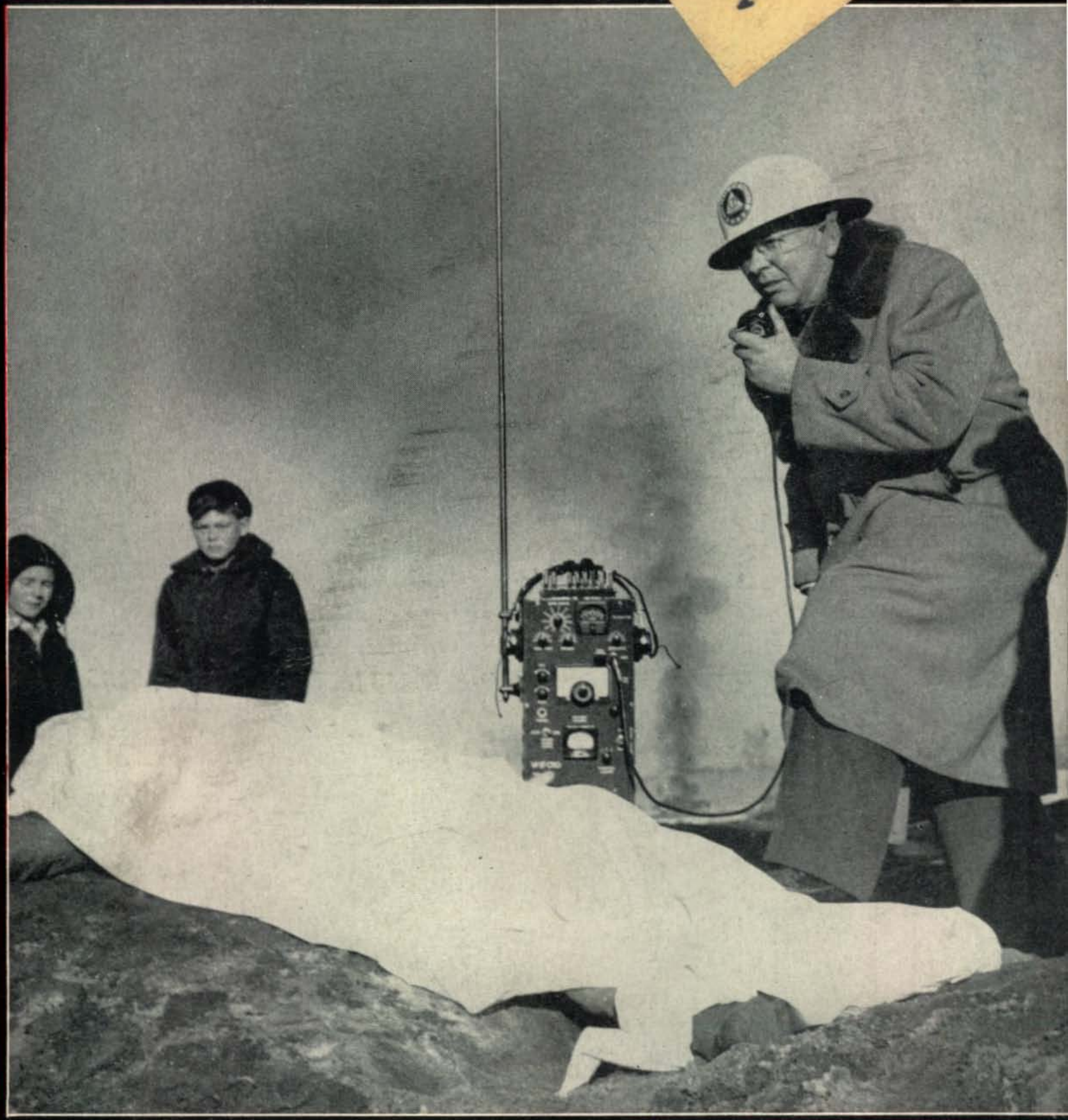
ANC

CQ

RADIO AMATEURS' JOURNAL

JUNE
1953



35c

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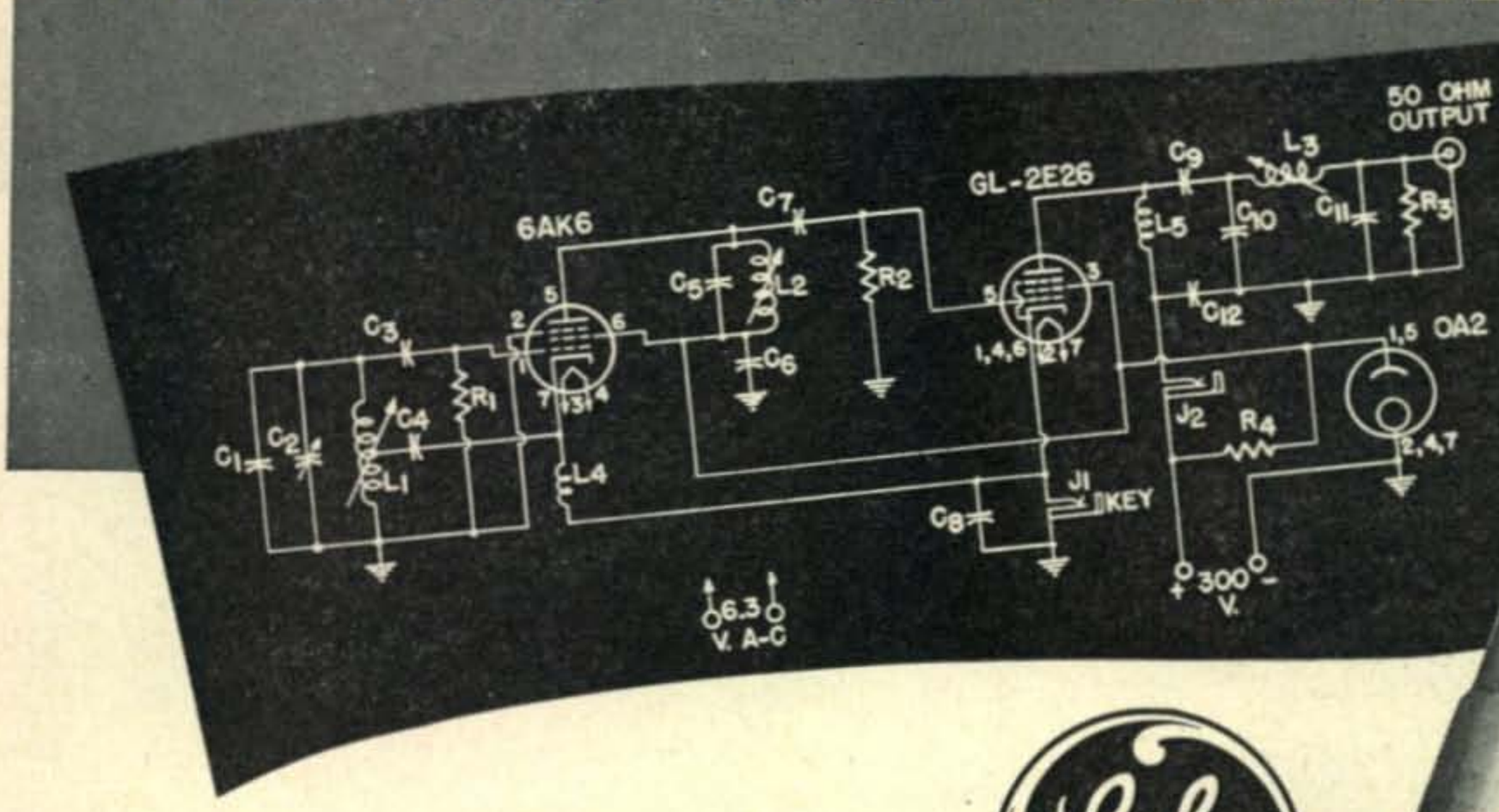

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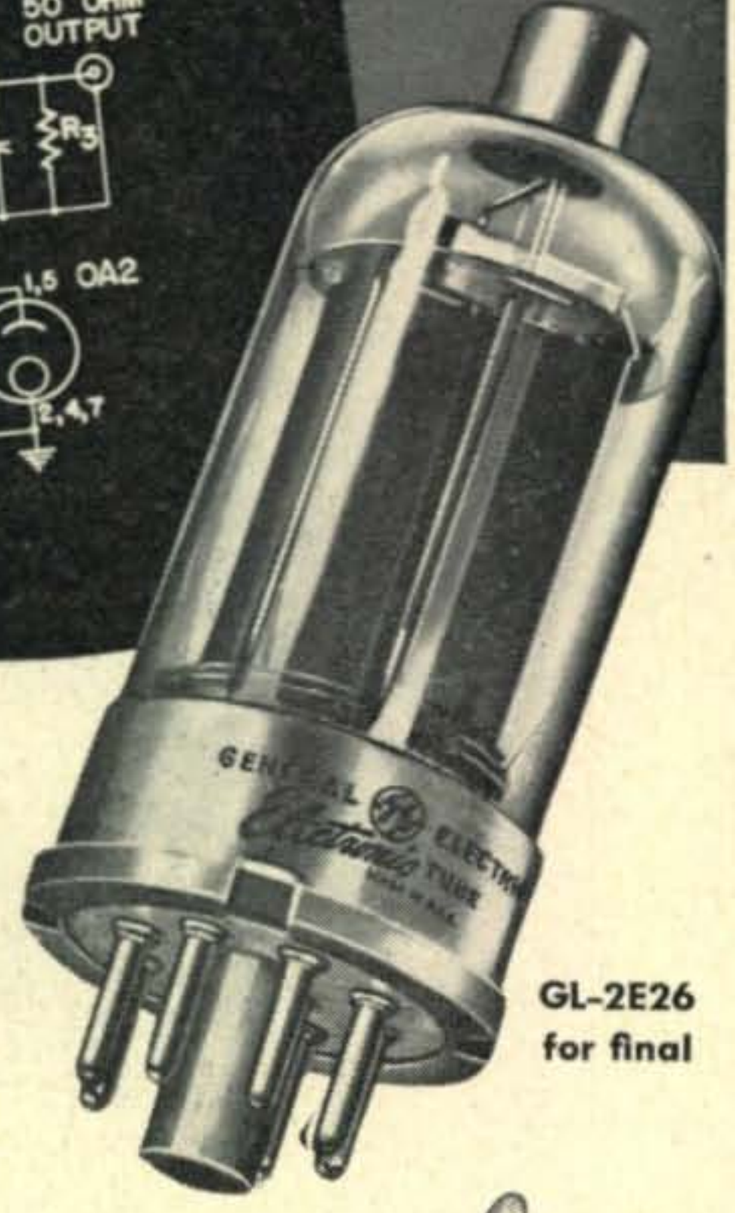

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ALSO . . . Ham News, Vol. 5, No. 4, tells how to build a modulator that will add audio transmission. Two 12AT7's and a 12AU7 comprise the tube complement. And in Vol. 8, No. 2, you will find instructions for a suitable power supply, using G-E 5GH1 selenium rectifiers. Your G-E tube distributor can furnish the audio tubes, also the rectifiers.

6AK6 as VFO

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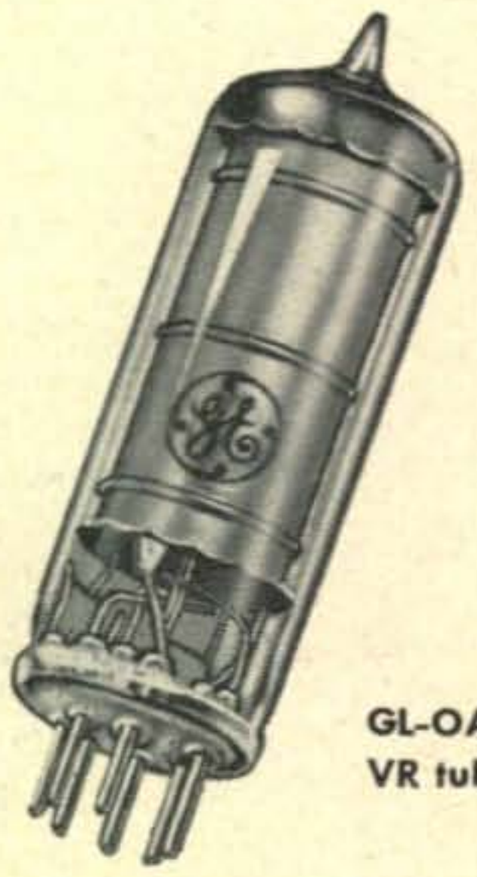

GL-OA2 VR tube

ELECTRONIC TUBES OF ALL TYPES FOR THE RADIO AMATEUR

GENERAL ELECTRIC

166-186

CQ RADIO AMATEURS' JOURNAL

VOL. 9, NO. 6
JUNE, 1953

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FEATURE ARTICLES

Cover photograph showing WØCRO at "Operation Crystal." See page 32 for full story.

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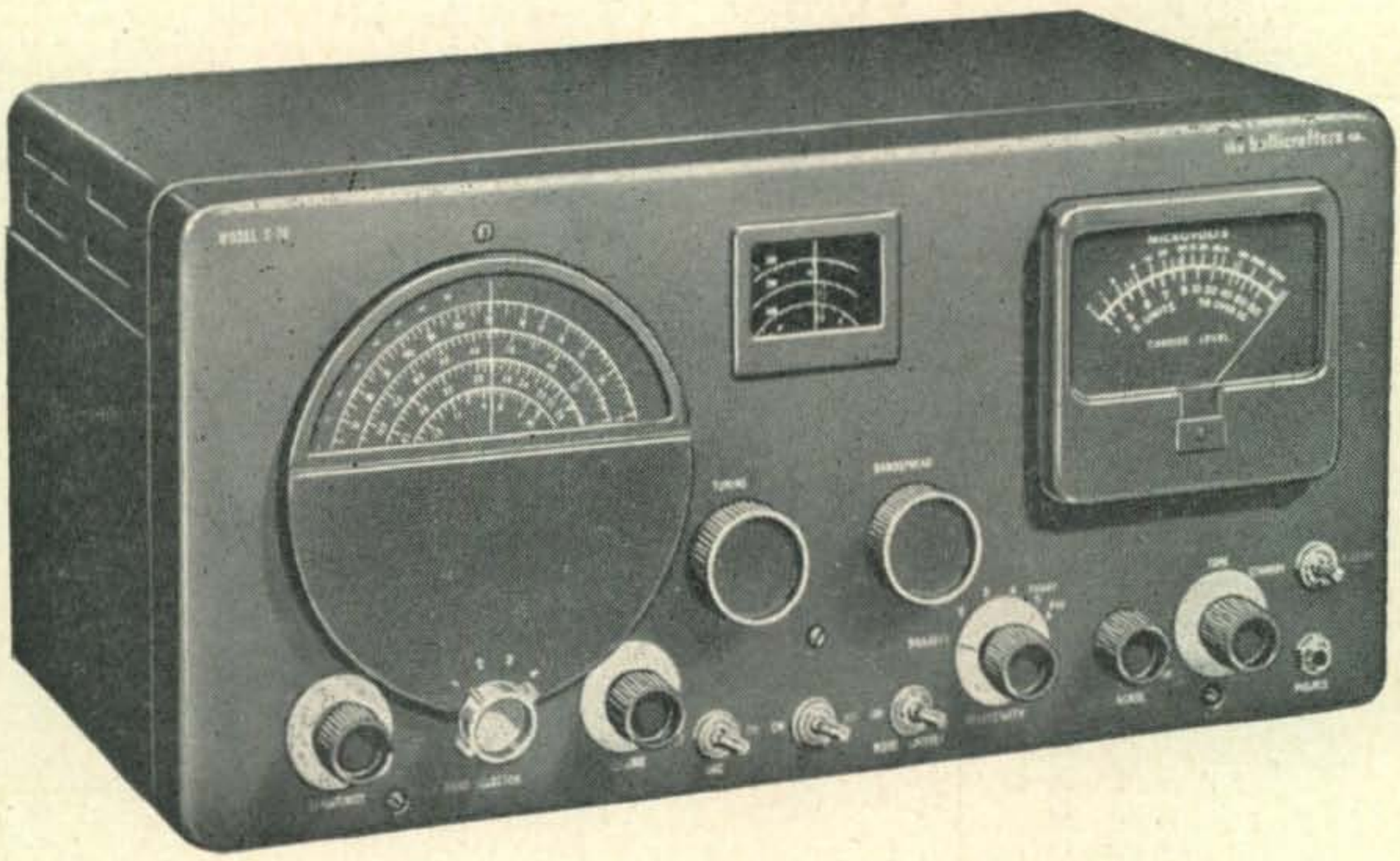

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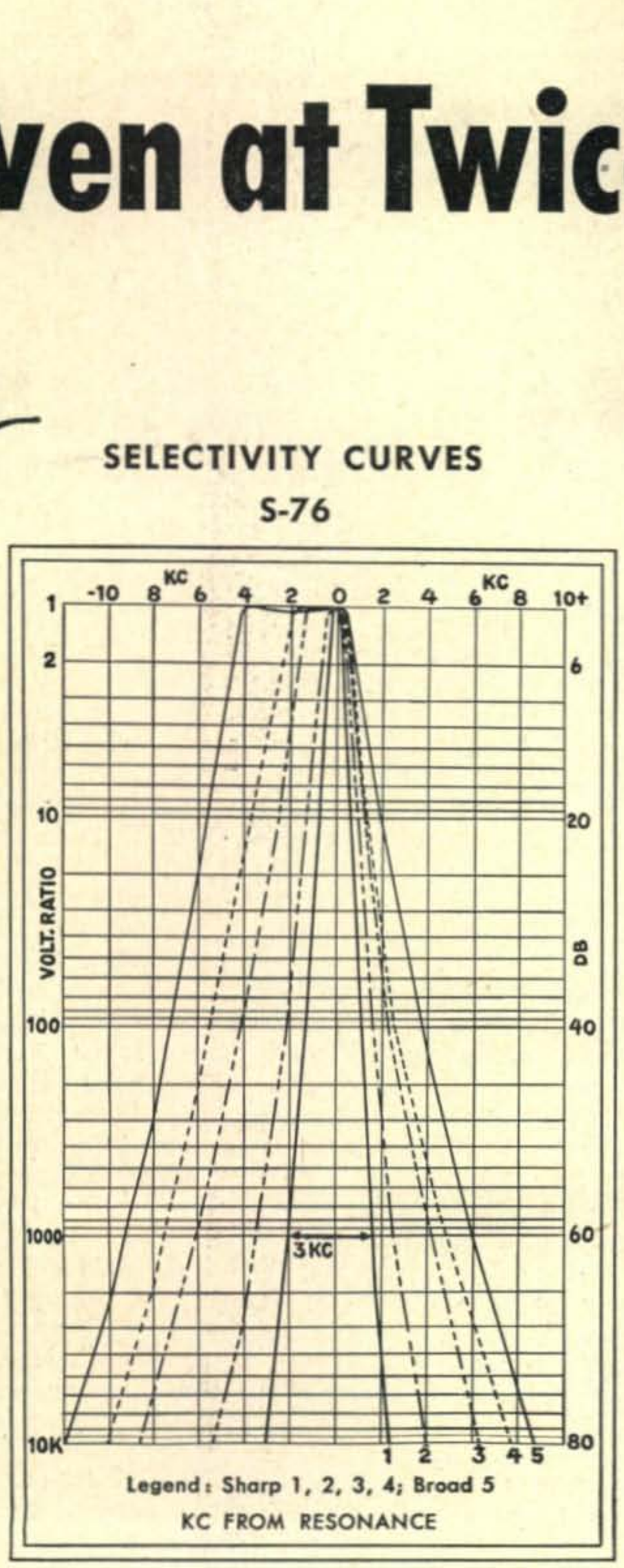

Legend: Sharp 1, 2, 3, 4; Broad 5

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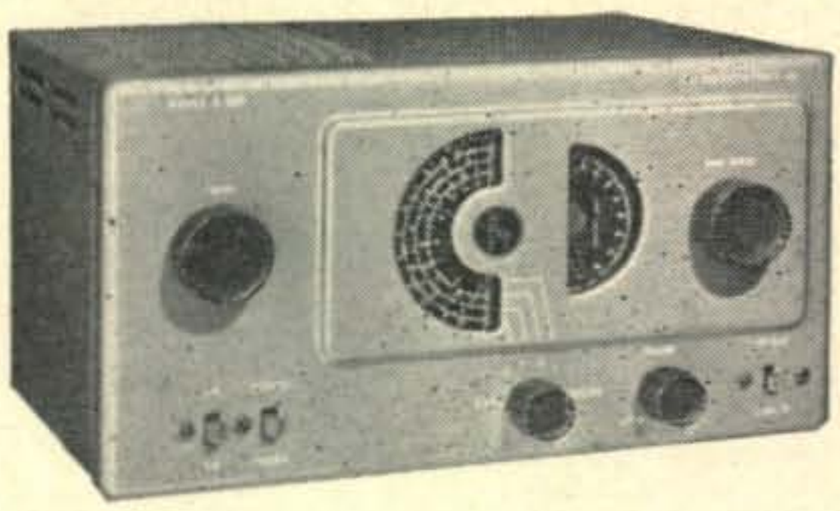

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World's Leading Exclusive Manufacturer of Communications Equipment, High Fidelity, Radio and Television

SCRATCHI

Feenix, Ariz.

Deer Hon. Ed:

Your worries are over. Yes indeedy, Hon. Ed., you can taking that frown from your face, lighting up a one bux seegar and sellebrating. Scratchi are just having collosus idea on how you can getting ten times as many subscribers to your Hon. Magazine as you now having, from all forty-ate states, inklooding Texas. Sound like you are interesting? Hokendoke, but it are reel simple.

First of alls, if wanting more subscribers to your Hon. Publication, must having more amchoors in the Yewnited States. To having more amchoors in this country, all having to do is getting FCC to making amchoor license tests easier. Scratchi not thinking that this being reel difficult, on acct. FCC already making new types of amchoor licenses resently, and FCC seem to liking to have lots different types licenses. So, if you wanting to talking FCC into this deal, heer are 1/c ideas on new amchoor licensing.

We wanting to making some types licenses sooper-easy to get, but we also wanting other types reel hard to get. This are way FCC now doings things, so should be ducky-soupy for you to selling them idea.

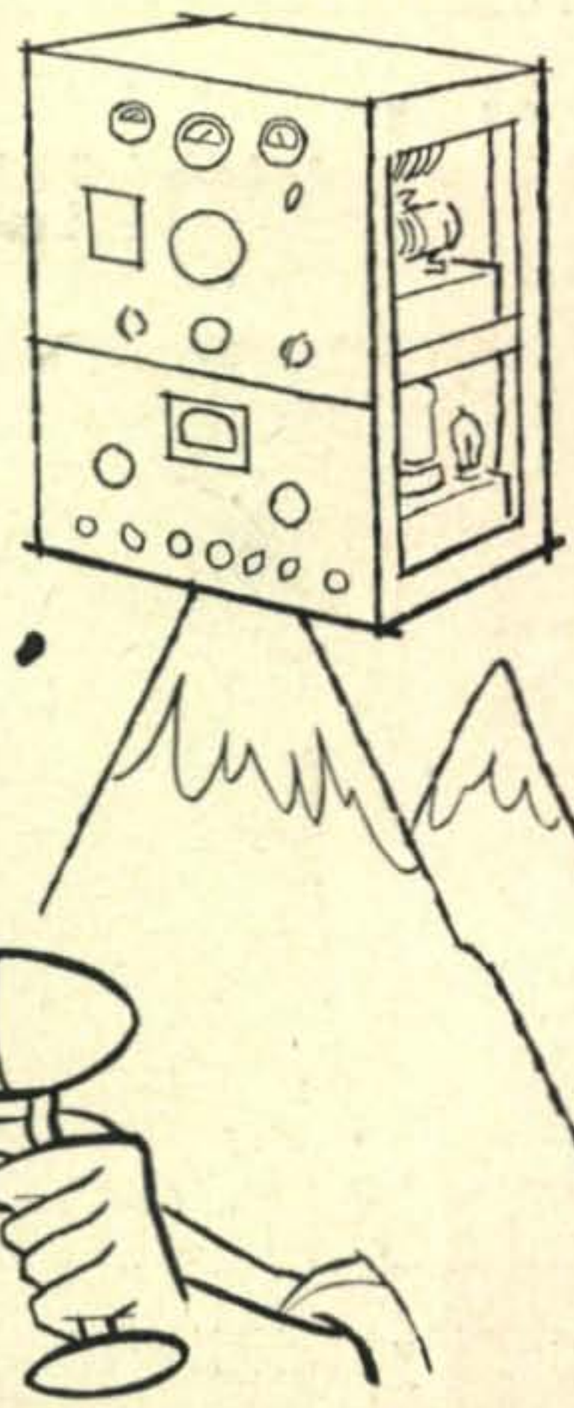
First type amchoor license are calling Private. (I calling all new licenses after kinds of people in Army.) To becoming Private must passing code test at one words per minute using wig-wag flags. Theery test consisting of knowing difference between toob and condenser. When having Private license, can using any types emission on any bands. With test like that, Hon. Ed., if anybuddy can't getting to be a Private amchoor, he should going through kindergarten again. There be so many Privates that we are having to restrict powers to ten whats for phoney bands work, five whats for see-w, and one whats for TV. Wowie!! Think of the new subscribers to your Hon. Rag, and think of the QRM on the amchoor bands.

Next harder step are calling Sargunt. Here needing to pass code tests of 5 words per minute and theery test to showing know difference between receiver and transmitter. If being Sargunt, can using higher power: 50 whats phoney, 25 whats see-w and 10 whats TV.

Now, if wanting higher power and not liking to be called Sargunt, are having to pass exam to be a Lootenant. Here are needing to know code at 10 words per minute, and for theery all having to do is knowing difference between Private and Sargunt (aren't that all Lootenants supposed to knowing).

(Continued on page 8)

for Peak Performance...



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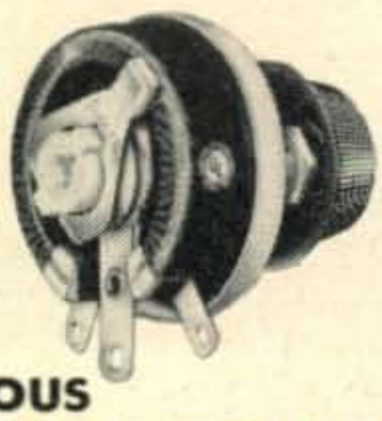

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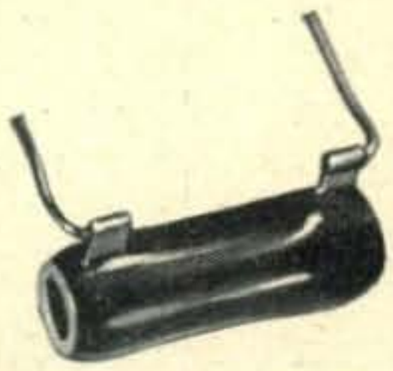

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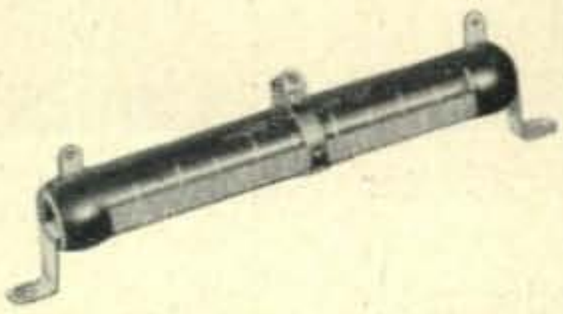

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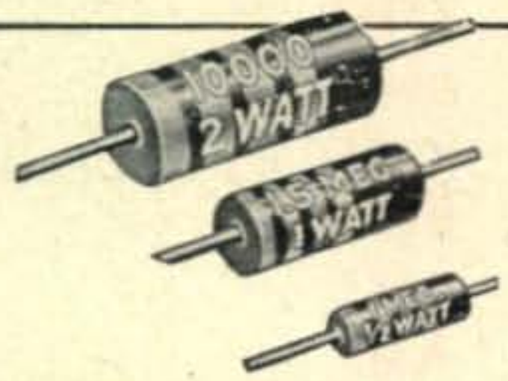

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For power, Lootenant can using 500 whats phoney, 250 whats see-w and 100 whats TV.

When getting tired of fighting QRM as poor old Lootenant, amchoor having to get Major license. Now, here are where things getting tough. After all, can't everybuddy being a Major. Needing to know code at 20 words in a minute, and passing theery test like now having for Extra Class License. Sounds too easy, you thinking? Hee hee, Hon. Ed., not so. You see, code test not being given in English. No indeedy, to being Major having to pass 20 wpm code test in Latin. Aren't that a slicky? Natchurally this are worthwhile, as Major can using 10,000 whats phoney, 5000 whats see-w and one kilowhat TV.

After having spent 5 years as Major, any amchoor can tackling test to becoming Kernal. Prackticaly nobuddies being able to passing this test. To being Kernal must passing code test at 50 words per minute, on typerighter, with one hand tied behind you. To taking theery test, must showing that are at least thirty years old and having 25 years expeeriance in radio. Theery test not too tuff—just taking two or three days to doing it. If managing to pass tests, and getting to be Kernal, can using 100 kilowhats phoney, 50 kilowhats see-w and 25 kilowhats TV.

Now, it are immedjutly aparent that some smart gentlefellow are liable to passing test for Kernal. On acct. of this. are needing one more amchoor license, a reel collosus one. We calling it General. To being a General are easy, if you can passing test. Code test are 100 words per minute, which are not too difficult, excepting having to copy when blindfolded. riting on blotting paper with paint brush. No, Hon. Ed., not a little paint brush—a two inch paint brush. Ha! If passing that hurdle, only having theery test left. This are stewpendus. Better figuring on having hole month free to take it, unless just gradyouating from engineering school, in which case can maybe getting through it in two weeks.

Well, there are hole idea in nut hole, Hon. Ed. Think what can happening. Your Hon. Mag. can having special departments for Privates, Sargunts. Lootenants, Majors. Kernals and Generals. On second thoughtly, not for Generals. Not being enuff of them. You can selling advertising like mad, for Kernals who wanting 100 kilowhats final, or maybe Lootenants who wanting TV cameras. Your magazine being so big you having to send it to subscribers by freight train.

What's that you are asking Hon. Ed? What are speshul privileges for General Amchoors, what power can they run? The same as Kernal, natchurally. Being General not getting you anything extra. Scratchi just putting that in to having something to shooting at.

Respectively yours,
Hashafisti Scratchi

$10,000.00 IN PRIZES

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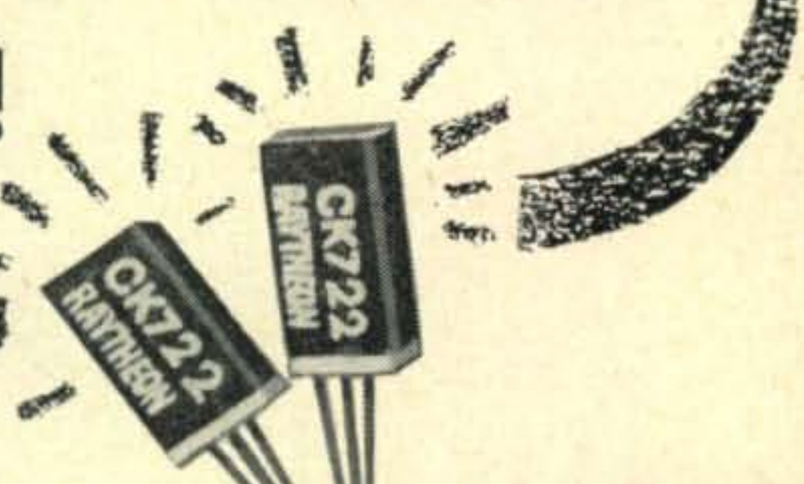

Here's the chance-of-a-lifetime to win a big cash prize while gaining valuable "know-how" on the latest electronic development — transistors. Raytheon is offering 17 *cash prizes* to the seventeen contestants who produce the most ingenious applications of the Raytheon CK722 Junction TRANSISTOR.

Here's all you have to do! Simply build equipment that uses one or more Raytheon CK722 Transistors which you have purchased from your local Raytheon Tube Distributor. Then send a photograph of the unit you have built, a completed official entry blank and a 500 word minimum, 1000 word maximum constructional article on the equipment to Raytheon, P. O. Box 6, Newton 58, Mass. All entries will be carefully judged and prizes will be awarded on the basis of ingenuity of application. Duplicate equipment to be judged on basis of descriptive material. Decision of the judges is final and all entries and their ideas become the exclusive property of Raytheon.

Here's how to enter! Go to your nearest Raytheon Special Purpose Tube Distributor. Get your official entry blank which *must* accompany each entry and which contains complete contest rules or get the official entry blank by writing directly to Raytheon, P. O. Box 6, Newton 58, Mass. Enter today — the contest closes on Midnight August 31, 1953.

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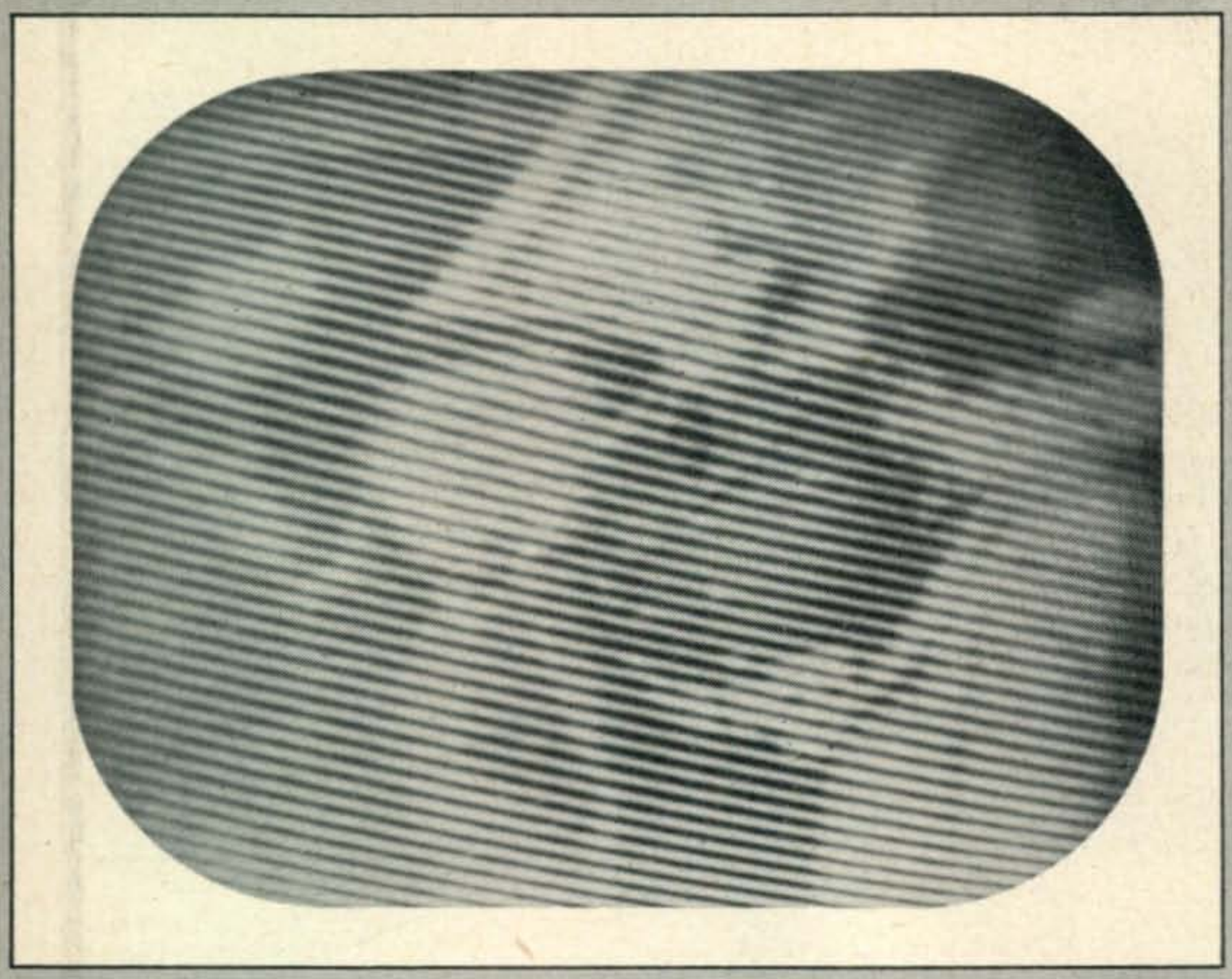

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Zero Bias . . .

Reader Interest

"What kind of material do you, the reader, want to find on the pages of CQ?" That is one of the big questions that must be answered by the Managing Editor. Not only manuscripts are accepted or rejected on this basis, but also the regular departments must be periodically "tested" to see if they continue to hold reader interest. Your letters are an invaluable help to us as we decide what is to go into the magazine.

Most of the letters we get commenting on magazine content oddly enough, seem to revolve around *Scratchi*. One wonders just how many readers get beyond 8! *Scratchi* is a type of dialect humor and was instituted some years ago by our indirect predecessor, RADIO magazine. It was a great favorite at that time. The return of *Scratchi* and his subsequent fictional adventures in CQ have been greeted with extremes of feeling. It is not unusual to open a letter from one reader who says it's so much "trash" and then to open a letter from another reader who says, "Cancel my subscription if *Scratchi* is ever discontinued." We have almost given up the idea of evaluating this department.

As this is being written, we are carefully considering the reactivation of the *VHF-UHF Department*. However, according to the usual barometer (comments in the mails and over-the-air), this field is extremely inactive. Two personal contacts, five letters and two over-the-air comments have been recorded in favor of a *VHF-UHF Department*—even if this represents 1/100 of those interested in the VHF-UHF spectrum, it does not justify any sizable expenditure of magazine space per month. Apparently, a few timely feature articles would be acceptable in lieu of a monthly department. If we are wrong—let us know about it.

Some readers are questioning the value of the Prediction Tables in W2PAJ's department on *Ionospheric Propagation*. They say: first, in certain areas, due to the mails, etc., they receive CQ after part of the month has elapsed; and second, the rule-of-thumb observations provide all the necessary data to consistently work DX. Although both of these objections are valid to a certain extent, the editorial staff feels that the Tables serve their purpose by educating the Ham to the use of such data and by providing a valuable guide in setting up routine schedules.

The "tempest in a teapot" furor that has accompanied the introduction of radio teletype to low frequency bands has provided the editorial staff with subject matter for many interesting discussions. Acknowledging the comparatively small interest in RTTY, the Department, headed by W2NSD, has been noteworthy for the interest it has established in this field, as well as its pronounced efforts taken to offset many of the misconceptions about RTTY. Of somewhat more personal interest at this end has been the current practice of several amateur radio clubs and bulletins to blame the permission to operate RTTY in the low frequency bands upon the non-amateur Managing Editor of CQ. Our present thinking in regard to RTTY is to continue periodic discussions as well as to print a number of feature articles on new equipment, etc.

Very little needs to be said concerning the *Novice Shack, YL* and *DX Departments*. The interest in these three sections continue at a high rate and all of them have scheduled expansions in coverage and subject matter. The *Monitoring Post* has provided the staff with a means of using many of the newsy items that do not fit into one of our established departments. Because many readers like to be informed of new items and keep abreast of component developments in the Ham radio field, we are also discussing the possible reactivation of the Parts and Products section.

Two-page insertions of *Shack & Workshop* material are also contemplated within the near future. Many valuable *Shack & Workshop* items are now on hand and a new Contributing Editor has been selected to handle this feature.

The short report given above represents the current editorial thinking with regard to the feature monthly columns in CQ. You, the reader, are the one who will decide the future editorial content of CQ. Please bear in mind, constructive criticism in this field is always welcome. What about a letter from you today?

o. p. f.

A SKED ON 14240? JUST SET THE DIAL AND YOU'RE THERE!

With a Collins transmitter and receiver in your shack you don't have to wonder — you KNOW what frequency you're on.

When keeping a sked or checking into a net, just set your dials to the desired frequency and you're in contact.

And you don't have to zero-beat the stations you call. Want to answer that station on his own frequency? If so, set the transmitter to the frequency indicated on the receiver . . . That's all there is to it!!!

On most bands you'll find each kilocycle is one dial division. And, for the perfectionist who wants to split kilocycles, the 8R-1 100 kc crystal calibrator is available. It plugs into a socket on the chassis of your 75A-2 or 75A-3.

Let your distributor show you the accurate easy-to-read Collins dial and the stable permeability-tuned oscillator behind it. You'll find this feature on the 32V-3 and KW-1 transmitters as well as the 75A-2 and 75A-3 receivers.

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11 W. 42nd St., NEW YORK 36 **1930 Hi-Line Drive, DALLAS 2** **2700 W. Olive Ave., BURBANK**

The Collins 310B —1953 Version

WILLIAM I. ORR, W6SAI

Contributing Editor, CQ;

Author, Radio Amateurs' Mobile Handbook

The VFO exciter modified in this article was widely accepted by the amateur fraternity—until TVI came along. It is still essentially a very fine moderate power transmitter and it can be reasonably well cured of its bad habits.—Editor

---

In the Spring of 1950 I exhibited unusually good judgment by purchasing a *Collins 310B* excited unit. This little transmitter, which has a 2E26 tube in the final amplifier stage running at 35 watts, did a bang-up job at FP8AC during the Summer of 1950. Some 950 contacts in 45 countries were made during the short stay at St. Pierre. After the FP8 trip, however, the *310B* went into semi-retirement, being used only for an occasional schedule on 80-meter CW. A few months ago its was called into service as a driver for a high-powered pentode final amplifier. At once—one thing was noticed immediately that had not been apparent at FP8AC: the *310B* did a pretty good job of jamming all television channels within a radius of several hundred feet of the house. A series of changes and modifications of the *310B* then followed, resulting in TVI-free performance and greater flexibility of operation. The following article describes these changes and modifications.

Before Modification

The *310B*, untouched, would effectively jam my television set (located about fifteen feet away) regardless of the frequency of operation of the 2E26. TVI from 80 meters was almost as bad as that from 10 meters, while viewing channel 2. Severe cross-hatching was noticed on all other channels. It was decided to try the customary three important TVI measures: bypassing of power leads, filtering of leads, and shielding. The bypassing and filtering was tried first, in the hope that it might not be necessary to do any drastic metal work to the *310B* cabinet.

Bypassing and Filtering

The first step taken was to investigate the harmonic content directly inside the chassis of the *310B*. This was found to be very high, regardless of which circuits and wires that were under investigation. As a starter, the following points were bypassed with *Erie Type 801-001 disc Ceramicons (Fig. 1)*:

1. Screen of 2E26 tube socket to cathode.
2. Filament of 2E26 tube socket to cathode.
3. Both ends of the rotor of *C-101* to ground. (This is the three-gang variable condenser which tunes the plate circuit of the multiplier stages.)

These condensers have low internal inductance, and if very short leads are used they will be effective as bypass condensers in the region of 200 Mc. As can be seen from *Fig. 1*, the three-gang variable condenser *C-101* is already bypassed to ground by a ceramic condenser, *C-120*. This, however, has rather long leads and a capacity of 0.01

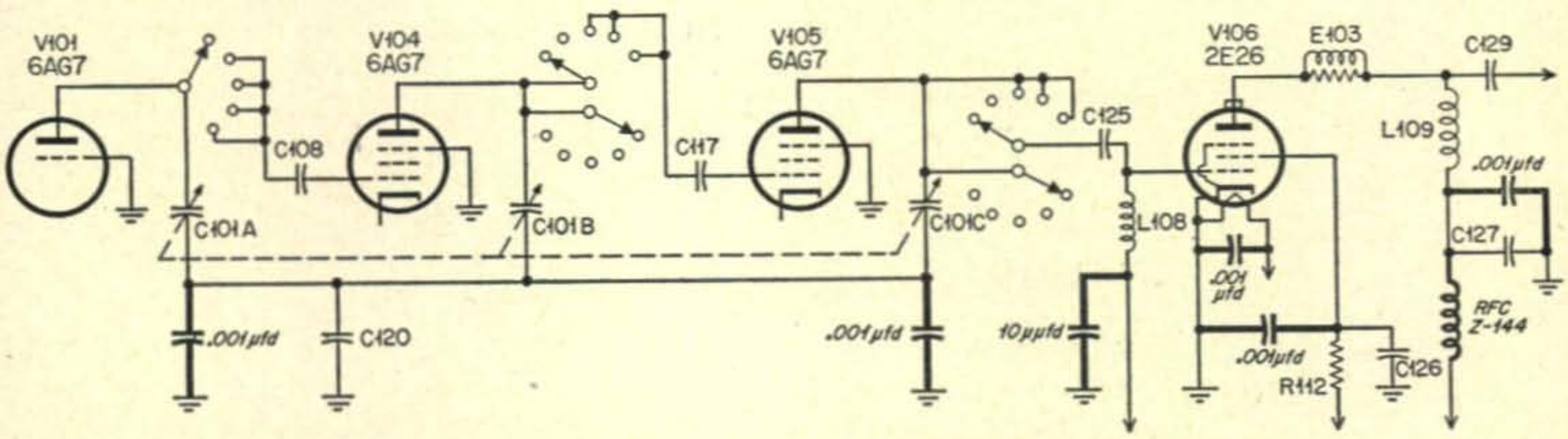


Fig. 1. The heavy outlined leads in this schematic show the location of additional bypassing to reduce the v.h.f. harmonic content of the 310B exciter.

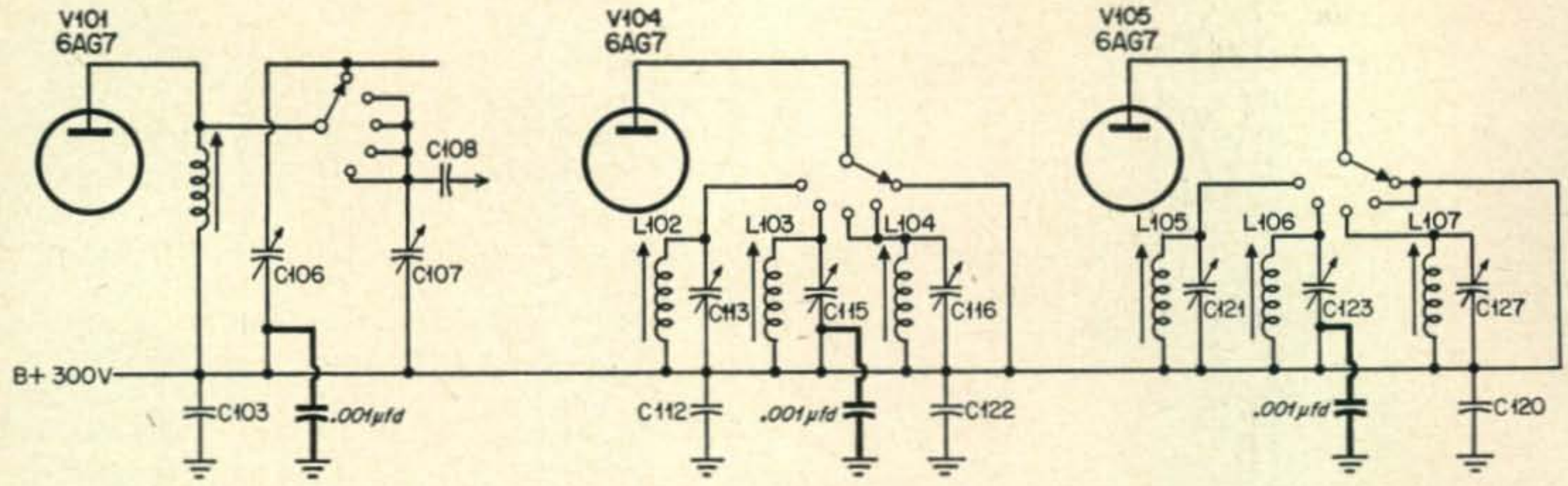


Fig. 2. Three additional ceramicons were effectively used in the spots shown in this diagram.

μfd. These two factors tend to reduce its usefulness as a v-h-f bypass condenser. After these changes were made, tests indicated that the harmonic level in the chassis was much lower, although still of considerable magnitude. A few additional "hot" points were found:

A B-plus bus line, connecting the rotors of *C-106, C-107, C-1 3, C-115, C-116, C-121, C-123* and *C-127* (r-f trimmers) was found to be bypassed at several points by the same type of .01 μfd ceramic condenser as found on the rotor of *C-101*. The bypasses on this line were *C-103, C-112, C-122* and *C-120*. These evidently resonated at a low enough frequency to allow the bus to remain at a high potential to harmonic energy. One additional bypass condenser *(C-110)* shown on the schematic diagram was either omitted in my particular *310B*, or so well hidden that I could not find it! Three additional condensers *(Type 801-001)* were added to this bus *(Fig. 2)*:

4. From the rotor of *C-123* (O) to *pin 6* of the 2E26, using very short leads on the ceramic condenser.
5. From the rotor of *C-115* (K) to *pin 3* of *V-104* (the second 6AG7).
6. From the rotor of *C-106* (H) to the ground lug of the VFO coaxial cable (ground).

The harmonic content of the underside of the *310B*, when examined with a "sniffer," was now showing rather weak harmonics. Additional filtering, which helped greatly to drop the harmonic level, consisted of:

7. A 10-μμfd Ceramicion *(Erie GP-1K-100)* was connected from the bias end of r-f choke *L-108* to ground *(Fig. 1)*. The nearest ground point is the bracket holding the band-change switch. A larger condenser that this value should not be used here, as there would be danger of the 2E26 oscillating, with *L-108* and *L-109* acting as parasitic grid and plate inductances.
8. The B-plus end of the 2E26 plate choke *(L-109)* was bypassed to ground with an *Erie Type FA-370-120M* button mica condenser of .001 μμfd. capacity. This condenser has a mounting stud which takes a 3-48 size screw (there are a lot of these screws in junked 274N equipment). A small hole was drilled in the *310B* aluminum chassis very close to *L-109*, and the condenser mounted so that the center lead of the condenser just touched the eyelet on *L-109*. The B-plus lead was connected to the free center lead of the condenser, making a very low inductance bypassing circuit. See *Fig. 3*.
9. An *Ohmite Z-144* r-f choke was placed in the B-plus lead running from this button mica to the power supply. This choke may be neatly supported by the insulation grommet in the chassis, the choke resting half above, half below the chassis.
10. Both sides of the key jack *J-101* were bypassed to ground with the Erie disc Ceramicons.
11. The 115-volt line cord was run through a pair of *Sprague Type 46-P8 Hypass condensers* of .005 μfd. capacity. These coaxial type condensers are bolted to the inside of the chassis just below the terminal strip, *E-102*.

At this stage of the game, the main source of TVI was the harmonics appearing in the output of the *310B*. Accordingly, terminal strip *E-101* was

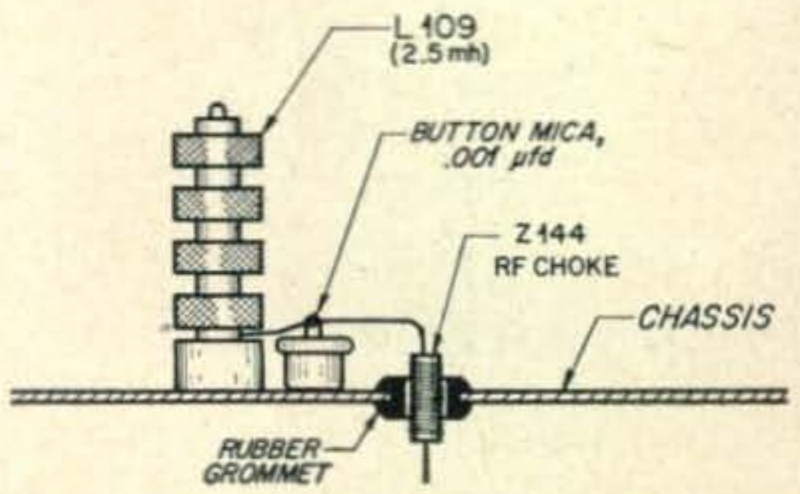


Fig. 3. A low inductance bypassing circuit is required in the 2E26 plate. The button mica and the Z-144 choke are new components.

removed and *pin 4* of the 2E26 coil socket was grounded directly at the coil socket. A small aluminium strip was cut to fit over the gap left by the removal of *E-101,* and a *SO-239* coaxial receptacle was mounted on this new strip. *Pins 1* and *5* of the coil socket were connected to the coaxial receptacle by short lengths of #14 tinned wire. This coaxial output fitting permitted the use of a conventional coaxial line low pass filter on the output of the *310B*. *(Fig. 4.)*

An operational check was now made. The *310B* was loaded into a lamp bulb, through a section of 52-ohm coaxial line and a low-pass antenna filter. With a fairly strong TV signal on channel 2 and the *310B* operating on 28.5 Mc., no crosshatching was visible when the *310B* and the TV set were separated at ten feet. When the *310B* was brought closer to the TV set, crosshatching on channel 2 became immediately noticeable. Operation on 80, 40, 20 and 15 meters showed no crosshatching on

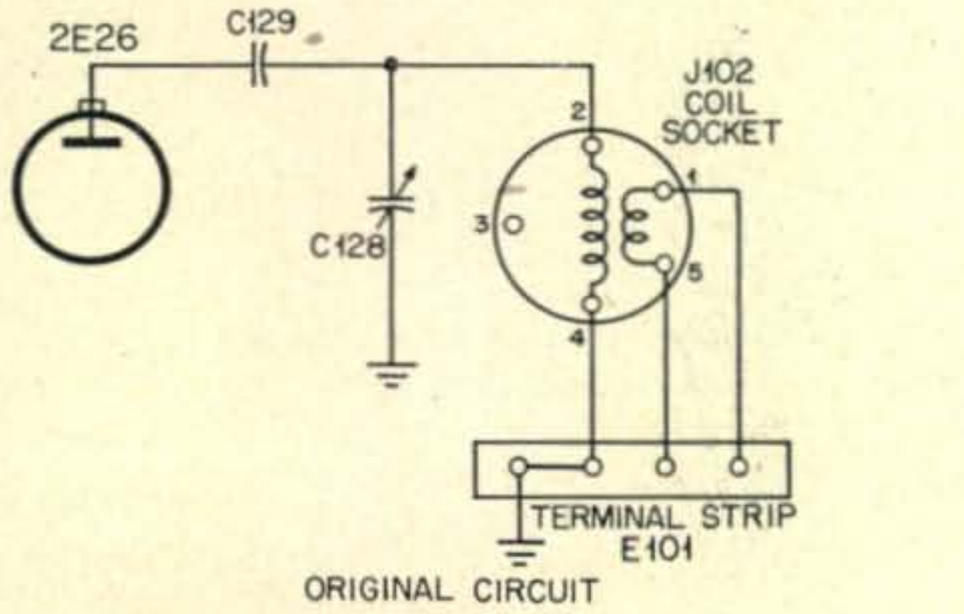


Fig. 4. 2E26 output connection is revamped to employ a coaxial fitting.

channel 2. All other channels were clear, regardless of the operating frequency of the *310B*.

A quick check one night, after all TV stations were in bed showed that a very faint crosshatch was apparent on all channels, but it was extremely weak. It was found next day that a strong enough picture to eliminate this crosshatching could be obtained by merely touching the antenna terminals of the TV set with my fingers. Connections could be made to other terminals of the *310B,* with no increase in TVI, if each wire was bypassed to ground at the terminal with a .001 μfd. disc Ceramicon.

It is suggested that if you live in an area with a fair TV field strength, and if the *310B* is no closer than fifteen feet or so from a TV set, you can stop at this point. You might have a bit of channel 2 trouble with your own set if you plan much 28-Mc. operation, but you should not bother your neighbors. (Assuming they do not get overloading from the fundamental signal. A high-pass filter on the TV set will cure this trouble.)

"Buttoning-Up" the 310B

In a weak signal area, more drastic steps must be taken to insure a clear TV picture. A bit more bypassing and some metal work is needed on the *310B*.

12. Bypass each terminal of meter M-101 to the panel with .001 μfd. disc Ceramicons.
13. Remove terminal strips *E-104* and *E-102* and replace with aluminum plates covering the terminal holes. *(Fig. 5.)* Drill four ¼" holes on one plate and five in the other as shown, and insert *Erie Type 362-152*. Feed-thru Ceramicions of .0015 μfd. capacity in each hole. These condensers serve as both bypass condensers an,d feed-thru insulators for the external leads.

Cabinet Rework

As is, the *310B* cabinet leaks like a sieve—from an r-f point of view. If the TV signal in your area is strong, you can overlook this effect. Otherwise, you have naught to do but to plug up the leaks as best you can. All you need is: copper window screening, a heavy duty soldering iron, flux, some acid core solder, and paint remover

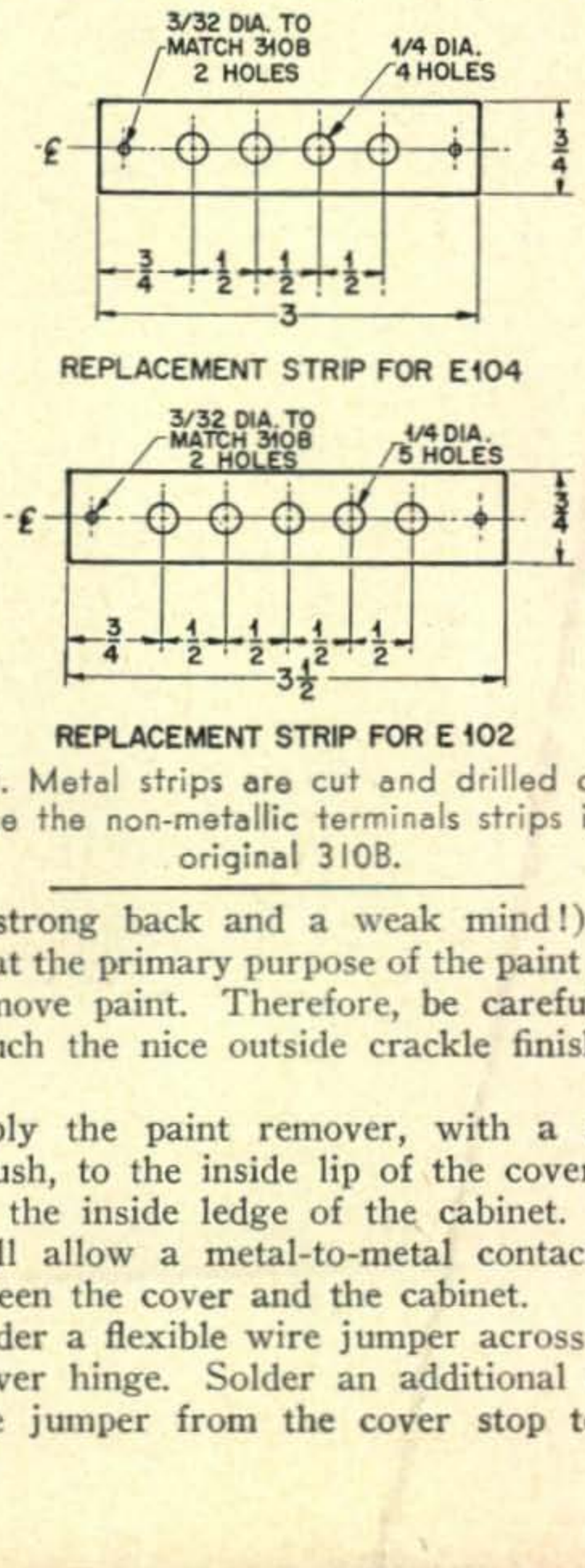


Fig. 5. Metal strips are cut and drilled out to replace the non-metallic terminals strips in the original 310B.

(and a strong back and a weak mind!). Don't forget that the primary purpose of the paint remover is to remove paint. Therefore, be careful not to let it touch the nice outside crackle finish of the cabinet!

1. Apply the paint remover, with a small brush, to the inside lip of the cover and to the inside ledge of the cabinet. This will allow a metal-to-metal contact between the cover and the cabinet.
2. Solder a flexible wire jumper across each cover hinge. Solder an additional flexible jumper from the cover stop to the

inside of the cabinet at the center of the cover.

3. Apply the paint remover, with a small brush in a ½" strip around the inside rim of the ventilation louvres on the back and sides of the cabinet. Do the same for the bottom louvres in the base of the cabinet, but clean away the paint on the *bottom* of the louvres. If the screening is applied inside the cabinet the *310B* chassis will catch on the screening each time it is inserted and withdrawn from the cabinet.
4. Apply a light coat of solder paste to the bare, exposed metal and, using the acid core solder, thoroughly tin these cleaned strips. Do this step evenly and rapidly to prevent excessive heat from blistering the crackle paint on the outside of the cabinet.
5. Cut the copper screening to size *(Fig. 6)* and place the pieces of screening over the vents. Solder the screening around the edges to the pre-tinned cabinet. This will make the vents TVI-proof, yet still allow circulation of air.
6. Using the paint remover, clean the paint away from the front lip of the cabinet where it meets the panel of the *310B*. Also clean the paint away from the holes in the back of the cabinet that hold the chassis bolts.
7. Clean the remaining side seams inside the cabinet with paint remover, and solder these seams shut. They are spot welded seams and leak r-f very easily.
8. The only remaining leak in the dyke is the large rear opening of the cabinet through which the terminal strip, the line cord, and the coaxial plug protrude. This opening worried me a good deal as it was not possible to screen it off. However, when the *310B* is placed in the cabinet, the chassis comes within a few fractions of an inch of blocking this hole. Accordingly, the chassis of the *310B* was tapped for 4-40 screws in three spots along the back edge. The rear apron of the cabinet was drilled to pass these screws. After the *310B* had been placed in the cabinet, and these screws inserted in the back of the cabinet and tightened, only a very slight radiation from this opening was noted.
9. As a final step, clean out all the excessive flux from the cabinet with thinner, and paint all the exposed seams and joints with aluminium paint to prevent the metal from rusting.

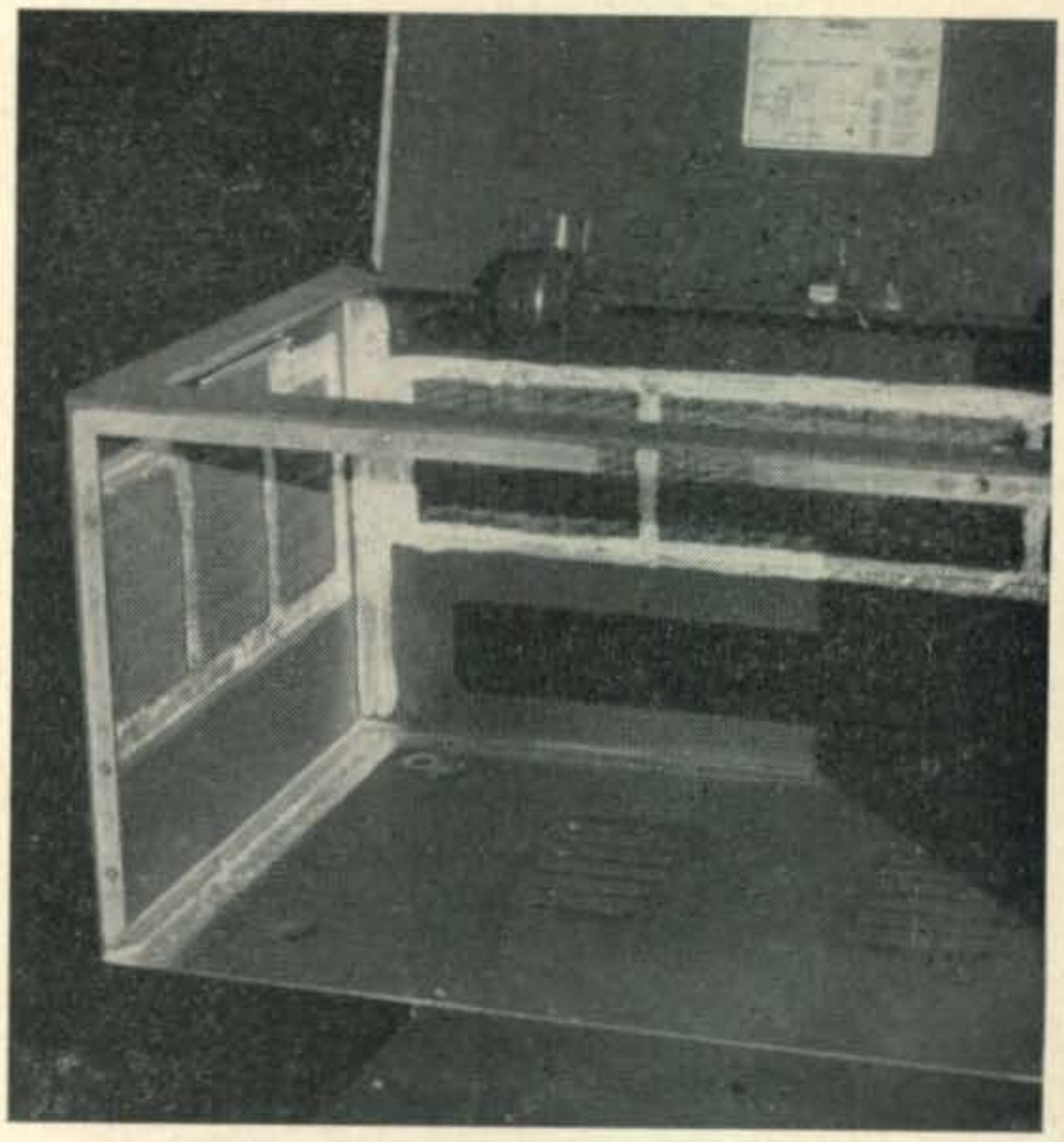


Fig. 6. Shielding the vents and louvres in the 310B cabinet.

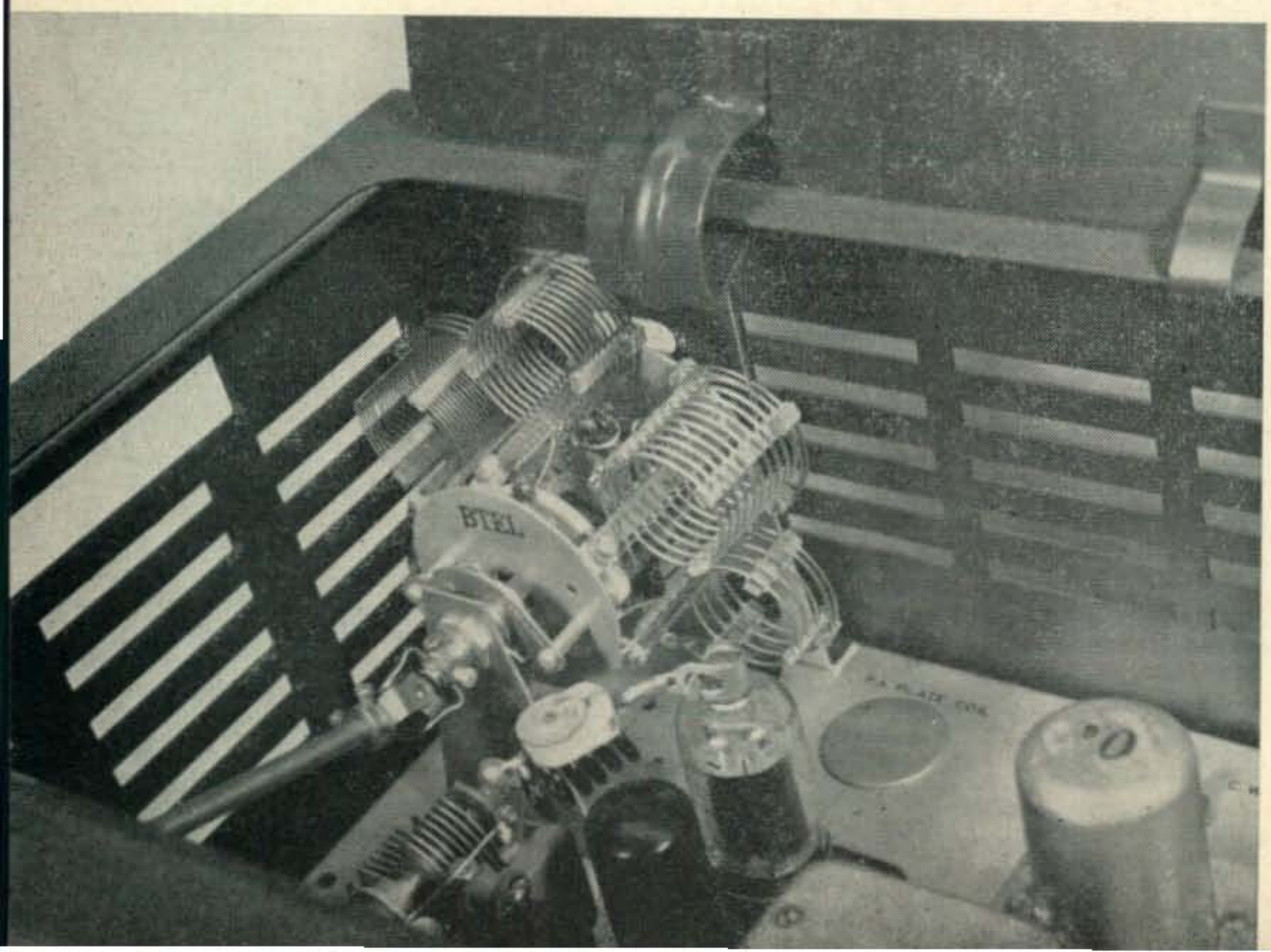


Fig. 7. In this unshielded 310B, the BTEL turret was reversed, placing the link end of the coils at the rear of the cabinet. The capacity effect to the cabinet was not detrimental and no difference in output could be observed. An experimental resonant trap is also visible in the plate lead of the 2E26. This is only required in weak signal areas.

The job is now complete. You should be able to connect the *310B* through an antenna filter to a suitable antenna or power amplifier, place it atop a TV receiver tuned to channel 2 (or any other channel), and get absolutely no interference—regardless of the frequency of operation of the *310B*. Of course—don't forget a high-pass filter on the TV set and a properly bypassed 115-volt line to it. You must give it a fair break!

Band Switching for the 310B

The operation of the *310B* was so pleasing after this TVI housecleaning that some thought was given to the idea of making the unit completely band switching. It was a pity to have to use plug-in coils in the 2E26 stage when the driver stages were automatically switched. Two approaches to this problem are possible. Either a *National MB-40L* all-band tank assembly could be used, or a *Barker and Williamson BTEL* 35-watt band switching turret. After some thought the *BTEL* unit was chosen over the all band *MB-40L* tank assembly. The reasons for this choice were; (1) There is always the danger of picking off the wrong harmonic with an all band tank, and (2) The tuning of any tank that covers 2/1 frequency range is bound to be very sharp. A vernier drive dial, such as the *National type AM*, could be used, but that would mean additional hole drilling in the panel of the *310B*.

Plans were therefore put underway to place the *BTEL* turret in the *310B*.

Modifications to the BTEL Turret

The *BTEL* turret, as it is purchased, is designed to cover 80, 40, 20, 15 and 10 meters with a 50 μμfd. variable condenser. This fine idea did not fit at all well with the design of the *310B*. The plate tuning condenser of the *310B (C-128)* is a 100 μμfd. unit. Mounted on the chassis, it has a minimum capacity of 20μμfd. The 2E26 tube has an output capacity of about 10 μμfd., and the circuit components add additional 10 μμfd. of distributed capacity. This raises the circuit capacity to a minimum value of at least 40 μμfd., and casts a severe doubt on the use of the *BTEL* turret for 28-Mc operation.

On eighty meters, the opposite case is true. The *BTEL* 80-meter coil tunes to 3.5 Mc. with a parallel capacity of only 45 μμfd. This is far too small for proper L/C ratio on this band. Tuning of the 2E26 would be erratic and proper loading of the circuit would be hard to obtain. Accordingly, the *BTEL* turret must be modified for proper operation in the *310B*. Fortunately, this is not a difficult thing to do, and takes but a short time:

1. Remove the 80-meter coil completely. This will not be used.
2. The forty-meter coil will now be used for 80 meters. A 50 μμfd. ceramic condenser *(Erie NPO-333-500)* should be soldered across this coil to pad it to 80 meters. The resulting L/C ratio is correct for the 2E26 plate circuit.
3. The 20-meter coil is used "as-is" for 40 meters.
4. The 15-meter coil is used "as-is" for 20 meters. In both these cases, the L/C ratio is just right for proper operation.
5. The 10-meter coil is cut down to five turns. Turns are removed from the end of the coil away from the link. This coil will now tune both 10 and 15 meters with good L/C ratio on both bands. (See *Fig. 7.*)

By the above process the number of switch positions has been cut from five to four. These are:

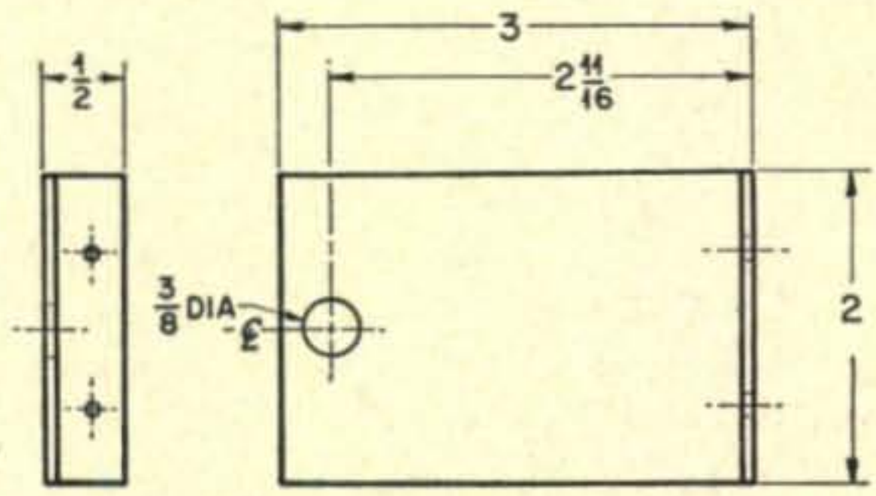
Switch Position	*Band*
1	10-15
2	20
3	40
4	80
5	—

Installation of the Turret

All that remains is to cram the modified turret into the *310B* and hook 'er up!

Putting the modified turret into the *310B* is not hard. It merely requires some finesse on the part of the installer! The points to be remembered are these:

1. If the turret is mounted too high, the coils will hit the hinge of the cabinet lid.
2. Care must be taken to keep stray capacities between the turret and the cabinet to the lowest possible value.
3. Care must be taken in mounting the turret so that the components beneath the *310B* chassis are not harmed.



MAKE TWO BRACKETS OF "SO" ALUMINUM. MAKE ONE WITH HOLE AS SHOWN. MAKE OTHER WITH TWO 3/32 DIA HOLES TO MATCH BTEL TURRET.

Fig. 8. The BTEL turret mounting bracket.

These conditions can best be met if the axis of the turret is located 2⅜" from the side of the chassis, and the rear mounting disc of the turret is located ⅝" from the rear edge of the chassis. Two brackets made as shown in *Fig. 8* will do the job. The shaft of the turret should be exactly 2 11/16" above the chassis.

After the brackets are made the deck of the *310B* should be cleared. Remove *L-109,* the bypass condenser *C-129,* the 2E26 plate tuning condenser *C-128* and the button mica condenser. These parts will have to be relocated as shown in *Fig. 7. C-128* is mounted to the chassis by means of two tapped

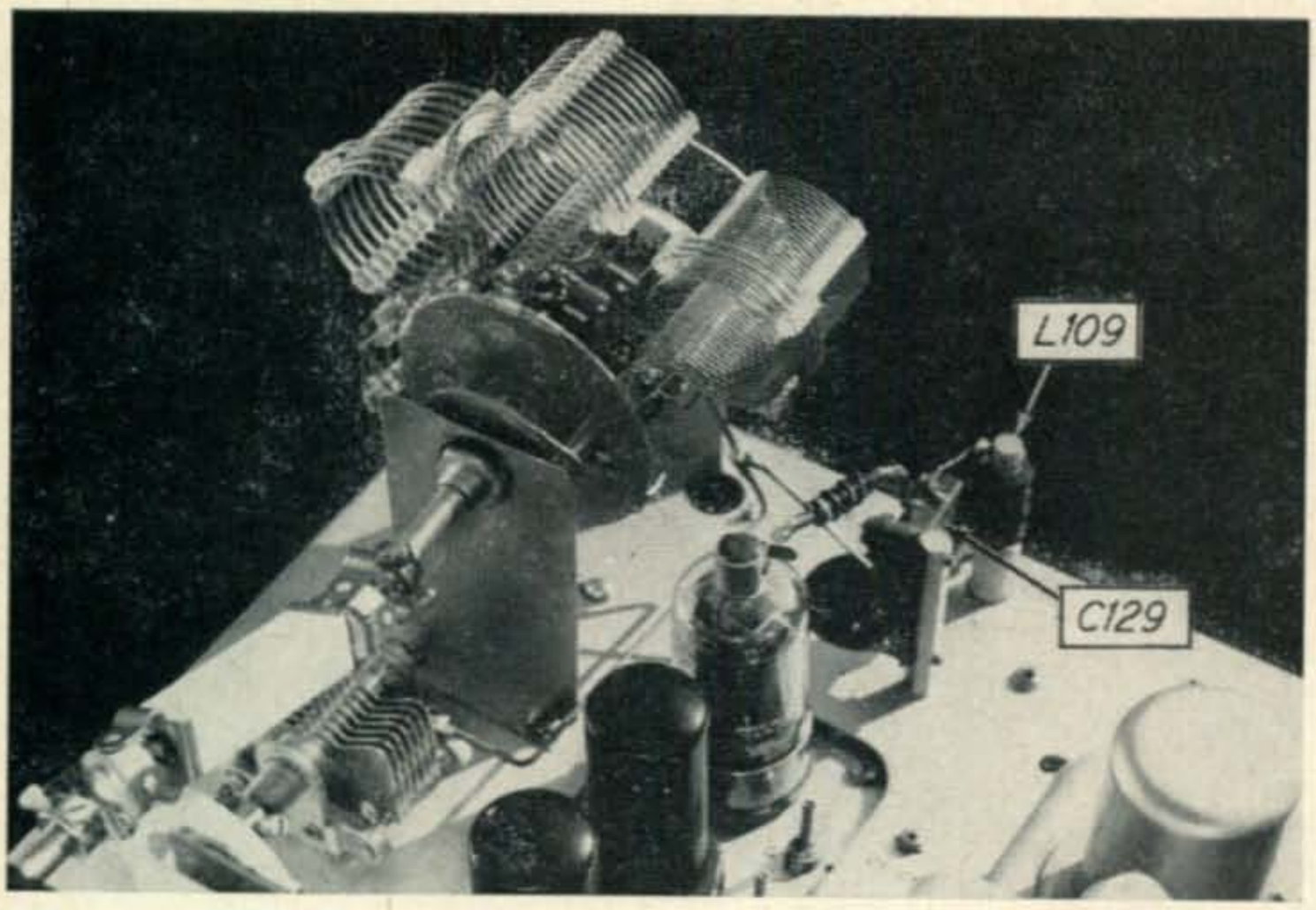


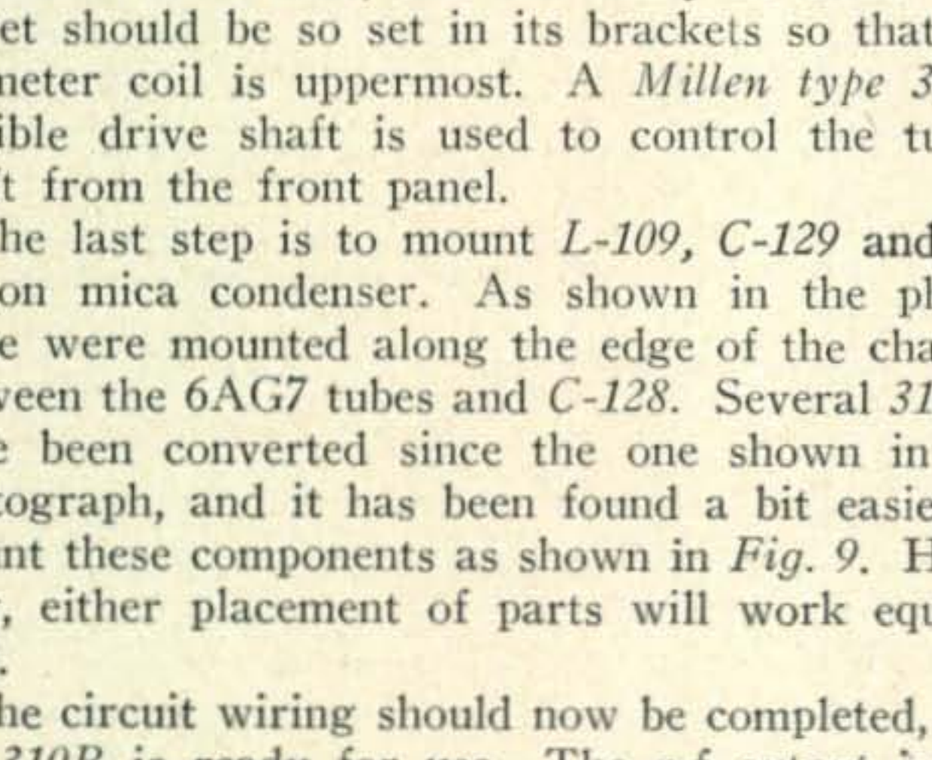
Fig. 9. This is the alternative method of mounting the 2E26 plate circuit. This method is probably a little easier to install, although either method (see also Fig. 7) is satisfactory.

holes in the chassis. The threaded holes in *C-128* should be carefully drilled out and matching tapped holes drilled in the chassis. Easy does it! The three-gang exciter condenser is beneath the chassis. Don't drill into it! Next, the drive shaft for *C-128* should be cut to the correct length.

To mount the turret it is necessary for the mounting bolts to miss the sub-mounted strip chassis upon which the excitation stages of the *310B* are mounted. With care, this can easily be done. The turret should be so set in its brackets so that the 40-meter coil is uppermost. A *Millen type 39011* flexible drive shaft is used to control the turret shaft from the front panel.

The last step is to mount *L-109, C-129* and the button mica condenser. As shown in the photo, these were mounted along the edge of the chassis, between the 6AG7 tubes and *C-128*. Several *310B's* have been converted since the one shown in the photograph, and it has been found a bit easier to mount these components as shown in *Fig. 9*. However, either placement of parts will work equally well.

The circuit wiring should now be completed, and the *310B* is ready for use. The r-f output is the same with the turret as with the plug-in coils, so no efficiency is sacrificed through the use of the turret.



PANEL PLATE FOR 310B

Fig. 10. This panel plate covers the two tree holes in the front panel left after installing the turret.

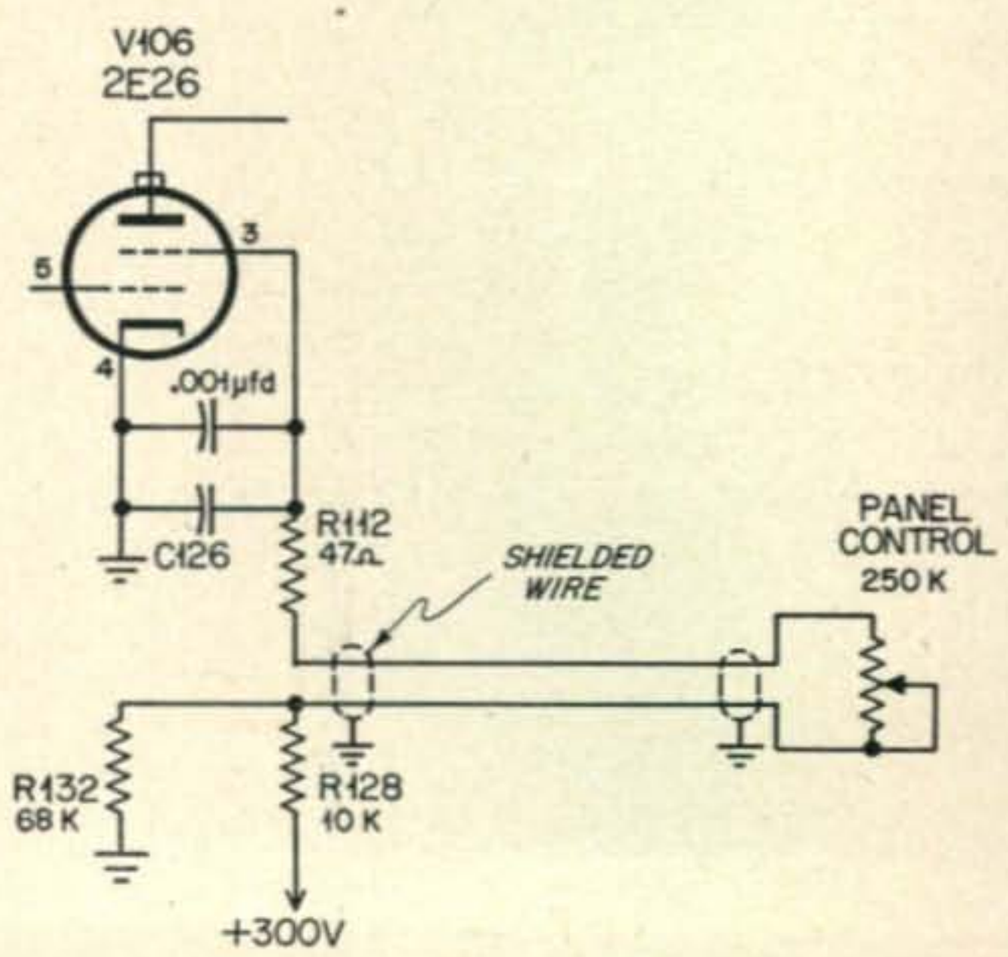
A small metal plate is cut as shown in *Fig. 10* and placed over the two free holes in the *310B* panel. The turret shaft is brought out through one hole by means of the *Millen* flexible drive.

Output Control

The links of the turret coils are fixed, and there is no easy means of varying the output of the *310B*. If the unit is being used as a driver for a high powered stage, it is imperative that there be some means of controlling the output. A 250,000-ohm potentiometer *(Ohmite CU-2541)* should be mounted in the remaining free panel hole and hooked into the 2E26 screen circuit as shown in *Fig. 11*. This will provide a smooth and flexible control of the output of the *310B*.

The *310B* is presently being used to drive a single 4-250A pentode stage. This is a one kilowatt all band amplifier that will—but that is another story!

(I would like to thank Ted Gillette, W6HX, for his many suggestions regarding the modification of the 310B. To those readers interested in obtaining a commercial "revamping" of their 310B, I would suggest contacting Ted for an estimate.)



OUTPUT CONTROL FOR 310B

Fig. 11. Suggested 310B output control circuit.

How to Prune Your Miniductors

Most amateurs are familiar with *B & W Miniductors.* For those who are not, *Miniductors* are small coils, available in four winding pitches and four diameters between a half inch and one inch. Their neat, high-*Q* construction makes them logical choices for many receiver and low-power transmitter applications.

To use them intelligently, two pieces of information are needed. One is the inductance of standard *Miniductors.* The other is how much to cut from one to obtain an intermediate value of inductance. *Figures 1* and *2,* reproduced with the permission of *Barker & Williamson, Inc.,* makes this information available in convenient form. *Figure 1* is a chart of the inductance values of all *Miniductors,* along with their physical dimensions. *Figure 2* is an inductance conversion graph to be used in conjunction with the chart.

Using The Graph

After determining the inductance required for a given purpose, refer to *Fig. 1* to find a *Miniductor* with equal or greater inductance. Then after ascertaining the ratio of the desired inductance to the actual inductance of the chosen *Miniductor,* use the graph to determine the length that will give the desired inductance. For example, suppose we need an inductance of thirty-two μh. From *Fig. 1,* we see that *Miniductor* #3012, with a diameter of three quarters of an inch and an inductance of 42.5 μh., or *#3016,* with a diameter of one inch and an inductance of 73 μh., has sufficient inductance for the purpose. We decide to use *#3016.*

The next step is to divide 32 μh. by 73 μh., giving a figure of fourty-four per cent (32/73 = 0.44 = 44%*). Laying a straight edge from the 44-per cent point on the left side of *Fig. 2* across the curve for three-inch *Miniductors,* then dropping to the bottom of the chart, reveals that just under 1½ inches of *Miniductor* #3016 will give the desired inductance.

If *Miniductor* #3012 had been chosen, the desired inductance would be seventy-five per cent of the total available, and a little over 2¼ inches of coil would have been required.

Choosing the Miniductor to Prune

Other things being equal, highest coil Q is obtained from an approximately "square" coil; that is, one whose length is approximately equal to its diameter. Keeping the ratio between 0.75 and 1.5 gives essentially the same *Q.* However, a short, fat coil or a long thin one will have an appreciably lower *Q* than one with a better shape factor.

Actually, things are seldom equal. For example, placing a coil inside a metal shield reduces its effective inductance and *Q,* unless a spacing of several coil diameters is allowed between the coil and shield

CATALOG NUMBER	DIA	TURNS PER INCH	LENGTH	INDUCTANCE μh
3001	1/2"	4	2"	.40
3002	1/2"	8	2"	.96
3003	1/2"	16	2"	3.2
3004	1/2"	32	2"	13.7
3005	5/8"	4	2"	.56
3006	5/8"	8	2"	1.4
3007	5/8"	16	2"	4.9
3008	5/8"	32	2"	19.2
3009	3/4"	4	3"	.94
3010	3/4"	8	3"	2.9
3011	3/4"	16	3"	10.9
3012	3/4"	32	3"	42.5
3013	1"	4	3"	1.9
3014	1"	8	3"	4.8
3015	1"	16	3"	19.9
3016	1"	32	3"	73.0

Fig. 1. Specifications of B&W Miniductors. Use this table with Fig. 2 to determine intermediate values.

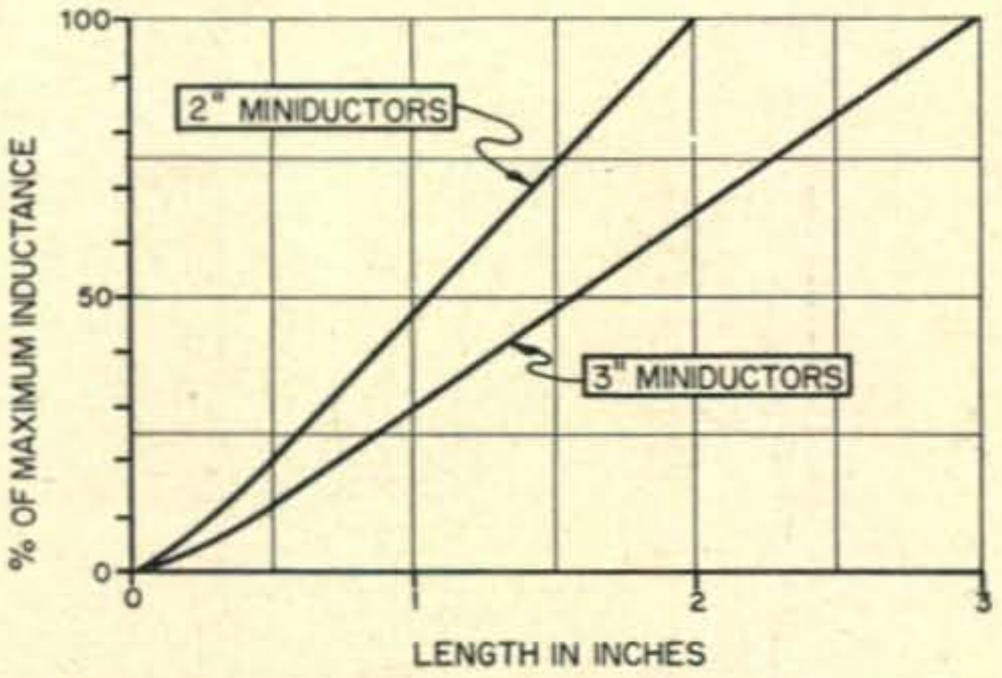


Fig. 2. This is the universal graph for determining inductance values of portions of the Miniductors. See text for details.

* Because of other unavoidable variations, there is nothing to be gained by carrying the result beyond two decimal places.

(Continued on page 53)

A VFO Mobile Transmitter

LOREN C. WATKINS, W5JXO

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PART II OF TWO PARTS

In the first part of this story the r-f unit, modulator and mobile power supply were described in detail. It was indicated that certain receiver modifications had been made, as well as, an a-c power supply for workshop testing. These details are outlined below.

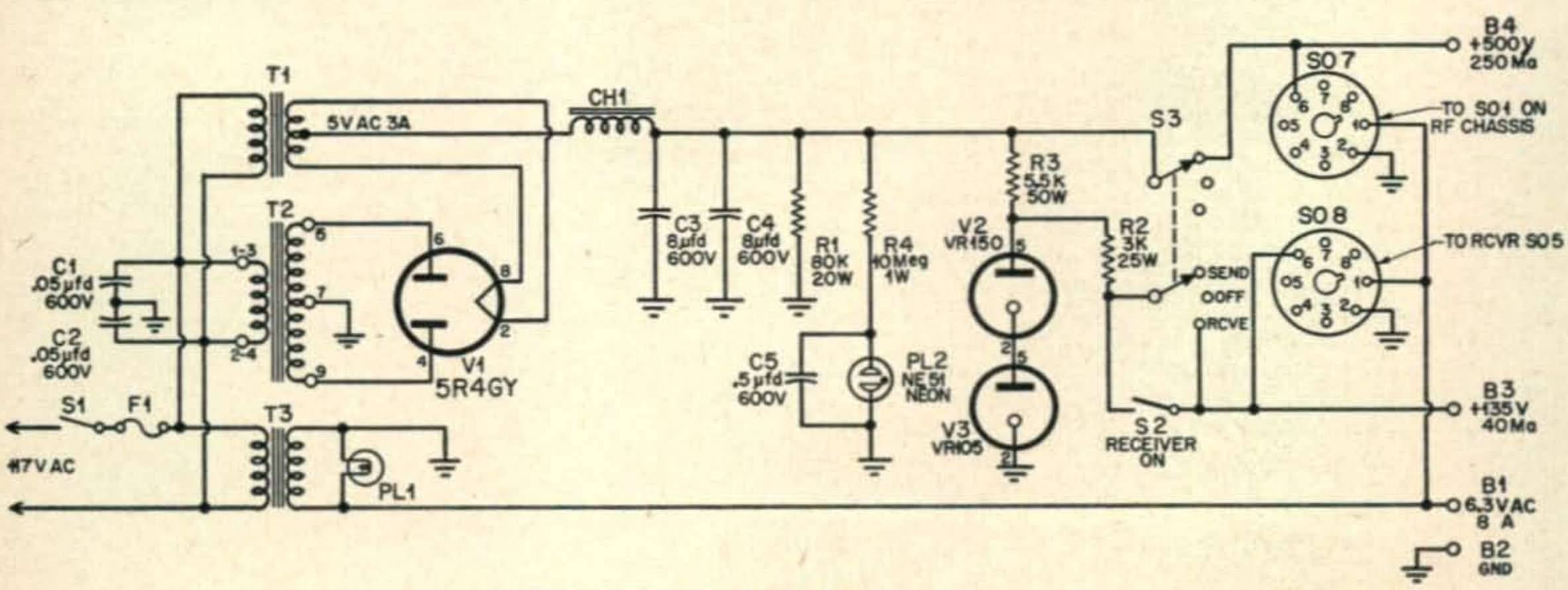
A. C. Power Supply

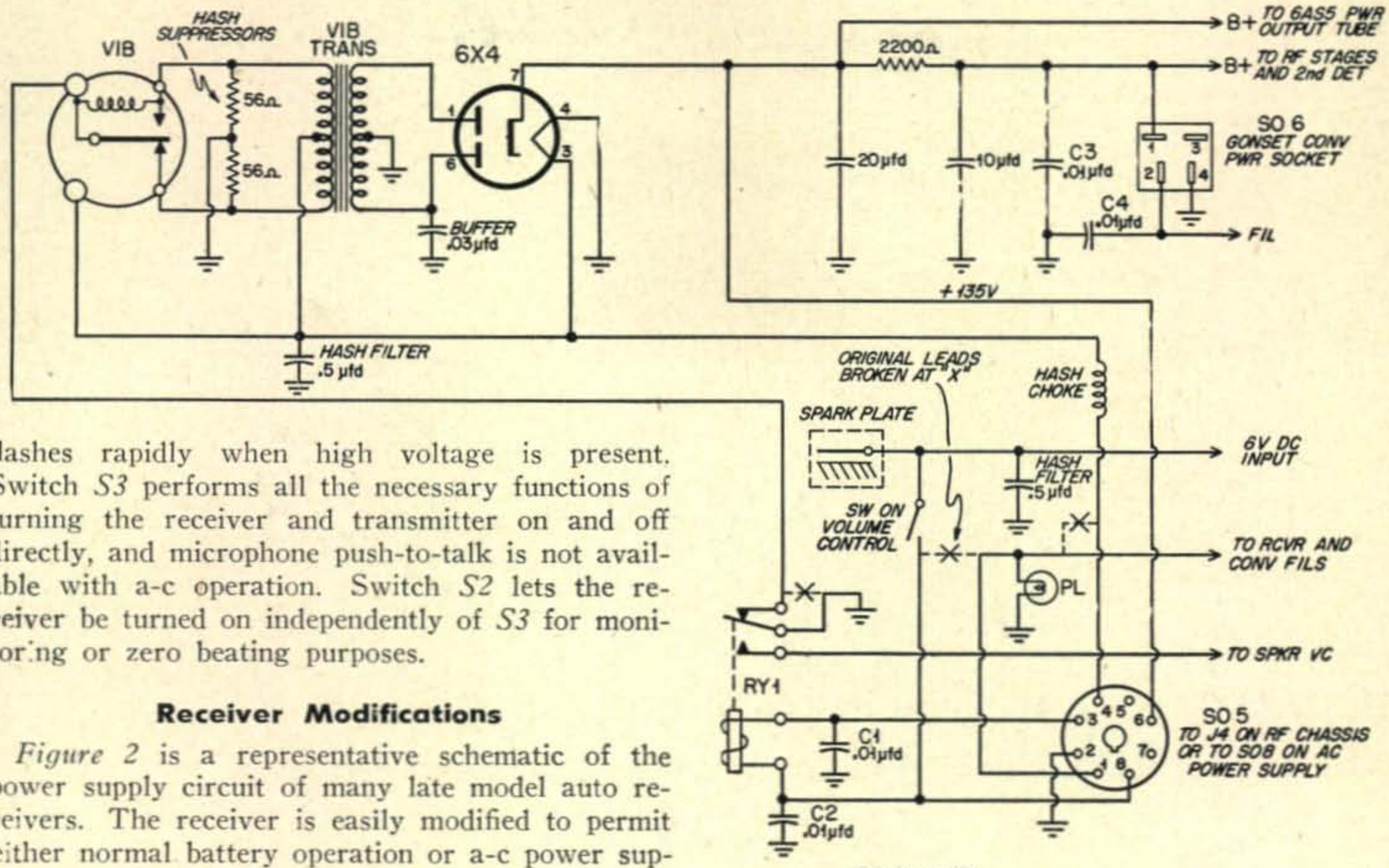
The a-c power supply, diagrammed in *Fig. 1,* is worth every cent of its cost for convenience in initial testing and future bench servicing of the rig, or for fixed operation in the house. Extended periods of mobile or fixed station emergency operation with a gasoline powered a-c generator prime source is also a very practical consideration.

The various photographs of the supply will indicate the parts layout, which is not critical in the least. The housing is a standard 12" x 9" x 8" amplifier foundation chassis kit. In addition to the receiver and transmitter power supply sockets, *So8* and *So7,* heavy duty binding posts are installed on the rear of the chassis to increase the convenience of using the unit as a general utility supply around the shack. The high voltage warning lamp, *Pl2,*

Fig. 1. Wiring schematic and parts list of the a-c power supply used by the author.

C1, C2—.05 μfd. 600v. paper
C3, C4—8 μfd. 600v. oil
C5—0.5 μfd. 600v. paper
R1—80,000 ohm, 20w.
R2—3,000 ohm, 25w.
R3—5,500 ohm, 50w.
R4—10 megohm, 1w.
CH1—8h., 250ma. choke (Chi. Tran. RS-8250)
SO7, SO8—octal socket
PL1—6.3v. pilot lamp
S1, S2—s.p.s.t. toggle
S3—d.p.d.t. toggle, center "off" type
T1—Filament transformer, 5v., 3a., (Chi Tran. FO-53)
T2—Power transformer, 675-0-675v., 250ma. (Chi. Tran. P-45)
T3—Filament trans-
PL2—NE51 neon lamp
F1—5 amp. fuse





PARTS LIST

RY-1 MIDGET 6V DC RELAY-SPDT
SO 5 OCTAL SOCKET
SO 6 4 PRONG JONES SOCKET
C1, C2, C3, C4-.01 μfd DISC CERAMIC

Fig. 2. Suggested receiver modifications.

flashes rapidly when high voltage is present. Switch *S3* performs all the necessary functions of turning the receiver and transmitter on and off directly, and microphone push-to-talk is not available with a-c operation. Switch *S2* lets the receiver be turned on independently of *S3* for monitoring or zero beating purposes.

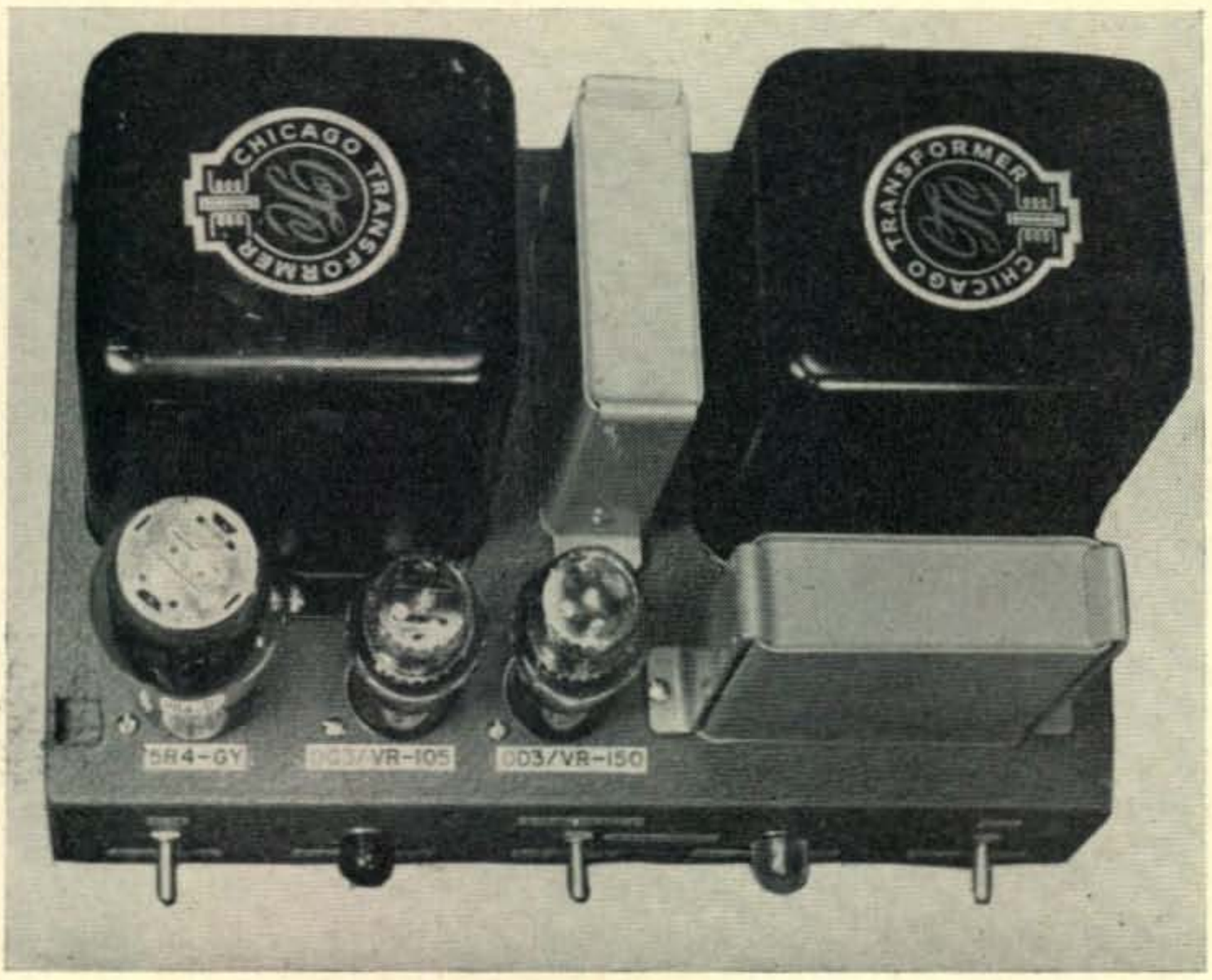
Receiver Modifications

Figure 2 is a representative schematic of the power supply circuit of many late model auto receivers. The receiver is easily modified to permit either normal battery operation or a-c power supply operation. Install an octal socket at some convenient spot on the receiver case, break the original leads as shown by the "X" marks, and connect to the octal socket, *So5*, as indicated.

Relay *Ry1* should be mounted as close to the vibrator socket as possible to avoid hash problems. The relay breaks the vibrator ground connection when the transmitter is turned on, and also shorts the receiver voice coil to eliminate any possibility of audio howl for the second or two required for the receiver filter capacitors to discharge. Opening the vibrator ground connection removes all receiver and converter power drain, except filaments, during transmit. Capacitors *C1, C2, C3,* and *C4* are for hash and noise bypassing.

A beat frequency oscillator installation in the receiver is desirable and necessary for VFO zero beating purposes. An effective noise limiter is also a "must" for mobile work, and a third modification would be to have the receiver crystal controlled.[1]

1. "Multi-Band V.F.O. Mobile Transmitter," L. C. Watkins, **Radio & Television News**, December, 1952, page 39.



This is a top view of the a-c power supply constructed by W5JXO in order to use the equipment at a fixed location or for testing purposes in the home shack and workshop.

C. O. BISHOP, W7HEA

207 East Toppenish Ave., Toppenish, Wash.

An amazingly high percentage of the semi-serious v-h-f operators use either the RME VHF-152, VHF-152A or VHF 2-11, converter or receiver. The basic design of these equipments is quite good and with only a small amount of work spent in the construction of one of these units, you will undoubtedly hear many new signals at your QTH.—Editor

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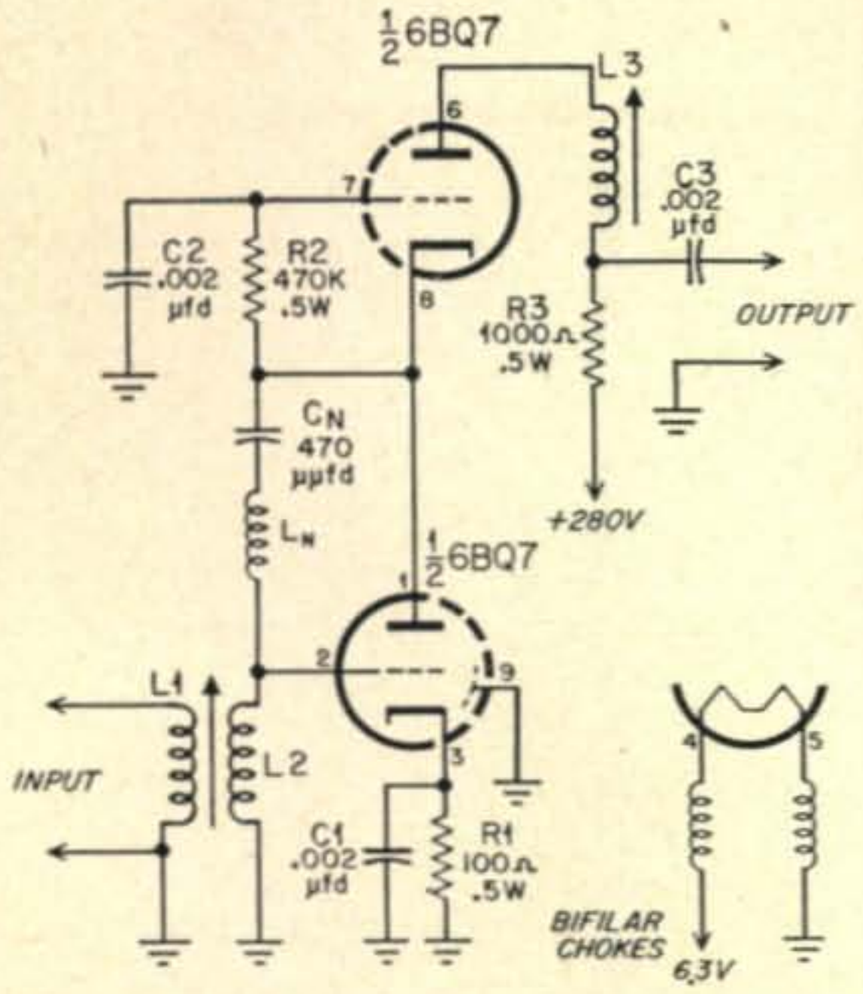
The Wallman, or cascode amplifier circuit has become the accepted standard for v-h-f receiver front ends. Without going into the theory of operation which has been described quite adequately elsewhere, the cascode will provide a front end noise figure that is unmatched for circuit simplicity. In addition, the cascode can be made quite broadly resonant and is thus an ideal performer in either the 6- or 2-meter amateur band. Because of the advent of television and the experimental development of low-noise triodes, the cascode is now well within the reach of the average v-h-f enthusiast.

One of the most frequently seen pieces of equipment in the v-h-f Ham shacks throughout the country is one of the *RME VHF-152* models. The front end of this converter (the *VHF 2-11* has the identical front end) was designed before the general acceptance of the cascode circuit. This means that there is serious room for improvement in the noise figure. As a matter of fact, the average noise figure of this converter on the 2-meter amateur band is generally more than 12 db. Because the r-f stage in the *VHF-152* does not lend itself to a modification, and since most of us are reluctant to make major changes in any piece of commercial equipment, an outboard unit—the "Piggy-Back" cascode pre-amplifier has been designed. It uses a minimum of parts and may employ either the 6BQ7, 6BQ7A, 6BK7, or 6BZ7 twin triode.

The *Piggy-Back* was designed to be bolted to the back of the *VHF-152* converter cabinet; since the power requirements are very small, power is obtained directly from the converter supply. The units are broadbanded and although they are usually adjusted for best performance at the center of the band, they will operate very well over the entire coverage of the converter. If operation is primarily confined to a small portion of either the 6- or 2-meter bands, they should be peaked at the center of that particular range. An improvement in circuit gain and noise figure will still be noted across the entire band even though the gain falls off slightly at the band edges. The adjusting slugs in both models are brought out in such a fashion to enable peaking up the *Piggy-Back* by reaching around the sides or across the top of the cabinet.

The circuit is shown in *Fig. 1* and is conventional with two possible exceptions. The improvement in noise figure and gain realized by neutralizing the 6-meter *Piggy-Back* is so slight that it was not considered worth the additional trouble. Neutralization does give a distinctly worthwhile improvement on 2-meters and should be used. The *Piggy-Back* is coupled to the *VHF-152* with about four inches of 300-ohm twin-lead in order to make the



C1, C2, C3—0.002 µfd. disc ceramic (Sprague High-K, Erie style 811, CRL Disc Hi-Kaps).

Cn—470 µµfd. tubular ceramic (CRL DC HI-KAP tubular, Sprague HI-K, Erie Ceramicon style K).

R1—100 ohm, ½w. carbon

R2—470,000 ohm, ½w. carbon (IRC BTS)

R3—1000 ohm, ½w. carbon

Bifilar choke—15 turns #20 en. on ¼" poly rod (see text).

*Fig. 1. The "Piggy-Back" parts list and schematic.

Coil Winding Data

50 Mc.

L1—6 turns #24 en., center tapped with tap grounded for 300-ohm input

L2—9 turns #20 en.

L3—12 turns #20 en.

Ln—not used (also remove Cn)

Note: L1, L2 & L3 are wound on National XR-50 or Millen 69046 slug-tuned forms.

144 Mc.

L1—2½ turns #20 en. hookup wire, interwound with L2 (Co-ax input circuit shown in schematic).

L2—5 turns #18 bare tinned spaced to fill form.

L3—4 turns #18 bare tinned spaced to fill form.

Ln—24 turns #24 en. closewound on 3/16" dia. form.

Note: L1, L2 & L3 wound on National XR-50 or Millen 69046 slug-tuned forms.

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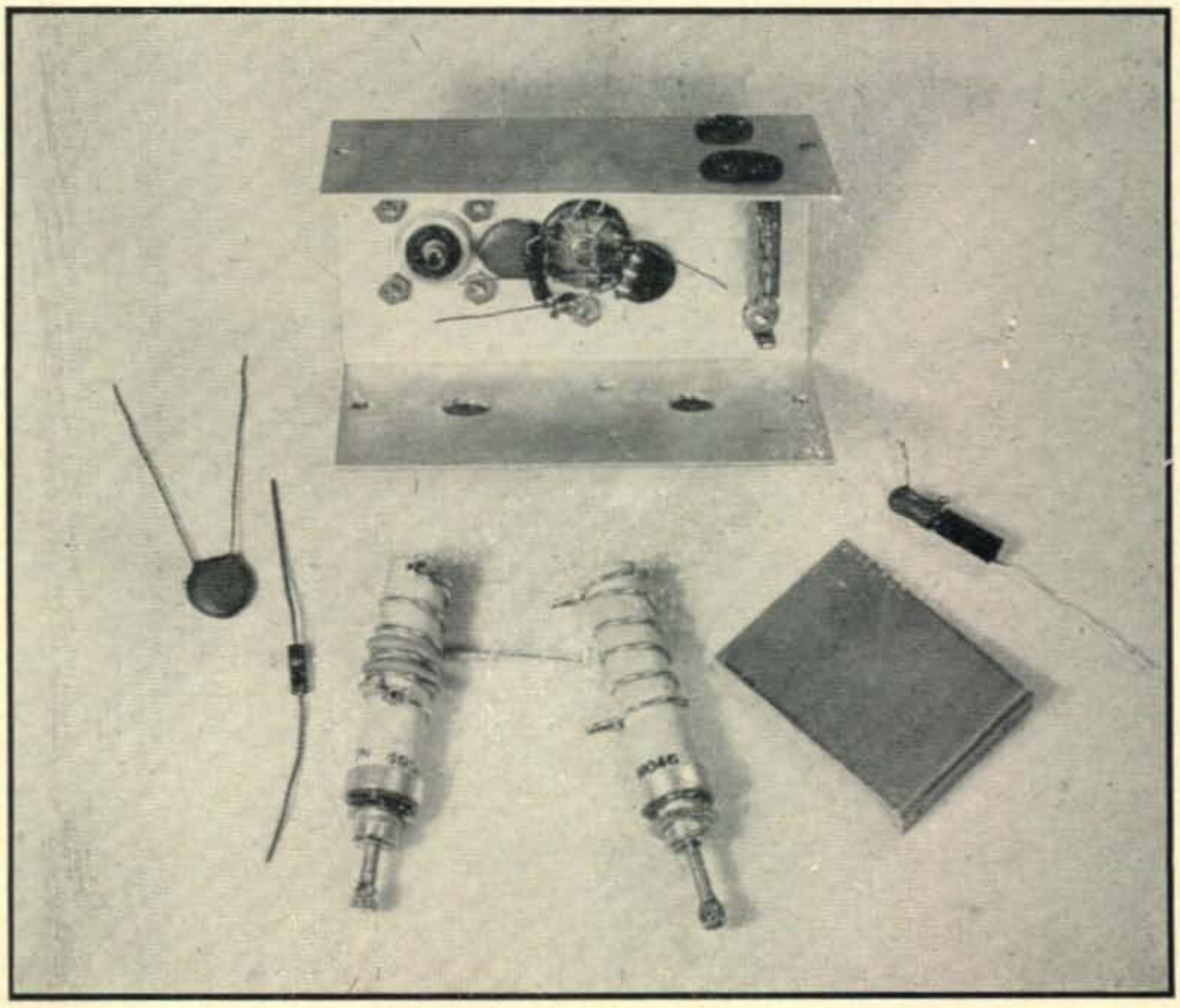
antenna coil of the converter a part of the plate circuit of the 6BQ7 tube. This will give a marked increase in performance over the usual linked coupling arrangements.

During the experiments with the *Piggy-Back* amplifiers several rather interesting things came to light concerning the input impedance of the VHF-152. The particular one used or tested by the author measured approximately 50 ohms on ten meters, 90 ohms on 6 meters and 150 ohms on 2 meters. The coupling method used with the *Piggy-Back* will automatically match the units to the *VHF-152* improvement noted with this system of coupling.

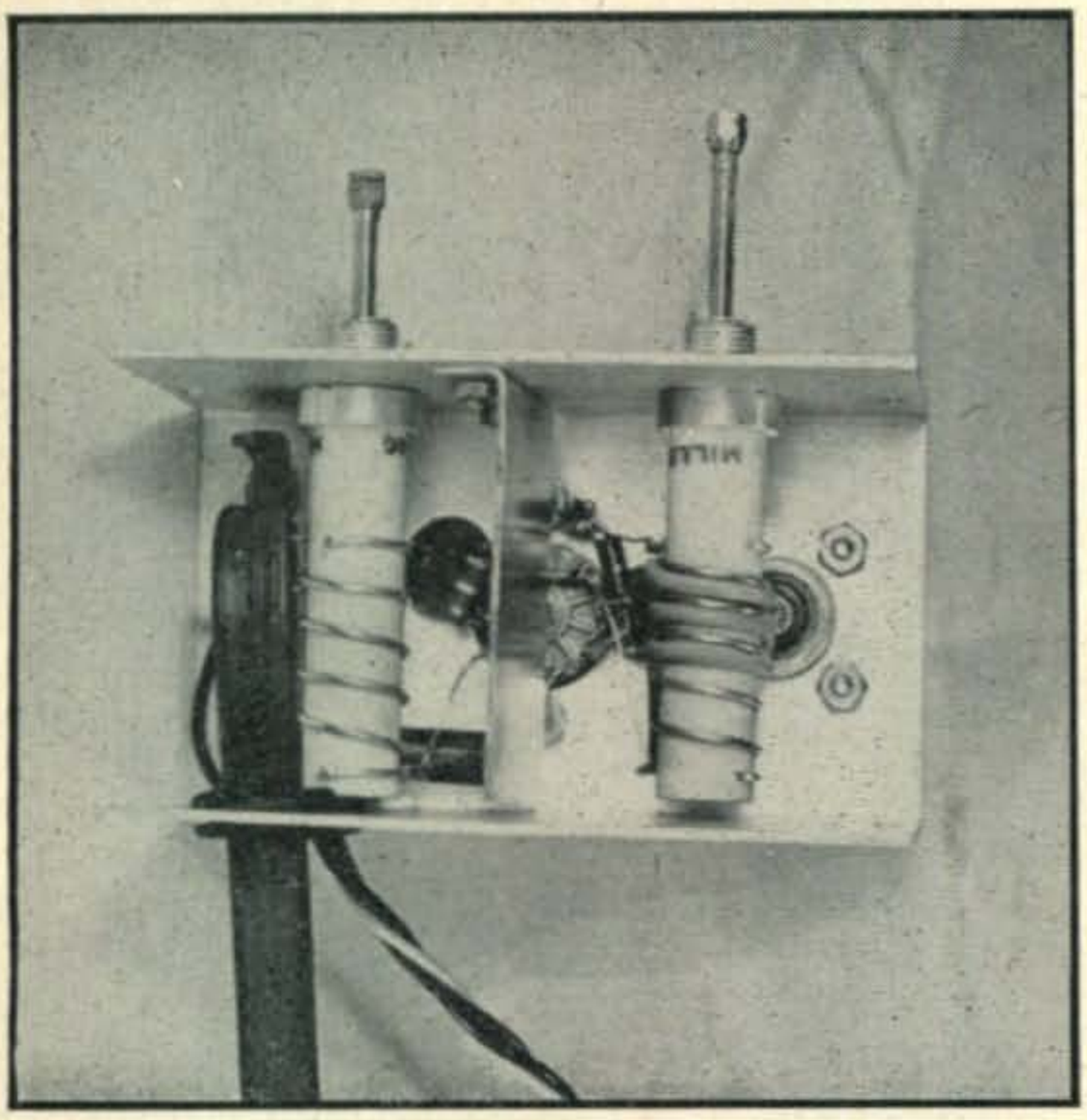
The measured gain of the *Piggy-Back* on both amateur bands was on the order of 16 db. and the improvement in noise figure was 6 db. on the 6-meter band and 8 db. on the 2-meter band, making the effective gain 22 and 24 db., respectively. Certainly this is a tremendously worthwhile improvement for such a little gadget! It will be noted that tight coupling of the input of the 6BQ7 to the antenna is necessary for the best noise figure.

Construction

The *Piggy-Back* shown in the accompanying photographs was constructed in a 4 x 2¼ x 2¼



The preamplifier unit before assembly. Either Millen or National slug-tuned forms may be used.



The unit, less mounting plate, revealing the 300-ohm output lead and 3-lead power cable, which are run through separate grommeted holes.

Bud Minibox No. CU-3003 or CU-2103, the latter having a grey hammertone finish which lends itself to the color scheme of the *VHF-152*. The components are mounted on the top and two sides of the box leaving the remaining section for mounting permanently to the converter. *Figure 2* shows the layout for drilling the necessary holes to mount the *Piggy-Back* components. The shield partition is shown in *Fig. 3* and is cut from a piece of scrap aluminum, flashing copper, or even an old beer can. This shield is fitted with its lower edge touching the center shield post of the tube socket and clearing all of the tube pins. All fittings should be made prior to wiring the unit.

Mount the coaxial input socket with 4-40 machine screws. Mount the tube socket with *pins 1, 2* and *3* towards the coaxial receptacle and with a solder lug under the mounting bolt adjacent to *pin 9*. This lug will act as the common r-f ground.

The coils should be pre-wound in accordance with the data shown on page 23 and given a light coat of *Krylon Acrylic Spray* or thin coil dope. *Piggy-Back* units have been constructed using either the *Millen* or *National* slug tuned forms as shown in the parts lists. No operational difference can be noted with either form. It is possible that *CTC* slug-tuned forms might be substituted provided the appropriate wire size is chosen and the coils wound to suit the diameter of the form. The bifilar filament choke is wound on a one-inch length of ¼" polystyrene rod and consists of two lengths of No. 20 AWG *Formex* or *Formvar* wire, parallel wound, to make two interwound coils, each with fifteen turns. The completed coil is then given a coat of dope or "spray." The neturalizing choke is wound on a 3/16" mandrel or drill shank and consists of 24 turns close wound of No. 24 AWG enameled wire. This coil is given a coat of coil dope after it has been slid from the winding form.

Additional Components

Tube socket—9 pin miniature (Amphenol #59-707, Cinch-Jones #9XM)
Tube shield—(Amphenol #5-408, Cinch-Jones #9S2)
Tie point—3 lug insulated (Cinch-Jones #2003)
Co-ax receptacle—(Amphenol 83-1R)
Box—Bud Minibox (#CU3003 or #CU2103)
Rubber grommets—⅜" (Walsco #3343)
4-40 machine screws, ⅜" long
4-40 hex nuts

Wiring

The wiring is simple and straightforward as may be seen from the under chassis photograph. The filament choke is first wired between *pins 4* and *5* and the insulated tie point strip and one of the grounding lugs. From this point in the wiring, all leads should be kept as short as possible. Wire in *C1* and *R1* between *pin 3* and the ground lug under the socket mounting screw. Tie the center tube shield to *pin 9* and the ground lug. Connect *R2* between *7* and *8*. Tie *pin 8* to *pin 1* with a short jumper of bare wire—which may be the lead from resistor, *R2*, threaded through *pin 8* and extending over to *pin 1*, if you are careful to clear *pin 9*. Connect *C2* between *pin 7* and *9*.

Mount coils *L1* and *L2* with terminals pointing towards the tube socket. Connect the cold end of coil, *L1* to the ground lug under the coaxial receptacle and the cold end of *L2* to the tube socket pin 2. Connect *Ln* and *Cn* between *L2* and tube socket *pin 1*. Mount *L3* by connecting the hot end to *pin 6* and connecting *R3* between the cold end and the center insulated terminal of the tie strip. Connect *C3* between the remaining insulated terminal

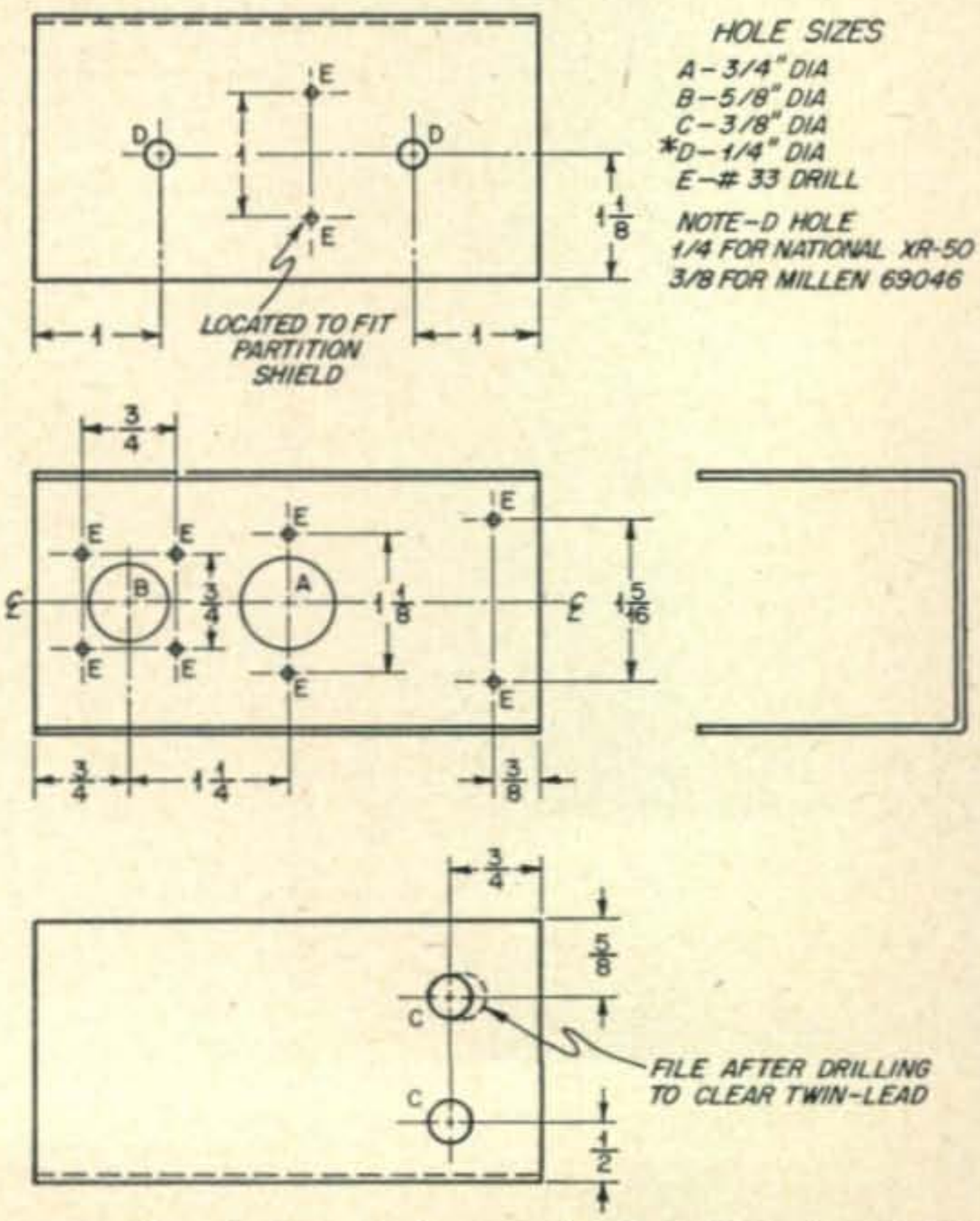


Fig. 2. Chassis layout plan on the Bud "Minibox." The mating section is mounted on your converter.

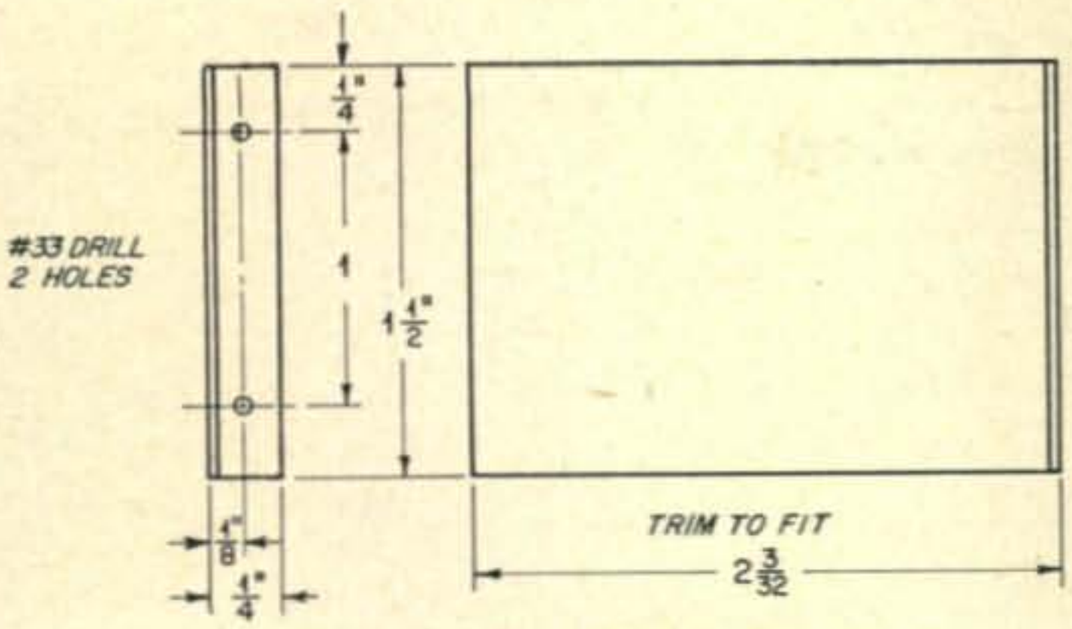
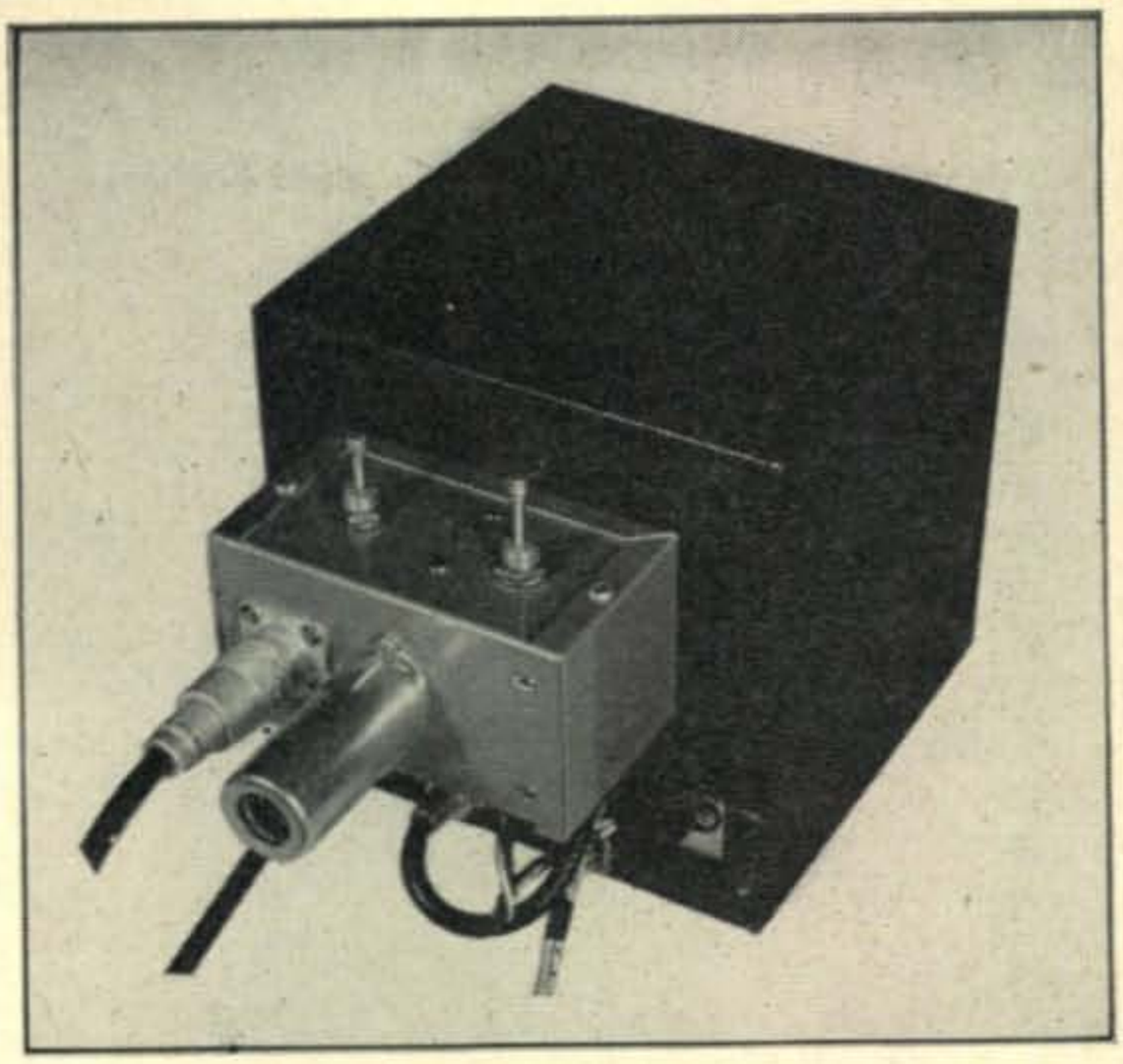


Fig. 3. The shield partition, clearly shown in the photograph on the opposite page, may be made from almost any handy scrap metal.



The "Piggy-Back" preamplifier, shown here installed on a Novice 2-meter converter (CQ, Nov. 1952). The noise figure of this converter may be improved through the use of a "Piggy-Back".

and the junction of *R3* at the cold end of *L2*. A short length of 300-ohm twin-lead is connected between ground and *C3* and brought out through the oval-shaped grommeted hole. The power cable may be made of three lengths of hook-up wire, running through the remaining grommeted hole to the tie strip and ground. Slide the shield down between the coils and bolt into place. With the tube inserted in the socket and output connected to the *VHF-152*, tentatively align the coils with a grid-dipper on either 51 or 146 Mc.

Final Alignment

Due to the output coupling arrangement between the *Piggy-Back* and the *VHF-152*, there is some possibility that oscillation may take place unless the chassis of the *Piggy-Back* is firmly bonded to the chassis of the converter. The 6BQ7 in the cascode circuit is very stable, but the combination of it and the high-gain r-f stage in the converter requires very secure bonding for purposes of receiver stability.

A center-tap antenna winding has been used for the 300-ohm input on the 6-meter *Piggy-Back* and a single winding for the 52-ohm coaxial input of the 2 meter model. The type of antenna feedline in use will dictate which system must be used. If excessive standing waves are present on the feedline, sufficient reactance may be reflected to the input of the pre-amplifier to make it impossible to hit resonance with the coil specified. This condition may be remedied by improving the standing wave ratio, changing the number of turns in the input coil, or varying the length of the feedline until resonance can be reached.

If a coaxial feedline is used, the input coil may be tapped to provide proper input matching. It is usually easier to obtain the necessary tight coupling on 2 meters by moving the tap closer to the grid end of the coil than through the use of a link coupling arrangement.

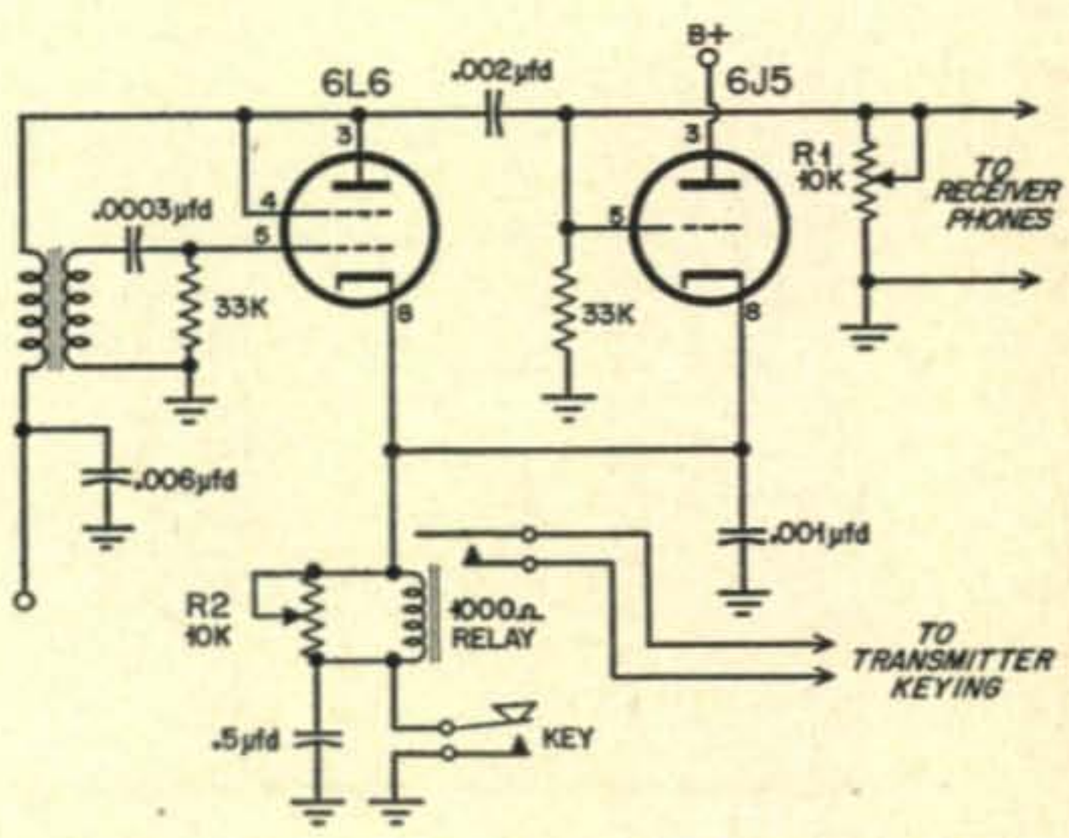
The results obtainable from the few hours of assembling and mounting a *Piggy-Back* pre-amplifier, will reward the operator with increased signal-to-noise ratio that will certainly put "new life in his equipment."

Inside the Shack and Workshop

A Sidetone Monitoring Gadget

Maybe I'm just getting lazy, but a look at some of these complicated monitors had me wondering if the solution couldn't be made a little more simple. The schematic is my answer and is the one that has given me the best results.

The 6J5 was added to bring more current up through the relay. Also tapping off the grid of the 6J5 enabled a clean make and break of the code characters. The control *R1* handles the volume of the sidetone and will also have the effect of decreasing the receiver output, but you should be able to more than compensate for this loss. Control *R2* will determine the current through the relay and may have a slight effect upon the tone.



Jack Frankel, W2DCI

More on the 6146

In a recent issue of *CQ*, a method of eliminating key-up instability in the parallel-6146, output stage of early-model *Viking II* transmitters was described.* The method consisted of limiting the rise in the screen-grid voltage when the key was up, by adding a pair of OB-2 regulator tubes to the screen circuit in the "CW" position of the function switch.

The engineering staff of the *E. F. Johnson Company*, manufacturers of the *Viking* transmitter kits, had found that, under certain conditions, the 6146's did funny tricks without excitation. This was due to tube characteristic variations and too high a screen voltage setting by some users. Going to work on the problem, the engineering staff devised a modified, 6AQ5, clamp-tube circuit to solve it. See *Fig. 1.*

All *Viking II* kits delivered in the past few months have incorporated the revised circuit. Furthermore, the *E. F. Johnson Company* has prepared a modification kit and a set of instructions so that early purchasers of *Viking II's* can use the improved circuit in their transmitters. This kit is supplied at no cost to the customer and is still available to users who have not incorporated this modification.

The editors of *CQ* are happy to call this modification to the attention of owners of *Viking II's* and to other users of the 6146. First, because we believe that the best way to get the most out of a piece of equipment is to follow the manufacturer's recommendations. Secondly, because this circuit would seem to have great possibilities for use in other transmitters using 6146, which is ordinarily a difficult tube to control with the conventional clamp-tube circuit.

* Marriner, E. H., "Taming Parasitics In Your 6146," CQ, March, 1953, page 20.

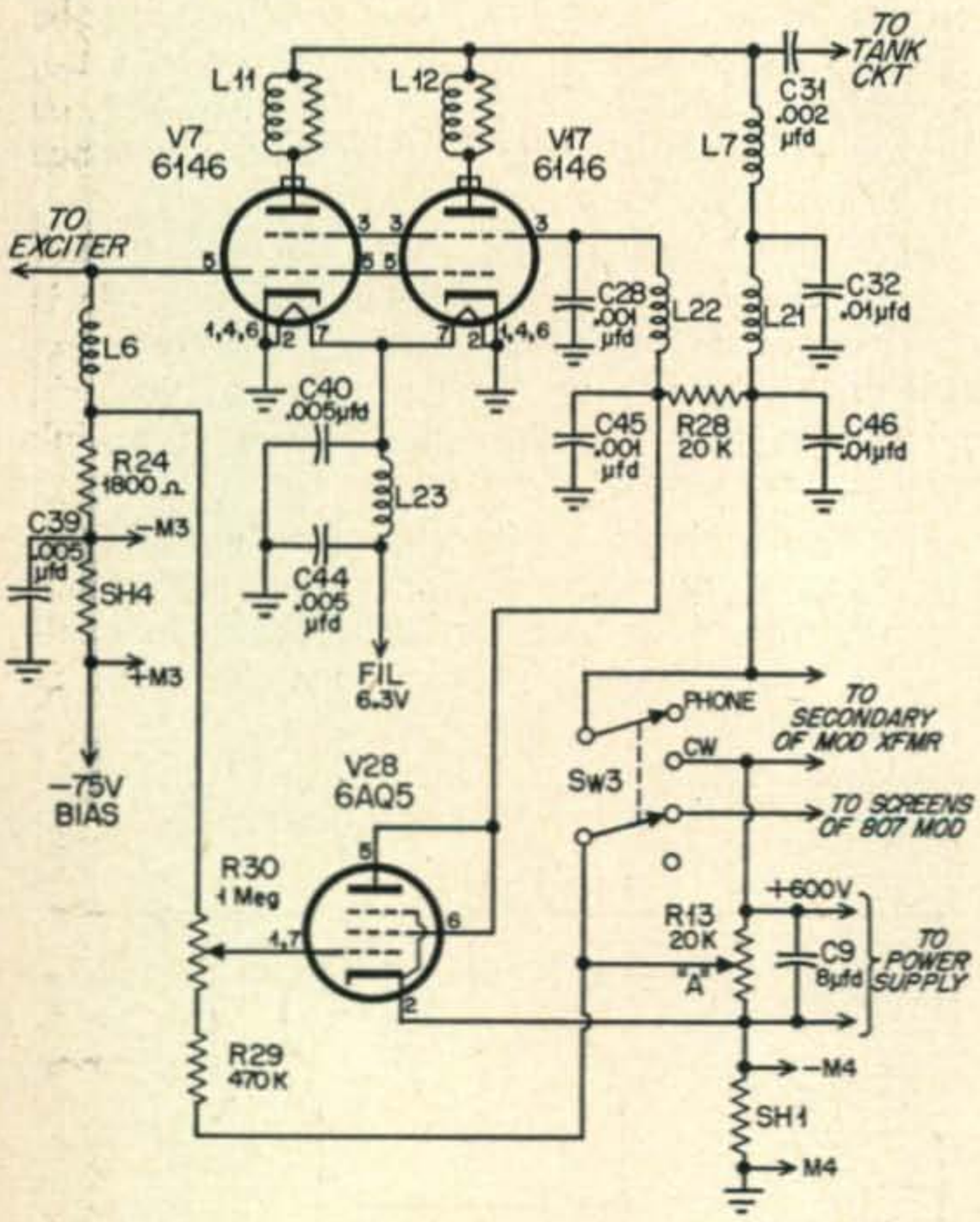


Fig. 1. The revised circuit of the Viking II, incorporating the clamp tube, V28, a 6AQ5, to limit the rise in 6146 screen voltage when the 6146's are not being excited. R29, R30 and V28 are added components. Complete instructions for making necessary changes in early Viking II's are supplied with the modification kit.

The Circuit

The major difference between the old and new *Johnson* clamp-tube circuit is in the grid circuit. In the former, operating bias is obtained from the flow of the rectified grid current through the normal bias resistor of the controlled stage. This system will not work with the *Viking II*, because most of the bias is supplied from a fixed source which would keep the clamp tube cut off, with or without excitation. Therefore, another system for varying its bias had to be found. This is the function of *R29* and *R30*.

One terminal of *R30*, a one-megohm potentiometer, is connected to the junction of *L6*, the final-amplifier grid r-f choke, and R24, at which point the operating bias of the 6146's varies approximately eleven volts between the excitation and no-excitation conditions. The other end of *R30* is connected through *R29* to a tap on the power-supply bleeder resistor. Its center terminal is connected to the 6AQ5 grid terminal.

Setting *R30* determines the polarity and the amount of voltage applied to the grid of the 6AQ5. In normal operation, it is set to bias the 6AQ5 to plate-current cutoff when the 6146's are loaded to the rated input with normal excitation applied. Then, when the excitation is removed, the 6AQ5 grid bias shifts in a positive direction. As a result,

(Continued on page 56)

Getting Started on Single Sideband

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412 Spring St., Herndon, Virginia

This part of the SSB series describes the phasing method of generating a single-sideband signal and describes the popular Multiphase exciter. A suitable voice control scheme is outlined. This VOX circuit may be used on the phasing exciter or the filter exciter described in Part II.—Editor

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Part III

The Phasing Method

While the filter method of SSB generation is pretty easy to understand, many of the boys have a little trouble in comprehending just what takes place in the phasing rigs. I won't guarantee to dispel that great black fog, but let's try.

The heart of the phasing rig is the audio phase-shift network. This formidable sounding gadget is merely a group of resistors and condensers chosen carefully and arranged in a certain way so that is a single tone in the voice frequency range is fed into the input the following takes place: The voltage is immediately divided into two channels and the phase relation of the separated voltages with respect to each other is changed, so that instead of the two voltages being in phase at all frequencies, they differ by 90° when they reach the two sets of output terminals. This 90° phase difference is maintained at all the speech frequencies in which we are interested—normally from 250 cps to 3000 cps. The other requirement of the network is that the two output voltages must have exactly the same amplitude with respect to each other for all frequencies in the speech range. These are quite rigid requirements, and it was only in recent years that designers have been able to come up with practical networks that could be built.[1] You will note that 1% components are used in the network—this accuracy is very necessary, and any deviation from this will adversely affect the degree of sideband suppression.

There is one more phase-shift network in phasing exciters that must be considered. It is the 90° r-f phase-shift network. This is concerned with only one frequency (not a band of frequencies like the a-f network), and is a cinch to build and to understand. There are various ways of obtaining r-f phase shifts. The easiest method is that of using two lightly-coupled tuned circuits as follows: One of the circuits is detuned on the *high-frequency side* to the 3 db. point. (This is where the voltage across the tuned circuit is 3 db. or 70% less than the voltage when tuned to the carrier frequency.) The other tuned circuit is tuned to the 3 db. point on the *low-frequency side* of the carrier. Under these conditions the voltages existing across the two coupled link windings (see *Figure 2)* are 90° apart in the phase relationship.

Now that we understand all about these phase-shift networks (who said that?) let's proceed with the theory of what happens in a phasing exciter. Follow along with the block diagram, *Fig. 1.* The speech amplifier output is fed into the audio phase-shift network, where, as we mentioned, two equal outputs are obtained. These equal outputs are each fed into separate diode balanced-modulators. These balanced modulators are crystal mixers (mentioned in the section on *Heterodyning* in Part II of this series) that are arranged so that the mixing oscillator voltage is balanced out in the output tank circuit. The r-f carrier is generated in a crystal oscillator and fed into the r-f phase-shift network, where the two outputs are fed into the balanced modulators mentioned above.

Look again at what we have. We have two separate channels where a carrier is combined with a modulating frequency. The carriers have the same frequency, but are 90° out of phase with each other. The modulating frequencies in the two channels are the same amplitude, but also differ by 90° from each other. The individual balanced modulator output consists of a double-sideband suppressed carrier signal. Remember—we balanced out the carriers. These two sets of sidebands are then combined in a common tank circuit.

All of this fooling around with phase relationships now pays off. Let's take a specific example: The upper sideband voltages of the two channels will be equal in amplitude, but due to all the phase changes we have purposely made along the line the component voltages of the two upper sideband are exactly 180° out of phase. This means that when combined in a linear device like the tuned tank circuit, the upper-sideband voltages will cancel each other. However, the lower sideband voltages

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1. "Wideband Phase Shift Networks," Dome, Electronics, Dec., 1946, p. 112.

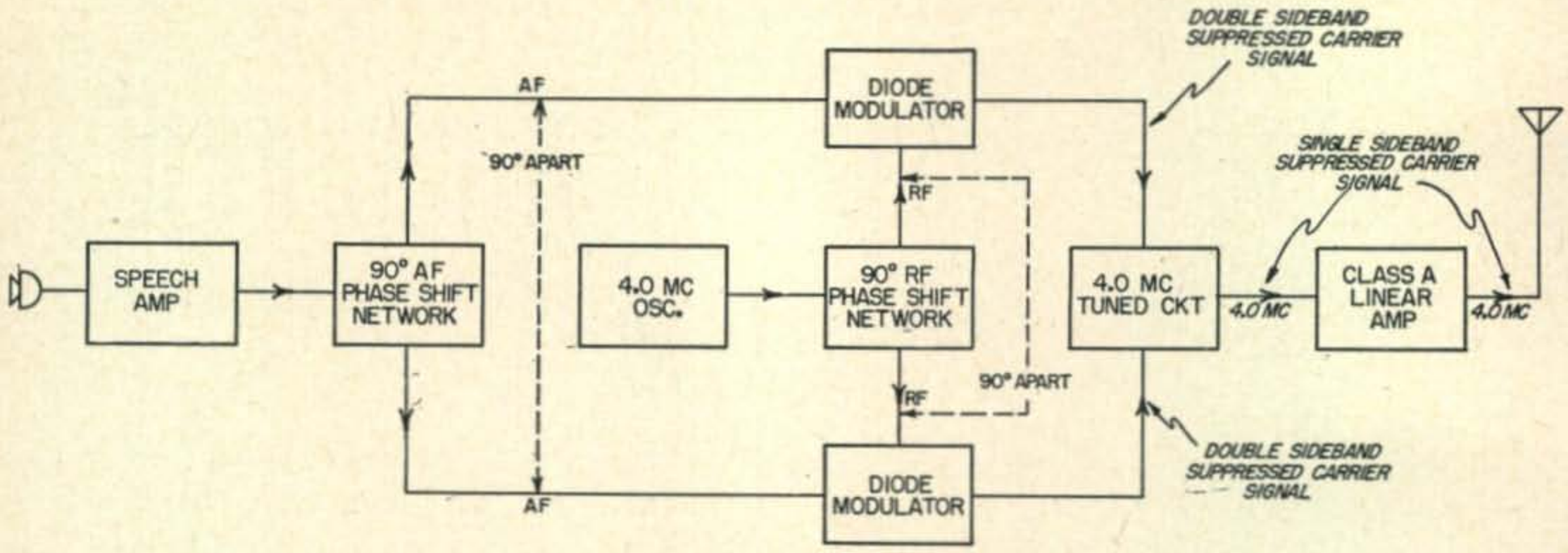


Fig. 1. Block diagram of a fundamental-frequency phasing SSB exciter such as the SSB, Jr. described in Nov.-Dec. 1950 G.E. Ham News.

in both channels will not be out-of-phase, but will be exactly in-phase and will add up vectorially to give a lower-sideband voltage twice as large as that existing in either channel. In order to switch sidebands—attenuate the lower and transmit the upper sideband—all that need be done is to reverse the phase of the audio voltage feeding *one* of the balanced modulators. This is done by interchanging any two audio leads going into one of the balanced modulators.

Ordinary double-sideband-with-carrier transmission may be accomplished with a phasing transmitter. To accomplish this, one of the balanced modulators must be disabled, and the carrier of the other balanced modulator unbalanced sufficiently to provide enough carrier to permit proper demodulation of its sidebands at a distant receiver. There is one good point about producing AM this way. If over-modulation takes place, negative peak clipping does not occur, therefore, there are no spurious splatter products generated. However, there is second harmonic distortion present upon detection, but a fair amount of this may be tolerated before the signal becomes unintelligible.

Phasing-type exciters can also be made to produce phase modulation. Phase modulation is produced by having a double-sideband suppressed-carrier signal as produced in either of our balanced modulators combined with a carrier that is shifted in phase by 90° from that originally present in the balanced modulator in question. This can be easily accomplished in our exciter by taking the sidebands with no carrier from one balanced modulator and adding a carrier with no sidebands from the other balanced modulator. Switches can be easily provided to do this.

The Phasing Exciter

We are very grateful to W9DYV[2] for permitting us to reprint a portion of his "Multiphase" exciter schematic. This very popular unit is available commercially, either in kit form or completely wired.

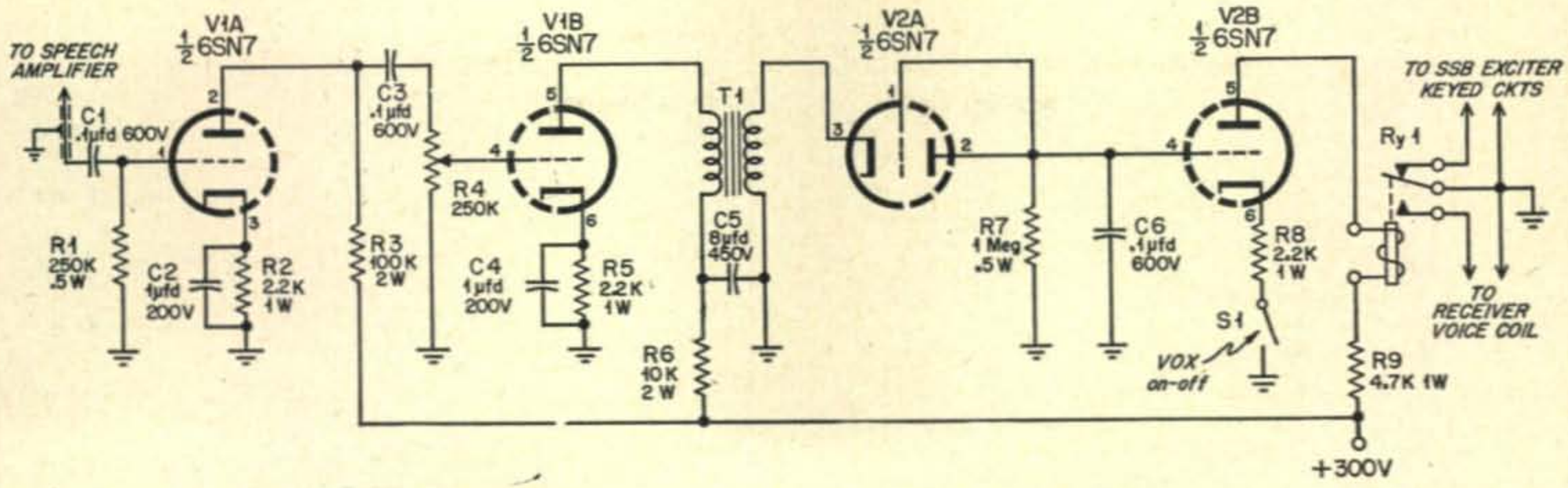
The circuit is basically that of the "SSB, Junior," devised by Norgaard,[3] but with improvements that make multi-band operation possible. The original SSB, Jr. exciter was a fundamental-frequency operating gadget. It operated fundamentally at 4.0 Mc., and if the operator wished to QSY more than a few kilocycles, he found it necessary to realign the r-f phase-shift network in order to maintain good sideband suppression. Wes, W9DYV, modified the idea by generating the SSB signal at a fixed frequency of 9.0 Mc. and heterodyning into the desired amateur band with a separate mixer stage, just as was done in the filter-type exciter. VFO operation is, of course, possible when using this scheme.

Remembering the foregoing discussion about the phasing method of generating SSB signals, we now refer to *Fig. 2*. *V1a* and *V1b* are the usual speech preamplifiers. *V2a* is the a-f driver stage which feeds the audio phase-shift network through the transformer, *T1*. Construction by the average Ham, of the a-f phase-shift network, is possible, but it turns out that the complete, aligned unit is available for about the same price for which we could buy the necessary precision stable components. Need I say more?

V3a and *V3b* are the dual-channel amplifiers wherein the audio balance is obtained by adjustment of the cathode resistor, *R18*. The transformers, *T2* and *T3*, are plate-to-low impedance line transformers used to drive the diode balanced modulators. W9DYV indicates that suitable units are not easily obtainable on the market so he has special transformers built for his production needs. Write to the gentleman and I am sure that you can talk business. Switch *S1* is the function switch which permits selection of sidebands, or of AM or PM transmission. Studying the switch positions will show that changing from one sideband to the other merely interchanges the connections on the output of *T2*, while switching to the AM and PM positions disconnects the secondary of *T3* from its associated balanced modulator.

The audio in the two separate channels is applied, in series with the r.f. from the link windings on *L1* and *L2*, to the balanced modulators. *Y1* and *Y2* are the diodes of the balanced modulator in-

2. c/o Central Electronics, Inc., 2125 W. Giddings St., Chicago 25, Ill.
3. "SSB Jr.," Norgaard, G. E. Ham News, Nov.-Dec., 1950.



R1—250,000 ohm, ½w.
R2, R5, R8—2200 ohm, 1w.
R3—100 ohm, 2w.
R4—250,000 ohm potentiometer
R6—10,000 ohm, 2w.
R7—1 megohm, ½w.
R9—4700 ohm, 1w.
C1, C3, C6—0.1 μfd., 600v. metallized paper
C2, C4—1.0 μfd., 200v. metallized paper
C5—8.0 μfd., 450v. electrolytic
Ry1—5000 or 10,000 ohm vacuum-tube relay, s.p.d.t.
S1—s.p.s.t. toggle
T1—interstage audic transformer. Single plate to single or push-pull grids.

Fig. 3. Voice control circuit for use with the Multiphase Exciter or filter exciter described in Part II

volved with *L1* and *T2*. Likewise *Y3* and *Y4* are associated with *L2* and *T3*.

V2b is the 9.0-Mc crystal oscillator, and utilizes *L1* as its plate tank coil. The resonant frequency of the *L1-C11* combination must be higher in frequency than 9.0 Mc., in order for the crystal to oscillate; therefore, to obtain our 90° r-f phase-shift, *L2* and *C13* will have to be tuned *lower* in frequency than 9.0 Mc. You will notice that there is no physical connection from *L2* to the oscillator tank. *L1* and *L2* are mounted physically within a couple of inches of each other, and the circuit capacity furnishes sufficient coupling to the job. Condensers *C9* and *C10* prevent r.f from getting into the audio transformers; yet they must not appear as a low reactance at audio frequencies.

Carrier balance is accomplished by adjusting *R23* and *R24*. Both must be carefully balanced in order to cancel the carrier completely.

The balanced-modulator output transformer *L3* is the point where the outputs of the two previously separate channels are combined. The additional double-tuned transformer, consisting of *L4* and *L5*, is necessary to further attenuate the second-harmonic of the 9.0-Mc oscillator, generated in the germanium diodes of the balanced-modulator stage.

The mixer stage, *V4*, is conventional with the exception of the trap circuits, *L6* and *L7*, and their associated tuning condensers. They are necessary, when operating in the 14-Mc amateur band, to attenuate the third harmonic of the 5.0-Mc mixing voltage. The same VFO may be used for both 4.0 4.0- and 14-Mc operation, for the difference between the 9.0-Mc SSB signal and the 5.0-Mc mixing voltage will put the output at 4.0 Mc. If the sum-mixture is selected by the mixer plate tank circuit, *L8* and *C27*, the output will be in the 14.0-Mc amateur band.

The output amplifier, *V5*, is the inevitable 6AG7. The output is shunt-fed, and obtained by means of a tap on the plate coil.

The swamping resistors, *R32* and *R38*, are usually necessary in order to stabilize the 6AG7 stage. Without these resistors self-oscillation often results. The exact values of these resistors are not shown; the highest value of resistance commensurate with stable operation should be used. *Always* insure that all stages are rock solid before the unit is "buttoned up."

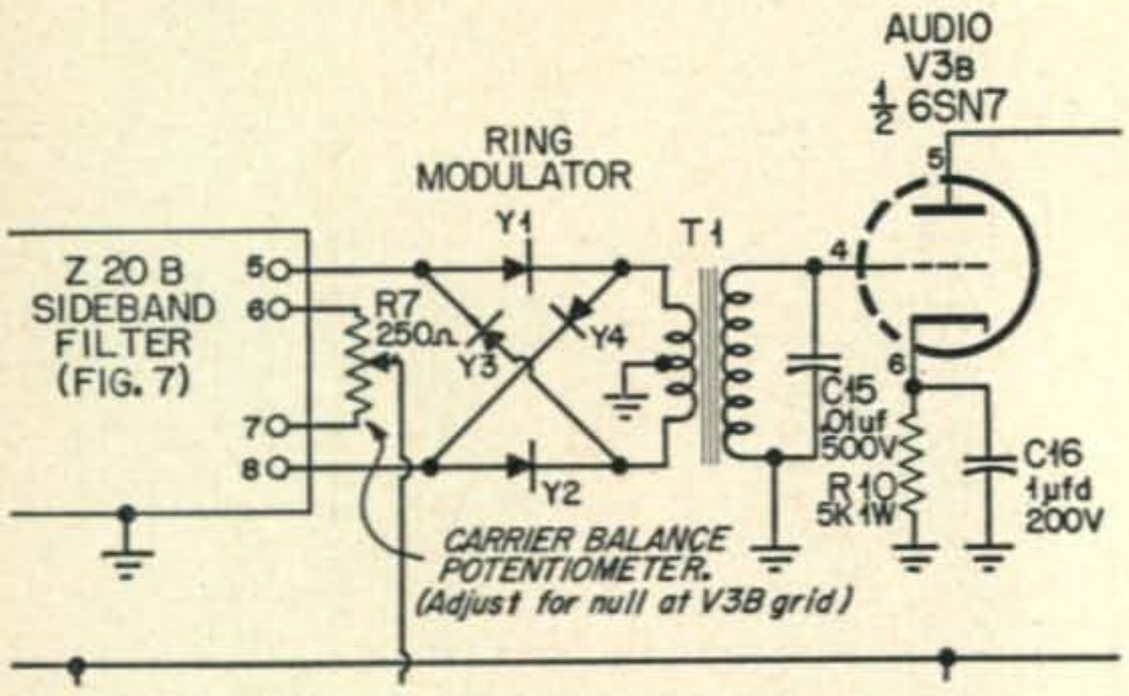
You will note, when in stand-by position (*S3* open), that there is a minus 100 volts of bias applied to the control grid of the 6AG7 and the oscillator grid of the 6BA7-mixer. This thoroughly squelches the output of the exciter. When *S3* is closed, the mixer returns to its normal operating condition, and an operating bias of about minus 10 volts is applied to the control grid of the 6AG7.

Forty-meter operation is also possible with this unit. However, it is *not* recommended that a mixing voltage at 1.8 Mc. be used, because of the various harmonics of this frequency that will fall in or near the 7.2-Mc phone band. These harmonics are not necessarily present in the v-f-o output, but are generated in the electron stream of the mixer stage. In view of this, the use of a 16.2-Mc v.f.o. is recommended. This might take a little doing, but is not an impossible task. In any case, a frequency-stable v-f-o voltage of about 3 to 8 volts is needed.

Alignment

Adjust the 9.0-Mc oscillator tank, *L1*, for oscillation of the crystal. With an appropriate mixing frequency fed into the v-f-o jack, and the receiver tuned to the desired mixture-output frequency, adjust *L3, L4, L5, L8* and *L9* for maximum output with one of the carrier-balance pots slightly off-balance.

Connect a 'scope to the output of the 6AG7 amplifier and use a recurrent sweep rate of about 30 per second. Now, carefully balance *R23* and *R24* for as perfect carrier balance as possible. Feed a steady tone of about 1000 cps from an audio oscillator into the microphone jack. Make



Corrected schematic of ring modulator diagram, Fig. 6, Part I of SSB Series in which Y3 was inadvertently reversed. Wrong polarity on diodes would make a carrier balance impossible.

Coil Winding Data

L1, L2—9.0 Mc., tank wound on Cambridge Thermionics slug-tuned form LS-3.
L3—9.0 Mc., balanced mod. tank wound on LS-3 form.
L4, L5—9.0 Mc. transformer wound on LS-3 forms.
L6, L7—15 Mc. v-f-o harmonic trap wound on LS-3 form.
L8, L9—4.0 Mc., 30 turns #18 on 1½" dia. plug-in form.
7.3 Mc., 15 turns #18 on 1½" dia. plug-in form.
Note—L1 through L7 may be obtained ready-made from Central Electronics, 2125 W. Giddings St., Chicago 25, Ill.

sure that the audio wave-form is good and that nothing is being overdriven. You will see on the 'scope a pattern that resembles a modulated AM envelope. Next, adjust the audio balance control, *R18*, and the r-f phase-shift network, *L2*, for *minimum* ripple (or modulation) on the 'scope pattern. The pattern for a properly aligned SSB exciter with single-tone input is a pure c-w envelope with no modulation. The presence of ripple indicates one of three things: (1), presence of undesired sideband signal; (2), carrier unbalance; or, (3), bad wave-form in the input audio tone or distortion produced by overdriving the audio stages.

Automatic Voice Control Operation

Voice control operation may be accomplished by using the arrangement shown in *Fig. 3*. The theory of operation is quite simple. Some of the audio signal is taken from the speech amplifier ahead of the gain control (to insure independence of operation) and amplified up to a relatively high level in *V1a* and *V1b*. This audio is then rectified by the diode-connected half of the second 6SN7, *V2a*, and applied to the grid of the second-half of the tube, *V2b*. The plate current of *V2b* operates a high-impedance relay, which in turn operates the keyed circuits of the exciter.

The filter exciter described in Part II may be keyed in the cathode circuits of the two mixer stages, plus the cathode of the 2E26. Proper precautions should be taken that the cathode lines are "cold." Good by-passing at the tube socket will insure this. The phasing exciter should be keyed as shown by making *S3* the relay contacts.

End of Part III. Part IV will appear in the July issue.

Fig 2. Partial schematic of Multiphase Exciter manufactured by Central Electronics, Chicago, Ill. Courtesy of W9DYV.

R1—1 megohm, ½w.
R2, R5—2,200 ohms, 1w.
R3—100,000 ohms, 2w.
R4—220,000 ohms, ½w.
R6—220,000 ohms, 2w.
R7, R10—133,300 ohms, 1%, ½w.
R8, R9—100,000 ohms, 1%, ½w.
R11—10,000 ohms, 1w.
R12—1 megohm potentiometer
R13, R26—47,000 ohms, ½w.
R14, R19, R21—1,000 ohms, 1w.
R15—400 ohms, 1%, ½w.
R16—1400 ohms, 1%, ½w.
R17, R20, R31—560 ohms, 1w.
R18—1,000 ohm potentiometer
R22—100,000 ohms, ½w.
R23, R24—1,000 ohm carbon potentiometer
R25, R35—1,000 ohms, ½w.
R27—180 ohms, ½w.
R28—4,700 ohms, 2w.
R29, R30—15,000 ohms, 5w.
R32, R38—swamping resistor (see text)
R33—56 ohms, 1w.
R34—22,000 ohms, ½w.
R36—560 ohms, ½w.
R37—100 ohms, 1w.
R39—10,000 ohms, ½w.
R40—100,000 ohms, 1w.
C1, C3—0.005 µfd., 500v. paper
C2—8 µfd. 450v. electrolytic
C4—250 µµfd. mica
C5—2,430 µµfd. (0.002 µfd. mica ± 5% with 170-780 µµfd. trimmer in parallel)
C6—4,860 µµfd. (0.0043 µfd. mica ± 5% with 170-780 µµfd. trimmer in parallel)
C7—1,215 µµfd. (0.001 µfd. mica ± 5% with 50-380 µµfd. trimmer in parallel)
C8—607.5 µµfd. (500 µfd. mica ± 10% with 9-18 µµfd. trimmer in parallel)
C9, C10, C12, C29, C35—0.001 µfd. mica
C11, C13—150 µµfd. mica
C14, C15, C16—0.005 µfd. mica
C17, C18—0.001 µfd. ± 1% mica
C19, C20—150 µµfd. ± 5% mica
C21, C22, C26, C28, C31, C32, C33, C34—0.006 µfd. mica or ceramic
C23—36 µµfd. ± 5% mica
C24—3 µµfd. ceramic or mica
C25—25 µµfd. mica
C27, C36—380 µµfd. air variable
C30—0.1 µfd. paper
C37—0.25 µfd. paper
S1—3 pole, 4 position wafer switch
S2—d.p.d.t. wafer switch
S3—relay contacts on voice control relay (see text)
T1—interstage transformer (special) Central Electronics Type 27AM-24
T2, T3—single plate to voice coil (special) Central Electronics Type 27AO-79
(Note—T1, T2, T3 may be procured from Central Electronics, Chicago, Ill.)
Y1, Y2, Y3, Y4—1N34 Germanium diodes

AUDIO PHASE SHIFT NETWORK PS-1

V1A ½ 12AX7 — C1 .005 µfd 500V — V1B ½ 12AX7 — C3 .005 µfd 500V — V2A ½ 12BH7 — V3A 12AT7

XTAL MIKE — R1 1 Meg .5W — R2 2.2K 1W — R3 100K 2W — C2 8 µfd 450V — R4 220K .5W — R5 2.2K 1W — R6 220K 2W — R11 10K 1W

TO VOICE CONTROL STAGES

R12 1 Meg — R13 47K .5W — C4 250 µµfd — R14 1K 1W — T1

R15 400Ω 1% .5W — R16 1400Ω 1% .5W

R7 133.3K 1% — C5 2430 µµfd — R8 100K 1% — C6 4860 µµfd — R9 100K 1% — C7 1215 µµfd — C8 607.5 µµfd — R10 133.3K 1%

90° AF

R17 560Ω 1W — AF BALANCE R18 1K — R19 1K 1W

V3B

T2 — T3 — S1 POSITIONS: 3 SB-1, 2 SB-2, 1 AM-PM

C10 .001 µfd — C9 .001 µfd — L2 — L1 — C13 150 µµfd — C11 150 µµfd

V2B ½ 12BH7 — R20 560Ω 1W — C12 .001 µfd — XTAL 9.0 Mc — R22 100K .5W — C14 .005 µfd — R21 1K 1W

+300V — +300V

90° RF

V4 6BA7 — V5 6AG7

R23 1K AM CARRIER BALANCE — C15 .005 µfd — Y1 1N34 — Y3 1N34 — Y2 1N34 — Y4 1N34 — PM CARRIER BALANCE R24 1K — C16 .005 µfd

9.0 Mc L3 — C17 .001 µfd ±1% — RFC-1 — C18 .001 µfd ±1% — C19 150 µµfd 5% — L4 — L5 — C20 150 µµfd 5% — C21 .006 µfd

R26 47K .5W — R25 1K .5W — S2 — R27 180Ω .5W — C35 .001 µfd — TO VFO 3-8 VOLTS

C22 .006 µfd — C23 36 µµf 5% — L7 — R28 4.7K 2W — R29 15K 5W — R30 15K 5W

C24 3 µµfd — C25 25 µµfd — C26 .006 µfd — L6 — R32 SEE TEXT — C27 380 µµfd — C28 .006 µfd — L8 — C29 .001 µfd — R31 560Ω 1W

R33 56Ω 1W — RFC2 — R34 22K .5W — C30 .1 µfd — R35 1K .5W — C31 .006 µfd — R36 560Ω .5W — C32 .006 µfd

C33 .006 µfd — R38 SEE TEXT — L9 — C36 380 µµfd — OUTPUT — RFC-3 — C34 .006 µfd — R37 100Ω 1W

+300V — S3 VOICE CONTROL RELAY CONTACTS — +300V — C37 .25 µfd — R39 10K .5W — R40 100K 1W — −100V

The Mobile Amateur Radio Corps of Hennepin County

By Wayne Trask, WØUGG

The origin of the *Mobile Amateur Radio Corps* dates back to the fall of 1950. Previous to that time sporadic attempts to organize the mobile operators in the Minneapolis, Minn. area had been made, but with no appreciable success. The mobile boys were in favor of some sort of organization, but a cohesive plan to unify them all in one group was lacking. It remained for Joe Sentryz, WØYLZ, engineer in charge of the Hennepin County Sheriff's radio, and one of the pioneers in mobile operation in this area, to advance the plan that was finally successful. A small group of the then active mobile operators were called to a meeting and informed by WØYLZ that the Hennepin County sheriff would make available operating room, provide space for a transmitter and furnish a 300-foot mast on which an antenna could be placed. This would provide the base station for what was hoped would be a well-organized mobile group to be affiliated with the sheriff's office.

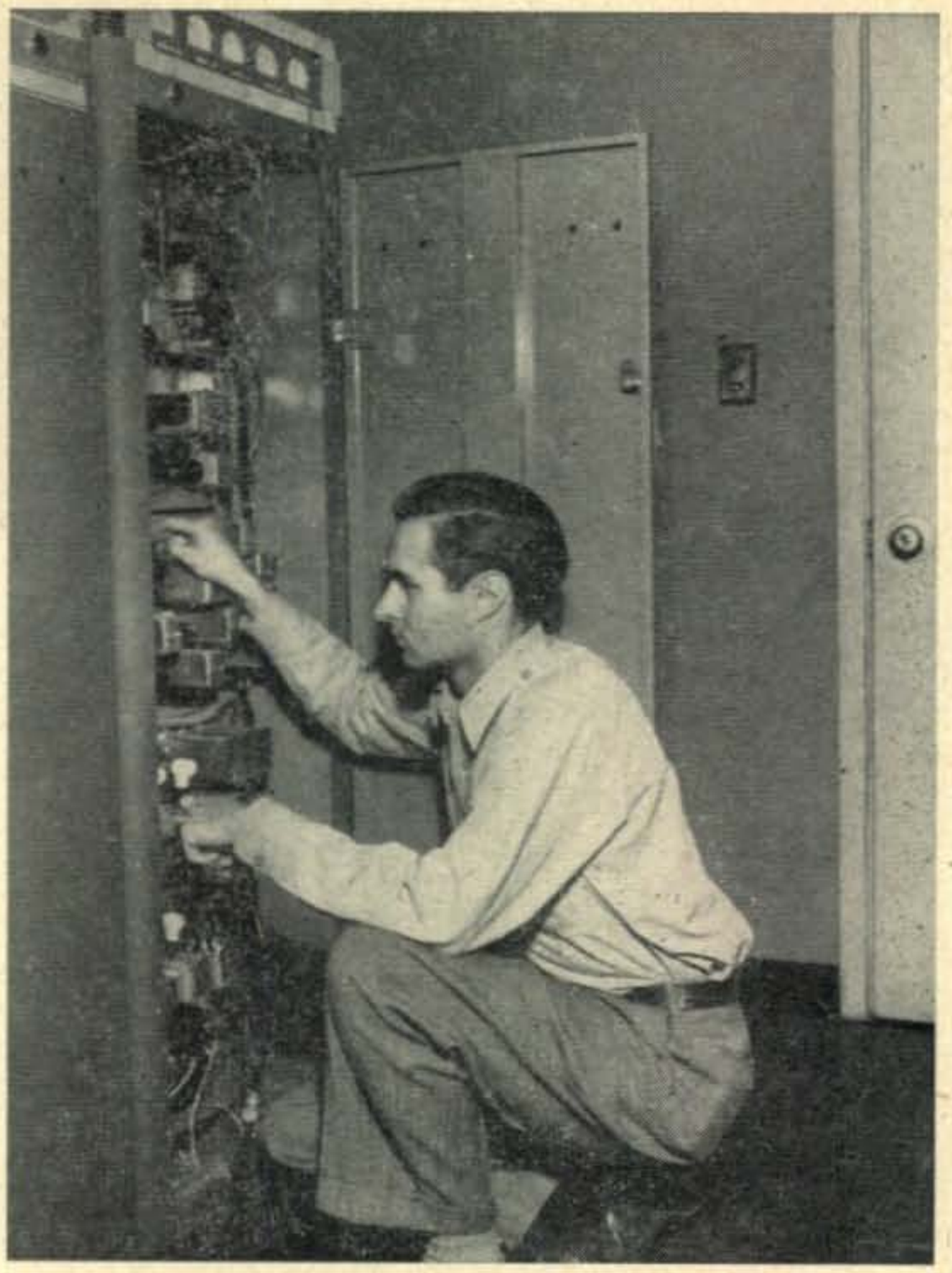
At this first meeting it was decided to send cards to all amateurs who were then known to be mobile as well as those who might be interested in becoming mobile, asking them to be present at a meeting to discuss the matter and to give their opinions. The response was gratifying and this meeting was attended by about 50 amateurs from Minneapolis and suburban Hennepin County. The group was unanimously in favor of the plan as set forth by WØYLZ. A date was set for an organization meeting (December 7, 1950) and officers and a board of directors were elected. The name, Mobile Amateur Radio Corps of Hennepin County was chosen and *MARC* was launched on a career of public service.

The Base Station

WØPZT, the base station, is located at the Hennepin County sheriff's radio, six miles west of Minneapolis in the suburban community of Golden Valley. The transmitter, a *Motorola*, was donated by Bob Davis, WØYDD. It consists of a 6V6 crystal oscillator and a 6V6 quadrupler driving a pair of 807's in push-pull running 100 watts. Crystal switching is provided from the operating position so that the transmitter can be instantly changed from the regular *MARC* operating frequency of 29,590 kc. to the National Emergency Frequency of 29,640 kc. The antenna is a vertical ground plane. All installation, including the placing of the antenna, was done by *MARC* members. Ground wave contacts of 100 miles are not uncommon and the reliable working radius from the mobiles to base station is about 60 miles.

The receiving equipment in use at WØPZT is at present an *HRO-50* receiver for general work and a *Motorola* fixed-frequency job for the National Emergency Frequency. The latter is equipped with an auto-call and the squelch is broken by a combination of 6 whistles and is in operation 24 hours a day. Anyone calling and breaking the squelch on the emergency frequency receives immediate attention. Many accidents have been reported by *MARC* mem-

This is the operating position at WØPZT with WØPCC on duty. WØPZT is the base station of the MARC and is located in the Sheriff's office, six miles west of Minneapolis.



(Above). TV star Mary Hartline of the Sunday show "Super Circus" learns about Ham radio from WØYBM. (Above right) WØDWA makes some adjustments at WØPZT. (Circle) MARC operators are visited by the 1952 Aquatennial Queen Joanne Melberg and her attendant. Looking on are WØSAW, WØVER, WØSER and WØUGG.

(Above) Johnny, of Philip Morris fame visits the logistics operators WØJJJ, WØGAH, WØCIS and WØVER at the 1952 boat races. (Right) Command Post at "Operation Crystal". Standing (l. to r.) WØRAG, Colonel Phillips, WØZME, WØZDU, WØVER, Governor C. Elmer Anderson of Minnesota, and WØHBG. Seated at the operating position are WØJJJ and WØUGG.

bers while traveling around the area and in at least 4 cases loss of life has been averted by prompt action in calling ambulances and doctors to the scene. *MARC* members operate the station every evening from 7:30 to 10:00 p.m. for general traffic. Emergency calls which come in at other times are handled by sheriff's personnel who have amateur licenses and are honorary members of *MARC*.

Organization

MARC operates under a constitution and set of by-laws which clearly define and interpret all phases of activity. The officers, elected for one year are President, Vice President, Secretary, and Treasurer. They cannot serve consecutive terms. There is also a Board of Directors consisting of the officers and three full members. Board members also are elected yearly. The Board meets once a month two weeks in advance of the regular monthly general meeting. There are four classes of membership in *MARC*.

1. **Full membership.** Amateurs owning and operating a permanent mobile installation in their cars capable of operating on frequencies useful to the Corps. These members must be passed on by the Board of Directors and must be cleared by the F.B.I. Identification cards, signed by the Hennepin County sheriff are given to these members which must be relinquished if their membership status changes. Under the constitution, full members are the only ones holding voting privileges.
2. **Associate membership.** This class of membership is limited by the constitution to 20 per cent of the number of full members and is non-voting. It consists of amateurs who have a genuine interest in becoming mobile, but who have not yet completed an installation in their car. This class is limited to a six-month period after which time they must become full members or change to an inactive membership.
3. **Inactive membership.** Any member who has been absent from 3 consecutive meetings without notifying the secretary shall be notified that his membership is in jeopardy. Unexcused absence from a fourth meeting shall automatically place him on inactive status. Failure to take regular assigned operational watch at WØPZT without excuse or obtaining a substitute shall be considered the same as failure to attend a meeting. Reinstatement to full membership requires an action by the Board of Directors. Inactive members are, of course, non-voting. Provisions are made, however, for temporary inactivity due to failure of equipment, installation of new equipment, vacation etc. The secretary is notified of the temporary inactivity and notified again when the member is ready for active duty.
4. **Honorary membership.** The Board of Directors may at their discretion designate certain persons who are not necessarily amateurs, but who have performed some service for the Corps as honorary members.

Activities

The activities of *MARC* fall roughly into two categories. These may be defined as planned events in which some recognized group or organization request communications for a specific function, and emergencies, where there is no time for advance preparation. In either case, all requests for the services of *MARC* must be cleared through WØYLZ who acts as liaison man between *MARC* and the Hennepin County Sheriff.

In handling a request for a planned event the group or organization desiring the facilities of *MARC* is given a form to fill out. This states the nature of the event, the date, approximate time it will take, number and type of units needed (mobile or fixed) etc. From this information the board sets up the necessary committees to handle the event. All members who are to participate are thoroughly briefed and the result is a smooth functioning, successful operation.

In an actual emergency the "fan-out" or "pyramid" type of telephone call-up is used to alert the members. A call, originating at the sheriff's radio is made to three key men. These men each call two more. The six men thus alerted make their two calls and so on until all members it is possible to reach have been called. The usual procedure when calls are made is to tell the party called to "make your calls and check in to WØPZT." WØPZT will then check the mobiles into the net as they report and furnish all necessary information. Any break in the call-up chain is averted by requiring each man in case he is unable to reach one or both of the men he is supposed to call, to make their calls for them. Charts are furnished each member giving complete information, residence and business phones with arrows indicating who calls him and the calls he is supposed to make. In the event of unforeseen emergency

(Continued on page 57)

WØVER (in the trunk compartment) shows WØHBG's rig to WØRAG, WØHBG, Colonel Miller, Minnesota Civil Defense, and Governor Anderson.

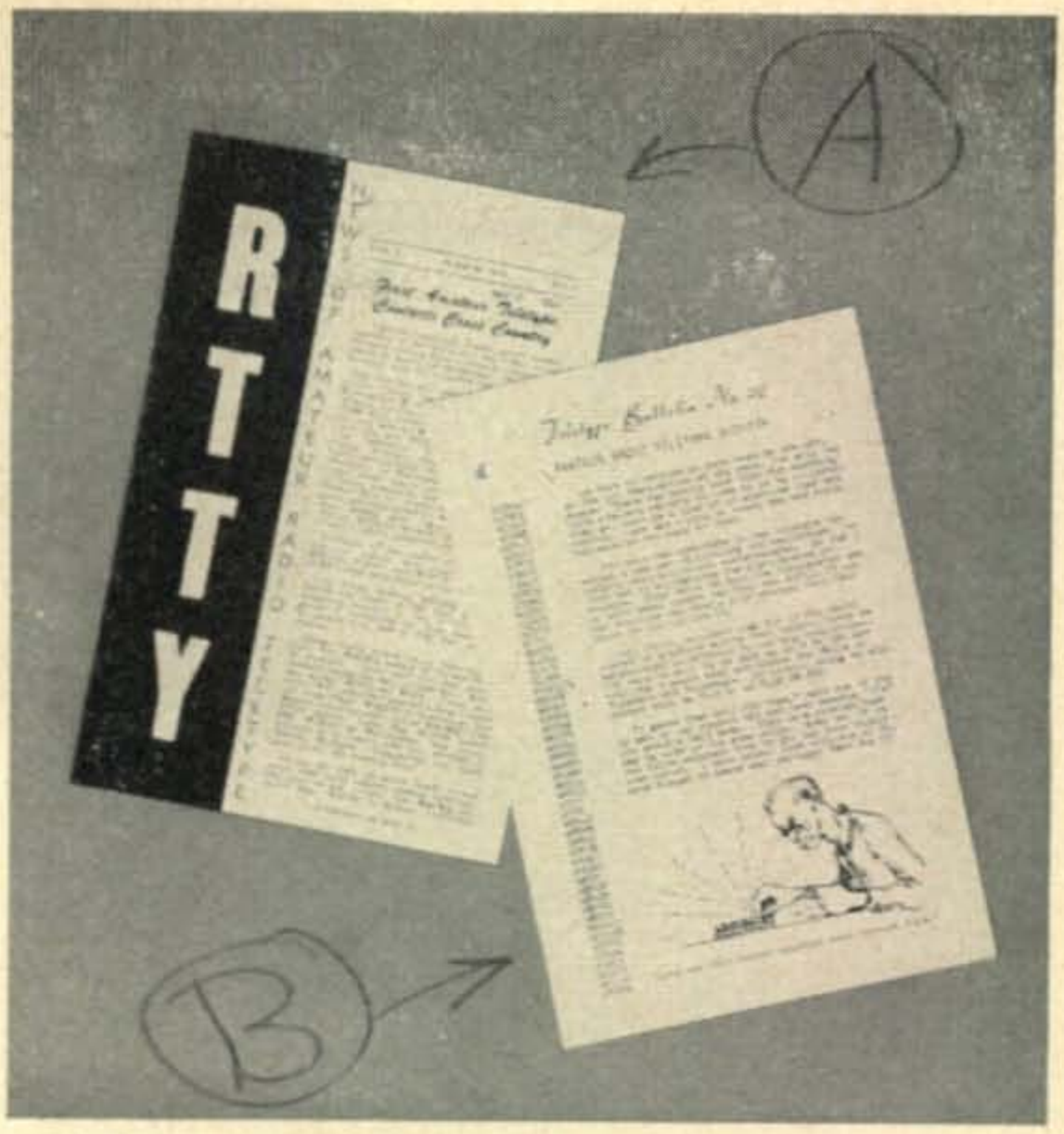
Amateur Teletype

As Reported By

WAYNE GREEN, W2NSD

1379 East 15th St.,

Brooklyn 30, New York



(A) "RTTY", the bulletin of the Southern California Teletype Society, and (B) "Teletype Bulletin", publication of the Amateur Radio Teletype Society.

Things are moving so fast in amateur teletype today that it is difficult to keep anywhere near up to date in a monthly magazine. New and better circuits are being developed, equipment is becoming harder to get, the likelihood of a commercial teleprinter for amateur consumption fairly certain, more and more stations are coming on the air, problems have arisen on the subject of calling and working frequencies, more equipment has been turning up from unusual sources, and groups are springing up around the country to help each other get on the air.

Frantic!!

Equipment is sorely needed. Our suppliers of equipment are still only able to obtain printers at the same old rate that used to take care of the demand, but now there are ten times as many fellows that want printers . . . you can take it from there. If you have any teletype equipment, or know anybody that has some to sell, how about sending me a list, how much you want for it (the going price of any piece of standard equipment will be sent to you if you wish), and any other details.

There are still quite a few receiving-only printers available for those that want to start out with a receiving setup. The major procurement problem has to do with keyboards. This problem is being somewhat mitigated by the recent development of the converted typewriter keyboard by W2BFD (scheduled to appear soon in *CQ*). One other component must be fabricated before transmission is possible: the sending distributor. For some reason the development of this device has lagged. It is not difficult, really, and any day now there will probably be several home-made ones in use.

One other piece of readily available equipment is the model 21A printer (a lot of them are available in California from W6CLW and in New York from W2BFD). This printer requires a receiving distributor for radio use which is almost exactly the same as the transmitting distributor.

"RTTY"

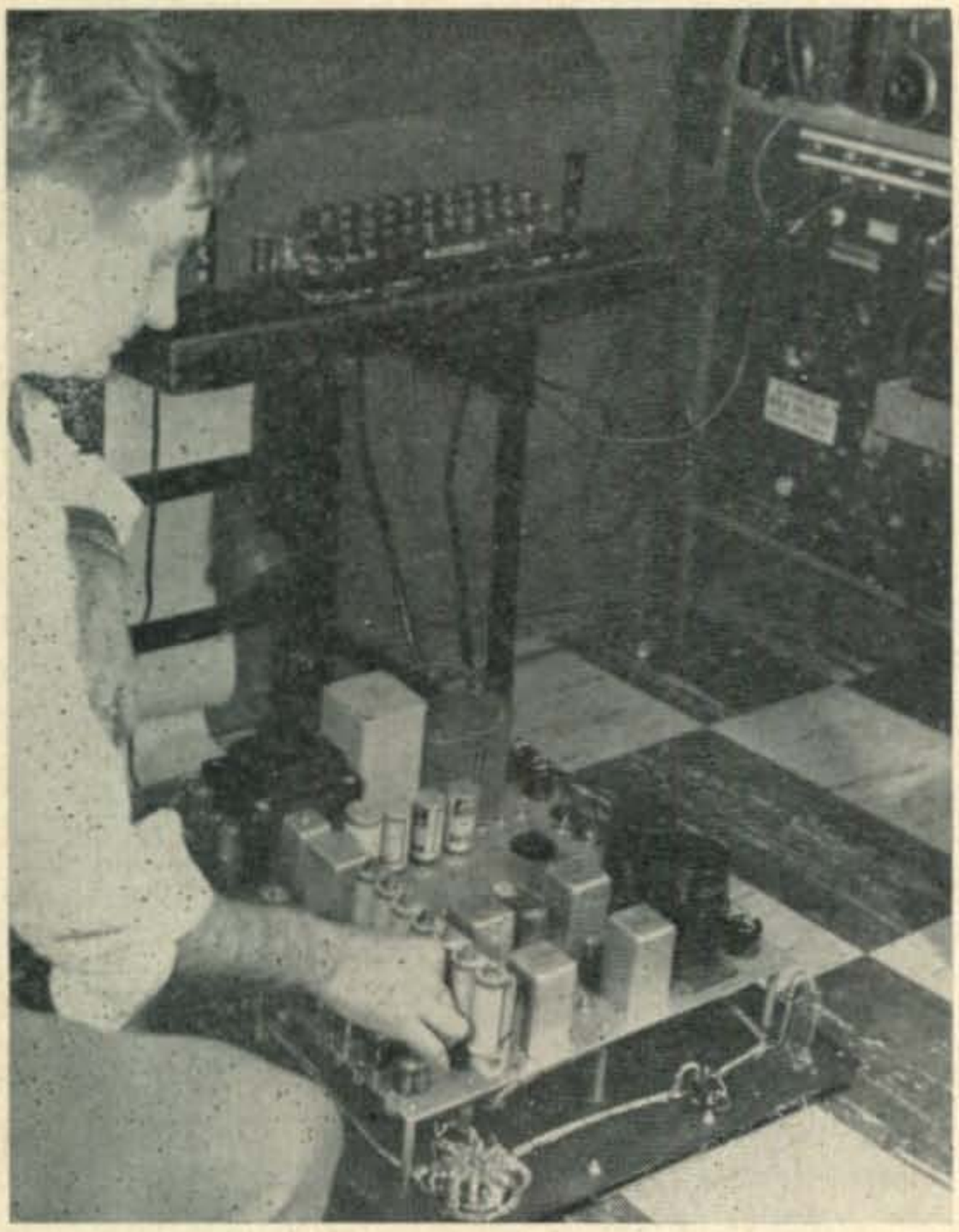
A number of amateurs in the vicinity of Los Angeles have recently formed an active group called the *Southern California Radio Teletype Society*. They are producing a club bulletin called "RTTY." The first issue of *RTTY* came out in January 1953, and it is now appearing on a monthly basis. The bulletin is printed (two of the members are in the printing business), and certainly represents a constructive effort on the part of the group.

The first issue of *RTTY* featured a list of the various model numbers of teletype equipment and gave brief descriptions of them. The second issue featured info on an auto-start circuit, a frequency-shift oscillator circuit (*CQ*, October, 1952, p. 37), and a discussion of the new regulations. The third issue had a fine description of the model 12 printer and the fourth issue had an article by Bob Weitbrecht describing his converter (similar to the W2BFD converter, November 1946, *CQ*, p. 20). These features are by no means all that there is in the bulletins for they are quite newsy.

If you are interested in getting more information about "RTTY" or have any questions on the subject write to Merrill Swan, W6AEE, 3769 East Green Street, Pasadena 10, California. Those of you that

HOW DO I GET ON TELETYPE?

1. You must already have a working Ham station.
2. Order a printer with keyboard from the VHF Teletype Society (See Oct. '52 CQ p. 38)
3. Build a receiving converter. (CQ: Nov. '46, Sept. '52, Dec. '52; QST: Jan. '53)
4. Install an FSK modulator in your transmitters oscillator. (CQ: April '53, p. 18)
5. Connect the printer to the converter and to the oscillator.
6. You are on the air.



Andy, W2AKE, opens the teletype converter, built according to W2BFD design and containing auto-start, auto-stop, a program clock to select when the receiver will turn on to check the teletype channel, a re-transmit circuit, local or remote control, etc.

are anxious to get some equipment might also get in touch with Merrill since I understand that W6CLW and the gang have quite a huge supply of printers and stuff. Newer type machines seem to be the rule out there, while here in the East they are definitely the exception.

The New York group, the *V.H.F. Teletype Society*, has recently initiated formal meetings rather than just getting together on the air, and has set up an ambitious program. The main reason for the formulation of regular meetings is to help members get on the air in any way possible. The group will set up demonstration teams to publicize Ham teletype and amateur radio. The New York group has put on a great number of demonstrations in the past, but each one has been a "maximum effort" of only a few of the gang and hasn't been carefully planned aforehand.

Groups are forming in several cities for the same purposes. Active or forming at present are groups in Montreal, Toronto, Chicago, Boston, Minneapolis and Milwaukee. I had better mention Detroit for they are one of the more active groups and now have at least eight stations on the air regularly.

"Teletype Bulletin"

The national group, the *Amateur Radio Teletype Society*, has been putting out a monthly *Bulletin* for all interested teletype amateurs for over two years. The *Bulletin*, a printed affair usually running to eight pages, consists of reports of activities from the brethren, editorial comment, technical data, circuits of interest, reprints of commercial teletype circuits, etc. The *Bulletin* started a couple of years ago with a circulation of only sixty. This rapidly expanded to well over five hundred within a few months. The editor, an ex-radio-scriptwriter, bonvivant, and dianetic auditor found this a delightful way to spend his lunch money and soon fell away to a scant two hundred pounds.

As the circulation increased he found it best to conserve on food and celebrate the mailing of a new *Bulletin* with a sumptuous dinner of veal patties. For a brief while he fell into the clutches of an evil group of food fadists who promoted the eating of fruits and nuts. After gaining ten pounds he suddenly discovered that he was supposed to stop eating his regular meals and just eat the fruits and nuts. That was the end of that diet.

About this time his boss caught on to the fact that he was spending all of his time on teletype and decided to make it official. In need of work he finally managed to land a non-salaried position with the Music Research Foundation. In between writing *Bulletins* and mailing them he helped the Foundation by installing a wire-recording system in a dentist's chair to speed the hypnotizing of the patient by the dentist and collaborated with a famous psychiatrist and dream analyst in the writing of a book on music and the emotions. From then on things got worse, if possible.

All except the *Bulletin*. It got better. The editor found a local printer that was unaware of his reputation and got him to print it up. By changing printers every three months he has been able to put out the *Bulletin* every month without a hitch. There seems to be a never ending supply of small printers so it looks like the *Bulletin* will continue for some time yet.

For more information, and possibly a sample *Bulletin*, write to the Amateur Radio Teletype Society, 1379 East 15th Street, Brooklyn 30, New York. All holders of sample *Bulletins* are warned that they are automatically liable to have a visit from the editor shortly before dinner time some evening on short notice.

Digging Up The Past

Every time that you start getting a bit swelled up and think that this time you have done something new, along comes some one who did it years ago. Amateur teletype is no exception. The other day I was clanking away on the 80-meter RTTY channel

(Continued on page 48)

The shack at W2AKE. The teletype converter is under the printer.

Gathered by DICK SPENCELEY, KV4AA

Box 403, St. Thomas, Virgin Islands

The appearance of each new electronic key circuit is always followed by a few remarks from those well meaning characters who deplore the use of these keys as a threat to the operators' "individuality." They claim to foresee the day when increased use of such keys will reduce the bands to "rubber stamp" QSO's with everyone sending perfect stuff with a resulting monotony that will take a lot of zest out of contacts. We, my *El-bug* and me, violently disagree with this school of thought. We feel that a properly adjusted and operated *El-bug* of the dash-completing type will do more to enhance an operator's keying personality than anything we know of. Individuality is hardly limited to the proper ratio of dots and dashes. Spacing, wording, speed and QRI are all there to give any particular operator his "individualism" and most *El-bug* users are as easily recognized through these variations as the "saltiest" bug or straight key operators. With the former, however, there is usually no doubt as to what they are sending while, from the personality expressed by the latter, you might be talking to Dracula or his cousin. Nope, we are sold on the *El-bug* and heartily endorse its use to all present non-users as an easy method of putting their "keying personalities" ten years ahead of their present efforts in as little time as two months practice. Give a listen to the "fists" of TI2PZ, TI2TG, OZ7BO, OZ7BG, W6DFY, W3FQB, W3FMC, W3PGB, YU1AD and ZK1BC, to mention a very few, and I think you will get what we mean. We've been using one of these "gadgets" for about four years now and it has been a pride and joy at high speed, low speed, contests, contacts and traffic with its ease of sending. Heck! Without it, we might even go on phone!!

Gus Roblot, FP8AP, is St. Pierres only Ham representative (during the winter months) and is always on hand to extend a hearty welcome to the visiting firemen during the summer months. Gus, here with the XYL and Jr. op, George, has been a champion weight-lifter which comes in very handy these days shifting the QSL's around!!

Well known for his potent 160-meter signals is Larry Connell, W1LYV, of "Confusion Manor", Waquoit RFD, Mass. Larry uses an ARC-5 to push-pull 803's at 180 watts input. Antenna is a 1000-foot doublet, center-fed with quarter-wave feeders (Under construction is a 2165 footer, 4 full waves on 160). Receiving equipment: a DB20 preselector, NC-120 receiver and BC453 as a Q-5'er. W1LYV worked most of the top band DX just using the ARC-5 rig with 60 watts input!!

At Time of Writing

We are happy to learn, via F9RS, that FI8 (French Indo-China) stations have now been officially licensed

You don't often catch so many YV's together but here are some well known calls who pitched in to help YV5EP adjust his beam and Collins KW-1. Standing left to right: YV5BZ, YV5BQ, YV5BX, YV5EA, YV5FK. Sitting left to right: YV5FQ, YV5EP, YV5FR, YV5AC and YV5AI.

and tickets have been issued to FI8AA thru FI8AJ. These licenses are retroactive to September 1st, 1952. This situation is provisional, however, and the Viet Nam Government is expected, very shortly, to re-issue calls with the new prefix of 3W---. Presently active are FI8AA A3; FI8AB (ex-DL5AA, FI8RO) A1/3; FI8AC (ex-F8MT) A3; FI8AD (ex-F9RO) A1; FI8AF (ex-F8YB, FI8YB) A1/3 and FI8AJ A1/3. FI8AD is usually on 14080 kc. while FI8AC may be heard on 14140 each day around 1630 GMT.

After receiving official word that the SS "Angamos" with CEØAA would depart for Easter Island on April 10th and after spreading this good news to the four corners of the compass Louis, CE3AG, received further word that the sailing of the "Angamos" had been delayed until the latter part of May. This unfortunate postponement disrupts CE3AG's schedule as Luis has bought round-trip tickets for a European trip for this date. Should CE3AG decide to delay his European trip and "if" the Easter Island sailing is not further delayed, CEØAA should be heard on the air around May 28th. Activity on 28, 14, 7 and (possibly) 3.5-Mc is planned. Arnold, CE3CZ, who had planned to hold down the phone end at CEØAA, was unable to obtain passage and the planned voyage of Fernando Cadiz, as CEØAB, has been cancelled due to a change in the island's administration.

The rare spot of Aden has been given a "shot in the arm" with the activities of VS9AP, VS9AD and VS9AS. VS9AP is very active on 3.5, 7, 14 and 21-Mc CW. Van is ex-VQ4CM, G2AVP. Most of our reports put all of these stations in Aden so VS9AS has apparently not replaced VS9AW in the Sultanate of Oman as previously reported. One dissenter, however, is FA8IH who reports VS9AS in the Shiekdom of Khormaksar.

F9JD/FC (Corsica) is active on CW and Phone . . . **ST2AR** was heard on 14003 2300 GMT . . . **SVØWG**, same op as SV5UN, on Rhodes, holds forth on 14021 around 1900 GMT. Roy will also be on 7015 by now with new antenna. Brother **W3EWR** is presently having **SVØWG** QSL's printed . . . **ZD8A** was rolling in on 7020 T8, no dope, probably NG . . . **ZL1TA**, ex-VR5PL, Noel, heads for VR1 or VR2 in the very near future . . . **VQ8AF** was heard working a couple of G's 1400 GMT 14080 . . . **W4CEN** nabbed VU4AB on 14 and 7 Mc . . . Surinam is showing signs of life with **PZ1AL** and **PZ1WX** . . . **TI8EP** has been active, this is just another TI station. The one you want is TI9!! . . . On Formosa, **C3AR, C3AW** and **C3BF** have been heard . . . **HH3DM** is active in Haiti. He is ex-WØEMN . . . MF2AA says **CR10AA** is active again (Timor) . . . **VP2SH**, Windwards, has been active 7011 1200 GMT. See QTH's . . . TI2TG reports W1MCW working one **ZA1F!!** . . . **OK1MB** nabbed MP4KAI/P giving QTH as Bubiyan Island.

W6NMC (NE1NMC) visited VQ4ERR and was unable to get on at VQ1 land. He hopes to do some A3'ing at ZD3 on his way to CN8 . . . **ZC5VS** has been active on 14 Mc. around 14080 . . . OK1MB reports that **MP4BAU**, Qatar,

(Continued on page 61)

The W1BB KYTOON Antenna has helped to put Stew Perrys' 160-meter signal over with a little more ZIP! (Weather permitting). Stew is seen here in the act of launching the KYTOON which ascends to a height of 260 feet. The antenna tuning unit is contained in the watertight box and is fed from operating position by co-ax.

W. A. Z. HONOR ROLL

CW & PHONE
WAZ

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W6VFR	249
W6ENV	246
W3BES	245
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WØYXO	243
W2BXA	243
W6SN	241
W3GHD	241
W3JTC	240
W8BHW	239
W6AM	239
PY2CK	239
W3GAU	239
W8JIN	238
W3EVW	238
W6GRL	237
G6RH	237
W3KT	237
W8NBK	237
W6SYG	237
W2AGW	237
W6ADP	236
W6MEK	236
W3CPV	235
W7AMX	235
W6MX	235
LU6DJX	234
VE4RO	233
W6AMA	233
G4CP	232
CE3AG	232
W7GUI	229
W8BRA	228
ZI2GX	228
W6GDJ	228
W6EBG	227
W6PFD	226
W7DL	225
W6TS	225
VK3BZ	223
VK2ACX	223
W3LOE	222
W6FSJ	222
W6DZZ	222
W6MVQ	221
W6PB	221
W7BD	220
W6ITA	219
DL1FF	219
W6TT	218
WØNUC	218
W6PQT	218
G2PL	218
KH6IJ	218
WØPNQ	217
W9DUY	217
W9NDA	216
W6DLY	216
W6VE	216
W2PEO	215
W3JNN	215
W6SAI	215
W3IYE	214
PY1DM	214
ZS2X	214
KH6BA	214
W6TI	214
W6OEG	213
W4AIT	213
KH6CT	213
VK4HR	213
G6QB	213
W6RBQ	213
W6HX	212
VE7HC	212
W6NNV	211
WØDU	211
W8HGW	211
W6BPD	210
W6MJB	210
W6IBD	210
W6CYI	210
W9VW	209
W6RW	209
W6EFM	209
W6UHA	209
W2AQW	208
ZL1HY	208
W6EPZ	208
W6SC	207
VE7VM	206
W4BPD	206
WØELA	206
W6KRI	205
G8IG	205
W6ZCY	204
W6DI	204
W6PKO	204
VK2DI	204
VE7VO	162
W6AVM	204
DL7AA	204
W4CYU	203
ZL1BY	203
W6HJT	203
W6RM	202
W6OMC	202
W6AOA	202
W5GEL	201
W9KOK	200
VE5JS	200
W7CY	200
PY1GJ	199
N6RLN	198
W6SRF	198
W2IOP	197
KH6QH	197
W6BAX	197
G3DO	197
PY1AJ	196
W6WB	196
G2FSR	196
OE1CD	196
I1KN	196
W6UCX	195
W5KC	195
OK1FF	194
W6GAL	193
W6EHV	193
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WØSQO	192
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W6SRU	190
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VK3JE	189
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W8SDR	186
VK6RU	186
W6DFY	186
W4CYY	186
W2CZO	185
W1AB	185
W6IFW	185
W6SA	184
KH6VP	184
W6MHB	184
W2JVU	183
DL1IB	183
LA7Y	182
W6LN	181
WØNTR	181
W6SR	180
W7ENW	180
PY1BG	179
W9VND	178
W6NGA	178
WØUOX	177
VE6KW	177
W6UZX	177
CX1FY	176
KH6CD	176
VK4EL	176
W6LDD	176
W8HUD	175
PK4DA	175
W8HUD	175
W6WKU	174
W6CIS	174
W7FZA	174
W6PCS	174
W6KUT	174
W6TZD	173
G5YV	172
OK1IM	172
W6WWQ	172
PY1ARL	171
OK1HI	171
VK2HZ	171
W6BAM	170
DL1AB	170
W6PZ	169
W5AFX	169
G2VD	169
W6JZP	168
W6ANN	167
VK3CN	167
W6BVM	167
I1XK	167
W6DUC	166
KH6MI	166
W6CEM	166
W6JK	165
VE7GI	165
W6LRU	165
W6BZE	165
W6PM	164
ZS6A	164
W6ATO	164
W6EAK	163
W6YZU	163
G5GK	163
ZS6DW	162
I1IR	162
W6PDB	161
OK1SV	160
VE3EK	160
W6PUY	160
JA2KG	160
KH6MG	160
WØFFV	158
W6CYI	157
WØOUH	157
G3TK	157
W6BUY	157
W6QD	157
ZS6FN	157
W7BE	156
KH6IG	156
VK5KO	155
G3AAM	154
G2IO	154
W6RLQ	154
W6KEV	153
OK1RW	153
W6FHW	153
G3YF	152
KP6AA	152
VK2QL	151
VK2AM	151
W6LEE	150
W6FHE	150
W6EYR	150
W6LER	150
OK1CX	147
W6LS	147
W7KWC	147
KH6PY	147
W7DXZ	146
W6AYZ	146
VE6GD	146
VS6AE	146
W9NRB	145
W6MUC	145
OK2SO	145
ON4TA	144
G3BI	144
W7LYL	143
KG6GD	143
W3IXN	141
W6AOD	140
VK2PV	140
W6ONZ	139
W6ID	138
ZC1CL	138
OK1WX	135
W7BTH	135
G3AZ	133
W6TEU	133
W6RDP	133
W6AUT	133
W6OBD	131
ZS2CR	131
W6IDZ	130
W6BIL	130
W7ASG	129
W7GBW	127
G8IP	127
G5BJ	126
VK6SA	126
PK6HA	124
G5VU	124
W6NRQ	123
W6MLY	123
ZL1GX	122
VK5MF	121
W6BUO	121
ZL2CU	120
ZS2EC	116
ZS6CT	113
KG6AL	103
W7KWA	98
W6DUB	89
W7IYA	59

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W8KIA	235
W9RBI	230
W2NSZ	230
F8BS	229
W3DPA	226
W2WZ	226
W3OCU	224
W1ENE	225
W3EPV	223
W1JYH	217
4X4RE	215
WJHX	214
W9LNM	213
W1GKK	211
W1BIH	209
W5LVD	209
W8SYC	209
W3DKT	209
W2HHF	208
W4GG	207
W8HFE	207
VE3QD	206
W5MPG	206
F9BO	204
W2BJ	202
W9IU	201
W9FKC	201
W2HZY	200
W3JKO	200
VK4FJ	199
W1ZL	199
W9MXX	197
W7PGS	197
SM5WI	196
KP4KD	196
W2EMW	195
W5FFW	194
W9HUZ	194
W3KDP	193
W2CWE	192
W4LVV	192
W2AGO	191
W1AWX	191
OK1VW	190
GM3CSM	190
W4RBQ	188
WØEYR	186
VE3IJ	186
W8RDZ	184
W9TQL	184
W3DRD	183
W4INL	183
W2MEL	183
VE3AAZ	182
W1DQM	181
W2CNT	181
W2RDK	180
W4AZK	180
VO6EP	179
VK4DO	179
W8CVU	172
W4DKA	172
W2RGV	171
W4VE	171
ZS2AT	171
W9LM	170
KL7PI	170
W6CTL	169
WINMP	169
W3JTK	169
OZ7EU	169
HC2OT	169
PY2AC	168
W2CYS	167
OE3CC	167
W8LEC	166
W9ABA	166
W6WO	166
SM7MS	164
W4BRB	162
W8VLK	160
W4OM	158
SM7QY	158
WØAIW	157
I1AY	157
W8WWU	157
WØRBA	157
DL1AT	156
W9YNB	155
DL1FK	155
I1AIV	154
W6LGD	154
W9NZZ	151
G3AKU	150
VE7VC	150
G6QX	150
W1ZD	150
W2GUR	146
OK1AB	144
W6KYV	143
TF3EA	142
VS7NX	140
W6MUF	136
W6KYT	135
W7HXG	134
VE7KC	133
W7ETK	132
W6TE	131
W6WJX	131
CR9AH	131
W5CPI	130
W6NZ	129
KL7UM	129
DL1DA	127
W6EYC	126
VR5PL	124
DL3DU	118
W6NRZ	117
W6JWI	114
KL7GG	114
W6FBC	114
W6VAT	110
DL3AB	107
W7GXA	105
W6LEV	103
W6FXL	93
W7LEE	91

38 ZONES

W2HMJ	202
CM2SW	183
WØTKX	181
W2PUD	181
W5KUJ	181
W8KPL	173
W8FJN	173
W2GVZ	173
W8EYE	172
W3FYS	172
W2SHZ	172
GM2UU	165
VE2BV	163
W1BFT	163
I1UV	160
ZL3CC	159
W3LVJ	158
W2UEI	156
LU7CD	155
W5MET	150
TF3SF	145
W8ZMC	143
WØAZT	143
ZL3AB	143
W6ETJ	139
W9FKH	135
VE3ACS	134
MP4BAD	133
W4FPK	131
W2PQJ	130
W4LQN	130
W3ZN	129
EA1AB	129
W9M7P	126
FE8AB	126
W9TB	122
GW4CX	120
WØFET	118
KL7PJ	117
W6CAE	113
W7EYS	107
VK6DX	103
C1CH	84

37 ZONES

W1HA	187
W1KFV	173
OZ7BG	171
W2ZA	160
IS1AHK	160
W2WC	158
W3WU	157
F9AH	157
W4IWO	149
W9WCE	142
OE1FF	142
W4ML	140
W1APA	136
W4EPA	134
W2AYJ	133
W7HKT	130
W4DIA	129
VE5JV	126
W9LNH	122
OH3OE	118
W6YX	117
VE1EA	116
G3BPP	112
W6AX	110
WØFWW	108
W7PK	104
W8HSW	104
W2PLS	99
W6WWW	99
KL7KV	88

36 ZONES

W5JUF	200
W4HA	172
W2OST	163
W3MZE	150
W9LI	147
W2ZVS	145
I1IT	140
WØCU	139
F9RS	139
W3AYS	137
ZL1QW	134
OA4AK	128
VE1PQ	128
I1IZ	128
F8TM	124
W2BF	115
4X4BX	112
W5CD	108
W2JA	102
KG4AF	180
W1DEP	159

35 ZONES

W5FXN	153
W1RAN	141
W4DHZ	132
W9CKP	132
N1MRP	130
N6ZZ	128
W5AWT	123
OE5YL	122
W9RQM	119
CO6AJ	119
ZL3CP	117
WØGBJ	116
W9GDA	115
W9FNR	114
W8AVB	113
W2HAZ	112
KZ5IP	108
KL7CZ	80

PHONE ONLY

39 ZONES

VQ4ERR	220
PY2CK	219
XE1AC	217
W3LTU	206
W6DI	203
W6VFR	178
G8IG	176
PK4DA	175
W7HTS	161
W8HUD	161
F9BO	158
VE7ZM	145
DL1FK	125

38 ZONES

W9RBI	202
W2BXA	198
W9NDA	173
W6AM	167
W6KQY	161
W4CYU	160
ZL1HY	157
W1HKK	153

37 ZONES

W1JCX	189
W3BES	188
CE3AB	181
W8REU	176
VK3BZ	173
W3GHD	170
G3DO	170
W9HB	161
W7MBX	158
GM2UU	158
W6WNH	157
W6PXH	153
W3JNN	152
W8BF	146
W6TT	143
F8VC	124
W7MBW	107
C1CR	83

36 ZONES

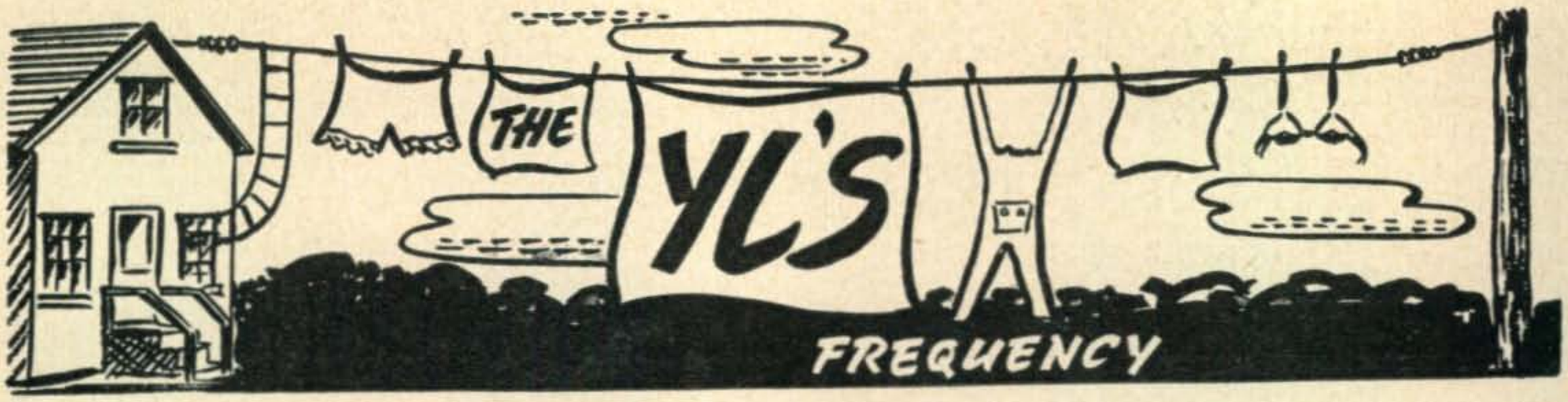
W1NWO	202
W1MCW	200
ZS6Q	173
W1BEQ	164
GM2DBX	160
W4ESP	159
W2DYR	140
W9BZB	139
W9HP	139
W8AUP	131
W8PDB	130
VE3BNQ	130
W4INL	129
W1FJN	128
G6BW	127
VE7HC	123
WØHX	120
W8CYL	112
W3DHM	96
W6SA	92
F8DC	87

35 ZONES

HC2JR	171
W5ASG	170
W5JUF	165
W4HA	164
W3EVW	162
W9RNX	155
WØNCG	150
W6PCK	148
W9BVX	148
WØANF	141
W2GHV	137
W2RGV	136
W6CHV	135
WØPUE	135
HC2OT	134
WØEYR	131
WØPRZ	124
W9CKP	124
G8QX	123
W8ZMC	122
W6YX	110
W5LWV	108
W4OM	106
W3PA	105
PY2JU	103

34 ZONES

W3KT	157
YV5AB	140
I1AXD	130
LU8CW	129
W2ZVS	129
W5KC	125
W4LZM	124



Monitored by LOUISA B. SANDO, W5RZJ

959-C 24th St., Los Alamos, New Mexico

Ten year old Jean Middleton, WNØNCB.

Along with spring comes the annual YL get-togethers. First of the season was the New England area luncheon held at the Smith House in Cambridge, Mass., on April 11th. Thirty-five YL's turned out for it with representatives from Maine, New Hampshire, Vermont, Rhode Island, Connecticut, Massachusetts, Maryland and the District of Columbia. Those attending included: W1MCW, NAD, UZR, FTJ, QJX, OAK, VKC, VOS, YYM, UPZ, SVN, UKR, QON, TRE, TUD, UPK, VYH, HIH, SLG, RYJ, BCU, FOF, RLQ, ULF, SCS, UQA, MWI, Margaret Flanders and Jean Goulding, awaiting calls, and W3MSU and W3OQF.

Ham in Pigtails

The Novice license is attracting lots of young people to amateur radio—and a mighty good thing, too. Here is one of the younger YL's we've heard of—Jean Middleton, WNØNCB, of Pueblo, Colo. Jean is just 10 years old, but prefers her rig to playing with dolls. It comes naturally, though. Jean's father is WØNIT and he teaches radio at Pueblo College. She beat him by seven years, however, for he didn't get his ticket until he was 17 and a senior in high school.

Jean built her own rig with her dad's help. It's a 20-watt 4-tube job. She says he showed her how to wire it, but that she did her own soldering, and ground the crystal herself to the correct frequency. She operates on 3702 kc., and though she has had her license only since January 29th, in three months she's worked fourteen states. Reading is chief among Jean's other interests—four books a week, she says. She also likes to play softball after school and help her mother cook, and is an active Girl Scout. She even talks of becoming a missionary to China some day—maybe she'll end up as some rare DX!

YL Certificate

The Los Angeles club's LAD 'N LASSIE certificate is now off the press and waiting for bidders. Here is an up-to-date list of the club members. Confirmations of QSO's with any ten of them will earn you the certificate. Present members: W6FEA, CEE, NLM, NZP, KER, WRT, WSV, GKV, KYZ, MFP, QOG, JMS, EHA, LMQ, PJU, UHA, CQV, LBO, JMC, TCN, OGX, and WN6JCA.

"Date Bureau"

From a W6 YL this comment (she's happily married, by the way!): Am especially getting a charge out of the 'date bureau' activities. Think it's a good thing, too! Shud've had one before."

An ex-W Ham now in Central America makes this bid for correspondence:

"Somehow your December column must have escaped me, but in going over the February issue of CQ I didn't miss! I didn't know that you were taking over as the Dorothy Dix of Hamdom, but maybe it is a good idea as I'll have to agree with the boys there is somewhat of a problem. I'm in my late 30's and I have had a chance to look around a little longer than they have. Now I have been out of the country for a couple of years and things haven't improved one bit.

"Of course, as far as DX is concerned this place is wonderful. One can work the world on any band from

(Continued on page 64)

LAD 'N LASSIE certificate offered by the Los Angeles YL Club.

Ionospheric Propagation Conditions

Forecasts by GEORGE JACOBS, W2PAJ

3620 Bedford Ave., Brooklyn 10, New York

Summertime Perspective

On June 21, the Summer Solstice will occur. This is the day that the sun reaches the most northern point on its apparent travel around the earth. This phenomenon not only marks the start of the summer season in the Northern Hemisphere, but also has a considerable effect upon DX propagation conditions.

Because of the relative angle between the sun and the earth, heat radiated from the sun during the summer months strikes the earth more directly than during the winter months. These direct and more intense heat radiations cause an expansion to take place in the gases that make up the ionosphere. This expansion reduces the electronic density of these regions. The reduction in density is responsible for a weaker F2 layer in the ionosphere during the daytime hours of the summer months as contrasted to the stronger reflecting daytime layer of the winter months. This results in the seasonal trend of lower daytime usable frequencies in the Northern Hemisphere during June and the summer months.

Maximum usable frequencies will be such that only the 20-meter amateur band will be useful for daytime DX possibilities. 10 meters will be generally unusable and 15-meter openings are not likely to be frequent, and then opening only on certain North-South paths.

During the summer months, the hours of sunlight are considerably increased. This permits ionization of the various layers of the ionosphere to occur for a much longer period of time than possible during the shorter hours of daylight during the winter months. Since there are fewer hours of darkness during the summer months, there is less time for the reflecting layers of the ionosphere to de-ionize. This will result in the 20-meter band being usable for DX well into the late hours of the evening, and should permit the use of the 40-meter band for DX throughout the dark hours.

During June an increase is usually noticed in atmospheric noise levels, especially during the night hours on the 80-meter band and to some extent on the 40-meter band. Ionospheric absorption also tends to increase somewhat during June, and signal levels during the daytime hours may appear weaker than during the winter months. There is also a tendency for a sharp increase in Sporadic E (short skip) propagation on frequencies as high as the amateur 6-meter band.

IIER

During the more than two years that I have been conducting this department for CQ, I have received much valuable propagation data from many amateurs.

During his recent visit to Europe, W2PAJ stopped in to see Mario, IIER (on the left) and Adriano Ducati, IIACD (on the right). Adriano was responsible for the first Italy to U.S.A. contact. See the text for news of IIER.

One deserving particular merit is IIER, Dr. Engineer Mario Santangeli of Milan, Italy. As many of you may know, IIER was one of the first Italian amateurs on the air almost thirty years ago, and is probably one of Italy's most popular amateurs. Every month for the past two years, Mario has been sending me a complete day by day propagation report of the various amateur bands as he observes them in Milan. This past Fall, I had the pleasure of personally spending a day with Mario.

It is therefore, with deep sorrow that I now learn that, due to an eye condition aggravated during the war-time German occupation of Italy, Mario's eyesight has now almost completely failed. I know that I speak for all the readers of this column, indeed, for all amateurs, in hoping that Mario's condition can be corrected—and that it will not deter the amateur activities of IIER, one of our famous pioneers.

Sunspots

This month's *Propagation Charts* are based upon a predicted smoothed sunspot number of 21, centered on June, 1953. It is of interest to note that the monthly relative Zurich sunspot number for February, 1953, was 2.9. This is the lowest value recorded since June, 1944. We are steadily approaching the actual

(Continued on page 66)

ALL TIMES IN E S T

EAST COAST TO: (Centered on Washington, D.C.)	15 Meters	20 Meters	40 Meters	80 Meters
Scandanavia	Nil	0600-1600 (2-3) 1600-1900 (3)	2000-0030 (2)	2200-0000 (1)
Great Britain & Western Europe	Nil	0600-1500 (3-4) 1500-1700 (4) 1700-1900 (2-3)	1900-0100 (3-4)	2030-0000 (2-3)
Balkans	Nil	0600-1300 (1-2) 1300-1600 (2) 1600-2000 (3)	1900-0000 (2)	2000-2300 (1)
Central Europe	Nil	0530-1400 (2-3) 1400-2000 (3-4) 2000-2100 (1-2)	1930-0030 (3)	2000-0000 (2)
Southern Europe & North Africa	1600-1800 (0-1)	0500-1500 (3) 1500-1900 (4) 1900-2100 (1-2)	1830-0100 (3-4)	2000-2330 (2-3)
Central Africa	1600-1900 (0-1)	0500-1200 (0-1) 1200-1500 (1-2) 1500-2100 (3-4)	1830-0100 (2-3)	1930-2330 (1-2)
South Africa	Nil	0430-0630 (1) 0630-1230 (0-1) 1230-1400 (1)	1900-0100 (2)	2000-0000 (1)
Near & Middle East	Nil	0500-1300 (0-1) 1300-1500 (1-2) 1500-2000 (2-3)	1930-2300 (1-2)	2100-2230 (0-1)
South America	1200-1800 (2-3) 1800-2000 (1-2)	0530-1430 (1) 1430-1700 (2-3) 1700-2200 (3-4) 2200-0100 (2-3)	1900-0430 (3)	2000-0400 (2)
Hawaii	1900-2200 (0-1)	1000-2000 (1-2) 2000-0000 (3-4)	2300-0730 (3)	0000-0500 (2-3)
Australasia	1700-2000 (1) 2000-2200 (1-2)	1600-2000 (0-1) 2000-2200 (1-2) 2200-0000 (2-3)	2300-0800 (2-3)	0100-0600 (1)
Guam & Pacific Islands	Nil	0800-1000 (1-2) 1000-2200 (0-1) 2200-0000 (2-3)	2300-0700 (2-3)	0100-0600 (1)
Japan	Nil	0730-1000 (1-2) 1000-2300 (0-1)	0200-0500 (0-1)	Nil
Philippine Islands & East Indies	Nil	0800-1000 (1) 1000-2200 (0-1)	Nil	Nil
India	Nil	0600-1700 (0-1) 1700-2100 (1-2)	1700-2100 (0-1)	Nil

ALL TIMES IN C S T

CENTRAL USA TO: (Centered on St. Louis, Mo.)	15 Meters	20 Meters	40 Meters	80 Meters
Great Britain & West Europe	Nil	0600-1430 (2-3) 1430-1700 (3-4) 1700-1930 (1-2)	1930-0000 (2-3)	2000-2300 (1-2)
Central Europe	Nil	0600-1300 (2) 1300-1600 (2-3) 1600-1900 (3)	1930-2330 (2)	2030-2300 (1)
Southern Europe & North Africa	Nil	0500-1400 (2-3) 1400-1700 (3-4) 1700-1930 (1-2)	1830-0100 (3)	1930-0000 (2)
Central Africa	1500-1900 (0-1)	0430-0600 (1-2) 0600-1100 (0-1) 1100-1400 (1-2) 1400-2100 (2-3)	1830-0030 (2-3)	1930-2300 (1-2)
South Africa	Nil	0430-1100 (0-1) 1100-1330 (1)	1830-0000 (2)	1930-2300 (1)
Central America & Northern South America	1200-1600 (3) 1600-2000 (3-4)	0600-1600 (3-4) 1600-2200 (4-5) 2200-0100 (2)	1730-0500 (4-5) 0500-0700 (2-3)	1830-0500 (2-3)

ALL TIMES IN C S T

CENTRAL USA TO: (Centered on St. Louis, Mo.)	15 Meters	20 Meters	40 Meters	80 Meters
South America	1100-1700 (3) 1700-1900 (3-4)	0500-0600 (2-3) 0600-1600 (1-2) 1600-2200 (3-4) 2200-0200 (2)	1830-0500 (3-4)	1930-0400 (2)
Hawaii	Nil	0900-2000 (2) 2000-0000 (3-4)	2200-0200 (3-4) 0200-0800 (2-3)	2300-0600 (3)
Australasia	1900-2300 (1-2)	1500-2000 (0-1) 2000-2200 (1-2) 2200-0100 (2-3)	2300-0700 (2-3)	0000-0600 (1-2)
Japan	Nil	0700-1000 (2) 1000-0000 (1) 0000-0200 (2)	0200-0600 (2)	0300-0500 (1)
* India	Nil	0600-1000 (1-2) 1000-1800 (0-1) 1800-2200 (1-2)	1800-2100 (0-1)	Nil
Philippine Islands & East Indies	Nil	0800-0930 (1-2) 0930-2200 (0-1)	0330-0600 (0-1)	Nil

ALL TIMES IN P S T

WEST COAST TO: (Centered on Sacramento, Calif.)	15 Meters	20 Meters	40 Meters	80 Meters
Europe	Nil	0600-1500 (1) 1500-1700 (1-2)	1900-2230 (1)	2000-2200 (0-1)
South Africa	Nil	2100-2300 (1) 0500-1400 (0-1) 1400-1800 (1)	1800-0000 (1-2)	2000-2200 (1)
Central America & Northern South America	1500-1900 (3)	0530-1500 (3-4) 1500-2030 (4-5) 2030-0100 (1-2)	1800-0400 (4-5) 0400-0600 (2-3)	1930-0400 (3)
South America	1200-1900 (3)	0500-1500 (1-2) 1500-1630 (2-3) 1630-2130 (3-4) 2130-0100 (1-2)	1800-0300 (3-4)	1930-0200 (2)
Australia	1300-1900 (1-2) 1900-2200 (2-3)	1200-1900 (1) 1900-2100 (1-2) 2100-2300 (3)	2200-0500 (2-3)	2300-0400 (1-2)
Japan	2200-0000 (0-1)	0900-1900 (2) 1900-0200 (3-4)	0030-0500 (3-4)	0200-0430 (2-3)
Philippine Islands & East Indies	1900-0000 (1-2)	0700-0930 (2) 0930-2300 (0-1) 2300-0200 (1-2)	0230-0600 (1)	Nil
Malaya	2000-2300 (1-2)	0700-1100 (1-2) 1100-2300 (0-1) 2300-0200 (1)	Nil	Nil
Marshall Islands	1600-2200 (2-3)	0900-1100 (2-3) 1100-1900 (1-2) 1900-2200 (2-3) 2200-0300 (3-4)	2300-0700 (3)	0000-0600 (2)
Guam & Marianna Islands	1700-2230 (2-3)	1100-2000 (2) 2000-0300 (3) 0700-0900 (2)	0100-0500 (3)	0130-0400 (2)
Hong Kong, Formosa & Macao	Nil	0700-0900 (2-3) 0900-2200 (1-2) 2200-0300 (3)	0230-0530 (2)	0300-0500 (1)
Siberia	Nil	0900-1900 (3-4) 1900-0000 (4) 0000-0300 (2)	0000-0500 (3-4)	0130-0400 (2-3)
India	Nil	0600-1000 (1-2) 1000-2300 (0-1) 2300-0100 (1)	Nil	Nil

Symbols For Expected Percentage of Days of Month Path Open:

(0) None (1) 10% (2) 25% (3) 50% (4) 70% (5) 85% or more.

Conducted by HERB BRIER, W9EGQ

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SWL Cards And The Amateur

Many regular readers of the *Novice Shack* are SWL's (short-wave listeners). Most of them are studying, so that they can get a license to operate their own amateur stations. Others are content just to listen to amateurs—well almost. Somewhere along the line another factor enters the picture. This is the SWL card.

The confirmed short-wave listener soon decides that he would like to have a collection of QSL (confirmation) cards from the station he hears. Getting a supply of government postal cards or of commercially-printed SWL cards and a *Call Book*, he starts sending reports to the amateur stations he hears and asks for their cards in return. Often, his percentage of replies is low. As a result, his opinion of the amateurs who ignore his requests is equally low.

On the other hand, many amateurs consider SWL cards as a nuisance. Even those that answer them do so simply as a favor. To be honest about it, there is considerable justification for this feeling from their point of view, yet an accurate listener report sent to the right amateur at the right time is valuable and will be appreciated.

First, let us see why SWL cards have acquired such a bad name with many amateurs. Then, we may be able to save your card from the wastebasket at least long enough to get a reply.

Lee Johnson operating his Novice station WN6TZU. The receiver is an eight-tube superheterodyne, and the transmitter uses a pair of 807's. Lee built both himself. Antenna is a 40-foot vertical.

OH2YV, Helsinki, Finland. John, who is not quite eighteen, is a regular reader of the NOVICE SHACK. He was first licensed when he was fifteen and has been the Finnish QSL manager for many months.

Why SWL Cards Are Not Answered

Probably only ten per cent of the active amateurs receive well over half of the SWL cards sent out. For obvious reasons, they are high-powered phone stations, and most of the cards they receive fall into one of the following categories.

First on the list of valueless SWL cards are the ones that say something like this, "Dear ——, I saw your call letters in *CQ*, the *Call Book*, or some place else. Please send me one of your cards."

Second is the card reporting reception of an unanswered call (especially a CQ), without date, time, frequency band or other pertinent data.

Third is this type: An amateur works several stations in a row in a certain area, getting excellent reports from all of them. Obviously, he knows that his signal was good in that area at the time. As a result, he is likely to be somewhat less than thrilled to get a handful of listener cards in the next few weeks, telling him the same thing.

It is easy to understand why such cards get only a small percentage of replies, when it is remembered that many amateurs get a constant stream of them.

How To Get Replies To SWL Cards

One way to get replies to SWL cards is to pick out carefully the stations to whom you send the cards. Then, try to put something on them that will be interesting or useful to the recipients. And be honest in your reports.

Instead of sending your cards to the loudest stations you hear, concentrate on the weaker ones. A lad with fifty watts or less will be much happier to get a report than the old timer with a kilowatt. Also, an amateur testing a new piece of equipment, especially a new antenna, is usually interested in getting some accurate reports about how it works. However, to be of any value, the reports must be received immediately. Yet, it constantly amazes me the number of SWL reports I get that are many months old.

Along the idea of sending reports to those who will appreciate them, if you should hear an amateur telling another that the contact represents his best DX and you are farther away, he will probably appreciate a card. So will a station who has not worked your state or call area.

The SWL who can copy the code has a simple way of getting a good percentage of returns from his cards. All he has to do is to send them to *CW* stations, especially Novices. Most of them have never received an SWL card in their lives.

I have saved the best ideas until last. A good way to increase the percentage of replies to SWL cards can be stated in three words: *enclose return postage.* Better yet is a stamped and addressed return envelope. If you are actually interested in confirmations of your reception reports, rather than the accumulation of QSL cards, get a supply of double, stamped postal cards from the Post Office. Put your report on one half of the card and fill in the other half in such a way that the operator has only to sign it and drop it in the mail to confirm your report.

Some SWL's object to including return postage with their cards, because it is too expensive. There seems to be only one answer to that. If one cannot afford to pay the postage for a card he wants, it is rather foolish to expect the amateur to pay it and contribute a QSL card in return for something he did not want in the first place.

Whether the SWL agrees with the above, he may as well resign himself to the fact that many amateurs have an inflexible rule: SWL cards without return postage are ignored. Foreign amateurs are especially likely to ignore such cards. *International Postal Reply Coupons*, which may be purchased from the Post Office, can be exchanged in foreign countries for postage sufficient to mail one letter.

Really, fellows, the best solution to the SWL-card problem is to get your amateur license. It's a lot more fun to collect QSL cards of actual contacts; so keep studying that code and theory!

Ev Battin, W9OWD (tuning the transmitter), and three of the many amateurs he has helped get licenses. The man in the foreground is WN9WTC. The other two are awaiting their Novice calls. Although W9OWD is blind, it does not prevent him from enjoying Ham radio and being an excellent teacher.

Johnny McGuire, who works for Uncle Sam's Navy, and his Novice station, WN3VAZ. His transmitter is a Harvey-Wells TBS 50C, and the receiver is an S-38B. The rack on the left contains a 10-11 meter converter, an oscilloscope, and the transmitter power supply. Johnny may be overseas when you see this picture.

Letters and General News

This letter speaks for itself. "Dear Herb, I think that all amateurs around here must subscribe to **CQ** and read it as soon as they get it. I got my first copy today and read the item about keeping 3555 kc. clear (page 37, March, **CQ**) between 9:30 and 10:30 p.m., EST, to avoid interfering with the nightly W1AW code-practice transmissions.

"I have a BC-348 receiver. While far from being the best, it is a good receiver, but until tonight it has been almost impossible to copy W1AW through the interference. But what a difference tonight! For the full hour, I heard only one key break in on W1AW, and that was only for a minute. Code practice was a real pleasure!

"You have proved once again that Hams are 'regular.' I hope to be one soon. Sincerely"—Russell J. Dayton, Newport, R. I.

Old timers, take a bow, and keep up the good work of avoiding W1AW's frequency during the code-practice transmissions.

OH2YV, Helsinki, Finland, wrote a long and interesting letter, from which I quote. "Dear Herb, I have been very much interested in the **Novice Shack**, because I'm quite a young boy myself. I always thought that all "W" amateurs started out with at least 100 watts and Super Pro receivers. Thanks to the **Novice Shack**, I now know the boys there start out just like we do in Finland. But, then later on! . . . Let us just not talk about it, hi.

"In Finland, we are allowed to operate on all amateur CW bands with fifty watts input when we get our first license. After 200 CW QSO's, we are also permitted to operate phone. Later on, we are permitted to use 200 watts input, after passing a special examination.

"I think that it is quite a fine thing that CW is required of all; so they can use it well. All "W" operators that I have heard on 14-Mc CW are very fine business operators indeed. I have never worked one who asked me to repeat, and sometimes, I have sent very high speed CW to them. Do "W" stations have to be able to pass a high-speed CW test to operate on 14 Mc.?

(Continued on page 67)

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Name_____
Address_____
City_____ State_____

Amateur Teletype

(from page 36)

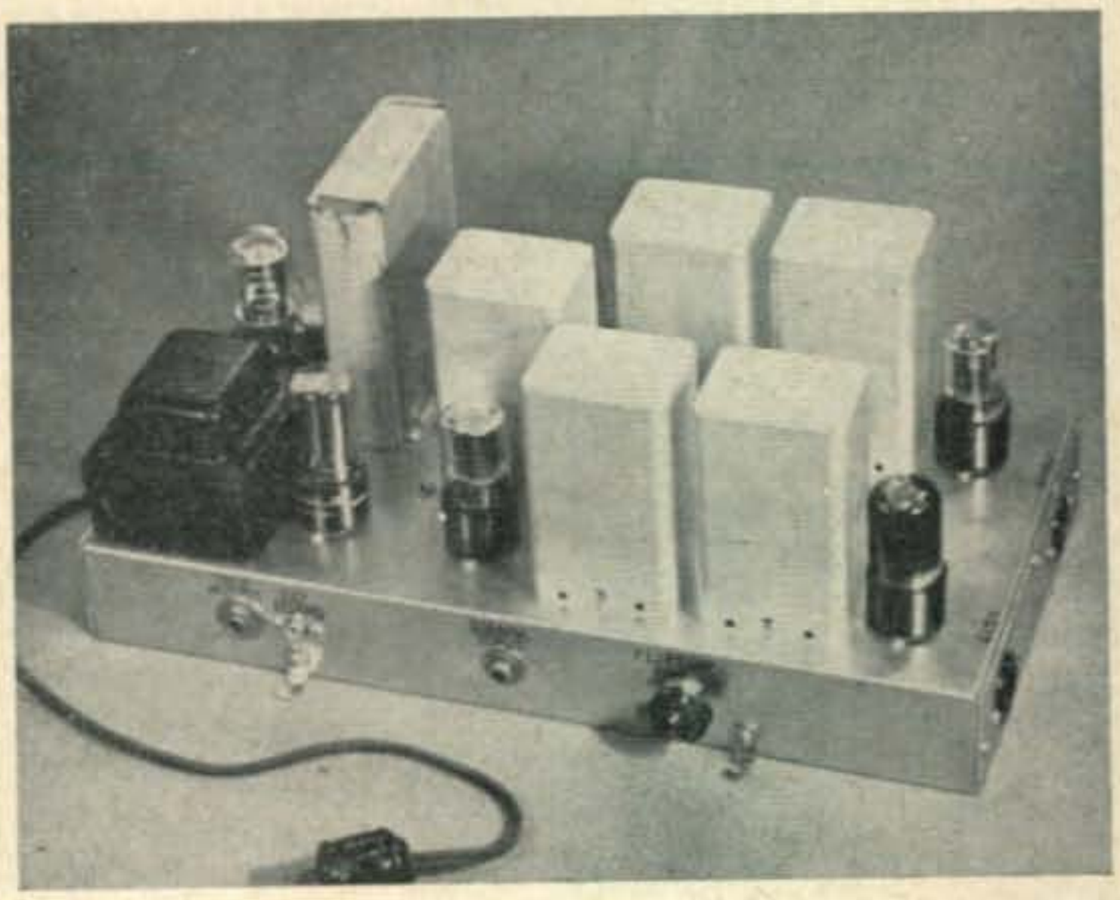
calling a CQ. The fellow that came back to me used CW and that threw me for a loop. I haltingly set to work on the hand key and tried to get across the idea that he would either have to call me up in the phone band or use the telephone as long as he apparently wasn't set up for RTTY.

My suggestions that we QSY to the phone band brought out the datum that my caller had no modulator! (Imagine, a Ham rig without a modulator!) I then sent my phone number a few times, figuring that he could take an average of what he received and call that. It worked, for the phone rang and lo, there was W4ZC/2 in Newark. Stu had a very interesting story to tell and I made him write it to me so that I could pass it on without the many deletions that entrusting it to my memory would involve. Here is the tale:

"Well, the early work on the Ham bands took place in three stages; First at 3XR during 1922-23 between Washington and Hyattsville on a more or less 'will it work?' test using Western Electric Model 10's and a rotary printer which Dr. Rogers had invented many years earlier. This Rogers machine was rather ingenious and relatively simple. The letters and figures of the alphabet can be formed from a maximum of eight different type shapes. In the Rogers machine these type shapes were assembled in a circle—with each of the shapes forming part of the armature on a printing magnet. The proper code was selected by the usual keyboard code bar device, and transmitted by a rotary distributor of entirely conventional design (at least in 1922 the design could have been called 'conventional,' but may have been quite original at the time that Dr. Rogers invented his machine.) The mechanical arrangement of the machine resembled that of the Barclay and Western Union Model 5 machines. Inking was done in two ways; by a wide ribbon of the sort common to the Smith Premier typewriter; or by means of an inking roller similar to the early Morse registers.

"The radio gear consisted of a 205D oscillator tube running about 8 watts on 200 meters (1500 kc. to you Young Squirts!) or a 2 kw. arc transmitter on about 1700 meters and using underground antennas. Receivers were a three-circuit tuner for 200 meters and a Navy Standard S.E. 143 for the long wave circuit. These tuners fed into a three-stage transformer coupled audio amplifier, a biased detector, and a Morse telegraph relay. Noise from the printers was then, as it is now, the big problem. The principles of filtering were not too

(Continued on page 50)



A receiving converter, without frills, as built by Bob Weitbrecht, W9TCJ. A full description of this unit will be found in the April issue of "RTTY", which is mentioned in this column.

(from page 48)

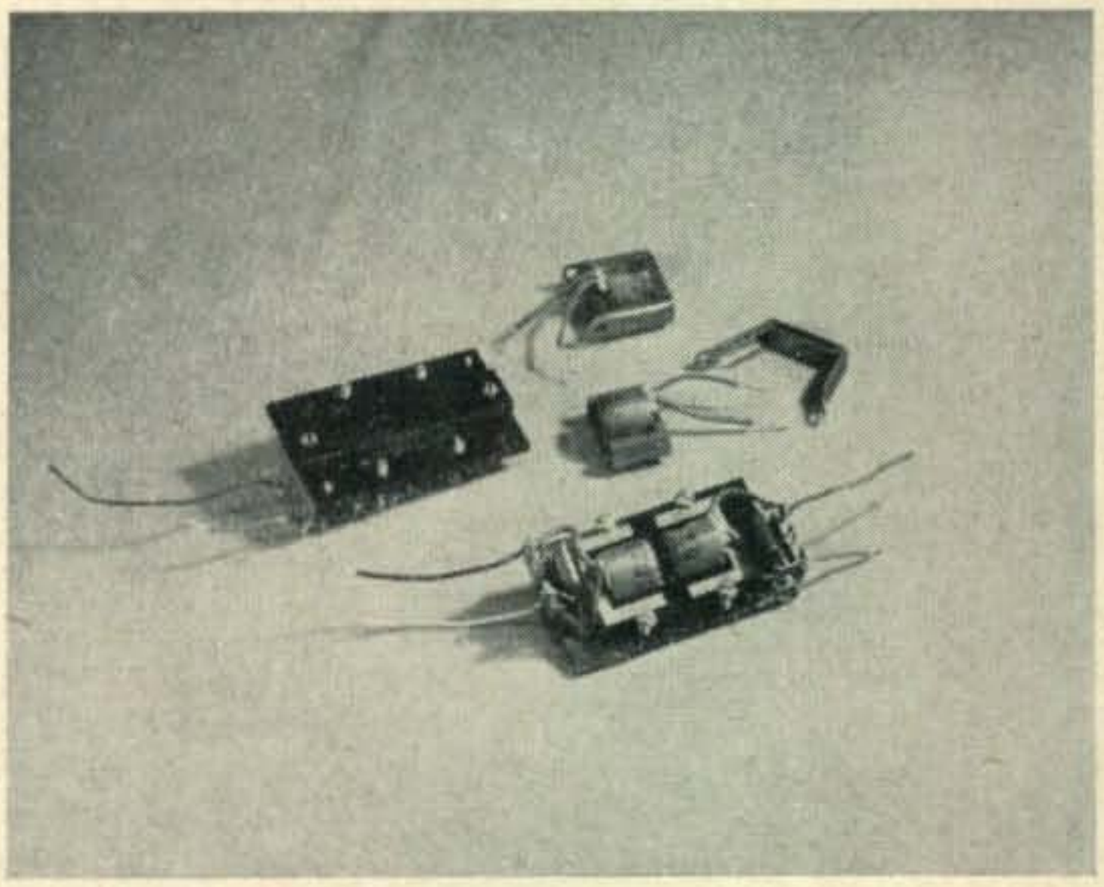
well known, and even less understood (at least by me).

"The system worked fairly well despite the crude equipment. Operating speeds were 45 w.p.m., which was one of the standard printer circuit speeds for many years on telegraph systems until the advent of high-speed relays and repeaters made higher speeds satisfactory.

"During 1926-27, while working for the old Postal Telegraph Company as a Telegraph Engineer, I got the urge to see what could be done with the little Morkrum machine (very similar to the present Model 14, except for the use of a type wheel in place of type bars). I 'borrowed' a couple of them and, since there wasn't anyone to work with, I had to set up two complete Ham stations. This was probably one of the earliest uses of a 'portable' teletype station anywhere!

"Most of the Ham gear was quite typical of the times; 112's as an oscillator, regenerative receiver. Power for the printer was from a bank of storage 'B' batteries. Used to drive out in the country, leaving the home station (call: 1HA) running with a locked letter. I'd stop the car, throw out a hunk of wire, and fire up. It was a real thrill to be way out in the hills, miles away from power or communication wires of any sort, and watch that little printer bat out the home station letter. After running this sort of 'field survey' around the hills of southern New Hampshire I managed to teach a couple of young fellows in the neighborhood to operate the stuff and then we were really able to effect two-way communication.

"Since my time to play with this gear was necessarily limited to weekends when I could lug the printers from the Boston Office, not too much was done with this gear other than to demonstrate the usefulness of the equipment to the Plant Department. (The Postal Engineering Department wouldn't touch it with a 10-foot pole!) It did serve to stir a good bit of interest on the part of A.T.&T. and W.U.



Detail of construction of the filters used by W9TCJ. Made from filter chokes.

"When I left Postal to join the staff of Bell Labs in 1928, one of the first things they wanted me to continue was development of the radio printer system! Again, it was side-tracked for more important work in the field of Trans-Atlantic communications, and the TWX prototypes.

"We had a depression arrive in the Fall of 1929, which was really booming in the summer of 1930, and since the young engineers recently added to BTL were given a furlough, I had lots of time (between job hunting) to 'play' with the RTTY! This time, equipment was not a major problem. Both AT&T and WU loaned me large amounts of gear, and were sincerely interested in the excellent results we obtained. You might be interested to know that one of the applications which came as a result of some of this experimental work was the use of RTTY as an order wire across the Atlantic on the Long Wave Phone circuit. The advantages of being able to type Wcyscyicx with an address in Lwow to an American Girl, needs no further illustration!

"Really went to town on the stuff, and came up with a throughly reliable system—using no relays or other

(Continued on page 52)

(from page 50)

trouble-making devices. Again, the mobile system was installed, powered in part by storage batteries, and partly by the new genemotors just coming on the market for auto radio use. I was also able to secure a former Bell System man as an assistant, and we worked night and day on this stuff for more than a year and a half. This work was all done on 80 meters. The transmitter at my home station ran 250 watts to a 211; the mobile transmitter used four 112's with 25 watts input from batteries. The receiver in the car was a superhet using an autodyne first detector, a UX-222 as an i.f. and 112's as balance of the circuit—which contained two grid limiting stages, and a paralleled bias detector output stage.

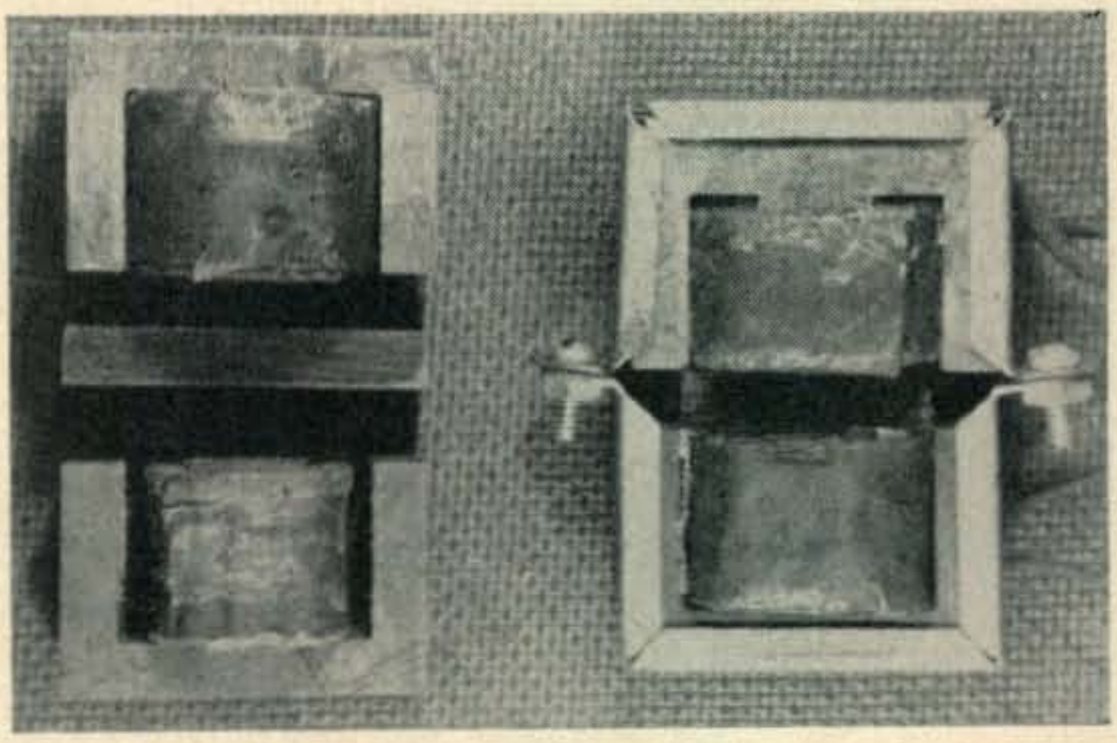
"The home station receiver was of the separate heterodyne type and balanced circuits were used throughout (Bell System influence, you see)! The audio system contained a sharply tuned network—the double limiter stages, several voltage stages, and the power rectifier stage. This system proved so reliable and stable, that we could drive away in our mobile unit—leaving the home station gear ready for receiving—go mebbe 25 or 30 miles away, toss out our antenna, fire up, send a few bells to attract my Mother's attention, send her a message and receive a reply, often without a miss in the whole transmission.

"We were successful in operating in this manner as far away as 150 miles during the early evening when signals were beginning to build up and before the evening QRM settled down upon us. Then, as now, certain 'characters' who resent what they cannot understand would deliberately jam our frequency. How we overcame a local yokel is another story!

"I think I've raved on long enough. The best DX was after we made arrangements to get a fellow station in Chicago on the air. Copy was often good, but the path a bit too long for 80-meter work."

Signed: Stuart Davis, W4FC/2

Well, things have changed a lot since the war. Now there are several hundred fellows around the country that are anxious to get on the air on tele-



Detail of filters used by W2BFD. See Nov. 1946 CQ for full description of the basic converter. The filters are made from 50L6 output transformers.

type, and about two hundred who have managed it, give or take a hundred. Actually, as best as I can figure, there are about fifty stations around the country that are holed up on two meters and won't come down, maybe a few more. There are about a hundred going strong on the low frequencies, and about twenty up on ten and eleven meters. And for every man that is on the air there are about five abuilding hot and heavy.

Certificate of Achievement

When a certificate is made available you know that things are popping. The *Amateur Radio Teletype Society* recently announced that it has a "Certificate of Achievement" available to those teletype amateurs that can furnish proof of contact with one hundred amateur teletype stations, no more than twenty to be located in any one amateur call area.

Amateur Radio Teletype Society

This is to Certify that.....
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TT-100

Certificate of Achievement

Certificate Number..... *Awarded*.....

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These certificates will be numbered and dated. All stations are invited to send in their present totals of stations worked so that the scores can be printed here in CQ.

Several of the gang have already worked over 50 stations, and even I have worked 36 so far. Guess it won't be long until we get some winners in the deal.

MINIDUCTORS

(from page 19)

on all sides. This is seldom possible in compact equipment; however, it is easier to approach with a small diameter coil. As a result, such a coil may have a higher effective *Q* in a given shield than a theoretically more efficient one.

Also, the concentrated "field" around a long coil may reduce undesirable couplings when several of them must be placed close together. On the other hand, it is easier to couple a load inductively to a coil with a near optimum form factor. Finally, a larger diameter coil may permit using a heavier size wire, with its obvious advantages in power-handling applications.

Determining Inductance

When Coil Dimensions Are Known

Figures 1 and *2* are usable in reverse to determine the inductance of a segment of a *Miniductor*. Identify the *Miniductor* from which the segment was cut by measuring its diameter and counting the turns per inch. Extend a line up from the length scale on the bottom of *Fig. 2*, to the curve and over to the left-hand scale. This will give the percentage of the inductance of the segment, compared to that of the entire coil.

In cutting *Miniductors*, allow at least one turn on each end for leads.

This method of determining the inductance of parts of *Miniductors* does not produce precision results, but results well within the limits of acceptable accuracy. For higher accuracy, actual inductance may be calculated with the aid of a standard inductance formula. Incidentally, owners of *B & W Model-600* grid-dip meters may find the revised table of *Fig. 1* slightly more accurate than the one in the instruction book.

PRESENT AND PROPHETIC:

Pensacola, Florida

It has been announced that the Annual Hamfest of the Pensacola Amateur Radio Club will be held during Sunday, June 28, at a municipal recreational area on Sanders Beach, which has been reserved for the occasion. Three hundred southeastern Hams participated in this event last year, and this year's attendance is expected to be even greater. This promises to be an affair that you and your family cannot afford to miss.

Indianapolis, Ind.

The annual Indiana Picnic-Hamfest, sponsored by the Indiana Radio Club Council, will be held again this year at Brookside Park, Indianapolis, Indiana, on July 12th. There will be games, contests, and prizes galore for both young and old alike. The registration fee will be $1.00 at the gate. No advance registration. Bring your lunch and have fun—anyone in Indianapolis will tell you how to get to the park.

San Mateo, Calif.

The San Mateo County Amateur Radio Club will hold its seventh Annual Hamfest and Picnic, Sunday, June 28, 1953, at Coyote Point, San Mateo, Calif. The program will begin at ten a.m., and close at five p.m. Activities for everyone, including the lads and lassies, will be scheduled. The two main features will be the two and 75-meter transmitter hunts, with a choice prize for the winner of each one. The major prizes, as well as the many others, will add to the attractiveness of the program. Here is your chance to have yourself a pleasant day by bringing the family and a picnic lunch. The admission is free; the registration for major prizes, $1.50.

Granite City Ill.

The attention of all midwestern amateurs is directed to the occasion of the W9AIU—The Egyptian Radio Club's Free Annual Hamboree, which will be held on July Fourth. The Hamfest Committee has planned, in addition to an auction, a prize distribution. Refreshments will be available from 9 a.m. until 9 p.m. If you have a mobile rig you'll be guided in by a base transmitter on 10 or 75 meters. If you are driving "blind" however, we recommend that you follow the signs to club located near the Illinois approach to Chain of Rocks Bridge on Route 66 North of Granite City, Illinois.

Put Your SCR-274 N on 160 Meters

EUGENE WESTERVELT, W9DRJ

Box 114, St. John, Ind.

W9DRJ's method for putting a Command Set transmitter on 160 meters is so simple and straightforward that comment seems unnecessary—Editor.

Putting a Command-Set (*SCR-274N*) transmitter on 160 meters is quite simple, if the following method is employed. Although used specifically with the BC-457, it appears equally applicable to other models.

Oscillator

Remove the shield can covering the oscillator coil and padding condenser. Without dismounting the coil form, strip the wire from it; both the large winding and the small one connected in the filament circuit. Do not, however, disturb the 1625 grid coil which is inside the form.

Rewind the larger coil with thirty-six turns of No. 20, enamelled wire. Close wind the first thirty-three turns, starting at the bottom of the form and complete with the final three turns spaced in the grooves at the top of the form. The winding must be put on tightly to prevent the turns from slipping.

The cathode of the oscillator tube is tapped on the eighteenth turn from the bottom of the winding. Cut loose the oscillator tube filament terminals from all other circuits and connect them directly to the filament heating circuit. Set the oscillator padding condenser to maximum capacity. Then replace the shield and turn the oscillator slug halfway in.

Under the chassis, remove the black wire between the oscillator coil terminal strip and the neutralizing condenser. Move the 15,000-ohm, 1625 grid-bias resistor and its bypass condenser to the terminal previously occupied by the neutralizing condenser lead.

The magic eye assembly is not used, and the neutralizing condenser may also be removed if desired.

Amplifier

Remove the amplifier coil form from the chassis and strip off the old winding. Tightly rewind with 34½ turns of No. 18 enamelled wire. Close wind thirteen of them in the space at the bottom of the form. Continue close winding in the upper part of the form for 18½ turns. Finish off with three

(from page 55)

turns space wound in the grooves on the form. Replace the coil.

Remove the antenna loading coil and connect the variable link to a coaxial output connector. If later it is found that this does not give enough coupling between the antenna and amplifier, a few turns of insulated wire may be wound over the amplifier coil and connected in series with the variable link.

After the coils are modified, apply low voltage to the transmitter and tune the amplifier padding condenser for minimum plate current. Experimentally adjust amplifier and oscillator coil slugs for best tracking of the two circuits across the band.

New V.O.A. Opportunities

The Voice of America has vacancies for unmarried radio engineers to operate its new 1,000,000 watt (1000 kilowatt) standard band stations on Okinawa and the Philippines. A shortage of family-type housing precludes consideration of additional applications from married engineers at this time.

Salaries range from $4,323 to $5,907 per year, depending on education and experience, plus allowances and transportation.

Applicants must be single, between 25 and 35 years of age, and holders of First Class Radio Telephone licenses, and must have had at least three years experience with standard band or short wave broadcasting transmitters.

Applications should be addressed to:

Office of Facilities Manager,
International Broadcasting Service
Department of State
251 West 57th Street
New York, N. Y.

MORE ON THE 6146

(from page 26)

the tube draws plate current through *R28*, reducing the 6146 screen voltage.

As already noted, the voltage at the junction of *L6* and *R24* decreases only about eleven volts, from a little over -85 volts to -75 volts when the excitation is removed. However, the fixed bias causes the plate and screen currents of the 6146's to decrease somewhat. This, in turn, causes the voltage at the tap on the voltage divider to increase due to the lessened load on the high voltage power supply.

The combination of decreased negative voltage

at one end of the *R29-R30* resistor network and increased positive voltage at the other is what causes the positive 6AQ5 bias shift.

When *R30* is properly adjusted and the function switch is set for CW operation, the key-up plate current on the 6146's drops to about ten milliamperes. In the "Phone" position, the current drops to less than fifty milliamperes in the event of an excitation failure. The difference is caused by the modulator screen current being obtained from the same tap on the bleeder to which *R29* is connected. Consequently, the voltage does not rise quite as much at this point on phone as it does on CW. In either case, the tubes are freely protected and are subjected to less than one-half the rated plate dissipation.

In the *Viking II*, proper adjustment of the tap on the bleeder is indicated when the idling current on the 807 modulators is seventy to eighty milliamperes when the 6146's are loaded to 230 milliamperes.

Resistor *R30*, is adjusted by turning it to the maximum, positive voltage position; then, with the function switch in the "CW" position and the key up, turning it until the 6146 plate current rises to 10 milliamperes. Sufficient negative voltage is applied to the 6AQ5 to keep it cut off even when the screen voltage on the 6146's doubles on modulation peaks.

These adjustments need be made only once.

Remarks

Because the fixed bias helps to hold down the plate current in the *Viking II*, it is not necessary that the clamp-tube reduce the screen voltage to a very low value. In circuits without fixed bias, the screen voltage must be dropped to a very-low value to limit the plate current to a safe amount. This is difficult to do with the conventional clamp-tube circuit in combination with the 6146, because even with zero voltage on the clamp-tube grid, the 6146 plate current remains at a dangerously high level.

With this circuit, the clamp-tube bias may be actually made positive in the event of an excitation failure by proper choice of values. Remember that maximum shift will occur when the positive voltage is obtained from a point of comparatively poor regulation. Keep the resistances fairly high to avoid upsetting the operating bias on the controlled stage.

MOBILE CORNER

(from page 34)

or disaster where the phone and other means of communications are disabled *MARC* members are supposed to monitor 29,590 kc. and all available information will be furnished by WØPZT or any other station able to get on the air.

Random checks show that it is possible at any given time to alert approximately fifty per cent of the active members within 15 minutes.

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Logistics Committee

Committees for planned events are set up by the Board of Directors as required and are dissolved when their specific function is completed. One exception, however, is the logistics committee. This group consists of six men who are responsible for transporting, setting up and operating the portable equipment which is used at the headquarters or command post station. Always set up near the actual scene of operations, logistics assumes complete control with WØPZT on the air acting in the capacity of monitor and relay station.

Logistics equipment consists of transmitters and receivers for six and ten-meter phone with portable ground plane antennas complete with sectional masts and guy ropes.

The *MARC* was officially turned over to Sheriff Ed Ryan of Hennepin County on February 22, 1951. With state, county, and city officials present as observers, including Minnesota's governor, at that time, Luther W. Youngdahl, as well as Civilian Defense and Red Cross officers, *MARC* staged its first full-scale drill. Thirty mobiles, a logistics station and airborne mobile using a pack-set in a *Navion* plane participated.

The mobiles were dispatched to key cities and towns throughout Hennepin County and requested to contact local fire and police chiefs and civilian defense heads. These men were informed about the *Corps* and were taken in the mobiles as passengers to observe at first hand how the group operated.

Following this the airborne mobile was instructed by WØPZT to proceed to St. Cloud, Minn., 70 miles northwest of Minneapolis and pick up a package theoretically containing plasma and return as soon as possible. The plane was "talked in" and told where to drop the package by the logistics unit, which was set up in a field about 3 miles from the base station. This fact that when the "plasma" was retrieved and triumphantly borne to the base station and unwrapped it was found to contain a 12-ounce can of a popular St. Paul brew did nothing to detract from the importance of the occasion.

In the two years since this initial drill, *MARC* has been called upon to furnish communications for a wide range of activities, both planned events and emergencies.

Members were called to Mankato, Minn. in April, 1951 when flood waters from the Minnesota river burst a dike and flooded approximately half the city. Logistics was set up in the Mankato armory and mobile units were used to bring flooded-out families to the Red Cross receiving center in the armory. Units were also used as patrol cars with special officers aboard to prevent looting. *MARC* members were also used to operate pack sets in National Guard amphibious units.

When the flood crest had passed at Mankato, *MARC* was released from duty there and also from the neighboring town of St. Peter and diverted to Chaska also on the Minnesota river. The flood rise there was more gradual and the main problem was supplying communications as the last phone link out of town was not expected to hold. Logistics was set up in the village hall and shortly after WØPZT had been informed that it was ready for operation the last telephone line was broken. Traffic in and out of town was handled by *MARC* for about 8 hours until

telephone lines were restored.

MARC was again called to flood duty in April 1952, this time at Rockford, a small town on the Crow River, 30 miles west of Minneapolis. This normally quiet stream was at its highest stage in forty years, and the business district of Rockford nearest the river was under water. The telephone exchange was flooded out. Logistics was set up in the school house which was above the flood and a pack set with battery power was placed in a downtown hardware store about 50 feet from the waters' edge. These stations were manned for about 48 hours until emergency telephone communications was restored. Mobiles were also sent to other towns along the river and were used in dispatching men and sand bags wherever needed thus aiding in keeping the damage to a minimum.

Aquatennial

An important function of *MARC* for the past two summers has been furnishing communications for the Minneapolis Aquatennial. Held during the latter part of July, this great nine-day celebration presents many communication problems and brings all the facilities of the group into play. The Aquatennial includes two large parades, one on opening day and an evening parade in the middle of the week as well as events taking place simultaneously on three or more of the many lakes within the city of Minneapolis. Aquatennial and *MARC* officers start planning this event many weeks in advance. Parades are directed by a logistics station in the reviewing stand. Mobiles along the route receive orders from the parade marshall at the logistics station. Boy Scout runners keep the mobile operators in constant contact with each parade unit so the parade can be slowed down or speeded up at the discretion of the parade marshall. The result is a smooth running parade with a minimum of jammed up or widely-spaced units. A mobile unit stationed at the police and fire headquarters does nothing but handle police and ambulance calls, 30 ambulance calls being about the average for a day parade.

Other Aquatennial events which require communications include swimming races, canoe races, inboard and outboard power boat races and the fireworks display.

MARC has also been integrated with the Minneapolis Civil Defense and all active members have been photographed, finger printed, and given identification cards.

A Sports Car organization known as "Combustion Cousins" requested communications facilities in timing their road race in the early summer of 1952. *MARC* handled this to their complete satisfaction. Also, for the past two years *MARC* has served in the same capacity for the Gypsy Motorcycle Club which runs a big endurance and obstacle race each fall. By establishing check points and calling in each rider's time as he reaches and leaves a check point to the logistics station, timers at this station are able to tabulate the results almost immediately.

Operation Crystal

MARC's most recent activity was participation in a large scale Civil Defense drill held in Crystal, a residential suburb, west of Minneapolis, on Sunday, January 11th, 1953. Activities included simulated bombing by 50 Civil Air Patrol planes. Immediately

(Continued on page 60)

(from preceding page)

following the bombing the logistics unit of *MARC* was called in to set up at the Crystal city hall, other communications being theoretically disabled by the bombing. Complete stations for six and ten-meter phone and 80 CW were put on the air. *MARC* members in their cars, having been previously alerted, were standing by, and as soon as logistics was on the air, mobiles were sent to the various locations, including the car and ambulance pool, schools, and churches, which were used as receiving stations for casualties, and others were roving the area to be used as needed.

Mobiles were also assigned to carry the various observers which included city, state, and civil defense officials as well as representatives of many large Minneapolis industries who naturally were very interested in the vital problem of civil defense. Minnesota's governor, C. Elmer Anderson, was present during the entire drill and was very enthusiastic about the work on *MARC* as well as the other organizations taking part.

Large fires were set in various parts of the area to simulate disaster conditions resulting from a firebomb attack and fire department units from seven neighboring towns were called in to assist. This was also handled by *MARC* Mobiles who were sent to these towns to contact the firemen and to accompany them to the disaster scene when they were called in by the command post station.

The drill was climaxed by a parachute drop from a Civil Air Patrol plane, the parachutist representing enemy infiltration. He was picked up immediately by a waiting car simulating enemy ground operation and immediately driven from the area. After a slight interval which gave the car time to get out of the area all available mobile units were called by WØPZT which then took charge of operations to set up a road block theoretically to prevent the enemy reaching the base station.

Six meters was used as a link from the command post to the temporary hospitals and schools where casualties were received. This link consisted of a fixed station and three mobiles and handled 20 written and 30 oral messages. Ten meters handled the biggest load consisting of 200 oral and 47 written messages. The peak load on ten was 5 messages per minute and the average was 2 per minute. Airborne mobile was also used and there were 25 messages from the Civil Air Patrol plane carrying a *MARC* operator with a pack set to the ground station. On eighty meters CW contact was established with several cities including Duluth, Chicago, Canton, Lima, Des Moines and LaCross. Forty-three members of *MARC* participated.

By the time this article appears, *MARC* will have a one-ton Dodge Vanette type truck completely equipped for 2, 6, 10 and 75-meters. Equipment will include an *Onan* gasoline generator and a *Leece-Nevelle* alternator and will operate mobile in motion as well as from fixed locations.

The following is a list of active mobile members: WØAJS, WØACV, WØANL, WØBJE, WØBJR, WØBSI, WØBVH, WØBYQ, WØCIS, WØCRO, WØCSG, WØCTW, WØDWA, WØEAL, WØECI, WØEIU, WØELX, WØEOK, WØEOP, WØGAH, WØGWR, WØGZN, WØHBG, WØHNS, WØHZY, WØJJJ, WØKHS, WØMBY, WØMFR, WØMGG, WØMXC, WØNYO, WØNZB, WØOUE, WØPAL, WØPCC, WØQMC, WØQMI, WØQYZ, WØRAG, WØRKB, WØRWF, WØSAW, WØSJK, WØUGG, WØUKB, WØVER, WØWNY, WØWQF, WØWRL, WØYBM, WØYLZ, WØZDU, WØZME, WØZT, WØZWM.

DX AND OVERSEAS NEWS

(from page 38)

should be on 7015 and 14 Mc. by now . . . **OH2RY** writes that there is good possibility that the Island of Aaland will be given the prefix of OHØ and qualify as a separate country . . . **G3GUM** ponders one VS3BC . . . **W6YRA** was heard QSO KF3AA, 14038, 2230 GMT. This is a new operator at KF3AA and QSL's go via W2PGG . . . During DX text UAØKRI and UAØKKO were heard calling CQ W!!! These stations were worked by W6RW, W6VUP and others. This was on 7 Mc. between 1430 and 1630 GMT. Could this herald a relaxing in the UA Ham policy? We hope so . . . W6RW reports **MP4BAO** plans activity on 7 and 14 Mc. from Qatar. (Courtesy **So. Cal. DX Bulletin**).

Exploits

VS9AP made it No. 228 for **W6GDJ**, 199 for **W1ZL**, 173 for **W2GVZ** and 233 for **KV4AA**. TI2TG was No. 58 for **VS9AP** in two weeks of operation . . . **W6ZZ** went to 128 with VP5BH and PJ2AA . . . **W6DI** brought his A3 listings up to date with 39-203 . . . **W5FXN** went to 153 with CR6CZ and KAØIJ . . . **W2AGW** upped to a modest 237 with SVØWG . . . **OZ7BG** added FK8AB for No. 171 . . . **G8IG** settles on 176 A3 and 205 with VP2DC and awaits the 'legalizing' of OQØDZ and KF3AA . . . **W4RBQ** hits 188 with 4W1MY . . . **W1BFT** finally nailed zone 39 with FR7ZA for No. 163 . . . **G3DO** raises to 170 A3 and 197 A1/A3 with such as ZS8D, ZD9AA, ZS9G, ZS7C and 4W1MY . . . **W2BXA** soars to 243 with ZD7A, MP4BAU, FB8BB and FB8ZZ. Bens phone total also reached 198 with VP8AP and HZ1MY/VQ6 . . . **W3GAU** ups to 239 with FB8ZZ . . . **W2ZVS** went to 145 with VP8AP . . . **W4ZAE** nabbed CR5AE, 7015 and DU1ER, 7005 . . . **W2BJ** goes to 202 with HE9LAA and ZS2MI . . . Latest at **OH2RY** are VK1RG (Maquarie), VK1JC (Heard), VR1A and JY1RT . . . **W1ZL** reports a good 3.5-Mc season with his "versatile vertical" ⅛ wavelength antenna which garnered contacts with LU4ZI, FP8AP, FF8AG, PJ2AA, ZS3K, LU1EP, ZE3JP, ZS2A, ZD4AB, KH6ARA, ZL3IA and ZL4IE. Carl has been QSO'ing Europe on 3.5 as early as 4 p.m. EST . . . **W6AM** nabbed VS9AP on CW and 5A1TZ on A3 . . . **W3AXT** is up to 55 on 3.5 which includes a WAC with PY2AJ, G5VB, VQ4HJP, ZL1ADU and 4X4RE. Sam says best time for DX on 3.5 is from 2200 to 0400 GMT Saturday nights . . . **W1DSF** received his DXCC . . . **VE3DCQ** nabbed new ones in KH6USA, PZ1WX, GI3IGB and CP1BX . . .

21 Megacycles

Activity on this band continues to rise. The allocation of phone frequencies has helped many to swell their country totals. Heard on A3, as reported by TI2TG were: CE1AJ, CE2CM, CE3DZ, CE6AB, HP3FL, HC1RT, PY4IE, PY3SI, KH6YL, KH6GG, VQ4RF, OQ5HL, OA4N, OA4C, OA4DI, KG4AJ, CN8MZ, CT1QG, XE1QE, G3BID and ZL4HJ. Conditions seem to vary widely from day to day but those who stick to it never fail to be rewarded by some juicy contacts. For instance, on Sunday, April 5th, 21 Mc. stayed open practically all day and such stations as SU1HS, 4X4RE, VS9AP, 9S4AX, OZ2PA, CX1KB and ZL2GS were heard with good signal strengths. YS10 made his appearance on the band on this date and nabbed ZL2GS and VS9AP and provided a new country for many others . . . G3GUM went to 71 with OD5VA, CR7AF and VQ2GW . . . G6ZO jumps to 76 with ST2GL and ZS8D . . . CR7AF, another newcomer to the band, now has 27 countries and was heard keying with LU1EP . . . TI2TG went to 63 with SU1HS, CT3AV, EA8AX and VP5EM . . . KV4AA made it 52 for OZ2PA . . . W4KRR went to 54 with CP1BX . . . W6ZZ went to 39 with PJ2AA, HR1FV, HP3FL and VP5EM. Miles has also worked KA9AA, KC6QY and VK3AHH.

Here and There

ZD7A/ZS6GV has now arrived home from England and most should have their ZD7A pasteboards by now. Dollar contributions with **QSL's** were disappointingly small and amounted to about $45. Art has decided to send this amount as a contribution to the Boston Hospital that

was so helpful in treating some of his South African compatriots. A list of contributors will be included . . . **LABRE** wishes to correct an error in an article in February **CQ** which stated that the "WABD" Certificate is issued by the LABRE. This certificate is really the **WAPY** (Worked all PY districts) and is awarded by "Antenna Magazine" of Rio de Janeiro. LABRE also advises that CE9 and LU/Z now count for Antarctica/South Shetland Islands for the "WAA" Certificate . . . **W6ZZ** received his WAVE and WACE Certificates . . . **OH2SF** was due to visit San Diego in April . . . **OH2RY** now has the QSL's for WAS. Nice going Ed . . . **W6AM**'s rhombic (to end all rhombics) is progressing. The 3rd leg has recently gone up and the feed lines are now in. Oh yes, the length, 1550 ft. . . . **G2HKU** wishes to thank G4FN, G6AB and G5PS and other Hams for their kindness and help during the recent flood disaster . . . **LZ1KAB** is building a new 250-watt rig and advises that QSL's will soon be sent out to cover contacts since January 1952—all 5000 of them.

Dropping in on KV4AA were W6DFY, W2DJT, KP4BI and W2APF. Uncle Dave, was just in time to see KV4AA acquire a son-in-law in the person of KV4BC . . . Bob, **W4OMW**, and XYL, **W4UTO**, pounded brass at W4RBQ during a recent Miami vacation . . . **VP8AP** totalled 135 contacts in recent DX contest . . . Anyone wanting to QSO **XE2WE** can get in touch with W5MIS who skeds him . . . Mirko, **YU1AD**, is now recovering from a foot operation . . . At the recent IRE gathering in New York, W2CTO, W6MUR, W4KFC, W4TO and W2BJ got together. W6MUR went on to visit W1FH and W5FXN.

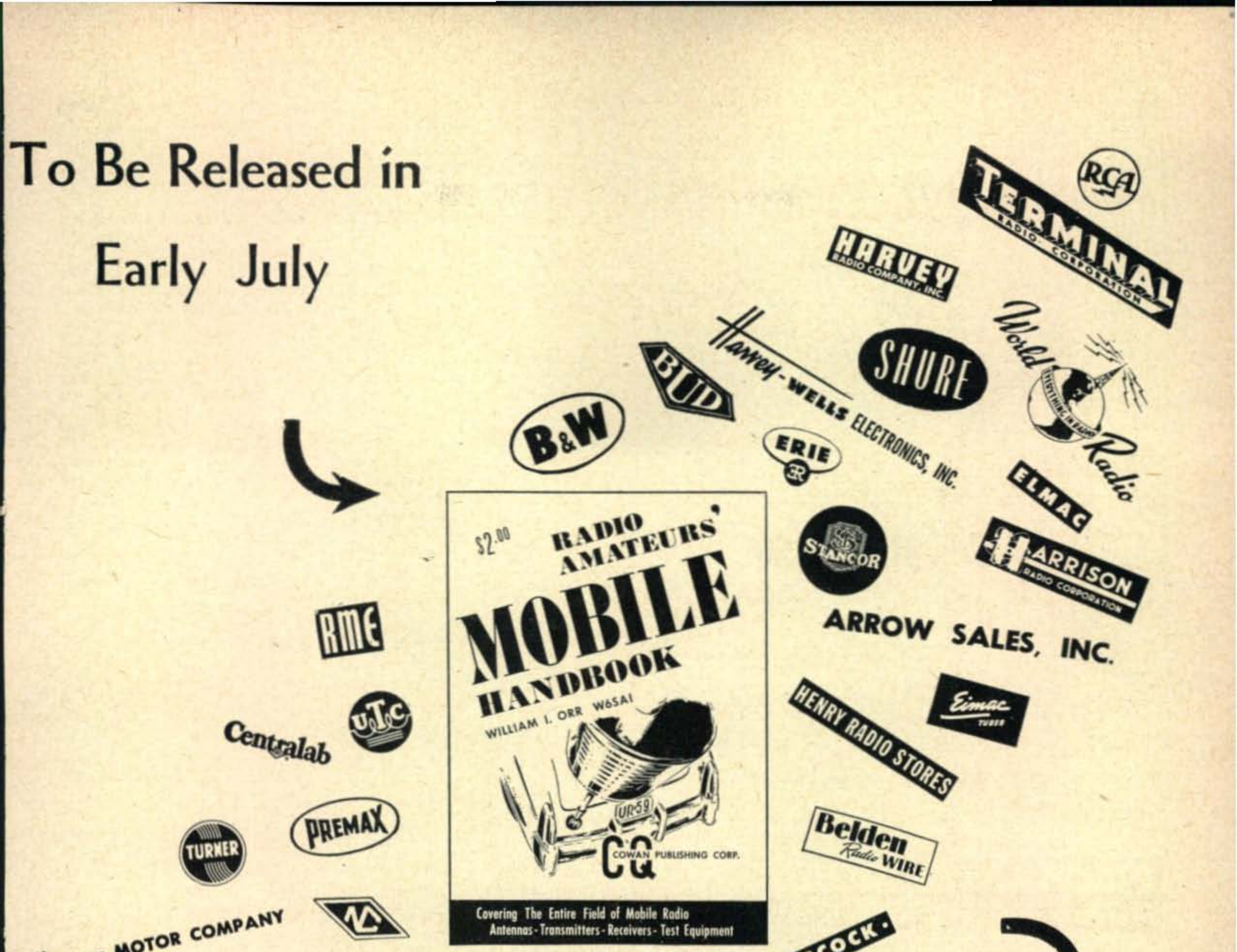
Via G6YQ we hear that, since this column has been written, Luis, CE3AG, has decided to postpone his European trip until July and he will be on the air as CEØAA in early June . . . From 9S4AX: LZ1KSA is on the air every Saturday at 1700 GMT on 14020 Kc.

F7BB/3A2AQ pulls the big switch and should be on as K2AQN in May and at K2AQN/4, Fort Bragg, thereafter. Jim regrets that official rulings made his Andorra plans impossible . . . The Far East Amateur Radio League, **FEARL**, wishes to advise that it will no longer be able to accept QSL cards for contacts with JA stations made after August 1st, 1952. Only KA QSL's will be accepted towards the WFJS and WAJAD awards after this date. JA cards before Aug. 1st, 1952 and KA cards after Aug. 1st are acceptable . . . The **GAARC**, German American Amateur Radio Club, requests that all Hams which have held DL4 calls to please submit their present QTH, DL4 call and period of holding such call. This information along with postage will greatly facilitate the forwarding of QSL cards now on hand at this bureau. Cards will be held sixty days after the appearance of this notice and then destroyed if no word is received. Address correspondence to DL4OR, QSL Manager, APO 757 c/o PM, N.Y. . . . Bob, **KA2JF** (ex-W4PFH, W5DRJ, W3DRJ), is now active from Tokyo. He runs a pair of 250TH's in a modified BC-610. Watch for him on 14080 xtl around 2300 GMT. See QTH's . . . **PAØGN** advises us that a new society has been set up in Holland. This is the VRZA, The Society of Radio Transmitting Amateurs of Holland. VRZA has its own QSL Bureau, Box 190, Groningen, and promises immediate distribution of QSL cards received as compared with the twice yearly distribution of VERON.

We note an error in the "Prefixes by Zones for WAZ" in the April issue. Zone 18 should read "Western Siberia" and Zone 19, "Eastern Siberia." Sorry! Zone 16 also includes UA9 (Bashkir and Chkalov) such as UA9S-, UA9KS-, and UA9W-, UA9KW-. It may surprise readers to know that at present the active number of amateur stations in the USSR total no more than 750, which is roughly the same number that were authorized by 1939. However, no less than 30% of these calls are held by radio clubs etc. thus affording experience to a greater number of operators. (From **Short Wave Magazine**).

W6LUN is ex-W1QOG . . . **SM5LL** received WAA certificate No. 77 . . . Chas. **W2ED/5** now hits the air from Galveston, Tex. . . . Frank, F7AZ, is **W3BTP** . . . W5KLS dropped in on W2CTO . . . Doc, **W4ALM**, can tell you all about Christmas Island (VR3) he was there from Xmas '42 till Sept. '43. How about another trip to revive old memories, Doc? 50 watts will be enough . . . **VE1PA** had a two weeks visit to VE5 and VE7 land . . . **K6AQP** is the new call of W9SRB/6 while Mac, ex-W8LZK, KP4HU is now **W4VNE** in Tenn. . . . **CP1BX** should have 1000 new QSL's by now, courtesy of KZ5BS, who advises that Ted was really taken care of during his recent visit to Balboa . . . **W8DAW** nabbed ZD1SW on 21 A3. The new bride at ZD1SW speaks Portuguese while he hails from Switzerland. So far,

To Be Released in Early July



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the language mix-up has been no problem!! . . . We are glad to learn, via W5FXN, that Alfredo, CE3DZ, is doing very nicely . . . W6IBD hopes to be W2IBD, N.J., in June. Being in W2SAI's back-yard doesn't seem to perturb him . . . **GM3CSM** vacations in LA land, arriving in Bergen on July 22nd . . . The ARRL turned down W8DMD's QSL from **ECZ1** . . . **G3EIX** did some keying from HB9LB . . . The operators of **FB8ZZ** arrived in Marseille on April 4th. QSL's will start flowing for QSO's after February 1952 in answer to cards received . . . **W6RW** sports a new final and **G5IV** a new ground plane antenna . . . **FM7WM** is ex-FM7WH . . . **FP8AP** holidays in France from April to the end of June . . . **FQ8AC** is now in OQ5'land . . . **FB8BB** visits France and then will return to Madagascar.

160 Meters

This report will probably wind up matters on 160 for the season . . . **W1BB** continues ZS3K sked and is heard at ZS3K each time. Stew's ears vibrate like a harp at sked time but they can't quite resonate to that ZS3K call in the background . . . **W3EIS** proves 160 can be a big help during contests. Don worked five countries, 11 contacts, during the recent fraces with KG4AF, KV4AA, KV4BB, VP9BF, VP9BDA, KP4KD, KV4AG, G8WF, G6GM, G6CJ and G5RI.

New DX QTH's

CM/CO's	Radio Club of Cuba, Lealtad No. 660, Habana, Cuba
CN2's	Box 150, French Post Office, Tangiers, Africa.
FI8's	QSL Bureau, Box 527, Saigon, Viet-Nam, Fr. Indo-Chica.
HH3DM (ex-WØEMN)	Don Morris, Box 943, Port-au-Prince, Haiti.
KA2JF (ex-W4PFH, W5DRJ, W3DRJ)	Major Bob O'Connor, HQ 5th Comm. Sqdn. APO 959 c/o PM San Francisco, Cal.
KZ5BS	Box 191, Diablo Heights, Canal Zone.
LU3DJX (new)	Mario, R. C. Bahia Blanca, Box 103, Buenos Aires, Argentina.
PAØ/PI's	VRZA QSL Bureau, Box 190, Groningen, Holland.
SVØWG/ SV5UN	LeRoy Wenger, Courier Radio Club, Rhodes, Greece. (APO 206 c/o PM NY) or via W3EWR.
VP2KO	Karney Osborne, Box 213, Basseterre, St. Kitts, BWI.
VP2SH	Stanley, Richmond Hill, Kingston, St. Vincent, BWI.
VS9AP (ex-VQ4CM)	J. E. Van Puyenbroek, c/o RAF, Tarshyne, Aden.

Thanks to W3AS and F9RS.

NOTE—Closing date for contributions for August issue, June 15th. 73's, KV4AA

YL'S FREQUENCY

(from page 40)

80 meters down. As far as the W/K land is concerned I can splatter an R9 signal all over it day and night with no trouble at all.

"Enough of this radio talk; after all, it is no fun holding hands with a transmitter all your life—or is it! I have plenty of time to work all the Ham radio I want so I don't need a cook or a housekeeper. There are plenty of servants to take care of such things. Of course, it is a little primitive here and the ox carts do get in the way of the Cadillacs at times. It is always warm and sunny here, too, so one can go swimming and/or play golf every day of the year. These few features probably wouldn't appeal to the average American girl as most of them seem to like to wash their own clothes and dishes, get wet in the ice and snow and watch TV. However, if there are any who might like to get to know a radio engineer living down in Central America, I'd like to hear from them." (Needless to say, we'll be glad to forward any letters.—**Lou.**)

If Central America seems too far away, how about this W6 Ham?

"I am another OM reader of your 'YL's Frequency' in CQ and enjoy it, but the letters from the OM's in the December and February issues really struck home. It had never occurred to me that the column could also have possibilities in the way of a "Miss Dix" service and it intrigues me very much.

"The gentlemen from Ohio very aptly describes a mutual situation of a lot of us bachelor Hams, I'm sure. About the only thing I might add to the statements of either one is that being a Ham doesn't help much to alleviate such a deplorable status. In fact, it is even logical, I think, that many of us are still single at a late age just because we are Hams, as it definitely does tend to keep us out of circulation where we might be able to meet the right girl. As we get older the situation gets worse, especially in a small town, because all the girls we used to know got tired of playing second fiddle to kilowatts, class B, beam antennas, etc., and have since married a man with whom they had more in common.

"I am 34 years of age, 5' 11½" in height, weigh around 170 and have been a confirmed Ham for exactly one half of my lifetime, at the same call book listing. That is in Northern California on a medium-size ranch, but I earn a good living by other means in an occupation that I enjoy, plus the fact that it allows me considerable leisure time for radio during the winter months.

"I would greatly appreciate seeing this in print to see if there are any YL Hams who find themselves in a similar situation and if they would like to correspond, QSO, or possibly even meet a male creature with similar characteristics and interests."

What? More?

Even the younger Hams are looking for YL correspondents. Here's one now in service, also a W6.

"After reading the last few issues of CQ and seeing your YL column I just couldn't help writing you. Though I'm in the Navy I'm not the type of person who has a girl to write to in every port—in fact, I don't have any! But I would like to exchange letters with a YL Ham.

"I'm 20 years old, 6' 1", weigh 160 pounds, have blond hair and blue eyes. Right now I'm going to electronics school, but I get home for three out of six week-ends so I could run skeds from there—or here. The rigs here at the base are on 75, 40 and 20 phone, and my home rig is now on 40 phone. I put up a 40-meter ground plane antenna recently so I would be able to work all over the States. Thanks for any help you can give me."

From the opposite end of the country, a W1 writes:

"I have been reading your articles in CQ for quite a while now. I wonder if you would mention my wish for correspondence with a YL Ham. I haven't had any luck at all in that line—I'm a stay-at-home boy, 19 years old. I don't find any girls around my home town interested enough in Ham radio to make me interested in them. Thanks for your help."

If you are interested in corresponding with any of these OMs, or setting up a sked for a QSO, send your letter in care of your YL Editor for forwarding. If you yourself don't want to write, pass this column along to some other YL you think might be interested.

Now from the opposite side of the fence, we have this plea for assistance from a YL:

"I am most interested in becoming a Ham operator, but never heard of amateur radio until about three months ago. And so far have not been able to receive too much information along this line. I would like most to learn code and basic radio theory to pass the FCC examination. Could you kindly print my plea so that anyone interested in helping me could write me? Dorothy E. Howe, 30 Emmett St., Harnell, N.Y."

Here and There

From G3GEN, Clem Cole, comes this note: "I have just been reading your piece in December '52 CQ about ON4MF, Francine. I would just like to say that there is another Belgian YL—in fact, ON4YL. I met Liliane in Antwerp two years ago, but have never heard her on the air, although I am told she runs 35 watts from time to time. She is the daughter of ON4BS." Tnx, OM!

Some time ago, in June '49 to be exact, we published a write-up about W7HFE, Louise Turner, and photos by W5CA of Louise and the entrance to her ranch, Triangle X, at Jackson Hole, Wyoming. Now in the March issue of **Better Homes and Gardens** is a beautiful full-color shot of this same entrance scene to Triangle X with the snow-clad Teton Mountains in the background. It's worth a look if you can dig up a copy of March BH&G.

(Continued on next page)

If many of you do see it, we're betting W7HFE will be getting some vacationing Hams this summer.

A reminder from the W1 QSL Bureau Manager asking the girls to send envelopes to the Bureau. Guess this goes for all the other districts, as well.

Wanting to display their new HT-20 transmitter, **Hallicrafters** had it set up in **Jordan's** (Boston, Mass.) Radio and TV Dept. with volunteer operators from the Eastern Massachusetts ARA to send Easter greetings to the GI's stateside and overseas. It ran for two weeks and they were swamped with messages. **W1UPZ** was the only YL operator at this GI message center.

Just recently back from a vacation trip to KH6-land, we hear from **W6WSV**, Carol. Though she didn't get to meet any YL's, Carol reports a wonderful time in Hawaii, including the flight over by Pan American. She says the thing that impressed her first is the racial blending in the Islands. She enjoyed Kauai, the Garden Island, with all its profusion of gorgeous flowers, and Hilo, the orchid capital. Said she had a regular field day with the many exotic fruits, eatng papayas till they were about to come out of her ears, guavas, poha cherries, taro and poi, breadfruit, and ripe pineapple cut open in the fields. She adds: "We went inside a Buddhist Temple, watched the preparations for a luau, including putting the pig in imu, went through coffee and sugar cane mills, went inside the earth in the pitch dank blackness of a lava tube, climbed and walked in the tree fern forest in Hawaii National Park, touched the tentacles of a squid, saw numerous wonderful singing and hula dancing groups, and could have gone torch fishing in the surf." But she says the most impressive thing of the whole trip was her visit to Kilauea Crater on Hawaii. The volcanoes, Mauna Loa and Mauna Kea, are still active —steam cracks abound and steam pours up constantly from the earth, with barren rock areas and black fingers where lava flowed to the sea . . . Say, how about a national convention in KH6-land some time?

33 es CUL-**W5RZJ**

PROPAGATION CONDITIONS

(from page 41)

minimum of the present sunspot cycle. The February sunspot number during 1947, the peak year of solar activity, was 132.3.

Basic ionospheric data used in this analysis appears in the Series D Publications of the National Bureau of Standards entitled, "Basic Radio Propagation Predictions," available from the Superintendent of Documents, U.S. Government Printing Office,

Ionospheric conditions will generally be quiet during June. Periods of better than normal propagation conditions are expected June 1-7, 18-20, 26-30. Below normal periods are expected June 9-10, 13-16, 22-24.

Washington 25, D.C., at an annual subscription rate (12 issues for $1.00). Methods for using these basic charts are given in Circular 465 of the National Bureau of Standards entitled, "Instructions for the Use of Basic Radio Propagation Predictions," and is also available from the U.S. Government Printing Office for 30 cents.

10-Meter DX

With a continued decrease in solar activity expected during the next few years, DX conditions on 80 meters will be considerably better than on 10 meters. Starting this month, therefore, the *Propagation Charts* will include predictions for the 80-meter band in place of the previous 10-meter band predictions. The only DX activity expected on ten meters during June, is an occasional erratic opening to South America during the afternoon hours.

THE NOVICE SHACK

(from page 46)

"I am proud to be a member of the German HSC (high speed CW) club and the English Tops CW Club. OH2MA and I are the only Finnish amateurs in the first, and I am the only one in the second. To become a member of the HSC, you must be able to send and receive at least forty w.p.m. It is really quite a hard speed to reach. Don't worry about these self prizes, hi.

"I am now almost eighteen years old, but I got my license when I was fifteen. You are supposed to be at least seventeen to get a license, but you see I was in a hurry. Since getting my license, I have been very active on the air, but I have two more years to go to school, and the hardest one is starting; therefore I have to study more now.

"From the picture, you can see that I am using an old SX 24 receiver. That is because new ones are hard to get and very expensive in Finland. The SX 24 cost 35000 Smk. That is "only" $105.00. An HRO-50 costs 115000 to 130000 Smk. So you see, amateur radio is not too cheap here for a school boy. But in time, we can get quite a good station.

"I have learned English for a little more than a year now. Therefore I do not speak it well yet. I'd be very interested in learning American English, and I think I could do it by exchanging letters with American boys and girls. I would be very interested in starting a letter war with boys and girls around my age who are interested in radio, too . . . Now I must stop, because I must again take my books and work hard at them. 73"—V. John Velamo, OH2YV, Isokaari 4-B-30, Lauttasaari, Helsinki, Finland.

WN5YHT writes, "Dear Herb, I read about some fellows complaining about cheap receivers. Well, I am using a three tube one, and I wish I had one as good as an **S-38B!** So far, I have worked fourteen states. One of them was Utah. He had only ten watts input. Did I have a time with him in the QRM!

"My transmitter is a converted BC-458, and the antenna is 135 feet long, fed in the center with a 67-foot length of 300-ohm ribbon. Lately, I've been working on a BC-454 receiver . . . Please print some of this in the Novice Shack."—Fred, WN5YHT ("Your Hill-billy Telegrapher")

Special to **Gordon Ziesing.** If you send me your complete address, I shall be glad to answer your questions.

W4WMQ writes, "Dear Herb, I got rid of the N in my call about two weeks ago, but I still operate in the Novice Band, because of financial difficulties, hi. So far, I've worked eighteen states, VE3, VE5, XE, and OA on 3.7 Mc. I didn't think that XE (Mexico) and OA (Peru) were possible on 3.7 Mc. with 30-50 watts. I found out, but I still don't believe it!

"Woody, WN4YDT, has really been going to town. Since December 12th, he has had over 150 contacts and has received 108 QSL cards. He has a beautiful, home-brewed, 6L6-807 transmitter and an S-76 receiver. Until two weeks ago, he had a thirty-foot antenna in the attic. Now he has a long-wire antenna . . . "Woody and I are both sixteen and Juniors in high school. We set up a rig in the physics lab, while studying about electronics, and messed up the school public address system. Not BCI, but PAI. There are several boys in school interested in radio. We sit in class and send code messages to each other by tapping on our desks—a funny way to learn geometry, hi. 73"—Fred, W4WMQ

WN6TZU writes, "Dear Herb, I have been licensed less than three months. I have worked twenty-seven states on 3.7 and 7 Mc. Power is 75 watts on 3.7 Mc., and 66 watts on 7 Mc. My antenna is a 40-foot vertical, backed up by a system of sixteen radials. I've had good results with it, and would recommend it to other Novices living on small city lots. 73"—Lee, WN6TZU.

K2BOF writes, "Dear Herb, I just got my General Class license. I worked twenty-seven states while a Novice, using a 6V6 transmitter and an "all-wave" receiver. I now have a BC-454, a vast improvement over the other one. My experiences prove that Novices can work out with low power and a poor receiver . . . Our high-school radio club has three licensed members and one waiting for his call. Five more are going to take their Novice examinations during the Easter vacation. 73"—Walt, K2BOF.

This month, the following lads are appealing for help in getting their licenses. The age of the applicant is included, if known. Give them a hand if you can.

Ronnie Yantz (17), Jericho, Vermont.

Luke Blossom, 550 Ralston Ave., Mill Valley, Calif. Phone Dunlap 8-1662.

Joe Meda, 36-01 31 Ave., Long Island City 3, N. Y.

M. Greco (13), 14 W. Garfield Ave., Atlantic Highlands, N. J. (He is also interested in trading some tubes for used code learning equipment or used technical books on radio.)

Paul R. R. Signorelli (13), 10162 Mountair, Tujunga. Calif., Phone FL 34194, after 3:00 p.m.

On the other hand, Frank Bates, III, WN6TTU, (13), 14332 Roblar Pl., Sherman Oaks, Calif., offers to help anyone obtain a Novice license. He is president of the Van Nuys Jr. High School Radio Club.

WN9SNI writes, "Dear Herb, Thanks for printing my picture and letter in the **Novice Shack**, for January, 1953. Unfortunately, I saw them on a ship while on my way here to Korea! I never had a chance to apply fo my General Class license before I left, and my Novice license expires next week. So I guess I'll be off the air when I get home, until I can get my General Class license . . . It is my opinion that the FCC ought to extend the Novice licenses of GI's sent overseas, before getting a chance to use them. They might simply extend the license six months after the veteran gets home.

"At present, I am assigned to a Combat Engineers Battalion in the Communications Platoon, as a switchboard operator. Our Communications Officer is a W8 . . . I would like to receive letters from some of the fellows back in the States. 73"—Phil, WN9SNI. P.F.C. Philip C. Murray, RA 16412145, H&S Co., 2nd Engr (C) Bn., APO 248, c/o Postmaster, San Francisco, Calif.

W9VAZ wants it known that, no matter what you may have read in previous **Novice Shacks**, his name is Pete Stanek. The fifth letter in his last name is not a C. Now that we have that cleared up, he says, "Dear Herb, I have my General Class license now. It really is a pleasure to escape that Novice-band QRM. My best DX as a Novice was XZ2KN, who sounded like he was in my back-yard. (Some fellows are as subtle as a Mack truck.)

"A few words of encouragement to those aspiring to the "unattainable" heights of thirteen w.p.m. It's easy. I dare say that anyone who can copy six or seven w.p.m. could bring his speed up to thirteen w.p.m. in a couple of nights without cracking up. All that one has to do is to sit bleary eyed in front of the receiver letting the stuff rattle through and copying it down for three or four hours a night. Seriously, it works. That's the system I used. 73"—Pete, W9VAZ.

KN2BVQ reports that in the first several months of being a Novice, he could work only locals, because of the extremely heavy interference in the 3.7-Mc Novice band. Then, W2FCJ gave him an audio filter. Inserting it between the receiver and the phones eliminates practically all the interference. The one he used was the FL-30 but the FL-8, also still occasionally available on the surplus market, may be used equally well.

WN4YTQ writes, "Dear Herb, the other day, I was in contact with WN4WAU. Suddenly my input and signal dropped away off. I went out in the yard and saw a 1952 Ford all wrapped up in my antenna. I was burned up as I went up to the car and started pulling my antenna free. I asked the driver, 'Why don't you watch where you're driving? I was in the middle of a contact.'

"He replied, 'Are you a Ham? I'm W4RXP.' Well, we shook hands, and he promised to help me put the antenna back up and came in to look over my rig.

"W4RXP is a fine fellow, but I still think that is a heck of a way to meet another Ham! 73"—John, WN4YTQ.

WN9UKG writes, "Dear Herb, I have worked thirty-one states now, and almost all on forty meters. That is the band for the Novice! Here are my reasons: 1) little QRM, 2) very good DX, 3) lots of fellows to talk to, 4) antenna system is easy to make. And there are others. I have given up eighty meters almost completely, except for some very early morning DX. 73"—Doug, WN9UKG.

There is room for just one more letter in this month's column. It is from Don Donaldson, WN9???, who is waiting for his license. He writes, "Dear Herb, I am sending you a picture I hope you can use. In it are WN9WTC, two other Novices waiting for their calls, and their teacher, Ev Battin, W9OWD.

"Ev is blind, but that does not stop him from doing a fine job of helping fellows get their Novice and General Class licenses. By the way, he is not the only Ham in his family. Ev's wife, Edith, is W9OTO; his daughter, June, is W9OTM; and his son, John, is W9MEM. The whole Ham family, hi"—Don, WN9——, Elgin, Ill.

That is it for this month. See you next month. 73, **Herb.**

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WANTED: BC-348 receiver. Please state price and condition. Write Frank E. Trainer, Route 2, Box 27, Lometa, Texas.

DON'T FAIL! "Surecheck Tests" are similar to FCC tests. Novice $1.50, General $1.75, Amateur Extra $2.75. Amateur Radio Supply, 1013 Seventh Avenue, Worthington, Minnesota.

VIKING II—6 weeks old; factory wired and modified. 52-ohm co-ax antenna relay, B&W filter included, $300. W4TFA, C. L. Meistroff, 113 E. Grace St., Richmond, Va.

COLLINS 32V2 in excellent condition, $500. W9HLA, 2229 West Taylor. For sale in Chicago or vicinity.

QSL CARDS? Largest variety! Samples 25c. Sackers, W8DED, Holland, Michigan.

SELL OR SWAP new BC-645A, 450 Mc. transmitter-receiver with tubes, $20. Want 723A/B klystron mount with choke coupling and/or 3 cm. waveguides. Also have other gear. Leonard D'Airo, K2CDS, 2289 Coney Island Avenue, Brooklyn 23, New York.

WANTED: SCHEMATIC or Tech Manuals for transceiver BC-322. 52-65 Mc., and transceiver type CRI-43007. 28-80 Mc. This is a unit of TBY-2 radio equipment. Manual that includes receiver BC-1023-A. C. J. Gromacki, 416 Rose St., Twin Falls, Idaho, W7SND.

WALLMAN CIRCUIT 2-meter converter, 11 Mc-IF in cabinet, very sensitive "DX-getter" needs 150 volts, $35. Electro-Voice speech clipper, original carton, never used, $10. Precise model 630, RF and AF signal generator, factory tuned RF, brand new—$30. W3QCB, Box 127, Ardmore, Pa.

JOHNSON VIKING TRANSMITTERS, wired and tested, $319.95; modified for six-meter operation by doubling in the final, $5.00 extra; other modifications as desired, available on special order at reasonable cost. Viking VFO's wired and tested $54.95. We trade and offer terms. Write W1BFT at Evans Radio, Concord, N.H.

SALE: Speech amplifier/modulator, self-contained power supply, 75-watts audio, panel-rack mounted, $40.00. Wire recorder, Knight, excellent and clean condition, two wire reels, $60.00. Dual power supply, 800/300 volts, 6.3 volts rack mounting, $40.00. W5NUN, Tucumcari, N.M.

QSLs! Interesting Samples 10c. Tooker Press, Lakehurst, New Jersey.

WANTED: APR-4, other APR-, APS-, APT; ARC-1, ARC-3, ART-13, BC-348, BC-221 etc.; TS-12, 13, 35, 120, 146, 155, 173, 174, 175, 323, other "TS-"; particularly MICROWAVE equipment, spectrum analyzers; G-R, Ferris, L&N; 723A/B, 3C22, all tubes; manuals, meters, parts, cable. Littell, Farhills Box 26, Dayton 9, Ohio.

CALL LETTER PLATES. Letters raised in aluminum, black background, white letters, 2½ x 7 in. $1.50 per pair. W1UGT, E. Swanzey, N.H.

BARGAINS: EXTRA SPECIAL: Motorola P-69-13 Mobile Receivers $29.50; Globe King $315.00; HT-9 $199.00; Supreme AF100 or Temco 75GA $250.00; HRO-50 $275.00; Collins 75A1 $275.00; SX-71 $169.00; SX-42 $189.00; SX-43 $129.00; HRO-Senior $119.50; RME 2-11 $99.50; RME-45 $99.00; Meissner Ex-Shifter $69.00; S-40A or SX-16 $69.50; VHF-152 $49.00; HF 10-20 $59.00; Globe Trotter $69.50; MB611 Mobile Transmitters $19.95; 90800 exciter $29.50; DM-36-10 meter converter $19.50; XE-10 $14.95; Gonset 10-11 converter $17.50; and many others. WE NEED USED RECEIVERS: We give highest allowances for S2OR; S-40 A, B; NC-57; NC-100; NC-125; SX-24; SX-25; HQ-129X; and similar receivers. Free trial. Terms financed by Leo, WØGFQ. Write for catalog and best deal to World Radio Laboratories, Council Bluffs, Iowa.

10, 15 & 20 METER BEAMS, aluminum tubing, etc. perforated aluminum sheet for shielding. Radcliff's, Fostoria, Ohio.

FOR SALE: Complete 350 watt CW transmitter in 39" enclosed rack. 813 final BC459 VFO $175. Dixie Kiefer, W2ZVS, 266 Midland Ave., Montclair, N. J.

QSL's—SWL's. Fair prices for excellent quality cards. Eleven styles for you to choose from. Samples 10c. Almar Printing Service, 602 Barker Bldg., Omaha, Nebraska.

AMATEUR TELETYPE, the newest most exciting thing in Ham radio! Twelve complete issues of the A.R.T.S. Bulletin are now available so you can get full data-circuits-facts-news. Send $3.00 to the Amateur Radio Teletype Society, Department C, 1379 East 15th Street, Brooklyn 30, New York, and find out what real excitement is.

WANTED: Cash for Navy or Army Ordnance type synchros or selsyns, 60-cycle types as follows: $35.00 for 1DG, 1DF, 1F, 1G, 1CT; $20.00 for 5DG, 5G, 5F, 5CT; 5D, 6DG, 6G, 6CT, 7G. Subject to inspection. Other types advise. Also want autosyns, servo motors, PM motors, inverters, Tubes and other electronic components. ELECTRO, Dept. CQ, 58 Eastern Avenue, Boston.

FREE LIST: Used Collins, Elmac, Hallicrafters, Hammarlund, Harvey-Wells, Lysco, National, RME, Sonar, etc. Lowest prices. Liberal trades. Dossett W9BHV, 855 Burlington, Frankfort, Indiana.

WANTED—AN/ARC-1 or AN/ARC-3 or Components. Write J. Durrant, 5526 Parkland Court, Apt. 202, Washington, D. C.

WANTED—Top Prices Paid—Navy Selsyns 1DG, 1F, 1CT, 1G, 5DG, 5D, 5CT, 5G, 6G, 7G, etc. and BC-348, BC-221, AN/ART-13, AN/ARC-1, AN/ARC-3, AN/APR-4, Electronic Surplus, Lectronic Research, 719 Arch St., Philadelphia.

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RTTY. An amateur teletype, monthly bulletin. $1.80 per year available from Southern California Radio Teletype Society, 3769 East Green Street, Pasadena 10, Calif.

QSLs—Brownie W3CJI, 3110 Lehigh St., Allentown, Pa. Samples free, catalogue 25 cents.

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ATLANTIC CITY VACATION: Kilowatt accommodations at low power prices. Near beach and boardwalk. Luxurious rooms with private bath and radio, or budget special rooms with just running water. Family suites. QSL brings information and rates. Commodore Hotel, 715 Pacific Avenue, Atlantic City, New Jersey, Ben Robin, W2BIG, Manager.

SELL: TBS-50; Meissner Signal Shifter; 19" cabinet; 14" panel; Millen Grid Dipper; Bud WM-78; Collins 310B-1 exciter; Mon-Key; PE-103-A; National 1-110; 2000 VDC 300 ma. supply components; AVR-20-A, AVT-112 75 mobile rig; novice, 75 phone, six-meter crystals; Command transmitters, dozens transmitting tubes; other items. Request detailed description, valuations. W9DPL, Howard Severeid, 2431 East Riverside Drive, Indianapolis 23, Indiana.

CRYSTALS: 80-40-20 meter bands. Brand new. JK, H23. $1.00. Specify frequency range crystal should be in. W9SED, 4045 N. Lawler Ave., Chicago, Illinois.

LATEST CALL BOOKS $3.00. Earl Mead, W7LCM, Huntley, Montana.

SELLING OUT: HQ-129X, $150; 150-B and V.F.O. $150; Hy-Lite beams, multiplier unit, BC-696, BC-453, selsyns, tubes, meters—ask for list. Hayden Anderson, W1FDL, Caribou, Maine.

SELL: Model 21A teletype tape printer, $50.000. #12 page printer only $65.00; Receiving distributor $45.00; Distributor motor, $10.00; Printer motor $5.00. Want: ART-13, DY-17, GN-58, SIG 5 and USAF supply catalogs; Collins 32V-2. Tom Howard, W1AFN, 46 Mt. Vernon St., Boston 8, Mass. Richmond 2-0916.

SELL: De-TVI'ed Viking. Super-Pro with extra set new tubes. Beam. 100 ft. each 72-ohm twin-lead and RG-8U. Need money for house. Best offer over $400. Herb Spingled, 35-50 78th St., Jackson Heights, N. Y.

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