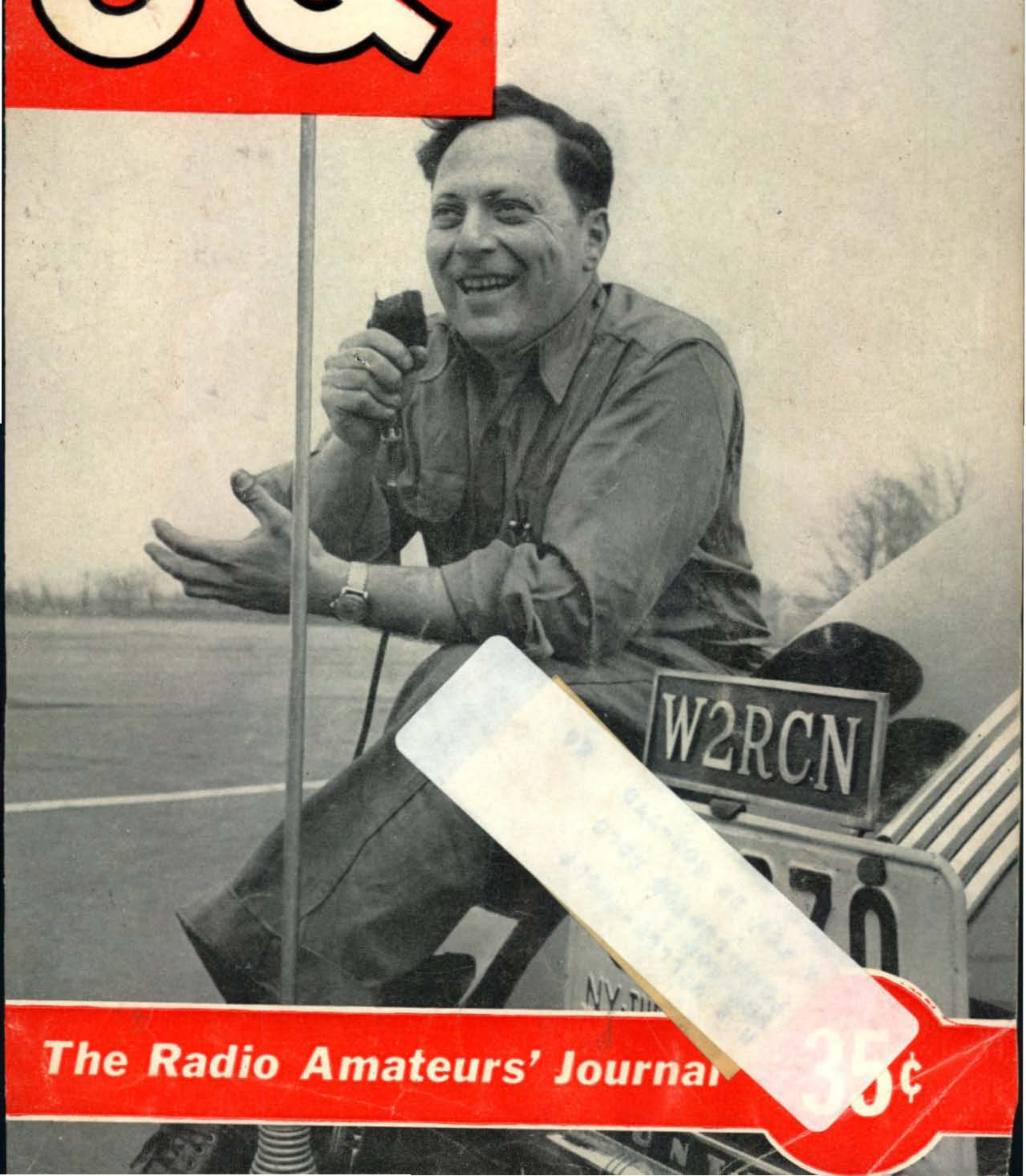
CQ

JUNE, 1951



The Radio Amateurs' Journal

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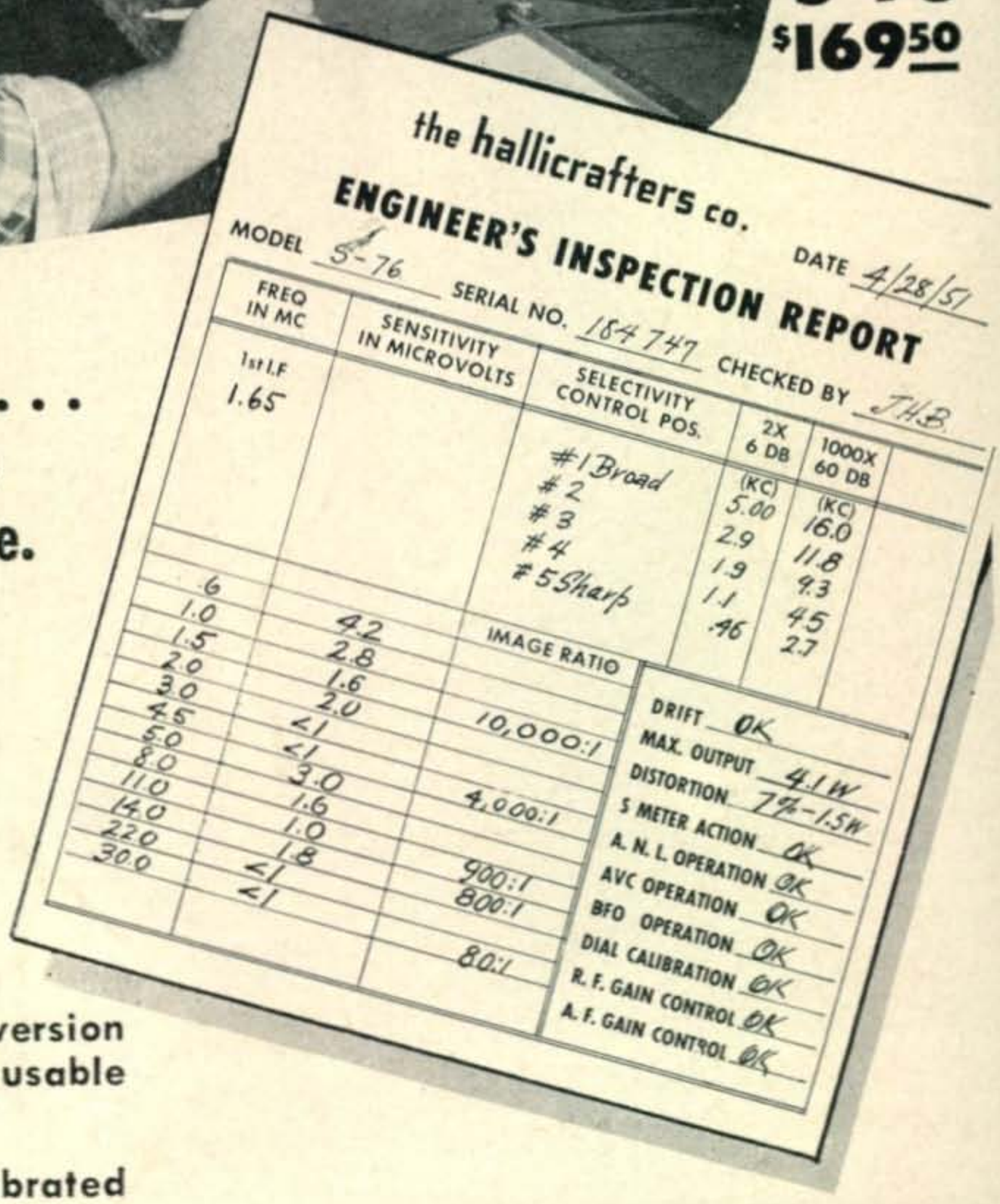

MORE of what you want . . . than any other set on the market, regardless of price.

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2 microvolt average sensitivity with ½ watt output. 9 tubes plus regulator, rectifier.

50 kc 2nd IF (after double conversion with 1st IF 1650 kc) gives more usable selectivity than the best crystal.

Giant 4-in. "S" meter. Calibrated electrical bandspread. Range 538-1580 kc, 1.72-32 Mc in 4 bands.

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"The Radio Man's Radio"

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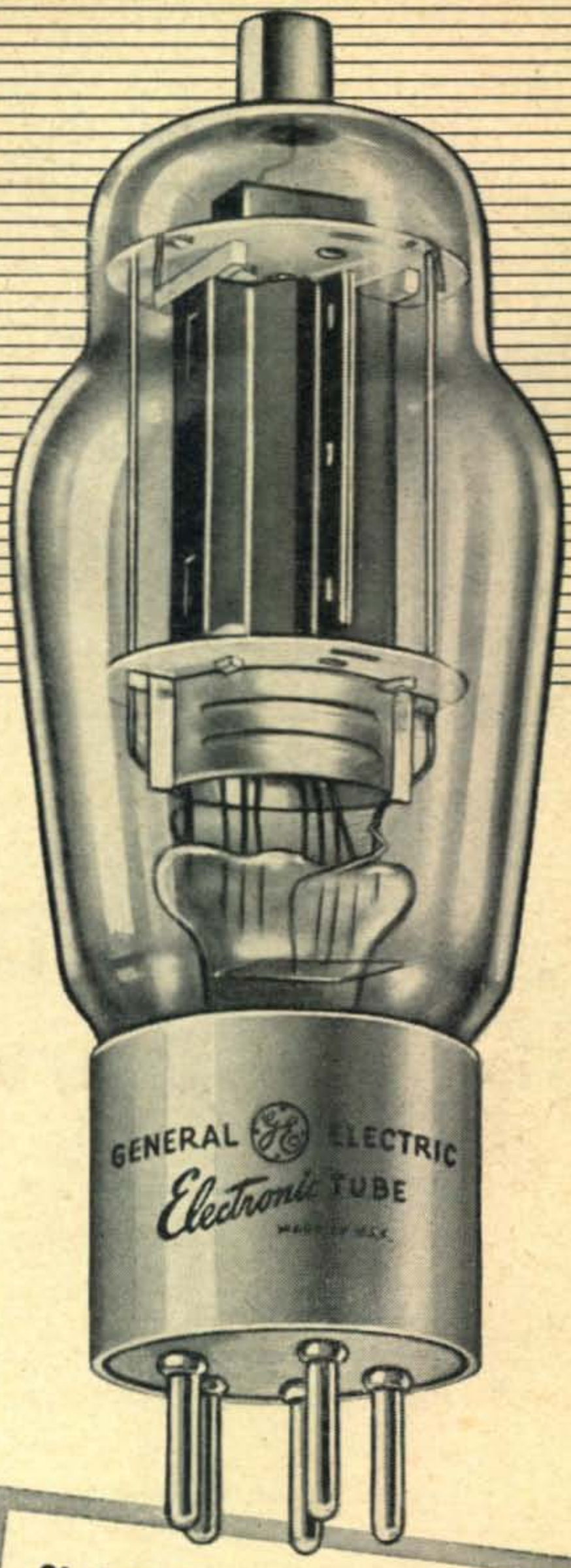
MOST TUBE FOR THE LEAST MONEY



GL-807's your No. 1 bargain ...with banner performance!

Three standout features make the GL-807 a ham's best "buy" (remember, this G-E tube costs you less than a pair of average receiving types):

1. Puts out more watts per dollar than any other tube, no matter what the class of service.

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3. The GL-807 is fully rated for five types of service: Class AB_1 audio (triode-connected) ... Class AB_2 audio ... Class B r-f power amplifier ... Class C telegraphy ... Class C telephony. These run the gamut of power-tube applications, meaning you have a tube which operates *efficiently* in all classes of service—also a tube whose performance in each class has been measured accurately, to guide you in your circuit design.

Buy and install GL-807's! G-E close-tolerance manufacture pays off handsomely in superior service! See your G-E tube distributor to study anew what this great G-E beam power tube offers you in wide usefulness, in surpassing value! *Electronics Department, General Electric Company, Schenectady 5, New York.*

GL-807 Beam Power Amplifier

Filament voltage	6.3 v	
Filament current	0.9 amp	
Max ratings, ICAS:	Phone	CW
voltage	600 v	750 v
current	100 ma	100 ma
input	60 w	75 w
dissipation	25 w	30 w
Freq. at max ratings	60 mc	

ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

GENERAL ELECTRIC

184-KA5

Wherever you live, there's a Bud distributor near you to serve you. He's an expert, and can give you practical advice on all your needs for electronic components and sheet metal parts.

A large number of the parts and components he normally carries in stock are on the "critical" list because of the vital requirements of the Armed Forces and Defense Industries. In spite of this, your Bud distributor is doing everything in his power to give you service. As a result he is working harder and longer to keep your needs supplied.

Naturally, there will be shortages and delays, but don't blame your distributor—cooperate with him and he'll do his best for you. Whatever your needs are for sheet metal parts and electronic components—place your order promptly with your Bud distributor so that he in turn can order from us and get delivery as quickly as possible. Bud makes the widest variety of requirements—very often by consulting your distributor you may be able to find an excellent substitute for the part you originally had in mind. Work with your distributor and he'll work for you!

Write for name of nearest Bud distributor.

BUD RADIO, Inc.

2120 East 55th Street • Cleveland 3, Ohio

CQ

VOL. 7, NO. 6

JUNE, 1951

CONTENTS

OUR COVER

Now that Spring is here and the band has opened up again, 20-meter mobile really comes into its own. With the aid of an extension cord for the mike, Sam Strauss, W2RCN, demonstrates how to get your Vitamin "A" and work DX simultaneously. (The mobile rig knocked off FG7XA for a new country before Sam could get to work the FG from his home QTH). Note the trick license plate—we hate to give the secret away, but in New York a "CQ" plate means Queens County.

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Feenix, Ariz.

Deer Hon. Ed:

As you are no doubtless knowing, in past few months it have been increasingly hard to get certain radio toobs. Not all kinds hard to get, in fact, the only scarce ones are those you not happening to have. Scratchi been doing OK until cupple of months ago, when one of my big bottles in the five kilowhat final are getting bad case of open filament. At the time I thinking this are no trubble, as can getting another from the local toob dealer. Are calling him, and he asking where I been lately, didn't I knowing that toobs are scarce?

So, I are having to be content with operating on low power, with my kilowhat driver, until toob dealer can dig up big bottle for me. For a while it looking like it be easier to find bottle of triple-distilled plutonium than the bottle I'm looking for. In factly, it taking so long to get toob that I are almost getting used to fighting QRM with my measly kilowhat.

Finally, toob dealer are calling me, and telling me that he getting shipment of toobs in, and my toob are there. Needless to say, I are dashing madly out of house and driving into town to get it. Because this toob are costing big hunk of dough, I stopping at bank and getting handful of lettuce to paying dealer. In no time at all I arrive at radio store and there it is — my toob. I not even bothering to unpack it, as not wanting to take any chance on dropping it. Just paying the man and heading toward the front door when ZOWIE! door are pushed open and knocking me flat on my back, with the toob still clutched in my hot little hands. Boy, I was never so worried in my life but the toob are safe.

Well, after that, you can bet I'm being careful I grabbing toob tighter, and keeping sharp lookout for characters who might jostle me. Hon. Ed. it might have been better if I watching the ground more and the peeple less, because all of a sudden WHOOSH! my legs are up in the air and then I flat on the ground, and no toob in my hands. I glancing hurriedly at banana peel that are causing down fall, then looking for toob. It not around anywhere. Not on sidewalk, not in street, then I realizing what happen. My toob are resting on awning that coming out from store front. I must have thrown it there accidentally when I slip. I quick rescuing

(Continued on page 48)

TO "HAMS" WHO ARE VETERANS!

Find out how your Amateur Standing Counts Toward a Professional Rating in the U. S. Air Force!

Here's why so many veterans with training in radio and electronics have been moving into the Air Force:

FIRST, if qualified, you can enter the Air Force at your old grade or better, according to your *present ability*.

SECOND, the Air Force will tell you exactly what your initial rating and pay grade will be, *before you join up*.

THIRD, you will skip basic training, and be assigned initially to a nearby Air Force base.

FOURTH, today's fast-growing Air Force offers better pay, and more chances for rapid advancement than ever before.

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Operator at Master Control Console operating a high speed CW circuit at Air Force MARS Station K4 AF/AIR, Pentagon, Washington, D. C.

Radio operators, repairmen and instructors are needed at once. Find out what the Air Force can offer you.

MAIL THIS COUPON TODAY!

HEADQUARTERS, U. S. AIR FORCE
Pentagon, Washington 25, D. C.
Att: AFPTR—Department 2

Please tell me how I, as a veteran, can get an Air Force rating in keeping with my skill and experience in radio and/or electronics.

Name _____

Address _____

City _____ *State* _____

★ ★ Letters ★ ★

Re the Naval Reserve

Putnam, Conn.

Editor, CQ:

. . . . .The gang up here was amused by the "Navel Reserve" . . . . . .

Ed Roller, W1ORP

Washington 20, D.C.

Editor, CQ:

With great strength I resisted the temptation to tell you a story when the April issue came out, but since the May issue has the same word misspelled I can no longer resist.

The old lady was visiting in a city where there was a military reunion. She was introduced to an individual: "I would like you to meet a distinguished Naval Surgeon." She replied, "My, how they specialize these days!"

73,
Andy, W3NL

(Our printer probably isn't allowed to be funny at home, so he takes it out this way—that's our guess. In both cases, the copy went down to the printer with the correct nautical spelling, but came out with an anatomical twist. Our apologies to all, including the author of the April article, Lt. George Funk, Exec. Officer of the Waukegan unit.)

Heckling Hector?

Los Angeles, Calif.

Editor, CQ:

Dr. H. Nector's article on "Zero Bandwidth" was very interesting; rather than wait for a future issue on constructional details I decided to build the unit from the meager information given.

Despite the jeers of fellow hams here in KW Town I managed, after considerable experimenting, to get the thing going FB. My only objection is the difficulty of getting it balanced. (They keep saying I'm not balanced.)

I have added an imposition timing device of my own that enables me to impress my ultra-modulation upon the signal of any old-fashioned station without causing any QRM; this is due to the fact that much of the bandwidth of these stations is wasted. I simply use the portions *between* modulation peaks. Of course this requires a time constant device at the receiver, to patch together my broken waveform.

Rather than use 3 xtals to filter out sidebands I use a simple FM oscillator that effectively produces the 3 frequencies at such a rapid rate relative to the audio that there appears to be 3 fixed frequencies.

I've had reports from many sources that say my rig is running more quietly that ever before.

Leonard Lee Lamascus, W6JQP

Help Wanted

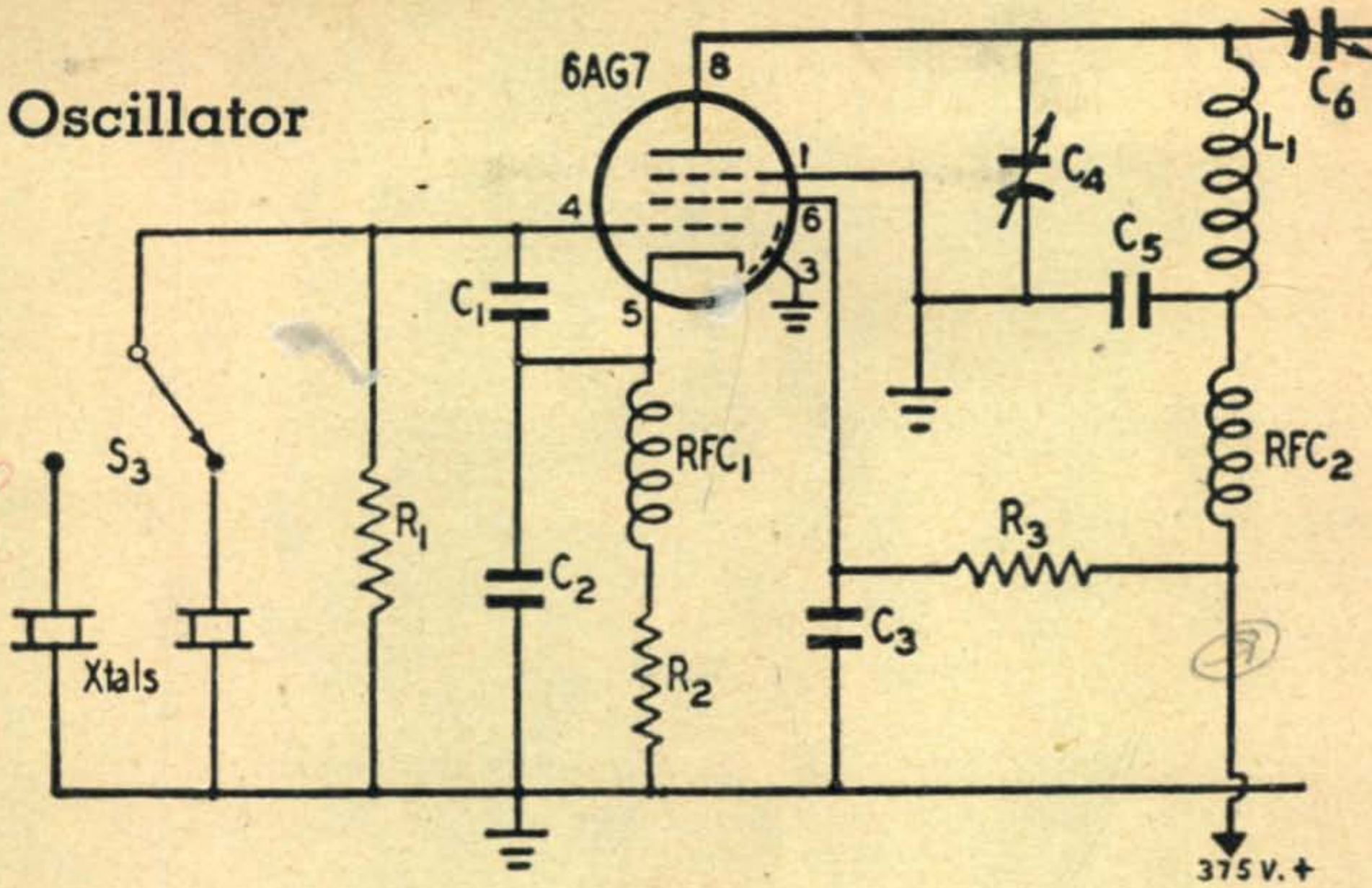
15 Robillard St.
Gardner, Mass.

Editor, CQ:

I have a problem which is bothering me and

(Continued on page 46)

Oscillator



C1—15-uufd. mica
C2—50-uufd. mica
C3—0.002-ufd. mica
C4—100-uufd. variable
C5—500-uufd. mica
C6—7 to 35-uufd. variable
R1—68,000 ohms, ½ watt
R2—500 ohms, 1 watt
R3—47,000 ohms, 1 watt
RFC1, 2—2.5-mh. choke
S3—S.p.d.t. snap switch
L1—(see text below)

OLD TIMER OR NOVICE . . . A Crystal Circuit You Can DEPEND ON!

This circuit, containing some of the best features of a number of similar combinations, will give a maximum of trouble-free output with a minimum of crystal current . . . on frequencies up to and including the fourth harmonic of the crystal. It is completely dependable when constructed with proper mechanical care. Using a 6AG7 as a harmonic oscillator sufficient output is generated on the fourth harmonic to drive a 2E26 or similar tube in a following stage or final amplifier.

The circuit is not tricky and crystal heating is held at a minimum. The crystal will oscillate at all times regardless of whether the plate circuit is at resonance. Pronounced plate current dip will be noticed when the oscillator is tuned to the fundamental frequency, and will become progressively less as higher harmonics are used. The inductance L1 should be designed for resonance at the frequency on which output is desired.

(Note: Additional copies of this circuit may be obtained from your PR Jobber, or directly from the factory.)

"I've been amazed . . ."

(by Eimac tubes, of course)

222 Indio Drive
South San Francisco, Calif.
March 15, 1951

Eitel-McCullough, Inc.
San Bruno, California

Gentlemen:

I've been amazed at the way your 4-125A tetrodes have performed for me.

I run the 4-125A's in a super-modulated circuit and, frankly, I've been a little brutal in the way I work them, especially the one that is the positive modulator. It is biased to cut off with no modulation and a potential of 2600 volts is placed on the plate and 800 volts on the screen grid of this tube. During modulation, the positive half cycle of audio removes bias to a value which will allow the tube to conduct. During a recent transmission, this positive modulator lit up to blinding incandescence and remained that way for what was probably 5 or 6 seconds. By this time I had collected my wits and cut the power.

The grid coupling capacitor between the driver stage and the 4-125A had broken down. This disabled the bias supply and put the entire positive 600 volts from the driver plate supply on the grid of the 4-125A.

This 4-125A is still in daily use at W6DHR and is still as hard as a rock.

It seems there is no limit to the torture these tubes will withstand!!

Sincerely,

John B Sargent

John B. Sargent (W6DHR)

John B. Sargent (W6DHR) of South San Francisco, California, like so many other active amateurs, knows the advantages of using Eimac tubes. His letter is further evidence that Eimac tubes are the outstanding vacuum tube buy . . . they are performance proved and rugged!

Modernize your transmitter now while these famous tubes are still available. A catalog containing important tube data is yours for the asking . . . write today.

285

Eimac TUBES

EITEL-McCULLOUGH, INC.
San Bruno, California
Export Agents: Frazar & Hansen, 301 Clay St., San Francisco, California

ZERO BIAS

EDITORIAL

FCC PUBLIC NOTICE

AMATEURS ASKED TO COOPERATE TO MAKE FREQUENCIES AVAILABLE FOR MILITARY MANEUVERS

The Federal Communications Commission has been advised by the United States Army of large-scale military maneuvers to be staged in North and South Carolina from August 6, 1951, to September 7, 1951. Because of the size and nature of these maneuvers, the use of the frequency band 3700-3900 kc will be required in addition to frequencies outside this amateur band to be made available temporarily for military use.

The problem is essentially one of interference from amateur operations to low-power military training operations in the southeast portion of the United States. Therefore, on behalf of the Army and with the concurrence of the ARRL, the Commission requests the voluntary cooperation of radio amateurs within interference range of the maneuver area to observe the conditions set forth below.—

1. For amateurs in North Carolina, South Carolina, Georgia, Delaware, Maryland, Virginia, West Virginia, the District of Columbia, and in Tennessee east of and including Hamilton, Rhea, Roane, Anderson and Campbell counties: No operation in the band of frequencies 3700-3900 kc during the period of the maneuvers.
2. For amateurs outside the area defined in (1) above and east of the Mississippi River:
   (a) No special limitations during daylight hours.
   (b) No night time operation (local sunset to local sunrise), in the band of frequencies 3700-3900 kc during the period of the maneuvers.
3. For amateurs west of the Mississippi River or outside the Continental United States: No special limitations.

The Commission and the United States Army officials are of the opinion that careful observance of the limitations proposed herein will permit essential radiocommunication in connection with the maneuvers to be conducted with a minimum of harmful interference. Since the military operations will be conducted with low power, the absence of any signal should not be construed as indication that maneuver operations are not in progress.

The Commission wishes to emphasize that this public notice is a request for the cooperation of the radio amateurs and an opportunity to further enhance the excellent reputation for cooperation which that group already enjoys.

Every amateur, whether East or West of the Mississippii, should read the foregoing FCC Public Notice with care. Note that it is a request to vacate these frequencies, and not a formal order which would require a change in the regulations. The FCC has decided to employ this simple, less formal procedure, and we hope that their expressed faith in us will be fully justified. There may be no individual penalty for failure to comply with an FCC request, but the possible consequences to the fraternity as a whole are obvious.

At the same time, it should be pointed out that the Army can expect to find some signals in this range. Occasional good summer north-south propagation conditions put husky VE 'phone signals into W4 and there are a number of commercial "invaders" from the West Indies and South America who roll through all year round. Some of these guys sound more like hams than we do ourselves (!), so we hope that the Army will be doubly careful in checking any possible reports of "amateur interference."

While the 'phone men in the Eastern half of the country will obviously suffer the most inconvenience during this temporary period, the chaps who will deserve the most sympathy will be the early bird crop of Novices. We don't have any idea what their numbers will be but we have a mental picture of some of these eager beavers passing the exam on July 2 (July 1 is a Sunday), getting their new calls in due time but unable to use their most likely CW band until the Army vacates 3700-3750 kc in the fall.

Novice Study Guide

The FCC has published a set of study questions covering the Novice examinations, which may be obtained free of charge upon request to any of the Commission's field examination offices, or to its Washington office. Mail requests should be addressed to the "Secretary, Federal Communication Commission, Washington 25, D.C." The July issue will carry these questions, together with the answers as we see them. Incidentally, it appears that anyone passing the Technician exam automatically qualifies at the same time for a Novice license, and apparently may apply for it at any time without examination.

(Continued on page 46)

MAJOR GENERAL JULIAN S. HATCHER
6039 BROOK DRIVE
FALLS CHURCH, VIRGINIA

Mr. Arthur A. Collins, WØCXX
President, Collins Radio Company
Cedar Rapids, Iowa

February 26, 1951

Dear Mr. Collins:

Just eight months ago today you wrote to me about my Collins 75A-1 receiver which had been damaged in shipment from the factory, and you also said that you had noted that I was getting a 32V-2 transmitter, and you expressed the hope that it would operate satisfactorily for me.

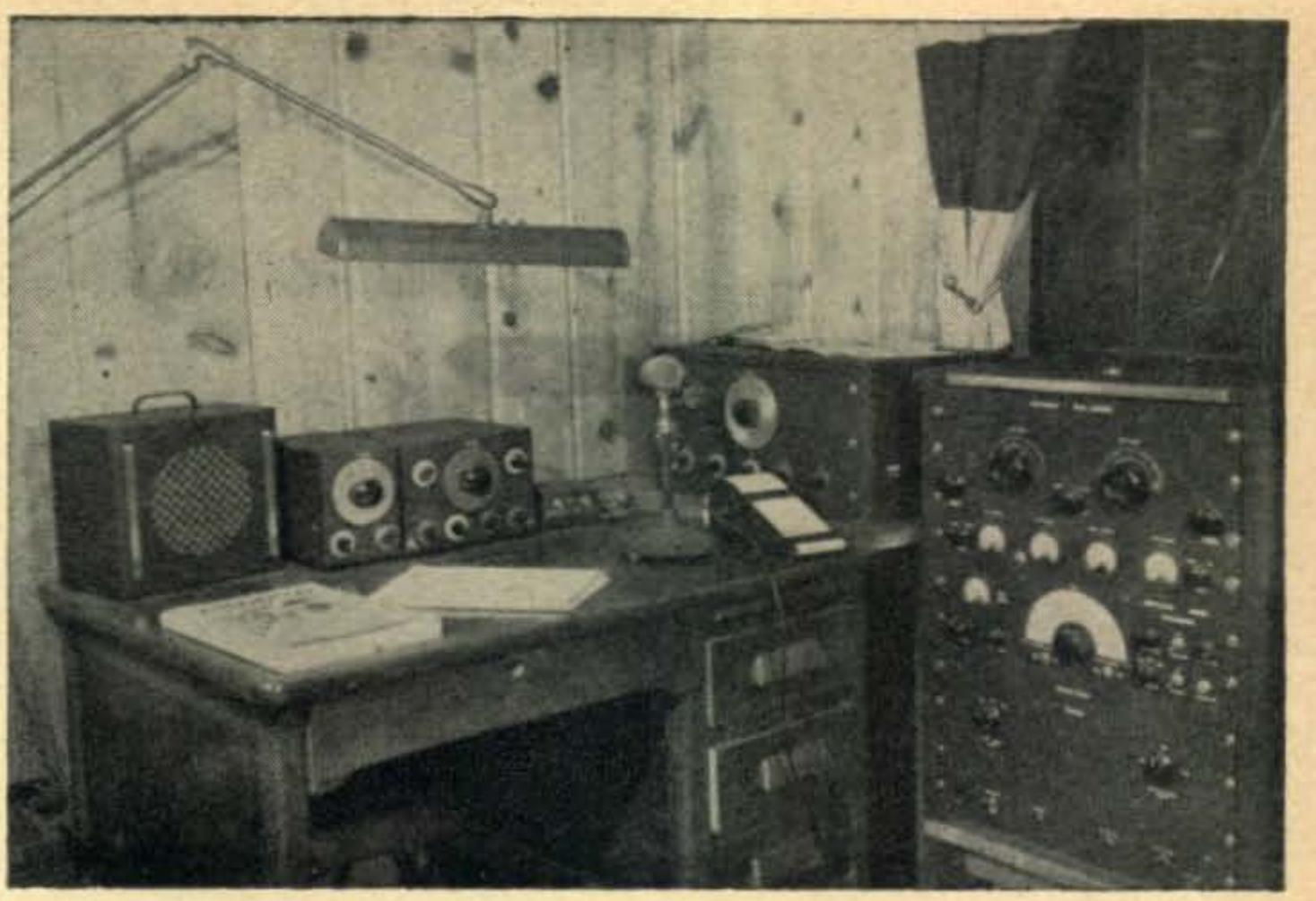
I thought you might be interested in seeing the enclosed picture of this fine equipment as it has been in use in my shack.

I want to take this opportunity of telling you that I consider the superb stability and the absolutely accurate calibration of these two equipments to be priceless. It is a real pleasure to operate them, and I think the hams of this country are greatly indebted to you for giving us such fine pieces of apparatus.

We have a sort of family radio net- my oldest son, Commander J. S. Hatcher, Jr., USN, W6OEO, is Electronics Officer of the Naval District at Long Beach, his wife, Mary D. Hatcher, is W6DKV, and my son Lieut. Robert D. Hatcher, USNR,W3RIL, is an engineer on guided missiles for the Navy.

With best wishes, Sincerely,

Julian S. Hatcher W4RNQ/A4RNQ



The compact half kw in place in W4-DWF's shack. Note that everything including the receiver is homemade.

HARRY D. HELFRICH, JR.,
W4DWF*

A COMPACT HALF KILOWATT

Most of us design our rigs by adapting others' ideas. Commander Helfrich's medium-powered transmitter contains a number of features well worth copying.

EVERY AMATEUR has his own requirements for his ideal transmitter and for almost every amateur these differ in some respect. The manufacturers of amateur gear must make some compromise on these many and different requirements and build a piece of equipment that will most nearly fill the bill of the most people. Otherwise the equipment will not be a commercial success no matter how well it performs. The amateur constructor on the other hand has only one person to satisfy, himself. Given an unlimited supply of time, energy, know-how and cash, there is no reason why he will not come up with his ideal transmitter.

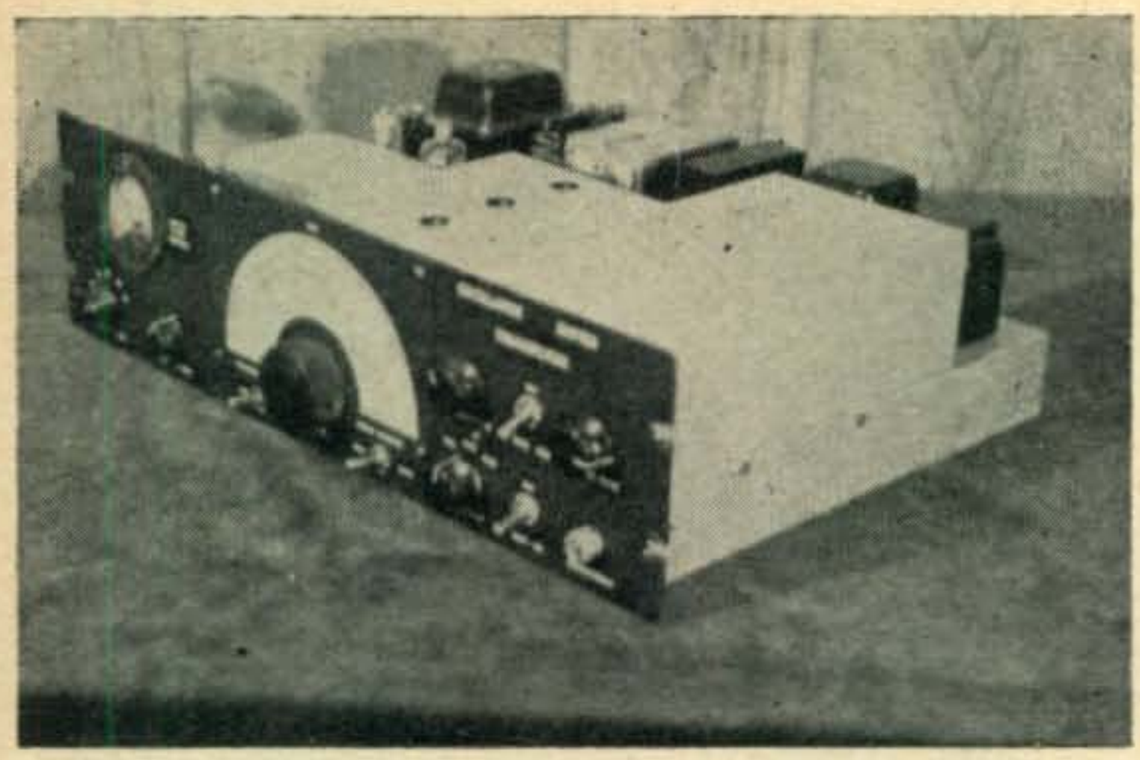
The transmitter described below is *not* purported to be the author's ideal. Like all or at least most amateurs, his supply of the four requisites above was definitely limited, and so the equipment as described is a compromise in some respects. It has, however, many features which should appeal to a great many amateurs. Although it is not likely that another amateur will duplicate this particular rig, features in it may well fit into that new rig which is still in the planning stage.

The author, being in the Navy, had as a prime requirement ease of transport of the rig. This meant a single package providing it could be moved by two men without a piano mover's experience. High power did not fit the above demands, but after a lot of planning, it appeared that half a kw might not be too immovable. In practice this has proven the case. Half a gallon of c.w. and NBFM and 400 watts AM fone have been packed into a 26¼" rack cabinet. A stable v.f.o. utilizing the series tuned Colpitts or Clapp circuit was included. Band-switching in the exciter, front of panel selection of AM-CW-FM, and power reduction all worked into the plans. Last but far from least in the overall requirements was freedom from TVI (insofar as possible). The author is fortunate to be in a strong signal area and the rig has proven usable with no complaints from the neighbors or even from the XYL. Use in a "fringe" area would probably require a few additional refinements, such as a low pass filter in the antenna lead. Due to exciter design, the rig is unusually free from harmonics and can be fully loaded into a dummy antenna on any band with no effect on the author's own TV set some thirty feet away. With the transmitter antenna connected, interference was found on all channels, but a simple hi-pass filter in the TV antenna lead removed all traces of TVI in this location.

*911 26th Pl. S., Arlington, Va.

General Features

It is the author's firm opinion that harmonic interference to TV is generated chiefly in the stages designed as harmonic generators. A carefullly adjusted and designed final amplifier should be fairly free of damaging harmonics. To this end the design of the r.f. stages was pointed at complete elimination of doublers, triplers, and the like. Especially dangerous are multipliers at 6L6 or comparable power level, unless bottled up in a hermetically sealed (for r.f.) container. The 6AC7 oscillator ends up on final frequency in its plate circuit when operating on any band. It is care-



The exciter unit with all shields in place.

fully bypassed, shielded, and isolated by the 6AG7 class A buffer. A 2E26 r.f. driver with carefully adjusted grid drive and plate filtering completes the r.f. exciter. The final amplifier with push-pull 814's has adjustable grid drive and a tank circuit designed for harmonic elimination. Reference 1 was written before TVI had reared its ugly head but it is "must" rereading for we TVI trouble-shooters of today. It follows exactly the author's conviction that the first effort should be to avoid generating harmonics rather than to bottle them up like an evil genie.

With no particular efforts at shielding except in the exciter, the author can find no trace of harmonics outside the transmitter cabinet, using a sensitive wavemeter with a 0-150 microamp meter indicator. Shielding efforts in the exciter are thorough yet not difficult because of the relatively smaller and lower powered components.

The audio frequency lineup is quite conventional. Since the speech amplifier is built within the transmitter cabinet it is well shielded to prevent r.f. pickup and possible feed back. A speech clipper and filter are used to give the advantages that have been pointed out in so many articles. The speech driver employs inverse feedback to give good drive regulation, and a simple 1000-cycle oscillator is included for test purposes.

Both modulator and final amplifier are powered from the same high voltage supply. This is held undesirable by some, due to slight downward carrier power shift with modulation. Economy of space, weight, and purse dictated the single unit, and to date no ill effects have been noticed from this type of power source. With the 811's and 814's both still available in surplus and operable at the same voltage, they fitted the author's needs exactly.

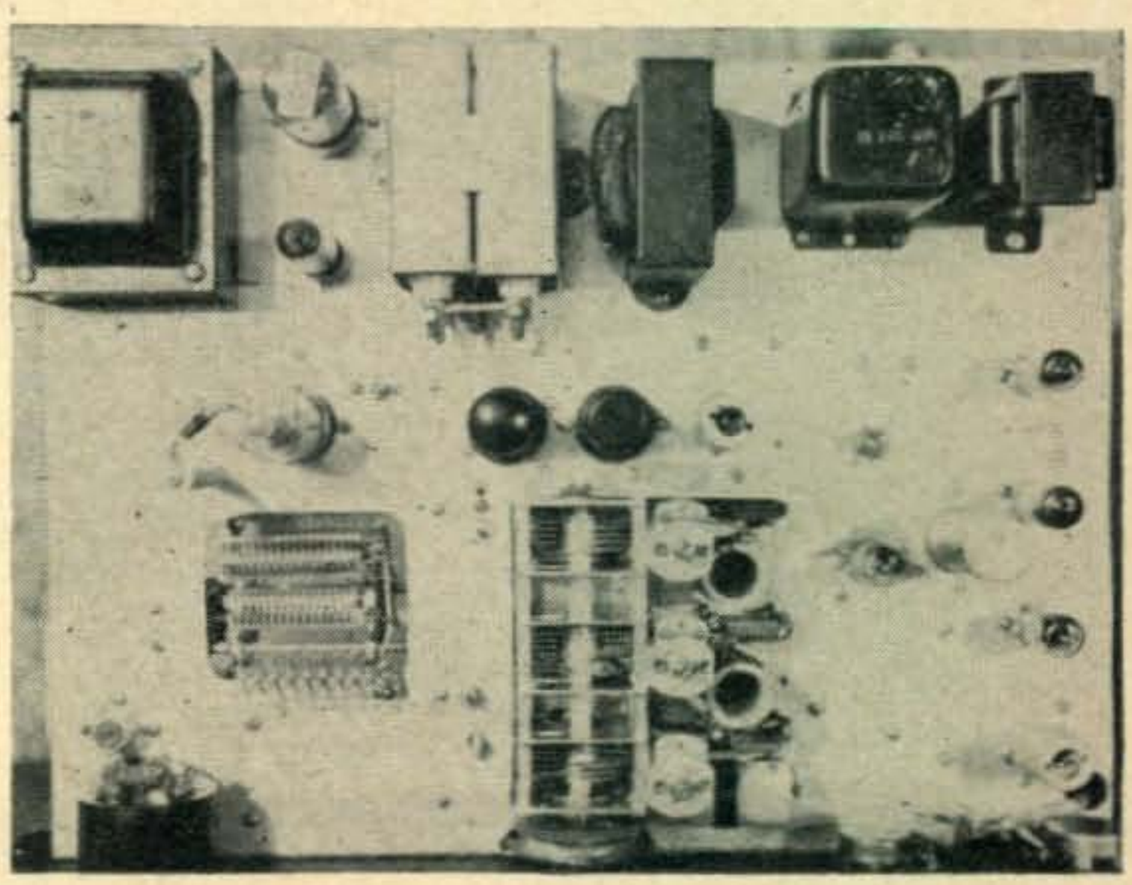
A few other features of the rig that are not customary in commercial equipment but come easily when we build our own include: monitor switch for spotting on another station's frequency; socket connections for receiver and oscilloscope; automatic turn-on with c.w. operation; c.w. side tone oscillator. These features will be taken up in detail later. The ability to include them or not is what makes the home built rig the one which can most nearly fill the builder's individual requirements.

Exciter

If some features of the r.f. exciter are vaguely familiar, you have read or at least seen reference 2. The author claims no originality at all in choice of tubes or in the frequency-determining circuit switching. The author does, however, reaffirm every good thing that was said about oscillator tank switching in the referenced article. To get into the oscillator circuit, it is the now very familiar Clapp arrangement with three separate tank circuits. Three were employed, not because the author had a surplus three gang condenser, but because it permitted the best possible band spreading and full six band coverage with *no* multipliers. L_{1A} and its group of condensers tune 3.5 to 4.0 mc with only a few kc to spare at each end of the dial, giving full dial spread on the 75-80 meter band. L_{1B} and condensers tune 7.0 to 7.3 mc, again giving full dial spread on 40. L_{2C} is switched into the oscillator plate circuit for 20 meter operation, spreading the band over two-thirds of the dial. L_{2D} is switched in for 15 meter operation (still hoping for that band!) giving band spread over better than 50% of full dial. L_{1C} and condensers tune 13.4 to 15 mc and L_{2E} permits doubling to give good spread of the 10 and 11 meter bands. Any other arrangement would not permit equally good spread without requiring the use of multiplier stages.

How about stability on 10 with the oscillator tank on 14 mc? Let's look at it this way. With the excellent isolation of the Clapp circuit, only L_1c and C_{1E}, C_{12}, and C_{13} determine the frequency of operation. Tube and switch capacity effects can be practically forgotten. Any drift or vibration effects on the L and C are percentage effects and will be present in equal amount in the final frequency no matter what the oscillator tank funda-

Top view of exciter with all shields removed.



Ref. 1. George Grammer, "Keeping Your Harmonics at Home", QST, November, 1946

2. Byron Goodman, "A 1950 VFO Exciter", QST, September, 1949.

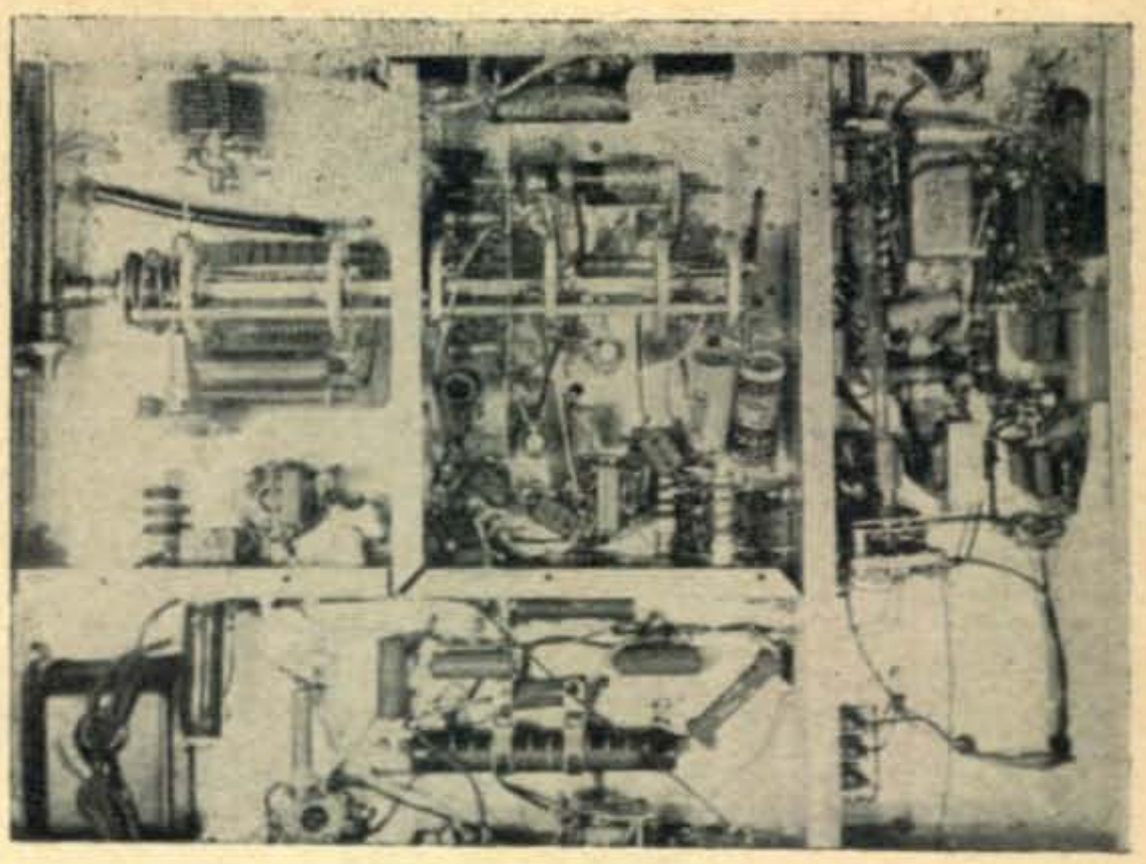
mental.* The old high-C oscillator technique of swamping tube capacitances with 500 to 1000 $\mu\mu$f of oscillator tank condenser broke down when we tried a fundamental of 14 mc or higher. Tank impedances became too low for successful operation. Reduce the tank capacity and away goes your stability. Not so with the Clapp circuit. Use a very normal value of capacity and inductance for 14 or even 28 mc and swamp the tube and switch capacity changes with the 1000 $\mu\mu$f series condensers. You'll find the stability is just as good as operation at a fundamental in the 160 meter band and multiplying any instability by the same factor of 16 that is required to get the fundamental down to 10 meters!

To date no one has ever complained about having to chase our signal up the 10-meter or any other band. When checking the signal against a BC221, it appears just as stable whether listening to the weak 4th harmonic of the 3.5 mc signal or to the 14 mc fundamental. The temperature compensating capacitors $C_{2,10,12}$ do not give perfect compensation for their respective circuits but do cut temperature drift to an almost negligible value. The most important factor in building the frequency determining section is to mount everything firmly and to isolate units from direct contact with tubes, transformers, or high dissipation resistances. As has been pointed out before, the Clapp oscillator is only as good as the components in the frequency determining circuit. Stable, high Q inductances and capacitors are a must if all the merits of this circuit are to be realized.

C_1 is a surplus three gang 50 $\mu\mu$f per section variable condenser, originally used in the AN/ARC-1. It was cut down from 9 plates per section to 8, 3, and 7 plates (approx. 45, 15, and 40 $\mu\mu$f) for C_{1A}, C_{1B}, and C_{1C} respectively. This should be done using a grid dip oscillator or a receiver to check coverage. A GDO is almost essential when winding coils L_1, L_2, L_3, L_4. L_1 coils must be adjusted within fairly narrow limits since $C_{2,11,13}$ cannot be adjusted over wide limits without changing the amount of coverage provided by C_1. No tuning capacity is used with either L_2 or L_3 since best broadbanding is obtained with the minimum capacity in each crcuit. It is necessary to adjust L_2 and L_3 coils to cover the desired frequency within the slug tuning range with only tube and stray capacities as the tuning capacity. No details are given on L_2 or L_3 coils since they were wound on odd slug tuned forms that happened to be available. The best instructions for winding these coils is to build or borrow a GDO and cut and try.

V_4 is a 6AG5 reactance modulator used to provide narrow band frequency modulation. It is

*Editor's note: In practice, this does not always hold true. Engneering investigations have shown that optimum oscillator stability, on both absolute and relative bases, is obtained at frequencies lower than 2.0 mc. This does not mean that it is impossible to obtain acceptable stability in a v.f.o. starting out at a high frequency, but both electrical and mechanical design are more critical in this case.

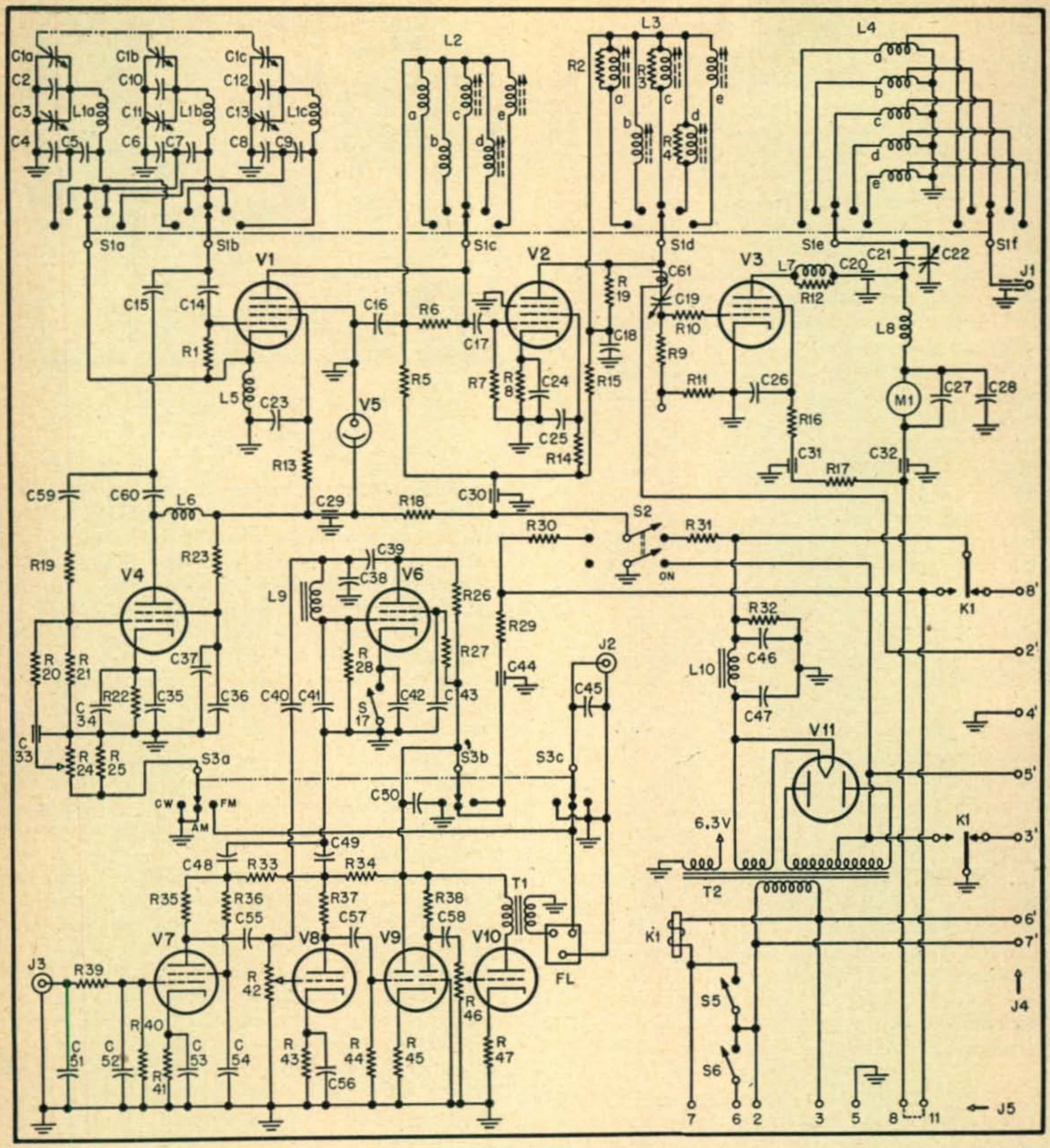


Bottom view of exciter with bottom shield plate removed.

mounted adjacent to the oscillator to provide the shortest r.f. leads. C_{33} is a combination feed thru and bypass condenser, which prevents stray r.f. from feeding back into the modulator. R_{24} provides adjustment of deviation separate from R_{46}. It should be set to give approximately 3 kc maximum deviation on modulation peaks when R_{46} has been set for 100% amplitude modulation. A listening test in your own receiver with antenna disconnected will give a good setting until you hook up with some one who has a pan-adaptor.

The plate coils of the oscillator and 6AG7 buffer are loaded by R_6 and R_{79} respectively. These resistances are sufficient to provide essentially constant excitation to V_3 across all bands but 10 meters. Here the two coils are peaked at different frequencies, one in the ten and the other in the eleven meter band. This will equalize the excitation in the two bands even though it falls off between. R_{11} is provided to facilitate adjustment of grid drive to V_3. A low range milliameter is connected from ground to the trminal between R_{11} and R_9. C_{19} is adjusted for 2.5 mills grid current on 40 meters. The current should be approximately the same on 10 meters. R_2, R_3, and R_4 are used in addition to load the buffer plate coils on 80, 20, and 15. This additional loading is necessary to reduce drive on these bands. The drive to V_3 has to be adjusted carefully to give efficient operation and yet avoid overdriving with resultant harmonic production. C_{20} is a home made coaxial condenser consisting of a 2½" length of ⅜" aluminum tubing, a length of ⅛" diam. rod threaded at each end, and two ceramic buttons. The use of an r.f. by-pass of this type has been discussed many times in ham literature. The plate of V_3 is parallel fed to permit simplicity in the output coupling circuit. Coils L_4 are mounted directly on the wafers of S_{1E} and S_{1F} and extend above the subpanel through a 3"x4" opening cut in it. A small shield can 2" high is mounted over the cut out and the coils. the meter M_1 is fed by shielded wire and is carefully by-passed. No need for shielding it is apparent.

The 2E26 driver was chosen both because it is smaller than an 807 and because it has a tendency



Circuit of the exciter, which constitutes a complete all-band CW-NFM transmitter in itself.

C1a,b,c—Triple 50 μμf variable cond. (Cut down—see text)
C2, 10, 12—20 μμf ceramic N220K
C3, 11, 13, 19—75 μμf APC trimmer
C4, 5, 6, 7, 8, 9, 24—.001 μf mica
C14—100 μμf mica
C15—5 μμf ceramic zero coef.
C16, 18, 23, 39, 40—.01 μf mica
C17, 59, 60—50 μμf mica
C20—See text
C21—.002 μf 1000 v mica
C22—100 μμf variable
C25—.004 μf mica
C26, 34—.005 μf mica
C27, 57—.002 μf mica
C28, 58—.003 μf mica
C29, 30, 31, 32, 33, 44—.001 μf ceramic feed-thru type
C35—25 μf 50 v electrolytic
C36—.0025 μf mica
C37—8 μf 150 v electrolytic
C38, 41—.02 μf paper
C42—.05 μf paper
C43, 48, 54—Triple .1 μf oil filled
C45—500 μμf mica
C46, 47—4 μf 600 v oil filled
C49, 50—15 μf 450 v electrolytic
C51, 52—35 μμf silver mica button
C53—10 μf 25 v electrolytic
C55—.0015 μf mica
C56—10 μf 25 v electrolytic

C61—See text
J1—Coax connector
J2—Shielded cable connector
J3—Microphone connector
J4—Octal socket
J5—Jones connector 12 pin
K1—115 v a.c., dpdt relay
L1, 2, 3, 4—See text
L5, 6—2.5 mh r.f choke
L7—10 T, #28 enam. on R12
L8—1 mh r.f. choke
L9—2.4. h audio choke
L10—7 h 160 ma choke UTC R20
R1—68,000 ohms, 1/2 w
R2, 6—5,000 ohms, 1/2 w
R3—6,800 ohms, 1/2 w
R4—7,500 ohms, 1/2 w
R5—360 ohms, 1/2 w
R7—30,000 ohms, 1/2 w
R8—300 ohms, 1/2 w
R9—8,000 ohms, 1/2 w
R10, 11—39 ohms, 1/2 w
R12—47 ohms, 1/2 w
R13, 41—1200 ohms, 1/2 w
R14, 34—5,000 ohms, 1 w
R15—390 ohms, 1/2 w
R16—330 ohms, 1/2 w
R17—20,000 ohms, 25 w
R18—5,000 ohms, 10 w
R19—10,000 ohms, 1/2 w
R20—100,000 ohms, 1/2 w
R21—560,000 ohms, 1/2 w
R22, 25—500 ohms, 1/2 w
R23—12,000 ohms, 1/2 w
R24—10,000 ohm potentiometer
R26, 37—150,000 ohms, 1 w
R27—500,000 ohms, 1 w
R28, 36—1 meg., 1/2 w
R29—20,000 ohms, 20 w
R30—2,200 ohms, 25 w
R31—3,000 ohms, 20 w
R32—500,000 ohms, 2 w
R33—20,000 ohms, 1 w
R35—250,000 ohms, 1/2 w
R38—47,000 ohms, 1/2 w
R39—130,000 ohms, 1/2 w
R40—2 meg., 1/2 w
R42—500,000 ohm potentiometer
R43—1800 ohms, 1/2 w
R44—390,000 ohms, 1/2 w
R45—5,000 ohms, 1/2 w
R46—250,000 ohm potentiometer
R47—2200 ohms, 1/2 w
R79—4,000 ohms, 1/2 w
S1a, b, c, d, e, f—6 pole 6 position ceramic switch
S2—dpdt toggle switch
S3a, b, c—3 pole 3 position ceramic
S4—spst toggle switch
S5—spst toggle switch
S17—spst toggle switch
T1—plate to 500 ohm line trans.
T2—750 c.t. 150 mc, 5 v 3a, 6, 3 v 5a Stancor 6014
V1—6AC7 oscillator
V2—6AG7 buffer
V3—2E26 r.f. amplifier
V4—6AG5 reactance tube
V5—OA2 VR tube
V6—6AK5 speech amp.
V8,10—6C4 speech amp.
V9—6J6 clipper
V11—5Y3GT rectifier
FL—Low pass audio filter
3000 cycle cutoff
M1—100 ma 2" panel meter.

COIL TABLE

L1a—31 turns #22 enam wire 1" diam x 3/4" long
L1b—15 turns #18 enam wire 1" diam x 1/2" long
L1c— 6 turns #18 enam wire 1" diam x 3/8" long
L2a, b—2.5 mh r.f. choke
L2c, d, e—Pi wound self resonant coil on any convenient slug tuned form. Tube and stray capacity resonate to desired frequency.
L3a, b, c, d, e—Pi wound self resonant coil on any convenient slug tuned form. Tube and stray capacity resonate to desired frequency.
L4—B & W "miniductors"
L4a—60 turns 5/8" x 1 7/8" tapped at 14 turns
L4b—34 turns 1/2" x 2" tapped at 6 turns
L4c—17 turns 1/2" x 2" tapped at 4 turns
L4d—15 turns 1/2" x 1 3/4" tapped at 4 turns
L4e— 8 turns 1/2" x 1 3/4" tapped at 3 turns
L11—B & W 50 watt center link xmtr coils with swinging center link removed.
L12—Bud 500 watt center link xmtr coils with variable center link. (Turns are removed from 80 meter coil to resonate with C69 and C70 in parallel with C68 as required)

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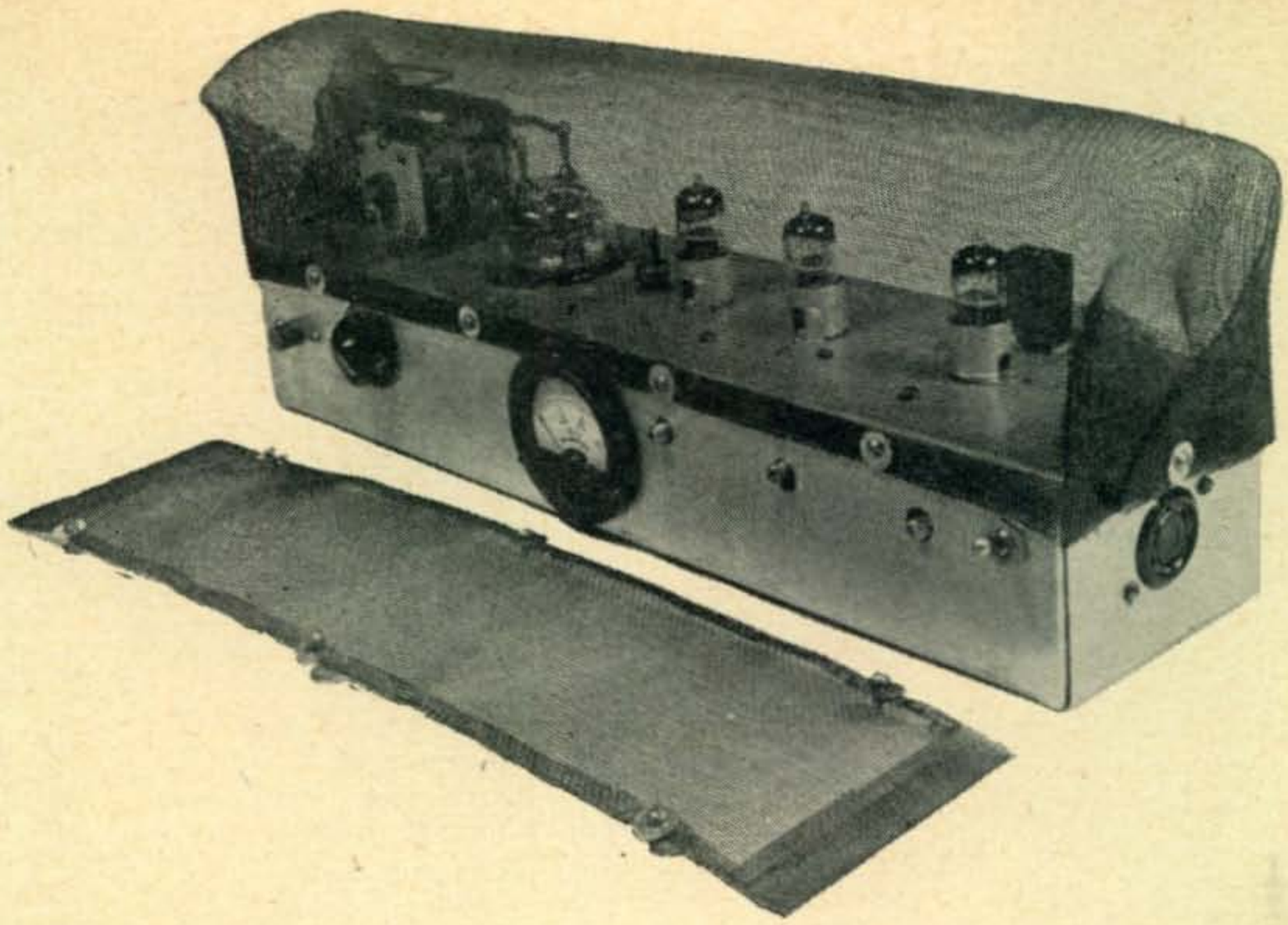
toward more stable operation. R_{10} and R_{12},L_7 are included for parasitic suppression. The driver was not tried without these suppressors, so their need is not certain. They are easy to include and provide good insurance. No tendency toward oscillation has been noticed in the r.f. driver, probably due to the use of the 2E26, the good shielding between input and output circuits, and the loading of the input circuit. The 2E26 just will not take off even with its output unloaded.

Switch S_2 is designed to turn on the exciter power supply, the oscillator and buffer, without putting power on the 2E26 or 814s and without disabling the receiver. This makes it possible to zero beat any signal being listened to in the receiver. Single frequency QSOs are a necessity these days, both for high percentage returns to calls and for best utilization of available frequencies. The output from the buffer is fed from a "gimmick" condenser, C_{61}, consisting of two turns of insulated wire around the buffer plate lead to socket J_4. J_4 is a utility octal socket having connections to turn off the receiver during transmissions, as well as controlled 115 volts a.c. and high voltage from the exciter power supply, should this be required for any supplementary gear.

Shielding of the exciter is made particularly thorough to prevent interaction between r.f. and speech units, and to keep any harmonics at home. Lengths of scrap aluminum divide the bottom of the chassis into four separate compartments: oscillator, buffer, and reactance tube; r.f. driver; speech section; and power supply. All power and filament leads pass through the shields via ceramic feed thru condensers ($C_{29,30,31,32}$,etc.) and shielded wire is used for meter leads, switch leads, etc.

(Continued on page 61)



For the Technician Licensee—
A 220 MC TRANSMITTER

FRANK HEUBNER*

The 220-225 mc band is the logical starting place for most new Technician licensees, since it is also used for Civil Defense nets. This stable rig is efficient and TVI-proof.

IF YOU ARE a potential amateur who is planning to get the simplified technician license on July 1, here is a transmitter you should consider in your plans. Although it is more complicated than a "wobbulated oscillator" transmitter, the superior stability will pay off in improved range and reliability of operation. It will also restrict the transmitter to a reasonable bandwidth, an important point since this band is now being used for Civil Defense activities. As a matter of fact, in Glen Ridge, New Jersey, a similar transmitter will be used at their Control Center for directing the Civilian Defense net which now operates on 223 mc.

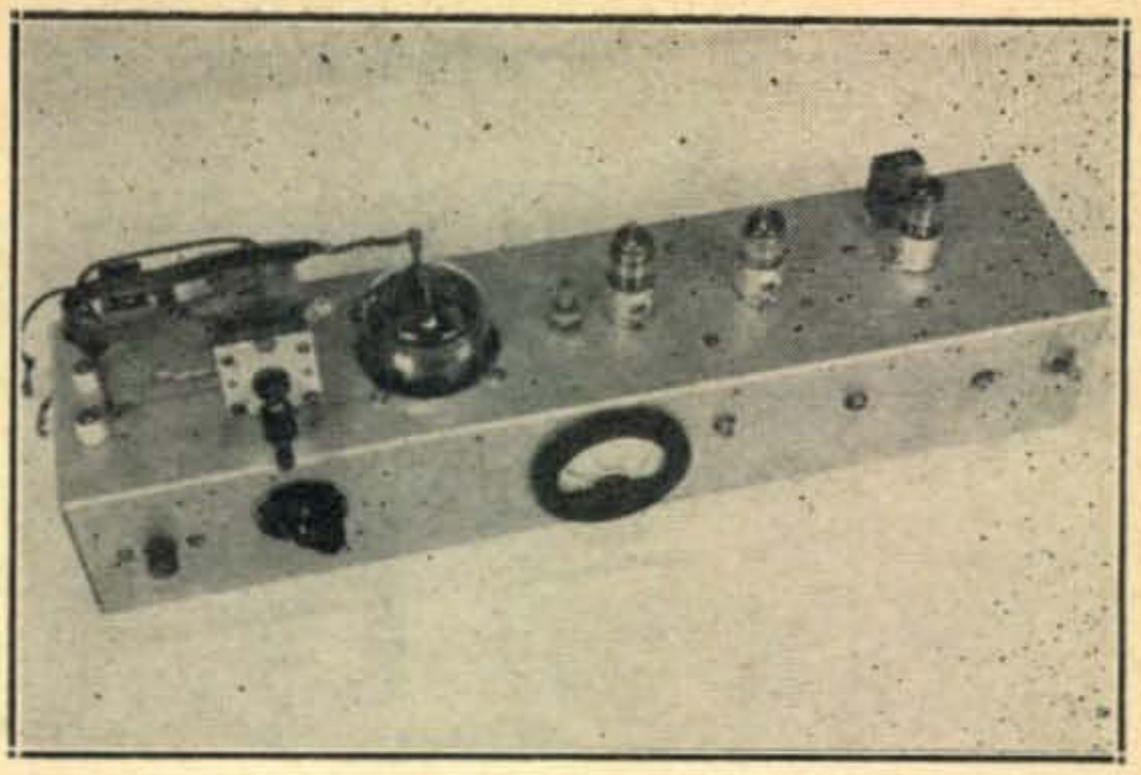
There is nothing about the construction, adjustment or operation of this transmitter that should frighten a beginner. It consists of only four tubes and practically all the circuits are metered so that any troubles that might develop can be isolated quickly. With crystal control, the beginner is pretty well assured that he is definitely in the band. Extra precautions have also been taken to make certain no television interference is caused by this transmitter. It has been totally shielded with copper screening and a special antenna coupler is included to prevent any of the lower frequency components from getting out on the antenna. If you intend placing the transmitter in a metal box, the copper screening may be omitted.

The final transmitting tube is an 832 which, with the recommended 300 volts "B" supply will give a good 10 watts of carrier output in the 220-225 mc band. Used with a beam at W2WG, transmission over a 32-mile path with this transmitter has been accomplished with a R5 signal report.

The crystal stage (one half of a 6J6 with the other section unused) is a regenerative type oscillator with its plate operating at 24.6 mc. The next two 6J6's operate as frequency triplers, ending up at 73.8 and 221.4 mc respectively. The last 6J6 drives the 832 final as a straight amplifier. The range of 8 mc crystals that will permit operation of this transmitter within the band is shown in

*10 Park Terrace E., New York 34, N. Y.

the material list. These crystals are of the FT-243 type and may be procured in surplus for less than a dollar. (If you intend operating at a location surrounded by television receivers, it would be advisable not to operate near 222 mc if channel 7 is used in your area. The sound i.f. of many TV receivers is 21.25 mc; 222 mc is the image frequency on such receivers and because of their poor rejection, you may find yourself in the sound channel of these receivers due to no fault of yours.)



Construction

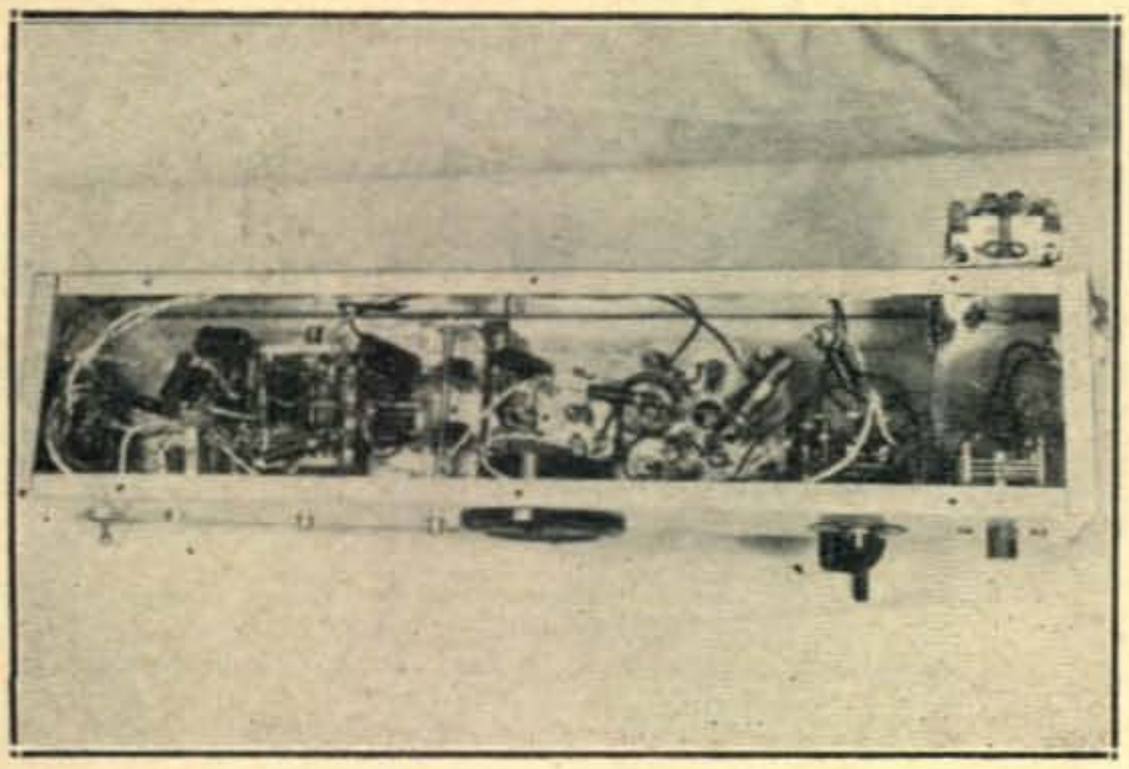
The construction method used can be easily followed from the photographs. An aluminum 3" x 4" x 17" was used in the model shown. In the front view photographs, the crystal and its associated 6J6 oscillator are shown at the extreme right hand top of the chassis. The next two 6J6 tubes to the left are triplers. Then comes the 832 final and its long-lines plate tank, which is supported by the split stator plate condenser. The antenna loop mounts over this and is supported from the two feed through insulators on the extreme left top of the chassis. Underneath these feed through insulators is the antenna coupler. Its butterfly condenser shaft, which is screw driver adjusted, can be seen on the front panel. Adjacent and to the right is the 6-position meter switch. This controls the milliameter in the center of the front panel. The three shafts protruding from the front panel beneath the three 6J6 tubes tune the condensers associated with the oscillator and tripler stages. These shafts are slotted for screwdriver adjustments. The toggle switch at the extreme right may be used to turn on the power supply. The socket on the one end of the chassis is for connecting to the power supply and modulator. On the other end the two feed through insulators shown lead out of the antenna coupler to the antenna relay, which is mounted on the rear of the chassis.

In the bottom view looking from left to right, the first variable condenser is in the crystal oscillator circuit. Behind it is the 6J6 oscillator socket and coil. Behind this coil is mounted the crystal holder. To the right the next condenser and coil is associated with the first 6J6 tripler. The ceramic sockets used for the 6J6 tubes are mounted in between the variable condensers. The second tripler's coil and condenser are adjacent to the meter. Opposite the meter is the butterfly condenser of the last tripler. The coil connected to this butterfly is over the left side of the 832 socket. Over this coil is the grid coil of the 832. Continuing to the right is the 6-position wafer switch. The last compartment, which is completely shielded from the rest of the transmitter, contains the antenna coupler. The copper sheet partition for the entire width is fastened 2 inches in from the end of the chassis. The antenna relay may be seen mounted on the rear at this point. You will note that the 832 socket has been submounted. It is recommended that an RCA, UT-107 type socket be used since it has built-in r.f. by-pass condensers. The final split-stator condenser C-11 is soldered to the ⅜" wide copper strip tank so as to bring the shaft of this condenser 2½ inches from the plate terminals of the 832 tube. The copper strip should be soldered to the lugs on each end of the stator plate on each side of the condenser. The model shown is a Cardwell ER-10-AD condenser which was mounted on metal stand-offs one-half inch above the chassis. This puts the final tank level with the plate terminals of the 832 tube.

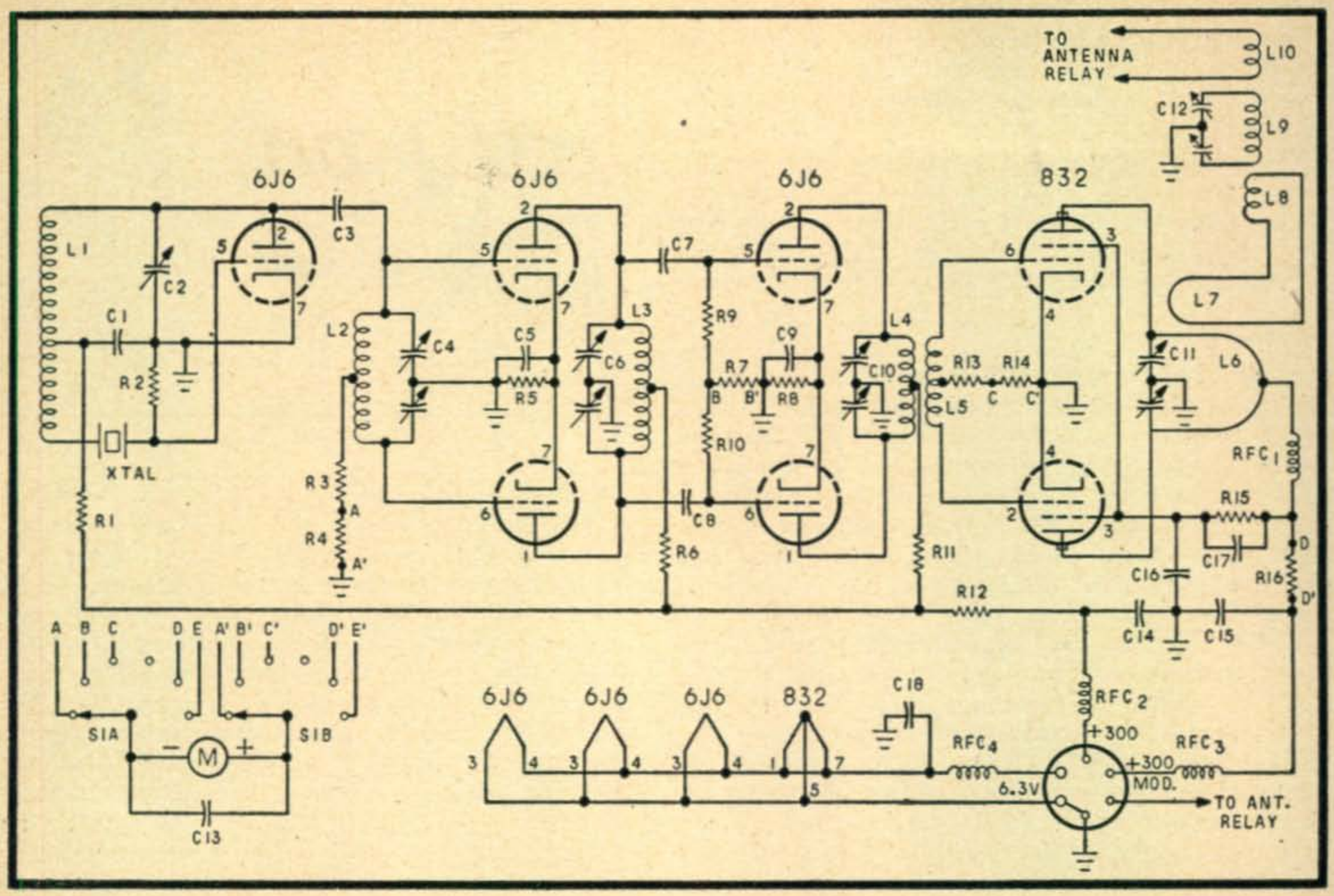
By mounting the 6J6 sockets in such a position so that the grid lugs face one way and the plate lugs face opposite, the leads to these lugs will not cross each other. This layout will also provide for the shortest leads, essential at these frequencies.

A surplus 0-3 ma meter was used in this transmitter, and special shunts made up to multiply the meter range.[1] A simpler method would be to use a standard 0-100 ma meter in which case, no special shunts would be needed, and resistors R4, R7, R12 and R16 would be 47 ohm ½ watt units. The small grid currents would be barely perceptible on such a high range meter, however.

The shielding was made by using fine copper screening which was cleaned at the point of contact with the chassis. It is held in place with self threading screws, using large washers to assure good contact with the chassis. The ends of the screening are folded over on the ends of the chassis. A better looking job could of course be made by making a framework of ¼" x¼" brass and soldering the screening to it. The shielding for the bottom is shown laying in front of the shielded transmitter and is fastened in the same manner as the top screening.



[1] "Putting Surplus Meters to Work," R. L. Parmenter, W1JXF, CQ, March, 1950. p. 24



C1—600 μμf mica
C2—50 μμf variable
C3—10 μμf ceramic
C4—30 μμf per section split-stator variable
C5, C9, C13, C14—.001 μf mica
C6, C18—20 μμf per section split-stator variable
C7, C8—50 μμf ceramic
C10, C12—7 μμf butterfly variable
C11—10 μμf per section split-stator variable
C15, C16—500 μμf mica
C17—2 μf 300 v paper or electrolytic
R1, R2—3300 ohm, 1 w
R3, R9, R10—22,000 ohm, 1/2 w
R4, R7—Meter-shunt, see text
R5—470 ohm, 1 w
R6, R11—300 ohm, 1 w
R8—1100 ohm, 1 w
R12, R16—Meter shunt, see text
R13—20,000 ohms, 1/2 w
R14—100 ohm, 1/2 w
R15—18,000 ohm, 10 w
L1—14 T on 1/2" diam. coil form, #18 wire, tapped 4 1/2 T up from grid end
L2—18 T 1/2" diam. coil form, #18 wire
L3—9 T 5/8" diam., #12 wire
L4—1 T 3/4" diam., #12 wire
L5—1 1/2 T 3/4" diam., #16 braid insulated
L6—5" long by 1 1/4" wide loop made of 3/8" copper strip. This includes the two flexible leads to the 832 plate terminals, each 1 1/4" long.
L7—2 1/2" long by 1 1/4" wide loop #16 braid insulated
L8—1 1/2 T 3/8" diam., #16 braid insulated
L9—4 T 3/8" diam., #12 wire
L10—2 T 3/8" diam., #16 braid insulated
RFC1, RFC2, RFC3— 12 T 1/4" diam., #22 wire
RFC4—12 T 1/2" diam., #14 wire
S1—2 pole, 2 section, 6 position switch
MA—2 1/2" diam. milliameter, see text
XTAL—8155 to 8330 kc Crystal

Any standard power supply which will furnish 6.3 volts at 3 amperes for filaments and 300 volts at 150 milliamperes "B" supply will operate this transmitter at full output. Typical examples of such a power supply are diagramed on page 24 of the November 1950-CQ.

As for a modulator, any type capable of giving about 10 watts of audio will do nicely. A modulator ending with a 6N7, a 6L6 or two 6V6's, such as the one described on Page 27 of the March 1950-CQ, will do nicely.

Adjustment

When the wiring has been completed, first apply only the filament voltage and insure that all four tubes light. Temporarily, disconnect the "B" voltage from R6, R11 and R16. With the crystal in place, apply reduced "B" voltage to the transmitter. Under these conditions, the crystal oscillator will be the only stage energized. Turn the meter switch to the first position, placing the meter across R4. This will read grid drive on the first tripler. Set condenser C4 at about one half capacity and with an insulated screwdriver slowly tune C2. You should find only one point at which the crystal oscillates. Tune for maximum grid current. If the crystal oscillator is functioning properly, you will read at least 3 milliamperes. Should a communication receiver be available, tune in the 8.2 mc signal and also check at the 24.6 mc point. You are now ready to tune up the next stage.

(Continued on page 55)

Amateur Publicity on the Faye Emerson Show

MARX S. KAUFMAN, W3IUC*

All of you who saw this TV broadcast know that it was a top-notch public relations job for amateur radio. Admittedly, the opportunity for a big deal like this doesn't come along very often, but this behind-the-scenes story may serve as a guide and stimulus for more local efforts.

As we write this, the Faye Emerson Show featuring 'ham' radio has been filmed at Long Island City and will soon be distributed to TV stations in 57 cities throughout the country.

As you read this, the show will have been seen on more than 5,000,000 TV screens and by an estimated ten to fifteen million persons.

Any interest or amazement on the part of the TV audience at what they see can only be matched by the writer's appreciation of the marvelous cooperation by the group of W2 mobiles who made the whole thing possible.

To start at the logical beginning, Faye Emerson came to Baltimore in February to attend the annual banquet of the local Advertising Club and to receive the gold plaque awarded her by the Advertising Club as Outstanding TV Personality of 1950. As Vice-President of the Club, the writer spent quite a bit of time talking with her during the afternoon before the banquet. We thought the story of the amateur emergency networks would make a good subject for one of her programs. After some explanation of how such networks function, she agreed and asked that we write her, setting forth all details, so that she could consult with the producer of her show.

Some weeks passed after we mailed the letter and then one day, out of a clear sky, came a long distance call from Gil Fates, producer of the Faye Emerson Show, who wanted to know whether we could come to New York immediately to make plans for doing the program. We flew there the next day and from then on, things started humming.

Fates was interested in incorporating two features—an actual network drill, conducted right in front of the cameras, and an interview with a ham, who (by profession) was "in the public eye". We had no trouble at all uncovering the latter in the person of Martin Block, known to millions of radio listeners for his "Make-Believe Ballroom" over WNEW-and to hams as W2MGE.

*4818 Greenspring Ave., Baltimore 9, Md.

But to stage a regular emergency network drill while the movie cameras rolled took a little more doing, and that's where the W2's came in.

A phone call to Vince Kenney, W2BGO, Radio Aide for New York City, resulted in complete cooperation. Vince agreed to line-up five or six mobile units, which would stand-by at different points in Manhattan and carry on contact with a

Yep, that's Faye Emerson on 10 meter 'phone at W2AVA/2, with W3IUC in the center and W2MGE relaxing on the 32V-2.

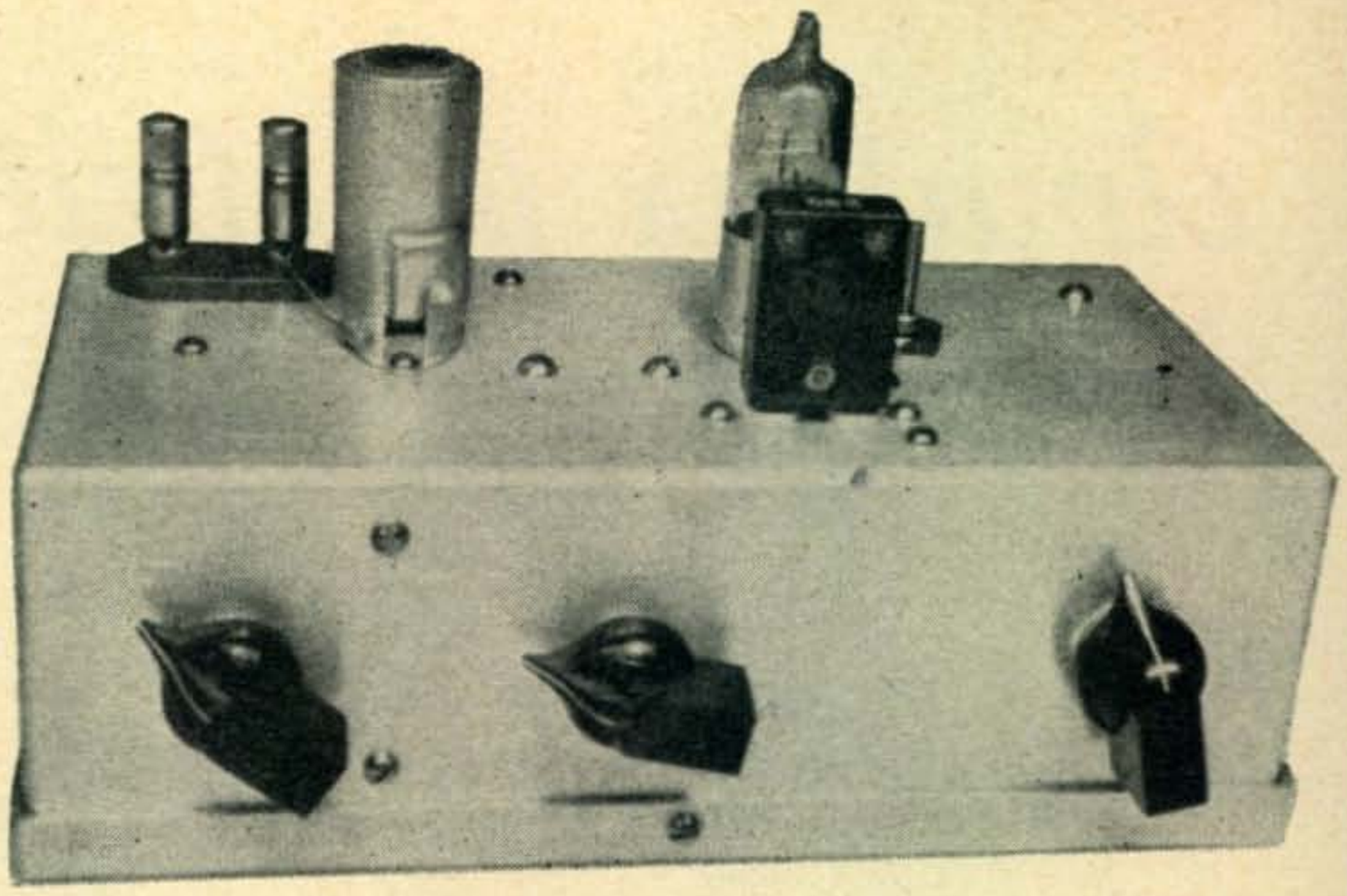
city control unit set-up in the studios. The actual filming was to take place on Tuesday, March 20th and on the Sunday before, Vince assembled his mobiles near the movie studio in Long Island City for a "dress rehearsal".

Meanwhile, however, we were faced with the problem of finding suitable equipment to use in the studio. But the problem didn't last long. A phone call to Bil Harrison, W2AVA, brought forth a

(Continued on page 60)

G. F. MONTGOMERY,
W3FQB*

a Tri-Band CRYSTAL CONVERTER

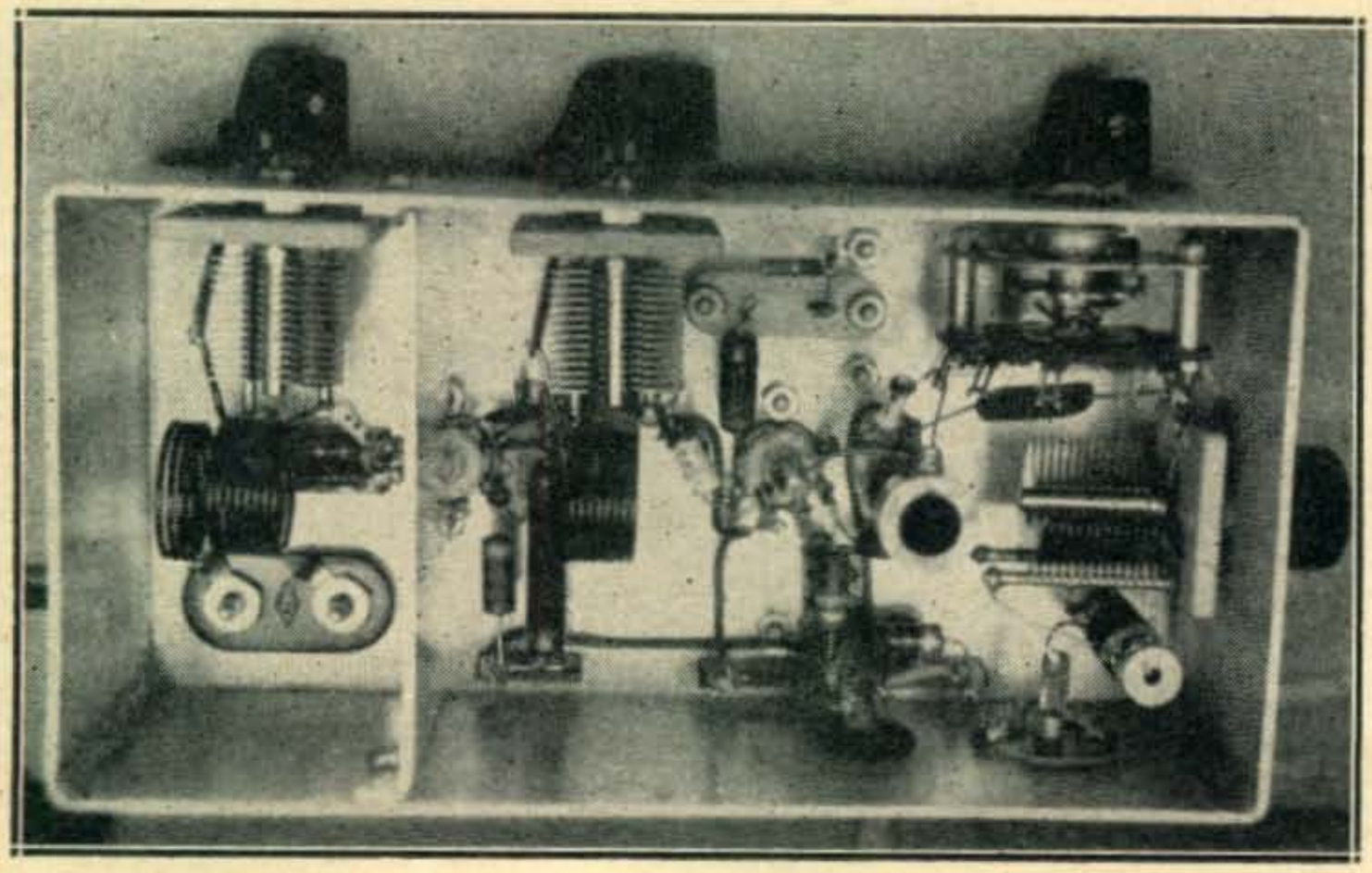


Although intended primarily for 14 and 28 mc, this high stability converter also covers the 21 and 27 mc bands. No coil- or crystal-changing is required

LIKE MANY ANOTHER amateur in the renewed activity of 1946, I started rebuilding the home station around a surplus BC-348 receiver. For most of the amateur bands, this receiver is still giving good service by itself, but since the upper frequency limit of the BC-348 is 18 mc, it was evident from the start that something would have to be done about 10 meters. In the rush to get on ten as soon as possible, a conventional tuned converter consisting of an r.f. stage, mixer, and variable-frequency oscillator was built. Operation with this unit became more and more a trial of patience as time went on, c.w. reception in particular being plagued by oscillator instability due to overload effects from the transmitter and to ordinary mechanical shortcomings. No one will deny that it is possible to build a 10-meter converter with adequate oscillator stability by taking pains with both electrical and mechanical design, but if there is a simpler way out it seems foolish not to take advantage of it. The way out, of course, is crystal control, using the regular communications receiver as a variable intermediate-frequency amplifier.

The superiority of crystal-controlled receiver front ends has been discussed in several recent

*4557 S. Chelsea Lane, Bethesda, Md.



The r.f. stage is at the left, with its input circut in the small shield compartment. The center knob tunes the mixer grid, and the crystal output switch is on the right. The condenser at the far right tunes the i.f. output.

articles, [1, 2, 3] wherein the conventional approach is to provide separate plug-in or switched front ends, one for each band. By using a combination fundamental and overtone crystal oscillator circuit, however, it is possible to switch the crystal oscillator frequency and cover more than one band with a single crystal. The BC-348 on its highest frequency range, the one including 14 mc, sometimes develops a peculiar tuning instability, and so the converter described in this article was designed to operate on both 14 and 28 mc. This range has been achieved with a single switch and and a single crystal in the high-frequency oscillator. The unit could probably be called a three-band converter, since 21 mc is included in its range, but at this point in world affairs the golden promise of the 21-mc band seems unlikly to be fulfilled, so that we may as well call it a two-band job and be done with it. Although the converter was built with the BC-348 primarily in mind, there is no reason why it should not work just as satisfactorily with any other general coverage communications receiver. Power rquirements are light: 6.3 volts at 0.63 amperes, and 150 volts d.c. at 15 milliamperes.

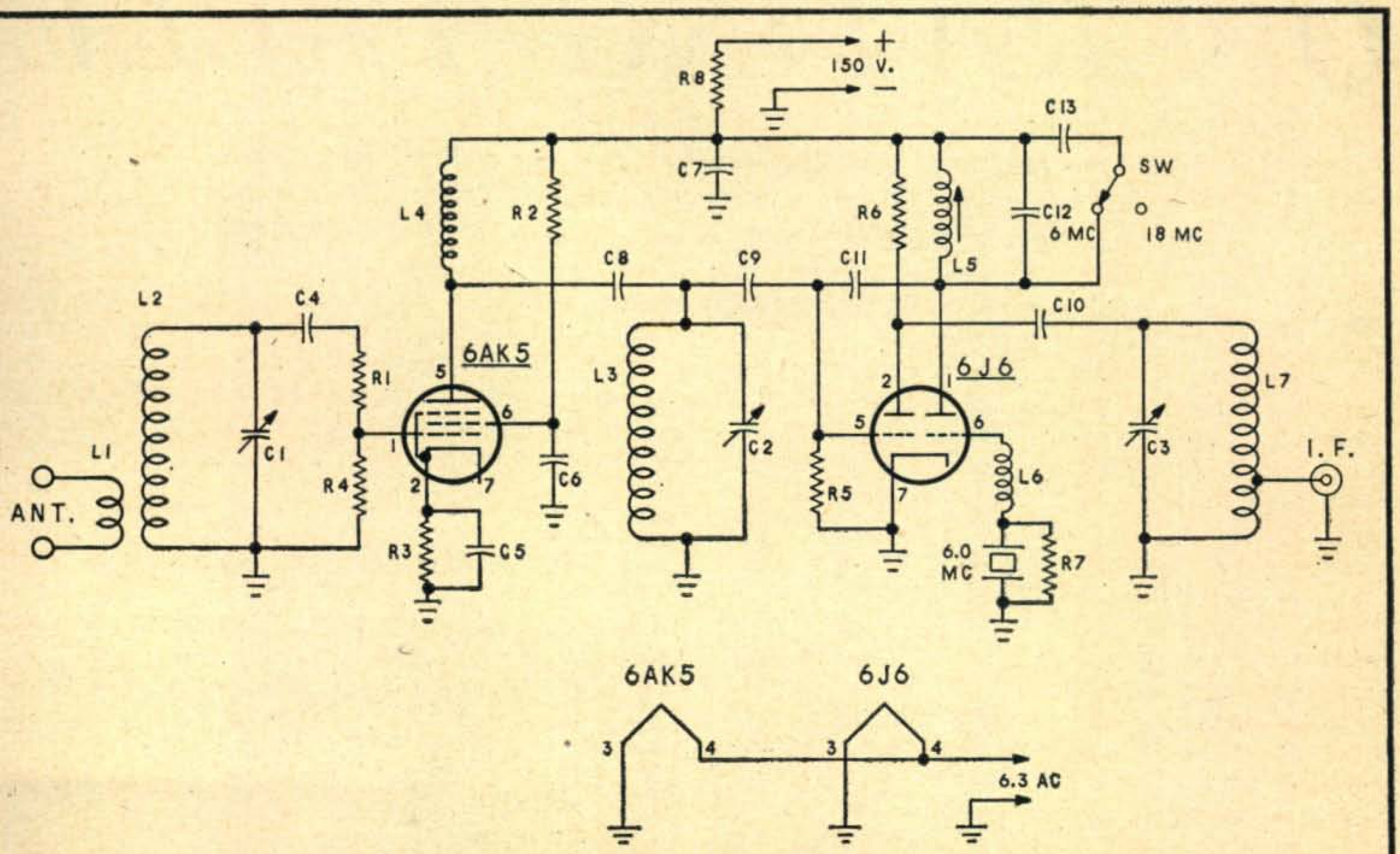
As is shown in the circuit diagram, a pentode-connected 6AK5 is used for r.f. amplification, and a 6J6 performs the oscillator-mixer function. The measured noise factor of the converter is 6 db at 30 mc, using a 150-ohm noise source. (Lest anyone balk at using a pentode amplifier after having read some of the literature on amplifier noise figures, it should be pointed out that cosmic radiation at 30 mc generates noise in a dipole antenna some 40 times greater than thermal noise, so that for 10 meters a receiver noise factor less than 13 db or so is largely a waste of effort.) Tuning condensers of 100 $\mu\mu$f are used for the

(Continued on page 58)

1 C. L. Faulkner, "A Two-Tube Crystal-Controlled Converter for 10 Meters," QST, August 1950, p. 30

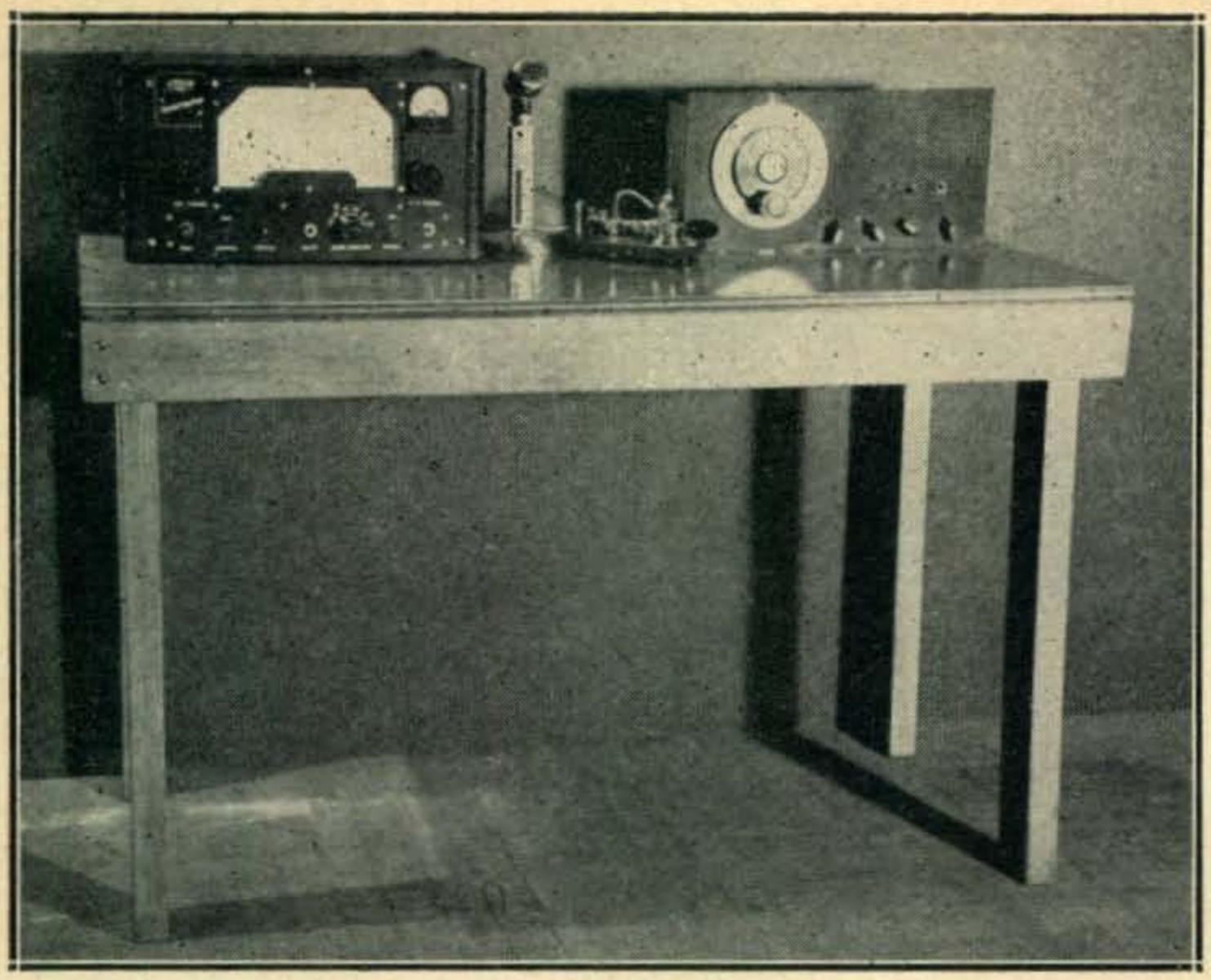
2 E. P. Tilton and C. V. Chambers, "Crystal-Controlled Converters for V.H.F. Use," QST, September 1950, p. 11

3 R. P. Haviland, "An Advanced Amateur Receiver," CQ, October 1950, p. 12



Circuit of the single-crystal multi-band converter.

C1, C2, C3—100 $\mu\mu$f variable (Hammarlund HF100)
C4—50 $\mu\mu$f ceramic
C5, C6, C7—500 $\mu\mu$f mica
C8, C9, C10—100 $\mu\mu$f mica or ceramic
C11—2 $\mu\mu$f ceramic
C12—20 $\mu\mu$f mica or ceramic
C13—300 $\mu\mu$f mica (See text)
R1—33 ohm composition, 1/2 w
R2—2000 ohms, 1/2 w
R3—240 ohms, 1/2 w
R4, R5—1 meg., 1/2 w
R6—0.1 meg., 1/2 w
R7—75000 ohms, 1/2 w
R8—1000 ohms, 1/2 w
L1—4 T, No. 14 enam., 3/4" inside diam.
L2—8 T, No. 14 nam., 3/4" inside diam.
L3—8 T, No. 14 enam., 3/4" inside diam.
L4—85 T, No. 28 enam., 1/4" diam. form (1 meg., 1 w resistor)
L5—14 T, No. 20 enam., National XR-50 slug-tuned form
L6—40 T, No. 30 enam., 1/4" diam. form (1 meg., 1 w resistor)
L7—26 T, No. 24 enam., 3/8" diam. form, tapped 4 T from ground end



NEIL A. JOHNSON,
W2OLU*

Although designed to double as a home station work-bench, this simple design is also a thoroughly satisfactory operating table.

a Portable OPERATING TABLE

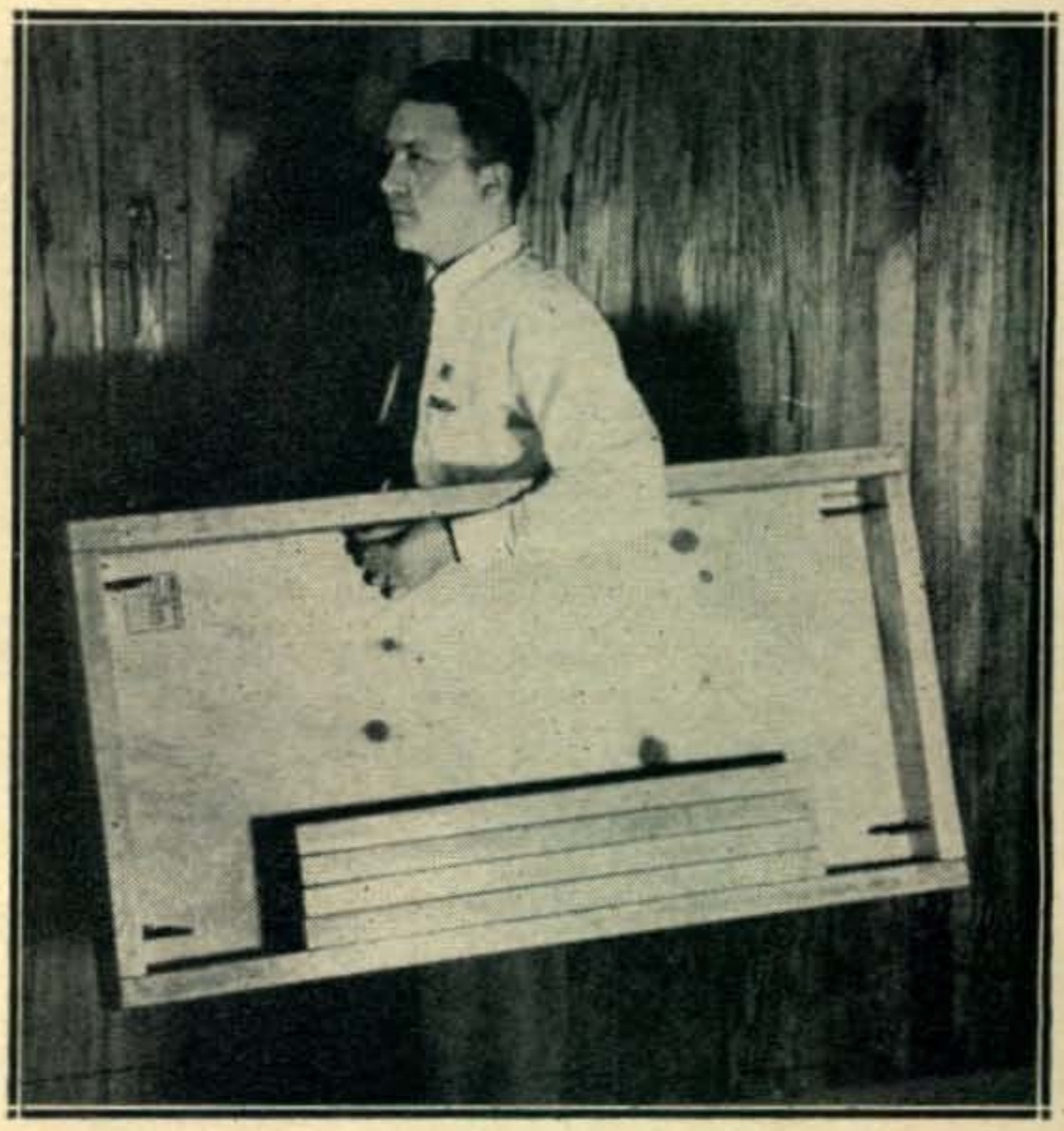
Have you ever used a rickety bridge table for a Field Day operating desk? Is your XYL happy when you use the kitchen table as a work bench? Here's W2OLU's economical answer to both problems.

SOME TIME AGO, the writer took up hammer and saw. By carefully applying the "modular" principle of construction, a very functional operating table was turned out at low cost. This table has seen two years of service since that time; and it has been called upon to serve as operating position, transmitter rack, and general work table. This last usage seemed a misapplication of what the rack type operating table was made for[1]; and upon a move to slightly larger quarters, the OM decided upon a separate and sturdy work table, if such an item could be easily and economically put together.

Last summer, while spending our three weeks summer vacation along one of New England's beaches, we had thrown together a very crude table; a piece of plywood formed the top, and although the whole thing was dismantled after Labor Day, and carted back to town, the germ of an idea had been born. Consequently, we had a fairly good idea of just what was wanted when we set out to plan our new worktable. Also, heard from the dark, a small gremlin persisted: "Say, pal, why not make that woik table so you can easily dismantle the whole thing?...maybe you could take it to the beach next summer." This inspiration seemed the best of a whole series of thought trends; so the resultant table serves not only as a very solid work surface for the ham shack, but it may be easily taken apart for transportation to the beach, or to some field day location. Re-assembling the table is also quite simple.

Modular construction, in this instance, implies the use of standard lumber sizes, in order that a) no wastage is involved, and b) labor is kept at a minimum. Thus costs are kept down; and the need

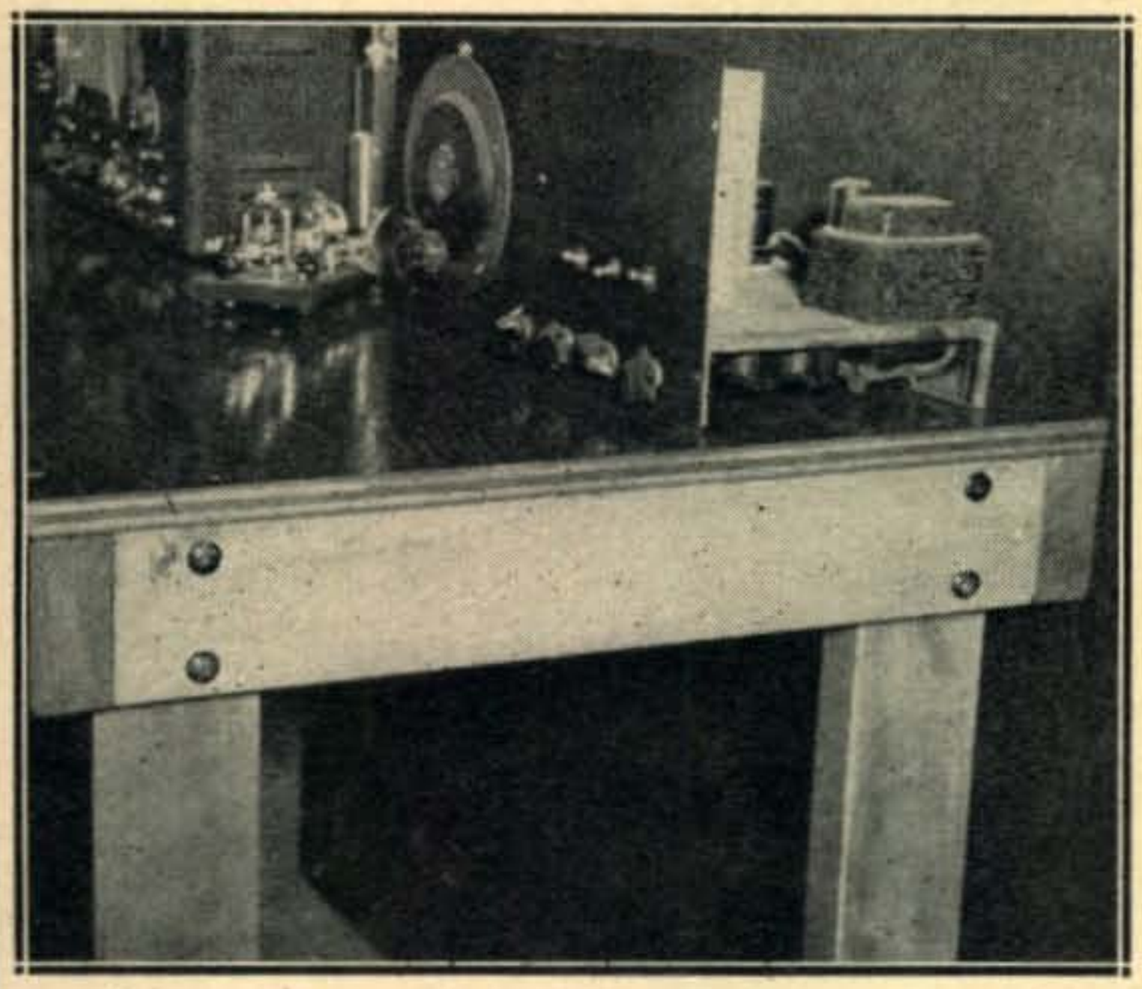
Here W2OLU demonstrates that the thing is portable, with the demounted legs stowing away neatly inside the top.



1 "A Rack-Top Operating Table," QST, Nov. 1948

*10 North 10th Ave., Mt. Vernon, N. Y.

for complex tools is eliminated. Toward this end, we have utilized a standard sized 2-ft. by 4-ft., 5-ply fir panel for the top. The only other lumber needed for the table was the 2 by 4's, each 12 feet long. The front and back aprons, each 4 feet long, are cut from the first two-by-four; also, the side aprons come from this piece of lumber. The 4 legs, each 30 inches long, are cut from the second two-by-four. In selecting lumber, a few suggestions might be in order. First, regarding the plywood: a 5-ply top, perfect on one side, and ¾ of an inch thick is recommended. For the apron and the legs, we wanted to make the table strong enough to withstand considerable pounding with-



Two carriage bolts through each leg provide necessary rigidity. The varnished top resists scratching, and can be refinished easily when necessary.

out having it bend or sag; weathered 2 by 4's' preferably free from knots, will do this as well as finished lumber, and they will have less tendency to twist or split. If you desire to make the work-table look pretty, as we did, you may "clean up" the 2 by 4's, using a plane and sandpaper to take off the outer layer of discolored wood. However, this entails needless work and in no way does it increase the serviceability of the table.

In this table, 16 brass wood screws are used to tie the table top to the apron. Since the table will be used for all types of work, and in different locations, we wanted to avoid using screws that could become rusted. Brass screws can be twisted apart easier than steel screws, so take it easy while driving them in the wood. Drill out the hole first with a small drill, and use a little soft soap for lubricating the screw threads as they go into the wood.

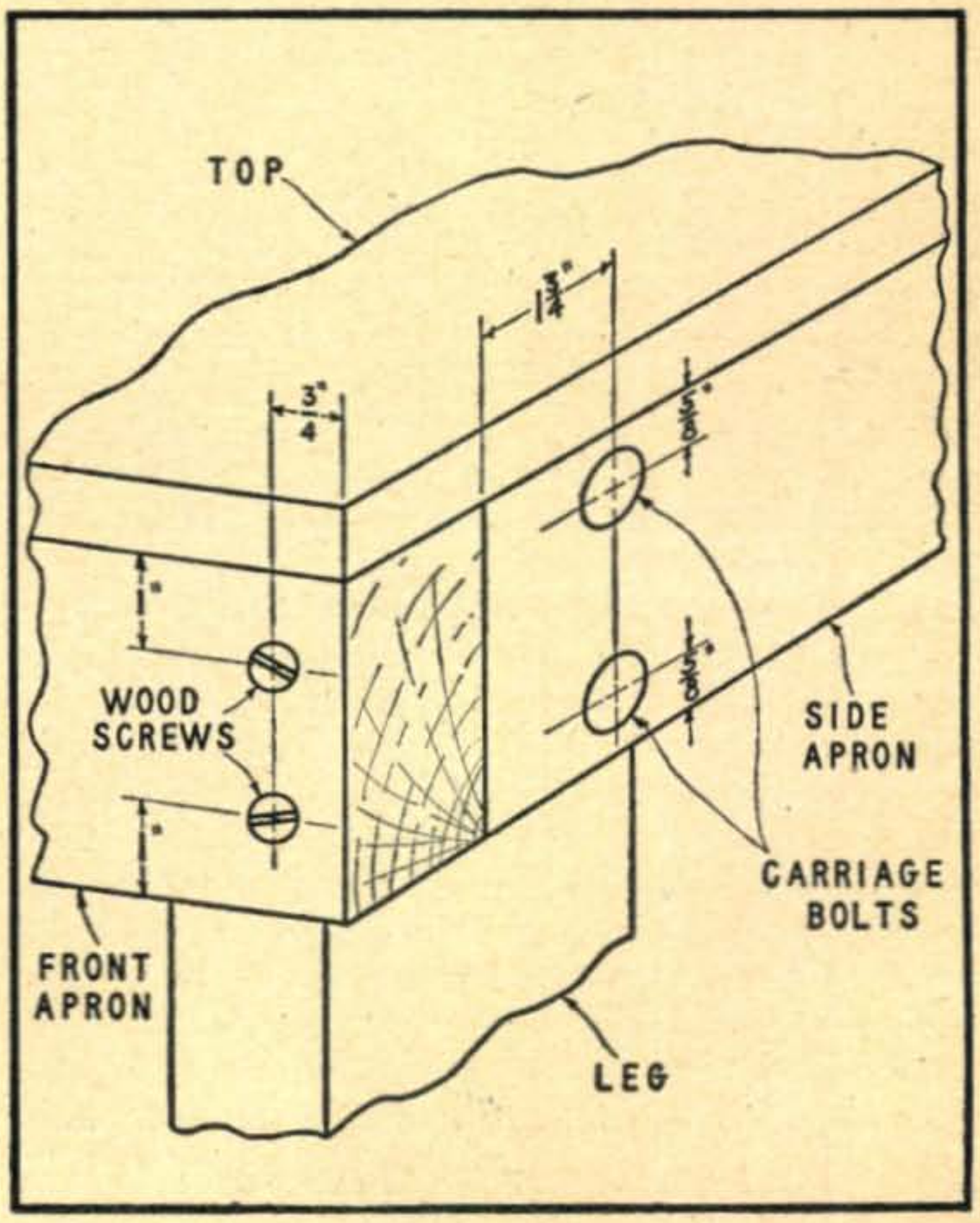
Steel wood screws are used to tie the front and back aprons to the side aprons. These are number 12 flat head wood screws, 3½ inches long. Get these to go in as tight as you can without chewing up the heads. It is advisable to use a small drill hole here to get the wood screws started. The corner plan should be *followed carefully,* in order that the wood screws do not conflict with the carriage bolts in their location. The carriage bolts are used to hold the legs to the side aprons, and 3/8 inch holes may be drilled to provide clearance for them. A better plan is to use a 5/16 inch drill; then ream or file slightly to permit the 3/8 inch bolt to fit snugly. The table can be left unfinished, or it may be waxed or painted. In our case, we sanded the table down, then stained it with light oak stain. This was touched up again with 4/0 sandpaper and then given two coats of varnish, mainly to please the XYL. The cost of the wood came to $5.00; this was several months ago, and prices are now about 20% higher. Hardware will cost another forty or fifty cents, and even with the deluxe treatment of the finish, paint should not cost more than a dollar or so.

The table knocks down very easily, and if much use is to be made of this feature, wing nuts are suggested for the carriage bolts. When travelling, the whole table is only about 4½ inches thick, and stows neatly in back of the front seat in our pre-war car. Thus it should fit easily into all of the post-war cars. The table has been in service here at home for six months or so, and no bugs have developed. If we had to do it all over again, the design would go unchanged. In short, we like it.

PARTS LIST

1	pc.	5 ply fir plywood ¾ inch thick, 2 ft. by 4 ft., perfect one side.
2	pc.	2 by 4, each 12 feet long
18	#10	Brass wood screws, 2 inches long.
10	#12	Steel wood screws, 3½ inches long.
8		Carriage bolts, ⅜ inch diameter and 4 inches long, with nuts and washers.

Hint: Number the legs for easy reassembly!



Rayo' to the Rescue

W. W. PURVIS, W2BK*

ALL mat-teeral used in this here story is true and correct. Anybody takin' offense, or gittin' mad at it, (either one) will be taken care of by a certain gent' in Washington that is handy with his mits; if he ain't too busy parachute jumpin'.

The inter-estin' and informative conversations that is takin' place on the ham rayo bands these days is boostin' rayo set sellin' up over television, and it might even 'liminate television altogether. And small wonder! What could be more interestin' than knowin' that some guys is preparin' for 'mergency with class H loopholes and XB longshaped wire neutralizers? And how would we find this out if it wasn't for ham rayo, which gives us a chanced to hear it wid our own ears? The very thought of dis is wunnerful, to say nuttin' of what leckdrit inventions was bein' used back in world war figgers one and two. I don't know how long things like this has gone on, an' I wouldn' even a knowed it now if it wasn't for heavy stadium on the rayo durin' da 'mergency which is now in progress.

Things is coming to a pretty pass an' everythink's changed. Instead of listnin' in to some nice music on da rayo, I gotta git *news*. I ain't had hardly no rest atall since da president declared dis 'mergency and sometimes I wished he didn't declare none. Account of the adam bombs that is expected, I gotta git out o' bed all hours and git dat news, git dat news, and git dat news, all time. An' if I don't git it, da world could come to end, adams could drop somewheres, da gov'mint could give out money or John Lewis could rastle on television and I wouldn' be none da wiser. Sometimes I think worryin' over dem adams is gonna drive me nuts. Last week I dozed off between da news and dremt about night mares wid adams bombs droppin' ever'wheres wid me up a tree ontop a mountain where I couldn' git down. If it hadn' been for a guy that come along in a flyin' saucer, I'da still been up there.

A guy's life ain't worth a nickle around here no more! Anyways I gotta be ready and do everythink I can even if it kills me. I'm diggin' fox holes around in da back yard and I got buckets of sand settin' all over da joint. While I'm restin' I'm air raid warden, auxiliary policeman, 'mergency welfare worker, nurses aide, baby sitter an' dog walker. Ontop o' that I got a big sign in da woods dat will make da whole country safe! Da sign lights up an' says WASHINGTON D. C., so dem reds will drop adams there thinkin' they're gittin' da president; an' da rest of us will be safe. I got my house all lookin' like a Russian salt mine, painted wid camoflag. I even keeps swords in bed wid me jist in case them reds fine time to drop in of a sudden. Now if nuttin don't happen after I went to all dis trouble, I'm gonna be awful disappointed.

Other night da stadium was fierce and I couldn' hear nuttin. so I tunes in short waves to da hams to see what dey was doin'. They was drillin' wid roll calls. One guy was bustin' up the whole thing

givin' code lessons, but after while I could git a little of it. I listened to what schemes they was cookin' up an' what they was usin'. 'Mergency net controls din't had no traffic an' nuttin to report, so he wished to be excused. A fell' I think named Rogers Wilco or sumpin like that said they was havin' a 'mergency ham meetin' 8 oclock at da YMCA on the 14th; so I figgers on bein' there myself. Course I aint got no business at no ham meetin', but that din't make no difference as long as I keeps up on this 'mergency stuff.

When the 14th come, I was all set for da meetin', and headed for da YMCA buildin'. Jist so them hams wouldn' think I was no outsider, I wore my 'mergency helmet wid sendin' and receivin' set inside, to prove I knowed somethin' about rayo. I carried extry ear phones wid spare tubes and battrees in my pockets jist in case anythink went bad. I knowed how to whistle CQ letters in code, so I runs into da YMCA buildin' whistlin' CQ, jist to make it look like I was a real rayo ham. Inquirin'

*Wayne, N. J.

at da desk, I was tole the amateur meetin' was up on da forth floor; so I runs upstairs whistlin' CQ. I looked all 'round and found a room wid a lotta fell's sittin' down. One tall ball' head guy with a beard was standin' up makin a speech. I wasn't sure if they was hams because some of 'em looked jist like normal human beins.

Sneakin' up quiet, so's I wouldn' interrupt nuttin' I whispers to da nearest guy. "Excuse me", I says, "is iss da right time to ast a ser'ous question an' git throwed out?"

"Yeah!" said da guy, "What did you want to know?"

"Is iss de amateur meetin'?" I says.

"Yeah, come right in and have a chair," he said.

Boy talk about *up* on stuff, these hams was really *up*. They was about a hunnert years ahead of every ham I ever knowed of. Pictures of all da stars and da moon wid horoscopes and scorpians was stickin' all over da joint. It looked like they musta been makin' rayo contacks wid Venus an' Mars and lotsa places that is outa this world. They knowed more about da stars than Metro Goldwind Mair hisself, an' they was talkin about planets too.

At first I din't ast too many questions because I din't want 'em to git to figgerin' I didn't know nuttin. I jist sat dare wonderin' what things was all about an' two guys give me books to look at. One fell' tole me he wrote da books. I din't look at the books right away because I wanted to be polite and make believe I was inter-ested in what da big ball' hed' guy was talkin' about. Besides I probbly wouldn' unnastan' no rayo book no way. Ever' onced in a while I fiiggered these guys must be some kinda nuts or maybe was cookin' up a new scheme for upper air rayo contacks. Anyways I figgered on humorin' em till I found out what was up.

"About 45 million lights, years ago", da big guy was sayin', "galaxies was bein' sent into da spectrum on different defractious wavelengths", or sumpin like that. It was gittin' inter-estin', but I din't unnastan' it all because I come in too late. Some other fell's got up and tole what they knowed on da subject, an' I was gittin' ashamed because I was almost de only-ist one what hadn' said nothin'. I figgered them guys was gonna think I was a dope or wasn' no ham atall.

Makin' speeches is jist my meat! I always can give out wid a mean spiel, even if I said so myself. I hadda show them guys they wasn't so smart, so I stands up after while an' speaks to da crowd. "Gentlemens", I said, "I am glad at dis opportunity of speakin' to youse tonight on da recent chains of events dat brought on dose brilliant conclusions." Then I busts out wid some reg'lar ham talk like I picked up from listnin' in to 'em. I says. "I been usin' a pole up ontop my roof dat took four men to put it up there. Then we found out we got better results wid da wire jist hooked on da tin roof, so we took da pole down. Therry-etically the set-up all boils down to this and stuff like that. And don't forgit ohms law there and all that. The co-tangereen multiplied by the co-signs there."

You shoulda saw them guys lookin' at me! There musta been 35 guys in da joint an' neither one looked like they knowed what I was talkin' about. They was watchin' me kinda queer like as if I was Christopher Columbus jist in from Egypt on ex'gurshion. The big ball' head' guy was stumped too I think, because he never said nothin' back to me. All he said was somethin' about a lecture on television from some college that was comin' on in a coupla minutes. He turned on the television set there in da room but da pitures didn't come in good. They was jumpin' up and down so bad we couldn't see nuttin'.

"Jist a minute", I says, "lets have a look at dat set. Maybe we kin fix it".

"Do you know anythink about it?" asts da big guy.

"Sure," I says "youse is got da wrong faze inversion match up or a loose dis-connection. We gotta check da aerial". Then looking' out da winder I seen da wires went out on a slantin' roof. Account of there was snow on there, I gits hold of a ladder and ties it to a chair wid some heavy twine so's I could stand up on it, out on da roof.

What happened next was da most wunnerful thing I ever seen! I gits out on da roof and stands on da ladder which was tied to da chair inside da winder. I think da twine musta broke, because I started slidin' down da roof ontop da ladder. Boy, I picked up speed dat was terrific! I took off down an' done a double bucket roll, somerset an' hammerhead power off whip up stall, all in one. I seen a limb on a tree goin' by so I grabbed it. Da limb busted off an' I seen another limb comin' up, so I grabbed dat too, an' it busted off. I hit da ground feet first an' was knocked down on my back side. I bounced up and come down ontop my head. When I got up my feet felt like they was on fire. To cool off da feet, I walks to a creek and gits in with shoes an' all on.

I don't know how I got home, but next day da

(Continued on page 58)

Go Fly a KITE

JIM CONKLIN*

Kite flying may be old stuff to most of us, but it's no longer kid stuff when you get up to designs like this big triangular box. Here's one way to divert the family while you operate portable this summer.

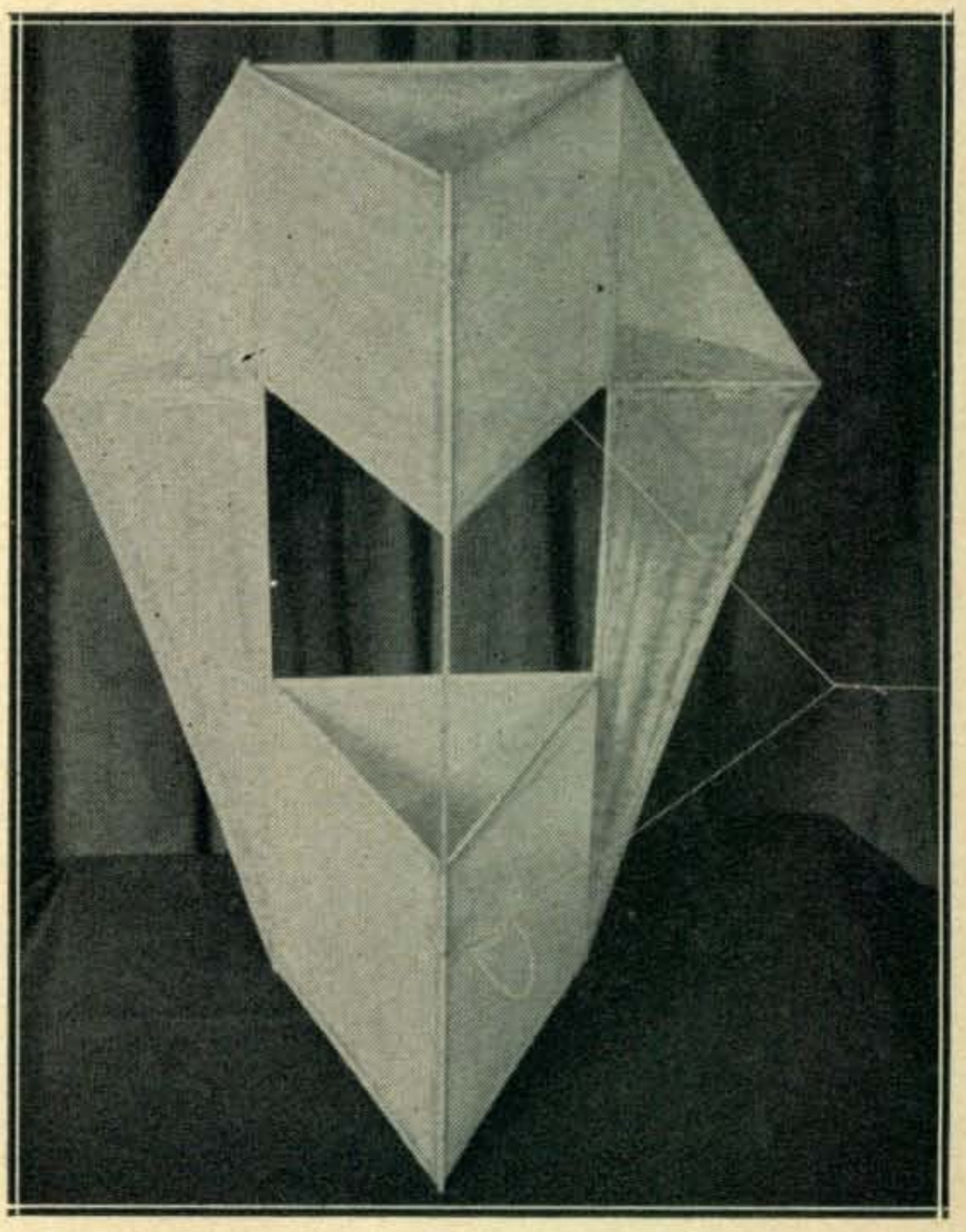
FOR YEARS, amateurs have been talking about "sky hooks." Most have been built from the ground up, although a few articles have appeared about using a meterological balloon or the kytoon (kite balloon). Even old Ben Franklin conducted some field-day work with a kite. Kite-flying is a facinating subject, and very helpful on field days when working on 80 or 160 meters, but most hams have done little about it.

A few months ago, Commander E. M. Little, USN, brought his ship to the Mare Island Naval Shipyard for overhaul, and immediately began to show us all up on kite flying. When ours were bobbing all over the sky, he would send two or three up on a mile or two of string, and they would stay in the sky for days. Some of our kites were the common Dutch or tailless kind, others were boxes made of aluminum rods and cloth, or the ones packed with Mae West radio sets in aircraft life-rafts. But after considerable experience towing them across the Pacific ocean, Commander Little has settled on a triangular box with side wings, similar to the one pictured.

A box kite requires matching the members in strength, size and weight; careful assembly; and proper adjustment of the string. The triangular box with its wings, however, is more easily adjusted and flown, and is satisfactory in a wide range of air speeds. It readily allows enough lift for its weight plus a half-mile or more of heavy string, with three or four pounds of lift remaining at the bottom of the string. This is much less than one kite used for military purposes (before the airplane was invented), which was 36 feet long and lifted a man 100 feet into the air, but the little triangular box will fit into the back seat of a car, and is about all that can be handled conveniently when there are strong surface winds.

Construction

To construct the kite, obtain some ¼-inch square, or slightly larger, sticks made of white pine or spruce. Cut three of them 49", one 36" and twelve 15" long. In order to arrive at the framework shown in the second photograph first construct the rectangular back. Lay out two of the 49" sticks marked *a* and *b* in Fig 1. Starting ¼" down from the ends of *a* and *b*, secure a fifteen-inch stick, *e*, between them. Drill a small hole to take a stick-pin or small brad with a tight fit but without splitting the wood, and glue the joint with Testor's *formula A* cement or DuPont's household cement. Fifteen inches down from *e*, insert the second cross stick, *f*. One-quarter inch up from the bottom end of the long sticks *a* and *b*, put in stick *h*. Stick *g* goes in 18" above *h*.



Using 60 and 30 degree miters, prepare the remaining eight fifteen-inch sticks for mounting, to complete the four triangles *ejk*, *flm*, *gno*, and *hpq*. One end of each of the eight sticks should have one miter to fit against the long sticks *a* and *b*. The other end of each of these eight sticks should have two miters, one so that *j* and *k* will fit together, and the same with the other three pair; the other miter is to form a flat surface at the ends of *j* and *k* and other pairs, on which the keel strip *c* can later be laid and secured to all four triangles.

Pins should be used to hold in place all these

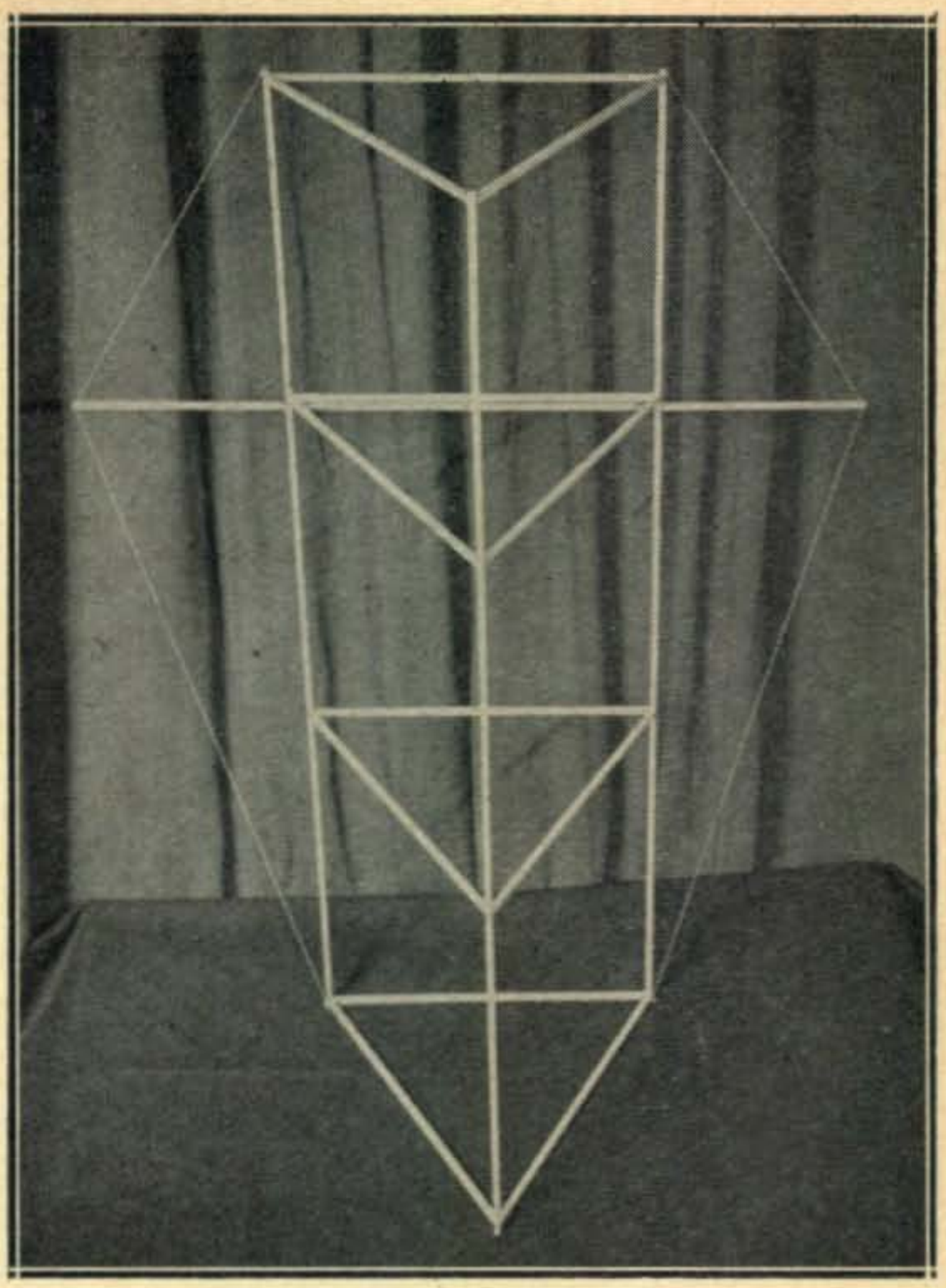
*Jr. op. at W3VQ-W3MVV/KH6, Pearl Harbor, T.H.

eight sticks, and the keel piece *c*, which should also be cemented when attached. At this time, a few turns of thread can be wound around the joints to strengthen them and to hold some cement on the surface of the joints.

The 36" wing stick *d* can now be fastened to *a* and *b*, beneath them and about one inch below *f*. Thread and cement are sufficient to hold this piece without a pin. It is a little easier to let this stick go until after the two ends of the triangular box are covered, if care is taken to mark which stick is *c*, to avoid the unbalance which will result if it is later confused with *a* or *b*.

A very light kite can be constructed by covering it with model airplane paper, but this covering may blow out in very strong winds or in a rain unless it is sprayed with airplane dope. Kitchen waxed paper is satisfactory. Cellophane, such as is obtained in rolls from the frozen-food sections of the mail-order houses, is strong unless the edge rips. This trouble can be prevented by using scotch tape to secure it to sticks and around strings so all edges are protected. Tracing paper (apparently an oiled parchment) has stood up in a light rain. Light, strong cloth may also be used. Scotch tape should always be on hand to repair rips.

The cellophane or cloth may be stretched around the upper and lower parts of the triangle sections, and fastened. With paper, it is probably as easy to cement in place three separate rectangular panels at each end of the frame. The frame will be wabbly until the covering is put on; the covering is a very important strength member and, therefore, should be stretched tight. After the covering is in place, the kite becomes rigid.



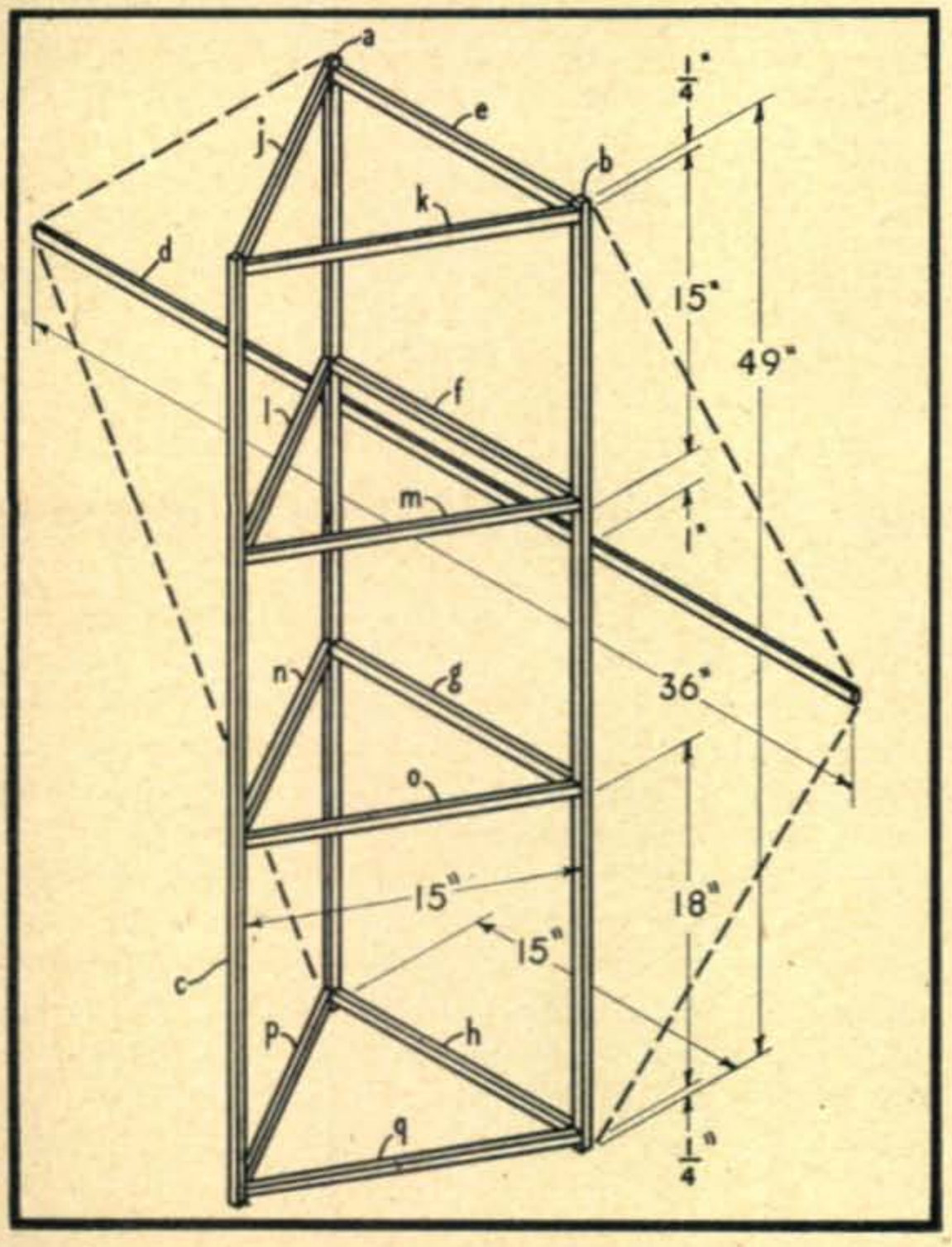
The completed framework before the covering is applied. It is just over four feet high, and three feet wide at the wing stick.

Next, slot the ends of the wing stick *c* with a coping saw or other tool. Tie a string to the upper ¼" extension of *a*, run it through the slotted end of the wing-stick *c*, and secure it to the lower ¼" extension of *a*. Run a similar string between the ends of *b* via a slit in the other end of *d*. Now cover the triangle formed by the string and *a*, and cover the similar triangle formed by the string and *b*.

It is necessary to keep both halves of the kite physically equal so that they will have the same lift; if this is not done, the kite may tend to circle in one direction. Similarly, the weight of the materials and their distance from the center should be the same on both sides to keep the kite balanced. A little extra scotch tape or unnecessary material is enough to unbalance it. Check the balance of the kite by hanging it by the keel stick *c*, after the bridle has been attached. The balance may then be corrected by pasting paper or scotch tape to a wing.

The bridle should be attached to points along the keel strip *c* that will minimize the strain; the best places, therefore, are along the central part of the two covered triangular boxes. Place a piece of scotch tape over the stick and the covering about five inches down from the junction of *j* and *k*, and also the same distance down from the junction of *n* and *o*. Punch small holes through the scotch tape and covering so that the bridle

Fig. 1. Details of the frame, which is made of ¼" square stock.

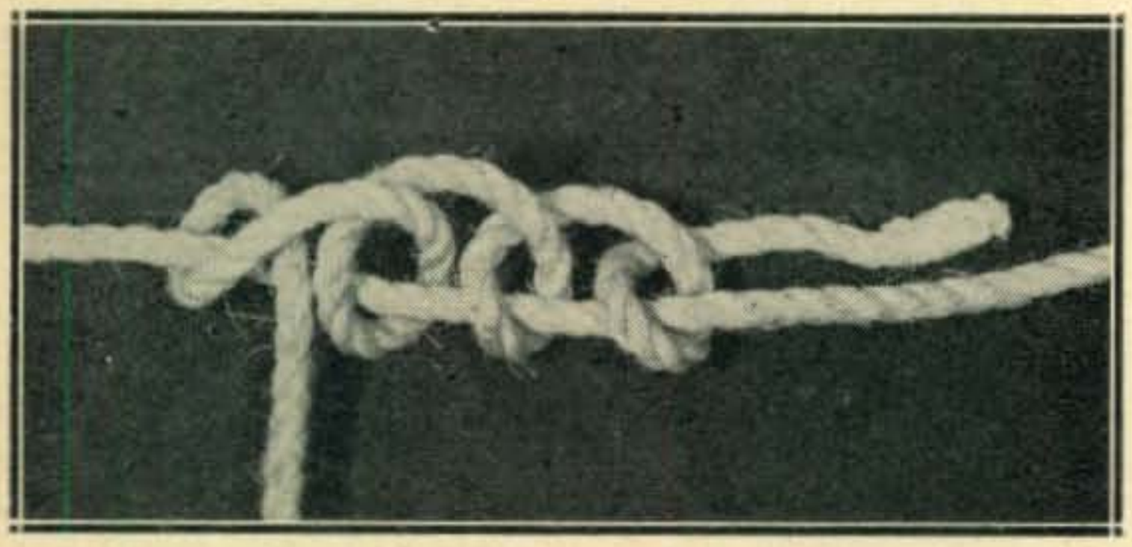


string can be tied several times around the keel stick *c*. Use a bridle about 38" long. The kite string will be attached to a point on the bridle opposite *l* and *m* in a light breeze, and a little higher up in stronger wind. An automatic adjustment can be installed by making the bridle string a little long, and tying near its bottom a series of rubber bands that will stretch about six inches on a 3-pound pull. These rubber bands should short-circuit a loop of the bridle string so that if they should break, the bridle string is still intact.

The Kite String

We have been using a sail twine made up of six threads, obtained from American Thread Company in large spools. Beeswax was rubbed on it as it was reeled. Tests in the shipyard industrial laboratory show that it breaks between 18 and 19 pounds if it has no knots. With the best knot we have devised, it breaks at a little over 12 pounds at the knot, although it should be possible to splice the twine like rope without loss of strength. Another type of cord is serving twine, used to form cables of numerous wires in telephone central offices and radio stations. This is heavily impregnated with beeswax, and can be obtained in larger sizes that cannot be broken by hand. The twine should not weigh over two pounds per mile, for a kite of the size described here.

The string can be attached to the bridle with a clove hitch and two half hitches, as shown in the third picture. This can be slid along the bridle for adjustment. The knot is a weak point in the system but the lift is seldom up to the breaking point of the twine. We hope to run tests shortly on the breaking point of knots using a simple



The recommended manner of knotting the kite string to the bridle.

form of wire-rope thimble, such as by slipping a piece of electrical spaghetti over the twine before tying it. This would be something like the parlor trick of rolling a cigarette in cellophane so that it may be tied in a knot without breaking the paper.

One must be careful of wear on the kite string at or near where it is tied at the ground. One answer to this, which permits letting the kite out fast to get it out of a dive or reeling it in fast, is to fly the kite from a crank-driven string reel set in a frame. Wood and steel reels are obtainable from anyone who uses quantities of hook-up wire. The core should be four to eight inches in diameter (by building it up if necessary) to facilitate taking in a lot of string per turn. The diameter of the reel should be about four inches or more larger than the core, to hold enough string. It is usually desirable to have two to four miles of string on the reel if much kite flying is to be done, and a few kites lost now and then. The handle fastened to the reel can be stopped from turning due to the kite pull by putting a bracket of some kind on the frame. A peg driven in the ground is needed to keep the frame and reel from being dragged along the ground by the kite unless the assembly weighs over ten pounds.

Up She Goes!

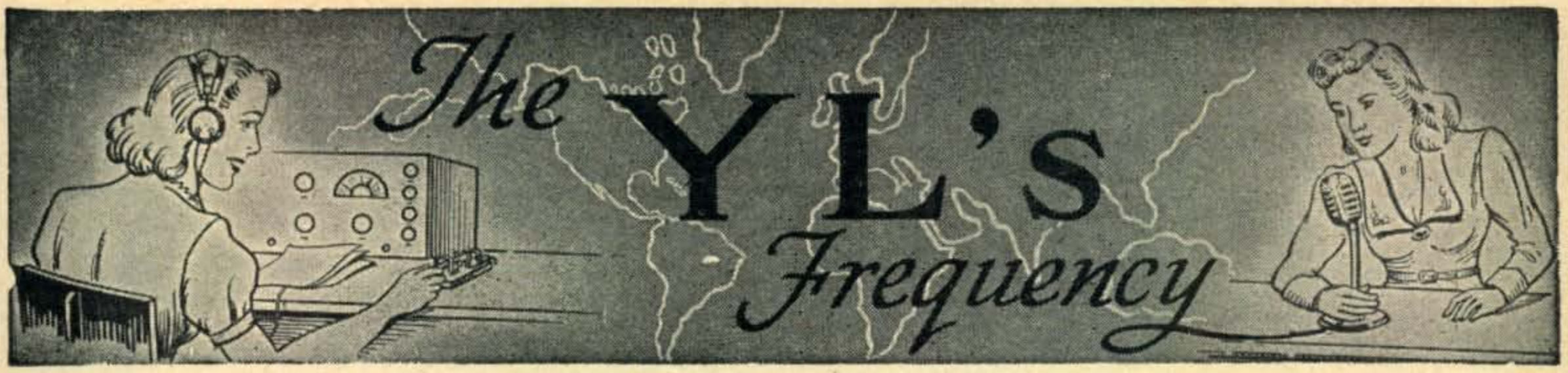
If a kite is stable on the ground, and the wind is not gusty or irregular around buildings and trees, the kite can be flown right out of the hand. A better way usually is to have someone hold it about fifty yards downwind and let it go when the wind is strong. In this way, the kite is likely to take right off and climb quickly for the first 100 feet or more, to a point directly overhead, where it will take out more string rapidly without much likelihood of going into a dive. If it should dive, let out string rapidly until the kite starts to right itself, even if it closely approaches the ground. With the string let out fast, it may land gracefully, whereas with a tight string it may crash in a dive at about thirty miles an hour and be useful only to provide a few sticks with which to make the next kite.

After the kite gets up to about 400 feet it will usually show much greater signs of stability than when it is in the variable surface winds. When it is up a half mile to a mile, it may fly for days when there is little evidence of any wind at all on the surface. For that reason, it is best to let a kite well out though its main purpose may be to hold up only a few hundred feet of antenna wire.

It should not be necessary to make special adjustments on this type of kite if it is physically balanced when tested on the ground. However, the kite can be made more stable if necessary, and able to take stronger winds, by placing a backward bow in the wing-stick *c*. This can be done by tying a string between the ends of this stick, and tightening it carefully while bending the short wings backward. A tail may also be added at the bottom of the kite. However, instability of this nature, requiring such drastic measures, may mean that the kite will get into trouble when it is hauled down.

Like aircraft, kites are in the greatest danger while landing. They are most inclined to circle and dive when the string is hauled in, especially as they get within a few hundred feet of the ground. It is frequently necessary here at Mare Island to let the kite stay up until late at night or early the next morning when the wind velocity will be lower. Kites may be put up in a large field and moved to more congested locations. Where telephone wires interfere, the kite string can be let out to a knot and cut at that point; then a string and stick can be tossed over the wires so that the end of the kite string can be moved over such obstructions.

(Continued on page 53)



Conducted by LOUISA B. SANDO, W5RZJ*

HOW MANY OF YOU TV viewers saw the wedding of W5NXH and W9GQQ, Myrtle Thomey and Sam Jamieson, on the Bride and Groom show on Feb. 15th? They hadn't planned it that way—but who can say what will result from this hobby of ham radio! In fact, it was all because of ham radio that they got together in the first place.

"It all started back in 1949—June 3rd, to be exact," explains Myrtle, "when we first made contact on 20-meter phone. One schedule led to another which budded into a friendship, and a visit to Laredo, Texas, by W9GQQ, 'to see what this voice looked like.'" Apparently he was favorably impressed, as was W5NXH, for in August, 1950, Myrtle and her mother paid a return visit to Granger, Ind. This visit resulted in wedding plans with the event set for Feb. 15th in Laredo. Their schedules on 20 meters continued all this time with their audience of listeners growing each day. But plans for the wedding in Laredo were abruptly changed at the last minute when the Bride and Groom TV show heard of their unusual romance via the air waves and invited them to appear on the program, televised by CBS in New York City. The wedding took place at 3:20 p.m. First they were interviewed by the MC and told the story of how they met. "We both were very nervous," says Myrtle, "would probably have felt more at home during the interview if only we could have been hanging onto a mike!" Then while their favorite love song was being sung they went to the chapel for the wedding—which also was televised. This was followed by a reception and wedding gifts. Following a honeymoon to Varadero Beach, Cuba, Myrtle and Sam are now residing in Granger, Ind.

Youngest YL

Look for Myrtle on 80, 40, 20 or 10 operating as W5NXH/9 or using her OM's call. The rig is a pair of T20s and runs 125 watts into a 2-element rotary beam or a 1200-ft. rhombic.

Newest candidate for title of youngest YL is W7PEF, Clio Marie Hood, of Tucson, Arizona. While Clio doesn't break the record (held by Jean Hudson, W2TEF, licensed at 9 years, and Jane Bieberman, W3OVV, licensed at the age of 10), still she is one of the youngest YLs to get her license and to be operating on the air at present. Clio is 13 and an eighth grader in junior high school, where she received her training in the Kilowatt Radio Club that meets daily after school hours. The only girl in the 12-member club, Clio has many other hobbies, among them piano, choral work, twirling, ballet, animal drawing, reading and handwork. On the air W7PEF uses a Hammarlund 4-20 transmitter and an S2OR receiver, operating 80 and 40 c.w. and 10 phone. Clio's interest in radio developed when her father became interested. Both took the exam at the same time last January—only Clio passed! Soon after W7PEF received her ticket she had an FB writeup and photo in the *Arizona Daily Star*. Our thanks to Edith, W7LIZ, for sending us a copy.

Clio Marie Hood, aged 13, is now on the air as W7PEF.

Speaking of young YLs, here's another who has had her license only a short time. W8GEN, Carolyn Coven, of Toledo, Ohio, is 16 and a junior in high school. She got her ticket last November after studying for it all on her own, for she says she didn't know any other amateurs at the time. Favorite bands are 160 phone and 40 and 80 c.w.

*Address all correspondence to 216 North Pine Street, Albuquerque, New Mexico.

She uses a 40-watt transmitter, SX-25 receiver and 260-foot center-fed Zepp antenna, plus a couple of ARC-5s, one ECO, for 40 and 80. During the summer W8GEN plans to build her own rig for 10 meters, consisting of a 6V6 modulator, 6L6 oscillator, and a pair of 1625s or 807s push-pull in the final. And she's now working for her Class A. You're a good example for a lot of us, Carolyn!

YLRL

Every month we mention YLRL—Young Ladies Radio League—in this column and every so often tell you how you can become a member. Judging from recent mail it's time for a repeat. W1SAS writes: "I wonder if you would be willing to forward data concerning the YLRL to a prospective amateur whom we hope may be obtaining her ticket in the near future." And he adds: "I read with interest your monthly reports in *CQ* and am at a loss as to why *QST* does not conduct such a department." Thanks, Dick! And from W8GEN: "I have held an amateur license for several months now and having heard and read so much about the YLRL I was wondering if I could join, and how?"

Of course YLRL is glad to welcome new members, and here's how you can go about it. Write to the secretary, W4HWR, Hilda Andrew, Apt. T-421-E, MacDill Air Force Base, Tampa, Fla., and ask for an application blank. After you have completed it, return it to Hilda with your dues (dues are $1 a year), and she will enroll you. You will then receive copies of *Harmonics,* YLRL's own news bulletin published every two months, which will keep you up to date on YLRL activities and what members are doing. As a member you can purchase YLRL stationery and pins, you will be eligible to enter YLRL on-the-air contests, and, of course, you will be welcome in the YLRL nets (although any YL is welcome to join these whether or not she is a member).

YLRL is an international club with 20 countries besides the USA represented at present and membership of about 400. Once again, let us say that new members are always welcome. And a word to present members. Some of you have neglected to send in dues for 1950. All dues are payable in January and secretary W4HWR will have to drop from membership those who do not pay up. Send 'em in now; let's keep YLRL going strong!

While we're on the subject of YLRL, according to ZS6GH the South African YLRL now offers a WAYL (Worked All YL) certificate. To win the award one has to work 25 members of the South African YLRL. Present officers of that club are: ZS4AZ, Annie van der Merwe, president; ZS6LK, Mae Meyer, vice president, and ZS5DZ, Bee Jordan, secretary.

Here and There

Just as the finishing touches were being put on copy for this column, W9TZI and WØGOJ, Ed and Alice-May Drury, stopped by for a visit. Married on April 7th, they are on their honeymoon, and by the time you read this they will have reached their destination—Hawaii. Alice-May was there on her vacation last summer and, if Ed likes it half as well as she does, they plan to make it their permanent QTH. They say the first thing they packed was their ham gear and with their mobile rig in the car (which they're taking over with them on the ship) they'll be all set. Both are Class A and will be working most of the bands. The mobile rig, by the way, is equipped with dual jack and mike so either can cut in on the other in a QSO and add his or her two cents' worth!

As might be expected, this is another ham radio romance. WØGOJ used to work W9TZI on 20 phone, and later they met at a hamfest. Then during the last couple of years when Alice-May needed help with her rig, Ed came to her rescue. After traveling the twelve miles from Carondelet, Ill., to St. Louis, Mo., so many times he practically had a half interest in the Mississippi River bridge, they decided to simplify matters by combining operations under one roof. Congratulations and good luck, folks!

The YL population of St. Louis seems to be on the decrease. A card from WØDBD said she and her OM were on their way to San Bernardino, Calif. Leta's OM has been in both world wars and has again been called to active duty.

Luck was with us when we dropped in on W5CA and his XYL recently and found W6CTO and his XYL, ex-W6CTE, visiting from California. Virginia let her ticket expire some time ago when homemaking and children took up all her time, but she was active on the air back in 1928-29 when YL operators were mighty few and far between. During high school Virginia worked part time in a restaurant where two hams were frequent patrons. They always conversed using code and this intrigued Virginia to the point where she "had to learn it too" and then got on the air. Of course, hamfests followed and it was at one that she met W6CTO.

W7KSQ, Phillis Coe Long, and her OM, W7ENC, had a jr. op. born in December. Though they be late, congratulations!

With 10 meters dead W5IZL, Ruth, and W3NNS, Anabel, have been keeping their daily skeds on 40. Ruth tells us that W3NNS's OM, W3AAW, is being transferred to Alabama in June, with Anabel to join him when their jr. op. goes into service. Guess that means some new calls for the Giffords.

W1FTJ and OM, W1BFT, entertained their Concord Radio Club with about 25 members showing up for the gabfest, colored movies, apple pie and ice cream. Dot says it kept her busy all day baking enough pies!

After telling you about the new TV show, Occupation Housewife, that W6NAZ was in, we hear it is off the air. But Lenore is back again with Classified Column over KTTV. Lenore says she misses her beam. Still has a kw on 20 but is giving 80 a whirl with 2 watts to a vertical wire. W6NAZ reports a new kind of QSO with W2OVV, Mina, and her OM, W2LLZ. They both have tape recorders so they have a little spool of tape which shuttles back and forth between California and New York via air mail. "Not as

(Continued on page 63)

The Monitoring Post

gleaned by THE BRASSPOUNDER

CURRENTLY ACTIVE on 10 and 20, W2AX is rounding out 36 years on the air with the same call. That's rather something of a record. We'd like to hear of the good old days when spot frequency operation prevailed with 20,000 volts on the spark rig, or other such stories. They are always interesting reading for the youngsters in ham radio. . . . The Easter Pageant out Oklahoma way, covered by the Lawton-Ft. Sill ARC, showed 1,259 messages originated at the Ft. Sill message center; the originating stations were W5FOM, FCG, RIT, FCP, FEC, and K5WAH: W5RXP was on hand with his mobile rg; WØAY, K5FAJ, and W5HJV also helped to get the traffic on its way.

We hope the boys of the Nortown ARC found a cook for their Field Day activities—they've been recruiting one for the past six months; hunger will go a long way toward keeping the score down. . . . W2NAI is again training potential ops for civil defense work, as she did in N.Y.C. just ten years ago—history again repeats. . . . One of the newsiest and most interesting local bulletins we've seen is the Virginia Section Bulletin, compiled by W4KFC. It's full of information and interesting to any ham . . . W2LRW now rates DXCC.

W5FPB, secretary of the Sandia Base CR, notes that this column neglected to mention in the April issue of CQ that the Sandia Base RC Friendship Award is available to those working 25 stations within the Albuquerque area *after June 12, 1950,* and that the correct mailing address of the club is: Secretary, Sandia Base Radio Club, c/o General Delivery, Sandia Base Branch, Albuquerque, N.M.; 85 stations are operating in the Base area, but 237 licensed hams are listed. . . . Difficulty in getting an urgent message from N. Y. C. to Shiprock, N.M., by telephone brought an appeal from a neighbor to W2BIV to please try his short wave radio to get the message through; W9RBI was the relay station to a broadcast station at Grand Junction, Colo., thence to the addressee during a daily broadcast.

W6RIA made quite a splash in a Los Angeles paper not long ago, with a four-column pix and two-column story; he was pictured at the mike and his gear was neatly stacked in front of him. During high school days in Chicago he was a swimming champ, but his senior year, 1937, brought crippling arthritis and he's been on his back since. In 1939 his first ham ticket put him on the air on Dec. 7, when Jose de Burro, that winged burro pictured on his QSL, came into being, and Jose has been galloping the freqs since, except for the duration. Lately there has been greater activity on the Goofer de Gopher Net for RIA, handling traffic daily with Guam, Hawaii, Kwajalein, and Tokyo. A 50-watt rig is set up beside his bed for nighttime operation, for he retires early. The big rig is nicely set up, and the position of the mike is adjustable on a suspended arm for the convenience of the op. Like many others who are physically handicapped, RIA spends a great deal of time on the air and moves traffic for the enjoyment of others. Equally important to RIA is the subject of arthritis; he's been a "guinea pig" for all sorts of cures and has undergone a great deal of surgery.

Another certificate of Achievement is announced, this one awarded by the Dunsmuir ARC, W6KII,

First 2AX, then NU2AX, now W2AX — 36 years with the same call.

located, as the certificate states:". . . . between the scenic castle crags and the towering peaks of Mt. Shasta in Dunsmuir, Calif., gateway to the Pacific Northwest, in the heart of the Shasta-Cascade Wonderland." Proof of two-way contact with five different stations in the immediate area of Dunsmuir brings a certificate; endorsements will be made for multiples of five confirmed contacts; send your proof of contacts, together with return postage to Dunsmuir ARC, W6KII, Dunsmuir, Calif., and the certificate will be sent to you. W6CFU is the club president.

The Bucktail ARC is a new one, located at Emporium, Pa., with W3OGN as its first president and VBL, secretary. Emergency communications is the club's specialty, and classes leading to ham tickets are being conducted. . . . . VE3JJ is the call of the club station of the West Side RC of Toronto. . . . It is said that after VE3AZX had completed his mobile rig he bought a new Henry J to go with it.

(Continued on page 57)

Conducted by HERB BECKER, W6QD*

As USUAL, W6ENV cranked out a swell column last month while I was out of town. During this trip we had a brief stay in Washington D.C. and "Doc" Westervelt, W4VE, entertained us as well as rounding up W4KFC, W3KDP, and W3JTC. It was certainly good meeting these top notch DX men and I only wish it hadn't been such a short stay. Brother, those fellows have really been injected with a DX vaccine of some kind!

Incidentally, Colonel "Doc" Westervelt has been put in charge of the Fort Belvoir Hospital, which is a mighty fine jump for him.

We also had a short stay in Atlanta and W4TO steered us around to a couple of spots. While there I also met W4JDR and you can guess what we talked about. Well, now let's see what is cooking.

Our heartiest congratulations to the following three DXer's, and we are happy to announce their being awarded WAZ certificates.

258	**W8HUD**	Philip H. Smith	40-174
259	**ZL1GX**	Fred L. Hawthorn	40-122
260	**OK1RW**	Ralph Major	40-153

Now that Saarland has been officially added to the country list, everybody and his brother is sending it in for credit, so we won't try to list all of those that worked him. This would be very tedious reading to you, I am sure.

FR7ZA has been giving a "little" zest to the DX picture lately, and quite a few of the boys have nailed him, including W8HFE. Other good ones Bob added were VK9GB, I5ZC, and ZS2MI.

JA2DS, ex-W7JCU, sends the QTH for C3KK which will be found in the usual place. Dale thinks the rough AC signals we hear drifting across the 20 meter band originate in Manchuria. OE1FF is still at it, but says he doesn't know how long he will be able to stick around. . . . W6CHV is probably QSLing ZK2AA and VR5GA after having worked him on 20 phone. . . .

W1NWO on 20 phone grabbed off FE8AA and FP8AW. . . . W1QXX reports VP4LZ as being ex-W1EEC/KW6, and asks that all QSL's be routed via PY1AJ. . . .

FG7XA and FG7XB are on the air, or at least they are at the moment. This, of course, will be anything but news to you by the time you read it, but if we don't record it some guy will write in and say "I think you are a louse for not mentioning FG7XA, because here is a guy that has sacrificed and gone to Guadeloupe just for Ham Radio". So, consider this duly recorded.

W2ESO is still cranked up on 80 and 160 and Gene has added ZD4AB, FP8BX, and FP8AW on 80. 8AW told him that he had worked 1200 stations in 53 countries during his little sojourn up there. . . . The other day in Phoenix I bumped into ex-W1CH, who is now W7AH, and W2HHF, who has not as yet received his W7 call. . . . VP3MCB signed off operation as of April 25th and is now living in Canada. So, if anyone works a VP3MCB after that date—well, you know the answer.

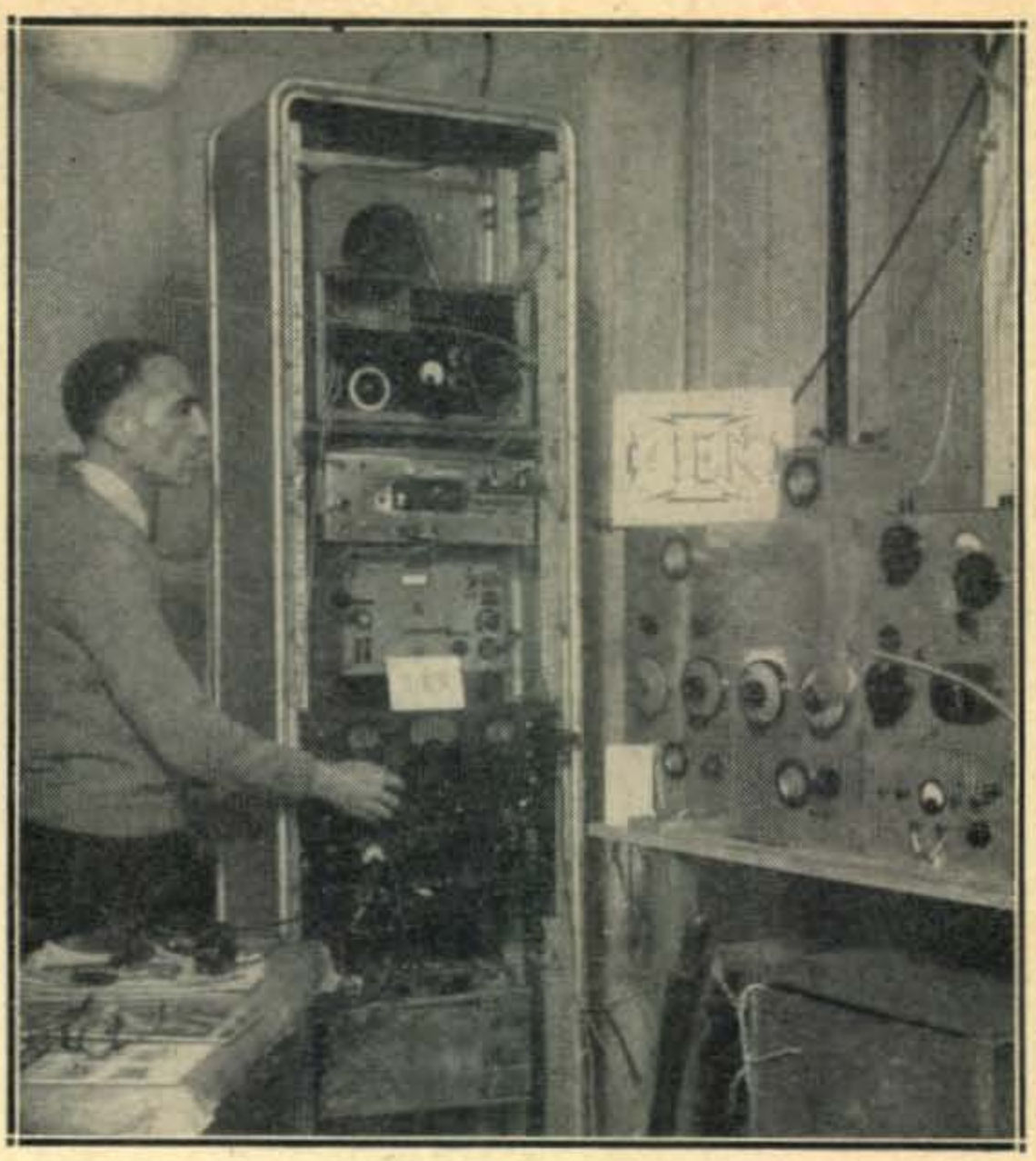
W8VLK is having local QRM problems from his Junior Op. He defys anybody to hear anything at his place when his 2-1/2 year old is bouncing in and out twisting any knob he lays his hands on. . . . W2HAE is on duty with the Naval Reserve and specifically in a patrol plane squadron. He has been flitting around DU1, VS6, and KR6, etc. . . .

HAE says HS1VR is a good one, and CW1TO gets on once in a while. AC4CQ is a Chinese airline pilot, and when he is on, it is phone. . . .

Another W2 to hit the trail is W2BXS and

Last summer WØYXO, left, and WØPNQ, right, paid us a visit and managed to get W6ENV in the middle. Since ENV and PNQ are well over six feet, YXO thought they ought to get down to his size.

*Send all contributions to Herb Becker, 1406 South Grand Ave., Los Angeles 15, Calif.



I1ER, the real old timer in Italy, made many records in the 20's and this, no doubt, was before many of you got tangled up in Ham Radio. As you well know, I1ER is still at it.

family. They are heading for KH6. Jack says he will probably be doing a little Maritime Mobile work and some portable operation in JA and KR6. ... According to a letter from G5JF to HB9EU, nothing new has been heard from AC4RF. You may recall we mentioned in this column a few months ago that Bob had been detained in the town of Chamdo by the Chinese Government....

W5JUF moved from Shreveport to Houston, but is quite sure his old QTH was much better for DX. Even so, he seems to have added 16 new countries during the past couple of months....

Haven't heard much from W2BXA, but I guess Ben decided he had better submit 3A2AB before he completely forgot about it, and then 9S4AA. These both are c.w. His new phone stuff is EAØAB, ZS7C, VP5VB, and CR5AC . . . Even W6TI found a new one in FQ8AC, 20 c.w....

From KH6KL we learn that both he and KH6ACL fly on a cargo airplane to Palmyra Island frequently in order to bring back fish for the Honolulu market. While on Palmyra, KL managed to work a little 20 c.w. and phone, while ACL did some work on 40 c.w. These boys are only on the air from there a limited number of hours, and they ask that all of you who have previously worked a KP6 please *do not* call them. They are interested in working the boys who have never worked a KP6, and therefore ask you to cooperate. They plan on QSLing 100 percent to those from whom they receive cards. They plan on using the frequency range between 7200 and 7300 and between 14300 and 14400.

OY3IGO and his family are going to Denmark during the months of June and July, so of course he won't be on the air. He is still having trouble with his DC mains and usually has only about 180 volt available. When it is up to 220 volts his input is around 250 watts. As far as Ingvar is concerned, every volt really counts. . . .

Incidentally, the antenna in use at OY3IGO at the present time is a half-wave dipole, center fed with 75 ohm twin lead. The direction is North and South, and the height above the iron roof is only about '4 metres'.

W7OHX never worked much DX from Oregon but now that he is located in Morro Bay, California, he's fired up on 80 meters and runs 75 watts. He has worked a flock of ZL's, KH6's, KL7's, and ZM6AK.... W6EFM heard VQ8CB and FR7ZA coming in the short way and managed to nail FR7ZA. Now he is after 8CB.... It is good to see I1IZ in the honor Roll.... As you can see, W8HUD is now WAZ. All but two are on phone. Phil describes conditions this year as "repulsive".

ZS2AT is now a 39'er. UAØKFB in 19 did it. Now, he needs Zone 2. Can anyone help? Arthur worked a few countries, too, including EQ3CY, ZS2MI, and UI8KAA, all on 14 mc.

W4HA helps his totals a little by adding VP5VP, VR1C, EQ3FM, FP8AW, ZK2AA, and LU7ZA. In addition to these on phone was W4RWR/KV4.... W9TQL had a good chat with VQ5AU, who at present is the only one there on c.w. He operates 14056 on c.w. and for phone uses 14136 and 14156. In case you are interested in his occupation he has been on the Uganda Police Force for 20 years. VQ5CB is on phone only, and VQ5DES will be on c.w. shortly, if he isn't on already. 9TQL worked HE9LAA, who is supposed to be HB9IL.

W8CYC worked CR5AA who said he was ex-CR5AM. Another one for Clint is EAØAB, who put in a request for a calendar with a YL picture on it..... W5FXN ran into TA3FAS who said to tell everyone hello. So, "Hello" from TA3FAS. FXN also logged VK9MR and some sort of a station signing FC2AT. Who dat?

W1GKK says he is gong to handle the cards for FP8BX. Send a self-addressed stamped envelop to GKK if you want your card in return.

W. A. Z. HONOR ROLL

CW & PHONE WAZ

W1FH	239
W6VFR	238
W3BES	234
W6ENV	234
W6ADP	231
W2BXA	230
G6RH	228
W6EBG	227
W6SN	226
WØYXO	226
W6PFD	226
G6ZO	226
W6MEK	225
W6SYG	224
W8JIN	224
W6GRL	224
W3GHD	224
W3JTC	224
W3EVW	223
W6AM	223
W8NBK	223
W3KT	222
W3LOE	222
W6FSJ	222
W6ITA	219
W6TT	218
W8BHW	218
WØNUC	218
WØPNQ	217
G2PL	216
W6AMA	216
W9DUY	216
W6DZZ	215
W2PEO	215
W7AMX	215
W3JNN	215
CE3AG	215
W3IYE	214
W6OEG	213
W2AGW	213
W4AIT	213
VK3BZ	213
PY1DH	212
W8BRA	212
VE4RO	212
W6MX	211
W6NNV	211
VK2ACX	211
ZL2GX	211
W6SAI	210
W6BPD	210
W6MJB	210
ZS2X	210
W9VW	209
W2AQW	208
W8HGW	208
W9NDA	208
ZL1HY	208
W6SC	207
W6HX	207
VE7ZM	206
W4BPD	206
W6GDJ	206
LU6DJX	205
W6MVQ	205
W6PQT	205
W6KRI	205
DL1FF	205
W6ZCY	204
W6DI	204
W6PKO	204
VK2DI	204
KH6CT	204
KH6IJ	204
W4CYU	203
W7GUI	203
W6RM	202
W6OMC	202
W6PB	202
W6AOA	202
W6DLY	202
W6TS	201
W6EFM	201
W9KOK	200
KH6BA	200
VK5JS	200
W6RBQ	200
PY1GJ	199
W2IOP	197
WØDU	197
KH6QH	197
PY1AJ	196
W6WB	196
G2FSR	196
G4CP	195
W6UCX	195
W5KC	195
G6QB	195
OK1FF	194
W6TI	194
W6GAL	193
ZL1BY	193
W6VE	193
W6AVM	192
WØSQO	192
G8IG	192
VK2NS	191
W6RW	190
W6SRU	190
W6EPZ	190
CE3DZ	190
W6RLN	190
VK3JE	189
ON4JW	189
W5GEL	189
VK4HR	189
WØNTA	188
W8SDR	186
VK6RU	186
W6DFY	186
W2CZO	185
W1AB	185
W6SA	184
KH6VP	184
W3GAU	183
W2JVU	183
I1KN	183
LA7Y	182
WØELA	182
W6IFW	180
W6EHV	180
W6UHA	179
OE1CD	179
W7OY	179
G3DO	178
W9VND	178
W6LN	178
W7DL	177
WØUOX	177
VK6KW	177
W6UZX	177
CX1FY	176
W6IBD	176
KH6CD	176
VK4EL	176
W6WKU	174
W6CIS	174
W7FZA	174
W6PCS	174
W6KUT	174
W6BUD	174
W8HUD	174
W6TZD	173
DL7AA	173
G5YV	172
OK1LM	172
W6WWQ	172
W6SRF	171
PY1AHL	171
OK1HI	171
VK2HZ	171
W6BAM	170
W6PZ	169
W5AFX	169
G2VD	169
W6JZP	168
W6ANN	167
VK3CN	167
W6LDD	167
W6BVM	167
W6DUC	166
KH6MI	166
W6CEM	166
W6JK	165
VE7GI	165
W6LRU	165
W6BZE	165
W6PH	164
W6EAK	163
W6YZU	163
VE7VO	162
ZS6DW	162
W7ENW	162
I1IR	162
W6PDB	161
W4CYY	161
OK1SV	160
VK3EK	160
W6PUY	160
JA2KG	160
W6MHB	160
W6CYI	157
W7BD	157
WØOUH	157
G3TK	157
W6QD	157
W6BUY	157
ZS6FN	157
W7BE	156
KH6LG	156
W6BAX	155
VK5KO	155
G3AAM	154
G2IO	154
W6KEV	153
OK1RW	153
G3YF	152
VK2QL	151
W6LEE	150
W6FHE	150
W6EYR	150
W6RLQ	150
W6LER	150
W6ATO	149
OK1CX	147
W6LS	147
W7KWC	147
KH6PY	147
W7DXZ	146
W6AYZ	146
VE6GD	146
W6NTR	146
W9NRB	145
W6MUC	145
OK2SO	145
ON4TA	144
G3BI	144
W7LYL	143
I1XK	140
W6AOD	140
W6ONZ	139
W6ID	138
ZC1CL	138
OK1WX	135
G3AZ	133
W6TEU	133
W6RDR	133
W6AUT	133
W6OBD	131
ZS2CR	131
W6IDZ	130
W6BIL	130
W7ASG	129
W7GBW	127
G8IP	127
G5BJ	126
PK6HA	124
G5VU	124
W6NRQ	123
W6MLY	123
ZL1GX	122
VK5MF	121
ZS6CT	113
KG6AL	103
VK6SA	103
W7KWA	98
W6DUB	89
W7IYA	59

39 Zones

W3DPA	220
W9ANT	218
W2NSZ	218
W9RBI	215
F8BS	215
W3OCU	210
W1ENE	209
W1BIH	209
W3EPV	209
W5ASG	209
W2HHF	208
W1JYH	208
XE1AC	206
W5LVD	203
W2WZ	202
W9IU	201
VE3QD	201
W2HZY	200
W4GG	197
W3DKT	197
W9CWE	192
W9LNM	192
W3KDP	192
W1HX	191
W2AGO	191
W1AWX	191
OK1VW	190
W8HFE	190
W8SYC	189
W9MXX	189
W2EMW	187
W1ZL	187
W3JKO	186
WØEYR	186
KP4KD	185
W8RDZ	184
F9BO	184
W9TQL	184
W3DRD	183
W4INL	183
W1DQH	181
W2RDK	180
VE3IJ	180
VO6EP	179
W9FKC	175
W2BJ	174
W2CNT	173
W8CVU	172
W4LVV	171
W2RGV	171
W7PGS	171
VE3AAZ	171
W9LM	170
W6CTL	169
W1NMP	169
W3JTK	169
OZ7EU	169
W4VE	169
HC2OT	169
PY2AC	168
W4DKA	168
W2CYS	167
W4RBQ	167
W8LEC	166
W4BRB	162
W8VLK	160
W4AZK	159
GM3CSM	159
W9ABA	159
W4OM	158
W9HUZ	158
WØAIW	157
I1AY	157
VK4DO	156
W9YNB	155
DL1FK	155
W8WWU	155
I1AIV	154
G3AKU	150
DL1AT	150
SM5WI	148
ZS2AT	148
W2GUR	146
W6LGD	146
W2MEL	145
W5FFW	145
OK1AW	144
W6KYV	143
TF3EA	142
W6KYT	135
W9NZZ	134
VE7KC	133
W7ETK	132
W6TE	131
W6WJX	131
W7BTH	131
W5CPI	130
OE3CC	128
DL1DA	127
W6EYC	126
W6MUF	125
VR5PL	124
KG6GD	121
W7HXG	120
DL3DU	118
W6NRZ	117
KL7UM	117
ZS2EC	116
W6JWL	114
KL7GG	114
W6FBC	114
W6VAT	110
DL3AB	107
W7GXA	105
W6LEV	103
W7LEE	91

38 Zones

W2HMJ	194
W2PUD	181
CM2SW	174
W8KPL	173
W2SHZ	169
4X4RE	168
W8FJN	167
W2GVZ	161
SM7MS	159
W8EYE	158
W2UEI	156
LU7CD	155
W3LVJ	151
W5MET	150
VE2BV	145
W8ZMC	143
WØAZT	143
ZL3AB	143
W9FKH	135
VE3ACS	134
W6ETJ	132
W4FPK	131
W2PQJ	130
W4LQN	130
W3ZN	129
WØRBA	127
W9MZP	126
FE8AB	126
W9TB	122
GW4CX	120
WØFET	118
ZL1QW	117
VE7VC	116
KL7PJ	115
W6CAE	113
W7EYS	107
W6FXL	92
C1CH	84

37 Zones

W1KFV	171
W2ZA	160
W3WU	157
W3FYS	153
W4IWO	149
W2WC	149
ZL3CC	143
GM2UU	142
F9AH	141
W4ML	140
W9WCE	140
W2AYJ	133
W7HKT	130
W4DIA	129
W1APA	128
VE5JV	126
W9LNH	122
OE1FF	117
VE1EA	116
W6AX	110
WØFWW	108
W7PK	104
W8HSW	104
W2BLS	99
W6WWW	99
OH3OE	99
KL7KV	88

36 Zones

W4HA	157
W5KUJ	142
W9LI	131
OZ7BG	130
OA4AK	128
VE1PQ	128
G6QX	128
I1IZ	128
W3AYS	124
F8TM	124
W2BF	115
4X4BX	112
G3BPP	111
W5CD	108
EA1AB	103
W2JA	102
W5BK	99

35 Zones

W1DEP	159
W2OST	146
W1BFT	141
W5JUF	137
W3MZE	134
W4DHZ	132
W9CKP	132
W5FXN	129
OE5YL	122
W6ZZ	120
W9RQM	119
CO6AJ	119
W9DGA	115
W9FNR	114
W8AVB	113
W2HAZ	111
WØGBJ	110
KZ5IP	108
KL7CZ	80

34 Zones

W8NSS	133
W1NLM	130
W4IYT	127
W1MRP	118
W1RAN	114
W5NTT	107
W8JM	102
G2BVN	91
W9WEN	83
W8PCS	80
W6EUV	66
W6OKL	61

PHONE ONLY

39 Zones

VQ4ERR	201
W6DI	192
W6VFR	174
G8IG	163
W7HTB	161
W8HUD	160
VE7ZM	145
DL1FK	125
XE1AC	201
W2BXA	185
W4CYU	160
ZL1HY	157
W1HKK	153
W6KQY	151
W9NDA	149
W6AM	148
F9BO	145

37 Zones

W9RBI	180
W1JCX	179
W8REU	176
PK4DA	170
W3LTU	169
W8REU	163
CE3AB	163
W7MBX	158
VK3BZ	158
W6WNH	157
G3DO	155
W6PXH	153
W3JNN	150
W8BF	146
W6TT	142
F8VC	124
W7MBW	107
C1CH	83

36 Zones

W1NWO	179
W1MCW	174
W1BEQ	164
W9HB	160
W4ESP	154
W2DYR	140
W9BZB	139
GM2UU	135
W9HP	131
W6PDB	130
W4INL	129
W1FJN	128
W8AUP	128
G6BW	127
VE3BNQ	126
VE7HC	123
WØHX	120
W3GHD	114
W8CYL	112
W3DHM	96
W6SA	92
F8DC	87

35 Zones

HC2JR	165
ZS6Q	156
W4HA	149
W6PCK	143
W9RNX	140
W2RGV	136
W6CHV	135
HC2OT	134
W3EVW	134
WØPUE	132
W2GHV	131
WØEYR	131
W9BVX	130
WØPRZ	124
W9CKP	124
WØANF	124
G8QX	123
W8ZMC	122
W5LWV	108
W4OM	106
W3PA	105

34 Zones

W5ASG	148
I1AXD	130
W3KT	129
LU8CW	129
W2ZVS	127
W5KC	125
W5JUF	125
W4LZM	124
W6UZX	123
W8BIQ	122
W5JUF	117
W1BPH	105
W8UIG	100
W4IWO	100
W8QBF	92
WØBFB	70
W2NXZ	65

33 Zones

W9MIR	131
W5ALA	130
W9WCE	121
W2ZW	115
I1VS	113
W8BFQ	114
W8SDR	113
W8NSS	112

...At the time of writing this, FP8AW is still banging away, and as all of you know, he is HB9AW on this side of the pond having a good time....

W2SHZ has 169 and trying to make it 170 before he goes back into the Navy....W4VE replaces 3A1A with 9S4AX. . . .

ZL1GX has been having quite a time getting a card in from one 19, but he made it, and as you can see at the head of the column, Fred is now WAZ. He seems to think now that he has lined up the 40 on c.w., he might be tempted to go after them on phone. After all, 1GX has been in the racket for 20 years and maybe he is entitled to a change.

JA2WM is ex-W1SIJ and expects to be on 10 and 20 c.w. and phone running 60 watts. . . . W2AQE/KM6 has been operating 20 phone; however, by the time you read this he will be on 10 phone using a beam. He says he hopes to work all of the old 10 meter Gang from the land of the "Gooney Birds". Power is 35 watts to an 807. . . .

I1KN has added ZS7C on phone, and CR5AA on c.w. . . . New stuff for W2WZ include AR8AB, 7020; VP5BH, 7005; and F9QV/FC, 14030. . . .

G6QX is not complaining too much, what with adding VS7NG, LZ1DX, and FY7YC. Also a new zone for Bob is XE1PJ. . . . G6RH hooked VT1AF, 14085 phone, and FR7ZA, 14023 c.w.

OZ7BG finds that all of a sudden he seems to be working a flock of new countries, among which are KW6AR, VT1AF, ZCUNU, SU6SN, VQ8CB, and FP8AW. . . . XE1AC is still finding them and now it is VP5VP, 14163; and FP8AW, 14158 on phone, of course. On c.w. Al grabbed UN1AE and UF6AC. . . . W2WC put up a vertical ground plane antenna for 40 last summer and it has worked out very well. It extends about 35 feet above the peak of his 2½ story house and makes quite an imposing sight. Frank relates. "You'd be surprised at the number of TVI complaints I received before I had even got the thing on the air." Frank raised VK5FH on 40, which indicates that the skywire is working O.K.

W6ZZ hasn't reported for over a year and I guess for a good reason—he hasn't been on the air. Due to numerous troubles, including beam, transmitter, and TVI, he has only occasionally done a little rag chewing on 80. He was, however, pleasantly surprised when he cranked up with 150 watts in the ARRL Contest and worked a lot of stuff on 80 as well as 10 and 20. . . .

W1FH and W6VFR are chasing each other around the top spot in the Honor Roll these days. Charlie has helped his cause with FR7ZA. I guess everybody knows by now he is ex-F3RR. . . . Another new one for FH is VR1G.

VE1EA, who has been doing considerable work on 160, actually did a remarkable piece of DX when he hooked HZ1KE for the first and only North American-to-Asia QSO on this band.

It is good to hear from ZS2X again. Rex is keeping in touch with FB8AB through VQ8AF, but so far there is no definite news of any FB8 activity. Rex worked something signing FB8AA and when he tossed a little French at him, he apparently closed down.

Still the PX's are being reported and we are going to forget about it until something shows up which is O.K. . . . Some guy made a crack about ZA1A apparently being someone who got tired of signing PX. . . . W2CWK reports working 3A2AC, 14015. In the April issue we told you another one was supposed to show up there, and this is it. If plans were followed it would be DL4QH, and this was passed along to me by DL4FS. . . .

W8NBK is happy to have his WAZ certificate. He says just because he has it he is not going to take it easy. In fact, his XYL says he is worse than ever. Actually, Arkie, how bad is that? I guess talking with W3KDP reminded him he hadn't brought his Honor Roll standings up to date, so now he has taken care of that little duty. It might not be a bad thought for you too to bring your totals to a current basis. This is about the only way I can remind you, as I certainly can't run around the country reminding everybody personally. So, let's hop to it. Send in your additions and this in turn will of course give W6ENV something more to do.

Here's an interesting little spot of news. It seems that XE1VA completed its 2,000th DX contact and this happened to be with W4PKM. To celebrate this achievement, XE1VA sent a real super-duper QSL card which was in the nature of a hand made pure silver book, in the form of a pocket size bible. The entire report of the QSO was hand engraved in this silver book and it required about twenty-five hours to complete the job. Now then, XE1VA will send a similar QSL to all stations whose call ends in "VA". Of course, you have to work him, and contacts can be made on either phone or c.w. The frequencies used are 7176, 14120, 14352, and 28244 kc.

W4TO happened to be home one night when the band was hot and worked a few locals like 9S4AX, ZM6AK, FF8JC, FR7ZA, HH5SS, and FG7XA. Buck heard some Europeans calling VQ6BFC on phone, supposedly around 14200.

VP8AR, South Georgia, waiting for conditions to change.

Figure this out for yourself: CE3AG worked something signing VR6AB but his QSL card was returned. I guess VR6AB isn't receiving mail these days. . . .

WAAP

Every once in a while one or two of the boys want to find out what the status is of the WAAP. Actually we have not resumed it in the post war period. It was originated before the war and at that time I was cranking out the stuff for the magazine "RADIO". However, since the American possessions were somewhat in a state of flux, it was not thought advisable to issue post war WAAP Certificates. Incidentally, the rules were printed in the DX Handbook, which was published about four years ago, but at that time we thought it possible that we could go ahead with WAAP. For those of you who have never heard of it, this means "Worked All American Possessions". If anything is done on it you will hear about it first in this column.

I have a letter from Howard Hanson, KR6EK, who is the QSL Manager for the Okinawa Gang. Howard has a request to make. When he took over the job, he inherited a whole flock of old QSL cards, whose owners and operators have apparently left Okinawa. Some of these are KR6 calls and some are the old J9 calls. Now then, if any of you fellows reading this are ex-KR6's or J9's, will you please forward your present QTH as well as giving your old call, of course, to the "Okinawa Amateur Radio League, APO Box 331, San Francisco, California". It is important that you *do not* put Howard's name on it, as he is not sure how long he will be around on the island. Just address it to the League as I have mentioned above.

Scratch ZA2AA

Another one has bit the dust. Those of you who have been accredited with ZA2AA can start deducting one from your totals. We are of course doing the same. Naturally we have determined he is a first class phoney.

W8NBK received a letter from TA3AA and he, too, is signing off April 25th and leaving for the U.S.A. via a number of European countries. No, he won't be on the air while en route, as he says this is really going to be a vacation. . . . XE1AC heard FE8AA, 14348, phone, but couldn't raise him. He had the same luck with FG7XA, 14310. Al also has some dope about EA3FJ having applied for a permit to operate in PX during his coming vacation. I suppose if we keep our fingers crossed long enough, somebody will actually show up there. HC2JR passes a little info along to XE1AC, that TI9GRC is about to fire up from Cocos Island. . . .

Next month if Editor W2ESO doesn't run out of paper, we will give you the complete contest results of the 1950 "CQ World Wide DX Contest". W6DI, one of our hard working Committeemen, has put in many long hours tabulating the totals on many logs whose operators apparently didn't quite know how to do it. We think you will be pleasantly surprised when you see the number of contestants—especially those out of the states.

I would still like to get a little further reaction from you fellows on this question: "Do you think the time is right to hold another DX Marathon lasting a whole year such as we sponsored in 1948?" Drop me a line on this little query giving your "yes" or "no". Many fellows believe now is a better time than was 1948, due to new stuff being hard to find.

By the way, how is your TVI? As one of the boys said in the East last month, "Brother, I have been messing with low pass and high pass filters so much that I am convinced I have the lowest low pass filter and the highest high pass filter in existence."

I am sure you know what he means! Neither do I!! See you next month. 73.

QTH COLUMN

C3KK	P.O. Box 226, Taipeh, Formosa, China
FR7ZA	Louis Ferrier, Box 330, St. Denis, Reunion Island.
PX2MU	Box 23, Andorra.
VK1DG	Via VK3XO, L. A. Paul, 340 Rathmines St., Fairfield, Melbourne, Victoria, Aus
VK1KJ	Via VK3XO, L. A. Paul, 340 Rathmines St., Fairfield, Melbourne, Victoria, Aus
VK1NL	Via VK3XO, L. A. Paul, 340 Rathmines St., Fairfield, Melbourne, Victoria, Aus
VP9AI	1934 AACS Sqdn, APO 856, c/o Postmaster, New York City, New York.
VT1AC	Douglas Taylor, Box 54, Kuwait, Persian Gulf.
KH6KL/KP6	Box 5392, Honolulu.
KP6ACL/KP6	Callbook QTH or ARRL.
VQ5AU	Via Box 355, Kampala, Alganda.
W2AQE/KM6	VR-21 Det., Navy 3080, FPO San Francisco, California.
9S4AC	Mathias Stemmrich, Saarbruckerstr. 98 Homburg/Saar.
9S4AD	Bernd Dittmar, Saarbruckerstr. 37, Friedrichsthal/Saar.
9S4AH	Walter Meyer, Schillerstr. 9, Quierschied/Saar.
VP4LZ	Via PY1AJ
I5ZU	Humbert, P.O. Box, Kismayu, Italian Somaliland.
XP1AA	Box 33, Sarajevo, Montenegro, Yugo.
ET3Q	Box 1636, Addis Ababa.
YI3BZL	Via R.S.G.B.
ex-VP3MCB	6 - 6th St., New Toronto, Ontario, Can

Monthly DX Predictions

GEORGE JACOBS, W2PAJ*

IN THE NORTHERN HEMISPHERE, the seasonal trend of lower daytime maximum usable frequencies (MUFs) and higher night time MUFs continues. During June, the lowest daytime MUF for the year should be reached towards the end of the month, while night time MUFs should attain their highest values for the year.

Daytime communication on ten meters is not likely to be very frequent, but over many circuits the 20-meter band will be open for almost the complete 24 hours of the day.

In the Northern Hemisphere the sun reaches its highest altitude during the latter part of June; since it appears that absorption in ionosphere is proportional to the sun's altitude, we see that maximum absorption probably will occur in June. This increased absorption, in addition to the seasonal increase in atmospheric noise levels, make 40 and 80 meters of little value, DX-wise, and twenty meters will be the band that should produce the majority of DX expected.

Usually June is a month of relatively undisturbed ionospheric conditions; however since this year has been marked by frequent disturbances, this June will no doubt have some disturbed periods. A long range forecast, based on observations of disturbed conditions during April and projecting ahead to June on the basis of the 27 day recurrence tendency, indicates that the moderate disturbance expected during the last days of May will probably carry into the first few days of June. There are indications of a slight disturbance occuring June 9-11, and possibly a fairly moderate disturbance during June 23-28. It should be pointed out that the 27 day recurrance tendency of ionospheric disturbances is not a definite scientific fact but is based on statistical observations over a long period of time. However it represents one of the best means available for long term predictions of disturbances with a fairly good degree of accuracy. Early in April, 1951., Mr. John Nelson, propagation analyst for RCA Communications, announced his discovery of a startling new method of predicting ionospheric disturbances with a very high degree of accuracy YEARS in advance. In a future article in this series we hope to cover some of the highlights of Mr. Nelson's methods.

The predicted smooth sun spot number for June is between 52 and 57. As mentioned last month, the sun spot count is on the decline, bringing with it generally poorer DX conditions until 1954-1955.

General Propagation Conditions for June, 1951

These forecasts are based on a power of 100 watts c.w. into a simple horizonal dipole antenna with a vertical radiation angle of less than 30 degrees.

3620 Bedford Ave., Brooklyn 10, N. Y.

EUROPE: With day time MUFs at a minimum, no 10 meter openings are expected.

Twenty meters will be open for a longer period in June then it was in May, opening first to the East Coast with fairly good signal strengths about 0900 GMT. Signals should take their mid-afternoon dip about 1200 GMT and then return strong as the absorption decreases on this path from about 2100 to 0300 GMT, with the band on occasion staying open until 0600 GMT for West Coast hams.

If any DX activity at all takes place on 40 or 80, it will be during the dark hours, which during June is a very short period running from 0200-0500 GMT. Don't look for much European DX activity on these bands until September.

SOUTH AMERICA: On these North-South paths the MUF is expected to rise above 28 mc and provide us with some DX on 10 meters. Signals should be at their best between 1800-2200 GMT for East and Central USA hams, and remain until 0100 GMT on the Pacific Coast.

Twenty meters is expected to be very good to Latin America during June, with the band open around the clock.

Forty may provide some infrequent contacts to Central America and the Northern countries of South America during darkness. Less frequent openings may occur on 80 meters but if they do, signals will be weak and just above the noise level.

FAR EAST: Pacific Coast hams may expect some 10-meter activity to the Far East between 0400-0600 GMT; however, many of these openings will be erratic, with high noise levels and deep fading.

Conditions on twenty will be much better, with the band open on some quiet days to the East Coast and Mid West from 1200-0500 GMT, and for Pacific Coast DXers between 0700-1900 GMT. Since a number of these paths cross the northern auroral zone, they are seriously affected during disturbed periods,

From the Pacific Coast to the Far East there may be some 40-meter DX between 0900-1300 GMT, but openings will be spotty.

OCEANIA, (Australia and New Zealand)

Its winter time "down under" and winter time propagation characteristics prevail, meaning high daytime MUFs and very low night time MUFs, with low noise levels and lower absorption factors. On some days the MUF should be high enough to permit 10-meter DX contacts, especially between the hours of 2200-0200 GMT to East Coast and mid-West sections, and 2100-0400 GMT for Pacific Coast DXers. Remember that although day time MUFs are very high in the Oceania area, daytime MUFs are low here in the USA, and it will still be these low MUFs that will determine the MUF for the path.

Twenty meters should provide some good openings, first around 1900 GMT and then again between approximately 0200-0700 GMT. Although these paths favor Pacific Coast QTH's, some good openings should extend into the East Coast.

Because of the low noise levels at the Oceania end of the path, some 40 meter DX contacts may be possible on quiet days. This again is an all dark path favoring the Pacific Coast between 0600-1300 GMT, with possibly some openings to the East Coast between 0800-1100 GMT.

Since 20 meters shapes up as practically our only DX band for June, this month's charts are presented for 20 meters only.

The writer would like to express his thanks for the many nice letters received following the March predictions. If you have any specific paths you desire to have analysed, just drop a stamped self-addressed envelope to me and I'll try to get the information off to you within a week after receipt. 73, George, W2PAJ.

20 METERS — ALL TIMES IN GMT

TO:	FROM EAST COAST	CENTRAL U. S. A.	PACIFIC COAST
Northern & Central Europe	0900-1130(2-3) 1130-2130(1-2) 2130-0200(3-4)	1000-1300(2-3) 1300-2230(1-2) 2230-0330(3)	1300-1600(1-2) 1600-2200(0-1) 2200-0100(2-3) 0100-0600(1)
Southern Europe & N. Africa	0900-1100(2-3) 1100-2100(1-2) 2100-0300(3-4)	1000-1130(2-3) 1130-2200(1-2) 2200-0300(3-4)	" "
Near East	2200-0100(2-3)	2200-0200(2-3)	2300-0100(1-2)
Central America & Northern South America	1000-1300(2-3) 1300-2200(1-2) 2200-0700(4-5)	1100-1300(2-3) 1300-0000(1-2) 0000-0900(4)	1200-1500(2-3) 1500-0200(1-2) 0200-1200(3-4)
South America	0930-1200(2-3) 1200-2200(0-1) 2200-0900(3-4)	1030-1230(2-3) 1230-2330(0-1) 2330-0900(3-4)	1130-1500(2) 1500-0100(1-2) 0100-1000(3-4)
Hawaii	1400-2300(0-1) 2300-0400(2-3) 0400-0800(3-4) 1200-1400(2)	1500-2300(0-1) 2300-0400(2-3) 0400-0900(3-4) 1100-1500(2)	1500-0400(2-3) 0400-1500(4)
Oceania	1900-2100(1-2) 2100-0200(0-1) 0200-0700(3)	1900-2100(1-2) 2100-0200(0-1) 0200-0700(3)	1830-2030(1-2) 2030-0300(0-1) 0300-0800(3)
South Africa	0600-1500(0-1) 1500-1800(1-2) 1800-2200(3)	0500-0700(2) 0700-2100(0-2) 2100-2300(2-3)	0500-0800(0-1) 1700-2100(1-2) 2100-2300(2)
Japan & Far East	1200-1600(1-2) 1600-0000(0-1) 0000-0500(2)	1100-1500(1-2) 1500-0200(0-1) 0200-0600(2-3)	0700-1500(3) 1500-1900(1-2) 1900-0700(0-1)
Guam & Pacific	1700-2100(1-2) 0500-1000(2)	1700-2100(1-2) 0500-1130(2)	1500-2000(1-2) 0500-1300(2-3)
East Coast to West Coast	10 M 1600-0000(1-2)	20 M 1200-0000(1-2) 0000-0500(3)	40 M 80 M 0600-1100(1-2)

Numbers in parenthesis indicate the general condition of the path and also the approximate percentage of the month that the band is expected to open as follows,

(0) No path opening expected.
(1) Openings on quiet, normal days only, not exceeding 10%.
(2) Openings about 25% of the days of the month.
(3) Openings about 50% of the days of the month.
(4) Openings about 70% of the days of the month, good circuit.
(5) Openings about 85% of the days of the month, excellent circuit.

Conducted by E. M. BROWN, W2PAU*

THE 1951 SPRING DX season is off to a good start, at the time of this writing. The closing weeks of April brought several good tropospheric band openings to the North Atlantic coastal states. A hint of what is yet to come this season is contained in the first stories of 420 mc DX from W2QED and K2AH. The 420 gang have spent many hours during the past winter improving their equipment and antennas in preparation for the coming season, and we predict that records will fall before many more months have passed. Auroral propagation was also noted on several occasions during the month of April. W4AO reports working W9EHX and W3NKM on two meters via the Northern Lights during the early evening hours of April 3rd. The boys at Cornell are still watching for auróra, and W2SNY, operating W2ZGP's six-meter transmitter, caught a typical opening into Wisconsin on the 21st. Their research program is providing valuable and hitherto undisclosed data on auroral propagation. The Aurora season should continue for several more weeks, and there is a good possibility that a good display, coming at a time when favorable tropospheric conditions prevail, might set the stage for a record-breaking v.h.f. contact. Sporadic E openings should be breaking out all over the country with increasing frequency any day now—remember June of 1949 and 1950? The W4's are pounding in on six meters as we type this column! Better get that six-meter rig all peaked up and ready, and start watching the band more closely!

VHF DX is being worked so frequently, of late, that there is a growing tendency to take it pretty much for granted. During the recent Massachusetts to Virginia two-meter opening, we noticed that there was a decided lack of the old fighting spirit among the participants. In years past, the high-powered gang vied with their VFO's for first crack at a rare DX station. The low-frequency end of the band used to be jammed with heterodynes and excitedly over-modulated carriers whenever a signal from beyond the 100-mile normal range broke through. Now, it seems, the tendency is for the "established" stations to either hook up with old acquaintances and chew the rag or to withhold their fire, meanwhile tuning carefully for some choice bit of DX that the rest of the gang cannot hear; for a new State to add to the "worked" list, or the like. We do not doubt that fear of TVI might influence some of the suburban dwellers away from high-powered operations during the early evening hours. There are some operators who simply leave their receiver tuned to the frequency of the local DX Champ. When he calls a station worthy of some extra effort, it is the cue to start serious operating! Some of the old timers resent the fact that they receive many calls from stations which are not real DX—these old-timers may have forgotten what a thrill it was when they made their first 200-mile contact using low power and perhaps an indoor antenna! Whatever the cause may be, it seems to us that the gang is not making the greatest use of their opportunities by following this sort of operating procedure. Let's hope that our impressions are not well-founded. If such operating practices are carried to an extreme, much of the thrill of VHF DX-ing may disappear.

It is a great source of satisfaction to have some new-comer to the band state that you are his best DX. Even though the signals from his flea-powered rig and dipole antenna are as hard to copy as those from better-equipped stations twice the distance away, the contact should be worth the effort. The incentive to work more and better DX is generally the reason why a newcomer to the v.h.f. bands continues to improve his equipment until he achieves the high degree of technical perfection that is commonplace today. We should help to provide this incentive wherever possible. Whenever we "sit out" a band opening we are not making the most of our opportunity to study the transmission characteristics of our v.h.f. bands. Need we point out that if it were not for the fact that W2NLY and W2BAV were both on deck and working DX on the evening of September 6, 1950, one of the finest West-East two meter band openings of the year might not have been detected!

We suggest that when you find the band in good condition, you should alert the local gang and try to get them on. Crank up all the power you dare to use, and get on the air and work stations. Try to keep the QSOs short and snappy, even though the urge to chew the rag may be strong. Follow a regular tuning procedure that will insure your tuning across the entire band, and announce your intentions to tune from a certain frequency

---

Associate Editor, CQ. Send contributions to E. W. Brown, 88 Emerald Avenue, Westmont, Collingswood 7, New Jersey.

in a specified direction. Answer *all* stations you hear calling you—no matter how strong or how weak they may be. Call frequent (but snappy) CQs when you run out of stations to call. We think it is best to operate consistently on one spot frequency rather than to use VFO tactics. VFOs are fine to break in on a particular station in the least possible time, but for normal DX working, it is a great help to know exactly where to listen for a station—his "spot" in the band becomes well-known. Log the frequencies of all stations worked; this data will come in handy during future openings.

By following these general operating practices, one should be able to work the maximum possible numbers of stations during a given band opening, and, by so doing, work all the DX that's worth working at the same time. By encouraging beginners to improve their equipment and by demonstrating to the skeptics that there are still plenty of active stations on the band, we can insure a continued high level of activity.

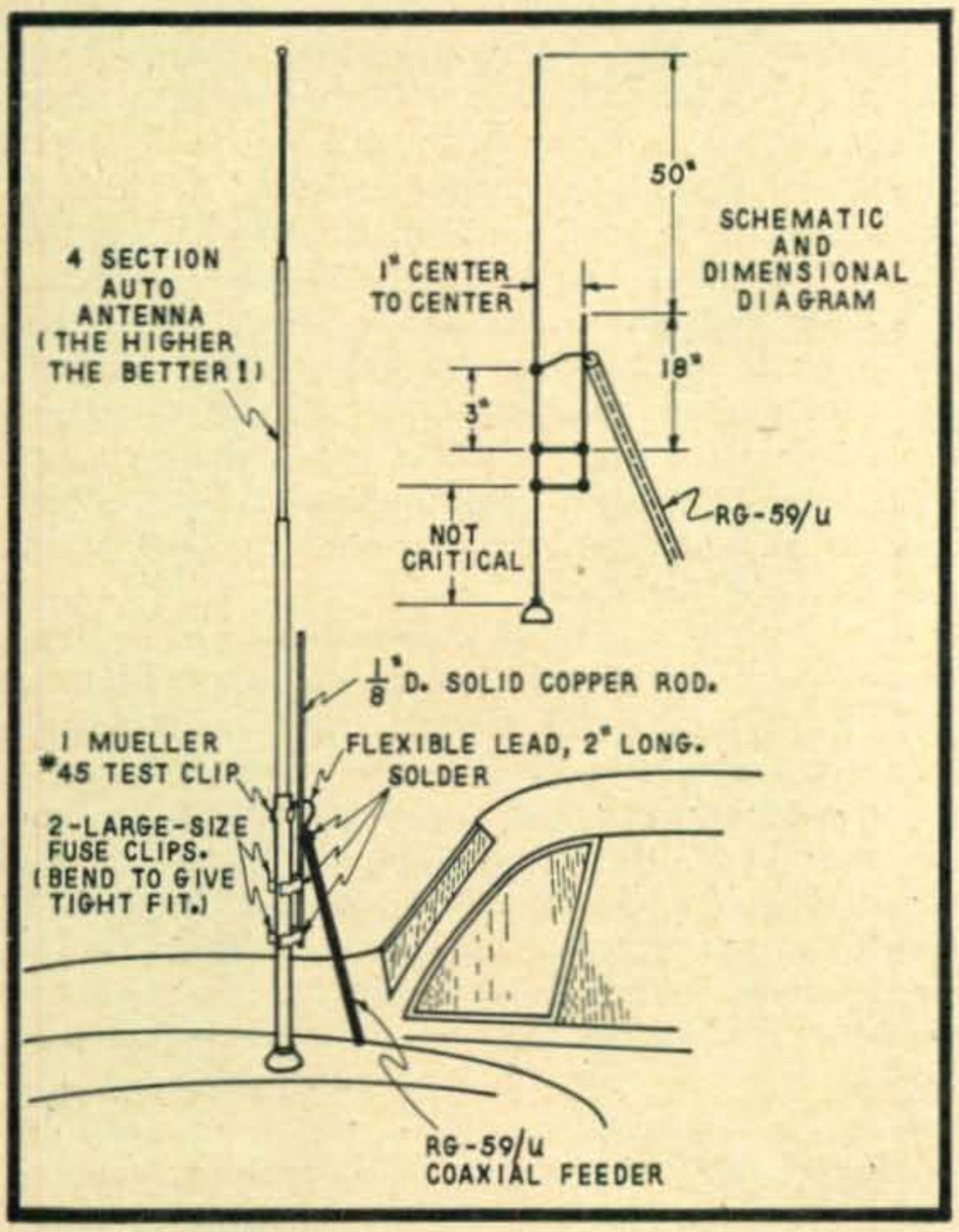


Fig. 1. The "clip-on J" 2-meter mobile antenna

Garbled Copy

In our column for May, 1951, we reported on an early-March 144 mc band opening between Texas and Illinois, and gave credit to "The VHF News" as our source of the story. By one of those all-too-frequent slips of the type our version of the story had W5QNS listed as one of the stations active during this opening. The original version, as printed in "The VHF News" showed the correct call, W5QNL. We hereby apologize to Editor McNatt and to W5QNL for our error.

While we are on this subject, it has been called to our attention that an item in our column for April, 1951, might have been construed as an attempt to discredit the "News" for publishing "an exaggerated report" . . . . We regret that what was intended as a friendly jest may have been misinterpreted. W9NFK is doing a thoroughly commendable job in editing and publishing his monthly paper. There has never been any friction between us, and we'd hate to have any develop. As every dyed-in-the-wool v.h.f. man knows, our particular phase of the radio hobby thrives best when there is a free interchange of ideas and a wide dissemination of news items from all sections of the v.h.f. world. We all owe a vote of thanks to Bill McNatt, W9NFK, for his share in bringing this about.

(That last paragraph contains a big hint. Postal cards still cost only a penny, and you can get a lot of news on one if you try. What's the matter—don't you guys like to see your names in print?)

A Simple but Effective 2-Meter Mobile Antenna

Many of the two-meter mobileers are operating with improvised antennas envying the more fortunate hams who wield sufficient authority to chop a hole in the roof of the family chariot. The quarter-wave vertical whip in the center of the car top seems to be the standard antenna for the v.h.f. mobile services, and as such has achieved more popularity than it might deserve. It may come as a surprise to some to learn that the famous 18" vertical is theoretically and practically inferior to the much-maligned straight dipole!

Although several hams have discovered that a conventional cowl-mounted auto radio antenna can be used with some success on 144 mc when fed at the base with its standard length of low-capacitance co-axial cable (which is designed specifically to feed into a broadcast receiver,) there is danger that the cable and the antenna mount may not be properly insulated for v.h.f. use. Because an appreciable part of the radiating section of the antenna lies below the level of the car roof, unwanted directional characteristics may result.

W2JAV, W2OQN, and others have noted that the familiar "J" antenna does a creditable job in a mobile installation. Although the "J" possesses the undesirable property of radiating a certain amount of energy from the un-balanced bottom stub which tends to raise the effective angle of radiation slightly, the effect of this radiation seems to be negligible compared to the shortcomings of other simple antenna systems. The fact that the radiating section of the "J" is located above the plane of the car roof probably makes up for its inherent defects. Comparative tests made by W2PAU show that a "J" on the new Plymouth performs as well as any of the practical mobile antennas we have used to date. (Some will say that the new car has less ground-current losses than the old one, but gosh, the top wasn't *that* rusty!) The "J" is almost the equal of the 5/8-wave vertical whip mounted in the middle of the roof—the best antenna tested to date!

Figure 1 shows our version of the "clip-on J". Although there are any number of combinations

of stub-length, feeder tap position, and radiator length which will produce a matched antenna system, the set of dimensions finally selected were based on a radiator length slightly greater than 1/2 wavelength. The height of the base of the "J" above the fender top had no appreciable detuning action. The dimensions chosen were those which gave a standing-wave ratio of 1:1 at the operating frequency of 147 mc. All dimensions should be multiplied by the ratio of 147 to the desired frequency (in megacycles) to obtain comparable performance at some other frequency.

The RG-59/U 75-ohm coaxial feed line was fed through a convenient crack between the hood and the fender, so no surgery except that necessary to secure the BC antenna was required. The feed line for the BC set is left attached, so by unclipping the "J" stub, normal low-frequency operation can be restored. In fact, if the v.h.f. feeder is link-coupled to the transmitter and the receiver, and if its outer shield is not grounded, simultaneous v.h.f. and l.f. operation can be achieved, since the small capacitance of the two-meter feed line to ground does not appreciably short-circuit low-frequency signals.

While we are on the subject of antenna systems, here is a description of one which we thought was unusual enough and had sufficient practical merit to justify passing it along:

The Folded Collinear--A VHF Array

by

Neal H. Brown, W7SLO*

This antenna was developed with the idea of obtaining greater gain than is possible with the usual arrangement of straight dipole elements, at the same time retaining the virtues of simple all-metal construction. Means for matching to a wide range of feeder impedances are provided directly in the antenna proper without the need for external transformers or stubs. Each basic element has excellent signal-pickup efficiency, approximately equal to that obtained from the usual "three-half-waves, in phase" array. These elements can be combined to form larger arrays, in much the same manner that single dipole elements are combined in driven phased arrays or parasitic configurations.

The term "pickup efficiency" may require a word of explanation. A half-wave dipole antenna cut for 420 mc is just as efficient a transmitting radiator as a half wave antenna is on ten meters. But it is very apparent that the half wave dipole on 420 with a physical length of only about 12 inches cannot extract anything like the same amount of energy on receiving as does a 10-meter dipole, with a physical length of 16 feet. In order to improve the pickup efficiency of our v.h.f. arrays we must increase their effective length.

The collinear type of antenna seemed to have most of the characteristics we were looking for, but it presented quite a mounting problem, even where only two elements were involved. Use of more than two elements called for the use of some kind of phasing stubs, which are difficult to support, and if insulating spacers are used across the stubs or at the feed point, their losses may be high.

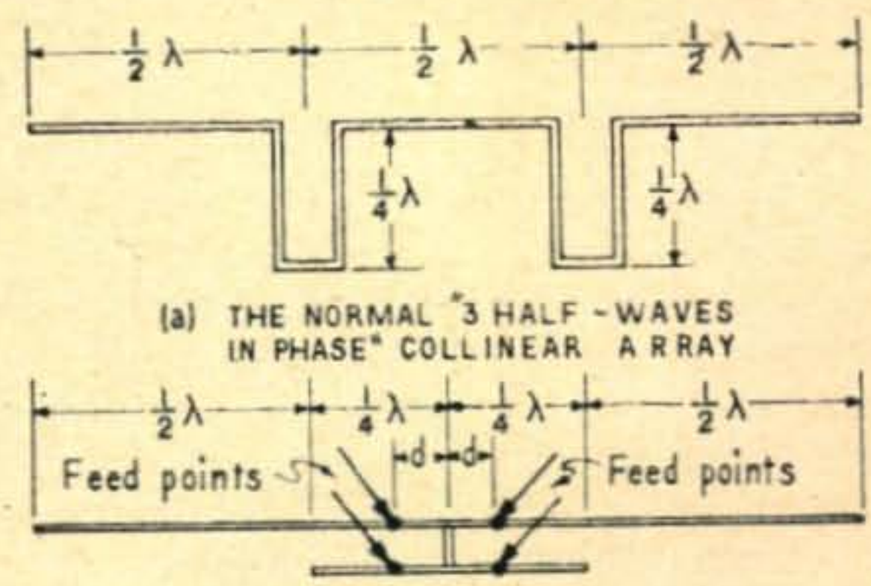
Looking for a simplified method of mounting, we hit upon the idea of forming the center section of the familiar three-half waves-in-phase array by folding back the usual phasing stubs onto the center dipole. The resulting arrangement might also be visualized as two "J" antennas butted end-to-end, with the two quarter-wave stubs forming the support and insulating system. Figure 2 shows the idea.

We now have two half wave dipoles, with their centers spaced a full wavelength apart. When fed with equal currents these two elements will provide a field pattern about the same as the usual three-dipole configuration. The center point of the system is at ground potential, and therefore may be mounted directly on a supporting structure without insulation. The quarter-wave stubs provide a variable impedance matching system for any type of feed line one might wish to use. Close to the shorting bar the stub impedance is very low, but as the tap point is moved out toward the end of the stub the impedance rises to several hundred ohms. The symmetry of the system makes it possible to feed with a symmetrical feeder harness and thus insure that equal currents are set up in both sides of the array.

One of these collinear sections can be backed up by a reflector system, to provide a directional array in much the same manner that a parasitic element is added to a simple dipole to form a beam antenna. It is suggested that in the interests of ease of assembly the reflector system be made exactly the same as the driven element. (Some fine tuning may be required in order to attain the best possible front-to-back ratio.) In a multi-section array of this type it seems preferable to place the half-wave section which forms the stubs directly in front of the driven element— in the direction of transmission.

At W7SLO, four of these sections are employed

Figure 2



*516 McMillan Drive, Tucson, Arizona

in a stacked array for 420 mc. This array shows exceptional gain and good directional characteristics. All-metal construction is employed. The supporting mast and booms were drilled to provide a snug fit for the cross members, then all joints were brazed, using aluminum brazing rod and a special flux marketed especially for low-temperature work. If brazing equipment is not available, the conventional methods of assembly could be used just as well, provided that low-resistance joints are provided at the element mounting points.

The general layout of the array is shown in figure 3. Exact constructional details are not given, as it is assumed that every ham who wishes to duplicate this system will attempt to work out his own version of the design to suit the space and type of material on hand.

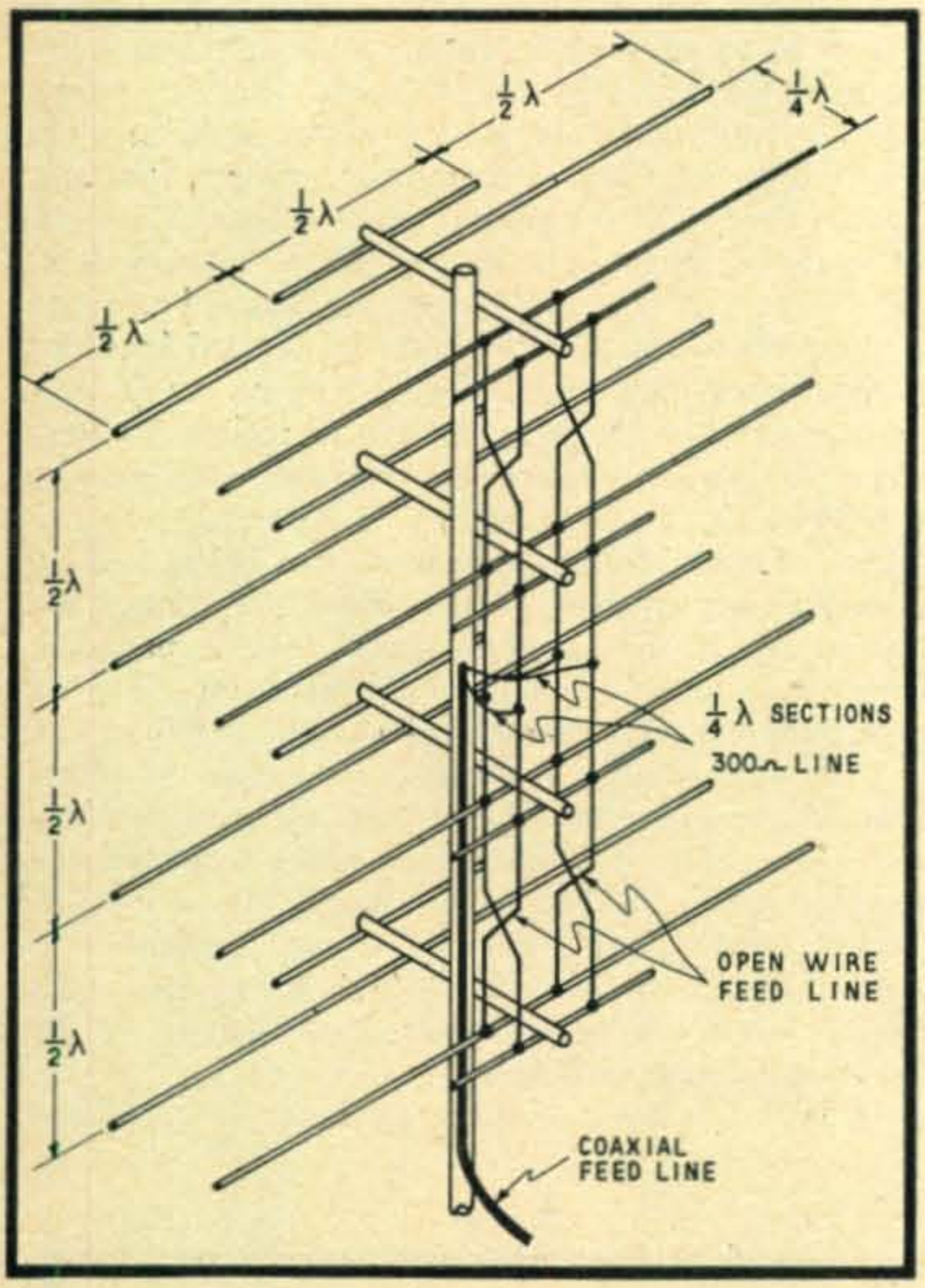


Fig. 3. W7SLO's array of "folded colinear" elements

The directional characteristics are shown in the plot of figure 4. The half-power beam width is approximately 30 degrees. For the "four-stacked" model, horizontally polarized, the vertical beam width is approximately equal to that of the usual 16-element array, or about 30 degrees. This pattern should give an effective gain of about 15 db, but in actual tests made on the air, the apparent gain ran much higher—in the order of 20 db! The minor lobes which show up at the 60° points are not objectionable. The band-width of the array is sufficiently great to include the entire 420 mc band, an dthe element lengths are not especially critical.

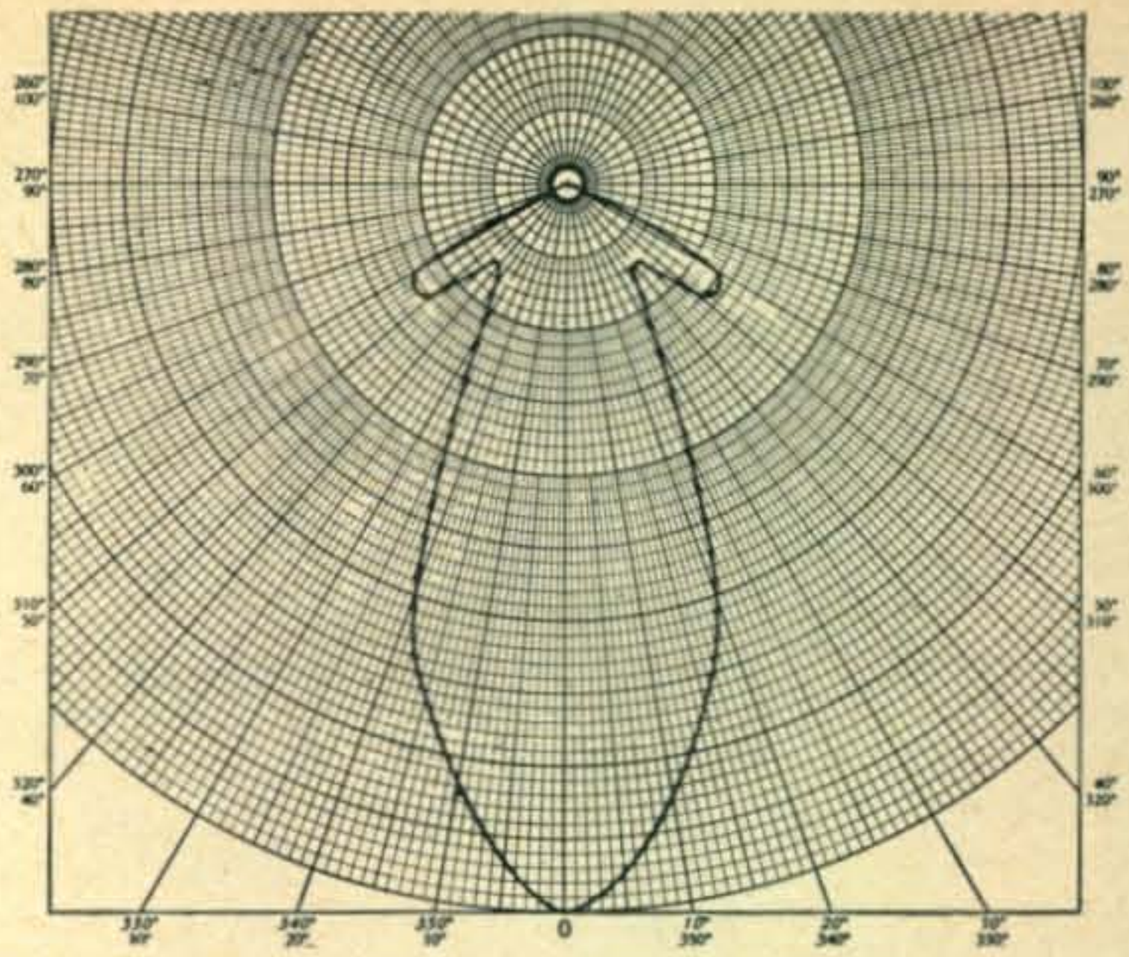


Fig. 4. Approximate pattern of W7SLO's 420 mc beam, in terms of relative voltage.

"Worked All Rochester Award"

The Rochester, N. Y., VHF Group announces a new award, designed to stimulate interest in operations on the bands above 50 mc. Known as the "Worked All Rochester" or "WAR" certificate, it will be issued to any amateur who works a large percentage of the total number of v.h.f. stations active in the Rochester area. For the purposes of this award, Rochester stations are defined as those fixed stations located within 25 miles of the center of the city.

You are eligible for the award if you are located within 25 miles of the center of Rochester and have worked 25 or more Rochester v.h.f. stations since Jan. 1, 1949 from a single fixed location; or, if you are located more than 25 miles airline from the center of the city and have worked 15 or more such stations during the same period. Full details can be obtained from the award committee, which consists of Hank Blodgett, W2UTH, Roger Williams, W2NES, and Ken Evans, W2UAD, who is Chairman of the Rochester VHF Group.

The boys have plenty of these certificates to give away, so point your beam at Rochester and line 'em up! They would like to see other v.h.f. groups around the country follow suit, to give them something to shoot for.

(Continued on page 50)


DATED April 10, 1951 NUMBER 1

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WAR

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2 METER AWARD

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THE ROCHESTER VHF GROUP ORGANIZED IN 1948 TO FURTHER INTEREST AND ACTIVITY OF THE FREQUENCY SPECTRUM ABOVE 50MC.

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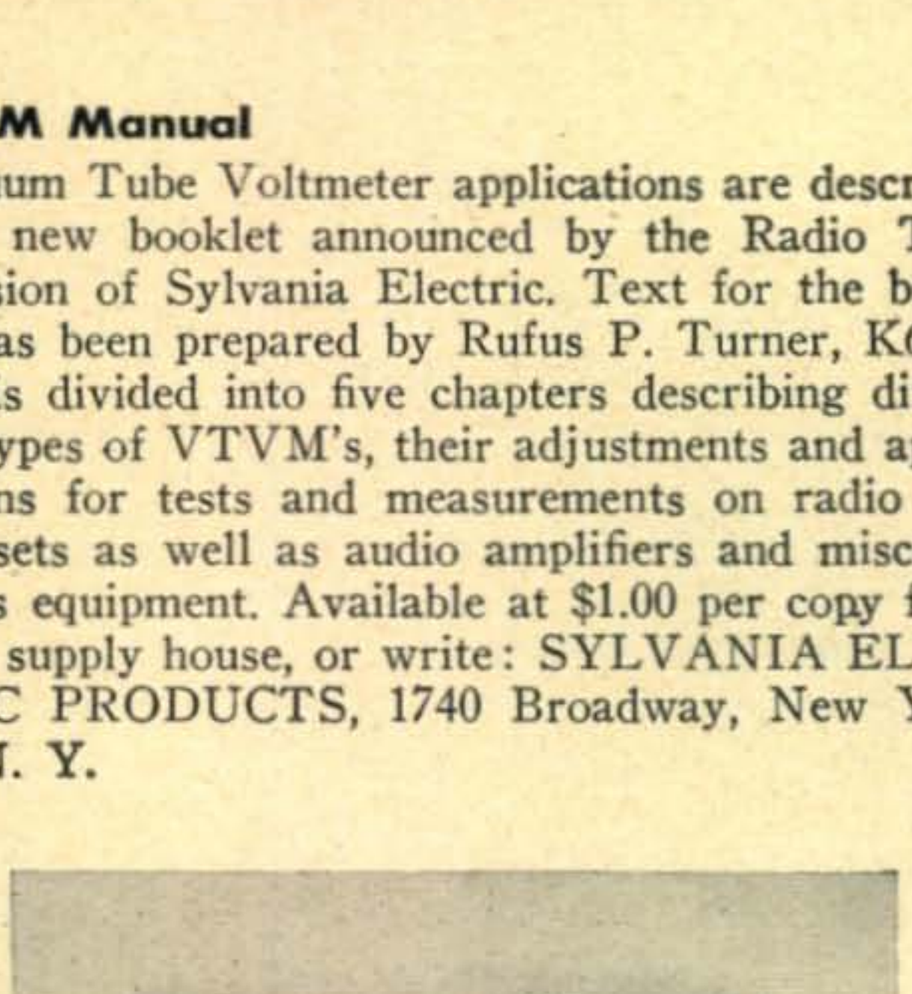
SIGNED Kenneth W. Evans, W2UAD

Chairman Rochester VHF Group

Parts and Products

VTVM Manual

Vacuum Tube Voltmeter applications are described in a new booklet announced by the Radio Tube Division of Sylvania Electric. Text for the booklet has been prepared by Rufus P. Turner, K6AY and is divided into five chapters describing different types of VTVM's, their adjustments and applications for tests and measurements on radio and TV sets as well as audio amplifiers and miscellaneous equipment. Available at $1.00 per copy from your supply house, or write: SYLVANIA ELECTRIC PRODUCTS, 1740 Broadway, New York 19, N. Y.



VHF and TV Trimmers

Tubular trimmer capacitors of the piston type are available from the JFD Manufacturing Co., Inc., in three models, VC3 (0.3-3 μf), VC5 (0.5-5 μf), and VC11 (1.5-11 μf). They deliver continually uniform change of capacitance in relation to rotation, and are free from variation under severe vibration, according to the manufacturer. They are only 1 inch in length and have solder lub connections. Temparature coefficient is approximately zero; "Q" rating is over 1000 at 1 mc; dielectric strength is 1000 volts d.c. at sea level. For detailed literature, write: JFD MANUFACTURING COMPANY, INC., 6101 Sixteenth Avenue, Brooklyn 4, N. Y.

Commercial Operator's License Manual

"Radio Operator's License Q and A Manual" by Milton Kaufman, Instructor, RCA Institutes, has been published in an enlarged second edition. It has questions and answers on the new element, Element VII: Aircraft Radio-telegraph and Radio-telephone for Flight Radio Operator. It also covers new elements II and V and revised elements III and VI. A number of questions have been added to elements V and VI on such topics as Frequency-Shift Keying, Marine Radar and Loran. Two new appendices have been added for small vessel direc tion finders and automatic alarm. A total of 766 pages; 240 illustrations; cloth-bound; price is $6.60 from the publisher: JOHN F. RIDER, 480 Canal Street, New York, N. Y.

Eimac Catalog

EIMAC has published a new catalog that summarizes the basic characteristics of all its vacuum tubes. In addition to data on tubes, pertinent information on other products manufactured by this company is also included. This catalog can be had without charge by writing: APPLICATION ENGINEERING DEPARTMENT, EITEL-McCULLOUGH, INC., San Bruno, Cal.

Antenna Rotator

A hand-operated mechanical antenna rotator called "Select-a-beam" has been introduced by Neo Products Corporation. Made of aluminum with sealed ball bearing pivots, the rotator adds a weight of only three pounds to the antenna mast. "Select-a-beam" is not limited to TV installations but the manufacturer claims it can be used to turn ham beams. For details, write: NEO PRODUCTS CORP., Erie, Michigan.

Crystal Diode Book

A new booklet "Electronic Shortcuts For Hobbyists" specially written for the hobbyist, experimenter and modelmaker in which twenty four applications of germanium crystal diodes are described, has been published by the Electronics Division, Sylvania Electric Products, Inc. The

54 page booklet is illustrated with photos and schematic diagrams and contains such information as how to build model radio controls and wired radio transmitters and receivers. The price for the booklet is only 25 cents, postpaid. It may be obtained by writing: SYLVANIA ELECTRIC

PRODUCTS, INC., Advertising Department, Emporium, Pennsylvania.

Code Records

Novice and Technician class license aspirants can now learn the radio code through the use of a set of five double-faced phonograph records containing specially transcribed lessons. The discs are 10" in diameter, plastic and work with any 78 rpm record player. These records, originally made for the

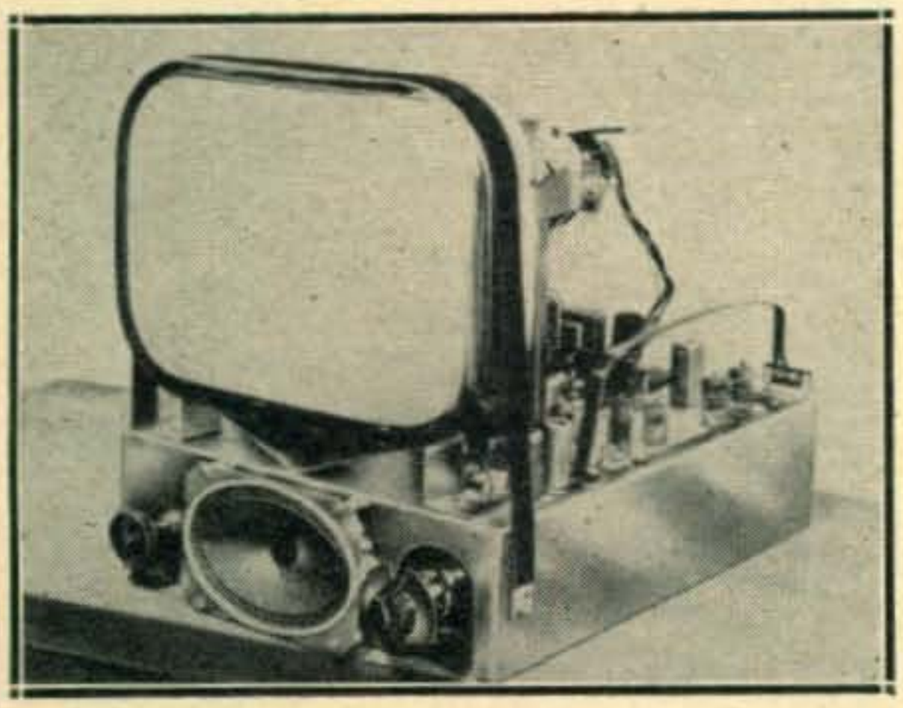
Linguaphone Institute, are now produced by ICA. All instructions are provided in a 32-page booklet that comes with the discs. For details, write: INSULINE CORPORATION OF AMERICA, 3602-35th Avenue, Long Island City 1, N. Y.

Color TV Book

A "Notebook On Color Television" is an informative booklet in which the fundamentals of the various systems are described in an easy-to-understand text with diagrams and photographs. It has been written by Edward M. Noll, author of "Television for Radiomen". The notebook, which measures 8½" x 11" and is provided with a durable cover, has been designed to lay flat for convenient reference and filing. Copies may be obtained by sending $1.00 to the PAUL H. WENDEL PUBLISHING COMPANY, P.O. Box 1321, Indianapolis 6, Indiana.

New TV Kit

For those hams who like to build their own TV, the Tech-Master Products Company announces a new low-priced kit. It will accommodate tubes up to 14" rectangular. Features include a.c.-d.c. operation, a stagger tuned i.f. system, 12 channel turret



type tuner, AGC and inter-carrier sound. No i.f. alignment is necessary since the tuner and i.f. strip come pre-wired and tested. The complete kit with all tubes except the kine sells for less than $90.00. For complete details, write: TECH- MASTER, 443 Broadway, N. Y.

New Circle Cutter

A new continuously variable type of circle cutter with a micrometer type adjusting screw is now available. Extra heavy construction of the main beam make it a useful tool for production labs as well as in the shack. Two types are available, round shank for drill presses or hand drills, and square tapered shank for hand braces. Maximum hole diameter is 4 inches for Model 1, and 6 inches for Model 5. All are equipped with a ¼ inch high speed steel cutting bit. For details, write the manufacturer: PRECISE MEASUREMENTS CO., 942 Kings Highway, Brooklyn, N. Y.

New Stackpole Catalog

Stackpole Catalog RC8 illustrating and describing fixed and variable resistors, iron cores, line and slide switches, choke forms, capacitor units and ceramag cores manufactured by its Electronic Components Division is available from: STACKPOLE CARBON COMPANY, St. Marys, Penna.

New Turner Microphone

A new crystal microphone for ham shacks, economical public address and sound systems is now

in producttion by the Turner Company. This new model, Turner 60X, is constructed for hand, desk or stand use. Frequency response is 70 to 7,000 c.p.s. The case is finished in baked-on beige wrinkle enamel. The microphone is furnished with a six foot cable and a stand adaptor. List price is $10.85. For complete details, write: TURNER COMPANY, 900 17th Street N. E., Cedar Rapids, Iowa.

Plastic Tweezers

Probing tweezers made entirely of tough polystyrene are now available at radio supply houses. The construction makes them shockproof so that intermittents, shorts, opens noise and other troubles can be traced with the power turned on. The price is 35 cents at your supply house. For details, write: HYTRON RADIO & ELECTRONICS CORP., Salem, Mass.

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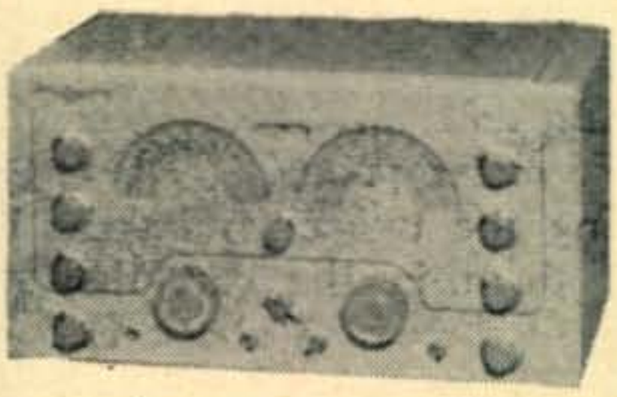

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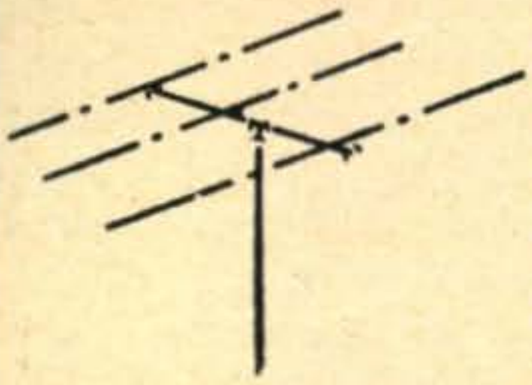

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160 METER

1.8 to 1.825 — 1.875 to 1.9
1.9 to 1.925 — 1.925 to 2.0

$1.25 ea.

80-40 METER

3.5 to 4.0 — 7.0 to 7.4

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Please state frequency. We will come as close as possible. No refunds or exchanges, please.

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COUNCIL BLUFFS, IOWA

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Please send me:

- ☐ SW-54 Info. C-6
- ☐ Select-O-Jet Info.
- ☐ HRO-50-1
- ☐ NC-57 Info.
- ☐ NC-183 Info.
- ☐ New Catalog ☐ Radio Map
- ☐ List of Guaranteed Used Equipment

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HAMFEST CALENDAR

The San Mateo County Amateur Radio Club will hold its fifth Annual Hamfest on June 3, 1951, at Coyote Point, San Mateo, California. The program will start at 10:00 a.m. and close at 5:00 p.m. A program of activities for all, including the lads and lassies, will be scheduled. Two main features will be the 2-meter and 75-meter transmitter hunts with a choice prize for each. An "Auction" and "Swap" table will be arranged so bring some gear and prepare to bargain. Major prizes as well as many others will add to the attractiveness of the program. Have yourself a pleasant day by coming and bringing the family and a picnic lunch. Admission—FREE; Registration for Major prizes —$1.00.

June 3 - Starved Rock Radio Club Annual Hamfest, at Camp Ki-Shau-Wau, near Starved Rock State Park. The Illinois Emergency Net convention will be a part of this hamfest. Special features for the XYL's and Jr. ops. Tickets $1.50 at the gate, advance registrations $1.00 up to May 25, if mailed to the Secretary, George E. Keith, W9QLZ, Starved Rock Radio Club, Inc., Box 22-A Utica, Ill.

June 8 - New York Quarter Century Wireless Assn. Semi-annual dinner at Fraunces Tavern, Pearl & Broad Sts., NYC. The bar will be open at 6 p.m., dinner at 7. Program will include several real old-timers as guest speakers. Non-members welcomed if guest of a member. The association now has over 350 members, with a Chapter in Cleveland. Details or reservations may be obtained from the President, John Di Blasi, W2FX, 295 West 14th St., New York City.

June 16 - Radio Assn. of Erie—25th Anniversary Hamfest at Lake Le Boeuf Park, 15 miles south of Erie, Penna., on Route 97. Registration starts at 11 a.m., dinner at 4:30 p.m. Prize drawings with separate prizes for the YL's. Tickets: $3.00 for OM's, $2.50 for YL's. Ticket deadline is June 13. For tickets, write Dr. W. R. Cook, W3HVP, 929 State St., Erie, Penna.

June 17 - Third Annual Hamfest, Mayville, North Dakota. Sponsored by the Goose River Valley Emergency 'Phone Net. For details, write the Secretary, Margaret Hilstad, Mayville, No. Dak.

The Mitchell Radio Amateurs' Club is sponsoring a Hamfest Picnic at Mitchell, So. Dak., Sunday June 17, 1951, at Hichcock Park. Everyone invited, no registration fees, fun for all, bring YL's, XYL's and Harmonics. Games, prizes and entertainment for everyone. Bring your own dishes, sandwiches and something for the POT-LUCK. We will furnish the coffee and ice cream. Serving will start at 12:30 p.m. Corn Palace available in case of rain. Listen on any South Dakota Net for more information or contact WØHDO, Activities Manager, Mitchell Radio Amateurs' Club.

ZERO BIAS

(from page 9)

Maritime Openings

The rapid expansion of our Merchant Marine has created more Radio Officer openings than there are men to fill them. As reported elsewhere in this issue, the FCC has re-validated the Temporary (T.L.T.) license and has provided for automatic renewal of all recently expired licenses, in an effort to meet current needs. It is obvious that men without previous experience must also be recruited, and the situation offers enterprising hams a chance to break into a field where they can perform a worthwhile service, learn, travel—and earn. These jobs pay $400 per month and up. If you're interested, watch July *CQ* for the first of a series of articles on how to get started.

—Gene, W2ESO

LETTERS

(from page 6)

would appreciate any assistance other CQ readers can give me.

I have a BC-654, acquired in new condition. I also have a PE-103 and intend to use the two units as a mobile 75-meter phone.

However in trying the two units on the bench, prior to installing them in the car, they would not function, although they both check OK separately. I found a tag on the PE-103 which said that it should not be used with a BC-654 with a serial number under 9000, unless the 654 had been rewired; mine has a serial lower than 9000

I am at a complete loss regarding the necessary changes: I know they must be in the switching arrangement on the set, but can't dope it out. Any information will be greatly appreciated.

Frank P. Fucile
Rear Cottage
104 Herman St.
Buffalo 12, N. Y.

Editor, CQ:

May I inquire through the Letters Column for information on converting an RU16 receiver to 115 volt AC operation? I have some equipment that I'll be glad to swap in exchange for the dope on this unit.

R. G. Summers

SCRATCHI

(from page 4)

toob, and once more I hold it tight and finally get to my car.

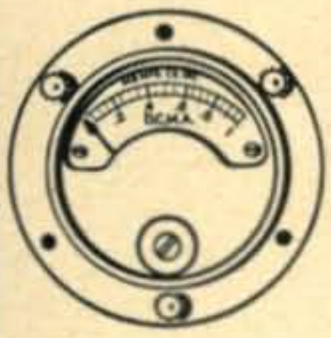
From now on, I am being caution himself. I get into car, and look around, trying to figure where to put Hon. Toob so it be good and safe. On seat beside me? No, I liable to stop quickly and it be tossed to floor of car. In glove compartment? Nope, foolish question, won't fit in glove compartment.

HARVEY HAS THE GEAR YOU WANT!

SUPERIOR POWERSTATS

Smooth, efficient voltage control, 0-135 volts output from 115 volt AC line. Models also for 230 volt input. Write for free literature. Models for table and panel mounting.

Type 20, 3 amp	$12.50
116, 7.5 amps, table mtg.	23.00
116U, 7.5 amps, panel mtg.	18.00
1126, 15 amps	46.00
1156, 45 amps	118.00



Emby 0-1 DC Milliammeter

Completely enclosed. Satin aluminum finish. Flange mounting; requires 1-inch hole.

Harvey Special Price . . . $4.75

Gonset Converters

3-30 Gonset Converter; 10-11 Gonset Converter; 20 Meter Gonset Converter; 75 Meter Gonset Converter. Shipping weight each, 4½ lbs. **$44.75**
Gonset Tri-Band Converter **$47.60**
Model B Noise Clipper **$9.25**
Universal Steering Post for use with all Gonset Converters **$3.90**

NEW GONSET TWO-METER CONVERTER; superheterodyne . . . same size and appearance as Tri-Band Converter and FM Tuner. **$44.50**

NEW GONSET FM COMMUNICATIONS TUNER; for all 2-way FM radio telephone communications; 30-40 mc; 40-50 mc; 88-108 mc; 152-162 mc. **$59.50 net.** (Other frequency ranges available on special order.)

DeLuxe Model (separate squelch tube, pilot light switch) ..... **$69.50 net**

TERADO 60-Cycle DC to AC Converter

110v AC in your car. Just plug into cigar lighter or battery. Small enough to hold in your hand.

TERADO Senior Model . . . furnishes 110v AC-60 cycles at 40 to 45 watts from 6V car battery. Operates small portable receivers, transmitters, etc. ..... **$10.99 net**

TERADO Junior Model . . . ideal for use with Selenium rectifier voltage doubler or tripler, and will supply 250 to 450 volts D.C. at about 100 mill ..... **$8.24 net**

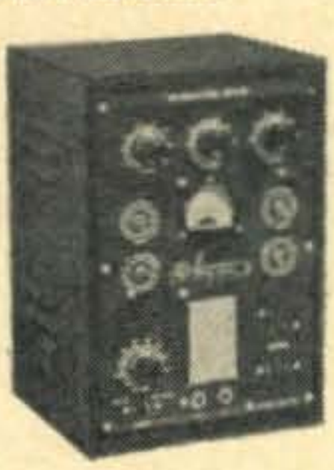
VISIT HARVEY'S AUDITORIUM — Come in and visit our new Sound Department . . . all these items and many more on working display at all times.

HARVEY-WELLS XMTRS

. . . have everything from 2 to 80 meters, for fixed or mobile operation.

H-W is the transmitter you will use for years. Best for Hams, Business Organizations, Government Departments, Emergency Services and Civilian Defense.

2 BANDMASTER MODELS



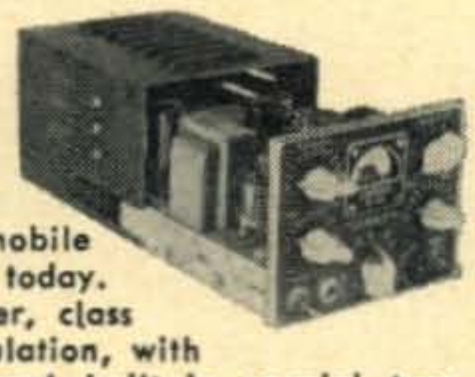
Senior **$111.50**
DeLuxe **$137.50**

BANDMASTER POWER SUPPLIES

APS-50 for 110 A.C., **$39.50**

DPS-50 for 6 or 12 V.
6V ..... **$87.50,** 12V **$54.50**

THE NEW SUBRACO MT 15X



The finest in mobile rigs available today. 30 watts power, class B 100% modulation, with push-to-talk and built-in coaxial type antenna relay. Xmttr complete with tubes, coaxial antenna connector, mounting brackets, etc. *Shipping weight 15 lbs.*

Complete with Tubes $99.55

STANCOR ST-203A Mobile Transmitter

6VS OSC. 2E26 Final. 25 to 30 watts at 10 meters.

6J5-PP6V6 Modulators. Crystal switch for two frequencies. Has antenna tuning network and change-over relay.

Factory Wired and Tested **$66.75**
Kit Form **$47.50**
(Above prices less tubes and crystals)

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LEECE-NEVILLE SYSTEMS in STOCK

Complete Line of Eldico Equipment in Stock

Get Your MASTER MOBILE Mounts and Antennas from HARVEY

Mounts, tapped for ⅜" threaded stud.

Model	Net
132 Universal Body Mount	$8.75
132X Above with Heavy Duty Spring	9.85
132S 132 with Stainless Steel Spring	10.75
140 Bumper Mount	6.55
140X Above with Heavy Duty Spring	7.65
142 Bumper Mount, no spring	3.25
92 18" Adjust. Extension Bar	3.25

Antennas, stainless steel

100-96S 96" whip, ⅜" stud for all mounts	$5.25
106-96S 96" whip, plain end to fit 92 ext.	4.50
All-Band Antenna, 20, 40 or 75 meter coil	8.75
Extra Coil for 20, 40 or 75 meters, ea.	3.30

Note: use all band antenna on 10 by shorting coil.

New LYSCO Mobile Transmitters

25 watts minimum peak power. Clamp type modulation. Tuning adjustment from front panel. Dimensions 4" wide, 4½" high, 6" deep. Rounded drawn case, black wrinkle finish. Tubes: Model A 3-6AQ5 . . . Model B 3-6V6GT . . . Model C 3-12A6. 25 watts power minimum.

Amateur: 10 meters, 20 meters, 75 meters.
Civil Air Patrol: 2374 kc ..... **$29.95 Net** less tubes
Model 144 2-Meter Receiver ..... **$49.95** with tubes
Model 381 Mobile VFO High Impedance **$26.95** with 3 tubes
Model 381 Mobile VFO Low Impedance **$33.95** with 3 tubes

HARVEY delivers these famous Emergency Receivers Immediately!

High quality emergency band FM receivers for application. ANYWHERE you are you can HEAR police calls, fire alarms, bus dispatchers, railroad communication, ships at sea, etc.

MONITORADIO

Mobile FM Receiver 152

Model M-101 covers 152 mc to 162 mc 'Band **$72.50**
Model M-51 covers 30 to 50 mc's.

POLICE ALARM

For Home or Fixed Location

Model PR-31 for 30 to 50 mc band . . . **$44.95** complete.
Model PR-8 for 152 to 162 mc band . . . **$44.95,** complete with 14" whip indoor antenna.

Telephone: LUxemburg 2-1500

hrc HARVEY RADIO COMPANY INC.

103 West 43rd St., New York 18, N. Y.

NOTE: In view of the rapidly changing price situation in both complete units and components we wish to emphasize that all prices are subject to change without notice, and are Net, F.O.B., N.Y.C.

In factly, base of toob won't even fit in glove compartment — which are reminding me, does anybuddy ever keep *gloves* in a glove compartment? On floor of car? Nope, sumbuddy might step on it. After while, I getting inspiration. I get some string from glove compartment, then take out rear seat cushion in car, wrap string around it, and tie toob to rear cushion, then put cushion back in place. Next I locking two rear doors so no ones can get in car and sitting on toob. Thus being all set, I drive off in high spirits.

So, Scratchi are driving along quite slowly, going not a bit over 45 (my speedometer not working, but radiator not boiling, so can't be going too fast) when ZOWIE! some accelerator-happy goof are barrelling out of a side street and I slamming on my brakes (both of them) and barely managing to stop. Gollies, it lucky that Scratchi's car not having a bumper, or I surely hitting that guy. After getting wits recollected, I glancing idly at back seat to just double-check on toob — Hackensake! no back seat. Evidentally I not getting rear cushion in right, as it are upside down on the floor. I quickly turn it over, but toob carton look OK, so I heaving a big sigh of relief, putting rear seat cushion back on floor, right side up, and driving off.

I manage to reach home with no further trubble, but before getting out of car I sitting and thinking how to get toob into house without any more accidents. Brother Itchi are coming out of house to seeing what are holding me up. I explaining whole thing, and after discussing it we go into house and get a bunch of pillows and cushions, and make a path out of soft things from car to house, then on into the shack. This time Scratchi taking no chances. Then, while Brother Itchi holding toob carton, I cutting string, then we both carrying it into house, very slowly, through front door, into shack, where we laying it down on pillow in corner of shack. Golly geewhiz, I never so relieved in my life to getting something done.

By this time Scratchi feeling in need of nourishment, so Itchi serving some cacktus juice and I are celebrating the safe arrival of the THING. After cupple of glasses I deciding to wait until next day to putting toob in the rig, on acct. my hands are too shaky. I guess I under such nervous strain that it are just now affecting me.

I just about to reach for another refill when Brother Itchi coming in and telling me that radio dealer are on the phone and wanting to talk to me. I answer and radio man are awful excited. He telling me he made big mistake, that he got to checking over the packing slip on the shipment of toobs, and my toob not come after all, and that toob I bringing home belong to big company in town. They is hurry for it, so he rushing out to get it.

Hon. Ed., are you realizing what this meaning? All my mental anguish, my suffering, my aching back — all for nothing. I are so mad I rush into shack, and kicking the toob as hard as I can. Hon. Ed., this are all happening two weeks ago, and I can still remember every detail of what happened. Have you ever kicked a mercury-arc

Still Available...

HALLICRAFTERS RECEIVERS at Newark

These Hard-to-Get Hallicrafter Sets Are Still in Stock at Newark for Immediate Delivery! Order Today...While Quantities Last

S-76 RECEIVER

Double superhet with 50 kc second i-f and giant sized 4-inch "S" meter. One r-f, two conversion, and two i-f stages; temperature compensated, voltage regulated Range 540-1580 kc, 1.72-32 Mc in four bands. Calibrated electrical bandspread. Sensitivity, Volume, BFO Pitch, Selectivity and Tone Controls: AVC, Rec./Standby, BFO, ANL switches. Phonograph input jack 3.2 or 500 ohm outputs 9 tubes plus voltage regulator and rectifier..... **$169.50**

SX-71 5-BAND RECEIVER

Double-conversion receiver with extra-sensitivity and superior image rejection. Covers 538 kc to 35 mc and 46 mc to 56 mc in 5 bands. Built-in NBFM. Has 1—RF, 2—Conversion and 3—IF stages plus limiter and balanced detector stages. Includes "S" meter, phone jack, external power socket and Receive/Send switches. Steel cabinet, 18½" x 7⅞" x 12". Less speaker. For 105-125 v., 60 cycles. AC operation.
98F008. Wt., 33 lbs. NET. **$199.50**

SX-62 DELUXE RECEIVER

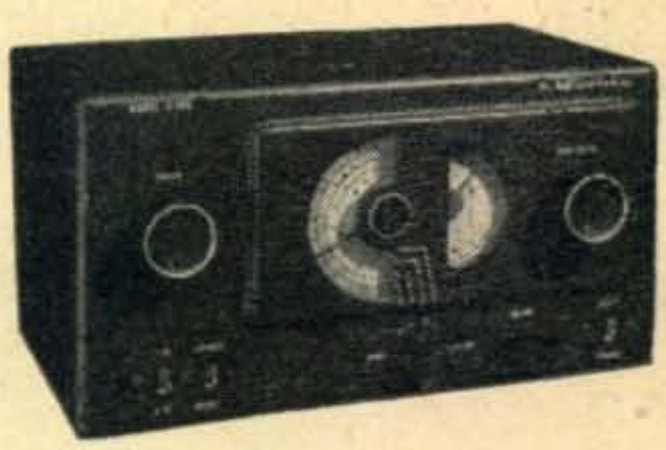
Covers 540 kc to 109 mc in 6 bands — includes AM, FM and SW broadcasts. PP 6V6 output stage furnishes 10 watts andio with response of 50 to 15,000 cps. Separate bass and treble controls plus phono input make this ideal for custom installation. Has built-in 500 kc crystal oscillator with dial pointer for re-set accuracy. Includes BFO for code signals. Steel cabinet, 20x10¼x16". Less speaker. 105-125 v.,60 cyc.
98F007. Wt., 77 lbs. NET. **$289.50**

S-72 ALL-WAVE PORTABLE

Operates on AC, DC, or self-contained batteries. Covers standard broadcast and 3 short-wave bands, 540 kc to 30.5 mc. Has one stage of tuned RF. Controls: Main Tuning, Bandspread, Band Selector, RF Gain-BFO-AVC and On-Off-Volume. With built-in speaker, AM and SW antennas. Size, 12¼" x 14" x 7¼". Less batteries, see below.
98F006. Wt., 16 lbs. NET.. **$109.95**
G6M60. Battery Pack. 7 lbs.NET **$4.17**

S-77 AC-DC RECEIVER

New AC-DC version of an old favorite, the famous S-40B. Covers 540 kc to 43 mc in 4 bands. Has electrical band-spread. High signal-to-noise ratio assures good selectivity. Includes ANL, AVC, BFO, 1—RF and 2—IF stages. Has phone jack and external power socket. 3-position tone control. Built-in 5" PM speaker. Steel cabinet, 9 x 18½ x 11". For 105-125 volts AC or DC operation.
98F004. Wt., 29 lbs. NET.. **$99.95**



S-38B ALL-WAVE RECEIVER

The famous low-cost "Radio Man's Radio". Covers 540 kc to 32 mc in 4 bands. Ideal for the beginning Amateur, SWL, or extra receiver in the home. Electrical bandspread dial with scale for separating crowded bands. Controls: Main Tuning, Bandspread, AM/CW Switch, Speaker/Phone Switch, and On-Off-Volume. Steel cabinet, 12⅞x7x7¼". 5" PM speaker. 105-125 v., 60 cyc.
98F005. Wt., 14 lbs. NET.. **$49.50**

Prices Subject To Change Without Notice

NEWARK IS FIRST IN THE FIELD WITH THE FINEST RADIO, TV AND ELECTRONICS EQUIPMENT

R-46 SPEAKER
Matching 10" PM Speaker for SX-71 and SX-62 receivers.
98F002. Wt., 19 lbs. NET..... **$19.95**

NEWARK ELECTRIC COMPANY

323 WEST MADISON STREET
CHICAGO 6, ILLINOIS

rectifier toob? The kind with the steel jacket about a quarter-inch thick? Kicked it when you are wearing bedroom slippers? Well, don't doing it, unless you wanting to practise up on how to use crutches. The doctor says I'll be able to get my right foot into my shoe in about another week.

Respectfully yours,
Hashafisti Scratchi

VHF-UHF

(from page 42)

Tropospheric Blobs?

In answer to our request for reports on the effect of antenna "tilting" on long-range v.h.f. contacts comes a report from GM3DIQ, Ayrshire, Scotland. While testing out a 144-mc 16-element stacked array (which appeared to have at least the usual gain on local contacts) he was surprised to receive a report from GM3FOW that he was 2 or 3 S-units weaker with this array than with the simple 4-element Yagi that had been used before. On the hunch that this might have been caused by differences in the vertical radiation pattern of the two arrays, GM3DIQ constructed a five-over-five array with full wave spacing, and made provision for tilting it upward. When the new array was directed toward the horizon, GM3FOW reported the signal was still S6, the same as with the 16-element beam. However, when the beam was tilted about 6 degrees above the horizontal plane, the report was changed to S9-plus!

On subsequent tests made with other stations GM3DIQ found that the tilted array provided noticeably better reports than the "level" job. These tests were made in relatively hilly country, at distances from 12 to 70 miles. He concludes that the results seemed to show that there is an optimum angle of radiation for varying distances and conditions. He does not believe that this is due to tropospheric scattering. Any other opinions?

Miscellany

W7QLZ of Phoenix, Arizona, has his heart set on working into California on two meters. Ol' Clyde has been running serious schedules with the W6 gang, at various times of day between 0400 and 2100. He has boosted the power of his rig to 400 watts on cw and 250 watts on phone. A new beam has been added. To date, the best that can be told is one case of reported reception of W7QLZ's signals by W6HZ, of Los Angeles. This is a hop of about 360 miles, over some of the toughest terrain that this country has to offer. W7QLZ is still in the mountain-top expedition business. On the 22nd of April he travelled to Pioneer Pass, about 15 miles SE of Globe, Arizona. No rare DX was caught, but some nice QSOs were held on two meters with W7NVN and W7FGG of Tucson, 80-odd miles away, despite the fact that the 9,150-foot peak of Mount Lemon lay directly in the path. The 420 mc signals couldn't be persuaded to bend around the mountain.

SUN CLEARING OUT ALL SURPLUS!

CRYSTALS FOR S.S.B. EXCITER

AS IN NOV. '50 QST—LO. FREQ.

Also many other uses— in FT 241-A Holder—½" Pin SPC. Marked in 54th OR 72nd Harmonic MC Freq. Listed Below by Fundamental Frequency. Fractions Omitted.

412 433 472 493	390 401	372 381	450 530
413 434 474 496	391 402	374 383	452 531
414 435 477 497	392 403	375 384	461 533
415 436 479 503	394 405	376 386	465 536
416 438 481 504	395 408	377 387	526 537
418 440 483 506	396 409	379 388	529 538
419 441 484 507	397 411	380	
420 442 485 509	393 404		
422 443 487 511	400		
423 444 488 516			
424 445 490 518			
425 446 491 519			
426 447 492			
427 448			
429 462 EACH	EACH	EACH	EACH
431 468 **49c**	**79c**	**39c**	**99c**

SPECIAL 200 KC XTALS without Holders. 21/32 x 23/32
69c ea. 3 for $2

HAM CRYSTALS

4100	6840	7806		3735	5850	6475	7340	7573	
5030	6873	7840		5305	5873	6506	7406	7640	
5485	6906	7873		5677	5906	6540	7440	7673	
6006	6973	7973		5706	5940	6573	7475	7706	
6040	7740	8273		5740	5973	6606	7506	7806	
6073	7773	8306		5750	6273	6640	7540	8340	
6106				5760	6373	6673			
6140	**49c**	EACH		5773	6406	6705	**99c**	EACH	
6173				5806	6440	6740			
6206	**10 for**			5825	6450	6806	**10 for**		
6773	**$4.50**			5840	6473	7306	**$9.00**		

SCR-522 XTALS

5910	6522.9
6370	6547.9
6450	7480
6470	7580
6407.9	7810
EACH	**$1.29**

BC-610 XTALS

2 BANANA PLUGS—¾" SPC

2045	2260	2415	3215	3570
2105	2282	2435	3237	3580
2125	2300	2442	3250	3945
2145	2305	2532	3322	3955
2155	2320	2545	3510	3995
2220	2360	2557	3520	EACH
2253	2390	3202	3550	**$1.29**

Payments must accompany order. Enclose 20c for Postage & Handling. Crystal shipped packed in cloth bags. All Shipments Guaranteed.

BENDIX 100 WATT TRANSMITTER C-W

Easily converted to 20-40-80 meter VFO and 10 meter crystal. Each ECO dial has 3000 divisions enabling quick precision shifting. This transmitter was constructed of the highest quality precision parts. Four separate output tanks; one 4 position selector channel switch having 7 sections which changes the ECO, IPA, and output tanks simultaneously. All controls are mounted on the front panel. The housing is cast aluminum. Shields and case are sheet aluminum dimensions 11x 12x15 inches, Wt. 35 lbs. Complete instructions furnished. Uses 3-807, 4-12sk7 — each a separate master oscillator. Has a 5 AMP R.F. meter. Requires 750 volt 300 MA power supply and modulator for phone operation. We cannot supply either the power supply or modulator. This is a complete coverage transmitter for the new or experienced amateur. A true ham value. Complete with tubes, not many of these units left. So hurry and get yours while they last.

NOW ONLY $29.95 LIKE NEW

NOW ONLY $19.95 USED

Ham Transformers New Boxed Peerless Hi-Quality — Not Surplus at 60% Off List Prices.

Modulation Trans., 300 Watt Universal, Model M-2107T, List $70.00, Reduced to $28.00
Driver Trans., 15 Watt Universal—70MA Primary, Model A4237Q, List $10.75, Reduced to $4.30.
Plate Trans., 2428V-CT 300 MA, Model P5196A, List $45.00, Reduced to $18.00.

FAMOUS MAKE BUTTERFLY CONDENSERS

ALL NEW — ⅓ OFF!

.500 GAP.	.375 GAP.	.250 GAP.
96-22.15	11- 8.15	111-16.80
115-25.20	106-20.15	127-18.25
124-26.65	130-21.60	143-19.85
	141-24.50	159-21.00
	153-25.95	175-22.50
		192-23.95
		203-25.95

Note: Figure in Left Column is Max. Cap. per Section

NATIONALLY KNOWN FAMOUS MAKE HEAVY DUTY SINGLE & DOUBLE STATOR TRANSMITTING CONDENSERS.

Max. Cap.	Gap	Price
300	.077	$ 5.32
230	.171	3.57
500	.219	17.22
250	.219	12.85
75	.344	8.96
245	.344	14.11
50	.469	7.05
100	.469	11.62
150	.469	12.95
75	.719	12.85
100-100	.219	14.11
100-100	.344	15.64
60-60	.469	14.11

NAVY VHF BRAND NEW CW TRANSMITTER

Battery operated (67½V."B" and 1½V."A") Frequency 80 to 105 MC. uses 2 1G4 Tubes - with instruction manual - less tubes and batteries.

$4.95

High Voltage Triplet DC. Voltmeters—125 Ohms per Volt—With External Multiplier — Brand New!

VOLTS	2" PRICE	3" PRICE
1000	$3.49	$4.49
1500	3.49	4.49
2500	....	4.49

ANTENNA RELAY UNIT—BC-442A with R.F. Ammeter & Vacuum cond. **$2.89**

SPERRY AMPLIFIER, 4-tube, Elevator Servo-Amplifier, used as voltage amp. to operate relay. Complete with tubes. New.....**$3.95**

SPECIAL BUY ON POTENTIOMETERS. Assorted, singles, duals, long and short shaft, RCA, WIRT and many other famous makes.
10 for **$1.99**

BC-645 UHF RECEIVER TRANSMITTER

"The Citizen's Radio" covers 420-450 mc. Consists of complete transmitter, modulator system and receiver, 15 tubes, and simple complete conversion instructions for Citizen band operation. Brand new . . . **$14.95**

WAVEMETER BC-1073A

Used. Good Condition. Covers 150-210 MC Companion to BC-1068A receiver. Contains resonant cavity wavemeter, oscillator, heterodyne amplifier, tuning eye, 110 VAC 60 Cycle Power Supply.

LESS TUBES $4.95

RADAR TRANSMITTER BC-1072A

Used. Good condition. Covers 150-210 mc. Contains many parts, such as 110 V AC Blower, Gen. Radio—1 AMP variae, kilovolt meter, circuit breaker, 110 volt HI & LO voltage power supply, tubes, oil condensers, and many others. Companion to 1073A. Operates from 110 V AC 60 Cycles.

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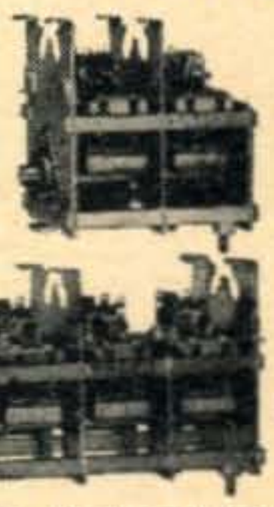
From SCR-522

2 GANG - 220 MMF per section **$1.29**

3 GANG - 220 MMF per section **$1.59**



BRAND NEW with CONCENTRIC AIR TRIMMERS

BC-746 TUNING UNITS, contains antenna, oscillator coils, 140 mmf midget tuning condenser, double crystal socket, less xtals. **39c**
With 2 crystals **99c**
With 2 crystals, one in 80 meter band **$1.29**

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5BP4 CATHODE RAY TUBE-NEW $2.49

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Handle here is "Pick" . . . call or write me for anything you need in ham gear or parts—Will be happy to expedite your order with best quality merchandise. 73's

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OF WASHINGTON, D. C.

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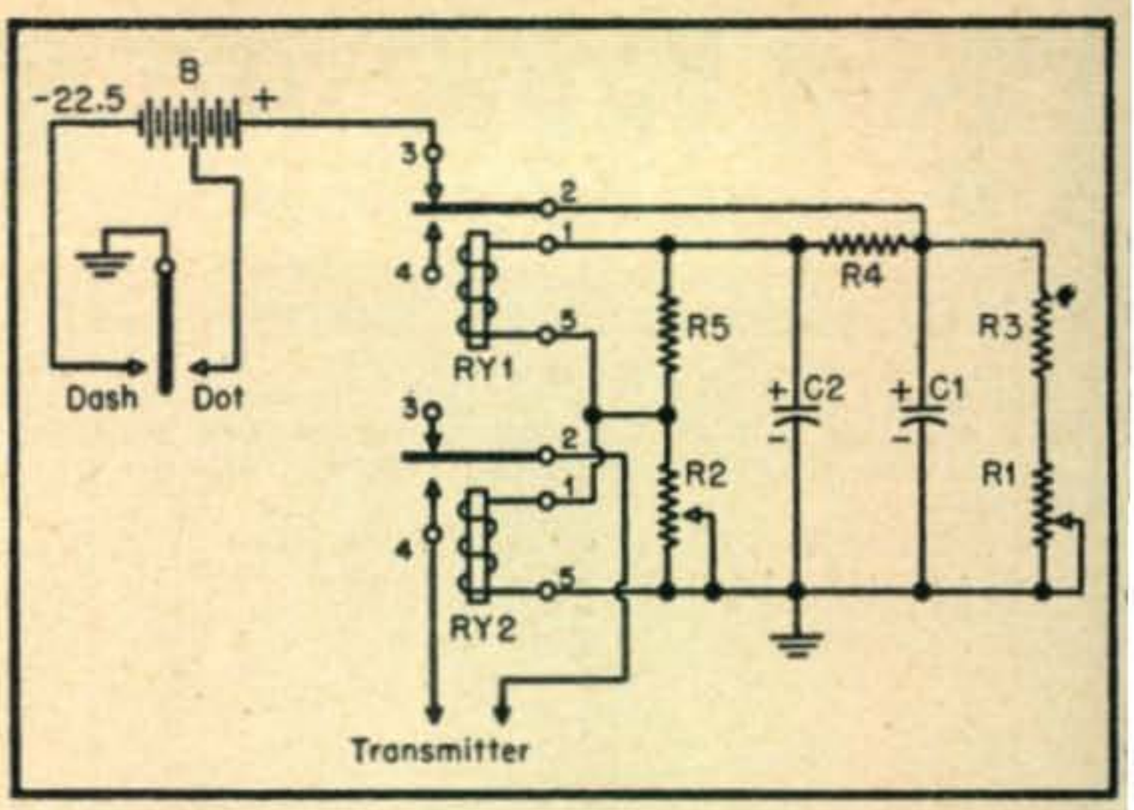
FCC EASES RENEWAL RULES, ISSUES EMERGENCY TICKETS TO FORMER SHIP RADIO OFFICERS

FCC will renew First or Second Class Radiotelegraph Operators Licenses without service time, now, and until further notice. This applies to licenses that have expired since June 30, 1950.

FCC will issue a T.L.T. (Temporary Limited Ticket) valid for ship radio operating during the emergency to anyone passing a 16 word a minute code sending and receiving test who a) has held a First or Second Class Radiotelegraph License since January 1, 1940 which has since expired, or b) who held a T.L.T. during World War II that was issued after a written examination. Those who held TLT's issued on the basis of previous licenses only do not qualify. Bring along your old license when applying for renewal or a T.L.T.

AN IMPROVMENT IN THE SIMPLER CORKEY.

In connection with the article on "A Simpler Corkey" in the March issue, the author reports that more positive action of the keying relay results if the negative terminal of the 4 μf electrolytic condenser is returned to the junction of the two



relay coils, rather than to ground as shown in the original diagram.

The complete circuit, Figure 3 of the original article, is reproduced above; the correction calls for C2 to be returned to the junction of R2 and R5.

SPECIALISTS WANTED BY THE U. S. NAVY MATERIAL CATALOG OFFICE

Electronic and electrical specialists are being sought by the U.S. Navy Material Catalog Office located at 29th Street and Third Avenue, Brooklyn N. Y. These jobs start at $3825 per year. There is an automatic annual pay boost of $125.

The work involves identifying, classifying, and describing electronic and electrical equipment used by the Defense Department, for the purpose of cataloging such material.

Experience in maintenance, repair, or overhauling work, proficiency in the analysis of blueprints or plans, work done in preparation of parts lists or in the design, testing, and preparation of specifications for supply items, would be considered as qualifying experience.

Further information may be attained by phoning STerling 8-0900 or by writing directly to the U.S. Navy Material Catalog Office. Personal interviews can be arranged on weekdays between 10:00 a.m. and 3:00 p.m.

REVISIONS IN REQUIREMENTS FOR NAVAL RESERVE COMMISSIONS

The Navy Department has announced important revisions in the programs providing opportunities for Naval Reserve officer commissions. The programs of particular interest to CQ readers were described on page 48, March 1951 CQ.

The first change is that an applicant may apply 120 days before his graduation from an accredited college or university. Previously, an applicant could not apply until he completed his four-year course and received his degree.

A second change is in the prerequisites for application for a General Line commission in the Reserve. Candidates are now required to have completed mathematics through trigonometry (either in college, university, or secondary school). This considerably lowers requirements which previously called for 18 college semester hours of mathematics and physics.

W1LDD, Net Control station of the Boston Area "Sunday Evening Two-Meter Round Robin" tells us that the name has been changed to "The KB Net" in tribute to their old friend, W1KB. Charlie also passes along the sad news that W1AXW, George Bent, was accidentally electrocuted while working on his rig April 7, 1951.

W2QED of Seabrook, N. J. is ready for anything the 420 mc band has to offer. Ken now has a crystal-controlled transmitter, which uses an Amperex 9903 as a tripler to drive another 9903 as a straight amplifier. At 100 watts input, sufficient output is obtained to light a 40-watt lamp to almost full brilliance. Ken found it necessary to shield the final amplifier completely to reduce radiation losses. The ASB4 receiver has been modified by changing the 955 converter over to a u.h.f. crystal mixer circuit, and numerous other minor modifi cations have been made which provided added gain and narrower band width. Although relatively high power is available, it is not usually necessary for local QSOs. Solid contact with W3NAG, located near Philadelphia, approximately 35 miles away, can be maintained when the input to the final is reduced to about one-tenth watt! W2QED is another 420 mc experimenter who insists that, watt for watt, *better* signals can be obtained over a given path on the 420 mc band than on two meters!

That's it for this month. Keep us posted! 73

Brownie, W2PAU

GO FLY A KITE

(from page 28)

Some thoughts on Antennas

So much for the kite. The antenna may be secured to the kite string after the kite is well up in the air. A string can be fastened to the kite string with a clove hitch and two half hitches around the kite string to hold the antenna with weakening the string. This take-off string may lead to a light insulator made of a bead or small piece of plastic, and then to a light antenna wire. A stranded aluminum wire would make a good antenna, but steel or copper also will work. A size as small as #22 is ample for handling high power.

By maneuvering the kite reel so that the transmitter is downwind from the reel, the light antenna may be dropped directly down to the transmitter, and little strain may be placed on the antenna. The high-level winds remain fairly stable, so that it will not often be necessary to move the reel.

A vertical antenna a quarter wavelength long is a good antenna, but requires a good ground which is not generally available at a field-day location. The ground problem can be dodged by using a half-wave antenna, feeding it at the voltage loop. Longer antennas, higher multiples of a quarter wave, may be satisfactory at some distances depending on conditions, but in general, vertical antennas much over a half-wavelength long will be inferior, especially on the higher frequency bands.

If the antenna is permitted to slant, a "long wire" antenna, directive along the wire and in the direction

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★ ***Pasquale Santella,*** millwright at United States Steel Company's Carrie Furnaces of the Homestead District Works, has a very personal reason for buying Savings* Bonds. To ***C. F. Hood,*** United States Steel Company executive vice president, he says, "My son Tony, 19, is missing in Korea. Used to be I bought bonds because it was my duty and it was a good way to save money. Now I want to help lick the Reds and get Tony back. I buy one bond every payday and when Uncle Sam needs more money, I'll buy *more* bonds." He has bought bonds regularly since 1943, has never cashed one.

*U.S. Savings Bonds are Defense Bonds Buy Them Regularly!

TODAY join with other Americans—business leaders and employees—in their drive to make our country and our citizens more secure. If you're an employee, go to your company's pay office *now* and start buying U. S. Defense Bonds through the Payroll Savings Plan—the safe, sure way to save for defense and for personal dreams-come-true.

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of tilt obtained, although limited as to direction and distance that it is effective, because of the lobe angles and the normal high-angle radiation that is necessary to work stations a few hundred miles away.

In closing, here are a few words of caution. (1) Do *not* lift a wire with a kite within a half-mile or so of overhead power wires! (2) Use a static drain, such as a resistor of 100,000 ohms or so, from antenna to ground. With these precautions, the use of kites, which in themselves are interesting, will add many enjoyable hours to a field-day excursion.

220 MC TRANSMITTER

(from page 18)

Turn the meter switch in the second position, placing the meter across R7 to read the grid drive to the second tripler. Reconnect the "B" supply to R6. Starting with condenser C6 about half capacity, tune for maximum grid drive, which should be about 3 milliamperes. Make certain that this stage is now tuned to 73.8 mc, either by means of a grid dip meter or an absorption wavemeter such as a Millen #90608.

The next step is to put the meter in the third position, placing it across R13 to measure the final grid drive on the 832. Reconnect the "B" supply to R11 and tune the butterfly condenser C10 for maximum grid current, which should be about 1 milliampere. Make certain that this stage is tripling to 221.4 mc and not doubling to 147.6 mc. This may be proven by using a grid dip meter or by means of Lecher Wires.

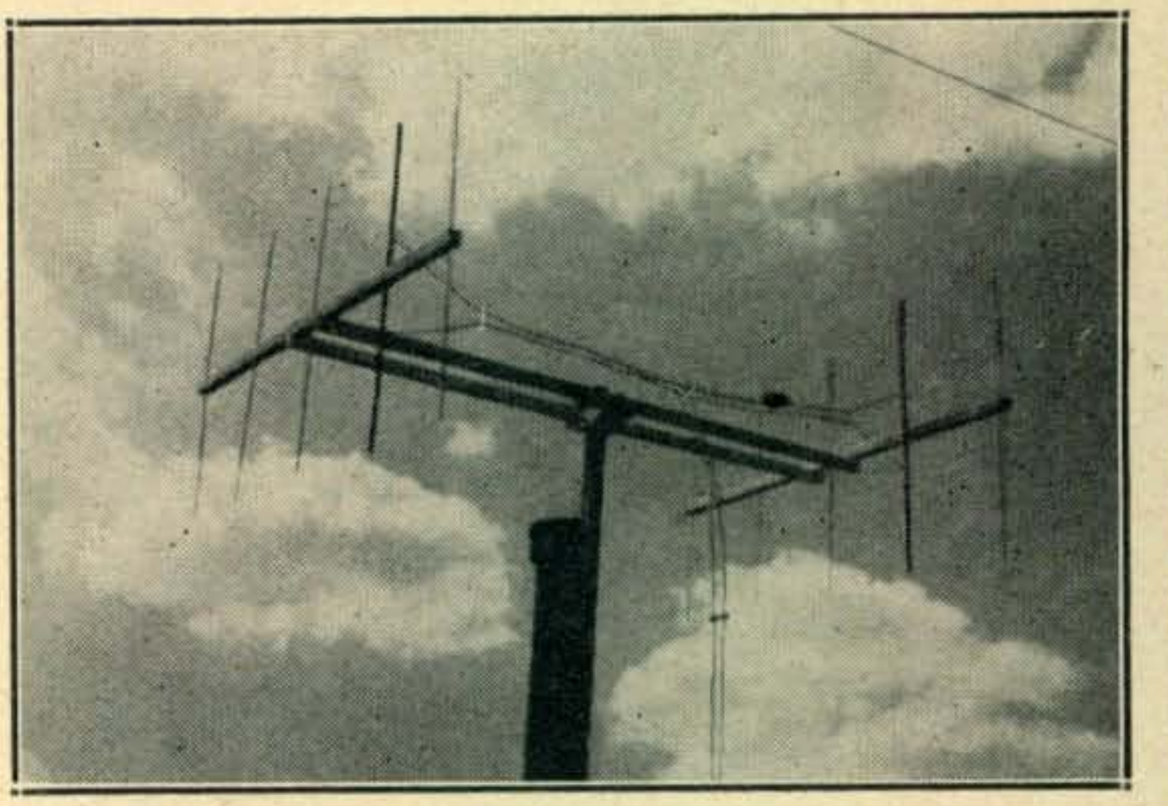
You are now ready to tune the final. Connect a 115 volt 10 watt lamp across L7 with the wiring to L8 temporarily disconnected. The coupling between L6 and L7 should be loose, at least one half inch separation. Condenser C11 should be about one third capacity. Now reconnect the "B" supply to R16 and tune C11 for maximum brilliancy of the 10 watt lamp. Turn the meter switch to Position 6 and with a maximum voltage of 300, the final plate and screen currents should read about 80 milliamperes. With the switch in Position 5, the total "B" drain for the three 6J6 tubes is 70 milliamperes.

The antenna coupler should now be connected. Connect the 10 watt lamp through the antenna relay to L10. Reconnect L7 to L8. Reapply the "B" voltage to the entire transmitter and slowly tune C12 so that the lamp burns brightly. The tuning of this condenser is very sharp. L8 should be tightly coupled to L9. L10 should be coupled as loosely as possible and still transfer maximum power to the lamp load. Make certain these three coils are all wound in the same direction.

You will note some interaction between C2 and C4 so therefore a slight retuning of all stages might result in still greater carrier output. The builder should not run into any great difficulty if he follows closely the layout, uses the components specified and winds the coils to the right sizes.

Antenna

The antenna used with this transmitter was modeled after the design of W2PAU's shown on page 11 of the March 1950-CQ. A considerable number of measurements with a 958 acorn field strength meter plus an "S" meter on a superhet receiver were made on this beam. Comparisons were made only between half wave and full wave spacing of the Yagi sections vertically polarized. No difference in forward gain could be detected with either spacing. The photograph shows a 220 mc



copy of the wide spread twin five, which was later cut down to half wave spacing. It could be possible that the author's equipment was not capable of measuring the slight difference in gain so the choice of spacing will be left to the builder. The gain obtained by the use of this beam was measured to be about 11db, which is very worth while. The half wave spacing was preferred because the overall size was smaller and the front to back ratio seemed better. The dimensions of this array for 220 mc operations is as follows:

Reflector Length	26⅛	inches
Radiator Length	25	inches
#1 Director Length	23¼	inches
#2 Director Length	23⅛	"
#3 Director Length	22⅞	"
Spacing between adjacent elements	10¾	"
Spacing between Yagis, half wave	26¾	"
Spacing between Yagis, full wave	53½	"

All the elements were made of the same diameter and material recommended by W2PAU, including the wooden frame structure. However, the method of feeding the two radiators was changed to a delta. A 375 ohm transmission line made from two #12 wires spaced one inch was used with this antenna. Such a line can be readily constructed by using a #450-3 Mosley spacer every twelve inches along the line. If you prefer a finished product, purchase the low loss line manufactured by Gonset. The feeders are soldered 3½ inches on either side of the center of each radiator, thus forming a triangle. This distance seemed to give the best match with the above feed line. No accurate standing wave indicator for these frequencies was available so a twin lamp indicator was used. With the match described, no indication of standing waves was noticeable, and with these dimensions the field strength meter also registered maximum

forward gain. Serious minded amateurs should not consider 300 ohm TV line for anything more than 25 feet or so, as the losses at these frequencies will run too high, especially in wet weather.

MONITORING POST

(from page 31)

The use of existing emergency communications services, such as police, fire, and other like networks for civil defense communications is generally felt unwise, though in a few cases it is being considered. The demand upon these services is so great that no extra duty can be added without sacrificing a great deal. Further, in the event of disaster, which is over and above regular work, there will be an exceedingly heavy load put upon police and fire communications. These networks can well be used for alerting purposes, but beyond that, when an actual emergency arises, an overload of traffic on police and fire networks will demand capacity operation.

Therefore, to follow the suggestion of the Federal Civil Defense Administration and the FCC that amateur stations be used in civil defense seems to be a very wise plan. There are a few spots in the country where CD officials have refused proffered assistance by ham radio operators with their equipment; these officials should give more thought to the value of ham radio. They have claimed " . . . we do not need ham radio. We have all the radio communications we need." This statement is made without actual knowledge of the circumstances, we can be sure, for available frequencies most certainly do not permit "all the radio communications we need" in any part of the country. Another statement made is that " . . . when disaster strikes we will use any and all radio equipment we can get our hands on." It will be too late then to start hunting for radio gear. To those with that view, they should consider that gear alone does not make a radio network; trained personnel is far more important in setting up emergency communications than the equipment, for radio stations without intelligent, well-trained operators will be only detrimental to the conduct of emergency communications. Having licensed operators with a thorough knowledge of the operation of the equipment on hand is the only manner in which to carry on radio work.

Visualize the chaos on the air, should untrained personnel frantically grab an available microphone, flip on the switch and start calling for assistance, or endeavor to transmit instructions when no other means are available, without being positively certain of the transmitter's frequency! Hundreds of emergency communications networks in orderly operation at such a time could be reduced to uselessness by the thoughtless use of "any and all equipment we can get our hands on."

Ham radio, with its wealth of talent and gear, is the only answer to the need in CD radio. It is a ham project. Let the hams do it and use the other emergency radio nets for the purpose for which they were intended.

RAYO' TO THE RESCUE

(from page 25)

doctor said I had two sprained ankles. An' as I sits in da kitchen soakin' my feet and lookin' at da mornin' paper, I seen da followin':-

"The lecture of Doctor David Swanson, eminent astronomer, before the local amateur astronomers club at the YMCA was slightly interrupted last night by a radio amateur who made a hasty but unexpected departure from the fourth floor window. The radio ham evidently had mistaken the astronomers meeting for the radio meeting that was taking place in another room in the same building."

Astronomers? Holy smokes! That ole ball' head' guy din't fool me for a minute. I knowed all da time he didn't look like no rayo ham!

As da silver fox said to da sour grapes, "A bird in da hand aint worth nuttin' so try, try again".

CRYSTAL CONVERTER

(from page 21)

input and output circuits of the 6AK5; this size allows the range from 14 to 30 mc to be covered easily with a single coil and provides good image rejection. The oscillator uses a surplus 6.0-mc crystal that is operated on its fundamental frequency for reception on 14 mc. The intermediate-frequency range for the 20-meter band is therefore 8.0 to 8.4 mc, and the BC-348 is tuned in this range when receiving on twenty. For the hypothetical 21-mc band, the oscillator is again operated on 6.0 mc, and the BC-348 is tuned from 9.0 to 9.45 mc; sufficient second-harmonic injection from the oscillator is available to produce the intermediate frequency in this range. For reception on 28 mc, the crystal is operated on its third overtone, which is very close to 18.0 mc, and the BC-348 is tuned from 10.0 to 11.7 mc.

When changing from one band to another, it is necessary only to set the crystal oscillator switch in the correct position, peak the r.f. controls, and set the tuning of the output circuit to the appropriate intermediate frequency. The BC-348 is then operated as usual. The bandwidth of the converter is about 150 kilocycles on both bands. Usually one is interested in scanning only a part of the band at any one time — say the phone segment or the c.w. segment of 14 mc — and the converter can be peaked up at the center of the desired range and left alone. On 28 mc, however, it is necessary to retune the r.f. circuits as one tunes across the relatively large phone assignment.

The crystal overtone circuit is essentially a tuned-plate tuned-grid oscillator with the crystal in series with the grid coil, where it operates near series resonance. When operating on the fundamental frequency, the crystal switch connects additional capacity across the oscillator plate coil to tune it to a frequency slightly higher than the crystal fundamental; at 6 mc, the 18-mc grid coil in series with the crystal has practically no effect. In testing the oscillator portion of the circuit, the proper capacity for C13 must be determined by trial. The tuning slug of L5 should be positioned first so that the oscillator will operate on 18 mc, with the crystal switch set for this frequency, and then several condensers of about 300 $\mu\mu$f should be tried with the crystal switch set for 6 mc until one is found that allows the oscillator to operate stably on its fundamental. The L5 slug may then be readjusted slightly so that the crystal will start reliably when the switch is thrown from one position to the other. It is suggested that L6 be duplicated as closely as possible; too small an inductance will provide insufficient feedback for overtone operation, and too large an inductance will allow self-oscillation not controlled by the crystal.

The converter was built in an aluminum chassis measuring 7⅜ by 3¾ by 2⅜ inches, with a bottom cover. A shield partition across the 6AK5 socket is necessary. The partition has two bends secured with screws to the sides of the chassis and should be notched out carefully with a file so that it just clears the 6AK5 socket pins and center shield. Care in construction of the chassis and shield, and attention to short leads in the 6AK5 circuit, will pay dividends in freedom from regeneration. The output circuit tuning knob is located on the right end of the chassis, and a phonograph cable connector on the back furnishes the i.f. output. A shielded cable is a must for connecting the converter output to the input of the BC-348. Adequate gain is provided in the converter, but if haywire connections are used for the BC-348 input, interference from strong stations on the intermediate frequency is bound to occur.

The operator who has not used a crystal-controlled converter before will be particularly pleased when he discovers that he can tune in a 28-mc c.w. station, make a transmission, and afterwards find the station right where he left it.

FAYE EMERSON SHOW

(from page 19)

promise to completely equip an operating position in the studio. So our worries promptly went QSB.

On the morning of the day the show was to be filmed, we flew from Baltimore to New York by early morning plane, and upon arrival at the studios at 9:30 a.m. found W2AVA and his able associate, Tet Suito, W2ZCS, hard at work setting-up an operating position on the sound stage.

One of the major problems which faced them was bringing an outside antenna into a windowless, sound-proofed studio. However, the usual ham ingenuity came to the fore. A small ventilator duct was discovered and we were able to set-up a vertical folded dipole, made of twin-lead, on the roof and bring in a long transmission line through a wall opening.

By eleven that morning Vince Kenney arrived, bringing with him a typewritten script sheet to be given to each mobile unit. This script had been written over the weekend by W2OUT and W2ZCS and gave each mobile operator his cue as to when he'd be called by City Control or Borough Control and what would be expected of him.

At exactly 1 p.m. W2JXH, acting as City Control, stationed in his car near the studios, called roll and mobile units W2EFA, W2QFR, K2AR, W2YOO, W2DLP and W2RVY (each of whom were stationed across the East River in Manhattan) responded promptly and with an S9 signal. From then on "we were in business".

Within a short time afterward the actual "shooting" started. With W2MGE at the controls of Emergency Network Station W2AVA/2 and with Faye Emerson and yours truly watching, the director shouted "Roll 'em". From that point on, with movie cameras and sound track recording every incoming and outgoing signal, the mobile network put on a perfect performance.

After the last contact had been made and signed out, the director yelled "Cut" and that part of the program was considered finished.

Before proceeding with the remainder of the program, however, Miss Emerson asked that she be allowed to express her thanks to everyone who had taken part in the demonstration. So with W2MGE operating, she talked with each car separately and told them how much she appreciated what they had done. Each "op", in turn, responded with a "bouquet" for Faye.

Everyone who has seen the program knows that in addition to the network demonstration, we discussed TVI and showed that in many cases it is caused by a source other than a ham transmitter. In addition, we made it quite clear that whenever a ham is to blame, if so advised, he will prove most cooperative and willing to eliminate the trouble.

It is our sincere hope that since several million TV fans will have seen this program, we have ac-

complished the purpose we had in mind from the time we first discussed the project with Faye Emerson—another effective public relations job in the interests of amateur radio.

COMPACT HALF KW

(from page 15)

The speech amplifier is conventional in most respects. In addition to thorough shielding, an r.f. filter is used at the mike input and an r.f. bypass, C_{45}, at the output. The R-C coupling combinations C_{55},R_{42}; C_{57},R_{44}; and C_{58},R_{46} are chosen to give a low frequency cut off at approx. 250 cycles. They, plus the surplus low pass filter, FL, combine to give the most effective speech pass band and power utilization. No, the speech amplifier is not flat from 20 to 20,000 cps; all or nearly all the speech power is confined to the band 250-3000 cycles, for best communication efficiency. The filter is also required to limit band width to cut out speech harmonics generated by the clipper V_9. This cathode follower type of clipper with a dual triode is most effective and has the advantage of needing no biasing voltages.

One unique item in the speech system is the 1000 cycle oscillator, V_6. Any small filter choke may be used for L_9 providing the series combination C_{38},C_{41} is chosen to resonate it at approximately 1000 cps. This oscillator, which is turned on by S_{17}, is a great advantage in conducting tests and especially in checking modulation percentage with an oscilloscope. Its inclusion in any transmitter is well worth its few parts, which may usually be found in any junk box, and the few minutes required to wire the circuit in.

J_5 connects the exciter to the power supply unit and provides parallel connections between the power switches S_4, S_5 and S_{15}. This provides transmitter control from either unit if they should be installed separately. Terminals 8 and 11 are shorted out in the plug for normal operation. However, the exciter has been used as a low powered transmitter on Field Day, when a special plug is used to provide a.c. to the exciter and modulation voltage between terminals 8 and 11. The exciter can of course be used as a self contained NFM phone transmitter.

The exciter was built into a 5¼" panel in order to fit the entire transmitter into a standard 26¼" rack type cabinet. This compression required some planning in advance but adequate space was secured by using a 17"x13"x2" chassis and limiting all components to 3" above chassis. The 2E26 socket is mounted ½" below chassis on spacers, and the v.f.o tuning condenser is driven by a set 1/1 ratio gears, originally used to drive the two separate sections of the seven gang condenser in the AN/ARC-1. No other particular efforts were required to keep within the space available. The band switch is built up of CRL switch sections mounted on extra long tie rods. To give the best r.f. layout with shortest leads, the switch is mounted lengthwise and driven from the panel knob by

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Advertising in this section must pertain to amateur radio activities. Rates: 25c per word per insertion for commercial advertisements. 5c per word for non-commercial advertisements by bona fide amateurs. Remittance in full must accompany copy. Phone orders not accepted. No agency or term or cash discounts allowed. No display or special typographical ad setups allowed. "CQ" does not guarantee any product or service advertised in the Classified Section. Closing date for ads is the 25th of the 2nd month preceding publication date.

REVOLUTIONARY copyrighted discovery! Learn Morse Code alphabet in 15 minutes with amazing new code teacher "PHILKODA." 50c postpaid (group size 5.00). Philip W. Miner, 7120 Lahser, Birmingham, Mich.

SELL: NC57 receiver with new "S" meter. Receiver in excellent condition. Best offer over $75.00. S. E. Teige, 1041 Jackson Street, Marinette, Wisconsin, W9MQT.

QSLs. Samples for stamp. Harrison, 8001 Piney Branch Road, Silver Spring, Md.

SELL: S72, $65; VFX-680, $40; HQ129X speaker cabinet, $3; S40, $55; HFC-610 converter, $35; BC453 Q5'er, FL8A, A. C. power supply, $15; Eimac 450TL never used, best offer. Everything in excellent condition. Robert Rosenquist, WØEHF, 2558 Ida, Omaha, Nebraska.

SELL: BC-654A (PE-103A, PE-104A) 3800-5800 kc easily converted 3500-4000 kc, TCS-equipment, RA-34H rectifier, TBL-13, BC-342N. TBY Technical Manuals. T. Howard, 46 Mt. Vernon St., Boston 8, Mass.

WANTED: 25 mmf 32 KV vacuum condensers, similar to type used in BC610 transmitters, Eimac, Amperex, etc. Also approximately .001 - 6,000 volt by-pass condensers, cast aluminum ends or bakelite cases. W9AU.

EVANS accepts used manufactured equipment in trade for new. Write for quotations or latest list of used equipment. W1BFT, Evans Radio, Box 312, Concord, N.H.

NEED ART-13; ARC-3; DY-17; TS-12; TS-13; MN-26 J or K: BC-342: BC-312; I-100; BC-348; BC-788A, AM, B or C: I-152A, AM, B or C; teletype; test or any other equipment. Will trade. Write: Bob Sanett, (W6REX), 4668 Dockweiler, Los Angeles, California.

BC-221, like new, with original book, $45.00. W2BYF, 8 E. Sampson St., E. Rockaway, N.Y.

LEARN INTERNATIONAL MORSE CODE by best and fastest method known. Code-Voice Records get you ready for good Army job, or new Novice ham license. Send only $4.00 for complete instruction album with Vinylite records. Money-back guarantee. Dept. C, Raybrum Company,Box 66, Orangeburg, N.Y.

BECOME an Amateur Radio Operator, Fascinating hobby leads to high paying positions, Home study course. Theory preparation for passing government license examinations. Low cost. Personal coaching. Federal Electronics Institute. 45 E. Putnam, Dept. G., Greenwich, Conn.

WANTED: 100 ft. length RG-8/U, 304TL's. W4MXP, 700 East Broad, Falls Church, Virginia.

HOTTEST surplus list in the country. Electronics-hydraulics-aircraft-gadgets. Dick Rose, Everett, Wash.

BEAMS and antenna elements. Send card for information. Riverside Tool Co., Box 87, Riverside, Ill.

SURECHECK tests for amateurs. Class B & C $1.75. Class A $2. Amateur Radio Supply, 1013 Seventh Avenue, Worthington, Minnesota.

COMPLETE kilowatt station with HQ129X, excellent condition, $350. Write Cleo R. Beauchamp, W1SLJ, 355 Merrimack St., Manchester, N.H.

CRYSTALS: Marine, aircraft, communications types, Special prices to MARS, Civilian Defense groups. Furnish requirements, request catalogue. R. E. Nebel Laboratory, 1104 Lincoln Place, Brooklyn 13, N.Y.

SHORT WAVE DIATHERMIES traded in on 1951 models. 200 to 500 watts output. Transformers, tubes, meters, condensers alone worth more than we're asking $25.00 F.O.B. Chicago. Medical Arts Supply Co., 500 S. Wolcott Ave., Chicago 12, Ill.

CARDS? QSLs? SWLs? Modernistic? Cartoon? Photographic? Samples 10c. Sackers, W8DED, Holland, Michigan. Subscriptions, renewals: CQ $3; QST $4.

FOR SALE: One almost new NC173 and new Meissner signal shifter, both for $300. Mrs. C. D. Davis, 205½ West Street, Grand Ledge, Mich.

SELL, trade DeForests radio course, perfect. Want Silver 701 or similar. Power supply. Vaughn, W7MXE, Box 546, Eugene, Oregon.

FIRST $125 takes my completely reconditioned HRO. Noise limiter and 6 step xtal filter added. L.J. Smith, Rt. 3, Box 187, Albuquerque, N. Mex.

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SWAP 10" TV with Mallory-DuMont front end, also all kinds of ham gear, for Panadaptor, Wire recorder unit, any good surplus ARC-1, ARC-3. "TS-" units, etc.) and laboratory equipment, or will pay top cash. Littell, Farhills Box 26, Dayton 9, Ohio.

FOR SALE—Raytheon power transformer 3650-0-3650. 700 ma, 110-220, $100. W1CPI.

BARGAINS new and used transmitters, receivers, parts: Globe King $315; HT9 $199; HRO-7 $199; Temco 75GA $225; Collins 75A1 $295; new 150 watt phone $199; KP81 $189; HRO-5T $175; Hallicrafters S-47 $119; HRO Senior $119; RME 45 $99; SX17 $89.50; NC 46, RME69 $69.50; VHF 152A $69; SX24 $69; Bud VFO21 $39.50; Globe Trotter $57.50; New Meissner signal calibrators $24.95; MB611 $29; 90800 exciter $29.50; Gonset 10-11 converters $25; XE10 $14.95; and many others. Large stock trade-ins. Free Trial. Terms financed by Leo, WØGFQ. Write for catalog and best deal to World Radio Laboratories, Inc., Council Bluffs, Iowa.

FOR SALE—Brand new Carter generator 6 volt-400 volt, never used, $50. W1CPI.

SELL HRO with regular coils plus 180-430 coil, speaker, power supply. Clean. Excellent condition. Ship C.O.D., subject inspection. Best offer over $145. WØPPZ, Walter Haeussinger, 1102 Marian, Winona, Minnesota.

FOR SALE: TBS50C complete with Harvey-Wells 300 volt generator, $175. W1CPI.

FOR SALE: Practically new Collins 75A-1 with speaker, guaranteed perfect, $300. W1CPI.

FOR SALE—Trylon steel tower, 13" triangular, 118 feet high, $700 in place. W1CPI. Many parts, send for list.

WANT 32V-2. Swap factory wired Meissner 24TV 10 in. picture (needs rectifier tube and speaker output Trans., no cabinet), cost $280; Reynolds deluxe alum. boat, cost $300, perfect; and $135 boat trailer with hitch to fit your car. Come get it all, or write Dr. J. R. Baxter, W4YNK, 1126 Edwards, Union City, Tenn.

HALLICRAFTERS SX-25. Very good condition. Must sell to settle estate. $65.00. Box C601, CQ Magazine, 67 West 44th Street, New York 18, N.Y.

BARGAINS: New and reconditioned Collins, National, Hallicrafters, Hammarlund, RME, Millen, Gonset, others. Reconditioned S38 $29.00, S40 $69.00, SX42 $199.00, NC57 $69.00, NC173 $149.00, NC183 $199.00, HRO7 $199.00, HRO50 $289.00; HFS $99.00, HQ129X $139.00, SP400X $259.00, RME45 $89.00, DB22A, HF-10-20, VHF152A, SX43, SX28A, Collins 75A and 32V, others. Terms. Shipped on approval. Write for free list. Henry Radio, Butler, Mo.

HELP WANTED

WANTED: HAM-ENGINEER to assist in design and development of Eldico's amateur equipment. Must have initiative and ingenuity, plus broad amateur experience. Call or write Don Merten, W2UOL at Eldico of New York, 44-31 Douglaston Parkway, Douglaston, L. I., N. Y., BAyside 9-8686.

WANTED: RADIO OFFICERS MERCHANT MARINE, FCC telegraph lic., 6 mos. endorsement, Coast Guard officers lic., wages $400. monthly. Radio Officers Union, 1440 Broadway, N.Y.C.

means of a bevel gear right angle drive. This arrangement can be seen in one of the photographs.

The exciter as described can, of course, be used to drive any final requiring up to 10 to 15 watts of r.f. If used as a separate unit it might well be laid out on a smaller but higher, chassis, thus conserving operating table space. (*The companion Modulator-Final Amplifier and Power Supply units will be described in the next issue.*)

YL'S FREQENCY

(from page 30)

immediate as 20 meters, but there's *no* QRM nor TVI!" says Lenore.

WØRAW, still traveling in W5 land, has met several more of the YLs. Writes Bertha: "Recently we had a transmitter hunt in Weslaco. W5OTU, Anne Maring, and her OM and two little girls came up for it so I got to meet Anne. She is a swell person. Teaches school in the mornings and also teaches a veterans' class in night school. We've visited Old Mexico several times. The last time was when we went up to Zapata to see W5NWR, Velma Cunningham, and her OM, W5CU, took us to an old Spanish village across the border. Their son, W5NET, and his wife, W5NES, Harriet Sanders, drove over from Laredo so we got to see them and their small son, too. They all were simply grand to us. All have Class A tickets and talk to each other every day on 75 phone."

From Hilda, W4HWR, we hear she had "one grand evening with Lou, W1MCW—a swell gal—and her OM" while they were vacationing in Florida.

A long letter from KL7RN in "the rugged north," with color transparencies of that amazing country —only wish we could reproduce them here. Jeanne and her OM have been moved from Shungnak; at the moment they're holding down a post in a far more rugged area of Alaska, but are practically on travel orders. "We are right in the mountains now," Jeanne writes, "and the country is really magnificent here. Our house and radio station cling to the side of a 3100-ft. rock. But this is the coldest place in all Alaska — so it seems. Actually not as low temperatures as at Shungnak but we always have a winds so that 10 below feels more like –70°." Jeanne used to live in New Mexico when her father had a ranch near Roswell. "Love that country," says Jeanne, "and envy you as I sit here with my fingers slowly freezing to the keys, staring at snow covered mountains and at my feet a large expanse of heaving ice of a glacier. A beautiful scene but not a very warm one!" In their new location most of their CAA work is on c.w., to Jeanne's joy. She is now Class A but says 20 isn't much better than 10 for getting out from their present QTH.

W5KZD, of New Orleans and now with an Infantry regiment on Okinawa, writes to say hello and send 73 to the YLs. He operates around 29.8 mc at KR6FV, and though 10 hasn't been open, he'd like the YLs to "keep a listenin' for me." Joe reports about fifty hams on the island and a very active club. 33

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TYPE NO.	TUBE BODY LENGTH	TYPE SOCKET
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TC-2	1 1/2"	7-pin
TC-3	2"	7-pin
TC-4	1 1/8"	9-pin
TC-5	1 9/16"	9-pin
TC-6	2"	9-pin

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