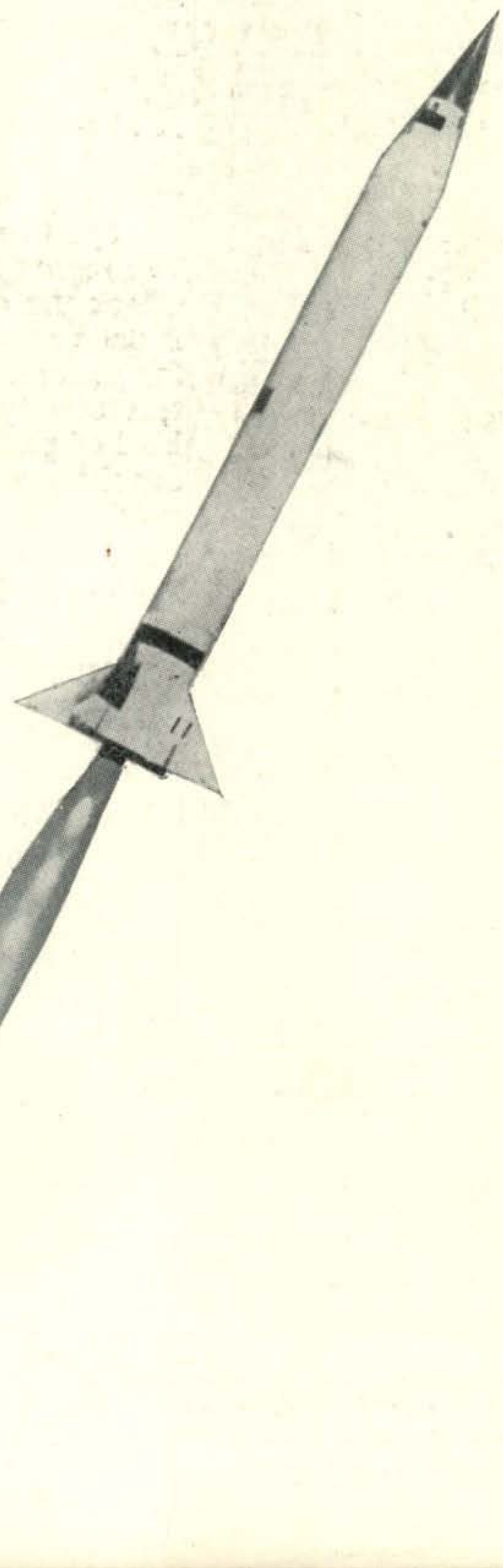
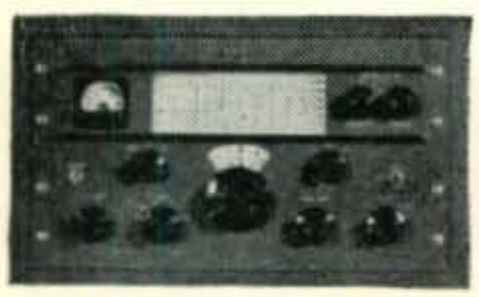
JANUARY
1957
50¢

CQ

RADIO AMATEURS' JOURNAL





75A-1 . . . 1948

75A-2 . . . 1950

75A-3 . . . 1953

32V-1 . . . 1948

32V-2 . . . 1949

32V-3 . . . 1953

310B-1 . . . 1948

310B-3 . . . 1948

All these years YOU could have owned Collins

75A-4

KWS-1

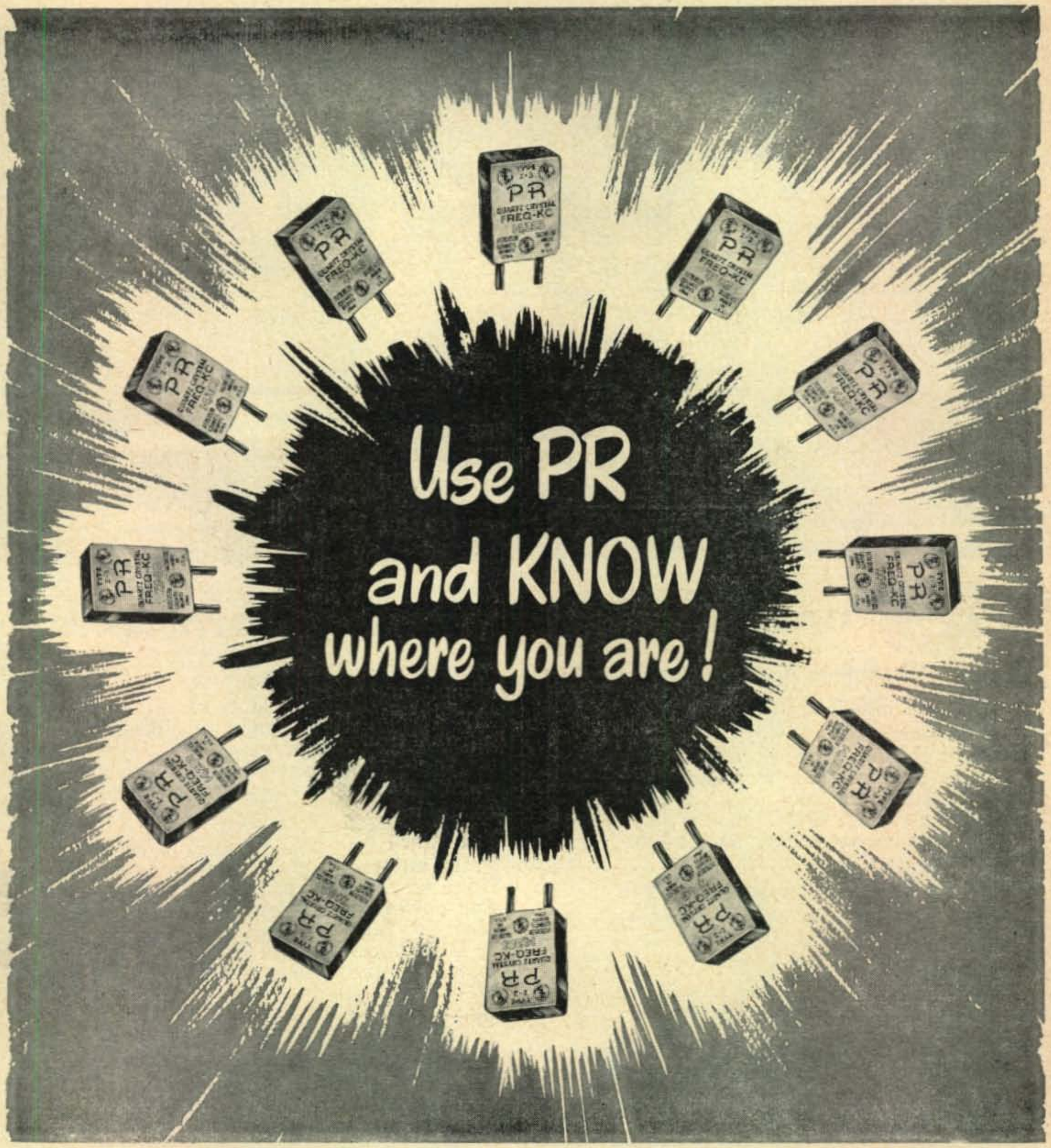
. . . because it costs only a few cents a day to own the world's finest. Considering performance you can't buy or build equipment that costs as little per day to own. The reason is Collins high resale value. Check the chart below. See why Collins Amateur equipment is not only the standard for performance,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

Collins CREATIVE LEADER IN COMMUNICATION

COLLINS

COST PER DAY TO OWN COLLINS EQUIPMENT

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



20 METERS, Type Z-3, $3.95 • 40, 80 AND 160 METERS, Type Z-2, $2.95

PR Crystals

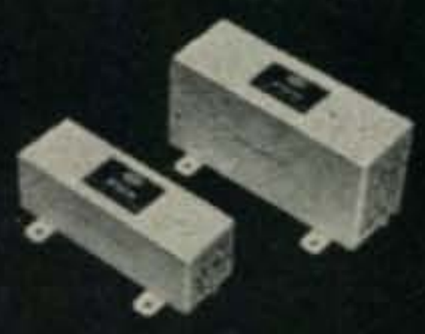
Since PR CRYSTALS 1934

USE PR AND KNOW WHERE YOU ARE

PETERSEN RADIO COMPANY, INC.
2800 W. BROADWAY • COUNCIL BLUFFS, IOWA

EXPORT SALES: Royal National Company, Inc., 8 W. 40th Street, New York 18, N. Y.

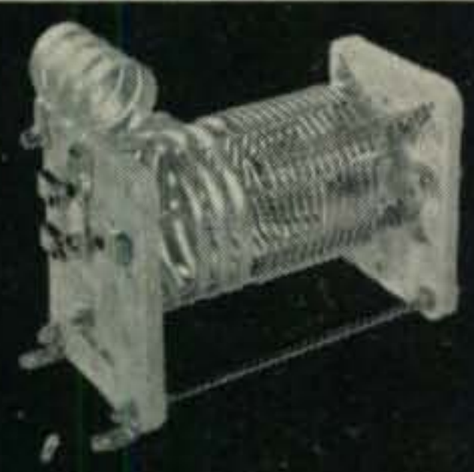
medium powered pi-network inductor



filament choke

r-f plate choke—transmitting type

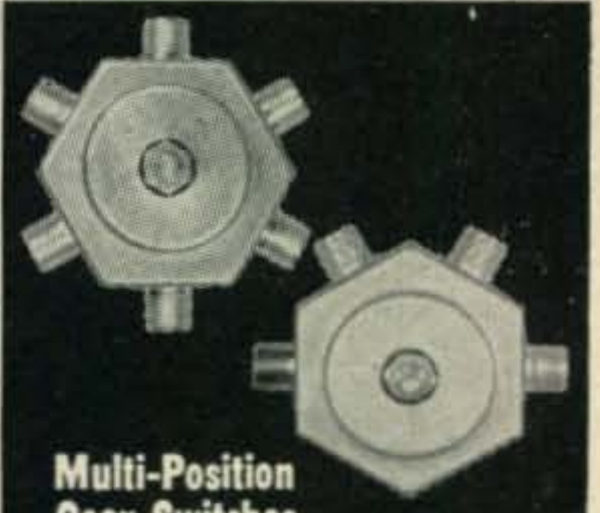
insulated flexible universal shaft coupling



1-Kw Pi-Network Assembly

T-R Switch

Grid Dip Meter.



Multi-Position Coax Switches

8 new quality products from B&W

MODEL 851 Medium Powered Bandswitched Pi-Network Inductor Assembly

An ultra-compact, highly efficient, integrally bandswitched pi-network inductor assembly for single or parallel tube operation 80 through 10 meters. Rated for 2000 VDC at 250 ma input SSB-CW . . . 1250 VDC at 200 ma input for AM. Minimum measured "Q" of 300.

NET PRICE $16.50

R-F Plate Choke—Transmitting Type

Ideal for parallel or series fed circuits. High quality grooved steatite form. Operates 80 through 10 meters. Rated for 2500 VDC at 500 ma.

NET PRICE ..... $ 3.75

Microphone Adapter Unit

Provides all necessary circuitry for switching a single microphone and push-to-talk features on transmitter-SSB generator combinations.

Use Model 51MCA with B&W 5100-5/51SB-B
Use Model 51MCA-B with B&W 5100/51SB
Use Model 51MCA-C with Collins 32V/B&W 51SB

NET PRICE $15.00

Tuning Knobs

Satin-etched, machined aluminum knobs dress up any piece of equipment . . . give it a professional appearance. Four sizes available, one plain, three skirted. Models 900-903.

NET PRICE 900 ..... $ 3.00
901 ..... $ 1.50
902 ..... $ 0.60
903 ..... $ 0.45

1-KW Pi-Network Assembly

A high-power, integral bandswitched tank coil for 80 to 10 meter operation. Ideal for class C or linear operation using triodes or tetrodes in conventional or grounded grid circuits. Minimum "Q" of 300. Model 850.

NET PRICE $35.00

T-R Switch

Fully automatic electronic antenna switching from transmitter to receiver and vice-versa. For power applications up to the legal limit. Ideal for fast break-in operation on SSB, AM, or CW. Receiver gain 6 db at 3.5 mc. Broadbanded . . . no tuning required. Model 380B.

NET PRICE $23.70

Grid Dip Meter

A highly accurate, sensitive instrument. May be used as a grid-dip oscillator, signal generator, or absorption wavemeter. Five color-coded plug-in coils cover 1.75 to 260 mc. Color-coded dial easily read. Operates from 110 VAC. Easy to use in hard-to-get-at places. Model 600.

NET PRICE $39.75

Multi-Position Coax Switches

For 75 or 52 ohm line. Instantly switches coax lines . . . no screwing or unscrewing coax connectors. Handles up to 1 KW modulated power. Max. cross-talk —45db at 30 mc. Model 550A 5-position switch. Model 551A 2-pole, 2-position switch.

NET PRICE 550A $8.25
551A $7.95

Prices subject to change without notice.

B&W

BARKER & WILLIAMSON, INC.
Bristol, Pennsylvania

CQ, The Radio Amateurs' Journal

January, 1957
Vol. 13, No. 1

Wayne Green, W2NSD Editor

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Foreign Subscriptions

England: RSGB, New Ruskin House, Little Russell St., London WC 1.
Australia: Technical Book Co., 297 Swanston St., Melbourne C1, Victoria, Australia.

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

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

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

HEATHKIT

DX-100

TRANSMITTER KIT

PHONE AND CW

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

MODEL DX-100

$189.50

$18.95 dwn., $15.92 mo.

Shpg. Wt. 107 Lbs.

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

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

HEATH COMPANY BENTON HARBOR 12, MICHIGAN

A Subsidiary of Daystrom, Inc.

HEATHKIT DX-35
TRANSMITTER KIT

PHONE AND CW

MODEL DX-35

$56.95

Shpg. Wt. 24 Lbs.

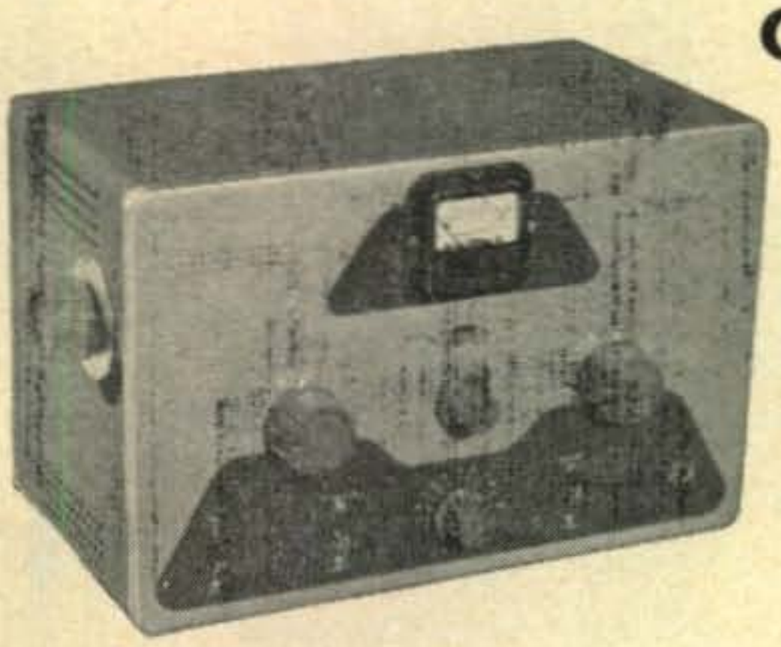
$5.70 dwn., $4.78 mo.

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

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

BRAND NEW

HEATHKIT DX-20
CW TRANSMITTER KIT



MODEL DX-20

$35.95

$3.60 dwn., $3.02 mo.

Shpg. Wt. 18 Lbs.

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

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

HEATH COMPANY BENTON HARBOR 12, MICHIGAN

A Subsidiary of Daystrom, Inc.

HEATHKIT

COMMUNICATIONS-TYPE, ALL BAND

RECEIVER KIT

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

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

MODEL AR-3

$29.95

incl. excise tax (less cabinet)

$3.00 dwn., $2.52 mo.

Ⓐ HEATHKIT VFO KIT MODEL VF-1

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

Ⓑ HEATHKIT GRID DIP METER KIT MODEL GD-1B

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

Ⓒ HEATHKIT ANTENNA IMPEDANCE METER KIT MODEL AM-1

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

Ⓓ HEATHKIT "Q" MULTIPLIER KIT MODEL QF-1

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

HOW TO ORDER...

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

HEATH COMPANY BENTON HARBOR 12, MICHIGAN

A Subsidiary of Daystrom, Inc.

Feenix, Ariz.

Deer Hon Ed:

Ho ho, Hon. Ed., are Scratchi doing it this time. Yes indeedy, and I hoping to kissing a Hon. Rotating Forty Meter Beem if this time Scratchi not coming up with gratest thing since diskovery of America.

I not forgetting what good old gentlefellow frend you are ether, and that is howcomes I letting you in on grounded floor. Any loose monies you having handy you can just sending to me, and I investing the bux in my new invenshun.

Please not to misunderstanding. It not that I needing the money, on acct. this new invenshun so reel slicky that it selling itself. Howsumever, there will be a few insidental starting eggspenses so Scratchi being happy to letting you helping. While you thinking about it, you can ordering your new Caddylac.

You can also be thinking how much monies you planning to sending, and while you thinking, I telling you howcomes I are running across hottest thing since eggploshun of H-bomb.

Cupple weeks ago I desiding it hi times for me to bilding sum of the things that are on my "to do" list. Number one on the assemble and sodder parade are a mobile awdio amplifier. This are sumting I wanting to do for long times. Are going to putting it in car, with speeker under hood. When wanting to talking to people I seeing on street, just grabbing mike and speeker are blasting forth.

Not wanting to wasting lots of powder, so desiding to using fast-heeting toobs. I going thru junkbox and coming up with few diffrunt kinds, then looking up sircut diagrams in your Hon. Mag. Are not finding anything eggsackly what I wanting, so taking cupple ideas from one place, another cupple from another place, until getting enuf ideas to taking care of all toobs I having.

Also wanting mike with pushing-to-talk switch, so can turning on hole thing rite from mike. Only one can finding are old war surplus carbon mike, but seeming in good condishun,

[*Turn page*]

[from page 7]

so desiding to using same.

Hole job are taking me cupple days, but it are finely reddy for testing. In order not to have to mounting unit, are driving stayshun wagon up alongside shack, and running leeds from car battery into shack. Connecking leeds to vibrator and are all set.

Pushing mike button, heering vibrator starting to go, seeing filaments in toobs liteing up, so speeking into mike. Hon. Ed., you not buleeving what coming out of speeker!! Not Scratchi's voice? Yes indeedy, are Scratchi's voice, but having accent.

Are trying it again. Hackensake!! Are heering Scratchi speeking in Spanish!! No dowts about it. Scratchi speeking in mike, and Scratchi's voice coming out in Spanish!!

You reelizing what this meening? Scratchi are discovering awtomatic english to spanish translator. Think what we can doing with this. Everybuddies at Yewnited Nayshuns are wanting one of these. All dee-x amchoors wanting to having one so you talking to reel dee-x in own langwidge!! We can making forchun!

Peeples no longer needing to lerning how to speeking Spanish, on acct. we can making these in small sizes with transisters so you can carrying with you. Whenever wanting to speeking Spanish, just yewsing small mike and out coming Spanish on small speeker.

Can also yewsing in brodcasting. Just putting Scratchi Awtomatic Translator between mike and amplifier, and stayshun can brodcasting in Spanish. Hon. Ed., my Hon. Hed are going crazy thinking of ways to making money.

And rite now, Hon. Ed., I bet I know what you are thinking. You thinking that in sum way Scratchi are going to loosing sircut, or destroying amplifier. Aha! that are where I are fooling you. No indeedey. Are alreddy having made cupple copies of sircut, and, in case sircut not important, are garding amplifier with my Hon. Life.

In fackly, if you waiting one minute, I running and checking rite now to seeing if ok, and while I doing that, I trying it out again. Now don't running away, Hon. Ed., I be rite back.

Well, here I am again. Scratchi's Awtomatic Translator are rite where it supposed to be. But, Hon. Ed., better cancelling that Caddylac. I trying Awtomatic Translator again. Just as pressing mike button I getting coffing spell, so can't talking. Only the speeker are talking, in Spanish. Then voice on speeker coming on and giving call letters of Mexican stayshun neer border of Arizona.

Evidently what happening are carbon mike acting like rectifier and Mexican brodcast stayshun coming over awdio amplifier. Rite now I not even caring. Happy New Yeer anyhow.

Respectively yours,
Hashafisti Scratchi

Incomparable Value!

Model SX-100
Amateur Net $295.00

• In all our quarter-century of manufacturing, no Hallicrafters design has received more enthusiastic approval than the SX-100 receiver.

How have we measured this approval? *First*, by the letters we receive—more favorable comment than ever before. *Second*, by the conversation we hear on the air from owners and observers alike. *Third*, by sales—the SX-100 is one of the *fastest selling communications receivers we've ever designed.*

Never before has there been available a receiver with all these quality features at such a reasonable price. Better look into it yourself, today. Your jobber has the details.

SX-100 selectable sideband receiver *proved best in its field by far!*

1. Selectable side band operation.

2. "Tee-Notch" Filter—This new development provides a stable non-regenerative system for the rejection of unwanted hetrodyne. The "Tee-Notch" also produces an effective steepening of the excellent 50 KC i.f. pass band (made famous in the SX-96) and further increases the effectiveness of the advanced exalted carrier type reception.

3. Notch depth control for maximum null adjustment.

4. Antenna trimmer.

5. Plug in laboratory type evacuated 100 KC Quartz crystal calibrator—included in price.

6. Logging dials for both tuning controls.

7. Full precision gear drive dial system.

8. Second conversion oscillator crystal controlled—greater stability through crystal control and additional temperature compensation of high frequency oscillator circuits.

9. Frequency range: 538-1580 kc. 1720 kc-34 mc.

CONTROLS

Pitch Control • Reception • Standby
Response control (upper/lower side band selector)
Antenna Trimmer • Notch depth
Notch Frequency • Calibrator on/off • Sensitivity • Volume
Band Selector • Tuning • AVC on/off
Noise limiter on/off
Bandspread • Selectivity.

from . . . **hallicrafters** *. . . where the best ideas in communications are born*

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EDITORIAL
WAYNE GREEN

. . . de W2NSD

NEVER SAY DIE

I've got news that you don't want to hear . . . that you probably won't believe. People have been crying "wolf" about our losing frequencies for so long that most of us put it in the flying saucer department and wonder what else is new. Well, on a recent trip to Washington I got ushered into the exalted presence of several VIP hams, and the story from each of them was identical: start worrying.

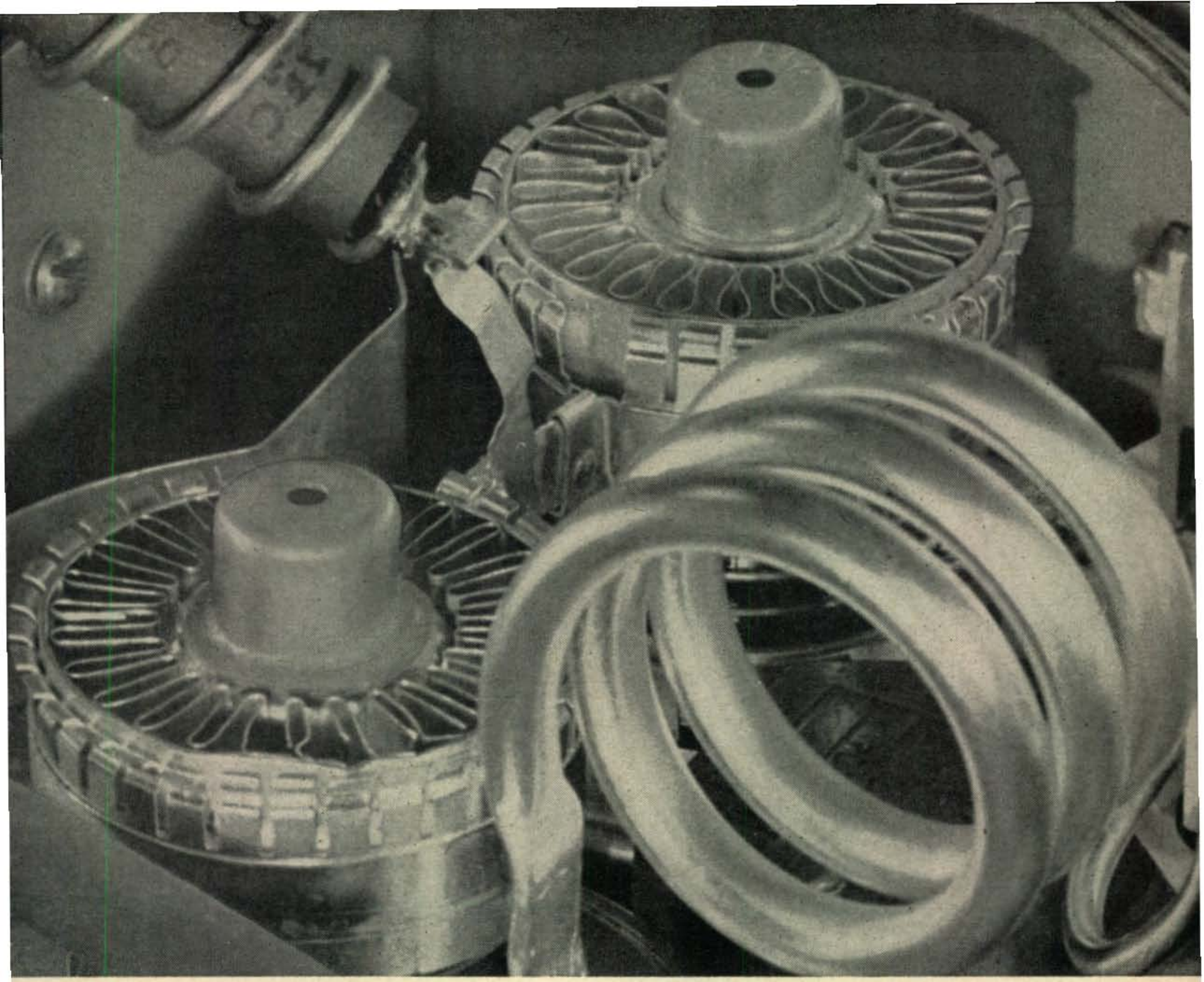
The pressure is on. The next international frequency allocation party will meet in 1959 and guess who is on the block. The Soviet bloc has been noted for its lack of interest in ham radio and for its ability to swing quite a flurry of votes. It will take, I believe, about 41 votes to shove us all up to 220 mc. The U.S. has one (1) vote. Perhaps, on the off chance that some of these worry-warts know whereof they speak, we had better get ourselves in gear and see what we can do to keep from getting amputated at the neck.

But what can we do about it? I know several things that will help, if we can really get going on them. Number one is the problem of reciprocation, which is being held up by the State Department and which has done more to ruin the good will of amateur radio for the U.S. than any other one item. More on this later. Second is publicity. It is imperative that we strive to do everything we can for the public benefit and then be merciless in our demand for credit. We must get our exploits in every newspaper, magazine, radio and TV station whenever possible. Every good deed should be carefully photographed . . . just watch how the Red Cross does it . . . or any of the military. Every radio club in the country should make a goal of publicizing every activity to the utmost. If you have five fellows running an outing have five more on the publicity. Have them take pictures of everything interesting, important people who attend (what, you didn't invite the Mayor? The Police Chief? The District Attorney?), the better mobile installations, the hidden transmitter hunts (with an article for the paper telling how these same fellows can in time of emergency hunt down illegal transmitters in a matter of minutes when needed), etc. I would appreciate it if you would send an extra copy of all these news clippings to CQ for our files.

The third big need is for more ham operators. The 140,000 we now have is fine, but if we could get ten times that number then we would have some real power. One and a half million hams *couldn't* be pushed off the air. We might even be able to swing a few more ehannels than we already have. Sure, I know, think of the QRM with ten times as many hams. Actually I don't think it would be as bad as you might at first think. The 20-40-75 meter phone bands are about as crowded as they are ever going to get, no matter how many hams there are. What would happen, I believe, is that more modern methods of ham communication would come into use. SSB would be more popular, we might go into multiplexing . . . which would allow duplex operation, eleven might get busy, the other 3½ mc on six meters might be put into use, two might fill up more, etc. Auto-call operation certainly would grow. The demand for more equipment would bring prices down even further. And with this growth of ham radio in the U.S. there would have to be an increase elsewhere in the world for our interest wouldn't stay within our borders.

Ha, a million and a half hams . . . what a pipe dream. Maybe not, I really believe that we could get that many hams if we set our minds to it. It would take a lot of cooperation though. Here is how it could be done. What we need most to get something of this nature under way is a huge advertising campaign . . . sell ham radio just as they sell soap, etc. This would (sob) cost plenty money. What do you do when you don't have enough money to advertise? You do the job with publicity. (Didn't I hear that term before?) Ham radio is in an excellent position to get publicity too. Not only are we doing all sorts of public services, but we have had very little publicity in the past and there is a stored up curiosity in the minds of editors all over the country.

Let me be even more specific. There might possibly be set up an Amateur Radio Council, a small group who would be financed by the manufacturers in the ham field and who would hire one or two full time publicity men to sell ham radio to the general public. Our hobby has some very strong points and cetrainly could be sold: have you ever met a "lonesome" ham? Impossible, as we all know. Yet there are millions of people who are lonesome. And many more who would like to use ham radio as a means for getting into a good lifetime career.



Compressed Steam for SSB

"No steam wasted to blow the whistle" is one way to describe the transmitting advantages of single sideband.

"Compressed steam for SSB" is equally descriptive of the concentrated power of Eldico's new, table-top linear amplifier . . . the SSB-1000.

Employing tight design and quality components, the SSB-1000 easily handles a peak envelope power input of 1000 watts with an efficiency rating of 62.5%. And it does this out of a 10¾" x 17" x 15" cabinet that also houses the power supply.

The heart of this new linear amplifier . . . two Eimac 4X250B power tetrodes. A logical choice, these tubes provide the performance demanded by Eldico, handle an input of 500 watts each, and stand only 2-19/32" high!

For the power that builds up "compressed steam", look to Eimac.

For further information, contact Amateur Service Bureau

EITEL-McCULLOUGH, INC.
SAN BRUNO · CALIFORNIA
The World's Largest Manufacturer of Transmitting Tubes

Eimac

EIMAC 4X250B TYPICAL OPERATION
Class AB_1
R-F Linear Amplifier
(Frequencies to 175 Mc, per tube)

D-C Plate Voltage	1000	1500	2000v	Max-Sig D-C Screen Current	25	20	15ma
D-C Screen Voltage	350	350	350v	Peak R-F Grid Voltage	50	50	50v
D-C Grid Voltage (Approx.)*	−50	−50	−50v	Driving Power	0	0	0w
Zero-Sig D-C Plate Current	100	100	100ma	Max-Sig Plate Dissipation	125	150	175w
Max-Sig D-C Plate Current	250	250	250ma	Max-Sig Power Output	125	225	325w

*Adjust grid voltage to obtain specified zero-signal plate current.

Our hobby is terrific for giving kids a tremendous head start over their friends toward an electronic education.

With a couple professional publicity men pushing things we would find ham radio sprouting out of TV shows everywhere, the national magazines would all be running articles on it, it wouldn't be long before things got out of hand. And what would such a thing cost? Maybe an average of $50 a week for the top ham manufacturers. It would come back to them a hundredfold.

Reciprocation

The more I get around the more I confirm my notion that the biggest thorn in the side of ham radio . . . world wide . . . is the uncompromising attitude of the United States with respect to reciprocal licensing. Just what is this all about? Well, you see, it is like this . . . we have a little paragraph in the Communications Act of 1934 . . . the law which sets up radio broadcasting in the U.S. . . . which states that no alien shall be able to get a license to operate in the U.S. or possessions.

Why this stipulation should have been included as a basic rule to which no exceptions could be made is hard at this time to envision. While we do from time to time need some sort of protection against foreign agents, this certainly could not be expected to accomplish much in keeping them from communicating when they really had their hearts set on it.

At any rate, the result of this stipulation is that the U.S. is one of the few countries in the world who will not license an alien to operate a transmitter. Since that is the way we are about it most countries have rightly refused to license Americans in their countries. Certainly we Americans have a lot more to gain from reciprocal licensing than any other country since we are traveling more than any other group.

But how about Canada, you are saying. They have reciprocal licensing. Yes they do, and that points the way for us to get the same deal with a lot more countries. Here is how it works. To change the Communications Act of 1934 and get that confounded paragraph out would require an Act of Congress. In other words, forget that. However, Treaties with foreign countries have precedence over national law so that if we make a treaty which states that foreign nationals can be licensed under certain circumstances then it is law. This is what happened in the case of Canada.

The U.S. already has treaties with just about every country in the world for the purpose of allowing foreign planes and ships to operate their radio equipment from the U.S. Likewise our ships and planes can operate their transmitters while within foreign countries. In the

[*Continued on page 108*]

NOW a BROAD-BAND* LINEAR

MULTIPHASE
600 L
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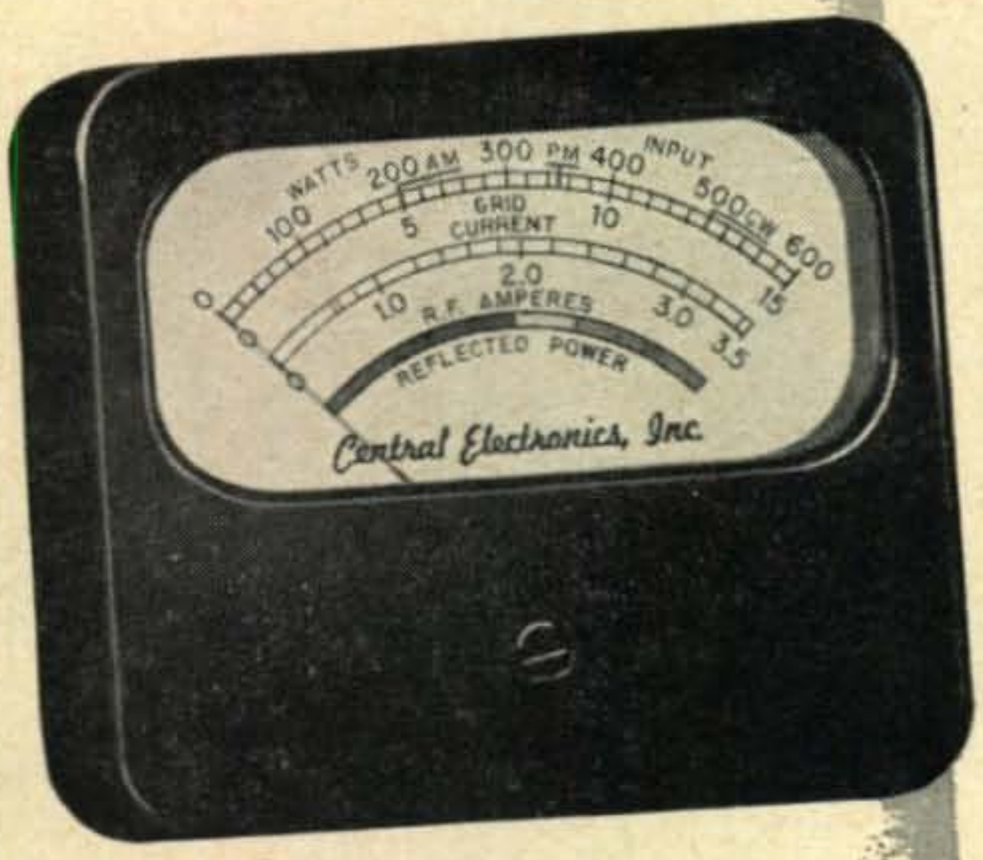
SINGLE KNOB BAND-SWITCHING 10-160

FOR USE ON SSB, AM, PM & CW

WIRED, WITH TUBES AND BUILT-IN POWER SUPPLY **$495.00**



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METER FEATURES NEVER BEFORE FOUND IN A TRANSMITTER

- Reads power input directly in watts
- Reads grid current
- Instantly reads output in RF amperes — no lagging thermo-couple
- Indicates reflected power caused by mismatched load
- Calibrated input levels for AM, PM and CW.

. . . and switch the meter to any position while transmitting!

*PATENT PENDING

WRITE FOR LITERATURE

a new concept in linears

CENTRAL ELECTRONICS takes pride in presenting a product of intensive research — the new Multiphase 600L Broadband* Linear. "It is destined to change the entire concept of RF amplifier design in the military, commercial and amateur fields." There are no tuning controls, servos or moving parts other than bandswitch.

- Single 813 in Class AB_2.
- New band-pass couplers provide high linear efficiency: 60 to 65%.
- Designed for 50 — 70 ohm co-axial input and output.
- Easy to drive — Approx. 4 watts effective or 8 watts peak drive power required for 500 watts DC input.
- Built-in power supply — bias and screen regulation, 45 mfd. oil filled paper output capacitor. Excellent static and dynamic regulation.
- Extremely low intermodulation distortion.
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- Effectively TVI suppressed — RF compartments thoroughly shielded and Hypassed.
- Attractive, modernistic grey wrinkle finish table model. Cabinet size: 18"W, 9"H, 15"D.

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THE OVERWHELMING CHOICE OF HAMS EVERYWHERE

Letters . . . to the editor

Dear Sir,

Recently, in order to assist a friend who wanted to construct the converter portion of the Novice Q'5er (January, 1956 CQ), I prepared a pictorial type diagram and wiring instructions of the step by step "kit" type. As I set about this work it occurred to me that others, desiring to construct this piece of equipment but hesitant because of inexperience, might profit similarly from my efforts and so I have had the enclosed several sheets of instructions and diagram prepared by a duplicating process, and will be glad to send copies (so long as the supply lasts) to those who feel they would be reluctant to build this piece of equipment without this aid. It is essential, however, that anyone interested in this material send a large sized, stamped self-addressed envelope.

Bertram A. Lane, W2HBQ
135 Amersfort Place
Brooklyn 10, New York

Contest Final

Dear Sir:

Shame on you, Mr. Editor, for printing the article "100 Watt Contest Final." Do you realize how many young hams will read the article and be adversely influenced by the crude attempts of the author to win a contest by what amounts to outright cheating. I might also point out that nearly everything in the article violates not only the rules, but the SPIRIT of the rules which govern our amateur fraternity.

I have worked over two hundred and fifty countries using a home brew rig with a 6L6 in the final. This is an achievement that takes extreme skill and patience. Needless to say, I am justly proud of my accomplishment. Some soreheads say that this feat could not have been accomplished without the "Antenna Impedance Matching Device" which my 6L6 feeds into. This is located in a cement block-house out in the yard. The heart of the "Impedance Matcher" is four 833-A's in parallel. All this does is to provide 100% transfer of energy from the 6L6 to the thousand foot tower, with a slight boost to make up for the usual transmission line losses. To give you an idea of how efficient it is — one of my cows leaned up against a wire fence while I was in QSO with UP9CD (he gave me a thirty over nine with his antenna post grounded) and the durned cow went up in a puff of smoke.

Fraternally yours,
Zeke Hemmler—W6SOS

P.S. My call letters are not in the book as I am temporarily bootlegging until such time as they issue licenses without having to pass the code test.

H'mm

Dear Sir:

Hah! You people are crazy! No, that is an incorrect and misleading statement. I should say that you people are trying to drive a large segment of the Amateurs of the World (Hq. P.O. Box 80 — Moscow U.S.S.R.) into abject and raving lunacy. If you persist in your present policies, I shall have to complain to the United Nations, the Mental Health Association and the Magnolia Society for Beer Drinking and QRM Generation.

As I see the situation, your magazine is guilty of a prolonged effort to cause frustrations that eventually lead to complete rejection of reality. If it were not for the ministrations of Mark Brown M.D. (K20DN) I would have slipped over the line beyond reclaim.

In case you haven't guessed, I'm referring to your continual hammering on the matter of subscriptions to your insidious proof readers nightmare.

Every issue that I read you have soul wracking pleas for subscribers. They are hidden beneath choice surplus ads. They sneak out from behind the skirts of your YL section. They come through as Garbles in your RTTY column. You even imply that if I had used your miserable publication as a corner reflector I could have worked transatlantic DX on 220 megacycles. Now you are threatening to again enlarge your magazine if the adver-

Proudly Presenting

the *new* Viking

"match-stick"

...fully automatic multi-band vertical antenna system

- *Bandswitching 80 through 10 meters... remotely motor driven!*
- *Inconspicuous appearance ...simple installation!*
- *Factory pre-tuned...no adjustment required!*

A major advance in amateur radio! Provides multi-band operation and flexibility.

Here's the antenna system every amateur has been looking for. The new Viking "Match-Stick" is a completely pre-tuned multi-band antenna system which is remotely motor driven—automatically controlled from your transmitter location. Bandswitching 80, 40, 20, 15, 11 and 10 meters . . . factory pre-tuned, no adjustment required. Installation is simple . . . easily mounts on roof top or in limited space location. Low SWR (less than 2 to 1) on all bands—impedance: 52 ohms. Low vertical radiation angle for DX. Antenna tuning network is enclosed in a weatherproof aluminum cabinet located at the base of the antenna . . . effective antenna length and network selected by weatherproof relays mounted directly on the mast.

SPECIFICATIONS—Vertical mast is 35′ in length—made of 2" diameter, hard-temper aluminum tubing—mast sections separated by steatite insulators. Six nylon guy ropes furnished—will not affect radiation pattern. Fused isolation transformer.

Complete "Match-Stick" assembly includes: Vertical mast, base, tuning network and relays; control box for remote operation; and six nylon guy ropes. Detailed installation and operating instructions also included.

(**NOTE:** Due to individual station requirements, the "Match-Stick" assembly is furnished less, transmission line, 6 conductor control cable and ground radial wire).

Cat. No. 137-102 . . . . . Amateur Net $129.50

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tisers and subscribers will make the old Ivy League try.

A pox upon your house — TVI upon your rig too.

Let me up! Cease this assault on my bruised and battered retinas. Tears no longer move me. I have settled for a cold and consuming rage that portends no good for you and yours.

I CAN'T AFFORD A SUBSCRIPTION.

I say again. I CAN'T AFFORD A SUBSCRIPTION.

I have lived frugally. I have saved my pennies. I have even saved bottle tops, but all to no avail. I CAN'T AFFORD A SUBSCRIPTION. I can't afford it because of your advertisers.

Once I almost had the money. All I needed was a three cent stamp to mail the letter then I saw another fatal ad. I didn't get the subscription, but I did get a beautiful surplus Wouff Hong complete with conversion data.

I even tried mailing in a subscription without wearing my glasses. I didn't get CQ but have been receiving regularly each issue of The Journal of the Proceedings Of the Society for the Prevention of Radio Propagation in Venus and Environs. Although this is an interesting magazine, it is not quite what I had in mind.

I asked Mr. Leopold (the druggist in Haddon Heights who sells your horrible scroll) to stop putting CQ in his magazine rack. I thought that if I couldn't buy it monthly I might be forced to subscribe. With large tears rolling down his cheeks he asked me if I would also like to take the bread from the mouths of his babes. He said that if I found the monthly cost of CQ prohibitive he would see if time payments could be arranged. This man will go far in the world of business.

All however, is not yet lost. I have a PLAN!

If you will print your December issue with only blank pages, I may be able to salvage enough of my Christmas Club to send in that which is closest to your heart. Please, OH PLEASE cooperate with me.

Enclosed you will not find a check or money order. Maybe next month I will send such an enclosure. LET'S SEE THOSE EMPTY PAGES!

Frugally yours,
James W. Kennedy K2MBD

Gentlemen:

I have just finished reading "Letters to the Editor" in your August 1956 issue of CQ and I wish to take issue with a Mr. F. C. Hervey of Appleton, Wis. who states in his letter, ". . . after all, a crook isn't very likely to be able to copy 35 (WPM) or better. . . ."

I am a WELL KNOWN crook, number *three* from the top of the list, and bucking for *first* place and I can copy 40 WPM easy! I have several friends, all crooks, who can put 35 down on a mill without blinking an eye.

So you advise that Hervey guy to be careful what he says about us crooks . . . we have enough trouble as it is without starting rumors like that.

NAME WITHHELD BY SPECIAL REQUEST
Top Secret, USA

Dear Sir:

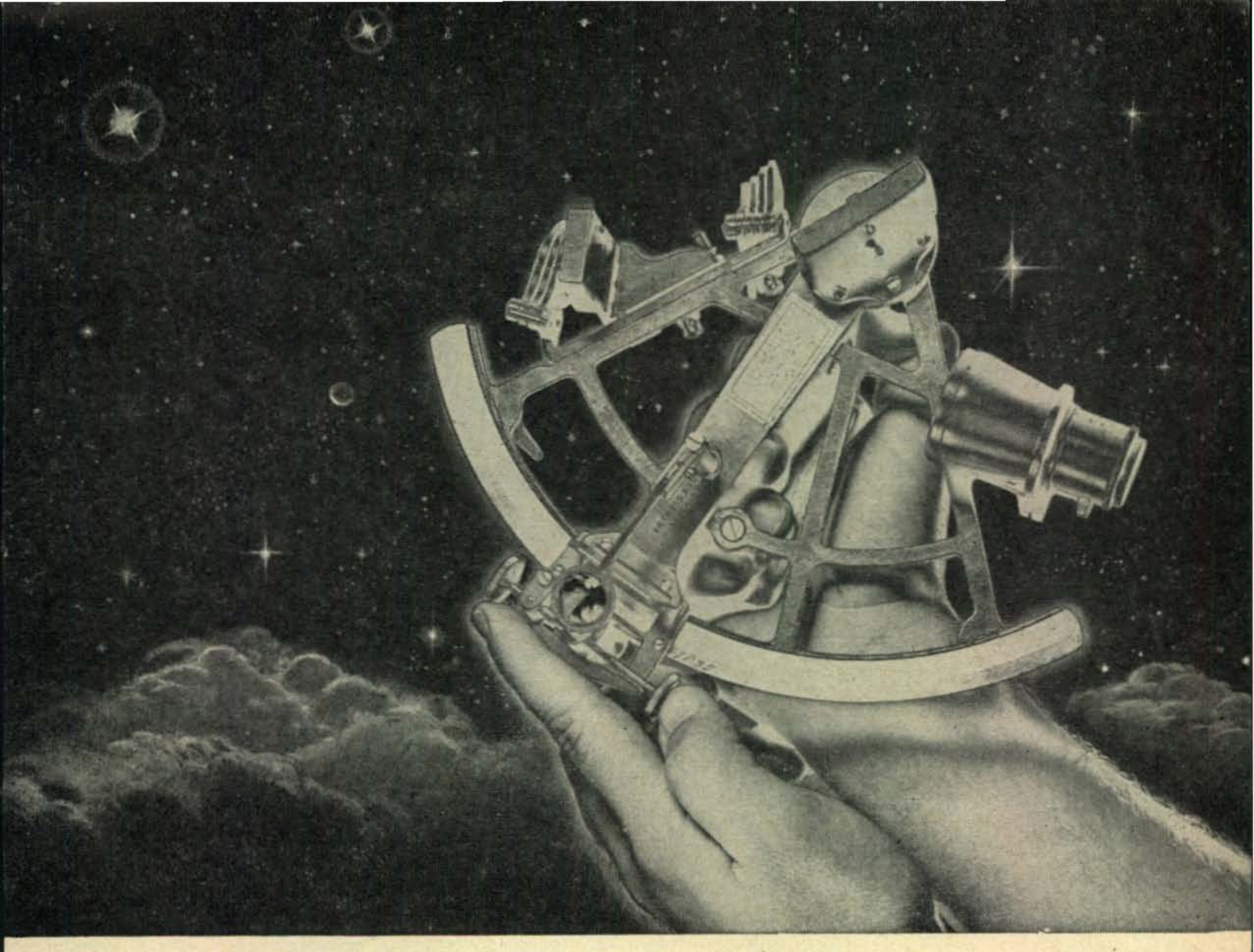
There are many occupations and hobbies in our wonderful country. It is my opinion that we are happier when working or playing at the one that we enjoy most. Since losing my eyesight in an automobile accident my choice of occupation and hobby has been somewhat limited, however, since becoming an amateur radio operator there are no words to express the pleasure I have received. This could not have been possible if there had not been some very nice fellows in my community who were amateurs. With their encouragement to study and the assurance that I was capable of learning the theory and code and then after getting on the air and meeting the swell bunch of fellows all over the country, I could name many and call their call letters. If I should attempt to list all the fellows that have been so nice to me it would take many more pages than there would be room for and it is to these fellows that I would like to express my gratitude for being such a nice group of amateurs and thankful that I am permitted to be called one of them.

Roger Bowen, W5CVZ
Hawley, Texas

Dear Sir:

Whether or not Viking transmitters have sequence keying, the instructions in "Updating the Viking" (CQ, Oct. 56) are correct. Please tell CQ readers and thereby relieve my mail carrier.

Kenneth E. Lohner, W6GTG
5400 Rockwell Road
North Highlands, Calif.



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Gonset's new Mobile Twins, G-66 Receiver and G-77 transmitter, represent the perfect mobile combination. Outstanding multi-band performance—beauty of appearance—finger-tip control—6 and 12 volt operation—compactness without compromise! Typical Gonset dollar-for-dollar value—real "owner satisfaction".

G-66 RECEIVER

new prices

6 BANDS: 540-2000 kcs. 3500-4000 kcs. 7000-7300 kcs. 14,000,14,350 kcs. 21,000-21,450 kcs. 28,000-29,700 kcs.

AM, CW, SSB RECEPTION. Highly stabilized HF and BF oscillators and xtl controlled 2nd conversion oscillator.

STEEP SKIRT SELECTIVITY: 265 kc 2nd I.F. 8 high Q tuned circuits. 3.5 kc I.F. bandwidth at 6 db down.

DOUBLE CONVERSION ALL BANDS: 2050 kc ist I.F. Double input tuning (3 tuned circuits) on high bands for high image rejection.

AVC—Noise limiter—Panel S meter—antenna trimmer—BFO pitch—Audio-RF gain control—slide rule dial—3 watts audio.

G66 RECEIVER...(less power supply).....(#3046).....net 189.50

"3 way" (6V-12V-115V AC) Universal power supply/speaker..net 44.50

G-77 TRANSMITTER

FREQUENCY RANGE: 80-40-20-15-10 meters. VFO or xtal, switchable. Highly stable VFO, each band spread over most of slide rule dial.

FULL BANDSWITCHING: Exciter ganged with VFO, pi network output.

POWER INPUT: 50-60 watts, modulated. CW provisions, 6146 tube in output. New modulator has integral speech clipping. High gain speech for PA-type dynamic, reluctance or xtal mikes.

POWER SUPPLY: Heavy-duty, vibrator, 6 and 12V DC. Output voltage 500-600V full load, Selenium rectifier, low drain both on standby and transmit. Power supply is a separate compact unit.

NOT YET RELEASED, G77 WILL BE AVAILABLE SOON AT YOUR DISTRIBUTOR.

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Conelrad: Are You Ready?

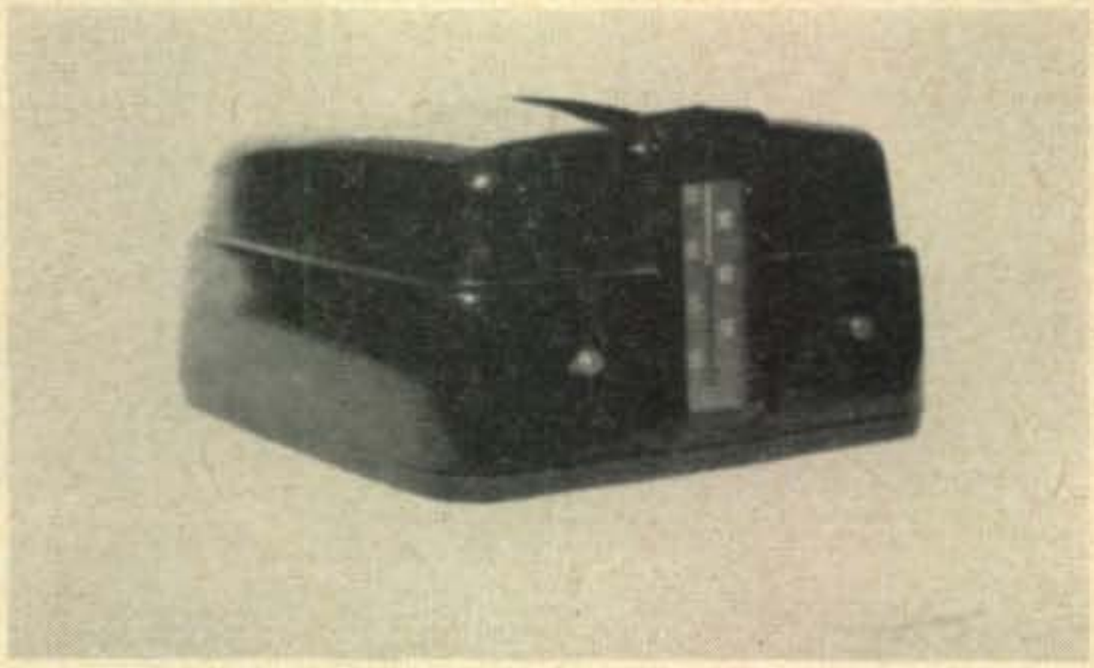
H. Frank Jordan, W5EDX
645 E. Woodlawn Avenue
San Antonio 12, Texas

By January 2, 1957 every ham in the U. S. must comply with the Conelrad regulation requiring some sort of warning in case of emergency. Here is a simple, inexpensive answer, one that is dependable.

For a couple of years now there has been a Thyratron Remote Control Unit, originally designed for an electric blanket, available from most supply houses. Burstein-Applebee in Kansas City (Mo.) sells this unit complete with tubes for $2.88 (Part #33A170). This unit has just about everything necessary to build a Conelrad monitor, including a sensitive plate relay. A 25 watt resistor is the only other item needed, an adjustable unit costs about 55c. This and any broadcast receiver having AVC does the job.

If you bought the unit with the case, remove the chassis and then the tubes. Decide on what tube socket and tube to use. You will need a triode, either a 6J5 or half of a 6SN7GT (which comes with the unit). Clip all leads close to all tube sockets and clean the terminals of the socket you intend to use.

Tear off the heavy cardboard on each side of chassis so you can get to the relay, but not the fibre-board on top that has all the soldering lugs and components; use the lugs for tie points. Remove the variable control and pulley with string and the upright red indicator and bracket that looks like a thermometer in the front of the chassis. Clip out all resistors and



The remote control unit

capacitors leaving leads as long as possible, save the two 1 meg. resistors and the .1 mfd tubular capacitor. Cut the leads from the 3000 ohm coil relay and contacts and the 6.3 volt filament transformer so that you leave them as long as possible. All of them are properly mounted. Do not move them. The 115 volt a.-c. leads from the transformer are the ones toward the rear of the chassis.

Rewire as per diagram *fig 1*. Make five leads from the unit at first to get it in operation and then when all is O.K. add the 2 to control whatever you wish as a warning. The dial light lamp and socket is left on the unit for test purposes and can be left on permanently if you wish. Connect the 115 volt leads in the broadcast set so that its switch will control both units. The Conelrad unit has its own switch also.

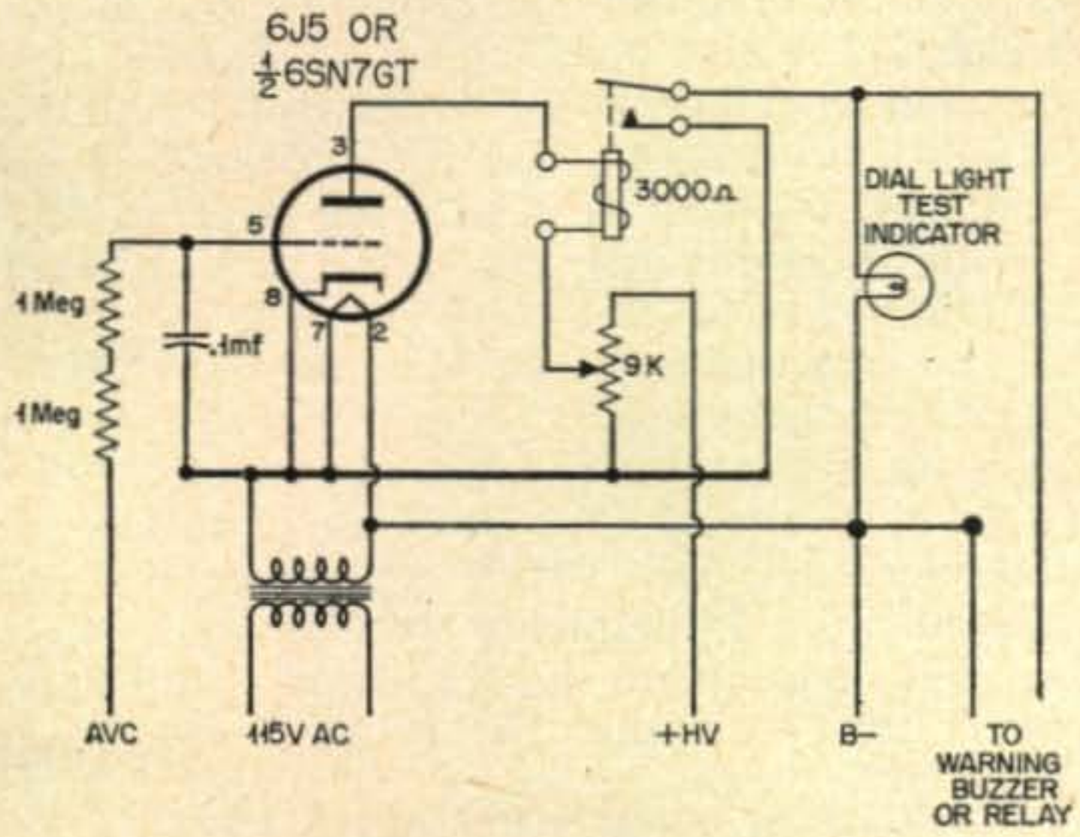
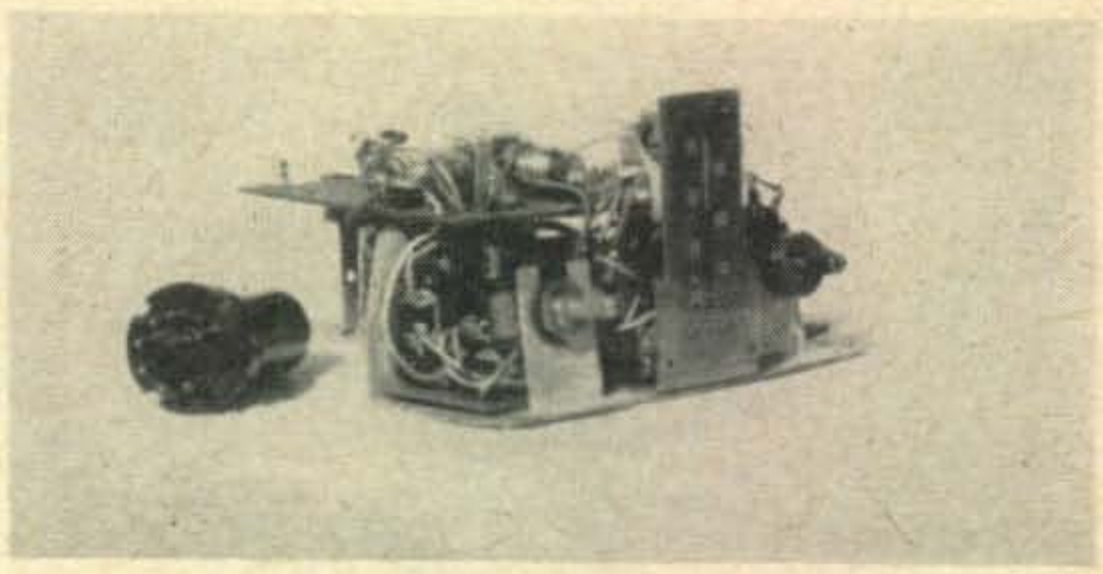


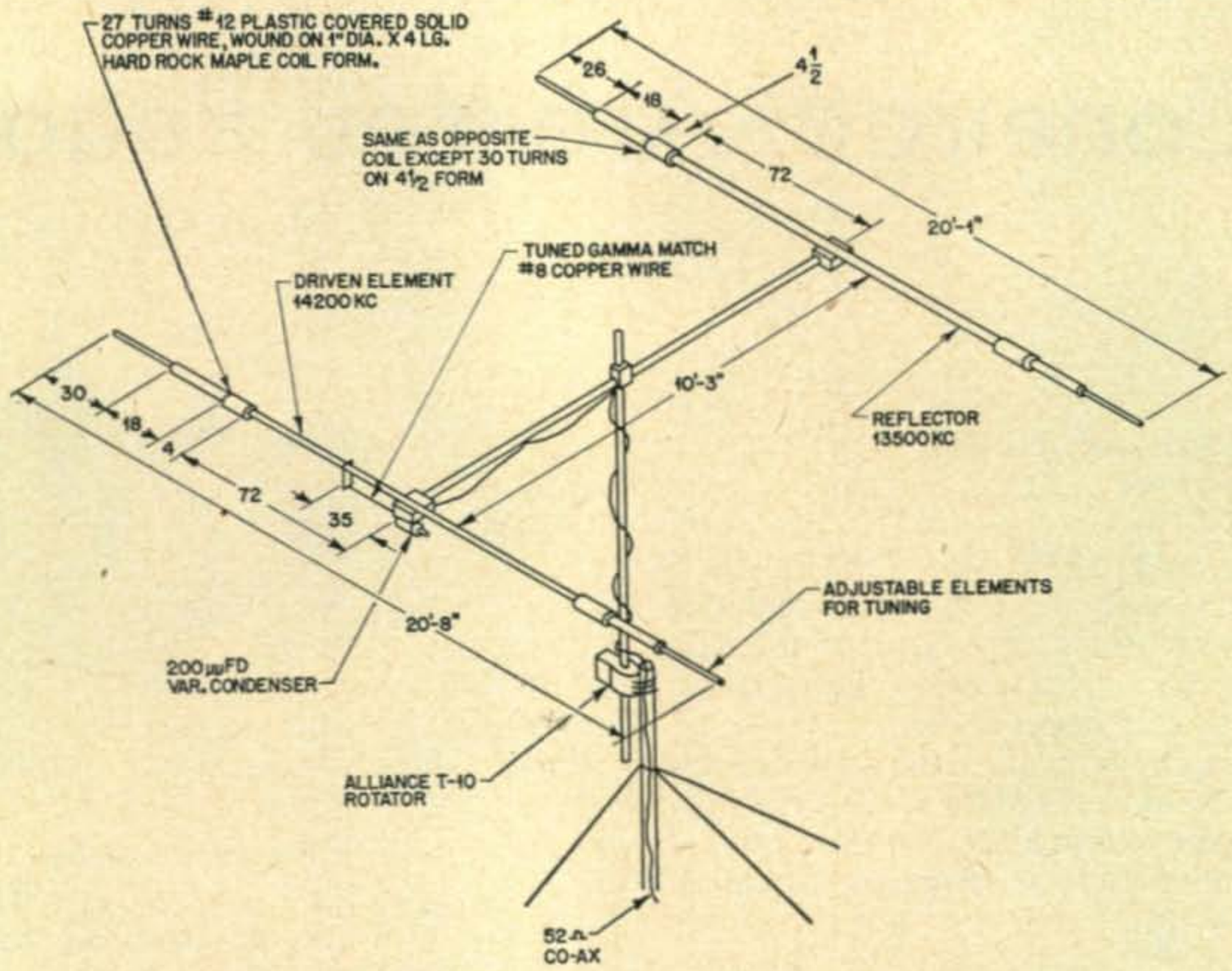
Fig. 1. Tube connections are for a 6J5.



With the cover off

You must locate the AVC line in the BC set. The quickest way is to look at a diagram of that particular set and then run it down. If no diagram, use a VTVM, positive lead to B negative, not necessarily chassis ground, and negative prod where you see the leads coming out of the i-f or r-f transformers. When you find a terminal that measures from 5 to 10 negative volts when

[*Continued on page 104*]



Short Twenty Meter Beam

Jack Taylor, W4CWB
2025 North Madison Street
Arlington 5, Virginia

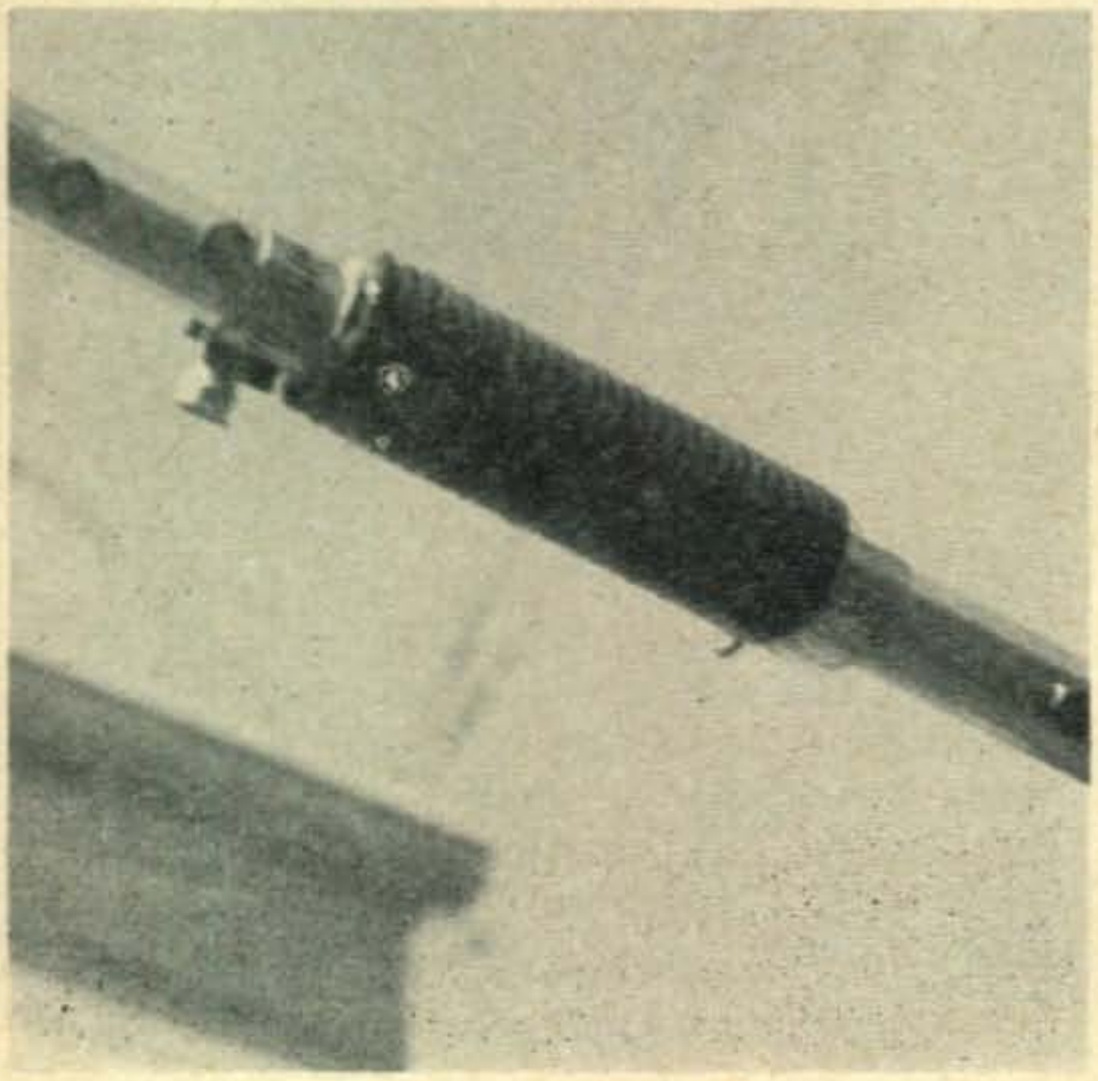
If you want to work out on twenty meters you have to have a beam. Some of us may try to fight city hall for a while, but eventually we come around. Once I finally got this fact through my head I still had to come to grips with the XYL and her ridiculous thumbs down policy toward full size beams. It will come as no surprise to you, if you noticed the title of this article, that I compromised on a short beam, something "a little larger than a TV antenna."

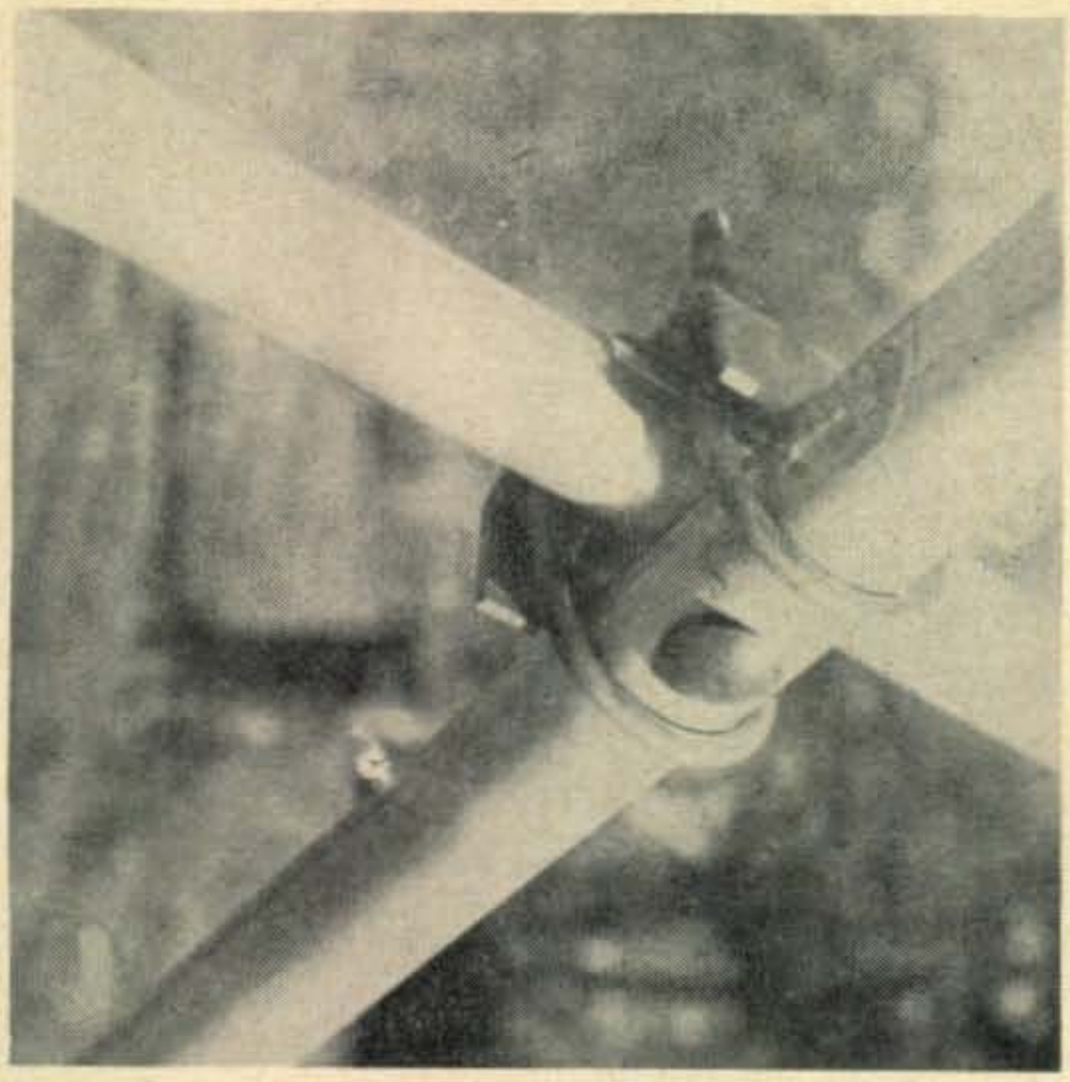
Since the bulk of the radiating of a beam element is done by the center of the element I decided it was only logical to shorten down the non-working parts . . . the ends. Plumbers-delight construction was used to keep it light and easy to assemble. It was fed with RG58/U (RG8/U would do) and tuned with a gamma match.

The completed driven element tuned and in the air measured 20′8″ from tip to tip and the parasitic reflector (which is electrically 700 kc lower) measured 20′1″; the spacing between the elements was 10′3″. The elements were attached to a 1″ diameter 10½′ boom.

I had to admit to the XYL that it did look a *bit* bigger than the TV conical, but believe it or not, neighbors asked us whether it was an antenna for color TV—so the beam was up to stay.

Detail of coil construction





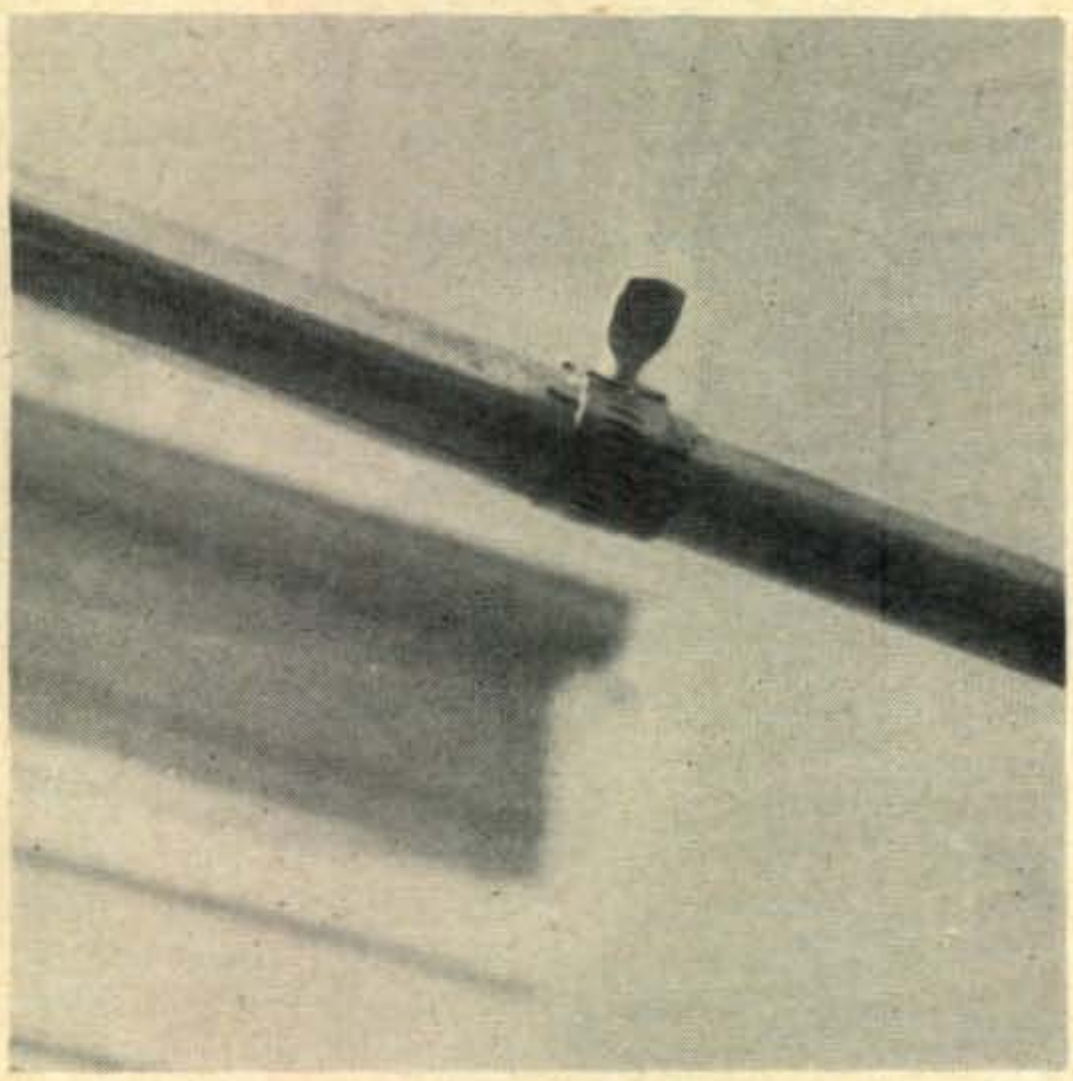
Method of fastening boom to rotator stub. In addition to bolt and TV "U" clamp, the stub has a crescent slot filed into it to make a mechanical solid fit to the boom.

The results obtained with the beam have been little short of fantastic. Running only 150 watts I can work about everything I can hear. The beam has consistenly outperformed center-loaded beams running the same and much higher power from the same local areas as well as occasionally getting better reports than those using full-size three-element beams. As a result of beam's success, several in this area have started to duplicate the beam at this writing.

Driven Element and Reflector

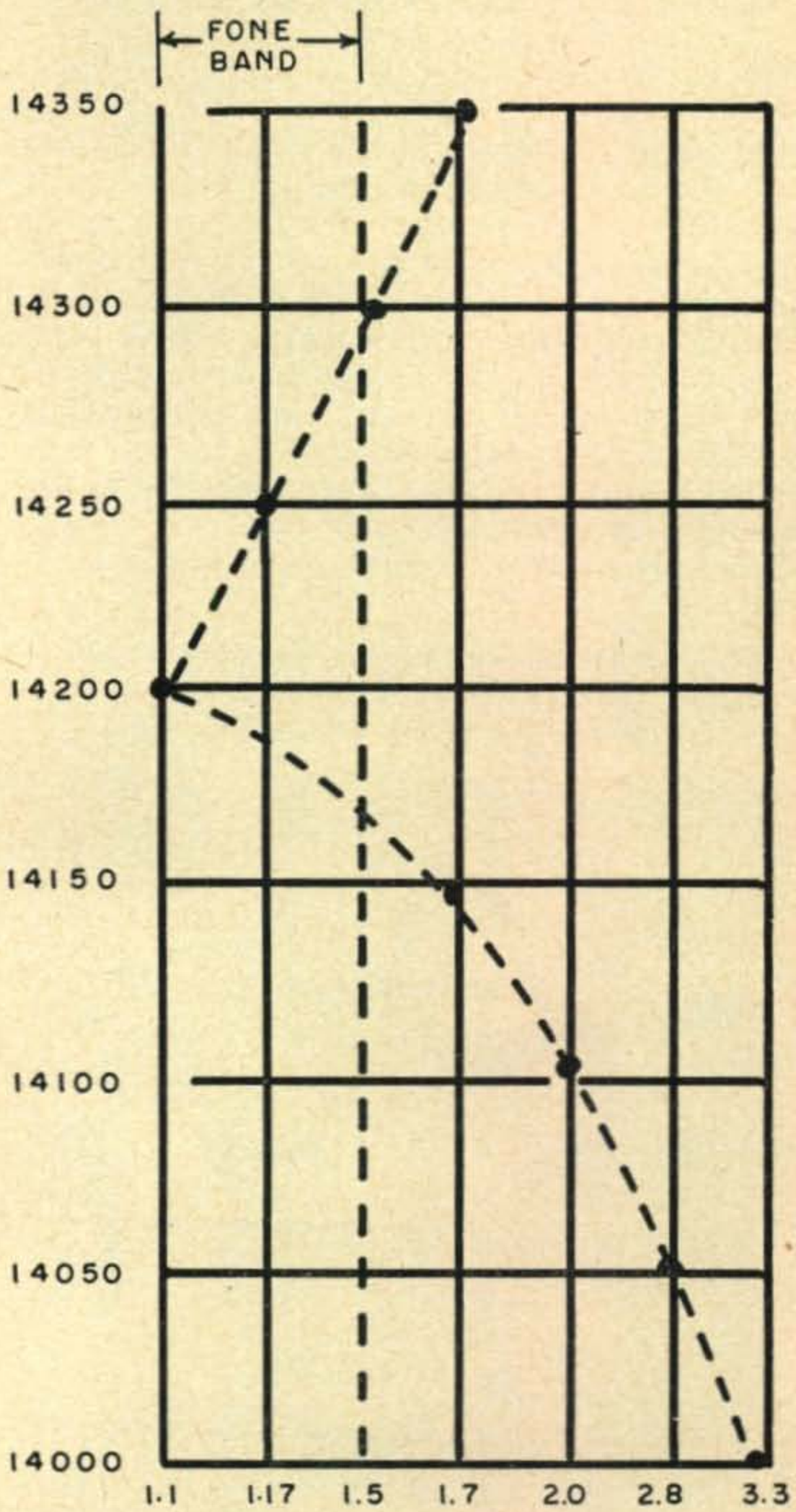
The center section of the driven element is a 12-foot length of 5/8" inside diameter, hard drawn aluminum tubing; on both ends have

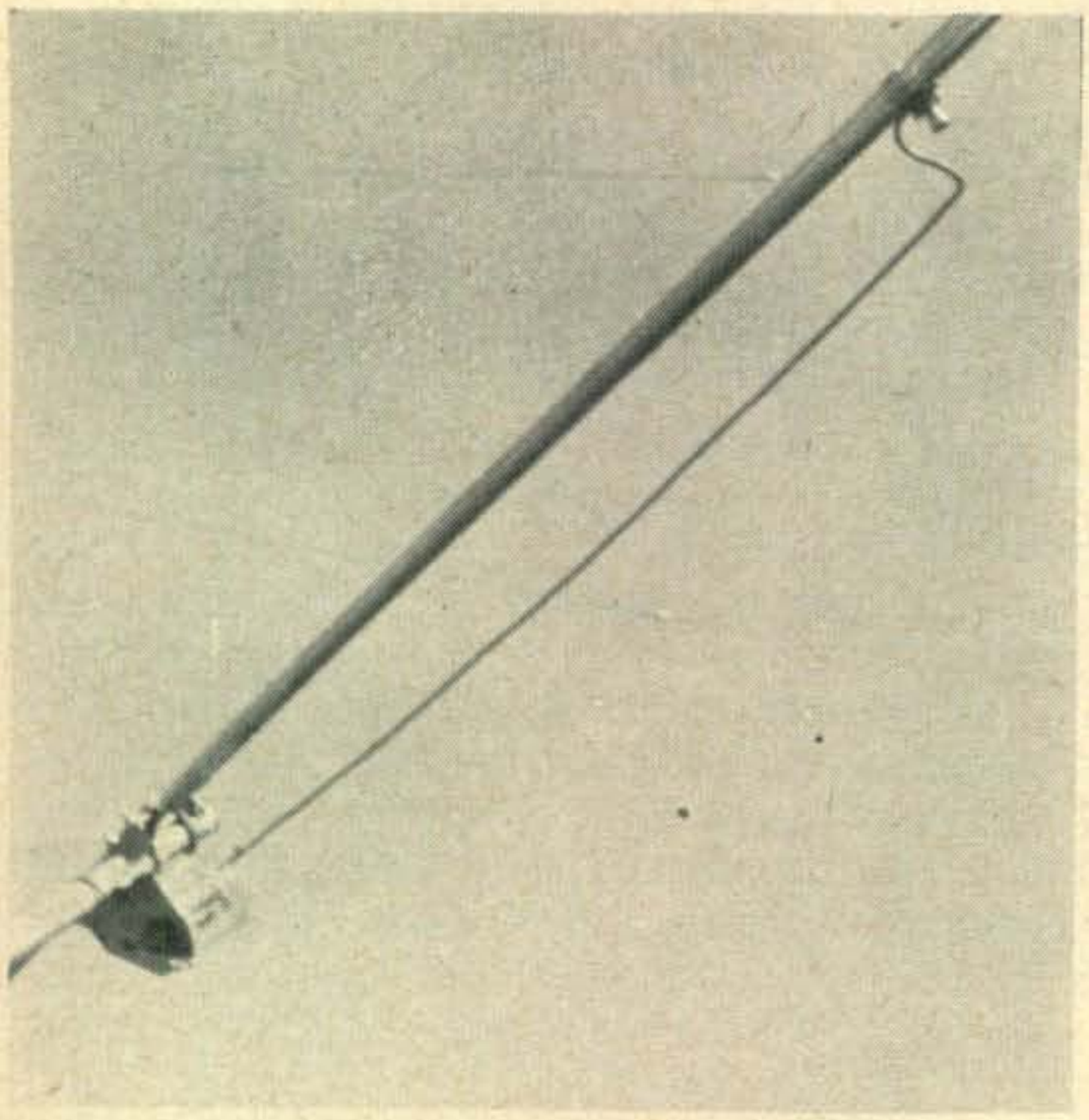
Aircraft tubing clamps come in both screw and bolt type. (Screw shown here)



been inserted hard-rock maple coil forms which were pre-dipped in melted parafin. After the coil form is inserted, slide on the 18", 3/4" outside diameter pieces. The coil form is now secured in place by drilling two holes in both sides of the form and bolting (use lock washers); attach a soldering lug to the bolt on either side. Wind the 27 turn coil tightly and secure at each end with an aircraft "aeroseal" hose clamp (secured at the local airport for about 30 cents each . . . 13 are used on the beam), solder the ends to the lugs and then completely cover the coil with Duco cement. When dry, apply at least three coats of plastic spray-type enamel. Insert the end tuning pieces all the way and lightly clamp. Duplicate this procedure for the parasitic reflector, except use 4½" coil forms and 30 turns. Construction of the boom is self-explanatory from the photo-

The chart shows the SWR over the entire band.



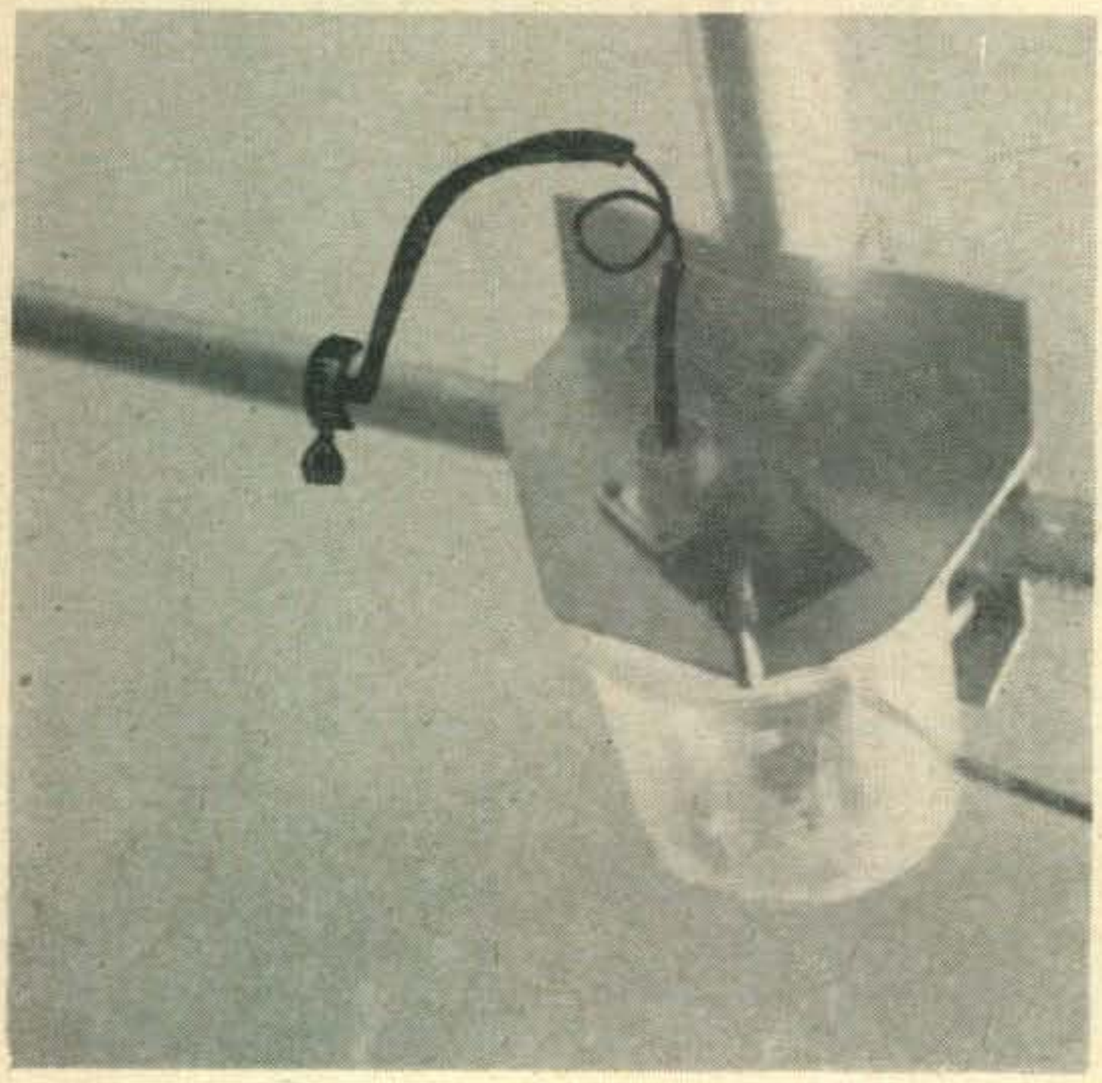


The gamma match consists of a 200 mmfd variable inserted between the hot side of the co-ax and the #8 solid wire extending 35" to one side of the driven element.

graphs and captions. All mechanical construction should be made with that terrific wind storm (you hope never materializes) in mind. This light-weight beam has so far ridden out a wind storm in excess of 60 miles per hour, snow and ice, and is still in perfect tune.

This brings up the matter of tuning. Contrary to anything you may have heard about the difficulty or impossibility of tuning end-loaded beams, this beam tuned perfectly to the desired frequency and there was *no* change when fully raised in the operating position.

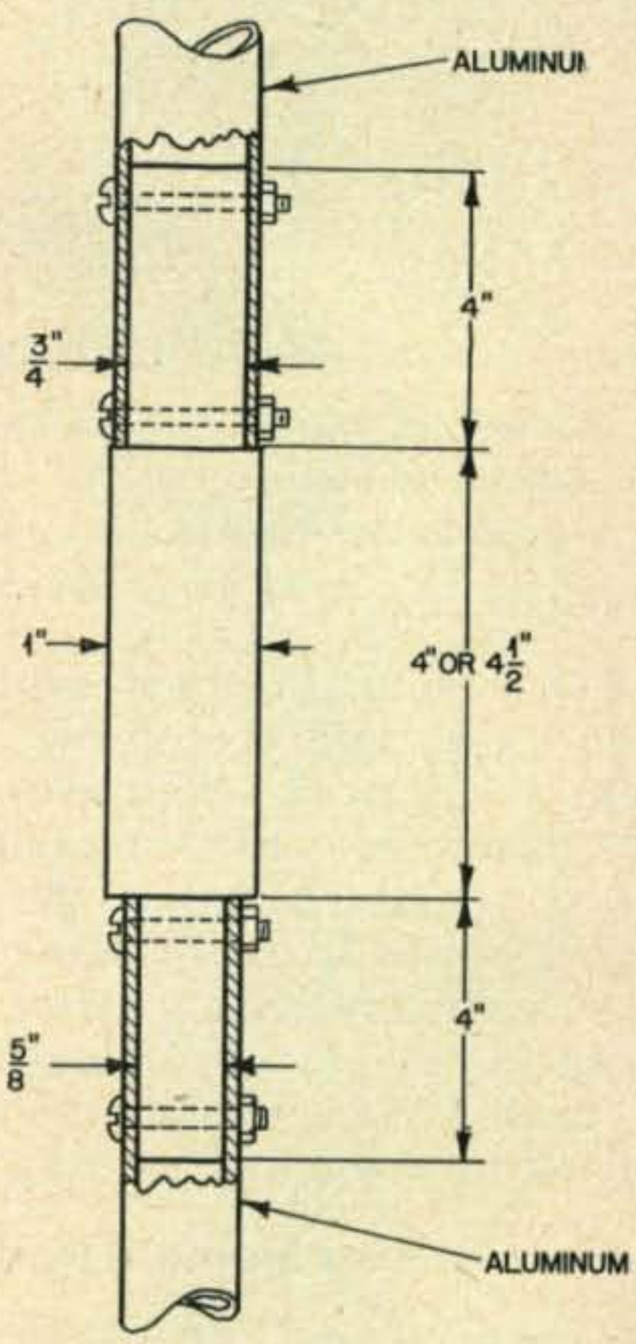
Detail of link coupling to tune element with grid dipper. Note holes drilled in the bottom of plastic refrigerator jar to prevent condensation.



Tuning Procedure

Calibrate a thoroughly warmed communication receiver to 14200 kc and dip your grid-dipper. Next, with the beam at least 5′ off the ground, and the gamma match condenser ¾ way open, insert a stiff piece of wire in the center of the co-ax on the gamma match, from this form a small loop, and ground the end to the driven element with a clamp. Insert the grid-dipper coil in the loop (the loop should be bare wire) and adjust tuning pieces in

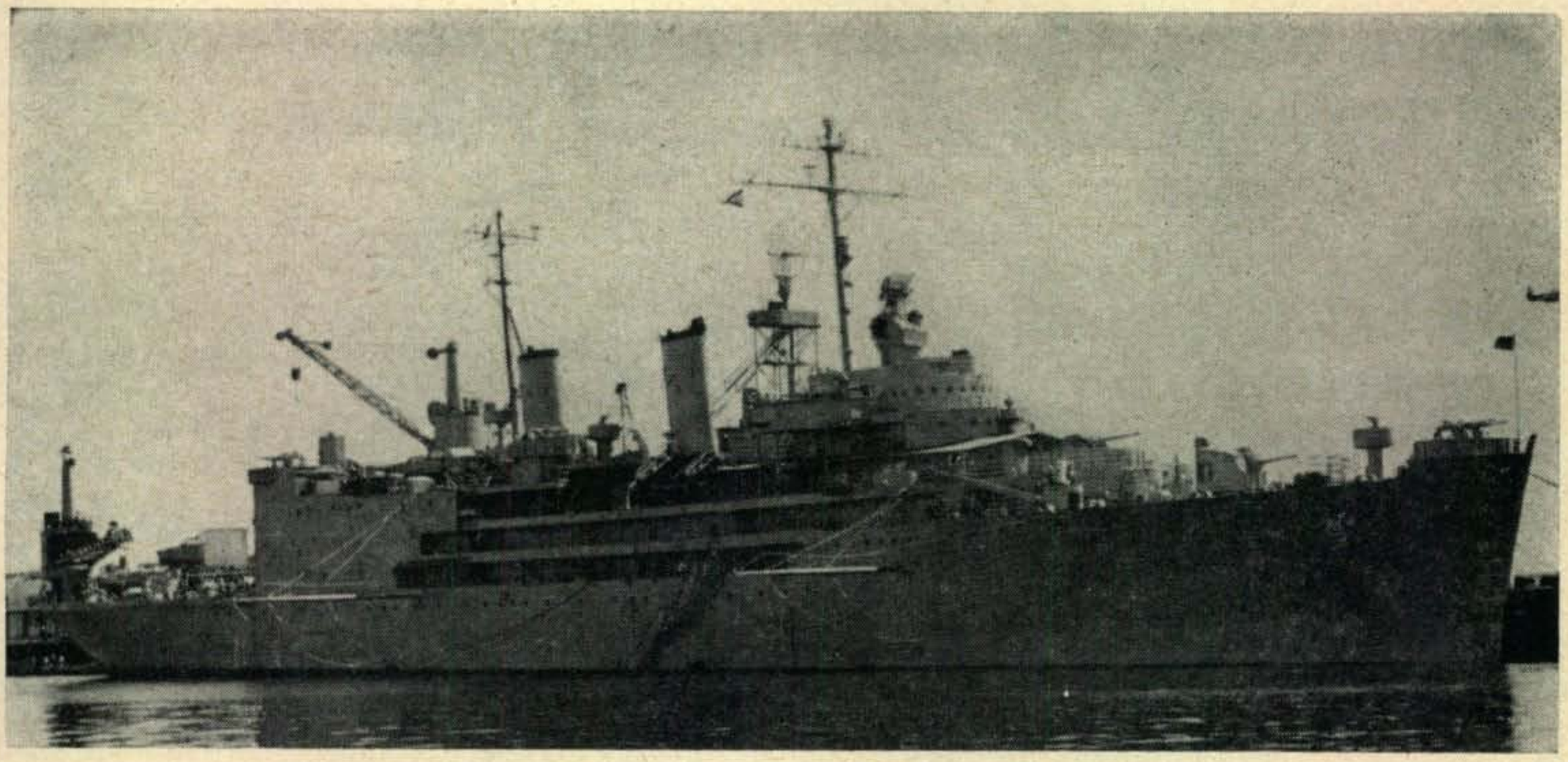
Coil form construction



driven element equally, an inch at a time, until dipper beats with receiver; then secure tuning pieces tightly with the clamps. Recalibrate the receiver at 13500 kc and repeat operation for the reflector, the only difference being the loop pickup for the dipper will be clamped to both sides of the center of the reflector instead of the co-ax connector.

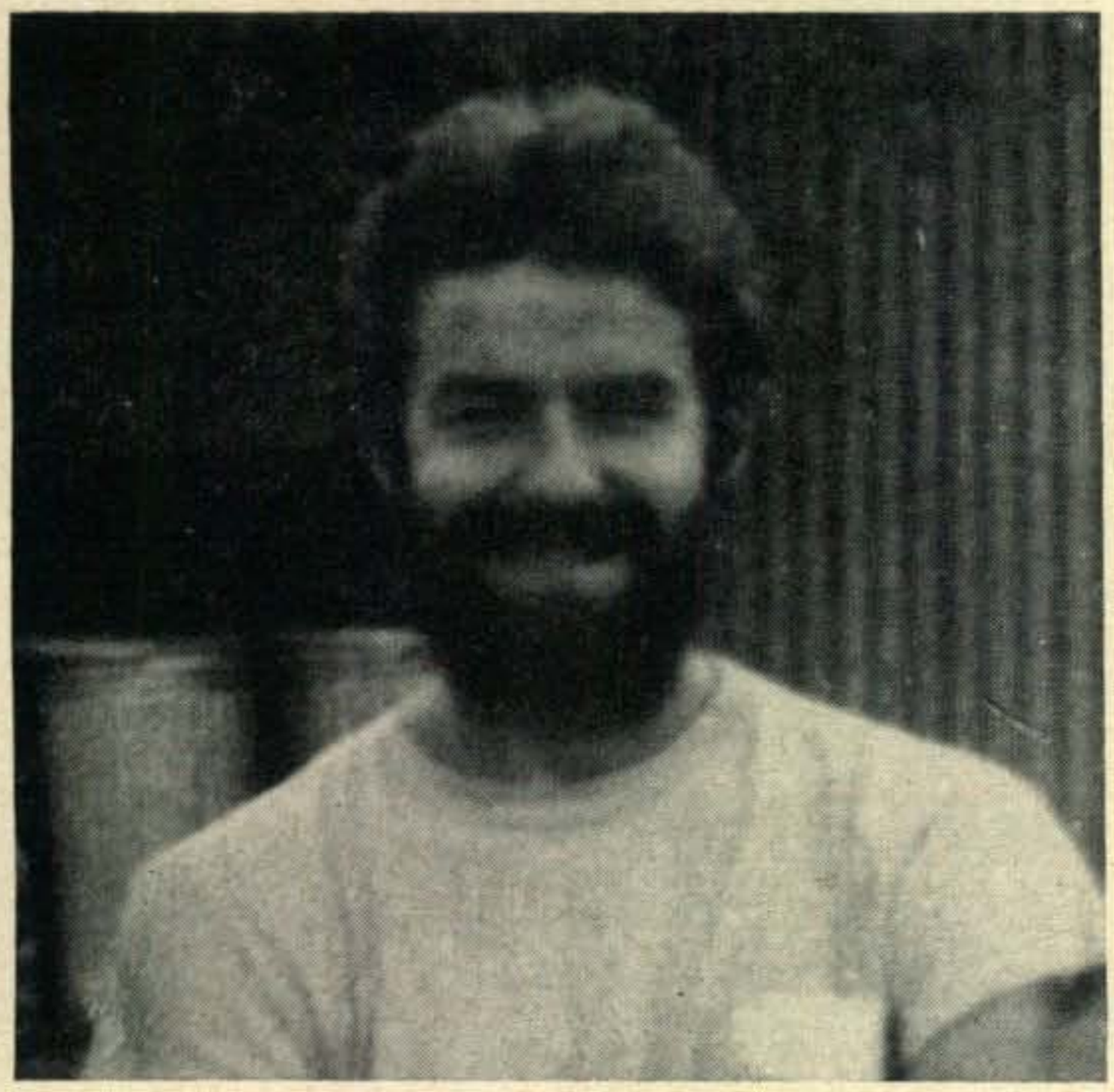
If you don't have a Micro-Match, I strongly urge that for the next step you immediately cultivate the friendship of one who does. Having the transmitter under load, the beam can be adjusted to zero reflected power in a matter of seconds by adjustment of the variable condenser.

No claim is made for this being the ultimate in beams or for anything revolutionary or new in design. The gamma match is essentially the same as the "Simple Squirt" beam (October 1954 *QST*) and the position of the end coils is scientifically determined by the fact that aluminum comes in 12′ lengths, but it will give a good account of itself with full-size beams and at least put a solid dent in "kilowatt alley." ■



CQ to Antarctica

Above is the USS Curtis (US Navy Photo) on which Jim will travel to KC4-land this month (via New Zealand). Below: Jim Morrissett, W8BAJ.



Since Life and Time are sending correspondents to cover the Deepfreeze do, it seemed only natural that an international organ such as CQ should not be left out in the warm. When the ever alert (yawn) editor discovered an empty bunk southward bound he tried first to figure how he could fill it himself. After much soul searching (sob) he figured that since the trip would probably take about three months, that if CQ was still running when he got back that they might try to keep on running without him. Art, noble assistant to the editor, selflessly volunteered to undertake the ordeal, but was turned down by the jealous editor on the vague explanation that if he was to go who would be around to do the work?

Next, Jim Morrissett, W8BAJ (K2OLK), who was still recuperating from a year of CQ duty, was contacted in his Dayton retreat, where he was occupied on a twenty-four-hour basis growing a long bushy beard. The prospect of an extended ski trip overcame his conditioned wariness. By next month we should have some of the grim details available. ■

My Unusual Shack

or . . . Time On My Hands

Joe Dubovy, W2TCC
RD.1, Holcomb, N. Y.

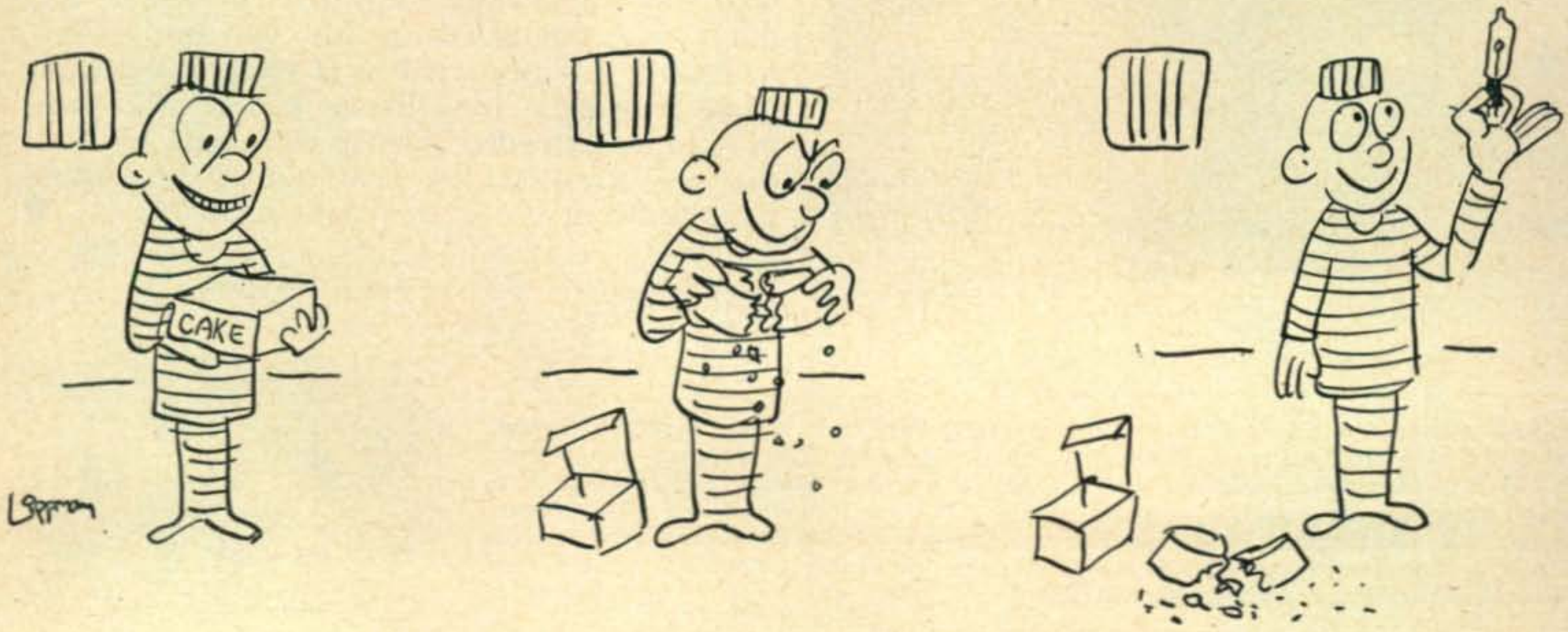
Dear Ed:

I hope that you will publish the following text, as your pages are the only means I have of offering thanks to one of our ranks who has greatly affected the course of my life; an anonymous individual whom I have neither met nor spoken to. Ten years (more or less) and two weeks ago, I was committed to one of the more famous upstate penitentiaries for a misdemeanor, about which I would rather not discuss. The first few months I tried with all my capabilities to gird myself mentally to this strange, unnatural way of life. My efforts were to no avail, for each day I sunk into a deeper and deeper gloom.

One day I returned to my cell after a back-breaking eight hours of rock crushing. If you have ever tried sawing square power transformer holes in a quarter inch thick chassis, you can get a very, very slight idea of what rock crushing is like. I dropped into my sack with a thud. Suddenly something was jabbing me in the ribs. Something very bulky was under my mattress. My mind jumped—maybe a file, maybe a saw! I leaped from the bed, raised the mattress and laid eyes upon a small three tube chassis with earphones nearby. Being an addict on circuit design in days gone by, I could quickly see that the 6U8, 6AQ5, 6X5 was a home brew super-regen. For months my mind had been in a dormant state —*but then*—at that moment my brain began to bubble with fever—asking a million seemingly unanswerable questions. My eyes darted about my 6′x8′ domicile for some kind of answer. Maybe a note! I turned everything upside down and inside out—nothing. I plugged the line cord into our B.C. radio outlet. I used my electric shaver cord for an antenna. (I had bought this shaver myself by saving up my $3.40 wages each week.) I put the cans on and, let me tell you, that little super could stand up to superhets on the ham bands.

Things were beginning to look up for me now. I monitored the bands in all my spare time (which means when I was not dreaming of women). My code speed was coming back up again and I was in a short time taking around 20 w.p.m.

After some very logical deductions, I finally concluded that the responsible party was a guard who was also a ham. He had seen my call letters on my personal history file, and perhaps even had worked me at one time. To ease my pain he built this wonderful gift. Each time I passed a guard I whistled *CQ* at him and watched intently for some sign of kinship. All I got were dirty looks. One ape-like gent suggested that a little solitary confinement might be good for me if I was getting to be a wise guy. I further reasoned after a while that my benefactor was afraid to re-



veal himself. After all, he may have been an old 75 fone buddy and it would not look too good if anyone were to see him conversing freely with me. Another idea; I could thank each one of the guards, but I did not feel like going through a session with the prison psychiatrist.

One day, about a year later, I returned to my cell, washed the granite powder off, and fell into the bunk. Then, again, a jab in the ribs—this time harder—something bigger! I jumped down and saw to my amazement another home brew three tuber. Upon examination, it was a 6AQ5 oscillator into a 6V6 P.A. with a 6x5 rectifier . . . A small key was attached. WOW! 15 watts on 40 c.w.—this guy, God bless him, was really the greatest. Also on the bedsprings was the most beautiful roll of Copperweld I ever saw. I wedged my newly found antenna between the wall and ceiling, forming a distorted rhombic shape. The 4 walls measured 28 feet. With capacity figured, just right for a 40 meter quarter wave. I spliced the line cord to the receiver (as I didn't have time to go to the corner dime-store for a double outlet). I pressed the key, put my finger to the antenna and got a nice little jolt of r.f. WOW! I was on the air! A W8 called CQ—I answered and he came right back to me with a 559 report. He asked what slant P.P. was, and I replied 'Portable Penitentiary.' He kept sending HI, HI, thought it was a great joke. I am sorry, but I never could see his sense of humor. I was once tempted to get on one of the traffic nets and pass traffic out for the boys. But after some consideration, I figured the Frank Charlie Charlie might take a dim view of this and act to suspend my P.P. operations. A W4 once told me he wished there were more like me so he could get him a WAP certificate (you guessed it—worked all prisons). It is hard to believe how quickly the years went by since that first QSO. Then one morning I was called to the warden's office and told that I had honorably served my obligation to society. I packed the two chassis in with my things and left the copperweld where it hung. Perhaps, by some small chance, the next occupant will recognize it as a 40 meter ¼ wave. Odd as it seems, a tear of sorrow came as I walked under the bars and took a last look at my shack.

I am on the air at home now and have inquired during every QSO if anyone ever knew of a W2 who worked as a prison guard. As yet I am still in the dark about my mysterious benefactor. In any event, whoever you are, you will never fully appreciate how grateful I am.

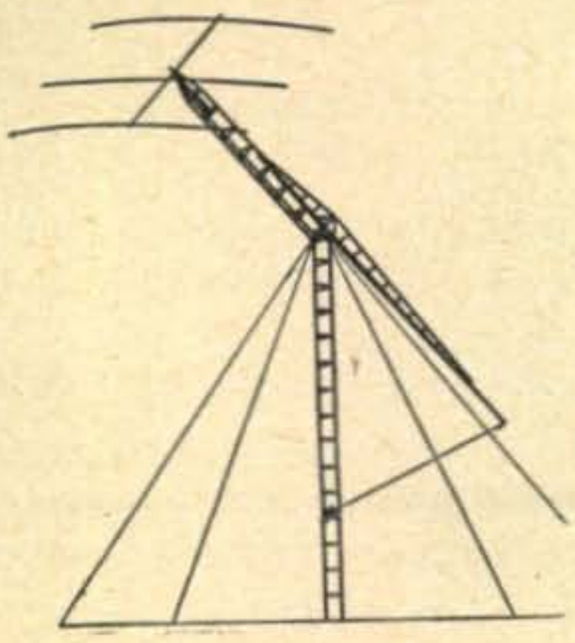
Yours truly,
W 2 T C C (ex/p.p.)

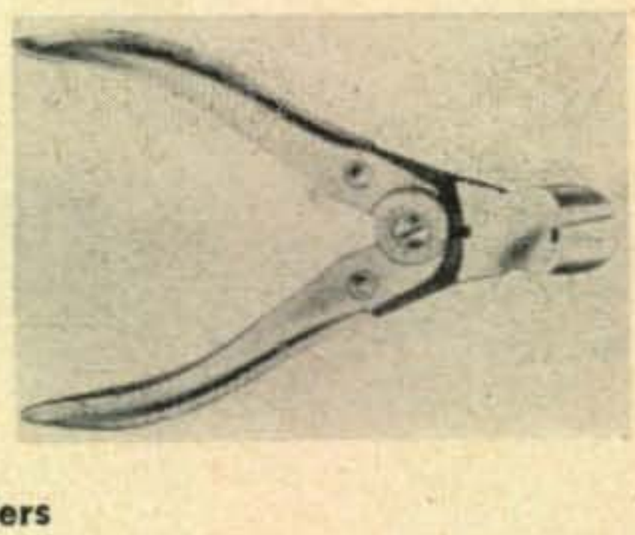
P.S. To any of you guys who are plagued by BCI, TVI, and interruptions from the XYL, and are thinking of committing a felony to get a portable pen call—DON'T! It ain't worth it. ■

U R *

Rohn Manufacturing Company of Peoria, Illinois will be real pleased if you will make the supreme effort of asking them for more information on their new line of Fold-Over Towers. This sort of thing makes it so you don't have to make that long hike to the top of your tower every time you want to prune, tune or change an antenna. These are heavy duty towers and will hold just about anything you have to guts to dangle in the air. If you already have a Rohn Tower you can convert it to this newfangled deal. So write 'em. Tell 'em where you read it.

*(You Lazy Too?)





Double-jointed Pliers

Easier cutting, that's why. One operation with these new pliers neatly performs cutting and crimping, which makes them particularly useful in work with printed circuit boards, as the crimped end will not slip back thru the hole of the printed circuit board. Smooth cutting action with less operator fatigue is ensured by the compound leverage action. Formerly a custom tool, the Printed Circuit Pliers are now available in Utica's standard line. Ask for #470-5. Why not drop them a line for other grim details (such as How Much?) and useful ones (like Where can I get one?). Utica Drop Forge and Tool Corp., Utica 4, N. Y.

J. P. Costas, W2CRR
General Electric Co.
Syracuse, N. Y.

Single-Sideband: Is It Really Better Than Amplitude Modulation?

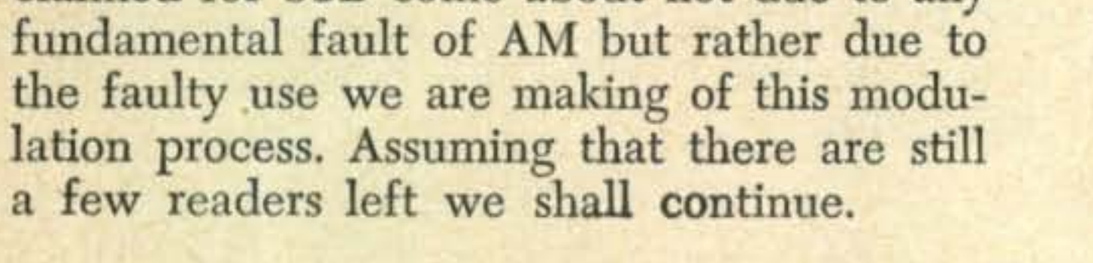
A Word of Warning

Before going any further it is only fair to warn the reader of the intent of this article. What I shall attempt to show is that AM as a basic modulation process is every bit as good as single-sideband. Furthermore, the performance advantages claimed for SSB come about not due to any fundamental fault of AM but rather due to the faulty use we are making of this modulation process. Assuming that there are still a few readers left we shall continue.

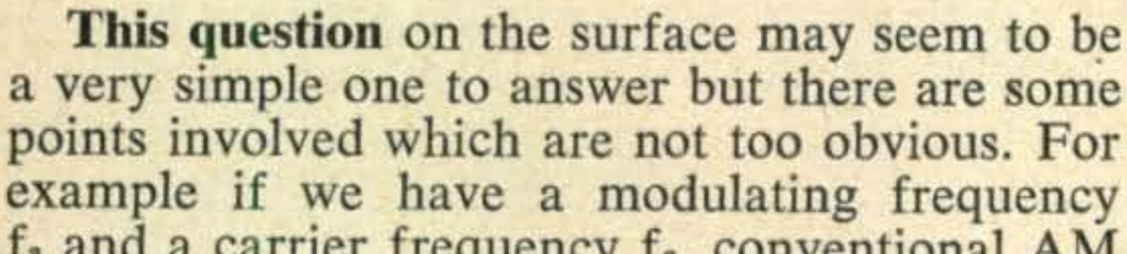
What is AM?

This question on the surface may seem to be a very simple one to answer but there are some points involved which are not too obvious. For example if we have a modulating frequency f_a and a carrier frequency f_c, conventional AM may be represented as shown in *fig. 1 (a)* by a carrier and a pair of sidebands each of ½ the carrier amplitude. Now as is well known, the carrier wave conveys no intelligence and its removal from the AM signal would not affect the information bearing components or sidebands. Thus if we remove the carrier from the conventional AM signal of *fig. 1 (a)* we shall have the suppressed-carrier, double-sideband AM signal of *fig. 1 (b)*. Note that the sideband (intelligence) powers in (a) and (b) are the same but that the total signal power in (b) is considerably less than in (a). Although the signal shown in 1 (b) does not look like an AM signal it is simply a conventional AM signal with the carrier removed. As we shall see the carrier component of an AM signal need not and should not be transmitted. Once we realize that the carrier component of an AM signal is not basic to the modulation process, it becomes clear that the signal of *fig. 1 (b)* represents "amplitude modulation" just as much as that of *fig. 1 (a)* and that 1 (b) represents the more efficient way of getting the message across.

Questions immediately arise as to how we are to generate and receive double-sideband suppressed-carrier (DSB) AM signals and some of the possibilities will be discussed later in this article.



(a) This is AM as we now know it.



(b) This is AM as it should be.

Fig. 1. Two Types of AM Signals.

The 9db. SSB Power Advantage— It Doesn't Really Exist

We are now in a position to examine the signal-to-noise properties of a DSB AM system as compared to an SSB system with the aid of *fig. 2*. Note that the sideband amplitude for the SSB signal is E volts while the sidebands in the DSB signal are each $E\sqrt{2}$ volts in amplitude. This makes the *average signal power* in the two cases the same. If we assume a noise

power P_N to exist in the small bandwidth required to receive the various sidebands the

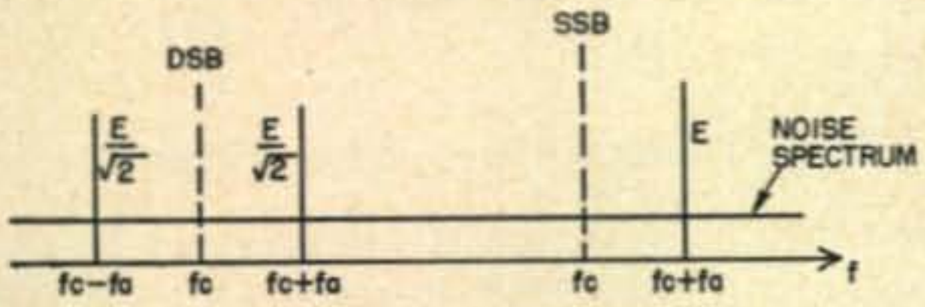


Fig. 2. DSB and SSB Signals in Noise

signal-to-noise ratio (on a power basis) will be for SSB.

$$\left(\frac{S}{N}\right)SSB = \frac{E^2}{P_N}$$

Now in the DSB case if we demodulate each of the sidebands properly and combine them, the signal components will add voltage-wise and the two noise components will add on a power basis. Thus we will have a signal voltage of $\sqrt{2}E$ and a total noise power of $2P_N$. The signal-to-noise ratio for the DSB signal will then be (again on a power basis)

$$\left(\frac{S}{N}\right)DSB = \frac{2E^2}{2P_N} = \frac{E^2}{P_N}$$

which is the same as for SSB. Thus we have one important result: when both are properly received, DSB and SSB require the same average signal power for a given signal-to-noise ratio at the receiver. The 9 db figure we hear quoted so often somes from a comparison based on *peak* power with full carrier assumed in the AM signal.

The Bandwidth Saving of SSB— It Won't Reduce Interference

This last statement must have convinced even the most broad-minded reader that the author has gone non-linear, but bear with me a while longer. In a given bandwidth it is quite true that twice as many SSB clear channels may be assigned as DSB clear channels which would initially lead one to believe that universal use of SSB would result in less interference than universal use of DSB. This sort of argument is misleading because we do not use the amateur bands on a channel assignment basis. Within the band edges we operate wherever and whenever we wish. So we must discard the "double the number of channels" picture and start with a new and more meaningful approach.

The correct approach to the interference problem on the amateur bands involves the mathematical theory of probability. Probability theory enters the picture because within the band edges signals appear at random frequencies and at any receiver location with random signal strengths. Thus if we consider this "jumble" of signals on the bands as constituting the intereference, we are interested in how the *average* interference level would be affected if all signals were DSB or SSB. This idea of judging performance on an *average* basis is very important and to illustrate my point let me give an example which has nothing to do with SSB or DSB.

We all know that at times we can do very well with low power and a poor antenna. In spite of this we don't laugh at the fellow who goes to a kilowatt and puts up a rhombic. Why? Well, because we know that *on the average* the KW and rhombic will give better performance than our 6L6-rain gutter combination. In other words we don't judge the performance of a new antenna or a new transmitter on the basis of the one or two hours of operation but rather we compare the *average* performance of the new system over a considerable period of time before we come to any conclusion as to whether or not we have made an improvement. This idea of judging performance on an *average* basis is so simple that it is almost obvious but don't let this fool you. This way of looking at the situation makes a lot of sense—keep it in mind.

Now let's get back to the SSB-DSB interference question. With the "jumble of signals" picture in mind (if someone questions this concept let him tune some of the crowded phone bands on a busy weekend) what would be the effect on the average interference level if every signal were SSB instead of DSB? Put another way, if each operator instead of splitting his radiated power equally between two sidebands (DSB) confined all his power to one sideband (SSB), would the average interference level in the band be reduced? The answer is *no,* the average interference level would remain unchanged! In other words *on the average* the amount of interference which we would get in our receivers would be the same if everyone were transmitting SSB or if everyone were transmitting DSB. The reduced bandwidth of SSB will not reduce interference. (Heterodyne interference which is such a serious problem now would be eliminated in either the SSB or DSB case since both are suppressed carrier systems.)

DSB Reception—Several Possibilities

Let's go back a bit and review what has been said so far. To begin with we have shown that if the carrier component of a conventional AM signal is removed we have a more basic form of the AM signal which we have called DSB. Secondly when DSB and SSB were compared on an average power basis the 9 db power advantage of SSB vanished. Finally we showed that due to the random frequency location of signals within a band the reduced transmission bandwidth of SSB did not result in reduced interference. So far SSB and DSB performance has been very much the same. The big ad-

vantage of DSB over SSB will show up at the transmitter but first let us consider the reception of DSB.

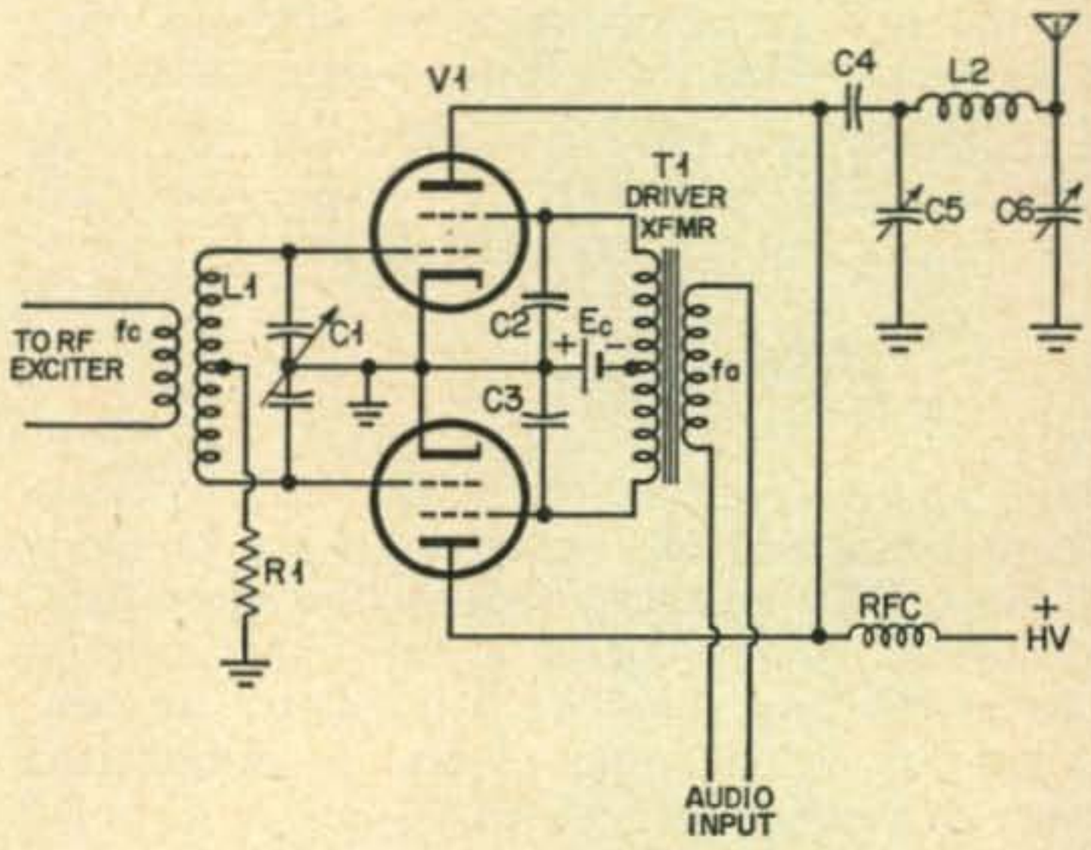
An ideal DSB receiver demodulates both sidebands and combines them so that all the transmitted power is used. To get the two sidebands to add in-phase however requires the receiver local oscillator to be phase-locked to the carrier which isn't transmitted. This sounds difficult if not impossible but such is not the case. Phase control under such conditions can (and has) been very simply obtained since carrier frequency and phase can easily be established from the received sidebands. Let's forget about the "ideal" DSB receiver for the moment and consider a more familiar reception method which although it does not give the best results its use will prove entirely satisfactory.

If one thinks of the DSB signal as two SSB signals back-to-back the use of SSB receiving techniques immediately suggest itself. Of course if we receive only one sideband we are apparently losing 3 db since one-half the transmitted power lies in the other or unused sideband. This other sideband is not being wasted, however, since it is available for use by the receiver when needed. In other words we may switch from one sideband to the other as the interference situation at the receiver changes, always picking the sideband with the lesser interference. The ability of the receiver operator to choose between two sidebands and pick the one with a minimum of interference buys back a good part of the 3 db loss, so much in fact that the difference on the average is not worth considering. Thus even if a non-ideal reception method such as SSB is employed, DSB transmissions can be received thru interference just as effectively as SSB transmissions. It is quite true that the upper and lower sidebands of an AM signal contain the same information but this isn't bad and if properly used, this feature (redundancy, as the communications engineer would call it) will pay handsome dividends. As a matter of fact in modern communications systems we sometimes go to a lot of trouble to put in redundancy by repeating the message in one form or another. This causes the transmitted signal to occupy more bandwidth but this repetition gives the receiver a much better chance of getting the message thru in spite of interference. The point to be made here is that AM has an inherent "diversity" advantage over SSB; let's not complain about it but rather we should try to make more good use of it.

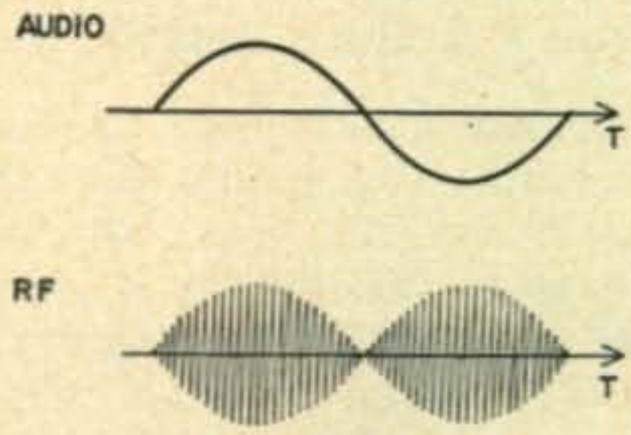
DSB transmissions may be received on a standard AM receiver by the same methods which permit such a receiver to detect SSB signals. The process requires some skill but it certainly can be done. A better solution involves the use of SSB adapters of the types Norgaard and others have proposed. These units simplify reception considerably and they make sideband switching a quick and simple matter. The best solution is of course a receiver or adapter designed specifically for DSB but this matter is beyond the scope of our present discussion.

DSB Transmitters—The Payoff

The DSB transmitter is far simpler to build and operate than a SSB transmitter. The DSB transmitter is simpler even than a conventional AM transmitter. Special tricks or gimmicks? No, just the proper combination of some old and well known techniques. No linear amplifiers, no filters, no phasing network, no frequency translators; you can do it yourself. How is all this possible? Well, it's mostly due to the simple fact that we no longer have to generate a carrier. To see how all these nice things come about take a look at *fig. 3*.



(a) DSB Transmitter, Basic Circuit



(b) DSB Waveforms

Fig. 3. DSB Transmitter Circuit and Waveforms

The final tubes V_1 and V_2 are beam tetrodes and are operated as screen-modulated class-C amplifiers. The plates are paralleled and are connected to the antenna load by means of a pi matching network. The control grids are driven push-pull from a normal r-f exciter at the operating frequency. The screen grids are by-passed to r.f. by C_3 and C_5 and are connected to the audio transformer T1. (A normal driver transformer will handle more audio power than will ever normally be required for amateur service.) The center-tap of T1 is either grounded or connected to a negative bias supply depending on the tube type and plate

voltage used. Blocking capacitor C_4 is used to isolate DC from the pi coupler as is usual. Now for the operation.

With no audio both tubes are nearly cut-off by virtue of the fact that the screens are either grounded or biased negatively, thus no output. If we assume a sinusoidal audio tone as the modulating signal as shown in (b), one screen is driven positive during the first half-cycle and the other is driven negative. The tube with the positive screen conducts and r.f. is supplied to the load by that tube. During the next half of the audio cycle the other tube supplies the power and the first tube rests. Note that only one tube is working at any one time, except when there is no audio then both tubes loaf. *Fig. 3* (b) shows the audio and r-f waveforms. Only one audio cycle is shown. Note further that the r.f. during the first half of the audio cycle is phased 180° to the r.f. during the second half of the audio cycle. This is typical of a suppressed-carrier AM signal. Suppose we add a carrier wave to the r-f wave of 3 (b). If the carrier wave has the same phase as the r.f. in the first audio half-cycle and an amplitude equal to the maximum amplitude of 3 (b) the two voltages will add during the first audio half-cycle and subtract during the second half resulting in the old 100% modulation picture. So the circuit of 3 (a) produces AM without carrier or a DSB signal.

A word or two about circuit efficiency is now in order. Since we are screen modulating, the efficiency will vary from zero at no audio drive to normal class-C efficiency at audio peaks. If an analysis is made the efficiency based on average r-f power out to DC power in will be

$$\frac{\pi}{4}\,\eta_M \times 100\%$$

for sine-wave audio where η_M is the efficiency at the audio peaks which runs about 0.8. The overall efficiency is theoretically about 60% with 50% the value usually obtained in practice. This may not sound too impressive but let's look a bit further. Note that the efficiency expression involves $\pi/4$ and the normal class-C efficiency as a product. In a normal AM transmitter $\pi/4$ is the theoretical efficiency of the class-B modulators and η_M of course is the efficiency of the class-C final. Thus the circuit of *fig. 3* (a) will produce r-f sidebands with the same efficiency as a conventional high-level modulated AM transmitter. The reason 3 (a) is so much simpler than a normal AM rig is that in 3 (a) we aren't bothering to generate the carrier.

The peak power outputs which can be obtained from a given pair of tubes in this service may be estimated by taking the carrier output given in the handbook for *one* tube in class-C telephony service and multiplying by four. *You can do at least this good and probably better.* For example, if a pair of 6146 tubes is to be used we find in the handbook that *one* tube will give 52 watts of carrier output in class-C telephony service at 600 plate volts and 150 screen volts. If we set the high voltage at 1200 volts and run the screens to 300 volts on audio peaks we will get 4×52 or 208 peak watts output. This you know you can do because the voltages and powers quoted are those which exist in Class-C telephony service during modulation peaks.

Without getting into too much circuit detail or DSB-linear amplifier power comparisons this much is clear: the class-C amplifier with its ability to put out large amounts of peak power is ideally suited for voice service in the circuit of *fig. 3* (a). The average voice sideband power produced by a pair of tubes in DSB service will easily match the average voice sideband power produced by the same tubes in SSB linear amplifier service.

The above power discussion actually underplays an important advantage of DSB over SSB. In DSB or standard AM systems voice clipping and filtering, if properly done, can increase significantly the average sideband power output of a given transmitter. Such tricks cannot be used in SSB since a flat-topped wave is deadly to an SSB system. (Such a waveform results in a very high peak-to-average power ratio for the SSB signal.) Do not confuse peak clipping with the peak limiting or audio AGC tricks that are sometimes used in SSB designs. These are defensive measures which in effect permit the audio *peaks* to fully load but not overload the linear RF amplifier. The average power gain of DSB using a good clipper-filter over SSB can be considerable but for the moment I'm willing to settle for a draw.

A few final comments: The r-f excitation in DSB service is not at all critical. Adjust for normal phone drive and you've got it made. That is one reason why screen modulation of tetrodes is to be preferred over control-grid modulation of triodes. You can use triodes but you have to watch the ratio of audio voltage to r-f voltage. With the Tetrodes you just read the grid mils. The r-f exciter of course is normal—use the one you've got. One more thing—we said that only one tube works at a time. This is true except that the "off" tube acts as a neutralizing capacitor for the "on" tube. The circuit is self neutralizing since the grid-plate capacitance of the "off" tube is in just the right spot for grid neutralization.

Concluding Remarks

I would not like to oversell DSB; it won't perform miracles. However, when compared with SSB we may draw the following conclusions:

1. SSB has no power advantage.
2. SSB will not reduce interference.
3. SSB is much harder to generate.

That's the end of my story, which is a good thing because I can see them coming for me now. ■

W6TNS's Communicator Notes

Don Stoner, W6TNS
Engineering Consultant
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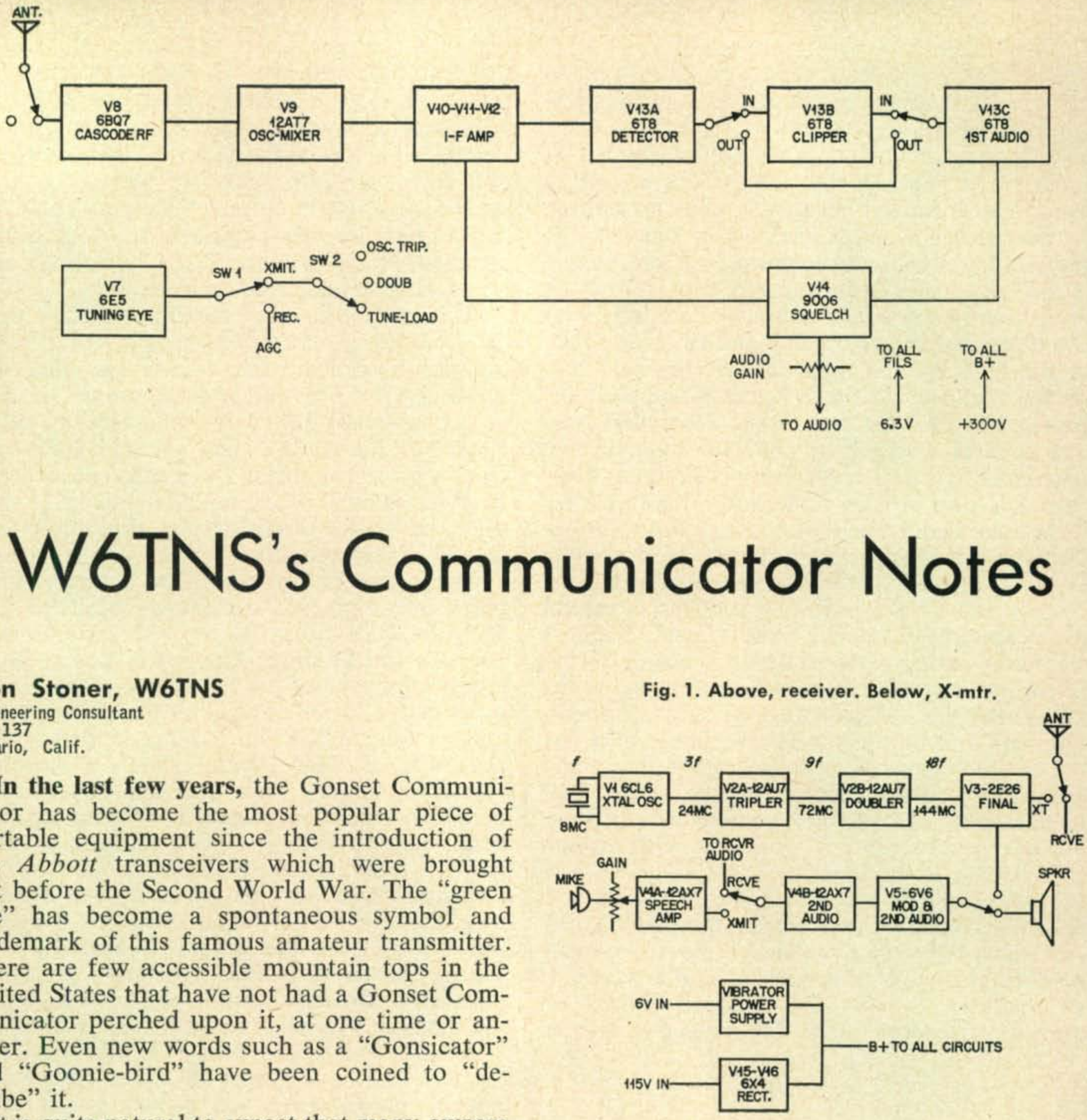
Ontario, Calif.

Fig. 1. Above, receiver. Below, X-mtr.



In the last few years, the Gonset Communicator has become the most popular piece of portable equipment since the introduction of the *Abbott* transceivers which were brought out before the Second World War. The "green eye" has become a spontaneous symbol and trademark of this famous amateur transmitter. There are few accessible mountain tops in the United States that have not had a Gonset Communicator perched upon it, at one time or another. Even new words such as a "Gonsicator" and "Goonie-bird" have been coined to "describe" it.

It is quite natural to expect that many owners of Gonset Communicators might want to modify and improve this device. But the appearance of this unit is well known and should one try to give the "Gonsicator" a face lifting, the resale value immediately takes a nose-dive. These notes describe ways in which the versatility and performance can be improved without incurring a loss in resale value.

How It Works

For the many persons interested in the circuit functions of a Communicator, a brief description of its operation is included. Because of space limitations and varations in circuits, no schematic is included. *Fig 1*, however, shows in block diagram form the general layout of this unit. Part numbers referred to in the text are those listed on your Communicator diagram.

In the receive position, signals picked up on the antenna are fed to a 6BQ7 cascode r-f amplifier (V8). The noise figure of this amplifier is quite good, in the order of 6 db. The amplified signal drives the mixer tube, ½ of a 12AT7 (V9A) where it is combined with the tunable local oscillator signal. The local oscillator, which operates on the low side of the incoming signal, heterodynes the two meter signals to a new frequency of 6 mc (the intermediate frequency). To raise the signal to a detectable level, the signal is amplified in a three stage i-f amplifier composed of V10 and V11 (6BH6's) and V12 (6BA6). This greatly amplified signal is detected in one of the diode sections of the 6T8 (V13). Another section of V13 is used as a noise limiter that can be switched in and out of the circuit. Any noise spike that exceeds the threshold level of the diode causes the tube to conduct, which momentarily shorts out the audio circuit. As soon as the noise pulse ceases, the audio system returns to normal. V13 also contains a triode section that is used as a first audio amplifier.

The squelch system used in the newer Communicators is quite novel and warrants some explanation. Older communicators used a 6111 subminiature twin triode that operated from the agc (automatic gain control) circuit. When no d-c was present in the agc circuit, the

6111 would not conduct and because it was in series with the audio, no audio reached the amplifier. As soon as a negative voltage appeared in the agc circuit this tube was allowed to conduct, thereby letting the audio pass. The newer Communicators use a much simpler circuit. A diode tube is connected in series with the audio (V14). A small portion of the B plus voltage from the i-f amplifier is used to cut off the diode conduction. However, when a signal appears, the negative agc voltage causes the i-f amplifier tubes to conduct less (because of the increased bias), which raises the i-f amplifier B plus voltage. When the B plus applied to the squelch diode passes a certain point (as determined by the squelch control) the diode will conduct, thereby allowing audio to pass.

The tuning eye (V7) circuitry is conventional. The more negative voltage applied to the grid (pin 3) of this tube, the more the eye closes. When receiving, the grid of the tuning eye is connected to the receiver agc circuit. The stronger the received signal, the more negative the agc voltage, and the more the eye closes. The eye is used to meter the grid voltage when transmitting.

The transmitter circuitry is conventional but characterized by its trouble free operation and ability to make almost any crystal in the 6 or 8 mc band oscillate.

A 6CL6 tri-tet oscillator (V1) causes the crystal to oscillate at its fundamental frequency, not an overtone. A small r-f choke in the cathode circuit introduces a controlled amount of regeneration to increase the output of this stage. The 24 mc (3rd harmonic) energy in the plate circuit is fed to a 12AV7 tripler (V2A). The 9th harmonic energy produced by this tube is further multiplied by the other half of the 12AV7 to 144 mc (the 18th harmonic of the crystal). A 2E26 pentode works straight through as a two meter final amplifier. Either a crystal or carbon microphone can be used to drive the speech amplifier, V4A. The speech amplifier drives the other half of this twin triode, which in turn drives the 6V6 modulator.

The power supply uses a universal power transformer, that is, one that will operate from the 110 volt a-c mains or from a storage battery with a vibrator to "chop up" the d.c. Dual 6X4 rectifier tubes are used with either power source.

A Tubeless VFO

Possibly the most popular addition to the Communicator is the "Tubeless VFO". This unit consists of a simple high Q tuned circuit that plugs in place of the crystal. In operation, the tuned circuit converts the 6CL6 (V1) crystal oscillator to a tuned Colpitts. In operation the VFO is extremely stable if all the components are securely bolted to a polystyrene panel mounted on the front panel of the chassis box. Also, the Air-Dux coil (or the homemade one, if you prefer) is cemented to the poly panel so that no vibration of the coil can occur. In addition, use the most rigid chassis box available to insure that the VFO is mechanically solid.

The dial should be the best quality available so that no backlash can occur. A National type MCN is preferred. Because the coax cable is part of the tuned circuit, the length should not be changed for any reason. If the above is followed the VFO will have good stability. My article next month will show photos.

The coil used in my version was Air-Dux type, with a pitch of 16 turns per inch and 1 inch in diameter. In case you wish to "roll your own," coil data is included on the schematic *fig 2*.

Layout used in a commercial version of the Tubeless VFO is shown in *fig 3*. The box is an ICA 3x4x5 inch style with overlapping edges. The poly plate is mounted about 1 inch back from the front of the panel on 1 inch pillars and lock washers. At the junction of the coil and coax cable a tie point is used to secure the two wires.

Because input capacities vary, to install an additional 10 mfd silver mica may be necessary across the calibrating capacitor. The acid test of the tuned circuit is with a grid dipper. With the cable plugged into the Communicator, the tuned circuit should resonate at 12 mc on the low end and 12.33 on the high end. To calibrate the VFO, insert a crystal that will come out near the low frequency end of the band

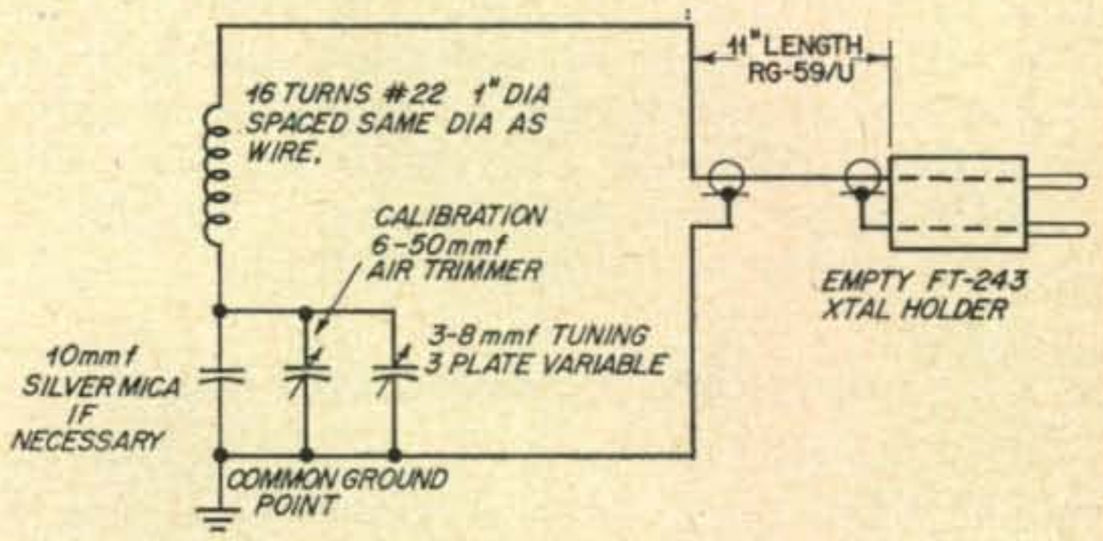


Fig. 2. Tubeless VFO diagram.

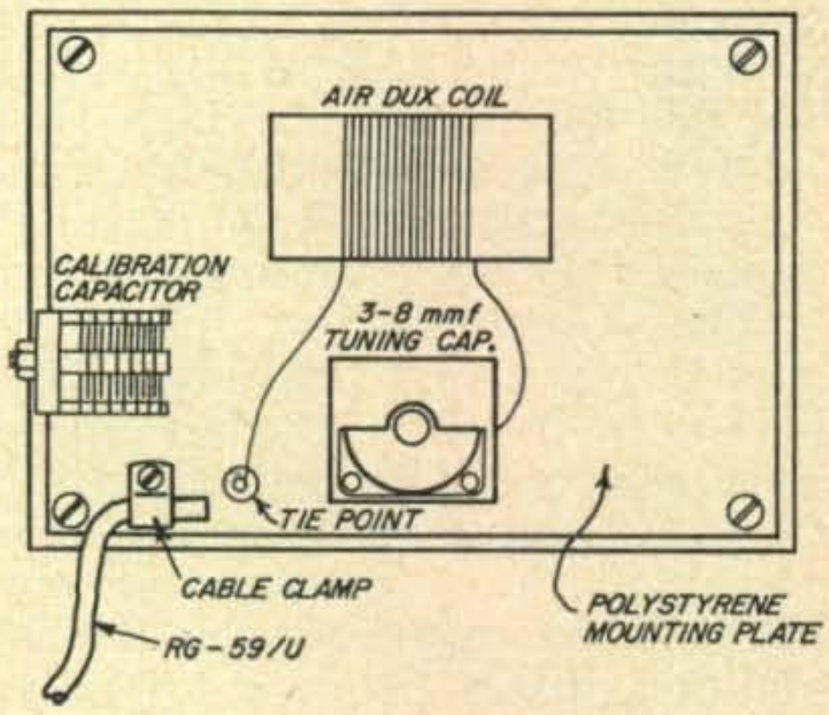


Fig. 3. Layout for tubeless VFO.

and turn the eye switch to the oscillator-tripler position. Turn on transmit and peak all adjustments for maximum power output. Remove the crystal and plug in the VFO with the MCN dial set at 10. Adjust the VFO calibrating trimmer for maximum closing of the eye with the switch in the tune-load position. Turn on the receiver but leave the eye switch in oscillator position. Set the VFO dial for 10 and the receiver dial for 144 mc and slowly adjust the trimmer until the signal is heard in the receiver and the eye closes. After this has been completed, 146 mc should appear near 50 on the MCN dial.

If the VFO is installed in an automobile, be sure to bolt it securely to the dash or steering column. To zero beat a station turn the function switch to the oscillator tripler position and turn the VFO dial until a beat note is heard. The other controls should be peaked up for maximum grid drive.

In order to zero beat accurately, it may be necessary to make a minor change in the Communicator. When the function switch is in the oscillator tripler position, it places less voltage on the oscillator tube than when actually transmitting. Therefore, even though you very carefully zero beat a station, you will transmit slightly higher in frequency. The simple solution is to place the same voltage on the oscillator when zero beating as when transmitting. This can be accomplished by connecting a 100K pot. across the resistor, listed on the Communicator schematic as *R4*. This resistor is located on the back of the function switch. The pot. can be placed in parallel with it by placing hooks in the end of the leads and crimping them around the 100K resistor leads. The value of this pot. will vary the calibrate frequency. Another solution might be to anticipate the frequency shift and set the VFO slightly lower than the frequency of the incoming station to compensate for it.

Improving Receiver Stability

The old trick of removing the 6 mc i-f signal and feeding it into a communications receiver (as described in the rear of the Gonset Communicator manual) is still a good one. *Double conversion* obtained in this manner will improve the selectivity many fold, but it does leave something to be desired in the way of stability. Because of the portable aspect of the Communicator, the high frequency oscillator was never intended for this type of service and severe drift is usually encountered generally due to line voltage variations.

The Communicator bandwidth is wide enough to accept small oscillator frequency variations, but if used with a sharp communications receiver the signal will drift right out of the communications receiver bandpass. The circuit modification shown in *fig 4* will minimize the drift by regulating the B plus voltage. In addition, it will also tend to minimize the buzz

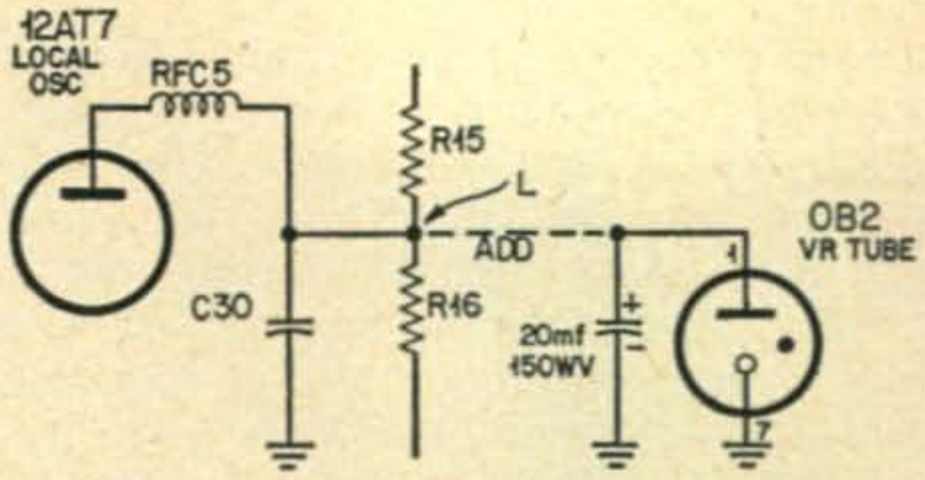


Fig. 4. Improving stability.

on the signal when copying c.w. as described under *How to Receive CW*.

More serious 2 meter operators have carried stability even farther. It is possible and sometimes desirable to install a crystal control unit to replace the local oscillator in the Communicator. A printed circuit, such as the *International Crystal Company* FO-6 is ideal for this purpose. To install such a unit, it is only necessary to link couple the oscillator output to local oscillator coil in the Gonset and remove plate voltage from the 12AT7 local oscillator tube. When such a crystal control unit has been installed, signals that are coupled into the communications receiver will be pure "T9" and solid copy.

High Power Linear Amplifier

One of the remarkable qualities of the Gonset Communicator is its ability to work *almost* everything that it can receive. I say almost everything, because occasions do arise when the other fellow *isn't* using a Gonset and what you hear is the advantage of higher power . . . 1E. He gets out farther. Its then nice to be able to boost your power to a level that can be received on the other end. This has been proven by the wide acceptance of the Gonset RF Linear Amplifier. This unit uses a pair of 826's (replacement with war surplus tubes when those wear out will cost about 2 dollars) and produces approximately a 10 db. signal boost. This means that if you drive the linear with 6 watts (standard output for the Communicator) the radiated power from the linear will be in the vicinity of 60 watts, quite an improvement! The Gonset Linear contains a clever switching circuit so that it is unnecessary to make any internal connections to the Communicator. R-f voltage that appears on the linear grids causes a relay to trip which in turn switches the antenna over to the transmitter and turns on the amplifier.

The circuit shown (*fig 5*) uses a common war surplus tube and contains automatic switching. An 829B/3E29 is used as a push-pull Class B linear r-f amplifier. When receiving, no r.f. from the Gonset appears across the transmission line. Under these conditions, the 6C4 is biased too high to cause RY-2 to pull in. RY-2, which controls RY-1 (The coax antenna relay) causes the coax antenna relay to switch the

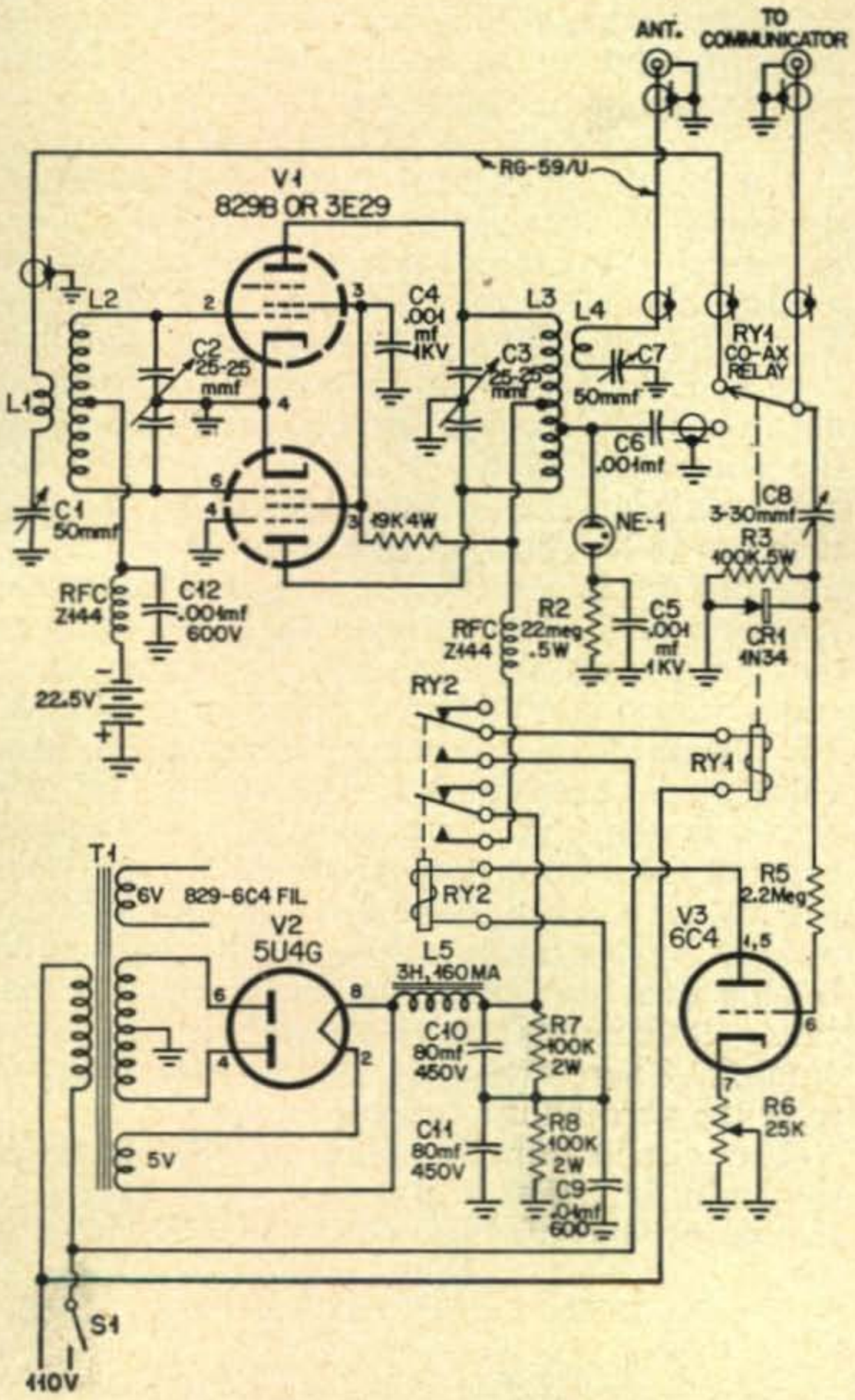


Fig. 5. Linear Amplifier. Parts are indicated. C6-1kv; C8-compression padder; C9-paper; C10, 11-electrolytic; L1-2 turns #16 insulated 1¼" dia; L2-5 turns center tap #12 silver plated 1½" dia; L3-same as L2 but tap one turn from center; L4-same as L1; RY2-5000 ohm or more coil.

Communicator coax to the 72 ohm tap on the final tank coil. No r.f. from the incoming signal is lost with this method because the final tank coil acts as an antenna tuner while receiving. Another set of contacts on RY-2 removes B plus from the final amplifier tube.

When the T-R switch on the Gonset is placed in the transmit position, r-f voltage appears across the transmission line and is rectified by CR-1. The positive voltage produced by this crystal causes the 6C4 to conduct heavily and this trips RY-2. RY-2 in turn energizes the coaxial relay and switches the Gonset transmission line to the input of the linear and turns on the plate voltage.

For six meters this same circuit will work satisfactorily providing the input and output coils are rewound and grid-dipped. Construction is on a 7" x 13" x 2" *California* chassis. The tube is placed in a horizontal position (as shown in *fig 6*) and the grid and plate tank circuits placed close to the approximate connections on the tube. The relay control tube and the two relays are placed along the rear apron of the chassis.

The power supply (already on hand) was placed on another identical chassis. If desired, it is possible to construct both the power supply and amplifier on the same (but larger) chassis.

The ½ watt neon bulb (NE-1) is a tune-up and modulation indicator. The 22 meg resistor (R2) ignites the bulb and when the transmitter is correctly tuned up, it will glow brighter as the Communicator is modulated. The tap for the neon bulb and receiver coupling is placed on coil L3 at the point where the modulation indication is just discernible. If the tap is placed too high on the coil, it will reduce the efficiency of the linear and if it is placed too low, the receiver sensitivity will suffer.

The transformer for the power supply is not critical and almost any on hand can be used. The more a-c that it delivers to the rectifier, the more power output. Ordinarily, the 829B should not be run at more than 600 volts

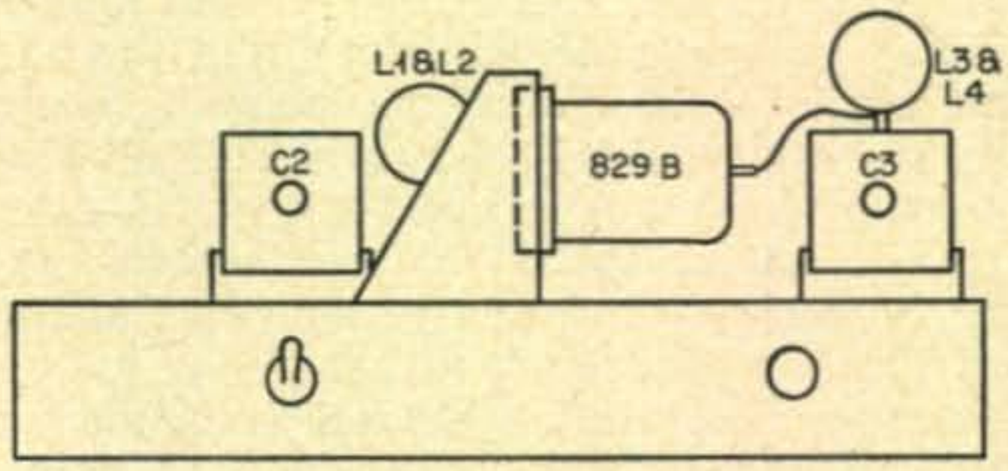


Fig. 6. Chassis layout.

at this frequency because of its lower efficiency. However, in linear service one can usually push the rating a little. C1 and C2 are adjusted for maximum grid voltage as indicated by a neon bulb or other device. C3 and C7 are adjusted for maximum power output consistent with upward modulation. Too much coupling or off resonance operation will cause downward modulation. For best efficiency, coils L2 and L3 should be silver plated. The greatest efficiency that you can obtain will produce the greatest power output.

To adjust the automatic operation, set R6 so that RY-2 just drops out. Then turn on the transmitter and adjust C8 until the relay trips. Do not increase the capacity too much or you may burn out the crystal. Any tendency to chatter in RY-2 should be corrected by adjusting C8 or R6. Be very careful when making adjustments inside the linear with the switch on. It is easy to bump either relay contact which could cause the B plus circuits to be energized. One other cause of trouble might be self oscillation in the linear amplifier. Should this occur, the crystal would rectify this r-f constantly, making it impossible to "shut off" the linear. If this appears to be the case, follow the amplifier neutralization procedure as

described in the Radio Handbook. This will stop any tendency toward self oscillation.

How to Receive CW

Most people don't realize just how simple it is to copy c-w on their Communicators. This stunt requires no work, and only 50 cents cash.

The b-f-o signal is usually injected into the i-f channel. The Communicator i-f frequency is approximately 6 megacycles, therefore, all that is necessary is to build a 6 mc oscillator and inject it into the i-f. Fortunately, the Gonset has an oscillator built right in that can be turned on and off at will. A 6 megacycle crystal was duly inserted into the xtal socket and the tuning eye switch placed in the oscillator tripler position. The 6CL6 oscillator tube then functions as a beat frequency oscillator and because of its strength, and proximity, it injects a strong signal into the i-f amplifier circuit. To a certain extent, the amount of injection can be controlled by changing the first tripler or oscillator adjustment.

In some cases, it may be noted that the "birdie" or beat note will not be at the exact same place on the dial as the incoming station. This is because the i-f frequency of all Communicators may not be exactly 6 mc. A crystal of 6 mc vintage should be satisfactory, but it may be necessary to do some experimenting with the best frequency to use.

Because the b.f.o. is crystal controlled, no drift can occur. Drift, therefore, can only be caused in the tunable oscillator circuit. The crystal trick was tried in several models I and II. Satisfactory performance was noted in all cases. In some models, an extreme raspiness of the beat note can occur because of poor filtering of the tunable oscillator's plate voltage. The 120 cycle ripple can cause the oscillator frequency to vary at a 120 cycle rate, causing a buzz on the beat note. This can be corrected by inserting an r-c filter in series with the B plus lead to the tunable oscillator as shown in *fig 4*.

By the way, the 24th harmonic of the 6 mc crystal makes an excellent band edge marker at 144 mc.

Sensitive Plug in "S" Meter

Re-sale value, ah yes! For some strange reason, if you were to install a gold plated platinum ball bearing "S" meter and cut a hole in the case in place of that "green eye," the re-sale value of your Communicator would drop $50.00. The "green eyeball" makes the Communicator what it is, for it is almost a trade mark. To install an "S" meter, simply remove the socket from the 6E5/6U5 tuning eye tube, and plug an "S" meter cable into it. Last but not least, adjust the zero pot for a zero reading on the meter with no incoming signal. It's as simple as that. The circuit was stolen bodily from the *Heath* V-7 vacuum tube voltmeter manual but modified somewhat to make the operation non-linear. S-9 is about mid scale and full scale represents 50 db over S-9.

The operation is very simple and quite understandable. Because both of the triodes draw the same amount of current, the cathode to ground potential of both tubes is identical. Therefore, the cathode to cathode potential is zero and the meter will read zero. As soon as negative AVC voltage appears at the grid of the controlled triode, V1, the two tubes become unbalanced. In this case, the controlled tube draws less current, the cathode to ground potential of this section is less and the meter reads up scale. The stronger the AVC voltage, the more unbalance we have and the meter reads progressively higher. The standard triode V2, always draws the same current which provides a reference for V1. The stability of this circuit is about the best available for a simple vacuum tube voltmeter. As the tube ages, both triodes get weaker, naturally, but they will get weaker by the same amount. The change in B plus does not affect the meter balance because it changes on both tubes the same amount. Therefore, it is seldom necessary to reset the zero adjust control.

The circuit for the plug in "S" meter is shown in *fig 7*. The 39K resistor will determine the sensitivity of the meter. If the value is

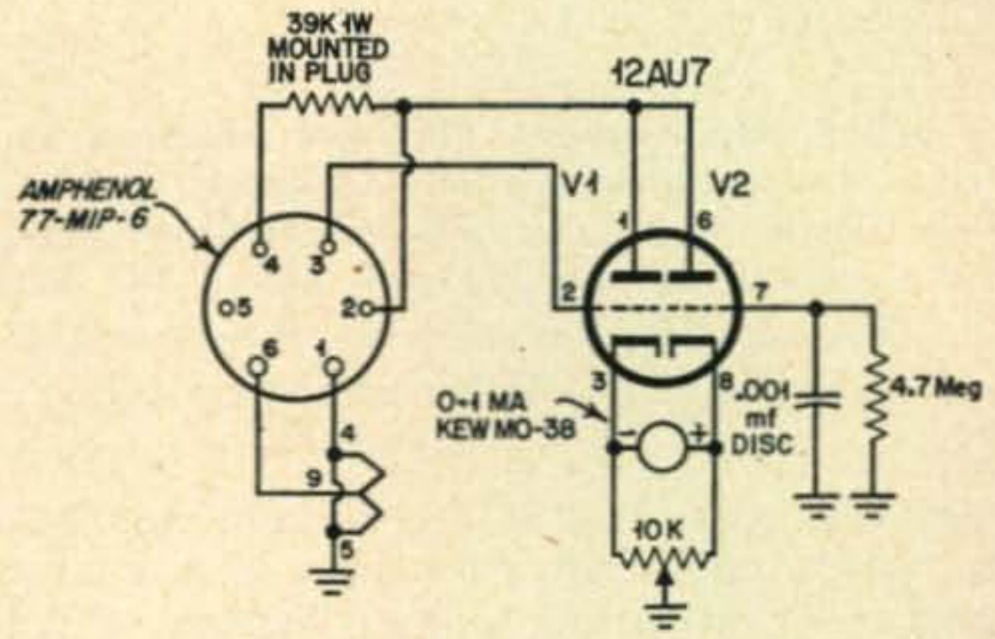


Fig. 7. Plug in "S" Meter schematic.

reduced, the pointer will "peg" even on a weak station. If it is increased, the meter will never go to full scale. The 10K pot is a 2 watt Allen Bradley "J" (used for the zero adjust). The meter is a Japanese midget 0-1 ma (MO-38) and is available from Arrow Sales in North Hollywood. Naturally, any 0-1 ma meter will work, but because of their small size these meters are very desirable. All the parts were mounted in a *Bud* Minibox (CU-2102). The meter will mount on the end of the box with a 32nd of an inch to spare. The 12AU7 was mounted on the rear end of the box on spacers as shown in *fig 8*.

To mount the "S" meter on the Gonset case, without drilling any holes in it, a 4/40 screw was passed through the "S" meter case just

forward of the zero adjust pot. This screw was secured through the ventilating grill on the top of the Communicator, providing a secure mounting.

Converting from 2 to 6 Meters

Because of the high mortality rate of Novices who operate on the two meter band, a method of converting their Communicators to six meters is included in this discussion. It is not particularly an easy job, because it involves working in cramped locations. For the receiver conversion, it is necessary to remove the two meter coils in the cascode preamplifier and mixer oscillator stages; then replace them with

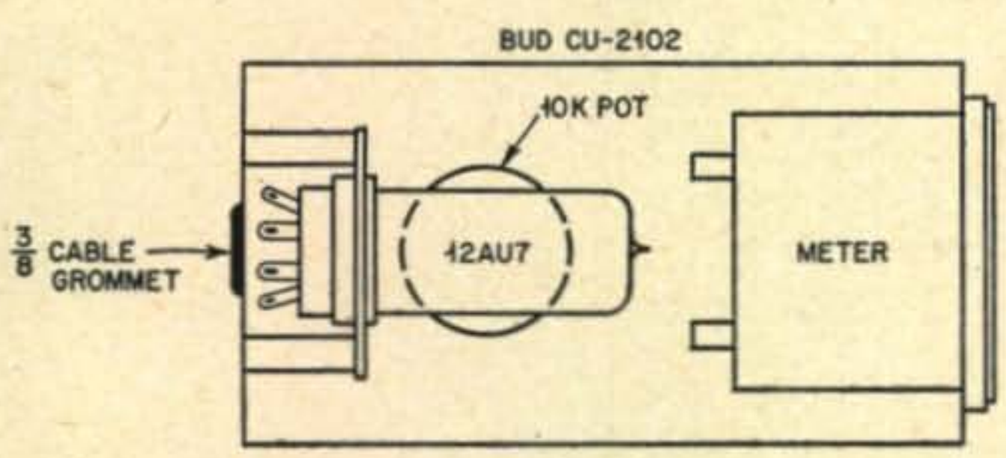


Fig. 8. Approximate chassis layout.

ones that are resonant at six meters. The transmitter is somewhat easier to convert. This involves removing the final tank coil and replacing it with one that resonates at six meters in addition to swapping some leads.

Start the conversion by locating a piece of ¼ inch rod as a winding form. Also obtain a roll of #22 enameled wire for the coils. Close wind a coil on the ¼-inch form containing 14 turns. At the 7th turn scrape the wire and secure a tap connection on it. Next wind a coil with 18 turns of #22 wire (no tap on this one). Then wind a coil with 11 turns of #22 wire. For the oscillator, wind another coil of 14 turns with a tap at 7 turns. However, before removing this coil, cement it thoroughly with coil dope to prevent any change in inductance with vibration.

Replace the cascode antenna coil (antenna connects to the tap) with the first 14 turn coil. Connect the wire from the antenna jack to the 7th turn tap. Remove the 2 turn link from the cascode plate coil by cutting it at the junction. Remove the plate coil and replace it with the 18 turn coil and cement it securely. Replace the link. Remove the heavy 4 turn coil that is parallel with the front of the receiver chassis (mixer coil). Replace this coil with the one previously wound containing 11 turns. Cement it so that it is mechanically solid. Remove the remaining coil (oscillator coil) and replace it with the 14 turn, center tapped coil. This completes the modifications.

Preliminary adjustments should be made with the aid of a grid dipper. Set the two cascode coils to 50 mc (have an antenna connected). Adjust the mixer padder for resonance of the mixer coil at 50 mc also. Set the oscillator padder so that the oscillator coil resonates at 44 mc. Then complete peaking these adjustments by receiving a weak station near the low end of the band. Because the frequency has been lowered considerably, the dial will have a greater coverage than may be desired. This can be corrected by spreading or removing plates from the tuning capacitor.

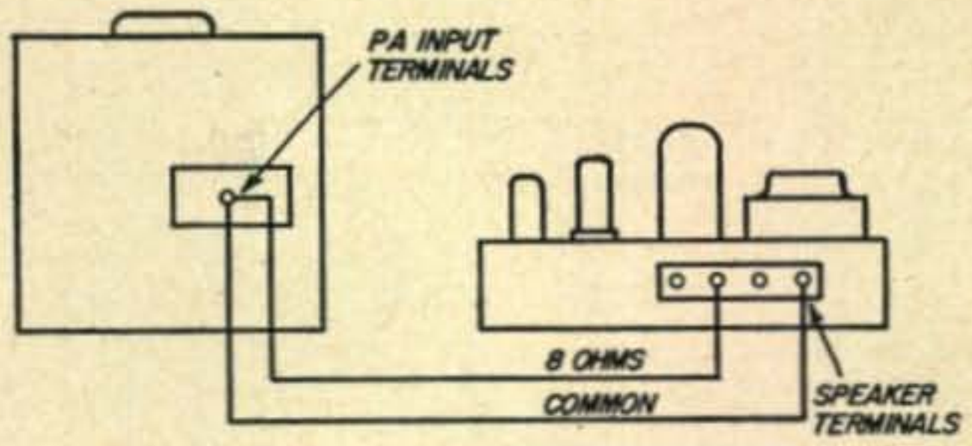


Fig. 9. An External Modulator.

To convert the transmitter, proceed with the following steps. Disconnect the 100 mmfd capacitor from the tap on the doubler coil. (This capacitor is connected between the doubler coil and pin 5 of the 2E26.) Add a half inch piece of wire to the loose end of this capacitor and connect it to pin 1 of the 12AV7 tube. Connect a 10 mmfd capacitor from pin 1 of the 12AV7 to ground. Remove the 2E26 and its associated plate coil. Be careful, that little r-f choke is delicate. Wind an 18 turn coil, tapped at 4 turns from the bottom end, out of #22 wire. Replace the two meter coil with this coil. The tap on this coil will be connected to the ground bolt, the part with the most turns will be connected to the top capacitor and the part of the coil with the least turns will be connected to the bottom capacitor. This completes the conversion of the transmitter.

Tuning of the "new" six meter Communicator is accomplished in much the same manner as before. However, the "eye" indication obtained in the doubler position will not mean anything, because this stage has been bypassed.

The transmitter containing these modifications is capable of putting out approximately 5.6 watt of power into a matched load. The receiver sensitivity at the low end of the band is approximately .7 μvolts for a detectable signal. Because the cascode r-f amplifier is "hot" (that is, it may have a tendency to oscillate), it is advisable to use only an antenna that is matched to the input impedance of the Communicator (between 50 and 80 ohms).

An External Modulator

It is possible to boost the modulation level of the Communicator by using an external audio amplifier (such as a "HI-FI" amplifier) as a modulator. *Fig 9* shows the manner in which the amplifier is connected to the Communicator. Access to the Communicator modulation transformer can be obtained by connecting to the *PA JACK* located on the rear apron of the transmitter chassis. Therefore, it is unnecessary to cut any holes in the chassis, for

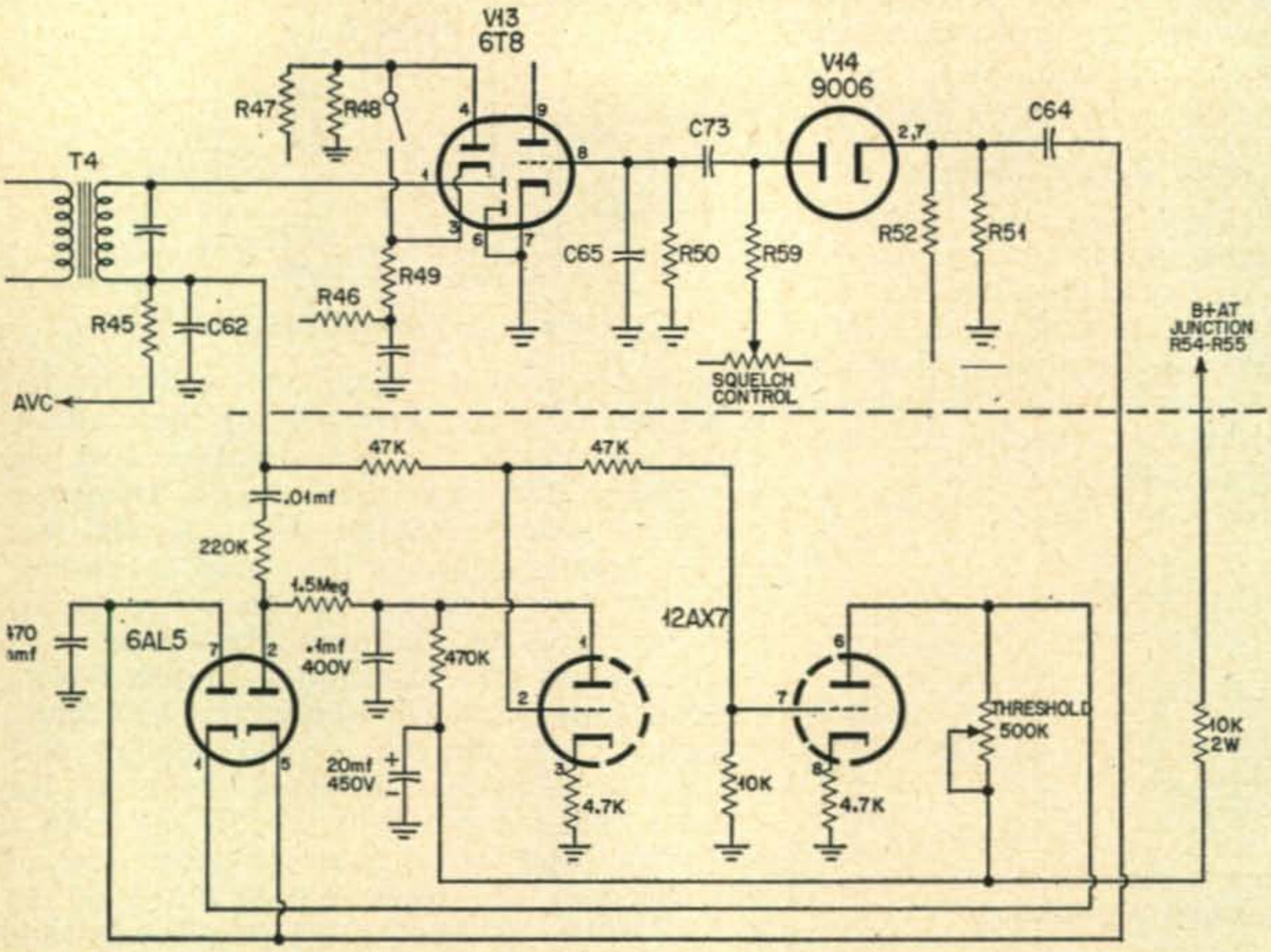


Fig. 10. TNS Noise Silencer Circuitry.

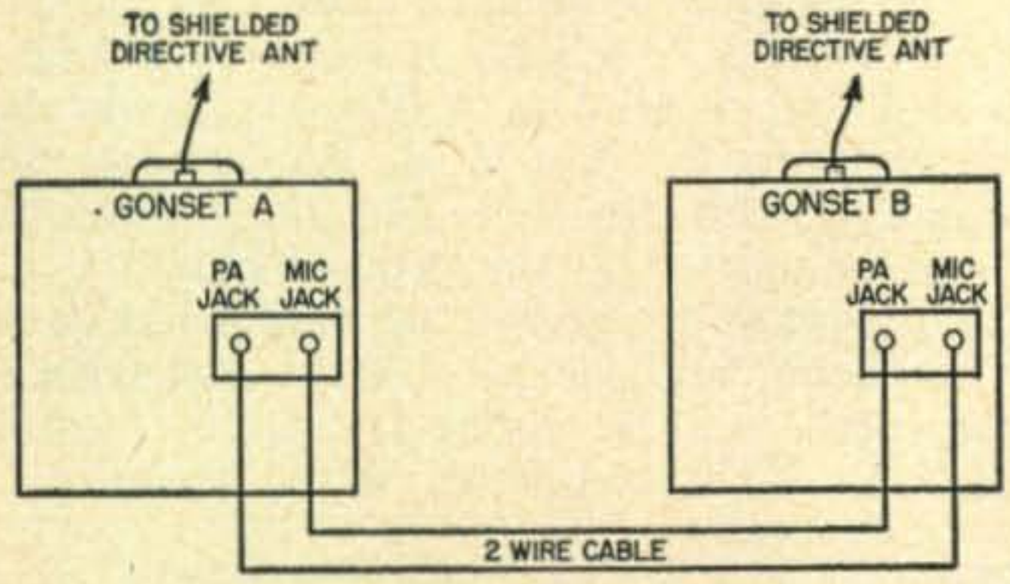


Fig. 11. Connections for Relaying.

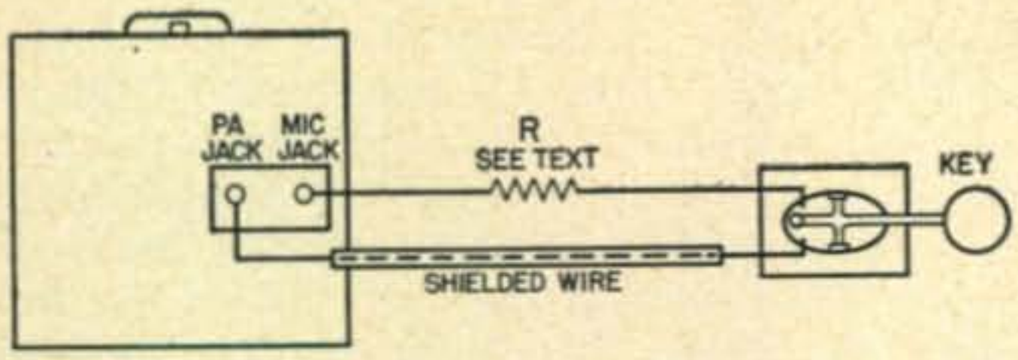


Fig. 12. Transmitting MCW.

Fig. 13. Lo-Noise r-f Amplifier.

connectors. The Communicator audio should be disabled by switching to carbon microphone and then removing the mic. When the transmitter is placed on the air, the microphone gain on the "HI-FI" amplifier should be turned up to a predetermined level. If the volume is left on when receiving, it is possible to get feedback between the speaker in the Gonset and the microphone.

A TNS Noise Limiter (Squelch)

I would like to take credit for the development of the TNS noise limiter, for it is one of the best noise silencer circuits available to the amateur. Unfortunately, the only connection is the similarity of the call letters. Several W6's have tried using the TNS noise silencer as an accessory to the Communicator and they have all reported good results. The author tried it and found it was everything it was claimed to be. It is necessary to remove the receiver chassis and mount a terminal for the output of the detector and one for the input to the audio. All components between these two points were removed and laid aside.

To modify the Communicator, proceed with the following steps: First, locate i-f transformer *T4*. This transformer is located nearest the 6T8 tube. Next, locate the terminal of *T4* that is connected to *R45*, *C62*, *R46* and *R47*. Remove all connections from this terminal except *C62* and *R45*. A 16 inch length of shielded wire should be connected to this point for connection to the TNS. Be sure to ground the braid connection of the wire. Next locate the noise clipper switch. Remove *C64* (a .004 ceramic) from the switch terminal. Mount a

tie point near this capacitor and secure the capacitor to it. From this tie point, connect a shielded wire for the output connection of the TNS. Because the TNS does not introduce any distortion into the audio, it is unnecessary to install an on-off switch. However, if the noise limiter switch was connected to move *C64* from the output of the TNS, to the terminal of *T4*, it could be used to demonstrate the effectiveness of the TNS.

Fig 10 is the circuit and modifications. Note that *R46* and *R47* are left hanging. They are part of the original noise limiter and are no longer used. The threshold control duplicates the action of the squelch control in the Gonset Communicator II. However, it was left in the circuit so that owners of the Gonset I could use it. To adjust the Squelch, tune the Communicator off station and rotate the control until the audio is silent. Then when the dial is tuned across the two meter band, the AVC voltage from the incoming station will automatically turn on the receiver audio. The noise limiting feature of the TNS is also automatic and the TNS circuit values shown are optimum. One component that has proved to be very critical is *C64*. If this capacitor is the slightest bit leaky, there will be no squelch action and noise limiting will be impaired. If there is any doubt about the quality of this capacitor, replacement is recommended.

DX Relays

Because of the versatile connections provided on the Gonset Communicator, it is possible to use two Communicators for relaying. As an illustration, let us assume a typical situation. Assume you are on a hill top and receiving a station from each valley. As is usually the case, the stations in the valleys cannot hear each other. If two Communicators were connected as shown in *fig 11*, it would be possible to relay to each other. Communicator "A" receives the station from valley "A" and the audio appears at the rear panel jack marked PA. A two wire cable from this jack is connected to the mic. jack of Communicator "B" and this Communicator is transmitting. The conversation can be monitored by listening to the speaker in Communicator "A." As soon as station "A" stands by for station "B," Communicator "A" is turned on transmit and Communicator "B" is turned on receive, and the same process is repeated in the other direction. Cross modulation is quite severe (interference between the two Communicators) but with strong signals and/or directive antennas this system is quite successful. When it is time for the station on the hill top to transmit, the mic. plug in either communicator is pulled out and a suitable microphone connected.

The choice of frequency for the two Communicators depends on the amount of interference between the two. Usually frequencies at each end of the band are most successful but there are frequencies nearer the center of the band where there is absolutely no interference (this appears to be a cancelling effect).

MCW Transmissions

No originality is claimed for this one. I found it listed in the rear of the Gonset Communicator manual where almost everyone overlooks it! By making the connections shown in *fig 12* a modulated c-w note can be transmitted. The signal is removed from the external PA jack on the rear apron of the transmitter chassis. It is passed through the key and a a resistor and then re-inserted into the transmitter through the "ring" connection on the PL-68 plug that is inserted into the mic. jack. Internally, from the jack connection, the signal drives the audio modulator in the transmitter. In this manner, we create a feedback path and the signal keeps racing around in a circle, so to speak. As a result, the modulator breaks into oscillation, producing an audio tone that modulates the transmitter. Breaking the circuit with the key interrupts the feedback path and causes the tone to stop. The value of the resistor and the setting of the audio gain control will determine the tone of the modulation. Any value of *R* between 1 and 50K should prove satisfactory.

For neatness, the spare contact on the microphone jack could we wired to the PA jack which would allow a single cable to connect to the key. The resistor could be mounted inside of the PL-68 plug. Wired in this manner, the mic. jack would also accept a handset which would come in handy for mobile operation.

Low Noise Pre-amplifier

The purpose of an r-f amplifier or pre-amplifier is to boost the signal level for increased sensitivity. Usually, the noise generated inside the tube is increased as well, leaving one right back where he started. The idea, then, is to increase the signal as much as possible but generate as little noise in the tube as possible. The r-f amplifier in the Gonset would be considered a low noise type (6BQ7) but it can be improved upon by using a slightly more expensive r-f amplifier tube. The diagram shown in *fig 13* is a universal r-f amplifier circuit, that is, it will function with various r-f amplifier tubes without changing the values shown. In selecting the r-f amplifier tube to use, let your pocket book be your guide. The more you pay for the tube, the better the performance (roughly speaking).

The best tube available for this circuit is, naturally, the WE-416B. Using this tube, it is possible to obtain a noise figure of less than 2. Cost—(unless you have a friend) about $100. Next in line is the WE-417B which will produce a noise figure between 2 and 3 depending on how well you adjust the circuit. The

[*Continued on page 107*]

These sails were replaced on Canton, visited before Nauru.

Danny Weil started well over a year ago from England with the overall goal of being the first Englishman to sail single-handedly around the globe. While making this trip he has been stopping at many out of the way DX ocations, setting up his ham station, and giving everyone interested a contact with that rare country. As FO8AN, VR1B, VK9TW, VR4AA and VP2VB/P Danny gave out thousands of DX contacts. Since this story was written the Yasme ran afoul of a reef off the coast of Australia. Look for the thrilling story of this disaster in a future issue of CQ. You can keep up to date on Danny in the DX column. See the index (December 1956) for a complete listing of all previous Yasme articles.

Yasme

Danny Weil, VP2VB/P

Nauru Island, VK9TW

My arrival at Nauru Island was 4 hours late, a result of my falling asleep at the helm and wandering about 7 miles off course. This slight deviation necessitated waiting around a couple of hours to obtain sun sights for an exact position. I had planned to arrive at a reasonable hour, but this slip-up caused me to arrive at cocktail time . . . most annoying for all concerned. Even so, by the time I had tied up to one of the massive buoys, a launch had been lowered into the water and as it came alongside, I was greeted by the customs and police officials. They were most charming and considerate, and the formalities were soon completed. The hour was pretty late, so plans to go ashore were put off.

It was a relief to stay aboard that night; the trip from Ocean Island had hardly been a comfortable one, and I'd forgotten when I last had a good sleep. Directly my visitors had departed and I hit the sack for a well-needed snooze.

Tired as I was, I passed a pretty restless night—as Yasme insisted on having minor arguments with the buoy. The continual thumping through the night kept me on deck fending her off with a boat hook and trying to put some old rubber tires between the two of them.

Only those of you that have had the experience of keeping a yacht from a buoy can appreciate my troubles. The lack of wind, which normally would have kept Yasme away from the buoy, made things doubly difficult.

Day broke without a sound except for that infernal thud from the buoy, and by this time I had practically taken up a permanent location on the foredeck armed with boat-hook and fender. What a night that was, and it wasn't

These are set up for the Birds to roost on.

until around 0800 that a slight breeze came up which kept Yasme from bumping.

I had felt pretty rough the night before, but now I was a wreck! My nice clean whites, donned that previous evening, looked as though they had been used to clean down the engine. After cleaning up I came up on deck to find many Nauruan lads with their outrigger canoes gathered around.

Although I had a fat head and felt like nothing on earth, the sight of all those smiling faces soon brought my temper down to normal. The rapt expressions on their faces when they learned that I had travelled from England alone was really something to see.

One of them took me ashore in his canoe. Armed with my case full of ships papers and attired in a clean set of whites, I stepped ashore to be greeted by Harry Freeguard, an Englishman like myself. In no time at all I was having a much needed shower, and afterwards, plenty of chow.

Digging out the Phosphate ore

Naturally, conversation went around to the voyage, and later that day when I had talked myself hoarse, Harry took me for a fast trip around the Island. By this time it was getting pretty late, so I was unable to spend much time in seeing everything, but after my experience at Canton, that wonderful sunset on Nauru, with the masses of trees made me feel really good.

My first day at Nauru was at an end, but in those few hours, I had been introduced to countless people, all of whom were interested in hearing about my voyaging. Dinner invitations poured in and I was overwhelmed with

Lifting Yasme out for overhaul

everyone's friendliness.

What a day that was for me. . . . I didn't dream I could have been so happy, and that night, after being taken aboard again, I slept the sleep of perfect contentment. Even Yasme decided to keep clear of that infernal buoy for one evening.

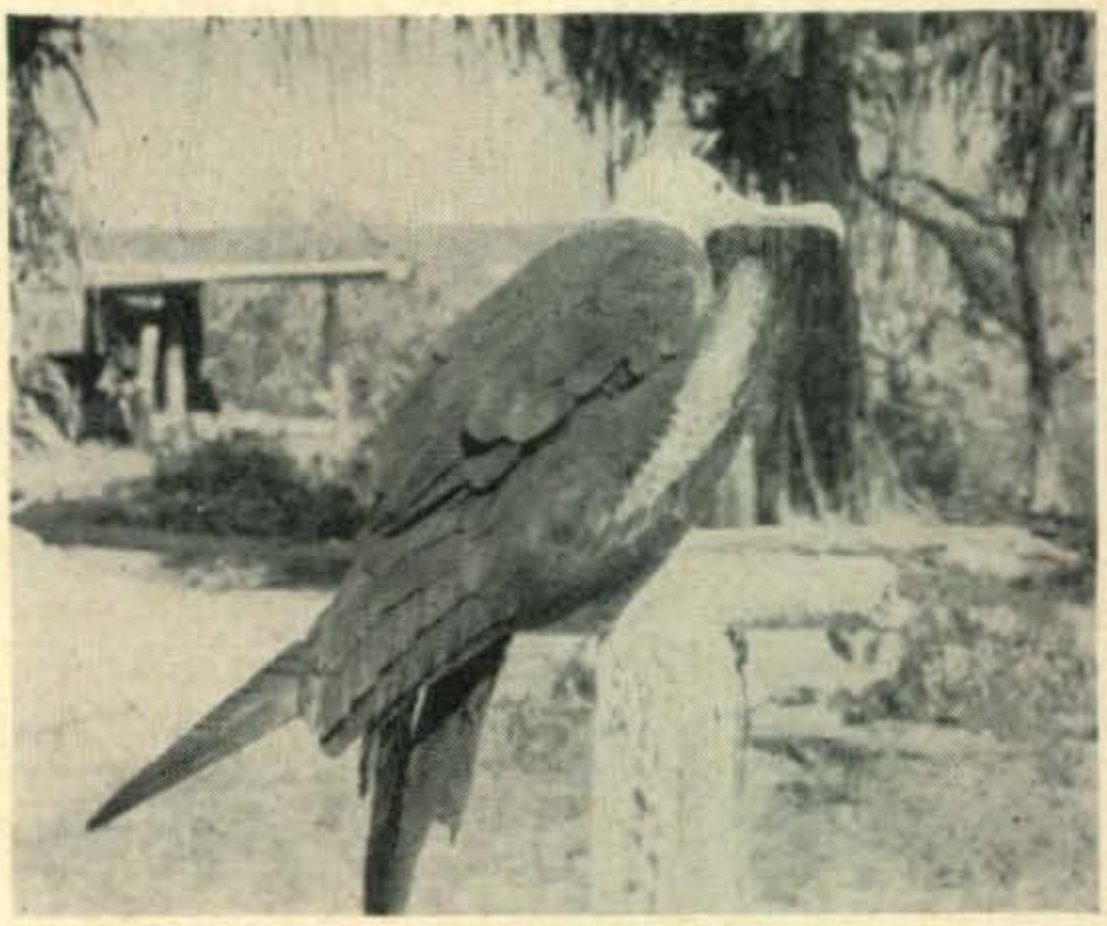
Early the following morning saw me ashore making an appointment to see Mr. Cameron, the Island Manager, and whilst he was very busy, he granted me an interview right away. Seeing important people always gives me a feeling of apprehension, but I need not have felt that way, because directly I got into his office, he made me feel at home, even inviting me to take morning tea with him.

After the initial introductions, little time was lost in telling him about my purpose for the voyage and visit to his island.

I feel that I must have babbled to him for hours with an assortment of facts dealing with sailing, radio, the last place, etc., etc. In fact, I must have got the poor chap completely befuddled with so much talk, and yet, he listened most attentively the whole time, rarely interrupting. I suppose I could have gone on talking forever, but eventually I did dry up, much to Mr. Cameron's joy, I should think. He supplied me with proper living accommodations ashore and a place to operate the rig, and to top it all off, arranged to have an antenna fitted up. Now this antenna wasn't anything cheap or rough, but the real thing.

Some chaps came along, dug a couple of deep holes around 200′ apart, and in them were concreted two 40′ steel poles. The usual wire was strung between, and finally, a 6′ steel post was driven into the ground for an earthing rod.

Little time was lost in getting cracking, and you lads saw that I didn't get any rest. During the first few days C-W QSOs were being logged at 2 to 3 a minute, but as is usual with all the rare spots, business started to drop off a bit after that. It was most unfortunate that the band was at its best at dinner time, but whatever way I planned my skeds, there would always have been someone who would have been unlucky. Fifteen was useless most of the time so naturally I devoted most of my time to twenty. You know fellers, I try to please everyone, but unfortunaely I have to eat and sleep. I reckon 12 hours a day regularly on the rig is enough for anyone, so for those that were unlucky, I can only say I am very sorry; perhaps you will be lucky when I make my next trip around . . . who knows?



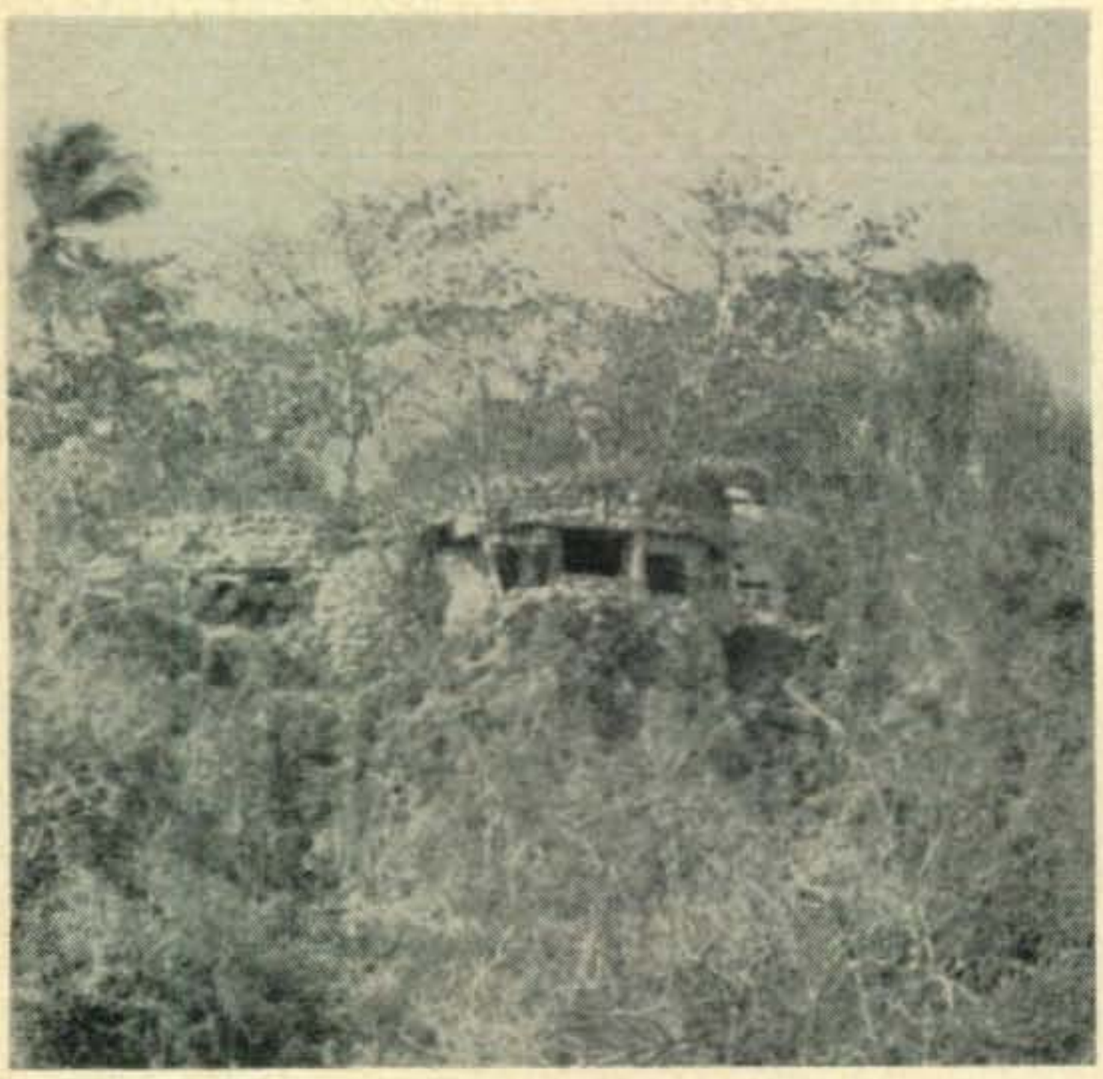
Cormorant bird

As many of you know, most of my gear was out of commission on arrival at Nauru, partly through bad luck, and partly because my test meter had given up the ghost. Fortunately Les Wright (VK9LW), in charge of the radio station there, stepped in and offered his help. He took every piece of gear I possessed and gave it a complete overhaul, so by the time I left, everything was in 100% working condition. Considering he had a full time job at the radio station, I reckon he deserves a great big pat on the back for all the time he devoted to the rigs.

He is unable to get on the air at present owing to lack of a transmitter. I have been trying, with the aid of W7PHO, to see if we can get him fixed up with the necessary gear to construct one so that we shall have a permanent ham on Nauru. The likelihood of another ham ever going there is pretty remote, so it would certainly help the DX boys if Les was on the air regularly . . . maybe some of you have some bright suggestions on the deal, if so, drop Les a line or Bill, W7PHO.

DX work progressed very favorably until one day, on my visit to Yasme, I found that she had taken considerable water . . . it was over the floor boards. I knew before I looked

Old Japanese pillbox



where she was leaking. A thorough inspection showed that the repeated bangs from the buoy had caused the stem to open up well below the water line, and water was pouring in from a ¼″ slit about a foot long.

This put me in quite a spot, since there were no facilities at Nauru for either beaching or slipping Yasme. I could make a temporary patch up job whilst she was moored, but I knew that directly I got under way, she would leak like a sieve. Well, there was only one alternative . . . Mr. Cameron.

Repair

I felt that he might be able to suggest some way to fix the damage. After my talk with him, he went straight to the Port Captain and his assistant, and they immediately came out to the Yasme armed with a tape measure. Within half an hour all the necessary measurements were taken, and then they started doing a little measuring ashore. The following morning at 7 the Yasme was towed into the inner harbor, tied up under a crane, all her deck gear put ashore, and the mast unstepped and lifted out . . . the first time since she had started the voyage. After that she was slowly brought under another crane which projected over the wharf, and then, with the aid of some of the Nauruan lads, steel wire slings were put under her.

I dived below to ensure they were on the iron keel, and then, very gradually, the crane took the strain. This crane was normally used for lifting massive barges out of the water, and had a maximum lift of 20 tons, so I didn't need to worry about the wires breaking. . . . Did I say I didn't need to worry? I was busy taking photos, my heart in my mouth, as she went up to about 30′, swayed gently, and then gradually was lowered to the quay. The slings were readjusted and she was lifted into the boat shed. It was a masterpiece of crane work as there was less than ¼″ clearance for Yasme to pass through and not once did they scratch a bit of paint.

Once inside, heavy wooden shores were placed to hold her steady, and several of the lads got cracking on cleaning off the surplus sea food that had joined us on the voyage from Canton Island.

The generosity and kindness of Mr. Cameron is hard to believe. Never did I once think that anyone would have gone to all that trouble, but as he said, "We can't have you leaving here and sinking on the way."

Having Yasme out like this simplified matters considerably in respect of fixing the stem, but what I didn't expect to find was a chunk of the keel become infested with teredo worm . . . the worst boring pest known to the sailor.

It was lucky that we had the Yasme lifted out. With the aid of one of the lads, we soon ripped out the rotten part and stuck a nice new piece in. Now it's better than new.

All sorts of jobs cropped up whilst she was out, and I had to make countless requests of Mr. Cameron . . . always he gave the OK. If he ever reads this, I can only apologize for all the trouble I caused.

Slowly the Yasme took better shape. She got a thorough sanding down, a few coats of white paint on her topsides, and a few on the bottom. In between working the rig, eating, and fixing Yasme, I did manage to get some sleep . . . think it was on a Friday. This fixing of Yasme wasn't supposed to be on the docket when I went to Nauru, so with the monsoon season coming up there was a mad rush to get everything done. It worked out that I was only a week late in leaving . . . not bad, but without the help I got, I should have been about two months.

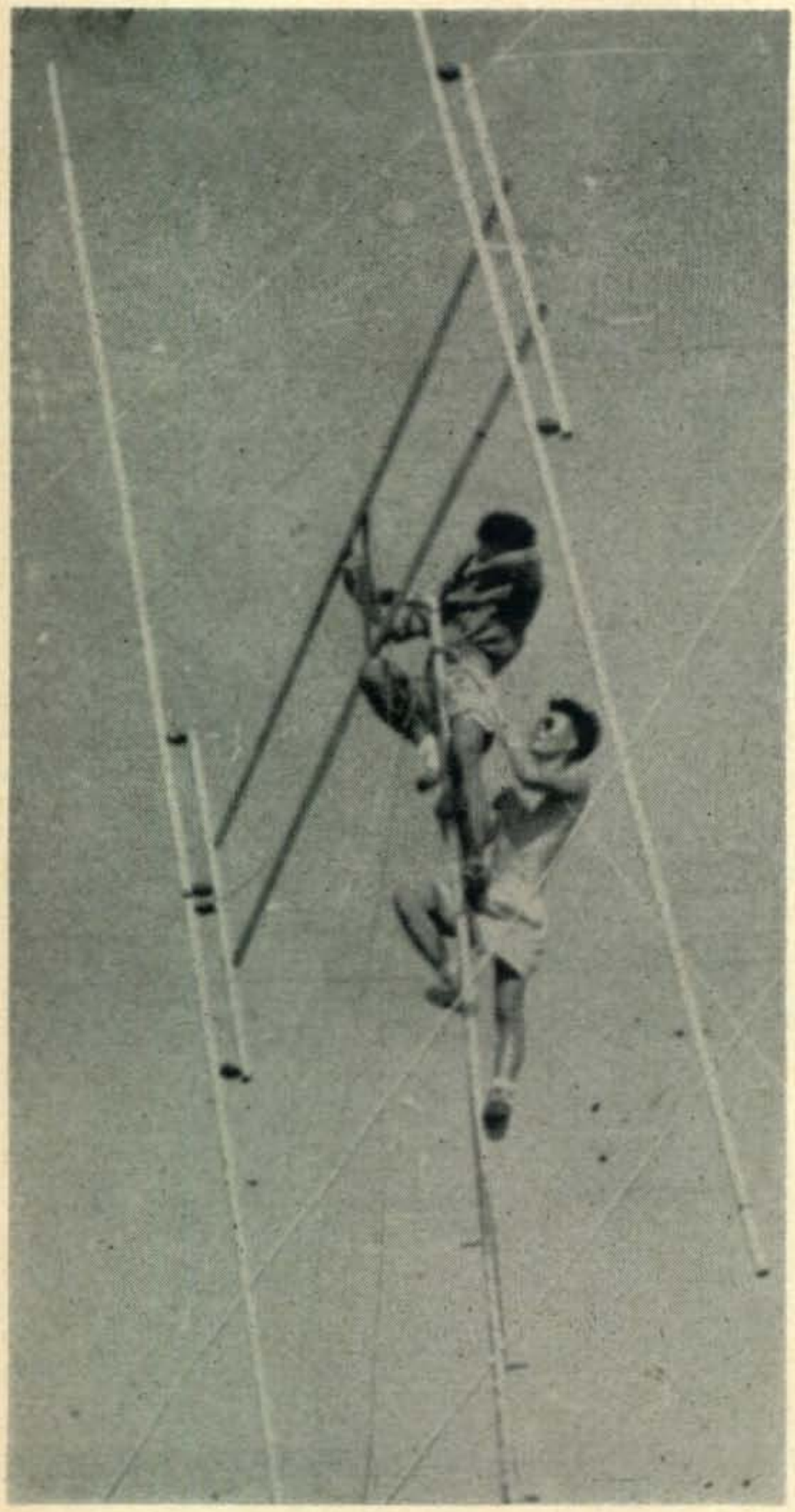
Regarding DX work, things weren't too bad generally, but Europe was still a tough place

Interior of the Local Church

to reach. The W's had more than their share, and the ZL's and VK's had a little bit more than usual. Generally speaking, conditions were far from being good. As most of you know, Ken, W7FA supplied me with the material to make a beam some time ago, but somehow the smaller diameter pipes were corroded inside the larger and nothing on earth seemed to be able to shift them . . . until . . . Nauru. Within an hour of them being given to Jack Mullins in the machine shop, he had got 'em apart, holes were drilled and the beam assembled. A design supplied by Fred, HCIFS was utilized, and the following day, with the aid of some of the lads, a 40′ steel pole was erected and the beam all ready to hoist up.

Now this pole was only 2″ in diameter, and I had plenty of misgivings in my mind about it supporting the beam, let alone myself at the top to fit it, and being one of the brave types, I looked around for volunteers to climb the pole.

The lads here had no fears whatsoever, and in a few seconds one had climbed to the top with a rope, and there, swaying in the breeze



Getting the beam up

he looked like a blob against the sky. He didn't seem to worry.

The end of the rope was attached, and the lad at the top pulled. The beam just missed a high tension wire which would have burned the lad at the top. We managed to avoid having roast meat that day. Part way up the beam jammed, and before I could say a word, another lad had shinned up the pole to help the other. That really worried me. The two of them got the beam to the top, struggled for quite a while, but couldn't get the beam to sit in its correct position.

A call came to the crowd below, and in a few seconds a third member was at the top of the 40′ pole. Certainly it swayed, and I shuddered and closed my eyes a few times, but they still remained at the top complete with beam, rope, and coaxial lead hanging down. Finally, with the three of them fighting the wind, the beam dropped into position, and from below came a hearty cheer for a job well done.

I had a sked with ZL1PA, Alan at that time, and gave him a shout. He came straight back with a 5/9 signal . . . this after weeks of 4/5 reports was something! Well, the whole thing was a towering success. Unfortunately I was leaving Nauru a couple of days later, so was only able to keep it up for 24 hours, but what a wonderful 24 hours it was. This beam has only two elements, no Gamma matches, T matches or safety matches, and it worked first time, what more could I ask? I have since had it up in Guadalcanal, and most of you know how my signal has improved.

Apart from the boat and radio, I did manage to see a little of the island. One of the Nauruan lads offered to run me around in his car, so one Sunday morning, off we went. The Island is run by the British Phosphates Commission, and is strictly a commercial venture, therefore it hasn't been turned into a miniature Tahiti. Nonetheless it has some charming views and beautiful beaches.

We passed the two massive Cantilevers, girderlike structures built for transporting via a moveable belt, the phosphate which has first been dried, from the warehouses to ships which are moored off the island. It is impossible for ships to come alongside a dock for loading, so they are moored some distance off and these cantilevers are swung out over the sea so that they are directly over the holds of the ships. The operator, who sits at the end of the cantilever, directs the supply of Phosphate which pours through a large pipe, and within 24 hours the average cargo ship can be filled. I watched several ships being loaded and was impressed with the smooth running of the whole operation.

After leaving the Cantilevers and the warehouse, we passed the Administration area. This was very well laid out, and I had occasion to meet Jimmy McConnachie, a Scot from the old country who was acting as chief Police Super. He had quite a lot to tell me about his own travels, and I will say his police organization was really something to see. We had quite a few good times during my short stay, and I must admit that is a rare thing for a Police wallah to be a sociable type . . . he was the exception.

Incidentally, I got my Nauruan driving license through Jimmy . . . just for the heck of it, something for my collection.

Along the coast road I found Japanese aircraft in varying states of decay. They were the few that didn't quite make it when the Americans decided to take the place back. Also littered about the place were old Jap pill boxes and odd chunks of fortifications, with a few rusty bits of shooting irons embedded in concrete; hardly picturesque, but they are gradually becoming overgrown with the bush, and in a few years, you won't be able to see 'em.

We left the commercial part of the island

and came to the native part, where along the beaches were erected wooden platforms about 12′ high which the Nauruans build for the bosun birds. The birds are quite tame, and I noticed several sitting quite contentedly on perches outside the native houses. On approaching one, I found it quite friendly.

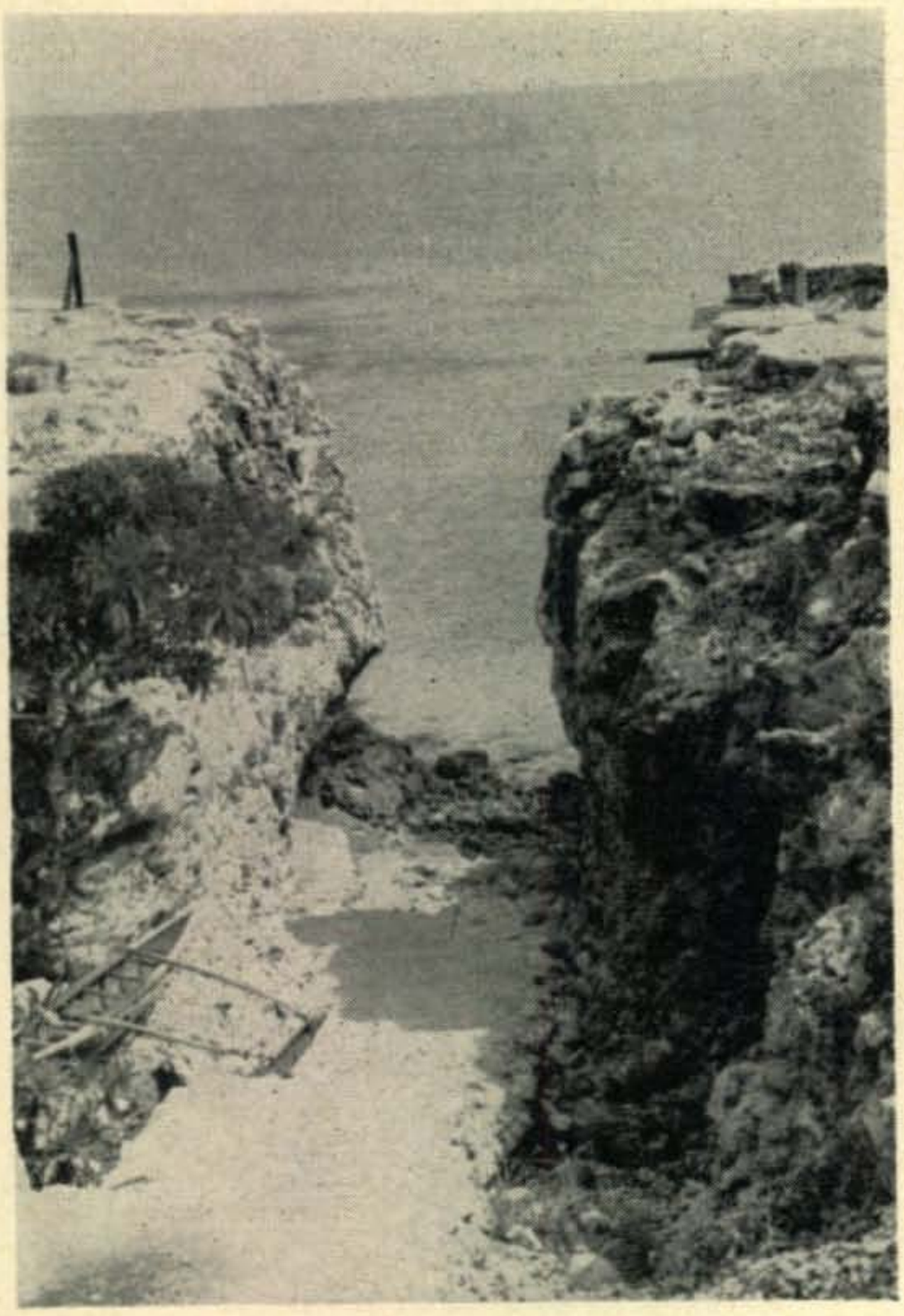
Continuing, the road wended its way through beautifully shaded groves of trees where everything was cool and very quiet. Looking through a frame of palms, stretched before me was one of the most picturesque sights I have seen in many a day . . . Anibare Bay. As the sea swept along this curving bay, the water seemed to change colour from blue to green, and then to the white foam as it broke on the sandy beach, and with the palms swaying in the background, and the sun setting, I only wished I could have been a painter.

Leaving the bay, we then worked our way a little higher on the island and there, hidden away in the foliage, were deep caves, many with underground lakes in them. We both stopped at one of these for a swim, and the water took our breath away with its icy cold touch. With a torch over our heads, we swam deeper into the cave until the entrance was but a tiny speck of light behind, and yet the lake seemed to go on forever. We both decided that it would be unwise to go further as the chill water was tending to give us cramp, so we turned around and swam back to the welcoming daylight. The island is honeycombed with caves and deep holes, and many of the people have spent days exploring them. To do this, one must have the proper equipment; ropes, torches, etc., and plenty of nerve.

These coral pillars, all that remains of a mined out phosphate field, average about 25 feet high.

After cooling off, we climbed to the top of the island and there saw a fantastic sight. This island was once under the sea and was originally a coral atoll, but through the ages it has been pushed up to its present height. In between the coral heads was the phosphate. It had been dug away and before us, were these coral heads sticking up into the sky looking like either an enlarged Stonehenge, or a mass of Easter Island Idols. They varied in height up to 40′, depending on how far down the phosphate had been cut away. The entire island, although appearing level now, will one day be like this. They figure that with continuous digging the supply of phosphate will last another 50 years, and brother, the way these chaps dig it out, you can bet there's plenty there

On the return trip I stopped in to see the Education Boss. He very kindly gave me the OK to get a recording of the Nauruan school kids singing, but he insisted that they have a rehearsal first. That suited me fine, and a few days later he gave me the OK. The school buildings were quite impressive and these kids get a darn good education, but they certainly don't need educating where singing is concerned. There were about fifty of them, ranging from 10 to 14. Those kids kept me sitting on the edge of my chair. I have heard plenty singing in my time, good, bad and indifferent, by professionals and amateurs, but these kids in my opinion lead the field all the way for their harmony. I have often cursed carrying that recorder around, but this was one time I thanked my lucky stars I had it with me . . . what a darn pity you boys can't hear this, however, maybe one day we shall get together and then you shall hear all the music I've picked up . . . let's hope so.



A handy launching site

Mobile with the GF-11

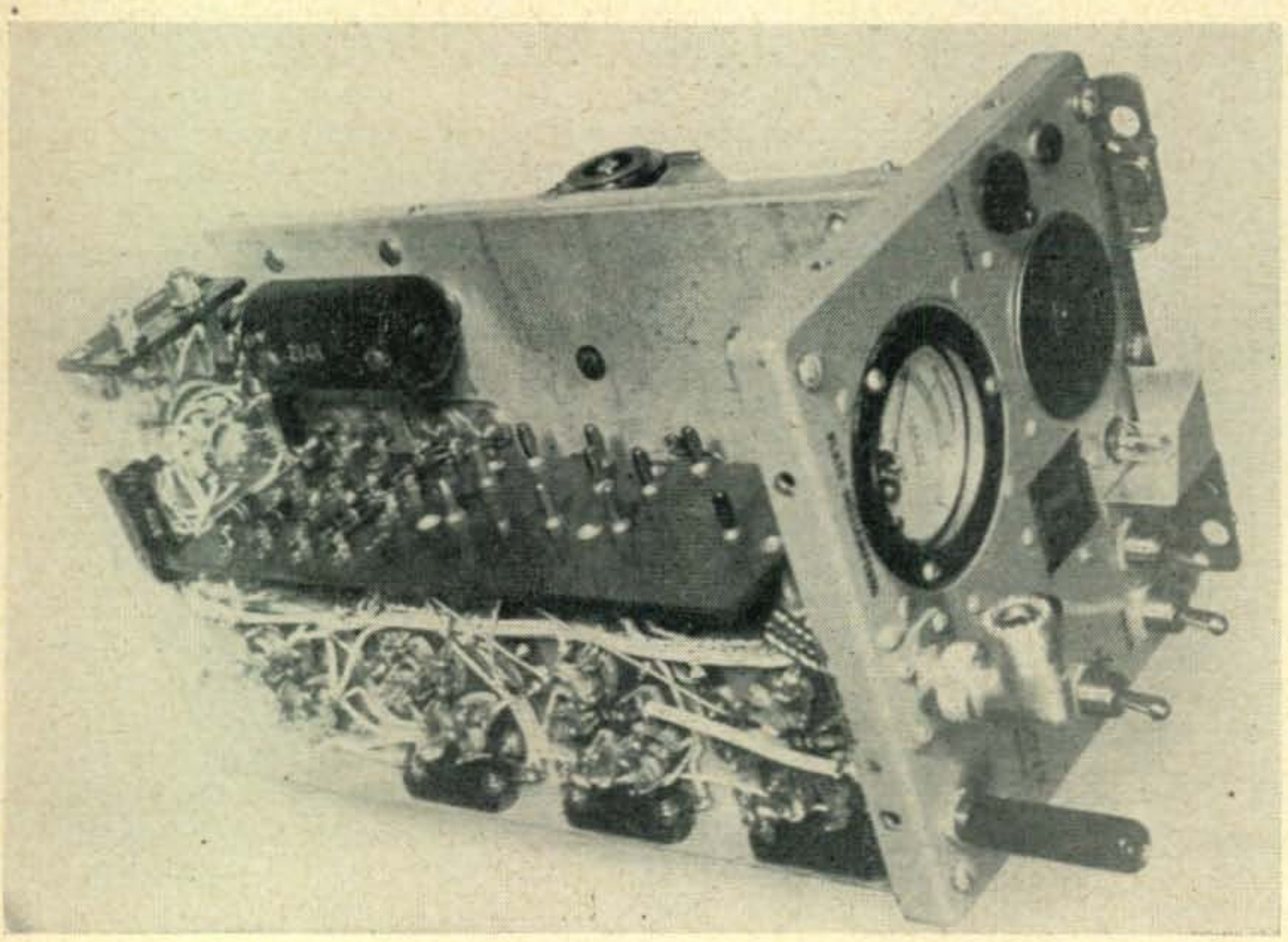
R. H. Brown, W6OVX
1228 Chalcedony
San Diego 9, Calif.

This article describes the modification of a Navy Surplus GF-11 Aircraft Transmitter for Amateur Mobile or fixed station use.

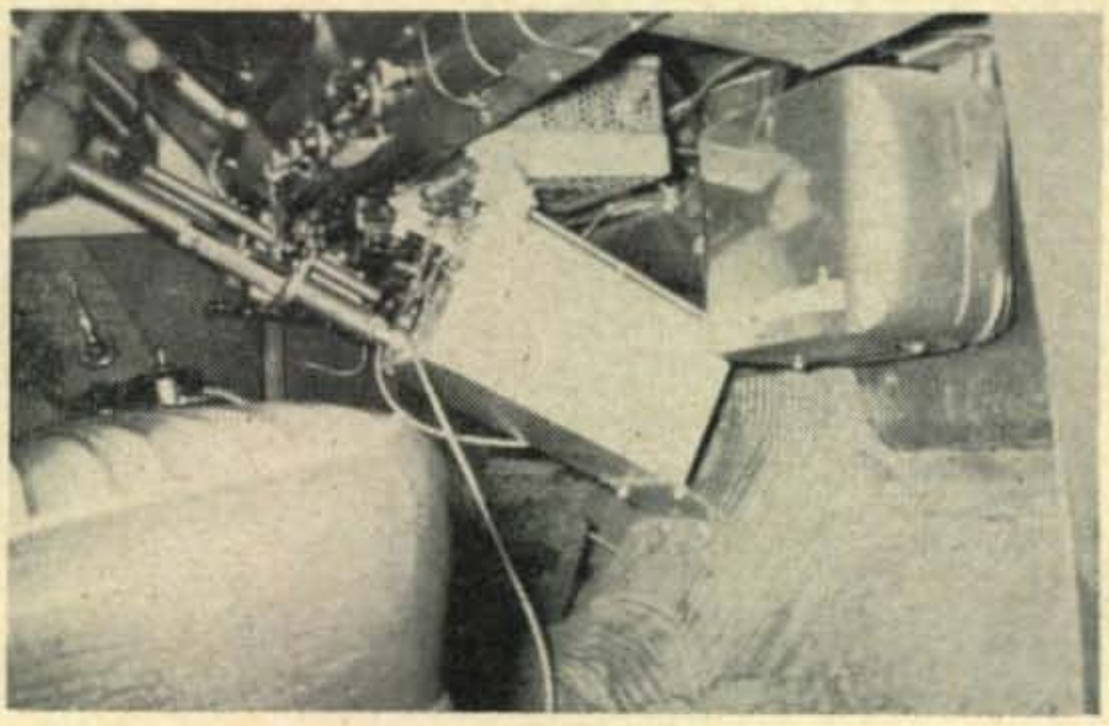
The GF-11 is ideal for Amateur mobile use for the following reasons:

1. Small physical size (6″ x 6¼″ x 12″).
2. Circuit: 89 suppressor modulator, 89 VFO, P.P. 837 (chg'd to PP 802 for 6V) final output.
3. Flexible power requirements (can be used with 6 or 12 volt automotive systems and vibrator or dynamotor inputs from 250 volts at 125 ma. to 500 volts at 200 ma.).
4. Control simplicity, one coil assembly for each band with only frequency and loading resonance adjusted on the panel face.

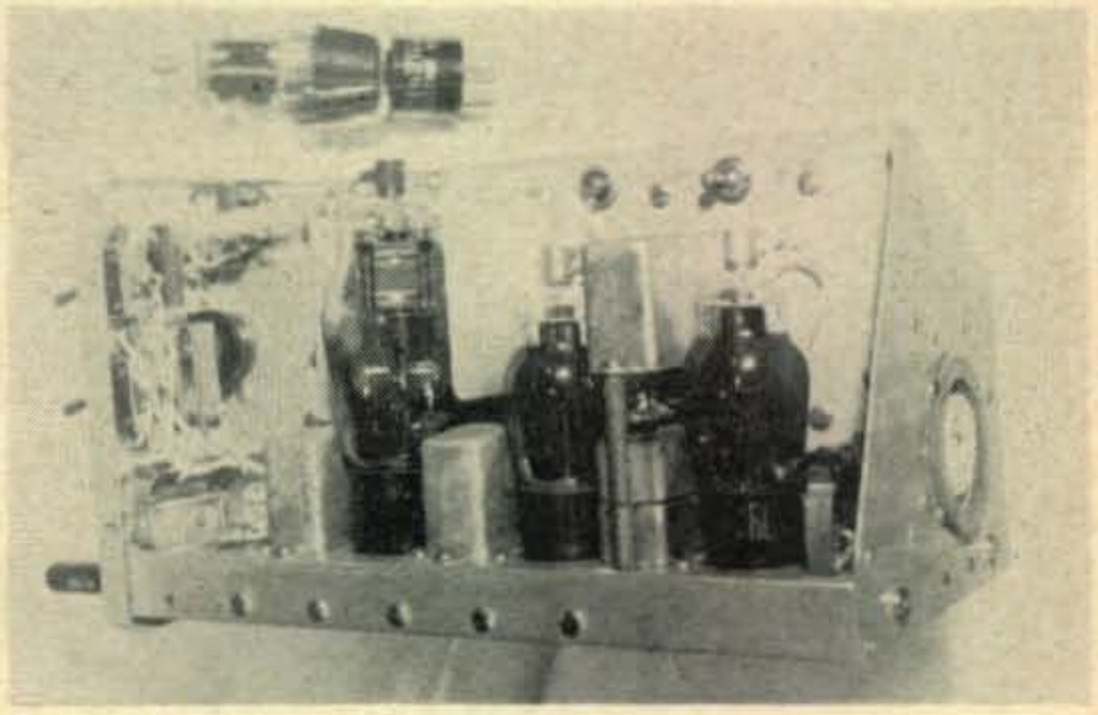
The circuit illustrates wiring changes of this modification, while the following text should enable one with even moderate skill to accomplish the actual modifications. Although the GF-11 transmitter is not often advertised it



Bottom view.



Here the unit mounts between the dash and fire-wall.



Right side with cover removed showing tubes, etc.

should be available[1] at a lower price than is being asked for the popular ARC gear.

Coils should be purchased along with the transmitter (CW-47138 for 3650-4500 kc, and CW-47141 for 6000-7350 kc). For 12 volt operation the dynamotor designation for this equipment is CW-21109A, however availability has not been checked at this time.

Conversion

For simplicity, mechanical changes should be made prior to wiring changes and in approximately the following order:

1. Remove the transmitter from its case by removing the coil from the left hand side of the transmitter, tube cover and amplifier tubes from the top and twelve (12) screws (eight around the front panel, one from the top and left hand sides, and two from the rear above the snap slide). The transmitter can now be pulled forward from its case.
2. Front panel changes include: removal of antenna and ground posts and calibration card and the addition of three switches, panel light and shield, antenna co-ax fitting, key jack and plate milliammeter. In my installation (see photo), the transmitter is supported from the upper edge of the front panel and lower edge of the rear panel. This eliminates the need for any rack, allows space for a large co-ax fitting along the lower edge, and leaves near normal knee room in a '50 Ford. For those who may wish to duplicate this installation, the upper snap slides engage bolt heads through 1″ shock mounts set in a bracket attached to clips from the bottom of the car radio. The rear snapslide engages bolt heads in an .051, 24ST, aluminum bracket which is attached directly to the car floor with 1¼″ metal screws. The action of the shock mounts, and flexibility of the bracket provide well dampened shock protection.
3. Dimensional details for installation of all switches are shown in figure 2. The panel lamp and hood location is a compromise of several trial installations which even included an edge lighted lucite panel. The simple hooded light provides good nighttime illumination at an angle which has not proven distracting. Incidentally the edge lighted panel would have required a minimum of three bulbs for which mounting space was not available.
4. The key jack serves also as a meter jack so that a remote meter can be mounted above the instrument panel of the car for ease of adjustment while in traffic.
5. A coat of grey synthetic enamel gives the entire transmitter a more modern appearance than the original black crackle finish.

The replacement of the power receptacle is optional, this was done to allow bench testing using a cable from my modulator supply. The installation is quite simple. An .051″ aluminum plate is cut to the size of the original plug shell, which is also used as a template for the four corner holes. The socket hole is cut in the center of the plate. The socket (Amphenol snap ring octal) is mounted on the plate and the assembly is installed from the front side of the rear vertical chassis member. The sponge rubber gasket should be recemented over the attaching screws.

Switches

A photo shows the switches as installed on the rear of front panel. The panel light socket is mounted by the screw visible under the plate clip, with its lamp extending thru the hole in the front panel. The new screen resistor is shown beneath the lower switch and is mounted in the original resistor support by a loop of solid copper wire run thru the center core,

1. On the West Coast, Columbia electronics, 2251-53 West Washington Blvd., Los Angeles 18, Transmitter and one coil for $7.95. Arrow sales, 7460 Varna Ave., North Hollywood, also indicates a supply available.

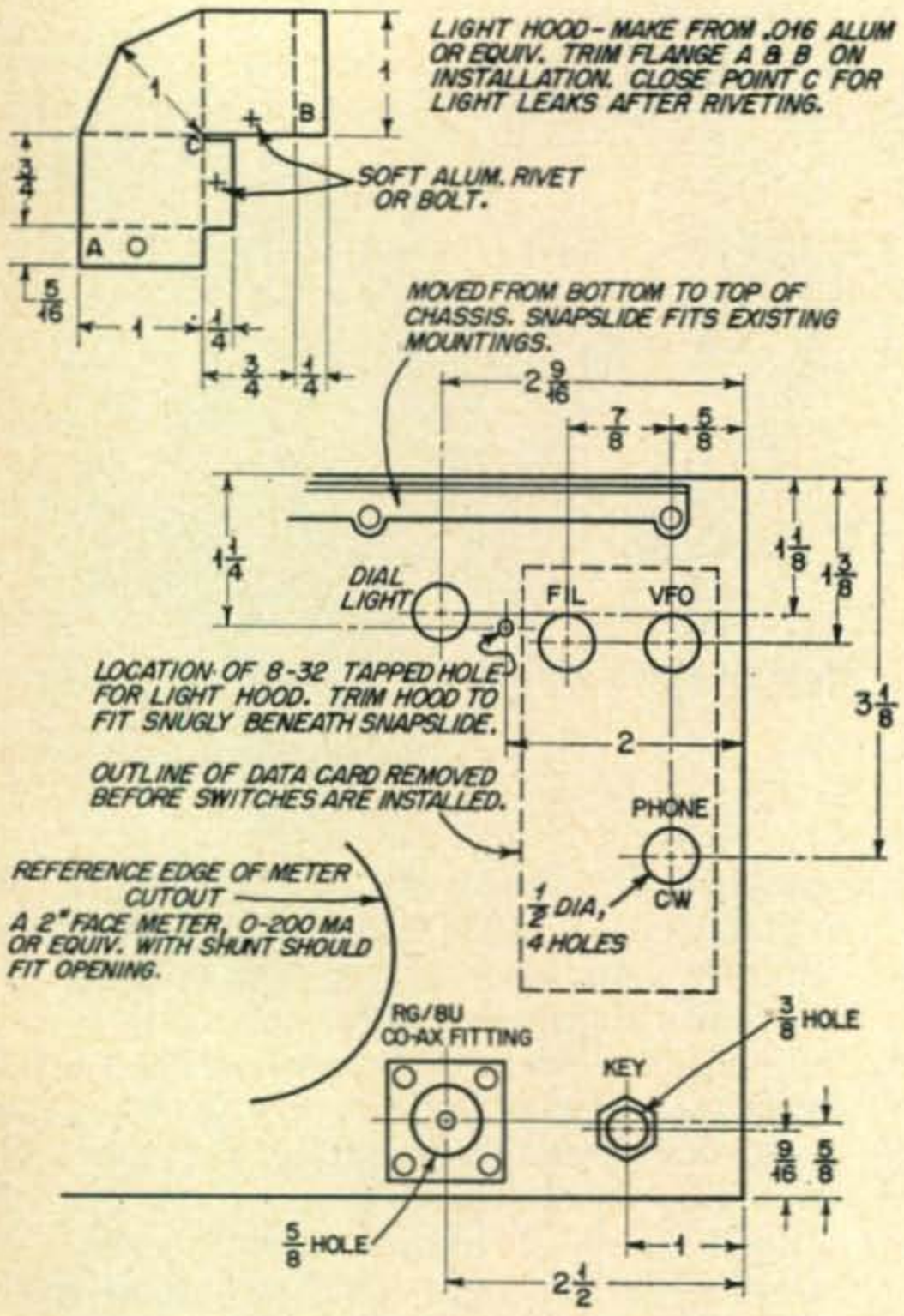


Fig. 2. Drilling template.

hooked over the inboard clip, pulled around the outboard clip and twisted snugly. Resistor leads are insulated with sleeving thru the shelf and spliced below. Wiring shown in front of the resistor passes thru two 3/16" holes for connection to the meter and underside of the chassis. One lead from the modulator coupling condenser (middle condenser in the vertical bank between the modulator (lower) and oscillator (upper) tube is routed above the tube shelf. A DPDT switch can be used to replace the tone switch to switch filament connections of the (2) type 89 tubes from parallel (6V) to series (12V) operation, at the same time the tube cover is removed to replace the 802's (6V) with 837's for 12 volt operation. This circuit is shown but not accomplished in my installation.

Another photo shows the underside of the chassis looking at the back of the panel. The plate meter (which actually reads plate and screen current) is a zero to three milliammeter with a .4 ohm shunt. The back of the antenna co-ax fitting requires removal of a portion of the micarta meter panel which previously provided insulation for the antenna post. The key jack is seen in the upper R/H corner. The adjacent socket lug is taped to avoid possible contact with the plug. Both co-ax and jack clearances are critical to allow the chassis to slide over them and beneath the lip of the

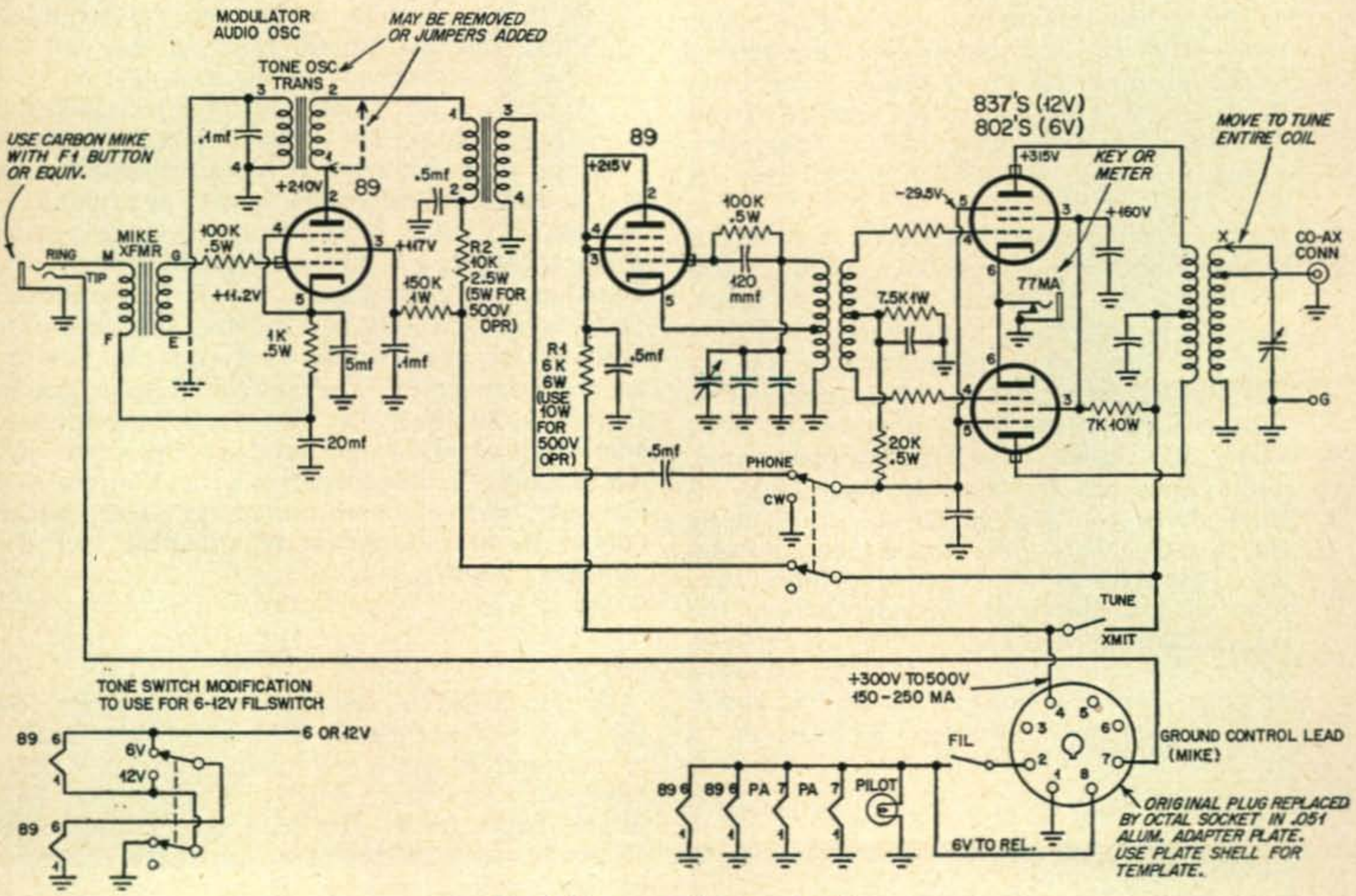


Fig. 1. Diagram of re-wired unit.

panel. Wiring from the added switches can be seen emerging from between the chassis and meter and laced with original wiring.

The next photo shows the octal socket, but the adapter plate is hardly visible. Immediately above the socket are the two original meter jacks, the R/H jack is used for microphone input with closed circuit contacts removed. The L/H jack is no longer used. Both jacks have ground leads soldered to the sleeves to ground. The round object (2148) is the tone transformer which may be removed entirely or simply shorted at the terminals as shown in the circuit diagram. Resistors are removed from the modulator circuit on the terminal block shown in the photo. The added jumper under the lower R/H resistor connects the 1000 ohm modulator cathode resistor to terminal "F" of the microphone transformer (after the ground lead is removed from beneath the terminal board).

It is necessary to modify both 40 and 80 meter coils with condenser connections moved to cover the entire coil. For those who are "going mobile" for the first time, it might be well to explain that resonance and loading is much more critical with mobile antennas than with most fixed station antenna systems. My installation includes a rear mounted antenna (back up light position) consisting of a 3 foot base section, **Vaaro** loading coil, and a 6 foot top section. The antenna loads on 3825 kc with the entire coil in use, and on 7275 kc with 29 turns in use. The antenna is fed with RG-8U run thru the top channel of the car body beneath the trim and connected to the mount thru a change-over relay. Coil taps are set at 7 spaces, and 10 spaces from panel end of the coil on the 40 and 80 meter coils respectively using the antenna system above.

On the air results have been very satisfactory. It is recommended that a surplus chest microphone (with either an "F1" or "T1" button) be used both for operating convenience and to free the operator's hands for the primary task of driving. The "Radio Amateurs Mobile Handbook" (Published by CQ) will prove very helpful, especially the sections dealing with noise reduction and voltage regulator adjustments. Articles in the May and September—'55 issues of CQ give excellent suggestions for more efficient antenna systems. ■

Contest Calendar

Frank Anzalone, W1WY

January	5-6	DARC - WAEDC - CW
April	6-7	DARC - WAEDC - CW
January	19-20	DARC - WAEDC - Phone
January	26-27	RSGB - BERU - CW
February	8-10	ARRL - DX - Phone
March	8-10	ARRL - DX - Phone
February	22-24	ARRL DX - CW
March	22-24	ARRL DX - CW

WAEDC

Rules were thoroughly explained in December CQ. As the scoring is rather complicated it is strongly recommended that you refer to same. It is too late to fully participate in the Phone section as the first part has already taken place. However you can still make the CW section of this popular European contest.

BERU

This is strictly a British Empire affair. All others, "listen but don't call." If you can keep your hand off the key when some of those rare, rare prefixes start coming thru, you're a better man than I am, McGee.

ARRL

No explanation needed for this one, probably the oldest active DX contest, now in its 22nd running. It's the USA and Canada against the world. Now is your chance to get even with some of those Caribbean prefixes that would not work you during the CQ "brawl" because you were only a one pointer.

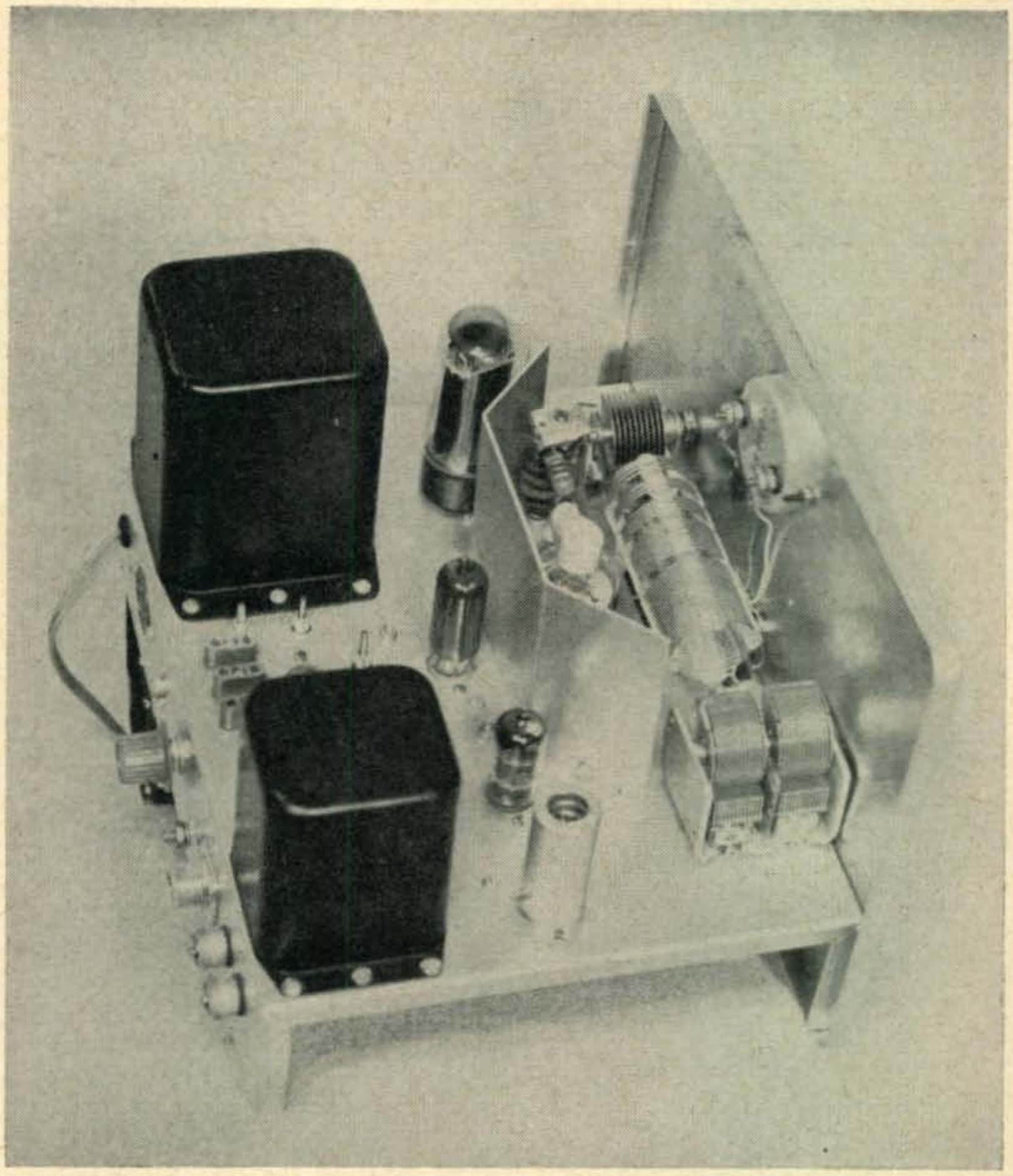
Logs for our CQ World Wide DX contest are now rolling in and some of the claimed scores are out of this world. This in spite of the fact that conditions were anything but good on both week-ends. George Jacobs, W3ASK's last minute forecast for October hit it right on the head; unusual sun spot activity is expected during the CW period October 27-29, with conditions varying between unsettled and disturbed. You should not have done this to us George. Ironically enough conditions had been excellent up to contest time. (Oh, well, that's all the less logs we have to check.)

To mention any more of the claimed scores would only make the final results an anticlimax but you can bet your grid leak drip pan that those listed last month will all be surpassed.

Item in the radio column of a New York daily. "Bill Leonard, well known C B S personality, who is also a ham radio operator, had a transformer installed in his hospital room where he is convalescing, and picked up 90 different countries." Anyone want to buy an HQ129X cheap? It's me for one of those transformers. (Hope you're feeling OK now Bill.)

73, Frank, W1WY

John W. Wilder, W9KLJ
1421 Sharon Street
Janesville, Wisconsin



Putting the DX-35 on SIX Meters

A question often asked by the newly licensed Novice/Technician is, "Where can I buy a rig for Six meters and how much does it cost?". When one explains that a store-bought phone transmitter for Six is in the 75 bucks-and-up class, and that it is strictly a one band affair, the would-be VHF'er generally decides to spend his money for a band-switching Eighty-through-Ten meter cw rig, and let the Technician ticket ride for a while. This unfortunate situation keeps many of the newcomers (and some of the oldtimers, too) from the enjoyment of phone operation on a band where ragchews are carried on with what would seem like flea-power to the Eighty meter boys, and where QRM is close to non-existent.

But where does this get us—the young fellow with the brand new tickets still hasn't got the moola for two rigs. Well, he doesn't need two rigs. Not since the *Heath Company* announced their *DX-35*. Here is a little exhaler which uses a real, live transmitting tube that will do something besides load up the tube socket capacity at 50 mc. It uses a 6146. It also has a separate buffer tube which can help us scare up that 2.5 ma of grid current we need for our precious final. Lastly, it has a built-in modulator. Some of the oldtimers may sneer and say, "Yah, but low level, and that's the worst kind!". Well, let 'em sneer. They haven't heard a modern controlled-carrier circuit that was working properly, and will they be surprised when they do.

So here we have a little rig which can be converted to Six for the Technician and still retain the lower frequencies for the Novice. A look at the schematic of the *DX-35* shows two ways to get to Six meter operation. The easy way is to sacrifice Ten meters for Six. The hard way is to replace the five position bandswitch with a six position affair, and retain that Ten meter operation. With either setup, the oscillator takes eight mc. crystals. In the easy way the oscillator plate doubles, and the buffer tube

triples. It works the other way around in the hard way with the oscillator tripling and the buffer doubling. The final amplifier runs straight through either way. Sounds easy, doesn't it? Well, actually there is a little more to it than changing coils, but nothing complicated or expensive.

The final amplifier r-f choke has a nasty tendency to be self-resonant at about 48 mc. This is just too close to the low edge of Six meters and so the choke begins to smolder after four or five minutes of transmitting. This has got to be stopped! The XYL doesn't like the smell of burning insulation. A choke with the same inductance but slightly different winding dimensions was tried and found to be self-resonant at 40 mc. Since this is halfway between Six meters and Ten, it works fine. The original parasitic suppressors also turned out to be great absorbers of 50 mc energy. The new plate parasitic trap was designed around the VHF rigs shown in recent editions of the *Handbook*, and the drive-robbing series grid resistor was eliminated.

Still sound good? Well, let's go!

The Easy Way

In the following description, all symbols and numbers refer to the schematic and pictorial drawings furnished with the kit.

1. Remove the oscillator shield. Place a grid-dipper near the 20 meter oscillator coil (the coil nearest the buffer tube), and tune the coil for a dip at 17 mc. Replace the oscillator shield.

2. Remove the 10 meter buffer coil (green dot) from *B2* and *D2* of the bandswitch. Remove all but seven turns from this coil, and reconnect to *B2* and *D2*.

3. Remove the bare wire from the terminal strip near the buffer coils and the buffer tuning capacitor. Replace with a piece of #16 bare wire.

4. Remove the 68 ohm ½ watt resistor between pin 5 of the 6146 tube socket and the terminal strip near the buffer coils. Connect a #16 bare wire between these two points.

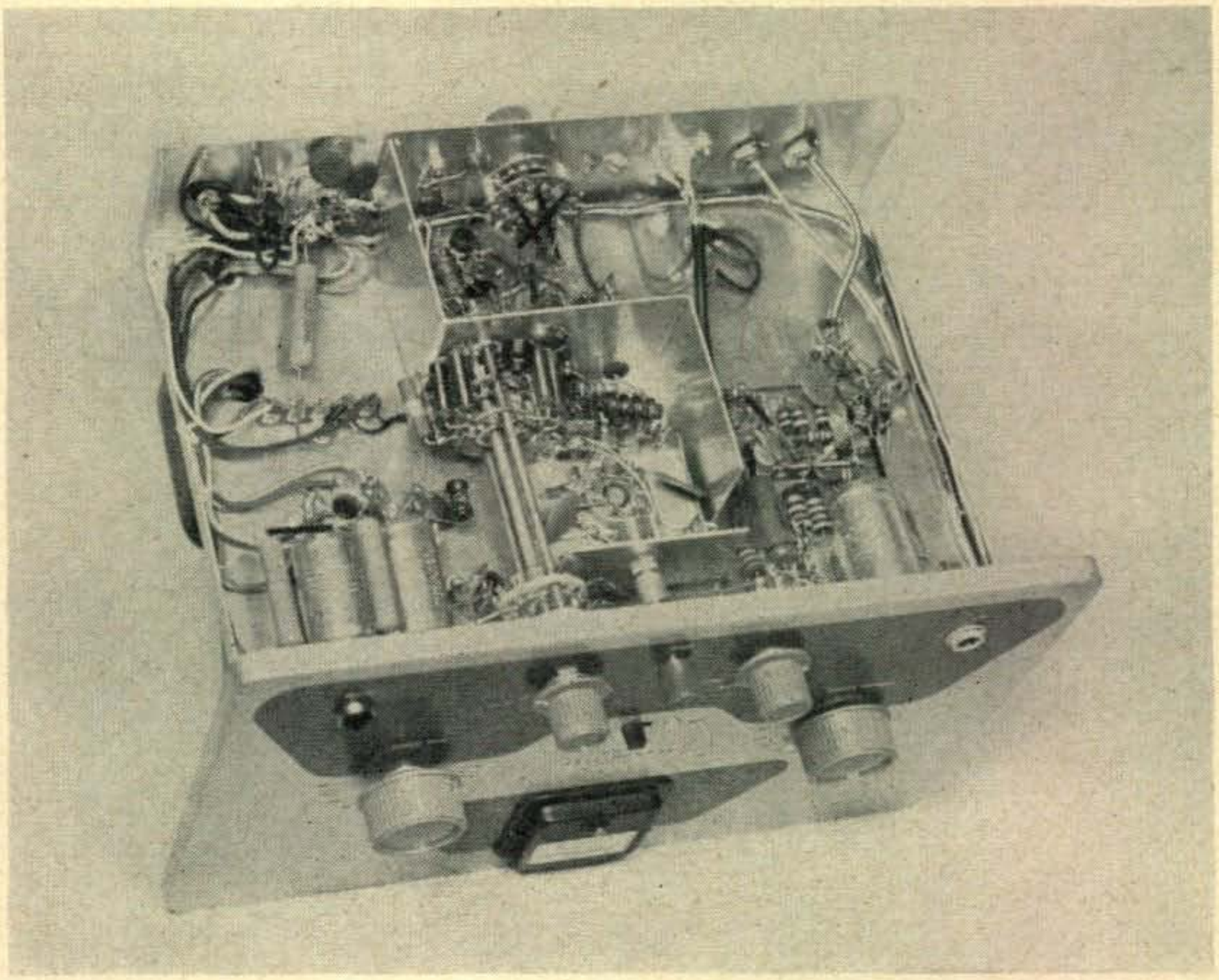
5. Remove the 2.5 mh r-f choke. Install a small cone insulator on the screw originally used to hold the choke in place. Put a #6 solder lug on a #6-32 screw in the hole in the top of the cone insulator.

6. Connect one end of a *Merit #BC-549* r-f choke (2.5 mh, 200 ma.) to the solder lug. Also connect the red *B-plus* wire and the lead from the bypass capacitor to this lug.

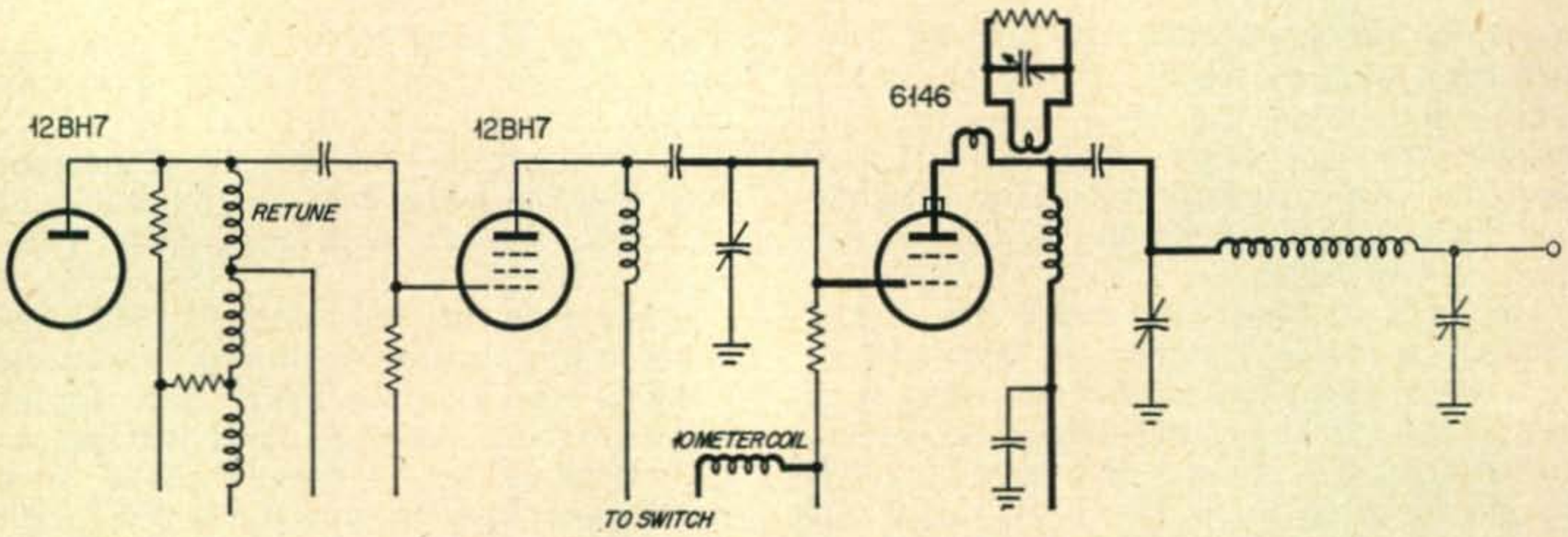
7. Remove the parasitic choke from the 6146 plate cap. Take a piece of #16 bare wire and wind two turns around a piece of ¼" diameter lucite rod 1½" long. Cut off one end of the coil ¾" long and solder to the 6146 plate cap. Cut the other end 1½" long and connect to the top terminal of the r-f choke. Also connect the lead from the plate blocking capacitor to this point.

8. Place the grid-dipper near the two-turn link in the coil and look for a dip in the vicinity of 90-140 mc. When this dip is located leave the grid-dipper at this frequency.

9. Wind a two-and-one-half turn link of #16 bare wire on the lucite rod. Slide this coil off the form and cut the ends off ¾" long. Solder a 3-30 $\mu\mu$fd mica compression trimmer capaci-



Bottom front view of the DX-35



The easy way, changes are shown in bold lines.

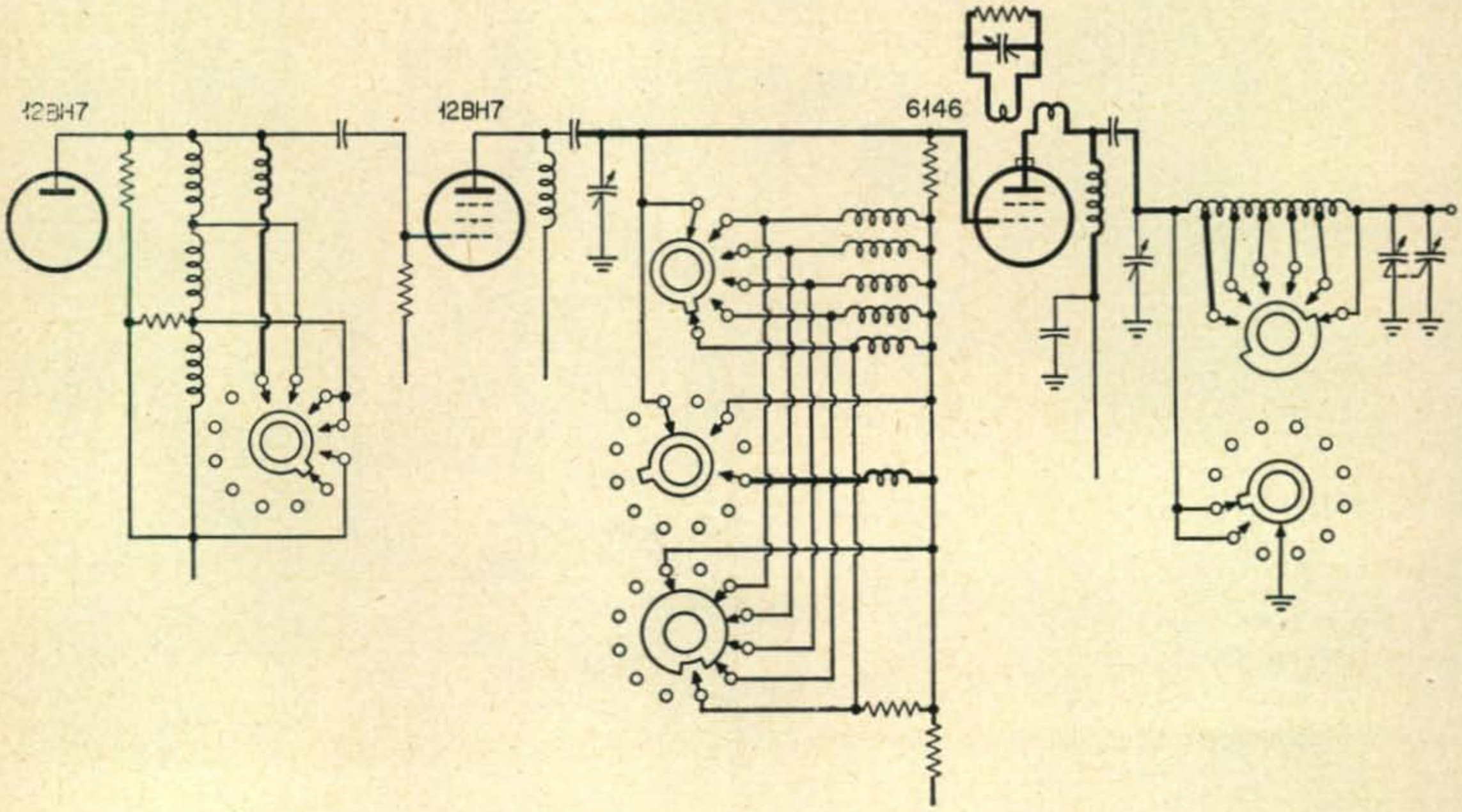
tor to the coil. Place this assembly near the grid-dipper and tune the mica capacitor for a dip at the same frequency as was noted in Step 8. Solder a 68 ohm 2 watt composition resistor to the two capacitor terminals. Slide the assembly onto the lucite form until the coil is spaced about ¼" from the coil in the plate cap lead. Cement the coils in place with a few drops of coil dope.

10. Looking at the final amplifier tank coil from the end nearest the 140 mmfd tuning capacitor, cut through the first turn of the coil 3/16" to the rear of the bottom plastic strip. Bend the 3/16" length toward the tuning capacitor until it touches the lead of the coil going to the 140 mmfd tuning capacitor. Leave the other end of this turn free. Cut through the second turn at the same point and bend the 3/16" length over to touch the bent lead from the first turn. Solder both bent leads to the original coil lead from the tuning capacitor. Check to see that the long ends of these two turns are not shorted to the remainder of the coil.

And there you are!

Install an 8 mc crystal in one of the crystal sockets and turn the Crystal Selector switch to that position. Turn the Final Tuning control to about 90 and the Loading control to about 60. Connect a dummy load to the antenna jack. Turn the Bandswitch to the old "11-10" meter position and switch the meter to read "Grid Drive". Turn the Operation switch to "Stand-by" and when the filaments are warm turn it to "Phone". Peak the grid current by tuning the 20 meter oscillator coil slug and the front panel Drive control for a maximum meter reading. About 2.5 ma of grid current should be obtained. Switch the meter to read "Plate Current" and tune the Final Tuning control for a dip in plate current. Turn the Operation switch to the "CW" position and again tune the Final

The hard way, changes are shown in bold lines.



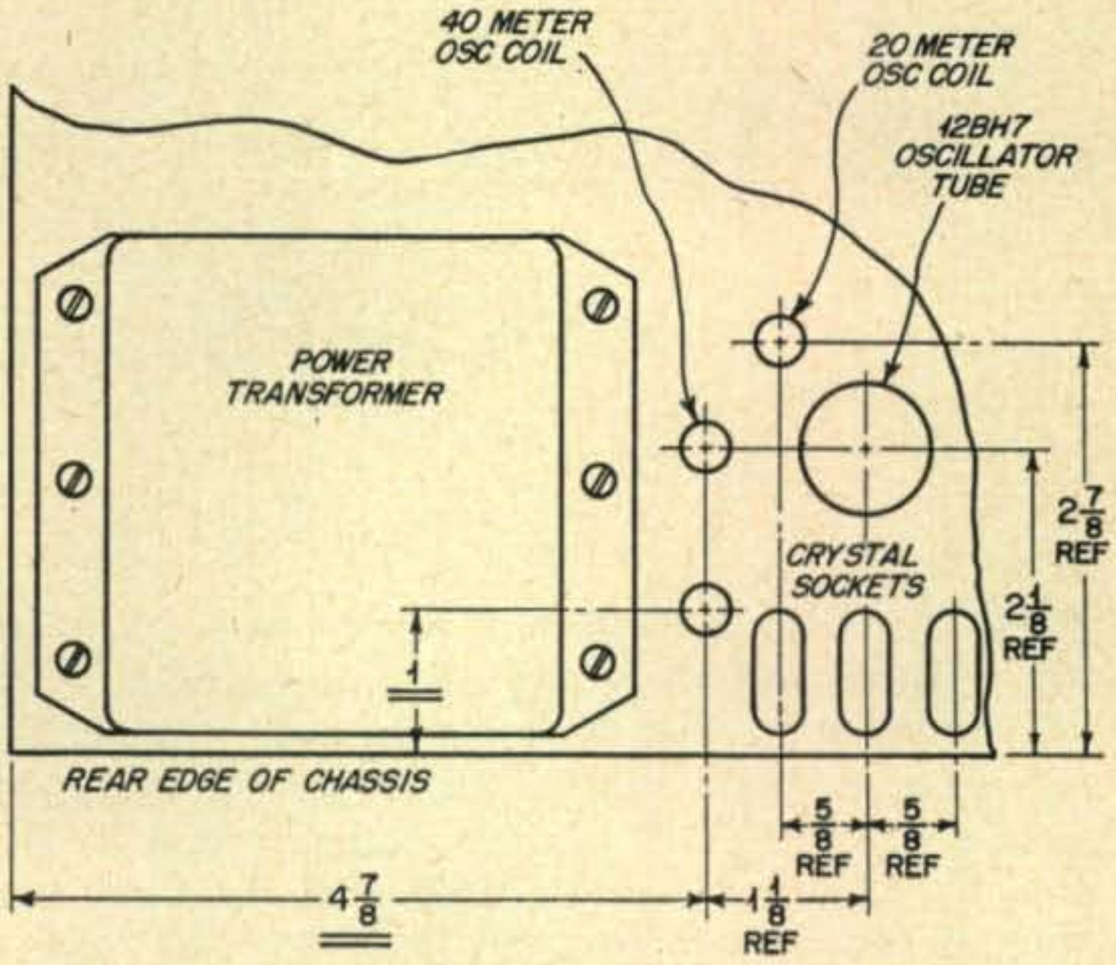
Tuning control for a dip in plate current. Advance the Loading control a little at a time and re-dip the Final Tuning each time until the transmitter is fully loaded to 125 ma. Re-peak the grid current occasionally during this process. Care should be used in making these adjustments as the tuning rate is rather fast.

The Hard Way

The first step in rebuilding the transmitter for six-band operation is to remove the bandswitch and the buffer stage shield. Next, drill a ¼" diameter hole for the new oscillator coil. This hole is located in line with and 1" to the rear of the present Forty meter oscillator coil. Close wind twelve turns of #26 enameled wire on a *Cambridge Thermionic Corp. LS-5* slug-tuned coil form, and install this coil in the hole.

Drill two ⅜" diameter holes about 4" apart in a scrap of sheet metal. This will form a jig for the assembly of the new bandswitch. Mount the old bandswitch in one hole and a *Centralab PA-302* 6" switch index in the other. Position both switches so that the thru bolts are in a vertical plane, and the knob ends of the switches are on the back side of the panel. Turn both switches as far counterclockwise as they will go. This will be the Eighty meter position. Break off four tabs on the adjustable stop plate of the new switch index. This will allow the new switch to be rotated clockwise from its present position to five more positions. Return to the Eighty meter position.

Slide a ½" spacer on each switch bolt. Next, hold a *Centralab PA-12* switch wafer so that the side with the six terminal clips are toward you and on the left. Turn the center contact until it touches only the uppermost terminal clip. See *fig. 1*. Slide this wafer onto the switch index assembly with the six clips toward the



Drill hole for 6 meter oscillator coil as shown.

rear, and follow with a ½" spacer on each bolt.

Hold a *Centralab PA-1* switch wafer so that the side with the twelve terminal clips is toward you. Turn the center contact until it touches the bottommost clip to the right of the bolt hole. Cut off all the contacts on the left side of the bolt holes. See *fig. 2*. Slide this wafer on the switch index with the twelve clips to the rear. Remove wafer *E* and the buffer stage shield from the old switch. Remove the assembly consisting of wafers *D* and *B* and the buffer coils. Remove the long brass spacers from the old switch and cut them to a length of 2¾". Slide these spacers on the new bandswitch assembly.

Pick up the assembly consisting of wafers *B* and *D* and the buffer coils and slide wafer *B* onto the new index so that the top thru bolt is between the Twenty meter and Fifteen meter buffer coils. Slide a ½" spacer on each bolt.

[*Continued on page 114*]

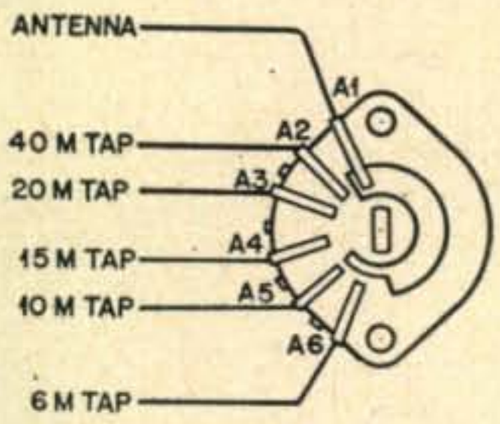


Fig. 1.

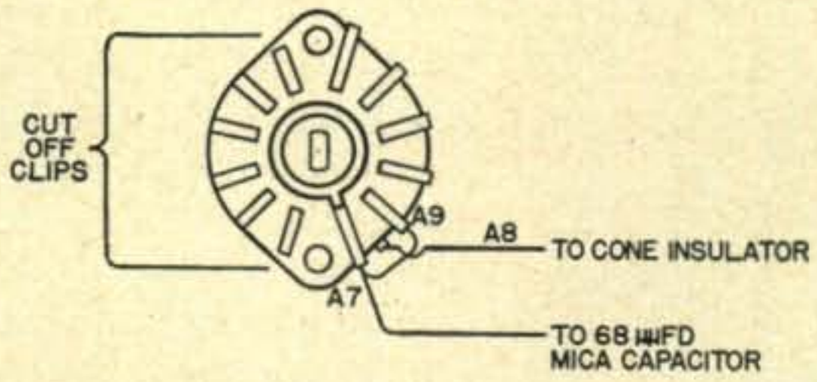


Fig. 2.

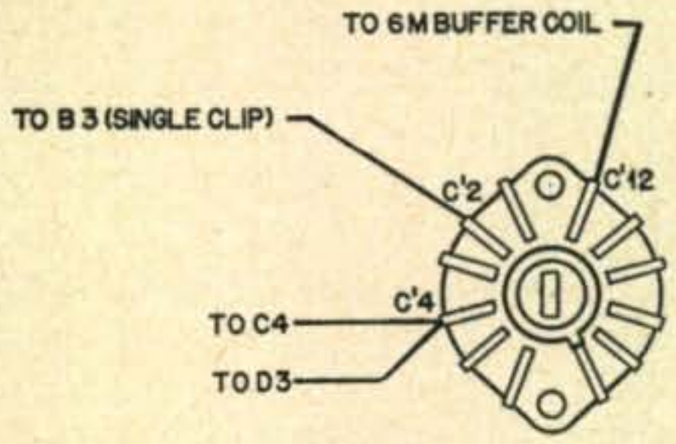


Fig. 3.

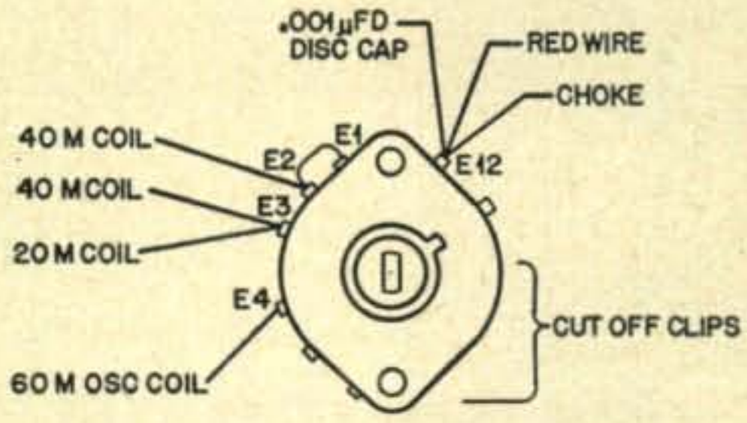


Fig. 4.

Connections for the various switch index taps are shown to the left.

Cary Mangum, W6WWW
7200 Eagle Road
Fair Oaks, Calif.

a 38′ Tower

With Self Supporting Construction

This home-made wooden tower was built by the author and originally installed on a 45 x 120 foot lot in Los Angeles where it remained for some 4 years before taken down, strapped into a 12′ x 2′ x 2′ bundle and shipped to the new QTH via a freight line at a very reasonable price of approx. $13.00 for the entire tower! (for some 500 odd miles).

The tower is easy to construct and looks good. It is a composite unit of 4 sections and a top. Assembly is made as a unit for each section and then the sections are joined as explained later. With but one exception all joints are bolted together both for ease of construction and to make disassembly possible.

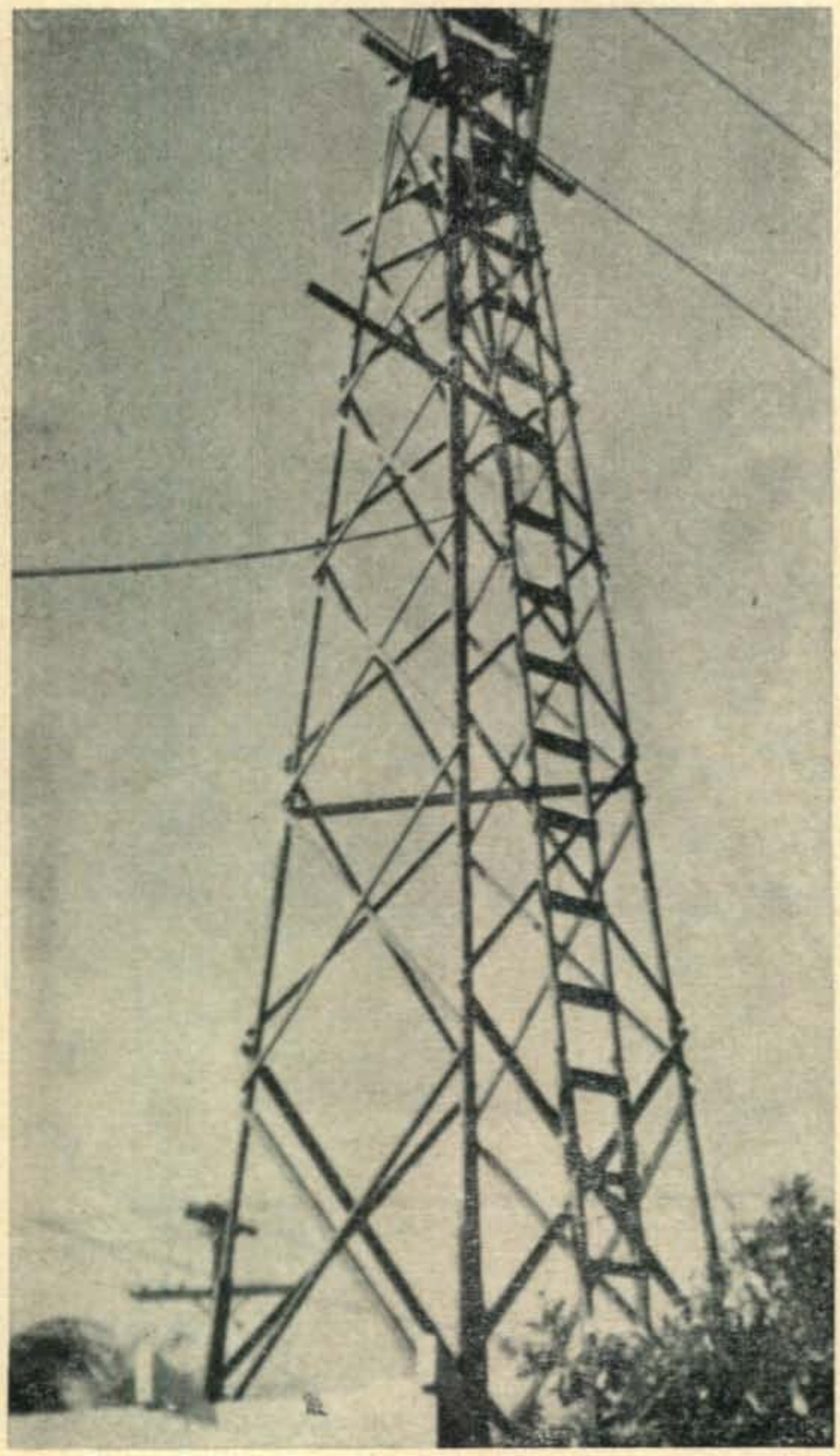
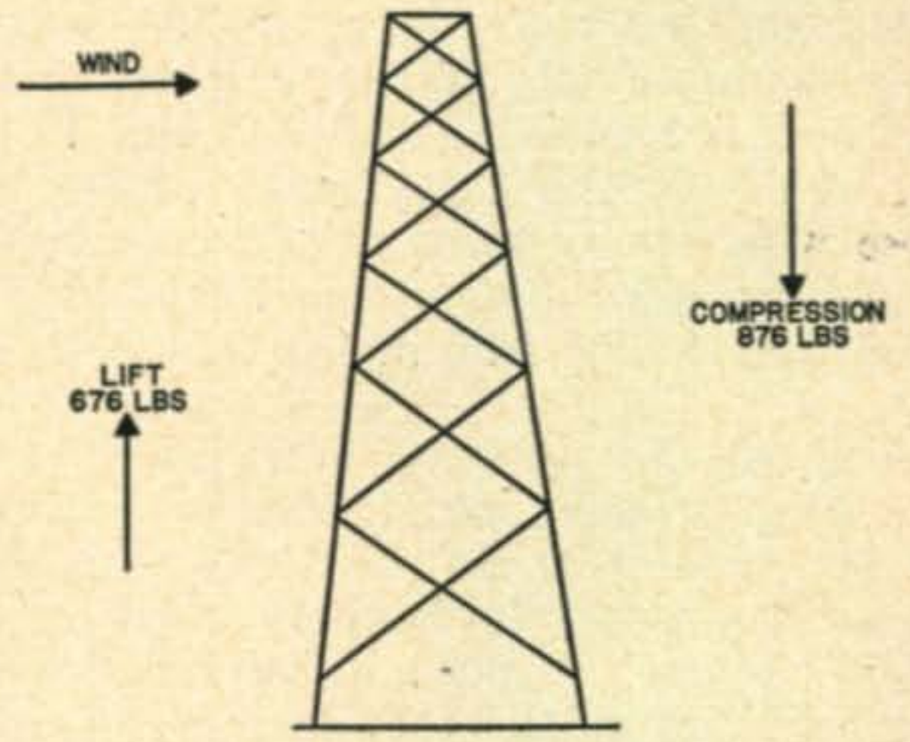


Fig. 1.



Design Considerations

As guy wires are not used a 4 sided tower was decided on as it is easier to build, and distributes the various forces better. The weight of the tower, beam, drive mechanism and the forces of the wind ultimately resolve themselves into two forces. One is lift which is the force applied by the wind against the side *against which* the wind blows, while the other (compression) is the force applied against the opposite side. Compression can also be called the "push" on the opposite side from the wind against the ground. See *fig 1*.

In order to keep the tower from blowing over from the forces of the wind (once upright it cannot fall over from its own weight, only the force of the wind) the anchors at each leg must be at least equal to the force of lift. To be safe even in the highest winds several safety factors must be considered to give ample margin for very high winds. One ham we know anchored his tower to his garage roof after reinforcing it. Even so you could see the roof undulate in a high wind. It is safer to anchor the self supporting tower direct to ground using any of a number of different type anchors.

The tower has 27 square feet of wood on one side. Doubling this (for two sides) and adding 6 square feet for the beam, we get a maximum of 60 square feet normal to the wind (ie: the wind blows against a total of 60 square feet of wood) a 60 MPH wind, (which is the minimum safety factor we would recommend although it is in excess of the California requirement) will apply a lift of 676 pounds at two legs and a force of 876

pounds compression at the other two legs. Since compression is the down thrust, obviously it is necessary only that the anchor equal the lift weight, as the earth will take the additional compression unless you place your anchors in very wet or swampy soil. Therefore the anchor at *each* leg must weigh at least 676 pounds. Seems like a lot but it really isn't. A 21 inch cube of concrete weighs that much. That's only 23″ x 23″ x 23″ for Adobe soil (a 23 inch cube). So at our QTH we dug a hole 23 x 23 x 23 (inches) and built a platform which was inserted in the bottom of the hole, an anchor properly nailed to that (see *fig 2*) and then the dirt was poured back in the hole.

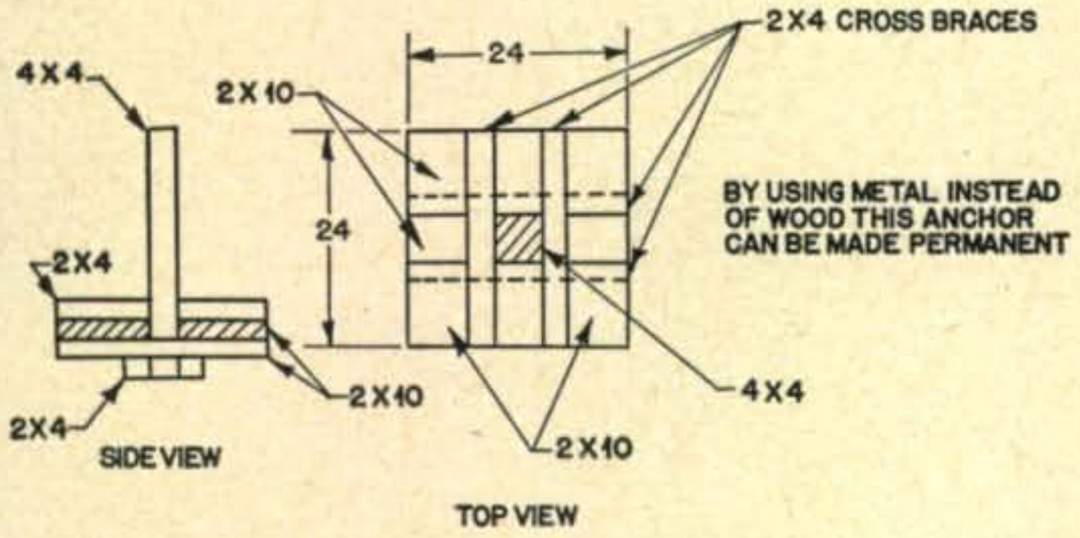


Fig. 2.

When placing those anchors use a spirit level from the top of each anchor to the others (on a straight board turned on its side) and make sure each and all four are level. This eliminates having to level the tower after it's raised into the upright position.

I used wood (mahogany and oak) for anchors as they were to last only a few years, although properly creosoted and coated with asphalt they would probably last 10 or more years. For a permanent anchor use an iron plate instead of wood. If concrete is used, before pouring the cement in place be sure and have ample reinforcing rods and some method of making the anchor lift the entire weight of the anchor itself, not just the top ½ or 1/3 of it!

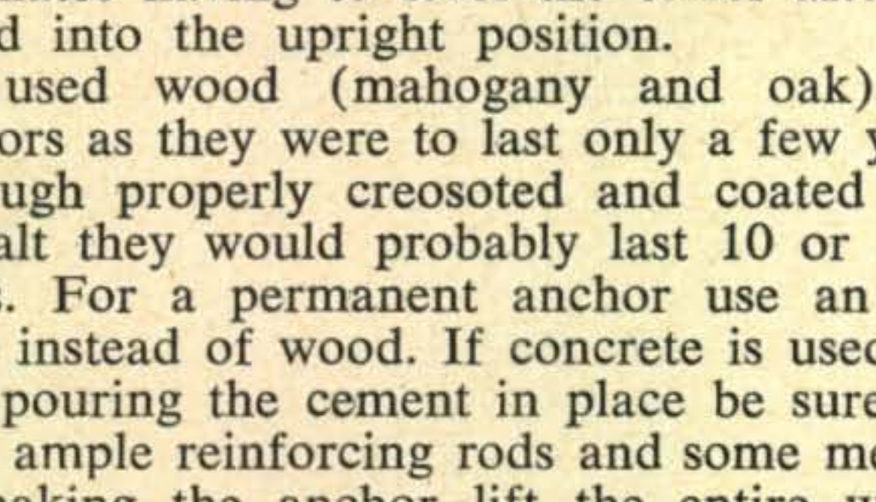


Fig. 3. Concrete Anchor

For a greater safety factor dig a hole 36″ x 36″ x 36″ (or its equivalent deeper but smaller in width and length) and fill it with concrete, or large heavy rocks, except for the top 1½ foot. Fill in around the rocks with either a

thin (not too thin) mixture of concrete or soil and water, preferably adobe or clay soil if available, to the level of the rock. Top that off with 1½ feet of soil well packed and plant some grass on top. Oh yes! Don't forget to put the anchor upright in place before filling the hole. The 36 x 36 x 36 (inches) cube will withstand a 100 mile an hour wind, being 4020 pounds at each leg!

However, I personally found this to be unnecessary as this tower withstood all Southern California had to offer for more than four years, which included gusts over 75 miles per hour. Use of the larger anchor is necessary only in those cases where year in and year out winds in excess of 60 miles per hour, or where you are exposed to hurricane conditions. One factor that will help to reduce the wind

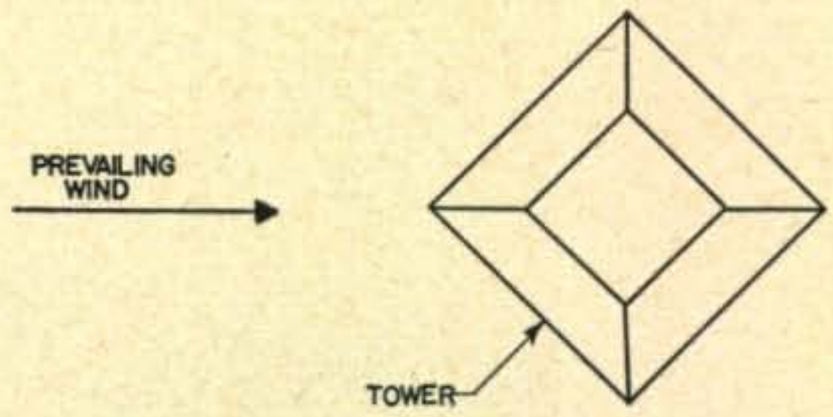


Fig. 4.

drag is to place one leg, not one flat *side* of the tower, facing the prevailing wind direction. This changes the air flow around the tower and it is recommended that the leg be placed facing the direction from which comes the strongest winds in your local. In our new QTH the winds are either North or South. The solution here is to put one leg at the North and one at the South and the sides of the tower then run Northeast and Southwest and Northwest and Southeast. See *fig 4*.

Construction

Obtain 4-12 foot 2″ x 4″ (2x4). Use grade No. 1 select, without knots, either Douglas Fir or its equivalent (ie, pine, etc). Notch one end of each 12 foot 2 x 4 nine inches deep to accept

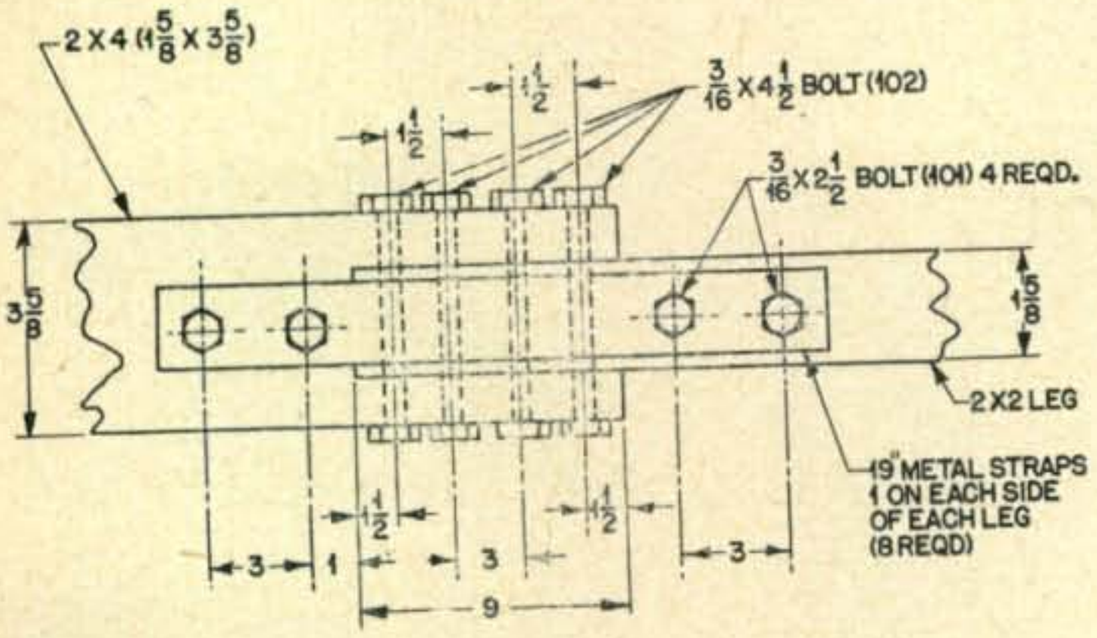


Fig. 5a. 2x4 & 2x2 Leg Joint

a 2 x 2, which will be the second section of the tower leg. (See *fig 5a*). Be sure this notch is in the center of the 2x4 and don't split it! Next obtain 8-8 foot 2″ x 2″ (2x2) and 4-10 foot 9 inch 2″ x 2″ (2x2). These 16 pieces form the four legs being 2 x 4, 2 x 2, 2 x 2, 2 x 2 for each leg. The cross (X) bracing ties the legs together and gives the strength required. These X braces are cut to length and drilled in pairs. *Fig 7* shows a typical brace. All lumber must be free of knots, preferably No. 1 select grade, have a good tight grain, be straight and have no defective places that will weaken the structure. Actually we used No. 2-2x4 for our legs with some partial knots, because nothing else was available and we have absolutely no trouble, but it would be best where possible to use No. 1 select grade, which means that you can select the pieces. If you treat that lumber-man correctly and tell him what you want without using the term select you will usually get the select grade without paying the extra price for it.

Start with the large 12 foot base section as the first unit to be made. In assembling the base section start by laying out two of the 2x4 on the ground so that their *base* ends are exactly 8 feet apart (center to center) not parallel but tapering together slightly at their upper end, *level* each of the legs. (We are assuming that at this point you have properly prepared the wood for assembly by painting it with a primer coat, letting it age for at least

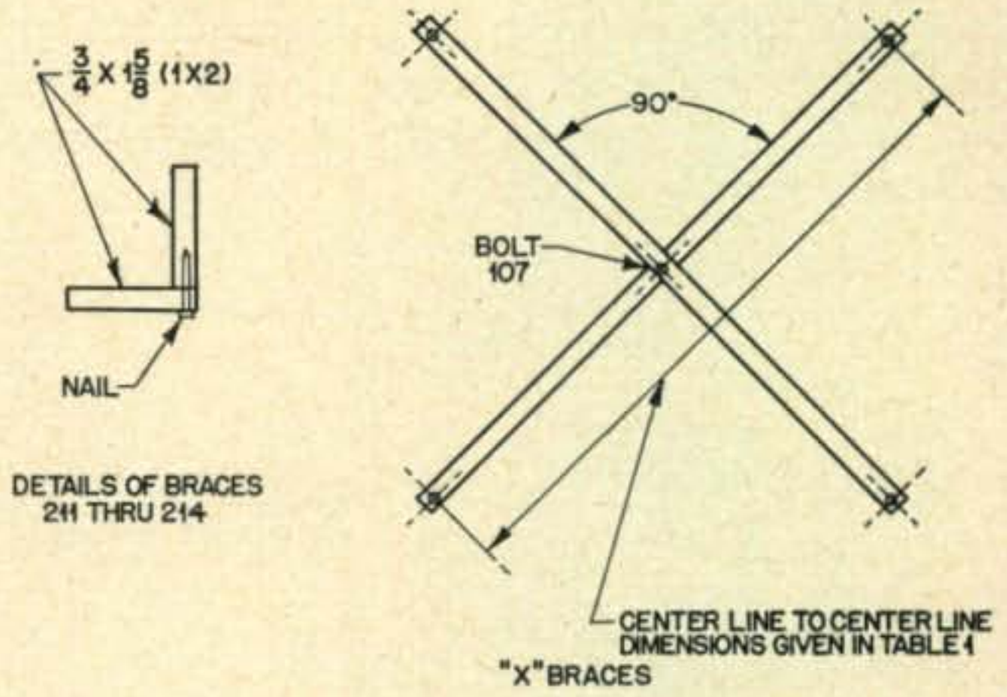


Fig. 7.

1 week, then following up with at least two coats of high quality outside oil paint, properly dried. If any doubt exists as to the best procedure consult a local painter or lumber yard). Now with those legs level, proceed to drill the holes as shown in *fig 9*, making sure your holes are true and well centered. The first hole which is for the lowest connection for the first cross brace is 13″ up from the bottom end, and drilled through the *narrow* side of your 2x4 (ie, drill passes through the wood starting on the narrow side and runs through the wood parallel with flat side . . . see the picture!!! this is important). We used a ¼ inch drill with a small burr on it for the ¼ inch holes and they are good and tight. The 3/16 holes by using 3/16″ drill with burr on the shaft. (We made the burr with a vise and pair of pliers).

Drill all the holes in both edges of the 2x4, then the crossbraces. Now assemble the crossbraces in their respective positions on the legs and bolt into place. Notice that the base of the legs are 8 feet center to center, while at the lowest joint between X brace and leg (narrow side) the dimension is only 7′ 9 27/32″, and at the upper joint of leg and lower brace, the dimension is 6′ 7½″. The large composite drawing shows how these dimensions progress up the tower. It is important that your base section be trued up. After finishing the two sets of sides for the base section, butt the base end up against a straight surface, such as a garage wall. Using a straight edge running perpendicular to the garage wall make sure the angle of each leg as it changes inward from that perpendicular is equal, *then* and not before, should all the bolts for that

section of two legs and an X brace be tightened, and the center bolt No. 107 have its hole drilled and the bolt put into place and tightened. By doing this the bolt at the center of the X brace should then be in the center of each of the cross members and the angle formed should be 90°. By spending the time to true up the bottom section this way, you eliminate a lopsided tower. The tower is constructed on an angle of 4° 46″ from the perpendicular. After *each* of the two sides of the base section have been assembled, trued and bolts tightened then place them on edge, assemble the side brace, and true up and

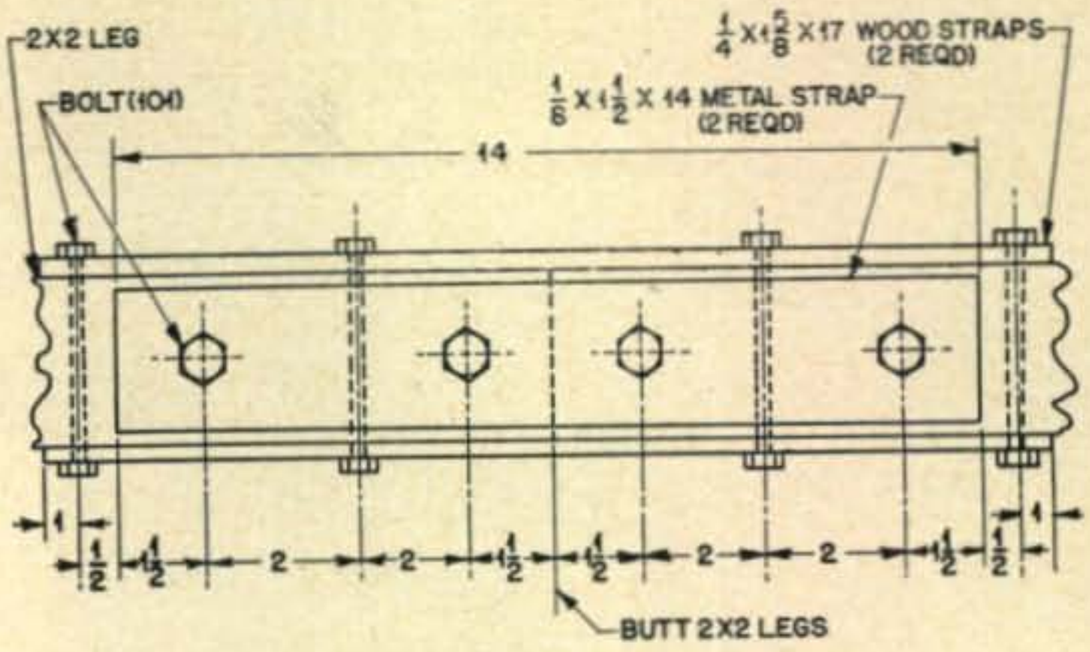


Fig. 5b. 2x2 leg joints

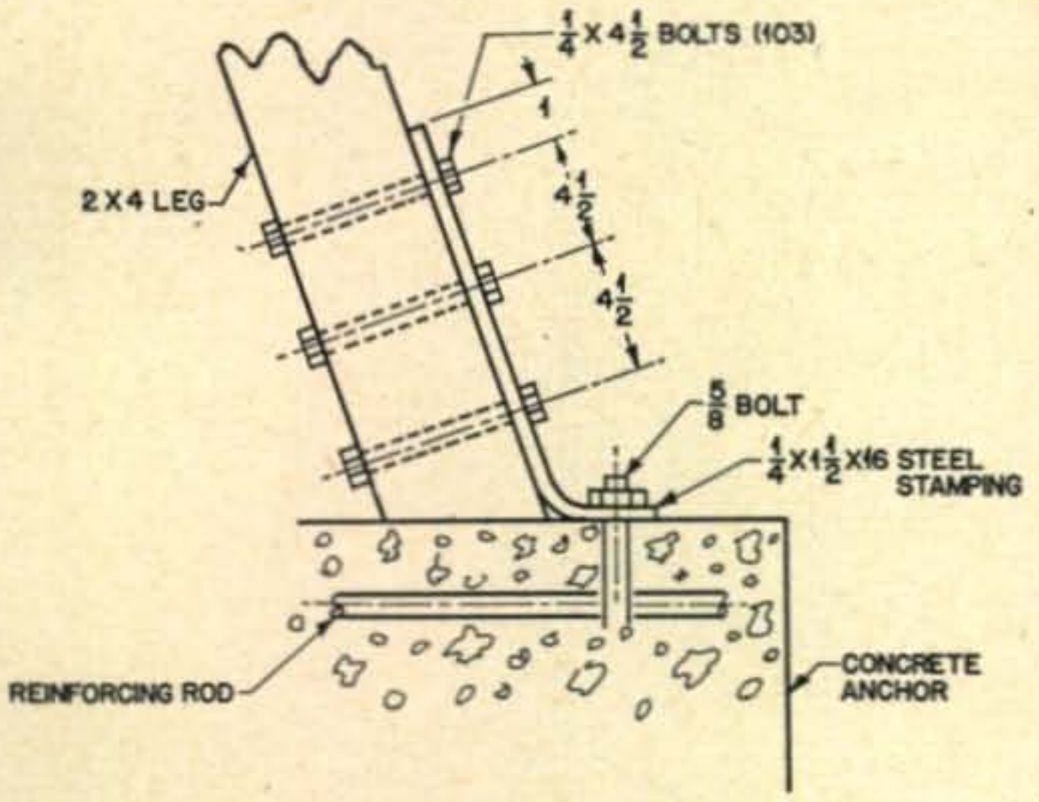


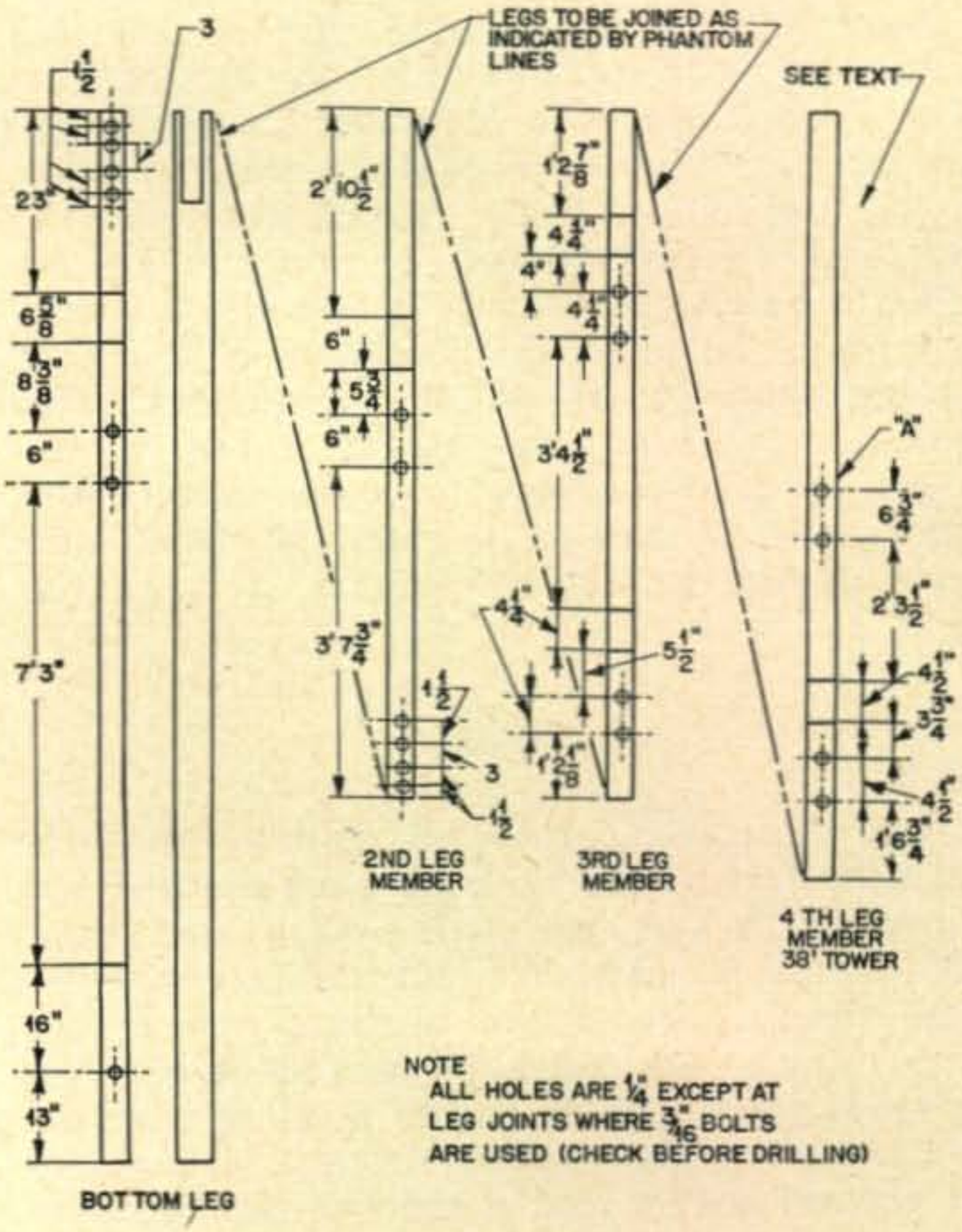
Fig. 8. Typical leg attachment to anchor

tighten, thus completing the entire base section. Note that the crossbraces are in pairs, opposites being alike, while the crossbraces removed by 90° (ie, the other 2 pairs) are also in pairs but their dimensions are slightly different as they join the legs at a point some 4″ to 6″ removed from the other joint. Also notice that the two lowest sets of crossbraces are reinforced by a 1 x 2 piece fastened at right angles to the brace.

After making the base section, true it up, then make the second section. It is much easier to assemble each section if you first level the two legs you are going to join with braces. If properly leveled with a spirit level, there cannot be any error in making the section true, for once leveled it just "ain't" possible to get it off! After the section is made join the two sections being absolutely sure each of the two sections are level and level with each other. Now join the bottom legs where they lay on or near the ground after leveling, and the "top" legs just naturally fit in place. That is why leveling each section is so important. If a drill slips or the rule slips and one of your braces was drilled slightly off it will result in one of the legs not matching up properly. Don't let it worry you. Notice that in assembling each section of the tower you are able to attach only one X brace to each section (except top section) before joining it to another section. This

is to allow for such possible error. You can adjust the legs slightly to fit into proper alignment, but refrain from changing the *base* section. It happened to us too, we just bent one leg slightly and slipped it into place, with no harm done. After assembling two such sections, put in the additional X braces. Build the 3rd and 4th sections and join, noticing the detail of the 2x2 joints in *fig 5b*. A suggested tower top is shown, but any sturdy top that properly boxes the tower can be used, even a formed aluminum top could be used if desired. The essential thing that the top must accomplish is that it box in tightly the legs, and second that it takes such thrust as you may place on it with your beam. Put your top in place, drill all holes and remove it, except for the boxing members. After raising the tower, replace the top, as this cuts down on weight in raising the tower. Use whatever motor mount you desire, place it into

Fig. 9.



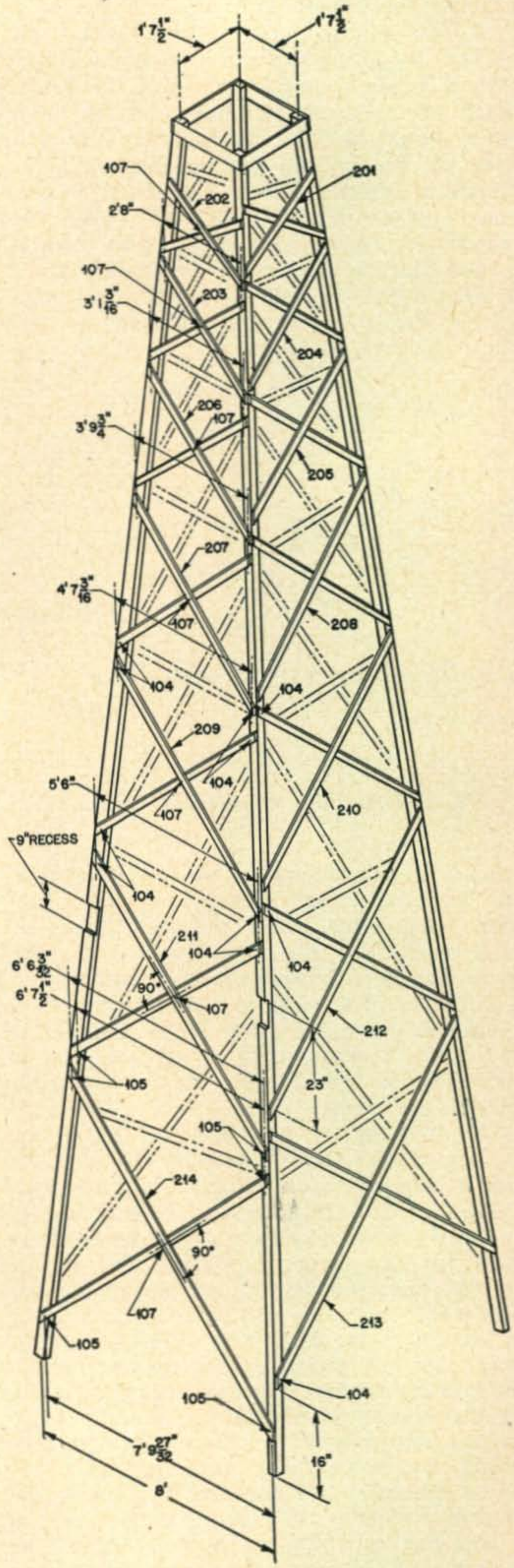
NOTE
ALL HOLES ARE 1/4" EXCEPT AT LEG JOINTS WHERE 3/16" BOLTS ARE USED (CHECK BEFORE DRILLING)

Showing detail of mounting

position, predrill, and remove it for the same reason, replacing it when the tower is upright. From *fig 9* note that the upper section of the last 2x2 is not predrilled. This is left to you to fit to your particular motor mount. The motor should be placed below the top, with a thrust bearing at the top of the tower. The mounting in this fashion makes motor repairs easier, and reduces the strain on the top mount or motor if the beam were directly on the motor and it were mounted on top of the tower. Install the last X braces as might be appropriate. Point A, *fig 9* is the starting point for the uppermost brace, which we made 3′ 8¾″ and wherever it hit the opposite leg we drilled a hole and attached it and left it there. As long as the angle at the center of the X is not less than 70° it will be satisfactory. The photos show how we mounted our motor mount to all four legs to assist boxing the upper portion and distribute the twist and thrust of the motor and the wind upon the beam and motor.

Now Raise It!

With the tower completed, anchors in place, place the legs of the tower against the anchors if possible. In our case, as the photo will show, this was not possible. We had to raise the tower some distance from the anchors because of large trees in the yard, by raising it between the trees, then walking it into position over the anchors. This we did by driving stakes into the ground at the base of the two legs lying on



Constructional details of entire tower. Above left "Recess" should not be recessed, the 9" only indicates slot length where leg joins.

Parts List

Legs—See Text
X Braces: 1" x 2" Douglas Fir or Equivalent #2 or better

		Long		Drill Center holes. to center.	
#214	2 Pieces	10' 6 5/16"	"	10' 1 3/16"	"
#213	" "	10' 6½"	"	9' 11"	"
#212	" "	8' 10¾"	"	8' 4"	"
#211	" "	8' 10½"	"	8' 6 3/32"	"
#210	" "	7' 2½"	"	6' 10"	"
#209	" "	7' 6 3/32"	"	7' 1 19/32"	"
#208	" "	6' 1¾"	"	5' 9¼"	"
#207	" "	6' 4 1/16"	"	5' 11 9/16"	"
#206	" "	5' 3½"	"	4' 10½"	"
#205	" "	5' 1¾"	"	4' 9¼"	"
#204	" "	4' 4½"	"	4' 0"	"
#203	" "	4' 5¾"	"	4' 1¼"	"
#202	" "	See Text	"	(3' 4¾"	"
#201	" "	See Text	"	3' 3⅜")	"

Brace for #214	Cut to fit
" " #213	Cut to fit
" " #212	7' 9" Long
" " #211	8" 1½' Long

Center Cross Member (Braces as in #214) — **6' 6" Long, 4 Pieces Plus Metal Angle Brackets to Connect to Leg at Existing Bolt.**

Straps:

Metal:

8 Pieces	1" x ⅛" x 19"	Lowest Leg Joint
16 "	1½" x ⅛" x 14"	Upper & Middle Leg Joint

Wood:

24 Pieces ¼" x 1⅝" x 17"	Any thin wood — i. e., Apple Crate

(Used at Upper & Middle Leg Joints)
2-lb. #6 Galvanized Nails to Nail Bracing to Center Cross Member and #211, 212, 213 & 214.

Bolts:

Surplus Aircraft Aluminum Bolts — plated to prevent oxidation. Measure Length without head!

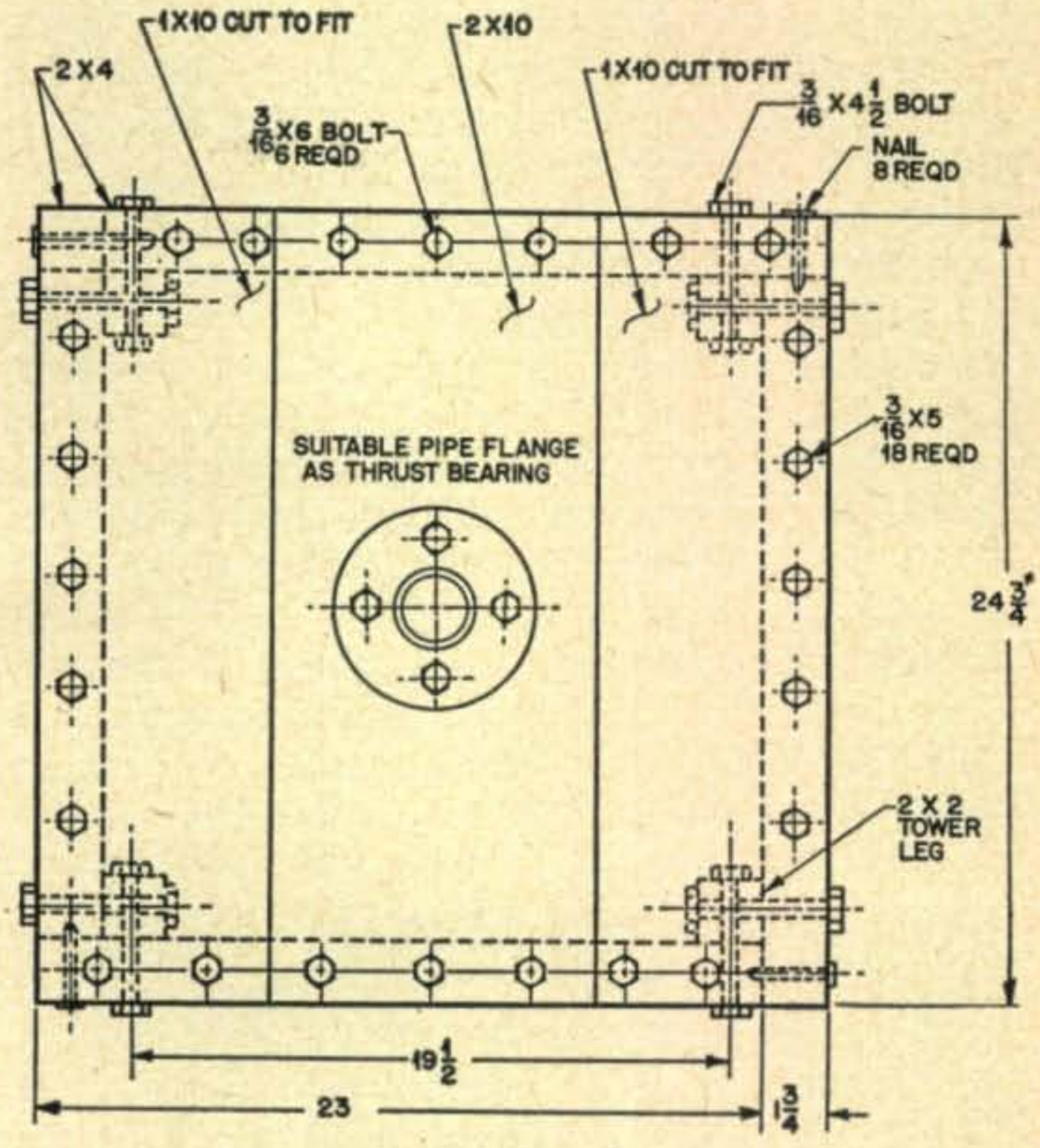
Bolt #	Number required.		With washer.	
104	100	3" x ¼"	"	(X Brace to Leg Bolts)
105	12	5" x ¼"	"	(X Brace to Leg Bolts, Long Side)
107	28	2" x 3/16"	"	X Brace Center Bolt
103	12	4½" x ¼" or ⅜"	"	Leg to Anchor Bolt
102	16	4½" x 3/16"	"	Lower Leg Joints
101	80	2½" x 3 1/6"	"	16 for Lower Leg Joints 32 for Middle Leg Joints 32 for Upper Leg Joints

Ladder:

4 14' 2" x 2"
2 10' 2" x 2"

1" x 3" for Steps (amount depends upon width of Ladder and Spacing).

Nail steps to legs—brace each joint with wood straps (where sections join). Tie ladder to tower at lower section. Bolt upper sections to tower in at least 2 places if lower section is to be removed.

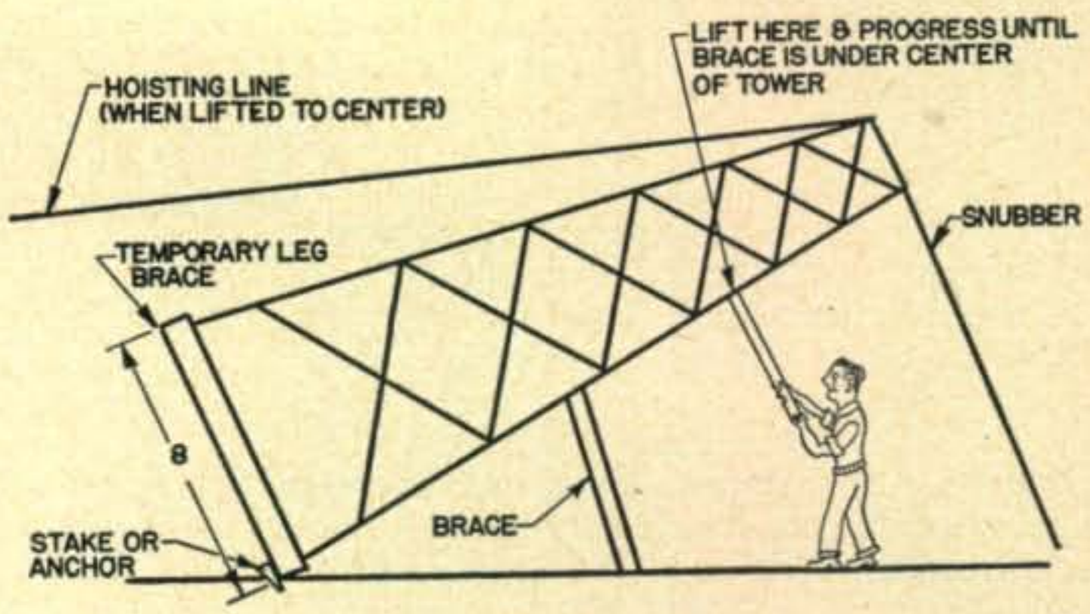


Tower top

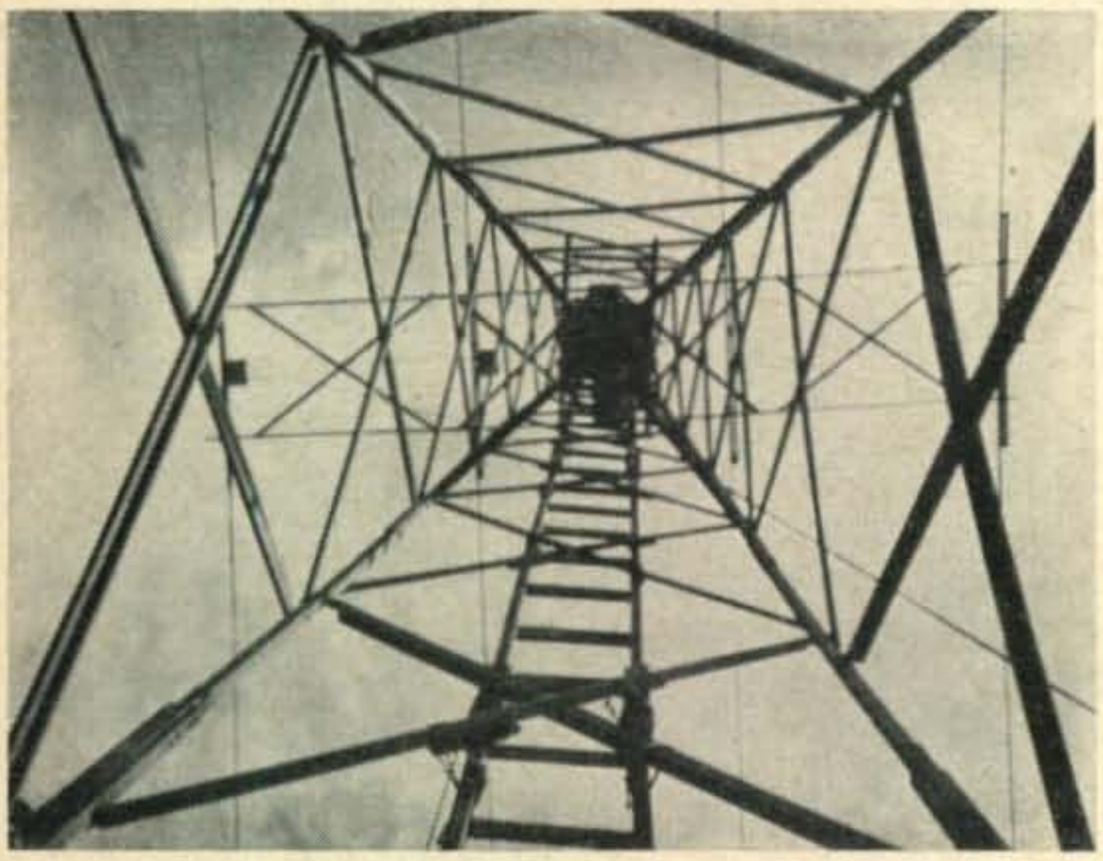
the ground to keep the tower from slipping as we raised it. We also bolted a temporary 2x4 across the base of the tower legs, right at the very ends of the legs, so that the legs would not break between the ends and the first joint (some 13" up on the leg) during the raising process. Next insert the center horizontal X brace connecting all four legs. This aids in preventing twist in raising and gives additional strength and load distribution, so put it in to stay. It will take bent metal brackets at each end to join it to the legs. Make them to fit, (cannot be precut).

Now start at the upper (small) end of the tower and start walking it up. As two or three men lift it and start walking it up have one or two more place braces under it and move the braces progressively towards the center as it is walked up further. Proceed thusly to the center of the tower (which is not the center of gravity). Now either two or three men (or a car) at the end of a *long* rope previously attached to

Fig. 6.



the top can complete the lifting process, while the men who were walking it up take hold of a snubber, also previously tied to the top, such snubber to prevent the tower from being pulled all the way over in the opposite direction after it reaches the upright position. (Believe me, it can happen!) Two men and two strong boys raised ours with no gin pole, pulleys or cars. A gin pole could be used if available and it would be much easier, as it would eliminate the walking up process, which is the worst part. (Don't ever try to take the tower down this way though. A gin pole high enough to catch the tower weight above the center of gravity, before the tower passes the point of falling is needed). We made the mistake of using clothes line for our rope to use for lifting. We



Heads up

had 200 feet as a starter. It stretched to half that again before the tower even started to move! Use ⅜" manila or larger and eliminate that problem. When we lowered this one later, we used ⅜ 3 strand manila rope with complete satisfaction.

Once the tower was upright, with one man on each rope attached to the top to prevent its turning over, we used a long 2 x 4 and levered the tower across the yard and into position on the anchors, by levering it under the temporary brace across the legs. When next to the anchors, one of us at each corner, and we lifted it into place. Now bolt it to the leg of the anchor. See *fig 8* and the photo of our particular anchor.

Now install the first ladder section, placing the base of the ladder upon a concrete or brick block set into the ground. Raise the second and third ladder sections into place using a rope over some tower X member as a pulley. Tie (or bolt if desired) the ladder sections into place along the side desired; make good joints at the ladder leg joints. We made our ladder in 3 sections, and boxed each joint with thin strips of apple box material, similar to the 2x2 leg joints except that these strips were nailed only to one ladder leg, the other riding free (for easy assembly and disassembly). If you have children, after all items are in place on the tower and no more climbing is necessary, remove the 12 foot lower section of the ladder, and store it away where the kiddies cannot get it. Otherwise they will climb that new tower! Forty feet may not seem far, but get up there for a while and look down, and just think what it would do to a child's arm or back if they fell! Safety is a good thing to keep in mind. We always take a safety rope up with us and tie ourselves onto that tower if there is work to be done up there.

When she's up, anchored, ladder in place, climb up and fasten the top and motor mount into place, hoist the motor and put it in with all wiring, etc. Light beams can be walked up the ladder; ours was a 4 element 20 meter beam, with automatic switching boxes for 8 Colinear half waves in phase on 10, and it weighed 120 pounds. So we attached two guy wires from the top to the ground at about 45° angle, slid the beam onto the guys, slid it up the guys and onto a specially built cradle, bolted it to the cradle, released it from the guy wires, swung the cradle into position, removed the cradle bolts, and bolted it to the driveshaft, dropped the cradle, and there she sat, all ready to go. We had lots of trouble with the beam and spent many a trip up and down that tower tuning it up, and finally ended up with a three element 20 meter beam. The photos show some of the work in progress. We have never had any trouble with the tower. It has exceeded even our fondest expectations. There is no reason why the tower could not be built even higher, if the same bracing is methodically continued and the anchor enlarged to compensate for the shift in the center of gravity. The necessary formulas can be found in Eshback "Handbook on Engineering Fundamentals", Pp 9-64 to 9-69. ■

Travel-Desk

One of the big nuisances in mobile operating is keeping that station log. Since this magazine might get into FCC hands we won't start anything blood curdling by speculating how many of us don't keep our mobile log up to date. Some Chicago outfit has seen the light and made everything easy for us . . . it is called the Travel-Desk and it fastens to the dash board of your car in a trice. With this you have your log right there handy, and the magnetized pencil doesn't chase itself around the floor of the car like regular ones. Dunno if you can tell from the photo or not, but the desk swings around out of the way when you have other business. Silly people didn't tell us how much the contraption costs. Probably reasonable. General Industrial Co., 5738 N. Elston Ave., Chicago 30, Illinois.

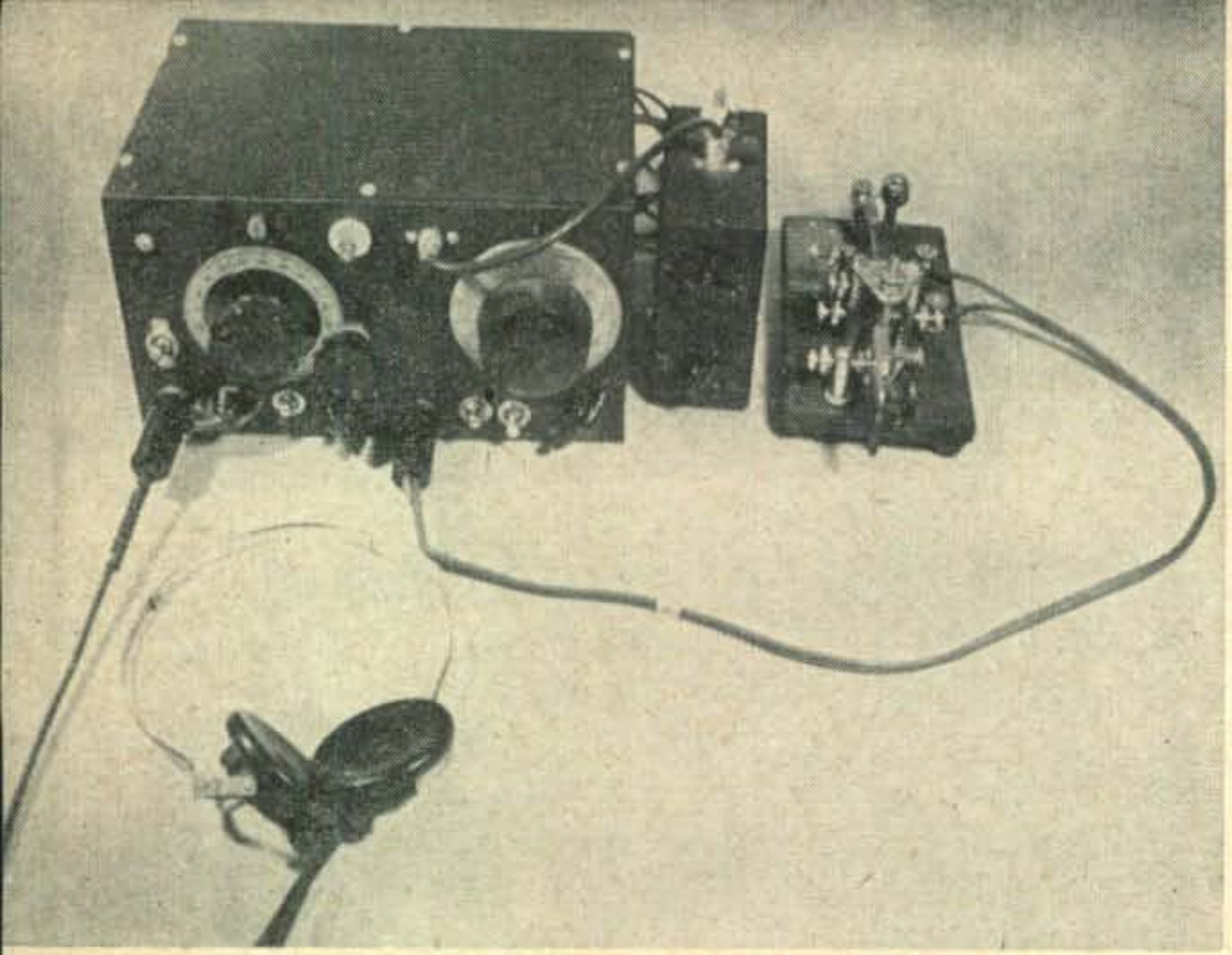
Below is a complete listing and relationship of the many different types of available surplus crystals.

Surplus Low Frequency Crystal Information

R. M. Mason, W8NN
419 S. Pine
Lima, Ohio

A-54th harmonic
B-72nd harmonic

Channel	Harmonic	Channel—Mc.	Fundamental Frequency	Progressive Difference in Kcs.
0	A	20.0	370.370	
1	A	20.1	372.222	1.852
2	A	20.2	374.074	1.852
270	B	27.0	375.000	.926
3	A	20.3	375.925	.925
271	B	27.1	376.388	.463
4	A	20.4	377.777	1.389
272	B	27.2	377.777	0
273	B	27.3	379.166	1.389
5	A	20.5	379.629	.463
274	B	27.4	380.555	.926
6	A	20.6	381.481	.926
275	B	27.5	381.944	.463
7	A	20.7	383.333	1.389
276	B	27.6	383.333	0
277	B	27.7	384.722	1.389
8	A	20.8	385.185	.463
278	B	27.8	386.111	.926
9	A	20.9	387.037	.926
279	B	27.9	387.500	.463
10	A	21.0	388.888	1.388
280	B	28.0	388.888	0
281	B	28.1	390.277	1.389
11	A	21.1	390.740	.463
282	B	28.2	391.666	.926
12	A	21.2	392.592	.926
283	B	28.3	393.055	.463
13	A	21.3	394.444	1.389
284	B	28.4	394.444	0
285	B	28.5	395.833	1.389
14	A	21.4	396.296	.463
286	B	28.6	397.222	.926
15	A	21.5	398.148	.926
287	B	28.7	398.611	.463
288	B	28.8	400.000	1.389
16	A	21.6	400.000	0
289	B	28.9	401.389	1.389
17	A	21.7	401.851	.462
290	B	29.0	402.777	.926
18	A	21.8	403.703	.926
291	B	29.1	404.166	.463
19	A	21.9	405.555	1.389
292	B	29.2	405.555	0
293	B	29.3	406.944	1.389
20	A	22.0	407.407	.463
294	B	29.4	408.333	.926
21	A	22.1	409.259	.926
295	B	29.5	409.722	.463
22	A	22.2	411.111	1.389
296	B	29.6	411.111	0
297	B	29.7	412.500	1.389
23	A	22.3	412.963	.463
298	B	29.8	413.888	.925
24	A	22.4	414.814	.926
299	B	29.9	415.277	.463
25	A	22.5	416.666	1.389
300	B	30.0	416.666	0
301	B	30.1	418.055	1.389
26	A	22.6	418.518	.463
302	B	30.2	419.444	.926
27	A	22.7	420.370	.926
303	B	30.3	420.833	.463
28	A	22.8	422.222	1.389
304	B	30.4	422.222	0
305	B	30.5	423.611	1.389
29	A	22.9	424.074	.463
306	B	30.6	425.000	.926
30	A	23.0	425.926	.926
307	B	30.7	426.888	.462
31	A	23.1	427.777	1.389
308	B	30.8	427.777	0
309	B	30.9	429.166	1.389
32	A	23.2	429.629	.463
310	B	31.0	430.555	.926
33	A	23.3	431.481	.926
311	B	31.1	431.944	.463
34	A	23.4	433.333	1.389
312	B	31.2	433.333	0
313	B	31.3	434.722	1.389
35	A	23.5	435.185	.463
314	B	31.4	436.111	.926
36	A	23.6	437.037	.926
315	B	31.5	437.500	.463
37	A	23.7	438.888	1.388
316	B	31.6	438.888	0
317	B	31.7	440.277	1.389
38	A	23.8	440.740	.463
318	B	31.8	441.666	.926
39	A	23.9	442.592	.926
319	B	31.9	443.055	.463
40	A	24.0	444.444	1.389
320	B	32.0	444.444	0
321	B	32.1	445.833	1.389
41	A	24.1	446.296	.463
322	B	32.2	447.222	.926
42	A	24.2	448.148	.926
323	B	32.3	448.611	.463
43	A	24.3	450.000	1.389
324	B	32.4	450.000	0
325	B	32.5	451.389	1.389
44	A	24.4	451.852	.463
326	B	32.6	452.777	.925
45	A	24.5	453.703	.926
327	B	32.7	454.166	.463
46	A	24.6	455.555	1.389
328	B	32.8	455.555	0
329	B	32.9	456.944	1.389
47	A	24.7	457.407	.463
330	B	33.0	458.333	.926
48	A	24.8	459.259	.926
331	B	33.1	459.722	.463
49	A	24.9	461.111	1.389
332	B	33.2	461.111	0
333	B	33.3	462.500	1.389
50	A	25.0	462.962	.462
334	B	33.4	463.888	.926
51	A	25.1	464.814	.926
335	B	33.5	465.277	.463
52	A	25.2	466.666	1.389
336	B	33.6	466.666	0
337	B	33.7	468.055	1.389
53	A	25.3	468.518	.463
338	B	33.8	469.444	.926
54	A	25.4	470.370	.926
339	B	33.9	470.833	.463
55	A	25.5	472.222	1.389
340	B	34.0	472.222	0
341	B	34.1	473.611	1.389
56	A	25.6	474.074	.463
342	B	34.2	475.000	.926
57	A	25.7	475.925	.925
343	B	34.3	476.388	.463
58	A	25.8	477.777	1.389
344	B	34.4	477.777	0
345	B	34.5	479.166	1.389
59	A	25.9	479.629	.463
346	B	34.6	480.555	.926
60	A	26.0	481.481	.926
347	B	34.7	481.944	.463
61	A	26.1	483.333	1.389
348	B	34.8	483.333	0
349	B	34.9	484.722	1.389
62	A	26.2	485.185	.463
350	B	35.0	486.111	.926
63	A	26.3	487.037	.926
351	B	35.1	487.500	.463
64	A	26.4	488.888	1.388
352	B	35.2	488.888	0
353	B	35.3	490.277	1.390
65	A	26.5	490.740	.463
354	B	35.4	491.666	.926
66	A	26.6	492.592	.926
355	B	35.5	493.055	.463
67	A	26.7	494.444	1.389
356	B	35.6	494.444	0
357	B	35.7	495.833	1.389
68	A	26.8	496.296	.463
358	B	35.8	497.222	.926
69	A	26.9	498.148	.926
359	B	35.9	498.611	.463
70	A	27.0	500.000	1.389
360	B	36.0	500.000	0
361	B	36.1	501.388	1.388
71	A	27.1	501.851	.463
362	B	36.2	502.777	.926
72	A	27.2	503.703	.926
363	B	36.3	504.166	.463
73	A	27.3	505.555	1.389
364	B	36.4	505.555	0
365	B	36.5	506.944	1.389
74	A	27.4	507.407	.463
366	B	36.6	508.333	.926
75	A	27.5	509.259	.926
367	B	36.7	509.722	.463
76	A	27.6	511.111	1.389
368	B	36.8	511.111	0
369	B	36.9	512.500	1.389
77	A	27.7	512.962	.462
370	B	37.0	513.888	.926
78	A	27.8	514.814	.926
371	B	37.1	515.277	.463
79	A	27.9	516.666	1.389
372	B	37.2	516.666	0
373	B	37.3	518.055	1.389
374	B	37.4	519.444	1.389
375	B	37.5	520.833	1.389
376	B	37.6	522.222	1.389
377	B	37.7	523.611	1.389
378	B	37.8	524.999	1.388
379	B	37.9	526.388	1.389
380	B	38.0	527.777	1.389
381	B	38.1	529.166	1.389
382	B	38.2	530.555	1.389
383	B	38.3	531.944	1.389
384	B	38.4	533.333	1.389
385	B	38.5	534.722	1.389
386	B	38.6	536.111	1.389
387	B	38.7	537.499	1.388
388	B	38.8	538.888	1.389
389	B	38.9	540.277	1.389



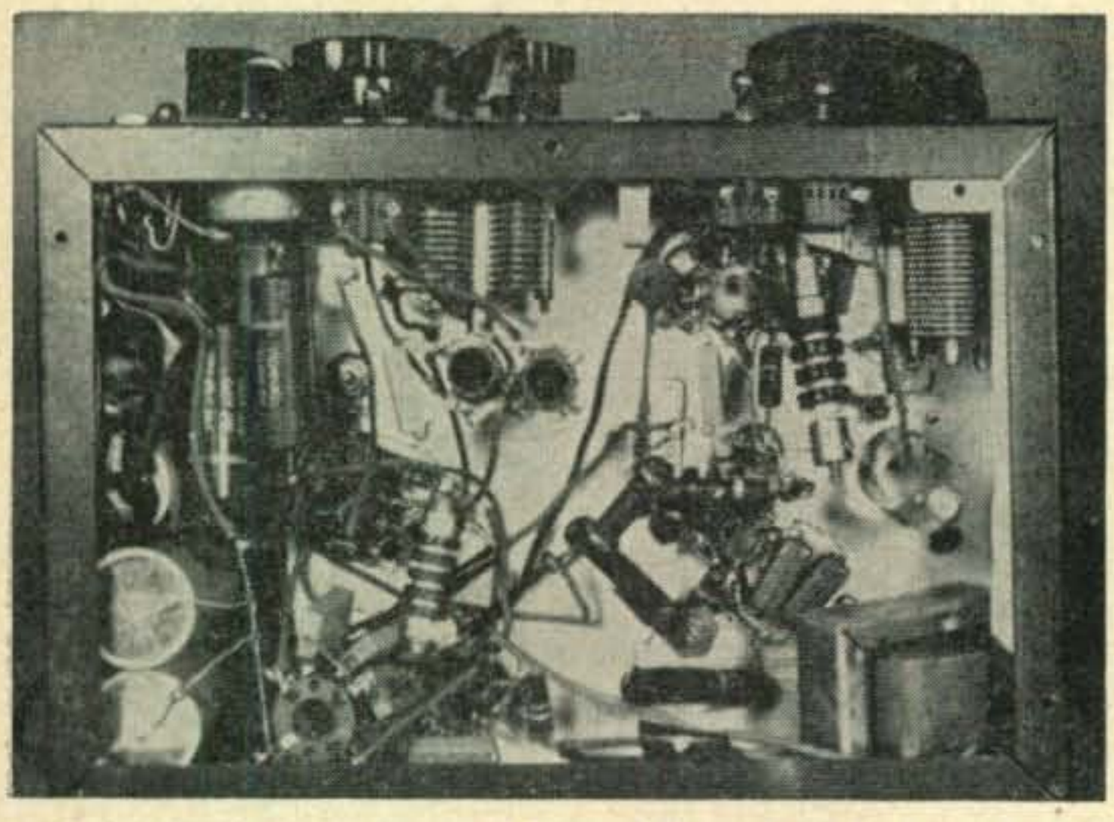
Rig ready to go. The coiled AC cord is visible at the rear

The Bedside Rag Chewer

Glenn E. Roof, W80PG/4
10923 N.E. 9th Ct.
Miami, Fla.

First of all, let us agree that this is not presented as a model of construction practice. The little piece of equipment shown in the diagram and photograph was built under somewhat trying circumstances and at a time when the looks of the finished product were of secondary interest. All of the equipment here at W80PG is home-built and, as visiting hams can testify, the usual finished product is reasonably attractive.

Recently, I was faced with a hospital operation and a period of recuperation at home in bed. Wishing to have some small bedside companion, the little transmitter-receiver shown here was planned. Since I had a good month to do the building, plans went ahead at a rather leisurely pace. Suddenly, however, the hospital date was moved up a month and the rig had to be built in a few evenings. The main concern right then was to get everything in the cabinet and working. This was accomplished and at this writing the little job has given a good bit of service and many hours of pleasant hamming from a prone position. Perhaps others who might feel the need for a small, light, moderately versatile station at reasonable cost would be interested.



Bottom view. From left to right: Power supply, receiver and transmitter

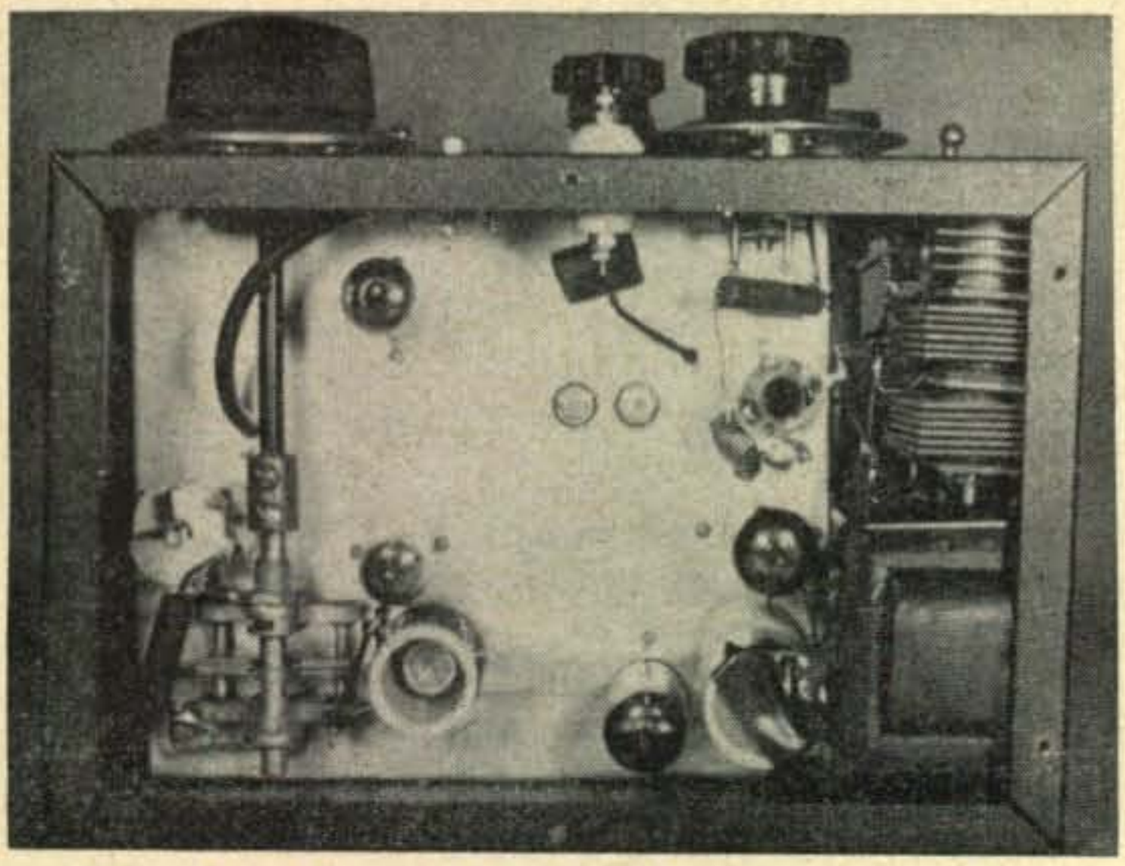
Description

As shown in the circuit diagram and photos, this is a 40 and 80 meter c-w transmitter, VFO controlled, and a 40 and 80 meter superhet receiver. These, together with the power supply, are in the large cabinet while the antenna tuner is in the smaller cabinet. All controls are brought out to the front panel because after being buttoned up none of the inside workings are available for adjustment.

Transmitter

The transmitter uses the usual Clapp Oscillator with a 6AK6 tube. Other tube types such as 6AU6 and 6AH6 will work just as well but the 6AK6 happened to be available. The plate of the oscillator is untuned since sufficient drive is available for the final without a tuned circuit. The amplifier is a 6AQ5, although here again other tube types can readily be substituted. A 5763 might be a better choice at slightly more cost. The output tank circuit on the amplifier is a pi-network. Since the loading capacitance for 52 ohm output at 40 and

80 meters is quite high it was decided to make this loading capacity fixed. This was dictated partly by the fact that there was just no room for a variable capacitance of some 1400 $\mu\mu$fd. The system used seems to work out fairly well and the loading on both bands is adequate. The input or tuning capacitance for a plate load of roughly 3,000 ohms works out to 180 $\mu\mu$fd on 80 meters and 90 on 40 meters. This is handled by the 100 $\mu\mu$fd final tuning capacitor *C10* which is shunted by an 80 $\mu\mu$fd tubular capacitor *C11*. Therefore, the amplifier tuning hits 80 at full capacity and 40 at minimum capacity. The inductance for 3,000 ohms plate load and 50 ohm feed is 12½ microhenries on 80 and 6½ on 40. This is covered with the small *B&W Miniductor L2* which is tapped for 40 meter operation. The output loading capacitance which is about 1400 $\mu\mu$fd on 80 and 700 $\mu\mu$fd on 40 consists



Top view. From left to right: X-mtr, receiver and power supply

of the two small 680 $\mu\mu$fd tubular capacitors *C12, C13*. One is in the circuit all of the time. The other is switched in by the same toggle switch that handles the tapping of the plate inductance. The output at 52 ohms is taken off the jack and fed to the antenna network in the smaller cabinet.

Receiver

The receiver is a two tube superhet using 1750 kc as the i.f. so the oscillator need be tuned only over a single range to cover both 80 and 40. A receiver of very similar design to this appeared in one of the magazines some years ago. A model of this receiver that I built at that time worked so well that I decided to use it in this small setup. The 6BA7 acts as converter with switched 80 and 40 meter r-f input coils. As mentioned before, the oscillator covers only one tuning range 5250 kc to 5550 to cover 80 and 40 with the proper r-f coil switched in and resonated. The i-f transformer is tuned to 1750.

With the oscillator values shown, the oscillator actually covers all of the 40 meter band with a bit left over on the low edge but only the 80 meter c-w band.

The 12AT7 operates as an oscillating second detector and audio amplifier. Sufficient audio output is obtained for good headphone volume.

Antenna Coupler

The antenna tuner is a simple L network. A 12 point tap switch shorts turns in the inductance to load various lengths of wires. The toggle switch at the top of the cabinet shifts the tuning capacitor to either the input or output side of the tuner. Almost any length of wire can be fed power with this type of network, however, the tuning will not improve the radiation efficiency of the antenna. It will merely insure getting power into the antenna.

Power Supply

The power supply is a selenium rectifier voltage tripler. It supplies 300 volts under full load to the transmitter and, by means of a voltage divider, a little over 100 volts to the receiver. With all of the filter shown the transmitter almost invariably will produce T9X reports and all signals on the receiver have a nice ring. At a sacrifice of voltage output smaller capacitors may be used in the power supply. However, some of the radio houses have periodic sales on electrolytics which allow going all the way on filters at reasonable cost. To hold up the supply voltage a small filter choke is included in the power supply rather than the resistor system sometimes used. A small 1½ amp filament transformer supplies all filaments.

Construction

As mentioned previously and as evidenced by the photographs construction was very hurried. The prime matter of interest was to get the job done and get everything into the cabinet. However, it works so well as is that no rebuilding is contemplated. The front panel controls from left to right are the AC on-off switch *S4* below which is the headphone jack *J2*. Next across the bottom is the regeneration control *R9* receiver band switch *S3* and receiver r-f tuning *C15*. The large dial to the left is the receiver band-spread tuning. Next to the receiver r-f tuning at the bottom is the transmitter key jack *J1*, the transmitter monitor switch *S1* and *S2* the transmitter band switch. In the lower right hand corner, is the transmitter plate tank tuning *C10*. The large dial to the right is the transmitter VFO frequency control *C2*. The two terminals at top center are the receiver antenna feed through to the left and the transmitter antenna output jack to the right.

Looking in the top of the cabinet the transmitter components are on the right with the oscillator grid tuning circuit and oscillator tube at the rear. The oscillator plate circuit

components as well as all of the amplifier components are underneath the chassis.

To the left center of the cabinet is the receiver. The oscillator components together with the inverted oscillator coil are at the front. This coil is tuned from the bottom. Next toward the rear is the 6BA7 converter tube with the i-f transformer slug tuning adjustment along side of it. At the rear is the 12AT7.

At the far left are the power supply components. To get all of the filters and rectifiers into this small space requires considerable juggling and as a matter of fact, the last capacitor just wouldn't fit so it was mounted in the receiver portion.

Looking at the bottom of the chassis, in the receiver portion the two switched r-f coils are toward the front. The i-f transformer is at the back together with the detector and audio components. On the transmitter side the oscillator plate circuit is at the rear with the amplifier components farther toward the front. The tapped output coil is mounted near the left wall of the cabinet just to the rear of the tuning capacitor and band switch.

The cabinet is 5″x6″x9″ with removable top and bottom plates. No suitable chassis was on hand when this was constructed so a larger sized aluminum chassis was cut down with tin snips until it fitted into the space. There is actually plenty of room in the cabinet and with a little care everything will fit easily. All of the components possible are mounted on their own pigtail leads and only a very small amount of hook up wire need be used.

The antenna coupler is mounted in a 2″x4″x4″ cabinet. The two front panel controls are tuning at the top and coil switch at the bottom. Along the top of the cabinet is the input jack, the input-output tuning capacitor switch and the output feed through. The two coax plugs are phono tip plugs. The coax is RG58/U.

Although no ventilating holes were drilled in the cabinets the temperature does not rise too badly and both oscillators are quite stable.

Tuning

Tuning is quite simple. However, it should be done with care to insure calibration. The transmtter VFO can be set by tuning the band spread to its maximum capacity then setting *C1*, the APC trimmer, so the oscillator signal is heard the low edge of either 40 or 80. It is advisable to keep the lowest frequency that can be tuned with the oscillator 10 or 15 kc inside the band edge. The oscillator will then cover almost the entire 40 meter band and most of the 80 meter c-w band. The amplifier is first tuned on 80 so that the tank circuit hits resonance with the tank circuit capacitor almost fully meshed. The tap on *L2* is then set for 40 meters so that the tank circuit resonates on 40 with the capacitor plates almost all the way out. The transmitter output is coupled to the antenna tuner and a length of wire hooked on to the feed through terminal. A dial lamp can be inserted in the antenna lead to indicate output. The selector switch is then rotated, stopping at each position to swing the tuning capacitor through its full capacity. This is continued until the combination of tap position tuning condenser is found that produces maximum brilliance on the output lamp.

The longer the antenna, the better the transmitter will get out. However, contacts can be made on pieces of wire as short as five or ten feet.

The first step in tuning the receiver is to set the i-f transformer on 1750 kc. This can be done by listening to a communications receiver tuned to 1750 kc, advance the receiver regeneration control until a hiss is heard in the earphones then tune the i-f transformer slug until a signal is heard on 1750 kc in the communications receiver. This must be done precisely if the 40 and 80 meter coverage is to be achieved. If no means of listening on 1750 kc is at hand the communications receiver can be tuned to 3500 and an antenna lead brought close to the small receiver i-f transformer. The second harmonic of the 1750 kc frequency will be audible. Once the i-f transformer has been set on its proper frequency, the oscillator should be set. This can be done by setting a communications receiv-

Parts List

C1—50 μμfd Hammarlund APC 50
C2—Approx 15 μμfd one rotor, one stator plate
C3, C4—.001 μfd silver mica
C5, 7, 9, 20, 23, 33—.001 μfd disc
C6, 24, 25—.01 μfd disc ceramic
C8—100 μfd ceramic
C10—100 μμfd variable
C11—80 μμfd ceramic
C12, 13—680 μμfd ceramic
C14, 16—140 μμfd variable
C15, 17, 21—100 μμfd mica
C18, 18A—20 μμfd approx. shunted with 40 μμfd zero temp.
C19—40 μμfd silver mica
C22, 32—500 μμfd disc
C26—.1 μfd 450 volt paper
C27—.05 μfd 250 v paper
C28, 29, 30, 31—40 μfd 450 v
C32—50 μμfd zero temp.
R1, 8—.1M ½ w
R2—47k ½ w
R3—30k ½ w
R4—22k ½ w
R5—1M ½ w
R6—22k ½ w
R7—1M ½ w
R9—25k pot.
R10—.47M ½ w
R11—47k ½ w
R12, 13, 14—25 ohm 1 w
R15—25k 2 w
R16—50k 5 w
J1—closed ckt. jack
J2, 3—phone jack
J4—open ckt. jack
CH1—8hy 75ma
RFC1, 2—1mh
RFC3, 4—2.5mh
T1—6.3v 2a.
S1—SPDT toggle sw
S2—SPDT toggle sw
S3—12 point rotary sw
S4a, 4b—DPDT toggle sw
S5—SPST toggle sw
L1—41T #26 en 1″ dia. on National XR60
L2—34T B&W 3012 center tapped (¾″ dia. #16 wire 32t/in.)
L3 — 3″ B&W 3015 tapped 2, 4, 7, 10, 13, 16, 19, 22, 25, 28, 38 turns. 1″ dia. @ 16 t/in.
L4—Meissner 14-1061
L5—Meissner 14-1061
L6—Meissner 141063
L7—Meissner 14-1062

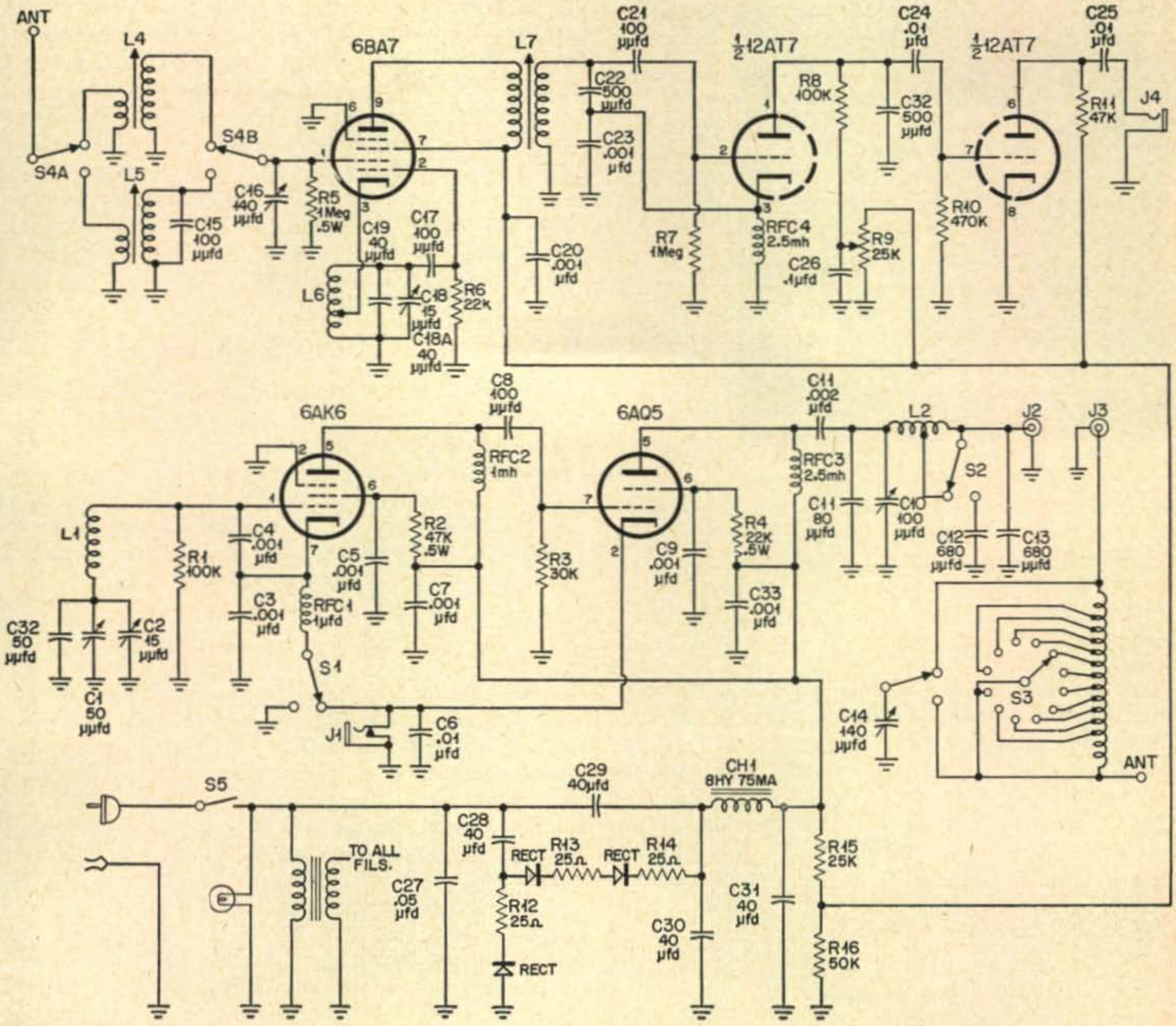


Diagram of complete rig

er at 5250, setting the small receiver band spread dial at its highest capacity value and tuning the oscillator coil slug until a signal is heard on 5250 kc. The receiver r-f stage is resonated by merely switching to either the 40 or 80 meter coil and peaking the circuit with the r-f tuning capacitor.

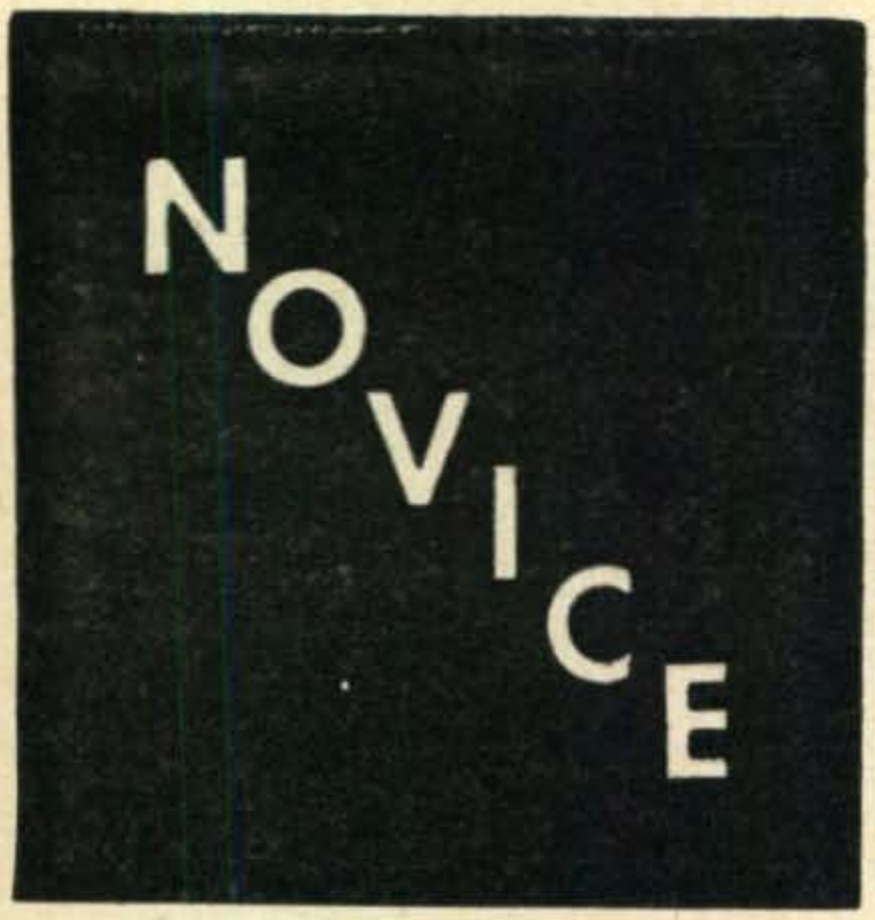
It is advisable to very carefully calibrate the receiver and VFO tuning dials to one another. Since the oscillator signal is very close to the receiver, it blocks it so badly that the VFO cannot be set by listening in the receiver. Therefore it is necessary to compile a chart of receiver and VFO settings that correspond to one another. In the unit shown the receiver dial was checked every two divisions and the VFO setting for each two division mark was noted. This was done on both 40 and 80 meters.

Operation

The purpose this little rig was built for did not include working DX. It was put together merely to rag chew away a few idle hours and this it has accomplished very well. The range limitation is, of course, the transmitter power and antenna used. The longer and higher antenna the farther out the transmitter will reach. The receiver is surprisingly lively. In the early morning on 40 VK and other Oceanic stations come in with good volume. In the evening South Americans come in quite well on 40. Calling any of these is a great temptation but it is just code practice. With about 50 feet of antenna the eastern part of the United States has been covered well on both bands.

When calling stations merely note the receiver setting, check the corresponding transmitter VFO setting on the chart, set the transmitter VFO and give him a blast.

I have had a lot of fun using this little rig and I am sure anyone building something similar to it will enjoy not only a small constructional job but many hours of rag chewing and a good topic of conversation. ■



Walt Burdine, W8ZCV
Waynesville, Ohio

As 1957 nears, you will be hearing a lot about IGY (International Geophysical Year). All over the world scientists are cooperating to further the study of any phenomena that has bearing on our lives. They will explore the heavens, the air, the sea and the earth to find information to help us live a healthier and happier life. People will be scattered to the remote corners of the earth to make these observations. Some of you will be asked to help.

Six Meters

Very few openings have been observed here. PZ1AE of Surinam was heard working just about everything. Ground wave contacts have been very good with my 17 watts and a couple of new states were worked on aurora phone. I still haven't got West Virginia though. According to all forecasts the six meter band should be good most of November and December.

Local Doings on Two

The Dayton Amateur Raido Association had a VFH contest November third and fourth. Warren County was without a ham on two meters due to my being ill those days. To give the boys a multiplier, Joe McNutt, W8GFN came down with a Gonset Communicator and did I open up the two meter band for a little while. KN8BUG and a couple of others called to lend me a Gonset to use here. I won't let another contest find me without adequate equipment for the high frequency bands. How 'bout you?

Converting the BC-1158

The BC-1158 is a tone modulated 53 to 95 mc transmitter using three 815 dual beam power tubes. Conversion to six meters is easy and only requires a power supply and a few circuit changes. Part of the BC-1158 is the TU-75 R-F unit which can be converted by itself to cover six meters. The complete BC-1158 is selling for about 30 dollars surplus and the TU-75's run about half that. The advantage of buying the complete unit rather than just the tuning unit is that you can use the transmitter for remote control applications and you get an excellent quality modulation system with its transformers, tubes, etc.

Application

The complete transmitter has several applications that will be covered in this conversion. It can be used as a mobile rig mounted in the trunk of the car, or as a fixed station. Its modulator can be tapped into to provide modulation for any small Novice transmitter. It makes a swell remote control transmitter for such applications as model airplanes, boats or garage doors.

Original circuit description

The first 815 is used as an oscillator-doubler, the second is a push-pull tripler and the third is used as an r-f amplifier. This gives a frequency multiplication of six and a power output of about 40 watts.

The modulator for the BC-1158 consists of an audio oscillator generating six audio tones at 300, 475, 755, 1195, 1900 and 3000 cps. The audio generator uses six 12SN7 tubes feeding push-pull-parallel 12SN7 audio amplifiers to push-pull-parallel drivers for the 815 modulator.

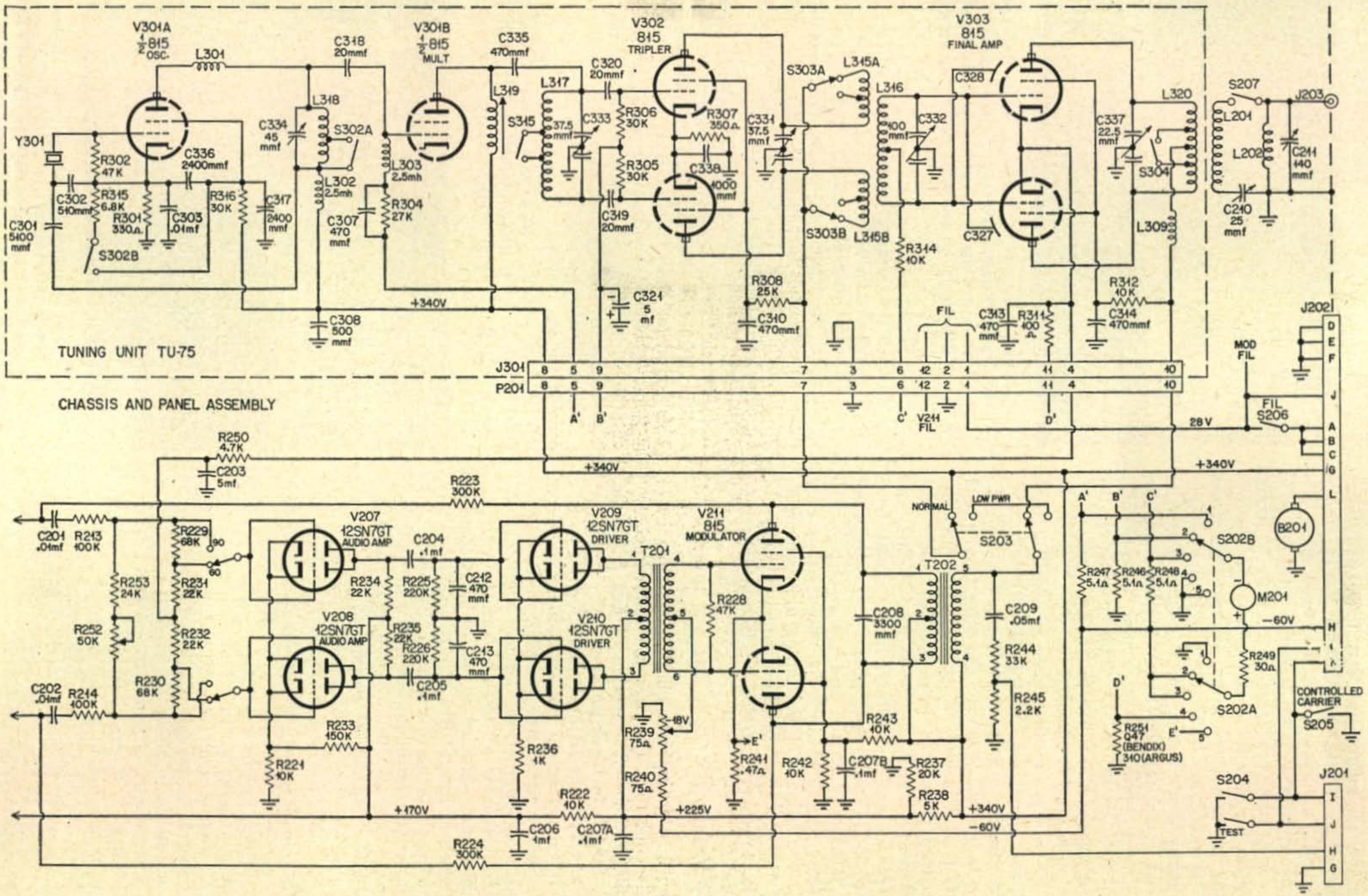
Overall size of the BC-1158 is 9" high by 17" long by 16½" wide inclusive of the shock-absorber mounting.

Conversion

Three different methods of conversion will be described herein and you can use the method that most nearly fits your needs. The first method will be the one that disturbs the original wiring the least and makes use of the parts already in the set. The second method describes a complete transmitter with self contained power supply and provisions for switching to external power for emergencies. In this conversion the modulator will be simplified reducing the possibility of audio feed-back. The third method will use an external power supply and allow the built-in audio tone modulator to be used as a remote control transmitter. The conversion of the TU-75-A tuning unit will be the same in all methods and will be the first order of conversion.

Converting the TU-75-A tuning unit

Removing the tuning unit will facilitate working on the unit and speed the conversion considerably. To remove the tuning unit: remove all the red-headed screws holding the unit in the



Above, TU-75. Below, Chassis and Panel Assy of BC-1158

chassis. Pull the plug P-201 from socket J-301 and gently remove entire tuning unit.

The TU-75 tuning unit has three 815 tubes designated as V-301, V-302 and V-303. Tubes V-301 and V-302 are wired in series and V-303 is wired in series with the modulator tube V-211. Each series string of tubes operate on 28 volts. To rewire: for 12 volts, V-301 no change, pin 8 is 12 volts and pin 1 is ground. Remove wire from pin 8 of V-302 and solder to pin 1. Ground pin 8 to nearby ground stud. On V-303, remove wire from pin 1 and resolder to pin 8; this completes the filament wiring of modulator tube V-211. Ground pin 1 of V-303. This completes the filament wiring of all 815 tubes. To check; a 12 volt supply may be hooked to the filament of any 815 socket and the tubes plugged in each socket and see if all tubes light correctly.

To rewire for 6 volts connect pin 5 of all 815 sockets to ground. Remove the wire from pin 1 of V-301 and solder to ground stud nearby. Solder wire from pin 1 to pin 8, remove the ground connection from V-302 and V-303 and solder pins 1 and 8 together. Remove wire from pin 1 of V-211 and solder pins 1 and 8 together. Apply 6 volts to ground and pin 8 of any 815 and check to see if all 815s will heat as they should. The balance of the tuning unit conversion entails the changing of the frequency range of all coils to cover the desired frequency range.

Changing the coils for six meters

Using a grid-dipper to check the frequency of all coils concerned discloses the following.

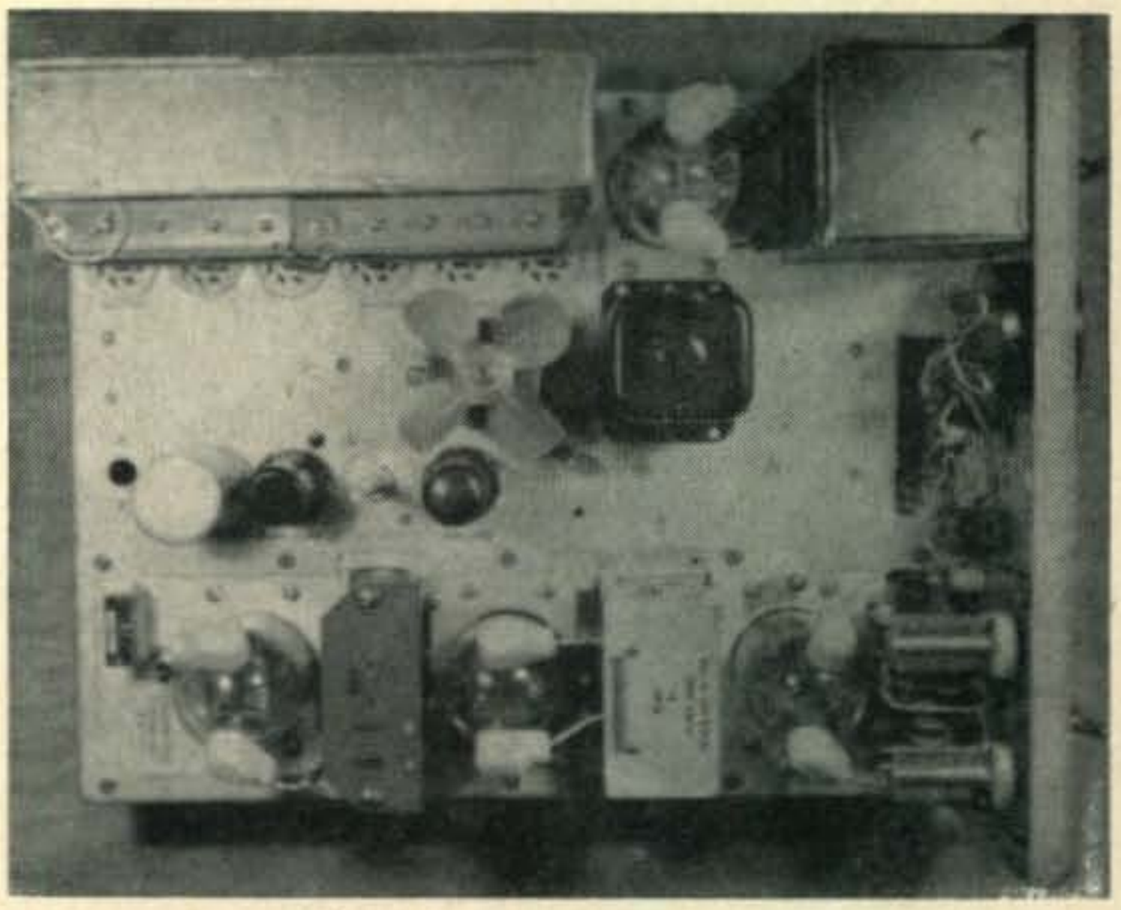
Oscillator Stage—first section of first 815 tube.
- A. Switch in black position.
  - a. condenser all in—9 mc.
  - b. condenser all out—12.5 mc.
- B. Switch in orange position.
  - a. condenser all in—7.5 mc.
  - b. condenser all out—11 mc.

Doubler Stage—Second section of first 815 tube. (P. P. grids of second 815 tube).
- A. Switch in black position.
  - a. condenser all in—16 mc.
  - b. condenser all out—26 mc.
- B. Switch in orange position.
  - a. condenser all in—23 mc.
  - b. condenser all out—38 mc.

Tripler Stage—P. P. Plate section of second 815 tube.
- A. Switch in black position.
  - a. condenser all in—52 mc.
  - b. condenser all out—60 mc.
- B. Switch in orange position.
  - a. condenser all in—76 mc.
  - b. condenser all out—110 mc.

Final Stage—P. P. grids of third 815.
- a. condenser all in—60 mc.
- b. condenser all out—110 mc.

Final Stage—P. P. plates of third 815.
- A. Switch in black position.
  - a. condenser all in—53 mc.
  - b. condenser all out—74 mc.



K8BOB's Transmitter with changes as in method changing the original wiring as little as possible. He plans to use the tone oscillators later. Note 15 volt C battery, fan and neat layout. Top view.

- B. Switch in orange position.
  - a. condenser all in—72 mc.
  - b. condenser all out—100 mc.

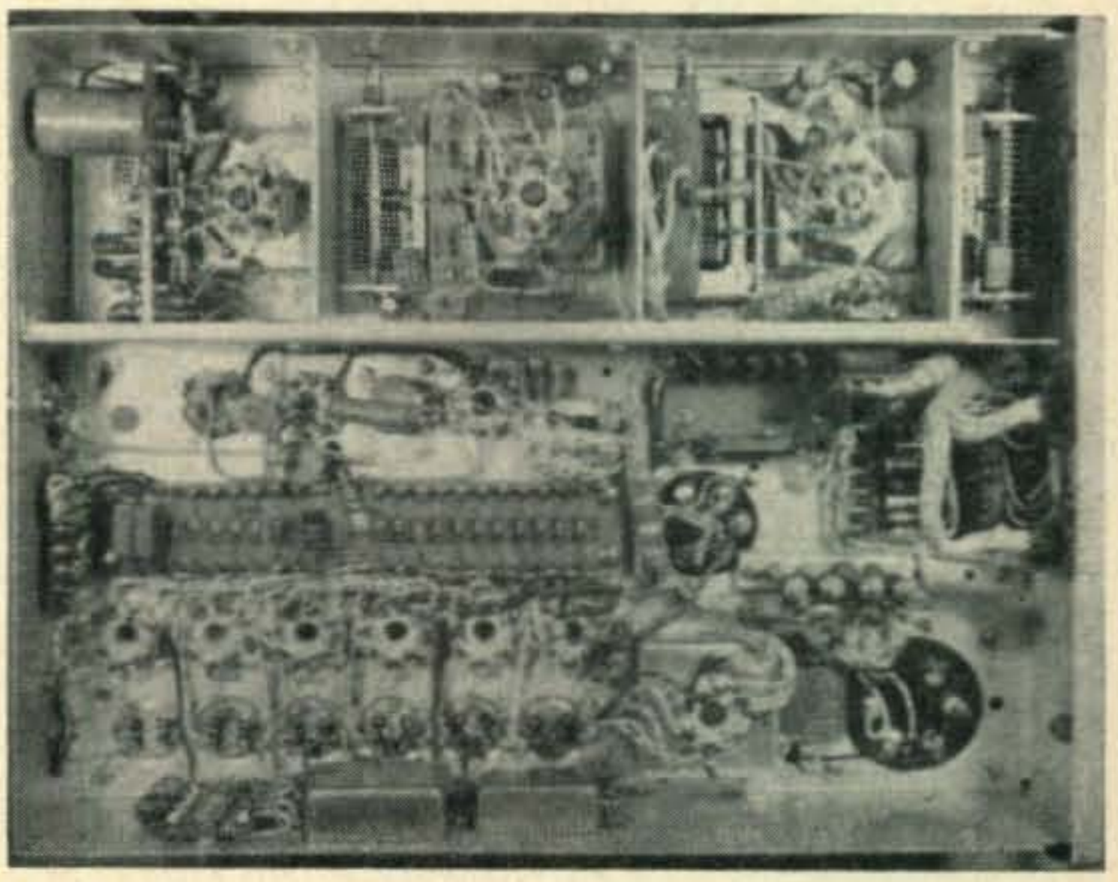
Changing to frequency range of the coils to tune at frequencies that make the BC-1158 usable on the six meter band is a very easy task and can be completed in about thirty minutes.

Remove switch, S-302 and clip wires neatly from switch to coil L-318. Remove resistor R-315 (6.8 or 10k) that was mounted on switch S-302. This completes the oscillator section.

Remove switch S-305 from the top of coil L-319, cut the wires from the switch to the coil neatly. This completes the doubler stage.

The tripler stage does not need any work to convert for six meters.

The final amplifier stage can be converted by putting the shorting bars of switch S-303 in the two black posts, you may remove the orange



K8BOB's unit showing the bottom view. Note: wiring has been changed as little as possible. Gain control and can condenser are placed in holes formerly used by Tubes V-210 and V-208, this makes neat wiring.

posts of this switch if you wish. Pad the grid circuit by soldering two 50 mmfd fixed mica or ceramic condensers from the grids of tube V-303 to ground posts nearby. The final grid coils will now hit 50 mc with the condenser at 2/3 capacity.

The original final tank coil tunes to about 54 mc and we can lower this to tune the six meter band (50-54 mc) by padding the final condenser with two 10 mmfd mica 1000 volt condensers, the bronze wiping spring for the rotor connection can be carefully turned around to form a soldering lug for these condensers. Place a 10 mmfd condenser from the stator connection of the final condenser to this contact at each end of the condenser.

The coupling coil did not need padding in any of the units I have converted but some hams are having to pad this condenser also, about 10 or 15 mmfd will be adequate for the purpose.

The tuning unit is now complete and ready for use on six meters as soon as we can rewire the modulator and connect the power supply.

Modulator Rewiring

The original circuit used tubes V-209 and V-210 as drivers for the 815 modulator tube. Tubes V-207 and V-208 are used as push-pull parallel audio amplifier tubes to feed the audio tones to the drivers.

We will use V-209 and V-210 without conversion except for the filament change. Rewire V-207 as a phase inverter and drive that with a 12SJ7 speech amplifier working from a crystal microphone (dynamic microphone for mobile).

If you wish to disturb the original wiring as little as possible rewire the filaments of the 12SN7 tubes as follows. First remove all 12SN7 tubes and use the ohmmeter to make a continuity check after each wiring change. In the original unit the tubes were wired in series-parallel to use on 28 volt supply. You must rewire all tubes in parallel to use on 12 volts (on 6 volts by substituting the 6.3 volt equivalent tubes). For six volt operation use either 6SN7 or 6SL7 tubes for replacement and use a 6SJ7 tube to replace the 12SJ7 speech amplifier tube.

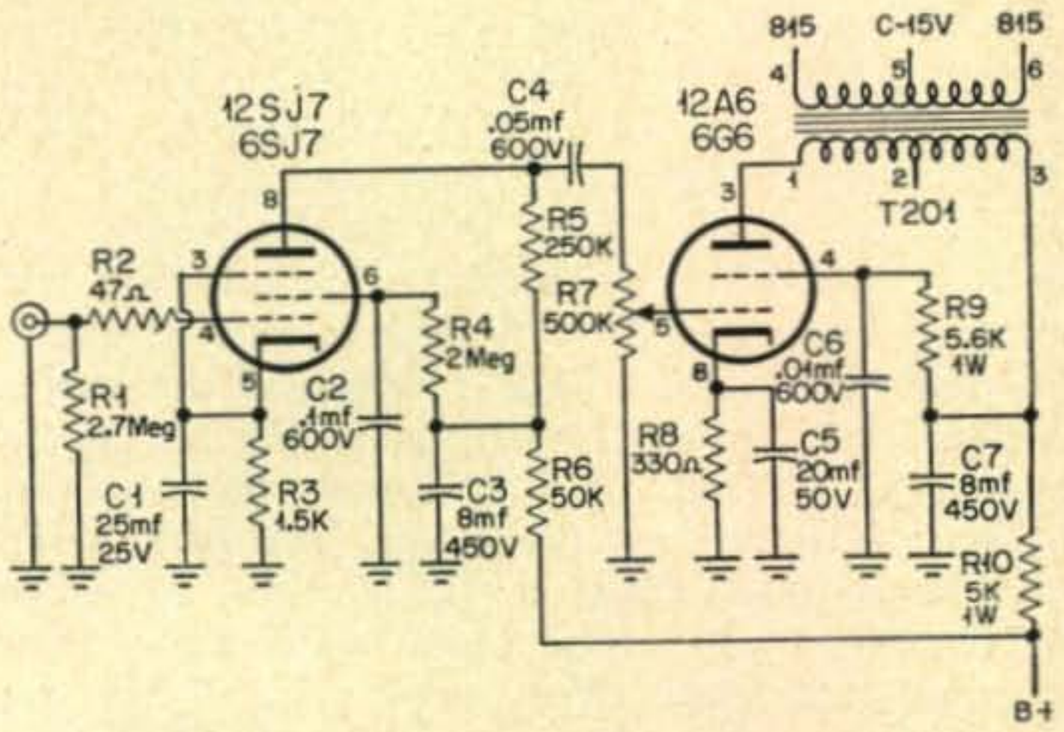
As a starting point: Pin 8 of socket V-209 is ground for the filament string. Pin 7 of socket V-210 can be used for the filament hot connection of the string of 12SN7 tubes. Rewire the filaments for parallel operation, use an ohmmeter to check for wiring errors. Be careful with the lacing as this keeps the unit as neat as the original wiring.

Remove all wiring from the sockets, V-207 and V-208 except wires from pins 7, 8 and 5. Rewire socket V-208 for the 12SJ7 speech amplifier tube and socket V-207 as the phase-inverter tube. Ground pin 2 of the 12SJ7 socket and use pin 7 as the filament hot lead. Pin 8 of the 12SN7s will be grounded to the chassis and pin 7 will be used as the filament hot lead. Rewiring the unit this way enables its use for either 6 or 12 volt operation by substituting the correct tubes. Of course we will have to wire the filaments of the 815 tubes to use the correct voltage.

Audio modifications

Remove all wiring from sockets V-207 and V-208 except wires from pins 5, 7, and 8 as per instructions above and change filament wiring as above.

Take wire and condenser C-205 lead from pin 5 of socket V-208 and after removing the jumper from pin 2 of V-207, solder the two leads to pin 2 of V-207. This is the plate leads and coupling condenser to V-209 and V-210 driver tubes. Remove C-204 and C-205. Replace them with .02 mfd 600 volt tubular condensers. Place the bottom one from R-225 (240k) to R-234. Replace R-234 with a 10k ½ watt resistor. Place the other condenser from R-235 (22k) to pin 4 of V-210. Change R-235 (22k) to a 47k ½ watt resistor. Ground pin 4 of V-207. Connect pins 3 and 6 together, put a 1200 ohm 1 watt resistor from pin 6 to ground. Build the 12SJ7 speech amplifier as shown and run shielded wire from the gain control to pin 1 of V-207. The microphone input connector must be placed at the rear of



Simple Modulator Speech Amplifier for 812. C1-3-5-7 can be a quadruple can cond.

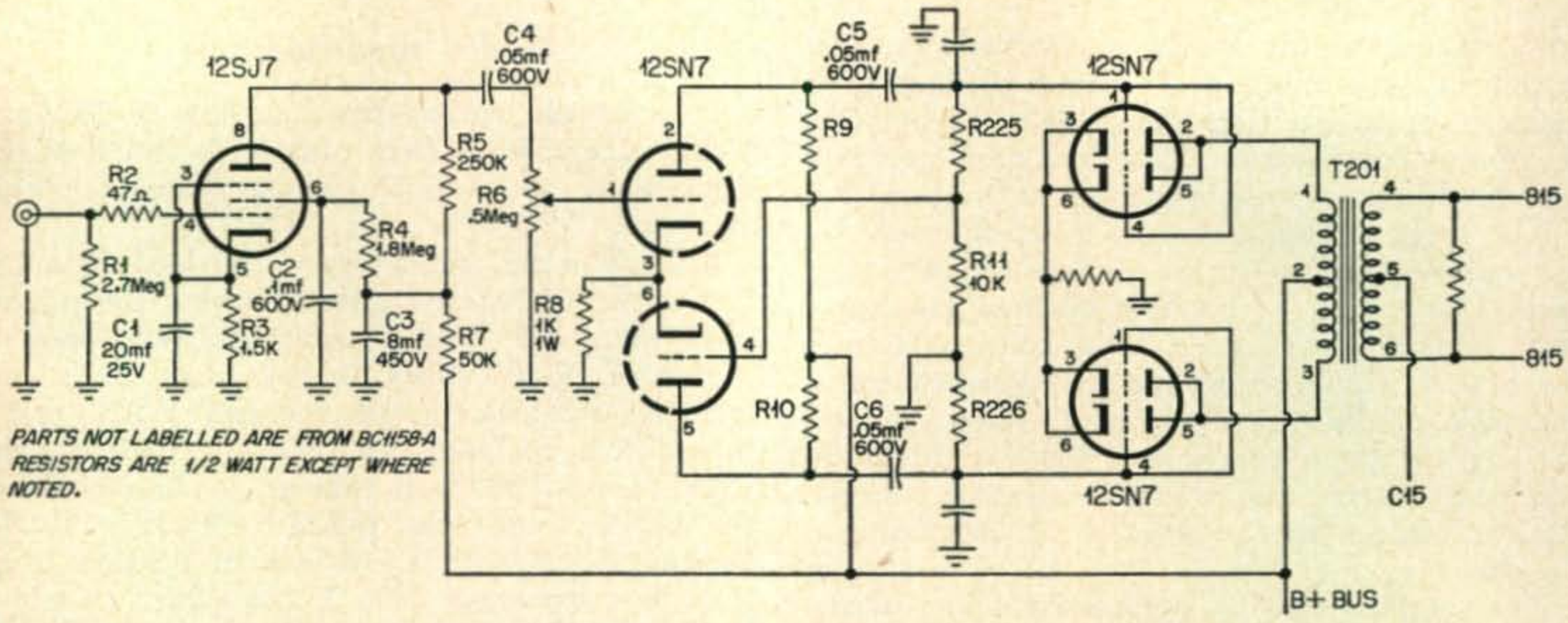
unit to prevent r-f feed-back. Place 12SN7 (6SN7) tubes in sockets V-207, V-209 and V-210. Place 12SJ7 (6SJ7) tube in socket V-208.

Connect the power supply and all accessories and you are on six meters.

Simplest conversion of the BC-1158 Audio

The simplest way to provide the necessary audio amplification from the microphone to modulator stage is to replace the entire audio amplifier from the coupling transformer back to the output of the tone oscillators. The hardest part of this work is the removal of all unnecessary components from the BC-1158. This can be done very easily with side-cutters, a good hot soldering iron, screw driver and some socket wrenches. Remove wiring from sockets V-207, V-208, V-209 and V-210, note connection to pin 2 of socket V-209. Mark this lead and be careful with the filament leads.

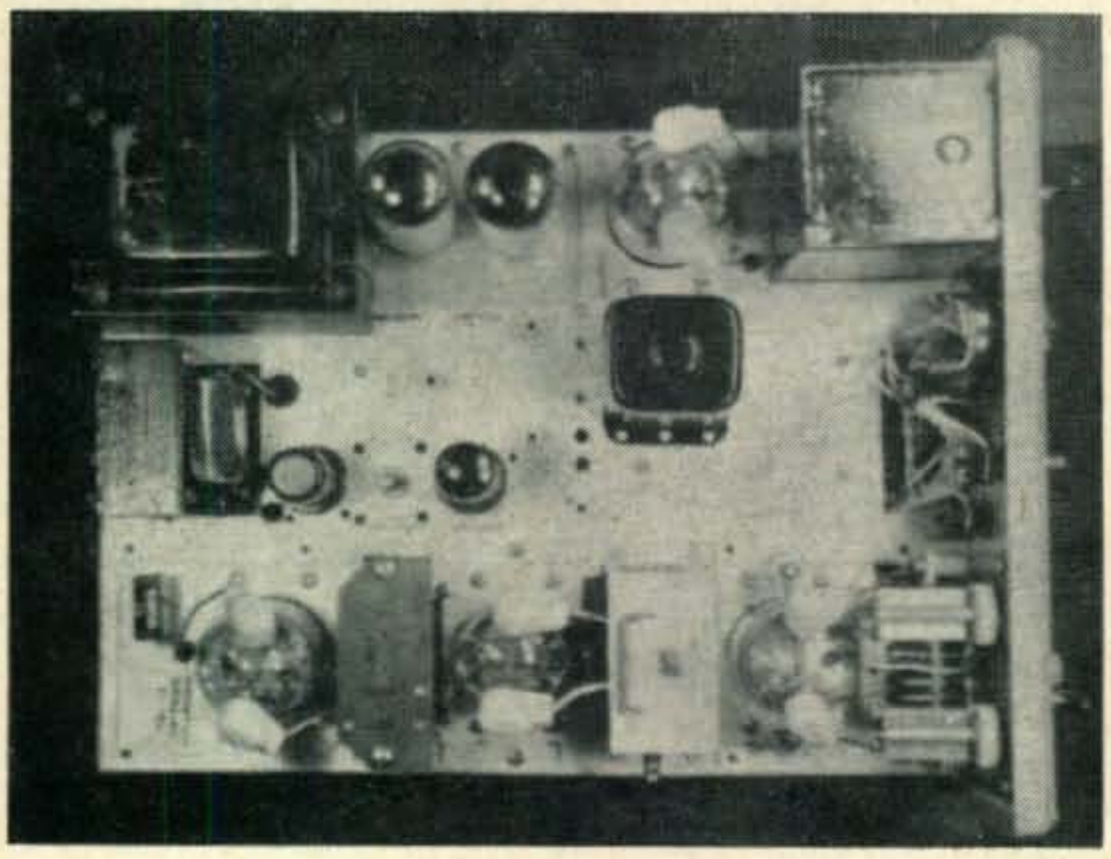
Check with the ohmmeter or color code and locate the other end of the wire you removed from



Modulator for BC-1158A. Parts not labeled are part of BC-1158.

pin 2 of V-209—this will probably be post 4 of transformer T-201. Remove the wire from post 1 and cut the wire short. Remove the two leads from post 2 and 3 of T-201 and resolder to post 1. Some of these transformers are marked as though each half of the winding were separate windings, others as just center-tapped windings. This completes the primary wiring of T-201. Replace R-234 (22k) with a 5.6k one watt resistor and run wire to pin 4 of V-209, this is the screen grid lead of the 12A6 driver tube. Solder the wire removed from pin 2 of V-209 to pin 3, this is the plate lead. Rewire the balance of the speech amplifier as shown in the diagram (*fig* 2). Do not forget that 15 volts of C bias must be connected to the center-tap of T-201 for bias of the 815 modulator tube. Place a 12SJ7 tube in socket V-207 and a 12A6 tube in socket V-209. Mount an aluminum plate over socket hole V-210 and mount the gain control here. Mount a 4 section condenser in hole V-208, this will contain C-1, C-3, C-5 and C-7, this makes for neater placement of parts. If you are building the power supply in the unit then you will need to build the complete speech amplifier without using the terminal strip.

Top view of BC-1158 with built-in power supply and speech amplifier. This unit will operate from the 117 volt line or from a 12 volt filament supply and dynamotor power supply. CHOOSE POWER SUPPLY COMPONENTS CAREFULLY.



Audio Oscillator Filament Rewiring

To rewire the filaments of the audio tone oscillators for parallel operation, remove the wire from pin 7 of socket V-201, V-203 and V-205 and connect to pin 8 of the socket from which it was removed. Connect a wire from pin 7 of V-201 to pin 7 of V-202, from pin 7 of V-203 to pin 7 of V-204 and from pin 7 of V-205 to pin 7 of V-206. The hot filament wires are color-coded, White with brown tracer. Ground wires are heavy white wires with black tracers. If you are not going to use the tone oscillators you need not rewire the filaments but be sure and remove the 12SN7 tubes from their sockets. To use the tone oscillators for modulating the BC-1158 you will have to rewire the filaments of V-207, V-208, V-209 and V-210. Check the ohmmeter to see that you have made no mistake in wiring.

To use this unit for remote control purposes there will be no need to change anything except the filament rewiring and the meter circuit and biasing methods. Of course we will need to apply the correct voltages to the appropriate socket connections and make a switch box to close the cathode circuits of the selected audio oscillator tube. A box containing six SPST toggle switches can be used to control the audio not selected. One side of the switch can be connected to the ground through pin G. of J-201, this is the common wire to all oscillator tubes. The connections of the cathodes are brought to pin A for 300 cps, pin B for 475 cps, pin C for 775 cps, pin D for 1193 cps, pin E for 1900 cps and pin F for 3000 cps. Closing the switch of any cathode will let that tube oscillate and modulate the transmitter with that selected tone. The correct plug for connection to the BC-1158 tone socket (J-201) is AN-3106-18-1S, and is available at your parts house.

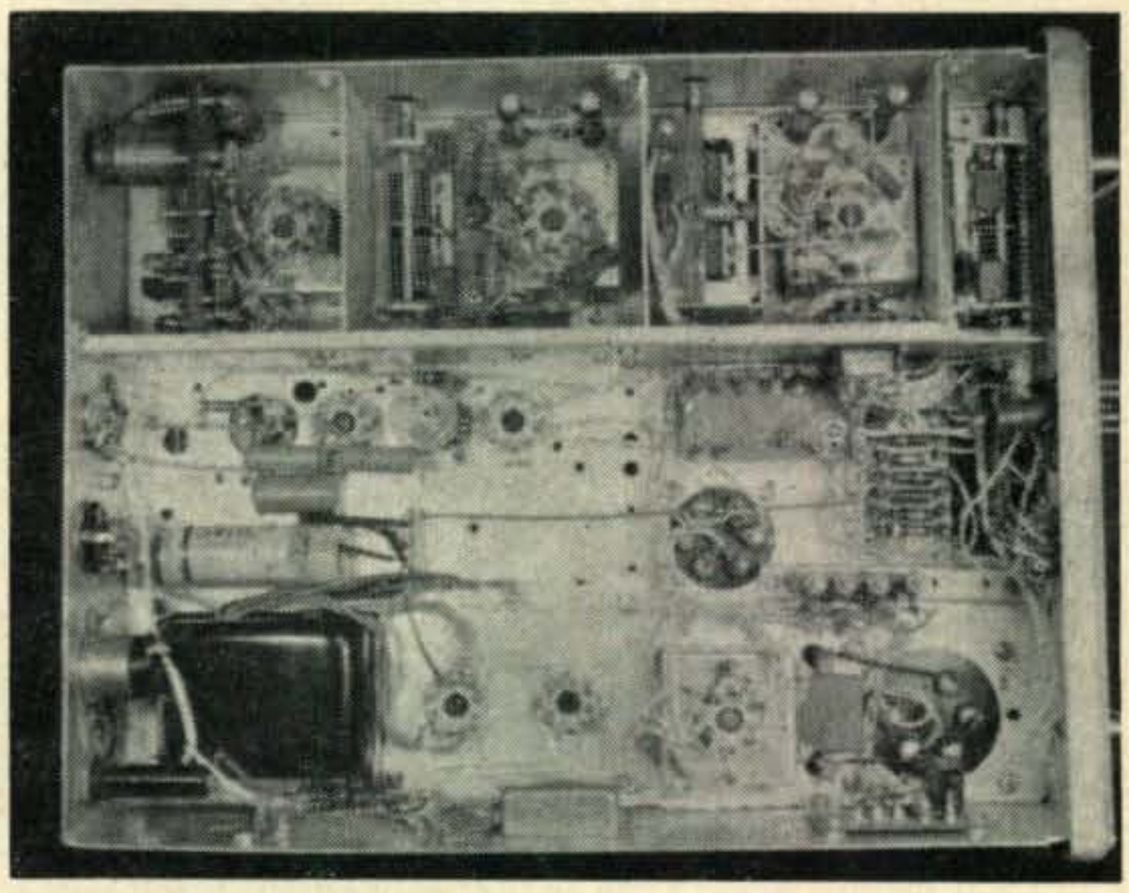
Power Supply Requirements

The tuning unit (TU-75-A) requires 6.3 volts at 4.8 amperes or 12 volts at 2.4 amperes. High voltage requirements range from 300 volts to 450 volts at about 300 ma. for the unit. If all tubes are used in the modulator it will draw 4.6 amperes at 12.6 volts or if rewired to use the 12SJ7-12A6-815 combination it will only require 1.25 amperes at 12.6 volts. The entire transmitter can be run on 3.65 amperes at 12 volts.

A power supply was built in the unit here so that it would make a neat desk top six meter rig and also be available for emergency work. The tuned choke assembly was removed along with the 12SN7 tubes and sockets and the resistor board. The power supply shown *(fig 3)* was built in this space. Great care must be taken to get all components to fit in the available space without cluttering up the nice appearance of the unit. A TV replacement transformer having two 6.3 volt windings was chosen to give us 12.6 volts for the filaments. This particular transformer (surplus) gave 310 volts at 310 ma., 5 volts at 6 amperes and 6.3 volts at 10 amperes plus 6.3 volts at 5.6 amperes. The two 6.3 volt windings were connected series aiding to give 12.6 volts at 5.6 amperes. If the windings of this filament supply are phased wrong you will have no voltage at all so check with the voltmeter before final assembly of the wiring.

The primary of the power transformer was fused for safety and a TVI filter was placed in the line to make it easier to operate in channel two territory, this helps a lot. The choke was a TV replacement choke rated at 300 ma and it seems to work very well with 20 mfd of filter condenser. I removed plug J-202 and replaced it with a male 5 prong plug for external power connection. A dpdt toggle switch was used to change from internal to external power supply. A 15 volt bias battery was connected between the center tap of T-201 and ground, the minus 15 volts going to the transformer. A small bias supply could be built if you only plan to use the unit as a home station. Use care in parts placement and in building the power supply and you will have a station to be proud of as the photographs will show.

For using the power plug J-202 as the input



Bottom view of BC-1158 with built-in power supply. Note line filter on side near transformer, neat placement of parts.

you will need the matching JAN plug, AN-3106A-20-27S available at your parts house. Both Amphenol and Cannon make these plugs.

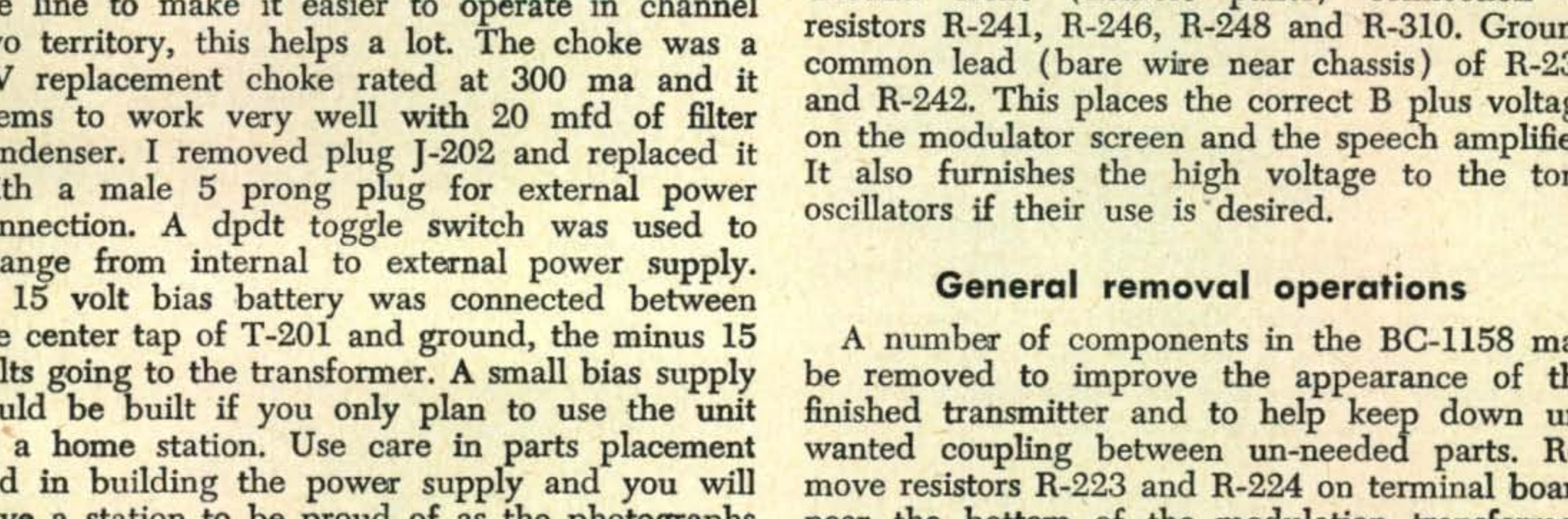
Meter Switch Rewiring

As the minus 60 volts is not available for bias and it was deemed advisable to use the built in meter for tuning the BC-1158 the switch has to be modified. Remove the two 75 ohm resistors R-239 and R-240. (the wire going to the slider is the connection to a bias supply if you wish to use it) Ground front (nearest panel) connection of resistors R-241, R-246, R-248 and R-310. Ground common lead (bare wire near chassis) of R-237 and R-242. This places the correct B plus voltage on the modulator screen and the speech amplifier. It also furnishes the high voltage to the tone oscillators if their use is desired.

General removal operations

A number of components in the BC-1158 may be removed to improve the appearance of the finished transmitter and to help keep down unwanted coupling between un-needed parts. Remove resistors R-223 and R-224 on terminal board near the bottom of the modulation transformer. Remove as much of the wiring associated with the removal of these components as possible. The

Fig 3. Power supply for BC-1158A.



terminal board containing resistors R-215 to R-220 inclusive may be removed if you are not using the tone oscillators, these are the cathode returns. Remove the following components, R-250, C-203, R-223, R-224; Lead from pin 4 of J-301, shield from crystal socket, to use FT-243 crystals use Millen socket #33102. Remove test switch and clip wires for neatness. Remove S-201, R-230 and resistor board at rear containing R-250, R-232, R-231, R-229, R-214 and R-213. Disconnect wire from pin 4 of P-201. If you plan to build as shown in the photograph, remove entire main resistor board and associated wiring, you will need all the space you can get.

An antenna matching network is included in the BC-1158 and it is used to match 52 ohm coax. If you wish to use it otherwise I suggest that you buy a copy of Bill Orr's Beam Handbook and follow his ideas on the subject. Bill is W6SAI, and he knows his antennas.

My BC-1158 is being run with 280 volts at 70 to 90 ma and very good reports have been received at ground wave up to 200 miles. The one converted for W8QLO is making a good account of itself. This transmitter will hold its own with any of comparable power due to the quality and quantity of audio available.

Stewart W, Schneller, KN4JOP, 137 S. Crestmoor Avenue, Louisville 6, Kentucky has worked and confirmed 36 states and the Virgin Islands with this neat amateur station.

The connection going to pin H of plug J-201 can be used to sample the audio by connecting headphones from Pin H to ground. The divider for the audio is R-244 and R-245, there is no high voltage due to condenser C-209. This can be used to connect to the oscilloscope if you wish to use it to check the modulation capability.

The fan motor will run on 12 volts but is likely to get hot, I would suggest that you replace it with a small phonograph motor and cooling blade if at all possible. The other alternative is to cut some cooling louvres in the side and close them with fine screen to help keep down TVI. Be sure and ground the metal case to a good ground.

I have converted six of these units and if a small amount of duplication is encountered it is due to the different methods of conversion for the different uses to which the unit was adapted.

This transmitter coupled to a good beam antenna will make a good showing in the six meter band. You should be able to work almost anything that you hear.

Questions

Q. . What is meant by a "doubler" stage?

A. . A "doubler" stage is a vacuum-tube circuit in which the output circuit is tuned to twice the frequency of the input circuit. When the frequency multiplication is more than twice the input frequency the stage is called a frequency multiplier stage.

Q. . What factors determine the frequency at which a crystal will oscillate in a circuit?

A. . The dimensions of the crystal, its temperature, the axis of the crystal material on which it was cut, the characteristics of the holder, and the shunting capacity of the circuit used.

Help Wanted

The names of those interested in becoming hams and needing help will be listed in CQ at the end of every Novice Shack column. If you are in position to offer help to one of these aspirants will you please do so. Thank you. Are any of these near you?

Jared Wolf, Box 127, Concordville, Pennsylvania. Phone Valleybrook, 2560. Jared needs help with code and theory.

Jones L. Jordan, R.F.D. Glen Mills, Delaware Co., Pennsylvania. Phone: Valleybrook 2782 and 2275. Jones needs help with code and theory.

Verle LeRoy Morris (21), 1935 Euclid, Wichita, Kansas. Phone WH-38302. Verle needs help for his Novice license.

Ted Steadman, 19 Bar Beach Road, Port Washington, New York, needs help with code and theory.

Jolyn Hofsted, 2415 Fairfield Street, Eureka, California needs help with code and theory.

Lt. Willie J. Kopecky, A03020731. 10th Air Division, APO 942, Seattle, Washington, needs help with code and theory.

Well, while I wished you a Merry Christmas last month, dog-gone it is just now Christmas time or at least the Holiday Season, so here's wishing you the best of Season's Greeting. May you work lots of DX this year and get all of the enjoyment out of your holiday as you expect.

The speaker from Missouri is Bill Wheeler (17), KNØDEW, P.O. Box 377, Waynesville, Missouri. He writes.

. . . Just a line to let you know how things here at KNØDEW have been going. First off, the rig is a Globe Scout 65-A and the receiver is an S-40-B with a 40 meter vertical antenna. This layout has been doing a fair job on 40 meters, but not much in the way of DX; Virgin Islands, Canada and 25 states so far. I am just finding out how to work DX.

My recommendation for working DX is to get up at one or two o'clock in the morning. It will pay off if you can stay awake.

I am very much interested in 6 meters and would like to hear from all of the guys that are interested in and around Missouri. The antenna problem is not so bad here as we have an 80 foot tower with a Channel Master TV antenna on the top. I am hoping it will load up, but if not, it will make a good 6 meter receiving antenna.

Keep up the good work, Walt, I will see you on six meters soon. 73 for now . . . Bill.

I'm sure I won't be the only ham looking for you on six meters Bill. Quite a few of my friends are still looking for Missouri for WAS. I have a card from Missouri but I sure will be looking for you. That TV antenna should load up ok, but a 6 meter beam will work better for DX. Most any kind of antenna will work when it is 80 feet high.

73, Walt, W8ZCV

Happy New Year to One and All

We welcome the following as newcomers to the HONOR ROLL:

VU2MD	39-147	W1LZE	38-208
W3MDO	38-169	K2PIC	37-146
W1WLW	36-168	WØPGI	36-141
K2BSM	36-140	W3EOB	36-134
KP4YT	35-119	K6CWS	35-108

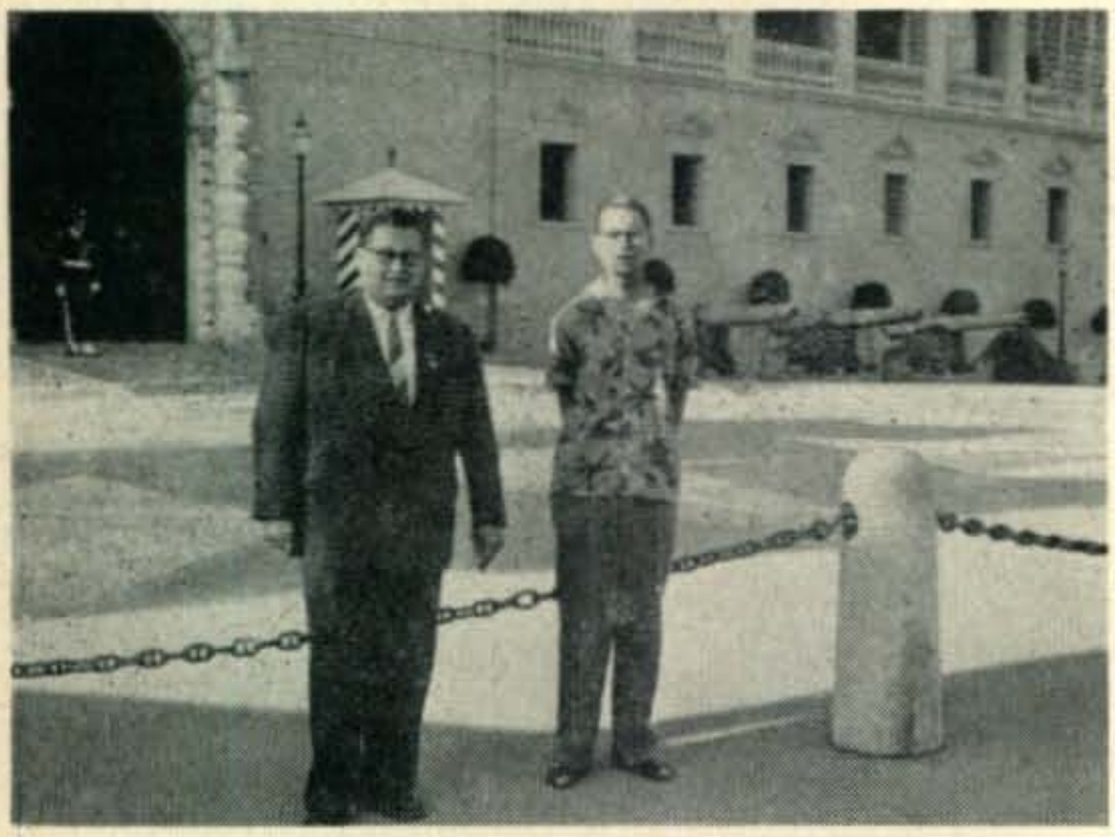
DX Notes

A dearth of hot DX items makes an interesting presentation of this month's issue quite a problem. A considerable spell of poor conditions hasn't helped anything either. So — — — from our somewhat stifled cornucopia of facts we hear that: VK1RW, Cocos-Keeling, continues activity but now signs VK9AJ . . . PK7ADM/JZØADM is none other than Tony, ex-MP4QAH, and he now signs JZØPA. Cards should go to VK6MK. JZØPB should now be active too . . . A boat calls at ZD9AE about November 1st and cards should appear in W-land around the first of the year . . . Marv, KAØIJ, is active every day but closes down around 1200/1300 GMT except on Friday when he stays on until 1500 GMT. QSL's go to APO 815, SF, or via FEARL . . . The Japs will definitely have an amateur station active from Prince Harald Land, Antarctica, early in 1957. He will make contacts with all hams as time from other duties permit . . . An all out effort is being made by W6KFV to compile an accurate list of all Russian Amateur Stations. This list will appear in QST and CQ. You can help by sending all Russian calls and QTH's to John Norback, 10522 Troon Ave., Los Angeles 64, Calif. . . . ZS9P is quite active on 14061, xtl . . . W4BPD is sponsoring Leny, VQ8AB/CB, who may soon come to the States and work for Gus. Another one sponsored by Gus is WØEPK, ex-PAØOK, who now runs a Radio-TV business in Denver. It would be nice if someone could similarly sponsor Dave Liang, YJ1DL/ZC3AB, who is caught in the toils of slightly inhuman legislation . . . FE8AE is on every day between 1930 and 2200 GMT on one of the following xtl frequencies: 14020, 14040, 14060 and 14080. (Except Saturday and Sunday.) He should not be called between 2000 to 2015 GMT when he calls CQ F on 14040 . . . After four years of activity in which 170 countries and 37 zones were worked, the license of YI2AM has expired and they are

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

experiencing some difficulty in getting it renewed . . . QSL's for VS9AS/G3ANK finally caught up with him and everyone should have theirs, via Bureau, by now . . . Via W6AM and W3NOT we hear that KC4USB and KC4USN should have been active by the middle of December while KC4USK and KC4USH will be on by the middle of March . . . A report on activity from Australia's Northern Territory comes from Tom, VK5TL, at Alice Springs. Tom says the only other N.T. activity stems from VK5AL who has been heard on 7 mc. W5WMA (I think) has been licensed as VK5EW but is not on as yet. VK5AE, ex-VR4AE, may be on towards the end of the year ('56) . . . Seth, ex-VP5FH (Turks)/W6HNX, is now stationed at Mayaguana Island, BWI, and says that Rod, VP5RR, has been assigned to Ascension Island and a ham license looks hopeful. Bud, ex-

W7HXG, Leroy Bates, of Portland, Ore. Lee was licensed in 1939 and operated as W6HXG in 1946. A 32V-2 drives a 450TH modulated by a pair of 250TH's. Four element yagi is used on 14 Mc and a three element on 21 Mc. Receiver is a 75A-1. DX activities are somewhat hampered, presently, due to work and school but Lee holds WAZ and a 243 country total. (Photo courtesy Willimette DX Bulletin)



Ernst, HB9KB (left), and Etienne, HB9RDX, are snapped in front of Grace Kelly's new house, during their October visit as 3A2BH. Eleven days of operating resulted in 2247 contacts on all bands.

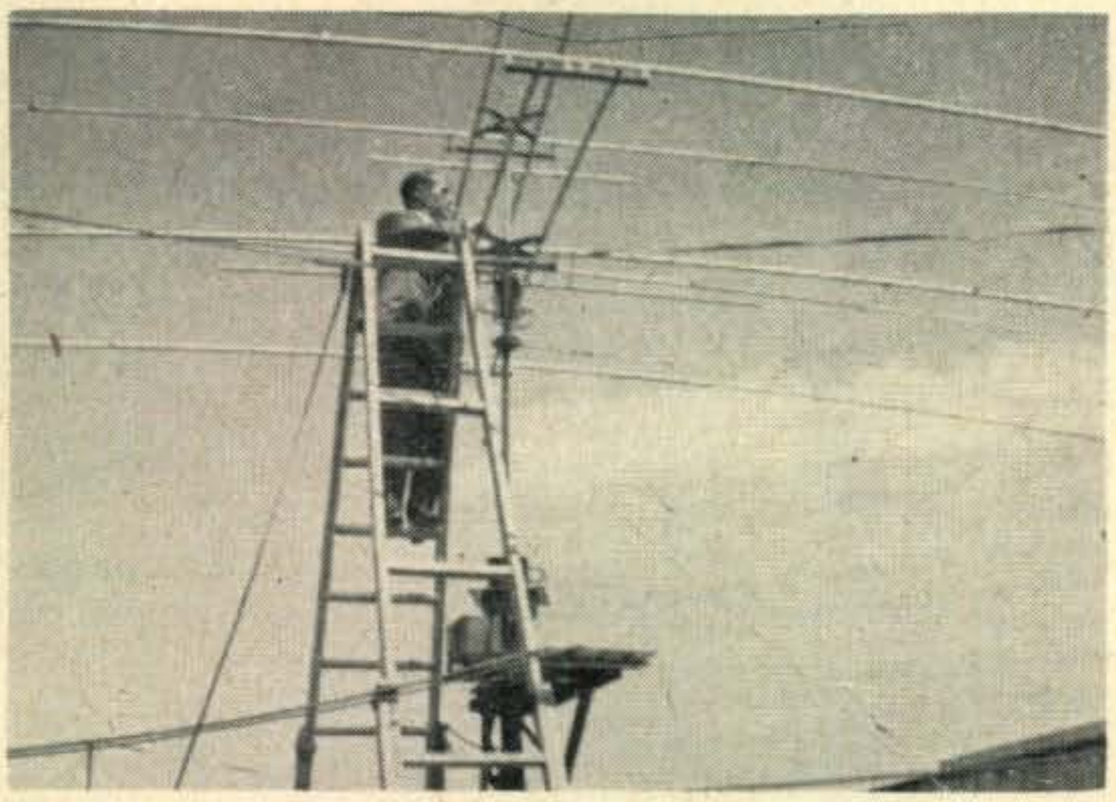
VP5RR (W5HVV), is stationed in Sabana del Mar, Dominican Rep. and advises that ham licenses have finally been approved and four will be on the air soon from this QTH . . . The following are active from Italian Somalia: I5NR 150 watts, I5FT 100 watts, I5MG 80 watts, I5LV 80 watts, I5REX 25 watts and I5RAM 80 watts (The last mentioned collects stamps!) . . . Looks like ZA1AB could be good, at least W4ML received a QSL. If he turns out OK he should be resubmitted for HONOR ROLL listings . . . Seems like Kang, HL9AA, was OK between Jan. 13 to Jan. 22nd, 1956 as he advises that he worked 77 stations during that period. QTH was Chii Mountain. Rig was portable running 20 watts to a 2E24 final . . . CR5SP (Sao Tome) still active on phone only. Usually can be found on 21200 from 1700 to 1900 GMT then on 14140 from 1900 to 2100 GMT . . . FG7XD's ten watter puts through a good signal on 14095 . . . WØVCA nailed AP2PR on 21055 at 1500 GMT. See QTH's . . . A report on the activity of HB9KB and HE9RDX from 3A2BH is as follows: 3A2BH went on the air at 0845 GMT, September 30th. First contacts were with DJ1WF, G6HU, WØNLY and ZB2V. Due to Monaco's generally poor radio QTH conditions were low. No openings occurred on 28 mc and on 21 through 3.5 there were many periods when the band was stone dead. Only the harmonics of Radio Monte Carlo proved that the 75A-1 was still performing. In eleven and a half days 2247 contacts were made (3.5-123; 7-524; 14-1366; 21-214; 28-20). 3A2BH closed down on October 11th at 2259 GMT. Each QSL will be answered. Since 3A2BH's last appearance in Monaco no new licenses have been granted. 3A2BF, 3A2BE and 3A2BJ are active only on phone. 3A2BZ and 3A2GG are unlicensed. Any 3A2 stations heard on CW are either DX'peditions or unlicensed stations . . . JZØACK has now been assigned the call of JZØPC . . . K6IYJ advises that KM6FAA closed down in October. KM6AX, with 10 ops, should be on with a KWS-1 about now . . . Word from Mal, ZE3JO (VQ1JO), knows nothing about VQ9JO who worked a few on 15 a while back. Mal hopes to operate as ZE3JO/ZS9 some time in '57 . . . The changeover time for the Australian Antarctic boys is now due again. VK1IJ and Co. will return to VK3-land. Going to the Mawson Base will be ex-VK1ZM, VK1DJ and VK1RR, all ex-Maquarie men. They will probably be accompanied by about four other ops so ham radio will be well represented down there this year. There will also be another base set up in the Vestfold Hills, Princess Elizabeth Land, about 400 miles east of the Mawson Base. This new base should be heard from in March or April. Antarctic prefixes will be changed to

L to R are Roger, KA2RK, Al, KA2NY and Bob, KA2LL, holding down the fort at KA2NY (Navy Mike and Key Club Station) at Yokosuka, Japan.

VKØ with VKL reserved for Capital district operation (like a special district for all Wash. D.C.) ZC5JM, Labuan, was worked by W6MJP on 14022 at 1700 GMT. See QTH's . . . ZC5SF has been on around 1200 GMT, 14020, QRS . . . G3ANK reports SU1CY on from Port Said. QSL via REF . . . K2LWR was told by SP2BI that himself, and some other SP's, planned a DX'pedition to ZA-land this June . . . No one seems to know if the UAØKTX, who claims Tannu Tuva as his habitat, in OK or not . . . Fred, VP2LU, promises a lot of CW activity from St. Lucia which is a good Windward Island catch. See QTH's . . . You can still get a sked with OY7ML via DL7AH . . . A new one in Cayenne is Ray, FY7YG. See QTH's . . . ZS6DG plans DX'pedition to ZS8 and ZS9 early in the year . . . Bob, ON4QX, (who seemed to fulfill most of the qualifications for an HV license) advises that he has just returned from Vatican City and says that he was refused a license. It seems that the authorities fear a big rush should one license be granted. ON4QX plans a DX'pedition to San Marino, or other small country, later in the year. He suggests the island of Linosa (60 miles from Malta) might be good for a ZB3 call! . . . Einar, VP8BK, is active again from South Georgia . . .

DX-ploits

Frank, W6AOA, adds VK9TW, ZC3AC, OQ5CZ and IT1TAI to reach 270 as Frank, W6SYG, hits 268 with ZC3AC, OQØDZ and IT1TAI . . . Walt, W6MX, adds IT1AQS and OQØDZ for a 267 total while Glenn, W8KIA, went to 266 with FL8AB . . . Ed, W6DZZ, upped to 265 with CR5SP and IT1TAI as Bill, W6SN, hits 263 thanks to PJ2ME, VK9TW, XE4A, PX1EX, YVØAA, CR5SP, ZC3AC and I1AQS . . . Jim, W8JIN, also rises to 263 with AC3SQ, IT1AGA and OQ5CZ besides running a 469,319 contest score with 544 QSO's . . . Ozzie, W9VND, finally nabbed VR6AC for 261 while Glenn, W6ADP, goes to 260 with FL8AB, IT1AGA and OQØVN . . . Ed, W6TS, comes up to date with YVØAA, VR1B, CR4AH, FL8AB, HB1MX/HE, VK9TW, OQØDZ, IT1AQS, SM8KV and PJ2ME for 258 as Gene, W6EBG, snagged FR7ZC for a like number . . . Horace, W6TI, goes to 254 with I5RAM and ZC3AC while Don, VK2DI reaches 250 thanks to PJ2ME . . . George, W1GKK, added VK1RW, OQØDZ, IT1ZGY and FL8AB for 248 as Ray, W6BUD, adds 13, including such as FR7ZC, ZD1FG, SM8KV, VK9TW, I1BRN/M1, YVØAA and XE4A to reach 247 . . . Jack, W6NTR, moves to 245 with ZC3AC, ET3AF, VS9AN, ZS9Q and IT1TAI while Clint, W8SYC, makes it 242 with OQØDZ and IT1TAI . . . Roy, W6LW, submits new list with a 239 label as Jean, HB9J, adds CEØAD, YVØAA, SM8KV and PJ2MC for



Santos Yebenes, EA4CR, of Madrid, Spain, takes time out to make some beam adjustments.

234 on CW. Phone total moved to 178 with VP5DX, FS7RT, UP2KBC, PJ2MC, 3A2BF and VP1EK . . . Don, W6BVM, hits 221 with such as UL7KBA, ZD2DCP, ZS2MI, PJ2ME, VK1IJ, UI8KAA, UO5KBR, UG6AB and ZB2Q while Doug, G3DO, moves to 217 CW and 194 phone with FS7RT, VP5RR, VP1HA, FO8AB, VR1B, PJ2MC and YVØAA . . . Joe, W7ASG, goes to 214 with 5A5TH, 3A2BH, ZS9Q, ZD4BT, ZD1FG, ZB2R, YS1O, VR4AA, VQ1JO, VK1RW, KAØIJ, PX1EX, FG7XC, etc. as Wally, W7ENW, submits new list giving him 208 . . . Hal, W6JK, keyed with IT1TAI, VK9TW, VK1RW, ZC4IP, UH8KAA, VS4FC and OD5LX for a 207 total while Dan, W6PH, moved to 205 with I1BNU/T, ZB2I, OD5AV, OY4GA and 9S4DE . . . Shelley, **W6BAM, adds CEØAC**, EA9DF, XE4A and 9S4AX for a 202 total as Hal, W6BUO, adds 22 which include such as VP5FH, ZD9AE, VQ5DM, UR2KAA, UQ2AH, UN1AA and SM8KV for a 201 tally . . . Clay, W6LGD, hits 199 with HB1MX/HE, EA8BF, 4X4BX, GD3FNX, UF6KAF and EA9AP while Arthur, ZS2AT, moves to 198 with FB8BK (Tromelin) . . . Vip, W6ID, upped to 197 thanks to ZS2MI as Dick, W6ATO, goes to 194 with such as ZS9R, ZD6RM, VK1RW, HI8WL, YJ1RF, SM8KV, VQ1JO, ZD9AE, VK9TW and FB8ZZ . . . Ross, W9RBI, makes it 257 (CW) with VK9AJ (VK1RW), SM8KV, YVØAA, UR2KAA, ZD8SC, OQØDZ and IT1ZGY. These plus ZD7A move his phone total to 240 . . . Ted, W8JBI, came up with HS1VR, UL7CB and VK1RW for 250 while Howy, W2QHH, adds LU3ZY and SVØWN (Crete) for a 246 total . . . Roger, W1JYH, moves to 239 thanks to XW8AB, VK1IJ and YVØAA as Gus, W2HMJ, hit 238 with OQØVN . . . Fred, W8KML, added UL7CB, FE8AE and VP8BC for 234 while Bob, W1KFV, upped to 225 with help from OQØVN, IT1AGA, ZK1BS and ZC5JM . . . Ev, KP4KD, picked up YJ1RF, PJ2ME and ZD8SC putting him on 219 as Bob, WØQVZ, keyed with ET2US, 3A2BH, UF6KPA, UJ8KAA, UQ2KAA and YK1AK for a 217 total . . . Vic, W1TYQ, also hit 217 with OQØVN, IT1AGA, KAØIJ, VP8BK, W4EMF/KS4 and UG6AB . . . Paul, K2GFQ, nabbed VQ1JO, ZD1FG and ZD9AF to rest on 215 as Bob, W2EMW, went to 213 with OD5LJ, VR1B, I5RAM, VR3B, PJ2ME and ZD1FG . . . Jim, W5FXN, keyed with UL7KAA, UI8KAA, OY7ML and IT1AGA for 210 while Frank, W9UXO, added UAØKUA for his 19th zone and 3A2BH for country No. 208 . . . Bud, W2HSZ, jumped two zones with UA9VA and UAØKJA while also adding FL8AB, MP4BBL, UI8KAA, IT1TAI and ZD9AF for a 201 total . . . Bill, W6YK (W4TZ/6-W6UP), submits new list which puts him on 39-198 while

G6GM, Harry J. Merriman, of Holsworthy, Devon, England, seen here with the XYL on his estate. Harry is 71 years young, an ex Navy man, and was licensed in 1930. He is very active on 160 meters and seeks a South American contact to complete his 160 WAC. His top band contacts include ZL1AH and ZL3RB. (Photo courtesy W1BB)

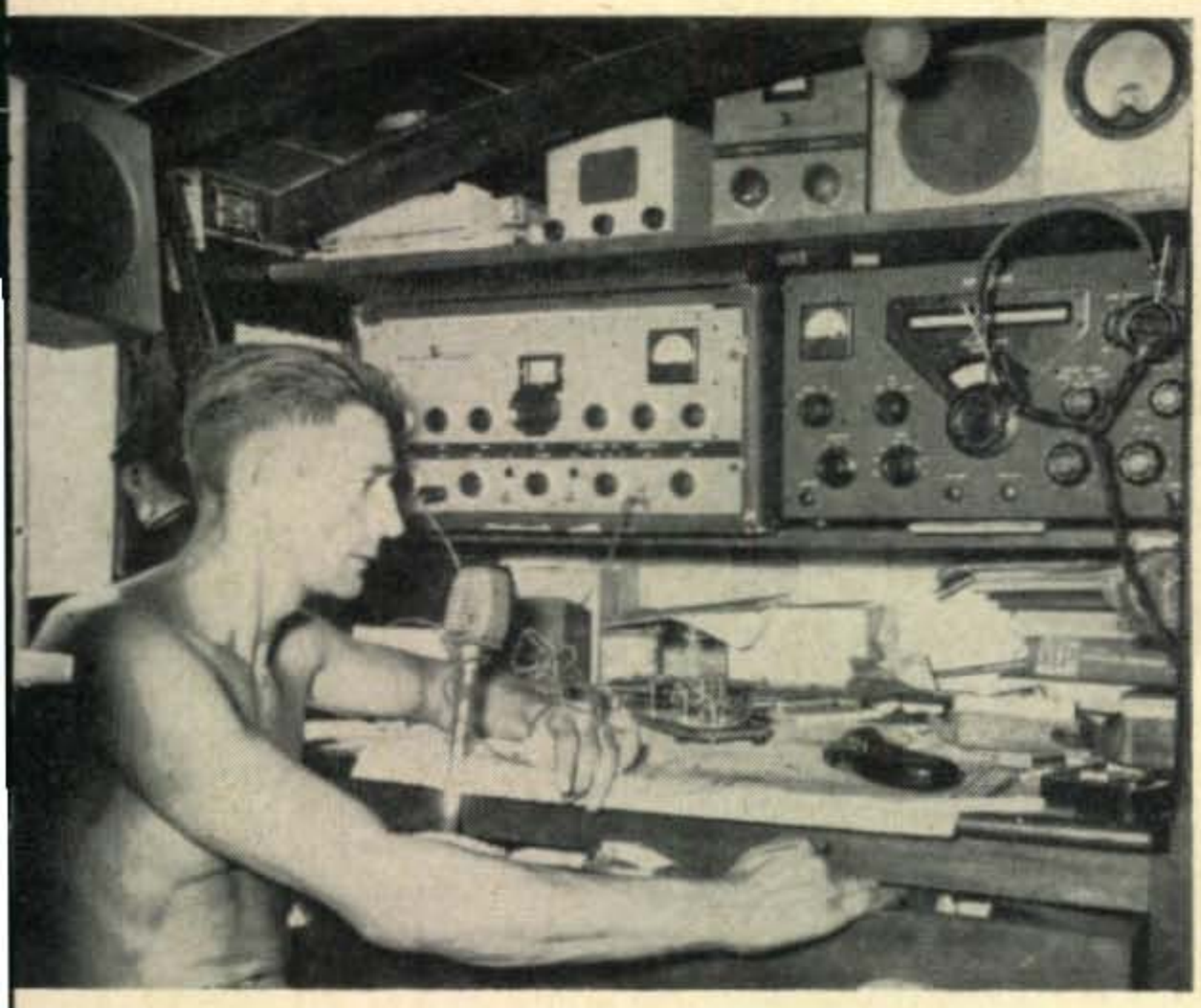
Abbe Charles Saniez, F9RS, of Calais, France, handles DX chores for the REF Bulletin and has been very helpful in passing along information regarding French colonial DX activities.

Bayard, W3AYS, adds 14, including such as VQ8CB, PJ2ME, UN1KAA, VR4AA, YJ1RF, VR3B and DL3AD/LUX, for a 192 country total plus UAØOE and UAØKQB for two new zones . . . Ed, W6UQQ, adds zone 34 with 5A2FB plus UD6AL, UP2KBC, UI8AE, UL7KBA, ZS9R, IT1TAI, HZ1HZ and OD5LX for 189 as Bob, W7NFE/6 (now K6UYC), snagged XZ2OM for his 39th zone plus such as I5RAM, UH8KAA, UF6KAF, ZS9Q, ZD1FG, ET2US, 5A1TV, W4EMF/KS4, CT3AN and VS4FC for a 165 country total . . . Hayden, K2BZT, upped to 39-207 with UAØKQB, ZS9P, FE8AG, YJ1AA, ZD1FG, VR4AA, UL7CB, UN1AA, OQØVN, W4DAZ/KS4 (A3), BV1US and ZD9AE while Skip, K6JQJ, ascends to 193 with IT1ZGY, HZ1HZ, CR5SP, ZS8I, I5RAM, UG6AB, FL8AB, VK1IJ, ZC5SF, ZS9P, UL7AB and HB1MX/HE . . . Sam the DXerama man, W3AXT, upped to 190 with FB8ZZ, KAØIJ, BV1US, VQ8AG, YJ1RF, VR1B, PJ2ME, FS7RT, VK9TW, VR4AA, UB5KAA and UP2KBC as Wilson, W3WU, adds ZD6BX, AP2M, 4S7MR, XE4A, UP2KBC, ZS7D, PJ2ME, 3A2BH, VS6CG and UR2KAA for a 188 total . . . Doug, VE1PQ, goes to 38-182 with such as FL8AB, VQ8AG, UL7CB, UN1KAA, UI8KBA, HI8FR, SVØWN, PJ2ME, UJ8AF and ZP5AY while Bob, W2AYJ, adds UA9VA for another zone besides adding 16 for a 161 total . . . Merle, VE6MN, added 10 besides UAØKQB for his 39th zone giving him 153 as Juan, KP4CC, slides to 213 thanks to MP4BBL, IT1TAI and PX1EX . . . Al, W1JNV, reaches 188 with OQØDZ, IT1AGA, 4S7MR, PX1EX, YVØAA, VK9TW, UO5KAA while Miles, W6ZZ, adds HZ1AB for a new zone plus OY1R and G3IDC/VS9 for a 163 total. His 21 Mc. total is 125 . . . Guy, W6DI, phoned his way to 230 with OQØDZ and I1AXV/IT as Willard, W1NWO, has a phone total of 224 with the addition of PJ2ME . . . John, W3UXX, upped to 135 with IT1ZGY and VR4AA as Paul, W4LQN, hit an even 200 with FL8AB, ZD1FG, ZD3D, LU3ZM, UA1KAE, KX6NC/KC6, UI8AF, 3A2BH, IT1AGA and XW8AB . . . W9RHA went to 126 with FS7RT . . . W7FAW reached 190 thanks to FR7ZC and CR4AH . . . Jack, W3TMZ, running QRP, is up to 112 with such as ZD1FG, HB1MX/HE, VR3B, VR4AA, YJ1RF, VS1GZ and 9S4CH . . . Frank, W9FDL, sporting a new Telrex 2 element came up with YJ1RF, DU7SV, SP1KAA, LZ1KPZ, UR2AO, HA2KTB, CX2AM, KV4AA, PJ2ME and 4S7WP for a 76 total . . . Pete, W1BPW, made it 61 with IT1TAI, EL12C, UD6DD and HK3JC . . . Luis, CE3AG, ran up a total of 646 QSO's and 507,312 points in recent CQ brawl. He says 1.8 Mc. should not be included (only QRN heard) and 27 Mc. (no CW). Result: big loss of time . . . Nikki, K5ADQ, passed the 100 mark. Congrats! . . . K6LSG, Kurt, is mostly on 21 Mc. and his 30 watter has snagged such as KW6CA, KX6NC/KC6, VU2RM, VS1DU, KM6AX, CE3AG and plenty of other stuff . . . Alberto, CO8DL, went to 36-130 with VK9TW, 4S7YL and XW8AB . . . W5OEN received card from TI9AA. GE type QSL via Bureau (still think NG.) . . . VS6BE will soon be on with a KWS-1 . . . Two DL contest scores were DL7AA 192,000, DL7AH 120,000 . . . I5RAM was No. 218 for Alan, VK3CX . . . Charlie, W9PCF, worked 30 new ones since putting up his cubical quad. They include PJ2ME, KR6QW, YI2AM and UI8KAA. Total 106 . . . Carl, W1ADM, received his Helvetia-22 Certificate No. 125. He figures he is about the 7th W to get one. . . .

160 Meter News
(Via W1BB)

Congrats to Don, VP3AD, who, on September 12th, made the first British Guiana/USA contact on 160 meters. This was with W1BB at 0700 GMT with signals peaking at 339. This contact was not come by easily but was a result of many weeks of faithful schedules. The rig at VP3AD consisted of a 6V6/807 combo. Just another case where patience and perseverance has paid off! . . . Paddy, EI9J, reports that he will not be on 160 this season. Special permission is always hard to obtain and Paddy felt that prevailing conditions did not warrant all the "red-tape" work . . . Al, W4UWA/4, is a BC engineer for WHUB. Each Saturday night after closing down at 2315 CST. Al switches on his par. 6L6 rig and uses WHUB's

Pete Woods, Chapel Hill, N.C. is lord and master of K4GZX. Pete is 13 with plenty of DX ahead!



Operating position aboard "YASME," lost on reef, shows Danny at the mike. All efforts will be made to get Danny under way again.

This action shot shows Phone WAZ leader Jayme, PY2CK (244), and CW WAZ leader Chas., W1FH (271), during Jayme's recent visit to Boston. From the looks of things could it be that they are latching on to a "new one"?

180′ vertical GP antenna with remarkable results . . . KP4's and KV4's will not be heard on 160 this season due to recent regulations prohibiting its use in these areas (We understand, and hope, this is a temporary measure) . . . KØHEM plans a rhombic on 160 with legs one half mile long. He will run a Viking Ranger to this array and concentrating on DX . . . Chas, W5SOT, will be on the job again from New Mexico and may be found on 1998 kc . . . XE1A was on 1823 on October 28th and worked W4UWA/4, WØHO and KØHEM. It is hoped that Juan will be on regularly . . . W1BB is issuing an appropriately lettered "AWARD" Certificate to all DX stations working him on 160. This may be had on request. Where the contact is a "FIRST" a special commercial lettering job will be done to adequately commemorate the event. This Certificate, in effect, is a king-size QSL measuring ten by fourteen inches and is quite attractive and suitable for framing. DX stations who have worked W1BB in past years, and any previous "FIRSTS" may have this award upon request. In addition, DX SWL's who send in 7 or more reports of W1BB's signals may also request a Certificate . . . DL6VN reports that selected German stations will receive permission to work 160 this season. This will be only from Nov. 1st to Feb. 28th, 0200-0730 and 2000-2400 GMT. QRG 1825 to 1835 kcs. Contacts: DX only.

Here and There

Reve, W2YW, is not retired and signs K4AW from N.C. . . . As Cesar, EA9DF, (Rio de Oro) is so prompt with his QSL's we feel justified in printing his request in hopes that the following stations will QSL to him: TA3US, VS2DZ, KL7ADR, OX3PW, HK4JO, VP8AA, CR5SP, CR4AL, CR5AF, FO8AC, GC2FZC, VR2BZ, VS1GZ, VS9AS, KR6PB, OQ5LL, VP6CJ; HA5KBP, VP2LH, VQ5CG, VP7NM, VQ3FN, SP3AN, UB5UB, FG7XB and YO3FT. Cesar plans an IFNI trip and may appear there at any moment . . . KV4AA was happy to log visits from W4IER, W1DSF, W6TSV and W2NSD. . . .

Last Minute Items

W7VY reports HL5AA active from Pusan, Korea, on 14060, 0600 GMT (HL stations along with 3W8AA, Viet-Nam, are still no the FCC "do not contact" list) . . . Mac, ex-FB8BB, now works in Chicago . . . UM8KAA has appeared on 14060 kc around 1335 GMT . . . We understand that FW8AA (Wallis Is.) should have been active on CW around mid-December . . . The raft "Tahiti-Nui" has been on its way since 2200 GMT, November 8th. FO8AP/MM uses 14330 kc instead of the announced 14103. Phone or CW is used according to conditions. Rig runs 50 watts CW, 30 watts phone plus a 1½ QRP battery rig . . . 9S4CH advises, via F9RS, that the Saar may assume the prefix of DL8 starting January 1st. Thfis may terminate this area's claim to separate country status . . . W4HE, ex-KH6VR, hopes to spend the next two years in Antigua, BWI. He will run a Pacemaker and SX-100. Licensing difficulties are not anticipated . . . KP4AO now holds the call of K2TKO. QTH is: Jose Flores, 625 Elizabeth Ave., Elizabeth, N.J. . . . Jim Morrissett, K2OLK,, acting as a reporter for CQ, will leave San Diego on the 27th of December aboard the USS Curtis. This ship will leave Fort Lyttelton, N.Z. for the Antarctic on January 15th. It is expected that Jim will have a QRP rig along to keep in touch. QSL's will be handled via CQ office . . . Two new KA stations are KA5CL, W. W. Clarke, FASRON 120, Navy 955, FPO, SF, Calif. and KA5MC, 1st Marine Air Wing Radio Club, R. F.

Krist-NCO1C, MAG-12, 1st MAW, FPO, SF, Calif. . . . Doug Berry, active from KR6PI, up to the 15th of August, now keys from W7STD/6, and may be reached via Box 83, West Sacramento, Calif., if any QSL's are missing. Doug has held the calls of: W8DLJ, DL4VG, D4AVG, KL7AQA and KR6PI . . . AP2RH's ambition is to DX'pedition to Nepal, Bhutan and (maybe) Sikkim. We hope this idea is DX'pedited! . . . Looks like activity from Navassa Island is certain in '57. Gus, W4BPD, with K4CRF, hopes to go. Maybe all the Navassa minded hams can get together for this venture. They can write each other or pool plans via KV4AA . . . FB8BR says the Comoro Islands will be on the air in January. The calls may be something like FB8CA and FB8CB. One is a resident and the other a visitor . . . W9UXO advises new QTH of SVØWO, Rhodes, is: J. W. McMinn, U.S.C.G.C. COURIER (WAGR-40), FPO, NYC, N.Y. . . .

Lloyd McBurney, PJ2AF, is seen here on a recent visit to Bob Harman, W4UDZ, Tazewell, Va. (Bob is tuning the NC-300). Lloyd's DX total is around 150 while Bob sweats out cards from 105. W4UDZ is a photographer by trade and also bangs the ivories for Decca Records. One of his latest releases is "Kentucky Home Boogie."

Danny

Regarding our drive towards YASME II, so that Danny may continue his trip, we would like to advise that he arrived in San Francisco on December 2nd and will be the guest of West Coast Clubs for a short period. Several invitations have been received from other Clubs (probably many more as this is read) and all efforts will be made to have him visit each of these. His itinerary, across the country, will be routed as per invitations received. Funds are available to cover his traveling expenses, but it is presumed that Danny will be the guest of any club visited. Please bear in mind that the picture may have changed as this is read. Sponsorship may have been obtained etc etc. KV4AA will be glad to give up to date info via radio contact (14080, daily, 2230-2315 GMT. Or other times). In the meantime club invitations are still solicited plus and ideas or suggestions which would pave the way towards YASME II. Danny is an interesting talker and we are sure all visits will be mutually satisfactory.

Note

Dave, W6VX, advises that he will leave on a trip, starting in January, which will take-in the Island of Bali (Indonesia) and the Seychelles. He will take along a 21 mc CW rig and four crystals. Permission to operate from Bali is extremely doubtful but Dave holds out hope that things may be OK from VQ9-land.

WAZ HONOR ROLL

Last complete HONOR ROLL appeared in the September issue. Next complete HONOR ROLL will appear in the May issue.

WAZ CW/PHONE

W1FH	271	W6SAI	255	W6GRL	237	W6EHV	221	W6MJB	210	W6LGD	199
W6AM	271	W6TI	254	W6LDD	237	W6BVM	221	W6IBD	210	W6UCX	198
W6AOA	270	WØYXO	252	W3CPV	235	SM5KP	220	W9VW	209	ZS2AT	198
W6ENV	269	CE3AG	252	VK4HR	235	W6CYI	220	W6RW	209	W2IOP	197
W6SYG	268	W8HGW	251	LU6DJX	234	W6EPZ	220	W2AQW	208	KH6QH	197
W6MX	267	W8BRA	251	HB9J	234	W6ITA	219	ZL1HY	208	W6BAX	197
W8KIA	266	ZL2GX	251	W6AMA	233	W6LN	219	W6RLN	208	W6ID	197
W6DZZ	265	W6GFE	251	SM5LL	233	W6TT	218	W7ENW	208	PY1AJ	196
W3GHD	265	W7GUV	250	G2LB	232	WØNUC	218	W6SC	207	W6WB	196
W2AGW	264	VK2DI	250	W7DL	232	W6PQT	218	VK3KB	207	G2FSR	196
W7VY	264	W8NBK	249	W6UHA	232	G2PL	218	G4MJ	207	I1KN	196
W3JNN	263	W9HUZ	249	W6SRF	232	KH6IJ	218	W6JK	207	DL1IT	194
W8PQQ	263	W1GKK	248	WØDU	232	W6PKO	218	VE7VM	206	W6ATO	194
W8JIN	263	G6RH	247	OK1FF	232	W6LRU	218	W4BPD	206	W6GAL	193
KV4AA	263	W6BUD	247	W6BZE	231	W9DUY	217	W6ERI	205	WØSQO	192
W6SN	263	W3BES	246	W6SR	231	G3DO	217	W6NGA	205	W6WWQ	192
PY2CK	262	W6NNV	246	CE3DZ	231	W2PEO	215	W6PH	205	W9YNB	192
W9VND	262	W6NTR	245	W7GUI	229	W3IYE	214	W6ZCY	204	VK2NS	191
W6VFR	261	VE4RO	244	W7HXG	227	PY1DM	214	W6AVM	204	W6SRU	190
W9NDA	261	ZL1BY	242	W6PFD	226	ZS2X	214	DL7AA	204	VK3JE	189
W6VE	260	W8SYC	242	W7GBW	226	KH6BA	214	W4CYU	203	ON4JW	189
W6ADP	260	W9FID	241	WØPNQ	224	W7ASG	214	W6HJT	203	WØNTA	188
W6MEK	259	WØELA	241	DL1FF	223	W6CEG	213	LU8EN	203	VK6RU	186
W3KT	259	W3JTC	241	VK3BZ	223	W4AIT	213	W6RM	202	W6DFY	186
W3EVW	259	VK2ACX	240	CE1ER	223	KH6CT	213	W6OMC	202	W4CYY	186
W2BXA	258	W6DLY	240	W8WZ	223	W6RBQ	213	G2MI	202	W2CZO	185
W6EBG	258	W6EFM	240	G8IG	223	PY1AHL	213	W6BAM	202	W1AB	185
W6TS	258	W3GAU	239	W3LOE	222	W8SDR	213	W6BUO	201	W6IFW	185
G6ZO	256	W6GDJ	239	W6FSJ	222	OK1HI	213	W9KOK	200	W6SA	184
W8BHW	256	W7BD	239	W3BHV	222	W6HX	212	VK5JS	200	KH6VP	184
W5KUC	256	W5KC	239	W6MVQ	221	VE7HC	212	W7OY	200	W6PCS	184
W7AMX	255	F8BS	239	W6PB	221	W5GEL	212	W6MHB	200	W2JVU	183
		W6LW	239	G6QB	221	W6BPD	210	ON4QF	200	DL1IB	183
		W9FKC	238	W8TTS	221			PY1GJ	199	LA7Y	182

VK4EL	182	W6LEE	150	4X4RE	235	F9AH	174	W8TLL	128	W8AM	214
SM7QY	182	W6FHE	150	W8KML	234	W4DKA	172	OH3OE	124	W3LTU	206
PY1BG	179	W6EYR	150	W4GG	232	W2OGE	172	VS1GX	123	W6VFR	188
WØOUX	177	W6LER	150	W2BJ	232	W9NZZ	169	IIER	119	PK4DA	175
VE6KW	177	W6NZ	147	W5FFW	230	WØRBA	168			W7HTS	161
W6UZX	177	OK1CX	147	W2HZY	228	W7NFE/6	165	36 ZONES		W8HUD	161
CX1FY	176	W6LS	147	W2GT	227	G6QX	162			F9BO	158
KH6CD	176	W7KWC	147	WØAZT	226	W6CAE	161	W5 JUF	206		
PK4DA	175	KH6PY	147	W4HA	226	W9ALI	160	W4QCW	186	38 ZONES	
W8HUD	175	W7DXZ	146	W8DMD	225	JA1CR	160	W8JGU	180		
W6BIL	175	W6AYX	146	W4LVV	225	W6MUF	157	WØAIH	176	W9RBI	240
W6WKU	174	VE6GD	146	W1KFV	225	W6CUL	154	W9NN	171	W9NDA	225
W6CIS	174	VS6AE	146	W3DKP	224	VE6MN	153	W1WLW	168	CE3AB	214
W7FZA	174	W9NRB	145	W5MPG	223	VU2MD	147	W4THZ	167	W2BXA	211
W6KUT	174	W6MUC	145	W3DKT	222	TF3SF	145	W1JDE	158	W3GHD	209
W6TZD	173	OK2SO	145	CO2SW	222			W9FNR	156	W6KQY	207
G5YV	172	ON4TA	144	W1HA	220	38 ZONES		W5VIR	154	SM5KP	199
OK1LM	172	G3BI	144	VK4FJ	219			W6YMH	147	W6PJ	193
G3AAE	172	W7LYL	143	W9FDX	219	W3MFW	219	WØCU	145	W4CYU	160
DL1AB	170	KG6GD	145	KP4KD	219	W5KUJ	218	K6ENL	142	ZL1HY	157
W6PZ	170	W3IXN	141	W1ZL	218	PY4IE	215	WØQBA	141	W1HKK	153
W5AFX	169	VK2PV	140	W1TYQ	217	W4EPA	209	WØPGI	141		
G2VD	169	OK1WX	135	W4RBQ	217	W1LZE	208	K2BSM	140		
W6CTL	169	W7BTH	135	WØQVZ	217	GM3EST	203	K6EIV	139	37 ZONES	
W6JZP	168	G3AZ	133	W2GVZ	216	K6JQJ	193	W1FZ	137		
W6ANN	167	W6TEU	133	W7ADS	216	W3AXT	190	W3EOB	134	W3JNN	284
VK3CN	167	W6RDR	133	OZ7BG	216	WØTKX	189	G2HKU	132	W8KML	214
IIXK	167	W6AUT	133	W9MXX	215	W1BFT	189	ZL3CP	129	G3DO	194
W6DUC	166	VE7KC	133	K2GFQ	215	W2SHZ	188	W6WWW	108	ZS6Q	192
KH6MI	166	W6OBD	131	W6TXL	213	W3WU	188			W3BES	190
W6CEM	166	ZS2CR	131	W2EMW	213	W9VP	187	35 ZONES		W1JCX	189
VE7GI	165	CR9AN	131	W8KPL	210	VE1PQ	182			W8BF	183
ZS6A	164	W6IDZ	130	W5LVD	210	W9WCE	181	KV4BB	185	HB9J	178
W6EAK	163	G8IP	127	W5FXN	210	EA4CR	180	W1DEP	184	W8REU	176
W6YZU	163	G5BJ	126	W6GPB	209	W9KXK	179	KG4AF	182	VK3BZ	173
G5GK	163	VK6SA	126	W2HHF	208	W8PUD	177	W8MWL	172	W6PXH	159
W6BUY	163	PK6HA	124	W9UXO	208	W1QJR	175	F8CW	168	WØHX	157
W6DUB	163	G5VU	124	W8HFE	207	VK3YL	171	LU5AQ	166	W6TT	145
VE7VO	162	W6NRQ	123	K2GMO	207	W3MDO	169	W1ODW	164		
ZS6DW	162	W6MLY	123	K2BZT	207	W1ZZK	163	W1DSF	157	36 ZONES	
IIIR	162	ZL1GX	122	W3VKD	203	W2AYJ	161	KP4JE	155		
W6PDB	161	VK5MF	121	VE3AAZ	202	DL6MK	160	W1RAN	154	W1NWO	224
OK1SV	160	ZL2CU	120	W6WO	201	ON4QX	158	W5AWT	149	W1MCW	223
VE3EK	160	ZS2EC	116	W2HSZ	201	OE1FF	158	W4HKJ	143	W4HA	212
W6PUY	160	ZS6CT	113	WØANF	200	W3LVJ	157	W2AZS	142	W5ASG	197
JA2KG	160	KG6AL	103	W4LQN	200	DL1YA	153	W3CPB	142	W4ESP	183
KH6MG	160	W7KWA	98	VE8AW	200	W4NBV	153	W3UXX	135	CT1PK	182
W6ONZ	160	W7IYA	59	W9BQE	200	W8AE	145	CR6AI	133	TI2TG	182
OH5NK	159			W9FNR	198	W6ETJ	144	W6HJ	129	W9RNX	181
WØFFV	158	39 ZONES		W6YK	198	OK3EA	138	EA4BH	127	WØNCG	174
WØOUH	157			W6DBP	194			K6CJQ	123	W3EVW	173
G3TK	157			OE3WB	193	37 ZONES		KP4YT	119	W1BEQ	164
W6QD	157	W5ASG	266	W7CNM	193			W2HAZ	117	GM2DBX	163
ZS6FN	157	W9RBI	257	W2IMU	192	KP4CC	213	K2QQO	116	W6CHV	163
W7BE	156	W2WZ	253	GM3CSM	192	W8YIN	212	K6CWS	108	W9BVX	160
W6AOD	156	W8JBI	250	W5MET	192	W6KYG	200	K5ABW	102	W2DYR	140
KH6IG	156	W9LNM	248	W8CED	192	W2ZVS	189				
DL1DC	155	W1CLX	248	W3AYS	192	W1JNV	188	PHONE ONLY		35 ZONES	
VK5KO	155	W8UAS	247	K6ENX	190	W5HDS	181				
G3AAM	154	W2QHH	246	W6UQQ	189	W1WY	176	WAZ		HC2JR	178
G2IO	154	W2NSZ	244	I1OJ	188	IT1TA1	173	PY2CK	244	W5JUF	171
W6RLQ	154	W3EPV	243	G3FXB	187	W2OST	169	VQ4ERR	241	W6PCK	152
W6KEV	153	W1BIH	242	W9LI	184	VE3LJ	167	G8IG	198	W8MWL	151
OK1RW	153	W1HX	241	VK3XO	183	W1APA	163			W2RGV	148
W6FHW	153	W3DRD	240	DL4ZC	179	W6ZZ	163	39 ZONES		WØANF	145
G3YF	152	W1JYH	239	W2RGV	178	W3ARK	159			W7HXG	142
KP6AA	152	W2HMJ	238	W8VLK	177	K2PIC	146	W6DI	230	PY2JU	140
VK2QL	151	W3OCU	237			W2OGE	143	XE1AC	217	WØCPM	139
VK2AM	151	W9ABA	236	ZL4BO	176						

WAZ—Honor Roll Information

An applicant for entry into CQ's Honor Roll will be provided with two country forms and two zone forms upon request. All these forms must be filled in. One country form and one zone form is then mailed to KV4AA. The other country and zone form is retained at the applicant's station for reference, additions and file.

A minimum of 35 zones is necessary for Honor Roll entry on Phone/CW or Phone only.

Double Honor Roll entry for both the Phone/CW and "Phone only" sections may be made on one form with the contact being clearly marked A1 or A3.

No QSL's are necessary for Honor Roll entry. But for full WAZ the applicant must submit 40 QSL's (one from each zone) to KV4AA.

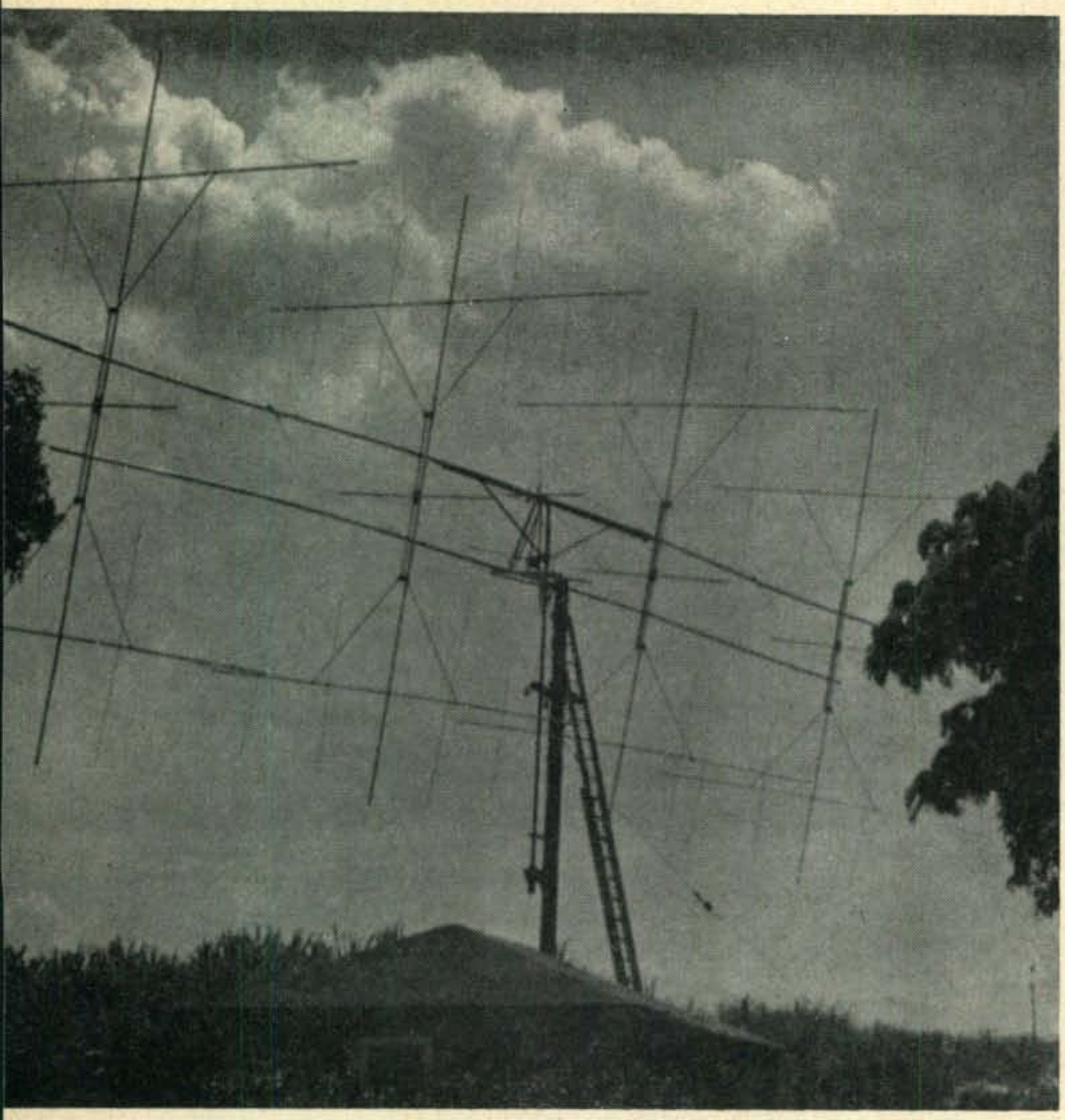
For zone locations a complete listing of zone areas may be found in February, 1956, CQ. Help in establishing the zone locations of most Russian stations may be found in September, 1955, CQ.

METHOD OF LISTING ZONE AND COUNTRY ADDITIONS FOR HONOR ROLL MEMBERS (JAN. 1957)

To lessen the considerable task of keeping all listings up to date it would be appreciated if all Honor Roll members would adhere to the following procedure when new zones or countries are added to existing lists:

1. Enter the new zones or countries on the list you now have in your file.
2. At the bottom of each page lightly pencil in the new totals for each page (if both Phone and CW put two totals).
3. Attach a small piece of paper to your list with the calls of the zones and countries which you have added. Keep a copy for yourself.
4. Mail to KV4AA, Box 403, St. Thomas, Virgin Islands, U.S.A. (Air mail takes two days, regular mail two weeks!).
5. Upon receipt of this list KV4AA will mail you (by air) the copy of your Honor Roll list which is in the file at KV4AA.
6. When this list is received by you please enter your additions (as per the list you have just mailed), change the page totals, and file.
7. You are now all set to repeat this process when new countries are acquired.
8. Your compliance will greatly facilitate Honor Roll handling. It will also provide a running check on country totals so that both sides will be in agreement.
9. Revised, up to date, CQ Official Country Lists are available upon request.
10. Deadline for receipt of new additions is on the 15th of each month.
11. It is generally requested that additions be submitted (if worked) not more than once per month.
12. Honor Roll endorsements appear in each issue of CQ which does not carry the complete Honor Roll. The complete Honor Roll appears in CQ three times per year, January, May and September.

73, Dick, KV4AA



Ed (KH6NS) has 104 elements on two meters. Total wing spread 68 feet, Height 30 ft., and Depth 24 ft. The eight big Berthas are mounted about 19 feet on centers. Rotation is 360 degrees azimuth and 90 degree elevation. The auxiliary vertical members which seem to clutter the big Bertha booms ar six meter reflectors and directors, the supporting structure furnishing a six meter driven element.

V H F

Sam Harris, W1FZJ
P. O. Box 2502, Medfield, Mass.

With the assistance of lots of sunspots and a plentiful supply of meteors the six and two meter bands are really putting on a show. (Details of all reported activity are noted in the letters section.) Six meters opened up in all directions. The first W-JA contact was perpetrated on the

Last Minute Items

The week-end of Dec. 1-2d, six meters opened up with a preview of things to come. EI2W was worked crossband six to ten meters by W1HOY, W1HDQ and as far West as Ohio working W8CMS. Many East Coast stations worked into G3 and G5 areas. G5BD was last heard signing with W5MJD and looking for W6's. Stations heard working six/ten included EI2W, G3COJ, G5BD, G2BDQ, G3AYC and GD3GMH on the Isle of Man.

KA2DS reports hearing the West Coast and Hawaii with S9 reports on many days of the month. Stations heard include W7's ERA, VAL, DYD, VOG, BKT, MKW, INX, CET, UWD, SEZ, ZTP, FVN, and PRW. W6's KEV, UOV, RNQ, BAZ, EDX, VQV, SUE, and others. Hawaiian KH6NS, BRJ and PP were heard on the 16 of Nov. Many of these stations were called but not worked. The only Far East six meter station, KA2DS, operates on 50.4 mc so take a listen with the beam West. The band opens shortly after the sun comes up in Japan.

Home of two meter phased arrays (plus aluminum castings and what have you). Bill (W8LAH) operates a lot of bands as the antennae indicate.

Al Burson (W8WXV) in his partially completed ham shack in the basement of his new home.

unsuspecting brethren on October 27 when K6EDX managed a contact with JA1AUH. Almost daily opening between Japan and the west coast followed. Meanwhile the east coast had good openings to Argentina, the west coast and Europe. On one of these openings LU9MA was heard contacting stations ranging from VE1 to W4 to WØ to W1 and everything in between. PZ1AE in Netherlands Guinea managed contacts with many W1's and W2's. W1 signals were reported received in Europe and efforts to contact cross-band were started. (At the time of writing there are no European countries with allocation in the six meter region.) The boys in the British Isles have wrangled an assignment on the four meter band and if the sunspots keep coming at their pace it might be worth while getting a converter going for it.

Meanwhile the two meter boys have been going hot and heavy. Biggest news is W4LTU (ex W2WFB). Walt has managed meteor contacts with W2ORI, W9WOK, and W3GKP. This kind of activity really puts Florida on the two meter map. Anent meteor activity Walt has the following comments:

"I must take issue with 'Bolide Bob' on his statements concerning optimum time for meteor contacts. Although his statements are true for the Perseid shower, he should have made it clear that the optimum time for other meteor showers can occur anytime. For instance, some meteor shower radiants are not even above the horizon at 0600!

"The optimum time for a given shower should occur when the *radiant is in a plane at right angles to the path and approximately forty-five degrees above the horizon.* The forty-five degrees optimizes the meteor density but of course requires that antennas be pointed approximately seven degrees off true bearing in a direction *away* from the radiant.

"For example: Taurids shower Nov. 1-10 "For NE-SW path, optimum time is 2330 (mid-point local) sc radiant is then in SE and forty-five degrees high. Antennas pointed seven degrees NW of true bearing (this antenna bearing will be different for different ranges and for radiant elevation other than forty-five degrees.)

"Rig at present is 400 watts and forty-eight element beam, 417A ccc. Hope to have KW in couple months. Frequency 144061."

Old "Bolide Bob" is preparing another commentary Walt.

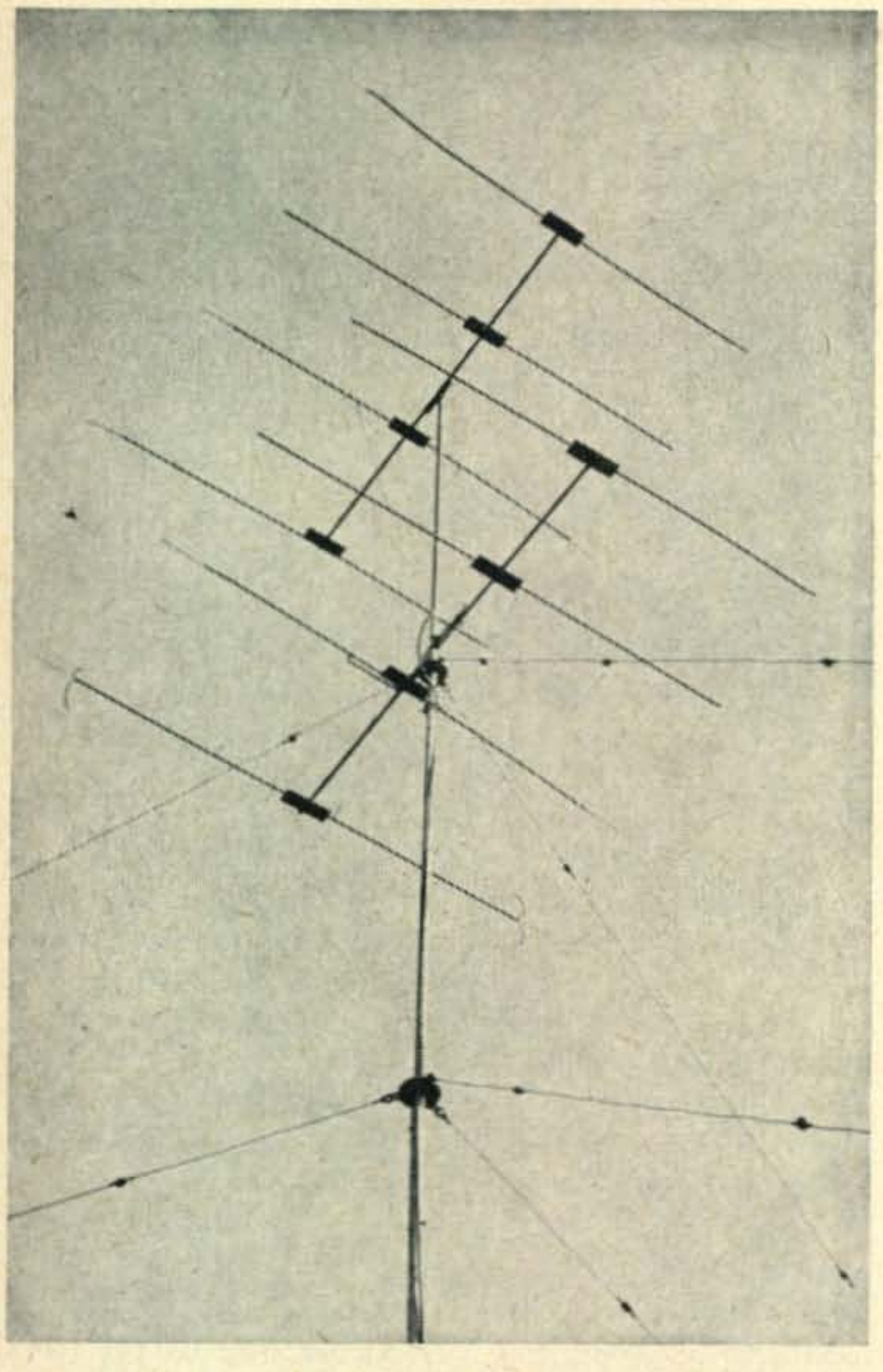
The fall aurora season was right on schedule. Contacts between the East Coast and as far west as Illinois being the regular thing with an occasional opening as far as Iowa. On one opening W9WOK made contact with all New England states except Maine. (He was still looking for that when I went to bed.) With the addition of these aurora states plus his meteor contact with Florida, old John must be pretty high on the totem pole. Speaking of being high on the totem pole I wonder how many states W8KAY has worked. (One rumor says he has fifty but I am inclined to doubt this.)

HAWAII

In case you think there is no activity on the Islands you might take a look at the photo of KH6NS combination six and two meter beams. The eight 13 element Gonset beams on two plus the eight six meter beams make a very impressive sight. Total apastrapus measures sixty-eight feet wide, twenty-four feet deep and thirty feet high. (Anyone for a windstorm?) KH6NS claims the two meter beam is working good. Still checking out the six meter beams.

If you think he's alone take a gander at the monster "old Meteor Scatter Tom" is keeping warm nowadays.

"No reports of any contacts with these things yet but don't lay any bets against it. It hasn't been too long since some misguided public servant put two TV stations on the same channel because their ninety mile separation precluded any possibility of interference. (They had advice from



4 over 4 rotary for six meters at JA1AN.

Kay (W2GBK) at the microphone. This rig is housed in the trailer under the beam on our August cover.

reliable sources too.)"

Speaking of Hawaii, W7ERA says via F2 skip, that on the eighteenth of November he made his first KH6 contact. Because of six layers of W6's, three layers of W2's and two layers of W1's on his frequency, we were unable to copy which of the three KH6's who are on six was the station which he worked. However Walt said that after the KH6's worked W6's and W7's they went on to work the JA's with the west coast boys listening all the time. (Whoever said that the six meter band was *not* a DX band). During the month of November up to and including the 18th, Walt (W7ERA) worked fifteen Japanese stations.

CW Band for Two Meters

The voluntary 100 kc c-w band from 144.000 to 144.100 has had considerable success in the New England area. Only rarely is a station heard operating phone in the c-w band and then it is usually by accident rather than choice.

I must point out that the idea can only work if you want it to. It isn't enough not to operate phone in the c-w band. You must refrain from contacting stations who are operating phone there. You must not be vindictive about it. Friendliness and cooperation will succeed. Strong words have little effect on someone who's in the right. If there is anything I don't want it's a law which prevents one from operating how and when I want to on two meters. And believe me if the voluntary c-w band don't work, we will end up with a new regulation that makes it work. The c-w boys may be in the minority but they are determined. (As witness the ridiculous phone, c-w allocations on the low frequencies.)

Viking 6-N-2

Somewhere in next month's issue will be a run-down on the new Viking 6-N-2. We brought one of the kits home a few weeks ago and, with the help of the "Rhododendron" VHF Society members, managed to get it assembled. It works real good on both six and two. You can hear it anytime on six meters by listening to W1HOY. Helen uses it interchangeable with her K.W. (No one ever notices.)

75 Meter D.X.

It has always been my opinion that a VHFer can't really appreciate the VHF bands unless he periodically drops down into the morass of QRM to refresh his memory.

If all you are going to do is talk to locals, you'd better stay on six or two, but—DX working on 75 (80 meters as the dedicated call it) is a real challenge. Starting with the evening band change (generally occurring approximately one to one and a half hours after sundown local time) and continuing until sunrise, long distance work on seventy-five meter phone provides a challenge for those black sheep of the seventy-five meter band, the DX men. Want to have some fun when the

VHF gets boring? Come on down to 3810 and give it a try. (ZS6DW please note.)

Michigan, Michigan Stu Bonney (W8JUV) reports for Michigan.

"After stuffing my ears with cotton to shut cut the screams of protest from the XYL, I managed to get the new tower up the first week at our new location. I now have the new twenty element beam up on top also. It consists of four five element yagis (5/5-5/5) spaced ¾ wave horizontally and vertically. The driven elements are split dipoles, utilizing hairpins to resonate them and to tap off at the two hundred ohm point. Each bay has its own ½ wave coaxial balun, with the rest of the phasing system being entirely of coax also. Measured SWR at the frequency I generally operate is 1.1 to 1. I haven't measured the gain, but I estimate it to be in the vicinity of 16 db.

"The 826 linear is complete now, but there are a few things about it which I don't like, namely, the rather large amount of drive required for maximum performan8ce, and a tendency towards instability.

"Next on the agenda is an improved 'nearing' aid. I have a brand new 416B on hand, and would like some dope on using it in a 'Tenna top' booster. The main thing worrying me is how to insure that no RF will get into it on transmit. Needless to say, that only has to happen once, and you have a pretty, gold-plated paperweight on hand.

"On the local scene, Jack (W8PT) is now using twenty-four elements at seventy feet, running about 400 watts on CW to a pair of 826's. Rip (W9JAQ) has been off the air due to antenna trouble, but should be back on soon with stacked fifteen element Telrex long johns. He has the rig going all day long from up on the hill at the radio station in Dellafield, Wisconsin. Bill (W9IMQ) in Green Bay, Wisconsin, is back on the air with a thirty-two element beam after an extended absence.

"Have been wondering why more of the fellows haven't tried phone on aurora. During the big opening last April I heard a number of phone signals coming through via aurora, some of them with good Q5 signals, albeit somewhat garbled. Most notable of those was WØLRY in Des Moines, who was barreling through. Possibly SSB would be even better yet.

"If anyone is interested in making some tests, I would certainly like to find out more about it. I have a few theories about that sort of propagation, but as yet no concrete evidence.

"In spite of any impressions I may have created to the contrary, the XYL is a very valuable and understanding assistant. (Why of course)" *Fine Business letter Stu, now another one please stating those theories.*

Mountain View, California From that long and narrow state and Loren (K6DTR) we hear—

"In the August contest *(which he won for that fair state on 144 Mc.)* I used a Gonset Communicator and an eight element beam from Black Mountain (2810 feet) during the period.

"The home rig is a pair of 4-125A's running about 500 watts and a Frank Jones type 417A type converter.

"Sure hope you'll be able to get the rules straightened out for the next contest. Speaking of rules I really approve of the county multiplier. Out here where the ARRL sections are quite large, a county multiplier type contest definitely stimulates interest, but please no power multipliers." *Three cheers! Another satisfied customer. Thanks Loren, we hope so too.*

Osage, Iowa Rick (KØAWN) is wondering:

"I just wonder, where's the VHF boys out here? I'm thinking of going on VHF (six and two and fool around on 220 Mc and 420 Mc.), but I could use some help. Hope I get some.

"I'd like to know about other hams in Mitchell County other than WØDJR and myself." *Allright now gang, come forth with the advice.*

Dunmore, Pennsylvania Once more we hear from Ted (W3LZD) with the following report:

"November 11th at 1815 worked W8DX on 144 Mc aurora RST 55A, we switched to 220 Mc at 1822, signals were 57A both ways on 220 Mc. We made three or four exchanges which Dick (W8DX) put on tape. Signals ranged from S3 to S8 and stayed around S7 for long periods. We both run about 450 watts, my antenna is five over five, forty feet high. My new rig at one KW is nearly ready as well as new antenna which is very much bigger. *How much?* Dick and I are going to check 220 Mc as often as aurora permits. We welcome some

Ed (W8OXS), Helen (W1HOY), and Fred (W1OED).

Standing in the background some of the W1MHL gang. In the foreground, the winners, the W3KX boys. (Rochester VHF Roundup)

John (W9WOK), Don (W1AZK) and Wayne (W2NSD). (Rochester VHF Roundup)

company during these tests." *Nice going Ted and Dick, I'm sure you'll have company on the tests when the news gets around.*

Washington, Indiana Stan Wilson (W9IFZ) wants information.

"I would like to receive information from anyone who is using a Gonset portable on six meters.

"I'm in an area where there is no local six meter activity and was thinking of going on that band. If there is anyone active on six here, I don't know of it.

"But I am not sure that I could talk to anyone with only 5-8 watts. My antenna would be limited to a four element about twenty-five to thirty-five feet high.

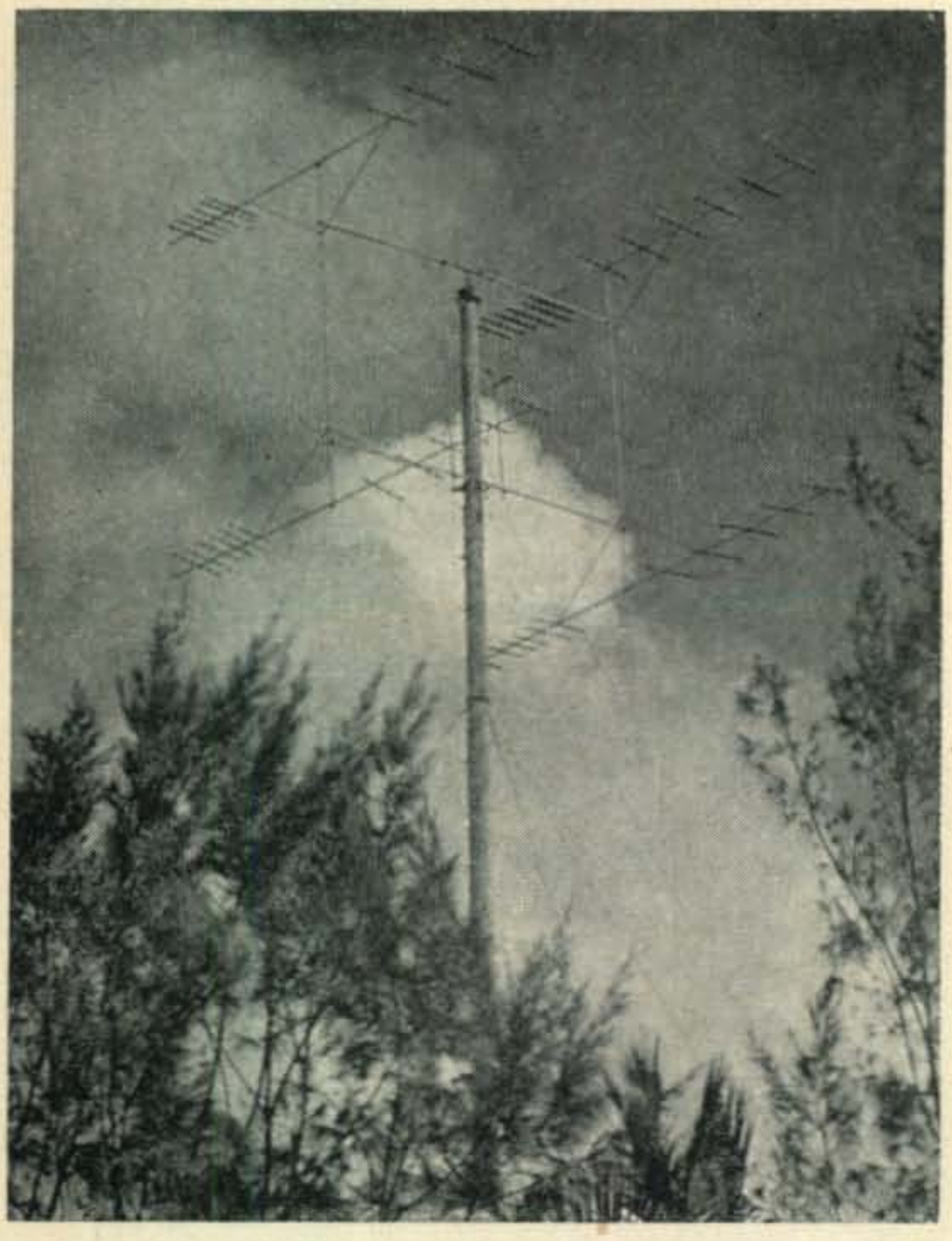
"Also, do you know if six or two meters is used in Lafayette, Indiana? I prefer cw to phone, is there much CW on six? Does the Gonset work on CW?" *Well, there's a list of questions for you Indiana boys on two and six meters. (Stan on November 19th, I worked two W6's who were mobile with Gonsets.—Signed-Helen, W1HOY, on Six Meters.)*

Washington, D.C. Larry Briggs (W3MSN) comes back to the fold and sez:

"Add me to your list of bald-headed VHF operators. Just robbed a bank, *(which one?)* bought a Gonset two meter communicator. Last time I worked VHF was in the 30's on five meters with a homemade transceiver. *Shades of years gone by! I was there too!* I believe the Gonset will be FB for the car and home use. (I enjoy your column even if I can't read.)" *You'll have a ball on VHF again, Larry. The bands just ain't what they used to be. PEOPLE.*

Affton, Missouri Ron Skaggs (WØODI) emits with:

"Just a bit of what's new here on six meters. KØDGE is running 80 watts of SSB and looking for skeds with Kansas City. WØVWH came on with a KW rig this summer. The simulated annual emergency that came off without a hitch, with seventeen mobiles and four base stations. We can count one hundred and thirty six meter stations here in the greater St. Louis area providing constant reliable communication. We hear W9ARU in Fort Wayne but can't make him hear us." *Thanks for the info, Ron, we don't often hear from your area although we know it's very active.*



52 element 2 meter beam in place on top of 80 foot pole at KH6UK.

Benton Harbor, Michigan Jack Woodruff (W8PT) surprises us with a nice long letter, chock full of information.

"Long time no see—not since you were W8UKS and I was W9PK. Am now W8PT and am located on the eastern shore of Lake Michigan. In fact, my antenna is twenty feet in from the edge of the 175 foot bluff and ten feet above a fifty-two foot tower, making it 237 feet above the lake. *Locations do change don't they Jack? Remember W8UKS on the shores of Lake Erie?* My address is wrong in the callbook. It is R R #3, Box 157, Benton Harbor, Michigan.

"The transmitter uses a pair of 826's in the final running about 400 watts and the converter is a 6BS8 Cascode into a 6AK5 mixer with a Cascode 417A preamp up at the antenna. My hours are such that I can't get on in the mornings so I'll have to work you between eight and eleven P.M., E.S.T. Frequency is usually 144086 Kc, A.M. & CW.

"I have just discovered that W2QY has competition for that 'Boner' trophy. In the Summer VHF contest, I only counted one point per contact where I should have counted two. I worked fifty-five stations in thirty-one counties for a score of 3410 instead of 1705 which would have given me first place for Michigan on 144 Mc. It is quite evident that no one checks the contest logs. *(I did, I did, I did.—signed-W1HOY.)* Another gripe I have is that the scores should be listed with the high man on top and others in sequence below the winner according to their scores. Anyway they are a lot of fun. *Whew, thanks for that last comment Jack.*

"Activity has been very poor because of band conditions but it is starting to come out of it. The lack of moisture in the air out here kept the band pretty closed up during most of August, September and part of October."

Tiffin, Ohio Roger Shultz (KN8AJF) emits:

"Well to start with, I am a newcomer to the VHF field. The rig here in use is an ARC 4 putting out enough signal to close the eye on a one eyed monster at about three miles (W8CUZ's.) The receiver is an ARC 5 / R-28 which is soon going to be replaced by a Tecraft converter. The antenna is a four element yagi which is homemade. I am feeding this antenna with RG8-U and a balun.

"I am thirteen years old and in the eighth grade. Expect to get my 'General' in a couple of weeks." *Congratulations on the 'General', Roger, hope it has come through by this time.*

Fort Huachuca, Arizona Richard Swift (W7FRG) has the following to say:

"I have a Hazeltine Electronics 'Slotted Line' which I have no use for. You are interested in VHF and UHF and no doubt know of several experimenters that would like very much to have this piece of equipment. If you do know anyone that would like to have this I would appreciate your asking them to contact me at the below address. I will sell it quite reasonable." M/Sgt Richard D. Swift, RA6138666—193d Sig Co., 504th Sig Bn.—Fort Huachuca, Arizona. *All right you experimenters, just what you've been looking for.*

Tokyo, Japan Shozo Hara (JAIAN) from Shinjikuku Tokyo, Japan sends wonderful information concerning F2 skip and six meters:

"It is my great pleasure to write this letter. I worked two way QSO with W7VOG.
Time: November 8, 1956, 0820-0825 JCT
RS I send R5 S8
W7VOG send R5 S9
W7VOG 400 watts to 4 element beam Con & HQ150x
JAPAN 200 watts to 4E27 final 1625 pp plate mod.
Receiver 6J6-6J6-6BA6 and HRO 6J6
Antenna 4 x 2 yagi and five element yagi

"On November 8, 1956, I heard W7 signals from 08.20—09.20 JCT.
W7CET—50.1 Mc—RS 5-7, W7DYD—50.2 Mc—RS 5-8
W7ERA—50.15 Mc—RS 5-9, W7VIC—50.15 Mc—RS 5-9
W7VAW—50.2 Mc—RC 5-8

"Many stations signal tape recording my recorder.

"JA active stations are: JA1AHS, JA1AUH, JA1ALZ, JA1ATF, JA1UM, JA1KS, JA1GP, JA1ALT, JA1AHL, JA1ANO, JA1IA, JA1AN, JA2IF, JA2QR, JA2AQ, JA2GR, JA2OW, JA2GJ, JA3JJ, JA6FR, JA6BI, JA3EA JA3EK, JA3LG, JA8CJ, JA8AO, JA7GB, JA7EY, and other two hundred stations." *Thanks for the information from Japan, Shozo, hope you'll keep us informed as you keep rolling the new countries into your bag.*

WPX Certificate

CQ takes pleasure in introducing our new WPX (Worked All Prefixes) Award.

This certificate is available to any licensed radio amateur operator, throughout the world, who has had radio contact with 300 or more different radio "prefixes."

The definition of "Prefix" for this award is as follows:

1. The two or three letter/numeral combination which forms the first part of any amateur call.
2. Any difference in the numbering, lettering, or order of same shall constitute a "separate" prefix. The following would be considered all different: W2, K2, KN2, 5A1, 5A2, 5A3, DJ1, DL1.
3. In a prefix only the first three (or two) letter/numeral combination will be counted. A call like FKS8ZZ (now obsolete) would count as FK8. EL12A would count as EL1 and EL44B would count as EL4 etc.
4. Should a station be worked such as VS6AE/CR9 it would count as CR9.
5. Any prefix will be counted as "legitimate" if its use was licensed or permitted by the governing authority.

Proof of Contacts

1. Applicant for WPX will submit a list giving call signs worked followed by the date of contact.
2. Applicant must be in *possession* of all QSL's (or other proof of contact) before submitting list.
3. CQ reserves the right to examine all QSL's on demand.

Lists will be provided for the recording of contacts for this award.

The holder of WPX has available many other DX achievements within the bounds of WPX as follows:

1. Space will be provided on the WPX certificate to accommodate many stickers giving proof of additional DX prowess.
2. Stickers for each additional 50 prefixes worked, over the minimum 300 are available. For example 350, 400, 450, 500, 550, 600, 650 etc. (It is estimated that there are some 700 prefixes available). Thus the WPX award may be classified as WPX-400, WPX-550 etc.
3. To holders of WPX who contact 80 per cent or more, of the available prefixes in any one continent, a sticker reading WPX-Africa, WPX-South America, etc. may be claimed and attached to the space provided on the certificate.
4. The original WPX calls for 300 prefixes to be worked on any or all bands. Separate stickers will be available to those stations who work WPX on any one band in the following amounts:

1.8	mcs.	50 prefixes worked.
3.5	mcs.	200 prefixes worked.
7	mcs.	300 prefixes worked.
14	mcs.	300 prefixes worked.
21	mcs.	300 prefixes worked.
27	mcs.	200 prefixes worked.
28	mcs.	300 prefixes worked.
50	mcs.	50 prefixes worked.

There Are Eight Basic Certificates Available

1. WPX is available for phone (AM) only. 300 prefixes worked. (WPX-phone)
2. WPX is available for CW only. 300 prefixes worked (WPX-CW)
3. WPX is available for SSB only. 150 prefixes worked (WPX-SSB)
4. WPX is available for mobile only. 300 prefixes worked. (WPX-M)
5. WPX is available for aeronautical mobile only. 150 prefixes worked. (WPX-AM)
6. WPX is available for maritime mobile only. 300 prefixes worked. (WPX-MM)
7. WPX is available for transistor QSO's only. 50 prefixes! (WPX-TS)

In all instances the mode of operation *stated on the incoming QSL* will be the governing factor.

This is a *new* certificate and we are starting from "Scratch."

All contacts submitted should date *on or after January 1st, 1957*.

There will be a one dollar charge for this certificate to USA and Canadian amateurs. CQ is a business venture, and not a club; no membership fee is charged. Such a charge defrays partial costs which include future handling and recording.

Remarks

It is felt that the above definition of "prefixes" will leave no doubt as to what constitutes a "prefix." There is no question of "countries" in this award. Thus the controversial question of what should be, and what should not be, a country is bypassed.

In most cases different prefixes are indicative of different areas both around the world and in any particular country, and it is felt that the achievement of this award, with its many openings for additional DX feats, more closely reflects DX prowess. ■

S S B

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

On November 4, Major General "Butch" Griswold, KØDWC flew East in his C97 plane picking up W8DNY, Bob, at Detroit, W2KR, Mort, W2GG, Dan, and Don K2AAA in New York for a routine flight to Boston, Washington, D. C., and return to Omaha. Hundreds of the SSB gang were worked enroute. During the stop at Detroit sixteen "side-banders" travelled from distances up to two hundred miles to honor "Butch" at an informal dinner. Through the courtesy of Mickey, W8JYZ we received the picture showing the W-8 gang and the Generals' party. Incidentally it was also a birthday celebration for Butch. On December 10, General LeMay, KØGRL, will begin a routine inspection flight to Europe and Africa and will take W2KR, W4FB and K2AAA as observers. The plane will be equipped with SSB gear and will operate on the ham bands and also the MARS frequencies.

Our old friend DL4AP, Ken, long famous in Germany as "DL4 Apple Pie" has now worked forty countries from his QTH in Colorado Springs where he is signing WØTwo Gun Louis. His KWS-1 puts out a big signal. Art, K6JEX in Long Beach has been on SSB for a year with Hallicrafters equipment and has been working plenty of DX. TG9AD is now on 15 after listening to PJ2MC.

This month we feature the station and operator of SM6SA in Bramhult, Sweden. Goran, SM6SA is Chief of the Mechanical Institution of the Technical High School at Boras. His present rig consists of a 20-A exciter, and a 600-L linear. He is building a new final utilizing a 4-400A. Goran uses a ZL-Special rotary beam shown in the photo on twenty, and a W2VS multi-band trapped antenna on the other bands. He has worked 27 countries and over 125 WK stations since the first of this year. He prefers a nice chat with an old friend to DX and a contact with Goran is very enjoyable. His hobbies include golf, sailing, traveling and photography.

We also are happy to include a picture of I1BAO, Peter and his fine station in Milan. Peter is consistently one of the strongest signals from Europe and his equipment is the finest obtainable. Good luck, Peter.

After examining the photo of I1LOV's antenna system we can easily see why Augusto's signal is

COUNTRIES WORKED
(Two-Way SSB)

K2DW	61	W3ZP	52
W2JXH	59	W2GG	52
ZS6KD	58	VK3AAE	52
DL4SV	58	W2CFT	52
VE4NI	57	VE7EL	49
W2EWL	56	ZL3PJ	49
W8DNY	54	W8QNF	43
K2AAA	54	OH2OJ	43
ZL3IA	54	HR2WC	40

Station of I1BAO in Milan.

SM6SA

Seated, Major Stewart, W8DNY, W2GG, KØDWC, K2AAA, W2KR. Second row, W8ALP, W8BN, W8RND, W8JYJ, W8BQG, W8EAN, W8ZN, W8TPB. Back row, W8BP, W8TTR. W8JYZ, W8NS, W8EGE, W8KDR, W8BYX, W8GLS.

so strong. In the short time he has been on SSB, Augusto has made many friends all over the world.

We welcome BV1US from Formosa, who has a terrific signal on the East Coast from 0730 to 1000 and at 2200 each day. BV1US works only on 14163 which was the frequency assigned by the Formosan Government.

Spain is finally represented on SSB, and in excellent style by the big signal from EA4DY, Luis the Marques de Matonte in Madrid. Earl, W2UE was the first US contact for TI2HP. Welcome OM.

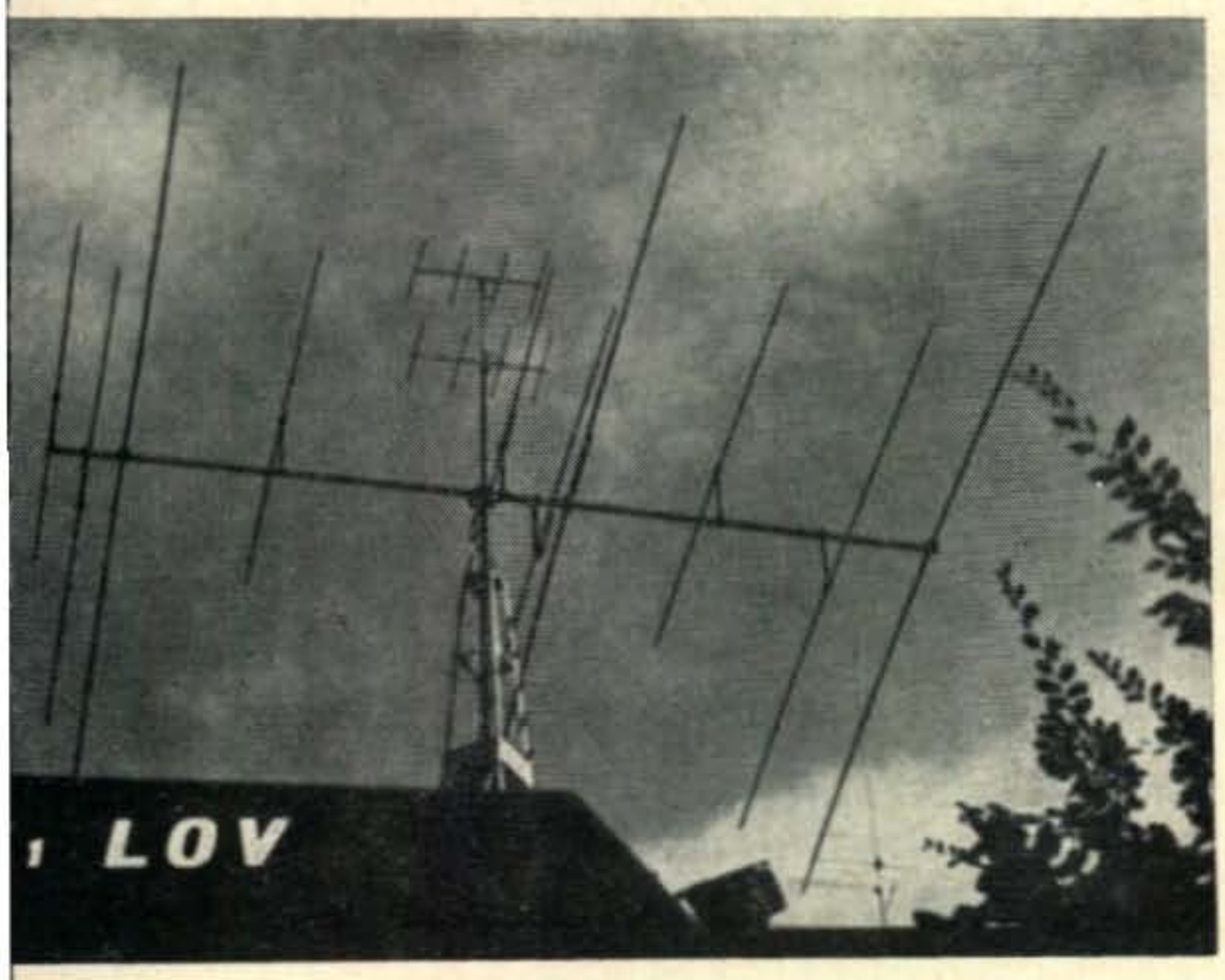
W3NWK, Jack reports working HH5GR, George in Haiti. There are now two active SSB stations on the Island as HH2JT has been giving the gang a new country this month. ZE6JB came on 20 SSB this month and has been a very popular contact for the country hungry gang. We learn from W2JXH that ZE5JJ will make his appearance in a few days. It won't be so long now until we have the 100 countries on SSB we have all dreamed about. According to my count we now have 79 active countries on SSB. Who would have believed two years ago that SSB would become so popular?

From Paul, W8BN we learn that the Interstate Single-Side Band Net meets every evening at 2000 EST with as many as 65 stations participating. For additional details contact W9KOY, Ken Smith who is the Net Manager. Empty, ZS6KD who has never actively participated in a DX contest said he is going to be on the air around the clock during our SSB DX Contest in January. We have received many encouraging words from the gang all over the World indicating their intentions to participate in the Contest, so if we have good conditions I believe we will all have a good time.

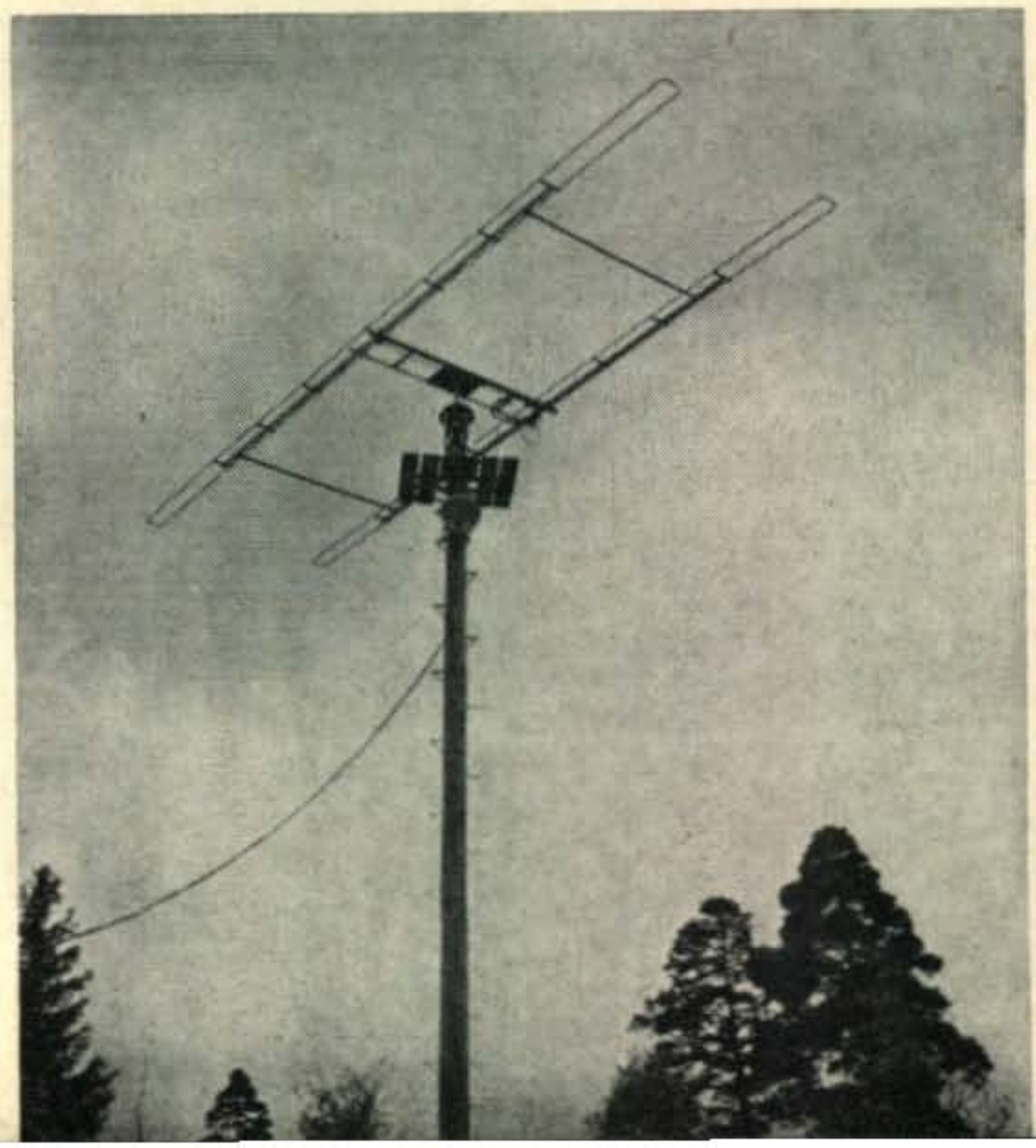
Jimmy, CX5AF came on twenty after a short standby, and during a QSO with your conductor hit 55 over 9 on the Scotch 75A4 meter. Why not try to be on more often Jimmy? He also QSLs 100%. Talking about strangers, we are happy to hear SVØWA in Salonika back on twenty SSB after several months' absence. Bill has given many of us Greece as a new country but some of the late comers to SSB will again have an opportunity to QSO SVØ land. Kosie, ZS3E has popped up again from a new QTH, after a long absence. With Matty, ZS3BC inactive due to losing his beam, Southwest Africa was silent on SSB. Welcome back, Kosie! I wonder how many of us can appreciate the terrific hardships endured by ZS3E including generating his own power from a worn out gas engine, and miles from civilizaton.

[*Continued on page 117*]

The beam at I1LOV



SM6SA's 20m beam.



Chapter III— 1932

Long-time YLs

Louisa B. Sando, W5RZJ
U. S. Indian School
Santa Fe, New Mexico

At least nine YLs licensed in the year 1932 still hold their amateur licenses. The "steady" boy friend, W2QZ, Marion Stern met in 1929 had been an avid Ham since 1924. The bug bit Marion sufficiently so that she got her ticket in 1932 and took to the air waves with the call W2BFM, c.w. only. Marion had a whale of a time, especially in interesting QSOs with the boy friend, he with microphone and she using c.w. They must have been interesting to other Hams also, Marion adds, since many years after she and Ben Russ had been married, at conventions and Hamfests from total strangers they'd get the comment, "So you two got married after all!" At present Marion shares W2QZ's kw. rig on SSB. With their two boys both Marion and Ben are active in Boy Scout work in Flushing, N. Y.

W2BFM, Marion Stern Russ, took to the airwaves in 1932.

W2FPR, Marge Wandelt, of Sidney, N. Y., got her license in 1932. At present she works mostly mobile sharing her OM's, W2AU, Johnson rig.

It was in 1932 that Rose Catron became interested in radio, and that interest came about through her future OM, who at that time was still eluding her marital snare. Rose says she surprised everyone, including herself, when she got her license and the nice two-letter call, W2TU. She was the only licensed YL in Manhattan then, the only other YL in New York City being W2WP on Staten Island. W2TU was on 80 c.w. almost entirely and had much fun surprising OMs in QSO by telling them at the end of the contact that she was a YL. Her first rig, which she put together herself, was a TNT oscillator using a 210. Rose did

8th Annual YL-OM Contest

Dates: Phone—Starts Saturday, Feb. 2, 1957 at 1 p.m. EST. Ends Sunday, Feb. 3, 1951 at 12 midnight EST. CW—Starts Saturday Feb. 16, 1957 at 1 p.m. EST. Ends Sunday, Feb. 17, 1957 at midnight EST.

Eligibility: All licensed OMs and all licensed YLs and XYLs.

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

Exchange: QSO number; RS or RST report; State, U. S. Possession, VE district, or country.

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

Scoring: One point is earned for each station worked. YL to OM, or OM to YL *only*. Phone and CW contests will be handled as separate contests. Submit separate logs. Stations and multipliers will count only once in each contest. Example: A station contacted on phone may be contacted in the CW portion of the contest for additional credit. Add number of points and multiply by number of different States, U. S. Possessions, VE districts and countries contacted. All phone or CW contestants running 150 watts or less input at *all* times may then multiply final score by 1.25. Maryland and the District of Columbia count as one state.

Deadline: Logs must be postmarked not later than March 9, 1957 or they will automatically be disqualified. Send Logs directly to YLRL Vice President Mildred Wright, W8YTM/5, P.O. Box 1088, Pasadena, Texas.

Awards: As of this year all awards will be on a permanent basis.
First place phone YL—cup
First place phone OM—cup
First place CW YL—cup
First place CW OM—cup
Winner of phone cup is not eligible for CW cup. The higest scoring contestant in *each* district, where three or more logs are submitted, will receive a certificate.

W5TU (ex-W2TU) Rose Catron Reiffin, licensed in 1932.

pretty well on the air and in 1934 Joe couldn't resist her two-letter call any longer so W2CWP and W2TU took the big step and Rose became Mrs. Reiffen. Some years ago they moved to Dallas, Texas, where Rose's present call is W5TU. Now she is on 10 meters, working DX and QSOing her family in N.Y.C. via friends' stations. Rose helps her OM in his TV business and is busy with jr. ops, Jim 18 and Susie 11.

Mae Dougherty got her first ticket in 1932 and went on the air from Philadelphia as W3CUL. Al (now her OM, W3VR) was her "steady" and he built Mae a crystal-controlled rig with a 2A5 oscillator, 45 final, and 53 Class B modulator. She worked 160 and the two c-w bands. Mae soon found that phone stamped her as a YL, so she stuck to c.w. where she could sail along on an even basis with the OMs. Before World War II Mae became Mrs. Burke and following the war, at Folsom, Pa., she went on 10 phone, working much DX and phone-patching for the boys overseas.

Eventually traffic got a hold on Mae and she and Al both kept many skeds. When Al took sick she met his skeds as well as her own. Over 35 daily skeds running up to 12 hours daily, at rush times many more, were spent handling traffic. They soon found that mailings cost many times the price of a good vacation so none were taken for five years. Not a single sked was missed during those years. BPL was earned by W3CUL 78 consecutive times and it looks like she will continue. Mae figures she handled 285,000 messages in that period alone. She has had some nice things happen to her, such as the TV appearance on a national setup with Laraine Day, appearances on BC stations, write-ups in papers and magazines from Tokyo east. Mae feels these make it well worth while, plus the letters from the folks to whom she's delivered messages.

Mae and Al are now in a new home at Morton, Pa. They have a completely dual set-up—two Collins receivers with two 32V2 rigs, plus two finals of a kw apiece. A robot antenna for all-band operation and a horizontal antenna for all bands, with new beams going up complete the picture. For vacation use in Florida a trailer equipped with a TR1TV 300-watt phone/c-w rig and NC300 receiver completes the circle. They are awaiting a new KW SSB rig. W3CUL's awards include BPL, ORS, ARE, Al op, WAS, WAC, 3RN and public service citations.

W6GEV, Dr. Lois Lary, licensed in 1932, with one of her early homebuilt portable CW transmitters.

W6GEV, Lois Lary, of Visalia, Calif., was first licensed in 1932, inspired by her OM, W6GCS. In her spare time Lois, who is a chiropractor, works the locals on 75 and 160.

W6GQZ, Iva Kirtley, and her OM, W6EXH (who recently became a Silent Key) of Ripon, Calif., were both licensed in 1932. Until the war Iva was on 80 c.w. only. Since WW II W6GQZ has been on practically all phone bands with 6 being her favorite. She holds permanent possession of the Wing trophy for

W6GQZ, Iva Kirtley, has been on the air since 1932.

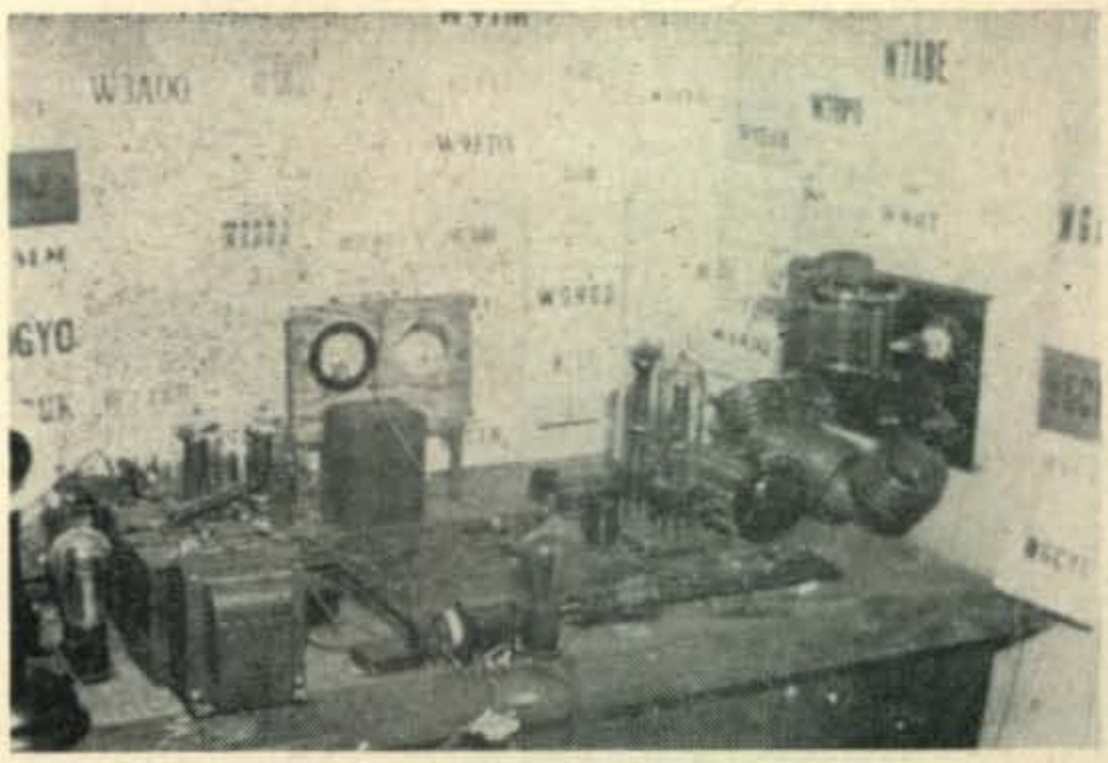
VHF activity and is proud of the certificate issued to her by the U.S. Air Force for participating in the network gathering Sporadic-E data on 6 meters for a period of 1½ years. A teacher, Iva has been working at this profession for the past 38 years. Iva is active in the San Joaquin County Emergency Net on 2 meters and since the net was founded eight years ago has missed only one checkin, and that when she was in hospital. W6GQZ runs 420 watts on the lower bands and 10 to 60 on VHF.

W7COX, Frances Viers, received her first license in February 1932 while at Red Lodge, Montana. As far as can be determined, she was the first licensed YL in that state. In 1935 she joined AARS and was a member until WW II. In 1936 Fran moved to Powell, Wyo. becoming Wyoming's first licensed YL. In 1939 she returned to Montana for a year before moving to Grand Island, Neb., as W9SUN in the spring of '41. 1946 saw Fran returned to Wyoming where she got her former call back and since then has operated as W7COX there and now on Vashon Island, Wash.

W7COX, Fran Viers, has been Hamming since 1932.

Fran's first rig was a 3-stage crystal-controlled job with a type 10 in the final running 90 watts input on 3.5 and 7 mc. Her receiver was a homebuilt 4-tube a-c operated "blooper." Now W7COX is on 3.5, 7 and 14 mc c.w. She holds Al op and RCC certificates. The present station consists of a 4-stage rig with 813s in pushpull running up to 1 kw on c.w. and phone. Receiver is an NC-183D with R9'er and a Q multiplier when the going gets rough. Two antennas 45-feet high and at approximately right angles can be selected by relays and may be used separately or in dual on any band.

Nellie Hart, W7NH, first became interested in Ham radio when her OM, W7HE-7AVZ, when operating phone, would let her talk to other amateurs. When he switched to c.w. Nellie decided to learn the code and get her own license which came in May 1932. Nellie says she operated part time on phone, until she



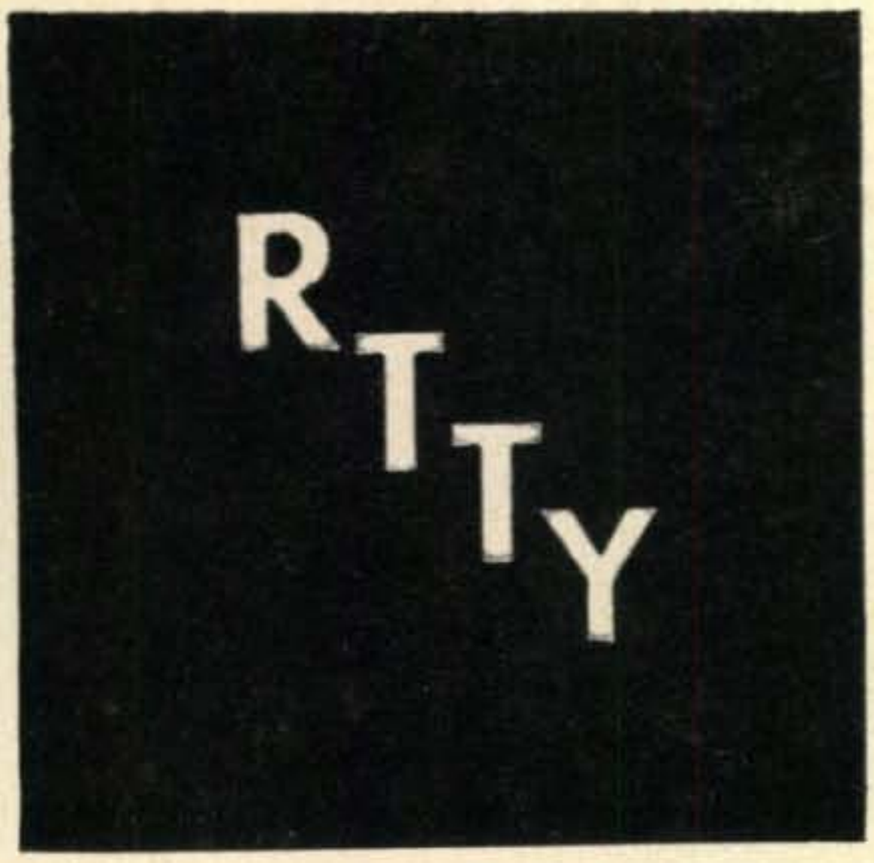
W7NH's 1932 rig.

W7NH at the mike, 1932.

W7NH, Nellie, in 1956.

heard some of the OMs discussing her conversations, so she returned to c.w. and has preferred it ever since. Her first rig was a self-excited 211E modulated by a pair of 211Es, speech amplifier a 201A and 171. Her mike was an old Frost hand mike. Pre-WW II W7NH was active on trunk line "G," also held ORS, OBS, RM and was SCM of Idaho. She was in AARS in 1934, then was DNCS, SNCS and later overseas relay and assigned WLMM. After the war she was manager of RN7 and PAN. At present she checks into RN7 and PAN, being NCS on PAN a couple of nights a week. W7NH runs 75 watts on 80 and 40.

[*Continued on page 118*]



AMATEUR RADIOTELETYPE CHANNELS

National, FSK	3620, 7140, 27,200, 29,160, 52,600 kc.
National, AFSK	27.2, 147.96, 144.138 Mc.
Area Nets:	
California	147.85 Mc. AFSK on AM
Chicago	147.70 Mc. AFSK on FM
Detroit	147.30 Mc. AFSK on FM
Washington, D.C.	147.960 Mc. AFSK on AM 147.495 Mc. AFSK on AM
New York City	147.960 Mc. AFSK on AM
Buffalo/Niagara	147.50 Mc. AFSK (space) on AM
Boston	147.96 Mc. AFSK on AM
Seattle	147.00 Mc. AFSK on AM

First reports of the RTTY contest are listed on page 116.

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

Happy New Year! Maybe you didn't find a Model 28 in your Christmas stocking, but from all reports many model 26 machines were obtained this past year by radio amateurs. Speaking of the past year, the highlight of the year was the approval by the FCC of the petition for a change in regulations to permit us to use any amount of shift under 900 cycles, thereby opening up a new world of narrow shift experimentation for RTTYers. History was also made last year with the DX contacts between ZL1WB and WØBP on 40 and 20 meters; and 2-meter RTTY history was made with the first of a series of successful contacts between VE7AOG and W7GQM.

Someone said, not too long ago, that radioteletype was the last frontier of amateur radio. How true this is, with all that factory-built stuff available these days! W6TNS recently remarked that the "do-it-yourself" trend was not getting its message across to the amateurs. But RTTYers are not usual amateurs, Don. They build avidly as well as operate. It is extremely gratifying to see interest in RTTY awakening in old-timers, builders, like W4JSS (ex-W2AOJ) and W2GZ as well as in the novice or technician, like W8PFE.

What is so fascinating about RTTY to these fellows? Well, for one thing, just about all of those you work on the air have built the gear they are using, and have more RTTY construction projects on the fire. And, of course, they all like to ragchew about those projects. Secondly, the somewhat unusual, but not unduly complicated, circuitry requires a little thought. You can't find diagrams in a radio amateurs' hand book—you have to dig a bit deeper. Thirdly, the *automation* aspect (in the form of autostart) is very intriguing to those of us who have discovered some of the many, many, possibilities of automatic control, not just of our own machines but of distant teleprinters as well.

Where can you read something about RTTY? In *CQ*, of course; in the monthly RTTY column. Since the January 1956 issue your RTTY column has carried a section called, "RTTY Principles & Practice," devoted to the newcomer or potential RTTYer. Basic principles were discussed, and in subsequent issues those machines most often found in amateur hands were described in detail—with circuit diagrams. At the end of this column we are listing just what and where radioteletype information has appeared in *CQ* in 1956. (Back issues may be obtained for 50¢ each.)

Also, the Radioteletype Society of Southern California publishes a monthly bulletin, *RTTY*, which contains quite a bit of technical information. It may be obtained for $2.50 per year from 372 West Warren Way, Arcadia, California. They also put out a very handy RTTY Call Book for $1.00.

"Now, where can I get a *Teletype* machine?" That is probably the question most asked of your RTTY Editor. As mentioned editorially last month by W2NSD, caution here is advised. Whenever possible, contact the nearest *active* RTTYer and ask him what the current state of the market is. (This is where the RTTY Call Book is useful.) If you don't have an RTTYer near you, contact W6AEE in the West, W9GRW in the midwest, or W2JTP in the east. (By the way, your RTTY Editor does *not* handle machines.) Also, unless you are an employee, do *not* contact either the *Teletype Corporation* or your local Bell System. They dispose of machines only through established channels. Some machines are available from government surplus dealers, such as W2ZKV. (plug) Several other hams and some telephone men repair and rebuild machines as a side-line. Again, your local *active* RTTYer will know about any such sources and if they are near you. Contact him.

How is an amateur radioteletype station set up

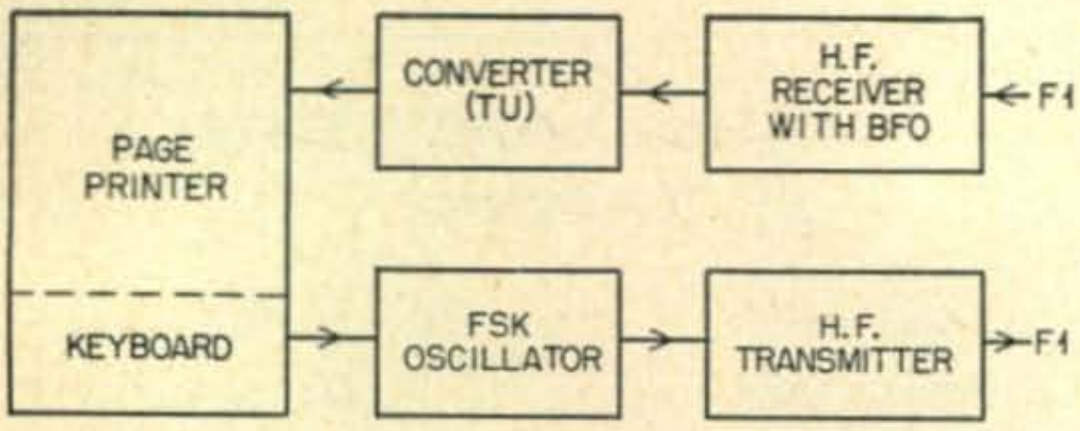


Fig. 1—FSK Radioteletype Station, Block Diagram.

and operated? In two general ways: A station operated on the lower frequency bands, 80, 40, 20, and 15 meters is permitted to use frequency-shift-keying (FSK) in the "CW exclusively" parts of those bands. While any shift below 900 cycles is allowed the standard shift of 850 cycles is generally used. The transmitter v.f.o. is frequency-shifted by the keyboard to produce the desired shift at the carrier frequency. The receiver usually has a b.f.o. which is adjusted to produce beatnotes of the standard tones, 2125 cycles for *mark* and 2975 cycles for *space*. The tones are then fed to a converter, or terminal unit (TU), which converts the tones into d-c pulses for the machine. *Fig. 1* shows a block diagram of an FSK station.

On v.h.f., mostly 2-meters, audio-frequency-shift-keying (AFSK) is utilized. An audio oscillator is frequency-shifted by the keyboard to produce the standard tones, 2125 cycles and 2975 cycles, which are then fed to the customary modulator. Audio from the receiver is fed directly into the TU. *Fig. 2* shows a block diagram of an AFSK station.

The above explanation is necessarily brief. A more detailed discussion can be found on page 51 of the Jan. '56 issue of *CQ*. (I hate to keep referring to back issues, but there is no sense in repeating myself *too* much!)

So many new stations are coming on the air these days that operating procedure is becoming a bit haphazard, we notice. So, we thought that this would be a good time to review not only the requiremens of the FCC but some of the procedures agreed upon more than a decade ago as well. The following should not be construed as being iron-bound rules—except where the FCC is involved. Undoubtedly, also, procedures and amateur-set standards will vary slightly in different parts of the country.

RTTY Principles & Practice

Part 5—Operating Procedures and Standards.

Considering first the case of the FSK station, the FCC requires that calling and signing be done in International Morse Code. This can be either with normal CW (make-and-break) or with FSK. Break-in operation is permitted without this bother —providing that identification in Int. Morse be made at least once every ten minutes by each station. Long-winded transmissions must also be identified in this manner once every ten minutes.

Identification with Int. Morse on FSK is more desirable than on cw for several technical reasons. Local copy (printing on your own machine what you are sending) can be obtained from a d-c loop within the shack, but this does not provide any monitoring of your own signal. When local copy is obtained via your own receiver and TU, you can be sure of both your own frequency and your shift. Now, if you identify by cw, most likely keying some stage following the FSKed oscillator, it is all too easy to leave the key open after you identify. You continue to get local copy, but nothing gets out of the shack! (This has happened to most RTTYers at one time or another.

W9LIS, RTTY station of Bob Meyer in Peoria, Illinois. The rack on the left is the 250TH rig, running 1 kilowatt. Behind the Model 26 is the W9AKM Terminal Unit and some "rusty" SSB equipment. The receiver is a 75A4, and while not shown, a BC-459 is the VFO for RTTY. Bob works mostly 40-meter RTTY, with some 20-meter RTTY during the Winter.

Most embarrassing.) If you connect your telegraph key across the "break" button on the machine, you can identify with FSK, holding down the button with one hand while pushing the key with the other without having to remember to close the key when you finish.

Considering the AFSK station, where RTTY began, it has long been standard practice to use 2125 cycles for *mark* and 2975 cycles for *space*. The object here is to permit the converter to be used for the standard 850 cycle shift on FSK as well as AFSK.

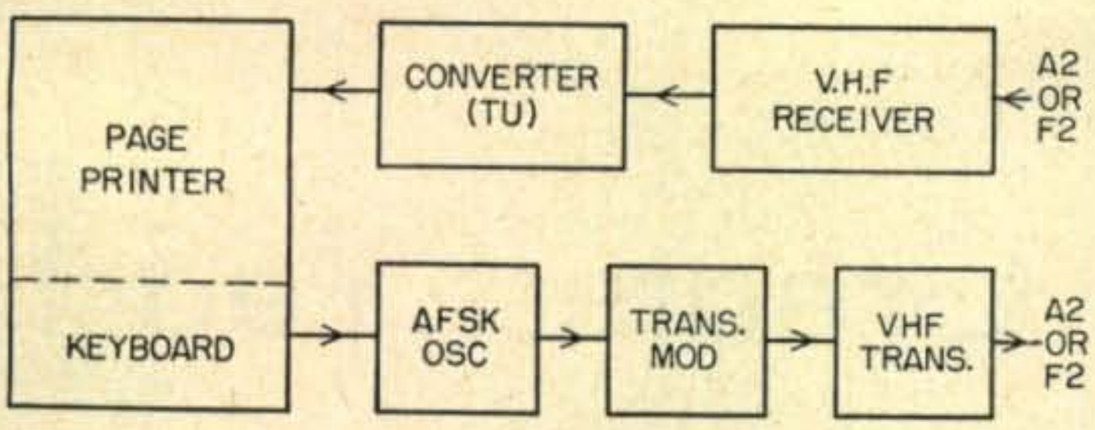


Fig. 2—AFSK Radioteletype Station, Block Diagram

Identification of an AFSK station can be either with voice or with Int. Morse Code. It is most desirable to key the *space* tone, make-and-break, rather than the *mark* tone so as not to start up and have running wild any unattended printers on autostart.

Autostart, the automatic starting and printing at unattended machines monitoring the channel, is accomplished by sending a steady *mark* tone for at least one minute before commencing to type. (A time clock usually turns on the receiver and TU at certain pre-set times, although some fellows leave them on all the time. See Oct. '55 *CQ*, page 46.) If tape transmission is to be copied, some types of TU's require a pause of about 5 or 6 seconds at least once each minute to prevent shutting down the equipment. Unattended machines are shut down by depressing the "break" button to send the 2975 cycle *space* tone for about 15 or 20 seconds.

Attended operation, as in a normal QSO or net operation, requires only a 3 to 5 second *mark* tone to start and *space* tone to stop the other man's machine. Just before it is turned over to the other fellow, however, it has been the custom to send three BELLs before sending the stop signal. (This gives the other fellow time to leave the work bench, read the copy, and get ready to transmit.) Remember, too, that all machines don't have the BELL on the upper case "S." Some have it on the upper case "J" or on the "blank" key. If you know that there are several different types of machines on your net, hit all three keys. If a small round-table is in progress, different numbers of bells can be assigned to different stations.

As for your typing procedure, on AFSK or FSK, it doesn't matter if you use the "hunt-and-peck" system or the "home" system of a schooled typist. Speed comes with practice in either case. It *is* important, though, that you punch the LTRS key after sending a number instead of just hitting the space bar. The reason for this is that not all the fellows who may be copying you have Model 26 machines with the "unshift-on-space" feature.

Also, when you begin a transmission, reach the end of a line, or end a transmission, hit the following keys in this sequence: CAR RET, LINEFEED, and LTRS. The object here, of course, is to reduce over-printing in case signals are marginal and some functions are being missed. (You never get anything built if you watch the machine *all* the time!)

From Part 12 of the RULES GOVERNING AMATEUR RADIO SERVICE of the FCC, the following applies specifically to radioteletype:

12.107. *Special provisions regarding radio teleprinter transmissions.* The following special conditions shall be observed during the transmission of radio teleprinter signals on authorized frequencies by amateur stations:

(a) A single channel five-unit (start-stop) teleprinter code shall be used which shall correspond to the International Telegraphic Alphabet No. 2 with respect to all letters and numerals (including the slant sign or fraction bar) but special signals may be employed for the remote control of receiving printers, or for other purposes, in "figures" positions not utilized for numerals. In general, this code shall conform as nearly as possible to the teleprinter code or codes in common commercial usage in the United States.

(b) The nominal transmitting speed of the radio teleprinter signal keying equipment shall be adjusted as nearly as possible to the standard 60 words per minute and, in any event, within the range 55 to 65 words per minute.

(c) When frequency-shift keying (type F-1 emission) is utilized, the deviation in frequency from the mark signal to the space signal, or from the space signal to the mark signal, shall be less than 900 cycles per second.

(d) When audio-frequency-shift keying (type A-2 or type F-2 emission) is utilized, the highest fundamental modulation audio frequency shall not exceed 3000 cycles per second, and the difference between the modulating audio frequency for the mark signal and that for the space signal shall be less than 900 cycles per second.

Across the Nation

A nice letter from Jim Thorpe, VE7AIK, reports on a Seattle visit with Don, VE7AOG. The pair of them toured the 2-meter and RTTY gang, including Garry, W7GQM, and Ernie, W7LHL. Garry also sent along a nice letter with three feet of copy "off the floor," to borrow a phrase from W6AEE. The copy was from one of the scheduled Monday night (9 p.m. PST) contacts between W7GQM and VE7AOG. Looks like VE7DV is getting set for RTTY.

W6CG tells us that his XYL, K6OWQ, is quite interested in RTTY and is trying to work out an RTTY sked with W6SXG, XYL of W6OWP. Bud is also trying to get VK5CG on RTTY. Cecil Crafts says to please get his call down correctly. It is W6ZBV. He is still air-checking his discriminator TU, made for both wide and narrow shift. He also has completed a new 2-meter converter with a BC-609 as the i-f amplifier. W6AEE reports a meeting of the RTTY Society of Southern California at Compton November 6th. They have 108 members, all on 2-meters, and about 40 on the lower frequencies. K6PNW has a combination VFO shift-control and TU of the discriminator type.

[*Continued on page 120*]

PROPAGATION

George Jacobs, W3ASK
CQ Propagation Editor

1957

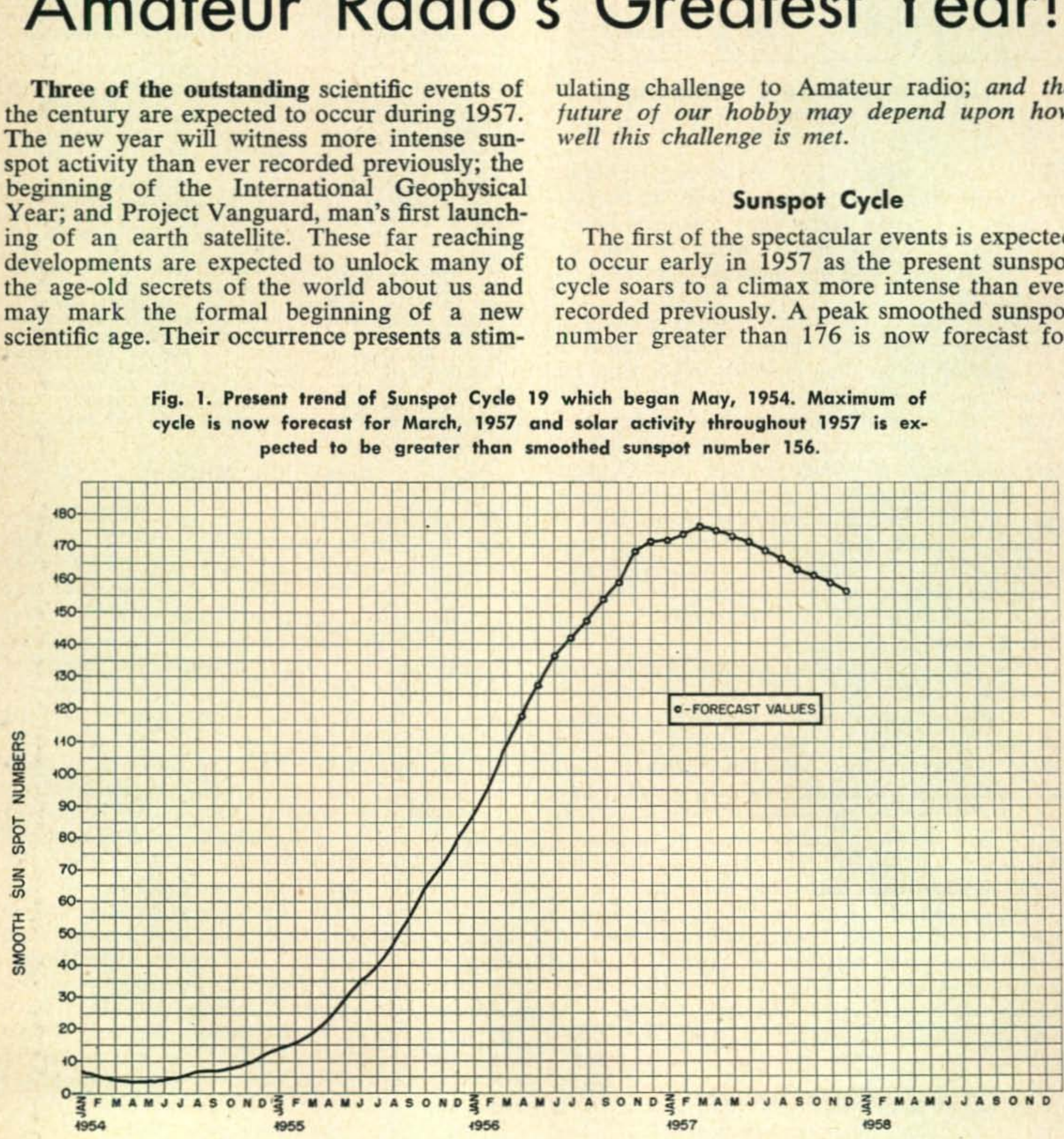
Amateur Radio's Greatest Year!

Three of the outstanding scientific events of the century are expected to occur during 1957. The new year will witness more intense sunspot activity than ever recorded previously; the beginning of the International Geophysical Year; and Project Vanguard, man's first launching of an earth satellite. These far reaching developments are expected to unlock many of the age-old secrets of the world about us and may mark the formal beginning of a new scientific age. Their occurrence presents a stimulating challenge to Amateur radio; *and the future of our hobby may depend upon how well this challenge is met.*

Sunspot Cycle

The first of the spectacular events is expected to occur early in 1957 as the present sunspot cycle soars to a climax more intense than ever recorded previously. A peak smoothed sunspot number greater than 176 is now forecast for

Fig. 1. Present trend of Sunspot Cycle 19 which began May, 1954. Maximum of cycle is now forecast for March, 1957 and solar activity throughout 1957 is expected to be greater than smoothed sunspot number 156.



Last Minute Forecast

Short-wave radio disturbances are forecast for January 4-6, 9-10, and 15-17th. Exceptionally good conditions are expected to occur between January 23 and 29th, with the remainder of the month seasonally normal.

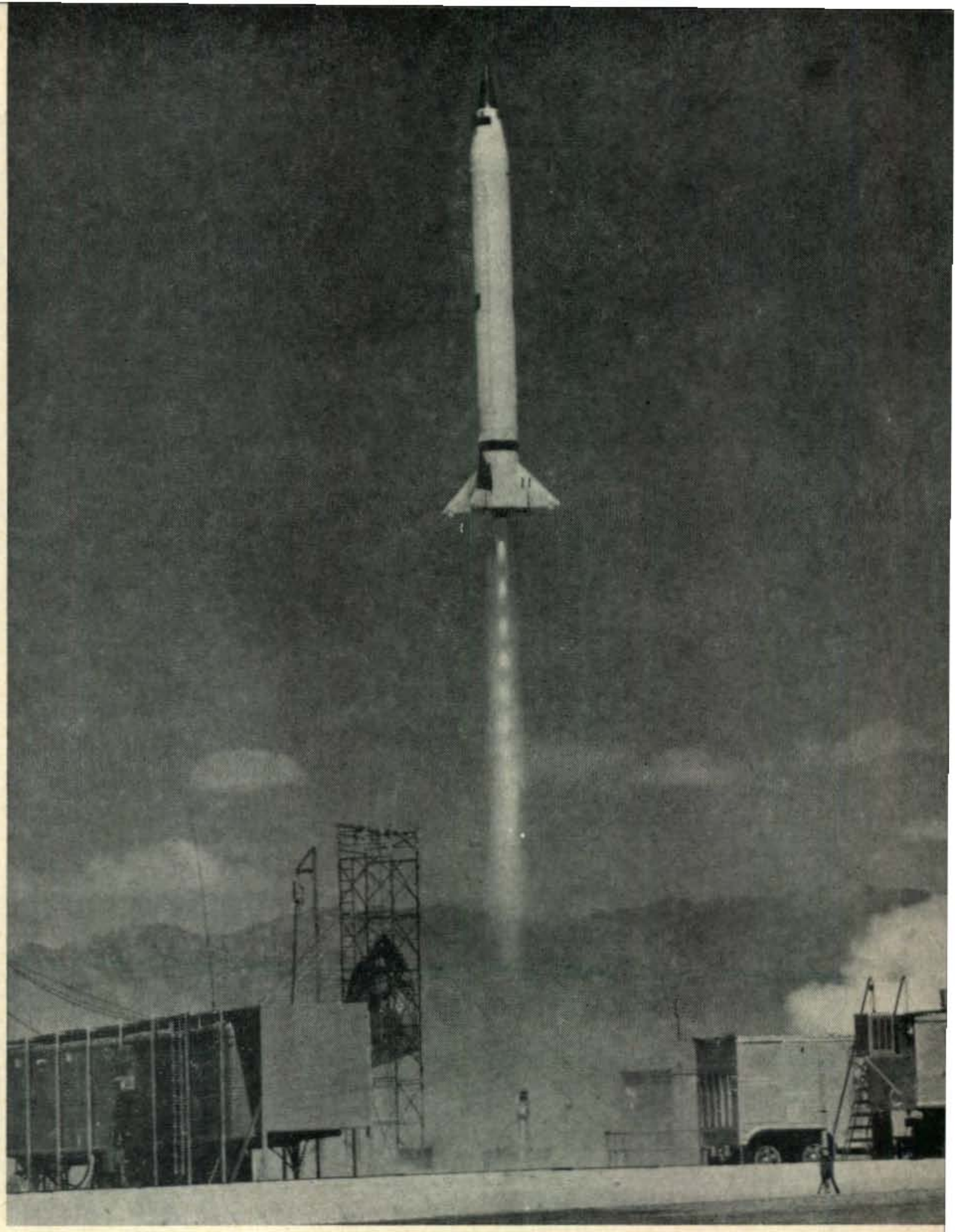


Fig. 2. Official US Navy Photo showing launching of Viking V2 rocket. Hundreds of these and similar projectiles will be launched throughout the world during the IGY to obtain data from the earth's upper atmosphere.

the early spring months, and solar activity throughout the entire year is expected to remain at an unprecedented high level. With the occurrence of record high solar activity we are entering a new period in shortwave progagation research . . . a period for which no previous scientific data is available. Scientific data collected during this period will no doubt give us a more complete understanding of the relationship that exists between violent eruptions taking place on the surface of the sun, ultraviolet radiation and the subsequent ionization of the earth's upper atmosphere, and shortwave radio propagation conditions. From what is already known of these relationships, long distance shortwave propagation conditions during 1957 should be *better than they have ever been in the history of radio*. On only two other occasions in more than 200 years has the sunspot cycle exceeded a smoothed sunspot number of 150, so 1957 may truly be called a year of "once in a lifetime conditions". *Figure 1* traces the progress of the present sunspot cycle, and shows the level of solar activity expected throughout 1957.

IGY

On July 1st, one of the boldest and most imaginative scientific endeavors ever attempted by man begins. This is the International Geophysical Year. Called a "year", it will actually last 18 months, ending on December 31st, 1958. During this period there will be an unprecedented cooperative effort on the part of scientists in almost every nation of the world to study man's environment . . . the earth, its

atmosphere and oceans, and those solar and cosmic phenomena whose effects are felt on earth and upon which life itself may depend. The IGY expresses man's ability to surmount political differences in joining forces to view the earth as a whole, and to make a detailed study of our planet. Problems to be studied include aurora, cosmic rays, geomagnetism, glaciology, gravity, ionospheric characteristics, seismology, solar activity and many others.

This great international effort offers an unparalleled opportunity for increasing man's fundamental knowledge of the physical universe and for providing information of a very practical kind. For example; meteorological studies furnish weather data important in every field of human activity; ionospheric studies provide data of the utmost importance in long-range radio communications; while the studies of the aurora and geomagnetism provide data essential for revealing the origin and exact nature of magnetic and ionospheric disturbances responsible for the vagaries of radio transmission conditions.

Much of the data collected during the IGY will be obtained from rockets sent into the vast unknowns of the earth's upper atmosphere. The United States plans to fire hundreds of rockets ranging in size from small balloon or aircraft-launched projectiles to the enormous, sleek, high performance Vikings and Aerobees (Figure 2) capable of penetrating more than 200 miles into space. Several other countries plan to contribute to rocket sounding projects from the Arctic to the Antarctic and over vast geographical areas of the world.

Project Vanguard

Project Vanguard is the third major scientific event expected to occur during 1957. This project almost staggers the imagination and might well mark the formal beginning of the space age. It is the United States plan to launch small, unmanned, earth-circling satellites as part of this country's participation in the International Geophysical Year. With such a device, scientists will for the first time be able to make sustained observations in the region *beyond* the earth's atmosphere. This man-made moon, measuring about 20 inches in diameter and weighing about 21 pounds, is expected to be launched by three rockets firing one after the other (Figure 3). It is expected to reach an altitude of between 200 and 800 miles above the surface of the earth and will orbit around the earth at speeds as high as 18,000 miles an hour. At this great speed it will take only 90 minutes, or so, to circle the globe. After several days, or possibly longer, the satellite will gradually circle back into the upper atmosphere where friction will cause it to disintegrate harmlessly. Delicate instruments inside the satellite will record and send back by telemetering

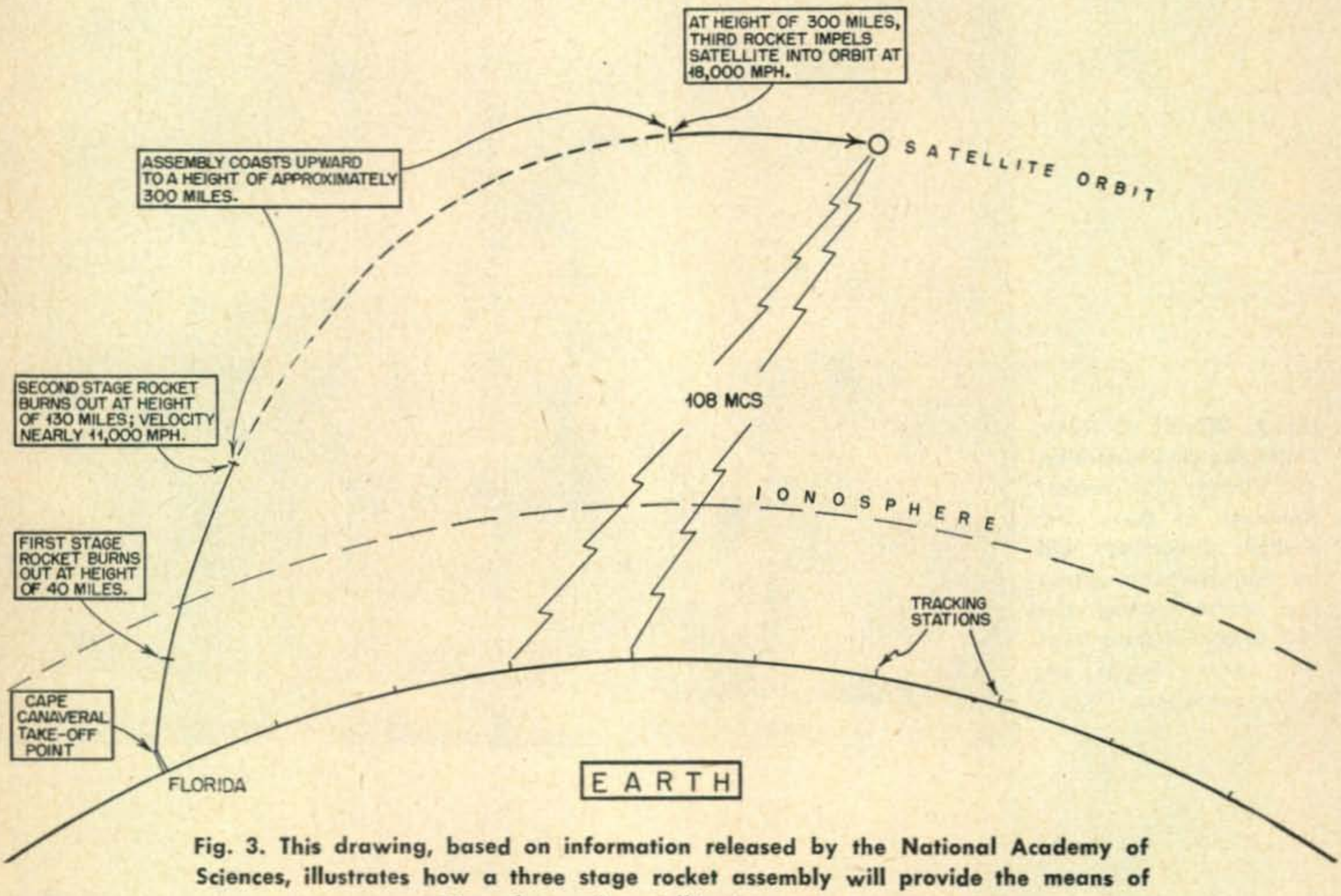


Fig. 3. This drawing, based on information released by the National Academy of Sciences, illustrates how a three stage rocket assembly will provide the means of getting the earth satellite into outer space.

ALL-BAND VERTICAL ANTENNAS

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

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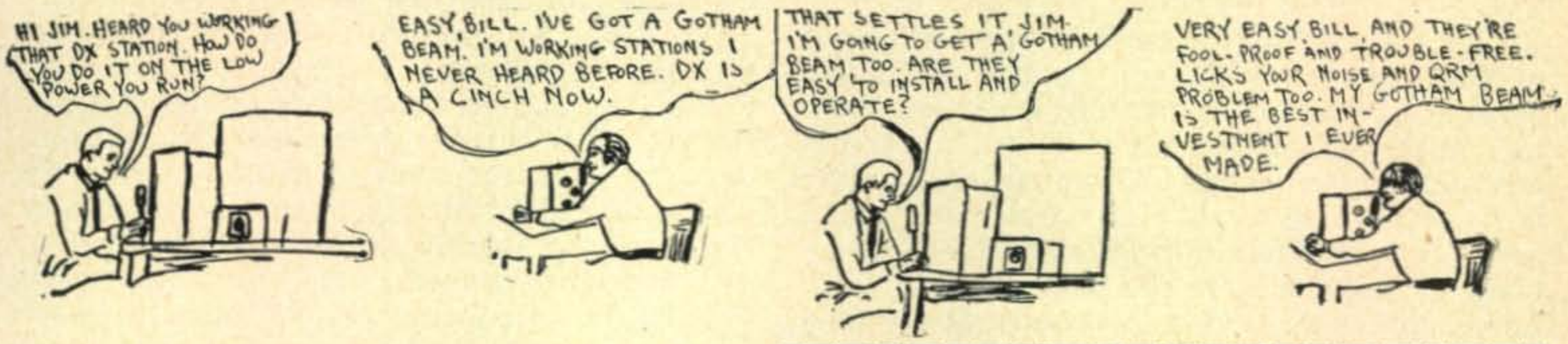
V80 (for 80, 75, 40, 20, 15, 10 and 6 meters) 16.95
V40 (for 40, 20, 15, 10 and 6 meters) 14.95

Complete instructions included with each antenna—literature on request

WORK THE WORLD WITH A GOTHAM BEAM



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

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

MORE DX CONTACTS WITH GOTHAM

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

THE DESIGN IS PROVEN

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

THOUSANDS IN DAILY USE

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

ALCOA QUALITY ALUMINUM

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

CONSISTENT PERFORMANCE

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

NO FLIMSY WOOD OR INSULATORS

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

QUICK INSURED DELIVERY

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

THE PRICE IS RIGHT!

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

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☐ Deluxe 6-Element	$9.95	☐ 12-El $16.95
6 METER BEAMS		
☐ Std. 3-El Gamma match	12.95	☐ T match 14.95
☐ Deluxe 3-El Gamma match	21.95	☐ T match 24.95
☐ Std. 4-El Gamma match	16.95	☐ T match 19.95
☐ Deluxe 4-El Gamma match	25.95	☐ T match 28.95
10 METER BEAMS		
☐ Std. 2-El Gamma match	11.95	☐ T match 14.95
☐ Deluxe 2-El Gamma match	18.95	☐ T match 21.95
☐ Std. 3-El Gamma match	16.95	☐ T match 18.95
☐ Deluxe 3-El Gamma match	22.95	☐ T match 28.95
☐ Std. 4-El Gamma match	21.95	☐ T match 24.95
☐ Deluxe 4-El Gamma match	27.95	☐ T match 30.95
15 METER BEAMS		
☐ Std. 2-El Gamma match	19.95	☐ T match 22.95
☐ Deluxe 2-El Gamma match	29.95	☐ T match 32.95
☐ Std. 3-El Gamma match	26.95	☐ T match 29.95
☐ Deluxe 3-El Gamma match	36.95	☐ T match 39.95
20 METER BEAMS		
☐ Std. 2-El Gamma match	21.95	☐ T match 24.95
☐ Deluxe 2-El Gamma match	31.95	☐ T match 34.95
☐ Std. 3-El Gamma match	34.95	☐ T match 37.95
☐ Deluxe 3-El Gamma match	46.95	☐ T match 49.95

(Note: Gamma-match beams use 52 or 72 ohm coax. T-match beams use 300 ohm line.)

NEW! RUGGEDIZED HI-GAIN 6, 10, 15 METER BEAMS

Each has a TWIN boom, extra beam mount castings, extra hardware and everything needed. Guaranteed high gain, simple installation and all-weather resistant. For 52, 72 or 300 ohm transmission line. Specify which transmission line you will use.

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☐ Beam #R10 (10 Meters, 4-El) 40.95
☐ Beam #R15 (15 Meters, 3-El) 49.95

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

techniques, on VHF channels, the much-sought-after data which scientists believe vitally affect the earth's state . . . hitherto unknown data that can be of great practical value to the whole of humanity. Some mysteries that may be solved by the satellite are: Why and how sunspots cause radio blackouts; where cosmic rays come from; what causes the northern lights; and why the earth's magnetic field varies.

Project Vanguard is surely a foot placed in the doorway to the stars, and brings man one step nearer to his age-old dream of someday reaching outer space.

Amateur Participation

The far-reaching scientific events expected to occur during 1957 will require the active participation of scientists, engineers and technicians throughout the world. They also present a stimulating challenge to Amateur radio. Here is a *golden opportunity* to contribute again, as we have so often in the past, to the advancement of knowledge in the field of radio communications. In meeting this challenge not only will we experience the once in the lifetime thrill of having participated in the outstanding scientific developments of the century, but we will further enhance the standing of Amateur radio throughout the entire world. An enhancement which may prove to be of tremendous value when the frequency bands allocated to the Amateur service come up for review at the next International Radio Conference, scheduled to be held late in 1959. The radio spectrum is terribly over-crowded, and spectrum space is at a premium. Other radio services may be eyeing the present amateur bands as possible areas for expansion for themselves. There is no better way to justify retention of our present band allocations than by further proving Amateur radio's value in the field of radio communications. With this in mind, CQ strongly supports and urges amateur participation in the scientific developments of 1957. Let's make this not only one of the greatest years in scientific history but also *the* greatest year in Amateur radio. Already projects are developing that will require the active participation of radio amateurs. For example: the ARRL-IGY Propagation Research Project for collecting VHF data on a world-wide basis; the Cornell University Auroral Research Project requiring hundreds of "northern-light watchers" for reporting the location and characteristics of visible auroral displays; numerous propagation research projects of the Central Radio Propagation Laboratory of the National Bureau of Standards developed for collecting data on high-frequency reception during the period of extraordinarily intense solar activity; the project of worldwide assistance in tracking and receiving transmissions from the earth satellite on a frequency of 108 mc as it travels in outer space; the role amateur radio can play in maintaining contact with scientific outposts at the North and South Poles and other remote locations throughout the world; and there will be many others as the weeks go by.

You'll hear lots more about the sunspot cycle, the IGY, the earth satellite and the very important part Amateur radio can, and must, play in these "once in a lifetime" events through the pages of CQ during the coming year . . . a year which may turn out to be the greatest in the history of Amateur radio and one of tremendous importance to us all. ■

1956 in Review

Although final observations have not yet been completed at deadline time for this column, it appears rather certain that 1956 witnessed the most rapid increase in solar activity ever recorded. The year began moderately with a 12-month smoothed sunspot number of 88. By December, it is estimated, activity soared to a record high in excess of 159 and possibly as high as 171. Because of the relationship that exists between the smoothed sunspot number, ultra-violet radiation and the subsequent ionization of the earth's upper atmosphere; shortwave radio propagation conditions improved considerably on the 10, 15 and 20-meter bands during 1956. In addition, the 6-meter band, useless for long-distance communication during the past six years or so, opened to many areas of the world during the late months of the year. During November and December record high maximum usable frequencies (MUF's), approaching 60 mc, were observed on paths from the United States to South America and West Europe. On the other hand, increased ionospheric absorption also associated with the rapid rise in solar activity caused a noticeable worsening of propagation conditions on the 80 and 160-meter bands. Overall conditions on 40-meters remained relatively unchanged during 1956, with improved reflection conditions more or less balanced out by greater absorption.

Outlook, 1957

Early in 1957, the present sunspot cycle is expected to reach its climax—a climax more intense than ever recorded previously. The Swiss Federal Solar Observatory, Zurich, predicts a peak smoothed sunspot number exceeding 174 to occur during February or March, and solar activity throughout the entire year is expected to remain at an unprecedented high

level. The following chart shows the provisional 12-month smoothed sunspot numbers recorded between January and April, 1956 and those forecast for the remainder of 1956 and 1957.

Month	SSN	Month	SSN
Jan. 1956	88	Jan. 1957	172
Feb.	97	Feb.	174
March	109	March	176
April	119	April	175
May	127	May	173
June	136	June	171
July	142	July	169
Aug.	147	Aug.	166
Sept.	154	Sept.	163
Oct.	159	Oct.	161
Nov.	166	Nov.	159
Dec.	171	Dec.	156

Previous record high sunspot numbers of 159 were recorded during June, 1778 and 158 during June, 1947. Unless nature plays a last minute switch on us, solar activity *during the entire new year* (except possibly December) will exceed the previous high established during only two months over the past 207 years! Shortwave radio propagation conditions on the 6, 10, 15 and 20-meter bands are expected to continue to improve during 1957 and may be better than they have ever been previously.

The sunspot cycle and its influence on shortwave radio propagation has been discussed at considerable length in "The Sun-Spot Story—Cycle 19", Part 1 of which appeared in the March, 1956 issue of *CQ*. Part 2 of this feature article appeared in the June, 1956 *CQ* and included a long-range forecast for each of the amateur bands. Part 3 is now in preparation and is scheduled to appear in the March, 1957 *CQ*. Part 3 will review the trend of Cycle 19 during the year that has elapsed and will include an up to date, band by band forecast of what we can expect in the way of shortwave propagation conditions during the next two years or so. Don't miss it.

Propagation Conditions—January

The following is an overall picture of band conditions forecast for January, 1957, with a brief discussion of the qualitative changes in each amateur high frequency band from month to month. For specific times of band openings for a particular DX or short-skip circuit, refer to the *CQ Propagation Charts* on the opposite page.

6 Meters:

MUF's are still increasing and six-meter openings to many areas of the world are expected to be more numerous than during November and December.

10 Meters:

Excellent world-wide openings can be expected almost daily from shortly after dawn through the late afternoon and early evening hours. Signals coming from the east and south will peak about noon time and those from the west and south during the late afternoon and early evening hours. Short-skip openings, between 750 and 2400 miles, are expected to occur daily from before noon until early evening.

15 Meters:

Fifteen-meters is expected to open shortly after dawn and remain open through the early evening hours. On most days conditions are expected to be excellent for world-wide communications with signals exceptionally strong during peak periods. The 15-meter band peaks about an hour or so later than does 10-meters. Short-skip propagation, between 600 and 2400 miles, should be possible on most days from a few hours after sunrise until after sunset. On days when the MUF is *exceptionally high*, the minimum skip may shorten to less than 450 miles.

20 Meters:

Seasonally lower ionospheric absorption and noise levels are expected to result in considerably *stronger* signals on 20-meters during the month of January. The band is forecast to open shortly after sunrise and is expected to remain open through the evening hours. On better than average days, 20-meters may remain open around the clock on some circuits. Exceptionally good DX conditions peak during the late afternoon and early evening hours on most circuits. Short-skip openings are also forecast from shortly after dawn until about mid-night. Minimum skip will be less than 100 miles at noontime, increasing later in the day. Since propagation conditions will be such that 20-meter signals will be reflected from distances ranging from 100 miles to several thousands of miles, QRM on this band is expected to be of a considerable magnitude!

40 Meters:

Propagation conditions on 40-meters are expected to be about the same as last month. Fairly good DX conditions are forecast to many areas of the world from shortly before sundown, through the hours of darkness, until shortly after dawn. Static levels are expected to be relatively low, and signal levels rather strong on some circuits.

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ALL TIMES IN EST

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

ALL TIMES IN CST

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

ALL TIMES IN PST

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

CQ PROPAGATION CHART

(SHORT SKIP)

BAND (METERS)	DISTANCE (MILES) 50-250	250-750	750-1300	1300-2400
10	NIL	10A-4P (1)	9A-11A (2)	10A-1P (1)**
			11A-3P (4)	7A-9A (2)
			3P-6P (3)	9A-5P (4)
				5P-7P (3)
15	NIL	9A-3P (2)	7A-10A (3)	6A-9A (3)
		3P-5P (1)	10A-5P (5)	9A-3P (4)
			5P-7P (2)	3P-6P (5)
				6P-8P (4)
				8P-10P (1)
20	8A-10A (2)	7A-10A (2)	5A-7A (2)	1A-7A (3)
	10A-3P (3)	10A-3P (4)	7A-3P (4)	7A-9A (4)
	3P-5P (2)	3P-8P (3)	3P-7P (5)	9A-6P (3)
			7P-9P (4)	6P-11P (5)
			9P-2A (1)	11P-1A (4)
40	6A-8A (3)	7A-10A (5)	3A-9A (4)	2P-6P (1)
	8A-6P (5)	10A-4P (4)	9A-2P (3)	4P-7P (3)
	6P-8P (4)	4P-8P (5)	2P-4P (4)	7P-5A (4)
	8P-10P (3)	8P-11P (4)	4P-3A (5)	5A-9A (3)
	10P-2A (2)	11P-7A (3)		
80	11A-4P (3)	8A-11A (3)	3P-5P (3)	4P-7P (2)
	4P-11P (5)	11A-4P (1)	5P-6A (5)	7P-5A (4)
	11P-11A (4)	4P-6P (2)	6A-9A (3)	5A-9A (2)
		6P-8A (5)		
160	4P-6P (3)	4P-6P (2)	4P-6P (2)	8P-6A (2)
	6P-8A (5)	6P-6A (5)	6P-4A (2)	
	8A-10A (3)	6A-8A (2)	4A-7A (2)	

SYMBOLS FOR NUMBER OF DAYS CIRCUIT FORECAST TO OPEN:

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

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

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

The CQ DX Propagation Charts are based upon a CW radiated power of 150 watts at radiation angles less than thirty degrees and are centered on the Eastern, Central and Western areas of the USA. They are valid through February 15, 1957. The CQ Short-Skip Propagation Chart is based upon a radiated CW power of 75 watts, using a dipole antenna a half-wave length above ground. They are valid through February 28, 1957. All forecasts are based upon ionospheric data published by the CRPL of the National Bureau of Standards, Boulder, Colorado.

Short-skip propagation should be possible around the clock, with the minimum skip distance as short as a few miles during the noon period, increasing as the hours of darkness approach.

80 Meters:

Seasonally optimum propagation conditions for 80-meters continues through January. The influence of intense ionospheric absorption associated with the peak in the sunspot cycle will limit DX openings from a few hours after sunset until dawn. The band is expected to open on only a very small percentage of the nights during the month, and signals will be relative-

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W1GWD—O. L. Dewey, Mgr., Gov't. Service Dept.
W1EEE—E. K. Doherr, Asst. Mgr., Gov't. Service Dept.
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ly weak. During the daylight hours short-skip openings up to 250 miles should be possible, with the skip increasing during the late afternoon, evening and early morning hours.

160 Meters:

Intense ionospheric absorption is expected to limit daytime propagation to a groundwave distance of less than 50 miles. As darkness approaches, ionospheric absorption will decrease and skywave propagation will be possible for distances as great as 1500 miles or more. In order to further determine the sunspot cycle influence on 160-meter propagation, I would like to receive reports of band openings in excess of 1000 miles. The report should indicate time of band opening, data, power used at both ends, signal report, receiving and transmitting antennas, etc.

Sunspot Cycle

The Zurich monthly relative sunspot number for October, 1957 was 161. This results in a 12-month smoothed sunspot number of 119 centered on April, 1956.

This month's forecasts are based upon a predicted smoothed sunspot number in excess of 165 centered on January, 1957.

Self-Forecasting

We ran out of space last month and *Figures 4 and 5* referred to in the December column were inadvertently omitted. So that you will have the forecast graphs and the explanation of their use together in one issue of *CQ*, following is a repeat of the entire item as it should have appeared in last month's column . . . *with the graphs*.

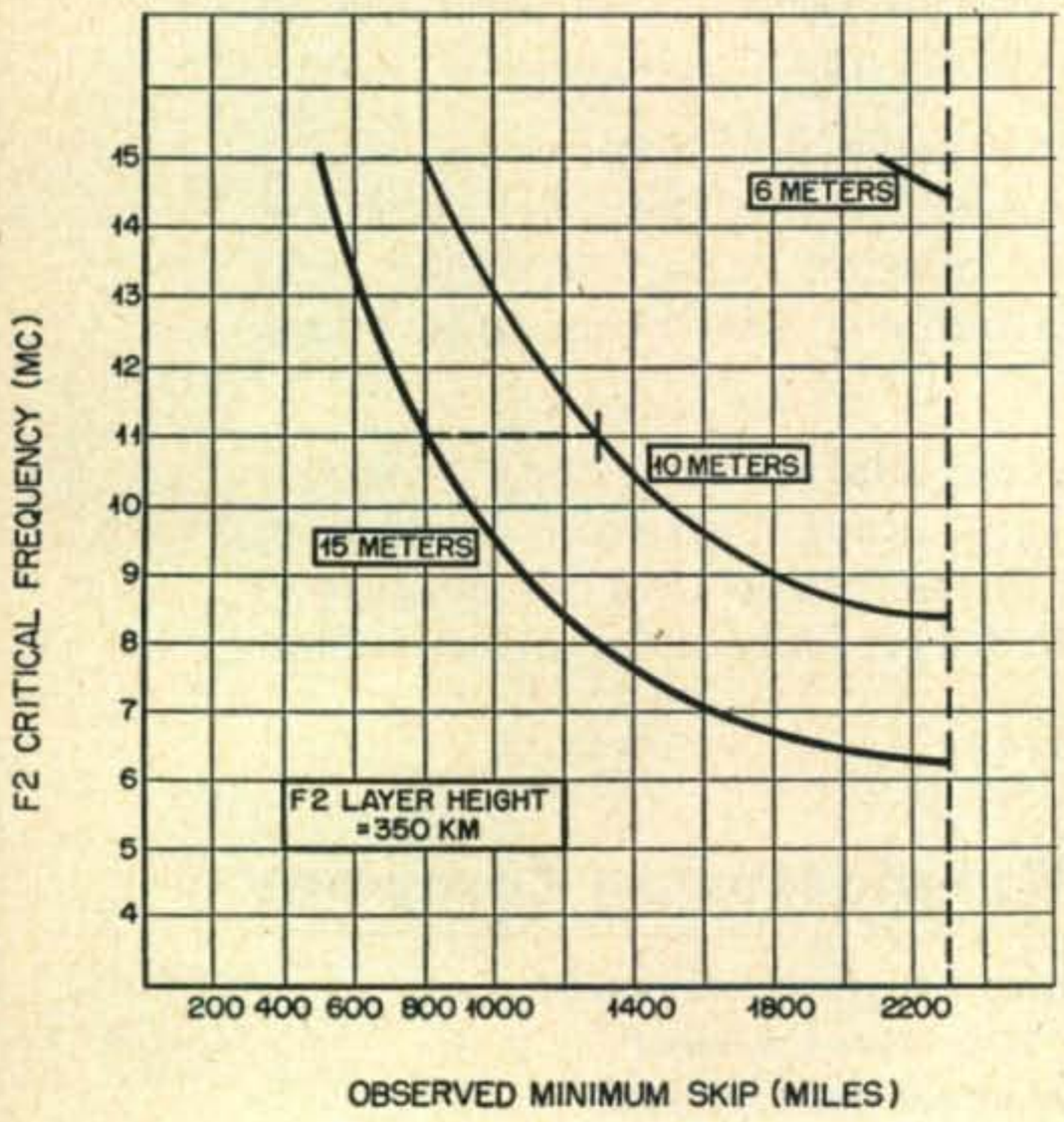


Fig. 4

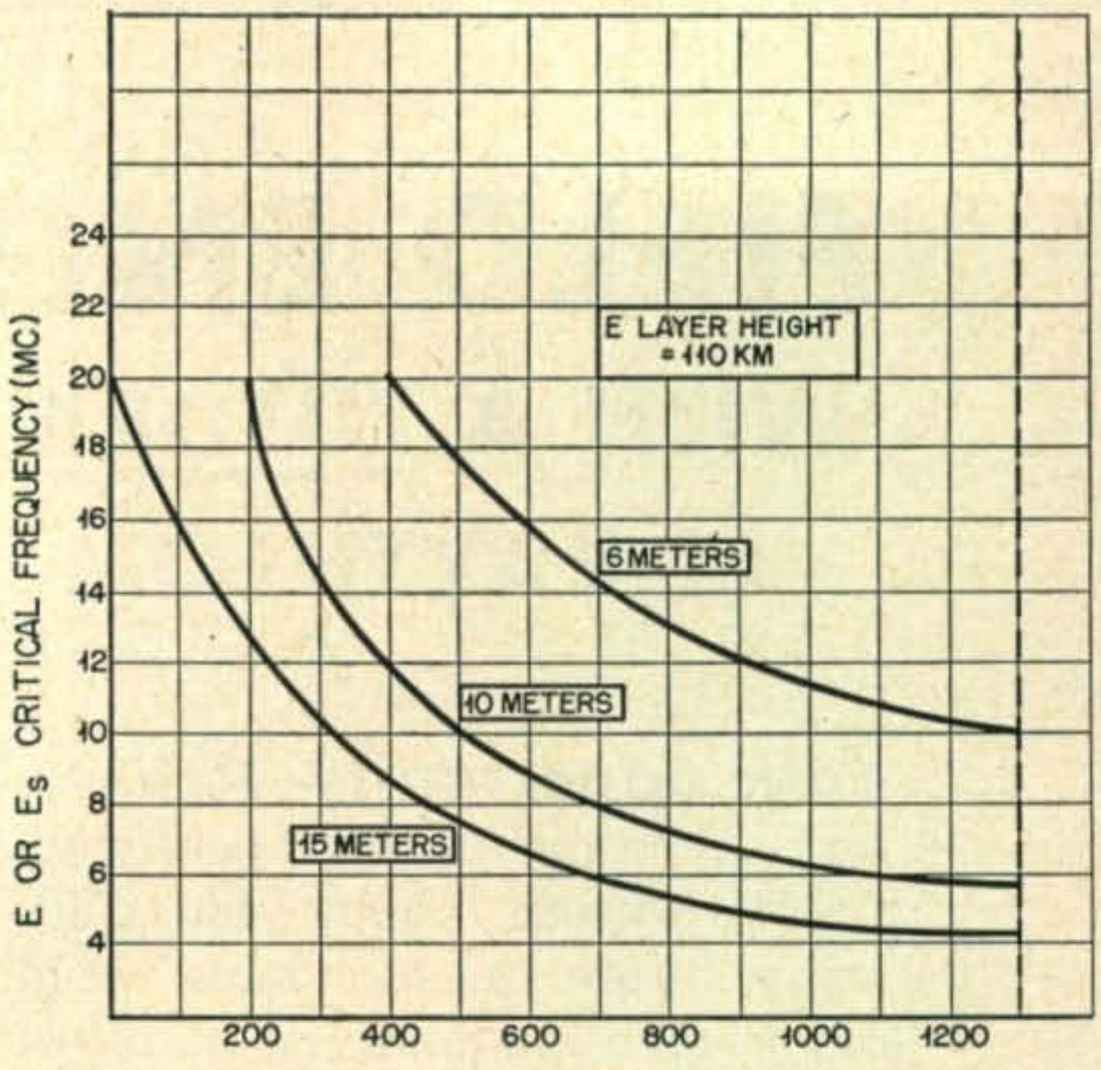


Fig. 5

The geometry of skywave propagation by reflection from the ionosphere is such that a definite relationship exists between *minimum* skip distance observed on a particular frequency and the *maximum usable frequency*, or MUF, in the direction of the skip. By observing the *minimum* skip on a particular frequency, the MUF in a certain direction as well as the minimum skip distances at *higher frequencies* can be determined with fairly good accuracy.

A complete discussion of the relationship between skip distance, critical frequencies measured at the center of the circuit, MUF factors, radiation angles, etc., all of which enter into the picture, would be rather lengthly and is now being prepared for publication as a special feature in *CQ* later in the year. *Figs. 4 and 5* are from the article now in preparation and can be used for forecasting MUF and skip-distances on the 6, 10 and 15-meter bands. This method of forecasting band conditions on the spot may be useful in determining 10 and 6-meter openings during the next few months of peak solar activity. As an example of the use of these graphs suppose that as we tune across the 15-meter band we notice that the *nearest* skip stations are coming from the southwest at a distance of approximately 800 miles. It's the distance to the *nearest* skip station that's important in this case, not the furthest station heard. During the daylight hours of the winter months it's more than probable that openings on 15, 10 and 6-meters will be due to F-2 reflection rather than E or sporadic-E.

After determining the minimum F-2 layer skip on 15-meters we note from *Fig. 4* that the point of intersection between a minimum

skip distance of 800 miles and the 15-meter curve corresponds to a *critical frequency* of 11 Mc. The *critical frequency* is a measure of the degree of ionization of the reflecting layer at the point of reflection. We note further from *Fig. 4* that the critical frequency of 11 Mc. intersects the 10-meter curve at a minimum skip distance of 1300 miles, but does not intersect the 6-meter curve at all. This means that ionization is strong enough to reflect the 10-meter signal for distances *greater* than 1300 miles towards the southwest, but *not* strong enough to support 6-meter propagation. Whenever sporadic-E appears to be prevalent, *Fig. 5* can be checked in a similar manner.

Both *Figs. 4 and 5* can also be used in a reverse sense, for example, if we want to know what the minimum skip distance should be on 15 and 10-meters to indicate that the ionosphere *is* strong enough to support 6-meter propagation. From *Fig. 4* we find that a critical frequency of 14.5 Mc. is necessary before F-2 reflection of 6-meter signals can take place. A critical frequency of 14.5 Mc. corresponds to a minimum skip distance of about 800 miles on 10-meters and 500 miles on 15-meters. When minimum skip distances of this order are observed on the 15 and 10-meter bands, the chances are very good that the 6-meter band will open in the same direction, with the skip beyond 2100 miles.

Post Mortem

In response to several dozen requests from readers of this column, next month's column will be devoted to a discussion of the unusual propagation conditions that developed during the CQ DX Contest this past October.

73, George, W3ASK

Conelrad [*from page 19*]

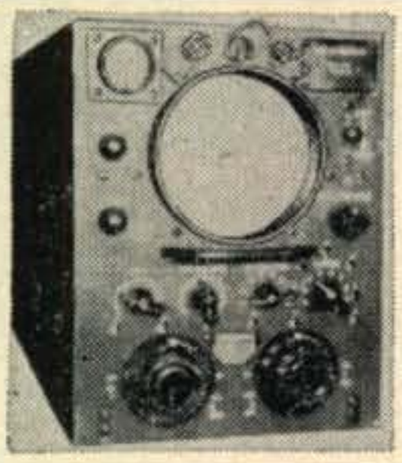
you tune the dial to a powerful local BC station, and when you tune off the station the negative volt reading drops way down, that's the AVC line. You may get a better reading on the other side of any resistor connected to this terminal. You may use a 20,000 ohm per volt voltmeter, but the negative bias reading may be only 3 volts or less. Sounds complicated, but it is not. If the radio is fairly old and the second detector uses a tube with diodes, it most likely has AVC.

As you can see in the photos, I used an old Truetone AC-DC radio having a half-wave rectifier tube. The maximum plate voltage available was 125 volts d.c. and the tap on the adjustable resistor was set at about 95 volts. This tap is adjusted by turning on the radio, having all leads between the radio and Conelrad unit connected (except to the AVC connection) and

[*Continued on page 108*]

ASB-5 RECEIVER for 420 Mc BAND!

As featured in "CQ" for October 1956. Easily converted, makes a marvelous receiver for 420 band, with RF Amplifier! Supplied complete with all tubes, OUR LOW PRICE..... **$14.95**



LORAN APN/4 OSCILLOSCOPE

Easily converted for use on radio-TV Service Bench!

BRAND NEW
Completely Assembled

Supplied complete with 5" Scope type 5CP1 and RCA 100 Kc. Crystal Unit..... **$14.95**

DYNAMIC HANDMIKE with "Press-to-talk" Switch, cord and plug—**BRAND NEW**.....only **$2.95**

HI-FI DYNAMIC HEADSET WITH RUBBER CUSHIONS
Freq. Range: 40-14,000 CPS. No distortion. BRAND NEW..... **$5.95**

DYNAMIC Headphone with Dynamic Mike, BRAND NEW, complete..... $3.95

MICROPHONES

Model		Excellent Used	BRAND NEW
T-17	Carbon Hand Mike	5.45	$7.95

CD-307A Cords, with PL55 plug and JK26 Jack.....99

DYNAMIC HEADPHONES, 600-ohm impedance, with large earphone cushions, cord and phone plug. BRAND NEW, special..... **$2.95**

BC-1206-C BEACON RECEIVER

195 to 420 Kc. made by Setchel-Carlson. Works on 24-28 volts DC. 135 Kc. IF. Complete with 5 tubes. Size 4" x 4" x 6". Wt. 4 lbs. BRAND NEW **$8.88**

Brand New, less tubes.....$5.95
USED, with tubes.....$5.95
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ARC-5/T-23 2-METER TRANSMITTER

Includes 2-832A, 2-1625 tubes. Excel. Used..... **$14.95**
BRAND NEW $21.50

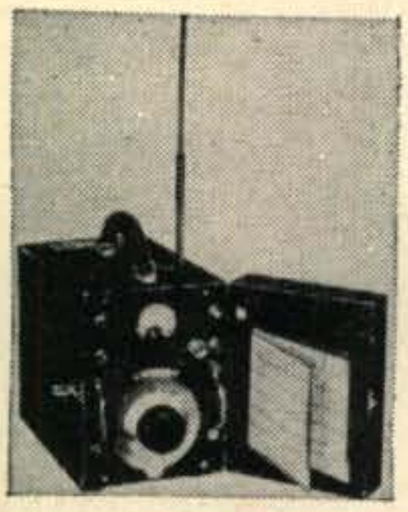
ARC-5 MARINE RECEIVER-TRANSMITTER

Navy Type Comm. Receiver 1.5 to 3 Mc BRAND NEW with 6 tubes..... **$16.95**
Navy Type Comm. Transmitter 2.1-3 Mc BRAND NEW with 4 tubes and Xtal..... **$12.45**

BRAND NEW CATHODE RAY TUBES

3CP1	$ .88	5BP4	$2.22
3FP7	.88	5CP1	2.45
5BP1	2.22	9LP7	1.88

RCA 826 Transmitting Tubes, New.....Each 44¢



BC-906 FREQ. METER— VALUE $200.00!

Made by PHILCO

Cavity type, 145 to 235 Mc. BRAND NEW in original factory packing, complete with antenna and operating manual. OUR LOW PRICE..... **$8.88**

VOLTAGE REGULATOR for gas-driven generators. Type B, 21-30 Volts input, Load 5 Amps. Made by Leland Electric Co. Reg. Volts: 18-25. Featured in CQ May 56. BRAND NEW..... **$2.95**

FL8-A RADIO FILTER $1.79

BRAND NEW WOBBULATOR, Special!.....$4.95

WRITE FOR FREE CATALOG!

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Ham Special! Famous BC-645 Transceiver

BRAND NEW

With MANUAL for Easy Conversion to CITIZENS' BAND!

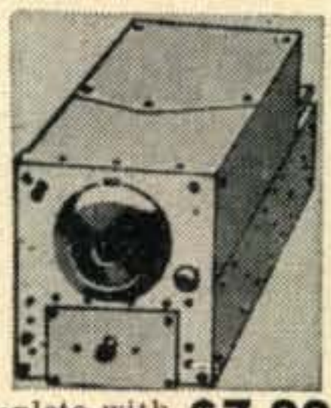
Makes wonderful mobile rig for 420-500 Mc. Easy to convert for phone or CW 2-way communication. This swell rig originally cost over $1000—yours for practically a song! You get it all, in original factory carton, BRAND NEW, complete with 17 tubes, less power supply. **Conversion Instructions Included.** Shpg. wt. 25 lbs..... **$29.50**

PE-101C DYNAMOTOR for BC-645, has 12-24V input (easy to convert for 6V Battery operation).....only **$7.95**
UHF ANTENNA ASSEMBLY, for BC-645..... $2.45
Complete set of 10 Plugs for BC-645 **$5.50**
CONTROL BOX for above..... $2.25
SHOCK MOUNT for above..... 1.25

CONVERSION BOOKLET. Instructions for most useful surplus rigs..... **$2.50**

R24-ARC/5 NAVY TYPE
(Similar to BC-946)

BROADCAST RECEIVER



520 to 1500 Kc. 6 tubes: 3—12SK7, 12SR7, 12A6, 12K8. For dynamotor operation. Easily converted to 110 or 32 Volt. 2—IF stages, 3-gang tuning cond. Complete with all tubes, in original sealed carton. BRAND NEW..... **$19.95**

BC-457 TRANSMITTER—4-5.3 Mc, complete with all tubes and crystal. BRAND NEW..... **$7.88**
BC-458 TRANSMITTER—5.3 to 7 Mc, complete with all tubes and crystal. BRAND NEW..... **$7.88**
BC-459 TRANSMITTER—7-9.1 Mc, complete with all tubes and crystal. BRAND NEW..... **$11.95**
BC-696 TRANSMITTER—3 to 4 Mc. BRAND NEW, complete with all tubes & crystal..... **$8.88**

SCR-274 COMMAND EQUIPMENT

ALL COMPLETE WITH TUBES

Type	Description	Used	Excellent Used	Brand NEW
BC-453	Receiver 190-550 KC	$9.95	$11.95	$14.95
BC-454	Receiver 3-6 Mc	7.19	8.29	11.95
BC-455	Receiver 6-9 Mc	5.25	7.95	9.95
BC-456	Modulator	2.24	2.75	4.24
BC-450	3 Receiver Control Box		1.49	1.95
BC-451	Transmitter Control Box		1.25	1.49
BC-696	Xmtr 3-4 Mc (like new)		6.95	8.88

110-VOLT AC POWER SUPPLY KIT

FOR ALL 274-N and ARC-5 RECEIVERS

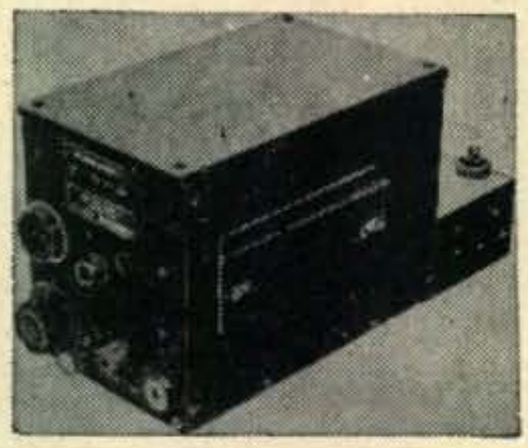
Can be assembled quickly and easily, on pre-drilled chassis. Plugs into the rear of any model 274-N receiver and delivers 24 volts as well as "B" voltage. No wiring changes needed. Complete kit of parts with metal case, instructions..... **$7.95**

SPLINED TUNING KNOB for 274-N RECEIVERS. Fits BC-453 BC-454 and others. Only..... **49c**

AN/ARR-2 RECEIVER

BRAND NEW—A Terrific Value! Tuning Range 234 to 258 MC. Tubes: 7-9001, 3-6AK5, 1-12A6. Only a few at this low price! Complete..... **$8.88**

With 28V 1.6A Dynamotor, complete.....$12.98
110 VOLT AC POWER SUPPLY KIT for above $7.95



SCR-522 FINEST 2-METER RIG!

Terrific buy! VHF Transmitter-Receiver, complete with all components. 100-156 Mc. 4 channels. Xtal-controlled. Amplitude modulated voice. They're going fast! Excellent condition.
SCR-522 Transmitter-Receiver, complete with all 18 tubes. COMBINATION.....Special $33.33
Receiver Only, with all tubes.....$19.50
Transmitter Only, with all tubes.....$22.25

2 VOLT BATTERY "PACKAGE"

1—2V. 20 Amp. Hr. Willard Storage Battery..... **$2.45**
1—2V. 7 prong Synchronous Plug-in Vibrator..... **$1.49**
1—Quart Bottle Electrolyte (for 2 cells)..... **$1.45**
ALL BRAND NEW! Combination Price..... **$4.99**

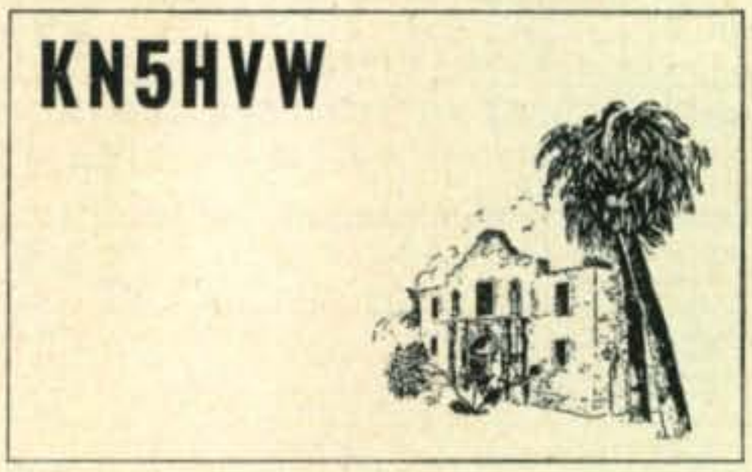
WILLARD 6-VOLT MIDGET STORAGE BATTERY

3 Amp. Hour. **BRAND NEW.** 3⅝" x 1-13/16" x 2⅜" Uses Standard Electrolyte.....Only **$2.22**

QSL Contest

This month was mighty rough on the unbiased QSL judging committee for there were some really excellent losers. Boy, did we have losers this month! The winner turned out to be W2AAA, done in a bluish black shade. As usual, the winner gets two more years of CQ, whether he likes it or not. The runners up receive our lavish praise: K6TID, done in grey and red, is a standout for its clean design and artistry; VE3EU's card was done with an aluminum foil surface with contrasting red, black and yellow printing; W6PH was done on yellow stock with brown printing, a low cost and effective card; KN5HVW is very clean and simple; G3LB/M and K2MPD are photographically done; K2DDK is a clever novelty.

Just be glad that so many good QSL's are now out of the way. Who knows, maybe your loser will be outstanding next month. Better flip it in to us for some high class judging. ■



WINNER

W6TNS Communicator Notes

[*from page 37*]

cost of this jug is about $17.50 although they are available for 5 to 10 dollars on the surplus market. Probably the next tube in line is the 6J4 at a cost of 6 dollars. In the 2 and 3 dollar class you will find the 6AM4 and the 6AJ4 and they are capable of improving the performance of the Communicator measurably.

To avoid complicated switching circuits, it is recommended that the connectors on the Communicator be changed to BNC type and that the r-f amplifier be mounted on the rear apron so that the input and output cables will reach. In effect, the 6BQ7 stage is replaced with the one shown in *fig 13*. If a WE416B is used, it will be necessary to add provision for a blower that starts as soon as the 416B's filaments are lit.

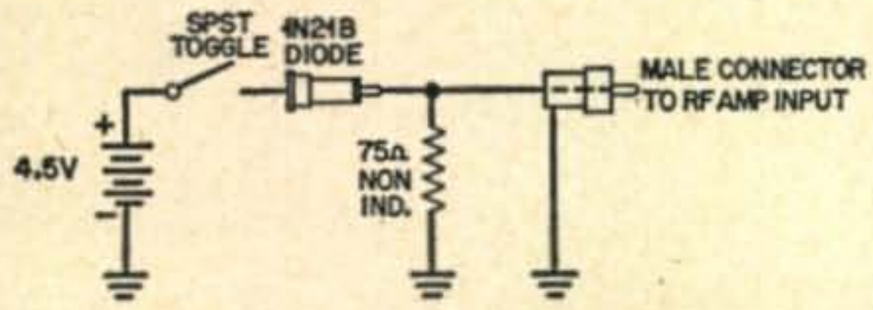


Fig. 14. A simple noise generator.

Adjustment of the input capacitors should be made with the aid of a noise generator. A simple diode noise generator for this purpose is shown in *fig 14*. The idea is to produce the greatest increase in the noise level when the generator is switched on. As the capacitors are adjusted, you will find a point where the noise level will be low with the generator off and high with it on. The point at which the greatest difference occurs is the correct setting. The output circuit will have a minor effect on the noise figure and may be peaked up on the most popular section of the band. For greatest accuracy, use an AC voltmeter connected to the earphone jack for indicating the increase in receiver noise. Although silver plated coils are not absolutely necessary they will produce an improvement in performance.

The B plus and filament connections are simply extensions to the leads that supplied B plus and filament voltage to the 6BQ7 r-f amplifier tube. No particular chassis layout data is given because of the variety of tubes that can be used, each requiring a different socket position. The chassis layout should not present any particular problems except, possibly, shielding. To minimize the possibility of oscillation, it is necessary to have a shield plate between the input and output circuits (usually across the center of the tube.) In other words, the input coil and wires should not be able to "see" the output coils and wires. If this precaution is observed, there should be no tendency toward oscillation.

Meterless "S" Meter

Those fortunate enough to own the Communicator II can have an "S" meter in just three minutes. That is how long it takes to paste a round circle of paper behind the squelch knob. The idea is this: as you rotate the squelch knob counterclockwise, while listening to a station, the speaker will go dead. The weaker the station, the less you have to turn it before the squelching action. On a stronger station, you have to turn it further. Because of this, the position of the knob is a direct indication of the strength of the station. Therefore, a paper scale pasted behind the knob, and calibrated in "S" units will show you relative signal strength. The accuracy of the readings is not as important a factor as the ability to give consistent readings. Two stations with the same signal strength should receive the same signal report, naturally, but sometimes (especially if the modulation is higher on one of them) one gets a better signal report. It is not always possible to interpret the eye the same each time, also.

To calibrate the scale, turn the squelch knob until the audio silences on tube noise alone and call this S-1. Then, while receiving stations of various signal strengths, calibrate the rest of the dial by interpreting how strong you think they are. Admittedly, this is a rough indication, but it is better than nothing. ■

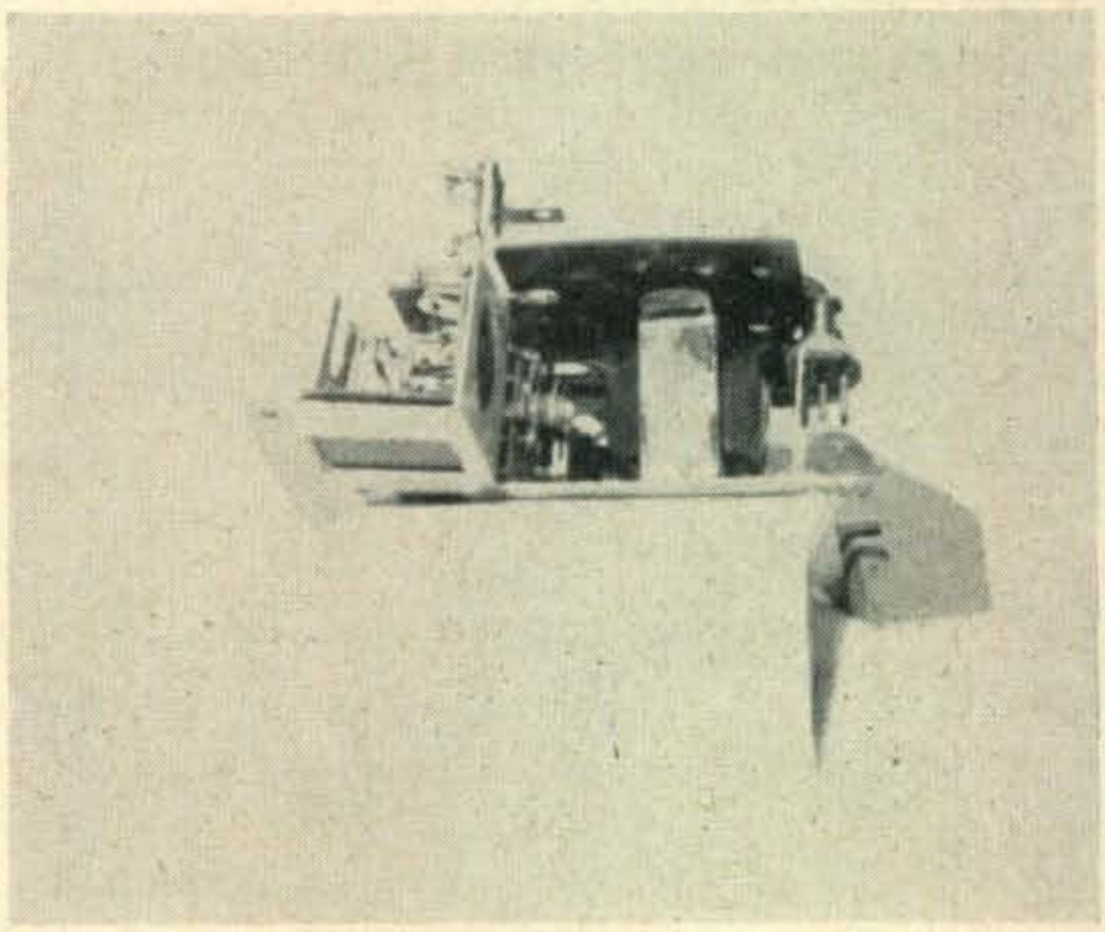
Communicator Troubleshooting Voltage Chart

TUBE	TYPE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CL6	1.3	–30	185	0	6.3ac	255	0	185	–30
V 2	12AV7	255	–100	2.7	6.3ac	6.3ac	255	–42	2.7	0
V 3	2E26	0	6.3ac	165	0	–45	0	0	0	cap-235
V 4	12AX7	100	0	1.3	0	0	185	0	.9	6.3ac
V 5	6V6	0	6.3ac	235	255	0	0	0	12	
V 6	9006	Varies with transmitter power and position on eye switch								
V 7	6E5	0	70	–7	255	0	6.3ac			
V 8	6BQ7	190	80	80	0	6.3ac	80	0	1.0	0
V 9	12AT7	143	–4.2	0	6.3ac	6.3ac	52	0	1.5	0
V10	6BH6	–1.0	.6	0	6.3ac	165	165	.6		
V11	6BH6	–1.0	17	6.3ac	0	150	150	.7		
V12	6BA6	–1.2	.8	6.3ac	0	120	120	18		
V13	6T8	–1.3	–.6	–.7	6.3ac	0	0	0	–.1	65
V14	9006	Varies with setting of squelch control								

All voltages taken with a VTVM such as a *Heath V-7*
Voltages shown are typical and may vary from model to model
V1 through V6 taken on 'Transmit'
V7 through V14 taken on 'Receive'

Conelrad [*from page 104*]

the tube plugged in. Slowly slide the 9000 ohm resistor adjustable tap toward the high voltage end and tighten it down when the dial light goes on. Now connect the AVC lead to the 1 meg. resistor. Tune the dial off of the broadcast station and click goes the relay and on goes the dial light. Then tune back onto the BC carrier and off goes the light. When working satisfactorily couple the unit permanently to the BC receiver and run leads in parallel with the dial light to a small flasher light, buzzer, Xmas tree flasher, etc. If you should ever get the signal to leave the air, just tune the BC receiver to 640 kc or 1240 kc and listen to instructions.



This Conelrad warning works beautifully for me and I believe it will be well worth the small expense, time and effort necessary to build it. ■

---

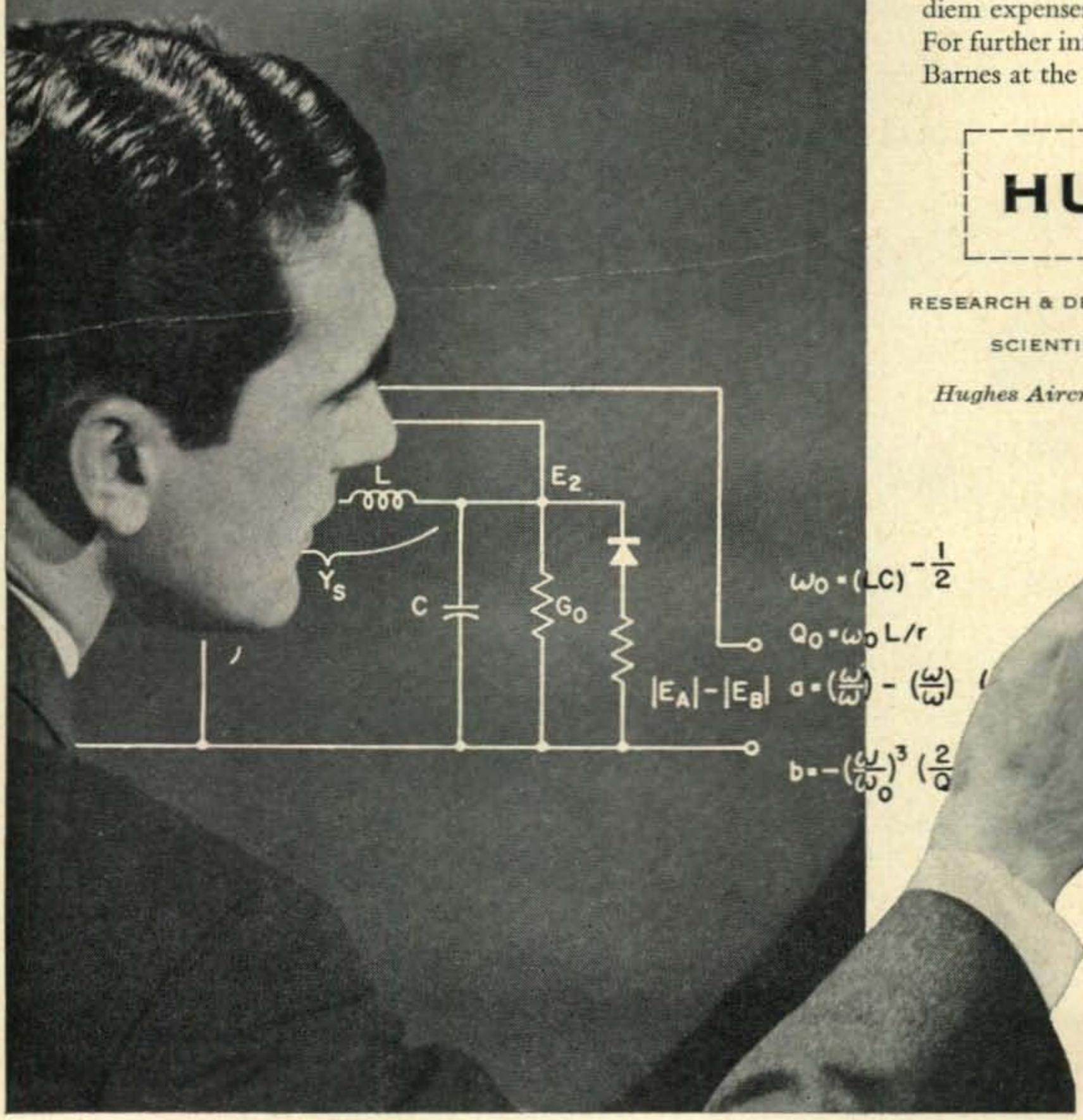
de W2NSD [*from page 12*]

case of Canada this treaty was expanded to include radio equipment in cars, trucks, and busses since quite a few companies need to keep in communication with their units over the borders. Some friend of ours added "and amateur" to the treaty in a sentence and we were in. Now the problem is to get those two words added to a few hundred more treaties . . . or at least to a few critical ones like England, France, Switzerland, etc.

These treaties, as you probably know, come out of the State Department. As I recall, we have a friend in a key position there who might be able to put some pressure on the chap who can get those two words where we need them. I've tried writing "the chap," but have been curtly answered by him advising me to get in touch with Congress and get *them* to change the law. Ho hum.

Perhaps this all seems a bit remote to get

HOW MANY CAN YOU ANSWER "YES?"



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worked up about, but when you take a good look at the upcoming international radio conclave where we may well find the U.S. voted right out of the ham bands it would seem like only good sense to do everything we can to promote international good will via ham radio. Right now, as far as I know, only the U.S. and Australia are really in favor of ham radio continuing to keep all those frequencies which would be of such immense value for commercial and propaganda broadcasting. That gives us two votes against how many?

Third Part Traffic

Most everyone has heard people talking about third party traffic, but quite a few are rather hazy on just what the term means. Let me clarify it for you. When you speak to another fellow on the air there are just two of you involved, parties one and two. If you ask the other fellow to pass along a message to a third party that is third party traffic.

Only a few countries now permit such goings on. The usual reason given for not permitting this stuff is that the local (state owned) telephone would possibly be missing out on some sheckles. We have found in this country that the phone company actually comes out ahead in the long run for most of the DX phone patches have some sort of long distance charge. Few of the messages handled would have been made over the regular facilities, etc.

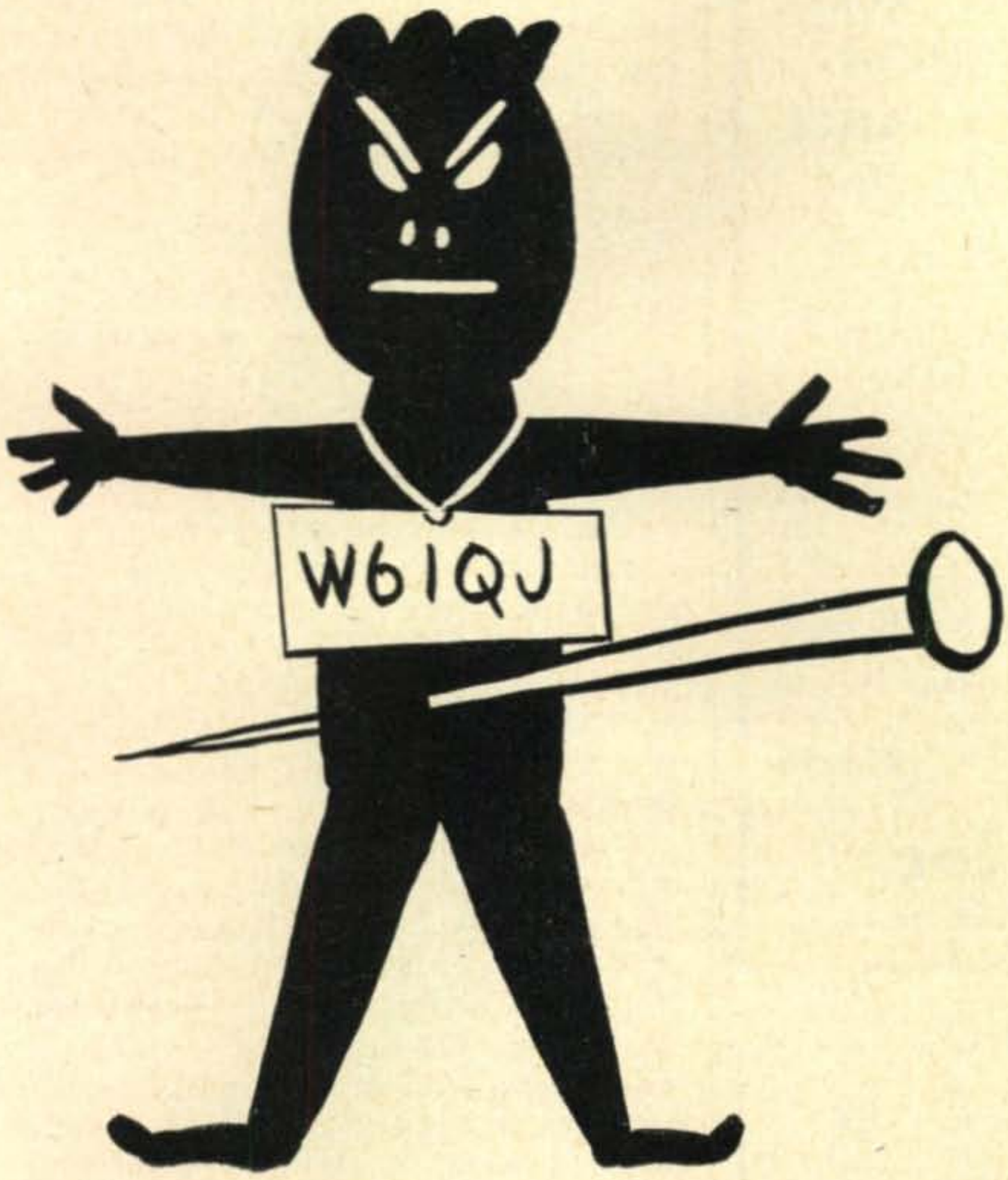
Many countries do not have third party traffic because no one has made the effort to get it OK'ed by their government. If there are any DX operators reading this who might be interested in getting their country to OK it they may get some help from the following. This is a step by step rundown on how Juan F. Anas F., HP1JF, President of the Liga Panamena de Radio Aficionados, L.P.R.A. made a special arrangement to permit amateurs to handle third party traffic between the Republic of Panama and the United States of America.

1st. A memorandum was sent to the Minister of Government explaining the benefits of third-party message traffic between the two countries.

2nd. The Minister of Government, after approving same, passed the memorandum with his recommendation to the Minister of Foreign Relations to take this matter thru Diplomatic Channels with the Ambassador of the United States in Panama.

3rd. The Ambassador of the United States in the Republic of Panama sent to the corresponding authorities in Washington, D. C., the note received from the Minister of Foreign Relations of Panama, by which the Government of Panama agreed to have third-party traffic with the United States.

4th. After receiving approval of the United



Say, all you non-subscribers, have you been noticing any strange pains lately? I'll bet you have been wondering what was happening. Here is the inside story.

CQ has gotten a splendid buy on a group of genuine voo-doo dolls from Haiti, complete with special pins. We are setting them up as fast as we can with the call letters of non-subscribers on them and fiendishly pushing pins through particularly painful spots every other day or so. I'll bet you thought that was lumbago hitting you. Heh, heh, heh. We will take the call letters off the dolls as the subscriptions come in, so why take a chance? Get that little old check book out and be generous. Keep our editor from having to eat at the Automat for lunch. Turn page for coupon.

States to have third-party traffic with the Republic of Panama, the Ambassador of the United States in Panama sent a note to the Minister of Foreign Relations informing him that the Government of the United States accepted the Proposal sent to him for third-party messages.

5th. The Minister of Foreign Relations acknowledged receipt of the note and informed the Ambassador of the date and hour that it would go into effect. With Panama, it became effective as of 00.01 E.S.T., September 1, 1956.

Wayne ■

Stolen, as usual, from

AUTOCALL

The bulletin of the
Washington, D. C. Mobile Radio Club

We are still getting in letters with solutions to the November Puzzler, the one about the steel tape. Here are a few of the answers:

K5AEV & K5BBM:	8.624171062″
K2RDP:	2″
W1TMO:	4.04″
W6OZC:	4.056″
W6KKO:	4.0″ plus

Richard Deal, W6KKO, adds the following as his effort to keep us all awake for a few hours: $e^{i\pi} = ?$ Mull that one over.

Now to get to the solutions to the December Puzzlers. Problem #1: W1—Red; W2—Al; W3—Bob; W4—Jim; W5—Jack. Problem #2 was a little trickier: 12 marbles, all look alike, but one is heavier or lighter than the rest. A balance scales is used to determine, in three weighings, if the marble is heavier or lighter, and which one it is. Answer: First weighing: weigh ABCD against EFGH with IJKL on the side. Second: weigh EJKL against AFGH with IBCD on the side. From these two weighings you will know which group of three is involved and whether it is heavier or lighter. Choose two marbles, weigh them, and there you are.

But let's get down to this month's head scratchers.

Problem #1:

A column of soldiers 10 miles long (pretty long) marched 30 miles. As the march started, a messenger at the rear of the column, walking faster than the column, proceeded to the captain at the front, delivered a message and returned to his place at the rear of the column just as the march was completed. (All speeds constant.) How far did the messenger travel?

Problem #2:

There are two candles, one is 1″ longer than the other. The longer was lit at 4:30, the other at 6:00. At 8:30 both were the same length. The longer went out at 10:30 and the shorter went out at 10:00. What was the length of the candles to start with? Careful of that hot wax, men. ■

PLAY IT SAFE - THE WALTER ASHE WAY!

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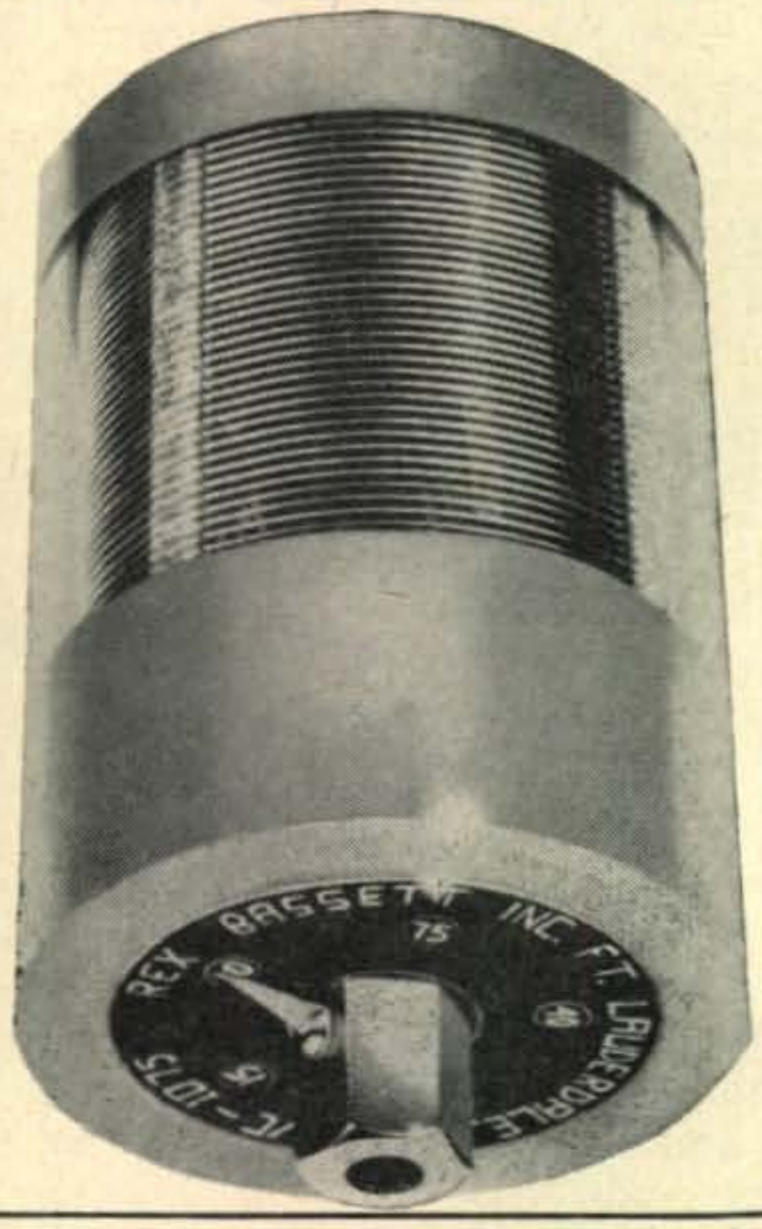

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BASSETT BUILDING **FORT LAUDERDALE, FLORIDA**

DX-35 ON 6

[*from page 51*]

Hold a *Centralab PA-40* switch wafer so that the side with the single contact on the center ring faces you. Turn the center contact so that it touches the bottommost contact to the right of the bolt hole. See *fig. 3*. Place this wafer between wafers *B* and *D* and slide onto the index assembly. Put another ½" spacer on each bolt and then slide wafer *D* on the index.

Put a washer and nut on each bolt and tighten up the assembly. Check to see that the switch rotates freely, then assemble the switch to the buffer stage shield and put a ½" spacer on each bolt.

Hold a *Centralab PA-31* switch wafer with the terminal clips away from you. Set the center contact so that it contacts the second clip from the top on the right of the bolt hole. See *fig. 4*. Cut off the next three clips below the contact the center ring touches. Assemble this wafer to the index and follow with a washer and nut on each thru bolt. Tighten up the completed switch and check to see that it rotates freely.

Install the new switch and shield assembly in the transmitter and wire up following the notes in *Fig. 1* through *Fig. 4*.

Take a piece of #16 bare wire and bend ¼" of one end over at a right angle. Poke this wire up through the chassis between the Drive control and the Bandswitch until it touches the final amplifier tank coil. Move the wire so that it contacts the tank coil on the bottom of the third turn from the tuning capacitor, and solder in place. Cut the other end of this bare wire and connect to terminal *A6* of the bandswitch. Connect terminals *A1* through *A5* to their original wires.

Connect a jumper between *A'7* and *A'9*, and connect the 68 $\mu\mu$fd mica capacitor to one of these terminals. Connect a bare wire from *A'8* to the solder lug under the cone insulator.

Connect a piece of #16 bare wire from the terminal strip near the buffer coils through *B3* to *C'2*.

Reconnect one end of the 22,000 ohm resistor to *D10*, and one end of the .005 μfd disc capacitor to *D3*.

Connect a bare wire from *C4* through *C'4* to *D3*.

Close wind six turns of #16 enameled wire on a 5/16" diameter form. Slide the coil off the form and cut the leads to ½" long. Strip the enamel off the ends and solder the coil between *C'12* and *D1*. (The Twenty meter and Fifteen meter coils may have to be separated slightly to make room for the new coil).

Reconnect the leads from the .001 μfd disc capacitor, the small r-f choke, and the red B-plus wire to *E12*.

Connect a bare jumper wire from *E1* to *E2*, and reconnect the lead from the Forty meter oscillator coil to *E2*.

Connect the lead between the Forty meter and the Twenty meter oscillator coils to *E3*.

Connect a piece of bare wire from one terminal of the Six meter oscillator coil to *E4*.

Connect a bare wire from the other side of the Six meter oscillator coil to the plate side of the Twenty meter oscillator coil.

Perform the changes listed under Steps 3 through 9 of "The Easy Way".

And now you own a Six-band *Heathkit DX-35*. Ain't you proud? The tune up procedure is the same as was listed for those who chose to tear up the Ten meter band.

Most any co-ax fed antenna system will draw power from this rig. It was used with a 3-element beam, a 2-element "Cat-Fish Special" (cut to six meters, of course), a twin-lead folded dipole via a balun, and three-legged ground plane (we didn't have room for the fourth radial on the roof of City Hall where we set up and ran for 36 hours during a CD test). During this test the owner happened to be on vacation and none of the many club members who worked this rig had any difficulty in tuning the thing, although many of them had never seen it before. ■

Parts List

1. The Easy Way
- (1) 68 ohm ± 20% 2 watt composition resistor
- (1) Merit #BC-549 r-f choke (2.5mh, 200 ma)
- (1) Small ceramic cone insulator (¾" long x ½" dia.)
- (1) 3-30 $\mu\mu$fd mica compression trimmer capacitor
- #16 bare wire

2. The Hard Way

All above plus:
- (1) Cambridge Thermionic Coil Form LS-5
- (1) Centralab 6" Switch Index PA-302
- (1) Centralab ceramic switch wafer PA-1
- (1) Centralab ceramic switch wafer PA-12
- (1) Centralab phenolic switch wafer PA-31
- (1) Centralab phenolic switch wafer PA-40
- #26 enameled wire
- #16 enameled wire

QST QST QST QST QST QST DE W6AEE W6AEE W6AEE PASADENA, CALIFORNIA. EARLY RETURNS FROM THE 1956 RTTY SS. NOT COMPLETE!!!

STATION CALL	SECTIONS	POINTS	SCORE
VE7KX	37	150	5550
W2RUI	32	136	4452
WOBP	30	138	4140
W2JAV	27	139	3753
W6MTJ	27	131	3537
W2TKO	26	127	3302
W6AEE	24	84	2016
WIBDI	23	67	1541
W9GRW	17	86	1462
WOFQW	20	72	1440
WOWRO	20	70	1400
W9ZBK	20	64	1280
W6WIS	18	68	1224
W8LEX	17	65	1105
K2USA	17	59	1003
WIAW	17	56	952
W6CG	17	44	918
WIWEW	19	48	912
W9BMV	16	56	896
W6CQI	17	50	850
W5JBW	15	46	690
W3KYR	13	40	520
W7HJC	13	28	364
W3CRO	9	24	216
K6OWQ (XYL)	9	20	180
W7CGA	7	22	154
W6CBF	8	18	144
W7CSC	5	14	70
ZLIWB—TWO WAY	5	14	70
ZLIWB—RECEIVING ONLY	13	17	221
VE3GL	3	6	18
K6PNW	2	6	12

FURTHER RESULTS WILL BE GIVEN AT A LATER DATE.

SSB [*from page 85*]

We are hearing of plenty activity on two and six meter SSB, and those now on with single sideband on the VHF bands are doing remarkable work. W9YYY, W2JJC and W3HYI are a few who have pioneered the way on two meters. We have received information that several JA-KA stations are putting good signals into the USA on six SSB. Danny, W2GG and your editor have recently installed HT-30 exciters with excellent results. During a recent storm in Iceland, Carl, TF3CJ reported that his beam elements were severely damaged, but his signals continued to hold up well over the S-9 mark. From John, G2MF who built ZD4BF's station which has done such a great job on the Gold Coast, we learn of a new SSB station, ZD4CF also a Doctor like Joe which will soon be active. G2MF is also building the new rig. VK3SK is now active on twenty and wonders why he didn't use SSB before. Nick, WØIIC wrote in to say that "after 27 years of hamming SSB has given him his most enjoyment." We know what you mean Nick.

Rex, W4QS is on with his new grounded grid 4-1000A and has an outstanding signal. W4HB, Stu had to make a quick trip to Michigan due to his father's illness. W5HHT, Irv is heard every evening talking to his many friends on all the popular bands. Tom, operating the Collins Mobile Trailer and signing WØREP will soon be back home after a long trek thru the Middle West. Our old friend Dick Bellew will soon be living in the New York area signing a W2 call . . . SSB of course. The severe pile up at the high end of twenty continues to amaze me. The other evening I listened to 11 different QSOs from 14290 to 14297 and an additional 34 QSOs carried on from 14270 to 14290 Kc. In addition to the actual contacts, many of which were round-tables involving from three to ten different stations, several other stations were logged around 14295 working DX stations who were outside the American band. A tribute to the conpatibility of SSB but definitely ridiculous considering all the additional frequencies below 14270.

W2JXH has a new beam on top of a building 250′ above Manhattan. W2DR has a new KW final and works the VK and ZS gang he visited this year. KA5ZS will soon be on SSB with a 20A exciter and a pair of 813's. W2GJX, Sy, has been off for a few months while building a new grounded grid linear. Rudy, HB9OJ has completed his hitch in the Swiss army and is back on with a new crystal filter rig and a cubical quad antenna on twenty. K2CIV and W2UE report considerable activity on forty SSB. There have been many new Canadian SSB stations appearing on twenty lately. Brig. General Frank Gregory, W3CO, (exF7CO) is on twenty frequently with his KWS-1 in Washington.

Don't forget the SSB World-Wide DX Contest to be held January 12 and 13 starting at 1800

YL [*from page 88*]

April 1932 was the date that Thelma Zimmerman entered Hamdom with the call W9JYO. Her OM, W9EQO, got his ticket in 1929 and when dots and dashes started haunting the house, Thelma's curiosity got the better of her and she started working for her ticket with help from the OM and other Hams in Louisville, Ky., where they lived. On receiving her license, Thelma was the first and only YL in Kentucky. She was ORS and NC on the Ky c-w net and made BPL often. She liked SS and DX as well as local ragchewing, and was active in the '37 Ky. flood work. When Ky. was removed from the 9th district the Zimmermans moved to Noblesville, Ind., to save their calls.

W9JYO, Thelma Zimmerman, has been active on the air since 1932.

W9JYO's first gear coinsisted of a Hartley oscillator 210, home-brewed regenerative receiver. Their present gear is an HT9 transmitter c.w. and phone, a homebuilt 813 rig and a 304TL rig which can run the limit. They are setting up for 2 meters and also SSB. Receivers are an SX100-S40 and BC224D, plus other gear and testing equipment. All equipment and their house can be powered in an emergency by a 5-kw generator. At present W9JYO is very active and spends from 5 to 8 hours daily at the rigs, mostly on 75 phone and 80 c.w. She checks in regularly on IFN and others as needed and keeps individual skeds for traffic handling. Most of her time, about 100 hours a month, is spent on MARS circuits, checking into about 10 nets for some of which she is NCS. Latest BPL certificate, Dec. '55. W9JYO also holds OPS, Old-Timers, RCC, and a Public Service Award for work in the '54 Illinois flood. Thelma's daughter is KN9BAO.

[*To be continued*]

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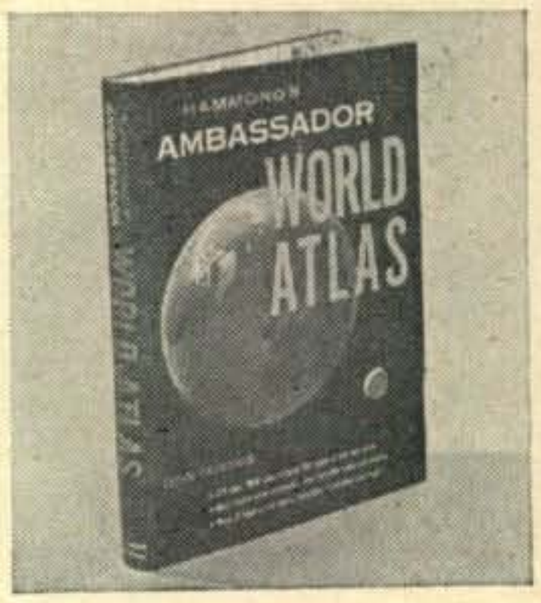

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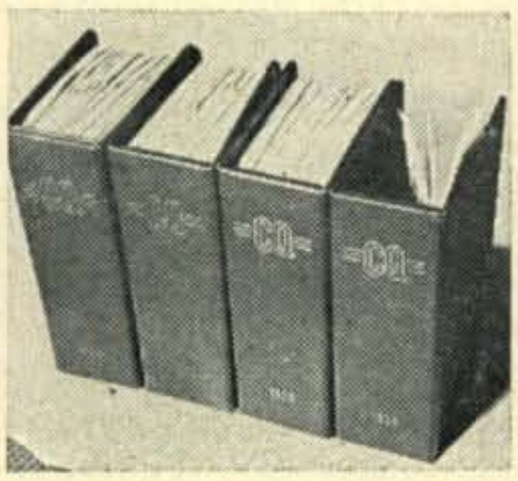

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RTTY [*from page 91*]

In the east, W3PYW tells me that he hears fellows on "short-shift," but thinks that most of the shortness is accidental! W3PLG, in Sharon Hill, Pennsylvania, has a machine and is getting set for RTTY. W2DGZ also has been bitten by the bug. W4EBH is now poking an excellent signal up here to New York City. W4JSS paid a short visit to your RTTY Editor. W2ZKV promoted radioteletype on a recent trip to Cuba, but reports that RTTY is not as yet authorized down there. Felix has FRA and FRE converters, plus a Model 28 (key-top!).

Heading towards the midwest, W8DOO has his Model 26 and should be on RTTY by now. W9WAX, in Champaign, Illinois, has been bitten via Signal Corps ROTC activity. W9GRW claims that, as of November 6, 1956, he is the only one with a "wholly ham-owned" working Model 28, although W6AEE has his almost rebuilt, and that he, Ray, is working on one for WØBP. Just worked W9TCJ, Williams Bay, Wisconsin, on 3620 kc. Bob says that he gets solid copy from W2JTP (200 watts) and that he is now using diversity reception. This we would all like to know more about.

Comments

Below is a list of just what RTTY information has appeared in *CQ* last year. Look over the list and see if what you want is there. If not drop me a line and I will see if I can get you the dope. If you are not looking for anything, drop me a line anyway. Letters, particularly with station photos, are always appreciated.

RTTY in CQ in 1956

Jan. p 50,	**P & P Part 1: Basic TTY and RTTY; W2JAV input filter; toroids.**
p 45,	**Very Narrow Shift TU—60 cycle, W2BFD.**
Feb. p 87,	**P & P Part 2: Machines in general, signal code; W9KLB audio-type converter schematic.**
Mar. p 52,	**P & P Part 2a: Model 12 Teletype machine; W1FGL Tuning Eye for W2PAT converter.**
Apr. p 76,	**P & P Part 2b: Model 26 Teletype machine; Narrow shift legalized.**
May. p 63,	**P & P Part 2c: Model 15 Teletype**
p 46,	**machine; WØHZR FSK 'scope tuning indicator.**
Jun. p 78,	**Commercial filters for AFSK con-**
p 40,	**verters; W5QHB converter, i-f type.**
Jul. p 90,	**How to tune in FSK, by W1FGL.**
Aug. p 72,	**P & P Part 2d: Tape equipment: Model 14 Teletype, Morkrum distributor, WU tape head.**
Sept. p 71,	**P & P Part 2d: Tape equipment continued: Model 21A and Model 401A; WØSV gear-type AFSK tone standard.**
Oct. p 52,	**P & P Part 3: Polar relays and adjustments; Weather information broadcast on RTTY.**
Nov. p 68,	**P & P Part 4: FSKing the Heathkit VFO.**
Dec. p 60,	**Product detector and i-f limiter for the FSK receiver in use at W2JTP.**

73, Byron, W2JTP

Yasme [*from page 43*]

Well, it seemed that I had seen practically everything worth seeing, and done, and HAD DONE everything too, and also, tide was getting mighty short,

Coral formations like this are around many Pacific islands.

By now I was nearly a week late on departure, so we decided to get Yasme back into the water and all the gear on board again,

All the arrangements were made for the big lift, and on the appointed day, Yasme, in all her new painted glory, glistening from every pore, the hole sealed up in the stem, was gradually lowered back into the water. Everything went off without a hitch. Although I had been treated like a Lord, I was getting itchy feet, and wanted to be on the move again. One Sunday morning, exactly five weeks after my arrival, many of my friends came down to see me off as I was paddled out in an outrigger canoe to Yasme.

The weather was perfect, a fine breeze was coming from the northeast, and the sea was relatively calm. With the engine ticking over slowly, I cruised up to one end of the island, turned, hoisted all the trade wind sails so that all my friends on the quay wall could see Yasme in all her glory, scudding along with every stitch of canvas pulling.

It was a wonderful send off. Goodbye Nauru, and all you good souls on it . . . maybe we shall meet again one day . . . who knows.

73, Danny

They have a leper colony here, and one of their pastimes is collecting foreign stamps. Any surplus you boys might have around would be welcomed. Send them to:—Jack Mullins, Nauru Island, Central South Pacific . . . he will attend to distribution, so lads, get the YLs and XYLs cracking with some steam on those old QSLs.

The Ham Shop

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FOR SALE

SOUNDSCRIBER late model Transcriber, slightly used, $300.00. ATR-DC to AC inverter (110 v. DC-117 v. AC continuous), perfect condition $40.00. Another DC to AC inverter (110 DC to 115 AC) in good condition, $25.00. Will consider trade for good, new tube tester or good inter-com equipment. S. R. Cowan, 300 W. 43rd St., New York City, JUdson 2-4460.

MILLEN 90887 RF amp with 812As filament transformer and coils for all bands $60.00. Lysco Transmaster 600 $70.00. Components for 1000 V 250 ma power supply $20.00. 20 watt plate modulator with multi-impedance output and built in power supply $20.00. R. Sykes, W2INY, Elmira, N. Y.

MICHIGAN HAMS! Amateur supplies, standard brands. Store hours 0830 to 1730 Monday through Saturday. Roy J. Purchase, W8RP, Purchase Radio Supply, 327 E. Hoover, Ann Arbor, Michigan. Telephone NOrmandy 8-8696, NOrmandy 8-8262.

BARGAINS: Reconditioned with new guarantee. Shipped on approval. Hallicrafters S38 $29.00; S40A $69.00; S40B $79.00; S85 $89.00; SX43 $99.00; SX99 $119.00; S76 $109.00; SX96 $189.00; SX100 $229.00; SX71 $149.00; National NC57 $59.00; NC88 $79.00; NC98 $119.00; NC173 $129.00; NC183, NC240D, NC183D, HR05TA1, HR050T, HR050T1, HR060, NC300, Hammarlund HQ-140X $179.00; HQ-129X HQ150, Super Pro, SP600JX, Viking Adventurer $39.00; Ranger $189.00; Viking II $199.00, Collins 75A1, 75A2, 75A3, 75A4, 32V2, 32V3, mobile converters, receivers, transmitters, many other items. Easy terms. Write for list. Henry Radio, Butler, Mo.

GEORGIA SALE complete KW CW rig PP 813's including all power supplies with two 6 KVA power transformers $200.00. Also other items. Call, write or visit G. D. Guler, DE 9057, 119 Vidal Blvd., Decatur, Georgia.

MULTI-BAND ANTENNA, 80-40-20-15-10, $19.95. Patented. Send stamp for information. Lattin Radio Laboratories, Owensboro, Kentucky.

SAVE! BUY surplus direct from Government at tremendous savings, radio, electronic equipment, parts, power tools, machinery, hundreds others. List, $1.00. Box 169CAF, East Hartford 8, Conn.

FOR SALE: One Meissner Signal Shifter with power supply. Partially built rig, cabinet complete with meters, knobs, frontal plates and all parts necessary for completion. Rig runs pair of 812A's in final and is modulated with pair 811's. Spare transformer for bigger final included. Any reasonable offer accepted. Sturgis Hiller, W1KPG, Foxboro, Massachusetts. Fone KIngswood 3-5736.

PE-103 owners, 8 pin male Cannon plug made the PE-103 Brand New $1.50 postpaid. W2CRJ, 37-20 Gardenview Terrace, Fair Lawn, New Jersey.

FOR SALE: Globe King Transmitter (500 Watts) WRL VFO. Collins 75A1 receiver with 3 KC mechanical filter. 2-element 20 meter beam (Telrex) and rotator. All for $750.00. W2ZRY, Box 33, Whitestone, L. I., New York.

FOR SALE: Gonset Communicator II with squelch circuit and Gonset VFO $225.00. W2ZRY, Box 33, Whitestone, L. I., New York.

A KWickPatch at $14.95 is your best buy in a fone patch. See them at your distributor or write for literature. KWickPatch, Box 612, Redwood City, California.

FOR SALE: NC240D, $130.00. Hallicrafters HT-9 Trans W/5 coil sets and spare final $125.00. 24G 10 mtr final w/ spare tubes, rack mounted $15.00. 75 watt CW trans. and po/s $20.00. English receiver type R-1147A and 12 V. Dyna. P.S. $15.00. Gonset 3-30 converter, $20.00. BC603-D receiver, 20-28 mc, $20.00. Two 814's, $10.00. W5QEX, R. J. Rudolph, 2709 Dakota, N.E. Albuquerque, New Mexico.

ATTENTION MOBILEERS!! Leece Neville 6 volt 100 amp. system alternator, regulator and rectifier, $45.00. Also Leece Neville 12 volt 100 amp. system, alternator, regulator & rectifier $85.00. Perfect condition. Herbert A. Zimmerman, Jr., 115 Willow St., Brooklyn 1, N. Y., K2PAT, ULster 2-3472.

CLEARANCE! All Reconditioned — 90 day new set Guarantee: Hammarlund HQ129X, $144.00; Elmac PM6A $84.50; Hallicrafters S76 $119.00, SX96 $189.00; Johnson Ranger $179.00; Knight VFO $19.95; National NC88 $84.50; NC98 $114.00; NC57 $67.50; Lettine Transmitter 240, $54.95. Many other specials; send for complete list. Write to Ham Shack, Allied Radio, Chicago 80, Ill.

FOR SALE: 56 Gonset 2 meter transceiver with accessories. 6 VDC-110 VAC push-to-talk model. Perfect condition. 40 ft. steel tower with brass ground plane, cables, coax, etc. $175.00. C. Teichert, Jr., 66 Prospect St., Greenwich, Conn.

FOR SALE: DELUXE 2 METER communicator for 6 VDC and 110 VAC operation. Set new in Aug. '56. Never used. Complete with ant., schematic and instruction book. Must sell am shipping overseas. $150.00 or best offer. A/2C Frank T. Laughner, 46th Ftr Intcp Sqdn (ADC), Dover AFB, Del.

"SATURN 6" MOBILEER, 6 meter antenna sets new standards of performance. Wholesale Supply Co., Lunenburg 1, Mass.

GLOBE KING 400B, 80, 40, 20 and 10 coils, $275.00. National 183D less speaker, $250.00. Both excellent. No shipping. E. G. Randolph, 2260 12th Avenue, Marion, Iowa.

TUBES for Hi Eff. Batt. portable VHF xmitter. 3B4 $1.10, 3A5 $.40. See Aug. 1949 Radio & TV News, page 34. M. Frost, 663 Broad Blvd., Dayton, Ohio.

PERFORATED aluminum sheet .051, 5/64" OD holes, 1/8" centers, $1.20 sq. ft., cut to size. Send for listing on beams, aluminum tubing, etc. Radcliff's, Fostoria, Ohio.

FOR SALE: CQ Jan '47 complete to date with eight binders. $28.00 postpaid. W6QJE/8, 5696 Hickam Dr., Dayton 3, Ohio.

PREFER WIFE — Must sell 6 volt mobile station. Morrow 5BR converter; commercial appearing 25 watt homebrew bandswitching xmtr; dynamotor supply; Master Mobile antenna complete; all cables, etc. Presently operating. All for $150.00. K2LGS, Auguste Schwab, Jr., 560 Woodmere Blvd., Woodmere, L. I., N. Y.

FOR SALE: Polaroid camera, electric train, good CW novice or second receiver, recorder, 2 meter converter, 10,000 volt transformer, bug, crystals. Send for list. Will swap. Stephen Pinion, Route 2, Bedford, Virginia.

COMPLETE MOBILE STATION $150.00. Delivered reasonable distance. K6GPC, 4335 N. Anna, Fresno 26, Calif.

LL: Heath AR-2. Needs alignment explained in nual. Good condition. $20.00 F.O.B., Racine, Wiscon- Poulson, KN9CPT, 929 E. Colonial Drive.

SALE: Globe Scout 40A, Gonset Super six and clipper. Best offer or trade for oscilloscope. Ken ee, W9BDD, Chana, Illinois.

FOR SALE (cont.)

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PE103 A DYNAMOTOR, 6 or 12 volts, with bath tub base and original cables. This has approximately 10 hours on it. Johnny Gray, Box 505, Daingerfield, Texas.

SUPER-PRO (SP 210 X) receiver with power supply and matching speaker, excellent condition. $150.00. A. Metzger, 3556 So. View Ave., Wantagh, N. Y. SU 1-6300.

FOR SALE: 75A-4 Collins receiver, in original carton (brand new) serial number 2778. For first offer over $500.00. Robert G. Wagner, W5VJP, 2450-B 35th St., Los Alamos, New Mexico.

COLLINS 75A1 and 32V1. Like new. Cash and carry $500.00. W6JXW, 11126 La Maida St., North Hollywood, California.

HALLICRAFTERS S-53A $65.00; S-40B $75.00. Chicago Webster Wire Recorder 18X $50.00. All FOB. Carlton Strickland, 930 Windsor Ave., S.W., Roanoke, Va.

SALE: BUD coils, VCL, MCL, MLS, others. Send for list, any reasonable offer. W2DUO.

SELL: Lettine 240 xmtr. with 80 and 40 meter coils, crystals and key $45.00. Hallicrafters S-20-R receiver $45.00. ICA code course, 2 to 15 WPM $4.00. Trade for 6 meter rig. A. Gregson, Rt. 3, Independence, Missouri.

SELL: PCA-2T-200 Panadaptor with spare CRT $50; B&W Butterfly Cond CX45B $10; Millen R9er with 6, 10, 20 coils $15.00; BC453B $7.00. Wanted: Rotator and 20 M Mini-Beam. W2LPC, 51 Elmira St., Hicksville, L. I., N. Y.

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FOR SALE: 400 W modern, de-TVI'd station, with HQ-129X, VHF 152 A, Heath VFO and Q-Multiplier, 100 kc standard, Johnson LP filter and JT-30 mike, complete, ready to go, $495.00. FOB KØCXS, 2962 S. Vrain St., Denver 19, Colorado.

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CRYSTALS: FT-243's—3500 to 8700 KC ± 2 KC, $1.00 each. .01% setting, $2.00 each. Hundley Crystal Co., 2951 North 36th, Kansas City 4, Kansas.

PERSONAL HAM SUPPLIES! Pocket printer—name, call, address (ink pad included)—$1.00. 500 miniature labels—name, call, address—$1.00. Lucite desk wedge, name or call, gold on black—$2.75. All postpaid. Santer, 544 East 6th St., New York 9, N. Y.

FOR SALE—Viking KW with matching desk, Viking Ranger set up to drive the KW, Collins 75A3 receiver, with matching speaker, 5" oscilloscope, 20 meter Gonset beam, Bell tape recorder, high pass filter, STR bridge, Coax relays and many extras. Station cost over $3,000.00. Will sell for $1,950.00. La Verne Gerboth, P.O.B. 893, Redwood City, Calif.

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FOR SALE: A few 1000 KC. marker crystals $1.50 each. 200 and 500 KC crystals 75c ea.; SX-25 with speaker, excellent condx. $70.00; Johnson VFO $28.00: R.C.P. 25,000 OPV Multimeter $14.00; Heath Grid Dipper $15.00; Dynamotor 12 volt input: Output 500 V. 250 M.A. $10.00, National "S" meter $5.00. Please send check with order. Samkofsky, 201 Eastern Parkway, Brooklyn 38, N. Y.

COMMUNICATOR "S" METERS. Illuminated. Just plugs in to attach. Also new and used Gonset Communicators, linear amplifiers, V.F.O.'s, G-66's, Commander transmitters, Super-sixes, Elmac AF-67's, PMR-7 receivers, etc. SPECIAL—Gonset Two Meter Communicator, brand new, $199.50. Graham Company (W1KTJ), Stoneham, Mass. ST 6-1966.

UNUSED BC-429 RECEIVERS, complete with 6 tubes, 2500-4700 kc coil and 201-398, 4150-7700 kc 2 band coil. Shipping weight app. 18 lbs. $2.95, C.O.D. only. George Salyers, 112 Neal Ave., Dayton, Ohio.

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JAMES C-1050 12 volt power supply for sale. Need C-1450. H. G. Kennedy, 500 Peshtigo Court, Chicago, Illinois.

PANEL METERS, crystals, tubes, transformers. Free List. Rijor Products Co., Box 81, Rego Park, New York.

SELL: Globe Scout 65A, modified with 6AG7 for additional grid drive on 10 and 15 mtrs. with Heath VFO, $85.00. Also extra Heath VFO, $15.00. Cash only. Len Morgan, 327 South Tenth Street, Baton Rouge, La. K5BGG.

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SELL OR TRADE

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RME HF 10-20 Converter excellent condition $36.00 or trade for VHF-152. Jack Lally, W2BXS, 10 Russell Ave., Bethpage, L. I., N. Y.

QSL

DELUXE QSLS. Petty, W2HAZ, Box 27, Trenton N. J. Samples 10c.

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QST's WANTED: Will pay good prices for QST's from 1923 and prior. State condition and price. Joseph Mullan W3RLR, 217 Northway, Baltimore, Maryland.

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QSL's. Glossy. Samples 10c. W1OLU Press, 30 Magoun Ave., Medford, Mass.

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MISCELLANEOUS

W2NSZ DX SITE FOR SALE: English style brick veneer bungalow in Bayside, Queens, NYC. South frontage on hill. 7 rms, 2 baths, 4 bedrooms. 17 yrs. old, but solid "prewar" construction with 3" joists, hardwood floors, slate roof, wood burning fireplace, dining room, and large living room. Residential neighborhood with one family houses both sides of street. Upstairs completely insulated with J/M batting, with two large bedrooms and bathroom. Modern Youngstown kitchen. Oil hot water heat. High N Shore location about 100' above L. I. Sound. Adjoins natural park (Oakland Lake) on light traffic street. CON ED power buried with no wire to affect antenna operation. House wired for 3 Ø 208 as well as 1 Ø 120. Ideal for KW or power tools. Full size 4 el 20 meter beam with rotator and 52' telescoping tower goes with house. Beam has withstood 80 MPH winds and brought in 245 countries. Call BA 9-9291, or drop around to 217-35 51st Ave., and see how you can live in the city and work them all.

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AROUND THE WORLD Ham Caravan departing February 9th from New York City. Are you interested in going along? Write for details to David L. Marks (Uncle Dave), W2APF, 904 Broadway, Albany, New York.

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NEEDED IMMEDIATELY hams who have tape recorders to read for blind radio enthusiasts. Drop a card to Vic Torrey, P.O. Box 136, Phoenix, Arizona for complete details.

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WANTED: Variac, 2 KVA or larger; 4X250B Tubes, Winchester 50 12 ga., Jones 263 SWR meter; 2 and 6 Kc filters A4; Ampro 40 projector or equal; variable vac Condensers; Ted Whildin, 288 Woodlawn Ave., Oakdale, N. Y.

WANTED: BC-348, BC-312, BC-342, BC-610-E, BC-614-E, BC-939-A, ARC-1, ARC-3, ART-13, BC-788C, BC-221, ARN-6, ARN-7, Teletype, APR-4, Technical manuals. All types transmitters, receivers, test equipment taken in trade for new Johnson, Hallicrafters, Hammarlund, National, B&W, Gonset, Elmac, Telrex, Fisher Hi-Fi. Write: Tom, W1AFN. Alltronics, Box 19, Boston 1, Mass. Richmond 2-0048.

WANTED: Used receivers and transmitters! Will pay you cash or take in on trade, 10% down, with up to 24 months to pay. Have in stock new 75A3, 75A4, KWS1 Collins, Johnson, B & W, National Hallicrafters, Morrow, Conelrad CM-1 $39.50; Elmac, Hammerlund, Gonset, Central Electronics; 10-15-20 Hi-gain Beams $99.75; 20 meter short beam $54.95; 20 meter beam $49.95; 15 meter beam $27.95; 10 meter beam $18.95; also Mosley and Gotham Beams. Write Ken, WØZCN, or Glen, WØZKD, Ken-Els Radio Supply Co., 501 1st Avenue North, Fort Dodge, Iowa.

WANTED: SX17 in excellent condition. Prefer one within several hundred miles. State lowest price first letter. Lyle Mattes, KØBMF, Hamburg, Iowa.

NEED SURPLUS GENERATOR GN-50-A or armature for same. Generator a part of Power Unit PE 162-B gas driven and delivers 6.6 and 500 volts. Frank Johnson, W6JWF, 1403 San Bruno Ave., San Francisco, California.

WANTED: Z Match Coupler. VE2JI, F/S Paterson, RCAF Station, Parent, Quebec.

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CODE made easy with your tape recorder. Most modern method known. Novice course $11.00, General $10.00. Pass that code test with a breeze. Dual track 3¾ IPS. TAPEDCODE, Box 31-F, Langhorne, Pa.

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WILL SWAP new Johnson #250-25 signal sentry for Vibroplex of equal value. K2PFC, 9 Bennett St., Canisteo, N. Y.

WILL BUY OR SWAP—State your needs. Quote best price and condition. F.O.B., Oakdale, Long Island, New York, Ted Whildin, W2HS.

CQ Ad Index

Start making your "dream rig" come true

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RAZOR-sharp selectivity, reliable frequency stability, and sensitivity of better than 1.5 microvolts are yours in the fabulous NC-300 "dream receiver". If you already own this superb instrument acclaimed by amateurs everywhere as the very finest in its class — you can complete the dream by assembling a rig especially designed for the NC-300. Or if you're considering a new receiver, consider the exceptional flexibility you'll get when you buy the NC-300 with the full set of accessories.

VERSATILITY is combined with attractive appearance and convenience in the NC-300's matching accessories. The plug-in crystal calibrator enables you to check exact frequency at 100 kc intervals for perfect signal reception. With the complete set of crystal converters, you can cover the three extra bandwidths easily — merely by flipping a selector switch, when these units are mounted in the converter cabinet.

START putting your "dream rig" together now, and see how easily and economically you can achieve the ultimate in receiver performance and flexibility.

Write now for your copy of the complete NC-300 book and descriptive literature on the line of accessories. Schematic, test procedure, operating instructions and detailed performance specifications . . . all for 25¢ (for handling and postage). Write to Dept. CQ-1, The National Company.

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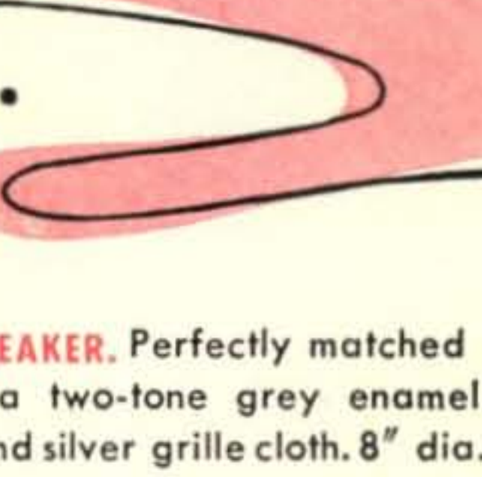
NC-300TS SPEAKER. Perfectly matched to the receiver in a two-tone grey enamel case with black and silver grille cloth. 8" dia. cone.

NC-300CC CONVERTER CABINET. Attractive matching cabinet for housing the three accessory converters for the 6, 2, and 1¼ meter bands. Eliminates unplugging of converters. Switches all power and IF output leads.



XCU-300 PLUG-IN CRYSTAL CALIBRATOR. Plugs into NC-300 receiver where its operating power is derived. Provides calibrating signal every 100 kc up to 29.7 mc. Is factory pre-set at exactly 100 kc.

CRYSTAL CONVERTERS. When fitted into converter cabinet (above), these converters need not be unplugged or shut off to change bands. Can be used with 3 separate antennas, thus eliminating the need for changing antennas when switching bands. Output frequency: 30–35 mc. Input impedance: 50–70 ohms. Output impedance: 50 ohms. Power required: 6.3 volts at 1.2 amps, 150 volts at 25 ma derived from NC-300 receiver. Shipping weight: 2 lbs.

NC-300 C1	Coverage: 220–225 mc. Noise figure: 5–7 db.
NC-300 C2	Coverage: 143.5–148.5 mc. Noise figure: 4–5 db.
NC-300 C6A	Coverage: 49.5–54.5 mc. Noise figure: 3–4 db.

National Co. has immediate openings for junior and senior electronic engineers with experience in communications.
Contact: Mr. J. O. Bigelow, Director of Industrial Relations.

Close-up view of the RCA-807 final amplifier in the S-255.

RCA-807 Beam Power Tube —world-famous in rf amplifier, frequency-multiplier, and modulator service.

The popular Allied Knight-Kit S-255 transmitter for 80, 40, 20, 15, and 11-10 meters.

LEADING AMATEUR DESIGNS

...use RCA Tubes

Compact, versatile, and capable of delivering a hefty CW signal on any band from 10 to 80, Allied's Knight-Kit S-255 transmitter pictured here is making friends with novices and seasoned amateurs alike for its outstanding on-the-air performance. The rig is designed around an RCA-807 beam power final!

And there's good reason why RCA-807 is specified in so many amateur and commercial designs. The tube has an excellent watts-per-dollar factor. Performance is noteworthy—even at lo plate voltage. And, of course, an RCA-807 is eas to excite (a single 6AG7 can drive it to full plat input; a pair of 807's can modulate it).

RCA-807—as well as the complete line o RCA beam power tubes, triodes, and rectifie tubes—is available through your RCA Tube Di tributor. For technical data on RCA-807 writ RCA, Commercial Engineering, Sectio A15M, Harrison, N.J.

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