☐ T-33 Beam (#29D296) 99.75
- ☐ V-33 Jr. (#29D291) 69.50
- ☐ T-32 (#29D292) 49.50
- ☐ V-3 Vertical (#29D294) 22.95
- ☐ V-3 Jr. (#29D295) 17.95
- ☐ Bargain Bulletins for 12 Months FREE!
- ☐ 1960 Guide to Electronics Buying 35c

☐ Check ☐ Money Order ☐ C.O.D.

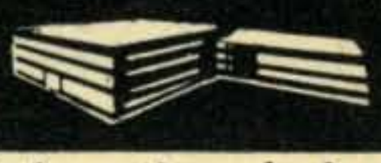
Name _____

Address _____

City _____ Zone _____ State _____

RADIO SHACK CORPORATION

167 Washington St., Boston 8, Mass.
730 Commonwealth Ave., Boston 17, Mass.
230-240 Crown St., New Haven 10, Conn.



For further information, check number 54 on page 126.

FOR SALE (cont'd)

ALIGN YOUR BC-603-683-923. Adapter FT-384-A plugs in receptacle at rear of receiver. With INSTRUCTION MANUAL. Shipping weight 4 lbs. $4.95 PLUS POSTAGE. PAM Electronics, 2129-A East Holt Ave., Milwaukee 7, Wis.

"GLOBE KING 400B with VFO. Pick up. Nice condition $230. W5AK."

SCR-522 VHF Transceiver, completely redesigned, with 115V power supply, 40 watts, crystal controlled, Ideal For Ham, Novice, C.A.P. phone. Complete sets with your choice of crystal $125.00. BC-1335 Transceivers. Unmodified, Ideal Citizens Band Rig $29.50, BC-312 Receivers $55.00, BC-342 $60.00, BC-348 $75.00, BC-611 Walkie Talkies, checked out $85.00 pair, BC-611 Batteries $1.75 pair, BC-221 $65.00, FL-8 Audio Filters $2.00, Command Receivers 190-550KC $12.00, 3-6 mc $8.00, 6-9.1 mc $8.00, double racks $2.50, triple $3.00, Command Transmitters 3-4 mc, 4-5.3 mc, r.3-7 mc $6.50, Single Racks $2.50, MD-7 Modulators $5.50. Write for ART-13, SCR-522, Command Set plugs and parts. All kinds of transmitter tubes in stock. C.O.D.'s o.k. Bill Slep Company, Box 178A, Ellenton, Florida.

CRYSTALS: "SSB PACKAGE" sets of 5 fundamental mixer crystals per June 1958 QST Mobile Handbook, FT-243 holders $8.95, metal hermetics $11.95. "Package" accurately matched filters sets, 7 FT-241A crystals $6.90. Many parts and all crystals for May CQ Transistorized Receiver," write. KWM-1 Conversion crystals available. All Novice frequencies FT-243 99¢. FT-241A 500 Kilocycle standard crystals, accurate $1.95. Add 5¢ per crystal for mailing. (9¢ Airmailing.) Ask regarding your crystal needs. Bob Woods Gilbert 8-3139, 2164 Pakway, El Monte, Calif.

FOR SALE: Perfect KWS-1; Complete with all cables, coax relay, phone patch, speed dial knobs. Latest model. W 2 ZOL

Have for sale the following: 1-Eldico EE3A Electronic Key, $70.00 (NEW). 1-Transistor Power Supply, 12VDC Input, 800 VDC at 200 MA, 300 VDC at 200 Ma, 150VDC reg. at 50 MA and Minus Bias, 35 to 65 volts. New & clean, will sell for $150.00. 1-Jackson Model 641 Sig Gen. Clean, $65.00, 2-Mitchell Wireless Intercoms, New, $50.00. 1-Karl Bringle RCL Bridge, clean, $65.00. 1-Dumont 224 Scope, Clean, $50.00. New Amperex 5894 Tubes, $10.00 each. Clean, Boxed R-28 Receivers, $13.50 each. Pair Jan 813's, $8.00 each. Thordarson Plate Xfrmr, Clean, PA-306 rated 2200-0-2200 at 500 ma ccs, $40.00. 1-PE-103 Ballantine Dynamotor, $15.00. All Items shipped FOB. BOX CQ, 300 West 43rd St., N.Y. 36, N.Y.

WANTED

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: 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 I- prefix. We pay freight. AMBER INDUSTRIAL CORP., 75 Varick St., N. Y. 13, N. Y.

SOS-HEY OLE Jim, K6HQ needs some 304TL or TH's for new final and spares. Send one or a dozen and name your price (don't rob me) 73 CU-SSB. K6HQ, 5208 Baltimore St., Los Angeles 42, Calif.

WANTED: SX62A Receiver. A-1 Condition. Leslie H. Noakes, Middleburg, Conn.

WANTED—WRL 755, 755A, or Knight VFO. Must be like new in appearance and condition. State age of VFO, price and condition. R. L. Wildman, 505 7th St., Phillipsburg, Kansas.

WANTED: Cylinders for original Thomas Edison Victrola. W2JBJ, 30 Monroe Street, New York 2, New York.

WANTED—75A4 Receiver. Send serial No., price, condition and other details. Will answer all mail. C. J. Kucyn, W2BTP, 34 Dumbarton Drive, Huntington, L. I., N. Y.

WANTED: All types of receivers, transmitters, test equipment, teletype, in trade for NEW Hallicrafters, Hammarlund, Johnson, Fisher HI-FI, Central Electronics, Gonset, Mosley, Telrex, etc. Write or phone: Tom, W1AFN, Alltronics-Howard Co., Box 19, Boston 1, Mass. (Richmond 2-0048) Store: 60 Spring St., Newport, R.I.

WANTED 75A4: Please give complete description as condition, serial number, modifications, filters, speaker, and price. All letters answered. Joe Galeski, W4IMP, Box 658, Richmond, Virginia.

WANTED: Tubes—special purpose and receiving. Top prices for Klystrons, Power Tubes, Thyratrons, T.V. and Receiving Types. Tubes must be unused. Also Communications Equipment—aircraft and ground, lab grade test equipment, omnireceivers, Loran, VHF, Marker Beacon, Transceivers, Signal Generators, Oscilligraphs, Recorders, and Counters. Bob Sanett, W6REX, V & H Radio and Electronics, 2053 West Venice Blvd., Los Angeles 6, California.

QSL

QSL's??? LARGEST variety samples 25¢ (refundable), CALLBOOKS (latest) $5.00. Religious QSL samples 10¢. "Rus" Sackers, W8DED, Holland, Michigan.

QSL's: Samples, dime. Print S...p, Corwith, Iowa.

CREATIVE QSL AND SWL CARDS. Are you proud of your card? If not, let us print your next order. Write for free booklet and samples. Personal attention given to all requests. Bob Wilkins, Jr. Creative Printing, KN6ZMT, P.O. Box 1064C, Atascadero, California.

QSL's—"Brownie" W3CJI, 3110 Lehigh, Allentown, Pa. Samples, 10¢, with catalogue, 25¢.

QSLs. Samples Free. Phillips, W7HRG, 1708 Bridge Street, The Dallas, Oregon.

QSL's, SWL's, VHF's, XYL-OM's. (Sample assortment approx. 9¾¢.) 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!)

QSL's-SWL's; $2.75 per 100, QSO file cards $1.00 per 100, Samples 10¢. Rusprint, Box 7507, Kansas City 16, Missouri.

GLOSSY 3 color QSL cards 100—$4.50. Free sampler. Rutgers Vari-Typing Service, 7 Fairfield Road, New Brunswick, N.J.

QSL's-SWL's: That are different, colored, embossed card stock, and "Kromekote." Samples 10¢. K8AIA, Box 953,

QSL's-SWL's: High quality, reasonable prices. Samples. Bob Teachout, W1FSV, 204 Adams Street, Rutland, Vermont.

Rubber Stamps for hams, sample impressions, W9UNY, C. W. Hamm, 542 N. 93, Milwaukee, Wisconsin.

QSL's, Glossy samples 10¢. W1TBB Press, 807 Main Street, Winchester, Mass.

QSL's-SWL's, samples 10¢. Malgo Press, 1937 Glendale Avenue, Toledo 14, Ohio.

QSL's SWL's samples 5¢. Nicholas and Son Printery, P.O. Box 11184, Phoenix, Arizona.

SPIRITUAL SIDE of ham's life in free folder. Request from "Rus" Sackers, W8DED, Holland, Michigan.

QSL's. Chep, medium, and expensive. Samples 15¢ (refundable). Elham Inc., P. O. Box 98C, Hawthorne, Cal.

QSLs New Designs, reasonable, Paye, W4ZKK, 824 Avondale Street, Cocoa, Florida.

SWAP OR SELL

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.

TRADE ASTATIC T3XTAL MIKE PLUS CASH for broadcast quality mike or buy outright. Also want professional turntable, arm, tape recorder, VU meter. W8SUB, 7229 Greenleaf Avenue, Parma 30, Ohio.

For further information, check number 56 on page 126.

QSL (cont'd)

CHINESE SILK bedspread. Beautifully hand embroidered in the Philippines. Peach color. Worth $150. Will trade for miscellaneous ham gear. Make me an offer. W8ZBD. 312 Church Street, Auburn, Michigan.

MISCELLANEOUS

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.

FOR SALE: Authentic looking PRESS CARDS for sophisticated fusters. Will really make you feel important. Lots of fun and always good for a gag! Better order more than one . . . everyone who sees it will want one. $1.00 ea. 6 for $5.00. (With name filled in, and laminated in lifetime plastic, $1.50, 6 for $7.50.) Send check or M.O. to Fun Art, 676 8th Ave., New York City, N. Y.

YOUR CLASSIFIED AD in this space would be seen by over 90,000 hams and would cost only 10¢ per word for a non-commercial ad and only 25¢ per word for a commercial ad.

FIFTH ANNUAL Syracuse VHF Roundup, October 10, 1959.

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.

DECORATE YOUR CAR WINDSHIELD WITH YOUR CALL LETTERS. Attractive 1" letters and numbers available in gold or black. Complete single set 75¢, two sets for $1.25. Include name, call, address and color preference. Money refunded upon return of unused decals if not satisfied. All orders must be prepaid. Send to Box RJ, c/o CQ Magazine, 300 West 43rd St., N. Y. 36, N. Y.

TWO COLOR CERTIFICATE. Attests to tongue-in-cheek ownership of one acre of the moon. Ideal gift or for wall of club, shack, bar or room. Name and call inscribed free. $1.00 each, 6 for $5.00. Box G, 1738 201 St., Bayside 60, N. Y. Check or M.O. only.

HAMS, Learn Calculus, Powerful mathematical tool. Easy practical lessons, first four $1. Mathco, 4256-5 Minmor, Cincinnati 17, Ohio.

DO YOU NEED Hamilton County, New York? Write for July sked—W2RKU, Ilion, New York.

6 METER BULLETIN—News, DX, etc. 13 issues—$1.20. "QSO," 67 Russell, Rahway, N. J.

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.

WYOMING HAMFEST July 25-26. Program, banquet, prizes. Tourist mobiles invited. See "Hamfest" section this issue, and watch for mobiles on U.S. 16 west of Buffalo, Wyoming.

THE BIGGEST in the Biggest—Alaska Hamfest, Anchorage, July 17-18-19. Write Box 211.

SWAP lies with bigger liars than Texans—Alaska Hamfest, Anchorage, July 17-18-19. Write Box 211.

TAKE A DX-pedition to KL7—Alaska Hamfest, Anchorage, July 17-18-19. Write Box 211.

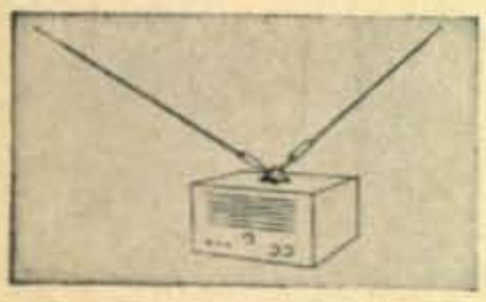
MISC. (cont'd)

THE BIGGEST RIVER, the highest mountain, the most area—see it all—Alaska Hamfest, Anchorage July 17-18-19. Write Box 211.

THE FARTHEST NORTH HAMFEST—Alaska Hamfest, Anchorage, July 17-18-19. Write Box 211.

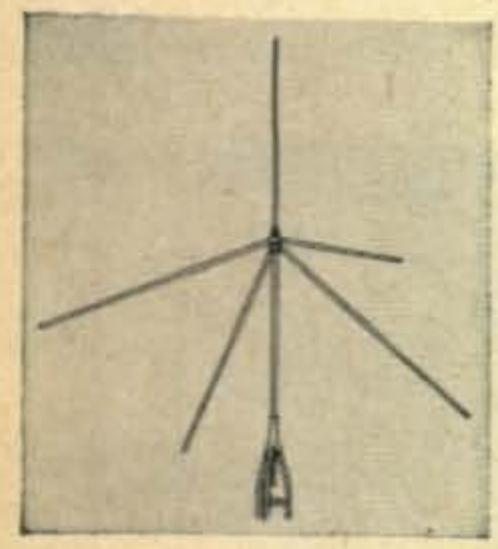
GOT A BOAT? We got more coastline than the southern 48, sail up and see us—Alaska Hamfest, July 17-18-19. Write Box 211.

New Amateur Equipment



The Citizens Dipole

Hy-Gain has done it again—this time antenna magic for our brothers on the Citizens Band. They may be landlocked, but there is no need for them to be limited. . . . Glam this new "rabbit-ears" type antenna for the 27 mc band. Telescoping chrome plated whips extend to 45" and telescope down to 15" for easy storage. Features a handy "suction-cup" base for quick and easy mounting on transceiver, walls, window, etc. Vertical or horizontal polarization. High efficiency base loading coils reduce size of elements to make this unit a most compact radiating assembly. For further dope, squash H on page 126.

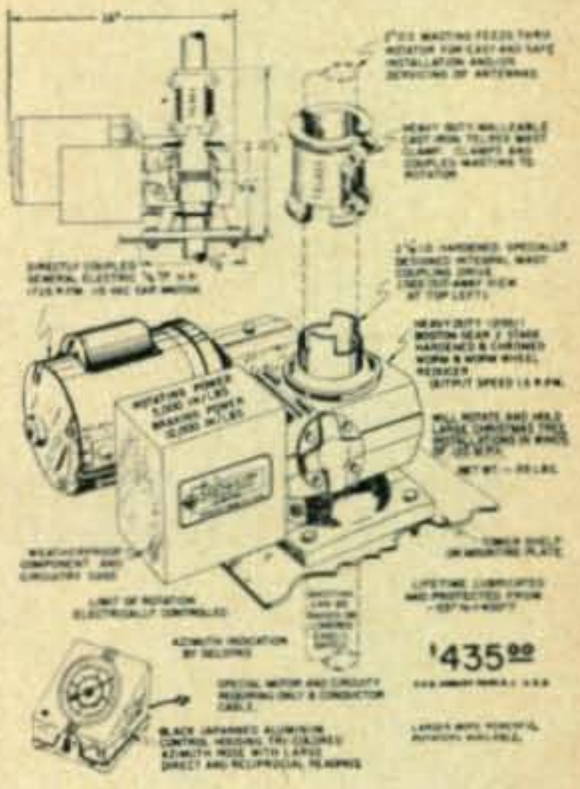


New Heavy Duty Ground Plane

Hy-Gain . . . again; this time with their new model GP-1 ground plane antenna for the new Citizens Band. This unit is constructed of extremely heavy duty material and will withstand winds up to 100 MPH. The antenna is supplied complete with four ⅞" to ¾" od telescoping aluminum radials and radiator. The drooping ground plane radials are adjusted so as to present a perfect 50 ohm match for coupling to any standard 52 ohm coaxial cable. Heavy Nylon base insulator and base casting to fit all masts up to 1⅝" diameter. For more detailed information you owe it to yourself to obliterate G on page 126.

For further information, check number 57 on page 126.

New Amateur Equipment



Rotator

Some time ago, a wise OM said "If the beam gets stuck, it'll rotate the house." At that time, a statement of this sort was looked upon as being 'a bit facetious,' Not any more! Telrex Laboratories, who need no introduction into the field of antennas and antenna products, have graced us with their Model 500-RIS heavy duty rotating system. Having a rotating power of 500 in/lbs and a breaking power of 12,000 in/lbs, this baby will hold and rotate the largest stack of arrays in winds up to 120 mph. The unit features a 1/6th hp motor which drives a 1200/1 gear system at an output speed of 1.5 rpm. Weighing in at only 55 lbs, this champion presents the 'ultimate' in amateur rotating systems. For additional information, smash B on page 126.

New Table Top Linear

Barker & Williamson have announced the major redesign of their well known 1 KW Linear Amplifier and power supply. The new units, now in production, are designated as the LPA-1 and LPS-1 respectively.

The ultra-modern rf section has been packaged in a 9¾ x 18¼ cabinet in order to hamonize with the most modern equipment. It is, of course, ideal for table top use since it requires little more space than the average communisations receiver. The *rf* section is supplied with blower, tubes, and filament and bias supply. Two 813's are utilized in a hi-mu triode, grounded grid circuit.

The separate high voltage power supply may be placed beside the amplifier or when space is at a premium, located remotely. For remote use, the switching panel on the front of the power supply may be removed and installed at the operating position.

A new matching unit, the LPA-MU has been developed so that the LPA-1 may be used efficiently with driver-exciter units having fixed output impedance. This unit fits in the rear section of the rf amplifier and couples to the band-switching Pi-Network so that line input matching to the final is accomplished simultaneously with bandswitching.

The LPA-1 can be driven by most standard commercial and composite home-built exciters in the 100 watt class. These will drive the unit to a full KW. Want more data? Disintegrate E on page 126.

Transistor Code Practice Oscillator Kit

Here's a brand new Heathkit that will be of great interest to Boy Scout groups and beginning radio amateurs learning and practicing Morse code. A convenient panel switch allows selection of built-in speaker for tone signal or a blinker light for night time or silent operation. Contactor provided for practice keying or any standad key can be connected to the teminals. Easy-to-build and compact in size the CO-1 is housed in a black bakelite case and measuring only 6" x 3" x 2½". The efficient low drain circuit uses a 2N238 transistor for long battery life and is powered by two standard size "C" flashlight cells. The CO-1 provides an excellent means of bringing up code speed in spare time hours. For more dope, circle D on page 126.

Flash Driver

Take a squint at this crazy solution to your construction problems. Flash-Driver is a rugged screwdriver with a built in piggy-back flashlight that focuses it's beam of light directly on the blade tip, permitting one to work with ease; even in total darkness or dim interior corners. A handyman's dream for repairs . . . anywhere! The unit operates from two standard flashlight batteries that fit into the handle. The handle is constructed of unbreakable high-impact plastic and includes a built on belt clip. If you wanna know more, mash A on page 126.

HARRISON

"HAM HEADQUARTERS, USA" . . . Since 1925 IS YOUR "BETTER RADIATION" CENTER!

WE'RE ON THE MOVE WITH THE HY-GAIN

Trap Traveller

MOBILE • PORTABLE • DIPOLE • BEAM

for 10, 15 & 20 Meters

8' 4½" Extended for Maximum Efficiency

Telescopes Down to Only 29" for Self-Storing and Easy Garaging

Automatic Loading Coil No. T-3

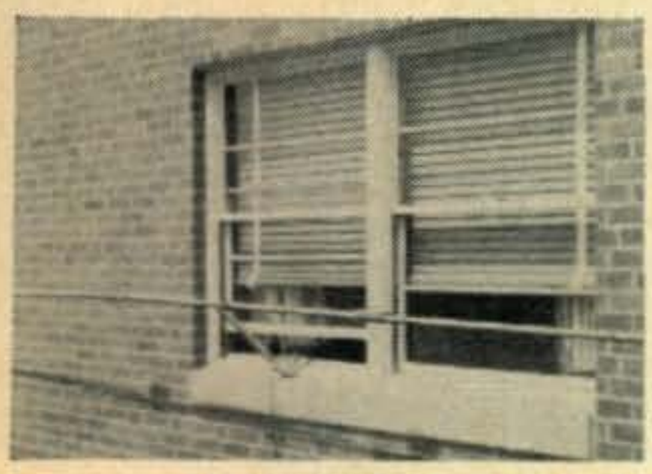
The Trap Traveller Mobile Automatic Band Loading Coil, Model T-3 may be used with any standard 3-foot base and 5' whip, or with Hy-Gain's telescoping base section and top whip assembly. Air foil design, only 1½" wide by 4½" high. **$14.95**

Hy-Gain telescoping base section and top whip assembly, Model TBW: fits all standard mobile mounts. 5' top whip, when used with Trap Traveller coil telescopes from 8' 4½" down to 29". Positive grip, knurled knob connections. **$15.00**

- ★ Automatic 10, 15 and 20 meter operation with ENTIRE WHIP OPERATIVE on all three bands for MAXIMUM EFFICIENCY.
- ★ Unique three band frequency selective circuits select proper amount of inductance for high efficiency CENTER LOADED whip operation on 15 and 20 meters. Loading coil is automatically shorted out for full sized quarter wave whip operation on 10 meters.
- ★ Coil is high Q air wound of No. 14 copper wire on ribbed high impact styron form. Entire assembly is enclosed in completely weatherproof, air tight plastic cover. Air foil design only 1½" wide and 4½" high. Handles up to 3000 watts power.
- ★ May be used with any standard 3' base section and 5' whip, or Hy-Gain's new telescoping base and whip assembly. Telescopes down to only 3' for easy garaging. No base spring necessary. Especially designed high pressure knurled knobs maintain perfect mechanical and electrical contact in telescoping sections when whip is fully extended.
- ★ Designed for 52 ohm Coax, SWR less than 2:1 on all bands.

WANT YOUR SIGNALS TO HAVE THE MOST "SOCK" PER WATT?
Send for a copy of our
PROPAGATION BOOSTING WORKSHEET
Let our experts evaluate your present or contemplated antenna system, and give you experienced advice and literature. No obligation!

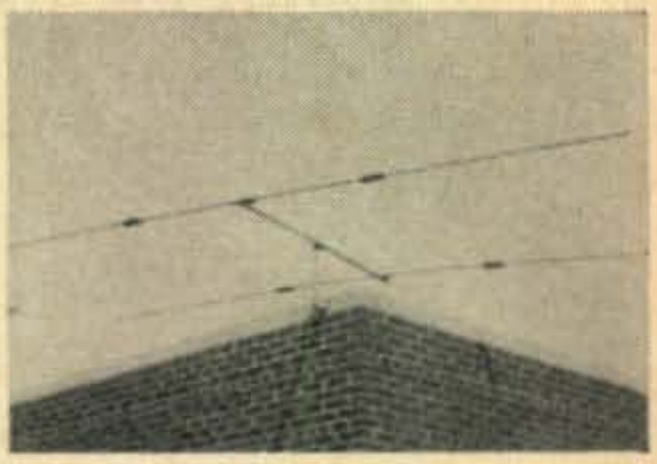
Portable MICRO-DIPOLE KIT



Trap Traveller Dipole Kit requires two 3-band loading coils and makes into midget high efficiency dipole for 10, 15 & 20M. Mounts anywhere; matches 52 ohm coax; low SWR, all three bands. 16 ft. overall when extended. Sections collapse to 3 ft. for easy carrying. Complete with all hardware (less the two loading coils). Wt.: Only 3½ lbs. Model TDK: **$9.95.**

Portable MICRO-BEAM KIT

Trap Traveller Beam Kit requires four 3-band loading coils and makes into world's first miniature 2-element, 3-band portable beam. 16 ft. overall when extended, boom 6 ft. long. Collapses into 3 ft. package for easy transportation. All elements, boom, aluminum. All hardware included (less the four loading coils). Wt.: Only 9 lbs. TBK: **$19.95**



UNIVERSAL MOUNTING BRACKET

Uniquely adjustable screw driven clamp mechanism with 2' mast for mounting the Trap Traveller Dipole or Beam almost anywhere. Adjustable through a 90 degree arc from vertical to horizontal. Wt.: Only 2½ lbs. Model UB: **$9.75.**

CONVENIENT PLASTIC CARRY BAG

Attractive and convenient plastic carrying bag with full-length zipper holds either Dipole or Beam when collapsed. Plenty of space for Trap Traveller coils and Mounting Bracket in addition. Model TCC: **$8.95.**

ALL ROADS LEAD TO HAM HEADQUARTERS, USA!

Because here, in the world's largest trading center you get the greatest values, the latest improved equipment, the lowest prices, the easiest terms, the "hottest" trade-in deals, all with the friendliest personal and helpful Service. Hurry on in! All the latest antennas, rotators and towers are on display.

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[LONG ISLAND—144-24 HILLSIDE, JAMAICA]

Do You Have The
NEW HARRISON AMATEUR EQUIPMENT CATALOG?
SEND POSTCARD TODAY!

For further information, check number 58 on page 126.

Advertising Index

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300 West 43rd Street
New York 36, N. Y.

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Void after
July 25, 1959

Please send me information on your ads in the July 1959 CQ keyed as follows:

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27
28	29	30	31	32	33	34	35	36
37	38	39	40	41	42	43	44	45
46	47	48	49	50	51	52	53	54
55	56	57	58	59	60	61	62	63
64								

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Name_____
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Call_____ Engineer ☐

Type of work (specify)_____

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"TAB" THAT'S A BUY

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
†Wndgs in Series at Ratings shown: Parallel 2X Current. Voltage output. 0-9-15-18

SELENIUM F.W. BRIDGE RECTIFIERS

One Year Gtd!

DC AMP	18VAC 14VDC	36VAC 28VDC	72VAC 54VDC	130VAC 100VDC
½	$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

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, 100/$90
Postpaid 48 states orders $10

Tophat Silicon 500MA Rectifiers Complete Range RMS ACV Input

35	70	140	210	280
36¢	54¢	63¢	81¢	99¢

Buy Qtys Deduct 20% on $10 Orders
Use in Bridge or C.T. up to 750ma dc

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 TR6125CB **$27, Kit** TR625CK **$24.**

"TAB"—THAT'S A BUY!—BARGAINS!!

IRISH/MYLAR Tape 2400 ft ..... 3/$12
CONDSR Oil/W.E. 2mfd@600WVDC 6/$1
SNOOPERSCOPE TUBE 2"..... $5@ 2/$9
MILLEN 1007/KNOB 1⅝" 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' HiQlty, ... 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 0-135V/3 Amp **$10.65**
New Variacs/or equiv 0-132V/1.25A **$7.25**
RF-MTR GE/475 Ma & 5 Amp **$4@,** 2/$7
DC-METER Dejur 800 Ma/3½" **$3@,** 2/$5
DC-METER One Ma/4" Rd. **$5@,** 2/$8
RF-MTR Weston 750Ma/TC... **$4@,** 2/$6
DC MTR 100Ma/2½"..... **$3@,** 2/$5
BC696/3 to 4 mc's good condition $5.95
AN-ARR2/RCVR less tubes A-1 cndtn $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 mcs..... $72
BC221 Freq Mtr—gd cndtn..... $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**

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**

WE BUY! SELL & TRADE
Send 25¢ for Bonus Catalog!

"TAB" Tubes Tested, Inspected, Boxed

Six Months Guaranteed!! No Rejects!

GOVT & MFGRS Surplus! New & Used

0A2	.70	6BZ7	1.25	*We Buy & Sell*	
0A3	.80	6C4	.45	43	.75
0B2	.65	6C5	.69	45	.49
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/$14
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	2/$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	6146	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
3API	5.95	12AT6	.59	801A	5/$1
3BPI	3.99	12AT7	.89	803	3.50
3C24	3.50	12AU6	.63	804	8.85
3D23	3.95	12AU7	.69	805	6.00
We Buy!		*We Sell!*		*We Trade!*	
3E29	7.00	12AX7	.79	807	1.10
3Q4	.68	12AY7	1.29	5/$5, 10/$12	
3Q5	.86	12B4	.95	808	.85
4-65A	13.50	12BA6	.65	811	3.45
4-125A	27.50	12BA7	.99	811A	4.41
4-250A	34.00	12BD6	.59	812	3.30
4X150A	7.00	12BE6	.59	813	8.00
4X250	36.00	12BH6	.79	814	2.35
4X500	37.00	12BH7	.99	815	3.15
5API	2.95	12BY7	1.00	826	.95
Wanted Test Sets and Equipment					
5BPI	5.02	12BZ7	.99	828	9.00
5BP4	5.00	12H6	.75	829B	8.00
5CPI	4.99	12J5	.69	832A	6.00
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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	4/$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 XMTTR 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	No See—Write!	

"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.
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"TAB" FOR THE BEST KITS!

KITS! *Each "TAB" Kit Contains The Finest Selection!!!!*

Kit 5 Myealex Glass/HF Strips
Kit 35 Precision Resistors
Kit 10 Switches
Kit 75 Resistors ½/1/2W
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 Bathtub Oil Cond's
Kit 5 lbs. Surprise Package
Kit 10 Transmit Mica Cond's
Kit Glyptal & Cement
Kit 3 Phone/Patch Xfmrs
Kit 3 Searchlights
Kit 4 AN/Reflector Lites
Kit 6 Insltd Tuning Tools
Kit 6 AN Plugs & cnnctrs
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 Xtmrs
Kit 8 Xtal Osc-Blanks
Kit 4 Asstd Rectifiers
Kit 12 Alligator Clips Astd
Kit 5 UG/Connectors
Kit 100 Self/Tap Screws
Kit Adj Wirt Striper & Cut

Kit 2 Bakelite Panels 6x12"
Kit 5 pcs Wrench Set
Kit 8 pcs Nut Driver Set
Kit Hi Gain Xtal Mike
Kit 5 Jeweler Screwdrivers
Kit 6 ea Phonoplugs & Jacks
Kit Silver Conduct Paint
Kit 6 Multi-Color Ball Pens
Kit 25 ft Lo-Cap Mike 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 Binding Posts Asstd
Kit 5 Phone Jacks Asstd
Kit 3 Phone Plugs Asstd
Kit Long Nose Plier
Kit Side Cutter Plier
Kit 2 Xmttr Variables
Kit 5 of 2mfd @ 600wvdc/oil

Order Ten Kits We Ship Eleven!!!
ONE EACH ABOVE KIT ONLY **99c**

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**

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
TF05/7.5VCT/12A/15KV KENYON..... $9
TF27 is 10VCT/5A or 220V Pri 20V @ 5A
Kenyon H'sld.....Special **$4.95, 2 for $9**

FILTER & SWINGING CHOKES

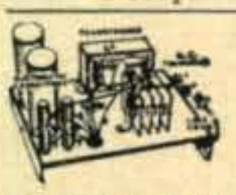
CH1029 CHOKE 8 Hy @ 750ma..... $12
CH1030 CHOKE 6 Hy @ 1.25A..... $18
CH1031 CHOKE 0.6 Hy @ 3.2A..... $10
CH1034 CHOKE 5 Hy @ 500ma..... $6
CHOKE 8 Hy @ 150ma $2
CTC/RS8150/8 Hy @ 150ma/80Ω..... $3
CTC/RS8250/8 Hy @ 250ma/90Ω..... $5
CTC/RS8105/8 Hy @ 105ma/100Ω..... $2
STAN/C2700/2-12 Hy @ 200ma/80Ω.. $6
STAN/C2701/3-12 Hy @ 350ma/80Ω.. $10
KEN/T509/7-22 Hy @ 200ma/140Ω..... $8
KEN/T510/6-19 Hy @ 300ma/125Ω $9
CH1011 RCA/10 Hy @ 150ma **$2 @, 3/$5**
CH1003 UTC/10 Hy @ 125ma ..... **@ $2**
Modulation xfmr BC610/16KCT. Pri, 8330Ω sec@250ma $24

W.E. 388A HiFreq Doorknob Tube **up to 700Mc's Special....3 for $1**

"TAB" for NEW TRANSISTORS!

2N38	$.98	2N255	$1.30	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



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.**

Wanted 304TL Tubes & ALL TYPES!!!

For further information, check number 59 on page 126.

something NEW? you can be sure ALLIED has it IN STOCK - FIRST!

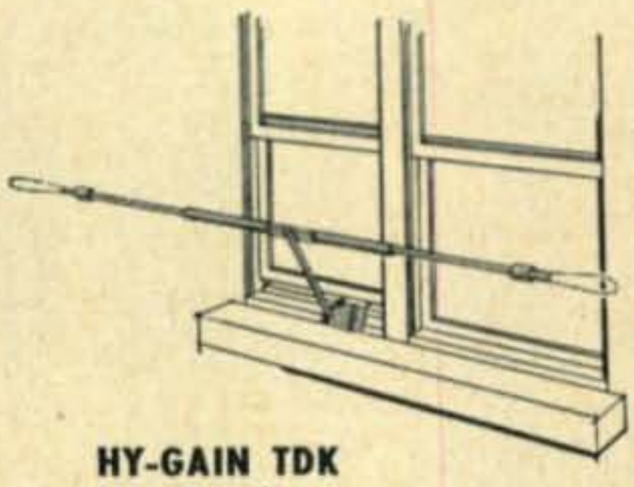
here's what's new:

GONSET GSB-101
Kilowatt Linear Amplifier
$439.50

KNIGHT-KIT MODEL G-30
Grid Dip Oscillator Kit
Complete with coils to 300 mc
$22.95

HALLICRAFTERS SX-110
All-Band Receiver
$159.95

NATIONAL NC-400
Dual Conversion
General Coverage Receiver
$895.00



HY-GAIN TDK
Trap Traveler
Portable Micro Dipole
$9.95

COLLINS 30S-1
Kilowatt Linear Amplifier
$1470.00

get HIGHEST trades for this new equipment

Try us...write today...describe your equipment, and see what a sweet deal we'll give you on the new gear you want. You'll get a "King-Size" trade-in every time!

easiest terms: Only 10% down, or your trade-in as down payment. Fast, efficient handling...no red tape.

15-day free trial: Order with confidence . . . 15-day free trial on all receivers and transmitters.

for personal service

write to Jim Sommerville W9WHF, or stop in at our Ham Shack and meet Joe Huffman W9BHD, Walt Balcom W9MFP and Jack Schneider W8CZE.

Our 39th Year

ALLIED RADIO

100 N. WESTERN AVE., CHICAGO 80, ILL.

For further information, check number 60 on page 126.

FINEST AMATEUR RECEIVER IN ITS PRICE CLASS

NC-109

NOW $169.95

The accent is on value . . . with features found only in more expensive receivers.

The lowest-priced general coverage receiver available today with exclusive "Microtome" crystal filter, separate product detector for CW and SSB reception. Has big "S" meter. Covers 540 kc to 40 mc in four bands including broadcast band. Voice, CW or SSB. Features smart, new styling.

FEATURES:

- ★ Calibrated bandspread for 10, 11, 15, 20, 40 and 80 meter amateur bands. Separate tuning capacitors, knobs, and scales for general coverage and bandspread.
- ★ Large 12 inch indirectly-lighted lucite slide rule dial.
- ★ Adequate over-all selectivity with eleven miniature tubes including rectifier and voltage regulator.
- ★ Has exclusive "microtome" crystal filter providing five degrees of sharp selectivity in addition to normal bandwidth for voice, has sharp phasing notch over 60 db deep for interference rejection.
- ★ Separate product detector for excellent reception of CW and SSB Signals.
- Has "S" meter on front panel for signal strength indication and more accurate tuning.
- Accessory socket for external adaptors, and other accessory devices including phono input or crystal calibrator.
- Has gang-tuned RF amplifier stage, two IF and two AF stages.
- Has separate antenna trimmer and tone control on front panel.
- Separate high frequency oscillator tube increases stability. Has ceramic oscillator coil forms and is temperature compensated for exceptional stability.
- Separate RF and AF gain controls.
- Series type automatic noise limiter.
- Conelrad (CD) frequencies clearly marked on dial.
- Mode selector switch for ANL, AM, CW, SSB and accessories.
- Smartly designed two-tone cabinet.

COVERAGE:

BAND	GENERAL COVERAGE	BANDSPREAD
A	.54-1.6 mc	—
B	1.6-4.7 mc	3.5-4.0 mc (80 meters)
C	4.7-15.0 mc	6.9-7.3 mc (40 meters)
D	14.0-40 mc	14-14.35 mc (20 meters)
		20.4-21.5 mc (15 meters)
		27-30 mc (10/11 meters)

TUNING SYSTEM: Separate general coverage and bandspread tuning capacitors connected in parallel on all bands. Bandspread, used primarily for tuning the amateur bands, can be used as a vernier for general coverage use. Antenna trimmer is on the front panel.

AUDIO SYSTEM: Two-stage audio amplifier with single 6AQ5 output tube provides 1.5 watts at less than 10% distortion. A handsomely styled accessory speaker is available. Output impedance 3.2 ohms. Has phone jack.

DRIFT: .01% or less.

SENSITIVITY: Under 1-2 microvolts (10 db signal/noise ratio).

SELECTIVITY: 6 Positions. Constant Gain.

	NORMAL	SHARP
6 db	5.2 kc	200 cycles
60 db	29.5 kc	10 kc

plus four additional intermediate degrees of sharpness.

CONTROLS: Main tuning; bandspread tuning; antenna trimmer; band selector switch; RF gain control; AC ON/OFF and AF gain control; stand-by switch; mode selector switch for ANL, AM, CW, SSB and ACC; tone control switch; BFO pitch control; selectivity control; phasing control.

TUBE COMPLEMENT:

RF Amp.	6BA6	AF Output	6AQ5
Freq. Conv.	6BE6	Rectifier	5Y3GT
HF Osc.	6C4	Voltage Regulator	0B2
1st IF Amp.	6BA6	Product detector	6BE6
2nd IF Amp.	6BA6	Det, AVC and ANL	6AL5

1st AF and BFO/S meter amp. 12AT7

OTHER SPECIFICATIONS:

Antenna Input: 50-300 ohms, balanced or unbalanced.
Size: 16 13/16" Wide x 10" High x 10⅞" Deep.
Finish: Handsome Two-tone gray wrinkle finish.
Shipping Weight: Approx. 35 lbs.
Optional Accessories: Matching Speaker, XTAL calibrator.

Only $16.95* down

Up to 20 months to pay at most Receiver Distributors.

*Suggested price: $169.95**

**Prices slightly higher west of Rockies and outside U.S.A.

INSTRUCTION BOOK AVAILABLE $1.00

For further information, check number 2 on page 126.

Eight out of 10 U.S. Navy ships use National receivers

NC-109

NATIONAL RADIO COMPANY, INC.

Melrose 76, Mass.

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25 out of the 34 transmitting-type tubes used in ARRL Handbook transmitters and modulators are High-Perveance Beam Power types

1959 EDITION

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High-perveance beam power tubes—originally developed by RCA—are sweeping the field.

For example, in the 1959 Radio Amateur's Handbook, the official technical textbook of the ARRL, 21 of the 22 transmitter and modulator circuits shown employ transmitting-type power tubes.

Why do transmitter designers "standardize" on high-perveance beam power tubes? First: Beam power makes it practicable to use smaller, less expensive drivers... fewer stages...fewer components...fewer tuning controls...simplified band-switching. Second: High-perveance design enables you to get the power you want at lower plate voltage. And you know the savings that can mean.

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