ICD

CQ

August 1965

75¢

W5LFL: New Project Apollo Trainee Could Be First Ham On The Moon...page 7

The Radio Amateur's Journal

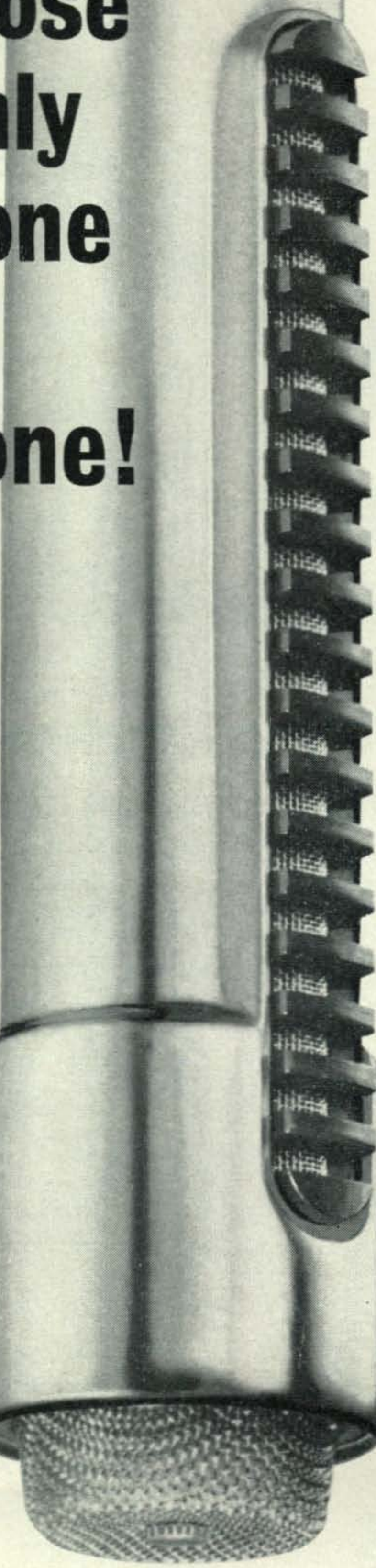
COST
C!O$T
COST
C!O!S!T!
COST
COST!!!!!!!!!!!!!!!!!!!

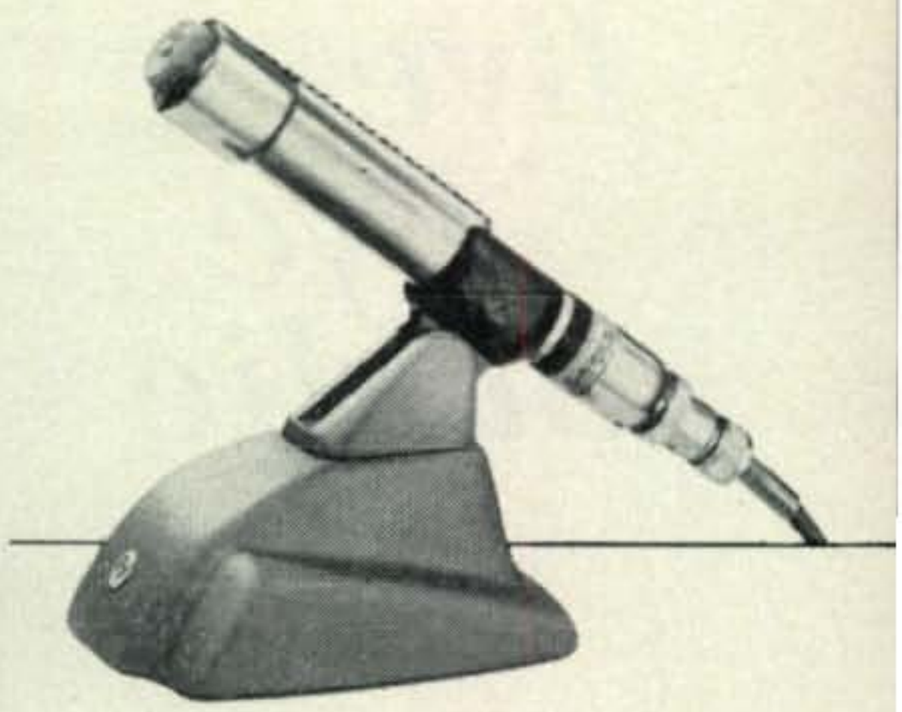
Why is it the most expensive is often the most economical? A paradox? □ No! □ First, with any purchase, and especially with ham equipment, you want self-satisfaction. Next, you want a good investment. □ *What better satisfaction* than to know you have the finest. When you purchase Collins you get such features as complete station compatibility; frequency stability; frequency calibration; more QSO's per kilocycle; mechanical filters; dual or single PTO control; automatic load control; negative RF feedback; light weight; simplicity and styling. And Collins is still the only equipment which has all ten of these features — and is still unexcelled in any of them. □ *What better investment* can you have than in Collins equipment — proven over the years by such famous units as the 32V series, the 75A series, the S/Line — and in the end costing less than the lower-priced units. Collins is interested in protecting your investment by not introducing new models and styles every year or so just to stimulate sales. □ As one of our customers told us, "You can't afford to buy less than Collins." See your Collins dealer. Ask for a demonstration. Then you'll know why Collins is the finest. Why it costs so little to own.

COLLINS

For further information, check number 3, on page 110

When QRM Gets Tough Choose The Only Microphone With Backbone!





ELECTRO-VOICE
MODEL 676
DYNAMIC CARDIOID

The backbone of the Electro-Voice Model 676 is no mere decoration. It's visible proof of the most exciting idea in directional microphones—Continuously Variable-D (CV-D)™.

Here's how it works. We attach a very special tapered tube to the back of the microphone element. This tube automatically varies in effective length with frequency. It's a long tube for lows—a short tube for highs. All this with no moving parts! The tube is always optimum length to most effectively cancel sound arriving from the back of the microphone, regardless of frequency.

This ingenious solution* is years ahead of the common fixed-path design found in most cardioid microphones. It means you pick up less noise and room reverberation, ensuring a crisp signal and optimum vox performance. It also is less sensitive to wind and shock—ideal for field days! There is almost no "proximity effect"... no boosted bass when you must operate extra close.

Long life and peak-free response are guaranteed by the exclusive E-V Acoustalloy® diaphragm. And the 676 has unusually high output for a microphone so small. Of course you get both 150-ohm and Hi-Z outputs, plus high efficiency dust, pop, and magnetic filters—indeed, all of the hallmarks of Electro-Voice design that have made E-V a leader for years.

But that's not all. The 676 has an exclusive bass control switch built in. Choose flat response (from 40 to 15,000 cps) or tilt off bass 5 or 10 db at 100 cps to eliminate power-robbing lows that reduce efficiency and lower intelligibility. You'll be amazed at the reports of improved audio you'll get when you switch to the E-V676.

Visit your E-V distributor to see this remarkable new microphone today. And when difficult QRM must be faced squarely, stand up and fight back with the microphone with a backbone (and CV-D)—the new Electro-Voice Model 676 dynamic cardioid!

Satin chrome or TV grey,
$60.00 amateur net, Model 420
Desk Stand, $12.00 amateur net.

ELECTRO-VOICE, INC.
Dept. 852G, 618 Cecil Street
Buchanan, Michigan 49107

*Pat. No. 3,115,207

Electro-Voice®
SETTING NEW STANDARDS IN SOUND

For further information, check number 9, on page 110

CQ

AUGUST 1965 VOL. 21, NO. 8

The Radio Amateur's Journal

TABLE OF CONTENTS

DEPARTMENTS

Offices: 14 Vanderventer Avenue, Port Washington, L. I., N. Y. 11050. Telephone: 516 PO 7-9080.

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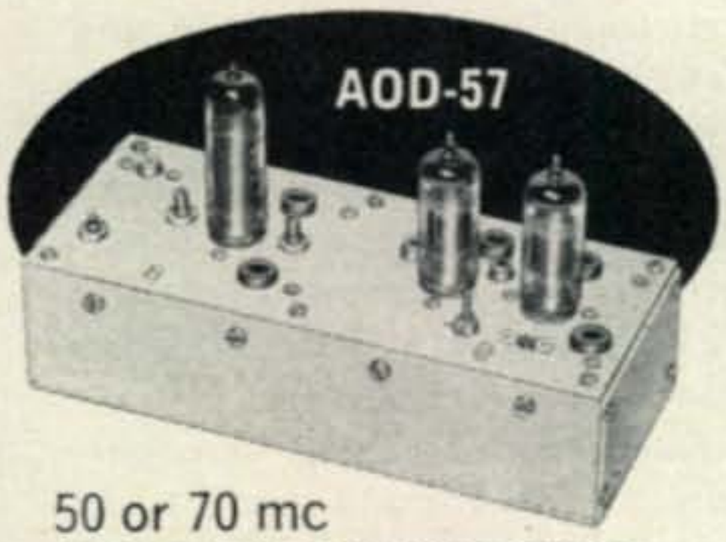
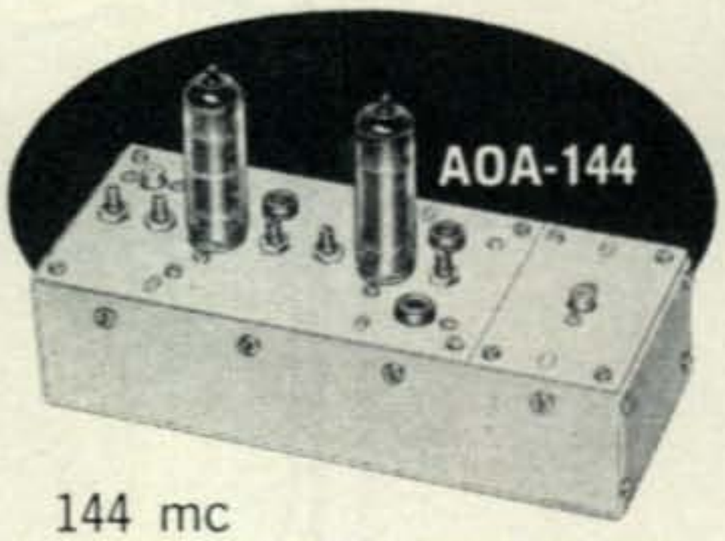
NEW FROM INTERNATIONAL

VHF/UHF UNITIZED TRANSMITTERS 50 mc—420 mc

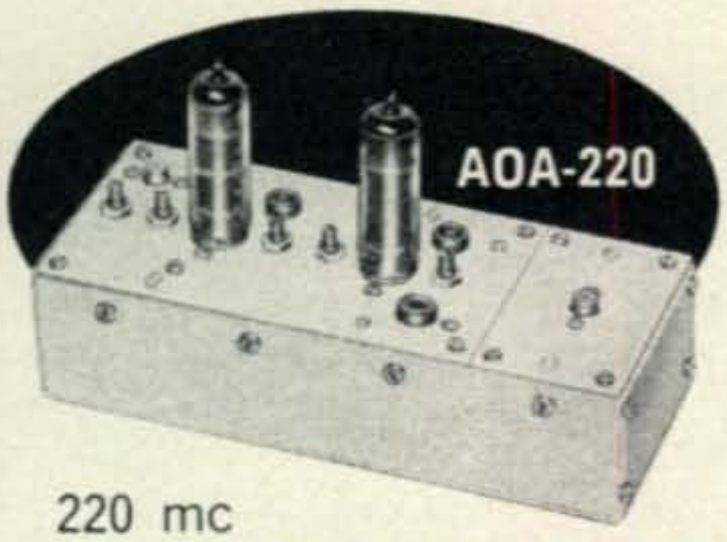
International's new unitized VHF/UHF transmitters make it extremely easy to get on the air in the 50-420 mc range with a solid signal. Start with the basic 50 or 70 mc driver. For higher frequencies add a multiplier-amplifier. All units are completely wired. Plug-in cables are used to interconnect the driver and amplifier.



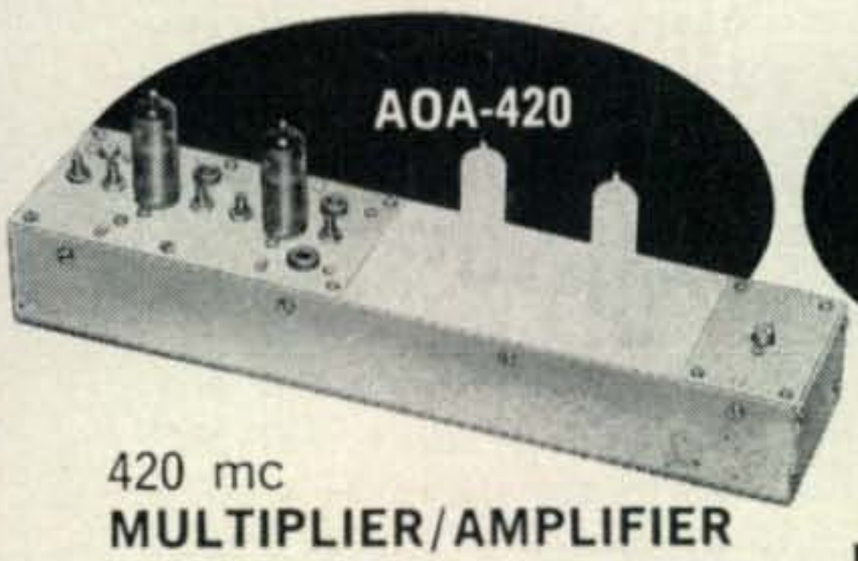
50 or 70 mc
DRIVER/TRANSMITTER
The AOD-57 completely wired with one 6360 tube, two 12BY7 tubes and crystal (specify frequency). Heater power: 6.3 volts @ 1.2 amps. Plate power: 250 vdc @ 50 ma.
AOD-57 complete.....$69.50



144 mc
MULTIPLIER/AMPLIFIER
The AOA-144 uses two 6360 tubes providing 6 to 10 watts output. Requires AOD-57 for driver. Heater power: 6.3 volts @ 1.64 amps. Plate power: 250 vdc @ 180 ma.
AOA-144 complete.....$39.50



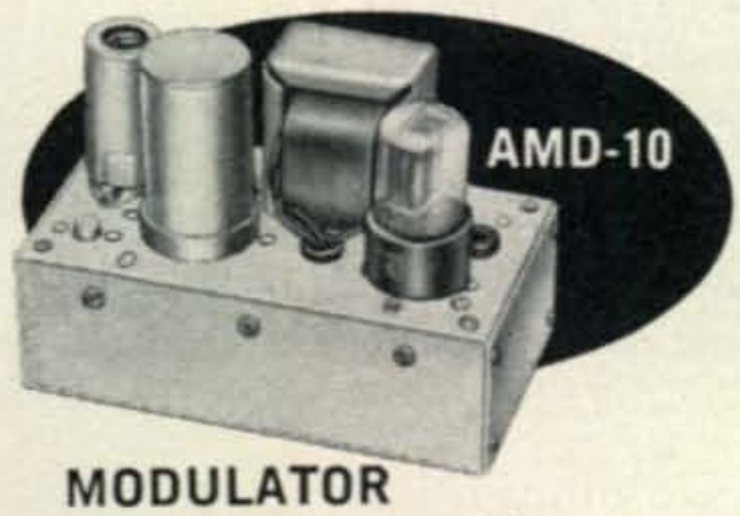
220 mc
MULTIPLIER/AMPLIFIER
The AOA-220 uses two 6360 tubes providing 6 to 8 watts output on 220 mc. Requires AOD-57 for driver. Heater power: 6.3 volts @ 1.64 amps. Plate: 250 vdc @ 150 ma.
AOA-220 complete.....$39.50



420 mc
MULTIPLIER/AMPLIFIER
The AOA-420 uses two 6939 tubes providing 4 to 8 watts output on 420 mc. Requires AOA-57 plus AOA-144 for drive. Heater: 6.3 volts @ 1.2 amps. Plate: 220 vdc @ 130 ma.
AOA-420 complete.....$69.50

RELAY BOX
Four circuit double throw. Includes coil rectifier for 6.3 vac operation.
ARY-4 Relay Box complete $12.50

FILAMENT SUPPLY
The APD-610 provides 6.3 vac @ 10 amperes.
APD-610 complete.....$9.50



MODULATOR
The AMD-10 is designed as a companion unit to the AOA series of transmitters. Uses 6AN8 speech amplifier and driver, 1635 modulator. Output: 10 watts. Input: crystal mic. (High Imped.) Requires 300 vdc 20 ma, no signal, 70 ma peak: 6.3 vac @ 1.05 amps.
AMD-10 complete $24.50

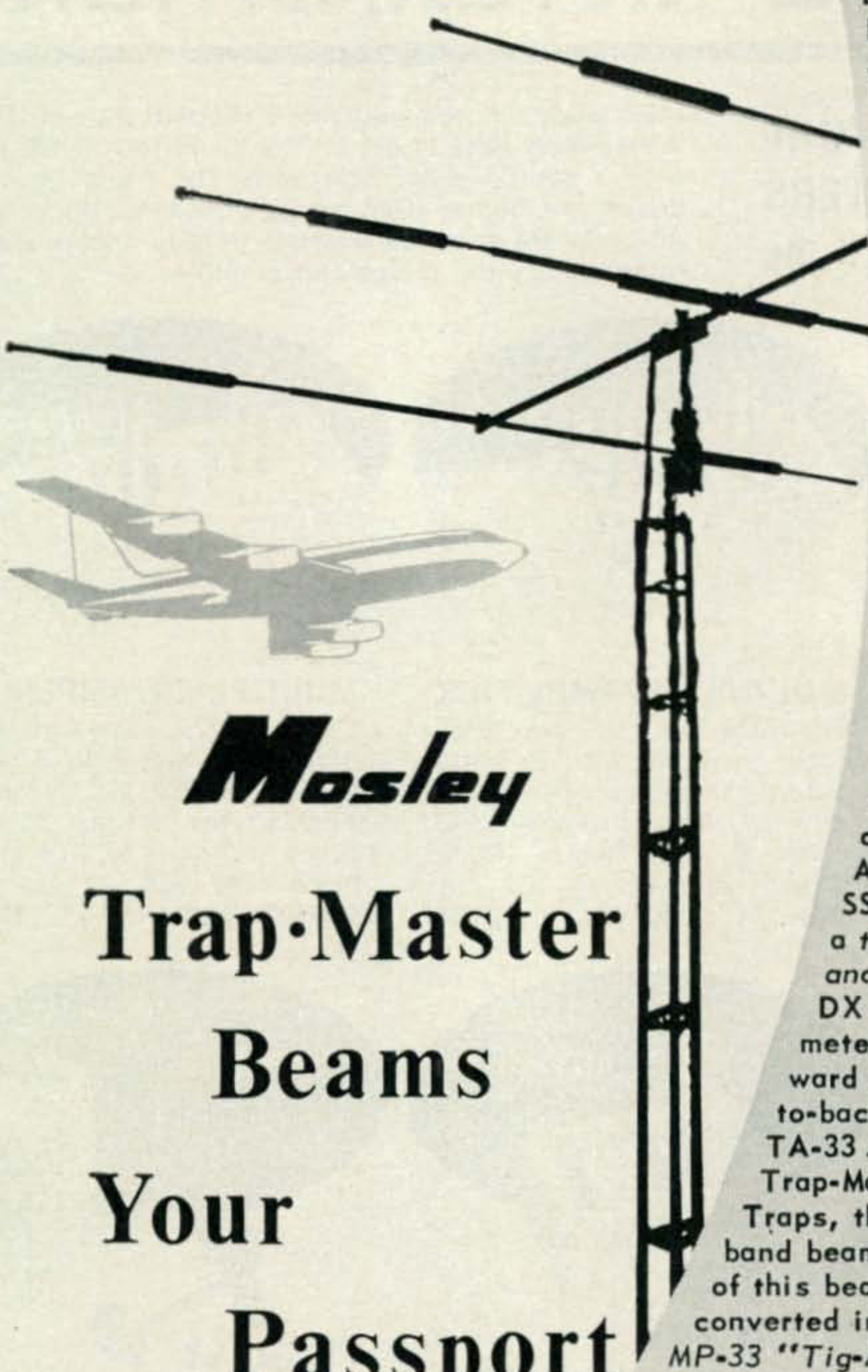
COMPLETE TRANSMITTER

6 METERS	50 mc	AOD-57
2 METERS	144 mc	AOD-57 PLUS AOA-144
	220 mc	AOD-57 PLUS AOA-220
	420 mc	AOD-57 PLUS AOA-144 PLUS AOA-420

INTERNATIONAL CRYSTAL MFG. CO. INC.
18 NORTH LEE — OKLA. CITY, OKLA.

Order Direct from International

For further information, check number 5, on page 110



Mosley

Trap·Master Beams

Your Passport To World Wide DX

Engineered to meet today's band needs / tomorrow's band changes, Mosley Trap-Master beams remain *your passport to world-wide DX*. Yes, now is the time to add the finishing touch to your station - Trap-Master by Mosley.

Consider TA-33, the superior quality beam known and respected by thousands of Hams throughout the world. TA-33 easily handles 1 KW AM on 10, 15 and 20 meters. Up to 8 db. forward gain. 20 db. or better front-to-back and 1.5/1 or better SWR. TA-33 features the original all metal encased traps, proved to last through years of faithful service.

For Hams with lower power needs, TA-33 Jr. is an ideal choice. Rated for 300 watts AM or CW - 1000 watts PEP on SSB. "Trap-Master Junior" is a *top-of-the-line high performance* beam that will boost your DX potential on 10, 15 and 20 meters. Features up to 8 db. forward gain - - 20 db. or better front-to-back and 1.5/1 or better SWR. TA-33 Jr. incorporates the famous Trap-Master All Metal Encased Traps, the mark of distinction in tri-band beams. An added *"plus feature"* of this beam is its ability to be easily converted into a version of the *NEW MP-33 "Tig-Array"* when you increase power.

The newest addition to the Mosley Trap-Master family and direct decendent of the TA-33 is the MP-33 Tig-Array. Featuring top 3 band performance on 10, 15 and 20 meters. Rated for 750 watts AM/CW, 2000 watts PEP on SSB. Here in the *medium powered performer* designed in the true Trap-Master tradition. Again features the high performance all metal encased traps, pioneered and developed by Mosley for dependable multi-band operation.

Visit your Distributor today for more details about the World-Famous Mosley beams. *Your passport to world-wide DX is a mere antenna away.*

Write for FREE Catalog!

Mosley Electronics Inc.

4610 N. Lindbergh Blvd.-Bridgeton, Mo.,63044

For further information, check number 6, on page 110

ZERO BIAS

W5LFL to Join Astronauts!

ALMOST daily we receive small indications that amateur radio is getting more intimately involved in the space age. This is as it should be, for amateur radio has always been in the "front line" of radio communications, and radio communications is the vital common denominator in the space program. The OSCAR series is only a beginning of amateur space participation. Tentative plans by other groups include such ideas as a 432 mc beacon on board a moon-probe, and some fellows are dreaming about a ham in space. Wild idea? Not as wild as it was a few months ago. W6SAI explains why.

A TROPHY resides in a steel and glass case at ARRL Headquarters in Connecticut. It is to be presented to the first radio amateur who establishes two-way contact with the planet Mars. This tongue-in-cheek award, created a decade ago as a wry jest suddenly has become a serious and realizable trophy as the world moves toward the space age of the 1970's.

Who will be the astronaut-radio amateur landing on Mars to establish this fabulous contact? Doubters may scoff at such a fanciful thought, but Owen K. Garriott, W5LFL could possibly take the matter more seriously. He looks forward to being one of the scientist-astronauts the United States will send to the moon! While the chance that earth-bound amateurs will hear W5LFL/moon may be remote, it is a much better bet that W5LFL will hear radio amateur signals from earth during portions of forthcoming lunar experiments.

In late 1963 W5LFL applied to NASA for admission to the Apollo Program during the last few weeks and was selected for the astronaut training program. He has since undergone extensive physical and psychological tests in preparation for the intensive months that lie ahead. In the immediate future lie 13 months of jet training school!

W5LFL is an associate professor of electrical engineering, Stanford University, California, specializing in ionospheric research in the Stanford Radioscience Laboratory. He is project director of Stanford's satellite receiving program. A portion of the vast antenna farm under his direction has gleaned valuable data about the electron content of the ionosphere and rate of ionization from studies of radio signals from the Transit, Explorer and syncom satellites.

Owen was first licensed in 1946, and believes that his early radio amateur career initiated his interest in electronics. His father became interested in amateur radio about the same time, so father and son attended code classes in Enid, Oklahoma. Owen received the call W5LFL and has father was licensed as W5KWQ.

The first station of W5LFL consisted of a home-built 6L6-807 transmitter and a dipole antenna for 40 meters. The receiver was a HQ-129X. Owen operated 40 and 80 meter c.w. and admits he has never operated a phone rig in his entire amateur career. During recent years, ionospheric research has prevented W5LFL from being active, even though most of his research activities are centered on radio techniques.

W5LFL looks forward to his new duties and opportunities as one of the astronauts of the Apollo program. "My selection for the astronaut training program presents a rare opportunity for an ionospheric scientist, who is normally forced to study his subject from the ground, to actually get up there and surround himself with it," said Owen.

One of the experiments Owen looks forward to is the scanning of the radio spectrum from beyond the ionosphere, or from the surface of the moon. An entirely different radio-profile may be expected from this unique vantage point.

"Through amateur radio I became interested in electronics and the ionosphere," Owen said. "This is a wonderful avenue for the young lad of scientific mind to enter the world of electronics. I'm sure I am not the only radio amateur who has turned his early interest in radio into his career."

And so W5LFL confidently faces the future. Professor O. G. Villard, W6QYT, Director of Stanford's Radioscience Laboratory said, "We all wish him well. Owen combines the most desirable qualities of scientific ability, calm wisdom, and personal courage. He will serve his nation well."

Radio amateurs world-wide salute W5LFL and his glorious adventure into space!

Why not take a moment to drop a QSL to W5LFL letting him know that we're doubly proud to learn of his selection; proud of him as an American, *and* as an amateur. *I* am!

73, Dick, K2MGA

LETTERS TO THE EDITOR

Top Honor's Plaques

Editor, *CQ*:

I read your March editorial with great interest, as a CHC Top Honor's man! But I was more than delighted at the arrival of my splendid "Arne Trossman" plaque a few days ago, and I am writing to thank you for it. Patience was well rewarded!

Many thanks, indeed.

Donald Cawley, G2GM
1 Afton Lodge
Freshwater, Isle of Wight
England

Editor, *CQ*:

I have received my Arne Trossman Plaque and am very pleased. It is indeed, a lovely award and one I am most proud to have.

My sincere thanks.

Avis E. Miracle, W8WUT
114 South Hooker Avenue
Three Rivers, Michigan

Modifying The Drake 2B

Editor, *CQ*:

I modified my 2B as per your June issue ["Adding Silicons to the 2B," *CQ*, June '65]. I used 600 p.i.v. 750 ma diodes—simple! But after modifying using 100 Ω the receiver would not mute properly so I figured *R* was too low. I wound up with 300 Ω. I imagine *R* will vary from 100-400 depending upon the receiver to the type of diodes used (the author didn't say). Some of the less experienced hams would probably curse and just put the 6X4 back in and can the idea. So how about a line to let those guys know.

Dick Martin, WA6DQR
11543 206th Street
Lakewood, California

Give It The Deep Freeze

Editor, *CQ*:

Thought your readers might be interested in an old remedy W6JPU taught me regarding an old Crystal Mike I had that wouldn't work. He told me to put it in the deep freeze overnite—cord, plug and all! I did, and next day I plugged it in. Was sure surprised when I got a reply. That was two months ago, and it still works.

George Simon, WB6BTR
5401 Sussex Way
Fresno, California

Modifying The Modified GPR-90

Editor, *CQ*:

I have just added a Jackson planetary drive to my GPR-90 as recommended by W2HWH in his article in the March *CQ*. The addition of this device is a great improvement to the receiver and enables me to tune in s.s.b. signals with comparative ease.

For further information, check number 8, on page 110

NOW—FOR THE FIRST TIME!

Single Sideband Equipment

FCC TYPE ACCEPTED FOR MARITIME MOBILE AND LIMITED SHORE STATION SERVICE

Model SB-6FB, SSB Transceiver

RF Communications is pleased to offer the first type accepted SSB communications equipment for marine applications.

Qualified applicants are eligible to apply for frequency assignments for private ship-to-ship and ship-to-shore channels in the high seas radio-telephone bands.

The SB-6FB is type accepted for use in the 4, 8, 12 and 16 Mc service as well as 2182 Kc AM applications.

NOW AVAILABLE FROM STOCK

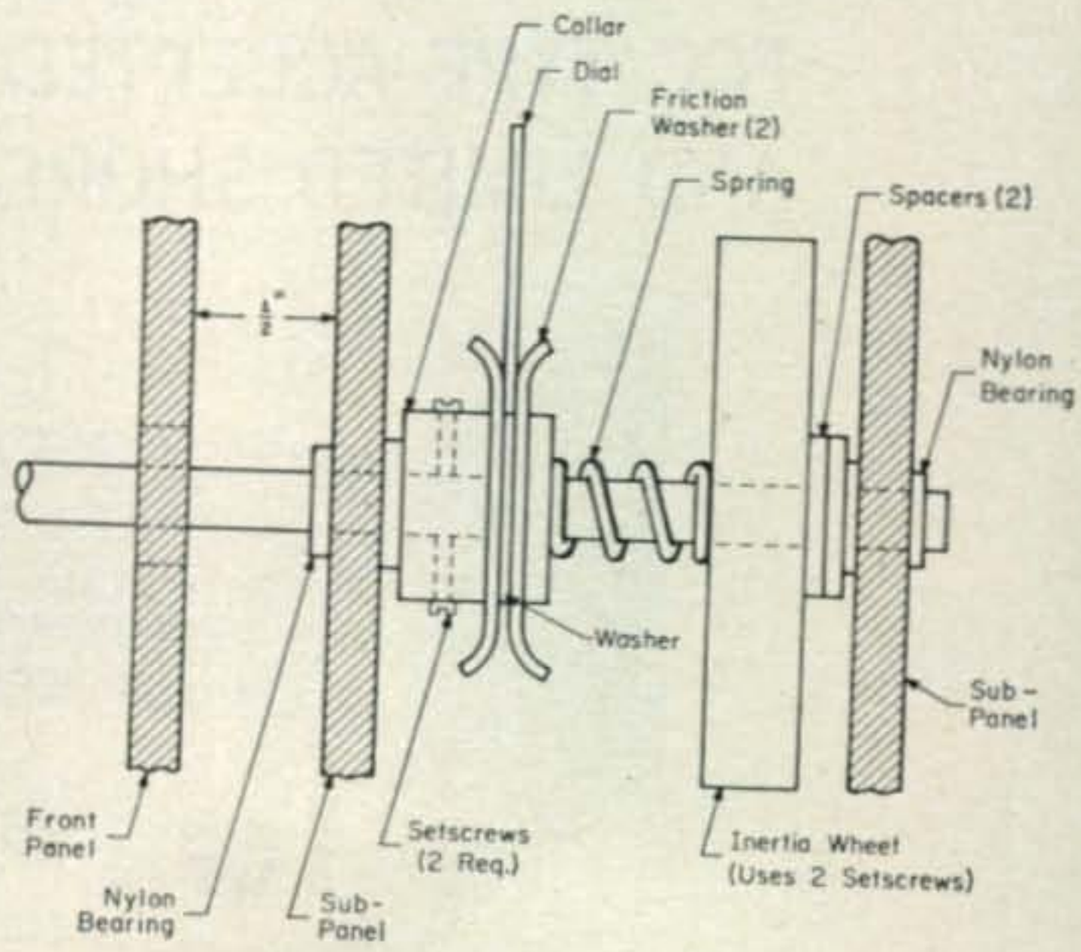
Contact us for further details and the name of your nearest R F Communications dealer.

R F COMMUNICATIONS, INC.
1680 UNIVERSITY AVENUE • ROCHESTER, NEW YORK 14610

For further information, check number 1, on page 110

The GPR-90 which W2HWH converted appears to be an early model. The current arrangement of the dial drive assembly is as indicated on the enclosed sketch. It should be noted that movement of the shaft is possible only after two setscrews in the collar and two in the inertia wheel have been loosened.

I don't know how W2HWH reamed out the hole in the front panel, but the ½" spacing between the front panel and the first sub-panel makes this operation extremely difficult. I took the easy way out and mounted the planetary drive on ⅛" spacers. This requires tightening the setscrews in the hub of the drive before the shaft is slipped back into the receiver. *Do not* remove the shaft because a large collection of parts will fall out. Putting them back is more difficult to do than somewhat!



The skirt on the original tuning knob may be removed from that knob and fastened to the planetary drive after two holes have been drilled in the skirt (on a ⅝" diameter between holes). The skirt can now be used for 1:1 and the knob for 6:1 ratio tuning.

Richard R. Hay, W1LE
253 Katydid Lane
Wilton, Conn.

Thanks, OM

Editor, *CQ*:

This is a letter I doubt you receive very often. I am an amateur enthusiast for several years, and have held General ticket since August 1961. Along the way I have interested and helped acquire tickets for friends, and especially my brother (now WB6EXB). I find myself possessed with an ever-increasing "thirst" for knowledge regarding electronics, and more particularly, ham radio.

Unfortunately, for me, I am forced to be without ham radio for a time of two and one-half years, while situated in Sweden. I return home March 24, 1966. I want to take this opportunity and thank you for your very fine publication *CQ*. The people at the newsstands now place any copies of *CQ* in the windows, so I won't keep "bugging" them to see if the latest has arrived. I want to extend my appreciation to all of your departments. I enjoy reading the entire magazine, and especially articles explaining theory. I consider it a "job-well-done" in regard to your approach in your various departments of up-grading the amateur society by exposing us to new techniques, rules and regulations, operating courtesies, and many more. You make it easy and enjoyable for an old-timer (if I may be permitted to use the term) to learn something. I am sure I will be a better ham when I return to amateur radio.

Thanks for your forthrightness. It's a good ship that can admit it needs constant checking and care. Bravo for your furtherance of our best needs and operating privileges regarding incentive licensing. I would sure hate to lose my call letters. Well, keep up the good work. I am looking forward to your next issue.

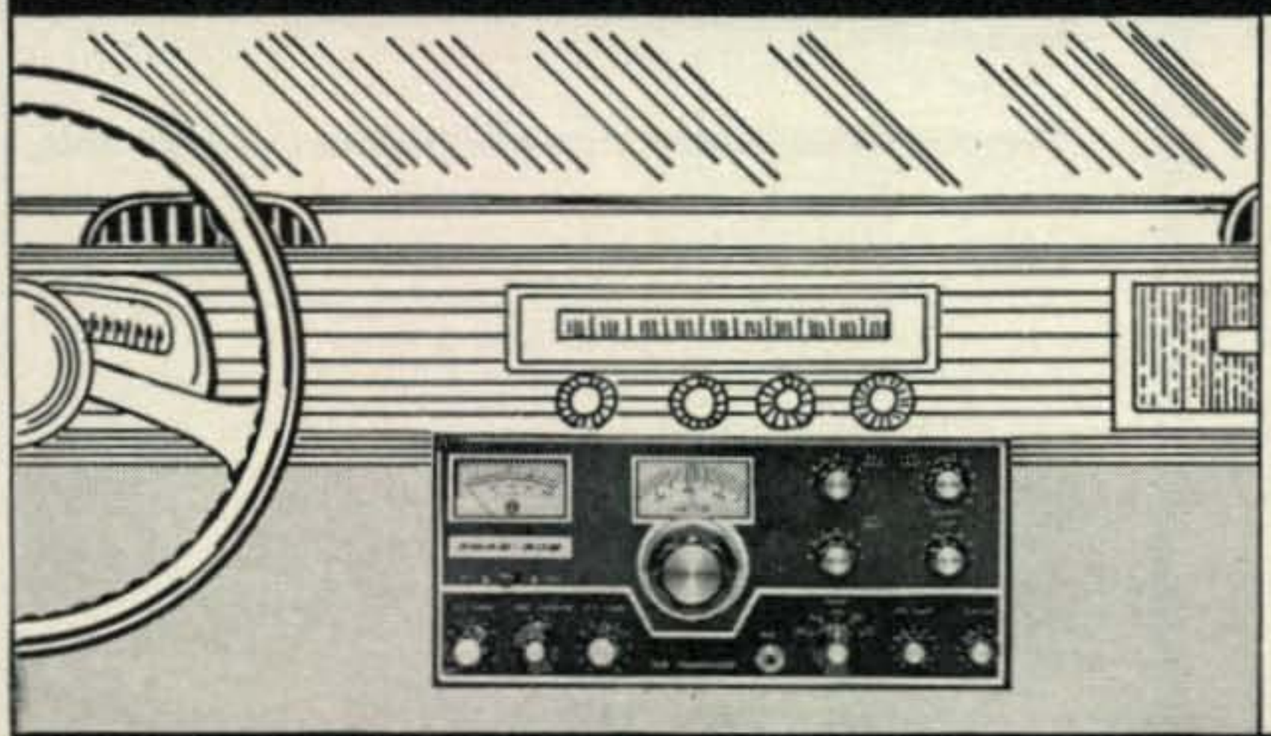
Some people like to extend thanks even if benefits may come "on the rebound," so to speak.

Jon M. Nelson, WA6RAF/SM
Postfack S.D.H.
Tumba, Sweden

going mobile?

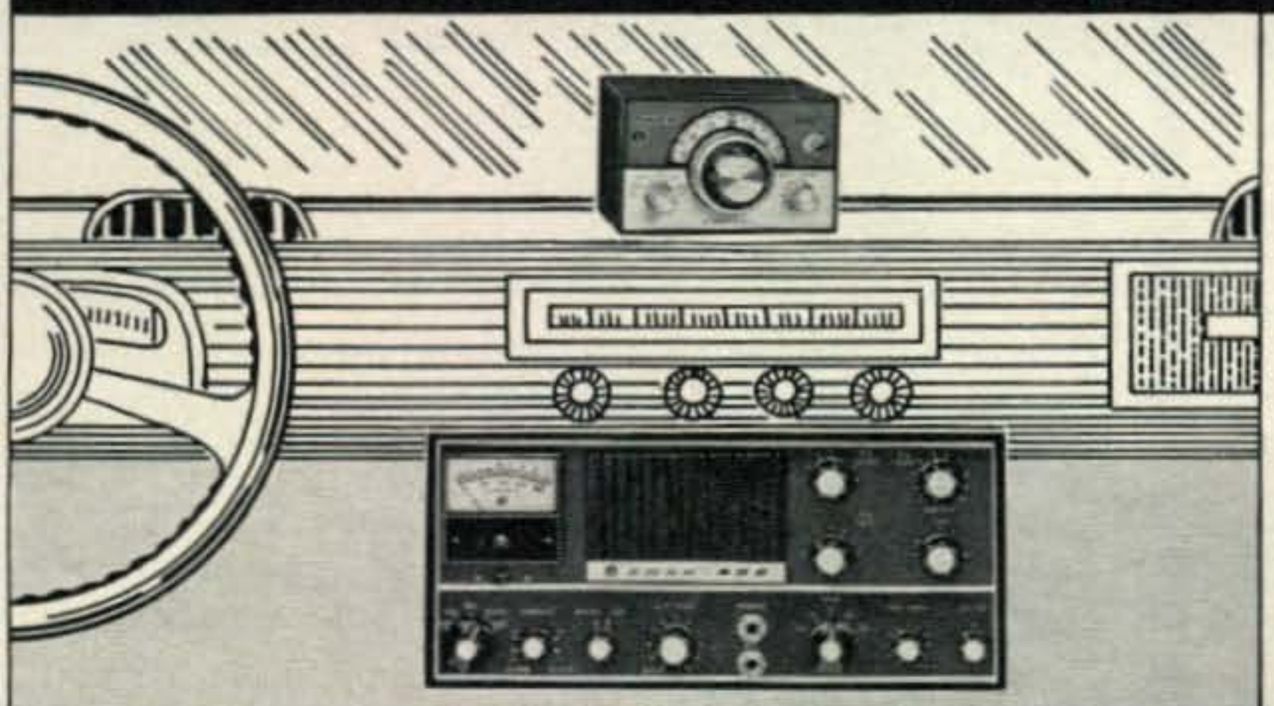
GET MORE POWER. . . BETTER
AUDIO QUALITY . . GREATER VERSATILITY
WITH SWAN
5 BANDS 400 WATTS

MODEL 350



Mounts under dash or on tunnel, or with a Model 22 Adapter and Model 405 mobile VFO can be mounted in the trunk. **$395**

MODEL 400



Particularly adaptable to sports cars with consoles and bucket seats. New Model 400 deluxe with outboard VFO can be mounted in trunk, under dash or on tunnel with Model 406 VFO mounted on dash or steering column for maximum ease of operation.

Model 400 **$395**

Model 406 **$ 75**

MODEL 55 SWANTENNA

Developed specifically for use with Model 350 and Model 400 transceivers. Remote controlled band switching, mobile antenna covers all phone bands 75 through 10 meters. Built-in output indicator for tune up to maximum efficiency. Rated 500 watts PEP input to transceiver. Complete with control unit. **$95**

MODEL 412 DC SUPPLY for either Model 350 or 400 **$130**

SWAN ELECTRONICS CORP.
Oceanside, California

For further information, check number 11, on page 110

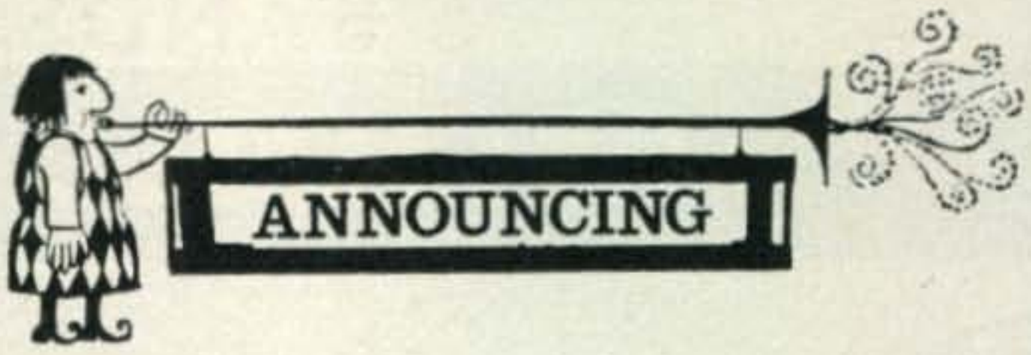
Sea Lab II

Editor, *CQ*:

We would like to invite all Ham operators to make contact with WB6LKH/MM during the period 10 August 1965 to 10 October 1965. This station will be at the site of the Sea Lab II operations off Scripps Institute of Oceanography at La Jolla, California.

Sea Lab II is generally a part of the U.S. Navy "Man in the Sea" Program. Specifically, it is a 57 foot long by 12 foot diameter chamber submerged to a depth of 210 feet. Twenty men in two teams of ten will live fifteen days each in Sea Lab II, breathing a specially prepared Helium Oxygen atmosphere. The Aquanauts will work

[*Continued on page 99*]



Winchester, Virginia

The Shenandoah Valley Radio Club will hold its 15th annual Hamfest on Saturday and Sunday, July 31—Aug. 1, at the National Guard Armory in Winchester, Virginia. There will be guest speakers, entertainment and a banquet on Sat. evening. For more information contact Ira Sirbaugh, W4KAV, Shenandoah Valley Amateur Radio Club, Inc., P.O. Box 139, Winchester, Virginia.

Austin, Texas

The first annual Texas Wide-Band F.M. Picnic will be held at Zilker Park in Austin, Texas on August 8, 1965. 52.525 and 146.94 mc will be monitored. Contact W5NFC, 2024 Ford Street, Austin, Texas, for details.

Dover, Delaware

The Delaware Committee is sponsoring a Delaware Hamfest on August 15th at Harrington, Delaware. Advance tickets are $1.50 and $2.00 at the gate. Tickets and information can be had by writing to Pete Robinson, K3OCI, 304 Kesserring Ave., Dover, Delaware, 19901.

Mays Landing, New Jersey

The Southern Counties Amateur Radio Association is holding its second annual Hamfest on Sunday, Aug. 29th at Lake Lenape Park, Mays Landing, New Jersey. There will be displays, swap shops, hidden transmitter hunts and many more activities. For complete details write to Charles Bengal, W2TUR, 815 Seaside Avenue, Absecon, New Jersey 08201.

Decatur, Alabama

The Huntsville Amateur Radio Club will be host to the annual North Alabama Hamfest which is to be held at the Community Center in Big Spring Park on Sunday, Aug. 15, 1965. Prizes, contests, dinner and entertainment are planned. For further information contact William C. Probus, WA4DBQ, 2607 Woodview Drive, S.E., Huntsville, Alabama 35801.

Stolen Equipment

The following equipment has been reported stolen from the home of Janice and Everett Coffey, K4AUU and K4APV: Drake TR-3 transceiver serial no 33026, with matching a.c. supply and speaker, Elmac PMR-8 receiver, serial no. 10056, Elmac AF-68 transmitter, serial no. 10364 with a.c.-d.c. supply and Astatic 331 microphone, Heath model 19 phone patch, Hallicrafters S-94 receiver serial no. 940200. Anyone who has information on the units please contact the Coffey's at P.O. Box 297, Buchanan, Virginia 24066.

...but where's the power supply ?

The power supply—and it's universal for both 12V DC and 117V AC—is neatly tucked in a corner **inside** the exceptionally small cabinet that mounts easily in the front section of the car—and leaves plenty of room for the driver and other members of the family.

And **SB-34,** 4-band SSB transceiver, goes mobile on a moments notice!

Two power cables come with your SB-34. Use one when you are operating the '34 as a fixed station on 117V AC. Use the other for 12V DC mobile. No strapping—no conversions. There's even a handle on the case for easy carrying.

Convenient certainly—but dollar-saving too because the very low price **includes** this universal supply—saves you the cost of a separate inverter. And it's assuring to know that '34 is easy on the battery—that the all transistor receiver draws only 500ma on standby.

Suggested price.

$395

THE BIGGEST SSB TRANSCEIVER VALUE!


EXPANDED FREQUENCY COVERAGE

PANEL SWITCH SELECTS USB OR LSB

SOLID-STATE DIAL CORRECTOR


NO RELAYS— SOLID-STATE SWITCHING

DELTA RECEIVER TUNING


COLLINS MECHANICAL FILTER

SBE

SIDEBAND ENGINEERS

317 ROEBLING ROAD, SOUTH SAN FRANCISCO, CALIF.

HIGHLIGHTS: 135 watts p.e.p. input (slightly lower on 15). **Freq. range:** 3775-4025 kc, 7050-7300 kc, 14.1-14.35 mc, 21.2-21.45 mc. 23 transistors, 18 diodes, 1-zener diode, 1-varactor diode, 2-6GB5's PA, 1-12DQ7 driver. **Speaker built in** (external speaker provisions)

Pre-wired receptacles on rear accept VOX and Calibrator—both optionally available.

SIZE: 5"H, 11¼"W, 10"D. Approx. 20 pounds.

Export sales: RAYTHEON Raytheon Company, International Sales & Services, Lexington 73, Mass. U.S.A.

For further information, check number 13, on page 110

CLUB FORUM

BY AL SMITH,* WA2TAQ

DOES your club have a problem filling officer positions come election time? Is your yearly nomination of officers meeting a shambles? Do members avoid the meeting because of a fear of being nominated for a club office? Well don't feel bad, most organizations suffer through the same problems year after year.

Fortunately there is a workable solution to the problem. Elect a nominating committee to round up a slate of officers prior to your election and/or nomination meeting.

Most members have little or no idea of what is expected of an office holder. A personal contact, full explanation and a little friendly persuasion can often sell a member into candidate status.

The size and method of securing the nominating committee will depend on the individual club. Many clubs have Boards of Trustees, Directors, or Executive Board which also act as a nominating committee. This writer however would suggest a separate group elected by the membership. Consideration should be given to have the committee comprised of partly past presidents or other past officers and mambers at large, thus taking advantage of past experience and at the same time giving a voice to any member.

A committee of this sort will need time to hold a few meetings as well as to locate potential office holders. Consideration should be given to electing this committee at the 5th or at least by the 4th meeting prior to elections. If you hold your elections in November or December now is the time to get your committee working.

Not only will the committee seek to find candidates but they should be certain they choose those who in their opinion are the most qualified.

Members interested in holding office should let their interest be known to one of the members of the committee. Committee members should also query members they think qualified. Get the word to all the members, mention it in your club publication, at meetings and by eyeball. The entire membership can assist the committee in this most important work.

Some may think of this type of operation as a prelude to machine politics which it could well be, however it beats any other form of digging up members to fill positions.

*504 Beach 43rd St., Far Rockaway, N.Y. 11691.

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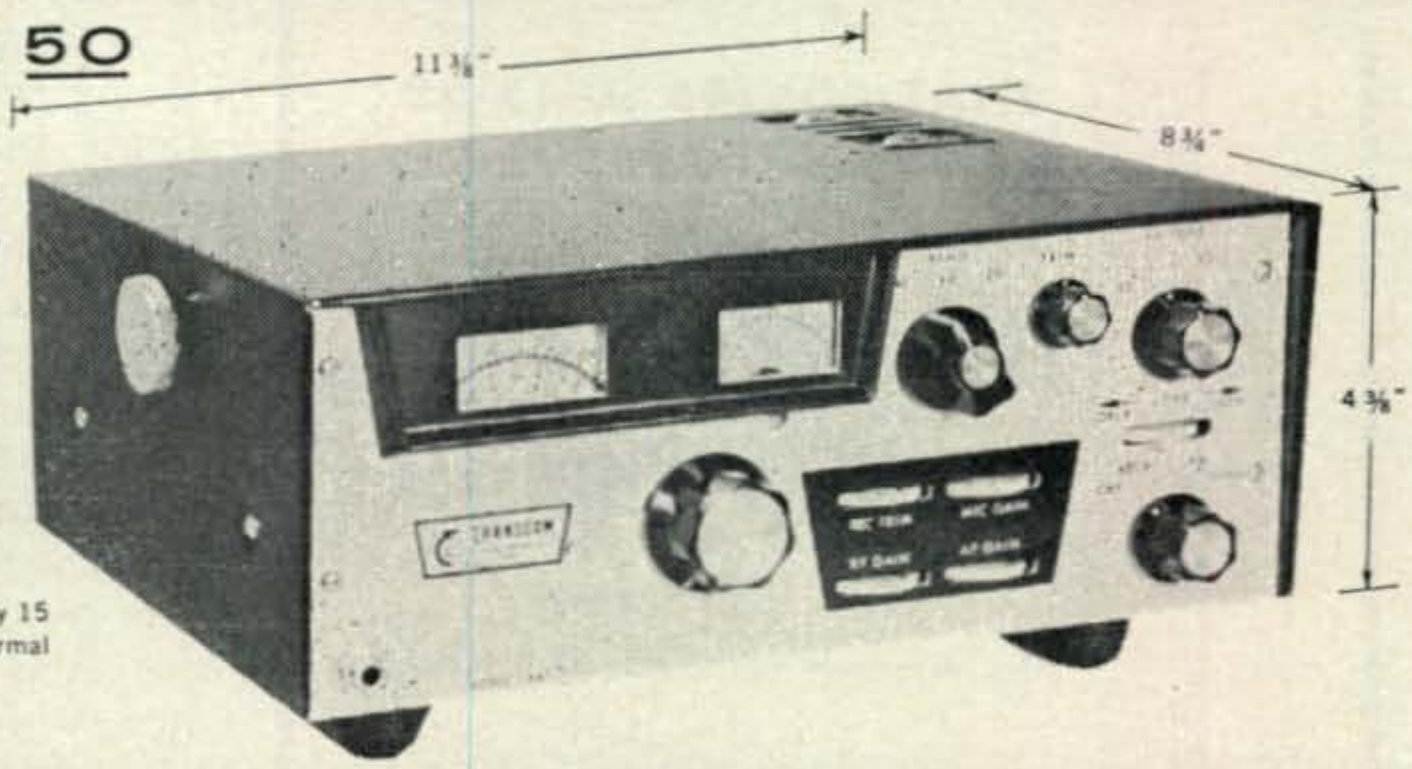
PRICED AT ONLY $299.50



SPECIFICATIONS

Freq. Range: 3780-4010 KC, 7180-7320 KC, 14130-14360 KC

Semiconductors: 2—8042 instant heating tubes, 18 transistors, 2—varicaps, 1—zener, 9 diodes

Size: 4 3/8 H x 11 3/8 W x 8 3/4 D. Weight 10 lbs.

TRANSMITTER

Power Input: 165W pep

Carrier Suppression: —45 DB

S.B. Selection: 80-40M lower 20M upper

Unwanted SB: —40 DB

Ant. Imped.: 30-100 ohm adj.

Power Consumption: .5 amps Receive, 12-15 amps SSB XMIT.

Operation: P. T. T. No tube filament on in rec.

RECEIVER

Sensitivity: .5μv for 10 DB S + N N

Selectivity: 3 KC @ 6 DB

Spurious: Image better than 60 DB

Stability: Less 100 cps in any 15 min. period under normal ambient conditions

Audio Output: 2 watts

TRANSCOM ELECTRONICS, INC.

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For further information, check number 31, on page 110

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For further information, check number 32, on page 110

Of course in any democratic organization the nominating committee will not have the final say on the slate to be presented to the membership. On nomination or election night the presiding officer should call for the report of the nominating committee and following that the floor should be open for nominations from the membership. In some cases the committee report is submitted the meeting prior to nominations giving the members a month to consider other choices.

Writing this column puts one in a position of seeing many things that are not apparent to many radio amateurs. One thing noticed is that many amateur radio club publications have very similar if not the same names. This may not seem like much of a problem considering that our several hundred clubs with publications are spread all over the country. This distance between clubs is getting smaller by the year. The advent of the Amateur Radio Editors Association and the Amateur Radio News Service proves this even more so.

It may be thought that a small club publication will only effect the club and duplication of names will be of little or no consequence. Many of our small club publications have branched out into small magazines covering large areas. These little papers do a terrific job for the amateur radio community and in many cases it is responsible for keeping clubs together. This writer edits *Spurious Radiations* however we have heard of a club paper titled *Radiations*. Needless to say they could be easily confused.

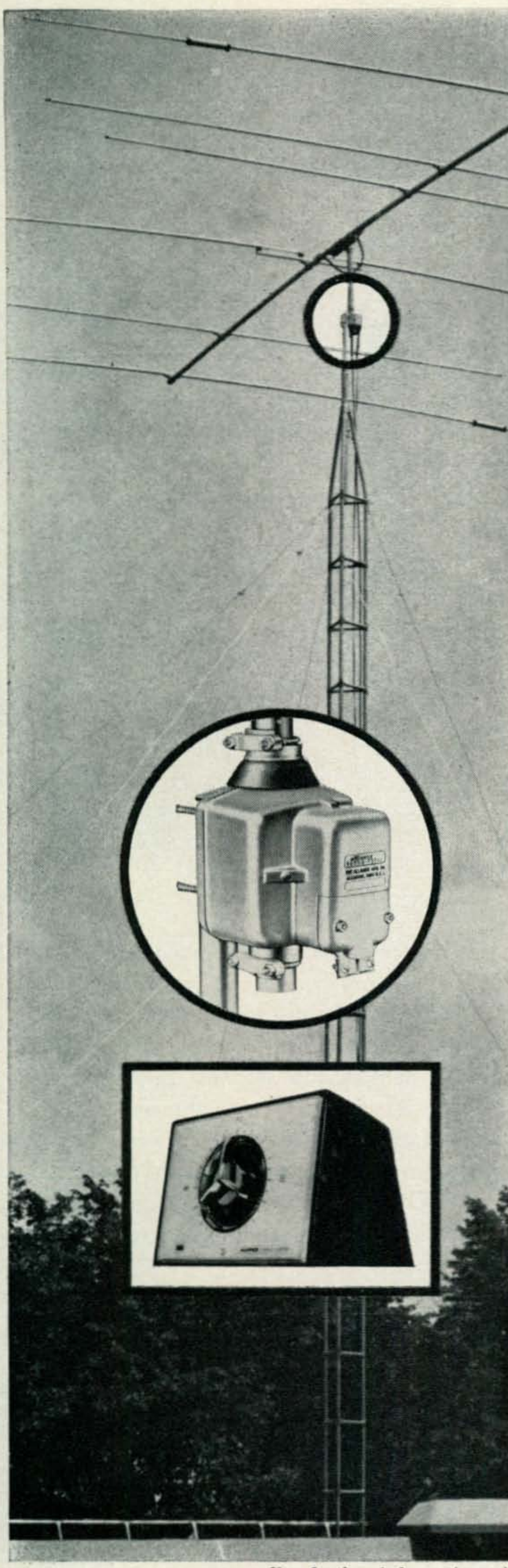
Amateur radio journalism has taken a giant step in the past few years and we may as well recognize the fact that club editors, their staff, and public relations committees as well are an extremely important part of a clubs activity.

In recognition of the need for a clearing house for club publication names, the CLUB FORUM requests that clubs having publications send us a post card or QSL (or index card in an envelope) stating Club name, Club address, name of publication and name and address of the editor. A file will be made up with this information and in the future clubs can check with us before they make a final decision on a club paper name.

Many national organizations fully recognize the importance of these small publications by conducting events at their national conventions to promote organizational journalists. Many have Press dinners in which all Editors, their staff, and public relations people attend. In addition Forums on press problems are conducted to improve conditions within the organization. A major feature of these forums is the awarding of prizes for best club publications in various classes.

We in amateur radio are no different than any other national group. We need publicity and good public relations even more than many groups. It behooves those of us in the amateur radio press to inform convention committees of

[*Continued on page 100*]



ALLIANCE® Tenna-Rotor® for 10-15-20 Tri-Bander Ham Installations

Tenna-Rotor stands up under severe conditions. Tests prove it is the strongest, most durable antenna rotator available for amateur use on all antennas up to 25 sq. feet in cross section, including six element 10-15-20 Tri-bander antennas.

This latest Alliance Tenna-Rotor will turn heavy antennas and is designed to withstand wind velocities to 90 m.p.h. in accordance with E. I. A. wind loading standards. The patented rigid offset design distributes the load resulting in superior strength to weight ratio for greater ease of installation.

Features anti-windmilling, gearing and brake system to maintain positive positioning and eliminate overtravel. Unit, enclosed in a sturdy, ribbed die-cast zinc housing, is lightweight and simple to set up. If you can lift your antenna and put it on the Tenna-Rotor . . . it will support it, hold it and turn it.

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The new Alliance transistorized automatic C-225 features a patented phase-sensing bridge similar to laboratory test equipment and is now available exclusively from Alliance for HAM users. Affords automatic, stepless, synchronous pinpoint positioning accuracy throughout 360° of rotation that reduces or eliminates interference.
All this with noiseless control.

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(Subsidiary of Consolidated Electronics Industries Corp.)
ALLIANCE, OHIO

CSA approved

For further information, check number 22, on page 110

NOW! A TRI-BAND SSB TRANSCEIVER KIT FOR 179.95

NEW EICO 753 SSB/AM/CW TRI-BAND TRANSCEIVER

Build the finest of SSB/AM/CW tri-band transceivers with 200 watts of SSB punch and every wanted operating facility, plus the extra reliability and maintenance ease inherent in kit design. Assembly is made faster and easier by VFO and IF circuit boards, plus preassembled crystal lattice filter. Rigid construction, compact size, and superb styling make this rig equally suited for mobile and fixed station use. The new EICO 753 is at your dealer now, in kit form and factory-wired. Compare, and you will find that **only the 753 has all these important features:**

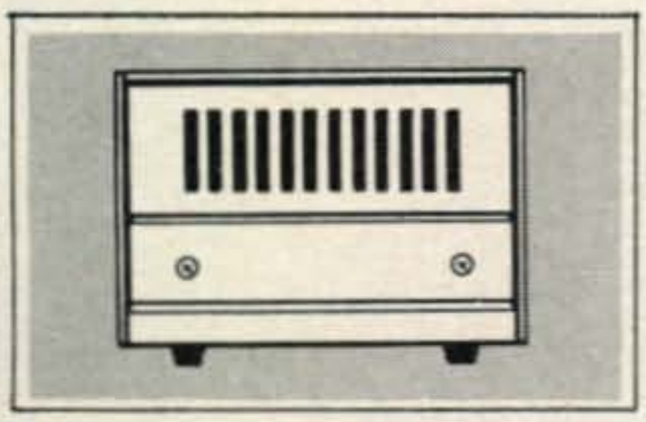
■ Full band coverage on 80, 40 and 20 meters. ■ Receiver offset tuning (up to ±10kc) without altering transmitter frequency. ■ Built-in VOX. ■ Panel selected VOX, PTT & STANDBY. ■ High level dynamic ALC to prevent flat-topping or splatter and permit the use of a linear amplifier. ■ Automatic carrier level adjustment on CW and AM. ■ Dual ratio ball drive permits single knob 6:1 rapid tuning and 30:1 vernier bandspread (over 10 degrees of scale). ■ Position of hairline adjustable on panel. ■ Illuminated S-meter/PA Cathode Current Meter and tuning dial. ■ Fast attack, slow decay AGC. ■ Grid-block break-in CW keying. ■ Product detector for SSB and CW, triode detector for AM. ■ TR relay with auxiliary contacts for use with high power linear amplifier. ■ Includes mobile mounting bracket.

ADDITIONAL SPECIFICATIONS

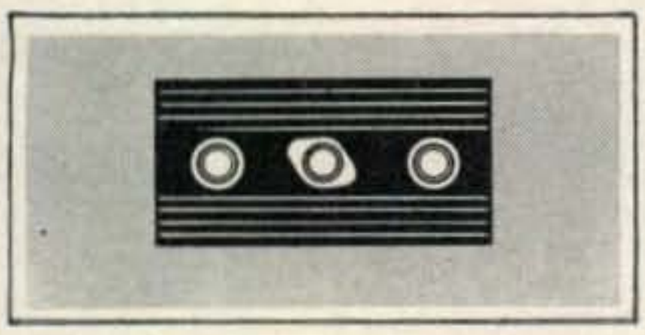
FREQUENCY COVERAGE: 3490-4010kc, 6990-7310kc, 13890-14410kc. SSB EMISSIONS: LSB 80 and 40 meters, USB 20 meters. RF POWER INPUT: 200 watts SSB PEP and CW, 100 watts AM. RF POWER OUTPUT: 120 watts SSB PEP and CW, 30 watts AM. OUTPUT PI NETWORK MATCHING RANGE: 40-80 ohms. SSB GENERATION: 5.2 Mc crystal lattice filter; bandwidth 2.7kc at 6db. STABILITY: 400 cps after warm-up. SUPPRESSION: Carrier-50db; unwanted sideband-40db. RECEIVER: Sensitivity 1uv for 10db S/N ratio: selectivity 2.7kc at 6db; audio output over 2 watts (3.2 ohms). PANEL CONTROLS & CONNECTORS: Tuning, Band Selector, AF Gain, RF Gain, MIC Gain with calibrator switch at extreme CCW rotation, Hairline Set (capped), Mode (SSB, AM, CW, Tune), Function (Off, Standby, PTT, VOX), Carrier Balance, Exciter Tune, PA Tune, PA Load, Receiver Offset Tune, MIC input, phone jack. REAR CONTROLS & CONNECTORS: VOX Threshold, VOX delay, VOX sensitivity, Anti-VOX sensitivity, PA Bias adjust, S-Meter zero adjust, power socket, external relay, antenna connector, key jack, accessory calibrator socket. METERING: PA cathode on transmit, S-Meter on receive. SIZE (HWD): 5 13/16" x 14 1/4" x 11 1/4". POWER REQUIREMENTS: 750 VDC at 300 ma, 250 VDC at 170 ma, -100 VDC at 5 ma, 12.6 VAC at 3.8 amps.

The Model 753 is an outstanding value factory-wired at $299.95.

Power Supplies Tailored for Optimum Performance of the 753.



Model 751 Solid State AC Supply/Speaker Console.
Matching table-top companion unit. Built-in PM speaker.
Kit $79.95 Wired $109.95



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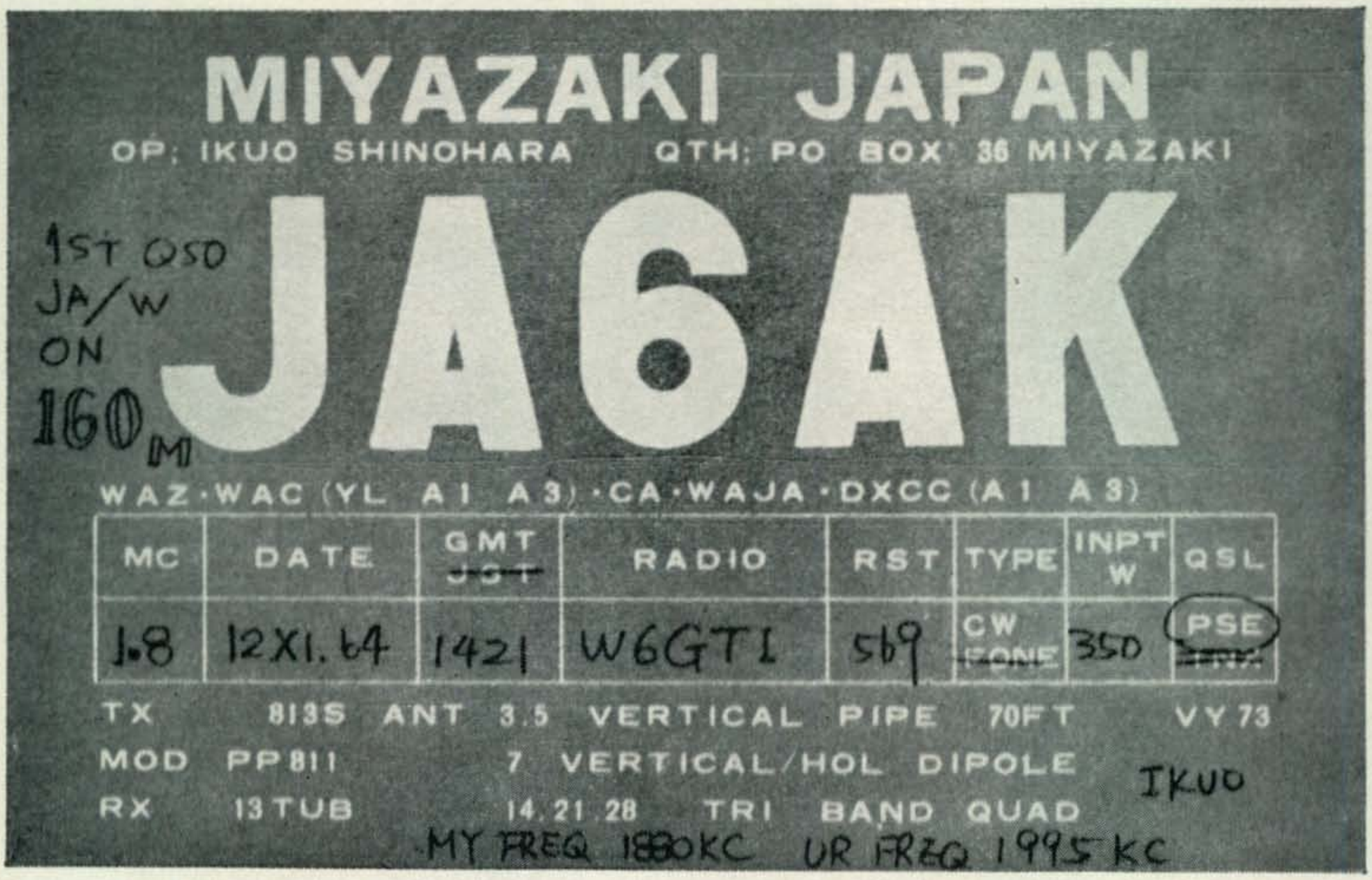
For further information, check number 19, on page 110

Penta Tube in First U.S.A.- Japan 160-Meter QSO



John Stewart, W6GTI, uses a Penta PL-4E27A beam pentode in the rig that was responsible for the first U.S.A.-Japan contact on 160 meters. He's enthusiastic about the PL-4E27A and feels that his Penta tube played an important part in this amateur radio milestone achieved on November 12, 1964. Although this historic contact was made on CW, the PL-4E27A is also excellent for single sideband linear amplifier applications. Capable of up to 425 watts input on SSB, the PL-4E27A, like all Penta beam pentodes, features high efficiency, low distortion, and excellent linearity. If you'd like to see a transmitter in which you can use the tube, turn to page 194 in the 1965 A.R.R.L., "The Radio Amateur's Handbook." For additional data on the PL-4E27A or any other Penta tubes, write: The Penta Laboratories, Inc., 312 North Nopal Street, Santa Barbara, California 93102

—Manufacturers of quality power tubes since 1951. A subsidiary of Raytheon Company.

Penta®

For further information, check number 20, on page 110

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Model T-4 **$269.95** Amateur Net

T-4 Features

Covers all Ham Bands 160 thru 10 meters.

Covers MARS and Other Frequencies between ham bands.

Upper and Lower Sideband on all frequencies.

Automatic Transmit Receive Switching on CW (semi break-in).

Controlled Carrier Modulation for AM is completely compatible with SSB linear amplifiers

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Two Crystal Lattice Filters for sideband selection, 2.4 Kc bandwidth.

Transmitting AGC prevents flat topping.

Shaped Grid Block Keying with side tone output.

200 Watts PEP Input on SSB—180 watts input CW.

Meter indicates plate current and relative output.

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R-4 Features

Linear permeability tuned VFO with 1 Kc dial divisions. VFO and crystal frequencies pre-mixed for all-band stability.

Covers ham bands 80, 40, 20, 15 meters completely and 28.5 to 29.0 Mc of 10 meters with crystals furnished.

Any ten 500 Kc ranges between 1.5 and 30 Mc can be covered with accessory crystals... (160 meters, MARS, etc 5.0-6.0 Mc not recommended).

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Passband tuning gives sideband selection without retuning.

Noise blanker that works on CW, SSB, and AM is built-in.

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All T-4 features plus

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Give:

Separate control of receive and transmit frequencies

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Coverage on 80, 40, 20, 15 meters completely and 28.5 to 29.0 Mc of 10 meters with crystals furnished

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Model T-4X, Amateur Net: **$379.95**

AC-3 Power Supply for T-4 and T-4X: **$79.95**

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For further information, check number 23, on page 110

The improved full coverage SIDEBAND TRANSCEIVER

DRAKE TR-4

All features of Drake TR-3
PLUS ...

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$585.00 Amateur Net

Features of TR-4 and TR-3

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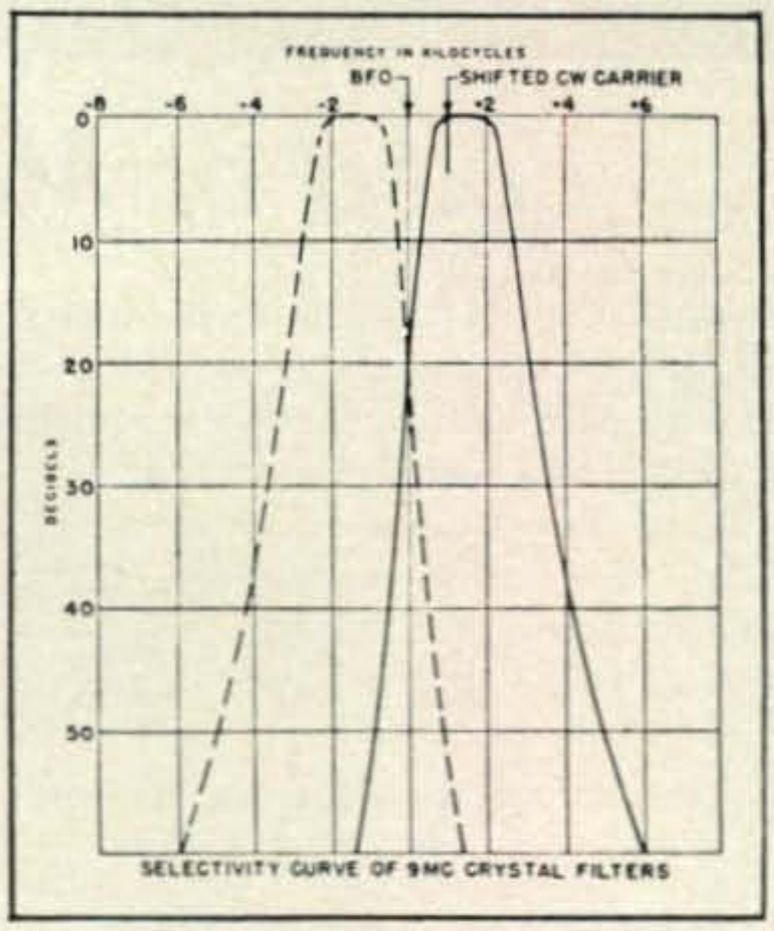
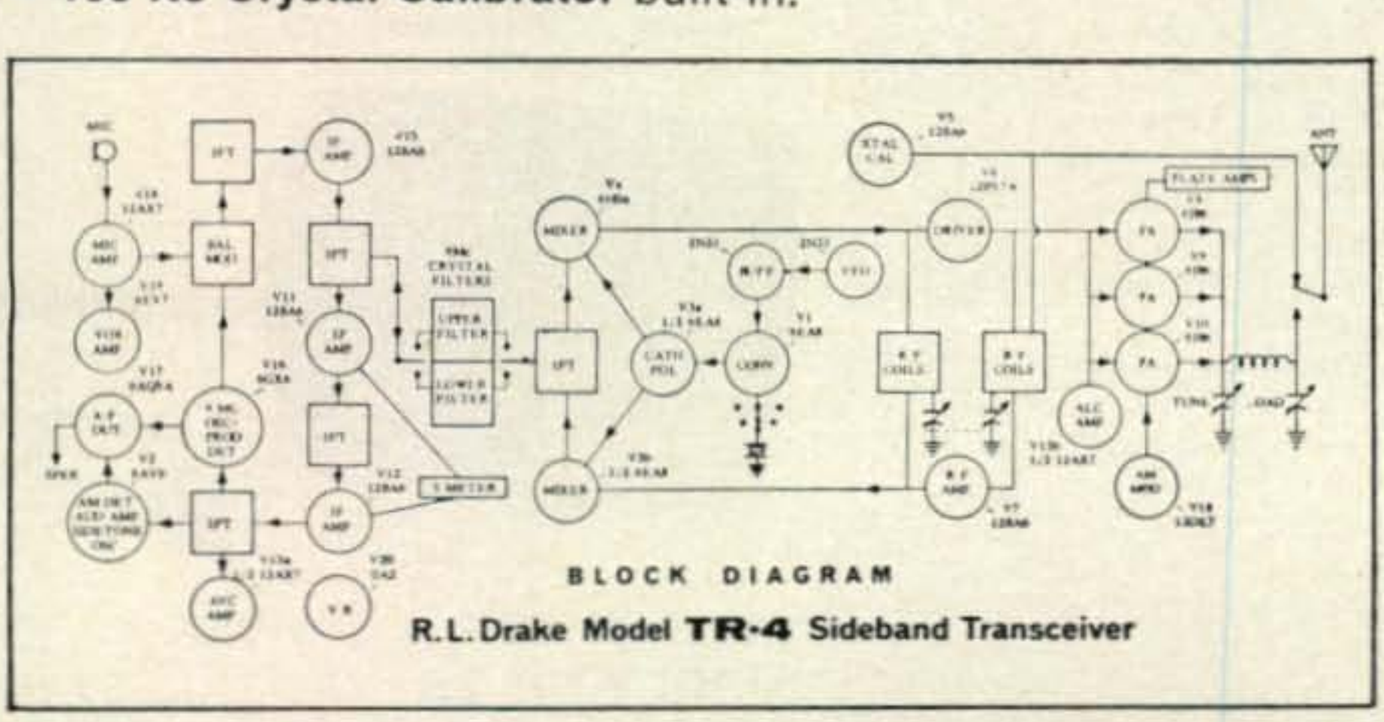
- **1 Kc Dial Accuracy.**
- **100 Kc Crystal Calibrator** built-in.





BLOCK DIAGRAM

R.L. Drake Model **TR-4** Sideband Transceiver

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For further information, check number 24, on page 110

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• **Kit SB-110** 23 lbs. **$320.00**

SB-110 SPECIFICATIONS—RECEIVER SECTION: Sensitivity: 0.1 uv for 10 db signal plus noise-to-noise ratio. **Selectivity:** 2.1 kc @ 6 db down, 5 kc max. @ 60 db down. **Image rejection:** 50 db or better. **IF rejection:** 50 db or better. **Audio output impedance:** Speaker, 8 ohms; Headphones, 600 ohms or higher. **AGC characteristics:** Audio output level varies less than 12 db for 50 db change of input signal level (0.5 uv to 150 uv). **TRANSMITTER SECTION: DC power input:** SSB, 180 watts PEP; CW, 150 watts. **RF power output:** SSB, 100 watts PEP; CW, 90 watts (50 ohm non-reactive load). **Output impedance:** 50 ohm nominal with not more than 2:1 SWR. **Carrier suppression:** 55 db down from rated output. **Unwanted sideband suppression:** 55 db down from rated output at 1000 cps & higher. **Distortion products:** 30 db down from rated PEP output. **Hum & noise:** 40 db or better below rated carrier. **GENERAL: Frequency coverage:** 49.5-54.0 mc in 500 kc segments (50.0-52.0 mc with crystals supplied). **Frequency selection:** Built-in LMO or crystal control. **Frequency stability:** Less than 100 cps drift per hour after 20 minutes warmup under normal ambient conditions. Less than 100 cps drift for ±10% supply voltage variations. **Dial accuracy:** Electrical, within 400 cps on all band segments, after calibration at nearest 100 kc point. Visual, within 200 cps. **Dial backlash:** No more than 50 cps. **Calibration:** Every 100 kc. **Power requirements:** High voltage, +700 v. DC @ 250 ma with 1% max. ripple. Low voltage, +250 v. DC @ 100 ma with .05% max. ripple. Bias voltage, —115 v. DC @ 10 ma with .5% max. ripple. Filament voltage, 12.6 v. AC/DC @ 4.355 amps.

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• Sectionalized circuit board layout • Modernized assembly manual techniques • Solid mechanical construction

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• Excellent dynamic regulation • Long-life silicon rectifiers • Provision for remote switching • Only 9" L x 4¾" W x 8¾" H

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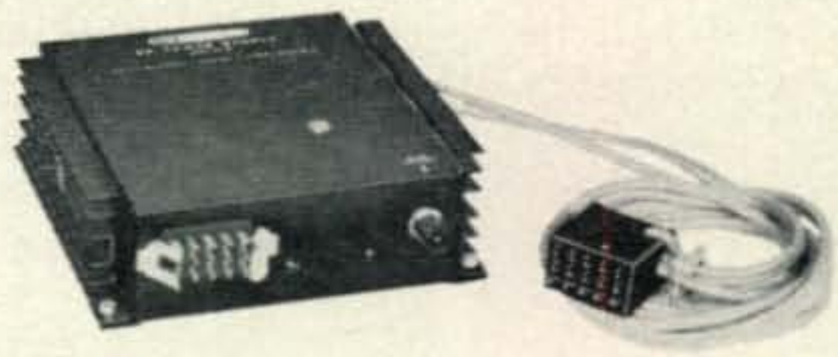
• **Kit SB-110** 23 lbs. **$320.00**



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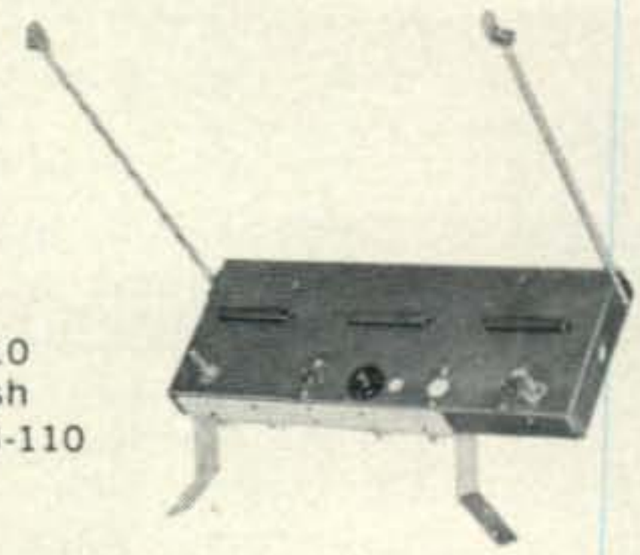

PLUG-IN MOBILE MOUNTING BRACKET
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For further information, check number 25, on page 110

Dimple Those Shields

BY ALBERT H. JACKSON,* VE3QQ

This handmade tool can simplify (or make possible) the construction of shields, compartments and enclosures. It eliminates the need for bending lips and as a result can reduce design problems and increase overall strength.

Open view of the dimpler with some examples of work done with it.

How often, when building equipment, have you had difficulty making aluminum shield boxes and partitions fit properly, with their necessary edge-lips and sometimes difficult-to-line-up mounting holes? Have you ever wished that there were a simpler and more direct method of assembly?

Well, there is, and manufacturers have been using it for many years with their punch-presses and other large metal fabricating machines. One name for the process is "dimpling". This is simply a means of alternately expanding the edge of a piece of sheet metal, in such a way that assembly screws can be driven directly into it without any need for lip-bending.

Advantages

The advantages of this system are numerous, and will be apparent from the accompanying photographs. The main ones are as follows:

(a) Metal preparation is fast and easy.

(b) The number of bends required to make a box can be reduced by 70% or more.

(c) Lack of lips can reduce over-all size requirements.

(d) Construction is rigid, even with sheet-metal screws, which can be inserted without tapping.

(e) The dimpling may be tapped for machine screws if desired.

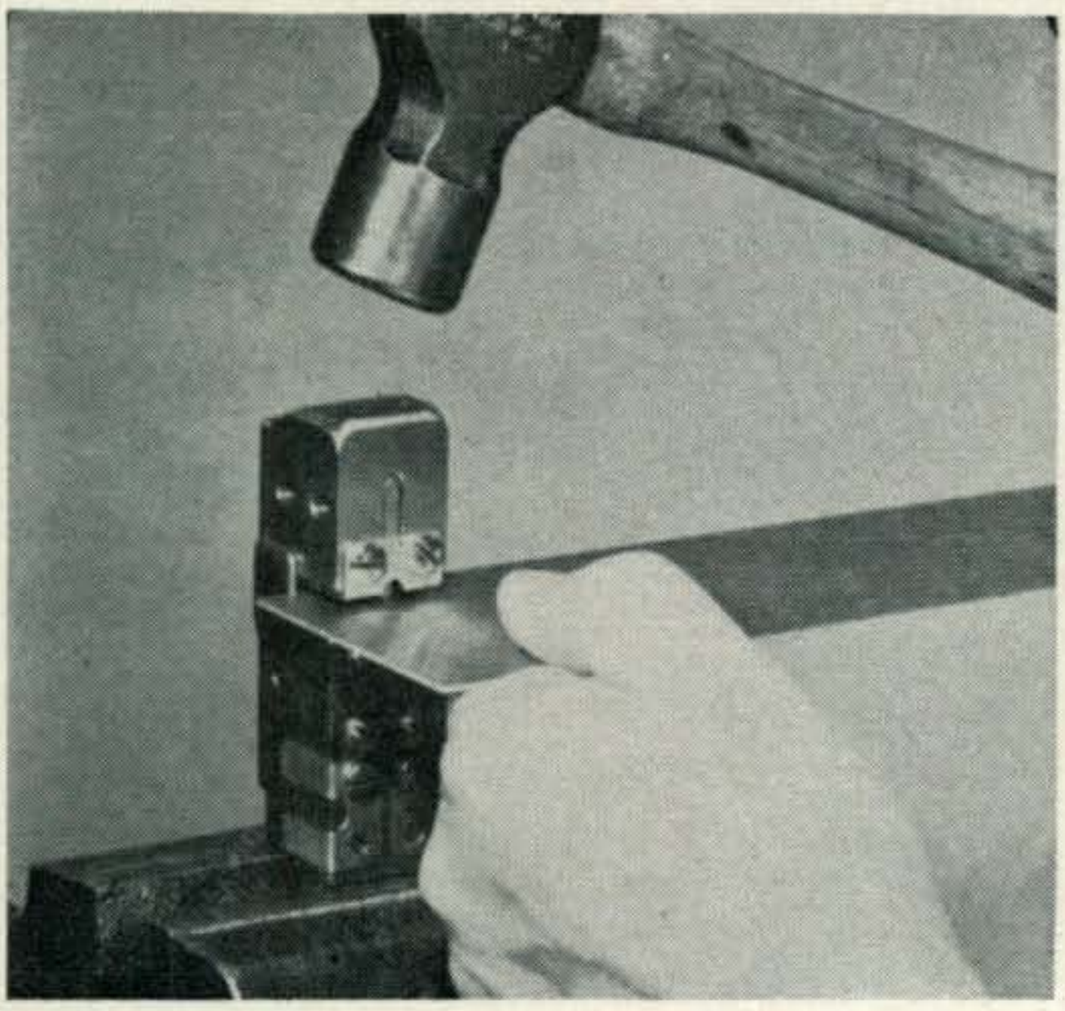
(f) Dimension tolerances between matching sections are less strict because the dimpling can "give" slightly, without detriment to strength or appearance.

(g) Along-the-edge contact of partitions is good, though the thinner metals will tend to rise slightly between screws, especially if these are over-tightened.

(h) Many of the errors encountered in sheet metal construction are introduced during bending operations, particularly when proper equipment is lacking. Since most bending requirements are eliminated by this method, so are the consequent errors.

(i) Lip-less partitions, supported at one end only and assembled in this way with sheet-metal screws, are usually *more* rigid than those employing a bent lip. Greatest rigidity and best alignment of adjacent pieces is obtained when alternate screw positions are punched from opposite sides of the work.

*12 Third Avenue, Box 453, Arnprior, Ontario, Canada.



Shield fabrication the easy way.

Production Dimpler

Such benefits need no longer be denied to the amateur builder; as a matter of fact, a "hand" method of dimpling was used by the writer in two previous construction articles, the Can-Key[1] and the Touch-Key,[2] for mounting the paddles. This system, while satisfactory, is much too cumbersome when it comes to making boxes and shields. A relatively simple, production type device is needed, and one tool of this kind is described below. It will handle soft aluminum in gauges from #12 to #18 or lighter, soft copper over a similar range and screws up to #6 by ½" in length.

"Are you suggesting *tool-making?*", you say. "That's beyond me!" But wait—this is only a small invasion of the tool-maker's field, and any-

[1]Jackson, A. H. "The Can-Key", *CQ*, Feb. 1964, p. 36.
[2]Jackson, A. H. "The Touch-Key", *CQ*, Nov. 1964, p. 28.

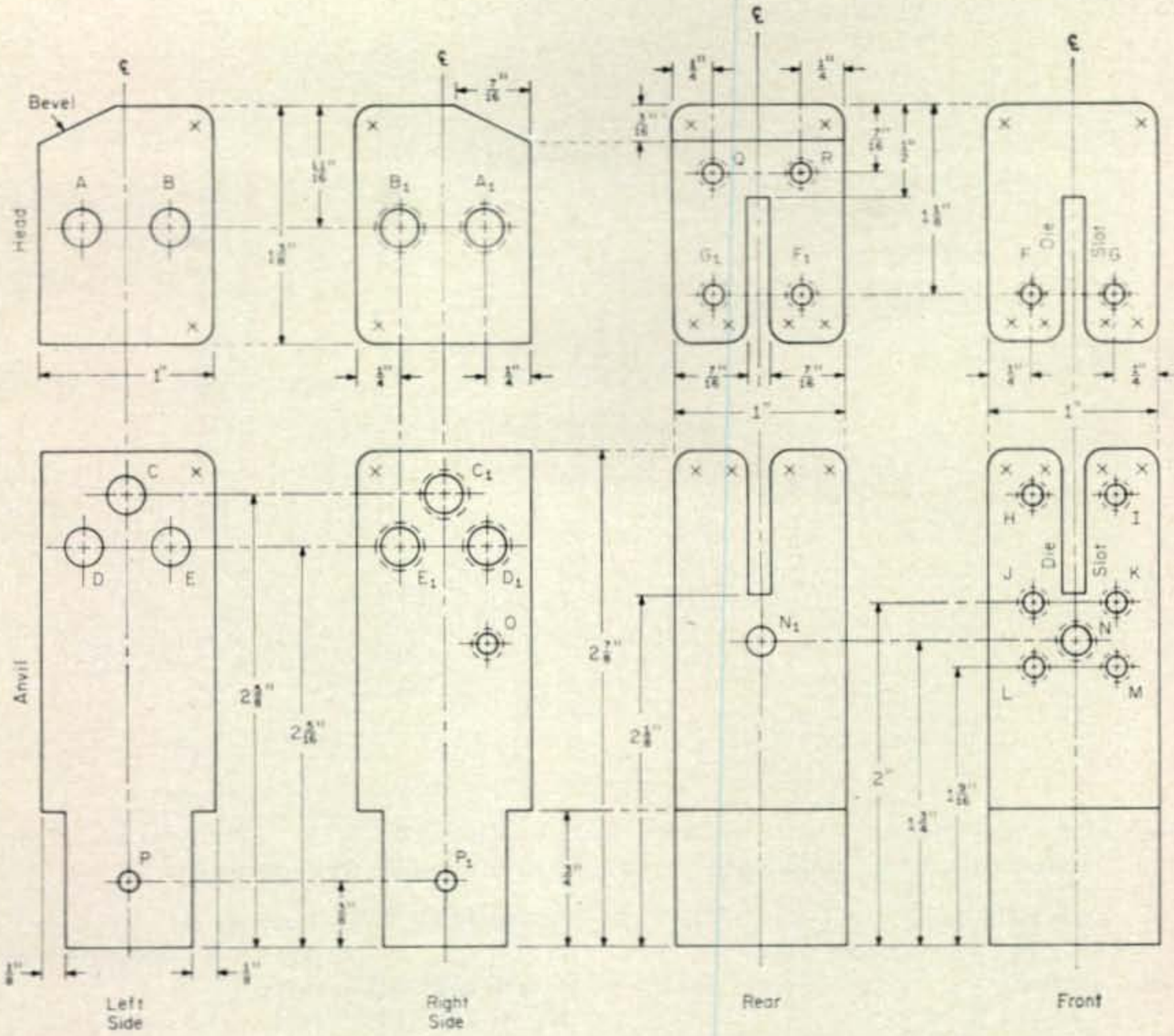


Fig. 1—Views of the head and anvil fabricated from one inch square mild steel bar. Round corners and edges to 1/8" radius at all points marked X.

Hole Data

A, B, C, D, E, N_1—1/4" dia., 1/2" deep.
A_1, B_1, C_1, D_1, E_1, N—#7 drill, 1/2" deep, tap 1/4-20.
F, G, H, I, J, K, L, M—#29 drill, 1/2" deep, tap 8-32.
G_1, F_1, Q, R, O—#21 drill 1/2" deep, tap 10-32.
P, P_1—5/32" dia. through.

one who is reasonably handy with a file, a hacksaw, and a few of the other usual tools, should be able to produce the dimpler shown. It is a hammer type punch; when the work is inserted between the dies, striking the top of the tool produces the dimpling action.

Construction

For greatest accuracy and ease of construction, drill all holes with the aid of a drill-press, and then have the die-slots in the anvil and head pieces milled by your local machine shop, unless you are equipped to do this sort of thing yourself. The remaining work can be done by hand, without a great deal of difficulty.

Most ham shields are made from aluminum or copper; this means that tool-steel, special hardening processes, etc., are not needed for a device restricted to working in these metals. The entire tool, including the upper and lower dies, can be made from readily workable mild steel, obtainable from most metal or repair shops. The drawings are arranged to permit easy "scaling off" of dimensions from the edges and ends of the materials, using a machinist's adjustable set-square and scriber. The die-slots should be a slide fit for the die material, and the upper and lower dies should match each other closely without binding. Patience and careful use of file and hacksaw should bring this result without too much trouble, though a certain amount of "elbow grease" will of course be needed.

Referring to fig. 1, bevel the top of the head piece toward the back as shown; this ensures that hammer blows aimed at this surface will strike directly over the dies, where the greatest force is required. Note also the indentations cut at the front and back at the lower end of the anvil; this permits firm support in a bench-vise clamped under these steps while the tool is in use.

A number of the holes shown go right through the material, but are larger on one side than on the other. In these cases, the smaller hole should be drilled through first, then counter-bored with the larger drill to the depth shown; a drill-press, with depth-gauge, is invaluable for this work. Use a drill vise, or clamp the pieces firmly while drilling, and clear the drill frequently in deeper holes; a little oil will help the process. Corners and edges should be rounded with a medium grade file as indicated at points "X", and this is particularly important at the edges of the die-slots.

Figure 2 shows the details of die and back plate construction, also the head and anvil sections in the closed position. A smaller than normal drill is used to clear the #10 screws at F_2, G_2, Q_1 and R_1; this minimizes any play in the

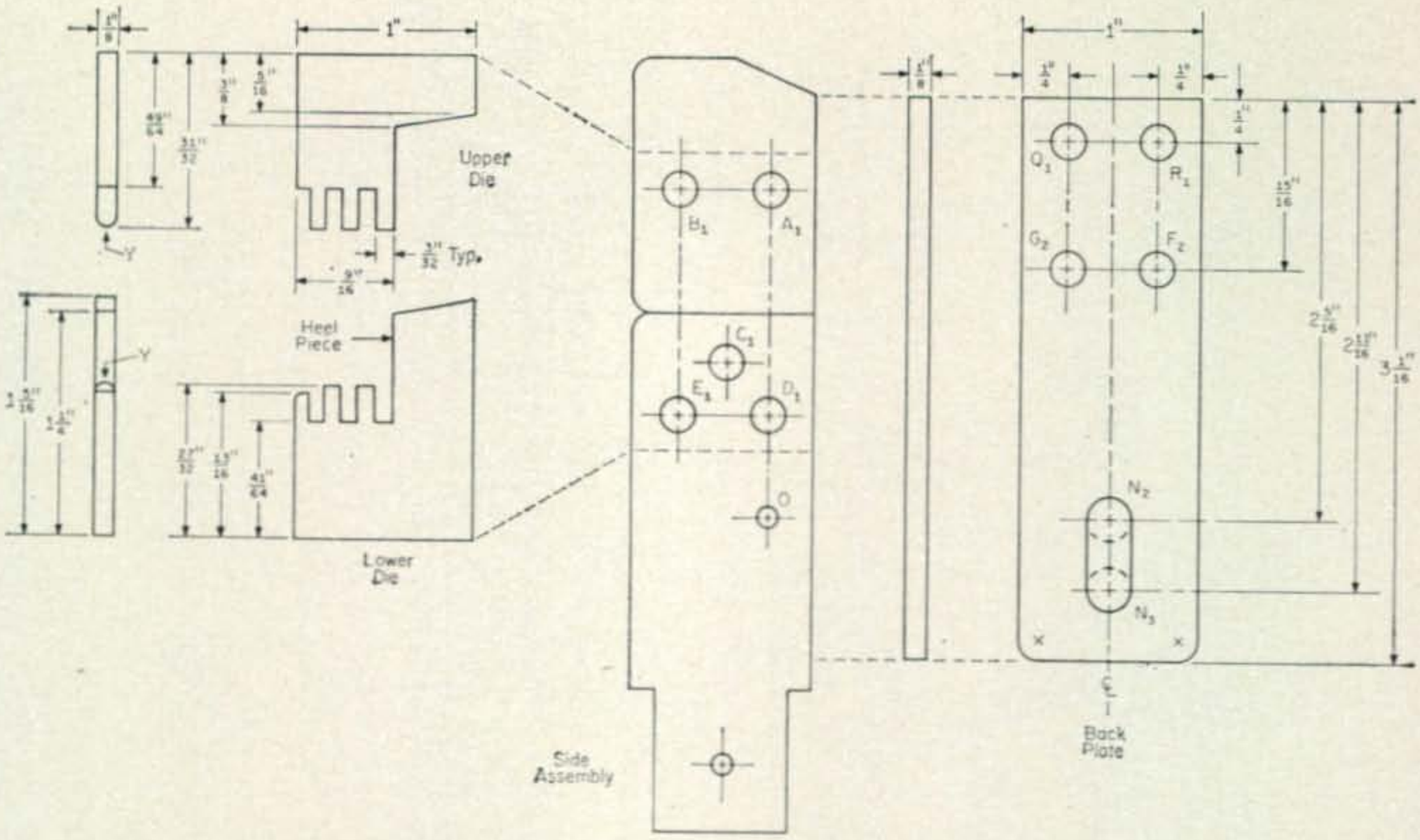


Fig. 2—Details of the dies and back plate assembly fabricated from 1" × ⅛" mild steel bar. Round corners marked X to ⅛" radius and approx. 1/16" radius at corners marked Y.

Hole Data

F_2, G_2, Q_1, R_1—#11 drill.
N_2, N_3—¼" dia. slotted.

Assembly Screws

A_1, B_1, C_1, D_1, E_1—¼-20 × ⅜" Headless set, Cup point, Allen.
O—10-32 × ¼"—Headless set, cup point, Allen.
F_2, G_2, Q_1, R_1—10-32 × ½"—Binding head, machine with split lockwashers.
N_2—¼-20 × 1¼" (cut to 1-3/32") Hex head cap.

head and back plate assembly. The squaring guide, detailed in fig. 3, straddles the anvil from the front as shown in the photographs.

Range Shims

The basic tool, as described above, will produce the proper dimple for a #6 machine or sheet-metal screw in #12 gauge aluminum. By using the correct shims between the head and anvil, the working range of the punch is shifted. and smaller screws and/or lighter gauges of metal are accommodated.

These shims should be made and used in pairs. and are diagrammed in fig. 4. In use, they are attached to the head and anvil at holes F, G, H and I; holes L and M are for storage of an extra pair of shims. These are shown in the photo, below the squaring guide.

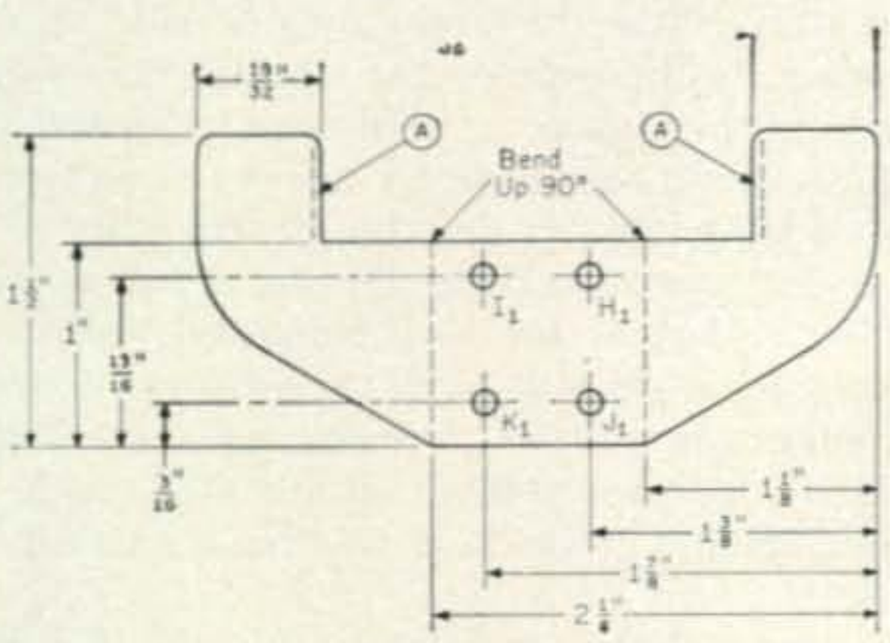


Fig. 3—Details of the squaring guide made from # 16 gauge mild steel. Both sides at A, are to be filed to match lower die heel piece after assembly. Holes H_1, I_1, J_1, and K_1 are made with a #18 drill.

As will readily be seen, the shim thickness is its most important dimension, since this governs the screw size in relation to metal gauge that the finished dimpling will take. For those who have the facilities and wish to do so, the exact shim thickness for a particular case can be determined using a micrometer and the following formula:

$$\text{Shim Thickness} = H - (W+T)/2$$

Where: H = Die tooth height or projection beyond the surface of the anvil or head, in this case 3/32" or .093".
W = Thickness of work metal.
T = Tap drill diameter for screw.

For the average ham constructor, however, a practical cut-and-try approach is perhaps the easiest one. Experiment a bit with a few pieces of scrap aluminum of various thicknesses and screws and shim material which happen to be on hand. One suggestion: use only ferrous metal for the shims, as anything else is likely to be too soft. In practice, you will find that acceptable shim thickness is not overly critical, since dimpling in the soft metals is fairly flexible. The range shims should center equally on both sides of the dies when in working position.

Assembly

Mount the head piece on the back plate with 10-32 machine screws and lockwashers, as indicated in fig. 2. Attach this assembly to the anvil with the ¼-20 cap-screw at hole N_1; tighten until snug, then back off very slightly to allow

free movement of the screw in the slot N_2, N_3. Lock the cap-screw in this position by means of the set-screw at 0.

At the front of the punch, lay the two die-slots in line and insert the lower die, heel-piece to the rear. Set the die flush with the back plate and front surface of the anvil, and while holding it against the bottom of the slot, lightly tighten the set-screws at C_1, D_1 and E_1.

Separate the head and anvil to the limit of travel, and insert the upper die in a similar manner. Close the tool fully, press the front of the die to the top of its slot, and gently tighten the screws at A_1 and B_1.

The punch should now open and close freely, without binding. If it does not, adjust carefully until satisfactory operation is obtained. Make certain both dies are firmly seated against the ends of the slots, and finish tightening the five die-locking set-screws. This will spread the top of the anvil very slightly, perhaps making it difficult to fit the squaring guide; file the anvil sides parallel once more, if necessary.

Attach the squaring guide from the front, using 8-32 by 3/8" machine screws at holes H, I, J, K. Its inner edges (dotted lines in fig. 3) should now be filed even with the lower die heel-piece, and so that a straight-edge placed across the guide edges is at right-angles to the die itself. To prevent damage to the dies, this is best done by marking the approximate amount of metal to be taken away, removing the guide, filing, re-installing it and checking results. Three or four tries should complete the job. If you happen to carry the process a little too far, a shim consisting of one or more thicknesses of paper can be inserted between the squaring guide and the front of the anvil, to correct the adjustment. Finish mounting the guide, using lockwashers at holes J and K. The screws at H and I must be removable to accommodate the range shim when needed. Hole P, P_1 may be used to hang up the tool when not in use.

To prevent loosening with repeated hammering, and after all adjustments have been made, an application of "Loctite" liquid thread sealant is recommended for all screws, except those associated with the range shims. This is

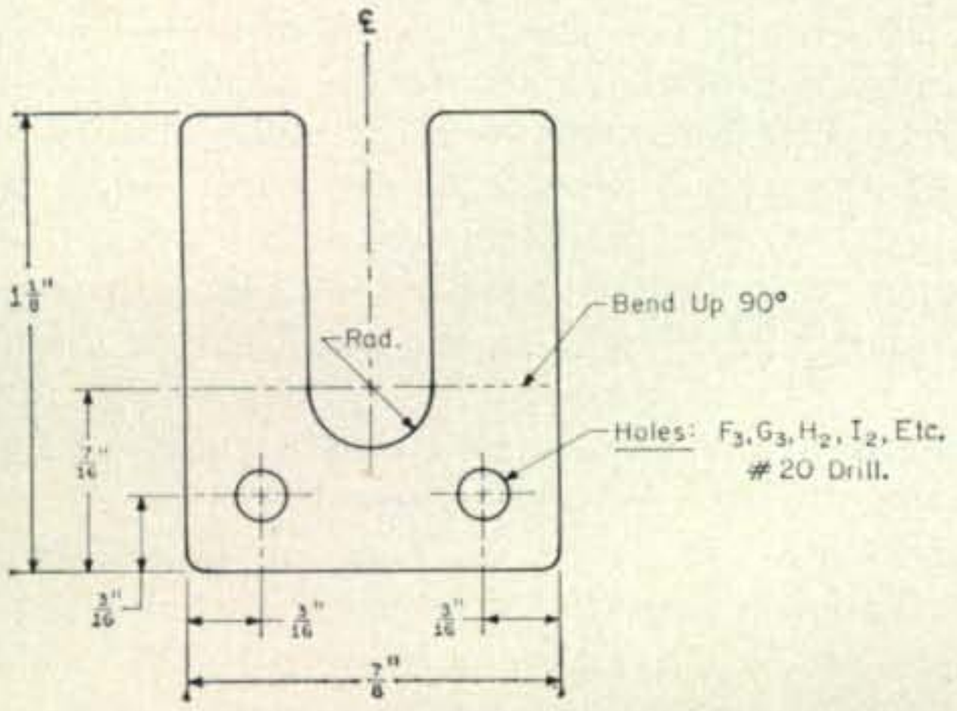
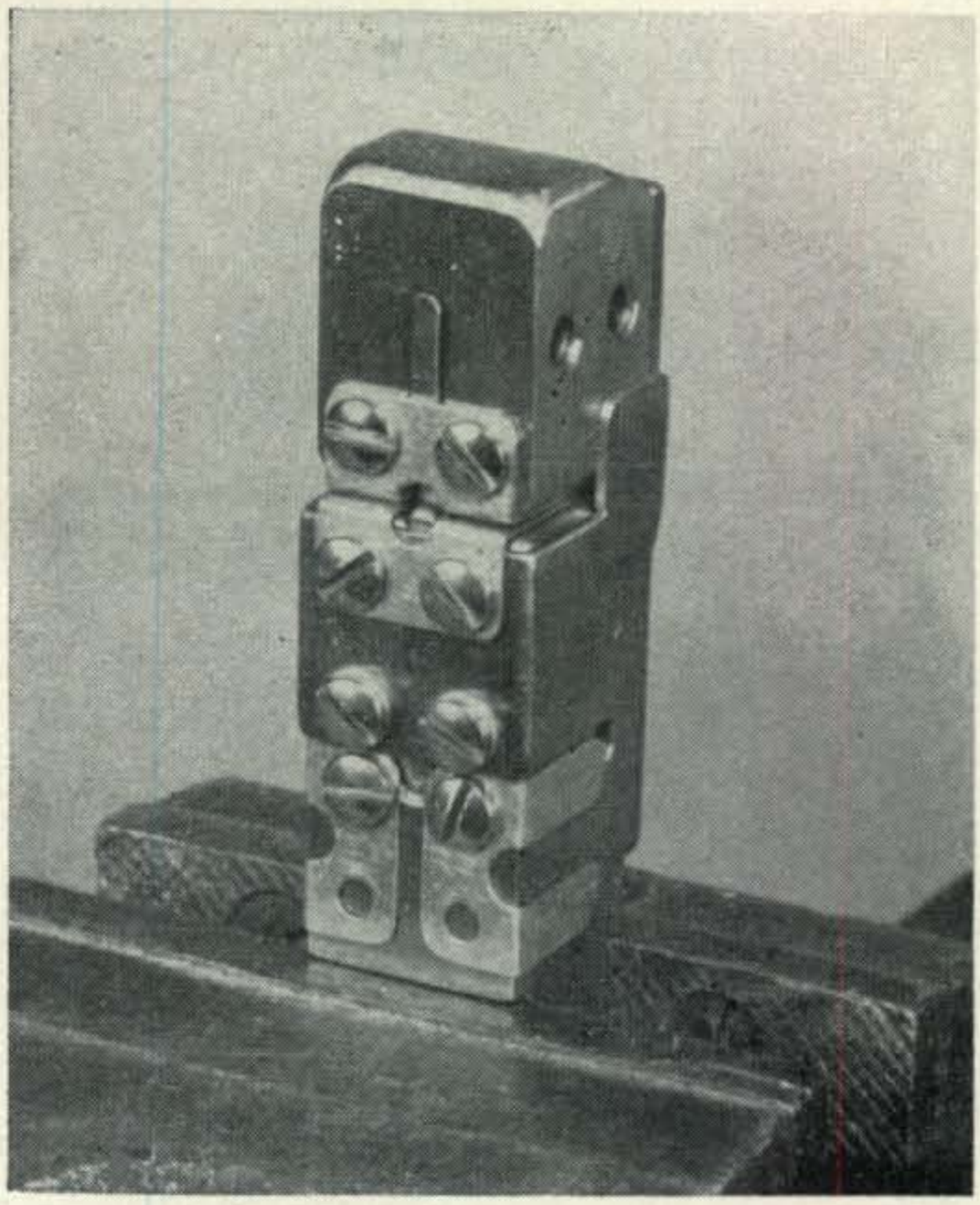


Fig. 4—Range shim details. Radius for #14 and #16 gauge work—1/8". For #18 gauge work use a radius of 3/32". The material used for the shims is discussed in the text. The two holes are made with a #20 drill.



View of the dimpler closed with range shims in place and unit in vise ready to work.

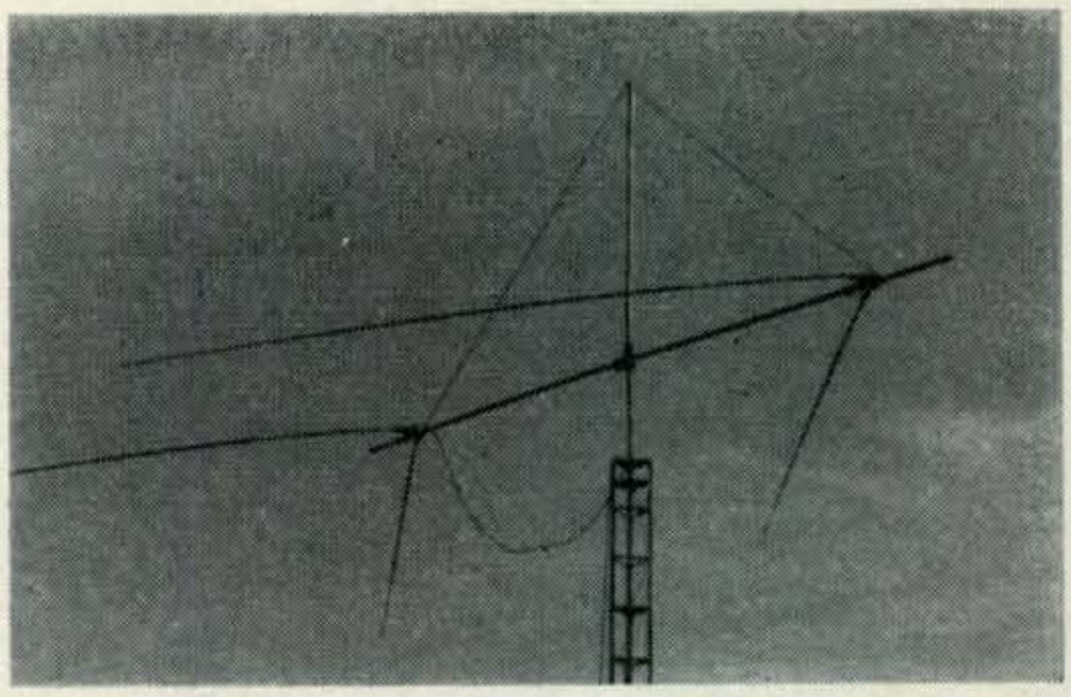
available from certain automotive suppliers and, if applied according to directions, gives a nearly permanent seal. Lubricate the moving parts of the punch with a few drops of light oil.

Operation

1. Use the dimpler with *soft* aluminum (3S ½ hard), or copper only.
2. Clamp the base of the anvil in a good-sized vise to give it weight and rigidity.
3. Insert the proper range shims, as and if needed.
4. Hold the work between the dies in the head and anvil, and against the squaring guide on both sides.
5. Strike three or four sharp blows with a fairly heavy hammer, as squarely as possible on top of the head piece. This will bring head and anvil together on both sides of the work, completing dimpling at the same time.
6. Rock the work from side to side *vertically*, to release it from the punch.
7. Insert the appropriate sheet-metal screw (one of the hardened, pointed ones resembling a wood-screw), or tap and use a machine screw if you like. If the dies have been carefully made, no drilling will be needed. Use a little oil at each position, and keep the screws or tap as straight as possible, particularly when starting.

Like the writer, you may even wonder how you ever managed without a dimpler! ■

PLEASE include your ZIP code number on all correspondence.



The directional V beam installed atop the author's tower. The vertical support keeps the ends from sagging.

A "V" Beam Antenna

BY RONALD LUMACHI,* WB2CQM

This V beam can be operated on one of several bands, 20-15-11 and 10 meters. The element lengths are varied by the use of carefully placed s.p.s.t. knife switches.

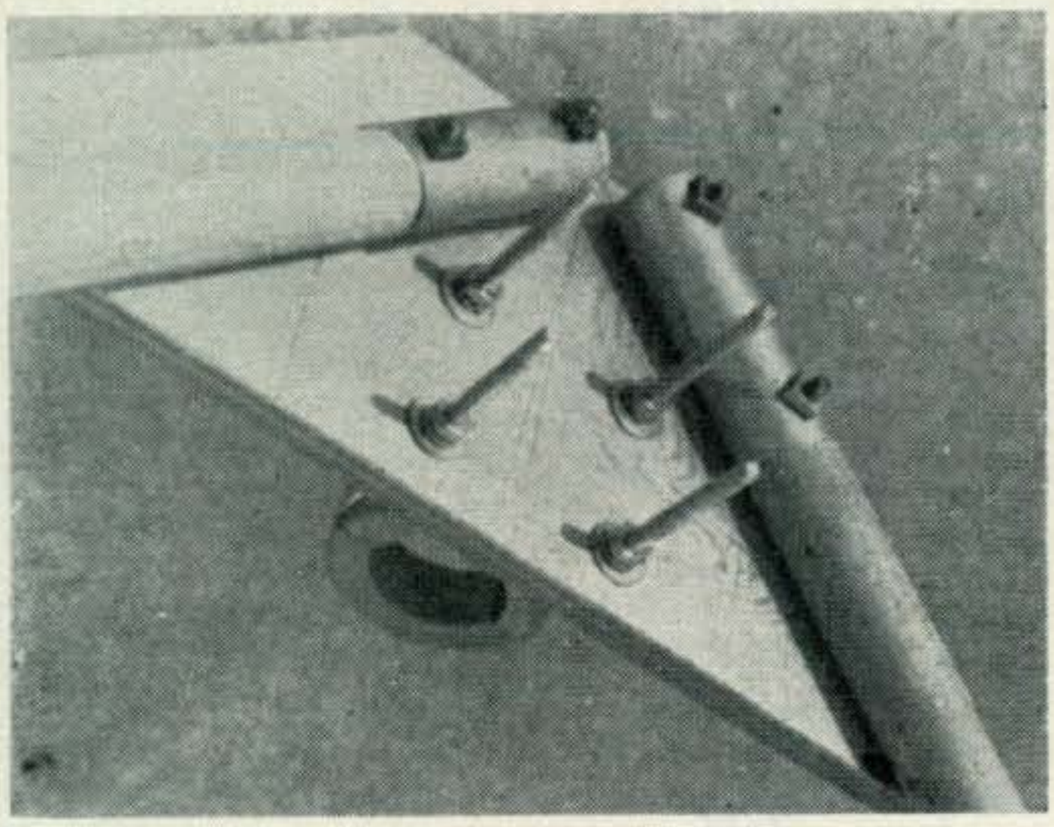
F.C.C. regulations are quite explicit concerning the maximum d.c. input to the final stage of the amateur and citizen band transmitter. As a consequence, the serious operator must turn toward the antenna radiation system for the necessary db gain in order to combat today's heavy QRM level.

In most instances space and money are prime factors that tend to govern an antenna's complexity. The majority of radio operators therefore gravitate toward the array that offers the most gain with the minimum cash outlay. With this firmly in mind, consideration might be given to this homebrew parasitic V wire beam boasting simplicity of construction and nominal costs for a compatible signal-to-expenditure ratio.

Design Theory

The driven (director) "V" element consists of two wires supported at a horizontal attitude by a dowl-fibreglass combination and fed at the apex with an r.f. current. Major radiation lobes from each leg combine in a manner to produce cancellation and reinforcement effects resulting in a radiated signal perpendicular to the plane of the array. The pattern of a single "V" is horizontally polarized and bisects the apex angle for a propagation pattern both to the front and rear of the array. It follows that the gain of this configuration is somewhat greater than a similar dipole. For example, a V antenna, one wavelength, with an apex angle of 90 degrees, boasts approximately a 2.1 power gain over the familiar isotropic standard. The addition of a second (reflector) element parasitically coupled boosts the gain of the system resulting in an array superior to a two element beam and comparable in performance to a three element yagi beam.

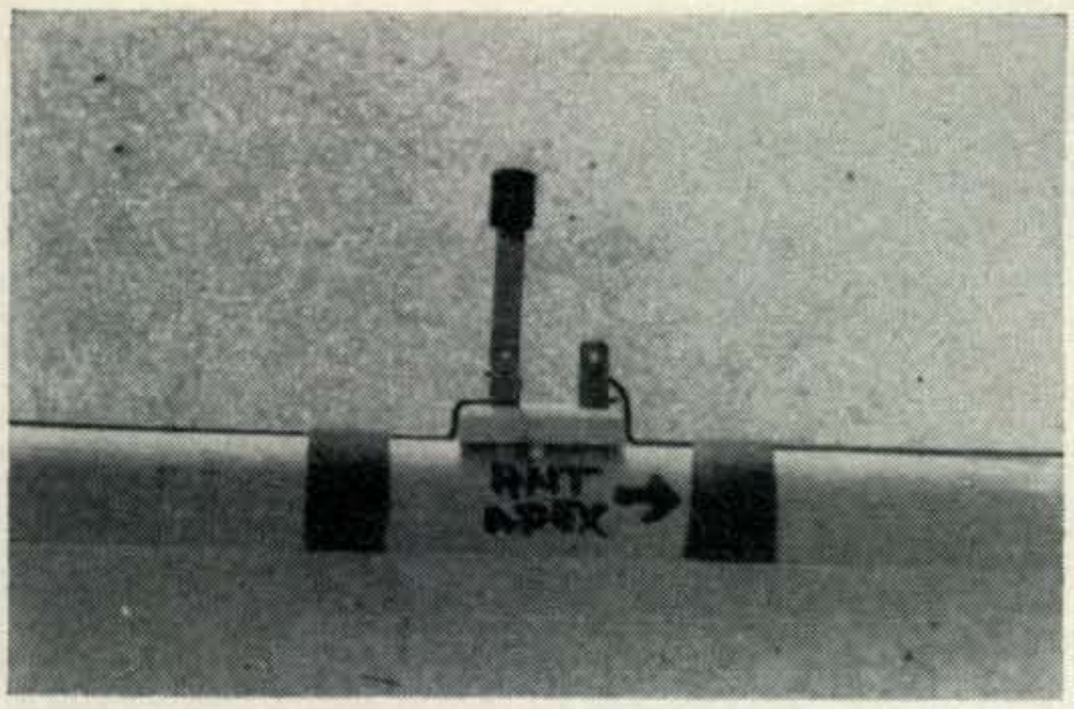
*73 Bay 26th Street, Brooklyn 14, N.Y.



Close up of the V beam apex assembly for 20, 15, 11 or 10 meter operation. Construction details are given in the text.

Construction

Construction was rather simple and from the photograph of the "V" support platform the part's layout can be seen. Half inch plywood was chosen for its inherent strength and non-warping characteristics. However, a coating of creasote preservative solution, purchased from a hardware store, was an absolute necessity. A Cesco clamp (or the more common TV "U" clamp) was used to secure the platform to the boom. For adequate support, two clamps per platform were utilized. A 90 degree angle was drawn on the platform in heavy crayon for proper orientation. Secure two lengths of 5' wooden pole (1⅛") to the platform by drilling two ¼" holes through the platform and poles utilizing the drawn lines as angle guides. Fasten securely with 2" × ¼" stove bolts. To prevent burrowing use large washers or half "shells" cut from a length of TV masting. Under two bolt heads of the driven element install a ¼" solder lug. To maintain an absolute weight minimum four 13' hollow fibreglass poles were purchased. (12' × ¾" dowel might be easily substituted at a substantial price saving but sacrifice in weight.)



Knife switches placed in series with the elements permit manual change of length for shifting of bands (10-15-11 or 10 meters).

The inside diameter at the fiberglass bases were measured at 1⅛" and slipped easily over the dowels forming the V angle for a force fit. All that remained was the installation of #12 or #14 wire along the dowel-fiberglass length to complete the assembly.

The reflector was cut from one length of wire measuring 35' 9" to resonate in the 20 meter band. The driven element was composed of two lengths of wire each 16' 5" in length and terminated in the solder lug at the driven element apex angle. The coax cable was also soldered at these lugs for completion of a monoband installation. Tape the wire along the element lengths at reasonable intervals.

For manual switching multiband operation a s.p.s.t. knife switch was placed in series with each antenna leg at the resonant points indicated by the enclosed chart. Insure that the terminal with the knife arm attached is placed away from the driven apex. If the knife's arm position were reversed, several inches would be added to the wire thereby lowering the resonant frequency. (see photo)

A boom of metal (or wood) measuring 8' and a diameter of 1⅝" supported the entire system. The Q or bandwidth of the wire beam was somewhat high hence major moves from the resonant point must be made within the tolerances dictated by the s.w.r. bridge. A 50 ohm coaxial transmission line provided a suitable match between the transmitter and antenna with a tolerable ratio of reflected power.

Resonant Frequency	Driven Element	Reflector Element
14.27 mc	32' 10"	35' 9"
21.30 mc	22'	23' 1"
27.10 mc	17' 3"	17' 11"
28.90 mc	16' 2"	16' 10"

Parts List

4—fibreglass poles 13' long[1] (12' × ¾" dowel can be substituted).
2—5' lengths of wooden pole 1⅛".
2—pieces of ½" plywood 1' × 2' approx.
4—Cesco or TV type U bolts.
4—stove bolts 2" ×¼" with nuts and washers.
70' #12 or #14 enameled wire.
S.p.s.t. knife switches (two for each additional band).
2—¼" solder lugs.

Performance

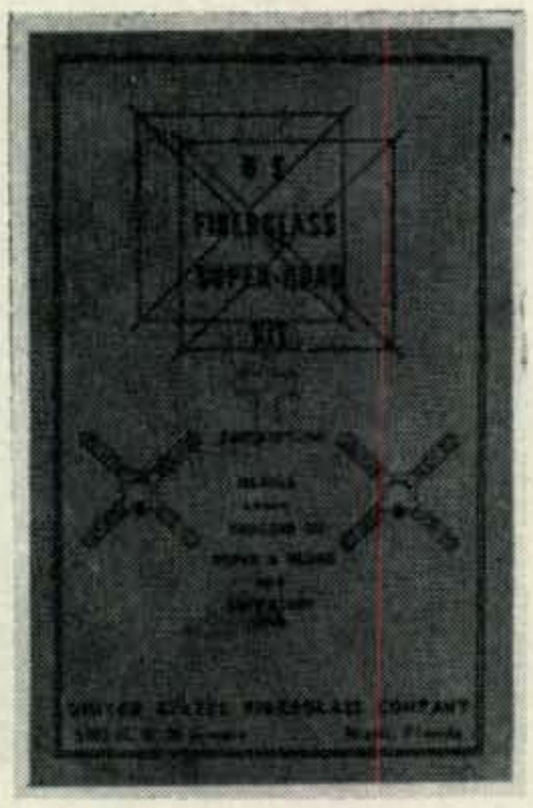
On the air performance netted a front-to-side ratio in excess of 30 db. Front-to-back ratio was a comfortable 18-20 db with the gain equal to a three element yagi. Increased performance figures can be achieved by adding parasitic elements and/or designing the system for monoband operation with a maximum spacing between elements. ■

[1]Available from U.S. Fiberglass Co., 5101 NW 36 Ave. Miami, Fla. $5.50 ea.

New Amateur Product

United States Fiberglass Company

A NEW book is available from the United States Fiberglass Company which describes the construction of Quad antennas. The book is an instruction manual based on the designs of W8FYR and W4WSM and is supplied with antenna kits sold by U.S. fiberglass. The book can now be obtained by writing them direct or using the reader service coupon on page 110. U.S. Fiberglass Company supplies the mounts and element supports shown in the book. The book details the construction of a three element, four element, and special 40 or 20 Quad. Featured in the construction are thirteen foot fiberglass arms, Quad arm "X" mounts, which are rigid die cast mounts poured from a special aluminum alloy, and boom to mast "T" mounts which fits a 2" boom to a 1½" mast. For further details write to United States Fiberglass Company, 5101 N. W. 36 Avenue, Miami, Florida, or circle 65 on page 110.



Results of the

6th Annual *CQ* 160 M. C.W. Contest

BY CHARLES M. O'BRIEN,* W2EQS

SUPPOSEDLY this was to have been the very best year of the IQSY on the low frequencies. Well, the Contest this year was just about the finest ever, but conditions were far below those of last year. The DX was in there by the proverbial millions but, ugh, what QRN!! Actually, we missed the best conditions of the season by just a whisker. The Monday after the contest conditions were good but Tuesday conditions were absolutely *excellent*. A general recap of the contest conditions were: Saturday, fair; Sunday, poor. So-o-o-o, see how close we came to hitting it right smack on the nose again? Too bad we have to use that word "close" though.

In last year's story it was mentioned: "Some want to know how much we want for our crystal ball. Let's just hope, boys, that our ionospheric luck, our being clairvoyant, having that extra sensory perception, or whatever you wish to call it, will be with us again next year." Maybe we should have taken up the offer of selling that crystal ball for a tidy sum. Actually, though, we missed the finest conditions as mentioned in the first paragraph by just a whisker. Actually, though, conditions weren't too bad. The DX was in there but it was the QRN that made the going rough. Many a weekend that has been QRN-less has produced nary a DX signal or, on other occasions, extremely few and weak ones.

Over the Contest weekend the QRN was bad Friday evening/Saturday morning but plain awful Saturday evening/Sunday morning—building up into one continuous roar. However, the path to Europe was open the *entire* evening both Friday and Saturday and remained that way until 0730 GMT or a little later.

Your writer heard 9L1HX as early as 2220 GMT Saturday which in local time here was 1720 (5:20 P.M.) while it was still daylight. There he was in the clear on about 1828 kc calling CQ and not coming back to a soul. I went out of my mind calling him.

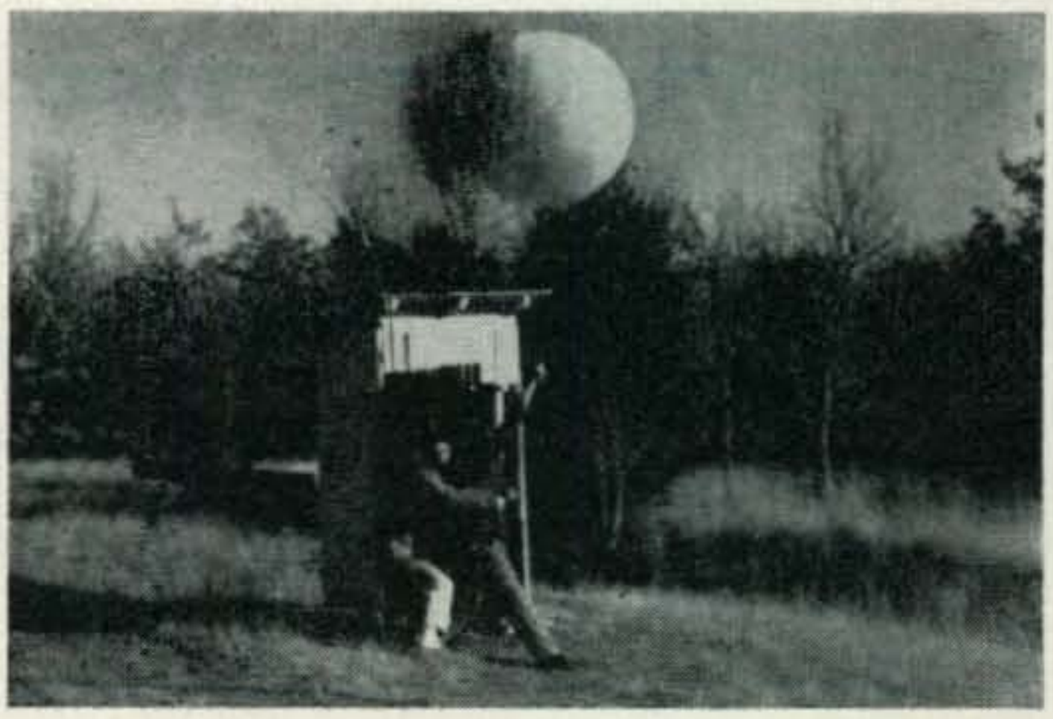
At my location the band just about folded between 0800 and 1100 GMT Sunday. Only a couple of sixes and sevens were to be heard and all signals between the East and West Coasts became extremely weak even including the usual S9 plus W2's, etc. who were 'way down.

Other odd conditions existed. One weekend in March VP3CZ was knocking off the Europeans one right after another, yet nary a one was audible here nor were any other W's calling them. On a weekend in April VP2AV did the very same thing. Then we can go north and listen to VO1FB and VE1ZZ working them one right after the other, but not a sign of the DX down here in New Jersey. Of course, I realize they are quite a bit closer to Europe. W1BB/1 does the same thing. He is enough to drive one crazy, for instance, working a GC3 which I sure could use but I couldn't even drive my imagination to thinking I was hearing that station. On the other hand, take into consideration that super, super deluxe antenna that old Stew has! Enough to make anyone turn extra green with envy.

One very interesting observation here in the United States was that Contest activity continued

*48 Prospect Avenue, Westwood, New Jersey.

On the right, Rev. Paul Bittner, WØAIH, of Minn. On his left our Contest Chairman, Charlie O'Brien, W2EQS.



K5LIW of Texas. No wonder they made such a fine score. K5LIW on the left and K5RWK on the right erecting the ¾ wavelength balloon supported vertical antenna.

The operating position at W8FBX, Grindstone City, Michigan at the tip of the "thumb."

A familiar face to all . . . Stew Perry, W1BB. How does he do it?

on a 24-hour basis and QSO's between stations 800 to 1000 miles during daylight hours took place. The same holds true in G-land where G3PU reported W1BB/1 being heard up to 0930 GMT as well as other W/VE stations. Is this due to the IQSY? And, how do you like VO1FB working G3PU as early as 1950 GMT?

Regardless of how you considered conditions there were still 1,374 different stations that participated from a record breaking 48 states, 8 Canadian Provinces and 30 DX countries. That, my friends, represents a total of 32 countries. The only States from which no activity was reported were South Carolina and Hawaii and of the 48 States participating, logs were received from all but Arkansas, Mississippi and Nebraska. The only Canadian Provinces from which no activity occurred were rare P. E. I. and N. W. T. Logs were received from all the Canadian Provinces that did participate.

In the 1964 Contest we had a record total of 229 logs received from 20 countries. This year we received 270 logs from 26 countries. So, the Contest keeps going up and up and up (VK5KO was reported on but no word from him).

Rules, regulations and logs were sent to stations in 57 different countries that were definitely allowed the use of 160 meters. Too bad that more than 32 didn't get on, but 32 is a very good amount of representation. Since we received logs from 26 what happened to those other 6 that didn't submit theirs?

You will note in the results tabulation that we list ZE3JO even though he was so unfortunate as to make nary a QSO. It is listed simply because he was active. The contents of his letter will appear in another part of this report.

New countries, states and provinces were added to dozens and dozens of logs. Look at the scores and see what the boys did. Greatest number of QSO's goes to well known GM3IGW/A with 260. Greatest multiplier of 54 is shared by three stations—namely, W3GQF, W8FGX and W9YYG. Greatest number of countries worked goes to G3GRL and GM3IGW/A with 17.

There are many, many hams who still don't actually realize the DX potential that 160 holds. Undoubtedly many of them will be reading this story, so let us take a peek into the countries that were on: CO, DJ/DL, EI, G, GC (Guernsey), GC (Jersey), GD, GI, GM, GW, HB, HI, HK, HR, JA, KL7, OE, OH, OHØ, OK, PAØ, VP2, VP3, VP7, XE, ZE3, 4U1, 6Y5, 9L1, 9M4. What's the breakdown of participating stations by country? This maybe of interest to you:

W/K	816	GW	33	OK	131
VE/VO	33	HB	6	PAØ	5
CO	1	HI	1	VP2	1
DJ/DL	25	HK	1	VP3	1
EI	1	HR	1	VP7	1
G	264	JA	5	XE	1
GC*	1	KL7	1	ZE3	1
GC**	2	OE	1	4U1	1
GD	3	OH	3	6Y5	1
GI	6	OHØ	1	9L1	1
GM	24			9M4	1

*Guernsey
**Jersey

How was activity spread out across the United States and Canada? Let us make another listing of stations participating per district:

1st	58	7th	71	VE2	8
2d	107	8th	128	VE3	9
3d	47	9th	92	VE4	3
4th	89	10th	75	VE5	2
5th	33	VO	1	VE6	2
6th	116	VE1	4	VE7	4

[*Continued on page 35*]

Top Ten World-Wide

GM3IGW/A	32,950	W9YYG	26,568
W3GQF	30,564	W2UWD	26,500
G3GRL	30,535	WØVXO	26,316
W2EQS	27,552	DL1FF	26,160
K2DGT	27,440	W8FGX	26,028

The first column indicates the number of contacts, second is the multiplier, third is the number of different countries worked and the last column is the final score.

Connecticut

W1WY	184	45	9	22,680
W1TX	136	37	7	14,208
W1BHQ	96	35	7	9,240
W1ECH	81	33	5	6,138

Maine

W1KVI/1	104	33	4	7,920
W1UOT	89	22	2	3,916

Massachusetts

W1BB/1	138	42	14	25,788
K1OOV	99	30	3	6,180
W4YCQ/1	115	26	2	5,980
W1AQE	99	23	3	4,738
WA1CRK	58	22	2	2,552
W1PH	48	20	2	1,920
W1MO	35	16	2	1,120
WA1CAG	6	6	2	72

New Hampshire

K1NBN	107	25	3	5,550
W1DYE	61	23	5	2,920
W1FZ	43	20	3	1,880

Rhode Island

K1YVN	59	16	2	1,888
K1QZW	28	13	2	728

Vermont

W1RWP	103	27	2	5,562

New Jersey

W2EQS	215	48	12	27,552
W2IU	116	45	12	18,000
K2GAL	121	42	6	11,508
WA2HNI	108	27	3	5,778
W2HUG	88	28	2	4,928
WB2PHV	27	12	2	648

New York

K2DGT	220	49	8	27,440
W2UWD	213	50	9	26,500
K2GNC	128	41	10	13,448
W2PSQ	109	35	5	8,480
WB2MFX	79	33	3	5,478
WB2LNA	68	20	2	2,720
K1IGF/2	42	17	2	1,428
W2GP	51	13	2	1,326
W2ZSD	40	13	2	1,040
W2ZV	30	16	2	960
WB2DXL	9	4	1	72

Delaware

W3EJU	43	19	2	1,634

Maryland

W3GQF	219	54	13	30,564
W3EIS	180	44	7	19,360
W3RFA	56	27	4	3,456
W3FSP	46	17	2	1,564
W3LMC	6	3	1	30

Pennsylvania

W3AZR	161	38	6	13,452
W3AJS	102	38	6	8,968
W3BUR	98	34	4	7,208
K3UKZ	32	11	2	704
W3KNQ	15	10	2	300

Alabama

W4OGT	38	22	2	1,672
K4HPR	35	19	2	1,330

Florida

W4WHK	80	34	7	6,800
K4QAY	34	24	8	2,784
K4IXG	42	24	5	2,592
W4IJE	21	17	3	986

Georgia

K4DKJ	86	34	6	6,800

Kentucky

W4ZCM	102	33	3	6,996

North Carolina

WA4-FJM/4	128	33	4	8,976
W4WUW	66	27	4	3,996
W4UWS	48	18	2	1,728
W4PVT	35	16	2	1,088

Tennessee

K4RIN	162	43	7	15,652
W4HYY	91	32	3	6,080
KH6-EOF/4	32	20	1	1,280

Virginia

W4BVV	200	46	9	22,458
W4PTR	140	35	6	10,920
W4KFC	133	31	4	8,742
W4KXV	124	29	3	7,424
WA4DUS	100	29	2	5,800
WØVEH/4	80	25	2	4,000
K4VDL	60	21	2	2,320
WA4PRF	9	8	2	144
WA4PAE	9	5	1	90

Louisiana

K5TFG	76	32	5	5,632

New Mexico

W5SOT	45	21	4	2,226

Oklahoma

K5JVF	135	43	4	12,298
W5FPN	73	27	2	3,942

Texas

K5LIW/5	176	47	5	17,672
W5FIX	67	32	6	5,312

California

W6RW	178	47	5	17,860
W6JTB/6	166	44	4	16,368
WA6JPR	121	36	3	9,072
WA6CDR	112	33	3	7,722
W6YC	90	26	3	4,888
W6GWQ	79	27	3	4,482
W6OSU/6	71	27	3	4,050
W6LHN	54	25	3	2,900
W6JEK	55	20	3	2,400
K6CSP	60	18	3	2,304
K6DQB	58	16	2	1,856
W6NKR	41	21	2	1,722
WA6TGH	55	12	3	1,416
WB6GZE	30	9	3	612

Arizona

W7AYY	84	28	3	4,928
W7ENA	68	26	3	3,692

Idaho

W7GOM	28	15	2	640

Montana

W7GBL	72	24	2	3,456

Nevada

K7ICW	88	30	3	5,460

Oregon

W7LNG	74	25	3	3,900
W7JRI	58	19	2	2,204
K7HDB	48	17	2	1,632
W7MLJ	50	15	2	1,500

Utah

W7ZC	63	23	2	2,898

Washington

W7VGQ	182	46	6	18,216
K7PBU	87	31	3	5,642
W7FVI	50	17	2	1,700
W7NLB	41	17	2	1,394

Wyoming

W7UFB	85	34	2	5,440

Michigan

W8DGP	178	45	5	17,100
WA8EMJ	155	35	2	10,850
K8CGM/8	128	35	2	8,860
W8OOR	120	35	2	8,400
W8TJQ	110	38	2	8,360
K8MFO/8	80	32	3	5,376
W8FBX	45	20	2	1,800

Ohio

W8FGX	217	54	8	26,028
K8RRH	215	48	7	22,560
K8HBR/8	177	47	4	16,650
W8BIQ	127	37	3	9,694
WA8IJI	124	33	3	8,448
W8MJG	107	31	2	6,634
W8YAT	74	29	2	4,292
K8BSH	34	18	3	1,368
W8VDF/8	18	12	2	432

West Virginia

W8HZA	99	28	2	5,544

Illinois

W9YYG	226	54	7	26,568
W9PNE	172	52	8	20,384
W9HUZ	158	51	7	18,156
K9BGL	110	29	2	6,380

Indiana

WA9AMZ	223	49	3	22,246
W9DNA	8	6	1	96

Wisconsin

W9VZP	175	46	2	16,100
WA9-GAR/9	84	32	3	5,632

Colorado

WØCDP	170	50	3	17,300
WØDK/Ø	137	39	2	10,686
WØEYE	75	30	2	4,500
WAØCVS	51	26	3	2,860

Iowa

WØNFL	109	36	2	7,848
WØDRE	61	25	2	3,050

Kansas

WØGDH	216	51	6	23,664
KØITF	102	39	3	8,268
WØPSF	39	20	2	1,560

Minnesota

WØVXO	246	51	5	26,316
WØAIH	239	52	4	25,688
WØRHI	89	37	2	6,586

Missouri

WØUXQ	92	34	2	6,256
WØOGC	82	29	2	4,756
WØGWT	64	28	2	3,584
KØYGR	59	26	3	3,276
KØJPL/Ø	59	22	2	2,596

North Dakota

WØSDN	156	40	3	12,800

South Dakota

WØPHR	21	13	1	546

Newfoundland

VO1FB	106	26	12	18,772

New Brunswick

VE1TW	2	2	1	4

Nova Scotia

VE1ZZ	121	44	16	22,616
VE1EK	50	20	2	2,000

Quebec

VE2UQ	115	43	12	16,168
VE2ATU	62	30	10	6,360
VE3ABG	145	40	5	12,560

Ontario

VE3ODX	138	40	5	12,000
VE3BWY	165	34	2	10,982
VE3DU	91	35	2	6,370

Manitoba

VE4XO	73	32	3	4,928
VE4JB	66	26	2	3,432

Saskatchewan

VE5JI	73	30	2	4,380

Alberta

VE6MC	48	23	2	2,208
VE6IZ	30	14	2	840

British Columbia

VE7AKI	103	33	2	6,798
VE7BDJ	29	9	2	522

Aland Islands

OHØNI	10	3	3	150

Alaska

KL7AUV	4	2	1	80

Antigua

VP2AV	7	6	4	360

Austria

OE1KU	61	8	8	2,440

Bahama Islands

VP7NY	28	14	2	3,920

British Guiana

VP3CZ	40	26	9	9,360

Colombia

HK4EB	7	7	4	385

Czechoslovakia

OK1EAZ	157	15	14	9,210
OK1AKQ	113	15	15	6,450
OK1AHZ	106	16	14	6,112
OK2KGV	134	15	15	6,090
OK1AKL	112	13	13	5,061
OK1KLX	74	15	14	3,885
OK1IQ	89	11	11	3,245
OK1WT	86	10	10	3,100
OK2QX	92	10	10	3,060
OK1SV	75	12	12	2,700
OK3KBB	78	10	10	2,460
OK1ALZ	69	10	10	2,390
OK3KTR	76	9	9	1,962
OK2KET	67	9	9	1,791
OK1KDT	78	7	7	1,722
OK1KHK	81	8	8	1,704
OK1KOK	70	7	7	1,568
OK2KGZ	63	8	8	1,488
OK1BM	64	8	8	1,480
OK3EM	58	8	8	1,264
OK1KRS	55	8	8	1,224
OK1EV	50	7	7	1,015
OK1AER	40	6	6	804
OK1AKS	46	5	5	600
OK1LY	26	7	7	511
OK1NK	38	5	5	500
OK1ALY	34	5	5	460
OK1PN	24	5	5	420
OK3CDN	39	4	4	372
OK1OO	27	5	5	350

The winner in Pennsylvania, Ike Kerschner, W3AZR. As Ike says: "Not a very impressive set-up, but at least it works."

Check logs are gratefully acknowledged from: OK1ADM, OK1AFY, OK1AHB, OK1AMS, OK1XM, OK2KGD, OK3CEO, OK3CFP, OL1ABM and OL6AEE.

OK2LN	37	4	4	344
OK1AEH	31	4	4	320
OK1AII	23	5	5	320
OK2KJU	24	4	4	242
OK2BCI	7	5	5	175
OK1AHI	24	1	1	48
OL8AAZ	3	1	1	6
Dominican Republic				
HI8XAL	19	16	5	1,800
Eire				
EI9J	101	23	11	14,490
England				
G3GRL	224	29	17	28,565
G8NF	239	23	16	20,056
G8FC	150	13	13	6,136
G2DC	125	13	13	5,291
G3SHD/A	132	11	11	4,279
G3PVA	108	11	11	4,103
G3TIK	118	10	10	3,660
G3SVW/A	108	9	9	3,213
G3SVK	109	9	9	2,484
G3TCQ	93	8	8	2,112
G3MWZ	52	9	9	1,530
G3HZL	48	9	9	1,386
G3TMA	41	8	8	1,040
Finland				
OH2HK	50	10	10	2,440
OH3NY	27	7	7	903
OH2MK	15	6	6	414
Germany				
DL1FF	184	24	12	26,160
DL1JW	108	14	13	7,280
DL9JL	102	10	10	4,770
DL7AA	45	12	12	2,652
DL1KB	61	6	6	1,758
DL1LB	37	9	8	1,665
DL1VW	47	7	7	1,477
DJ4FZ	32	6	6	852
DJ5GW	20	4	4	400
DL3MO	13	6	6	342
DL9KRA	3	3	3	75
Guernsey, Channel Is.				
GC3-PAI/A	3	2	2	24
Honduras				
HR3HH	56	27	4	14,180
Jamaica				
6Y5XG	59	29	6	16,530
Japan				
JA3AA	4	1	1	8
Malaysia				
9M4LP	3	3	3	45
Netherlands				
PAØPN	100	16	12	8,384
PAØVB	55	7	7	1,904
Southern Rhodesia				
*ZE3JO	—	—	—	—
Scotland				
GM3-IGW/A	260	25	17	32,950
GM3KMR	146	12	12	8,568
GM2HCZ	28	5	5	685
Switzerland				
HB9CM	70	15	11	5,565
HB9EO	30	12	12	1,824
HB9QA	27	8	8	1,032
United Nations, Geneva, Switzerland				
4U1ITU	62	6	6	1,860
Wales				
GW3JI	144	22	14	16,764
GW3PMR	174	13	13	10,907
GW3CW	124	13	13	7,800
GW3SSK	92	14	10	6,594

*Regarding ZE3JO you may wonder why he is even listed in this scoring section. He went to great effort and spent considerable time in the Contest. See his remarks elsewhere in this story.

Last year I mentioned this and will repeat it again. Why is there such a lack of activity in the 1875/1925 kc portion of the band? Oh yes, we know there is a Loran signal on 1900, but there is still PUL-ENTY of room for many, many QSO's. Although there were more stations using this segment this year than in the past, you could still say the occupancy was rather negligible and many a comment to this extent was made on the logs asking "why" over and over again don't more of the boys make use of it.

Another thing noted and asked here is why

The group from WA9AMZ. A mighty fine score and winner for Indiana.

Here are Don W8SQI/W8FBX, Don, W8LXE, and Chuck, WA8BRS, exploring a Lake Huron ice cave before the contest.

is the band absolutely jammed Friday/Saturday and then drops off so *extremely* much Saturday/Sunday? This has happened every one of the six years this Contest has been in existence, yet we receive requests in a few logs wanting the Contest to run two week-ends—hi!

Suggestion: Please sign your call letters to your logs. We received a couple that were very neatly recorded and signed but no indication of the call. Through a process of checking we were finally able to determine whose they were.

An important point for the DX boys to note. A QSO to each separate State and Canadian Province gives you an extra multiplier plus the 10 points you obtain for such a contact. But, on top of this, you cannot count the United States and Canada/Newfoundland as separate multipliers, too, as some did.

For the entire gang to make note of . . . this is a c.w. to c.w. Contest only. C.w. to phone QSO's are not permitted nor are any cross-band contacts allowed. For the sake of awards, and in lieu of QSL, *CQ* will honor all listings within the logs received as sufficient proof of contact. And, we do not believe we are out of line in stating that ARRL will likewise agree on this point for any of their awards.

Remember that this Contest is a yearly event that is scheduled to run over the last week-end of January from 0200 GMT Saturday until 1400 GMT Sunday. A most attractive certificate shall be sent the winners in each State, Province and DX country and in cases where scores are close a certificate shall also be sent to second and third place contestants.

Now, just what went on in the minds of many of the boys who participated in this rat race? Well, here are some of the comments which always make for interesting reading. So, off we go. . . .

[*Continued on page 94*]

A Self Powered C.W. Monitor

or

Look Maw!! No Batteries!!

BY OTIS WRENCH,* WØMQB

As every c.w. operator that has ever worked me knows, I have a lousy fist, and it is even lousier if my code monitor isn't working. I've always had one (code monitor, that is) albeit my tale of woe and frustration has its silver lining and happy ending.

I've always been a strong adherent to the principle of versatility. Not only does it save the cost of chassis pans, panels, cabinets and bumper feet, but there is a great deal of satisfaction in having a piece of equipment that will do umpteen dozen things. Not all at once, mind you, but it will do them, one at a time. It also keeps the XYL interested, because she has her eye on that chassis if I ever salvage it. She says she is going to use it for a cullender some day.

If my code monitor was anything, it was versatile. It was also a very satisfactory code monitor at certain times. But it had seven double pole double throw toggle switches on the front panel and one double pole double throw slide switch. (I had depleted my supply of toggle switches.) Also a speaker, a meter, a phone jack, a pitch control knob, a meter adjust knob, a dial for the code monitor input capacitor, a dial for the variable oscillator, a dial for the doubler, tripler stage, a five position band switch and two crystal sockets, plus three tally lights. Oh yes, also two pots and two banana jacks on the back panel but I've long since forgotten what they were for.

*6436 Longmont Drive, Wichita, Kansas 67219.

It was a joy to behold. It was a code monitor and an a.m. monitor. You only had to plug in a headset to monitor phone. It was field strength meter that worked fine. I transistorized that part of it several years ago when transistors first became available at bargain prices. It was also a 100 kc and 1000 kc crystal calibrator, with and without tone modulation. (A double pole double throw switch selected that mode of operation). It had two crystal sockets on the front panel for the most popular types (with me) of holders. That stage was a type of Pierce oscillator, untuned, and the meter could be switched from the field strength position to read a portion of the grid voltage, and hence give an indication of the activity of the crystal. There was a variable oscillator in it, covering the low frequency range, which I thought I needed to align my BC-453. However, I was never quite sure of the calibration of this low frequency oscillator, and never used it. (It's coming out on the next modification.) Also there was a tuned doubler, tripler, quadrupler (?) stage which could be fed by either the Test Xtal or Calibrate Xtal stage by throwing the appropriate switches in the right direction, and which would give me marker points down to 6 meters, depending, of course, on which crystal I was using at the time. It could also be used as a single frequency audio oscillator and as a code practice oscillator.

Now, isn't that a humdinger? What more could you ask for on one little 8" × 10" panel? The only problem was that after it had set there for a while, I forgot which switch to throw which way to get the code monitor to work.

One evening while in the middle of my third QSO (and I still hadn't thrown the right switches to get the code monitor turned on) I had a happy thought. Why not build a separate code monitor? What evolved was placed in a 4" × 5" × 3" aluminum box.

I did and the circuit is shown in fig. 1. Most of the parts were scrounged from a defunct transistorized radio. Capacitor C_1 is the tuning capacitor with both sections paralleled. There are no numbers on the transistor; they were rubbed off long ago, but it is a p.n.p. type. I can't decipher the code on the diode either so any type you have will probably do.

[*Continued on page 100*]

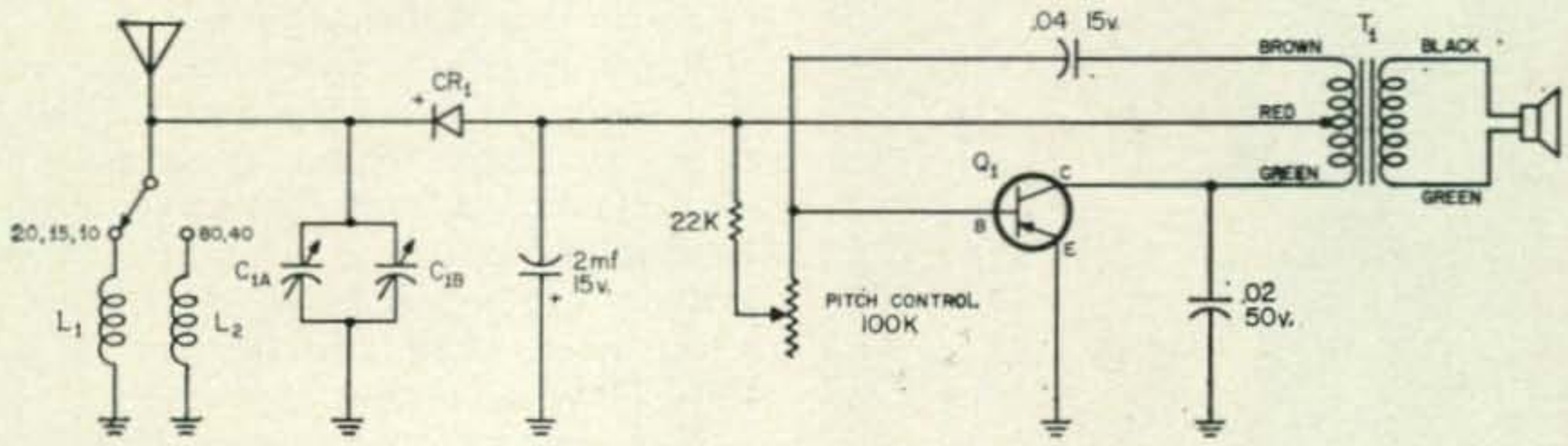
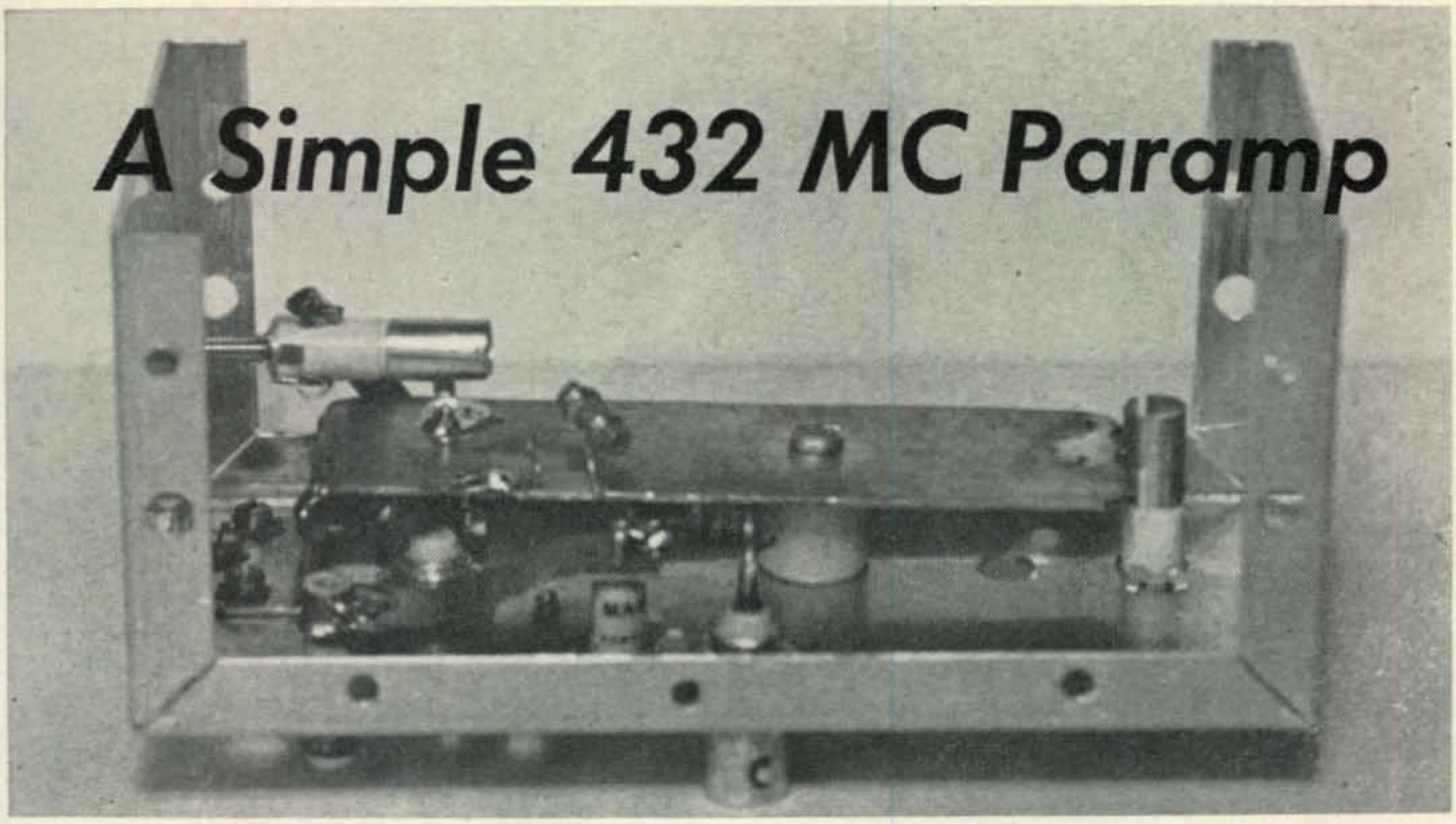


Fig. 1—Circuit of a self powered c.w. monitor. Most of the components, speaker included, are salvaged from an old transistor radio.

C_1—See text.
L_1—8t. #24 E. on ½" dia. poly rod.
L_2—40t. #24 E. wound on other end of L_1 rod.
T_1—Lafayette TR-99.
Q_1—Any audio type p.n.p. See text.

A Simple 432 MC Paramp



Interior view of the 432 mc parametric amplifier above, shows the signal circuit in the background and the idler circuit in the foreground. Capacitor C_2 may be seen on the left with C_3 on the right end of the signal circuit.

BY FRANK C. JONES,* W6AJF

Previous parametric amplifiers have exhibited a very cantankerous nature and have been difficult to adjust. This unit, used for the moonbounce contact between Hawaii and the East Coast is simple and easy to adjust.

THE parametric amplifier illustrated here is the result of many experimental units built during the past five or six years. Many of the earlier types were very difficult to adjust for proper operation; in fact, a popular saying was that all a person needed was five hands to get a paramp to function correctly. The version shown here can be adjusted with one hand, and has been in use at W6AJF for the past two years with no problems. The paramp at KH6UK in the Hawaiian Islands was modified to use the same circuit, and was used successfully in the 432 mc moonbounce contacts with W1FZJ on the U.S. east coast.

The noise figure is apparently between one and two db, or about 3 db better than a 416B tube, Nuvistor or transistor r.f. amplifier. Ordinary diode type or crystal noise generators are not effective in measuring the noise figure of a good paramp. A much more elaborate set-up is needed for measuring parametric amplifier noise figure than is available at W6AJF. However, the increased signal to noise ratio of a paramp can be easily noted when listening to weak 432 mc signals on the air, or to a weak signal from a signal generator.

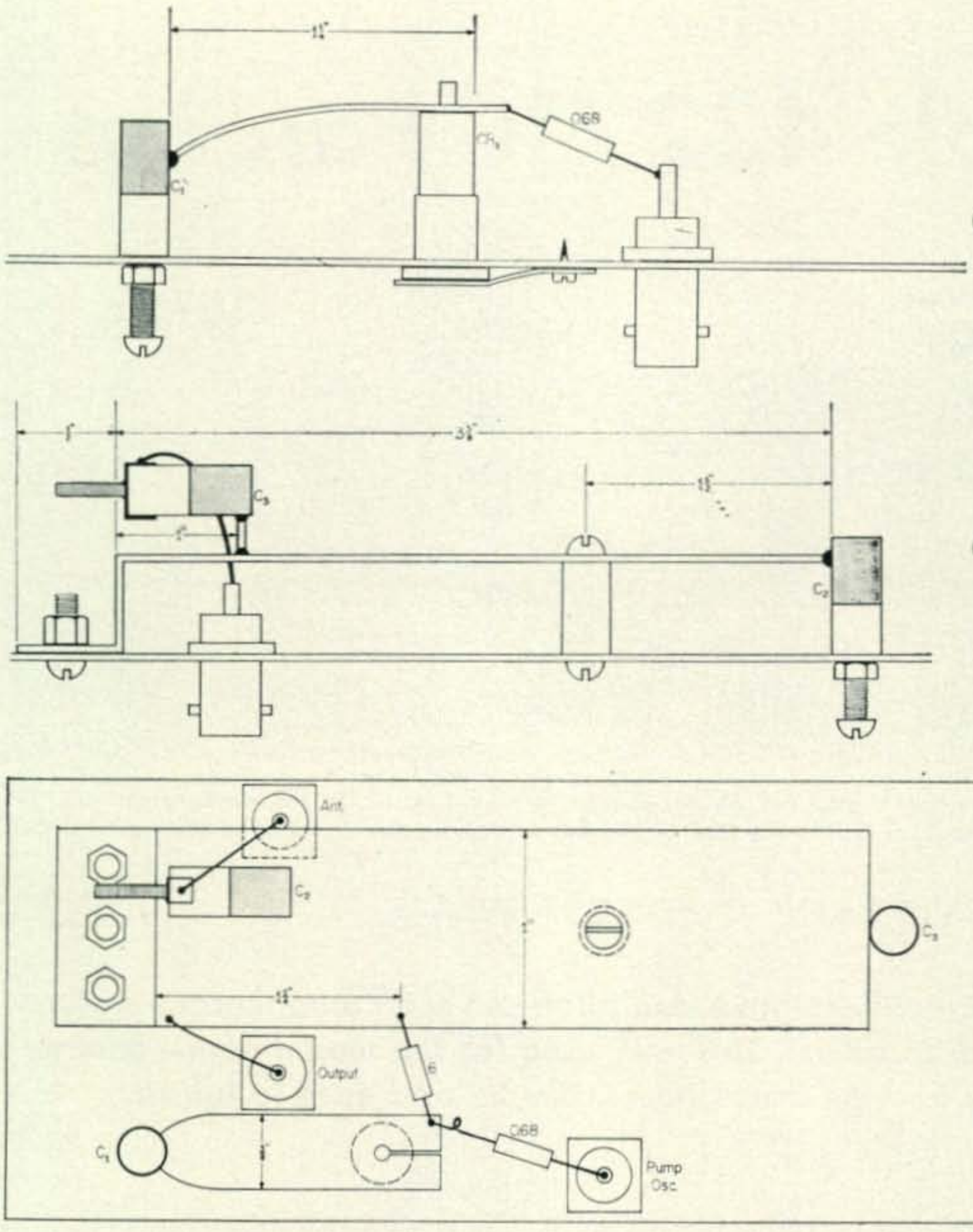
In the latter case it is desirable to use a good u.h.f. coaxial 10 db resistor pad in the coaxial line to the signal generator since most generators are not of 50 ohms impedance. Similarly, the antenna system should look like 50 ohms at the input to the paramp, with very low s.w.r. on the transmission line.

Antenna System

Nothing makes a paramp more unstable than a high s.w.r. on the transmission line to the antenna, unless a low loss circulator or isolator ferrite device is available to minimize this effect. These devices seem to cost at least two hundred dollars so they haven't been used at W6AJF station. A little extra work on the beam antenna with a tuning stub and proper match to the transmission line costs much less and is quite effective. Tubular twin lead and fairly large coaxial cable have both been used here during the past ten years with 32 and 64 element beams. In either case, a good balun is needed to transform the 300 ohm balanced feeder to 50 ohm coax relay and lines to the transmitter and receiver, or a balun is needed up at the antenna matching system with coaxial line to the station.

A few hours of work on the antenna system once in a long time is quite desirable to get best results in transmitting on 432 mc, and necessary if really good results are to be had in receiving. Even this simple paramp will not work at all if the transmission line has a high s.w.r. A paramp

*850 Donner Avenue, Sonoma, California.



(A)

(B)

(C)

Fig. 1 — Construction details for the 423 mc parametric amplifier. View (A) shows the idler circuit dimensions and the mounting of the MA46OA diode. View (B) shows the cross section of the 432 mc signal circuit. View (C) shows both the idler and signal circuits secured to the cover plate from the 5" × 2¼" × 2¼" box.

is a regenerative device and needs to be terminated on both sides by as near a resistive impedance as possible.

The 432 mc input circuit of the converter should be resistive, preferably near 50 ohms and non-regenerative. A regenerative second r.f. stage can make for some tough problems when using a paramp as the first r.f. stage. These problems are mentioned since they must be faced and minimized if the operator wishes to use a paramp in day to day operation on the amateur bands. I personally would not be without a paramp on 432 mc since it means I can copy or understand other stations only running a fraction of the power that I use.

The so-called no auto ignition interference band suddenly begins to sound like the 144 mc band. There is auto ignition and even power buzz noises on 432 mc in most locations if your receiver is really sensitive for weak signal reception. A good paramp will really make a fairly good receiver into a real "hot" one and also greatly reduce image interference if that happens to be present.

Construction

This paramp was built into a 5 × 2¼ × 2¼ inch aluminum box which was held together with a few extra sheet metal screws for insuring better rigidity and electrical contact. The amplifier uses a varactor diode connected to three separate circuits and a common ground. The common connection point on the varactor diode is such that each circuit is somewhat isolated from the others by means of series and parallel resonance. For example, the pump oscillator power at about 1650 mc is connected to the diode through a fixed 0.68 mmf ceramic capacitor. This capacitor with a total lead length of 1¼ inches including the ceramic capacitor length, will series resonate at about 1650 mc. The extra lead length, can be coiled up in a turn or two at the diode end or at the BNC coax fitting. This offers a low impedance to the pump frequency energy but not at the signal frequency of 432 mc or the idler frequency of 1218 mc.

An idler frequency circuit tuned to the difference between the signal and pump frequencies, (1650—432=1218 mc), is needed in a non-degenerative paramp in order to make it function as an amplifier. This circuit is a piece of flat copper strap 1¾ × ⅜ inches with the diode connection at one end and the other end soldered to a 0.5 to 3 mmf adjustable tubular ceramic capacitor. This capacitor to ground, tunes the idler circuit to 1218 mc or whatever the differ-

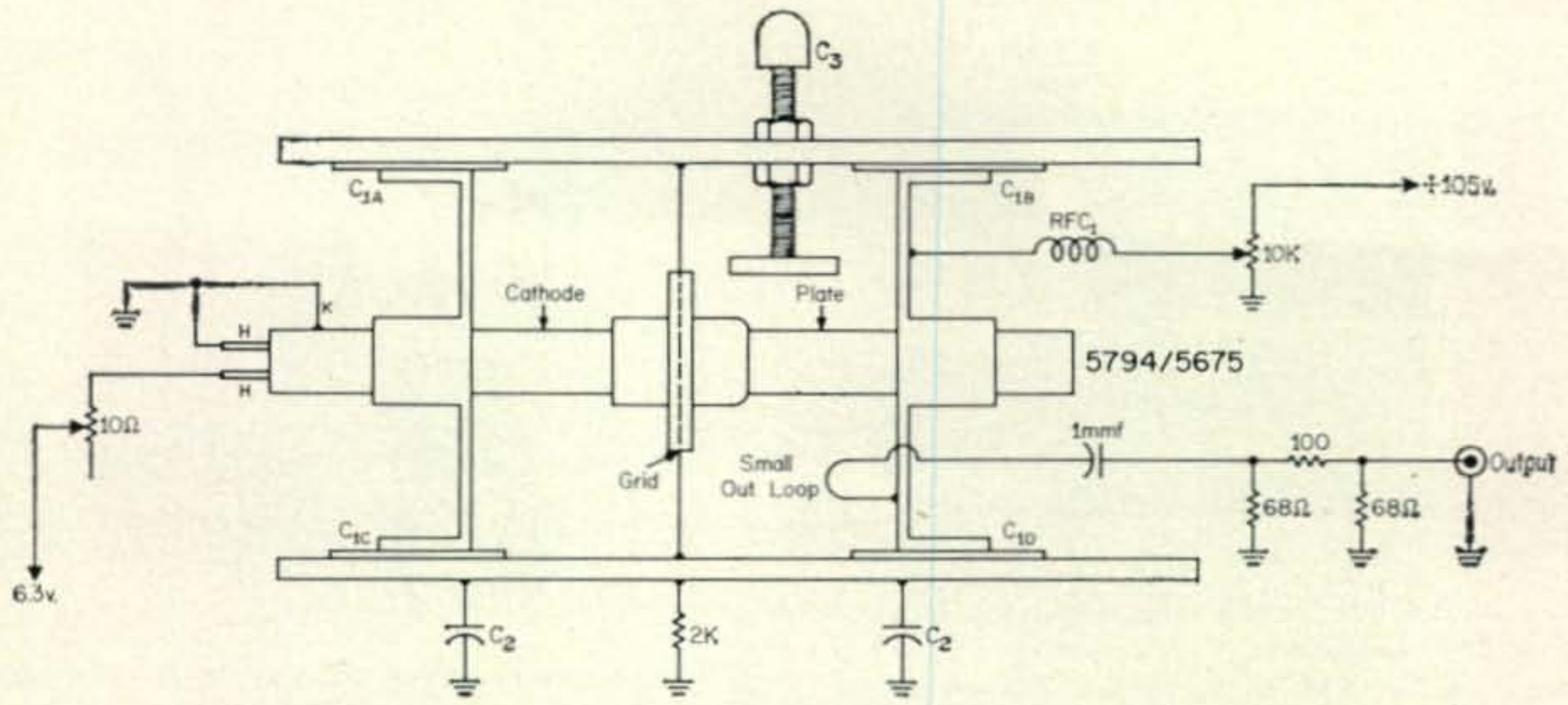


Fig. 2—Pump oscillator construction details for the 432 mc paramp. The unit is fabricated from a surplus radiosonde unit. Capacitors $C_{1A,B,C,}$ and C_{1D} are formed by 5 mil Teflon sheet placed between the end slider plates and the outer shell. Capacitors C_2 are formed between the shell and mounting clamps with 5 mil Teflon acting as the dielectric. The tuning disc, C_3, is made from a ¼" diameter copper plate. RFC_1 is made from 10t of #24e, ⅛"d and ⅜" long.

ence frequency between 432 mc and the pump oscillator frequency is. A hole near one end with a saw slot to the edge makes a friction contact to the small end of the varactor diode. A hole was made in the aluminum box just large enough to pass the diode through it but not the flange edge of the diode for the "ground" contact on the diode. A short piece of spring brass holds the diode in place by clamping down on the diode flanged end from the box top. A sheet metal screw holds this clamp in position. The varactor diode used in this unit is made by Microwave Associates and is the same physical size as a common 1N21B mixer diode. This varactor diode did not require a separate resistor of the usual 1 or 2 megohms for self bias to ground. Some varactor diodes do need a shunt resistor to function properly.

Again referring to the circuit layout diagram of fig. 1, the diode connects to the 432 mc tuned circuit through a ceramic 6 mmf tubular capacitor with leads long enough to series resonate it to 432 mc. This was done by first connecting the two capacitor leads together and "grid dipping" it to 432 mc. The total lead length including capacitor turned out to be 1¼ inches. This capacitor connects to the idler circuit near the diode, over to the 432 mc flat plate line at a point 1¼" from the grounded end. The 432 circuit is a flat line 1 inch wide made of fairly heavy sheet copper bent to be up ½" from the aluminum box with the top length of 3⅝ inches to the 432 mc tuning capacitor. The grounded end was a ½ inch lip clamped to the aluminum box with three machine screws. The original piece of copper for this 432 circuit was 1 × 4⅜ inches of about 1/16 inch thickness, bent with rigid right angle bends to form a ½ inch wide mounting lip and a ½" rise to the top 3⅝ inch section. Either a ceramic or plastic adjustable 1 to 10 mmf capacitor is soldered to this line at the free end for tuning the circuit to 432 mc. A ½ inch ceramic insulator holds this line rigid to the box at a point about 1½ inches back from the tuning capacitor.

Originally, the antenna coax jack was connected to the 432 mc line at a point ½" from ground by means of a short piece of flexible copper strip. In using this paramp with several 432 mc beams, two signal generators and a noise generator, some adjustment of antenna coupling was desirable. A 1 to 10 mmf plastic trimmer capacitor was soldered to the 432 line about 1 inch from the line ground, and the other capacitor terminal to the antenna jack by a rigid copper strap in a rather make-shift arrangement, as can be seen in one of the photographs. This capacitor can be adjusted by means of a bakelite screwdriver through a hole in the end of the aluminum box. The idler and signal frequency capacitors are mounted in the top of the box as well as the three type BNC coax fittings. The input jack connects through an adjustable capacitor to the 432 circuit at about 1" up from ground. The output jack connects to this circuit at ½" up (at the bend) through a short piece of small copper strap. The pump oscillator jack was then connected through a 10 db resistor pad and short length of coax line to the pencil tube oscillator.

Pump Oscillator

This pump oscillator using a 5794 pencil triode was made from a surplus radiosonde unit.[1] The plate and cathode connectors or plungers were pulled out near the ends of the small coaxial cavity in which the tube is mounted, in

[1]Jones, F. C. *"VHF For the Radio Amateur,"* Cowan, N.Y., 1961, p. 168.

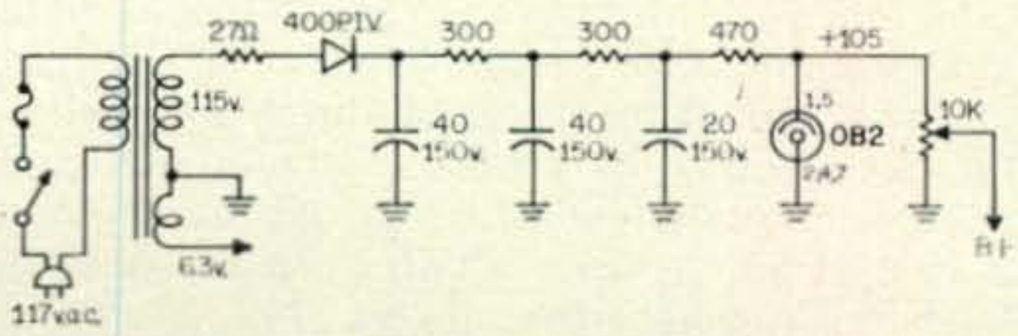
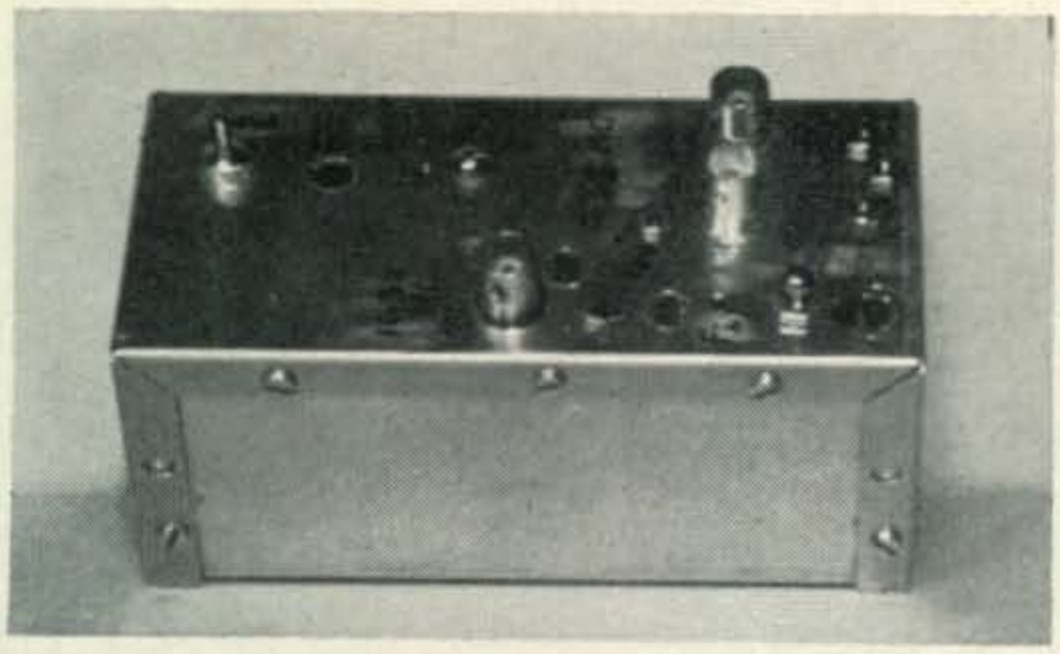
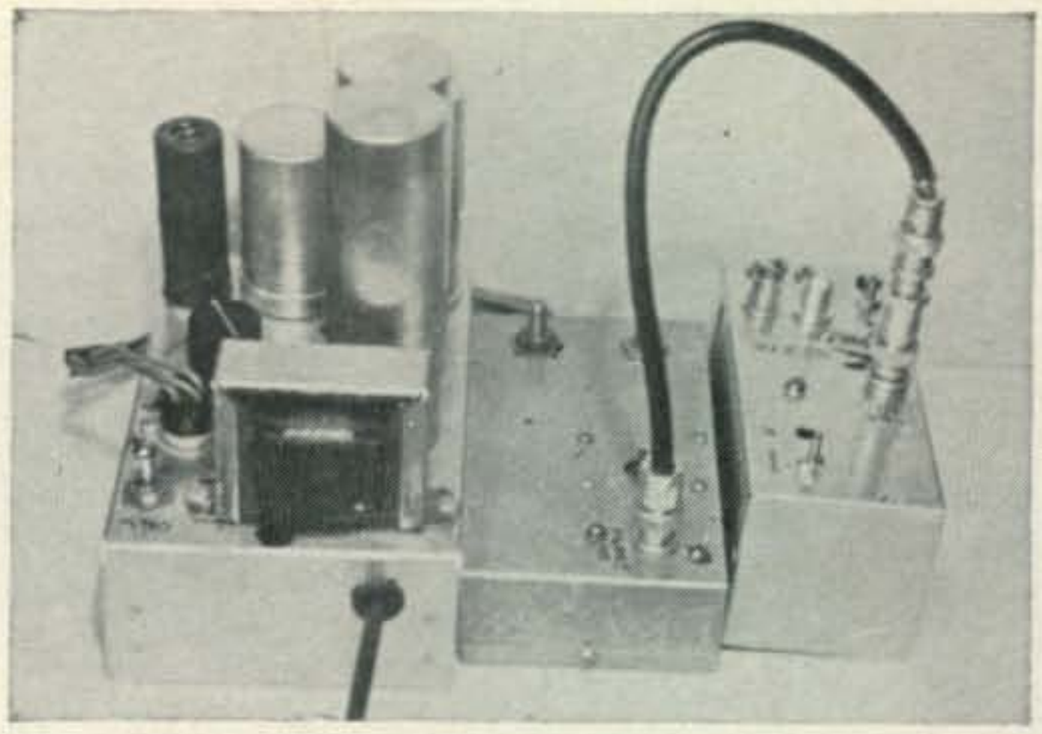


Fig. 3—Circuit of the power supply for the pump oscillator. All resistors are ½ watt and the 10K pot is a 2 watt unit.



Top view of the 432 mc paramp shows the location of the three BNC connectors. The capacitor in the upper left corner is C_3 (432 mc) and the lower right is C_1 (idler freq.) Note the hold down strap for CR_1.



View of the complete assembly shows the power supply on the left, pump oscillator in the center and the 432 mc paramp on the right.

order to have it oscillate at about 1650 mc. The 432 mc paramp described in the handbook required the full power of this oscillator but the new one in this article, only required a small fraction as much, so a 10 db pad can be used between the pump oscillator and the paramp. This helps the isolation and the tuning adjustments in the paramp cause only the slightest changes in oscillator frequency.

The vernier adjustment of pump power, a 10,000 ohm potentiometer across the 105 volt regulated supply does affect the pump frequency as well as amplitude but is not too noticeable, and over a range of 5 to 25 db gain in the paramp, no paramp adjustments are needed. This holds true if the idler and signal adjustments are made at maximum gain for a weak 432 mc signal. The pump power adjustment then can be backed off to reduce the gain to any desired value for day to day operation with no further adjustments in the paramp. The estimated pump power requirements were from 10 to 20 milliwatts, so a crystal oscillator and frequency multiplier chain of circuits could be used for the pump with an improvement in gain stability.

Adjustments

The initial adjustments of the paramp were made by reducing the pump power to a low value, connecting the paramp to a signal generator through a 6 or 10 db pad, and the paramp to the usual 432 mc converter. The 432 signal circuit and antenna series capacitor can then be adjusted for best signal feed through in the paramp to the 432 converter. This should be not more than a half S-unit less than when the signal generator and pad are connected directly to the converter. Then increase the pump oscillator plate voltage and tune the idler circuit until amplification of the signal begins to take place. Slight adjustments of the 432 circuit in the paramp may be needed to obtain maximum gain without oscillation. Once the idler circuit is peaked up correctly it will normally need no further adjustment for months. The 432 signal circuit and pump oscillator amplitude may be slightly changed for conditions of foggy or rainy weather as compared to dry weather since the change of s.w.r. in the antenna system will affect the paramp.

If the paramp is peaked at 432.1 mc and operated at 10 to 15 db gain (one to two "S" points) it will cover about 400 kc bandwidth without more than half to one "S" point change of gain. Beyond this range, the 432 signal circuit will need adjustment. When the paramp is peaked up for a gain of 20 db or more, the bandwidth drops to about 200 kc or less.

The pump oscillator requires a few minutes warm-up time in order to reach a fairly stable frequency. The circuit of this oscillator and its power supply are shown in figs. 2 and 3, and one photograph shows the arrangement in a $1 \times 3 \times 5$ chassis box and a $2 \times 4 \times 6$ inch chassis respectively.

One final comment. Don't try to use a paramp on any amateur v.h.f. or u.h.f. band unless the receiver stage following it is stable and close to 50 ohms impedance. This also applies to the antenna feeder system. Much grief can be avoided if some time is spent on both the antenna matching system and also on the input circuit and r.f. stability of the following converter system. Do this before setting up the paramp for normal use and then you will find paramp operation very rewarding on all weak signals. ■

". . . and in the interest of stability I've got the crystal in an oven . . ."

CQ Reviews:

The Hallicrafters 2 & 6 Meter Transceivers

BY WILFRED M. SCHERER,* W2AEF

THE Hallicrafters SR-46 and SR-42 units are separate matching v.h.f. transceivers for 6 and 2 meters respectively. Relatively small in size and compact, these units are ideally suited for fixed, mobile or portable station operation. Each model in itself is a complete station except for the mike and an antenna. The transmitter section is crystal controlled and has a power input of 12-14 watts; while the receiver is tunable over the full four megacycle range of the amateur band.

A special feature is the use of high-frequency crystals in the transmitter to eliminate multiple harmonics that could cause TVI. There also is a hi-pass TVI filter in the two-meter model, while in both models antenna filters are used during receiving to eliminate spurious responses or birdies that might otherwise be caused by signals from local TV or f.m. stations.

Other features include: double-conversion receiver with low-noise front end and a triode mixer, fine sensitivity and selectivity, high image rejection, automatic self-adjusting noise limiter, regulated B-plus on receiver v.f.o. which is tuned with a double-spaced variable capacitor, planetary drive, frequency range split into two segments for greater band spread, crystal-controlled 2nd oscillator, calibrated S-meter that is automatically switched to double as a relative ouput-power indicator for transmitter, heavy-duty loudspeaker, panel-mounted 4-position crystal selector switch plus external v.f.o. position, mike and a.f. gain controls, push-to-talk operation, frequency-spotting position, special hinged cover for easy access to crystal sockets and tubes, built-in power supply for operation from 117 v.a.c. or 12 v.d.c.

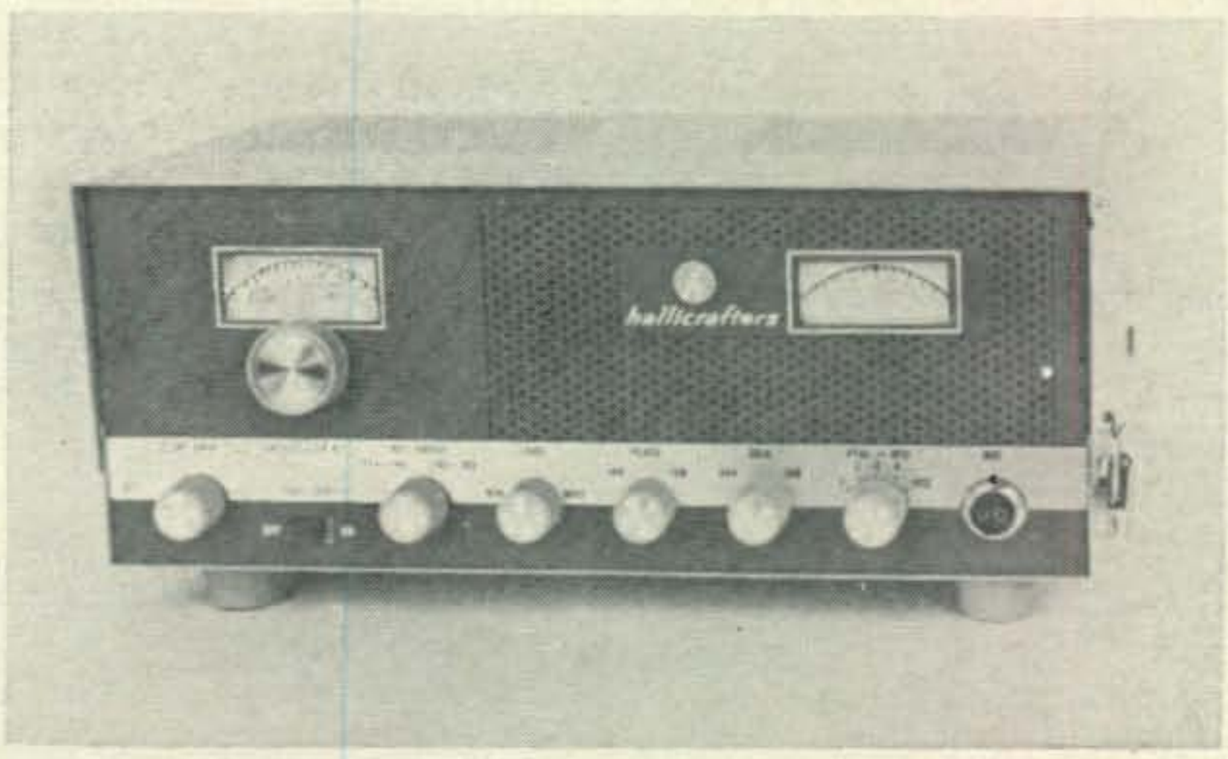
*Technical Director, *CQ*.

Circuitry

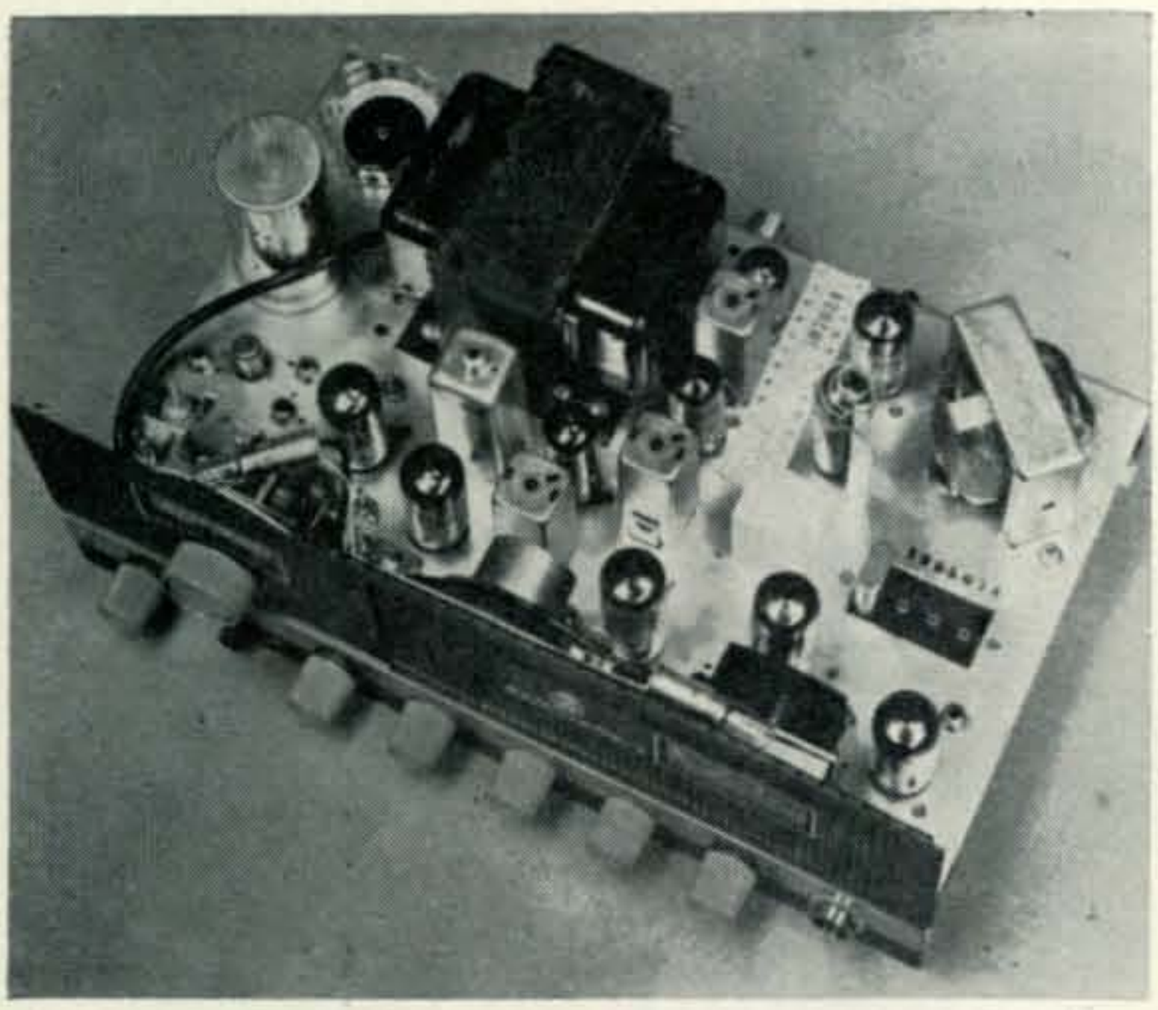
Eleven tubes and two zener regulators are used in the two-meter model. We've not included a block diagram, since the lineup is quite straightforward with no special tricks employed.

The receiver starts out with a 13CW4 Nuvistor neutralized r.f. amplifier which has high sensitivity with low noise. The input circuit is broadbanded with the output of the amplifier band-pass coupled to a low-noise triode mixer (½ 6U8A) where the 144 mc input signal is heterodyned with a signal from a tunable oscillator, to produce an i.f. of 20.15 mc at the mixer output. The pentode section of the 6U8A is used for the v.f.o., with feedback to the control grid obtained from a "tickler" coil in the screen-grid circuit. The plate circuit is used as a doubler, so the oscillator can operate at half the required heterodyning frequency, an arrangement that contributes to better stability and which minimizes "oscillator pulling." Temperature compensation, a double-spaced variable capacitor and regulated plate voltage for the oscillator, obtained from a zener-diode regulator, further contribute to frequency stability. A zener regulator for the heater of the oscillator tube also is used with 12 v.d.c. operation to eliminate frequency changes with varying battery voltage during mobile service.

The oscillator range is split into two equal segments to provide twice the usual degree of bandspread. This is done by switching in an additional coil across the oscillator tank when the higher frequency segment is used. The basic frequency range of the oscillator is 61.925-62.925 mc which is doubled to 123.85-125.85 mc for 144-146 mc operation (123.85 + 20.15 i.f. = 144 mc). The range for the second segment is



The Hallicrafters SR-46 6 meter transceivers.



Top chassis view of the SR-42. The crystal sockets are at the right center shown with one installed crystal. The empty socket at the upper letf corner is for the vibrator needed with 12 v.d.c. operation.

62.925-63.925 which is doubled to 125.85-127.85 for 146-148 mc.

The 20.15 mc i.f. is fed to a second mixer to be combined with an 18.5 mc crystal-controlled signal to produce a second i.f. of 1650 kc which is amplified in two stages. Double-tuned coupling circuits are used between all i.f. stages to provide the best selectivity. The detector is one-half of a 6AL5 diode which also furnishes a.g.c. for the r.f. and the 1650 kc stages. The other section of the 6AL5 is a series-type automatic self-adjusting noise limiter with a fixed threshold and which is in the circuit at all times. The a.f. power stage uses a 6AQ5 to deliver 3.5 watts of output. It is driven by a 12AT7 a.f. amplifier and is also used as the modulator for the transmitter.

Transmitter Section

The transmitter starts off with a triode crystal oscillator (½ 7059) using 24 mc crystals, followed by a pentode tripler (½ 7059) which is in turn followed by a 12BY7A doubler that drives a 7551 in the final amplifier to 12-14 watts input. Bandpass coupling is used between the tripler and the doubler, with a tunable impedance-matching circuit used between the doubler and the final. The output circuit of the final amplifier uses a series-tuned arrangement that minimizes the effects of tube and stray capacitances to enable the proper load impedance to be readily obtained for improved efficiency.

The final, which operates in class C as a straight-through amplifier, is plate and screen modulated by the a.f. output amplifier of the receiver, using the Heising system through a split winding on the a.f. output transformer. A mike preamp precedes the a.f. driver. The mike receptacle is wired for push-to-talk operation and an r.f. filter is provided at the grid of the mike amplifier to minimize the possibility of r.f. feedback into the a.f. system.

The antenna is coupled to the final tank through a link that is series-tuned from the panel to provide variable loading and matching. A high-pass filter is used in the antenna line for both the transmitter and the receiver.

6-Meter Model

The SR-46, 6-meter model, has a similar lineup, but it uses one less tube and one less zener diode. The first mixer is one triode section of a 12AT7, the other half of which is the receiver v.f.o. that also operates at half the required heterodyning frequency with its second harmonic, obtained directly from the oscillator rather than through a doubler stage, used for the heterodyning signal. In this case the oscillator range for each 2 mc receiver segment is 29.85-31.85 and 31.85-33.85 mc for 50-52 and 52-54 mc respectively. Heater regulation with 12 v.d.c. operation is not needed in this band, so one less zener diode is used. A low-pass filter, with cutoff above 54 mc, is installed in the antenna line to the receiver for reducing TV station interference with reception.

The 6-meter transmitter employs 25 mc crystals using the same oscillator/doubler setup as in the two-meter model. A tripler is not needed as before, so one less tube is used. The final is driven directly from the doubler through capacitive coupling. The output circuit for the final is a conventional Pi-network with bridge neutralization employed for stabilizing the pentode amplifier.

Switching

In both models a relay is used for switching from receive to transmit, at which time it removes B-plus from the r.f., mixer and i.f. stages, and applies it to the speech amplifier, the transmitter oscillator and multiplier stages. It also transfers the antenna to the transmitter. B-plus is applied at all times to the a.f. power amplifier, its driver and the final r.f. amplifier. During receive, the cathode of the latter is open. On transmit a grounded relay-contact arm opens the ground side of the voice coil on the a.f. output transformer, thus disconnecting the speaker; and it then grounds the final amplifier cathode. The transfer relay also switches the a.f. driver input from the a.f. gain control, at the detector output, over to a mike gain control at the output of the speech amplifier. Frequency spotting is obtained with a panel switch that applies B-plus to the crystal oscillator or to an external v.f.o.

Construction

The SR-46 and SR-42 transceivers are built on open-end chassis that permit easy access for servicing, if needed. The cabinet is built in two parts with the lower section enclosing the sides and the bottom of the chassis to which it

is fastened. The top part of the cabinet is a hinged section that serves as the top cover and the upper sides of the cabinet. It is hinged at the rear and when closed, is held firmly in place with snap-on clamps at the sides. When the clamps are released, the cover may be raised for easy access to the tubes and to the four crystal sockets that are mounted on top of the chassis. If need be, the top cover may be removed entirely by also disengaging the rear hinges, simply by pulling the two rear corners slightly outward. In the event the transceiver is installed in the car, this allows the unit to be conveniently removed for safety against theft or for servicing, without removing the mounting brackets (the cover remains in place, however).

The receiver is tuned with a 6 to 1 ratio planetary drive and a circular dial is used that is calibrated in 100 kc steps for the two 2 mc ranges, with a total bandspread on the dial of 7½".

Power Supply

The power supply uses silicon diodes in a voltage-doubler circuit with R/C filtering. There are two primary windings on the power transformer, one for 117 v.a.c. operation, the other for 12 v.d.c. use. In the case of the latter, the d.c. input voltage is converted to a.c. by means of a heavy-duty vibrator (not supplied with the basic unit). Separate power cords are used for each type of power source. Their cable plugs are wired to automatically make the change in interconnections required in each case. D.c. operation is for negative-ground systems, but a positive-ground system may be used after making a few simple wiring changes in the unit. Maximum current drain is 5 a. for the SR-46, 6 a. for the SR-42 @ 11-16 v.d.c. With 117 v.a.c., 65 watts of power is required.

Performance

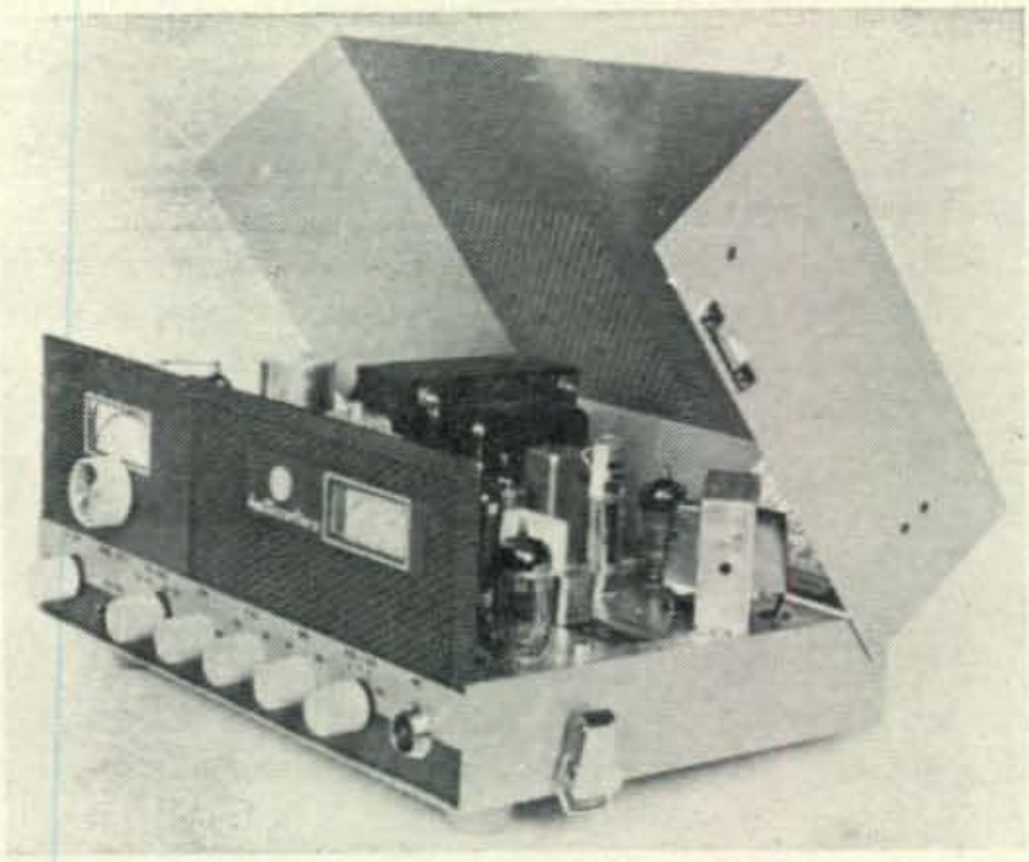
The sensitivity of the receiver is rated at less than 1 μv for 10 db signal-to-noise ratio with a noise figure of 4-6 db for the 6-meter unit and 5-7 db for the 2-meter one. The sensitivity measured mostly on the "less" side with an average of 0.5 μv on 6 meters and 0.7 μv on 2 meters. Noise figures for the respective receivers turned out to be 4-5.5 db and 6-8 db. Selectivity specifications are not given, but we came up with 8 kc at the 6 db points. I.f. rejection came up to rating at 85 db. During the recent v.h.f. contest we heard stations in many states and experienced no particular QRM problems despite the fact that we're located in an active metropolitan area; neither did we have trouble with the host of TV and f.m. stations found here. Tuning was a little critical, but the S-meter, which, by the way is calibrated at S-9 for a 50 μv signal, is very lively, making it easy to locate weak signals through background noise. Since the noise limiter is always operating, we could not closely determine its effectiveness; however, we had no difficulties with usual type of noises. After 15-20 minutes warmup, the receiver frequency stability was fine, eliminating the need for "chasing a signal around."

The transmitter power output, not given in the specifications, amounted to 5.5 watts on 6 meters and 6 watts with the 2-meter unit. The modulation limits at about 80 percent with clipped waveform, but the average power is high, and with the mike gain adjusted to where the output meter just starts to wiggle, only a moderate amount of clipping is found, and on-the-air reports indicated plenty of modulation with good-sounding a.f. quality. One difficulty that we ran into with the 6-meter model, was that when the final was lightly loaded, it took off by itself. This can be checked by switching to an empty crystal position and noting whether or not there is output. The situation was not evidenced, however, when the amplifier was properly loaded. Operation on 12 v.d.c. was not checked, inasmuch as we did not have the necessary vibrator on hand.

The case for the SR-46 and SR-42 units is gray with perforations on the top of the hinged cover, described earlier. The loudspeaker is behind a grill at the center of the panel with the tuning dial at the left and the S-meter at the right. The controls are in one line across the bottom of the panel. A screw-on type on mike connector is used. The plastic feet at the front of the case are longer than those at the rear to place the set in a tilt-up position.

On the rear are located an SO-239 antenna connector, the power plug, S-meter zero adjust, mic gain, ground terminal, phone jack and power/rf plug for external v.f.o. The overall size of these units is 5½" × 12⅛" × 8¼" (h. × w. × d.) and weight is 15 pounds.

The SR-46 and SR-42 units are priced at $189.95 each with one crystal for 50.22 mc in the 6-meter model, and one for 145.14 mc in the 2-meter unit. The model MR-40 kit for 12 v.d.c. mobile operation included a heavy-duty vibrator, d.c. power cable and the necessary brackets and hardware for mobile mounting. The Manufacturer is Hallicrafters, Inc., 5th and Kostner Avenues, Chicago 24, Illinois.—*W2AEF*



View of the SR-42 showing the hinged cover described in the text.

THE IDEAL MOBILE

BY RICHARD M. JACOBS,* WAØAIY

My Ideal Mobile started as a figment of my imagination and progressed over the past two years since the purchase of a 1962 Chevrolet. I wanted a mobile that incorporated everything electronic that I might desire and above all have three prime requisites: 1. Comfort—the possibility of three comfortably seated people in the front seat; 2. Appearance—neat appearance throughout by the use of hidden wires and a "down to earth looking antenna system"; 3. Practical—equipment actually used and not just installed for appearance sake.

Unfortunately, many people today are so concerned about their car's resale value that they can't really enjoy it. This was one of my last considerations since today's modern glass fillers and chrome plated hole plugs make it easy on one's "conscience" to drill all necessary holes. The Ideal Mobile should be enjoyed to be appreciated.

Of primary importance in any mobile system is the electrical requirements and safeguarding of the equipment. When purchasing my car I had a heavier duty 52 amp alternator and a very high duty battery substituted for the original equipment. Later, I desired an additional battery installed under the hood with a diode circuit so that both batteries may be charged simultaneously (fig. 1), thus enabling me to talk for hours to my heart's content without ever worrying about having trouble starting the engine.

To get three people in the front seat, I decided to use remote control wherever possible. In the trunk the transmitter and a receiver were shock mounted, along with a 300 watt 110 v.a.c. transistorized inverter and power supply for tuners, etc. Coffin box trasmitters can be procured at a low cost and I converted one for 6 meter a.m. and use it with a transistorized power supply and modulator. This system was mounted in my mobile on one side of the trunk and a 2 meter f.m. coffin box transmitter and receiver on the other side.

Dashboard

Control boxes for the communication systems were redesigned and chrome plated. Decals and miniature remote control crystal switches were utilized to give them a professional appearance. In any mobile system it is necessary to know what equipment is on and for this purpose, I installed a row of miniature indicator lamps on the right side of the dashboard and had a hot stamped legend placed on each one to indicate its use. Switches for control of the equipment were mounted in two rows on a convenient panel at the left side of the dashboard.

Since I did not desire to have a separate microphone for each communication system, I installed a miniature relay to switch the microphone from the 6 meter transmitter to the 2 meter transmitter and a legend stamped indicator light shows the operational state of the relay. Desiring to monitor police, taxi, mobile telephone, and aircraft, I procured two tuners and had their cases chrome plated to match the other dashboard equipment. Both tuners are powered by the transistorized power supply in

*1015 Glenside Place, University City, Missouri 63130.

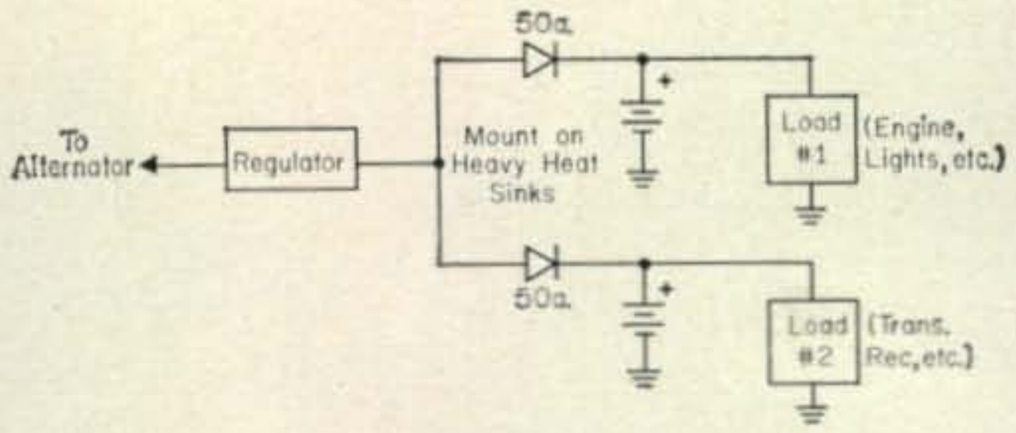


Fig. 1—Use of two silicon diodes enable simultaneous charging of both batteries and gives fullest use of one battery without fear of not being able to start the engine with the other.

the trunk and use the audio circuit in the transistorized a.m. radio. With the addition of a 6 meter converter under the dash everything was complete except for one thing—a public address system. Originally a home brew 50 watt transistorized p.a. was built and installed. This was later replaced by a 150 watt transistorized electronic siren and p.a. which completed the dashboard installation.

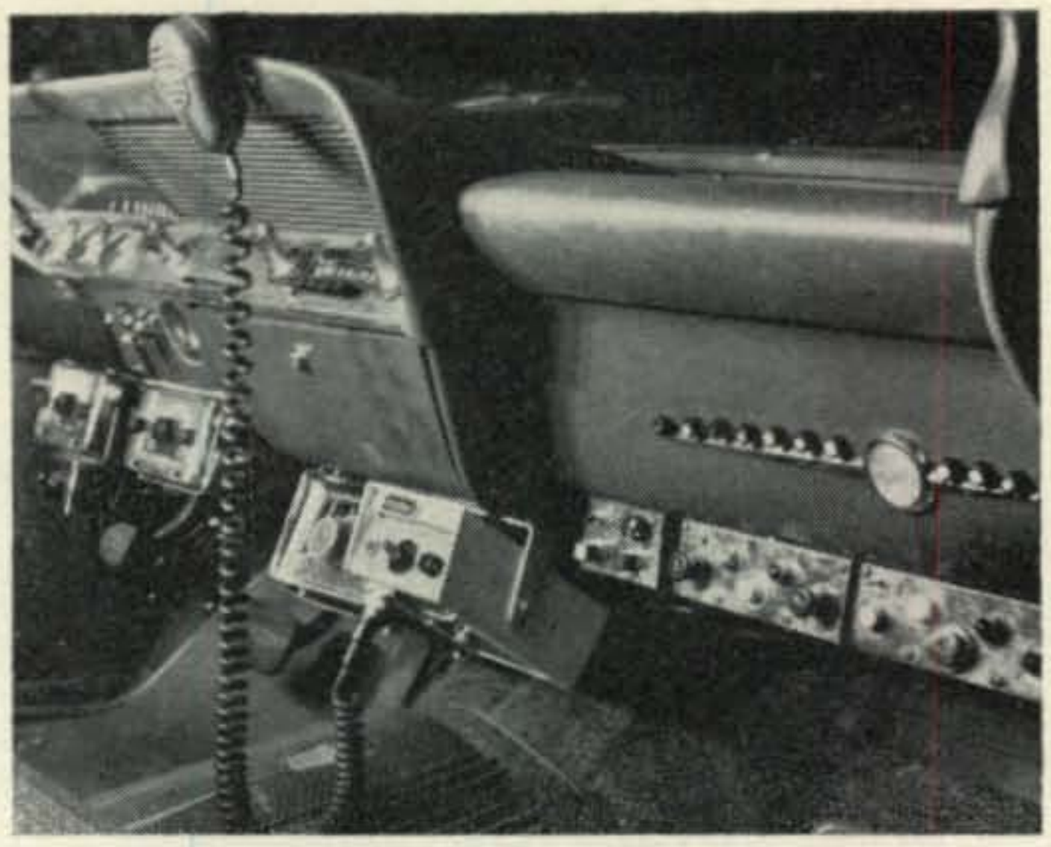
Two signal flashers were installed in the remaining few inches of space so that the brake lights and directional signals could be flashed simultaneously and, if desired, the special high intensity high beam lights could be flashed alternately. One of the dashboard switches was wired so that a high intensity spot light could be flashed or have a steady beam and a legend indicator light shows the status of each system.

Fortunately, the housing for the directional signals allowed for the installation of another socket into which specially made red directional signal bulbs were installed. These were connected into the car's directional, parking light circuit and to an indicator legend light on the dashboard to show when the red-yellow switch was in the "red" position. The red-yellow lamp selector control switch and a fader control to the rear speaker and p.a. were installed in a chrome plated minibox and mounted under one of the tuners.

So that every piece of electrical equipment in the car would be safeguarded, I installed under the hood automatic reset circuit breakers on the transmitter battery cables going to the trunk and to the main power cables going to a separate fuse block which I installed next to the one in the car under the dashboard. The hundreds of feet of wire and cable under the dash and to the trunk were color coded and numbered for easy maintenance. Three, four, and six wire connectors allowed for the quick disconnect of any piece of equipment in the car for trouble-shooting and any necessary maintenance or modification. All wires to the trunk and heavy battery and control cables were run along the sides of the car under the rug and secured.

Under The Hood

I set my voltage regulator (after moving it to allow for the installation of the second battery) up to about 14.5 volts for brighter lights and a minimum of 12 volts under full transmitter load. Although the increased voltage may decrease the life of lamps in the car, it seems



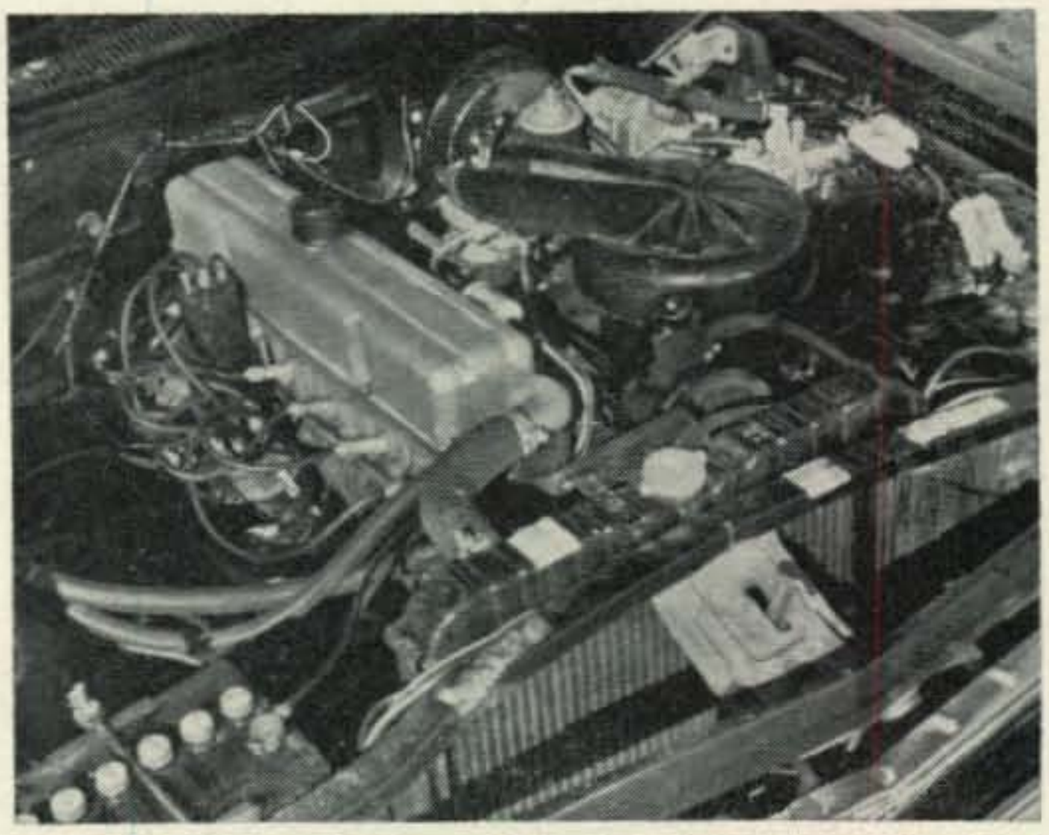
Equipment placement under the dashboard should depend on size of units and natural layout of the dash. Wires should be out of the way.

well worth it for the advantages obtained. Also installed was a revolutionary new anti-skid unit. This prevents skids on ice and water-slick highways by automatically pumping the brakes very rapidly when the wheels begin to lock after the brake pedal has been depressed.

Originally when the car was purchased there was more ignition noise than desirable for dependable reception. To combat any ignition noise, aircraft resistor sparkplugs were utilized of the same rating as the original equipment with a shielded ignition coil, cable, and distributor cap completing the shielded ignition system. This completely eliminated any noise from my car and the only other noise ever encountered is from a passing car once in a while that has a noisy ignition.

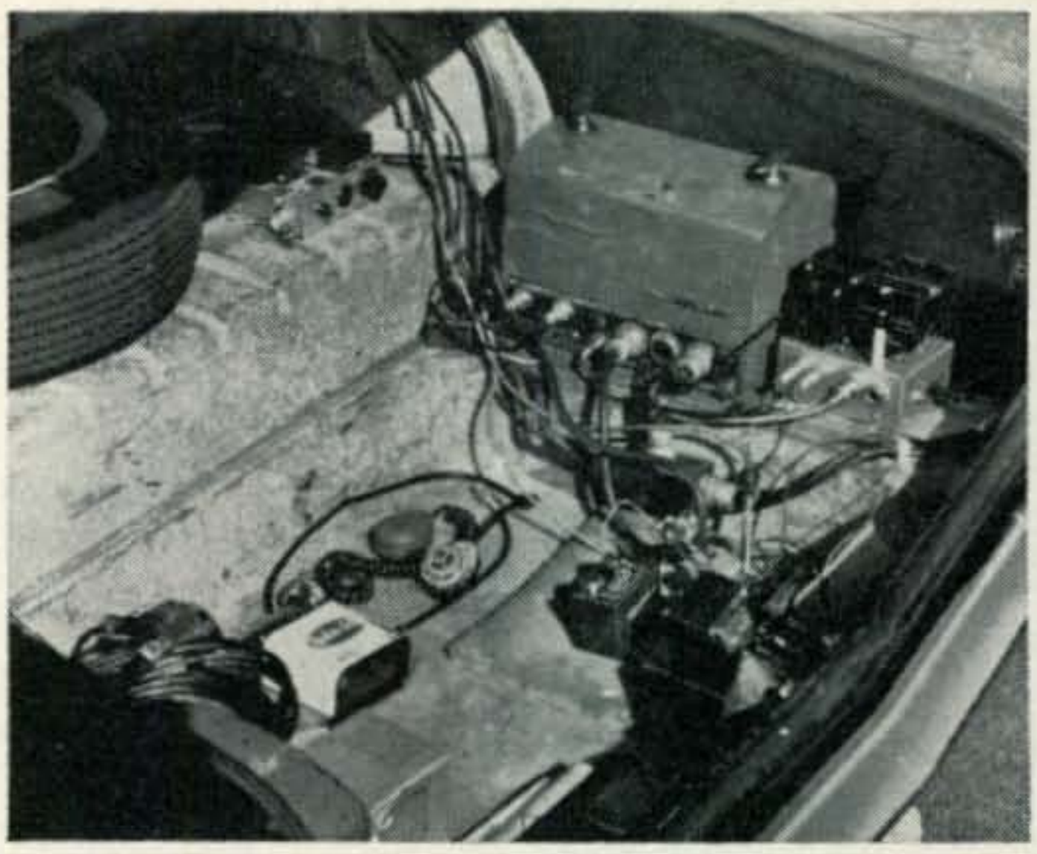
Antenna System

A great deal of consideration was given to the antenna system so that it would be as optimum as possible without being extremely obvious. A broadcast antenna was installed on the right front to feed the 108-128 and 152-162 mc tuners simultaneously. The slanted rear antenna feeds the a.m. radio, a small whip in back of the rear window feeds the 2 f.m. system and a



Under-hood installation of Ideal Mobile shows shielded ignition system, battery placement, etc. A hood lamp that goes on when the hood is lifted is convenient for night repairs or maintenance when necessary.

Symetrical antenna system strategically placed not only looks well but is very functional. Large antennas such as halos can be chrome plated, and should be easily removed when taken to a commercial car wash.



The 6 meter transmitter and transistorized modulator are shock mounted on one side of the trunk. A.c. inverter (upper left) and power supply for tuners (center) are well mounted. Trunk light that goes on when truck is lifted comes in handy at night.

halo symetrically located and body mounted completes the 6 a.m. system. The halo, incidently, was chrome plated to give a professional appearance and the plating did not seem to have an adverse effect on the s.w.r.

Taking great pride in my mobile, I placed my call letters on the rear window and a call letter plate on the front of the car. There is no better way to show one's pride in his hobby than the identification of his mobile. Although the Ideal Mobile is completed, one of these days the Ultimate Mobile will be realized and the great amount of experience with the I.M. will be utilized along with more advanced and sophisticated techniques and equipment.

Operation

My system features dual frequency transmit (80 watts output) and receive on 2 f.m., 146.94 and 147.3 and three crystal control transmit frequencies on 6 a.m. (200 watts input), 50.160, 50.250, and 50.550. If desired, I can listen to the 6 and 2 meter receivers, a.m. radio, aircraft tuner, and police tuner simultaneously with the aid of squelch control of the receivers.

The Ideal Mobile has been a lot of fun too. On one occasion I was able to take a 6 meter walkie talkie half a mile away and heard my voice being fed out of the car's p.a. system.

The advantages of a p.a. system mobile are very numerous and after one is installed, you wonder how you ever got along without it. For example, if you want to get into a solid line of traffic during rush hour, you simply ask "may I cut in" and you'd be surprised at the number of motorists who nod and let you into the lane. A "thank you" completes the maneuver.

As a public service I have received several letters of thanks from motorists for my mention to them over the p.a. that their license plate had expired or their license plate light was out or they were driving with only one headlight beam. A few words to a motorist about these things are always appreciated. If a child gets lost in a busy neighborhood, a few calls over the mobile p.a. has worked extremely well. All kinds of things can be done with this type of system, *i.e.* music through the p.a. at outdoor parties, etc., it's all up to one's imagination.

Suggestions

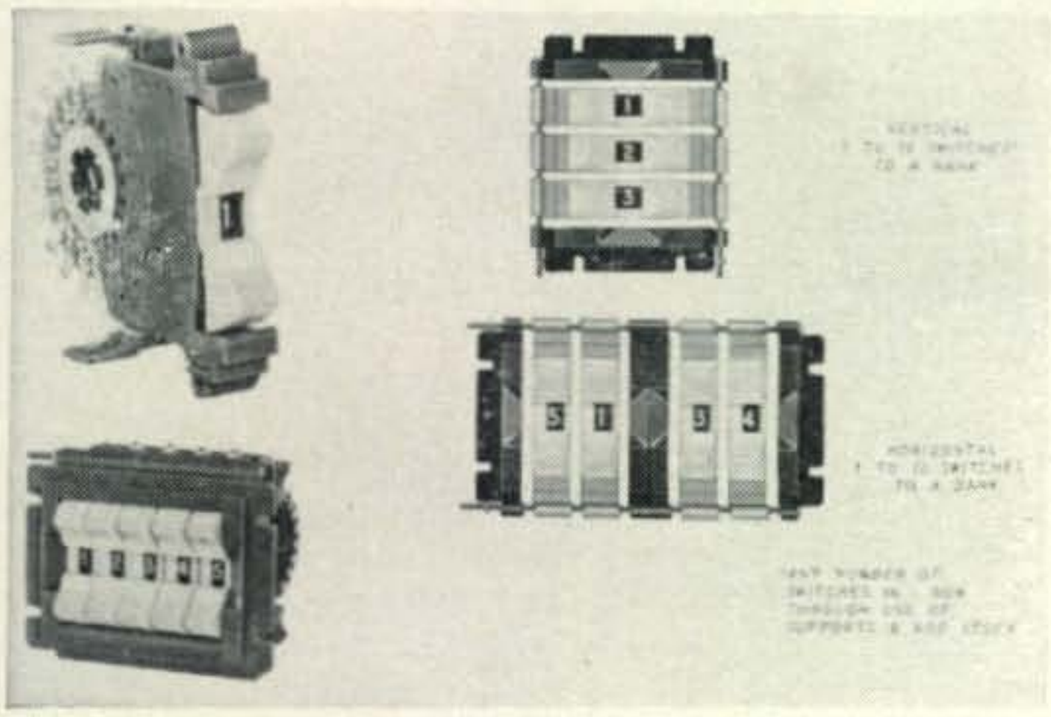
When considering the building of an ideal system for one's individual needs and desires, several things should be taken into account: What equipment will be installed immediately or eventually and where will it be placed, the electrical system and adequate safeguards, the antenna system—its appearance and its function, switching circuits and an indicating system to show what equipment is on.

A grouping of power switches is convenient to avoid having to reach all over the dashboard to turn equipment on or off; and the use of a push plug type of connector is essential for quick disconnect. The utilization of transistorized equipment, whenever possible, should not be overlooked due to its low power drain; and the use of automatic reset circuit breakers eliminates fuses completely.

The Ideal Mobile described wasn't built in a day or a week or a month—it took painstaking planning and many many more hours of work. If you are planning an Ideal Mobile, don't try to do everything at once—set a realistic goal for yourself each time you work on it. Go over each part of your system in advance and carefully install equipment so that a minimum of maintenance along with easy accessibility may be realized. Consider chrome plating and decals to give your installation a professional appearance.

And, most of all, enjoy your mobile for you will get many hours of pleasure with it and can be very proud of your accomplishment when you have finished. Anyone can build a low cost Ideal Mobile with a little time once in a while, a modest amount of finances, and a good imagination with the desire to see it fulfilled. Good Luck! ■

New Amateur Products

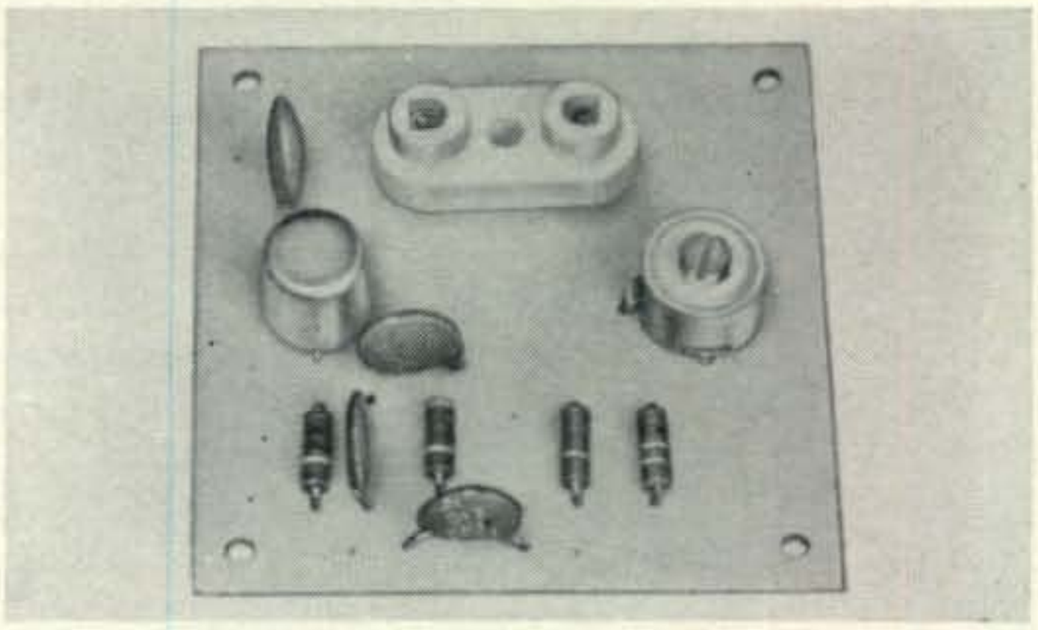


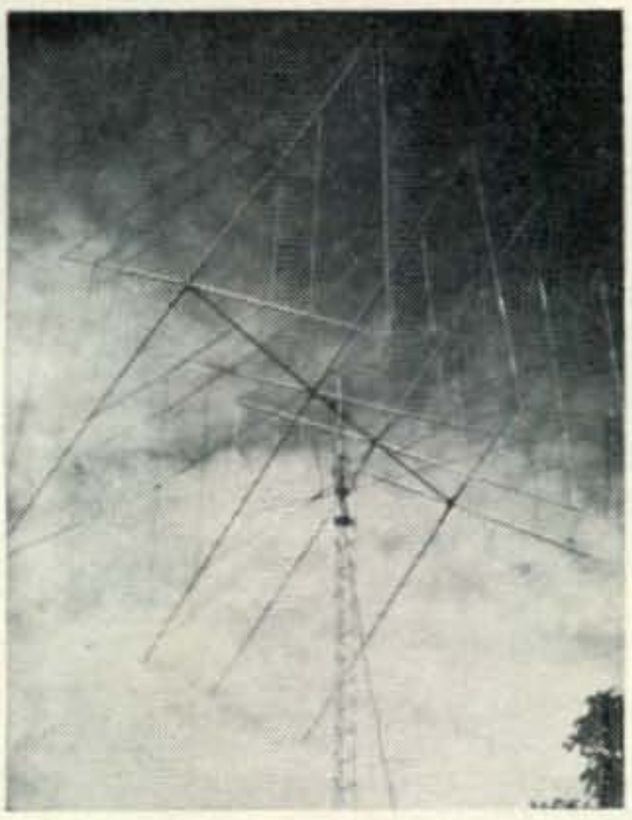
Oak Manufacturing Co.

A NEW rocker-type thumbwheel switch has been engineered by Oak Manufacturing Co., which is bi-directional, has positive push-button action and is modular in design so that the switches can be mounted singly or arranged in groups. They are available in seven different models in configurations up to 20 switching positions. For additional technical data on the new switches request Form No. SP-202, Oak Manufacturing Co., Crystal Lake, Illinois 60014, or circle 61 on page 110.

Petersen Radio Co.

Two new transistor oscillators have just been introduced by Petersen Radio Co., Inc., of Council Bluffs, Iowa. PR 455 has a frequency range of 455 kc to 1 mc PR 1-5 has frequency range of 1 mc to 5 mc, but can be supplied to 17 mc on request. Both units are completely wired and are very compact, being 2" × 2" × 1-15/16". Each requires matching crystal for frequency desired, and both are priced at $4.95 less crystal. For more information either write direct or circle 62 on page 110.





Skylane Products

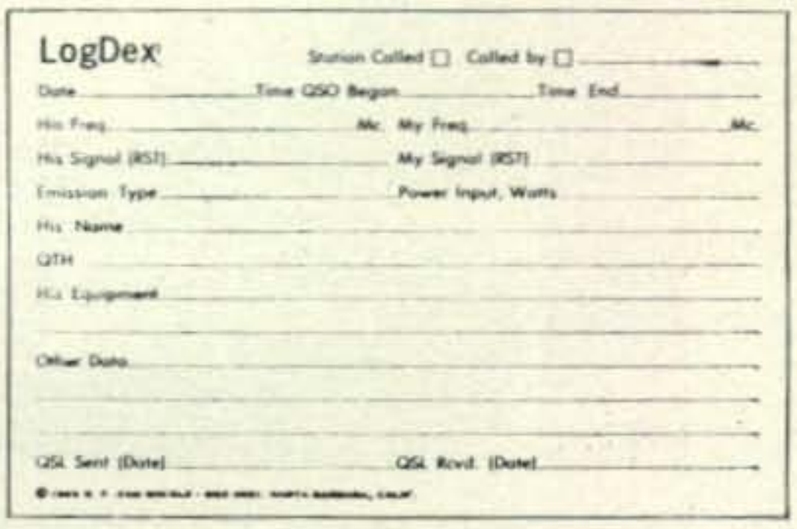
SKYLANE Products has introduced a new member to their line of quads. The new quad is a four element array that boasts many advantages over the lesser element quads such as greater gain, better F/B ratio and a much sharper horizontal field pattern. Input impedance is approximately the same as the three element quad, while the s.w.r. remains less than 2 to 1 at any place in any band for which the quad is designed, and approximately 1.1 at resonance.

This new addition rounds out the Skylane Line, which now includes 2, 3 & 4 element quads.

Write for new catalog with complete information to Skylane Products, Dept B, 406 Bon Air Drive, Temple Terrace, Florida, or circle 63 on page 110.

LogDex

LOGDEX is a system using 4" × 6" index cards to serve as both a station log and alphabetical record of stations worked. The LogDex card contains spaces for all required information and includes large areas for entering the name of the operator, his QTH, equipment description, and miscellaneous data. A free sample LogDex card and price information are available from LogDex, P.O. Box 4051, Milpas Station, Santa Barbara, Calif. 93103, or by circling 64 on page 110.


LogDex

Station Called ☐ Called by ☐

Date Time QSO Began Time End

His Freq. Mc. My Freq. Mc.

His Signal (RST) My Signal (RST)

Emission Type Power Input, Watts

His Name

QTH

His Equipment

Other Data

QSL Sent (Date) QSL Rcvd. (Date)

THE STORY OF COLLINS RADIO

Collins Radio Company started in the basement of this house in Cedar Rapids, Iowa. Here the first transmitter was built and sold.

BY ED. MARRINER,* W6BLZ

A SUNDAY afternoon during the hot, humid Iowa summer is usually not conducive to much activity except relaxing or recreation. The often oppressive heat and sunshine place a mantle of stillness over the landscape, broken only by a gentle breeze.

Such was the case back in 1932 when Benton White, W4PL, and his wife were driving through the Iowa countryside. The heat and weariness from travel led them to call a halt and find a hotel when they reached Cedar Rapids.

After getting accommodations, W4PL went out for a walk, just to look the town over, while Mrs. White stayed in the hotel room to cool off. Passing a newsstand, Benton noticed a *QST* magazine which he picked up, casually glancing through the pages. By chance his eyes fell on an ad for "Collins Transmitters," made in Cedar Rapids by Arthur A. Collins, W9CXX.

With nothing more important to do, Benton decided to locate the Collins' factory even if it was a Sunday afternoon.

Returning to the hotel to get his wife, they drove around town with her as navigator until they arrived at the given address, a house on a quiet shady street. Despite her protests, "You must be mistaken, there is no factory here," Benton decided to ring the doorbell anyway and see for himself.

A lady answered the door and replied to his question, "Yes, this is the Collins factory. Just a minute and I will call Mr. Collins." Benton returned to the car to inform his XYL that he would be inside for a while.

As he again approached the house he overheard a man talking on the telephone to a Mr. Miller and urging him to hurry over, saying "I think we have a customer." Benton had no intention of buying anything that Sunday afternoon, and as he silently debated whether to go through with his visit a jalopy pulled up outside with a squeal of brakes. Before he could change his mind, Benton was whisked inside and down into the basement; the Collins Factory.

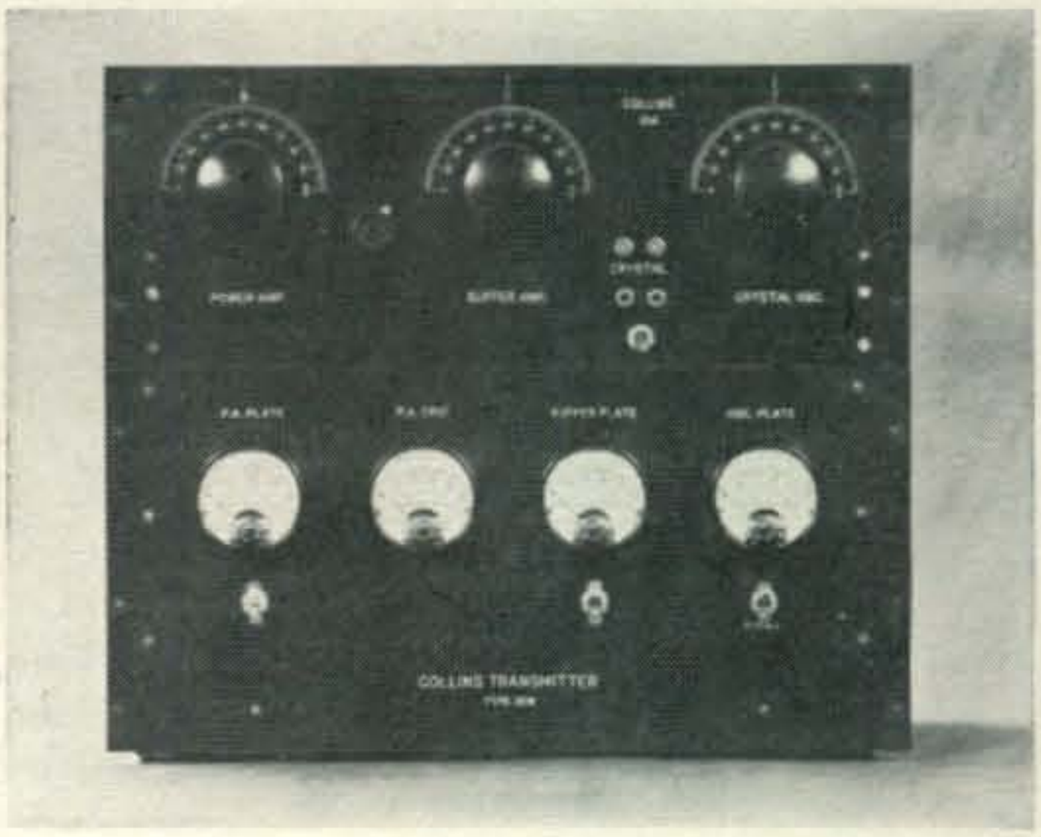
In one corner stood the furnace, a cat curled up next to the cool steel base. Around the walls were neat, clean workbenches. On one bench was a nearly completed transmitter, and as the three men gathered around it, Mr. Collins and his partner, the only other employee of the firm at the time, fired up soldering irons and started working.

Benton recalled that as members of the ham fraternity they sat on stools and chatted. He

[*Continued on page 104*]

*528 Colima Street, La Jolla, California.

Art Collins, WØCXX, founder of Collins Radio Company, seated by a Type 30W Transmitter built by him, back in 1932. It is now in the engineering museum.



The first transmitter sold by Collins Radio Company Inc.

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FREE with
2 year sub or
3 year sub

Actual Size

Actual Size

$1.50 VALUE
FREE with
one year sub

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RTTY From A to Z

BY DURWARD J. TUCKER,* W5VU

Part XIII

The various types of distortion encountered in RTTY work were covered in Part 12. The question arises as to what can be done about all of this. This installment touches upon the need for a distortion measuring instrument and covers the circuitry leading up to such a device as well as the basic circuits for modern Terminal Units.

It must be pretty apparent that one must strive to rid an RTTY system of distortion even though "store-bought" RTTY distortion equipment is not at all common to the radio amateur's shack. Some very few have access to RTTY distortion measuring devices where the majority must rely mostly on time consuming and painstaking "cut and try" and eternal experimenting.

The author has devised an instrument to be used in locating, checking and measuring RTTY distortion. It is most important that first some of the circuitry that went into the design of the device be covered before the actual instrument. This point has further significance, since much of the circuitry to be covered is considered basic for the modern Terminal Unit.

Square Waves

The subject of square waves has never been of much importance or interest to the average amateur unless he happened to be an RTTY'er. Square waves are all-important to the RTTY'er and a respectable knowledge and understanding of them is an almost must. Unfortunately, most beginners in RTTY work are not too well versed in the fundamentals of square waves.

It can be realized very quickly that square waves are very important in RTTY simply by checking back on the wave forms illustrated up to this point.

A 23 cycle per second *sine wave* is one thing and a 23 cycle per second *square wave* is an entirely different thing. The square wave is made up from a combination of many sine waves. How many sine waves are involved depends upon how "square" the square wave really is. In all instances, it is made up of first the fundamental frequency (23 c.p.s. in this case) and *odd multiples* (harmonics) of the fundamental frequency.

Square waves can be created easier than they can be analyzed. Figure 25 indicated how a square wave could be generated by a very simple method. Here the switch is opened and closed in a series circuit and the current pulses are square since only resistance exists in the circuit.

Figure 28 showed how square waves were generated by the keyboard contacts in a direct wire hookup. Here, the resistance of the circuit is kept high compared to the inductance of the selector magnets in order to maintain good square wave characteristics.

Another simple means of creating a square wave is indicated in fig. 81 and its transistor counterpart is shown in fig. 82. These are actually simple switching circuits that switch a voltage and current on and off. In the circuit shown in fig. 81, the switch is actuated manually. In the circuit of fig. 82, the transistorized version, the switch is Q_1 and can be actuated electrically. In both circuits the output waveform is a pulsating d.c., the output rising from zero to some positive value and then back to zero.

It must be realized that the simple on-off d.c. signal produced by the circuits of figs. 81

*6906 Kingsbury Drive, Dallas 31, Texas.

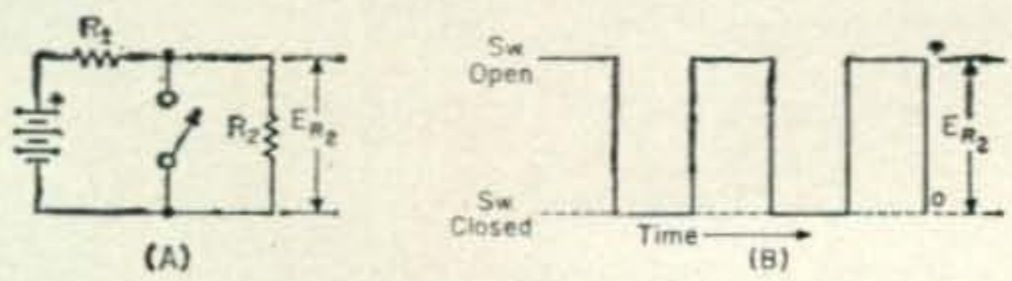

Fig. 81—Shown above is a simple switching circuit (a) that creates a pulsating d.c. square wave (b).

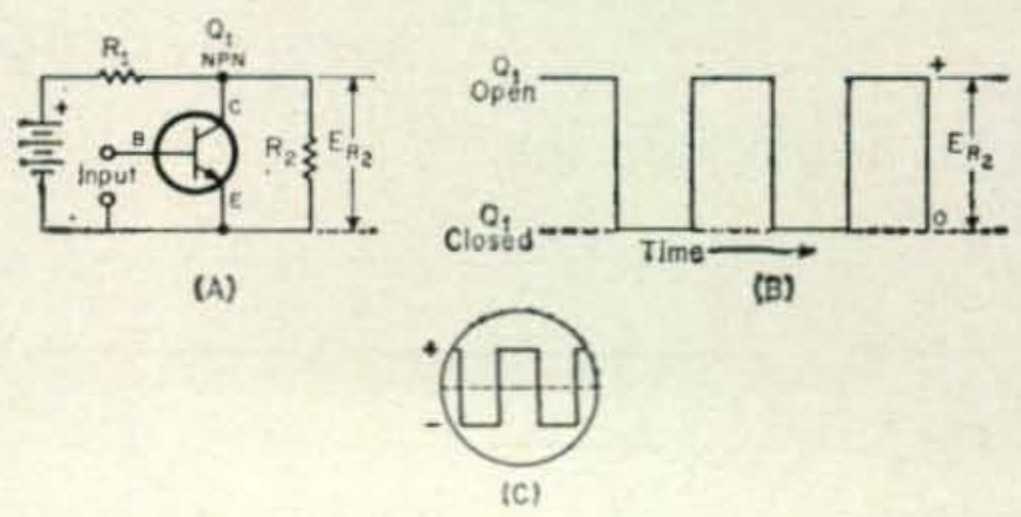

Fig. 82—The simple transistor switching circuit (a) creates the pulsating d.c. square wave shown in (b). When viewed on most oscilloscopes this wave form appears as an a.c. signal shown in (c).

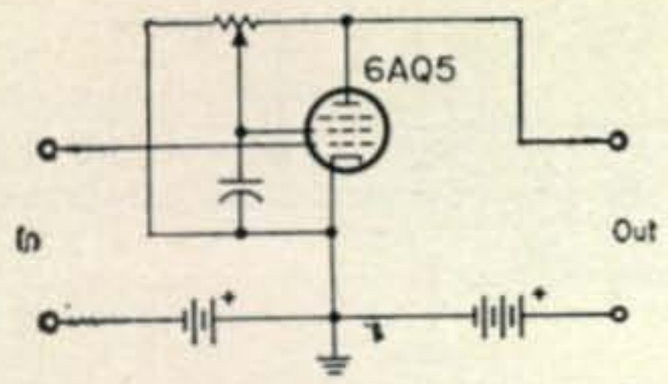

Fig. 83—Simplified circuit of a vacuum tube keyer. The principles of operation are explained in the text.

and 82 turn out to be square waves with positive and negative half-cycles when reproduced as a trace on a scope that does not use direct-coupled amplifiers to its vertical deflection plates. This fact should be kept in mind when working with signals and circuits similar to these.

The transistor *Q* in fig. 82(a) can be considered as replacing the manual switch in fig. 81(a). The *emitter current* controls the *transistor resistance* between emitter and collector. This resistance is very high when there is no emitter current flowing and it drops to a very low value (almost a short circuit) when the emitter current is high. The emitter current is determined by the emitter-base junction bias as applied to the input of fig. 82(a). Maximum current flows when the emitter-base junction is heavily forward-biased (plus to the base). Additional forward biasing of the transistor does not increase the emitter-to-collector current. In fact, a point could be reached where the emitter-base junction could be burned out by too much forward-bias voltage.

Reverse-bias (negative voltage to the base) to the emitter-base junction produces the opposite effect. Reverse bias cuts off the emitter-to-collector current. By going from a no current condition to a maximum current condition we have, in effect, a switching transistor that has two states—cut-off or saturation (off or on).

A vacuum tube keyer circuit, given in fig. 83, is another form of switching circuit. It will be noted that this circuit is similar to the keyer portion (V_5 and V_6) of the W2JAV converter circuit shown in fig. 46. Various versions of this circuit are in wide use by RTTY'ers. The tube bias and screen voltage is adjusted such that the plate current is at approximately the cut-off value with no signal input. A strong square wave input signal gives a pulsating direct current square wave signal at the tube output.

In each instance, in fig. 81 and 82, note that the square wave was formed by the voltage rising from a zero value (switch closed) to its full value E_{R2} (switch open). It maintains the E_{R2} value until the switch is closed and then it immediately drops to zero. It is interesting to note that in the very beginning of an RTTY signal, which starts at the keyboard transmitter contacts, the signal created is a square wave such as just described. Noted further that this *pulsating direct current* signal becomes a square wave *alternating current* signal when it passes through other than a direct-coupled amplifier stage (to be covered in a moment). Note finally that this originally pulsating direct current RTTY signal, after taking on various forms in the radio transmitter, through space, through the receiver and finally through the converter or terminal unit, emerges (if it makes it) as a pulsating direct current signal that operates our teletype printer. For that reason, it pays good dividends for any RTTY'er to learn all he can about square waves.

Square Wave Analysis

A sine wave, when added with its third harmonic, is shown in fig. 84. Note how closely the resultant resembles a square wave. As the 5th, 7th, 9th *etc.* harmonics are added the resultant becomes closer to a perfect square wave. A good square wave is one that contains the odd harmonics up through the 21st harmonic. Each harmonic must have the proper amplitude and the proper phase with regard to the fundamental signal. If either the amplitude or the phase of one or more harmonics is changed the square wave shape is altered.

Amplifier Response

The frequency response and phase shift in the internal amplifiers of a scope, effect the trace of a square wave shown on the scope tube face. Some are shown in fig. 85. Actually, the various traces shown in fig. 85 can be the result of the frequency response and phase shift in any amplifier whether it be a part of an oscilloscope or some other device such as a speech amplifier or a part of an RTTY *terminal unit*.

Traces (b)(c)(d) and (e) are only intended as a general guide, since any circuit causing frequency amplitude variations (poor frequency response) and phase shift can give a varying response, depending upon the amount of each present. Distortion of the bottom and top of a square wave (a curved line instead of a straight line) is an indication of a lack of perfect low frequency response. A tilt of the top and bottom of a square wave is an indication of a phase shift. A tilt downward (from left to right) of the plus cycle indicates a phase shift *decreasing with frequency*. This could be caused by a grid-coupling capacitor that is too low in value. If the top of the wave tilts in the other direction it is an indication of phase shift *increasing* with frequency. A phase shift at the fundamental frequency of a square wave with respect to its harmonics is the cause of the tilting of the normally horizontal portion of a square wave. The top tilts from left to right when the phase

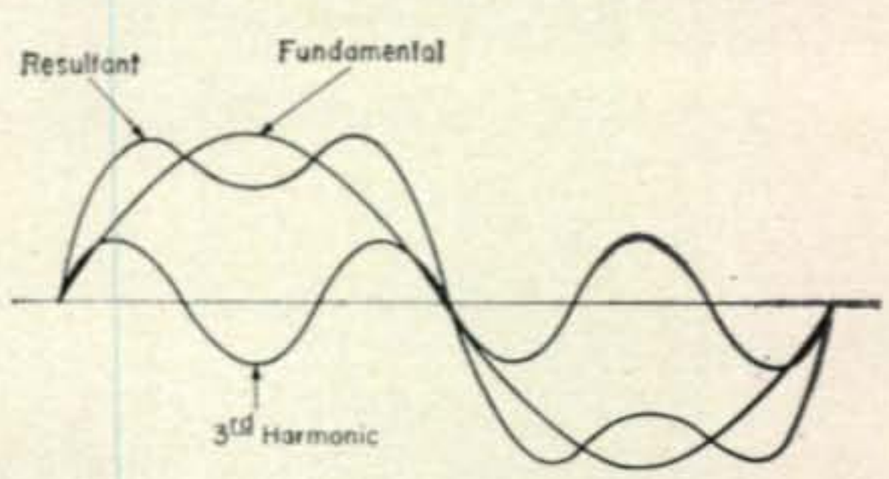

Fig. 84—The fundamental sine wave plus the third harmonic produces a resultant close to that of a square wave. Additional odd harmonics bring the resultant closer to a perfect square wave.

leads at low frequency and the tilt is reversed when the phase *lags* at low frequency.

Trace (a) shows an undistorted square wave. Trace (b) shows practically no very low frequency drop and practically no rise at extremely high frequencies and the overall frequency response is flat with a small phase shift decreasing with frequency.

Trace (c) shows a little more phase shift and the effect of a decreasing frequency response at the low end although the overall frequency response is fairly flat. Trace (d) shows some phase shift, a peak in the high frequency response and a fairly sharp low frequency cutoff while the overall frequency response is not so flat. Trace (e) shows phase shift, a very definite low frequency cutoff as well as a pronounced high frequency peak with the overall frequency response anything but flat.

Conclusions

One of the handiest pieces of electronic test equipment to have around, next to the v.o.m., is an oscilloscope. An RTTY'er, like the phone man, can hardly operate his station without an oscilloscope. Generally speaking, an RTTY'er needs a better quality scope. The reason for this is that the RTTY'er is mostly concerned with square waves. Further, the RTTY'er is principally interested in a square wave of 23 c.p.s.

It is most desirable that the scope has a frequency response that will permit the trace shown in (a) fig. 85. One can settle for a trace such as (b) or even (c) in a scope. Let us suppose that our scope produces trace (c) for an input wave such as (a). When a square wave such as (a) is put through an amplifier that is under test and if the amplifier has a very good frequency response, the signal will appear as trace (c) since that is the response of our scope for a perfect square wave. If the amplifier under test has poor low frequency response it may appear as a trace such as (d) or (e). In this case we have to compensate mentally, for the scope deficiencies by comparing traces (c) and (d) or traces (c) and (e). From this, it can be seen that the testing of an amplifier for its square

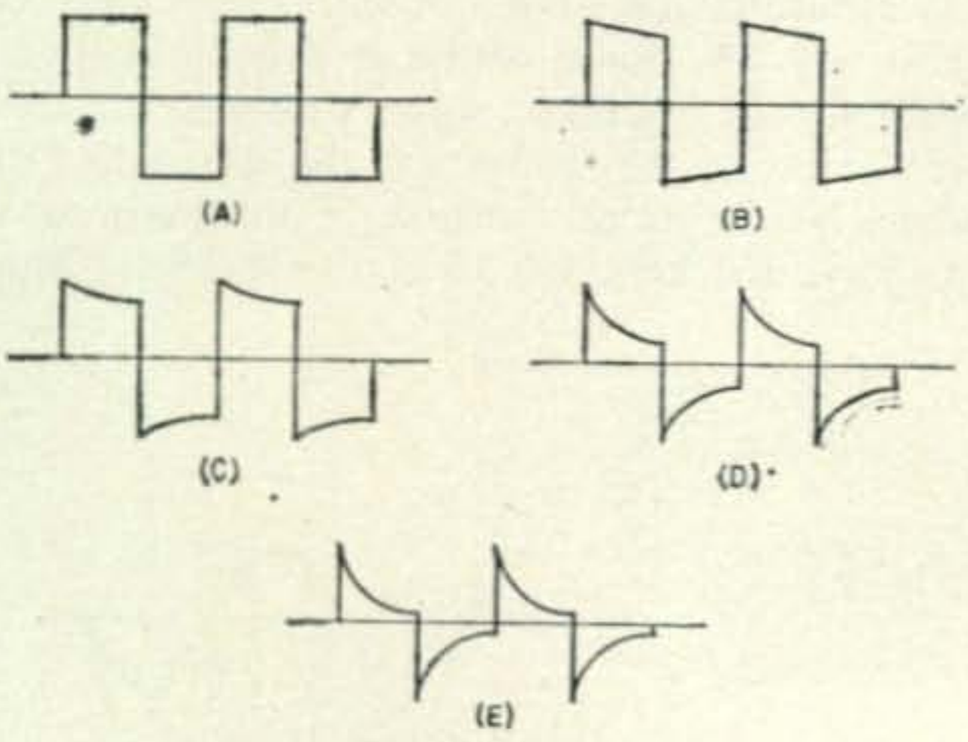

Fig. 85—The various scope traces from (b) to (e) are each from a different frequency response and phase relationship in an amplifier as discussed in the text. The input in each case was the perfect square wave shown in (a).

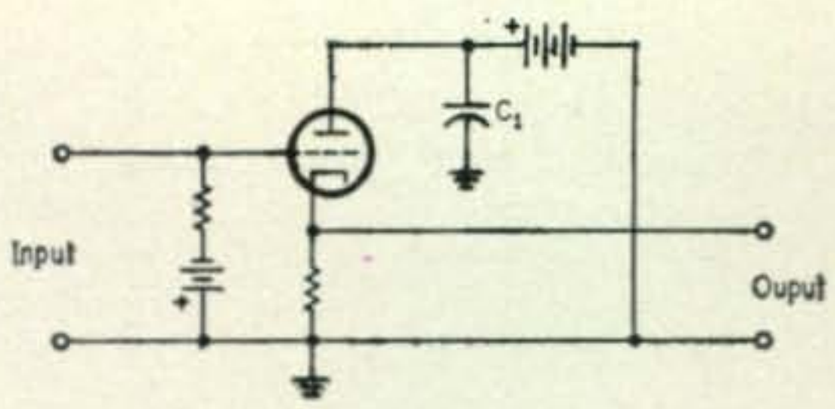

Fig. 86—A basic cathode follower circuit.

wave response can become somewhat sticky if the scope that we are using to make the test isn't flat either. If the scope response is poor, our job becomes progressively more difficult.

Special Circuits

The distortion test set, previously mentioned, as well as the Terminal Unit, and many other Terminal Unit designs collectively use numerous circuits not too common to amateur radio except for RTTY work. For that reason, it is considered appropriate that some of this circuitry should be touched upon at this time before going into the actual design and circuitry of the special distortion test set, which uses some of this circuitry. All of the circuits to be covered are somewhat inter-related and some of them are referred to by more than one name which can be confusing.

The further one gets into the study of RTTY, especially Terminal Units, the more he begins to wonder if he is still on the RTTY subject or somehow got switched to the subject of computers. One begins to read about Eccles-Jordan circuits, flip-flops, triggers, logic, Schmitt trigger, *etc.* The modern Terminal Unit uses numerous circuits that are quite common to computers. In addition, there are such terms as "decision circuits", point at which a circuit "changes state", and decision threshold computer circuits, as well as others that will be covered in due course.

The Cathode Follower

For many years the load of a vacuum tube was placed in the plate circuit of the tube and this was commonly known as plate loading. About the time of World War II another method of loading a vacuum came into existence. This new method was called *cathode loading* and an amplifier stage with cathode loading was called a *cathode follower*. The basic circuit of a cathode follower is shown in fig. 86.

The voltage gain of this stage is always less than one since the output voltage is always less than the input voltage. Since such a stage does not have a voltage gain, one is prone to question as to what useful purpose it might serve.

Distortion in a cathode follower is usually low because of the 100% negative voltage feedback inherent in such a stage. An additional value of a cathode follower is in its impedance characteristics. The input impedance is high and the output impedance is low, which makes it quite useful and practical as a driver for Class AB_2 and Class B amplifiers. One is familiar with the 180 degree phase shift between the input voltage and output voltage of a plate-loaded

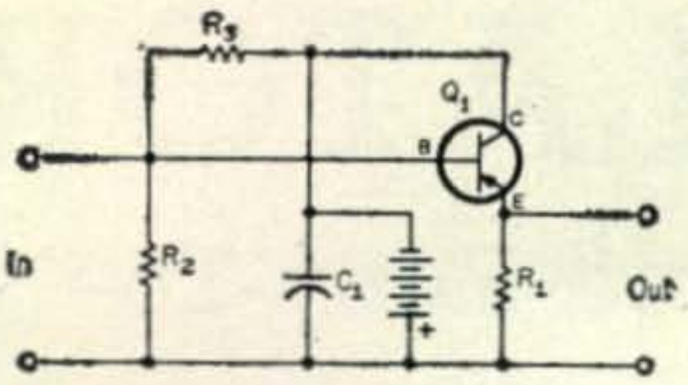

Fig. 87—The basic circuit of the common collector amplifier, the transistorized equivalent of the cathode follower.

amplifier. The input (grid) and output (cathode) voltage of a cathode follower are *in* phase. This feature as well as the low output impedance of a cathode follower makes it particularly useful where pulse techniques are involved such as in RTTY work. Also, the cathode follower can provide current gain. (This means power gain, too.)

This discussion of a cathode follower would not be complete without reference to its transistor counterpart, the *common collector* amplifier. Figure 87 gives a basic circuit schematic of a transistor common collector amplifier or emitter follower as it is sometimes called. Capacitor C_1 is for bypassing the collector to ground. Like the cathode follower, the emitter follower has a voltage gain of less than one. The main reasons for its use are the same as those for the cathode follower, high input resistance and very low output resistance as well as a good current gain. The common collector amplifier is sometimes called an *emitter-follower* since the voltage drop across the emitter resistor tends to follow the input voltage to the base. This is similar to the way the voltage drop across the cathode resistor of a cathode follower follows its grid voltage.

Direct-Coupled Amplifiers

Obtaining uniform frequency response or any response at all in an audio amplifier becomes more difficult as the frequency approaches zero or near zero. Some of the effects of poor frequency response in audio amplifiers at extremely low frequencies were just discussed. The use of a transformer becomes less practical both technically and economically at very low frequencies. Even with resistance-capacitance coupled stages a limit is reached as the operating frequency approaches zero.

A practical solution to this problem is to use *direct-coupled amplifiers* which are sometimes called direct-current amplifiers since they will amplify down to d.c. A direct-coupled amplifier will amplify low frequencies, uniformly and without phase shift or attenuation, right down

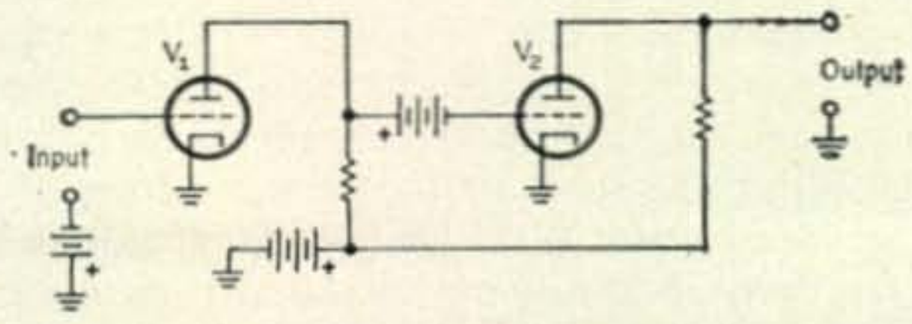

Fig. 88—Simplified schematic of a direct-coupled amplifier. Such an amplifier will handle low frequencies down to d.c. without phase shift or loss of response.

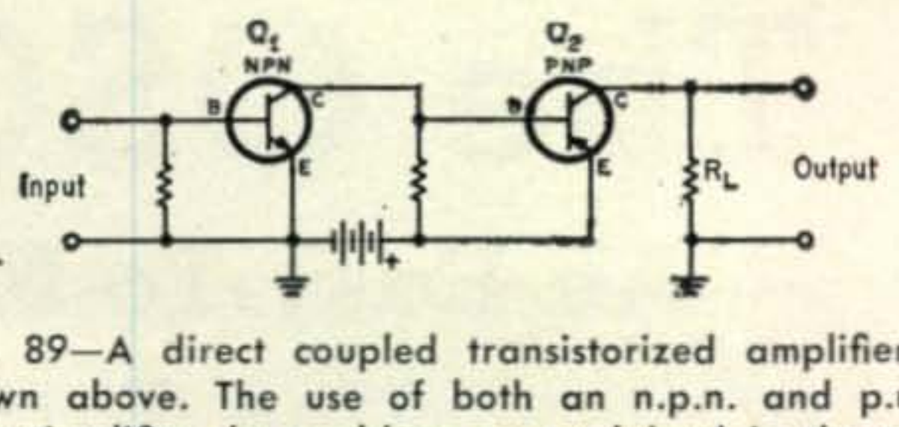

Fig. 89—A direct coupled transistorized amplifier is shown above. The use of both an n.p.n. and p.n.p. type simplifies the problems as explained in the text.

to zero. After the seemingly insurmountable problems associated with low frequency response, especially at RTTY frequencies, one can readily see that such an amplifier would be bound to find favor in RTTY applications. Anyone experienced in the use of scopes knows the value of having a direct-coupled amplifier at the input to a scope.

An elementary circuit of a direct-coupled amplifier using tubes is shown in fig. 88 and a circuit using transistors is shown in fig. 89. These circuits are basic for the sake of simplicity. Actual working circuits are found in varying forms depending on design requirements.

When vacuum tubes are cascaded in a direct coupled circuit, voltages become a problem as may be seen in fig. 88. In this form two separate voltage sources are used. In another form one source of voltage is used but it must be greater in value (at least the sum of the two individual voltages).

In the transistorized version shown in fig. 89, the use of a p.n.p. and n.p.n. transistor permits a single voltage source to be used that is no greater than usual (about 9 volts).

The collector of Q_1 in fig. 89 requires a positive voltage. The emitter of Q_2 requires a positive potential since the collector of Q_2 is returned to ground through the output load R_L. The biasing arrangement, as shown in fig. 89 makes it possbile for the collector of Q_1 to be connected directly to the base of Q_2.

Additional RTTY circuitry building blocks will be covered next.

[*To be continued*]

"I understand it started out as a mild disagreement over an oscillator circuit."

The OSCALATOR

An Easy-To-Make and Easy-To-Use Satellite Locator

BY WILFRED M. SCHERER,* W2AEF

THE recent launching and success of OSCAR III proves that space communications among radio amateurs is here! For this upcoming space age we can still refer to the old addage that goes, "you can't work 'em, unless you hear 'em;" to which might be added, "and you can't hear 'em, unless you know where and when to find 'em." Many amateurs were ill prepared in this respect and thus good opportunities for a QSO through OSCAR III were lost. Although the satellite's translator is no longer working to provide relay QSO's, now is the time to get better prepared for "the next time" and for practicing tracking and locating techniques. Even if the OSCAR III telemetry beacon should permanently fail, you can still follow four of the other satellites that were launched together with OSCAR III into similar orbits.[1]

So with these considerations in mind, we have constructed a simple satellite locator that will enable you to determine the position of a satellite at any time. It will tell you when OSCAR is due to enter and leave your range, from which you can figure the total expected in-range time. In addition, for future relaying OSCARS you'll be able to find out when the satellite will be within your range and that of another amateur station at the same time.

From this you'll also be able to determine the possible times and duration for a QSO, the most desirable orbit and the equatorial crossing bearing required for a useable orbit or for an overhead pass in your locality. The direction in which your beam should be headed for maximum effectiveness at any minute can also be determined. All this can be done in a matter of seconds for on-the-spot estimations or for long-range planning. The gadget will also be useful for correlating Doppler readings in respect to the p.c.a., t.c.a., etc., as well as for an aid in working out your own orbital predictions.

The basic idea is not entirely new,[2] but the method of plotting the satellite track has been simplified, while updated features have been added to extend its usefulness. All that is needed to make the OSCAR Locator, which we have given the corny but affectionate name of "Oscalator," is some transparent paper and a compass. You don't need any globe, unwieldy wires, tables of coordinates, fancy mathematical calculations—or even a map! All you have to know is the period and inclination of the satellite, and your own location. Knowing these parameters, you can easily make the track for any satellite such as future OSCARS.[3]

The complete Oscalator package is shown at fig 1. It consists of a Polar Chart, a transparent overlay with the satellite track, and transparent overlays with various range scales.

The largest solid-line circle on the Polar Chart represents the equator with the numerals indicating west longitude degrees defined by the 36 meridians. The inner rings are likewise calibrated for latitude. The center point represents the hemisphere Pole (north or south). The latitudes below the equator are indicated by dashed rings.

The Satellite Track is an arc which is marked off in minutes starting with the beginning of the orbit; that is, the point at which the orbit crosses the equator heading North.

The Range Scales are cailibrated in 500-mile increments up to 2000 miles and include the major compass points for great-circle bearings to the outer limit of the range. Separate Range Scales are needed at different latitudes.

Making The Oscalator

The Polar Chart may be made on a piece of heavy white paper or on transparent celluloid. The larger the chart, the better the accuracy, but the dimensions suggested here will give good accuracy and at the same time will be small enough to allow the Oscalator to be used at the operating table for on-the-spot checks. Also, the use of this size chart and transparent material at the same time can be helpful for another reason, as explained later.

First draw a 7⅝" diameter circle, using a compass, and label it *equator*. See fig. 1. Divide the circle into 36 equal pie-shaped segments. The exact spacing may be determined by using your compass as a pair of dividers. At the equator, the spacing will be about 11/16" per segment. Then along the circumference mark each radii (or meridian) in steps of ten degrees from 0 to 350 to identify the West Longitude. If you're in the Northern hemisphere, make the numerical progression clockwise; for a Southern hemis-

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*Technical Director, *CQ*.

[1]EGRS-3 on 136.841 mc follows OSCAR III by about 2 minutes, GRAVITY GRADIENT 2 and 3 on 136.742 and 136.767 mc respectively by about 16 minutes, and SOLAR RAD on 136.8 mc by about 19 minutes.

[2]Walters, Wells and Hillesland, "Project Oscar Measurements and Tracking," *QST*, July 1961, page 59.

[3]Having a near circular orbit.

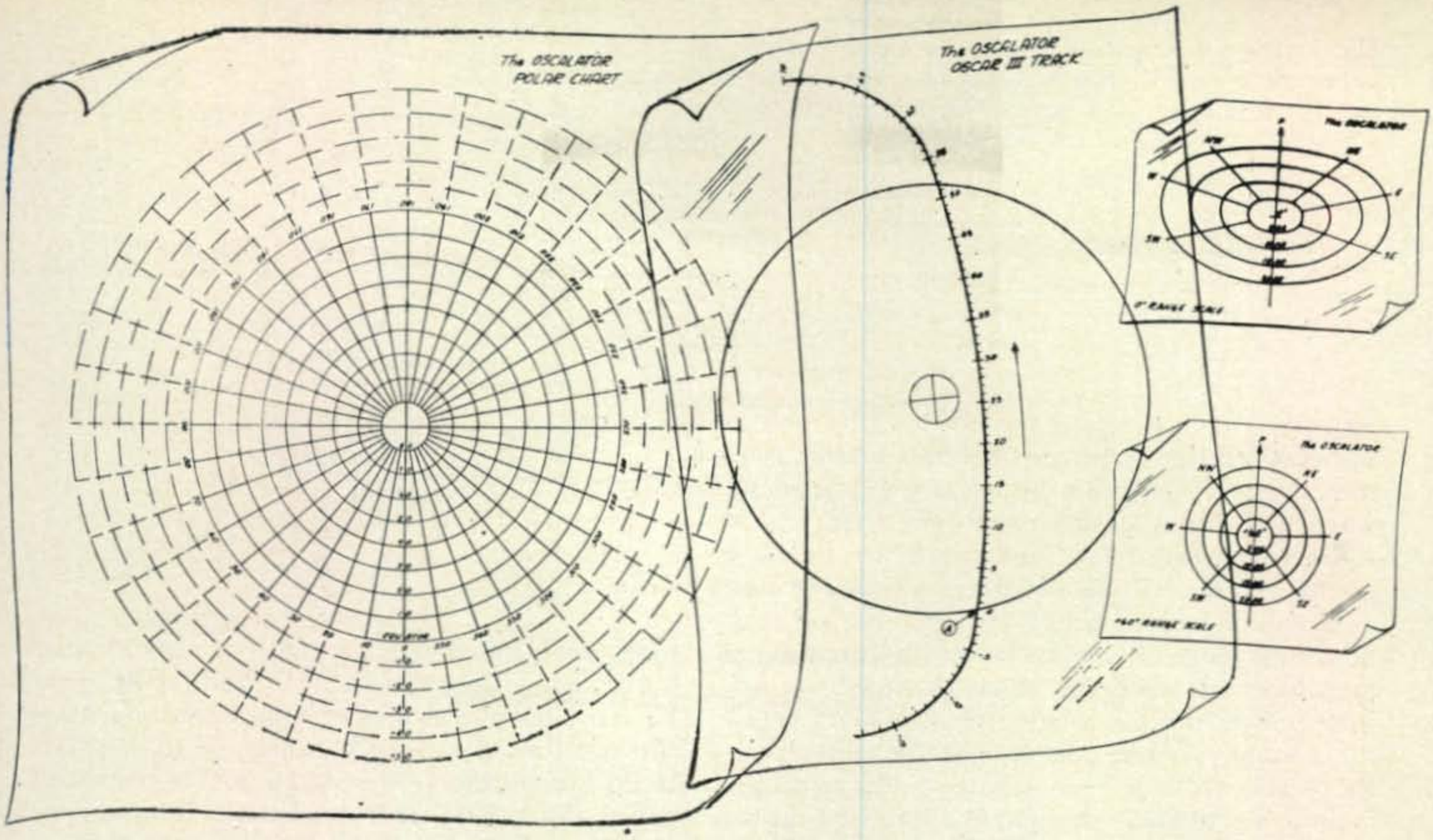


Fig. 1—The Oscalator: Polar Chart, Satellite Track on overlay, and typical Range Scales on overlays.

phere projection make it counterclockwise.

Next, draw seven equally spaced inner circles with solid lines and five outer circles with the same spacing using dashed lines. Again use the compass as a pair of dividers for determining the *exact* equal spacing between each circle, which will be near 7/16". The circles represent the various latitudes, so the inner ones should be marked from 10 to 80 as shown, while the dashed-line circles should be marked —10, —20, etc.

Satellite Track

The satellite track should be made on tracing paper or some other form of transparent material. This should be available at your local stationery or art-supply store. If you can locate it, the best material to use is transparent frosted acetate which is very durable and has excellent transparency.

Position the Polar Chart as shown at fig. 2 (if you're using a Southern projection chart, first temporarily mark the 90° meridian "270," and the 270° meridian "90"—these marks may be erased after the track is made). Place the tracing paper on top of the Polar Chart. Copy the 80° latitude circle on the tracing paper and also make two cross lines through this "alignment" circle as shown. Over the 270° meridian place a dot at the latitude corresponding to the same number of degrees as those of the inclination for the satellite's orbit. For OSCAR III this is 70 degrees and is shown at Point "B."

Next, divide the orbital time (or "period"), in minutes, by 16 to find the degrees of arc "displacement", A_d. For OSCAR III, A_d = orbital time $\div 16 = 103.5 \div 16 = 6.47°$ (nominally 6.5°).

Now, on the equator at the *right* of the 0° and 180° meridians make a dot located A_d degrees from these meridians, as indicated at "A" and "C." For OSCAR III A_d, as determined above, is 6.5°. The satellite track will then be an arc through the points "A," "B," and "C."

To draw the arc, first extend the 90° meridian to the left, out to a point equal to about three times the diameter of the equator. More than likely, your tracing paper won't be large enough to do this, so temporarily extend it by clipping another piece to it. This extension may be removed after the track has been made.

The arc should be drawn using a compass with its pivot point located on the extended 90° meridian at point "0." The arc must pass through the three points marked on the transparent paper. For OSCAR III the pivot point will be about 15⅞" from point "B." For any other satellite's track, it may be found by cut-and-try, or for those acquainted with geometry, the location may be found easily. When the arc is made, it should pass beyond the equator only as far as the —10° latitude.

Chances are that you won't have a large enough compass to do the job, but you can improvise one by using a string and a pencil with a pin or a thumbtack for the pivot point.

If the inclination of the orbit is 90° or if the period is very long with a high-inclination orbit, it will not be possible to draw a left-hand arc through A, B and C, as just described. In this case the compass should be pivoted from the *right* side of the Polar Chart along an extended *270°* meridian, so the arc will follow a right-hand curve.

After the arc has been made, mark it off in one-minute steps between equatorial crossing points "A" and "C" according to the time required for *one-half* orbit. For OSCAR III the number of minutes between "A" and "C" will be 51.75, but 52 will be close enough. The starting point, "A," will be zero minutes, with 52 minutes marked at "C". See fig. 1 & 2. The time calibration may be continued on to —10° latitude, with that below "A" marked in *minus*

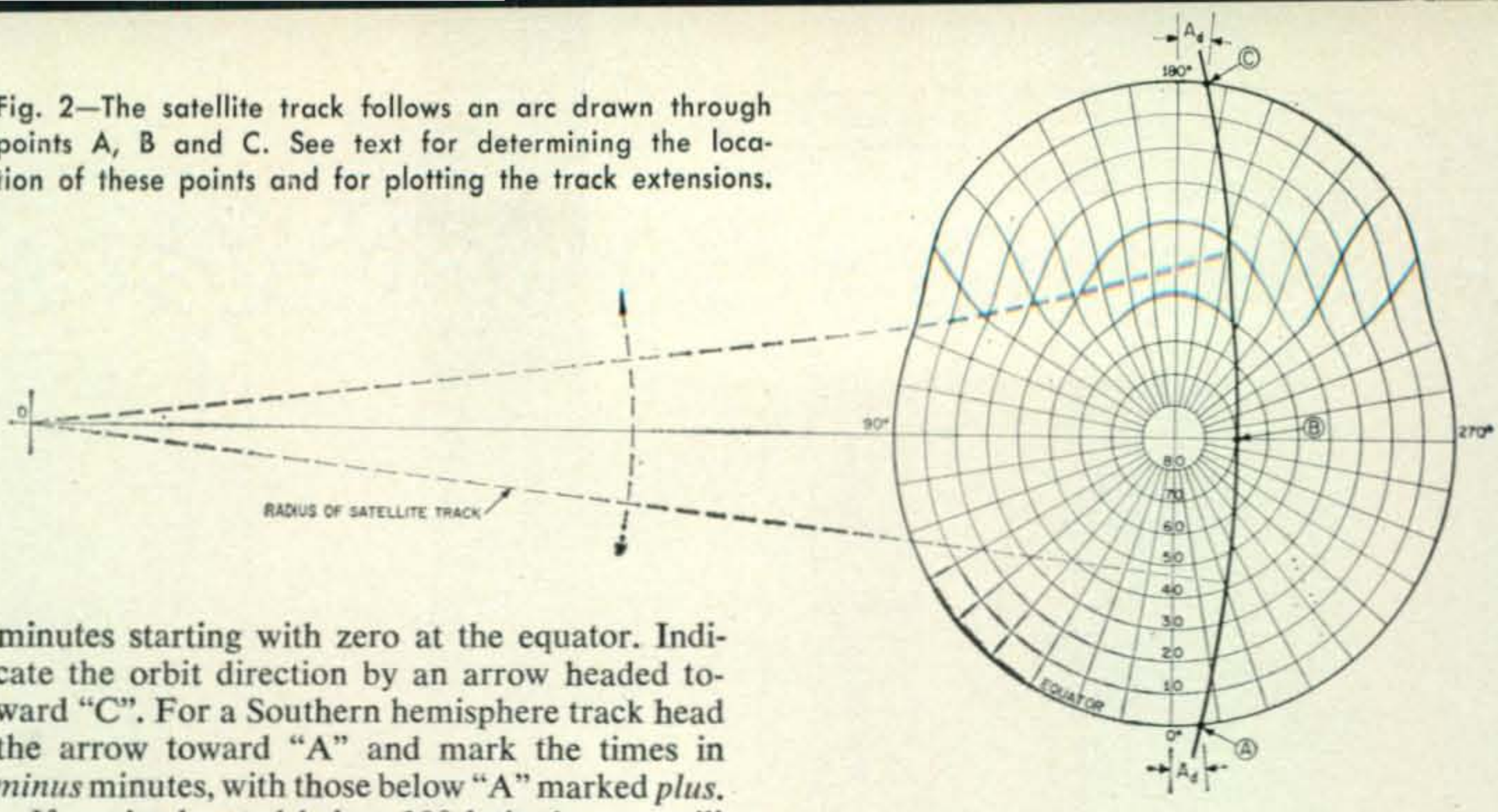


Fig. 2—The satellite track follows an arc drawn through points A, B and C. See text for determining the location of these points and for plotting the track extensions.

minutes starting with zero at the equator. Indicate the orbit direction by an arrow headed toward "C". For a Southern hemisphere track head the arrow toward "A" and mark the times in *minus* minutes, with those below "A" marked *plus*.

If you're located below 30° latitude, you will be within range of stations below the equator and therefore will need the track extended accordingly. Since the meridians (on the chart) below the equator do not converge at the other pole, the track will not be accurate if the same arc is used. Fortunately though, you have the means on hand for plotting the different course, as follows:

Align the track on the Polar Chart with point "A" at zero-longtitude crossing (0° on the equator). Then tabulate the number of degrees from zero longtitude where the track crosses each latitude. Do this every five degrees of latitude up to 50°. Also record the number of track minutes at each latitude. Now, using these reference numbers, make a dot at each corresponding *minus* latitude. This should be done on the other side of the zero meridian, so that after you draw a curve through these points, it will curve in the same direction as the main track. Also mark the minutes at the *minus* latitudes and scale the intermediate times accordingly (note that the time divisions come out nonlinear). The resulting track will resemble the one in fig. 1.

Range Scales

The North-South mileage on the Polar Chart will be the same regardless of the latitude, but in other directions the mileage distances vary according to the latitude. The largest variation occurs along the east-west parallel and becomes increasingly greater the further the latitude is from the pole. Separate Distance Scales are therefore needed at different latitudes.

A circular range scale will introduce little error at latitudes above 60°, but at lower latitudes the scales must be made elliptical.

A circular scale at the 2000-mile limit should have a diameter equal to 0.31 times the diameter of the equator on the Polar Chart. In our case it will be 2⅜" diameter. Draw this with a compass on a separate piece of transparent paper. Mark the center with a small "indexing" cross and then add three equally spaced inner rings. Starting with the center ring, label them 500, 1000, 1500 and 2000 miles, as shown at fig. 3. Also mark "+60°" at the top to identify the scale's use for latitudes at and above 60°.

The elliptical type ranges for the other latitudes are plotted from a table of coordinates,[4] but to make the job easier for you, at fig. 3 we have provided drawings of ranges that are made full size for the various latitudes, so all you have to do is copy them on separate pieces of tracing paper. For other size Polar Charts you can base your scales on the relative dimensions of those shown. The direction for the major great-circle bearings to the outer limit of each range also is indicated on the scales. One range should be made for your nearest latitude, and one each for the other latitudes.

The maximum map range over which you can hear a satellite at OSCAR III's altitude is a little over 2000 miles and may be easily attained if you're in a good location with a clear horizon; however, for an average reliable range, we have limited the scales to 2000 miles. It is expected that OSCAR IV will be at about the same height as OSCAR III, but if this turns out to be higher you can extend the ranges by adding either a 2250 or a 2500 mile ring, scaled accordingly.

Using The Oscalator

Before using the Oscalator, place the Range Scale for your latitude on the Polar Chart, centered on your location (you can obtain your exact location from a geographical map, your town engineer, a local surveyor, the Coast Guard or an airport). If you're located at an *East* Longitude, subtract the E. Long. bearing from 360 to obtain the *West* Longitude degrees marked on the Polar Chart. Fasten the Range Scale to the chart with scotch tape. If the chart has been made on transparent material, tape the Range Scale on the underside.

Now, place the satellite track on top of the Polar Chart so that starting point "A" is at the equatorial-crossing point (equatorial-crossing degrees in West Longitude as reported in the official OSCAR prediction bulletins) and with the center reference circle aligned with the 80° circle on the Polar Chart.

If the track passes over any part of your Range Scale, the time it takes the satellite to come within your range, after crossing the equator, may be found directly by counting the minutes

[4]These will be supplied on request. Send self-addressed stamped envelope to *CQ*, Attn.: OSCAR Data.

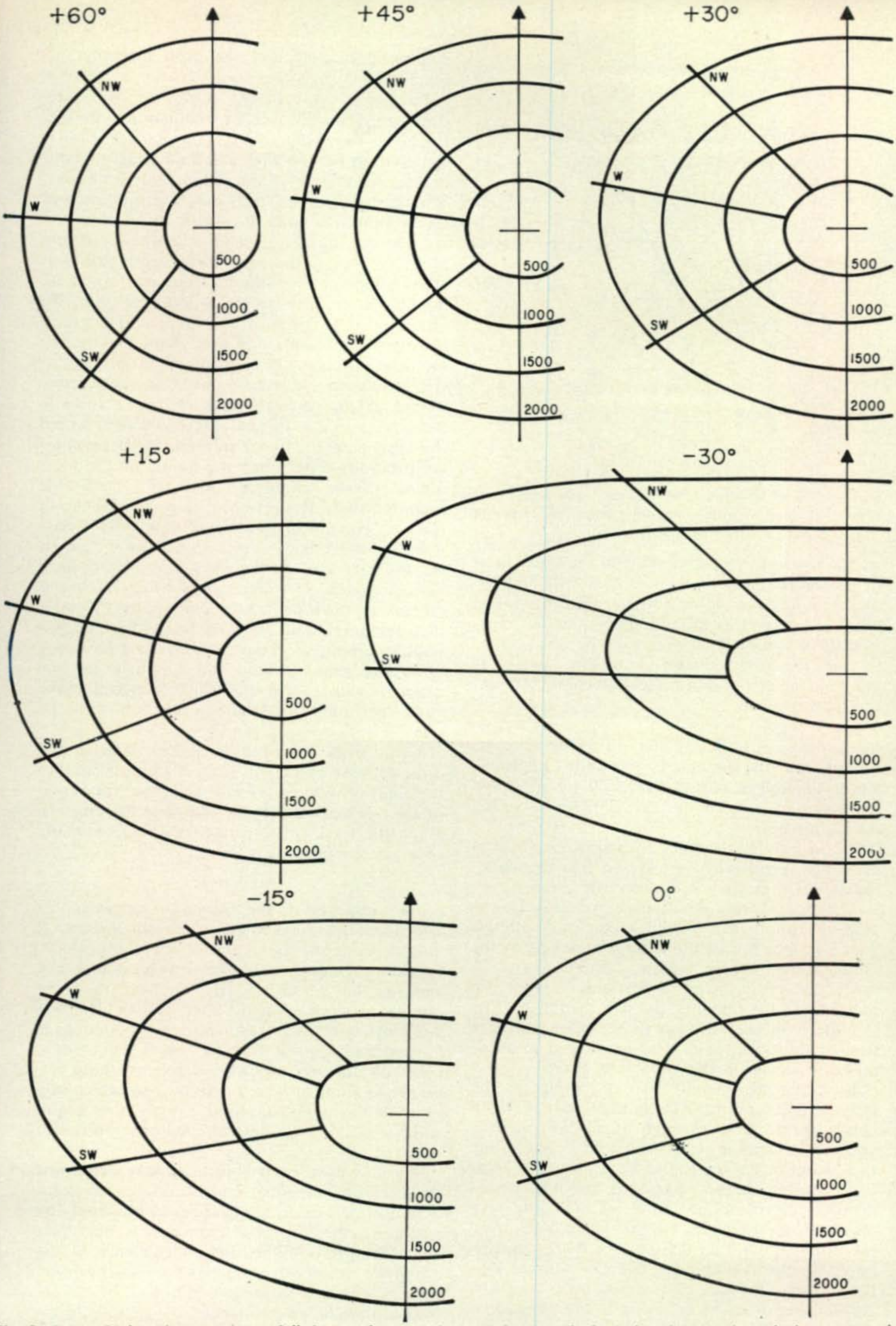


Fig. 3—Range Scales. They are drawn full size, so they may be traced to match the polar chart made with the suggested dimensions. Only one half of each scale is shown, but the other half may be traced by folding over the tracing poper along the N.-S. line and tracing from the half already drawn to match. In use, the North-South reference should be directed toward the pole as indicated by the arrows.

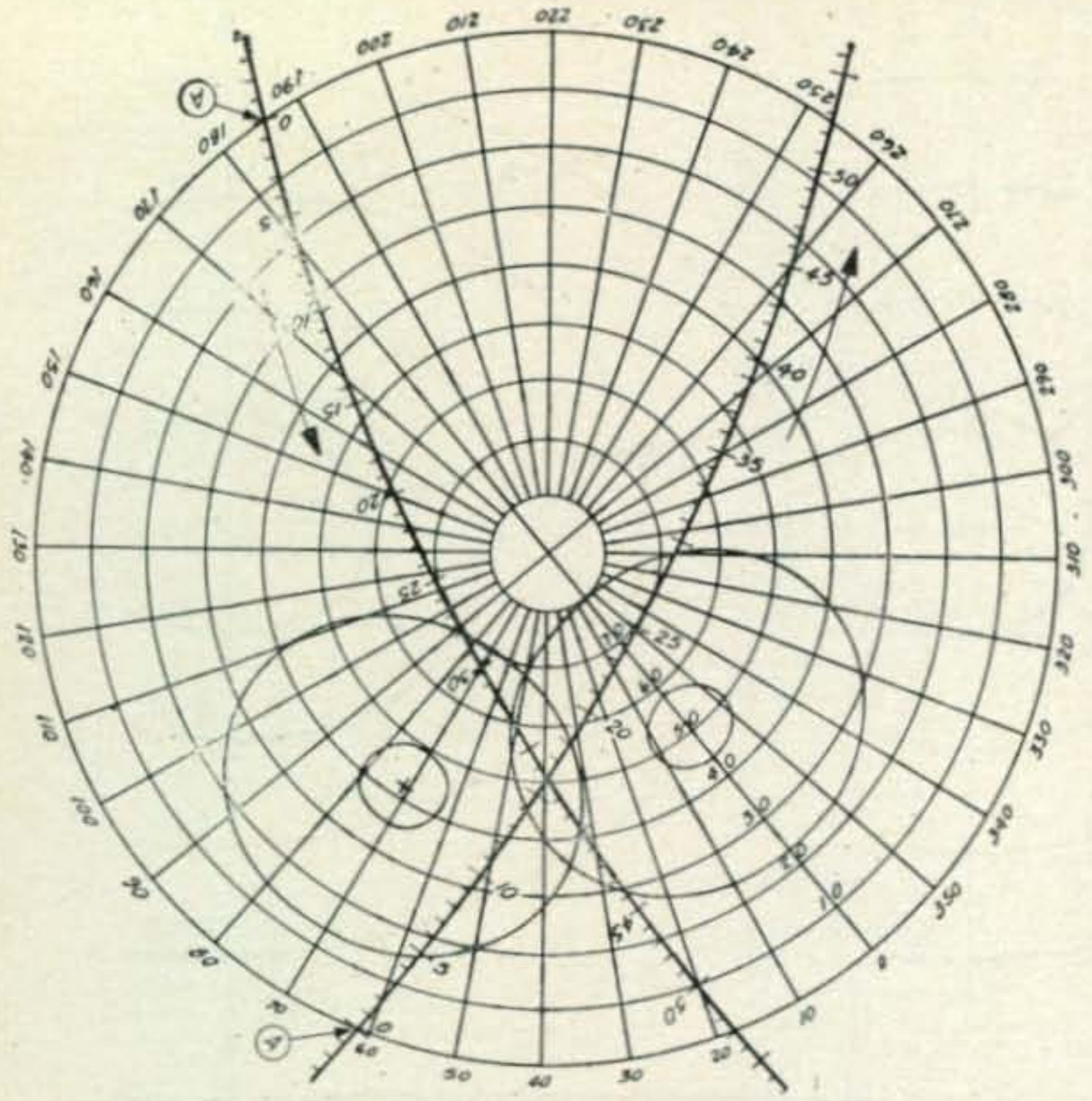


Fig. 4—Use of Oscalator for finding times and orbits when satellite is within mutual range of separate localities. See text.

on the track, from the equator to the outer limit of the Range Scale. Likewise, you will find the time required for the satellite to reach the closest point to you and its time for going out of range. For the absolute time you add the track times to the reported equatorial-crossing times. If you're using a Southern projection chart, subtract the times instead.

Conversely, you can find the equatorial-crossing time by subtracting the travelling time required from the equator to the points of acquisition, fadeout or closest approach (as indicated on the track), from the actual times recorded during a pass.

By positioning the track for various equatorial crossings, you'll also be able to find the equatorial bearings that will place an orbit within your range. During the first few weeks of OSCAR III's operation, the official prediction bulletins gave the location of the orbital crossings at the 40th parallel. Where this location *seemed* obviously out of range of a particular station, in many cases the operator did not realize that the satellite path actually *was* in his range during a part of the orbit. Such a situation can immediately be seen with the Oscalator.

By centering one of the extra scales at the latitude and longtitude of another station which you'd like to QSO through an OSCAR satellite, you can determine if this is possible, according to whether or not the Range Scales for both locations overlap. If they do and if the orbit passes through the overlapped area, a QSO could take place. In addition, the number of minutes indicated that fall within this area will tell you how much time is available for that QSO, along with the starting time to look for each other's signals. At the same time, by referring to the directional points on the Range Scale, you'll see where the antenna must be pointed at any moment during the pass. You also can easily determine the most favorable orbit for a QSO, together with the equatorial bearing and the orbit direction required.

EXAMPLE: An amateur in Boston, Mass. desires to QSO with another amateur in London, England. Referring to fig. 4, a Range Scale is centered on Boston with a second scale on London (according to latitude & longitude for each). For the best South-North pass the satellite will be in range of both localities for 4 minutes, starting 14 minutes after an equatorial crossing at 62° W.; while the best North-South path will allow almost a 6½ minutes QSO starting at 32 minutes after crossing the equator at 186° W. Suitable orbits, plus or minus several degrees, also can be found, but with some, less communications time will be available.

If you've made your Polar Chart on transparent paper, you can place it over a suitable Polar Map to see the actual territory over which the orbit passes, and for reference to geographical locations rather than depending on the meridians for the localities concerned. A suitable map (Northern Projection) with dimensions to fit the 7⅝" equatorial diameter of your Polar Chart is available.[5] You can use a map alone instead of the Polar Chart, but the meridians on the maps usually are in 15° increments which makes it difficult to read out intermediate points. Besides this, the meridians are sometimes hard to distinguish among the map colors. If you have any other size map on hand (there is a larger one supplied with the above map), you can make your track and Polar Chart to size, following the relative dimensions given here.

If the track has been made on material that does not tear easily, we suggest that you mount the chart or map on a board and pivot the center of the track overlay at the center of the chart to allow the track to be rotated without requiring constant realignment.

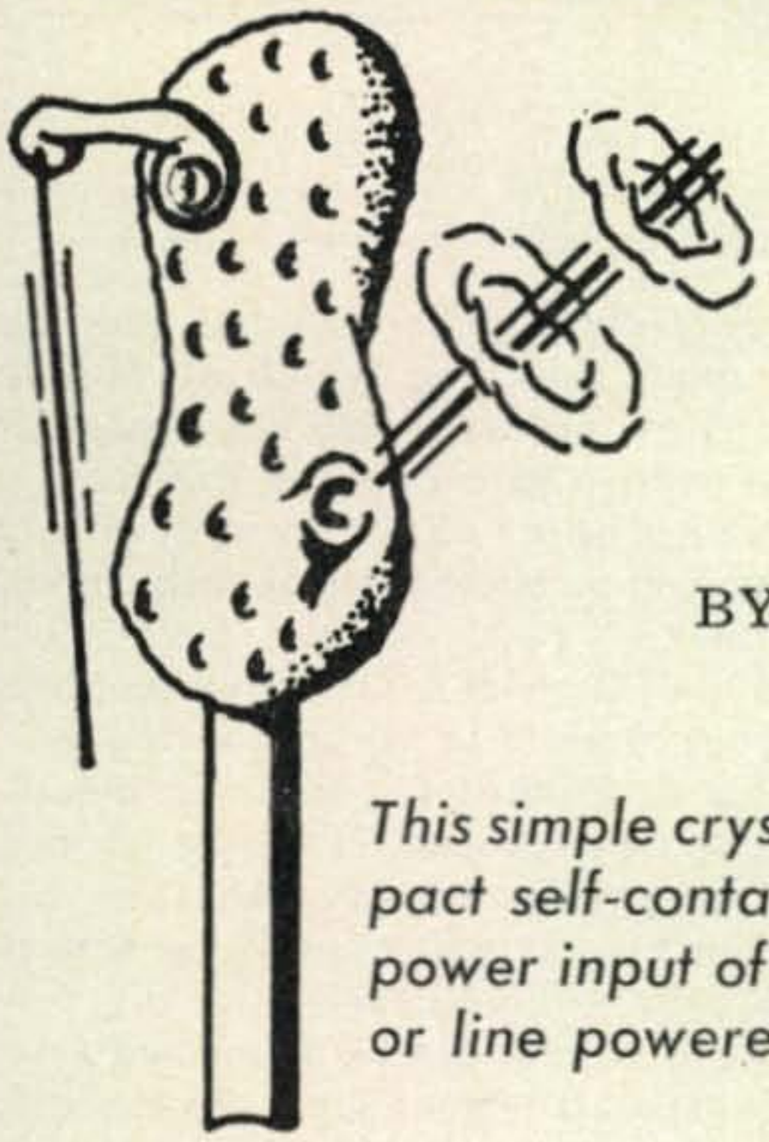
Accuracy

The accuracy of the Oscalator hinges on its size and on the exactness of its dimensions. It also depends on the shape of the orbit which, for best accuracy, should be near a circular one such as that of OSCAR III. We have used the Oscalator since shortly after OSCAR III was launched, with an average accuracy of 30 seconds in predicted acquisition, t.c.a. and fadeout times, based on our own predictions. Even without reference to Doppler t.c.a. readings, you can closely estimate the equatorial times simply from acquisition and fadeout times obtained over a series of orbits.

We also have been able to closely determine the accuracy of equatorial-bearing predictions, without referring to Doppler readings, simply by noting whether or not an orbit can be heard for which the predicted bearing indicates it will pass along the rim of our range, as seen on the Oscalator. Using this technique, errors of 5° to 23° found in prediction bulletins, have agreed closely with those found through Doppler readings. ■

[5]The Radio Amateur's World Atlas, Radio Amateur Callbook, Inc., 4844 W. Fullerton Ave., Chicago, Ill. 60639, U.S.A. Price is $1.50.

THE PEANUT WHISTLE



A One Tube C.W. Transmitter

BY BARRY W. WRIGHT,* K4WWY

This simple crystal controlled rig uses a pentode-diode for a compact self-contained 40-80 meter transmitter. It has a maximum power input of 4 watts and can be completely battery operated or line powered. Good for QRP, Novice or an emergency rig.

THIS is an 80-40 meter, 3 watt maximum, self-contained transmitter. There are many low powered rigs on the air, but none quite like this one. Using the 117N7GT power pentode section of the 117N7GT tube makes it possible to do away with the large power transformers, and instead have simplicity and compactness.

This is an excellent rig for the Novice just receiving his license, for the General tired of high powered rigs, or for an emergency standby rig.

I have used the little rig for quite some time now and received such reports as: On 40 meters 559 in Pittsburgh; On 80 meters 569 in N.C. You will have some difficulty though, I must admit, when you try to convince the other station of your "Little Peanut Whistle."

*517 Circle Drive, Calhoun, Georgia.

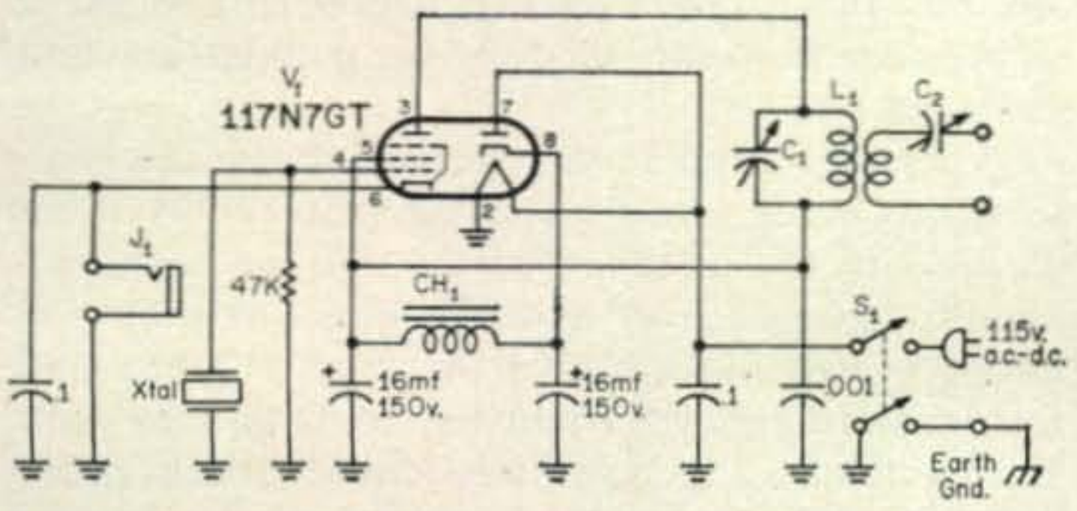


Fig. 1—Circuit of the one tube transmitter. The transformerless power supply makes a good ground and a single wire line cord mandatory for safety as explained in the text.

C_1, C_2—100 mmf variables, receiver type.
Ch_1—12 h, 250 ohms d.c. resistance.
L_1—80 m. B&W JEL-40, 26 t. #18 1⅞" dia., 2½" long with 5 turn link. For 40 m. operation short out half the turns. Coil may be wound on 1⅜" dia. form with 18t #18 e. 2" long.

The rig is built on a 5" × 2" × 3" aluminum minibox. Layout of the parts is not critical and can be left up to the individual builder. The diagram is so simple you can probably have it built in a few hours.

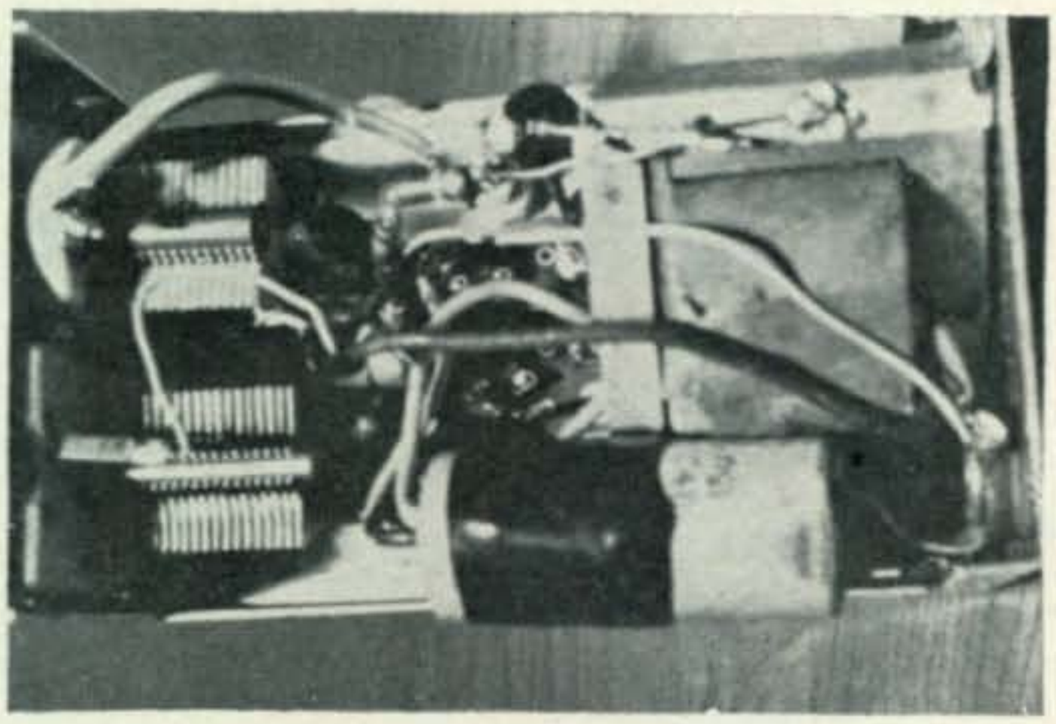
The 117N7GT does not need a line cord resistor and it operates directly from the 117 volts a.c. or d.c. It will also operate from 135 volts d.c. for emergency operation by using two 67½ volt batteries in series and applying the voltage directly to the line cord. What could be more simple?

The transmitter uses cathode keying with a 0.1 mf bypass capacitor condenser.

Tuning is done by a 100 mmf variable which must be insulated from the chassis. This can be done by using a rubber grommet or any other ingenius method you can devise. Further tuning is done by another 100 mmf capacitor connected in series with the antenna. This capacitor should also be insulated from the chassis.

The parts list of the transmitter are not

Side view of the 40-80 meter transmitter shows the simple arrangement of the parts.



Bottom view of the one tube transmitter. The filter choke takes up most of the room and the remaining few comcopents fill the gap.

critical by any means. I used a dual electrolitic condenser with 25-25 mf at 150 volts instead of two 16 mf units. Also used are two half watt resistors to obtain 50k. I had no crystal socket around so I used an FM/TV antenna connection of the type you see in the walls at hospitals, motels, etc.

Operation

After the construction is complete, check your wiring carefully. Any error might burn out the tube which is not inexpensive.

Connect the chassis to a good ground and

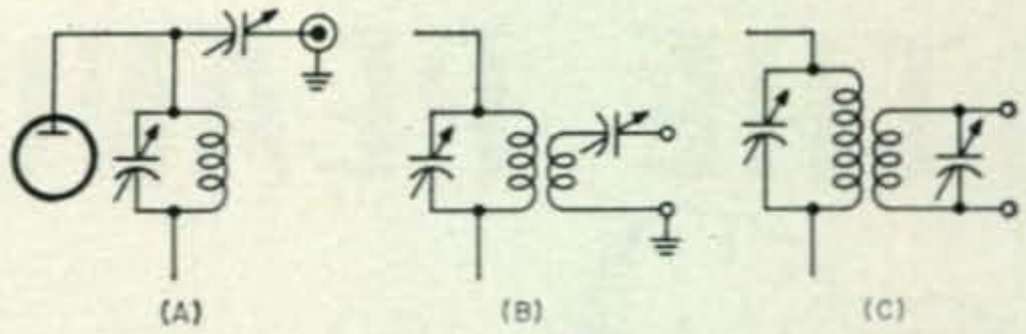


Fig. 2—Shown are several methods of feeding an antenna. The coil data are listed in fig. 1.

insert the power plug. If the tube does not light, reverse the plug. The tube will light with the plug in one of the positions. Do not bypass this arrangement with a conventional line cord as this will create a short circuit hazard with the ground connected or a lethal shock hazard without the ground.

Insert a 40 or 80 meter crystal and the proper coil. Tune your receiver to the crystal frequency. Close the key and adjust C_1 until the signal is heard in the receiver. Adjust C_1 for the strongest signal and maximum stability. That is, each time you open the key and close it, be sure the crystal kicks over without delay.

A meter, 0 to 30 ma, can be connected across the key terminals and then C_1 can be tuned for a dip (and then move slightly off resonance for good stability). A field strength meter may also be used for tuneup. Capacitor C_2 should be adjusted for maximum field strength meter indication and then C_1 should be retuned. ■

The Radio Inspector—1920 Style

BY ED. MARRINER,* W6BLZ

Those fellows behind the desks at your local FCC office have a heritage more colorful than one might suspect. OM Marriner reminisces . . .

RIGHT after World War I the Radio Inspector came under the Bureau of Navigation. Amateur stations were licensed for 3 months and marked provisional. Every three months they had to be renewed and blanks had to be filled out in duplicate with a complete description of the transmitter used by the amateur. The process of entering, filing and taking the oath along with everything connected with the license procedure kept three clerks busy in the office.

The Inspector's life was not easy, 17 of the 30 days in the month were spent out in the field, he had a large district to cover, further than most amateur signals he could monitor at the main office. For instance, Radio Inspector R. Y. Cadmus of the Baltimore, Md. office had to cover, Washington, D.C., New Jersey and throughout Pennsylvania. To check on a station, he finally had to outfit an automobile with monitoring equipment. The receiving equipment was too big to keep in the back seat, and was heavy and cumbersome. The gear was mounted on the running board of an old cloth covered top motor car. To monitor, the auto had to be stopped and the equipment set up, and this sometimes was a problem to get it going after bumping all day over cobblestone and unpaved roads.

A good antenna was necessary as low frequencies were used. To satisfy the requirement to pick up the signals from 20,000 meters down to 300 meters a four wire antenna was mounted between two pipes above the car. Cadmus had an assistant named Richwein to help him with his troubles. Together they could check more amateur stations in two weeks using the mobile method than in six months back at the Custom House in Baltimore. One worked the equipment while the other slept in the back seat of the car. They drove all day and worked all night to get measurements when the low frequency conditions were best.

Since these old days times have changed around a bit for the R.I. and he will agree with you, the working conditions are better. ■

*528 Colima Street, La Jolla, California.

The man behind those big glasses and that big signal from Lima, Peru, is Vitaly France, OA4PD. Vitaly is shown here with his jr. op. and his XYL, who recently received her Novice call as OA4NRX.

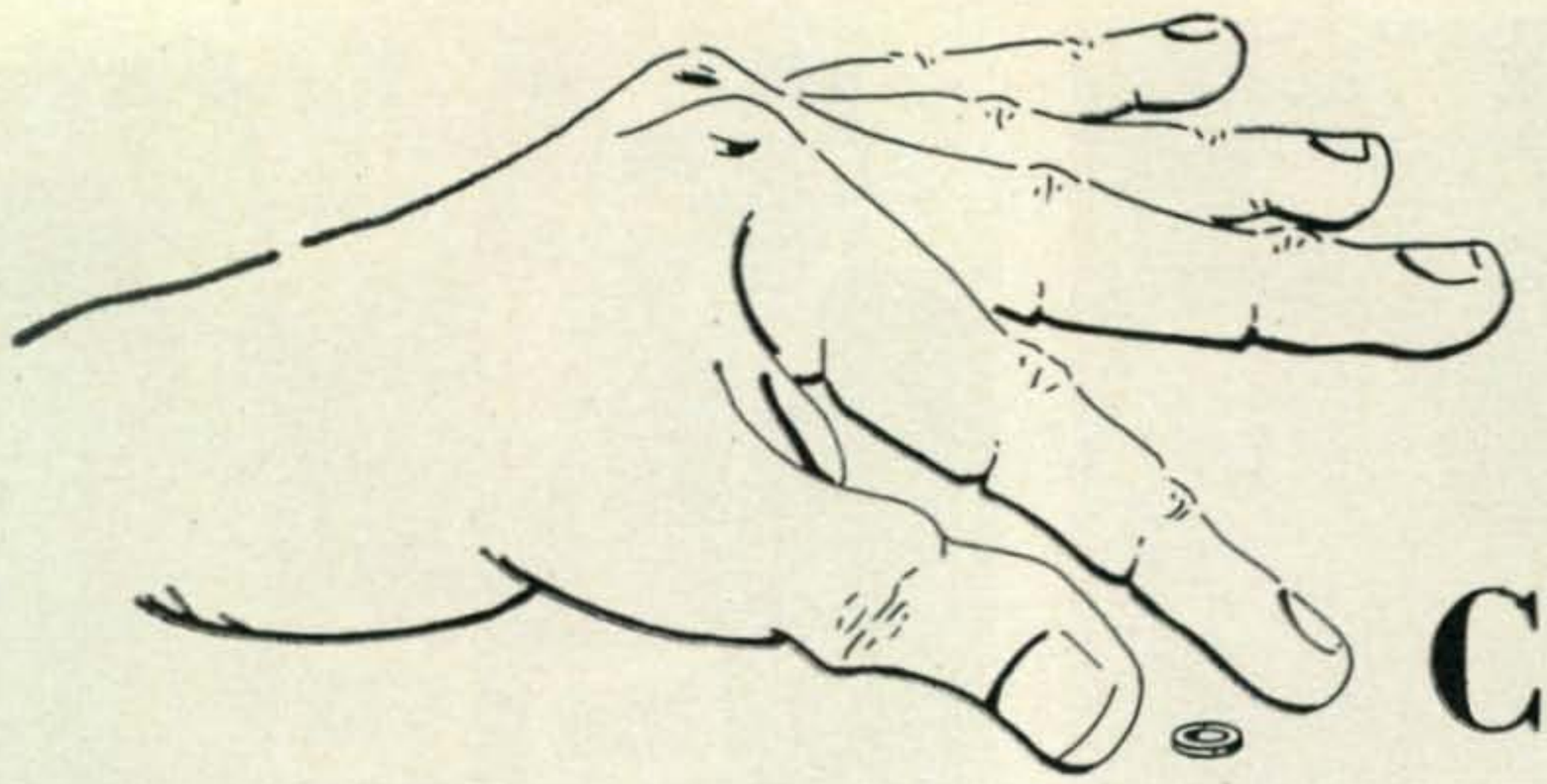
Here is a photo taken at a recent meeting of the Evreux Amateur Radio Club in Evreux, France. Pictured left to right are: Chet Lambert, W4WDR/F7CL, Hammarlund's Stu Meyer, W2GHK, and Club President Jean-Claude Lebourg, F5IL. Stu is shown holding photos of two pieces of gear he has just donated to the club.

PEOPLE AND PLACES

George Jacobs, W3ASK, CQ's PROPAGATION and SPACE COMMUNICATIONS Editor, conducting a c.w. QSO during a recent visit to 4U1ITU, Geneva, Switzerland.

Dr. Emil Savundra, G3SDN (ex 4S7ES) shown with his lovely XYL and five harmonics while visiting Washington, D.C.

Jack Reck, VP9FH, and Al Jones, VP9DC, of Bermuda tune up for the 1965 DX Contest for amateur radio operators in the U.S., Canada, and Bermuda. The North American ham with the most Bermudian contacts wins a free trip to the mid-Atlantic resort isle. The Bermudian who works the most U.S. or Canadian stations gets a silver trophy. The contest was held on the week-ends of May 22-23, and June 5-6.



KIT CRAFT

BY GEORGE S. BECK,* W2CE

Ever try to pick up a #4 washer with #14 fingers? If your a typical kit-builder, you'll appreciate the plight of a couple of oldtimers on their first venture into the world of miniature printed circuit kits.

AWHILE ago the Gentle Zephyr, K4GZ, ordered a tunnel dipper kit. On the morning he received it in the mail, he went up to visit Zeus Obstinate, W4ZO. These old timers, after building equipment for a zillion years (more or less), recant the modern building process and what wireless has become.

"Let's use the kitchen table for this project," sez ZO, "it shouldn't take long." (Naturally, they didn't ask the XYL's permission—they were too busy yack yacking on the front porch.) GZ, starting to assort the parts, "Have you got a magnifying glass ZO?"

Soon the assembly was started. Working on the circuit board came first. Shortly the board begins to look like an octopus.

"I can't tell if this resistor is yellow, violet, black or not. Can't see a rim on this tunnel diode with my ordinary glasses," sez ZO. "Can't get this ding miniature resistor out of this dang plastic envelope. Let me take your scissors, GZ. Can't handle resistors with my #14 hands, you try it, GZ."

"Cut the black wire. (GZ checks parts with his bi-focals.) Hmmmmm, seems to be getting along pretty gud." (Sometimes it was tough handling small parts with large fingers.)

"Circuit board now beginning to look like a centipede. The diode just dropped out," sez GZ.

"Hmmm," sez ZO, reading directions as he picks up a small piece of paper from the table, "make sure big end goes this way. Check back on order number, GZ. . . . So that's a tunnel diode, gosh, you'd never know it."

Now they begin the soldering; GZ holding the circuit board, and ZO feeding the solder. ZO is sitting on the table edge reading, trying to see if the instructions tell which leads to solder first.

ZO: "Which lead does it say to cut?

GZ: "It doesn't say. Use long nose pliers and bend here, bend there and solder here. Put switch over holes and one 8 inch wire on circuit board." ZO's fingers are twice as big as the switch. "Fasten switch to board on ⅜ spacers and 5/40 screws. Are those 5/40 screws?"

ZO: "Wait 'til I check with my calipers and thread gauge, I'm not quite sure. Oops, there goes a 3/48 nut on the floor." (Imagine locating it and trying to pick it up with #14 fingers.)

GZ (reading to ZO): "Measure ¼" and bend strip, measure ⅞" and cut. Discard short piece . . . you do this and this," still reading out loud. "Give me a #4 lock washer. Mmm, I hope I'm on the right side of the board. Refer to pix, then put ⅞" strip under 4/40 nut near center of board."

ZO: "Where are we?"

GZ: "We just soldered *that* thing. Put 1500 ohm resistor with leads thru switch lugs."

ZO: "Won't go, have to loosen switch before it will."

GZ: "Here ZO, prepare this cable while I work on the antenna."

While ZO works on cable and GZ is lighting another stogie, the girls (XYL's) come in and ask what time it is (as if they didn't know). Twenty to twelve, time to go to bed.

"Don't touch anything on the kitchen table," orders GZ to the girls, "we'll eat breakfast in the living room."

GZ and ZO resume their construction the following night.

GZ: "Take a 3/48 screw, nut, and lock washer."

ZO: "Where is my thread gauge Gee, I can't measure 3/48, what to do now?"

GZ: "Install the speed nut on the back of the chassis. No wonder that was a step by itself!" Holding battery box, "How can I manipulate these miniature parts with #14 hands in a #6

*55 E. Bedell Street, Freeport, L.I., New York.

[*Continued on page 100*]

The Case of

The "Throw Away" Beam

BY JULIAN N. JABLIN,* W2QPQ/9

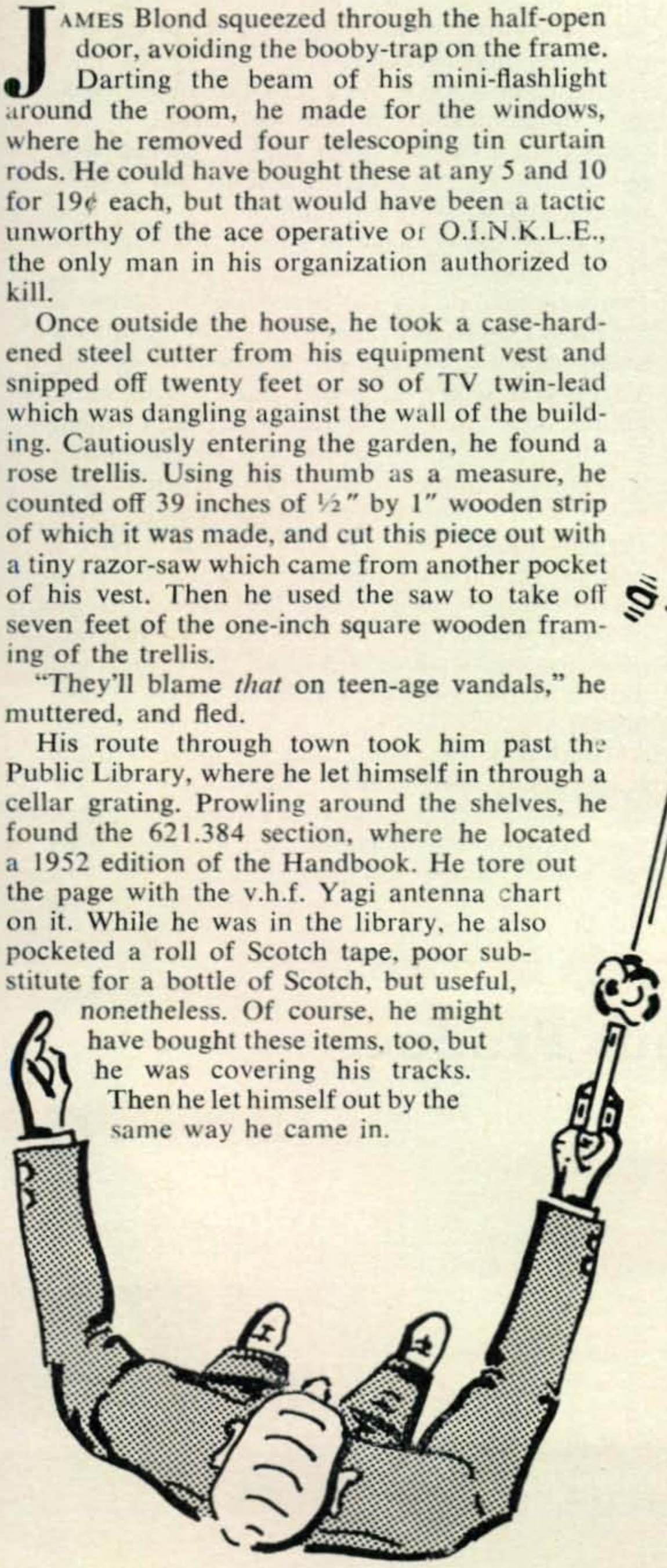
Need a two meter beam in a hurry? Here is one assembled from scraps at such a low cost that it can be discarded when the operation is completed.

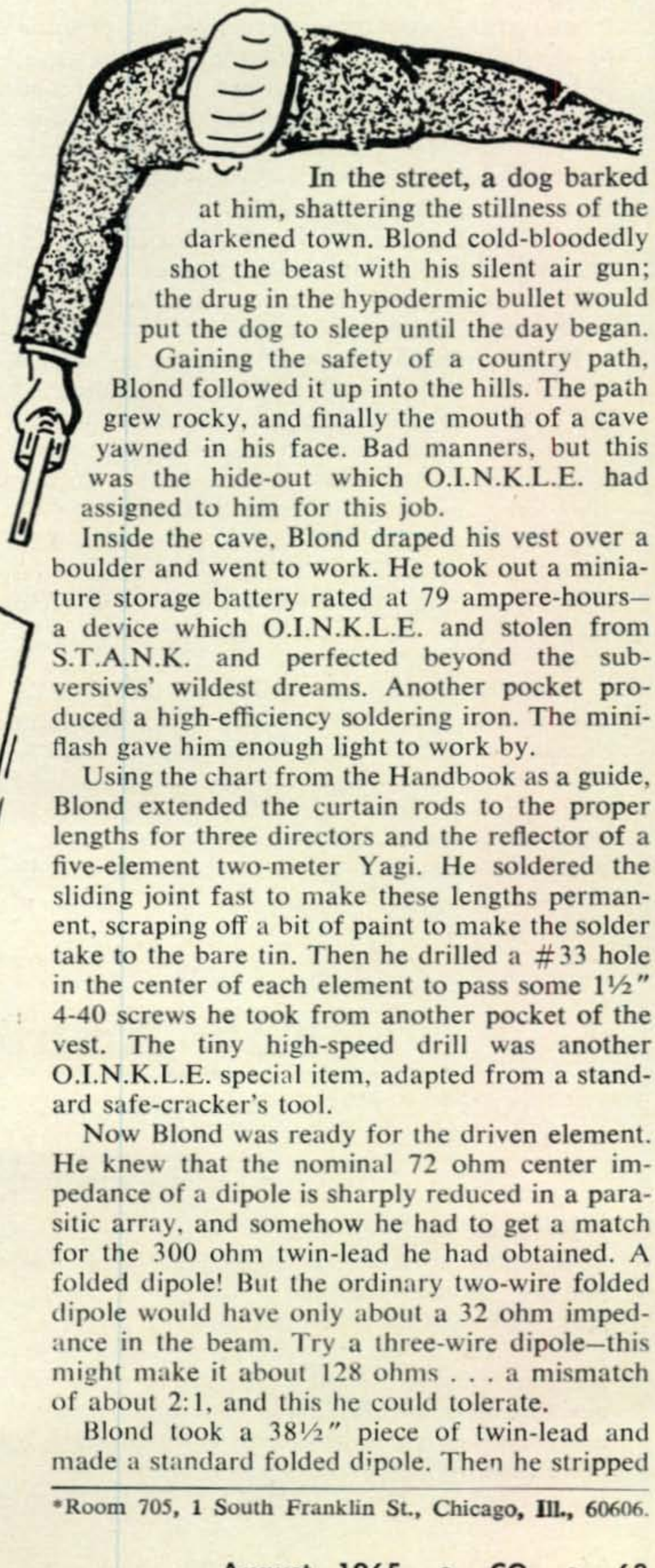
JAMES Blond squeezed through the half-open door, avoiding the booby-trap on the frame. Darting the beam of his mini-flashlight around the room, he made for the windows, where he removed four telescoping tin curtain rods. He could have bought these at any 5 and 10 for 19¢ each, but that would have been a tactic unworthy of the ace operative of O.I.N.K.L.E., the only man in his organization authorized to kill.

Once outside the house, he took a case-hardened steel cutter from his equipment vest and snipped off twenty feet or so of TV twin-lead which was dangling against the wall of the building. Cautiously entering the garden, he found a rose trellis. Using his thumb as a measure, he counted off 39 inches of ½" by 1" wooden strip of which it was made, and cut this piece out with a tiny razor-saw which came from another pocket of his vest. Then he used the saw to take off seven feet of the one-inch square wooden framing of the trellis.

"They'll blame *that* on teen-age vandals," he muttered, and fled.

His route through town took him past the Public Library, where he let himself in through a cellar grating. Prowling around the shelves, he found the 621.384 section, where he located a 1952 edition of the Handbook. He tore out the page with the v.h.f. Yagi antenna chart on it. While he was in the library, he also pocketed a roll of Scotch tape, poor substitute for a bottle of Scotch, but useful, nonetheless. Of course, he might have bought these items, too, but he was covering his tracks. Then he let himself out by the same way he came in.





In the street, a dog barked at him, shattering the stillness of the darkened town. Blond cold-bloodedly shot the beast with his silent air gun; the drug in the hypodermic bullet would put the dog to sleep until the day began.

Gaining the safety of a country path, Blond followed it up into the hills. The path grew rocky, and finally the mouth of a cave yawned in his face. Bad manners, but this was the hide-out which O.I.N.K.L.E. had assigned to him for this job.

Inside the cave, Blond draped his vest over a boulder and went to work. He took out a miniature storage battery rated at 79 ampere-hours—a device which O.I.N.K.L.E. and stolen from S.T.A.N.K. and perfected beyond the subversives' wildest dreams. Another pocket produced a high-efficiency soldering iron. The mini-flash gave him enough light to work by.

Using the chart from the Handbook as a guide, Blond extended the curtain rods to the proper lengths for three directors and the reflector of a five-element two-meter Yagi. He soldered the sliding joint fast to make these lengths permanent, scraping off a bit of paint to make the solder take to the bare tin. Then he drilled a #33 hole in the center of each element to pass some 1½" 4-40 screws he took from another pocket of the vest. The tiny high-speed drill was another O.I.N.K.L.E. special item, adapted from a standard safe-cracker's tool.

Now Blond was ready for the driven element. He knew that the nominal 72 ohm center impedance of a dipole is sharply reduced in a parasitic array, and somehow he had to get a match for the 300 ohm twin-lead he had obtained. A folded dipole! But the ordinary two-wire folded dipole would have only about a 32 ohm impedance in the beam. Try a three-wire dipole—this might make it about 128 ohms . . . a mismatch of about 2:1, and this he could tolerate.

Blond took a 38½" piece of twin-lead and made a standard folded dipole. Then he stripped

*Room 705, 1 South Franklin St., Chicago, Ill., 60606.

one wire from another 38½" length and discarded it. The other piece, with the plastic web, he soldered on as a third wire in the folded dipole. He taped the assembly to his 39" piece of wood, the fed wire in the center, the other two wires roughly parallel to it on either side. The balance of the twin-lead went to the cut center wire, to be the feeder.

Back to the Handbook chart again, and the 7 foot piece of 1" square wood. The latter was to be the boom. The chart gave 0.2 wavelength as an optimum element spacing, and translated this into 16 inches. A #33 hole every 16 inches along the boom took the 4-40 screws in the element centers; Blond put transverse notches in the boom to seat the elements slightly and prevent them from turning from their perpendicular position on the boom. Cautiously exiting from the cave, to be sure that no one was about, Blond searched through the woods until he found a sapling some 15 feet tall. His fighting knife made a good hatchet to cut this down and clear off the twigs. In the cave, he fastened the boom to the impromtu mast with a lashing of fishing line. A TV antenna U-bolt would have been quicker and neater, but it would have been another clue to his mission, had he stolen one.

He was ready! Propping the mast up against some rocks at the mouth of the cave, he attached the 300 ohm feeder to his sub-sub-miniature Gooey-Box. Holding the microphone close to his lips, he checked the time to be sure that he was right on schedule, and spoke softly—"CQ, CQ, CQ Field Day. This is W6ONK, Field Day Station of O.I.N.K.L.E., calling CQ Field Day and carefully tuning 144.1 to 144.628 . . . CQ Field Day . . ."

* * * * *

The character in this story it fictitious—only the beam is authentic. It is one that I first built to take on a camping trip when I did not want to bother lugging it home. I made it, used it and threw it away, hence the title of this episode. In the event that you're too lazy to consult a Handbook, the reflector was 40½" long, and the directors were 35½", 36¼" and 36½" long, respectively, from the front end of the beam back to the driven element for the low end of the band. The whole object was to build something quick and dirty, without the business of cut and try, testing and checking.

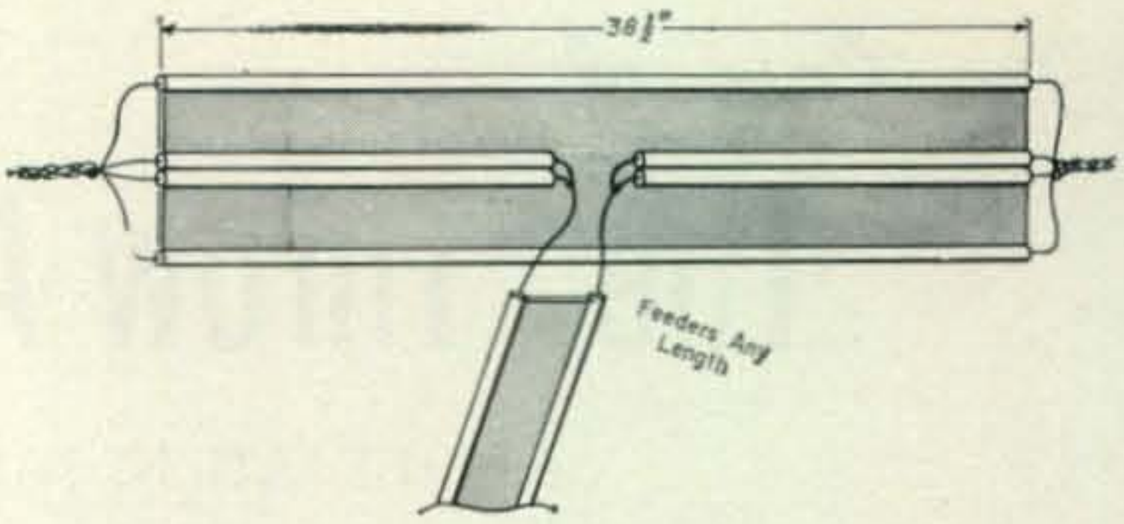


Fig. 1—Dimensions and construction technique for the driven element of the two meter "Throw Away Beam."

The beam worked. With it tied to an old Gonset Communicator we had consistent "local" QSOs over a 60 mile path, and it reached well out toward the 200 mile mark. This was in hilly terrain, and we were on a hill!

You can easily make this beam for a similar "DXpedition" to your favorite vacation spot. James Blond (and I, later) found it quite adequate for Field Day or any other short-term use. It is a handy device for experimenting with long-long Yagis; you won't go broke buying aluminum tubing and you can fiddle with the element lengths. I had it in the air for a full month, through a couple of summer storms, and it held together well. I shellacked the boom and driven-element support, although Blond did not have the time for such frills. I also hinged the boom to get it into the car—it was nailed fast when I assembled the whole beam on location. All drilling, soldering and taping was done at home, and putting it together in camp took about a half-hour.

Total cost was $1.04, and I had to buy the curtain rods, U-bolt and a length of wood for the boom. But I had to get permission from the park superintendent to take the sapling I used for a mast; Blond has more guts than I in this department! ■

New Amateur Product

Nordlund Radio Products

Nordlund Radio Products, Chicago, has announced the availability of a global wrist watch which tells local time on a 12-hour dial, and also indicates the time in any world time zone, using its 24-hour scale and rotating bezel assembly.

It features an easy-to-read "Day-Night" 24-hour scale, and International Date Line markings. Swiss-made jewelled movement is anti-magnetic, has luminous dial, sweep-second hand and unbreakable main spring. Gift-boxed. Price—$16.45 F.E.T. included. For more information write Norland Radio Products, 7635 West Irving Park, Chicago, Illinois 60634, or circle 70 on page 110.

Varactor Harmonic Generators

Presented below are the results of some practical experiments with varactor diodes in doubler, tripler and quadrupler circuits with a 65 mc input. Efficiencies of up to sixty-two percent were obtained.

BY WILLIAM J. LaHIFF,* W2IVT

THE varactor radio frequency harmonic generator offers advantages over frequency multiplier circuits using vacuum tubes. In particular, as frequency is increased to the v.h.f.-u.h.f. region, where the common vacuum tube circuits prove less efficient, the higher efficiency of the varactor multiplier becomes attractive. These solid state multiplier circuits are simple, employ few components, do not require filament or plate voltage and reduce the overall power supply requirements for a given transmitter power output. The theory of operation is not covered here but can be found in previously published data.[1]

To develop information of practical varactor multiplier operation a number of circuits for various orders of frequency multiplication were built and operated and the results noted. In addition, an attempt was made to employ a varactor as a frequency multiplier-single sideband mixer.

Test Equipment

A crystal oscillator-frequency multiplier chain (using old vacuum tubes) was built to serve as a driver for the varactor multipliers. The unit delivered 12 watt at 65 megacycles to a 50 ohm load. Other major test equipments included a Bird Model 43 Thruline Wattmeter, a Jones Micromatch (calibrated for power against the Bird meter at 130 mc) and a dummy load. These equipments were used in a test lash-up as shown in fig. 1.

Doubler Operation

A varactor multiplier utilizing the circuit of fig. 2 was constructed for doubling 65 to 130 mc and inserted in the test set-up. The initial attempts to obtain output from the doubler proved quite frustrating. Considerable perseverance is necessary to tame a beast where all of the adjustments are interdependent. Interaction of all of the controls, including the driver plate circuit was severe. For over an hour the input and output circuits, the bias control and the pi-network controls of the driver were adjusted with completely confusing results. Power output was low and the reflected power to the driver varied wildly but for the most part remained high.

To eliminate at least one of the tuning controls the pi-network was removed from the driver stage and a simple link coil coupled to the tank circuit, optimized to deliver power to a 50 ohm load, was installed. Elimination of the pi-network variable loading control simplified the tuning procedure and suddenly there was power output with a low v.s.w.r. reflected to the driver, just as Microwave Associates said it should be. It was found that each adjustment must be made in small steps, taking advantage of each small increase in power output.

The tuning procedure then became apparent. It is necessary to first adjust the output tuning control for a peak in output. This adjustment will affect all of the other controls. These controls are adjusted starting from the output circuit and working back to the driver control. Repeat this procedure again and again until maximum output is obtained.

It was found that the bias potentiometer was not critical so long as the resistance exceeded

*Kahn Research Laboratories, Inc., 81 South Bergen Place, Freeport, N. Y.

[1]Thorpe, D., "Varactor Multipliers for V.H.F.," *CQ*, Jan. 1965, p. 44.

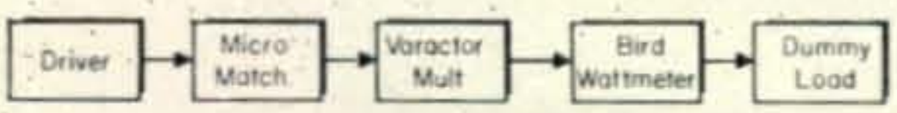


Fig. 1—Block diagram showing the interconnection and types of test equipment used in the experiments.

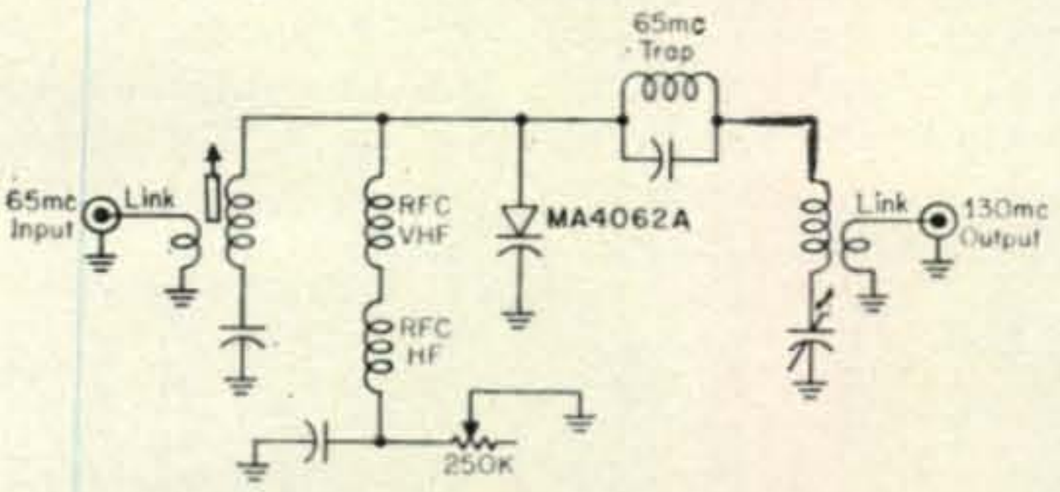


Fig. 2—Circuit of a varactor doubler for 65 mc to 130 mc.

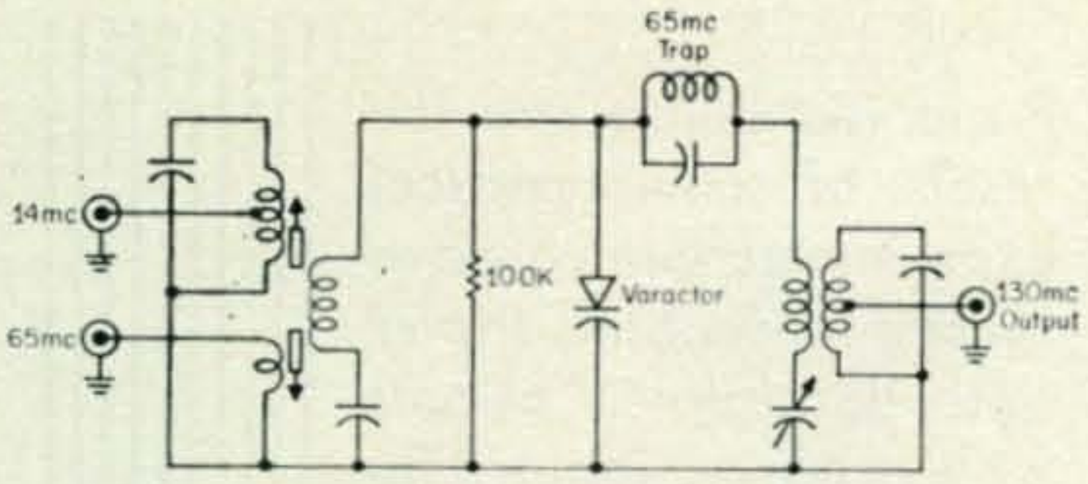


Fig. 3—Circuit shown above was used in an attempt to operate the varactor as a mixer but was not successful.

25,000 ohms. In fact, after many observations it was determined that the bias resistor affected the obtainable power to such a minute degree that it was not necessary to use a variable resistor. The resistor and the radio frequency chokes were removed and a 100,000 carbon resistor was installed, further simplifying the circuit.

The maximum power output proved to be 7.5 watts at 65 megacycles, an efficiency of 62.5 percent.

Mixer Operation

At this point a carrier from the single sideband exciter was injected using the circuit of fig. 3. Output at 144 megacycles was observed but it was 50 percent or less than the 130 megacycle local oscillator signal. Various methods of coupling the single sideband exciter output to the exciter were tried, without an improvement in the ratio of the signal components and it was finally decided that the varactor did not want to be a mixer.

Tripler Operation

The multiplier output circuits could be tuned to 195 megacycles and adjustments were made to obtain output on this frequency with a 65 mc input. Again it was necessary to go back to the learning process. As a capacitor or coil was adjusted a satisfying increase in power output occurred until a peak was reached, after which power output abruptly ceased. Panic prevails with the thought that the exciter output tube is operating without a load or the expensive varactor has gone West. Such is not the case. It is merely necessary to tune in the opposite direction until power output is once again obtained, then continue adjustment to a point a bit less than the peak. Go on to the next control and again adjust "almost to the peak", following the tuning procedure outlined for the doubler.

Power output measured 4.5 watts at 195 megacycles, an efficiency of 37.5 percent.

The multiplier circuit was then modified to include an idler circuit as in fig. 4. The manu-

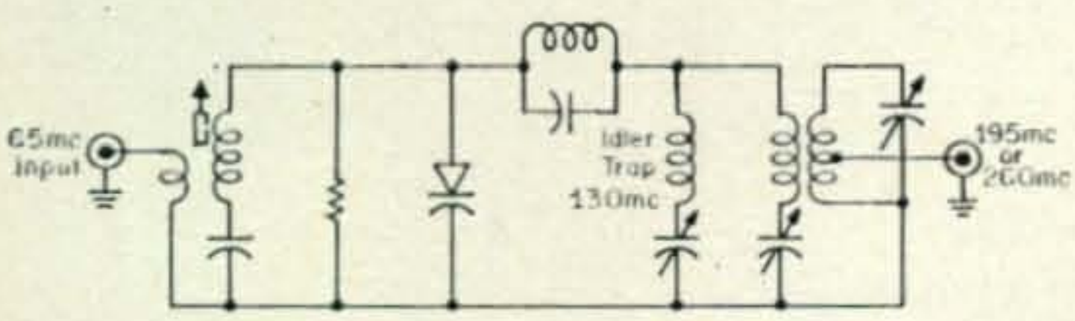


Fig. 4—The addition of an idler circuit tuned to the second harmonic permits multiplication factors over two.

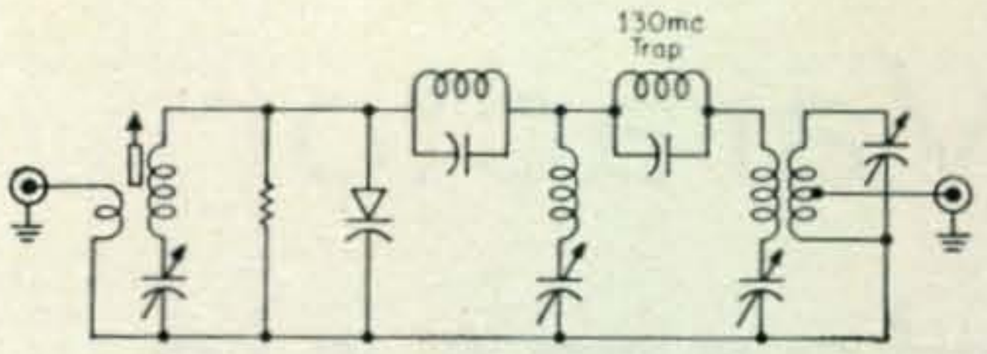


Fig. 5—For practical operation a parallel tuned trap is necessary for removal of the second harmonic.

facturer recommends that a shunt circuit tuned to the second harmonic be used in frequency multipliers with a multiplication factor greater than two. The low impedance path offered by a series tuned circuit permits heavy second harmonic current flow, improving the efficiency with high order multiplication.

The circuits were then retuned, as they must be after any change, including a change in power input. The power output measured 6 watts at 195 megacycles, an efficiency of 50 percent.

Although not previously noted, a grid dip meter, employed as a wavemeter was used for the initial tuning adjustments, when the output power was too low to indicate on the Bird wattmeter. At this time it was noted that the wavemeter indicated equal power output at 130 and 195 megacycles when coupled to the output coils. To obtain a true indication of the actual output power the wavemeter was coupled to the coaxial line within the Bird wattmeter. With fixed coupling the wavemeter indicated 20 at 130 megacycles, 100 at 195 megacycles and zero at 260 megacycles. Evidently a parallel tuned trap (fig. 5) is necessary to eliminate the second harmonic component in a practical tripler multiplier. However it was not necessary for this series of tests.

Quadrupler Operation

The multiplier circuit was modified for fourth harmonic (65 to 260 mc) operation by changing the output coils. The adjustment procedure proved to be the same as for the tripler except that *extreme* care was necessary in tuning. This did not bother the author because by this time he was an old hand at this sort of thing. The adjustments can best be described as cranky. For the first time it was noted that the chassis was warm to the touch, indicating high varactor dissipation.

Power output measured 3 watts at 260 megacycles, an efficiency of 25 percent. With the wavemeter coupled to the Bird wattmeter only the 260 megacycle signal gave an indication. Evidently the second harmonic got lost along the way.

32.5 to 130 Mc

To ascertain whether the maximum efficiency obtained when multiplying by a factor of four was due to the varactor characteristics or was affected by the coil circuits employed, a test was conducted at a lower frequency. The driver was modified to deliver a measured output of 5 watts to a 50 ohm load at 32.5 megacycles. The har-

[*Continued on page 100*]

DX

BY URB LE JEUNE,* W2DEC

Here and There

Gus: Gus has now been active from AC3 and AC4 after a run of prefixes from Bhutan. Gus expects to continue to operate from the AC area until early July. About mid-July Gus will start working his way west, and should be finishing up in Europe the early part of December, at which time he returns to the states so as to fulfill his promise to Peggy, *i.e.*, home for Christmas. *(Tnx DXpedition of the Month).*

G2YL: An old-time ham of 30 years or so, Nell Corry, G2YL (Peter smead, Walton-on-the-Hill, Tadworth, Surrey) expects to leave England about August 20th for Montreal. She will have one of the "unlimited travel" Greyhound bus tickets (due to dollar limitations), driving by bus across Canada, down the west coast of the U.S., and returning east. She may arrive in Los Angeles about late September or early October. This information is furnished in case anyone wishes to get in touch with Nell prior to her trip. *(Tnx K6KA).*

5J4RCA: For those of you who worked or heard this call during the *CQ* SSB contest and thought him to be a phony, this call sign was issued to the Antioquia Radio Club in Colombia for the contest only. QSL to HK4EB.

BV Formosa: Both BV2A and BV3HPT are presently active on 20 c.w. They are the only BV2 and BV3 active. *(Tnx DX-MB).*

BY China: JA3UI reports that he will operate BY1PK during a visit to Peking in September. Sounds almost too good to be true. *(Tnx LIDXA).*

CR5 Sao Tome: CR5SP now has s.s.b. equipment and is in the process of putting up a beam. Al is also building a linear amplifier and expects to be more active. The rig will remain with Al for the rest of the year. *(Tnx LIDXA).*

CR8 Portuguese Timor: After his CR8BH activity, VK3AHO left his 20 meter Quad for CR8AF who can now be worked on 20 meter phone, 14236 and 261 crystal controlled. Try about 1700 GMT.

CT2 Azores: CT2AL, Padal, worked at 2300 GMT on 14196 a.m. and listening 14205. QSL c/o Portuguese Airways, Lages, Azores. *(Tnx LIDXA).*

EA6 Balearic Islands: EA6BC, Salvatore, on a.m., 14211 kc at 2300 GMT, copies s.s.b. and says QSL to POB 34, Palma de Mallorca, Balearic Islands. *(Tnx LIDXA).*

*Box 35, Hazlet, New Jersey 07730.

EP Iran: From EP2DS: "Having just taken over the duties of the EP QSL Bureau, I have found many cards for amateurs that are no longer in this country. Since I have no address for them, I cannot notify them. It would be appreciated if you would publish our address in hopes that some of the past holders of EP calls will write us and send along their address. Some stations have as many as 100 cards in this bureau. Here is a list of some of the stations that have cards in this bureau. EP2's AC, AF, AM, AO, AY, BB, BD, BE, BH, BK, BL, BM, BN, BO, BR, BS, BY, MR, NM, RK, RS, RU, RY, SM, SX and VS. We now have a new address. It would be appreciated if all QSL cards for the EP QSL bureau be sent to this address: Amateur Radio Society of Iran, ARMISH/MAAG, APO New York 09205." *(Tnx EP2DS).*

FK8 New Caledonia: FK8AU is usually active on weekends on 14130 kc on s.s.b. Best time is about 2200 GMT. *(Tnx LIDXA).*

FM7 Martinique: FM7WQ skeds his manager W4OPM at 0715 GMT Tuesdays or Wednesdays. Pierre is on 14125, listens 14260. Don't call until sked is finished. *(Tnx LIDXA).*

GC Alderney (Channel Islands): G2HFD is planning to be daily on the air as GC2HFD/ during his stay on the island from July 24 until August 14 frequency 14125, listening 5 kc up or down, or 200 kc up. From about 2200 GMT on 3740 or may 7042. Equipment KW-2000 and Groundplane antenna for 20. For DXCC purposes, Alderney is the same as Guernsey. *(Tnx VERON).*

IS1 Sardinia: IS1RUA is presently active on 20 meter s.s.b. *(Tnx DX-MB).*

LA/P Jan Mayen: Currently QRV on 14 mc c.w. are: LA2AJ/P, LA2QJ/P, LA3IJ/P, LA3P/P, LA5AJ/P and LA8FI/P. LA8FI/P on s.s.b. at 0400 GMT. *(Tnx LIDXA).*

MP4T Trucial Oman: MP4TBO on 14056 at 2000 GMT. QSL Box 8, Sharjah, Trucial Oman, Persian Gulf of VE1AKZ. Also active is MP4TBM. *(Tnx LIDXA).*

OD5 Lebanon: OD5BZ, Bob, active on 14255 at 2000 GMT with QSLs to W8ZCQ and OD5LX on 14015 at 0500 GMT. *(Tnx LIDXA).*

OK Czechoslovakia: "I am turning to you with this appeal. I am a radio amateur, age 19, a student of Technical University in Bruo and a member of club OK2KOJ. I should be very glad, if I could correspond with any ham or s.w.l. from DX Countries, (NA, SA) or just from the USA. My address is Rudolf Klvana, Rezkova 5, Hranice, Czechoslovakia."

ON8 Belgium: To amateurs temporarily residing in Belgium, ON8 licenses are being issued. The first letter behind the figure indicates the country of origin of the license holder. For instance, ON8N tells us this ham is from the Netherlands.

OY Faeroe Islands: "Just a little information about OY activity. We are starting a new club here called FRA Faroes Radio Amateurs, and there is newly licensed OY2J, OY3B, OY3S, OY3M, OY4M, OY7S, OY7X, OY7T, OY7M, and more are to come soon, but they are all

The following certificates were issued between the period from May 6th, 1965 to and including June 5th, 1965:

CW-PHONE WAZ

2146	W5ENE	Ben Holloman
2147	JA1BN	Akira Tani
2148	DL7EG	Harald Dickertmann
2149	G3GAD	George A. Day
2150	KR6JZ	Peter Susko
2151	SP5AFL	Leon Kossobudski
2152	VE6AAV	K. Tettelaar
2153	VE6ABP	Andrzej Pelczar
2154	SP9ADU	Margaret Tettelaar
2155	VE2BV	D. G. Murphy
2156	F3II	Paul LaBlan
2157	W2CZF	Frank D. Pizzuti
2158	WA6TGY	Joseph H. Reisert, Jr.
2159	UQ2AS	L. H. Freimanis
2160	UB5KDS	Lvov Politechnical Institute
2161	K9QIE	A. J. Sweeney

ALL-PHONE WAZ

299	W7DQM	James A. Maricle
300	W2CZF	Frank D. Pizzuti
301	VE4OX	D. E. McVittie

TWO-WAY SSB WAZ

319	W7DQM	James A. Maricle
320	SM5AM	Arne Sönnergaard
321	SM4SB	Carl Fjall
322	F9MS	Claude Ronsiaux
323	W2CZF	Frank D. Pizzuti
324	VE4OX	D. E. McVittie
325	DJ1KM	Reinhard Richter

CW WPX

648	W2NR	Clarence O. Aber
649	G3GAD	G. A. Day
650	PAØOI	Ger Leemheer
651	PAØSNG	Gerrit Mulder
652	UB5DQ	Rudolf O. Taranov

SSB WPX

212	G3KXT	R. I. Richardson

MIXED WPX

112	K2SHZ	John W. McCann

100 TWO-WAY SSB

471	VE3EUU	Bert Iseman
472	UA3BT	Ewgeniy Danilov
473	WA5KBK	Fred A. Duran, Jr.

strictly c.w. Please also bring the address of our QSL bureau which is now taking care of all QSLs to and from OY. OY QSL Bureau, Box 184, Torshavn, Faeroe Islands. *(Tnx OY7ML).*

OY2GHK has been issued for W2GHK to use when he visits the Faroe Islands. It will also be used periodically by the Radio Club on the Faroes, and QSO with this station will count toward DXpedition of the month award credits. *(Tnx DXpedition of the Month).*

ST2 Sudan: ST2AR, in a letter to W2FGD, says that he has been QRT at "official request" but looks forward to getting his permission to operate renewed. Recent elections and the forming of a new government are the reasons. *(Tnx LIDXA).*

SVØ Crete: Three active stations here are SVØ-WR, WFF and WGG. *(Tnx LIDXA).*

TA Turkey: Der in letzter zeit aktive TA1DB war ein Pirat. *(Tnv DX-MB).*

UAØY Tana Tuva: UAØYP is presently the only active s.s.b. station in Zone 23. He operates various frequencies on 20 meters with low power. *(Tnx DX-MB).*

VE1 Prince Edward Island: "I am planning a two-week operation from Prince Edward Island (VE1) the last two weeks in August. I will be mobile at (K2HN/M VE1) using the following approximate frequencies 3.575, 7.050, 14.050, 21.050 c.w. and 3.795, 14.195, 21.245 a.m. Mostly c.w., however. I hope this operation will help toward giving more hams a chance for the WAVE award. Listen sharply as my signals may be weak." *(Tnx K2HVN).*

VK9 Papua Territory: VK9CJ on 14050 kc c.w. between 0500 and 0700 GMT.

VK9 Cocos-Keeling: Bob, VK9CR, is operating daily on 14245/55 and 14100 kc s.s.b. Usually 1600 to 1800 GMT. *(Tnx WGDXC).*

VKØ Antarctica: VKØGW is looking for state-side QSOs between 0200 and 0600 GMT on 20 meter c.w. *(Tnx K7SNB).*

VP2K St. Kitts: "Just thought I'd drop you a line to let you know that I am acting as QSL manager for VP2KD on St. Kitts. I have had this arrangement with Sammy since last fall but his activity was sparce and we did not bother to publicize it then. However many cards did find their way to me. Sammy is now active with a TR-3, RV-3 and TH-4 from St. Kitts and I do have regular skeds with him to give fast service on all incoming QSLs for him. S.a.s.e. or a nickel from U.S. amateurs would be appreciated. Seems a shame to send an IRC when a nickel would do. *(Tnx VE3ACD).*

VP3 British Guiana: VP3AA will be QRV for about two years. He has been active on 14275 kc around 1100 GMT. *(Tnx LIDXA).*

VP8/LU South Orkneys: Hugo, LU4ZA, is active between 14046 and 14049 kc around 2300 GMT. *(Tnx ISWL).*

VR1 Ellice Island: VR1S, Pat, reported QRV at 0600 GMT on 14250 s.s.b. and 14010-015 c.w. at 0800-1000 GMT. QSL to POB 288, Suva Fiji, Ellice Islands. *(Tnx LIDXA).*

VR2 Fiji Islands: Bill, VR2EK, as a weekly sked on Friday nights with W6AL, Bill transmits on 14150-180 kc. QSL to radio VR2EK, Deuba, Fiji Islands. VR2BG has a rock for 14115 and can be heard around 0330 GMT. WGDXC reports VR2ET, Lionel, now active s.s.b.-14115 kc from 1800 GMT with QSL via VK6RU. *(Tnx LIDXA).*

VR4 Solomon Islands: VK4SS via the LIDXA reports VR4CR will be QRV for another year and can be found on 14060 c.w. at 0400 GMT most days. He is building a fone rig now. QTH—A. Carter, c/o Weather Officer, Honeara, Br. Solomons.

VS6 Hong Kong: The following VS6's are active on 20 meter c.w. between 0900 and 1700 GMT VS6's FB, FC, FE, FF, FJ, FK, FL and FO. The following are active on 20 meter s.s.b. at the same time VS6's AZ, AJ, EK and BE. The

recent VS6AOK was a phony. *(Tnx VS6BJ).*

YJ New Hebrides: YJ8BG has been active on 14125 and 14200 kc a.m. phone. Usually around 0400 GMT. *(Tnx NCDXC).*

YS El Salvador: "The reason of this short note to you is to advise of the change in our QSL Bureau. It will now be handled directly by the Club De Radioaficionados De El Salvador (CRAS) P. O. Box 517, San Salvador, El Salvador, C.A. We have taken into consideration that it is much better that our club handle the QSLs rather than an individual member. New board of directors: President: Dr. Jose Italo Giammettei, YS1IM; Secretary: Mr. Salvador Rodriguez Diaz, YS1RRD; Treasurer: Mr. Roberto Schaps W., YS1RSE; Director: Mr. Jose Rodriguez C., YS1JR; Director: Dr. Marco A. Fortin, YS2MFI; Director: Mr. Roberto Sagrera, YS1RES.

ZD5 Swaziland: Archie, ZD5R, is active daily on 14120 kc s.s.b. *(Tnx WGDXC).*

ZD7: ZD7IP, George Barrett, ex-ZC4IP, etc., is now active with low power but a good Vee beam in a QTH 1800 feet above sea level and he can see over miles of ocean to the north. He will be there for two or three years and has three crystals, 7002, 7007, and 7040 and operates 7 mc, 14 mc and 21 mc and his favorite spot is 21021 kc. George needs no introduction to the DX fans as he has been a real hot DX man for years. There is no air strip on the island and thus no air mail and only a few boats each year, so QSLs will be slow and he wants cards sent to RSGB. His home is now one of the houses where Napolean stayed; in fact, his radio den has the famous hole in the shutters which Napoleon cut so he could watch his guards without being seen. *(Tnx W2GT).*

ZD8 Ascension Island: Harold, ZD8HL/VP2KL, passes along the following: "Just returned from operation on Anguilla a few days ago. Worked about 800 stations as VP2KL. About half were Ws. Used Galaxy V Transceiver and Hy-Gain TH-2 MK 2 tri-band beam. Have plans for several other DXpeditions in the next year or so. Will let you know when something firm develops on it. Would appreciate it if you would mention that QSLs for ZD8HL go via W2CTN and cards for VP2KL go via Hammarlund DXpedition of the month.

"Cards for ZD8s may be sent to the following QTH unless they advise otherwise. Ascension Amateur Radio League, ZD8AR, POB 4187, Patrick AFB, Fla. 32925. We will make every effort to forward cards to fellows who have left the island. Sorry I wasn't able to get on from Antigua and some of the others. Time ran out. Only problem from Anguilla was expensive power ($3 per hour). Looking forward to another trip back there in the next year or so."

ZS2MI Marion Island: The new operator at ZS2MI is Charlie. He has been reported on 21410 at 0930 GMT. *(Tnx LIDXA).*

4W1 Yemen: 4W1I is often active on 21 mc c.w. while 4W1Y frequents s.s.b. on 14115 kc starting at 1500 GMT. *(Tnx WGDXC).*

5W1 Western Samoa: "Thought perhaps you might be interested in details of amateur activity from Western Samoa. The call here, since independance in January 1962 has been changed to bring it into line with international prefixes and we therefore no longer go under the call ZM6. Instead, the amateur prefix is 5W1, AA-Z. I am incidently 5W1AC and have been operating for some four weeks with home brew s.s.b. equipment on 20 meters only, running 50 watts input into a dipole on 14,200. The only other activity is from 5W1AZ who operates c.w. mainly on 20 meters. I note with interest the 'Orange Picker' (Danny Weill) VP2VB in the October 1963 issue of *CQ*. Danny was down in Western Samoa late in 1961 or thereabouts and operated from here as ZM6AZ. He was instrumental in forming an amateur radio club here and gave the local lads a whale of a time, assisting him in operating ZM6AZ. Interest in the club has since waned, but I hope with the operation of the simple Home Brew equipment to start it rolling again. The main difficulty is in getting the proper equipment or parts.

"We are on from 0400 GMT to 1000 GMT most days, operating on 14120 and 14190-14220 so if by chance you happen to hear us, we would be very pleased to hook up with you. When conditions are right, we usually put in a 5/3-5 signal into the U. S." Tnx to Jim, 5W1AC, for the above letter.

9E3 Ethiopia: "Thought you would be interested in knowing, due to your WPX program, that our Kagnew Station Amateur Radio Club (ET3-USA) has permission to work portable during our 12th anniversary month of June in the Massaua, Cheren and Ghinda areas of Ethiopia. We have been given special permission to operate portable with the callsign of 9E3USA during the month of June. We expect to ask permission to operate with the 9F3 prefix at some later date." (Tnx K1QHP/FL8AK).

9M8 East Malaysia: 9M8KZ and EB presently active. QSL for K7 to W6KTE and for EB to Ed Brogden, Dragon School, 24th Mile, Simanggang, Kuching, Sarawak. *(Tnx LIDXA).*

9X5 Rwanda: 9X5MH on 14247 between 1900 and 2000 GMT. *(Tnx LIDXA).*

QTHs and QSL Managers

I recently reported W3KTY as QSL manager for KG6IJ. This was an error. W3KTY is QSL manager for KG6IG.

WB6FGT would like to offer his service as a QSL manager. His QTH is Galen F. Tustison, 4446 W. 170th St. Lawndale, Calif. 90260.

BV2A	Box 11, Hsintien, Taiwan, Formosa.
BV3HPT	Box 11, Hsintien, Taiwan, Formosa.
EA3OT	via WB6BSJ.
ET3USA	via K7UCH.
FL8AK	via K7UCH.
FP8CM	via VE2AFC.
HP1AA	Box 2033, Panama City, Panama.
HP1JC	Juan G. Chen, Box 26, Panama City, Panama.
HS3RP	Mike, 201 Det. RB, APO 96237, San Francisco, Calif.
HZ1AB	1141 USAF, APO 09616, New York, N. Y.

[*Continued on page 99*]

Contest Calendar

BY FRANK ANZALONE,* W1WY

Calendar of Events

August	**7-8**	***CQ* Summer VHF.**
August	7-8	Illinois QSO Party.
August	14-15	WAEDC C.W.
August	28-29	All Asia DX C.W.
August	29-30	QRP QSO Party.
September	11-12	WAEDC Phone.
September	18-20	Pennsylvania QSO Party.
September	18-19	S A C C.W.
September	25-26	S A C Phone.
September	25-26	RSGB 21/28 Phone.
September	25-26	MARC VE/W.
October	2-3	WADM C.W.
October	2-3	Oceania DX Phone.
October	2-4	Mass. QSO Party.
October	9-10	Oceania DX C.W.
October	16-17	RSGB 7 mc DX Phone.
October	16-17	ARRL CD Phone.
October	20-21	YLAP C.W.
October	23-24	ARRL CD C.W.
October	**23-24**	***CQ* WW DX Phone.**
November	3-4	YLAP Phone.
November	6-7	RSGB 7 mc DX C.W.
November	13-14	ARRL SS Phone.
November	20-21	ARRL SS C.W.
November	**27-28**	***CQ* WW DX C.W.**

CQ Summer VHF

Starts: 9 A.M. Local Time, August 7.
Ends: 9 P.M. Local Time, August 7.

Bob Brown covered this one on page 61 last month's issue.

Illinois QSO Party

Starts: 1600 GMT Saturday, August 7.
Ends: 2200 GMT Sunday, August 8.

This is the third annual QSO party sponsored by the Illinois Chapter #17 of the Certificate Hunters Club. With plenty of advanced publicity and expeditions scheduled to some of the rare spots, it is anticipated that at least 60 counties will be active.

Use all bands, c.w. and phone; a.m. and s.s.b. classified as phone. The same station can be worked and counted for QSO points on each band and each mode. A c.w. and a phone contact on the same band with the same station is good for 2 points.

EXCHANGE: QSO number, RS/RST, state, province or country (Illinois stations, their county).

POINTS: 1 point per contact for out of state as well as Illinois stations who are also permitted to work in state station for QSO points.

MULTLPLIER: Out of state stations will multiply their total QSO points by the number of different Illinois counties worked. Illinois stations will use States, Canadian Provinces and Countries as multiplier.

FREQUENCIES: 3600, 3900, 7100, 7220, 14,100, 14,300, 21,100, 21,300, 28,100, 28,700 kc.

AWARDS: In Illinois, single and multi-operator stations will compete in separate categories with certificates for 1st, 2nd and 3rd place winners. Out of state stations: a certificate to the high scoring station in each State, Canadian call area and each country.

LOGS: Must show: Date and time in GMT, station worked, QSO number sent and received, band, mode and score claimed. Illinois should also indicate if single-or multi-operator.

Mailing deadline is September 1st and your logs go to: Illinois QSO Party, c/o Cliff Corne, K9EAB, 711 West McClure Avenue, Peoria, Illinois 61604.

DARC WAE DX

C.W.—Aug. 14-15. **Phone**—Sept. 11-12.
Starts 0000 GMT Sat. Ends: 2400 GMT.
Sunday in each instance.

This is the 11th annual WAE Contest sponsored by the DARC. It's the Europeans working the rest of the world on all bands and modes.

Complete details in last month's CALENDAR with an explanation of the QTC feature and the WAE country list.

Mailing deadline is September 15th for c.w. and October 15th for phone. Logs go to: Dr. H. G. Todt, DL7EN, Chlodwigstr. 5, 1 Berlin 42, Germany.

All Asia DX

Starts: 1000 GMT Saturday, August 28.
Ends: 1600 GMT *S*unday, August 29.

This is the 6th annual All Asia DX Contest sponsored by the JARL. Its the Asians working the non-Asians on c.w. only. Use all bands 1.8 thru 28 mc.

CLASSIFICATIONS: Two categories—all band and single band. However, operation is limited to single operator only.

SERIAL NUMBERS: For OM stations; five figures, RST report plus your age. For YL stations; RST report plus 00 (Zero, zero).

POINTS AND MULTIPLIER: For non-Asians; 1 point per contact and a multiplier of one for each Asian country worked on each band. For Asians; 1 point per contact and a multiplier of one for each non-Asian worked on each band. The DXCC and WAE country list will be used.

SCORING: Score for single band entries is the total contact points multiplied by the number of

*14 Sherwood Road, Stamford, Conn. 06905.

countries worked. The all band score is the total contact points from all bands multiplied by the sum of countries worked on all bands.

AWARDS: Certificates will be awarded to the top scorers in each band in each country and to the three high scorers on all bands in each country. There will also be additional awards to the top scoring all band stations in each continent.

Your log must be in the hands of the committee before December 31st and they go to: The JARL Contest Committee, P.O. Box 377, Tokyo Central, Japan.

QRP QSO Party

Starts: 0100 GMT Sunday, August 29.
Ends: 0100 GMT Monday, August 30.

This is the fourth annual QRP Amateur Radio Club International QSO Party. Entries may be on c.w. only or phone only. Club members may contact non-members as well as members, however non-members may only work club member stations. (100 watts input or less constitutes QRP).

EXCHANGE: Members send QSO number, RS/RST and QRP Club number. Non-members send QSO number, RS/RST and "NM" (non-member).

SCORING: Each completed QSO counts 1 point. A 1.5 multiplier is given for a.m. only QSO's and a 1.5 multiplier to those stations using 20 watts input or less.

LOG DATA: Date/time in GMT, QSO Nr. sent and received, station worked, RS/RST sent and received and QRP number. Also band and mode.

FREQUENCIES: C.w.—3540, 7040, 14,065. 21,040, and 28,040.

Phone—3855, 7260, 14,260, 21,30 and 28,560.

AWARDS: Certificates to the 1st place c.w and 1st place phone station in each State an Canadian province. A minimum of 75 points must be scored for a station to be eligible for an award. Certificates will also be awarded to top scoring stations, c.w. or phone, in each continent with scores of over 50 points.

Logs must be postmarked no later than September 15th and must be sent to: Fred Behrman, K7LNS, 3425 S.E. King Road, Milwaukie, Oregon.

Information or application for membership in the QRP A.R.C. can be obtained from K8DZR, 2146 Chesterland Ave., Lakewood, Ohio 44107.

S A C

C.W.–Sept. 18-19. **Phone**–Sept. 25-26.
Starts: 1500 GMT Saturday. Ends: 1800 GMT. Sunday in each instance.

This is the seventh annual Scandinavian Activity Contest and this year is sponsored by the NRRL (Norway).

It's the world working the Scandinavians and for contest purposes the following prefixes will be considered country multipliers: LA, LA/p, OH, OHØ, OX, OY, OZ and SM/SL. A total of 8 on each band.

1. Use all bands, 3.5 thru 28 mc.
2. Two classifications, single and multi-operator. Club stations are classed as multi-operator even though only one operator participates. Multi-transmitter operation is permitted.
3. Serial numbers will consist of the usual five and six figures, RS/RST report plus a progressive three digit number starting with 001.
4. Each completed contact counts 1 point.
5. A multiplier of one (1) for each country prefix worked on each band, a maximum of 8 per band. (LA/p will count as only one even though there are 3 countires under that prefix.)
6. The final score, total QSO points multiplied by the sum of prefixes from all bands. (There is no single band classification.)
7. Certificates will be awarded to the two highest scoring stations, c.w. and phone, in each country and each W/K call area. Additional awards may be made depending on the returns.

Logs should show in this order: Date/time in GMT, station worked, number sent and received, band used and note each new prefix as it is worked on each band. A separate sheet for each band is not necessary, however a summary sheet showing the scoring for each band is requested.

The summary sheet should also include other essential information regarding equipment and other comments. Dont forget the usual signed declaration that all rules have been observed. And your name and full address in BLOCK LETTERS.

Mailing deadline is October 15th. This year your logs go to: The NRRL Traffic Department, P.O. Box 6594, Rodelokka, Oslo 5, Norway.

Pennsylvania QSO Party

Starts: 2300 GMT Saturday, September 18.
Ends: 0400 GMT Monday, September 20.

The eighth annual Pennsylvania QSO Party sponsored by the Nittany Amateur Radio Club, offers all out of state stations an opportunity to earn credits for the Pa. Counties Award, Keystone Award, USA-CA Award and others.

Rules are of the conventional state party contests and will be given in detail next month.

RSGB 21/28 Mc Phone

Starts: 0700 GMT Saturday, September 25.
Ends: 1900 GMT Sunday, September 26.

The date of this activity has been moved up considerably from previous years and with an expected improvement in conditions on these bands the participation is also expected to pick up.

No changes in the rules are expected, but rules will be covered in next months CALENDAR.

MARC VE/W

Starts: 1800 EST Saturday, September 25.
Ends: 2400 EST Sunday September 26.

This popular across-the-border activity has always been held the last weekend in September so I'm sticking my neck out and making this

announcement even though no official announcement has been received.

A modification of the rules is expected this year and I hope to have them in time for the next issue.

CQ World Wide DX Contest

Phone—October 23-24. **C.W.**—November 27-28. Starts: 0000 GMT Saturday. Ends: 2400 GMT. Sunday in each instance.

Rules will be same as previous years, however a modification has been made in awards to certain areas. See Par. 8.

The following is a brief run-down of the rules for our overseas friends in remote areas:

1. All bands may be used, 1.8 thru 28 mc.

2. Contest exchange, RS/RST report plus your Zone.

3. QSO point value: (a) 3 points between stations in different continents.

(b) 1 point between stations in the same continent but in different countries.

(c) Contact between stations in the same country are permitted for Zone and/or country multiplier, but they have *NO* QSO point value.

(d) Exception: Contact between stations in the North American continent *only* will count 2 points. (This rule applies to stations in North America *only*.)

4. Your multiplier is determined by the number of Zones and Countries worked on each band.

5. The final score is determined: (a) Single band, Zones plus countries multiplied by the QSO points.

(b) All Band, the sum of the Zones and Countries from each band multipled by the total QSO points from all bands.

6. Competition is in three divisions: (a) Single operator.

(b) Multi-operator, Single transmitter.

(c) Multi-operator, Multi transmitter.

7. Single operators have the option of operating on all bands or on a single band. Multi-operator stations however are judged on all band operation only.

8. Certificates will be awarded to the top scorer on all bands and on each individual band, in each country, each USA call district and each Zone in Australia, Canada and the USSR. NOTE: We feel that the poor returns from VK and VE does not warrant separate awards for each call district as in previous years.

Trophies are also awarded to the world high stations in several categories as listed under Par. 6.

NOTE: The definition of a Multi-operator, Single transmitter station is one in which only *one* signal from *one* operating position is on the air at the same time. Switching back and forth to different bands from different operating positions with different operators, during the same time period, will *not* be considered as "Single transmitter" operation. In Multi transmitter operation, all bands may be activated at the same time, but all the equipment must be located in the same building or immediate area.

That briefly covers the rules, but they will be published in details in the September issue.

These rules as well as official log forms and summary sheets are available from *CQ*. Include a large self-addressed envelope with sufficient postage with your request (IRC's are acceptable of course).

All requests go to: *CQ* World Wide Contest, 14 Vanderventer Ave., Port Washington, L.I., N.Y. 11050.

Section Winners
1965 Vermont QSO Party

W1BHV	K3ILC	W6CLZ	KØPUB
W1DPJ	K3VSV	WB6IEX	WAØHMW
W1SWX	K4FF	W7KUZ	WAØHYI
K1UJX	K4IEX/4	K7QCO	VE2IL
K1YKT	K4UYY	K7SDF	V3FHV
W2UAP	WA4FAT	W8UMP	VE5JI
WA2HGL	WA4JJY	K8GWK	VE6ABV
WA2WEE	WA4LCO	WA9AVT	Vermont
WB2AEO	W5LGG	WA9JRS	W1AYK
WB2LUW	K5BQS	WØVFE	K1UZG
W3EYF	K5HYB/5	KØGSV	W1ZNM
W3UVH	WA5KLX	KØOAL	W1FPS

W1AYK was Trophy winner for Vermont and W1SWX for the out of state.

Editors Note

The high point in a recent visit to Washington, D.C. was an informal meeting and dinner with some of the Potomac Valley Radio Club boys. It was my pleasure to present the 1964 *CQ* Plaque. Present at the dinner were W3GRF, W3MSR, W3TMZ, K3EST, W4GF, W4ZM, W4IYR, W4KXV, W4WBC and W6HOH. Equally delightful was a visit to W3GRF, W3MSK and W3PZW before the dinner. This through the courtesy of Jack Colson, W3TMZ. Thanks Jack, it was a most enjoyable experience. I'll never complain about my little TA-33 again. Hi!

73 for now, Frank,W1WY

THE VHF COLUMN

BY BOB BROWN, K2ZSQ
AND ALLEN KATZ, K2UYH*

THE advent of the upcoming OSCAR IV shot moves us to remind you of the significance this ham satellite series presents. We expect to see in the near future long-distance satellite communications at the level of the *average* two meter operator become a reality. It should be, therefore, imperative that 144 mc enthusiasts get their hands on all available information on the OSCAR series if they expect to cash in on this exciting opportunity at hand. *CQ* has endeavored to publish data on the satellites as it is received and will continue to do so. The rest, though, is up to you.

Rather than ignoring the feat and relegating future satellite communications to a select few, make it a point to get your feet wet with the next one.

CQ has spent countless hours developing their "Oscalator," an ingenious device which simply constructed can tell you at any given time where the OSCAR satellite is, how to beam-in on it, plus tons of useful related information. Full details are in this issue. Even if you haven't previously paid much attention to this satellite business, make it a point to get your hands on the "Oscalator" article when it comes out. With this device at hand you should be able to get in on what is becoming the sound of the sixties hamwise: Satellite communications on two meters.

Latest reports indicate that OSCAR IV will go up sometime either in September or October. It will be almost identical to OSCAR III in function, although many foresee possible beacon signals on 1296 mc, 432 mc and 10 meters in addition to the two meter emissions. (The probabilty of these beacons will start from 1296 and work down; that is to say that should there be a 10 meter beacon, there will definitely be the others, too.) The likelihood of that 10 meter signal is extremely low, however, in view of the antenna dimensions that would be necessary at the frequency.

Probably the two meter signal frequencies will have to be changed somewhat, since at this writing experts predict that the OSCAR III telemetry beacon will continue broadcasting for several months more.

*c/o Allen Katz, K2UYH, 48 Cumberland Avenue, Verona, New Jersey.

In any case, those who missed out on the earlier OSCAR fun should have little excuse this time. With each new satellite, increasing numbers of v.h.f.'ers are participating and reporting on what they've heard and worked. By the time OSCAR IV goes into orbit, amateur radio should have the largest percentage of particpating hams yet.

At a recent conference between the editorial staff and v.h.f. columnists it was decided that much good could come from extensive OSCAR IV coverage on these pages. This means who-heard-what-and-when, where to look for satellite DX, etc. More information on this subject next month.

Twelve-Hour Contest: Still Time

Flip out your July *CQ* and take another look at the announcement for the *CQ* Summer VHF Contest. Due to last minute decision by our editorial staff, the old "VHF Amateur" 12-Hour contest was revived and set for Saturday, August 7. Don't miss this one!

Announcing

Windblowers "Big Blow": On Saturday, September 25, the Windblowers VHF Society, Inc., will mount their 11th Annual "Big Blow" starting at 1400 and ending at 2400 EDST. "Big Blow" stations will be W2NLN/1 in Connecticut; W2WBY/2 in New York; W2NUL/3 in Pennsylvania; and W2ZDR/2 in New Jersey. Transmitting frequencies will be between 144 and 146 mc.

All v.h.f. enthusiasts are invited to participate and qualify for the Special Certificate of Achievement which will be awarded to each participant who successfully communicates with all four "Big Blow" stations.

New C.W. Net on Six: "In the interest of all amateurs who wish to operate c.w. on six meters," writes WB2DIK of Paramus, N.J., "WB2JVE and I have organized a six meter c.w. net.

"The net will meet twice a week at 6 P.M. EST on Tuesdays and Fridays on 50.4 mc. I am looking forward to meeting all interested stations on the air at those times." For readers information, WB2DIK may also be contacted by sending a QSL to A. William Paulsen, 280 Addison Place, Paramus, New Jersey.

From the Mailbag

Dave, K1WHS/1, reports on May V.H.F. Contest *(Don't miss August one!!)*: "I just want to supply you with a preliminary report on the May Contest as operated by the University of New Hampshire Amateur Radio Club. We set up and operated from Mt. Agamenticus in York County, Maine. The club is small but that did not stop anything. We operated on 6, 2 and 1¼ meters and contacted 181 stations in 44 counties. Power was 30 watts to a six element beam just about 720 feet above sea level. Stations were contacted from Florida to Missouri.

'I operated two meters with my old 829B at 120 watts input. Receiver was a Collins 51J-4 with my new home brew 7788 converted. Antenna was eight elements at 730 feet. Results were spectacular with 133 contacts in 36 counties, although there seemed to be a lag in two

New VHF Century Club Members

Six Meters

WA8KBD 304
WA8BXS 305
K1ZGH 306
K2CMG 307
K1ZGH 308
WB2JRR 309
WB6CGZ 310
WA6NUA 311
WA8LWO 312
WØYRD 313
K3SKZ 314

Two Meters

WA8NUB 212
WB2NDI 213
WB2EFF 214
WB2LYP 215
WA8GKU 216
WA9KPD 217
WB6HCQ 218
OK1WDR 219
K8TSC 220
WA8DMN 221
WA9CFK 222
DJ8CR 223

Operating position at W1ASZ/1, Mt. Agamenticus, Maine, in our May VHF Contest. Operators included: K2EKI, WA2ULP, K1WHS, W1ZIZ, WA2ULO, K1INL, W1END & K1ABM.

meter activity. We were begging for contacts in the afternoon hours. More c.w. would certainly have helped. *(Come on, two meter gang. Let's not let six get too far ahead of us in August.)*

'On 220 we ran 15 watts to an 11 element beam with a 417A converter. We were only on Sunday and worked a mere 3 stations. There was just no one on. *(That is the way it usually seems to go on 220 and above during V.H.F. Contests.)*

Kurt Lambert, WB2LSV, on May contest discovery: "I am writing because of my new interest in 2 meters. When I was a Novice I operated 2 meters, but never really became excited about it. I always enjoyed the low bands, and, after receiving my General, operated 20 meters s.s.b. and c.w.

'However, last weekend I turned the two meter rig on by chance. I was very surprised by the sound of activity on the band because of the May contest. So I started operating the contest. My dad WB2MRI (ex-W8NSP) later joined in and we both worked the contest with our two'er and 7 element beam. We made 19 contacts in 6 counties; not much, but we tried and had a go-cat time. You will see our calls in contests more now. Soon our beam will be on a rotator, which should help in the future." *(That's the spirit Kurt; will be looking for you in the August contest.)*

Al, K7VQI, keeping the ATV bug alive in Arizona: "See by the last *CQ* you have been on vacation. *(Some vacation—work, work, work!)* Hope you got up along the Hudson near Bear Mountain. Some years ago I took an extended vacation: Boston to Tampa in the first six weeks. Then we interrupted our travel for a year due to financial necessities. We finally finished the trip by gong from Tampa to California (with a few stops in Mexico) back to Buffalo and Niagara Falls, down to Stamford, Conn. and finally back to the starting point, Boston. All the fruit trees in bloom, the unbelievable colors, an afternoon through the Utah mountain! So I hope you outdid me. *(Sorry, but Bob just has a vivid imagination. See October, 1963* U.H.F. *column to see what K2ZSQ can do when he really gets carried away, hi!)*

'I am sending along a snapshot of my test bench while air testing the PH565 camera after conversion. PH565 cameras are latter versions of the ATJ-ATK series and are labelled as PH565-AXT-3. The main difference is in the extra shielding and extra terminal board, and the lens is a 90 mm f4.5 Raystar. You can get a picture at 15 to 20 feet by bringing the lens close to the face of the Iconoscope. This means that you will have to lift off the top shield and remove the shield in front of the ike, which acts as a stop for the lens. The ATJ-K lens system can be used in the PH565 or vice versa, but you need the lens mount that slides into the large opening. So don't throw away your old cameras.

'Not much doing on Ham-TV here at present. The boys are at their 2 and 6 meter rigs." *(Thanks for the tip, I am sure a lot of fellows will find it helpful.)*

Glenn Hickman, KH6EOZ, on 2 meter operation in Hawaii: "I have some general information on 2 meter activity in Hawaii. Most activity centers around the Civil Defense frequency of 147 mc. There are also a few stations on down about 144.1 mc. Among these, the more highly developed stations are W2UK/KH6 (otherwise known as KH6UK), KH6DEM, and KH6EEM; who run in excess of 500 watts on c.w. and s.s.b. Other active stations are KH6's AFM, DBY, EVY, VF, DUL, FCY, and GC (on Oahu). There are a few stations on the outside islands, most of which are located on the island of Kauai. Among these stations, the most active are KH6BAS and KH6ECT. I hope this information is of interest. I can supply you with more details, if you wish." *(It sure is Glenn. Please do keep us informed of Hawaiian v.h.f. activities.)*

George Gatliff, K5KOC on ATV in Texas: "I have just started work as a transmitter engineer at a TV station, KVKM, Channel 9, Monahan, *(Welcome to the industry, fellow Channel 9'er)* and am really interested in 432 mc TV. There is another ham at studio building a camera, and in the near future we hope to have a transmitter and receiver completed. Having use of a 1200 foot tower, I expect that I will be able to work other stations in Western Texas. Can you supply me with information on other ATV stations in this area?" *(The only TV activity in your area that we know of is through Vic, W5HPT, in Bedford and Leroy, W5AJG, in the Houston area. However, your letter will stir up some new enthusiasts. Anyone interested? K5KOC lives in Braintree.)*

Dennis Silage, WB2LGJ, writes on u.h.f.: "I have a little problem. Like most amateurs, I want to make a contribution to the 'art' in whatever way I can, and I feel that populating either 220 or 420 may be a good start. *(We agree!)*

'There are several of us, all under twenty years, who want to form a pocket of activity on either of these two bands here in Trenton, N.J. Could you tell me of the relative use of these bands in our area? Which would be better? *(The Pack Rats from Phily, otherwise known as the members of Mt. Airy VHF Radio Club, Inc., are very active on 220 and have a net going on 221.4 mc. Dave, W3LHF, operates a net additionally—145.2 mc Monday nights—that might be of some help. There is also a great deal of u.h.f. activity in central Jersey spearheaded by W2UUW in Parlin. A good place to get information on this group is the annual S.J.R.A. Hamfest. Look for announcements on this year's bash—usually held in early September in CQ & QST. There are always a lot of u.h.f.'ers in attendance.)*

'The transmitter, due to cost limitations, will not be a kilowatt-variety, but two or three watts in should be sufficient to start. What about receivers? Can you suggest a working arrangement? *(This one would take us pages to answer here. Will jot you a letter on it. Meantime check with people mentioned above. There's a great deal being done with surplus on these frequencies.)*

'I may be sticking my neck out too far, because at the present time I operate six meters only—with absolutely no equipment on two—but I feel that we may be able to stir up some activity among the Techs and Generals around town who have been operating 75 long enough to know that there are other bands (like ten)."

Russ Lietzou, WB6HCQ, on mountain-bounce and such: "A few notes about myself and my interest in ham radio. I am 56 years old and started in amateur radio about 2 years ago. A friend of mine who is a ham gave me some *CQ* magazines and had me over to his place when he was on the air. Well, I got the bug . . . Next week I go to Los Angeles for my General. *(Best of Luck, Russ.)*

'I sure like 2 meters. We are about 70 miles from Los Angeles on the floor of the Mojave Desert in the heart of the Antelope Valley. There is a range of mountains between us, two peaks about 11,000 feet high. A signal bounced off of either one puts us into L.A. It sure is fun to hear them call CQ and then answer them. When they find out I am in the high desert . . . everybody wants to break in.

[*Continued on page 98*]

HAM CLINIC

CHARLES J. SCHAUERS,* W6QLV

As we have pointed out in this column many times before, we cannot hope to answer *every* question received to the complete satisfaction of *every* reader. Being human we make mistakes, but we do try our level best to help the ham in need of technical or other information related to amateur radio. If we knew *it* all we would not be human! With every batch of mail that comes to us we learn something new because we are forced to do a great deal of research to dig out some of the answers—this has been going on now for over 7 years.

But believe it or not, a large part of the time we spend on answering HAM CLINIC correspondence is devoted to answering questions that can be found in back issues of *CQ*, *QST*, *73* or radio handbooks.

Nearly every technical magazine published, publishes a yearly index in its December or January issues. If used wisely, the index can be very helpful to you in locating specific articles.

We are continuing to receive requests from readers for complete design information—these we cannot do because of lack of time.

We are proud to say that many, many letters coming to us from readers say, "the first *CQ* feature I turn to is HAM CLINIC." This certainly does encourage us to expend extra effort to please our readers.

If after perusing back issues of available magazines, your radio handbook and other books, or you are having trouble with a receiver, transmitter etc., and you are not successful, *then* write to us. If you follow this procedure you will help us by giving us more time to devote to correspondence from hams who *really* need help.

We mention correspondence in this column often because HAM CLINIC picks up new readers every month and we wish to give the service that we feel we should. Our backlog is never less than 100 letters, so you can imagine what happens when we go on vacation—if we are lucky enough to take one.

Make your letters short and to the point, and if you are in a hurry enclose 2 IRC's (obtainable from any post-office) with your letters. Before you write however, *do* think of the ham who is really stuck and who does need help—is your problem that important?

*c/o *CQ*, 14 Vanderventer Ave., Port Washington, L.I., N. Y.

The IARC

The International Amateur Radio Club (IARC) located in Geneva, Switzerland is an organization devoted to the perpetuation of amateur radio on an international scale. Numbered among its membership are hams from all over the world, including some very famous personages.

IARC activities and its stations 4U1ITU thru 4U6ITU are under the constant scrutiny by telecommunications officials of nearly every country on the globe. As such, it is in a position to extol the advantages of amateur radio operation (especially to developing nations). It is in the city where the body that allocates radio frequencies gathers. It is the only organization that I know of in existence today that has begun to help developing nations with getting amateur radio started by loaning actual ham gear.

I mention the IARC here because I believe every ham should belong to it, not only for the reasons already mentioned but also because it fosters international understanding and goodwill; it is also a *purely* non-profit organization; is non-political and possesses the only station in the world that permits *any* licensed amateur from any country to operate it!

Copies of the IARC annual magazine *4U1ITU Calling* for 1964 are still available. You can get your copy by sending $1.00 or 8 IRC's to: the IARC, 1211 Geneva, Switzerland. If you want to join the IARC, drop them a line for an application blank at the same address. If you join you will receive a beautiful membership certificate and pin. You'll help amateur radio by joining the IARC, believe me!

This year's IARC convention will be held on the 18 and 19 September. If you are in the Geneva area (member or not) join in the fun, technical sessions, operation of 4U1ITU and enjoy some real international friendship—with hams, from all over the world.

A New Name

Many hams feel that the word "amateur" does not do justice to the present day ham. Some feel that even the CB'er has a more dignified name.

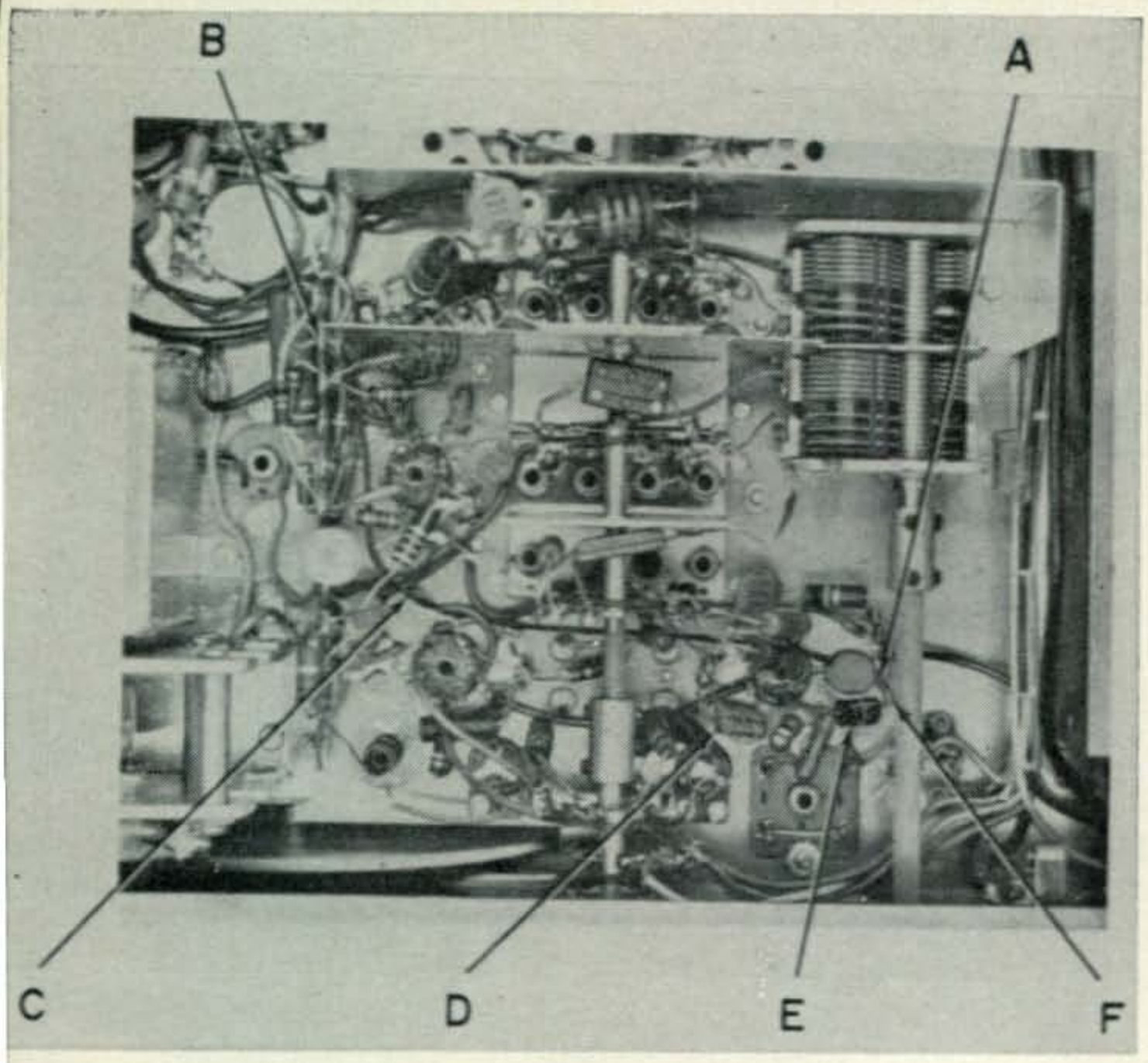
What are your thoughts on the subject? What is your idea for a new name? Drop us a postcard.

Questions

Converter Power Supply—"Would you publish a circuit of a power supply that I can use for a 2 meter converter I am building? Its output should be regulated with a v.r. tube and 90 volts should be available as well as 6.3 volts a.c. for the filaments of the Nuvistor tubes I am using."

Sure. See fig. 1. Transformer T can be any good transformer having a 120 volt secondary at 50 ma or more and contain a filament winding for 6.3 volts at ½ to 1½ amps (depending on the number of tubes used). Adjust the wire wound 10K pot for 90 volts output.

Shortwave Broadcast Stations—"It seems to me that there is a large waste of money operating shortwave broadcast stations. Who listens to



Location of parts in HT-32 and HT-32A modifications. (A) by-pass at this point with .005 mf ceramic disc at 500 v. (B) connect new wire to this terminal (Junction of 4.7K resistor and green cable wire). (C) lay new wire lead along this path, lay wire down on chassis to avoid stray pickup. (D) clip ground side R_{32} (47K) resistor. (E) new position for R_{32}. (F) connect new wire lead at junction of R_{32} (47K) resistor and disc by-pass.

them anyway? With so much QRM on the s.w.b.c. bands how can anyone 'enjoy' a broadcast anyway? Do you personally think that the s.w.b.c. effort is worth the time and the money expended on it by most nations?"

Conducting a meaningful s.w.b.c. listeners survey is presently impossible. I feel that *most* nations are "kidding" themselves when they think their s.w.b.c. audiences are large and worth the effort. Who do you personally know who is a constant listener to the thousands of shortwave broadcasts that clutter the ether every hour of the day and night?

Let's be factual! We all know that *every* government does *selectively* monitor broadcasts of other governments, outside of these official monitors the s.w.b.c. audience is small—and no one can prove otherwise.

The information usually heard on most s.w.b.c. stations can be read and analyzed by embassy officials in locally published newspapers. Why go to all the trouble to spend millions of dollars to keep s.w.b.c. stations on the air when the audience is so limited? This is a big question. Those who encourage s.w.b.c. operation have the idea that they need only reach a *few* people in a target area—these people, (they reason) will spread their "message" by contact with others. This I do not believe—especially in some countries where it is a crime to be caught listening to foreign broadcasts.

Nearly every s.w.b.c. service (including our own VOA) offer inducements for listeners to write in so they can get an idea of how their broadcasts "are doing."

Yes, the s.w.b.c. bands are crowded and they will be more crowded. Read Stanley Leinwoll's fine article in the June 1965 issue of *Popular Electronics*. The article, "Chaos in Shortwave Broadcasting" should be read by everyone interested in frequency allocation.

The questions that those contemplating more s.w.b.c. operations (especially in developing countries) should ask themselves are: other than the fact that we can say we have a station, who will listen to us? Is the outlay in money and time worth the effort, or should we concentrate on improving our *internal* telecommunications first? People who do not like one another will seldom listen to each other, so who is trying to convince who that s.w.b.c. facilities are essential?

A country is not building up its telecommunications resources with shortwave broadcasting, but it *is* by allowing amateur radio operation and encouraging it.

The good accomplished by s.w. broadcasting? You tell me. To compete nowadays, s.w.b.c. stations must be in the megawatt class and these cost *real* money.

The only shortwave program that seems to have a good audience is the jazz program over the VOA—when it is over, off goes the set.

If someone can *prove* I'm wrong, I am willing to listen and present the other side of the record too.

Who prefers listening to s.w.b.c. stations when they have their own local medium frequency BC and TV stations? Why fight the QRM?

The answer to the whole s.w.b.c. situation is of course international agreement to cut down the *number* of stations—but this is something that won't happen tomorrow.

HT-33A Linear Modifications—"I have a second hand HT-33A linear and was wondering if you know of any modifications to this fine amplifier?"

Yes. Hallicrafters Engineering Bulletin (Part No. 094-902038) covers three subjects, i.e., mechanical vibration, fan noise and idling current instability.

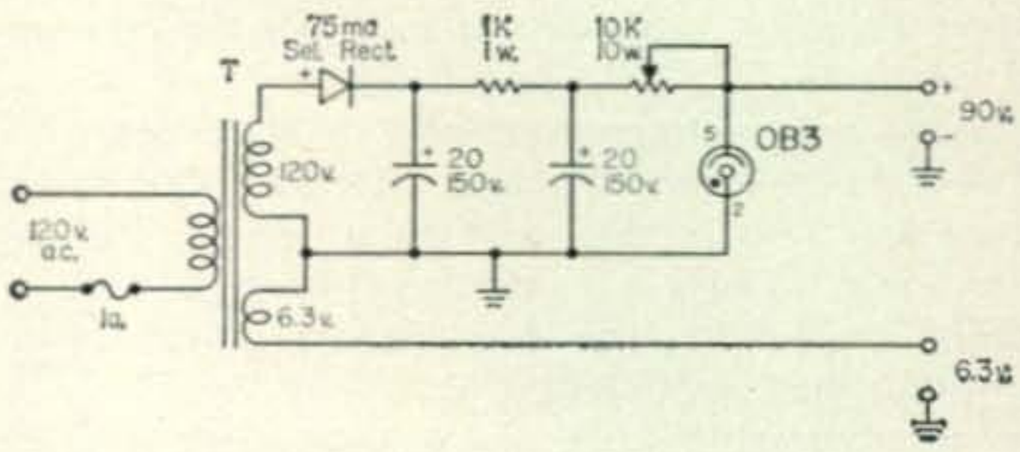


Fig. 1—A power supply for a v.h.f. converter.

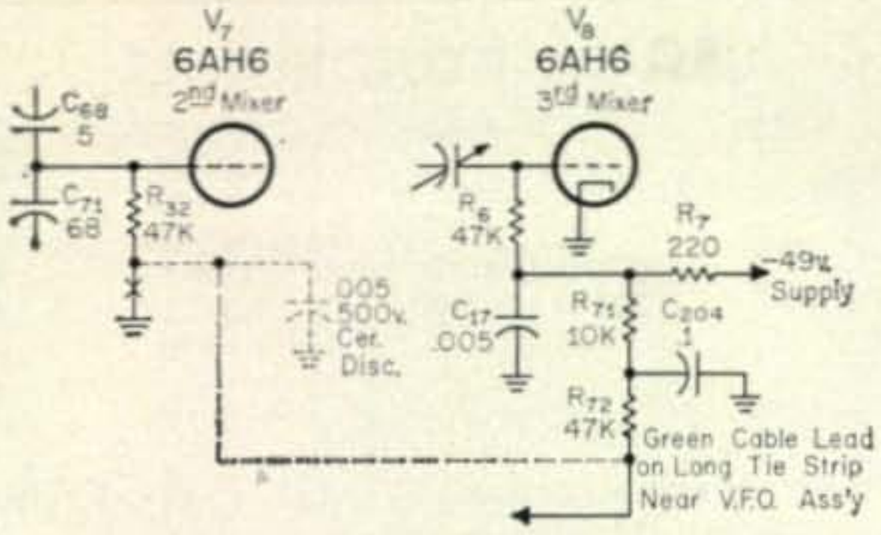


Fig. 2—HT-32 and HT-32A keying modifications. Check photo and caption for details.

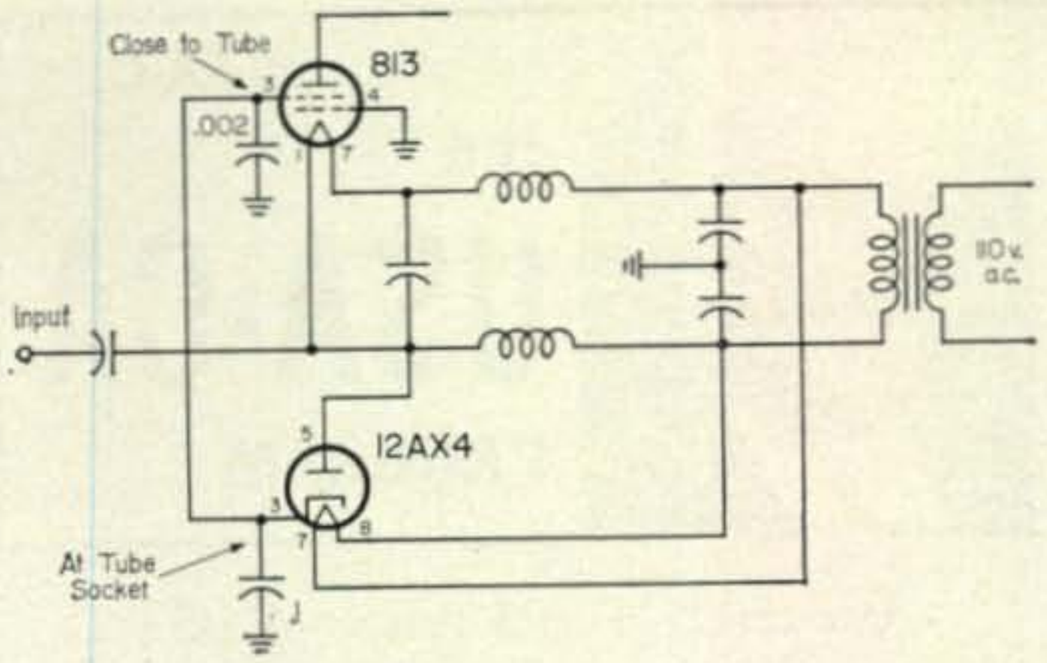


Fig. 3—How a 12AX4 tube is used to improve 813 grounded-grid performance.

"Transformer hum" or 60 cycle mechanical vibration has been found due to the filter choke (L_3). Repositioning this slightly will eliminate the trouble. Fan noise is cured by installing a new fan blade and hub (Part No. 080-100583). Idling current instability is corrected by removing resistors R_{18} and R_{19}. R_{16} and R_{17} are replaced with 1000 ohm 2 watt resistors. A new 100K 2 watt resistor is installed between the junction of R_{16} and R_{17} to the ground lug on the V_4 socket. I suggest you get the Bulletin for detailed instructions.

HT-32 and HT-32A Modification—"Would you please show me how to key more than one mixer stage in my HT-32? I use a TR switch and want to reduce the signal level in my receiver to a point where it is not bothersome."

Thanks to Hallicrafters see the information reproduced from their Bulletin No. 092-104364.

Certain installations involving Models HT-32 or HT-32A, where a TR switch or two separate antennas are used, make it necessary to key or cut-off more than one mixer stage. This is necessary to attenuate the signal level sufficiently so that it will not be heard by sensitive receivers. To alleviate this condition, a modification is necessary to apply cut-off bias to the second mixer grid as well as to the third mixer grid during standby or when the key is up during c.w. transmission. With both mixers blocked, the signal level will fall well below the noise level encountered in even the most quiet receiver locations. This modification will not require any readjustment of the HT-32 or HT-32A circuits, nor will it change the operating procedure from that specified in the instruction manual. See fig. 2 and the photo for the necessary modification information.

Coil Equivalents—"Can you give me the name of a manufacturer who publishes data on coil equivalents? What I am looking for is a table or tables which show i.f., r.f. and special coil interchangeability possibilities by manufacturer and part number."

Suggest you write the J. W. Miller Co. 5917 S. Main St. Los Angeles, California (90003) and ask for their catalog No. 65. This contains the information you seek plus a lot of other good information and construction data, including schematics for a couple of ham radio receivers.

Improving GG 813 Operation—H. Roth, VE2QJ sent us the following: "just a note which might be of interest to some of the hams using 813's in grounded grid configuration for s.s.b. I have found that by using a diode to load the positive cycle of the exciter unit (as suggested by an earlier *CQ* article), it helps linearity. Taking this a step further per the article on the class C amplifier, the output voltage from this loading diode is used to supply screen voltage to the 813's on modulation. It improves the performance of the amplifier considerably in that the drive requirements are cut by approximately one third. Approximately 150 volts is developed from a 12AX4GT which is utilized on the screens as shown in fig. 3. The 12AX4 was used in order to avoid additional filament supply requirements—the 10 volts for the 813's will do fine.

"Maybe its too simple, but an 813 which was considered flat in the normal configuration took on a new lease of life and works very well with the screen voltage added. A doubler circuit might be better to obtain additional voltage but it should not load the negative cycle of the exciter."

Thanks VE2QJ.

SB-300 Noise Limiter—We have had a number of requests from readers for a noise limiter for Heath's fine receiver the SB-300. Anyone try out a good shunt or other limiter that works? If so, we'd like to publish the results here.

KWM2-A Changed Mike Gain—"Why is it necessary that the mike gain on my KWM-2A has to be turned all the way up for proper operation. Before, it operated just above mid-range? The vox gain is way up too."

First check V_{1A} the mike amplifier tube. Then check V_{11B} and V_{3A} tubes. I'll bet one or all of these are weak. If not, check plate coupling resistors if a voltage check indicates low voltages. If this is not your trouble then suspect C_1, C_3 and C_4.

Thirty

Next month the HAM CLINIC column will contain a number of interesting and useful items. We plan to devote as much space as possible to questions (of which we have thousands on file). If you have something that would be of interest to fellow hams, let us hear about it. Thank you for reading and supporting HAM CLINIC.

73 & 75 Chuck, W6QLV

the USA-CA PROGRAM

BY ED HOPPER,* W2GT

WHAT trouble the printer will have this month. I am not the worlds' worst typist, not quite, but for a little while I will have to use a different set of two fingers because the regular ones are covered with blisters. All this introduction is to let you know that we now have a swimming pool in our back yard. It is real fun except for all the work putting it up; the worst job of all was digging the 18 inch deep trench about 70 feet long for the water filter power line, and I don't have to tell you who did that job.

Here is the story of awards and endorsements up to June 10. USA-CA-2000 awards, endorsed mixed, went to Rod, W9CMC and Norman, W5NXF; and they both received endorsements for All 7 mc 2X s.s.b. for their USA-CA-1000 and USA-CA-500 awards. USA-CA-1000 awards, endorsed mixed, went to George, K2PBU and Andy, WPE9ETT. Andy is the third s.w.l. to receive USA-CA-1000 award and his predecessors were VE3-9301 and VE3-11367. Harold, WA2QMF was issued USA-CA-1000 and USA-CA-500 awards, both endorsed All 7 mc s.s.b. and all 7 mc mobiles. The other USA-CA-1000 award went to Charlie, WA2IMT, endorsed all 7 mc 2X s.s.b. USA-CA-500 awards, endorsed mixed, were issued to Doug, W1KVA, Charles, WAØFPU, Warren, KØYET and Robert, K1NWE. Other USA-CA-500 awards were earned by Ray, VE3CBY for All A3, Bill, WØHAO for All A1, and by Fred, WA6RZX for All A1 and All 7 mc. Congratulations to all.

New Honor List

In response to many requests, last month a new list was started, listing the Top Twenty-Five County Hunters, so far most comments have been favorable. By the October issue of *CQ*, I hope the list will actually show the Top Twenty-Five County Hunters with the most *confirmed* counties, so if you feel you should be in the Special Honor Roll, send me your latest list (by number only) of *confirmed* counties.

New Ideas

New and helpful ideas are always welcome and I hope to start using photographs of Top County Hunters, so put on your best smile and send along the photographs. I believe it would be nice to include the equipment in the photos and that antenna farm at K5SGJ/K5SGK should make a most interesting photograph.

*103 Whittman St., Rochelle Park, New Jersey 07662

USA-CA HONOR ROLL

3000

K9EAB 1

2000

W9CMC 20
W5NXF 21

1000

K2PBU 80
WA2QMF 81
WPE9ETT 82
WA2IMT 83

500

W1KVA 491
VE3CBY 492
WØHAO 493
WA2QMF 494
WA6RZX 495
WAØFPU 496
KØYET 497
K1NWE 498

Complaint

There was some comment, awhile back, when WA2QMF gave out some QSOs on the county line of Schoharie, Greene, and Delaware of New York. The complaint was that this point was out in the middle of a lake. Investigation shows that although some service station road maps mark the county lines so that they appear to merge in the center of the Schoharie Reservoir, better maps clearly show these lines intersecting on the road circling the reservoir and this was verified at the local town clerks' office.

Letters

Bill, K2HVN, writes, "I am planning a two week operation from Prince Edward Island (VE1), the last two weeks in August.

"I will be fixed mobile (K2HVN/M VE1) using the following approximate frequencies—3.575, 7.050, 14.050, 21.050 c.w. and 3.795, 14.195, 21.245 on a.m.—but mostly c.w. on 7.050.

"I hope this operation will help towards giving more hams a chance for the WAVE award. Listen sharply as my signals may be weak."

Parker Bishop, W4WRY, writes, "I have been enjoying your column in *CQ* and thinking I ought to write you. I am here at Clemson University, Clemson, S.C., as a graduate student but I am originally from Stewart County, Georgia. Stewart County has but one or perhaps two hams.

"I do go back there to see my parents on some weekends, but at present these are few and far between and I seldom know very far in advance when I will be there.

"I'll be getting back to Stewart County off and on for approximately two more years so I'll try to get on and give as many QSOs as possible.

"I will try to advise K9EAB and some of the other fellows before I go and I will attempt to

SPECIAL USA-CA HONOR ROLL
TOP TWENTY-FIVE COUNTY HUNTERS

3000

K9EAB

2500

K8CIR
WØMCX
K4VOF
K5SGJ
K5SGK
WØJWD

VE3-9301
K8IWI
WA9AJF

2000

K9UTI
W5EHY
WA8EZW
K8KOM
W8UPH
WØKZZ

K8VSL
K8YGU
WØVFE
W9CMC
W5NXF

1500

K4BAI
W6KG
KØHUU
W9HAS

WAPUS, Worked All Prefixes, U.S.

WAVE, Worked All VE

WPIB, Worked Polytechnic Inst. Brooklyn

check into the County Hunters' Net at 1300 GMT." His address for anyone needing Stewart County is 21 Littlejohn Apts., Clemson, S.C. 29631.

Mike Shields, K8CHN, writes, "I am very active from Cheboygan County, Michigan on 21 mc a.m. from 1800-2100 EST when the band is open, and I do QSL 100%. I have over 300 counties so far and am hard at work for the necessary 500, so you can see I am just as happy to give out Cheboygan contacts as the fellows are to get it. Keep up the good work." Anyone needing this county can write to Mike at 438 So. Huron St., Cheboygan, Michigan 49721, wasn't there an old vaudeville song about that county? Oh, that was before your time, excuse me . . . Hi . . .

County Identification

Bob, "The Fuzz", WA8EOZ, "Just finished reading your USA-CA Column in the latest *CQ*, (its the 1st thing I turn to) and in reply to your plea for spare P. O. Dept. Book #26, I will be happy to donate one, please send me the name of a DX friend needing one.

"I had the pleasure of meeting in person, a bunch of the fellows and gals at the Dayton Hamvention this year. They were all a grand bunch.

"You will shortly receive my application for USA-CA-1000."

Ray, W1FPS, writes, "I have 3 P. O. D. #26 which I will be glad to send to any DX hams, so if you will send me some addresses I will sure send them along."

Bertha, WA4BMC, writes, "My USA-CA is so very beautiful, my OM, Slim, WA4AZZ went right out and bought a frame and hung it in the shack.

"I will be glad to volunteer to help with county identifications." So for help, write Bertha Farr Eggert (Mrs. R. W. Eggert, Sr.), 1510-17th Ave., N., Lake Worth, Florida 33460.

Counties Caravan

As I write this column, I do not have any definite information on any Counties Caravan plans by Hammarlund for this summer, so if you are interested in their Counties Program send a s.a.s.e. to Stuart Meyer, W2GHK, P.O. Box 7388, GPO, New York, N.Y. 1001 and mark on the back of your s.a.s.e. "Counties Bulletin".

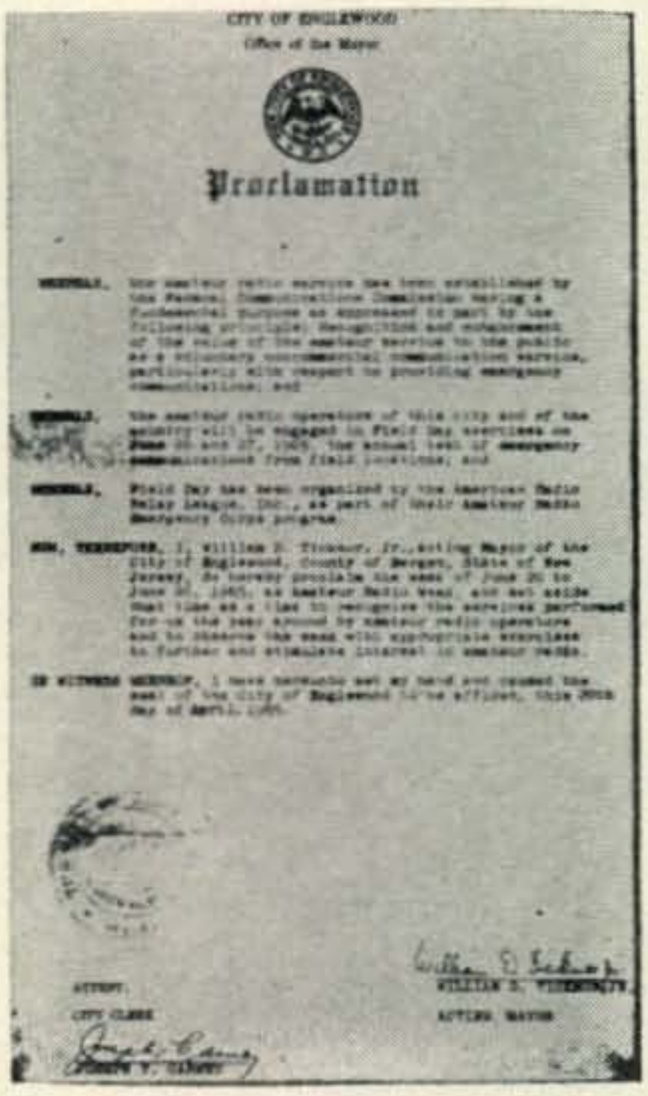
Awards

Old Timers Club and Old Old Timers Club

K2CYX, wrote back in January, for information on O. T. C. and now a second letter from him with copies of letters to ARRL, W2AEC and W6WPF, proves to me how mixed-up simple things can get. So in another effort to clarify things, here is the data.

O. T. C.—Old Timers Club—is a club sponsored by ARRL and is open to anyone who holds an amateur call at the present time, and who held an amateur license 20-or-more years ago. Write for details, sending an s.a.s.e. to ARRL, 225 Main St., Newington, Conn. 06111.

O. O. T. C.—Old Old Timers Club is a club with membership open to those (for a fee) who were active 40 years or more prior to applying for membership. They also issue awards for working members, starting with 10. Photographs of their award and membership certificate are on page 76 of *CQ* February 1965 and rules on page 95.



Another example of good amateur radio public relations — Proclamation issued by the Acting Mayor of the City of Englewood, New Jersey, for Amateur Radio Week 1965, to coincide with the ARRL Field Day activities of the Englewood Amateur Radio Association, Inc.

Texas County Award

The Johnny Appleseed Award.

"36-63" Award.

WAOC, Worked All Orange Counties.

Their awards chairman is P. B. Dunn, W6WPF, 18123 Marilla St., Northridge, Calif. 91324. Their new secretary-treasurer is Mrs. Eunice R. Thompson, W1MPP, Christian Hill Road, Lovell, Maine. For any other data send an s.a.s.e. to either and you will get full details and answers to any of your questions.

Texas County Award is sponsored by the Dallas Amateur Radio Club, P. O. Box 30532, Royal Lane Station, Dallas, Texas 75230. Texas has the most counties with 254 and certificates are issued for having worked 100, 150, 200 and 254 with the usual different endorsements. So far, the only certificate issued for all 254 counties has gone to Cliff Corne, K9EAB. The cost is $1. and certification by two amateurs other than the applicant. Please list counties alphabetically and mention call and town of station worked.

NH-CBA, New Hampshire-Concord Bicentennial Award is jointly sponsored by the Concord Bicentennial Committee and the Concord Brasspounders Amateur Radio Club, W1OC. The certificate will be awarded, free of charge to any ham who makes ten contacts with New Hampshire stations during the Concord Bicentennial year of 1965. Of these ten contacts, at least three must be with Concord stations. No endorsements except at time of application. Submit a list of confirmed contacts, certified by two other hams, to W1OC, Concord Brasspounders Radio Club, P.O. Box 339, Concord, New Hampshire. Special QSLs are being used by the members of the Concord Brasspounders during the bicentennial year 1965. One important item of interest to clubs interested in sponsoring commemorative certificates, the material and printing costs were taken care of by the Bicentennial Committee.

WAPUS, Worked All Prefixes in the United States, is sponsored by the Bossier High School Amateur Radio Club. Will be issued to any amateur or s.w.l. in three classes: Class C—16 Prefixes; Class B—32 Prefixes; and Class A—Total number of prefixes in effect at the time of application. Send log data including call sign, mode, band and date, certified by two other amateurs for contacts after 20 October 1963. Send 50¢ and a self addressed business size (No. 10) envelope with or without stamps to Bossier High School Amateur Radio Club, C/O Edwin T. Shell, P. O. Box 5223, Bossier City, Louisiana.

WPIB, Worked Polytechnic Institute of Brooklyn Award, requires QSOs with 10 members of W2BXK individually or 5 members individually and a QSO with W2BXK. A time limit of one year will start September 1965. Most active members are WA2GUR, IBH, IGF, IMP, RQZ, RTR, WYL, ZIR. WB2ADI, DVK, JHK, and K2RTH. Address inquiries or log-data with 10¢ to Brooklyn Polytech, W2BXK, Box 417, 333 Jay Street, Brooklyn, N.Y. 11201.

WAVE, one of the most popular Canadian awards which has now been issued to about 650 operators, is sponsored by the Nortown Amateur Radio Club, VE3NAR, P. O. Box 356, Adelaide Street Postal Station, Toronto, Ontario, Canada. Produce QSL cards to verify QSO with 2 different stations on 2 different bands in each one of the following 9 provinces. Prince Edward Island VE1, Nova Scotia VE1, New Brunswick VE1, Quebec VE2, Ontario VE3, Manitoba VE4,

[*Continued on page 102*]

Photograph of the presentation of the first NH-CBA certificate to W1CNX. Left to right: Eugene Woodward, treasurer of the Concord Bicentennial Committee; Tom Atherton, W1CNX; Dennis McAlpine, W1DYE, chairman, awards committee; Richard Cressy, W1EAW, president of the Concord Brasspounders Radio Club.

NH-CBA, New Hampshire-Concord Bicentennial Award.

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It's your one dependable source for everything in station gear, for everything in electronics. You know, too, you can rely on our staff of over 100 licensed hams to give you the kind of ham-to-ham help you want—in *every* way. Get the 1966 Allied Catalog now—it's invaluable for your shack.

FREE send for it!

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Propagation

BY GEORGE JACOBS,* W3ASK

Flash

It appears almost certain that the new sunspot cycle begain during November, 1964, and that solar activity is now on the increase!

The Swiss Solar Observatory reports a monthly sunspot number of 26 for April, 1965. This is the highest level of average solar activity reported for any month since October, 1963.

Solar activity observed during April results in a smoothed sunspot number of 10.3 centered on November, 1964. This represents a slight gain from the level of 9.7 recorded during the previous month. Provisionally, this represents the beginning of the new sunspot cycle, *cycle 20.*

Solar activity is now increasing at a rather rapid rate. A smoothed sunspot number of 25 is forecast for August, 1965. A special article discussing the last months of cycle 19, and the probable course of cycle 20 is now in preparation, and is scheduled to appear in *CQ* later this year.

August Forecast

With increasing sunspot activity, the 10 meter band is expected to slowly come to life again. Some 10 meter DX openings, mainly to southern or tropical areas, are forecast for August. An increased number of openings should take place during September and the fall and winter months.

Excellent short-skip conditions are expected to continue on 10 meters during August, between distances of approximately 750 and 2300 miles.

Fairly good DX openings are forecast to most areas of the world for 15 meters during the daylight and early evening hours. Excellent short-skip openings, ranging between approximately 600 and 2300 miles, should also be possible on most days.

Twenty meters is expected to continue to be the best band for DX propagation during August. The band should open for DX shortly after sunrise, and remain open through the early evening hours. Good openings are forecast to almost every area of the world sometime during this period, and signal levels are expected to be especially strong during the late afternoon and early evening hours. During periods of exceptionally good conditions, the band may remain open for DX well into the hours of darkness, and possibly around-the-clock. Excellent short-skip openings are forecast for 20 meters, ranging in distance between approximately 400 and 2300 miles.

*11307 Clara Street, Silver Spring, Md. 20902.

LAST MINUTE FORECAST

Day-to-Day Conditions and Quality for August

	Forecast Rating & Quality			
Days	(4)	(3)	(2)	(1)
Above Normal: **4, 6, 18, 25, 29, 31**	A	A-B	B-C	C
Normal: **1-3, 5, 7-8, 12-14, 16-17, 19-20, 22-24, 26, 28, 30**	A-B	B-C	C-D	D-E
Below Normal: **9, 11, 15, 21, 27**	C	C-D	D	E
Disturbed: **10**	D	D-E	E	E

HOW TO USE THESE CHARTS

The following is an explanation of the symbols shown above, and instructions for the use of the *CQ* propagation predictions:

1—Enter Propagation Charts on following pages under appropriate band and distance or geographical area columns. Read predicted times of band openings at intersection of both columns.

2—Following each predicted time of band opening is a forecast rating which indicates the relative number of days the band is expected to open during each month of the forecast period. The higher the rating, the more frequent the opening, as follows: (4) band open more than 22 days each month; (3) between 14 and 22 days; (2) between 8 and 13 days; (1) less than 7 days.

3—With the forecast rating noted above, start with the numbers in parentheses at the top of the "Last Minute Forecast" appearing above. Read down the table for a day-to-day forecast of propagation conditions in terms of Above Normal (WWV rating higher than 6); Normal (WWV rating 5-6); Below Normal (WWV rating 4); Disturbed (WWV rating reception conditions (signal quality, noise and less than 4). The letter symbols (A-E) describe fading levels) expected for each day of the month and have the following meanings: A—excellent opening with strong, steady signals; B—good opening, moderately strong signals, little fading and noise; C—fair opening, signals fluctuating between moderately strong and weak; D—poor opening, signals generally weak and considerable fading and noise; E—poor opening, or none at all.

4—This month's DX Propagation Charts are based upon a transmitter power of 250 watts c.w.; 500 watts s.s.b., or 1000 watts d.s.b. into a dipole antenna a quarter-wave above ground on 160 and 80 meters, a half-wave above ground on 40 and 20 meters, and a wave-length above ground on 15 and 10 meters. For each 10 db gain above these reference levels, reception quality shown in the "Last Minute Forecast" will improve by one level; for each 10 db loss, reception will become poorer by one level.

5—Local Standard Time for these predictions is based on the 24-hour system.

6—The Eastern USA chart can be used in the 1, 2, 3, 4, 8, KP4, KG4 and KV4 amateur call areas; The Central USA Chart in the 5, 9 and Ø areas, and the Western USA Chart in the 6 and 7 areas. The Charts are valid through Sept. 30, 1965, and are prepared from basic propaganda data published monthly by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colorado.

Despite seasonally higher static levels, 40 meters is expected to open to many areas of the world from shortly before sunset, and remain open through the hours of darkness and the sunrise period. To many areas of the world, 40 meters is expected to be the best band for DX propagation conditions during the hours of darkness.

Some 80 meter DX openings are forecast for August, during the hours of darkness and the sunrise period. Openings, however, are likely to be weak and noisy. Few 160 meter DX openings are expected to take place during August, but

some may occur during the hours of darkness and at sunrise.

This month's column contains a detailed propagation forecast to DX areas of the world for use during August and September, 1965. Instructions for the correct use of this data appear directly below the "Last Minute Forecast" at the beginning of this column. For a more detailed forecast of short-skip conditions expected during August, over distances ranging approximately 50 and 2300 miles, see the *CQ* Short-Skip Propogation Charts which appeared in last month's column.

VHF Ionospheric Openings

The *Perseids*, a month long intense meteor shower which began late in July, is expected to reach maximum intensity during mid-August. During this shower, more than 100 million meteors are expected to enter the earth's atmosphere each day. While most of these will be no bigger than a grain of sand, many will be large enough to leave a characteristic trail, and will be visible from earth as "shooting stars". The ionization produced by these meteors, as they burn in the earth's atmosphere approximately 60 miles high, is expected to result in numerous opportunities for meteor-scatter openings on 6 and 2 meters.

Sporadic-E ionization, although past its seasonal peak, is forecast to occur fairly frequently during August. This should result in a number of short-skip openings on 6 meters between distances of approximately 750 and 1300 miles. During periods of intense sporadic-E ionization, 6 meter "two-hop" openings may be possible up to distances of approximately 2600 miles, and some 2 meter openings may also take place at distances ranging between approximately 100 and 1400 miles.

During periods of ionospheric disturbances, v.h.f. openings may occur as a result of auroral-scatter propagation. Check the "Last Minute Forecast" appearing at the beginning of this column for days that are expected to be "disturbed" or "below Normal" during August. Auroral-scatter v.h.f. openings are most likely to occur on these days.

73, George, W3ASK.

CQ DX Propagation Charts

AUGUST & SEPTEMBER, 1965

Time Zone: EST (24-hour Time)

Eastern USA To:

	10/15 Meters	*20 Meters*	*40 Meters*	*80/160 Meters*
Western & Central Europe & North Africa	09-12 (1) 12-14 (2) 14-15 (1)	05-06 (1) 06-07 (2) 07-08 (3) 08-12 (2) 12-15 (3) 15-17 (4) 17-19 (2) 19-21 (1)	18-20 (1) 20-21 (2) 21-00 (3) 00-02 (2) 02-03 (1)	20-22 (1) 22-00 (2) 00-02 (1) 23-01 (1)†
Northern Europe & European USSR	09-13 (1)	05-06 (1) 06-10 (2) 10-12 (1) 12-15 (2) 15-18 (1)	19-21 (1) 21-23 (2) 23-02 (1)	21-01 (1)
Eastern Mediterranean & East Africa	10-12 (1) 12-14 (2) 14-15 (1)	05-06 (1) 06-08 (2) 08-13 (1) 13-16 (2) 16-20 (1)	19-23 (1)	21-23 (1)
West & Central Africa	14-16 (1)* 07-09 (1) 09-11 (2) 11-15 (3) 15-16 (2) 16-17 (1)	05-06 (1) 06-09 (2) 09-13 (1) 13-15 (2) 15-17 (4) 17-19 (3) 19-20 (2) 20-22 (1)	21-00 (1) 00-02 (2) 02-03 (1)	00-02 (1)
South Africa	11-13 (1)* 07-10 (1) 10-11 (2) 11-13 (3) 13-14 (2) 14-15 (1)	06-14 (1) 14-15 (2) 15-16 (3) 16-18 (2) 18-19 (1) 23-02 (1)	20-22(1) 22-00 (2) 00-02 (1)	22-00 (1)
Central Asia	*Nil*	06-09 (1) 19-22 (1)	04-06 (1) 18-20 (1)	*Nil*
Southeast	*Nil*	06-07 (1) 07-09 (2) 09-11 (1) 17-21 (1)	*Nil*	*Nil*
Far East	16-19 (1)*	06-07 (1) 07-09 (2) 09-10 (1) 16-18 (1) 18-20 (2) 20-22 (1)	05-07 (1)	*Nil*
Guam & Pacific Islands	12-15 (1) 15-17 (2) 17-19 (1)	06-07 (1) 07-09 (2) 09-12 (1) 19-20 (1) 20-23 (2) 23-01 (1)	01-02 (1) 02-05 (3) 05-07 (2) 07-08 (1)	03-07 (1) 04-06 (1)†
Australia & New Zealand	17-19 (1)* 16-17 (1) 17-19 (2) 19-20 (1)	06-07 (1) 07-09 (2) 09-11 (1) 14-15 (1) 15-17 (2) 17-21 (1) 21-23 (2) 23-01 (1)	02-04 (1) 04-06 (2) 06-08 (1)	04-06 (1) 04-06 (1)†
North & Central South America	13-15 (1)* 15-17 (2)* 17-18 (1)* 08-10 (1) 10-12 (3) 12-14 (2) 14-15 (3) 15-17 (4) 17-19 (2) 19-20 (1)	06-07 (2) 07-09 (3) 09-15 (2) 15-17 (3) 17-19 (4) 19-21 (3) 21-22 (2) 22-06 (1)	18-19 (1) 19-20 (2) 20-03 (3) 03-05 (2) 05-07 (1)	21-01 (1) 01-03 (2) 03-06 (1) 01-04 (1)†
Southern Brazil, Argentina, Chile & Uruguay	13-15 (1)* 15-17 (2)* 17-18 (1)* 07-09 (1) 09-11 (2) 11-14 (1) 14-15 (2) 15-17 (4) 17-19 (2) 19-20 (1)	06-07 (1) 07-09 (2) 09-15 (1) 15-17 (2) 17-19 (4) 19-21 (2) 21-22 (1)	21-22 (1) 22-00 (2) 00-02 (1) 02-05 (2) 05-06 (1)	03-05 (1) 03-05 (1)†
McMurdo Sound, Antarctica	13-16 (1) 16-17 (2) 17-19 (1)	14-16 (1) 16-18 (2) 18-20 (3) 20-22 (2) 22-00 (1) 07-09 (1)	00-06 (1)	*Nil*

*Predicted 10 meter openings, all others in column are 15 meter openings.

†Predicted 160 meter openings, all others in column are 80 meter openings.

Time Zones: CST and MST (24-hour Time)

Central USA To:

	10/15 Meters	*20 Meters*	*40 Meters*	*80/160 Meters*
Western & Central Europe & North Africa	10-13 (1)	05-06 (1) 06-08 (2) 08-12 (1) 12-14 (2) 14-16 (3) 16-18 (2) 18-20 (1)	20-22 (1) 22-00 (2) 00-03 (1)	21-01 (1) 21-01 (1)†
Northern Europe & European USSR	09-12 (1)	05-06 (1) 06-09 (2) 09-11 (1) 11-14 (2) 14-16 (1)	20-01 (1)	21-00 (1)

Eastern Mediterranean & East Africa	09-14 (1)	05-06 (1) 06-07 (2) 07-12 (1) 12-15 (2) 15-19 (1)	19-22 (1)	20-22 (1)
West & Central Africa	10-13 (1)* 08-10 (1) 10-13 (2) 13-15 (1)	05-06 (1) 06-08 (2) 08-13 (1) 13-15 (2) 15-18 (3) 18-19 (2) 19-21 (1)	21-01 (1)	23-01 (1)
South Africa	11-13 (1)* 07-09 (1) 09-12 (2) 12-14 (1)	06-13 (1) 13-17 (2) 17-19 (1) 00-02 (1)	20-21 (1) 21-23 (2) 23-00 (1)	21-23 (1)
Central Asia	17-20 (1)	06-07 (1) 07-09 (2) 09-10 (1) 18-21 (1)	05-07 (1) 18-20 (1)	*Nil*
South-east Asia	17-20 (1)	06-07 (1) 07-09 (2) 09-12 (1) 20-00 (1)	05-07 (1)	*Nil*
Far East	14-16 (1) 16-18 (2) 18-19 (1)	06-07 (1) 07-09 (2) 09-18 (1) 18-22 (2) 22-00 (1)	02-05 (1) 05-06 (2) 06-07 (1)	05-06 (1)
Guam & Pacific Islands	14-16 (1) 16-18 (2) 18-20 (1)	07-09 (2) 09-11 (1) 11-13 (2) 13-18 ( ) 18-20 (2) 20-22 (3) 22-00 (2) 00-07 (1)	23-01 (1) 01-05 (3) 05-07 (2) 07-08 (1)	00-02 (1) 02-04 (2) 04-06 (1) 03 06 (1)†
Australia & New Zealand	16-18 (1)* 14-16 (1) 16-19 (2) 19-21 (1)	18-20 (1) 20-00 (2) 00-07 (1) 07-09 (3) 09-10 (2) 10-12 (1) 14-16 (1)	01-04 (1) 04-06 (2) 06-08 (1)	03-04 (1) 04-06 (2) 06-07 (1) 04-06 (1)†
North & Central South America	13-14 (1)* 14-16 (2)* 16-17 (1)* 07-09 (1) 09-11 (3) 11-13 (2) 13-14 (3) 14-16 (4) 16-18 (2) 18-20 (1)	06-07 (2) 07-09 (3) 09-16 (2) 16-19 (4) 19-21 (3) 21-22 (2) 22-06 (1)	18-19 (1) 19-20 (2) 20-02 (3) 02-05 (2) 05-06 (1)	20-23 (1) 23-02 (2) 02-05 (1) 00-04 (1)†
Southern Brazil, Argentina, Chile & Uruguay	12-14 (1)* 14-16 (2)* 16-17 (1)* 07-09 (1) 09-11 (2) 11-14 (1) 14-15 (2) 15-17 (4) 17-19 (2) 19-20 (1)	06-07 (1) 07-09 (2) 09-14 (1) 14-16 (2) 16-18 (3) 18-20 (2) 20-22 (1)	20-22 (1) 22-00 (2) 00-02 (1) 02-04 (2) 04-06 (1)	01-05 (1) 02-05 (1)†
McMurdo Sound, Antarctica	12-16 (1) 16-17 (2) 17-19 (1)	14-16 (1) 16-18 (2) 18-20 (3) 20-22 (2) 22-00 (1) 07-09 (1)	00-06 (1)	*Nil*

Time Zone: PST (24-hour Time)

WESTERN USA To:

	10/15 Meters	*20 Meters*	*40 Meters*	*80/160 Meters*
Western & Central Europe & North Africa	11-13 (1)	05-06 (1) 06-08 (2) 08-11 (1) 11-14 (2) 14-16 (1) 21-23 (1)	19-20 (1) 20-22 (2) 22-23 (1)	20-22 (1)
Northern Europe & European USSR	09-12 (1)	05-06 (1) 06-09 (2) 09-13 (1) 20-22 (1)	19-23 (1)	*Nil*
Eastern Mediterranean & East Africa	08-11 (1)	06-10 (1) 10-12 (2) 12-14 (1) 19-21 (1)	19-22 (1)	*Nil*

West & Central Africa	11-14 (1)	05-06 (1) 06-08 (2) 08-13 (1) 13-15 (2) 15-18 (3) 18-19 (2) 19-20 (1)	20-00 (1)	*Nil*
South Africa	10-13 (1)	05-13 (1) 13-16 (2) 16-18 (1) 21-23 (1)	19-20 (1) 20-21 (2) 21-22 (1)	*Nil*
Central Asia	17-19 (1)	06-07 (1) 07-09 (2) 09-11 (1) 16-18 (1) 18-20 (2) 20-21 (1)	05-07 (1)	*Nil*
South-east Asia	15-19 (1)	07-08 (1) 08-09 (2) 09-12 (1) 19-21 (1) 21-23 (2) 23-00 (1)	01-05 (1) 05-06 (2) 06-07 (1)	05-06 (1)
Far East	14-17 (1) 17-19 (2) 19-20 (1)	06-07 (1) 07-09 (2) 09-12 (1) 12-13 (2) 13-15 (1) 15-19 (2) 19-21 (3) 21-22 (2) 22-00 (1)	00-02 (1) 02-05 (2) 05-06 (3) 06-07 (1)	04-07 (1) 04-06 (1)†
Guam & Pacific Islands	16-18 (1)* 14-16 (1) 16-18 (2) 18-20 (1)	06-07 (2) 07-09 (3) 09-11 (1) 11-13 (3) 13-18 (2) 18-20 (3) 20-22 (4) 22-00 (2) 00-06 (1)	21-22 (1) 22-05 (3) 05-07 (2) 07-08 (1)	22-01 (1) 01-04 (2) 04-06 (1) 02-06 (1)†
Australia & New Zealand	15-17 (1)* 12-16 (1) 16-17 (2) 17-19 (3) 19-21 (2) 21-23 (1)	17-19 (1) 19-20 (2) 20-22 (3) 22-23 (2) 23-07 (1) 07-09 (3) 09-10 (2) 10-13 (1)	23-01 (1) 01-03 (2) 03-05 (3) 05-07 (2) 07-08 (1)	01-03 (1) 03-05 (2) 05-07 (1) 03-06 (1)†
North & Central South America	13-14 (1)* 14-16 (2)* 16-17 (1)* 06-08 (1) 08-10 (2) 10-12 (1) 12-14 (2) 14-16 (4) 16-18 (2) 18-20 (1)	07-09 (3) 09-15 (2) 15-18 (4) 18-19 (3) 19-22 (2) 22-06 (1) 06-07 (2)	17-20 (1) 20-00 (3) 00-02 (2) 02-06 (1)	19-21 (1) 21-01 (2) 01-04 (1) 00-03 (1)†
Southern Brazil, Argentina, Chile & Uruguay	12-13 (1)* 13-15 (2)* 15-16 (1)* 07-09 (1) 09-12 (2) 12-14 (1) 14-15 (2) 15-16 (4) 16-18 (2) 18-19 (1)	06-07 (1) 07-09 (2) 09-13 (1) 13-15 (2) 15-17 (3) 17-18 (2) 18-20 (1)	19-21 (1) 21-23 (2) 23-01 (1) 01-03 (2) 03-05 (1)	00-04 (1) 01-04 (1)†
McMurdo Sound, Antarctica	11-16 (1) 16-17 (2) 17-19 (1)	16-18 (1) 18-20 (2) 20-22 (3) 22-23 (2) 23-00 (1) 07-09 (1)	00-06 (1)	*Nil*

"Repeat that last word please, it sounded like boing-g-g . . ."

NOVICE

WALTER G. BURDINE,* W8ZCV

I HAVE always said that the easiest way to learn the fundamentals of radio was to build the circuits into a working unit. Learning by building is the best way to keep it in your mind. Too many hams are memorizing the fundamental concepts of electronics from the handbook; they really are not helping the status of amateur radio or improving their minds by this method. Those memorizing the license manual, buying the equipment ready built, and having someone install their station are not reaping the most enjoyment from their license. The self-satisfaction received from building and operating your own equipment can never be obtained by any other method. Too many operators on the air do not even know the type tube used in the final stage (or any of the other tubes used), the type circuit and the fundamental frequency of the controlling frequency, or how the operating frequency is generated. They do not know that the frequency of the crystal must be multiplied many times to get the operating frequency. No wonder that many of the fellows are off the air for three or four months because they sent their rigs back to the factory to have a tube replaced. I guess that is one of the reasons for the incentive licensing idea. Why not carry it a little further and require the newcomer to build and install his first station?

The word "Home Brew" has no connection with the way it was used during prohibition days. It means that the ham has built his station from the chassis up and has had to debug its circuits and get it working from a few circuits in one or more radio publications, plus a few resistors, coils, transformers and capacitors, correctly wired and operated. You can really hear the pride with which a fellow talks about his homebrew rig. He can always change the circuit or substitute another part if trouble occurs, for he knows where they fit and how they operate. His rig does not scare the wits out of him because of its complexity. He may not even have a good diagram of it, but he should.

The fellow that constructs his set usually has to pay more for the parts than the same power kit-constructed station, but he has the possibility of changing the circuit to use available parts and to change the circuit to use any new ideas that he may have or read about. With kit-built or commercial units he will rarely change the parts or circuitry. Another deterrent to keep the amateur from building his own is the resale price, although sometimes the resale price may approach or surpass that of the kit. Any changes in the parts or circuitry of kit or commercial equipment decreases its resale price. Almost all improvements in the art of communications have come about by the construction of the homebrew builder. I have often said that the parts company has helped to hinder the home construction of ham stations by raising the parts prices.

Another reason for the decrease of homebrew equipment is the surplus sales of radio supplies. There are very few ham stations that do not have at least one piece of surplus equipment. Before the war there were not many kilowatt rigs on the ham bands, now any high school kid can have a kilowatt rig. I wonder if this has been good for the ham bands. Certainly the availability of surplus equipment has helped many of us to get on the air, although the job of converting the surplus is often more than building from scratch. We still have a surplus item that rarely fits the method of building in the rest of our station. I have started to disassemble and rebuild all of my surplus equipment into regular homebrew equipment. The availability of surplus has made it possible for many of us to obtain parts that we never would have been able to afford before. This is especially true in the field of v.h.f. and u.h.f. experimentation, information and the field of amateur television. I think there are still enough serious experimenters to improve the status of these bands. We need many more experimenters for these bands; there is much to be learned on these bands. You can help.

QSL's and QSLing

We ran out of space last month and were unable to use this material about QSL's. As there have been many letters about this subject, we will finish the part on the subject of garnering those elusive QSL's.

One of the ham's biggest problems is working DX and then getting a QSL confirming the contact. Back when I first started in ham radio you could put more dependence in a ham's word that he would send you a QSL (if you asked for one and sent him one). I believe that the ham fraternity was a more closely knit group then than now. I was an s.w.l. for many years and I could always depend on the c.w. ham to QSL my report. I have been very lucky in receiving a high percentage of returns from my QSL's. I need two countries for DXCC and about 4 states for WAS YL phone. I especially would like to receive a card from CR5UP (now CT1BW) and the only TF5 that I ever worked. So you see, I also have troubles.

Nevertheless, I can't say that I haven't had good returns on the cards sent.

I can give you some of the reasons that I think my percentage is higher than most.

*R.F.D. 3, Waynesville, Ohio 45068.

This neat DX Corner belongs to Arthur Castrup Jr., WN9NKY, Route #2, Bretz Street, Huntingburg, Indiana. He uses a Heathkit HR-10 and crystal controlled BC-459 with a Hi-Gain 14AVQ trap vertical antenna. Arthur offers to help anyone in his locality with code and theory for their General license. Arthur has an impressive looking station and is trying for a commercial Telephone and Telegraph license.

First, I always try to make my contact interesting. I try to make a friend of each ham that I talk to and find out about him and his interests. You are more likely to get a return QSL if you can make him remember the QSO when he gets your QSL. I also try to know some of the geography of the country and I keep an atlas near when talking to foreign countries, it is nice to be able to locate sections near by so that he knows you have an interest in his country.

Keep an up-to-date Radio *Callbook* at hand when working DX and check to see if he is OK in the *Callbook,* if so, no need to use up time getting the address. This shows that you really are interested in receiving his QSL. Send your card next day, while the QSO is still fresh in his mind, don't wait until he has worked 25 other stations in your state. If he is not in the call book and the contact is solid try to get the address after you have become acquainted. Don't ask for a QSL before you send the signal report and other pertinent data usually sent in a QSO. Don't forget about the QSL bureaus, find out how they work and tell the fellow that he can use the QSL bureau. It is not how you get the card that counts so much as IF you get the card. QSLs by the bureau take a little longer but frankly many of the DX stations can only afford to QSL that way as they simply do not have the money to afford direct QSL service.

If you want direct QSL service, either send International Reply Coupons, available from your post-office or send enough money (a nice shiny quarter) to defray cost of sending the card direct to you. International Reply Coupons (IRC) will cost about 13 cents and is good for one return unit of first class surface postage from any country that is a member of the Universal Postal Union. Your postmaster can tell you about this and if they are a member of the Union.

Always put the complete address of the recipient on the envelope and it is best to type or at least print all information if it is going to a foreign station. If you can write the language of the country, Do so, it will help.

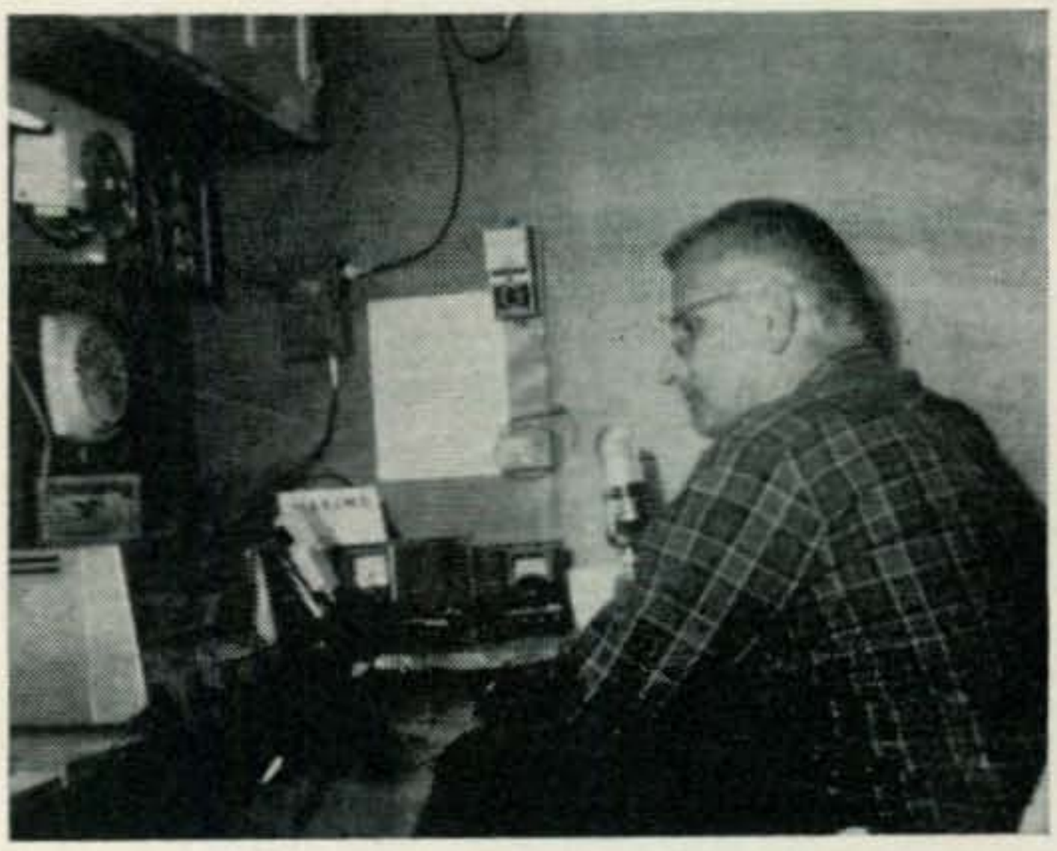
It is best to use 2400 hour time and express it as GMT or Zulu time. This way the station won't have to try converting the time to his time zone, this can be a task in some places.

Even here in the States do not send a card to A.R.S. W8ZCV, Waynesville, Ohio. If at all possible, copy the complete name and call letter along with the address from the *Callbook*. It is almost a miracle how some of the cards get to their destination with the poor writing and illegible addresses that are put on them. (By the way this also applies to mail sent to your editors and any other objects deposited in the mail boxes.)

It is best to put the card in an envelope as this protects the card from torn edges and cancellation stamps. Some cards never mention ham radio or give any reference to call letters, check the addresses in the DX columns for the various reasons. Sometimes the only place you can find the address of a station is from the DX columns in *CQ* and *QST*.

The post office department specifies the standard size card that can be sent through the mails for the postcard rate. Check with them to see if your card is too large or small.

By the way there are places in the United States where you can get foreign stamps for return postages from other parts of the world. I have often used commemorative stamps for QSL and had quite good results, many hams are also stamp collectors. Don't send stamps with slogans that will anger the code of the land to whom you are sending your card, I have had two cards sent back marked "unable to deliver." They bore the inscription, "That government of the people, by the people, for the people, shall not perish from the earth." Your stamp *can*



The most enjoyable corner of the house belongs to Chester A. "Bud" Fenton, WA8JMD, 204 East Street, Box 1045, Gordon, Ohio. This 6 meter station really puts out a good signal.

carry a message to other countries. It can also create a bond of friendship with peoples of other lands. Use them wisely.

I hope these ideas will help you get a better return from your QSLs. Tell me, how do I get a card from CR5UP and the TF5?

Many of the big companies furnish the hams working for them with QSLs. Jack McDuffee, WN9OAA, 313 Pearl, Chesterfield, Indiana has sent me a sample of the company-furnished QSL by Delco-Remy where he works. Many of the airlines and railroad companies furnish their employees with QSL's. I am proud of my QSL from *CQ*. I have sent out quite a few of these, do you have one?

Well, you have worked him and here is what he looks like. This nice lay-out belongs to George Glagow, VE6CJ, 12212-56th Street, Edmonton, Alberta. George says he always likes to see the snaps of those he has worked and is sending his in return for the favor. See, I told you. (What do you mean "Old Goat," George?)

Letters

"Dear Walt: I got my novice license today! WN9PCT. I will be using a Hallicrafters SX-17 Receiver and a T-60 Transmitter. I am having a little trouble with the 6DQ6B tube in the T-60, but should have it on the air soon. I will be operating on 40 meters mostly with some 15 meters once in a while.

"My SX-17 is pretty old, possibly before 1940, but it has pulled in hams from 46 states with 39 confirmed as an s.w.l. I have 21 states on the broadcast band. I will do better now because I have a long wire antenna and this should help me work out better. A loop is in the works too and will also help. I still want a new receiver but doubt if I can afford it. I plan to build a VHF receiver this summer.

"Think your magazine is the best for amateur news for the newcomer. The order of the columns I like in *CQ* are NOVICE, USA-CA, ZERO BIAS, DX, VHF, CONTEST CALENDAR: Oh, what the heck, I like almost everything in *CQ*.

"This summer I hope to get my Tech then work for the General license, I hope RM-499 won't be in effect 'til I get my general—though I guess it wouldn't matter that much anyway. I will be striving for the awards, that is why I like USA-CA. I will send you a picture later. (I wish a lot of others would do that too, Doug.) Well 73, and keep up the good work. Doug—WN9PCT/WPE9HSZ."

The above is part of a letter from Douglas A. McKirahan, 4 Elizabeth Court, Oak Park, Illinois 60302. Sure, I'd like to work you on two meters, Doug.

Some of you readers might send in some pictures and a letter and then you might read this letter and 'do you likewise unto me.'

"Dear Walt: I made an announcement at the club that you want pictures and letters from the novice operators. I will also put a sign on the local Ham shack store bulletin board to the same effect. They finally got this board up, I've been after them for a long time to do it.

"I am waiting for my *CQ*, I have received the other two. 73 . . . Al."

This was from a card from Al, K7VOI, Tucson, Arizona. That is what we need from some of the old-timers. Thank You, Al.

And a couple of cards from Allan, G3IDG a list of about 40 Novices and news that another Basingstoke ham is also listening to novices. He is G3OMU. Boy, those fifteen meter Novices surely get across the pond and I surely like to get letters and cards from those overseas with information about our Novices.

A letter from Roger Young, WA8LCY, 18495 Dolores, Lathrup Village, Michigan makes this offer:

"Dear Walt: Well, after reading your column for a year, I finally decided to write. I have been a General since June 1964 and am willing to help any future ham to get his license.

"I have been operating portable one. Recently my HT-37/Drake 2-B rig was stolen. The police have found the thief, an ex-KN1. I will be getting my equipment back shortly. I am at school here in one land and in the 10th grade.

"I will be back at my home QTH in June for the summertime where I'll be back again on my 40 meter s.s.b. hangout.

"I would like to express my gratitude to WA2QMF in New York for supplying me with a good antenna here. 73, Roger."

I have had a series of nice communications with Howard S. Pyle, W7OE, Mercer Island, Washington 98040, who is writing a new book for the Novice constructor. If it is as good as his *ABC's of Ham Radio* and *General Class License Handbook*, you be sure and get it when it comes out as it will solve many of your constructional problems.

Help Wanted

If you are able to offer any kind of help to the newcomer, it will add to your enjoyment of our hobby. These listed below need help and I'm sure it will be gladly given by a member of your local radio club or someone possibly working toward a license of his own. If you need help, just write to Walt Burdine, W8ZCV, Waynesville, Ohio 45068 with all particulars, and I will put your name in the shack of a lot of our readers. Someone will help you. Thank you who have offered to help.

Ladies First: Joanne Black, 4717, North Crestline, Spokane, Washington, needs help with code and someone to give her the test. Jo says she would like to be a ham very much but is having trouble trying by herself. Help, please.

Basil F. Petty, P.O. Box 37, Shadow Lake Mobile Homes Park, Mason, Ohio 45040, needs help with code and theory.

Pete K. Hay, 614 Main Street, Portage, Pennsylvania 15946, needs help with code and someone to give the test.

Buddy Pickalick, WN7BZJ, 316 West Mullan Avenue, Kellogg, Idaho, will sked anyone needing Idaho, and he will help anyone needing help with the code in his locality.

Jan Nilsson, 15, Sofielundsv, 23E, Malmo S., Sweden, would like an amateur for a pen pal. He is an s.w.l. and plans to become a ham.

Michael Fletcher, P.O. Box 313, Bay City, Oregon, would like to contact a local with a BC-454 and BC-696 conversion plans and possibly extra units.

Joe Andrada, 2126-6th Avenue, Kingsburg, California, needs help with code and someone to give the test.

Well, that just about uses up our space for this month. I sure hope I get to see you at one of the local hamfests this summer and maybe work you on the air. If so, don't forget to QSL. Enjoy your summer, but don't give up operating because of the weather.

73 to all, Walt, W8ZCV

SPACE COMMUNICATIONS

BY GEORGE JACOBS,* W3ASK

THE OSCAR III satellite continues to orbit the earth every 103.5 minutes. By the time that this appears in print, it should have completed more than 1500 orbits in space.

The satellite's telemetry beacon on 145.85 mc, now receiving power from solar cells mounted on the surface of the satellite, continues to operate intermittently. On some occasions the beacon goes off the air, remaining silent for several orbits. At other times it remains operating with a strong steady signal, orbit after orbit. Project OSCAR urges that radio amateurs and space listeners throughout the world continue to track the OSCAR III satellite, and report reception of its beacon transmitter. The telemetry data is still an accurate indication of the voltage level being supplied to the transmitter, and the temperature within the satellite.

Project OSCAR requests that all data reports covering OSCAR III up to orbit 1000 be submitted to project headquarters as soon as possible, so that a preliminary report covering the first 1000 orbits can be completed in the near future. The satellite completed its 1000 orbit on May 20. For reports concerning orbits above 1000, Project OSCAR urges continued surveillance of the 145.85 mc telemetry transmitter. When reporting data for orbits beyond 1000, only the last three digits should be used on the OSCAR reporting form or on RTTY tapes. For example, orbit 1512 should be logged as orbit 512. All data reports should be sent to Project OSCAR, Foothills College, Los Altos Hills, California, USA.

Report from Russia

In the June SPACE COMMUNICATIONS column, brief mention was made of the excitement caused by the OSCAR III satellite among the v.h.f. radio amateurs in the Soviet Union. A more complete report of the activity of Russian radio amateurs in the OSCAR project has been received recently from UP2ON, which contained the following information.

UP2ON in Lithuania worked HB9RG, SM5-BIZ and SM7OSC through the satellite, as well as hearing DL3YBA, EA4OA, G6AG, OH1NL and ON4FG on c.w., and DJ4ZC on s.s.b. UP2ON used a kw amplifier and a 9-element Yagi antenna for the QSOs. UP2ABA, also in Lithuania, worked SM7OSC using 120 watts and a 13-element Yagi antenna.

In Latvia, UQ2DT heard DL3YBA and HB9RG via the translator, plus several other unidentified signals.

In Estonia, UR2BU, UR2CQ, UR2DE and UR2CB collectively heard DJ2RLA, DJ4ZC, DL3YBA, EA4AO, G3LX, G6AG, HB9RG, LZ9RO, OK2WCG, ON4FG, ON4SB, SM6CSO and SM7OSC. UR2BU used a cascade converter having a 1.8 db noise figure and a "quad" antenna consisting of four 6-element Yagis. This was similar to the antenna system used at W6EE, Project OSCAR's headquarters station. UR2CQ received OSCAR signals with a nuvistor converter and a 10-element long Yagi. Although no two-way QSOs were reported from Estonia, UR2BU had a 150 watt transmitter on the air, and UR2CQ was using 120 watts.

In the northern city of Leningrad, UA1DZ and UA1MC were very active in the OSCAR III experiment. UA1DZ heard DL3YBA, EA4AO, HB9RG and ON4FG, while UA1MC copied the telemetry transmitter S-9 plus, with some passes as long as 25 minutes. UA1DZ used a converter with a 1.2 db noise figure, a 15-element Yagi and an 800 watt transmitter. UA1MC used a similar receiver and antenna.

UA6AJ in the town of Armavir, heard DL3-YBA, G3LTF, SM7OSC and HB9RG. On March 11, HB9RG's s.s.b. signal was R5 S8, and on March 12 UA6AJ heard HB9RG with an S9 signal in QSO with OK2WCG and G2HCG. Also reported heard were several unidentified SM5, OZ5, OZ4 and G2 signals.

In the Ukraine, UB5ATQ and UB5KDO monitored the telemetry transmitter on a large number of passes, but there are no reports of signals heard or two-way QSOs.

UP2ON also reports that several stations in Siberia (UA9) participated in the OSCAR III project, and he is trying to get information on the results.

Report from France

Andy Bertemes, F3NB, Project OSCAR coordinator for France, reports considerable OSCAR III activity among French v.h.f. radio amateurs.

According to Andy, when the first news was received that OSCAR III was in orbit, it seemed so fantastic that he had a difficult time con-

Harley Gabrielson, W6HEK, Project OSCARs man in charge of orbital predictions and data reduction shown going through a pile of incoming reports received recently at Project OSCAR headquarters, Foothill College, Los Altos, California.

*11307 Clara Street, Silver Spring, Md. 20902.

Andy Bertemes, F3NB, Project OSCAR coordinator for France, following OSCAR IIIs orbit on a satellite computer made on a polar map. French amateurs were among the most active to participate in the OSCAR III project (see text.

vincing other radio amateurs that it was true!

French amateurs, limited, unfortunately, to 100 watts on 2 meters, realized from the beginning that it would be very difficult for them to QSO via the satellite's translator. Instead, they concentrated on identifying signals heard through the satellite, and observing the telemetry beacon to determine orbital data, Doppler shift, and the levels of battery voltage and internal temperature.

Radio amateurs and s.w.l.s in all corners of France joined in the effort. The following is a list of French participants in the OSCAR III experiment as reported by F3NB: F1CH, F1FN, F2NB, F2TU, F3AC, F3EN, F3NB, F3ND, F5BK, F5DN, F8DO, F8GB, F8IR, F8KY, F8NS, F8SW, F8TD, F9AJ, F9BG, F9EA, F9HS, F9LD, F9MX, F9UT, and several s.w.l.s including the space expert Dr. Fulpuis.

The combined effort of this group resulted in identifying no less than 40 different stations in 13 different countries. The following is the list of stations heard. All were c.w. QSOs except those shown as s.s.b.: DJ2AY, DJ3EN, DJ3ENA (s.s.b.), DJ4AU, DJ4ZC (s.s.b.), DL3BA, DL3YBA, DL6EMI, DL9GU, DL9GQ, DL9SHA, EA4AO, G3EDD, G3LTF, G3LTS(?), G6AG, HB9RG (c.w. and s.s.b.), HB9EN, I1HC, LZ1KBA, OH1NL, OH2RK, OK1AHO, OK1DE, OK2WCG, ON4FG, ON4TQ, SM5BI, SM5BSZ, SM6CSO, SM6PU, SM7BA, SM7BCX, SM7CH, SM7OSC, SP6AGW, UP2ON, W1BU, W1HDM, K2IEJ, K2MWA/2.

Also reported heard, but still not confirmed, were DL6EL, DL6XD, DL9DJ, OE1AO and an unidentified UB5 and OH station.

Although no two-way QSOs were reported by French stations, F2TU has confirmed that his signal was received in Belgium by ON4FG during orbit 23 on March 11, at 0959 GMT, with a report of 449.

On the scientific side, F8TD, with the help of F2NB, F5BK, F9HS and F9MX, continuously tracked the OSCAR III satellite and produced orbital predictions of a very high degree of accuracy.

[*Continued on page 111*]

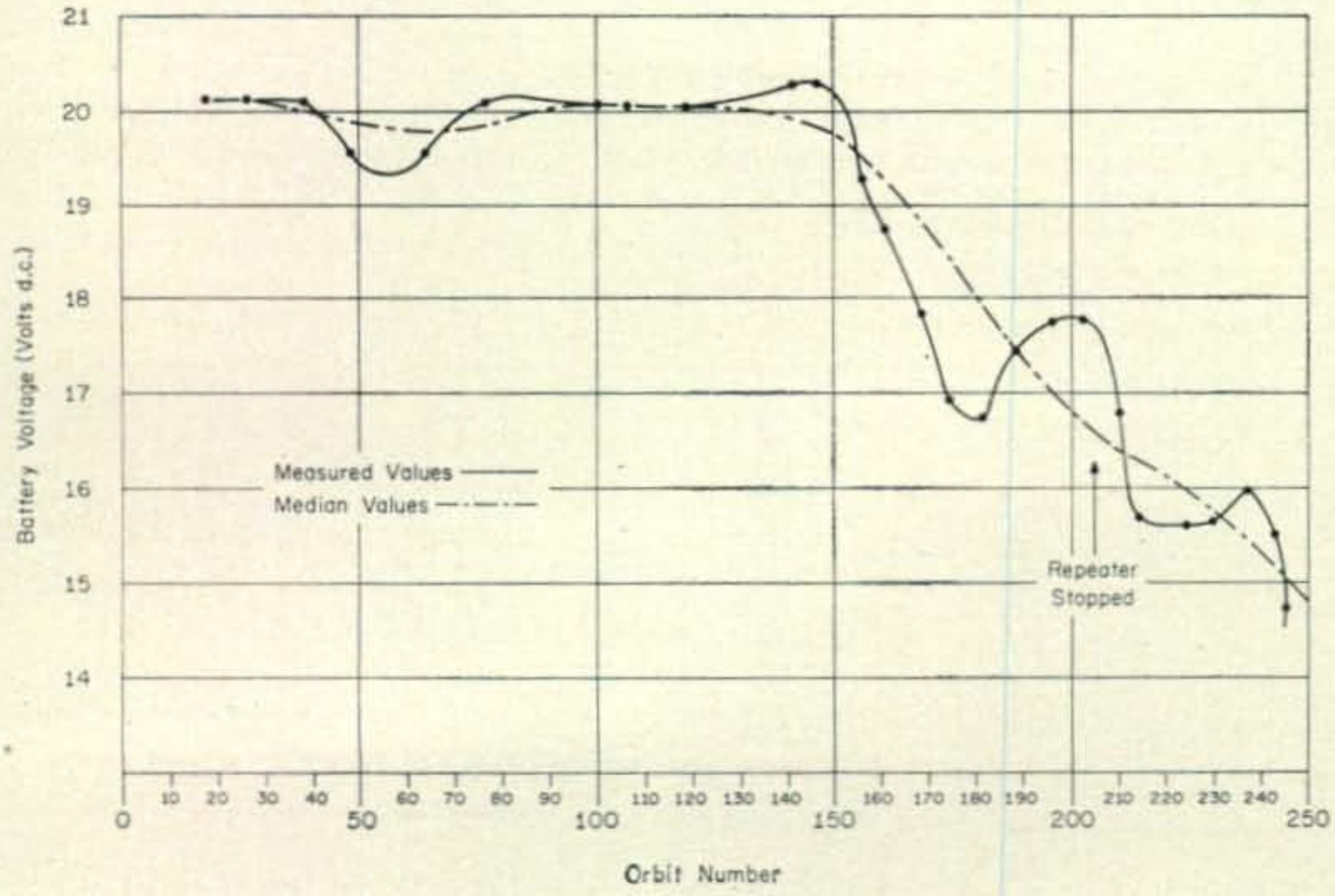


Fig. 1—Variation in primary battery voltage of OSCAR III repeater, as measured by F8TD and F3NB.

RTTY

BYRON H. KRETZMAN,* W2JTP

RTTY Operating Frequencies

Nets centered on frequencies given; operation usually ± 10 kc on h.f.

80 meters	3620 kc
40 meters	7040 kc
40 meters (narrow shift)	7140 kc
20 meters	14,090 kc
15 meters	21,090 kc
6 meters	52.60 mc
2 meters	146.70 mc

RADIOTELETYPE can be a very useful tool to the *really* serious radio amateur, such as the traffic handler who wants reliable radio circuits. Just how useful RTTY can be, was recently proven on the OSCAR project. Most RTTYers are aware of how W6EE, the tracking and control station of Project OSCAR, broadcast the orbital predictions for Oscar III on RTTY.

As we said last month, the fabulous monster, the surplus AN/FGC-1 terminal unit, when used in *diversity*, can provide the significant reduction in error rate that changes an amateur radio traffic circuit into one of commercial quality.

Current Limiter Panels of the AN/FGC-1

Referring to the block diagram of the AN/FGC-1 which appeared with last month's RTTY Column you will see that the duplicate current limiter panels, one for Channel A and one for Channel B, each has its own band-pass input filter. Figure 1 shows the characteristics that indicate a band pass from about 1600 to 3600 cycles. A 7-db resistive pad is between the receiver output and the filter input to improve impedance matching by some isolation. Also shown on Figure 1, for comparison, are the characteristics of the *mark* and *space* channel filters in the detector panels which we will discuss next month.

Fading over long-haul radio circuits cause the output of the receivers to vary many db. This effect is reduced by using a limiter circuit which has the ability to compensate for wide variations in signal level. Figure 2 shows the relation between input and output levels. Figure 3 is the simplified schematic diagram of the current limiter panels of the AN/FGC-1.

The first tube, designated IN, amplifies weak signals sufficiently to insure limiting action in the second tube, designated LIM, and at the same time limits strong signals to a value that does not block the LIM tube. A sharp cut-off type tube is used with a low plate voltage to give more effective limiting. On weak signals the tube is an amplifier; strong signals drive the grid positive on the signal peaks and grid current flows through the 0.5 megohm grid resistor. The resultant bias opposes the positive alternation of the signal thus, limiting its positive swing. A low plate voltage results in plate current cut-off on the negative peaks, thus maintaining a fairly constant output. The output of the IN tube is fed to the LIM tube through a low pass filter which removes high frequency noise.

Practically all incoming signals are limited by the LIM tube which is of the sharp cut-off type. A low plate voltage is used so that grid current may flow more easily and aid limiting action. Even weak signals cause grid current flow through the 2-megohm grid resistor to develop a negative grid voltage. As the signal changes in strength, the developed grid bias voltage due to grid current flow changes proportionally. Therefore, any tendency of the plate current to increase with signal strength is offset by a decrease in grid bias voltage. Thus grid curent flow effectively limits or clips the positive alternation of the signal. The negative peaks of the signal are limited in the plate circuit as the tube is operated near plate current cut-off. The output of the limiter is substantially constant in amplitude for

*431 Woodbury Road, Huntington, N. Y. 11743.

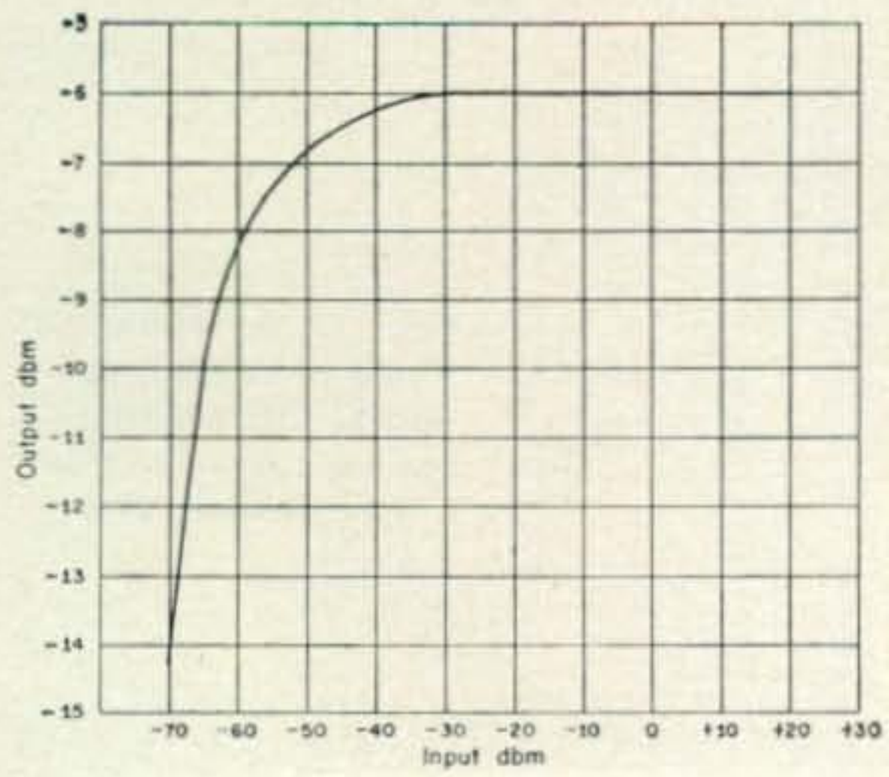


Fig. 1—Limiter characteristics.

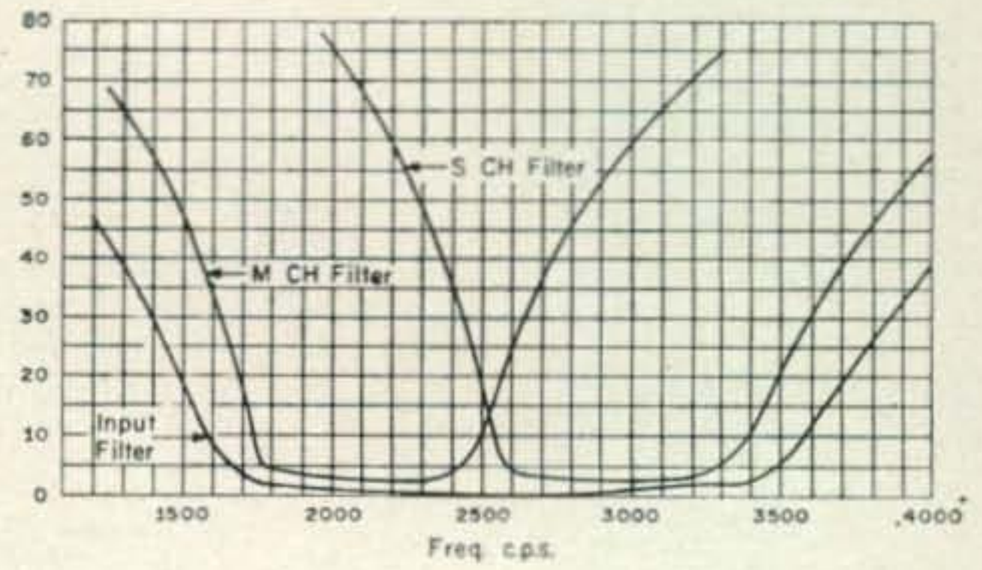


Fig. 2—Characteristics of input, mark, and space filters.

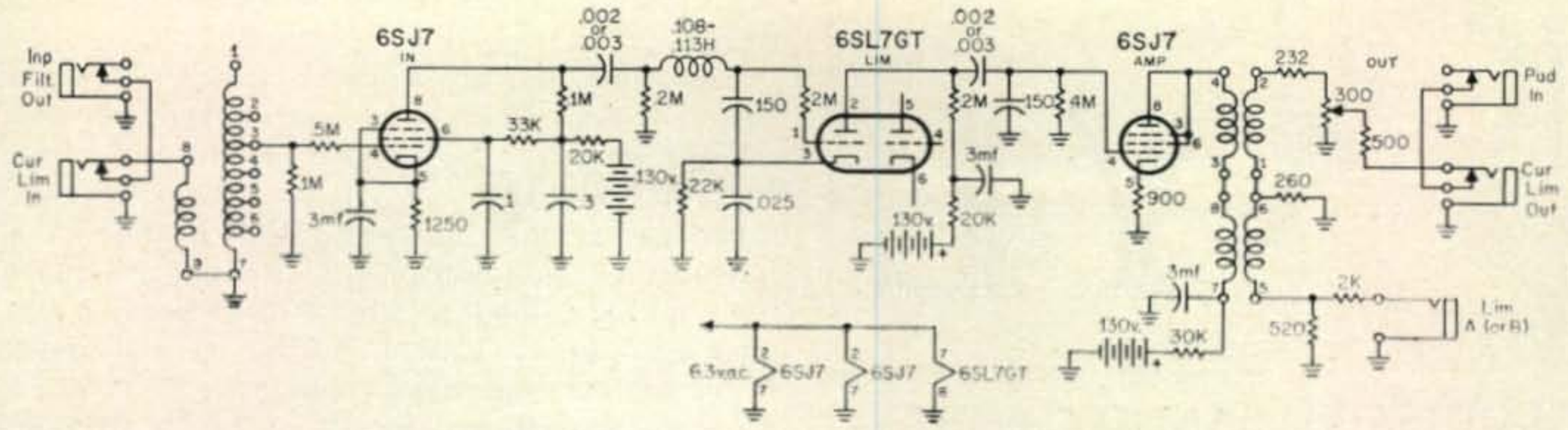


Fig. 3—Simplified schematic of current limiter.

signals between the input levels of —40 dbm and +20 dbm.

The un-bypassed cathode of the AMP tube provides some inverse feedback which reduces the distortion that occurs in the tube. The output of the AMP tube is fed through a transformer to the detector circuit and, by means of an additional secondary winding, to the frequency indicator circuit. A potentiometer, designated OUT, in the output circuit is used to adjust the signal level to the desired —6 dbm level before it is fed to the detector.

Refer again to the block diagram of the AN/FGC-1 in last month's RTTY Column. Next month we will discuss the Detector Panel, and in particular, the noise suppression circuit which ties together the detector panels to get the beautiful diversity performance unique with this terminal unit.

On the Bauds

W1GUC of East Granby, Conn., is on 80 with tape. W1MGL of Norfolk, Mass., runs an HX-20 into an SB-200 with a modified W2JAV TU and a Model 15. W1QP of East Harwich, Mass., is on 80. W1GYJ of Presque Isle and K1AGP of Winterport, both in Maine, are on 80.

WA2ZGC of the Bronx, N.Y., now has a Model 14 strip printer and is looking for tape. W2GDU of Freeport, L.I., is on 80 with tape. W2RBN of Poughkeepsie, N.Y., has a Model 15 without the unshift-on-space function level. *(Contact W2ZKV for the missing parts, Royce.)* W2TAP is on 20. WA2KNA of Albion, N.Y., works 80 meters.

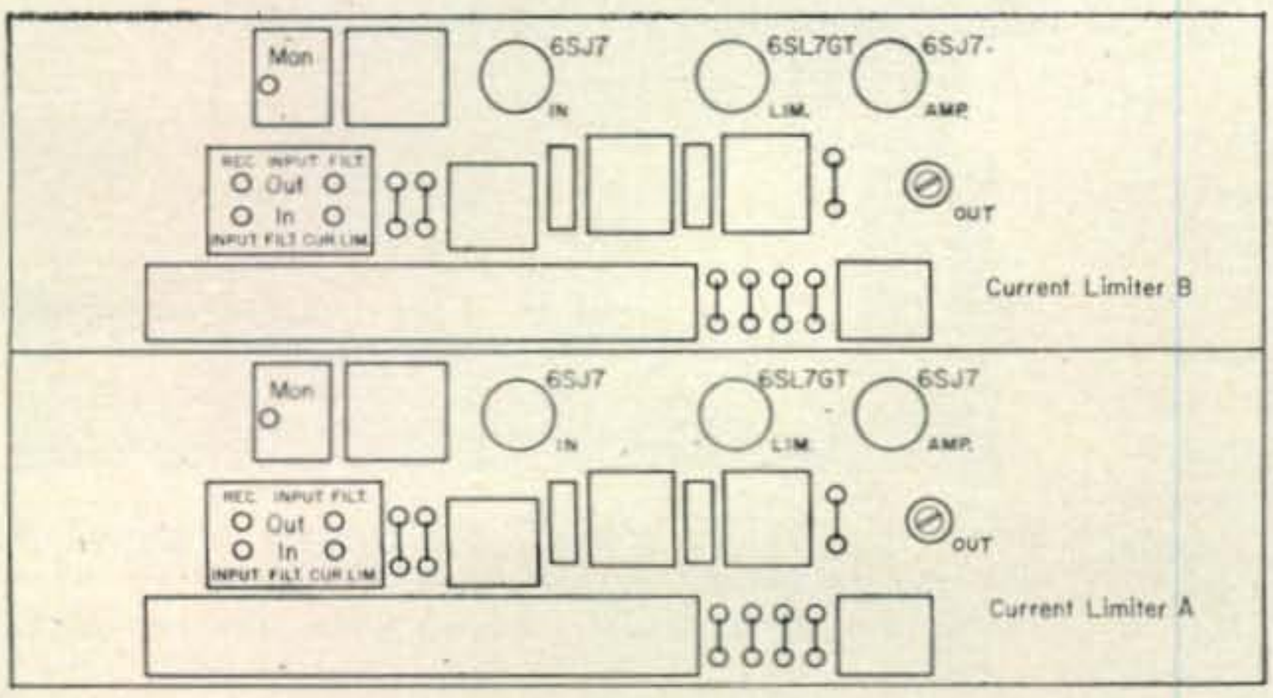
W3VDU of Elkton, Md., is on 80 with an HT-32 driving a pair of 450-TL's to 800 watts, an SX-100 receiver, and a Model 19. W3LST of Oil City, Pa., has for sale a CV-89/URA-8A converter. K4AWQ of Falls Church, Va., is on 80. K5SBU of Corpus Christi, Texas works 20.

WB6GDF of Monterey, Calif., is looking for conversion dope on the Northern Radio Type 152 narrow shift converter. *(See the January 1965 issue of RTTY, the monthly bulletin of the RTTY Society of So. Calif. Inc. Subscription $3 per year via W6AEE.)* WB6GDF uses a Model 15 with his W5BGP converter and is building a transistorized heterodyne exciter. W6LVQ of Whittier, Calif., works 20 meters.

W8CQ of Royal Oak, Mich., works 20. W8IS of Marietta, Ohio, is building a W2JAV terminal unit. W8MGQ of Southfield, Mich., has an l.f. exciter, the O-73A/URT, and wants to know what to do with it. *(If anybody has used this surplus unit on the ham bands, please drop us a line or two with the details.)* W8QMI of Midland, Mich., is on 80.

W9NAA, the Rose Tech Radio Club Station at Terre Haute, Ind., works 20 with tape. W9HXW reports the recent election in the Chicago Area Teleprinter Society (CATS): K9HYF President, WA9MKQ VP and Treasurer, W9JBT Secretary, and W9QVQ Sgt-at-Arms. CATS is the oldest RTTY club in the Chicago area. They meet the first Wednesday of the month at Edgebrook Field House, Central Park and Devon Avenues. Coffee, rolls, and a raffle are usually on the program each meeting. K9TOL showed the Illiana Teleprinter Society recently how to service the Model 15. K9DOF corrects us: K9CMW is in Sheboygan, Wisconsin (the Bratwurst Capital); not Elkhart, Ind.

[*Continued on page 104*]



Front view of both Current Limiter panels as they are installed in the AN/FGC-1. The large rectangle in the lower left of each panel is the band-pass input filter. Directly above the filter is a small jack panel used to test and to adjust this panel.

YL

LOUISA B. SANDO,* W5RZJ

LOOKING at the accompanying photo, you probably wonder what a Nun at a printing press has to do with ham radio. Well, there is a connection, and it's all part of Sister Mary Cletus' philosophy of service to the 130-plus aged residents of St. Francis Home, Breckenridge, Minn., where she is floor manager. A life of service began for Sister Mary Cletus when she entered the St. Francis Convent in 1941. After that she worked with orphans, the mentally retarded and taught school before joining the staff at St. Francis Home. Hoping to make the aged patients' lives a little less lonely, she gladly accepted the challenge to earn her license when KØEGE suggested to the home's administrators that a ham station might be enjoyed by the old folks.

KØEGE and KØJTZ helped her obtain code records and key and KØAHH set up a station. Sister Mary Cletus received her call, WAØJIE, in June '64, but then for several months was without a station. Shortly before Christmas she received, as a gift from W6QKI, a Swan 240 transceiver and a power supply. With it she has been able to make numerous contacts resulting in phone patches to the patients' families. She adds, "It is impossible to describe what goes on within the heart of the aging as they hear their loved ones over the radio, often after not having any contact with them for years—tears of joy come forth in abundance. . . . I may not have many *awards* hanging on the walls of my shack, but the *rewards* which I experience from the response of the aging here at the Home could never be placed in a frame and posted on a wall!"

WAØJIE also uses her station in another way to help her patients, by informing the public of some of the needs at the Home. For instance, by mentioning their need in a QSO, they received some diamond willow for one of the grandpas to make into canes. She also has asked for driftwood, fancy bottles, and more recently locating outlets for the Home's "bow industry" which has boomed so they need more persons to sell these lovely products. Despite aging or bent fingers, the Home residents turn out beautifully tied package bows in all colors, designs and for all occasions, which they sell for only enough to pay for the materials for it gives the elderly persons so much joy to make them. (If you know of an organization that could help sell these bows, do contact Sister Cletus re this worthwhile project.)

Most recently, again with service to her patients in mind, Sister Cletus has taken a course in printing at the N.D. State School of Science (and adds she is the only woman who has ever taken the printing course at this school). She has learned to photograph, enlarge and print material big enough so those with dim vision can once again enjoy reading and thus be kept more in the main stream of life. She now has a small press and has started her project to print song books, magazine articles, favorite psalms and a weekly paper for the Home, and her own QSL cards, as well.

WAØJIE planned to be on the Eye Bank Net as soon as school and other duties would permit. She adds that many of the home residents have donated their eyes to this worthy cause. Also, Civil Defense officials asked Sister Cletus to operate their rig as soon as it was set up in the basement of the jail fallout shelter. (If you hear she's in jail—think twice! . .)

Congratulations to you, Sister Mary Cletus, WAØJIE, on your life of service.

Here and There

Congratulations to Mavis Stafford, VK3KS, for achieving WPX on c.w. Her award is number 632, but hers is only the 15th WPX award made to a YL, the sixth on c.w. For photo and write-up on Mavis, see *CQ* for Dec. '64, p. 85, when she was given recognition for earning WAZ.

Officers of TOO's (The Only Operator YL Club) elected in April are: Pres., K5BTM, Dot; V.P./historian, K3TNL, Elinor; S/T, K7ADI, Ruth, who also is certificate custodian. This club has a cute name for its newsletter—"WHOZIN TOOS". Any YL whose OM is not a ham (jr. ops don't count on this) is eligbile to join.

TOO's sponsor an award to any operator in the W/K US call area for contacts with 5 members of the club; any other operators make contacts with 3 members—any band, any mode,

[*Continued on page 105*]

Sister Mary Cletus, WAØJIE, has learned printing, as well as ham radio, to help make less lonely the lives of the old folks at St. Francis Home, Breckenridge, Minn.

*4417 Eleventh St., N.W., Albuquerque, New Mexico 87107.

CQ TECHNICAL BOOKS

CQ ANTHOLOGY I

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.

CQ LICENSE GUIDE

212 pages of everything the Amateur must have to get his license and progress toward the general class ticket. Plus many additional pages of vital information for the ham operator.

ANTENNA ROUNDUP

A common denominator for all ham stations is the antenna. Here at last is the cream of antenna information packed into a 160 page book. Forty-seven information-packed articles that will dispel much of the mystery surrounding antennas.

THE NEW RTTY HANDBOOK

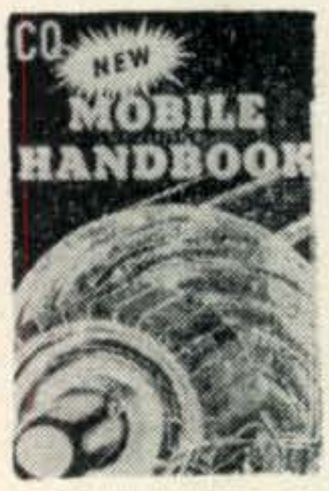
A treasury of vital and "hard to get" information. Loaded with equipment schematics, adjustment procedures, etc. A valuable asset to both the beginning and the experienced RTTY'er. Special section in getting started, all written by Byron Kretzman, a well known authority in the field. First printing sold out. Second printing on hand.

CQ ANTHOLOGY II

Top favorite CQ articles from 1952 to 1959 . . . including some you may have missed . . . compiled into one new information-packed book! No more need to try to locate sold out back copies of CQ. This Anthology includes past articles of lasting interest to every amateur radio enthusiast. Over 250 pages of text. Over 75 different articles. A definite Must for your shack!

MOBILE HANDBOOK

This new Mobile Handbook by Bill Orr, W6SAI, has been getting raves from top experienced mobile operators. Written for advanced, as well as beginning mobile operators, much of this information cannot be found anywhere else. This is NOT a collection of reprints.



SIDEBAND HANDBOOK

Written by Don Stoner, W6TNS, who 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.

VHF FOR THE RADIO AMATEUR

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160 Meter Results [*from page 35*]

1st District

W1WY: It was a rough one this year. DX was coming thru but oh that static! Man, it was brutal! My head is still spinning. Each DX contact was a project in itself. Daytime activity Saturday was below last year's and activity petered out to almost nil in the closing hours. W1BHQ: It was a very nice Contest. QRN was pretty bad, though. Looking forward to the next 160 W.W. affair. W1ECH: Still love 160 for its friendly atmosphere. The gang is usually more friendly and patient than on the other bands—at least for my money. W1KVI/1: The Portland Amateur Wireless Associatios operated from the transmitter shack of WJAB whose antenna is a 175′ vertical and a solid pattern of radials. Temperature dropped to about —15 at night! We had a great time and enjoyed giving out Maine contacts. Sure plan to be on again next year. W1BB/1: Another fellow with a tee-rific antenna set-up. Had a grand time. Wonderful affair. They just keep getting bigger and better.

2nd District

W2IU: 12 countries worked and a multiplier of 45. Not bad considering the overpowering QRN at times. WA2HNI: I found that near the end of the Contest I was getting many calls from stations whom I had already QSO'd. Perhaps more of the boys should use anti-duplication sheets. [How right you are, Dave. And such an easy task to make such a sheet. Saves the other operator wasted time and effort, too. Just consider the task it gives the Committee checking for dupes especially with stations whose scores are mighty close. Next year we might put into the rules that if duplicated QSO's exceed a certain percentage of total QSO's it will automatically disqualify that amateur. *Ed*] W2HUG: Operated only 8 hours so score is low. Had to leave my son (WA2HNI) some operating time also. [It's rough when you have to share such as this in a contest, isn't it Phil? *Ed.*] K2DGT: Severe line noise, atmospheric QRN bursts and local oil burner electrical noise combined to make this the most difficult Contests I have ever participated in.

3rd District

W3GQF: [Welcome back, brother, welcome back. *Ed.*] W3EIS: Spent several hours during the Contest looking for source of intermittent instability in rig [Of all times, eh? *Ed.*] Finally fixed it but it cost many QSO's. Very few west-coasters appeared interested in east coast contacts. W3LMC: Ran 15 watts to a ¼ wave piece of wire. Didn't have time for more operating, but the band sure was very active. Condx good. W3AZR: Did a lot better this year than last. Condx were plain rotten, tho. Even at that I picked up 2 new countries . . . EI9J and GM3-IGW. Was glad to see activity pick up on the center segments [???] but on Sunday activity was almost nil there. So, it's all over but I am looking forward to next year's already. This is the only contest I enter so I'm not a skilled rat race op.

4th District

K4HPR: I was very happy to have participated again this year. Ran 10 watts. I was able to operate only a little Friday night and Saturday morning. My score isn't much, but for my power and time involved I think I did fair. W4WHK: Well, I bettered last year's score but not without a struggle. The QRN level on the 2d night sounded like a continuous buzz saw, but some stalward individuals persevered for more QSO's and all wasn't lost. K4QAY: The afternoon and evening of Saturday and Sunday morning the band was plagued with QRN from local thunder storms and lightning here in southern Florida. The band was a shambles and only a few stations actually readable. Therefore, after several scattered attempts, it was given up as a bad day! W4IJE: Practically all of my contacts were made during a 1½ hour period Saturday morning. QRN prevented any contacts Saturday night or Sunday morning.

5th District

K5TFG: It was a real "madhouse" this year. Really became rattled at start of test but later calmed down to a steady pace. K5JVF: The QRN got so bad here that I had to QRT about 1030 Sunday morning. I thought W1WY stated things nicely in his column . . . this re-

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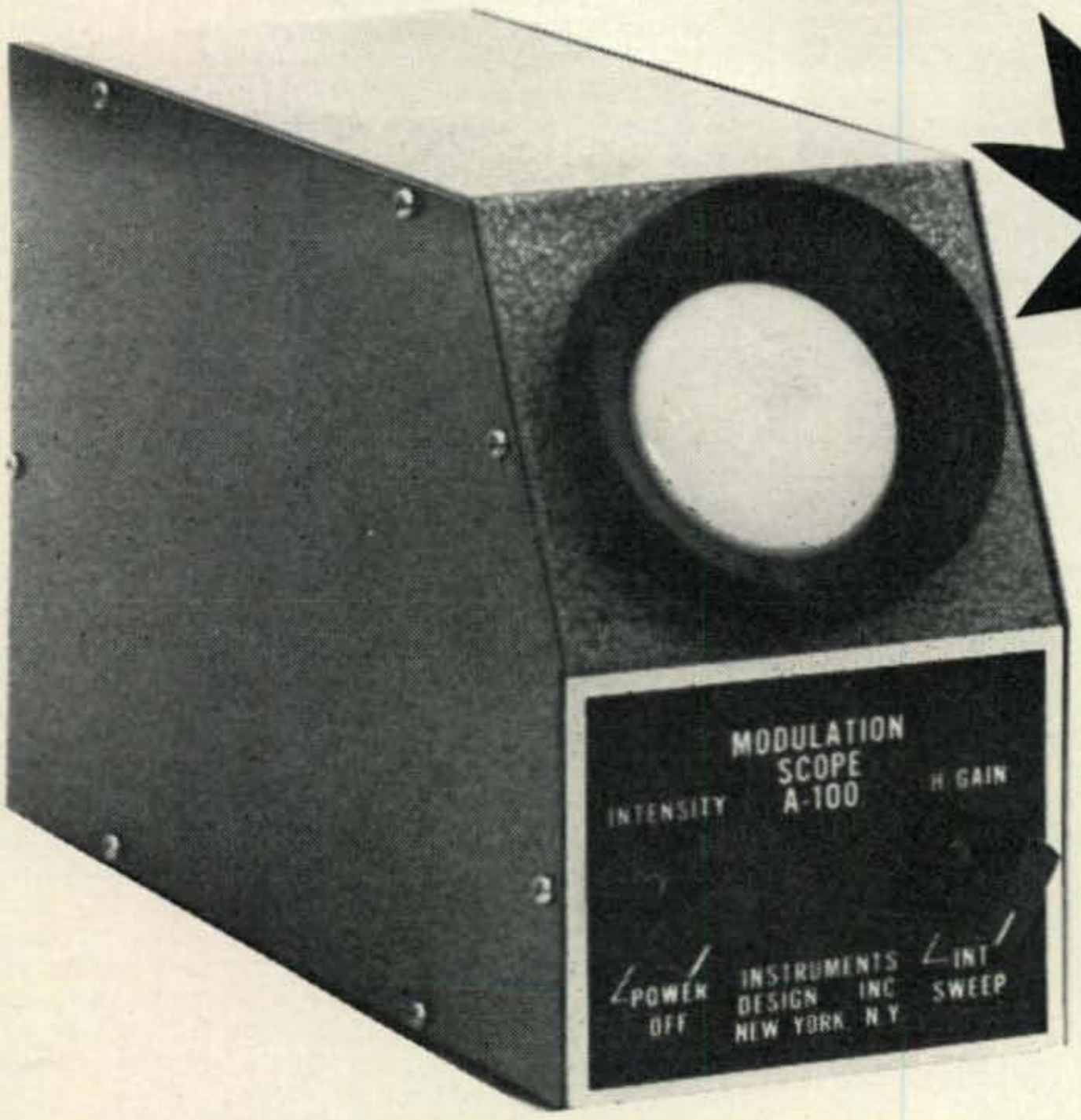

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73, Elliot *WA2HDP*

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mains "The biggest Little Contest in the World" . . . Had a ball! K5LIW/5: As in previous years we operated portable from a cabin at Mill Creek on Lake Texoma, Texas. Improved antenna systems increased the QSO total this year, but DX stations were disappointingly scarce. Except for some periods when high winds prevailed, our ¾ wave length balloon supported vertical was poised for DX signals which never came. It will be hard to forget the excellent band conditions enjoyed during last year's test. But, despite the shortage of DX it was a very enjoyable contest and a great time was had by all here. [You were heard in England—*Ed.*]

6th District

W6RW: Had a ball although condx not good. Reported by Europeans up to S6 for an hour at 2 mc but Loran covers not only its central frequency but 1825 to 1830 kc where most of the Europeans operate, and extends all the way down to 1805 kc with 20 over S9 noise and splatter. It's a pity because Eu would be easily workable from here. G3PU reports us as among the strongest Ws and stronger than most East Coast stations. [What do you think of that boys?] W6JTB/6: Because of a power supply failure we were unable to operate during the prime hours of the first night. Condx weren't what we expected. Very little DX heard. A very enjoyable event. WA6CDR: Condx good to very good except that nobody on the East Coast could hear me! Think that the dipole has too high an angle of radiation to work beyond about Ohio. Only QSO'd 4 stations in the 1800 kc segment Friday night and none on Saturday night but *heard* practically everything.

7th District

W7AYY: Hampered by having just a 28 foot loaded whip, but sure did get a bang out of this Contest. Biggest thrill was being XE2OK's first contact in the affair. He was the only DX I heard. Band quiet Friday night but heavy QRN bursts Saturday. Drew a blank in 1-2-3 land. Hope to be back next year with maybe a little bit better antenna though with a 60 × 48 foot backyard. I can't string too much up for 160 and haven't room left for anything else—hi! W7GOM: Don't take *CQ* so didn't know the dope. Sorry. [Dick—Better get after this fella] W7LNG: Ran 100 watts to a ½ wave dipole 20 feet above ground. Only one QSO in the 1900/1925 segment. K7HDB: Activity much above last year though no real DX from here as last year. This is still the only Contest on the air as far as I am concerned.

8th District

W8DGP: Brazil s.w.l. Rolf Rasp (2d op PY1NFC) in town and fired me up on this one. Much enjoyment this first time in the Contest. Although I gave G2AZC only 339 he was peaking 569. [Think he was a pirate, Earl, as no other Eu stations worked him—sorry.] Also heard other G's, GM3, PAØ. First night QRN absolutely nil—second night some QRN and Eu louder but worse copy due to QRN. Plan to be on next year with better antenna and legal maximum power of 100 watts night and better receiver. K8CGM/8: Boy, it was a great Contest again this year. Heard HR3HH, VP7NY and VP2AV but no G's. Many 6's and 7's but no answers even though both antennas were up 150 feet.

9th District

W9YYG: Only Eu heard was DL1FF Saturday night, RST 569. QRN was real rough Saturday night. Looking forward to next year's test. W9PNE: This is a great Contest! The competition is fierce, activity high, and there is never a dull moment. It will be hard to decide the winners in some sections. [The understatement of the year, Brice] I got home over 2 hours after the Contest started with my shack temperature 26 degrees. In 4 hours my small electric heater warmed it up to 45. I nearly froze. And, it is hard to use a bug and keep a log with gloves on, hi! Condx were good Friday night but Eu DX weak. Saturday night condx were poor. With —10 degree temperature the QRN levels were like summertime. I also had an intermittent S9 power leak that really slowed down the QSO's. Had to stop at 0855 Sunday as I was chilled to the bone.

10th District

WØCDP: Real fun! Thanks to *CQ* for this activity. I was disappointed that no activity showed in the middle segments. Maybe we could get a contest going on those

frequencies? [Um-m-m-m. Good idea for thought, Bing—*Ed.*] WAØCVS: Finished putting up a vertical Thursday night but the winds had it down by Friday morning. Used a wire thrown over the roof. Next year? WØDRE: This Contest is certainly great fun and an easy way to make WAS on 160. I wasn't able to make 100% effort because of school work. WØGDH: Had fair luck most of time but early morning condx weren't good—too much noise and QRM. I have taken part in 3 Contests now and haven't had an Arkansas contact [Only one station on from there and no log received. Anyone want to operate /5 Arkansas next year? Same as concerns South Carolina]. I would like to think I would have time to take a station to Arkansas next year [Please, by all means, do it, OM].

Canada

VO1FB: Condx were marred by QRN but despite this had a most enjoyable weekend. As you see from the log, I found it easier to work into Eu than to the west but found it most frustrating on the second day to be able to copy many G stations from 1930Z but unable to QSO until 2046Z. Was pleased to work Peter, 6Y5XG, for a new one. Nice to be on again after a break of two years in G land. VE1TW: Sorry I didn't make more contacts but my rig isn't working good on 160. Hope to do better next year. [So do we all, Les, as N. B. sure is rare]. VE2UQ: QRN:—!X@?!!X9. Comment: Ditto. VE2ATU: Sure did thoroughly enjoy the Contest. I wasn't able to stay right through to the bitter end, but was very glad to add three new countries to my total on Top Band. Condx generally seemed better than last year. I didn't have freezing rain to contend with this time. Looking forward to seeing the results in due course. VE3ABG: Couldn't hear much DX because the W's and VE's filled the band. Apart from that it was the best line-up of c.w. stations on 160 ever. Wait until next year .

DX DX DX DX DX DX DX

[And, there was never so much of it before]. OHØNI: Thanks for nice test. KL7AUV: Was on from 0430 to 0910Z Saturday and 0600 to 1033Z Sunday. The power ratio . . . my 50 watts to their 200 watts, plus another 4X factor for noise level, means exchanges with Alaska must overcome an 8 to 1 signal ratio. Pretty rough. Enjoyed listening to a conference between W6IDY and WA6ATY about when and where the KL7's would come in. VP2AV: Hope the log will be of some use to the stations I did work. Was on only Sunday and the QRN was so bad I had but few QSO's. OE1KU: Worked only Europeans but am up to 14 countries on the band now. Heard VO1FB very well with signals RST 569 QRM, QRN, QSB.

VP3CZ: Spent afternoon prior to Contest erecting new aerial. For first two hours of operation didn't make a QSO. Thought condx poor but proved to be faulty aerial c/o relay *CQ* has again chosen a 'fb condx' night. Have now worked 4 Eu stations [One Sunday morning after the Contest you should have heard Dev knocking one Eu off after the other while nary a one was heard here]. Once aerial and relay okay make 22 QSO's in an hour to all areas but 6 and 7. W6RW was excellent—S8 for long time. Called many 6's and 7's but no results until after calling W7VGQ for "hours" he eventually came back. Evidently he was so overjoyed he omitted his state. Worked 9 countries but heard 13. HK4EB: Condx were very poor. Open only during 4 hours first night and about 1 hour second night but no QSO's. I called W2IU and W6RW several times without answer. [Sam and Roger . . . ugh!].

Here is a letter in full from ZE3JO, Salisbury, Rhodesia. "I received the log sheets for the WW Top Band Test for this last week-end. Many thanks for same. Ivan Wood (ZE3JJ) and I did spend some hours on this test but for the second time in three months, we more or less wasted our time. On the Saturday we went by car to a QTH named Mtoroshanga about 70 miles from Salisbury right out in the bush, to a spot on top of a hill well over 6,000 feet above sea level. The site is one which belongs to the Rhodesian Electricity Supply Commission, who have a v.h.f. station there with a.c. mains and a small brick building plus an antenna mast of 110 feet in height. We rigged up a 133 footer to the top of the mast plus another 133 footer down the side of the hill which has a vertical drop. Thus we had a centre fed antenna of 266'. The transmitter was Ivan's Viking Ranger and his Triple 8 Rx. We came on the Top Band about 9 in the evening until 6 Sunday morning. During this time we called lots of CQ's but only heard a few weak c.w. signals which we were unable to obtain the calls because of the high static level. We did manage to hear DL1FF on 1830 kc at a reasonable QRX but no QSO. It's a pity that we get this QRN out in this country, as I am sure we could have had one or two QSO's if the band had been less noisy. It's very disappointing to us both as the QTH is pretty well in the bush, a pretty rough road to the top of the hill, and possibly one of the most ideal sites one could wish for in Africa; especially on Top Band. But, due to the high noise level, nothing was contacted. I am writing this to let you fellows know that we are trying on this band, but being so far from any other Top Band transmitters and the local QRN, it seems impossible for much on this frequency. You can have no idea just how the static sounds out here which is believed to be one of the worst in the world."

P. S. from your author. Can anyone give me a hint as to how to obtain a QSL from CT1CO for a 160 meter QSO? Of 48 countries worked on this band all are verified but this one.

73, Charlie, W2EQS

For further information, check number 27, on page 110

VHF [*from page 74*]

'After they give me the 57 to 58 reports I tell them about my Heath Twoer. I have had quite a few drop in on me here when they go to Bakersfield. They don't believe I have only the Twoer." *(This is half of the fun in 144 mc that the low frequency boys almost never hear about. The next letter also testifies to the unusual end of hamming only QRP'ers experience fully.)*

Tim Carey, WA4JTM, talks about lunchboxes in Florida: "Thought I'd drop a line and tell you about the v.h.f. activity in the Daytona Beach area.

'We have a net each Sunday at 2000 EST on 146.7 mc. The main purpose is for use during hurricane emergencies, but we keep it going with 10 to 15 regular check-ins every weekend. Most of the gang run lunchboxes. *(Be prepared for a sudden increase in those check-ins, Tim!)*

'On the 5th and 6th of April Lou, K4UOQ, worked St. Augustine (45 miles) with his Twoer and on the 9th worked Gainesville (105!) and Melbourne (60) off the back of his beam! This doesn't sound like much, but with those ½ watt outputs, DX is pretty hard to come by." *(Bet the Gainesville boy still hasn't recovered.)*

Thirty

For our closing this month, we are reprinting the following useful suggestion from the *Pack Rats Cheese Bits*, the monthly bulletin serving the Mt. Airy V.H.F. Society of Philadelphia. It offers an almost perfect solution to the problem of how to discourage forgetful rig-borrowers:

How about the guy who borrows your two-twenty rig or test gear and doesn't return it until you call him three months later? To alleviate these conditions and many others that will suggest themselves to the resourceful v.h.f. addict, a laboratory has spent many months of secret research that has now culminated in the final development of a device that is not only foolproof but has survived the most rigorous of field tests under all kinds of actual environment.

Although it is beyond the scope of this publication to discuss the mathematical analysis of the circuit parameters, a complete discussion may be found in the 1927 edition of the *ARRL Handbook*. We are also deeply indebted to Ohms Law for making the whole thing a reality.

The input is connected across a 117 v.a.c. line that enters the device that is being "rigged." It may be installed before or after the a.c. switch, depending on whether action is desired before or after the device is turned on.

At any rate, soon after application of the prescribed voltage to the input of the circuit, some sort of action can be expected depending upon the model chosen for the particular application. As usual, good engineering is required in choosing the proper model to fit the desired results. Using the following chart, a unit may be engineered for any use:

Type	*Value*	*Effect*	*Suggested Application*
Mark 1	4700 ohm, 1 watt	Slow,subtle, long	Long-lasting irritation
Mark 2	4700 ohm, ½ watt	Medium slow	Early return of gear
Mark 3	3100 ohm, ½ watt	Medium fast-smoke	Guaranteed action
Mark 4	2700 ohm, ½ watt	Equiv. to burn-out	Run for panic button
Mark 5	1000 ohm, 1 watt	Exploding effect	?

Various combinations can be employed for individual problems; a Mark 5 installed with a Mark 2, for example, gives a dual effect. In all cases we have observed that the coincidence of perception is inversely proportional to the I.Q. of the borrower.

A variation is the application of suitable compounds, such as fingernail polish, speaker cement, insulating varnish or paint. Each of these refinements produces an effect displaying a strong individual character. They also change the tint of smoke produced which is an interesting variation. —*Name Withheld.*

73, Bob, K2ZSQ & Allen, K2UYH

DX [*from page 69*]

KM6DJ	via K4ISV.
KX6DP	via K4ISV.
MP4TBO	via VE1AKZ.
OD5BZ	via W8ZCQ.
OD5CN	via K4ISV.
OH2AM/ø	via W2CTN.
PJ2MI	via VE3EUU
SV1AB	direct *not* via W4HUE.
TF2WJF	via W4PVI.
TG9EP	via W9HOG.
TN8BK	Box 32, Brazzaville, Congo.
VK9CR	via VK6RU.
VP2KD	via VE3ACD.
VP2SK	via W3AZD.
VP2SM	Box 142, St. Vincent, B.W.I.
VP2SRC	Box 142, St. Vincent, B.W.I.
VP3AA	U. S. Consulate General, Georgetown, British Guiana.
VP5LV	Box 4187, Patrick AFB, Fla.
VP7CC	via K6UTO.
VR1S	Box 288, Suva Fiji, Ellice Islands.
VS9MB	(Opr. Joe) Via W2CTN.
VU2DIA	B. S. Hegde, ATMO, Inter Police Wireless, Port Blair, Andaman Islands, India.
W5HWR/VP9	via W5HWR.
XW8AY	Ocie O. Sager, USAID APO 96352, San Francisco, Calif.
XW8AZ	via W6KTE.
YJ8BJ	Box 93, Santo, New Hebrides.
ZB2AM	Chief Radio Supervisor, M. Matthews, CPO Mess, HMS Rooke, Gibraltar.
ZC4CZ	via W2CTN.
ZD5R	V. V. Parkhouse, Box 99, Mbabane, Swaziland.
ZD7GP	via GW3LXI.
ZD7IP	via RSGB.
ZD8	QSL Bureau, Box 4187, Ascension Island.
ZD8JL	via WA4INR.
ZD8LT	via K9YXX.
4W1G	via HB9NL.
4WIL	via HB9TB.
5J4RCA	via HK4EB.
5N2JEB	Box 914, Lagos, Nigeria.
5W1AC	Jim Moore, Broadcasting Dept., Box 200, Apia, W. Samoa.
7X2AH	via WA4STL.
9G1DT	direct *not* via W4HUE.
9K2AM	Box 326, Kuwait, Persian Gulf.
9M4JW	via K4ISV.
9M4JY	via K9BPO.
9M4MB	via K7GCM.

73,Urb, W2DEC

Letters [*from page 12*]

inside and outside the Sea Lab II to determine the affects of this type of environment on man.

Astronaut turned Aquanaut Cdr. Scott Carpenter will be the team leader of the men in Sea Lab II.

Included in the instrumentation installed by the Naval Ordnance Test Station will be facilities to converse with the Aquanauts via a special helium speech unscrambler. Amateur radio station WB6LKH/MM will be operating the new Hallicrafters SR-500 Tornado tranceiver loaned for the project by the Hallicrafters Corporation through their west coast distributor, the Herb Becker Company of Los Angeles. Our antenna problem was solved by the Hy-Gain Company who donated, through the Becker Company a 14 AVQ vertical and 2BDQ trapped doublet.

Phone patch traffic will be sought to the areas of the men's families in the South East as well as general operation on 80, 40, & 20 meters.

Tom Wheeler, K7QCP
Chief Op., WB6LKH
5406 48th Avenue S.W.
Seattle, Washington

Kitcraft [*from page 62*]

cabinet and #3 circuit board? Now, install the 'Cats Clip'."

ZO: "You mean cats whiskers?"

GZ: "No, cats clip over the whatsit. Where's a fillister head screw?"

ZO: "I think this is it."

After installing the wrong one, GZ admits he was wrong, and makes the change.

GZ (Installing the battery box): "Red is on #3."

ZO: "No, red goes on the battery lug."

After completing the assembly the second nite, the table was soon released to the girls. The dipper was completed in short order. With minor adjustments, the dipper worked the first try. Amazing, Watson! These modern kit deals are the cat's pajamas. So *simple!* ■

Club Forum [*from page 16*]

the importance of conducting press activities at all conventions.

One way to get the ball rolling in the right direction is for those qualified to join an amateur radio press group such as the Amateur Radio Editors Association or the Amateur Radio News Service. 73, Al, WA2TAQ.

C.W. Monitor [*from page 36*]

If you use an n.p.n. type transistor simply reverse the diode polarity and it will work also.

I originally had intended to power it with batteries, and I haywired the oscillator section together first. Testing it with a depleted pen light cell I had taken out of my Tunnel Dipper; it gave out a weak chirp.

At that point I had another wild idea. Suppose I could power it from the air? I hastily wired up the front section, and clipping a test lead on the top of the capacitor for an antenna, I turned the transmitter on. It sat there and squalled like a harmonic with a wet diaper.

From that point on, it was a matter of taking it apart and putting it back together in the box, applying the decals, and setting it on the operating desk in front of me.

One disappointment in the works. I bought a red banana plug and jack and rigged up a cute little 18" whip antenna that sticks up out of the top. My 55 watt rig wasn't quite powerful enough. It just wasn't loud enough. I tied about 10 feet of wire to the whip, and now it is just right. I measured the voltage at the top of the 2 mf capacitor and found that it was approximately 5 volts, using the 10 foot piece of wire for an antenna.

It would startle me at first. I would close the key to test the transmitter, and it would immediately start squalling like a junior op that had been stepped on, and I knew I hadn't turned it on. But then you will get used to it after coming back to turn it off a few times, and you will glory in it, and say, "Look, Maw! It don't run up no light bill and you don't have to buy no batteries! ! It's free!"

And, incidently, if you build one of these and it doesn't work, don't write me. I didn't have to trouble-shoot mine either time. Fortunately it worked both times I put it together. When I haywired it together and when I put it in the box.

If you want to visit, I'll show you mine, and prove that it does work. I'll even take the back cover off so you can see there aren't any batteries in it! Gud luck, OM es 73s. ■

Varactors [*from page 66*]

monic generator was revised for quadrupler operation from 32.5 to 130 megacycles, using the circuit of fig. 4. The idler circuit was placed at 65 megacycles and the isolation trap at 32.5 megacycles. Tuning was much easier than with the 260 megacycle quadrupler and maximum power output was obtained with little trouble.

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Hundreds of thousands of automobiles are stolen annually. Countless thousands are broken into. Protect your car, mobile radio "goodies," sales samples, and other valuables with a WIGGINS VEHICLE THEFT ALARM. Build it yourself with easily obtainable parts. (Assembled units not now available.) Does not depend upon opening doors, hood, etc. for actuation. Highly sensitive, it actuates a signal rhythmically. Stops and re-arms itself when not disturbed. Requires very little or NO battery current while armed. Can be used also for trucks, trailers, boats, and small aircraft. Only $2.00 postpaid (check or money order) for a nine-page brochure of copyrighted circuits and complete instructions for assembly and installation.

W. S. WIGGINS
P.O. Box 448, Whittier, California, 90608

For further information, check number 56, on page 110

cycles, an efficiency of 50 percent. This indicated that the lower efficiency of the circuits employed at 260 megacycles was a prime factor in determining the overall multiplier efficiency. As an estimate, it is possible that quadrupler efficiency approaching 50 percent may be obtained at 260 megacycles if strip line or coaxial output circuits are used.

Again, as in the higher frequency quadrupler the idler frequency got lost.

Conclusions

The varactor frequency multiplier is useful for high frequency multiplication at v.h.f. and u.h.f. With proper circuitry an efficiency of 70 percent when doubling frequency and 50 percent or better for third or fourth order multiplication, is attainable.

Considerable care is required when adjusting the varactor frequency multiplier, prohibiting use in band changing transmitters. However, the manufacturers information concerning bandwidth indicates that a useful bandwidth of 5 percent is possible with proper adjustment. This indicates that the varactor multiplier may be used over any of the v.h.f.-u.h.f. amateur bands without retuning. ■

USA-CA [*from page 80*]

Saskatchewan VE5, Alberta VE6, British Columbia VE7. Cards from Yukon and or Northwest Territories VE8 may be submitted for British Columbia VE7. All contacts must be made from an area within a radius of 150 miles of one point and after January 1, 1939. Submit the 18 QSL cards with $1.00 or 10 IRCs. All cards will be returned.

Johnny Appleseed Award of the Coshocton County Amateur Radio Association of 1329 South Fourteenth Street, Coshocton, Ohio has the following rules. For QSOs after January 1, 1964 with three members of the Coshocton County Amateur Radio Association, Ohio stations are required to work 5 members. No fee, send General Certification Rule list, any amateur frequency and mode is ok.

"36-63" Award issued by the Macon County Amateur Radio Club, Macon, Missouri for confirmed contacts with 2 Macon, Mo. stations or Macon County; 3 Kirksville, Mo. stations or Adair County; 3 Hannibal, Mo. stations or Marion County; 2 Moberly, Mo. stations or Randolf County; 1 Brookfield, Mo. station or Linn County. No limitations as to date, band or mode. Mobile and portable contacts must show county and/or city on QSLs. Application certified by two other amateurs. Submit list by counties showing station, band, mode and date and 50¢ or 5 IRCs to John Knaak, KØEQY, 16 Maple Lane, Macon, Mo. 63552.

WAOC, Worked All Orange Counties operating achievement award is issued by the Fullerton Radio Club of Orange County, California. This new award will be awarded to amateur radio operators for contacting the eight Orange counties in the United States of America. Here is a list of the approximate number of amateur radio

operators in each of their respective Orange counties: California 1700, Florida 450, New York 260, Texas 80, North Carolina 40, Vermont 25, Indiana 25 and Virginia 15. The basic award will be presented for contacting any four of the Orange counties. Send QSL cards verifying two way contacts with $1.00 for handling and mailing fee to: Fullerton Radio Club, P. O. Box 545, Fullerton, California. Additional seals for remaining counties will be sent upon receipt of the serial number of the basic award and the QSL cards confirming the new Orange counties and a s.a.s.e. All other usual rules apply except that no other special single band or mode of operation are planned.

It appears that I have run out of space, again many thanks for all the very wonderful letters, so many of no interest to my readers but they sure help me a lot. Mail has been heavy from all over U.S., South America, England, Italy, Germany and even Israel. How was your month?

73, Ed., W2GT

RTTY [*from page 91*]

UB5AC in the West Ukraine (Europe) has been on 14,085 kc Sundays about 1000 GMT. I1ORS was one of the first to work him. I1OK in Padova is also on 20. DJ5SD found a "Recorder-Scanner BC-918" in a junk yard in Germany *(This is a FAX machine similar to the Hellschreiber in that tape is used.)* YV5BX of Caracas, Venezuela, and TG9AD of Guatamala City, Guatamala, are on 20.

DJØIK of Mannheim, Germany, has a Model 15. Bill is ex-W2KYT from Franklin Square, L.I. KP4GN in Puerto Rico uses tape on 20. VE2HY and VE3CM are keeping 7140 kc hot with narrow shift. DL4VR is on 20 from Muenchen, Germany. YU1EM has moved to Caracas, Venezuela and is awaiting a YV5 call.

Comments

In the past we have had scattered reports of RTTYers using diversity reception, and we were fortunate enough to see such an installation (at W6CQK) some seven years ago. We would like to have some up-to-date reports of this kind of advanced amateur RTTY operation. So, please drop us a post card, a QSL card, or even a letter, with any news of such operation in your the make of receivers, the kind of TU, and the area. The information desired, besides who, is type of antennas used. 73, Byron, W2JTP

Collins Story [*from page 48*]

pressed with the transmitter as a high quality piece of gear, which he decided then and there he wanted for his own.

Informed that the transmitter was being built for someone else, Benton nevertheless was able to negotiate an immediate deal when he produced on the spot the $97.50 which was the price.

Everything apparently was working out just as Mr. Collins and his partner had planned, and in a short time the three of them were loading the transmitter in Benton's car so he could take

it home to Chattanooga.

It is believed this was the first or second full-sized transmitter, not a kit, which the Collins company sold, and a forerunner of thousands of Collins electronic units used for many applications throughout the world.

Down through the years the transmitter remained a treasured possession of Benton White, complete in its original condition except for replacement of a condenser. He operated the transmitter for a good many years until it became semi-retired as a low power emergency and field day rig.

Several years ago Mr. White died. The story of this incident was related by W4ARP, now W6ARP, Harry Heibeck, and brought to the attention of Mr. Collins. With a brief lead, the Collins company started to track down the early production transmitter. It had changed hands since the death of Benton, but was located and arrangements were made to obtain it for an amateur equipment display room at the Collins plant in Cedar Rapids.

Here it rests after many long years with only one flaw, that being a missing Hammarlund type MLW-125 tuning condenser which was in the original unit. Can anyone help locate one of these? ■

YL [*from page 92*]

after Jan. 1, 1964. Send application to K7ADI showing list of members contacted, call, name, state, date of contact, band and mode with certification of log entries signed by two other amateurs or notary public. A fee of 50¢ for US amateurs and 4 IRCs for DX to accompany application. Seals and band/mode endorsements will be issued for each additional 5 members worked by W/K, or 3 for DX. Current membership includes: K1's BJZ, USQ; W1YWT; K3's FRQ, TNL; WA4's EPM, LRP, AWK; K4ICA (K5LXA); W5RZJ; K5's BTM, TSZ, EJR, WSS; W6's CBA, GOZ; WA6's DNW, SFC, TZT; K6UHI; K7ADI; W7's DHK, HHH, IRF, ZMN; K7's JUC, NZO, PKY, RQZ, SBA; WA8CTE; K9's AWJ, MPN; W9RTH; WØATO; KØ's, BOF, BTV, HPS, KHR, RGU, UXO/5; GM3NYG; KL7's CSR, EFH; ZE1JE.

Mo-Kan Gals

It's been a long time since we've been able to report the formation of a new YL club. Now the Kansas City YLs have formed a club called the "Mo-Kan Gals," and current officers are: Pres., WØAYL, Ella; S/T, WAØKSL, corres, secy and certificate custodian, WØUMO, Alyce. The group plans to sponsor a certificate and have a 40-meter net.

Condolences

Sincere condolences to Evelyn, W6NZP, on the passing of her OM, Harold Scott on May 31. Though not an amateur himself, he was well known to hams through his Scott Radio Supply Co. and from his entertaining writing in *Radiogram* under the name of "Mr. X."

33, Louisa, W5RZJ

For further information, check number 34, on page 110

Ham Shop

Advertising Rates: Non-commercial ads 10¢ per word including abbreviations and addresses. Commercial and organization ads, 25¢ per word. **Minimum Charge $1.00.** No ad will be printed unless accompanied by full remittance. **Closing Date:** The 10th day of the second month preceding date of publication.

Because the advertisers and equipment contained in Ham Shop have not been investigated, the publishers of CQ cannot vouch for the merchanidse listed therein.

QSLs $2.00 per 100 postpaid. New style glossy 2-colors. Free sample. Hobby Print Shop, Umatilla, Fla. 32784.

PICTURE of yourself, home, equipment etc. on QSL cards made from your photograph. 250—$7.50 or 1000—$14.00 postpaid. Samples free. Write Picture Cards, 129 Copeland, La Crosse, Wis.

CREATIVE QSL CARDS free, new catalog and samples. Personal attention given. Wilkins Creative Printing. P.O. Box 787-2, Atascadero, California.

RUBBER STAMPS for QSL Cards. Kits available. Free sample impressions. E & R Stamp Co., 50 Gerald Rd., Rantoul, Illinois.

QSL CARDS $2.50 per 100 in three colors. Samples and catalog free. Garth, Box 51C, Jutland, New Jersey.

QSL CARDS. As low as $2.50 per 100. Samples free. Radio Press, Box 24C, Pittstown, New Jersey.

QSL's 3-color glossy. 100 $4.50. Rutgers Vari-typing Service. Free Samples, Thomas Street, Riegel Ridge, Milford, N.J.

QSLs Samples 25¢. Rubber Stamps; Name Call, Address, $1.55. Harry Sims, 3227 Missouri Avenue, St. Louis, Mo. 63118.

PRINTED CIRCUIT BOARDS Hams, Experiments. Many different projects. Catalog 10¢ P/M Electronics, Box 6288 Seattle, Washington 98188.

QSL's Samples, dime, Print Shop, Corwith, Iowa.

QSL's . . . 18 samples 10¢ . . . Filmcrafters . . . Martins Ferry, Ohio.

QSL's WSL's XYL-OM's (Sample assortment approximately 9¾¢) covering designing, planning, printing, arranging, mailing eye-catching comic, sedate, fantabulous, DX-attracting, Protopay, Snazzy, unparagoned cards. (Wow!) Rogers, KØAAB, 961 Arcade St., St. Paul 6, Minn.

QSL's BROWNIE—W3CJI . . . 3111 Lehigh, Allentown, Pa. Samples 10¢ with catalogue 25¢.

QSL's FREE SAMPLES . . . Ace Printing, 5506 Detroit Ave., Cleveland 2, Ohio.

QSL's CB, WPE Samples 10¢ Nicholas & Son Printery P.O. Box 11184, Phoenix, Arizona 85017.

QSL CARDS—100 3-color, glossy $3.00. World globe in silver; report form on reverse side; Free samples. RUSPRINT, Box 7575 Kansas City, Missouri, 64116.

QSL CARDS—Free Samples—Catalogue 20¢—Knight Printing Co., 1550 Downey, Indianapolis, Indiana.

HUNDRED QSL's: $1. Samples, dime. Meininger, Jesup, Iowa.

ELECTRONIC CHASSIS PUNCHING and drilling service, Panels cut, etc. Build that magazine article! Send chassis or request estimate. Hole (16ths) diameters to ½", 5¢; to 1½", 25¢; to 4", 50¢; sq., 5¢ perimeter inch in aluminum to 3/16. Steel 20 ga. add 50%. Mark sizes and centers, allow clearances. Payment with material, minimum $2.00, under 2 lbs returned postpaid. Metalwerk, P.O. Box 1372, Cedar Rapids, Iowa 52401.

ELIMINATE Mobile Vibrator Noise. Revolutionary device outmodes noise-creating vibrator. Completely transistorized unit plugs directly into vibrator socket. No moving parts. Same size as vibrator. 12 Volts. Not a kit. Comes completely wired ready to use. **For negative ground only.** State make and model of transceiver. $11.95 PPD.-$5.00 deposit on all C.O.D. orders. Tel-Trol Systems, 2180 Bronx Park East, Bronx, N. Y.

"GOLDEN CALLS" QSLs, samples 10¢. Samco, Box 203, Wynantskill, New York 12198.

QSLs. Large Selection, including photos, rainbows, glossy stocks, cuts, etc. Fast Service. Samples, dime. Ray, K7HLR, Box 1176 Twin Falls, Idaho, 83301.

QSL SPECIAL. 100 Two-Color. $1.65. Quality. Free samples. Kanuck, 1945 Riverside, Apt. 123, Dayton, Ohio 45405.

LOOK, Brother Ham! 150, 2-color QSL Cards, plus other printed goodies, $1.70 postpaid. Merchants Press, Taylor, Texas.

QSL's?? CB's?? WPE's?? Samples 25¢. (refunded). Sackers, W8DED, Holland, Michigan.

QSL's—Ham and CB, related products. Free Samples. April Sign Co. 56290 Van Dyke, Washington, Michigan.

ATTENTION HAMS! We buy, sell ham gear. Repair and alignment facilities available. Hold Advanced and First phone. Used Gear always reconditioned. Money back guarantee. KitKraft Company, P.O. Box 406—Canal St. Station, New York N.Y. 10013.

CASH, SONY TRANSISTOR TV's etc. swapped for G-R, H-P, L & N, etc. Equipment, special tubes, manuals, military electronics. Engineering Associates, 436 Patterson Road, Dayton, Ohio. 45419.

CRYSTAL BARGAINS. Free list. Nat Stinnette, W4AYV, Umatilla, Fla. 32784.

FINE NEW BOOK—4000 words German-English for Hams and SWL's. Send $1.25 or 11 IRCs for your copy to Christian Zangerl, OE9CZI, Dornbirn, Nachbeurstrasse 28, Austria.

FREE! Giant bargain catalog on transistors, diodes rectifiers, components; Poly Paks, P.O. Box 942P, Lynnfield, Mass.

HAMS! Convert any television to sensitive, big-screen oscilloscope. Simple changes. No electronic experience necessary. Illustrated plans, $2.00. Relco-A68, Box 10563, Houston 18, Texas.

NEW TRANSISTOR INSTRUMENT detects buried coins, firearms, treasures, gold, silver. $19.95 up. Free catalog. Relco-A-68, Box 10563, Houston 18, Texas.

SWL Program Guide, FBCB English language transmissions listed by the hour. $2.00. SWL Guide, 414 Newcastle Rd., Syracuse 19, N.Y.

THIS COMPANY is looking for Ham & CB cartoon artists and ideas. $10.00 per idea IF ACCEPTED. For information, write AMBRU PRODUCTIONS, 10 Burbank Street, Yonkers, New York 10710.

INTERESTING OFFERS GALORE in the new "Equipment Exchange —Ham Trader"! Rush $1 for next 12 issues. Brand, WA9MBJ, Sycamore, Illinois.

100.00 Kc. crystal in HC-13/U Holder—same pins as FT-243. Only $3.00 each with Free Bonus 200 Kc crystal—postpaid, USA, Quaker Electronics, Hunlock Creek, Pa.

Technical Manuals—lowest prices USA, teletypewriters, receivers, transmitters, text equipment and etc. Large lists. Send 10¢ coin-stamps. Quaker Electronics, Hunlock Creek, Pa.

FOR SALE Complete instructions including 28 page booklet and 22" × 36" schematic for converting the ART-13 transmitter to a.m. and s.s.b. Satisfaction guaranteed. $2.50. Sam Appleton, 501 No. Maxwell St., Tulia, Texas.

WANTED—An APR-14, 13 receivers. SG-13, H-p4, SG-1, SG-2, MD-83, 479 Collins, in any condition. T-368-C xmtrs. R-390, 390A, R-388, 389, 391. Receivers. RT-66 thru 70 Rt units RT/77-GRC-9, GRC-10, GRC-19. RCA, Bendix, Collins Aircraft Radio and Radar Equip. Hewlett Packard, General Radio, Tektronix, etc., Test Equipment. GRC, PRC, GRR, TCC, ARC, sets ARM, PRM, URM, UPM, URM, SG Test sets any and all types. You name it. Call E. Charol, Tech Systems Corp., 42 W. 15th Street, N. Y. 11, N. Y. CH 2-1949 Collect.

REMOTE CONTROL UNIT, brand new $5.00. Postpaid. (Cost Navy $125.00) MDC, 923 W. Schiller, Phila. 40.

ANTENNA tuning unit, brand new $3.00 postpaid (cost Navy $85.00). MDC, 923 W. Schiller, Phila. 40, Pa.

LEE'S OUTSTANDING NO-GUM OIL . . . Amazing space age lubricant. Cleans tuner and switch contacts, volume or contrast controls. Lubes record changers, tape recorders and motors, watches, camera shutter and iris controls, guns, locks, etc. Double order—2½ oz. $2.00 ppd. LEE'S PRODUCTS, Box 945, Arleta, California.

"DX-er" WRIST WATCH Features time conversion. Both world and local time. Write for brochure. NORDLUND (C-8); 76 35 West Irving Park; Chicago, Illinois 60634.

THEORY TEST, Refresher for Technician, General Exams. Your work corrected and returned with comments by licensed instructor. $3.00. Schoening, 10040 Brookside, Bloomington, Minn. 55431.

Big Discounts on famous brand ham gear, down to our cost and below. Sample: Tribander SSB transceiver, with AC supply, $479.50 value, yours for only $346.50. Send for list. H & H ELECTRONIC SUPPLY, 506 Kishwaukee St., Rockford, Illinois.

WE WILL PAY CASH or TRADE . . . on popular, clean, unmodified amateur gear. World Radio Laboratories, Box 919, Council Bluffs, Iowa.

FREE! Blue Book List. Leo has over 1,000 bargains in used gear. KWM2 $675.00; Galaxy 300 $215.10; Viking 500 $350.10; NCL-2000 $485.00; SX101A $229.50; Collins 62S1 $625.00; King 500A $259.00; SB400 $299.95; SX117 $260.10; Drake 2A $189.00; and many more. Free 1965 catalog—WRL, WØGFQ, Box 919, Council Bluffs, Iowa.

WANTED: Commercial or Military, Airborne or Ground . . . Equipment and Testsets, Collins, Bendix, Others . . . We Pay Freight . . . RITCO, Box 156, Annandale, Virginia.

SOLDER PROBLEMS? New Multi-metal Bonding Alloy bonds similar and dissimilar metals: aluminum, brass, copper, cadmium, galvanized, stainless steel, silver and others. Flow temp. 383 deg.; tensile strength 63,460 psi. Solve your bonding problems—send $3.98 per pkg. solder and complete instructions. Bonding Alloy, Box 201, Redding, California, 96002.

MOVING—Must Sell All Good Ham Gear. Write for details WA2YQC, 111 Albernaty, Liverpool, N.Y.

BIGGEST? Nope. BEST? Heck yes! Warran ARA Hamfest, Aug. 29, Newton Falls, Arrows from RT. 534 & Turnpike Warren Exit 14. Details: WARA Hamfest, Box 809, Warren, Ohio.

STAMP COLLECTORS: Will swap stamps (your choice) for amateur and military radio equipment, supplies, tech manuals, etc. John Reilly, 35-19 167th Street, Flushing, New York 11358.

SALE: Viking Adventurer transmitter $25.00; Knight T-60 transmitter $40.00; Hallicrafters SX-99 receiver $90.00; HY-Gain trapless dipole antenna, 10-20 meters with lead-in $20.00; Western Radio trap dipole for 10-40 meters with coax lead-in $25.00 all with manuals. Steve Marshall, K4WUN, 24 Hawthorn Road, Salem, Virginia 389-3749.

NY AREA Trade—Drake 2BQ-Mult-Spkr. Min Cond for Collins Linear or 2 meter communicator. WB2GFI, PI 6 6389.

FOR SALE: Collins 75A-2 Receiver $160, National NC-183D receiver $100, Viking Ranger I transmitter $60. All gear clean, but needs minor repairs. No trades. WØEBE Memorial, S.M.A.R.C. INC., P.O. Box 291, Springfield, Missouri 65801.

FOR SALE: Back Issues of *CQ, QST,* other radio magazines. Used Radio, Television books. Radio tubes. T. Wojciechowski. 2837 Fulton St., Brooklyn, N.Y. 11207.

RTTY: Polar Relay Test Set I—193, only $12.95; Manual $2.00. See May '65 CQ. Limited amount page paper $8.00/case of 12. FOB Jim Cooper, W2BVE, 834 Palmwr Avenue, Maywood, N.J.

Back Issues *QST's, CQ's* and binders. Advise requirements—Fred Norton, 379 West Western, Muskegon, Michigan.

I need and will pay top price for a GREBE receiver for my antique radio collection. Same also applies to PARAGON, CLAPP-EASTHAM, KENNEDY, MARCONI and similar material. WORCESTER, R.D. 1, Frankfort, N.Y.

Like New—Collins 51J3/J4, Central Electronics 200V, and Rare TT-56/MGC perforator. Transmitter-Tape Printer. Write "WEB-FOOT" Neil Delafield—K5YME, 8855 Blaylock, Beaumont, Texas. Phone 713-UN6-1526.

EICO Model 710 Grid Dip Meter $20.00 factory wired. Eico 1180 Capacity Decade Box $12.00 wired. Hy-Gain 12AVS vertical $14.00 with radial kit. R. W. Campbell, W4KAE, 316 Mariemont Dr., Lexington, Ky.

COLLINS 51J4 (modified 51J3-R-388) receiver, product detector & hand AVC, 3. 1kc Mech, filter. Excl. Cond. $345.00, Dennis Dressler, KØLAD Rt. 7, Topeka, Kan.

FOR SALE: One 75A4 Collins Receiver; One 100V. Central Electronics Single Side Band. One KWM2 Collins Transceiver. Excellent condition. All inquiries will be answered. Al. Ruska, Jr., 11533 Copas Rd., Lennon, Michigan K8HNW.

Selling Gonset Sidewinder 900-A with a.c. supply for two meters. Used two hours. Want only $390.00 FOB Chicago. J. Leonard Herron, WA9MPG, 5701 Sheridan Road, Chicago, Illinois.

Hanging 'em up. Complete Collins Station for sale. 75S-3, 32S-3, 30L-1, 312B-4, 516F-2, all Rack Mounted in Collins Rack Mounts, on 51 inch Bud Deluxe Relay Rack with Trans-Aire Blower mounted in top. Complete KW Station will roll right in closet. Not just good, but the best. A $2400 value. Best offer over $1800 F.O.B. Also KWM-2, MP-1, PM-2, CC-2, 351D-2, $1050. J. B. Holmes, Jr., P.O. Box 36146, Houston, Texas 77036.

COLLINS s.s.b. Station. KWS-1, 75A-4, serial numbers 1250 and 4603, 3 filters, integrated station control with speaker, power meter, antenna relays, clock, and antenna indicator. Table and other extras go too! $1500. Frank Mills, K1FVU, 148 Chalmers St., Springfield, Mass. Tel 3-5173.

SELL SX-117 $335.00 Five months old. HA-10 Tuner $20.00. Ben Hassell, W8VPC, 4046 South Hagadorn, Okemos, Mich.

SELL: PH565 HAM-TV Camera converted and air tested $60.00 prepaid. Al Johnson, K7VQI 5018 E. Cooper Street, Tucson, Ariz. 85711.

SCHEMATICS of surplus electronics, ham gear, and test equipment. Send dime or stamps for list. Hill Enterprises RD#1, Box 241 Ringtown, Pa.

NEW—Purchased for business never opened—Lampkin 105B Freq Meter and 111 Crystal Calibrator. Both $300 or sell separately. $200 and $110. K6JVT, 1165 Anza Vista, Cal.

G-50 with 10 hours use for $210. Dick Sullivan, Box 156 Boone, Iowa.

EICO—grid dip used once $25. J. Bright 131 Nugent St., New Hyde Park, L.I., FL-2-0088.

FREE Wholesale Catalog: Tubes, transistors, parts, equipment. Why pay more? ROYAL, Box 2591, El Cajon, California.

Sell: Heath 80 mtr. transceiver, new, never been used. $130.00. Power supply $20.00. Viking Adventurer trans. with modulator good shape $35.00. Morrow mobile rec. FTR/5BRF 12 tubes, with 12 volt power supply $70.00. Heath Cheyenne $50.00 Superb stereo Tape player—write for more $225.00. Hallicrafters S-120 $35.00. RCA WO-33A 3" Scope $65.00. Eico #249 VTVM $30.00. Gonset 80, 20, 10 mtr conv. $25.00. BK500 tube checker $35.00. Bud 10½" rack cabinet, new $15.00. Eico demod probe new $6.00. I PAY ALL SHIPPING. Al Churchill, 210 North 24th Ave., Yakima, Washington.

IDEAL MOBILE—same type #3012 (152-162 M.C.) and (40-50 M.C.) tuners for sale. Receive highway patrol, police, fire, secret service, taxi, mobile, telephone, etc. Also, Federal "DIRECTOR" Electronic Siren-PA, 12 volts all transistorized. 4 lbs. 150 watts siren, 125 watts audio output w/two speakers. Richard M. Jacobs WAØAIY, 1015 Glenside Place, University City, Missouri 63130.

COLLINS 75A-4 OWNERS: Don't trade up! Investigate our conversion that makes the 75A-4 a real dream. W2VCZ—30 Pitcairn Ave., Ho-Ho-Kus, N.J. 201-652-8494.

PEORIA HAMFEST, September 19, Exposition Gardens, Peoria Area Amateur Radio Club, Advanced registration $1.00 until Sept. 11, Ferrel Lytle, W9DHE, 419 Stonegate Rd., Peoria, Illinois.

BOUND VOLUME 1964 **CQ** for sale. Order no wand be sure to receive your copy. Limited quantity. First come first served. Send $15.00 to Dept. H.W., **CQ** Magazine, 14 Vanderventer Ave., Port Washington, L.I., N.Y. 11050.

FOR SALE—Gonset Communicator III 6 meters, 12v., complete with mike and book. Like new. Local sale only. $165.00 K2EEK, 75-15 177 St., Flushing 66, N.Y.

SPECIAL ANNOUNCEMENT Celebrate "Illinois Amateur Radio Week" with us by official proclamation of Governor Otto Kerner. The Hamfester Radio Club announces its 31st annual hamfest Sunday, August 8, 1965, at Santa Fe-Park 91st and Wolf Road—near Chicago. The hamfest features; manufacturer displays, mobile contest, swappers row, games for all ages, food, refreshments, a clown for the kids, and much more. For maps and details write: John Chass, K9LOK, 5434 South Bishop St., Chicago, Illinois 60609.

Wanted: Complete set, preferably bound volumes, CQ for 1945 through 1963. Must be in excellent condition. Write Charles Miller, W4AXV, 2875th GEEIA Squadron, Box 460, APO San Francisco 96323.

I NEED and will pay top price for a GREBE receiver for my antique radio collection. Same also applies to PARAGON, CLAPP-EASTHAM, KENNEDY, MARCONI and similar material. J. Worcester, R.D. 1, Frankfort, N.Y.

FOR SALE—Collins 30L-1, Heath Kit Multiplier Q-F-1, Vibroplex Key and Microphone. Mrs. Alberta L. White, Box 1, Richland, Iowa 52585.

GREATER BAY AREA Hamfest, Peacock Gap Country Club, San Rafael, Calif. October 16-17. Write Box 113 Hayward, Calif.

For further information, check number 57, on page 110

READER SERVICE

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Please send me more information on your ads in the Aug. 1965 *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	65	66	67	68	69	70	71	72
73	74	75	76	77			Total Inquiries				☐

Void after Aug. 28, 1965

CQ MAGAZINE, Dept. RS
14 Vanderventer Ave.
Port Washington, L. I., N. Y. 11050

advertisers index

Space [*from page 89*]

F8TD and F3NB teamed up to measure the variation in primary voltage of the translator. Figure 1 is a graph of their results. Note that the battery voltage was practically constant at 20 volts for the first 150 orbits, except for a slight unexplainable drop between orbits 35 and 75. Battery voltage began to drop steadily after orbit 150, and the translator failed to operate when the level dropped below 16.5 volts during orbit 206 on March 24.

While a considerable amount of data has already been forwarded to Project OSCAR headquarters for further evaluation, French radio amateurs continue to monitor OSCAR III's telemetry signal on 145.85 mc.

HB9RG

Dr. Hans Lauber, HB9RG, dentist and radio amateur *extraordinaire,* was certainly the "leader of the pack" as far as QSOs through OSCAR III are concerned. Hans accomplished 22 QSOs via the satellite, with 17 different stations in 8 different countries. Here's his list: DJ3ENA, DJ4AU, DJ4ZC, DJ9DT, DL3YBA, DL6EZA, DL6TU, DL9GU, EA4AO, G3BAR, G6AG, I1BMV, OK1CG, OZ9AC, SM7BA, SM7OSC, W1BU.

Report from the USA

A. David Middleton, W7ZC/W5CA, Springfield, Utah, an old-timer on the 2 meter band, reports hearing at least 58 different stations through OSCAR III, in every continental USA call area, as well as Hawaii and Ontario, Canada. His list follows. W1BU, W2AMJ, K2GUG, K2IEJ, W2QEU, W3BPR, K3KEO, W3SDZ, W4AWS, W4BUZ, W4FJ, W4IXC, W4MHS, W4MNT, K4QIF, W4WNH, W5AJG, W5JWL, W5KXD, K5TQP, K5WXZ, W6AJF, K9CHU/6, W6DNG, K6GCD, W6GDO, W6GHV, K6HMS, K6JYO, WB6JZY, WB6KAP, W6KEV, K1LSC/6, WA6MGZ, W6MSG, K6TSK, W6UXN, W6YK, K7DZG, K7JRG, W7LHL, W7MGZ, W7UAB, W8NSH, W8PT, K9AAJ, K9AIO, W9TGB, K9UIF, W9ZIH, WØEYE, WØHTN, WØIC, WØLER, WØMOX, W2UK/KH6, VE3SQN.

Dave's 2 meter experiments go back a long way, since he has been active on this band since 1931! He was coordinator for the original 2 meter transcontinental network, and in 1953 he participated in what may have been the first 2 meter space experiment. In that year Dave installed a 2 meter station in a large balloon which was sent aloft several thousand feet from Albuquerque, New Mexico. According to Dave, however, Project OSCAR, is giving him some of his greatest thrills in amateur radio.

Next month, more news on OSCAR III, and perhaps some inside information on OSCAR IV, as well as an updated listing of all satellites in orbit transmitting signals back to earth.

73, George, W3ASK

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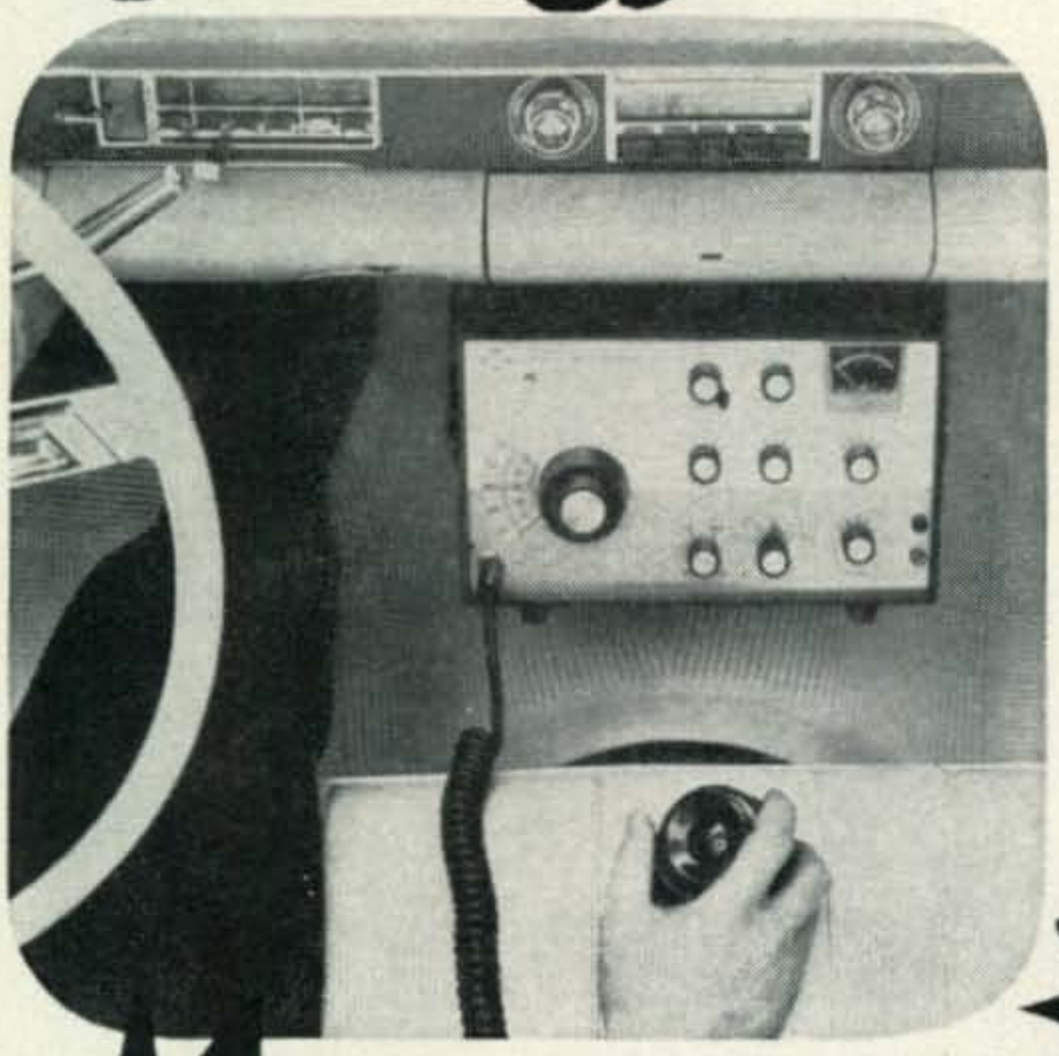

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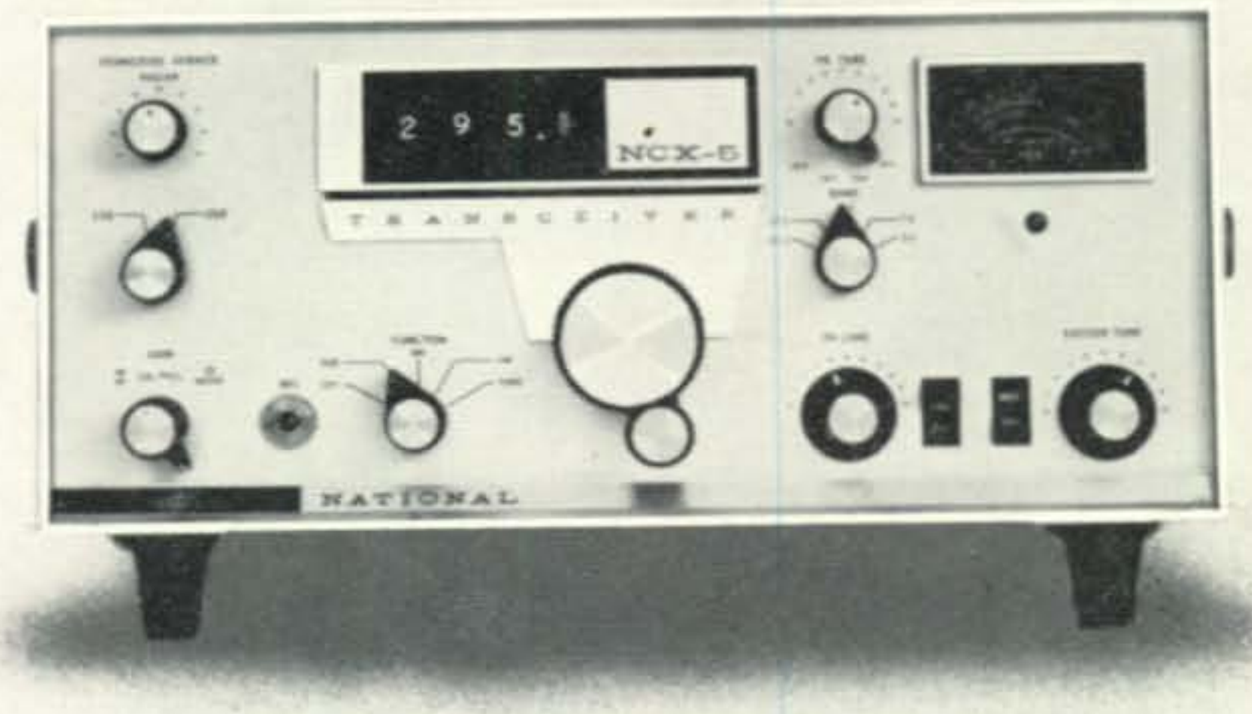

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One thinks long and hard before making a change in a rig like the NCX-5 — after all, it has proven itself as the finest transceiver ever offered the amateur at any price. But we have designed a new balanced modulator circuit which offers such high performance that we felt it should be incorporated in new NCX-5 production. The new balanced modulator is a solid state ring-type device which is totally unaffected by external or magnetic influences, on-off cycling, aging, or warm-up time. Minimum carrier suppression is 50 db through all of these variables, and typically can be adjusted to provide even 65 or 70 db! In fact, the circuit cannot be unbalanced far enough, using the carrier balance control, to provide sufficient carrier for AM or CW operation of the NCX-5. We therefore replaced the carrier balance control with a new Carrier Insertion control to provide a gradual increase in carrier as the control is turned clockwise. Carrier is also now inserted automatically in the AM or CW positions of the NCX-5 mode switch. "Carrier balance" has become an internal factory adjustment which need never be touched.

The new NCX-5 is designated Mark II, and is identical in appearance to previous units. The superb dial calibration, stability, selectivity, and all other maximum performance features of the NCX-5 are, of course, unchanged (including the remarkable price of only $685).

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For further information, check number 7 on page 110

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W2OKO offers this novel ham rig design in a two-part article starting in the Spring 1965 issue of HAM TIPS. Get your copy from your RCA Industri Distributor. Or write Commercial Engineering, Section H-15-5D, RCA Electronic Components and Devices, Harrison, N. J. 07029.

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